وزارة الصحة العامة والسكان
Ministry of Public Health & Population

SBDMAY

World Health Organization

Yemen Treatment Guidelines

& ESSENTIAL MEDICINES LIST

3rd EDITION 2024

YEMEN TREATMENT GUIDELINES & ESSENTIAL DRUG LIST COMMITTEE

2024

كلمه وزير الصحة العامة والسكان

ا.د. قاسم محمد بحيبح

يشكل الدليل العلاجي أحد الدعائم الاساسية في السياسة الدوائية الصحية ليس في الدول النامية فحسب بل وفي الدول المتطورة ايضاً، معتمد على انماط علاجية

تأكيد لذلك تم وضع الدليل العلاجي في اولويات السياسة الدوائية والصحية لوزارة الصحة التي دشنت اول دليل رسمي عام 1992م ولتضمن وزارة الصحة ديمومة ذلك اصدرت الوزارة قرار وزاري تم بموجبة تأسيس لجنة علاجية دائمة مستقلة تتكون من قيادات اكاديمية وخدمية في مجال الصحة تعني بأستمرار مراجعة وتحديث الدليل بما يستجيب والتطور العلمي والمهني في مجال الخدمة، كما تتولى مسؤلية نشره وتوزيعة على نطاق واسع على مستوى المؤسسات التعليمية والخدمية وادخال عدة مفاهيم اهمها الدليل العلاجي وطرق المعالجة في المناهج التعليمية وعلى مستوى التعليم الطبي العام والخاص وكذا الزام المتقدمين للحصول على تراخيص مزاولة المهنة بالاهتمام بالعمل به لانه اهم مرجع لتقديم الامتحان الحصول على الترخيص.

إن الالتزام الدقيق بالدليل العلاجي يقود الى العمل بقائمة محددة هي قائمة الأدوية الأساسية وهو تدخل فعال ومثبت يعزز الوصول إلى الأدوية والاستخدام الرشيد لها، مما يؤدي إلى تحسين جودة الرعاية. وقد اصبحت فكرة قائمة الأدوية الأساسية نهجًا راسخًا في مجال الصحة العامة الدولية وتدعمها الحكومات ومقدمو الرعاية الصحية في جميع أنحاء العالم

لقد اثبتت الدراسات الاكاديمية وايضاً الصادرة من منظمة الصحة العالمية ان 80% من الاحطاء الطبية سببها عدم الالمام بطرق المعالجة النمطية المعتمده على الدلائل والبروتكولات العلاجية ولهذا نؤكد على استمرار دعم العمل بالدليل العلاجي من قبل الكوادر الطبية لتقديم الخدمات الرعاية الصحية والطبية في جميع المؤسسات العامة والخاصة ومواكبة والتقدم والتحديث المستمر في جميع العلوم الطبية والصحية بما يضمن تقدم الخدمة الى اعلى مستوى مكن.

YEMEN TREATMENT GUIDELINES & ESSENTIAL DRUG LIST COMMITTEE This is the 3rd edition of the Yemen Treatment Guideline (YTGL) and the Essential Medicine (EML). It was initiated by a ministerial decree N0. 123 in 2024. by which the Permanent Committee of the YTGL and The Editorial Board were established

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FORWARD

FORWARD FOR THE YEMEN TREATMENT GUIDELINE 3RD EDITION

By Dr. Ali. O. Alsallami

With the emergence of the Primary Health Care (PHC) concept and its declaration in Al-Mata in 1987. Yemen adopted this concept as the best solution to overcome the many problems and improve poorly funded health systems, particularly in the ruler areas. The idea of volunteer health guides (GH) was very attractive in compensating for the lack of qualified health providers. Many males and females volunteered to be health deliverers. They had no medical background but had primary education and were well respected by their community They were provided with a bag with eight medicines and were trained to recognize and treat about 10 health conditions. on Childhood illnesses, safe pregnancy, and malaria.

In 1988 the Medical Assistant (MA) replaced the HG to work as a health provider at Health units and Health center levels, The MA had two years of training to deal with more health problems and was provided with more medicines i.e. 43 medical preparations. This situation posed a new problem of misdiagnosis and irrational use of drugs. Inservice training and setting up a sort of standard treatment was a reasonable solution.

the Yemeni training team introduced the term Treatment Guidelines (TGL). These trainers had to travel to remote rural districts to train the medical assistants. They had no financial interest or incentives. but had strong motives and devotion to serve their country. For historical records these people were the pioneers of the rational use of drugs and treatment guidelines in Yemen, it is worth mentioning among a few others, the following:

1. The late Dr. Amin. N. Nasher, Was the Dean of the Health Manpower Institute.
2. Dr. Ali Alsallami. W was the Director of Pharmacy services
3. Dr. Al-Khather. N. Leswar. a medical graduate and is now the president of Aden University.

WHO experts had evaluated the experience. The outcome was very impressive in improving rational prescribing in terms of the number of drugs prescribed, reduction in the use of antibiotics, and avoidance of injectable medications. The evaluation result was published in an international journal.

Encouraged by the outcome of the evaluation, we managed to publish the second edition in the year 2000. It was much improved in its content. It tackled all health conditions that the general health provider will meet in his daily practice.

The guide had input from over 150 specialists and health deliverers form all over the country though workshops held in Sanaa, Taiz. Aden and Hadramout. The second edition was received with much appreciation by many doctors and pharmacists to the extent that it went out of print in the same year.

It was unfortunate that the country plunged into an internal armed conflict that had a negative effect on the whole infrastructure of the health system including the availability of most of the essential medicines in the public as well as in the private market. However, we continued to peruse our aims to develop this 3wd and improve on the earlier edition despite the difficulties that causes ta delay of 24 years since the second edition. Was issued.

The third edition follows the same type of medical conditions but, with more options of treatments to suit different patients. Building on feedback from contributors and readers of the second edition, the third edition included brief hints on diagnosis and other tests. Also based on evidence-based sources and official provisional organizations some normal values have changed such as patients with a Blood pressure of 120/80 are considered hypertensive patients but, do not need drug treatment but rather change in lifestyle. Similarly, patients with fasting blood glucose levels of 100 are considered as prediabetics

Two new sections were also added 1. Factors affecting drug responses 2. Management of poisoning, with related tables as Annexes.

PRESCRIBING GUIDELINES

Before prescribing a drug, it is always necessary to carefully inquire about any other medication currently being taken by the patient.

Rational Use of Drugs

There are four key elements in assuring Rational Use of Drugs:

1. Accurate diagnosis of the patient's condition.
2. Rational prescribing of the most effective, safe, and economic treatment regimen for the patient's condition.
3. Correct dispensing of the prescribed drug(s) with adequate and clear instructions for use, the drug(s) suitably packaged to preserve them until used.
4. Compliance of the patient with the treatment prescribed

The rational prescribing approach includes the following six basic steps:

1. Define the patient's problem

Making the right diagnosis is the key to starting the correct treatment

2. Specify the therapeutic objective(s)

The clearer the therapeutic objectives are defined, the easier it is to select the drug

3. Choose the treatment for the individual patient

Give priority to drugs of proven efficacy, safety, suitability, and cost to meet the needs of the majority of the population

4. Write a prescription

A prescription must be clear, and legible and indicate precisely what and how it should be given.

5. Give full information, instructions, and warnings to the patient

Take sufficient time to give the necessary information, instructions, and warnings to the patient. It is the prime responsibility of the prescriber (and this should not be "delegated" to the dispenser or packing insert) to ensure that the treatment is fully understood by the patient,

6. Monitor and continue, modify, or stop the treatment.

i. The purpose of monitoring is to check whether the treatment has solved the patient's problems. Monitoring should answer two questions:
ii. Is the treatment effective?
iii. Are there any side effects?
iv. The answer will allow you to continue, modify, or stop the treatment

General remarks

Some general remarks to consider before writing a prescription:

1. Not all patients need a prescription for drugs. Non-drug treatments and/or simple advice may be more suitable in several situations.
2. Good therapeutics depends on accurate diagnosis, knowledge of the drugs available, prescribing correctly the selected drugs, and ensuring that the patient understands fully how to use each prescribed medicine.
3. Try to resist patient demand to prescribe injections or other expensive dose forms, e.g. capsules and oral liquids. Always try to explain to the patient that these may not be the best form of treatment.
4. In life-threatening conditions, always prescribe the most effective drug available, irrespective of cost or limited availability.
5. Always prescribe drugs by their generic name and not by a brand name, eg. diazepam (not ValiumR), or paracetamol (not PanadolR).
6. Avoid prescribing combination drugs, unless they have a significant therapeutic advantage over single ingredient preparations (eg. Sulfadoxine and Pyramethamine).
7. When prescribing any drug, always take into consideration factors such as age, sex, the weight of the patient, the presence of renal or hepatic disease, other diseases that are present, pregnancy, breastfeeding, and the likely degree of patient compliance with treatment.
8. In all cases the likely benefit of any prescribed medication(s) must be weighed against potential risks.
9. Avoid overuse of symptomatic treatments for minor self-limiting conditions.
10. Avoid multiple prescribing (polypharmacy), especially when the diagnosis is not clear.

Prescription writing

Write all prescriptions legibly in ink. Poor writing may lead to errors in interpretation by the dispenser, and have harmful consequences for the patient.

the full name and address of the patient, and sign and date the prescription form.

Write the title of the drug or preparation in its full generic name. Unofficial abbreviations, trade names, and obsolete names should not be used.

State the strength of the preparation required where relevant or solid dose forms:

- ◇ quantities of one gram or more should be written as 1g, 2.5g, 10g, etc.
- ◇ quantities less than one gram but more than one milligram should be written as milligrams rather than fractions of a gram, e.g. 500 mg and not 0.5 g
- ◇ quantities less than one milligram should be expressed as micrograms (in full) and not as fractions of a milligram, eg. 100 micrograms rather than 0.1 mg or 100 mcg.

If decimal figures are used, always write a zero in front of the decimal point where there is no other figure, e.g., 0.5 ml instead of .5 ml.

Always state the full dose regimen, i.e.

- dose size
- dose frequency
- duration of treatment.
- The quantity to be dispensed will be deduced from this.

Avoid expressions such as "to be used/taken as required". State instead a suitable dose frequency. In the few cases where "as required" is appropriate, the actual quantity to be supplied should be stated as well.

For oral liquids, doses should be stated in terms of 5 ml spoonfuls for linctuses, elixirs, syrups, and pediatric preparations, and 10 ml spoonfuls for adult mixtures.

Doses other than 5 ml or 10 ml or multiples of these will be diluted to the nearest equivalent 5 ml or 10 ml quantity for dispensing, or use syringe.

Total volumes of liquid preparations prescribed are usually selected from 50, 100, 200, 300, or 500 ml.

Total quantities of solid or semi-solid preparations prescribed are usually selected from 25, 50, 100, 200, 300, or 500 g, except where the product is supplied ready-packed in a particular pack size, e.g. hydrocortisone acetate cream (tube 15 g).

Where relevant, always remember to include on the prescription any special instructions necessary for the correct use of a drug or preparation, e.g. "before food", "apply sparingly", etc.

Inform patient on common adverse reactions of prescribed drugs.

For research and monitoring purposes it is important to retain a copy of all prescriptions with the pharmacy.

Prescribing for pediatrics.

The use of medicines in children provides many challenges to the

prescribing, supply, and administration of drugs. Awareness of the issues discussed here may improve the rational and successful use of medicines in the young.

Age

This handbook categorizes children by age:
- neonate, 0–28 days
- young infant, 1–3 months
- infant, 3 months–2 years
- child, 2–14 years

Age impacts significantly the pharmacokinetics and pharmacodynamics of many drugs. The neonatal period is one of rapid physiological change in which absorption, distribution, and elimination of drugs are in a state of flux. Changes in the proportion of body water and fat, variations in the activity and rates of maturation of liver enzymes, and changes in renal function may all contribute to weight-related loading and maintenance doses that differ from those in older children and adults.

Frequent feeds, composition of feeds, and varying rates of gastric emptying predispose neonates to variations in the rate and extent of drug absorption. Neonatal skin is particularly permeable, so care must be taken when applying therapeutic substances and during exposure to potential toxins.

During the postnatal period, infants become increasingly efficient at eliminating drugs. Although the maturation of liver and renal functions varies in rate and extent with age and the drug used, most drugs can be cleared effectively before the infant is one year old.

Normalized weight clearances in early childhood are higher than at other periods in life. Consequently, higher doses (expressed on a weight or body surface area basis) are required.

Puberty and adolescence bring further pharmacokinetic changes, usually a decrease in clearance. In general, the Therapeutic Goods Administration (and therefore the Approved Product Information) does not discriminate between adolescents and adults with respect to dosing. For many drugs, the adult dose is appropriate once a child is over 12 years of age. Continued use of pediatric doses on a weight basis in this group can cause overdose.

Paediatric dosing

Many formulae have been developed that relate a child's age or weight to that of the adult and the adult dose. Apart from ignoring the physiological changes of childhood, these formulae often assume a fixed weight or

adult dosage. The lack of flexibility of these and other factors makes the use of such formulae inappropriate in calculating pediatric doses. A dose expressed on a weight basis (mg/kg) is used for most drugs used in children. However, there is great variability in the quality and quantity of information supporting such dose recommendations. In patients with large variations from ideal body weight, ideal body weight (not actual body weight) should be used. When the calculated dose using mg/kg exceeds the adult dose, it is appropriate to use the recommended adult dose instead.

Paediatric prescribing and common errors

The concentration of the active ingredient(s) can vary between products and formulations. This requires care when prescribing doses as a number of milliliters (mL) without reference to mass. Prescriptions should indicate the dose required in units of mass (mg or g) wherever possible. Give clear verbal and written directions to the child's carers. Inaccurate and/or inappropriate measuring devices may contribute to over- or under-dosage of medicines.

Compliance is a significant problem in children, particularly in those with chronic diseases. Complex and demanding dosage schedules contribute to noncompliance. In addition to relatively simple issues such as taste, a child's treatment requires consideration of the attitudes of the carers, schools, and daycare centers to the use and administration of drugs. Whenever possible, once or twice daily dosing schedules are recommended. While liquid preparations may seem ideal for the young child, formulation issues such as sugar and alcohol content, coloring agents, the need for refrigeration, and the need for adequate shaking should be considered. Appropriate safe storage and handling of pediatric medications are necessary.

The high incidence of accidental ingestion of medicines in young children can be reduced by selecting appropriately packaged products, providing advice on safe storage, and ensuring the use of child-resistant lids.

Administration of medicines

Administering medicines to children may present challenges to doctors and carers. Awareness of the child's likes and dislikes with regard to taste may contribute to the prescribing of a suitable product. Using suppositories or sprinkle formulations may assist in the battle associated with oral administration. The wide range of inhaler aids and spacers available may overcome problems with inhaled drugs.

Mixing medicines with drinks or foodstuffs the child likes may be helpful, but negatives such as the long-term use of jam or honey, the deleterious

impact on the taste of the infant's milk feeds, and the potential for drug-food interactions require consideration.

Give drugs to children by injection only when there is no suitable alternative. Avoid intramuscular injections when possible, as they are very painful when muscle mass is small.

Prescribing for pregnant women

Exercise care when prescribing for pregnant women and women of childbearing age, as drugs may cause harm to a fetus at any time during pregnancy. Teratogenic drugs taken during the first trimester may cause congenital malformations. In the second and third trimesters, fetal growth and functional development may be affected by drugs; some drugs taken during this period may affect the fetus, while some drugs given close to term may have adverse effects on labor or the neonate.

Generally, Animal studies are not used as sole sources of information upon which advice is based, as their interpretation with respect to human risk is not clear. Refer to Annex 3 for more details and the CDC categorization for drugs in pregnancy.

Practice points

- ◇ Prescribe drugs during pregnancy only if the expected benefit to the mother is thought to be greater than the risk to the fetus
- ◇ Counsel pregnant women to avoid exposure to all unnecessary drugs and chemicals
- ◇ Few drugs have been shown conclusively to be teratogenic in humans, but no drug is safe beyond all doubt in early pregnancy
- ◇ Some drugs have been used widely during pregnancy and appear to be safe; in general, prescribe these agents rather than new or untried drugs

Adverse drug reactions (ADRS) (See Annex 1 Table 1)

Definition

Adverse effects are noxious and/or undesirable effects associated with the use of a drug at doses normally used in humans. They may occur as part of the drug's pharmacologic action, or may be unpredictable. Almost all effective drugs, no matter how skilfully used, can cause adverse effects in some patients. The risk of a serious adverse effect may be acceptable if the disease being treated is also serious.

Classification of adverse effects

Predictable

Includes adverse effects predictable from knowledge of specific drug pharmacology and pharmacokinetics. Often related temporally to initiation of a drug or to dose increase.

Unpredictable

Includes immunologically mediated adverse effects, effects of drugs due to genetic differences in drug metabolism, and other effects where the underlying mechanism is not understood. The onset of effect may be less clearly related temporally to the initiation of the drug and is often delayed.

Predisposing factors

Age: elderly people and neonates have a higher risk of adverse drug effects.
Gende: females are generally considered to be more susceptible than males (this may reflect their relatively smaller size for given doses).
Dose: many adverse effects are dose-related.
Polypharmacy: The incidence of adverse effects increases with the number of drugs a patient takes concurrently.
History: patients with a history of significant adverse drug effects seem to be at higher risk of adverse effects with subsequent medication.
Genetic factor Single Nucleotide Polymorphism (SNP) Plays a significant role in the variation of drug response and toxicity which is not immediately apparent during clinical trials

Recognizing adverse effects

When a new drug gains approval to be marketed, the full adverse effect profile will not be defined, as relatively few (less than 3000) people will have been exposed to the drug. Adverse effects that occur infrequently, have a delayed onset, or occur only in specific patient groups will usually be unknown. It may be another 10 years or more until a fuller profile of adverse effects is defined.

An open mind about adverse effect profiles of individual drugs or classes of drugs, listening to patients with care, and confirming temporal relationships between drug treatment changes and adverse events can enhance recognition of adverse effects.

The need to cease a drug because of suspected adverse effects is influenced by the clinical impact of the adverse effect, the indication and

strength of the indication for treatment, and the availability of alternative treatment.

Reporting adverse effects

Consider reporting all events you suspect to be drug-related. It is acceptable to provide incomplete information, and diagnostic confidence is unimportant, especially for new drugs.

What and to whom to report

The Adverse Drug Reactions Advisory Committee (ADRAC) encourages the reporting of all suspected adverse reactions to drugs and other medicinal substances. Reporting seemingly insignificant or common adverse reactions is useful and may highlight a widespread prescribing problem. Reactions to other drugs that are suspected of significantly affecting a patient's management, including reactions suspected of causing:

- ◇ Death.
- ◇ Anger to life.
- ◇ Hospital admission.
- ◇ Prolongation of hospitalisation.
- ◇ Absence from productive activity.
- ◇ Increased investigational or treatment costs.
- ◇ Birth defects
- ◇ All suspected drug interactions.

Reports of suspected adverse drug reactions should be made directly to ADRAC by using a prepared reporting form ('Yellow card) or photocopy, which can be sent to the address:

Supreme Board of Drugs & Medical Appliances

National Center for Pharmacovigilance

Telephone. 02-276860 - 777751056

E- / ynpvc@ysbda.com

VARIATION IN DRUG RESPONSE.

People taking the same drug can have markedly different responses to the same dose. While many people will get the intended effects, some may get little to no benefit, and others may get unwanted side effects. This occurs often when the prescribed or over-the-counter drug. This is due to:

1. Adverse drug reactions
2. Drug interaction.

1- Adverse drug reaction (ADR) (See Annex 1 Table 1)

is a broad term referring to unwanted, uncomfortable, or dangerous effects that drugs (including medications) may have. Because all drugs have the potential for adverse drug reactions, conducting a risk-benefit analysis (the likelihood of benefit vs risk of ADRs) is necessary whenever a medication is prescribed). Incidence is higher with young and advanced age and with polypharmacy. ADR may occur to any of the flowing causes:

- ◇ **Dose-related** adverse drug reactions represent an exaggeration of the drug›s therapeutic effects.
- ◇ **Allergic:** Allergic drug reactions are not dose-related but require prior exposure to a drug. Allergic reactions develop when the body›s immune system develops an inappropriate reaction to a drug (sometimes referred to as sensitization).
- ◇ **Idiosyncratic:** Idiosyncratic adverse drug reactions result from mechanisms that are not currently understood., genetic factor plays an important role.

Adverse drug reaction ranges from mild to lethal ADR as illustrated below.

Classification of Adverse Drug Reactions (ADRs)

Severity	Description	Example
Mild	No antidote or treatment is required; hospitalization is not prolonged.	◇ ACE inhibitor: Cough ◇ Antidepressants: Dry mouth ◇ Antihistamines (some): Drowsiness
Moderate	A change in treatment (e.g., modified dosage, the addition of a medication), but not necessarily discontinuation of the medication, is required; hospitalization may be prolonged, or specific treatment may be required.	◇ Hormonal contraceptives: Venous thrombosis ◇ NSAIDs: Hypertension and edema ◇ Opioids: Constipation

Severity	Description	Example
Severe	An ADR is potentially life-threatening and requires discontinuation of the drug or medication and specific treatment of the ADR.	◇ ACE inhibitors: Angioedema ◇ Macrolide antibiotics: Abnormal heart xrhythm
Lethal	An ADR directly or indirectly contributes to a patient's death.	◇ Overdosage: Liver failure ◇ Anticoagulants: Hemorrhage

Rules for prevention of ADRs:

1. Never use a drug unless there is a clear indication for its use.
2. Always prescribe the minimum number of drugs possible.
3. Never use drugs in pregnancy, particularly in the first trimester, unless it is necessary.
4. Remember to reduce doses, when necessary, e.g. in the young, the elderly, and if liver or renal disease is present.
5. Carefully explain dose regimes to patients, especially those on multiple drugs, the elderly, and anyone likely to misunderstand.
6. Check if the patient has had any previous reactions to the drug or to similar drugs.
7. Use drugs with which you are familiar, if possible.
8. Look out for ADRs when using new or unfamiliar drugs.
9. Warn patients about likely adverse effects and advise them on what to do if they occur.
10. Patients on certain prolonged treatments, eg. anticoagulants, corticosteroids, insulin, etc. should carry a small card giving information about the treatment

Diagnosis of Adverse Drug Reactions

- Consideration of rechallenge.
- Reporting of suspected ADRs to the National Center for Pharmacovigilance.

2. Drug interactions.

The effect a drug has on a person may be different than expected because that drug interacts with

- Another drug the person is taking (Drug-drug interaction)

- Food, beverages, or supplements the person is consuming (Drug-nutrient interaction)
- Another disease the person has (Drug-disease interaction)

Drug-drug interactions (Annex 1 Table 2)

Can involve prescription or nonprescription (over-the-counter) drugs. Types of drug-drug interactions include duplication, opposition (antagonism), and alteration of what the body does to one or both drugs.

Duplication: When two drugs with the same effect are taken, their side effects may be intensified. Duplication may occur when people inadvertently take two drugs with identical active ingredients with different brand names.

Opposition (antagonism)

Two drugs with opposing actions can interact, thereby reducing the effectiveness of one or both.

Alteration

One drug may alter how the body absorbs, distributes, metabolizes, or excretes another drug Acid-blocking drug, such as histamine-2 (H2) blockers and proton pump inhibitors,

Rules for prevention of ADRs:

1. Consult the doctor or pharmacist before taking any new drugs, including over-the-counter drugs and dietary supplements, such as medicinal herbs.
2. Keep a list of all drugs being taken. Periodically discuss this list with the doctor or pharmacist.
3. Keep a list of all disorders. Periodically discuss this list with the doctor.
4. Select a pharmacy that provides comprehensive services (including checking for possible interactions) and that maintains a complete drug profile for each person. Have all prescriptions dispensed in this pharmacy.
5. Learn about the purpose and actions of all drugs prescribed.
6. Learn about the possible side effects of the drugs.
7. Learn how to take the drugs, what time of day they should be taken, and whether they can be taken during the same time period as other

drugs.

8. Review the use of over-the-counter drugs with the pharmacist. Discuss any disorders present and any prescription drugs being taken.
9. Take drugs as instructed.
10. Report to the doctor or pharmacist any symptoms that might be related to the use of a drug.
11. If seeing more than one doctor, make sure each doctor knows all the drugs being taken.

Drug-Nutrient Interactions (Annex 1 Table 3)

Nutrients include food, beverages (including alcohol), and dietary supplements. Consumption of these substances may alter the effects of drugs on the person taking them.

Food

When food and drugs are taken by mouth must be absorbed through the lining of the stomach or the small intestine. The presence of food in the digestive tract may reduce the absorption of a drug. Or make a complex that cannot be absorbed. Such interactions can be avoided by taking the drug 1 hour before or 2 hours after eating.

Dietary supplements (Annex 1, Table 3)

Dietary supplements, including vitamins, minerals, herbs, or amino acids may interact with prescription or over-the-counter drugs. People who take dietary supplements should tell their doctors and pharmacists so that interactions can be avoided. Alcohol affects body processes and interacts with many drugs. Alcohol with metronidazole can cause flushing, headache, and antimalarials.

Drug-Disease Interactions (Annex 1 Table 4)

Drugs that are helpful in one disease are harmful in another disorder. This could

Drug-disease interactions can occur in any age group but are common among older people, who tend to have more diseases. This can happen by direct pharmacological action such as in the case of Beta backers in Asthmatic patients or indirectly by aggravating the symptoms of existing disease such as Aspirin (Acidic drugs) in patients with sickle cell anemia. and antimalarials in patients with Glucose 6-phosphate deficiency.

COMMON SIGNS & SYMPTOMS

Cough

A cough is a normal voluntary or reflex attempt to clear an irritant from the airway. It augments mucociliary clearance when this is impaired or overwhelmed by airway secretion, as in chronic bronchitis or bronchiectasis. The ability to cough effectively is compromised in severe obstructive pulmonary disease.

There are several conditions in which cough is an important symptom, some of which may coexist.

Chronic bronchitis

Smoking is the most common cause of cough whether productive or non-productive. Over 50 percent of smokers who cease the habit will lose their cough within 4 weeks, so smoking cessation must be the main aim of management.

Infections

Coryzal viral illness with a sore throat, tracheal discomfort and cough is very common at all ages and especially in winter months. Superimposed bacterial infection with Streptococcus pneumoniae or Haemophilus influenza may occur and should be considered when the course of the illness is protracted.

A short dry cough is typical of the early stages of pneumonia and may be accompanied by a high temperature, leucocytosis, breathlessness and possibly pleurisy.

Productive cough is the most common presentation of tuberculosis (TB), and should always be considered in high-risk groups such as the elderly, alcoholics, the immunosuppressed and immigrants from countries with a high prevalence of TB and Asthma.

Cough is a common accompaniment of wheezing, chest tightness and shortness of breath. It may be the dominant feature, especially in children, but if present alone without other symptoms of asthma, then an alternative diagnosis should be considered.

Postnasal drip

Rhinitis has been reported to cause cough at all ages, and sometimes, particularly at night.

Hiatus hernia and oesophageal reflux

Oesophageal reflux is a cause of nocturnal cough or cough precipitated by bending or straining and may be considerably more common than has been realised.

Drugs

Approximately 15 percent of patients receiving angiotensin-converting enzyme (ACE) inhibitors develop a cough. This occurs more commonly in women. The risk of increased cough is lower with angiotensin II receptor blockers.

Beta-blockers can also induce cough and/or wheezing in vulnerable individuals, such as those with a history of previous asthma or pre-existing airway hyperresponsiveness or airway obstruction.

Carcinoma of the bronchus or lung

Cough is the presenting complaint of about one-quarter of patients with lung cancer and will develop in up to 90 percent of cases. Its control may be an important part of the patient's palliative care.

Bronchiectasis

The history is usually typical with a long-standing cough, productive of purulent sputum, frequently initiated by a severe respiratory tract infection which damaged the airway in childhood or young adulthood. In young people, cystic fibrosis should be considered and at all ages, an immunoglobulin deficiency should be sought because of the potential for immunoglobulin replacement therapy.

Aspiration

A history of cough with drinking or eating should raise the possibility of neuromuscular incoordination of the pharyngeal musculature. Obtruded patients, and patients with Parkinson's disease, stroke and dementia may aspirate freely giving rise to recurrent basal lung infections and chronic cough.

Heart failure

Left ventricular failure may present with a nocturnal cough.

Idiopathic chronic persistent cough

This condition, which is poorly understood, may follow an episode of acute bronchitis during the preceding weeks or months, which failed to resolve leaving the patient with a chronic, non-productive, irritant cough. It requires the exclusion of other causes on the basis of history, examination, spirometry and chest X-ray. The cough may be aggravated by exposure to irritants, or by talking or eating.

Generally, cough medicines, have little part to play in the management

of cough. They should not be used in asthma or chronic bronchitis as they may suppress breathing and induce hypercapnia and they can be counterproductive by causing sputum retention and constipation. They should not be used in infants.

In cases with severe cough resulting in vomiting, syncope, exhaustion, chest pain or headache, or where cough is distressing in patients with lung cancer or terminal alveolitis, other measures which may be useful are.

Fever

The definition of fever is an elevation in body temperature or a high body temperature. Technically, any body temperature above the normal oral measurement of 98.6 degrees Fahrenheit (37 Celsius) or the normal rectal temperature of 99 F (37.2 C) is considered elevated. However, these are averages, and one's normal body temperature may be 1 F (0.6 C) or more above or below the average of 98.6 F. Body temperature can also vary up to 1 F (0.6 C) throughout the day.

Fever is not considered medically significant until the body temperature is above 104 F (38 C), which is the temperature considered to be a fever by medical professionals. Anything above normal but below 104 F (38 C) is considered a low-grade fever. Fever serves as one of the body's natural infection-fighting defences against bacteria and viruses that cannot live at a higher temperature. For that reason, low-grade fevers should normally go untreated, unless accompanied by troubling symptoms or signs.

Also, the body's defined mechanisms seem to work more efficiently at a higher temperature. Fever is just one part of an illness, many times no more important than the presence of other symptoms such as cough, sore throat, sinus congestion, fatigue, joint pains or aches, chills, nausea, etc.

Fever should not be confused with hyperthermia, which is a defect in your body's response to heat (thermoregulation), which can also raise the body temperature. This is usually caused by external sources such as being in a hot environment. Heat exhaustion and heat stroke are forms of hyperthermia. Other causes of hyperthermia can include side effects of certain medications or medical conditions.

Fever should also not be confused with hot flashes or night sweats due to hormonal changes during perimenopause (the time period around menopause). Hot flashes and night sweats cause a sudden and intense feeling of heat, and may be accompanied by flushing (skin redness and tingly feeling) and sweating, but are not the same thing as a fever.

Children with fever, and accompanying symptoms such as lethargy,

fussiness, poor appetite, sore throat, cough, ear pain, vomiting, and diarrhoea are important signs for further investigation.

An infant younger than 3 months old with a rectal temperature of 104 F (38 C) or above, could be a sign of a potentially life-threatening infection. If any child has a fever above 38oC High fever can cause seizures in young children, (Practically sudden rise in temperature)

Although the most common causes of fever are common infections such as colds and gastroenteritis, other causes include:

- Infections of the ear, lung, skin, throat, bladder, or kidney.
- Conditions that cause inflammation., Side effects of drugs, cancer and vaccines

The pattern of temperature changes may occasionally hint at the diagnosis:

- ◇ **Continuous fever:** Temperature remains above normal throughout the day and does not fluctuate more than 1 °C in 24 hours, e.g., lobar pneumonia, typhoid, meningitis, urinary tract infection, or typhus. Typhoid fever may show a specific fever pattern (Wunderlich curve of typhoid fever), with a slow stepwise increase and a high plateau. (Drops due to fever-reducing drugs are excluded.)
- ◇ **Intermittent fever:** The temperature elevation is present only for a certain period, later cycling back to normal, e.g., malaria, kala-azar, pyaemia, or sepsis. The following are its types
- ◇ **Quotidian fever,** with a periodicity of 24 hours, typical of Plasmodium malaria
- ◇ **Tertian fever** (48-hour periodicity), typical of later in the course of Plasmodium falciparum, Plasmodium vivax, or Plasmodium ovale malaria
- ◇ **Quartan fever** (72-hour periodicity), typical of later in the course of Plasmodium malaria e.g.,

Nausea and vomiting

Nausea is when you feel sick to your stomach as if you are going to throw up. Vomiting is when you throw up. and can be even provoked by smells or unpleasant sights, Trauma to the head and Anxiety or stress. But it can be a symptom of many different conditions including the following,

- ◇ Morning sickness during pregnancy
- ◇ Gastroenteritis (infection of your intestines) and other infections
- ◇ Migraines
- ◇ Motion sickness
- ◇ Food poisoning
- ◇ Medicines, including those for cancer chemotherapy
- ◇ GERD (reflux) and ulcers

- ◇ Intestinal obstruction
- ◇ Poisoning
- ◇ Vomited for longer than 24 hours
- ◇ Blood in the vomit
- ◇ Severe abdominal pain
- ◇ Signs of dehydration, such as dry mouth, infrequent urination or dark urine

Vomiting as an emergency

- ◇ Severe chest pain.t
- ◇ Abdominal pain or cramping
- ◇ Blurred vision
- ◇ Confusion
- ◇ High fever and stiff neck
- ◇ Faecal material or faecal odour in the vomit

Pain

Pain is an unpleasant sensation signalling that body tissue is threatened with injury. It can be caused by physical or psychological factors or a combination of both. The characteristic of pain can be a useful indication of a disease and sometimes it is the only presenting symptom.

Note: If pain is felt in some area of the body this may not accurately indicate where the trouble is. For instance, pain at the tip of the shoulder indicates gall bladder pain, and pain in the heart radiates to the back, arm and jaw. This is called referred pain, as several areas of the body often end in the same nerve pathway

Evaluation of Pain

Pain me be sharp or dull, intermittent or constant, throbbing or consistent, localised or diffuse. The intensity may vary from minor to intolerable. It may be acute (occurs suddenly) or chronic (pain that lasts for weeks, months or even years). Acute pain may indicate medical or surgical emergencies such as AMI or acute abdomen.

There are two main classifications of pain: the common sensical sort that arises from damaged tissue (nociceptive pain), and the more exotic kind that comes from damage to the system that reports and interprets damage, the nervous system (neuropathic pain) there is still no clear, official "other" category for the pain of conditions like fibromyalgia and irritable bowel syndrome, which see to involve dysfunction of the nervous system, as opposed to damage; historical names like functional pain have many problems, and new names like sociopathic, allopathic, or just primary pain are on the table.

Pain can also be classified as somatic (skin, muscle, bones, joints) and visceral (organs). Migraine pain is still tough to classify! Some experts consider it a major category of its own, parallel to nociceptive and neuropathic pain,4 but it's probably just a complicated neuropathy

There are two types of pain: acute and chronic. Acute pain usually comes on suddenly, because of a disease, injury, or inflammation. It can often be diagnosed and treated. It usually goes away, though sometimes it can turn into chronic pain. Chronic pain lasts for a long time and can cause severe problems.

Pain is not always curable, but there are many ways to treat it. Treatment depends on the cause and type of pain. There are drug treatments, including a Non-steroidal anti-inflammatory (NSAI) drug (effective for inflammatory and somatic pain) They are usually helpful in mild to moderate pain and Opioids or narcotics which are more effective for visceral and severe pain. There are also non-drug treatments, such as acupuncture, physiotherapy, and sometimes surgery. In some cases, a simple elastic bandage i.e., Pressure on the affected area gives some relief.

Anaemia

Anaemia is defined as a low number of red blood cells. In a routine blood test, anaemia is reported as a low haemoglobin. Which is the main protein in the red blood cells. It carries oxygen and delivers it throughout your body. If you have anaemia, your tissues or organs may not get enough oxygen. Symptoms of anaemia -- like fatigue or shortness of breath -- happen because your organs aren't getting what they need to work the way they should. Women, young children, and people with long-term diseases are more likely to have anaemia.

* Important things to remember are: Certain forms of anaemia are passed down through your genes, and infants may have it from birth.
* Women are at risk of iron-deficiency anaemia because of blood loss from their periods and higher blood supply demands during pregnancy
* It may be a sign of a dangerous disease or cancer.

There are many types of anaemia. All have different causes and treatments. Some forms -- like the mild anaemia that happens during pregnancy -- aren't a major concern. But some types of anaemia may reflect a serious underlying medical condition

Anaemia Types and Causes

There are more than 400 types of anaemia, and they're divided into three

groups:

- ◇ Anaemia caused by blood loss
- ◇ Anaemia caused by decreased or faulty red blood cell production
- ◇ Anaemia caused by the destruction of red blood cells

Anaemia Caused by Blood Loss

- ◇ You can lose red blood cells through bleeding. This can happen slowly over a long period of time, and you might not notice. Causes can include:
- ◇ Gastrointestinal conditions such as ulcers, haemorrhoids, gastritis (inflammation of your stomach), and cancer
- ◇ Non-steroidal anti-inflammatory drugs (NSAIDs) such as aspirin or ibuprofen, can cause ulcers and gastritis
- ◇ A woman's period, especially if you have a heavy menstruation (or heavy period). This can be associated with fibroids.
- ◇ Post-trauma or post-surgery as well.
- ◇ Anaemia Caused by Decreased or Faulty Red Blood Cell Production With this type of anaemia, your body may not create enough blood cells, or they may not work the way they should. This can happen because there's something wrong with your red blood cells or because you don't have enough minerals and vitamins for your red blood cells to form normally. Conditions associated with these causes of anaemia include:
- ◇ Bone marrow and stem cell problems
- ◇ Iron-deficiency anaemia
- ◇ Sickle cell anaemia
- ◇ Vitamin-deficiency anaemia, specifically B12 or folate

Bone marrow and stem cell problems may keep your body from producing enough red blood cells. Some of the stem cells in the marrow that are in the centre of your bones will develop into red blood cells. If there aren't enough stem cells, if they don't work right, or if they're replaced by other cells such as cancer cells, you might get anaemia. Anaemia caused by bone marrow or stem cell problems includes:

- ◇ Aplastic anaemia happens when you don't have enough stem cells or have none at all. You might get aplastic anaemia because of your genes or because your bone marrow was injured by medications, (Chloramphenicol)radiation, chemotherapy, or infection. Other malignancies that commonly affect the bone marrow include multiple myeloma or leukaemia. Sometimes, there's no clear cause of aplastic anaemia.
- ◇ Lead poisoning. Lead is toxic to your bone marrow, causing you to have fewer red blood cells. Lead poisoning can happen when adults

come into contact with lead at work, for example, or if children eat chips of lead paint. You can also get it if your food comes into contact with some types of pottery that aren't glazed right.

◇ Thalassemia happens with a problem with haemoglobin formation (4 chains aren't correctly formed). You make really small red blood cells-though you can make enough of them to be asymptomatic, or it can be severe. It's passed down in your genes and usually affects people of Mediterranean, African, Middle Eastern, and Southeast Asian descent. This condition can range from mild to life-threatening; the most severe form is called Cooley's anaemia.

Iron deficiency anaemia happens because you don't have enough of the mineral iron in your body. Your bone marrow needs iron to make haemoglobin, the part of the red blood cell that takes oxygen to your organs. Iron-deficiency anaemia can be caused by:

- A diet without enough iron, especially in infants, children, teens, vegans, and vegetarians
- Certain drugs, foods, and caffeinated drinks
- Digestive conditions such as Crohn's disease, or if you've had part of your stomach or small intestine removed
- Donating blood often
- Endurance training
- Pregnancy and breastfeeding use up iron in your body
- Your period
- A common cause is chronic slow bleeding, usually from a Gastrointestinal source.

Sickle cell anaemia is a disorder that, in the U.S., affects mainly African Americans and Hispanic Americans. Your red blood cells, which are usually round, become crescent-shaped because of a problem in your genes. Anaemia results when the red blood cells break down quickly, so oxygen doesn't get to your organs. The crescent-shaped red blood cells can also get stuck in tiny blood vessels and cause pain.

Vitamin deficiency anaemia can happen when you aren't getting enough vitamin B12 and folate. You need these two vitamins to make red blood cells. This kind of anaemia can be caused by:

- Dietary deficiency: If you eat little or no meat, you might not get enough vitamin B12. If you overcook vegetables or don't eat enough of them, you might not get enough folate.
- Megaloblastic anaemia: When you don't get enough vitamin B12, folate, or both.

- Pernicious anaemia: When your body doesn't absorb enough vitamin B12.

Other causes of vitamin deficiency include medications, alcohol abuse, and intestinal diseases such as tropical sprue.

Anaemia associated with other chronic conditions usually happens when your body doesn't have enough hormones to make red blood cells. Conditions that cause this type of anaemia include:

- Advanced kidney disease
- Hypothyroidism
- Old age
- Long-term diseases, such as cancer, infection, lupus, diabetes, and rheumatoid arthritis

Anaemia Caused by Destruction of Red Blood Cells

When red blood cells are fragile and can't handle the stress of travelling through your body, they may burst, causing what's called haemolytic anaemia. You might have this condition at birth, or it could come later. Sometimes, the causes of haemolytic anaemia are unclear, but they can include:

- An attack by your immune system, as with lupus. This can happen to anyone, even a baby still in the womb or a newborn. That's called haemolytic disease of the newborn.
- Conditions that can be passed down through your genes, such as sickle cell anaemia, thalassemia, and thrombotic thrombocytopenic purpura (TTP)
- Enlarged spleen. This can, in rare cases, trap red blood cells and destroy them too early.
- Something that puts strain on your body, such as infections, drugs, snake or spider venom, or certain foods
- Toxins from advanced liver or kidney disease
- Vascular grafts, prosthetic heart valves, tumours, severe burns, being around certain chemicals, severe hypertension, and clotting disorders

Anaemia Diagnosis

A complete blood count (CBC) test will measure your red blood cells, haemoglobin, and other parts of your blood. Your doctor will ask about your family history and your medical history after the CBC. They'll probably do some tests, including:

- Blood smear or differential to count your white blood cells, check the shape of your red blood cells, and look for unusual cells
- Reticulocyte count to check for immature red blood cells

MESILANIOUS CONDITION

Management of anaphylactic shock

Anaphylaxis is a serious, rapid-onset, allergic reaction that may cause death. Severe anaphylaxis is characterised by life-threatening upper airway obstruction, bronchospasm and/or hypotension. Anaphylaxis in children is most often caused by food. Bronchospasm is a common symptom, and there is usually an Overview of atopy and asthma.

Venom- and drug-induced anaphylaxis

are more common in adults, in whom hypotension is more likely to occur. Diagnosis can be difficult, with skin features being absent in up to 20% of people. Anaphylaxis must be considered as a differential diagnosis for any acute-onset respiratory distress, bronchospasm, hypotension or cardiac arrest.

Initial management

The cornerstones of initial management are putting the patient in the supine position, administering intramuscular adrenaline into the lateral thigh, resuscitation with intravenous fluid, support of the airway and ventilation, and giving supplementary oxygen.

If the response to initial management is inadequate, intravenous infusion of adrenaline should be commenced. The use of vasopressors should be considered if hypotension persists.

The patient should be observed for at least 4 hours after symptom resolution and referred to an allergist to assist with diagnosis, allergen avoidance measures, risk assessment, preparation of an action plan and education on the use of self-injectable adrenaline. Provision of a Medic Alert bracelet should also be arranged

Investigation

Anaphylaxis remains a largely clinical diagnosis. Serum mast cell tryptase concentration can be determined, but this is an insensitive biomarker for anaphylaxis, although serial measurements (egg, on arrival, 1 hour later and before discharge) may improve sensitivity and specificity.32 An elevated tryptase level may be a useful clue when the diagnosis is uncertain, but a normal result does not exclude anaphylaxis.

Observation

The time course of anaphylaxis can be classified as "unemphatic", "protracted" or "biphasic".33 Although most reactions respond rapidly to treatment and do not recur (unemphatic reactions), an observation period is recommended. This is because, in some patients, symptoms may fail to improve or may worsen as the effect of adrenaline wears off (protracted anaphylaxis) or may return after early resolution (biphasic reaction). No clinical feature consistently identifies patients at risk of a biphasic reaction. Expert consensus is that a reasonable length of observation after symptom resolution is 4-6 hours in most patients, with more prolonged observation in those with severe or refractory symptoms and those with reactive airway disease, as most.

Ancillary medications

Medications such as antihistamines, H2 receptor antagonists, corticosteroids and antileukotrienes have no proven impact on the immediate and dangerous effects of anaphylaxis, although they may ameliorate mild allergic reactions confined to the skin. The only registered antihistamine for parenteral use in Australia, promethazine, can worsen vasodilation and hypotension, and its use is not advised. Until human research clarifies the potential risks and benefits of antihistamines, it is prudent to restrict antihistamine use to oral, selective, non-drowsiness-inducing antihistamines, with or without oral or injectable corticosteroids, for the symptomatic relief of mild skin symptoms. Based on their use in treating asthma, corticosteroids are commonly given to reduce the risk of biphasic anaphylaxis (see below), although there is currently no evidence to support their effectiveness for this purpose.

Persistent airway obstruction

If the patient is still unresponsive after the treatments outlined above, there are several further options:

- **Persistent bronchospasm** may respond to treatment with additional bronchodilators. If intubation is required, continuous puffs of salbutamol through an aerosol port directly into the ventilation circuit may help to "break" severe bronchospasm.
- **Persistent stridor** may respond to continuous nebulised adrena¬line (5 mg in 5 mL [i.e., five 1 mg ampoules]) in addition to parenteral adrenaline. Surgical airway intervention (cricothyrotomy) may be required.
- **Persistent hypotension** may be due to either profound vasodilation or cardiac failure. Anecdotally, vasodilation may

respond to vasopressors such as metaraminol or vasopressin. In patients who have pre-existing heart failure or are taking blockers, a phosphodiesterase inhibitor such as glucagon may be tried. Emergency treatment of anaphylactic shock

1. Stop administration of causative agent (if relevant), assess reaction severity and treat accordingly

1. Call for assistance
2. Give adrenaline IM (lateral thigh) 0.01 mg/kg (maximum dose 0.5 mg)
3. Set up IV access
4. Lay patient flat (elevate legs if tolerated)
5. Give high flow oxygen + airway/ventilation support if needed
6. IF HYPOTENSIVE, ALSO:
7. Set up additional wide-bore IV access (ie, 14G or 16G in adults) for normal saline infusion
8. Give IV normal saline bolus 20 mL/kg over 1–2 min under pressure

2. If there is inadequate response, an immediate life-threatening situation, or deterioration

Start an IV adrenaline infusion, as per hospital guidelines/protocol

OR

Repeat IM adrenaline injection every 3–5 min, as needed

Management of a wound

The basic principles for the management of a wound or laceration are:

1. Haemostasis
2. Cleaning the wound
3. Analgesia
4. Skin closure
5. Dressing and follow-up advice

These principles can be applied to any simple wound, yet always involve your senior colleagues for advice and input as necessary.

Personal protection

when dealing with wounds assessing a wound, including gloves, apron, or gown, and Haemostasias is the process that causes bleeding to stop. In most wounds, hemostasis will be spontaneous.

In cases of significant injury or laceration of vessels, steps may need to be taken to reduce bleeding and aid hemostasis. These include pressure, elevation, tourniquet, or suturing of the Wound

Wound cleaning

is important for reducing infection and promoting healing. There are five aspects of wound cleaning:

- ◇ Disinfect the skin around the wound with antiseptic
- ◇ Avoid getting alcohol or detergents inside the wound
- ◇ Decontaminate the wound by manually removing any foreign bodies
- ◇ Debride any devitalized tissue where possible
- ◇ Irrigate the wound with saline
- ◇ If there is no obvious contamination present, low-pressure irrigation is sufficient* (pouring normal saline from a sterile container carefully into the wound)
- ◇ Antibiotics for high-risk wounds or signs of infection (follow local antibiotic guidelines)
- ◇ Risk factors for wound infection include foreign body present or heavily soiled wounds, bites (including human), puncture wounds, and open fractures

If the wound is clearly contaminated, it must be irrigated at high pressure to remove any visible debris present

Analgesia

Analgesia will allow for a humane and easier closure of the wound. Infiltration with a local anesthetic is the most common form of analgesia used, with regular systemic analgesia (such as paracetamol) used as an adjunct. The maximum level of lidocaine is 3mg/kg and the addition of adrenaline allows for up to 7mg/kg (a 1% solution equates to 10mg/ml). Remember to not use adrenaline with local anesthetic if administering in or near appendages (e.g., a finger)

Skin Closure

- ◇ To aid wound healing, the edges of the wound can be manually opposed. There are four main methods of doing so:
- ◇ Skin adhesive strips (e.g., STERIS-Strips) are suitable if no risk factors for infection are present
- ◇ Tissue adhesive glue can be used for small lacerations with easily opposable edges (a popular choice in paediatrics)
- ◇ Sutures are typically used for any laceration greater than 5cm, deep dermal wounds, or in locations that are prone to flexion, tension, or wetting
- ◇ Staples can be used for some scalp wounds

Dressing the Wound and Follow-up

Correct dressing of the wound will reduce infection and contamination. When applying a wound dressing to a non-infected laceration, the first layer should be non-adherent (such as a saline-soaked gauze), followed by an absorbent material to attract any wound exudate, and finally, soft gauze tape to secure the dressing in place.

Tetanus prophylaxis

is required for any individual not up to date with (or unsure of) their tetanus immunization status.

Following initial wound management, advise patients to:

- ◇ Seek medical attention for any signs of infection
- ◇ Take simple analgesia (e.g., paracetamol)
- ◇ Keep the wound dry as much as possible, even if wearing a waterproof dressing

Any sutures or adhesive strips should be removed 10-14 days after initial wound closure (or 3-5 days if on the head); tissue adhesive glue will naturally slough off after 1-2 weeks. Remove dressings at the same time as the sutures or adhesive strips.

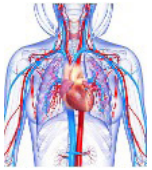
Key Points

- ◇ Clean the wound thoroughly, start antibiotics and refer for debridement as necessary
- ◇ Ensure adequate analgesia is provided
- ◇ The choice of skin closure technique depends on the wound
- ◇ Ensure the wound is appropriately dressed

CARDIO-VASCULAR DISORDERS

Hypertension

Overview



Hypertension is defined as persistently elevated arterial blood pressure (BP).

The classification of BP in adults (age 18 years and older) is shown below table:

Classification	Systolic (mm Hg)	Diastolic (mm Hg)
Normal	<120	<80
Elevated	120–129	<80
Stage 1 Hypertension	130–139	80–89
Stage 2 Hypertension	≥140	≥90

Isolated systolic hypertension is diastolic blood pressure (DBP) values less than 90 mm Hg and systolic blood pressure (SBP) values of 140 mm Hg or more.

Hypertensive crisis (BP >180/120 mm Hg) may be categorized as hypertensive emergency (extreme BP elevation with acute or progressing end-organ damage) or hypertensive urgency (high BP elevation without acute or progressing end-organ injury).

Measurement of blood pressure

It is important to consider whether blood pressure is affected by factors the Use of no steroidal anti-inflammatory drugs, steroids, oral contraceptives, topical

or oral decongestants. Blood pressure measurement is also constantly changing minute by minute in response to mood, activity, and body position. Factors listed in box 1 can cause blood pressure to fluctuate between 5 and 40 mmHg. Box above. Shows the factors that can influence BP measurement.

- ◇ 1. **Blood Pressure Cuff is too small** causes a patient's systolic blood pressure measurement to increase 10 to 40 mmHg.
- ◇ 2. **Blood Pressure Cuff Used over Clothing** can impact a systolic blood pressure from 10 to 50 mmHg.
- ◇ 3. **Not Resting 3-5 minutes:** To obtain an accurate blood pressure measurement, it is important that you relax and rest quietly in a comfortable chair for 3 to 5 minutes before a reading is taken.

- ◇ 4. **Activities such as exercise or eating:** can affect your systolic blood pressure measurement 10 to 20 mmHg.
- ◇ 5. **Arm/Back/Feet Unsupported.** If your back is not supported, your diastolic blood pressure measurement may be increased by 6 mmHg. Crossing legs raises systolic blood pressure by 2 to 8 mmHg.
- ◇ 6. **Positioning of the upper** arm below the heart level results in higher measurements, whereas positioning your upper arm above the heart level will give lower measurements.
- ◇ 7. **Emotional State:** Stress or anxiety can cause large increases in blood pressure.
- ◇ 8. If you are talking to the nurse/doctor while having your blood pressure taken, systolic blood pressure measurement may increase 10 to 15mm Hg.
- ◇ 9. **Alcohol/Caffeine &Khat** consumption causes blood pressure levels to spike so stay from alcohol/caffeine at least 30 minutes before having a blood pressure measurement taken.
- ◇ 10. **Temperature** "Chilly" room temperature causes blood pressure readings may be higher than

Threshold for treatment

For adults with confirmed HBP and no known CVD and a 10-year risk of atherosclerotic cardiovascular disease of less than 10%: BP lowering medication is recommended for BP >140/90 mmHg. For adults with clinical CVD, start medication for BP >130/80 mmHg or higher

The goal for blood pressure treatment:

In the general population aged up to 60 years, the guideline maintains the recommendation of treating to goals of SBP < 140 mmHg and DBP < 90 mmHg. ... The last update recommends a blood pressure target < 130/80 mmHg for adults with confirmed hypertension and known cardiovascular disease.

Treatment of high blood pressure

All patients with blood pressures above normal should be treated

Non- pharmacological interventions: healthy diet, reducing sodium intake, potassium Supplementation, increasing physical activity, limiting alcohol consumption, and losing body weight for those who are Overweight.

Pharmacological intervention: For individuals with stage 1 or 2 Hypertension

and/or high risk for cardiovascular disease (10-year CVD risk 10%).

Initial first-line therapy for stage 1

Antihypertensive include thiazide diuretics, CCBs, and ACE inhibitors or ARBs are the first choice of Monotherapy (See table on Oral antihypertensive drugs. Two first-line drugs of different classes are recommended for stage 2 hypertension and an average BP of 20/10 mm Hg above the BP target. Improved adherence can be achieved with once-daily drug dosing, rather than multiple dosing, and with combination therapy rather than administration of the free individual components Adults with stage 1 hypertension and high ASCVD risk (≥10% 10-year ASCVD risk) should be managed with both non-pharmacologic and antihypertensive drug therapy with repeat BP in 1 month.

Drugs for treating hypertension

Monotherapy must be initiated to the maximum tolerated dose before you switch to an alternative drug or combine another drug from the same list. In some cases, a third drug may be needed from the Secondary list.

Resistant hypertension

The first step to treating resistant hypertension is the assurance of compliance with a low-salt diet and medication.

ACEi or ARBs, CCB, and chlorthalidone. Spironolactone is the preferred additional drug for resistant hypertension.

NOTE: **B blockers** are not first-line therapy except in CAD and Here. Abrupt cessation of beta-blockers should be avoided. Do not combine ACEI and ARB. Beta-blockers are not first line therapy.

(ACEi or ARBs) are not recommended for hypertension in pregnancy. Assess treatment effect monthly until goal BP is reached, if goal BP cannot be reached, consider adding other classes of drugs or referral to a Hypertension specialist

Class	Drug	Dose, Range/D	Frequency
First line			
thiazide-type diuretics	Hydrochlorothiazide	25-50	1

Class	Drug	Dose, Range/D	Frequency
ACE Inhibitors	Captopril	12.5-150	2 or 3
	Enalapril	5-40	1 or 2
	Lisinopril	10-40	1
ARBs	Losartan	50-100	1 or 2
CCB-dihydropyridines	Amlodipine	2.5-10	1
	Nifedipine LA	30-90	1
CCB- non dihydropyridines	Diltiazem ER	120-360	1
	Verapamil I	120-360	3

Table: Oral Antihypertensive Primary (First line)

CLASS			
Second line	Drug	Dose, (mg per day) *	Frequency
Diuretics-loop	Furosemide		
Diuretic, aldosterone antagonists	Spironolactone	25-100	2
Beta-blockers-cardioselective	Atenolol	25-100	2
cardioselective & Vasodilator	Metoprolol	100-200	2
	Bisoprolol	2.5-10	1
Beta blockers- non-cardioselective	Propranolol lord	80-160	2
centrally acting	Methyldopa	250-1000	2
Direct vasodilators	Hydralazine	100-200	2 or 3

Table: Oral secondary antihypertensive drugs

Class	Comments
Primary Agents	
thiazide-type diuretics	Monitor for hyponatremia and hypokalaemia, uric acid, and calcium levels. • Use with caution in patients with a history of acute gout unless the patient is on uric acid-lowering therapy
ACE Inhibitors	• Do not use in combination with ARBs or direct renin inhibitors, Increased risk of hyperkalemia, especially in patients with CKD or in those on K+ supplements or K+-sparing drugs. May cause acute renal failure in patients with severe bilateral renal artery stenosis.
ARBs	• Do not use in combination with ACE inhibitors • Increased risk of hyperkalemia in CKD or in those on K+ supplements or K+-sparing drugs • May cause acute renal failure in patients with severe bilateral renal artery stenosis • Do not use if history of angioedema with ARBs. Patients with a history of angioedema with an ACEI can receive an ARB beginning 6 weeks after ACEI discontinued. • Avoid in pregnancy
CCB-dihydropyridines	• Avoid use in patients with Here; amlodipine or felodipine may be used if required • Associated with dose-related pedal oedema, which is more common in women than men
CCB- non dihydropyridines	• Avoid routine use with beta blockers due to increased risk of bradycardia and heart block, Drug interactions with diltiazem and verapamil, CYP3A4 major substrate and moderate inhibitor)

Table : Comments on First line oral antihypertensive drugs

Class	Comments
Secondary drugs	
Diuretics-loop	• Preferred diuretics in patients with symptomatic HF. Preferred over thiazides in patients with moderate-to-severe CKD (e.g., GFR <30 mljmin)
Diuretics- aldosterone, antagonists	• Spironolactone associated with greater risk of Gynecomastia and impotence compared to Eplerenone. • Common add-on therapy in resistant hypertension. • Avoid use with K+ supplements, other K+-sparing diuretics or significant renal dysfunction. Eplerenone adequate BP lowering often requires twice daily dosing for
Beta blockers-cardioselective	• Beta blockers are not recommended as first-line agents unless the patient has IHD or HF, preferred in patients with bronchospastic airway disease requiring a beta blocker. Bisoprolol and metoprolol succinate preferred in patients with Here. Avoid abrupt cessation
Beta blockers-noncardioselective	• Avoid in patients with reactive airways disease, • Avoid abrupt cessation
Alpha-1 blockers	• Associated with orthostatic hypotension, especially in older adults • May consider as second-line agent in with concomitant BPH patients
Direct vasodilators	• Hydralazine associated with drug-induced lupus like syndrome at higher doses
centrally acting drugs	Causes postural hypotension

Pregnancy

Preeclampsia is defined as hypertension (elevated BP ≥140/90 mm Hg on more than 2 occasions at least 4 hours apart after 20 weeks' gestation or ≥160/110 mm Hg confirmed within a short interval) in association with thrombocytopenia, impaired liver function, new development of renal insufficiency, pulmonary edema, or new-onset cerebral or visual disturbances. It can lead to life-threatening complications for both mother and fetus.

Eclampsia, the onset of convulsions in preeclampsia, is a medical emergency.

Definitive treatment of preeclampsia is delivery, and this is indicated if pending or frank eclampsia is present. Otherwise, management consists of restricting activity, bed rest, and close monitoring. Salt restriction or other measures that contract blood volume should be avoided. Antihypertensives are used before induction of labor if the DBP is greater

than 105 mm Hg, with a target DBP of 95 to 105 mm Hg. IV hydralazine is most commonly used; IV labetalol is also effective.

Chronic hypertension is hypertension that predates pregnancy. Labetalol, nifedipine, or methyldopa is recommended as first-line therapy due to favorable safety profiles. β-Blockers (other than atenolol) and CCBs are also reasonable alternatives. ACE inhibitors, ARBs, and the direct renin inhibitor aliskiren are contraindicated in pregnancy.

Drug	Dosage Range	Action	Contraindication and Comments
Labetalol	Standard dose: 200- 600 mg orally per day in 2-4 divided doses Maximum dosage: 2,400 mg per day	Beta blocker with mild alpha vasodilator effect	Avoid in women with cardiac conduction abnormalities, systolic heart failure or asthma.
Nifedipine (extended release)	Standard dose: 30-60 mg orally per day maximum dosage: 90 mg per day	Calcium channel antagonist	Ensure correct form prescribed; short acting is not recommended due to risk of hypotension Not recommended before 20 weeks' gestation
Methyldopa	Standard dose: 250- 1000 mg orally per day in 2-3 divided doses Maximum dosage: 3000 mg per day	Centrally acting	Slow onset over 24 hours

Table : Antihypertensive Drugs Recommended in Pregnancy

Acute Coronary Syndromes

Acute coronary syndrome may present in a wide variety of clinical entities including unstable or, acute myocardial infarction. Stable angina pectoris is one of its more common presentations. It is a clinical expression of myocardial ischemia associated with fixed atherosclerotic coronary

stenosis, which prevents the adaptation of coronary perfusion to an increased oxygen requirement.

Stable angina pectoris

- ◇ Retrosternal chest discomfort (pressure, heaviness, squeezing, burning, or choking sensation) as opposed to frank pain
- ◇ Pain localized primarily in the epigastrium, back, neck, jaw, or shoulders
- ◇ Pain precipitated by exertion, eating, exposure to cold, or emotional stress, lasting for about 1-5 minutes and relieved by rest or nitroglycerine

Quality and duration of pain are often described as pressure, tightness, or heaviness; sometimes strangling, constricting, or burning. Shortness of breath may accompany angina or a sense of impending doom. Shortness of breath may be the sole symptom. Discomfort is brief, no more than 10 min in the majority of cases, but chest pain lasting for seconds is unlikely to be due to angina.

Management of angina.

Non-pharmacological

Although the mainstay of treatment of angina is pharmacological, the importance of lifestyle adjustments must not be underestimated. Of these, smoking cessation, dietary control, and increased exercise are the most important.

Pharmacological treatment of angina

The drugs used to manage angina can be split into those that reduce mortality and those which only control symptoms, anti-ischemic with hemodynamic effect. . Symptoms of chronic stable angina can usually be managed with optimum doses of one of the available antianginal drugs.

(β-blockers, long-acting nitrates, or calcium channel blockers), alone or in combination.

To slow the progression of atherosclerosis and reduce the incidence of MI and death, lifestyle modifications together with pharmacologic treatment with aspirin, statins or ACE inhibitors are necessary. Patients who remain symptomatic despite medical treatment and patients with high-risk anatomy should be considered for revascularisation.

Anti-ischemic drugs

. Nitrates offer coronary arteriolar and venous vasodilatation, which are the basis of symptomatic relief of effort angina, acting by their active component nitric oxide (NO) and by the reduction of preload.

Relieve of symptoms

Short acting nitrates for acute effort angina. Sublingual Nitro-glycerine is the standard initial therapy for effort angina. When angina starts, the patient should rest sitting (standing promotes syncope, lying down enhances venous return and heart work).

◇ **Sublingual nitro-glycerine** (0.3~0.6 mg) every 5 min until the pain goes or a maximum of 1.2 mg has been taken within 15 min. Nitro-glycerine spray acts more rapidly.

Prophylaxis

Isosorbide dinitrate (5 mg sublingually) helps to abort anginal attacks for about 1 h. Because it requires hepatic conversion to the mononitrate, the onset of anti-anginal action (within 3~4 min) is slower than with nitro-glycerine. . Nitro-glycerine can be used prophylactically when angina can be expected, such as activity after a meal, emotional stress, and sexual activity and in colder weather after oral ingestion, haemodynamic and anti-anginal effects persist for several hours, conferring longer protection against angina than sublingual nitro-glycerine.

Oral preparation is frequently given for the prophylaxis of angina. Exercise duration improved significantly for 6~8 h after single oral doses of 15~120mg Isosorbide dinitrate, but for only 2 hrs. Thus, prolonged therapy with isosorbide dinitrate is not evidence-based.

Mononitrate have similar dosage and effects to those of Isosorbide dinitrate. Nitrate tolerance

Long-acting nitrates for angina prophylaxis. Long-acting nitrates are not continuously effective if regularly taken over a pro¬longed period without a nitrate-free or nitrate-low interval of about>- 10 hours (tolerance).

Nitrate side-effects. Hypotension is the most serious, and headache the most common side-effect of nitrates. Headaches (aspirin may relieve these) may facilitate loss of compliance, yet often pass over.

Failure of therapy. Apart from non-compliance, treatment failure includes nitric oxide resistance and nitrate tolerance.

Nitrate drug interactions. Many are pharmacodynamics, including po¬tentiation of vasodilator effects with calcium channel blockers (CCBs).

Note that serious hypotension can occur with the selective PDE5 inhibitors (sildenafil and others) for erectile dysfunction or for the

treatment of pulmonary hypertension. Sildenafil decreases the BP by about 8.4/5.5 mmHg and by much more with nitrates. In the case of inadvertent PDE5-nitrate combinations, emergency a-adrenergic agonists or even norepinephrine may be needed. Nitrates should not be given with a-adrenergic blockers. In men with prostatic problems, taking tamsulosin (α1A and α blocker).

β-Blockers (Cardio selective) Atenolol or Betalol

Patients with stable angina who take **beta blockers** usually experience a noticeable diminishing of episodes of **angina** and have to take nitro-glycerine less often. Beta **blockers** are the only anti-**angina** drugs that have been shown to reduce the risk of having another myocardial infarction. (Heart attack). Beta blockers (Cardiac selective) work by blocking the effect of adrenaline on the heart. This has two major beneficial effects in patients with angina:

Atenolol 25 to 5omg can be taken once daily with or without food.

Unstable angina

Unstable angina is either new chest pain or a change in your usual pattern of chest pain or discomfort — such as chest pain that is getting worse, lasting longer, or not being relieved with rest or use of medications.

Unstable angina is dangerous and a warning sign of a heart attack. If your angina is unstable, seek urgent medical care. You may need hospitalization, adjustment of medications, and angioplasty with stents or coronary bypass surgery.

ECG is the most important test and should be done within 10 min of presentation. ECG changes such as ST-segment depression, ST-segment elevation, or T-wave inversion may occur during unstable angina but are transient.

Treatment

Myocardial Infarction

Overview

Myocardial infarction (MI) usually results from an imbalance in oxygen supply and demand, which is most often caused by plaque rupture with thrombus formation in a pericardial coronary artery, resulting in an acute reduction of blood supply to a portion of the myocardium.

. Although the initial treatment of the different types of acute coronary syndrome (ACS) may appear to be similar. Trained pre-hospital personnel can provide life-saving interventions if the patient develops cardiac arrest.

The key to improved survival is the availability of early defibrillation.

Prehospital care:

- ◇ **Oxygen**,
- ◇ **Aspirin** Antiplatelet drugs: Aspirin, clopidogrel, or both Anticoagulants
- ◇ **pain management** with **nitrates**) and triage to an appropriate medical centre can reduce risk of mortality and complications. Early diagnostic data and response to treatment can help determine the need for and timing of revascularization

Prehospital care and initial management

All patients being transported for chest pain should be managed as if the pain is ischemic in origin, unless clear evidence to the contrary is established. Specific Prehospital care includes the following:

- ◇ Intravenous access, supplemental oxygen if the oxygen saturation (SaO2) is less than 90%,
- ◇ Immediate administration of non-enteric-coated chewable aspirin,
- ◇ **Nitro-glycerine** for active chest pain, given sublingually or by spray
- ◇ Prehospital electrocardiography (ECG), if available
- ◇ Electric cardio version in cases of VF; and rapid transfer of the patient to facilitate prompt coronary assessment.

Dyslipidaemia

Overview

Dyslipidaemia, is defined as elevated total or LDL cholesterol levels, or low levels of HDL cholesterol, is an important risk factor for CHD and stroke (cerebrovascular disease). . Primary prevention in this context is defined as long-term management of persons at increased risk,

The Cholesterol Ratio

Total cholesterol levels less than 200 milligrams per decilitre (mg/dL) are considered desirable for adults. A **reading** between 200 and 239 mg/dL is considered borderline However,

Total cholesterol is made up of two different types of cholesterol.

1. High-density lipoprotein, or HDL, "good"
2. Low-density lipoprotein, or LDL, "bad" cholesterol

The cholesterol ratio is calculated by dividing the total cholesterol by the HDL number. For instance, if the total cholesterol is 180 and the HDL is 82, the cholesterol ratio is 2.2. One should aim to keep the ratio below 5,

with the ideal cholesterol ratio being 3.5.

Patients qualified for Dyslipidemia treatment?

In the absence of regional treatment guidelines for dyslipidaemia treatment, a panel of expert for the Middle East and advised to use data obtained in Thailand and used NICE guidelines. Table xx shows the group of patients that are recommended for treatment.

Patient scenarios	Recommendations by expert panel
Primary prevention	All adults ≥18 years LDL-C ≥190 mg/dl. are candidates for primary prevention
Elderly (>75 years)	Statins may be prescribed, with caution, taking into consideration polypharmacy and comorbidities in this population
Chronic kidney disease	Statin therapy is beneficial in pre-dialysis patients. The statin dose should be adjusted according to EGFI
Type 2 diabetes	All type 2 diabetes patients should receive statin therapy
Documented CVD	Statin therapy with a target LDL-C ≤70 mg/dL or ≥50% reduction
Patient with ACS	Maximum tolerated dose of statin with a target LDL-C ≤70 mg/dl in case of intolerance, decrease the statin dose and add ezetimibe
Family history of premature IHD with LDL-C <190 mg/Dl	Family history is an important additional risk factor and thus treatment with statin therapy should be considered

Table: typical patient scenarios and management recommendations by the expert panel

Management of dyslipidaemia

- Diet: Foods high in saturated fat, trans fat, and carbohydrates raise cholesterol levels, so eating fewer of these types of foods will help manage and reduce them.
- Weight: Being overweight or obese is associated with many risks, including increased cholesterol levels. Maintaining a healthy weight helps all health factors and reduces the risk of heart disease.
- Exercise: Being active for at least 30 minutes per day raises the heart rate, helps with keeping a healthy weight, and reduces LDL cholesterol levels while increasing HDL cholesterol levels. Exercising for at least 30 minutes a day can lower LDL cholesterol levels

Pharmacotherapy

The most commonly used medication to treat dyslipidaemia is a statin. Statins help reduce LDL levels by interfering with cholesterol production in the liver. There are number of statin products available, but there is no significant difference in their profile except strength. The dose described here are based on Atorvastatin clinical trials

Statin therapy can be high, moderate, or low intensity. High-intensity Table) statins typically reduce low-density lipoprotein cholesterol (LDL-C) levels by 50% or more while moderate-intensity statins reduce LDL-C by 30% to 49% and low-intensity statins reduce LDL-C by less than 30%,

High intensity	Moderate intensity	Low intensity
Lowers LDL-c by ≥ 50%	Lowers LDL-c by 30 – 49%	Lower LDL-c by <30%
Atorvastatin 40mg	20mg	5-10mg

Table :High-, Moderate-, and Low-Intensity Statin Therapy

Initial dose: 10 mg or 20 mg orally once a day; an initial dose of 40 mg may be used in patients who require a reduction in low-density lipoprotein (LDL-C) of more than 45%. -Maintenance dose: 10 mg to 80 mg orally once a day. -Following initiation and/or upon titration, lipid levels should be evaluated within 2 to 4 weeks and dosages adjusted accordingly.

Special cases lipidaemia

Pregnancy

Lowering cholesterol or TG with drugs or diet is usually inappropriate during pregnancy, with the exception of massive increase in TG which may increase risk of pancreatitis. The physiological hyperlipidaemia of pregnancy does not require treatment; seek specialist advice.

Children

Seek specialist advice. Treatment is usually dietary, and drug treatment postponed until adulthood.

Deep Venous Thrombosis

Overview

Deep venous thrombosis (DVT) and pulmonary embolism (PE) are manifestations of a single disease entity, namely, venous thromboembolism (VTE). DVT is the presence of coagulated blood, a thrombus, in one of the deep venous conduits that return blood to the heart.

Physical findings in DVT may include the following:

- ◇ Calf pain on dorsiflexion of the foot (Humans sign)

- ◇ A palpable, indurated, cordlike, tender subcutaneous venous segment
- ◇ Variable discoloration of the lower extremity
- ◇ D-dimer testing positive*
- ◇ Coagulation studies (e.g., prothrombin time for a hypercoagulable state

D-dimer is one of the protein fragments produced when a blood clot gets dissolved in the body. It is normally undetectable or detectable at a very low level unless the body is forming and breaking down blood clots. Then, its level in the blood can significantly rise. This test detects D-dimer in the blood.

Management of DVT

- ◇ Treatment options for DVT include the following:
- ◇ Anticoagulation (mainstay of therapy) – Heparins, (Low-molecular-weight heparin (LMWH; e.g., enoxaparin)
- ◇ Endovascular and surgical interventions, Physical measures (e.g., elastic compression stockings and ambulation).

Congestive Heart Failure

Overview

Heart failure in which the **heart** is unable to maintain adequate circulation of blood in the tissues of the body or to pump out the venous blood returned to it by the venous circulation. Heart failure can be:

Predominantly left ventricular, with pulmonary congestion and dyspnoea, or

Predominantly right ventricular, with elevated venous pressure, peripheral oedema and hepatic congestion. Usually both coexist in the classical syndrome of congestive or biventricular heart failure.

A major goal of management of heart failure is the identification of underlying causes and/or precipitating factors that may be reversed by specific therapy. However, in the majority of patients there is irreversible myocardial damage, never the less with appropriate pharmacological and non-pharmacological that control the symptoms and delay progression of heart failure, still the patient can life with acceptable quality of life.

Common causes and specific therapies for heart failure

Usually, common causes are those conditions that cause damage to heart muscle or conditions that cause increase in the heart overload or reduce oxygen heart supply

Treatment

Non pharmacological management

Following recommendations about diet, exercise and other habits can help alleviate heart failure symptoms, slow the disease's progression and improve everyday life. In fact, people with mild to moderate heart failure often can lead nearly normal lives as a result. Important lifestyle changes may include:

Sodium restriction

The use of diuretics obviates the need for strict sodium restriction in many patients with heart failure. However, excessive salt ingestion may precipitate or exacerbate heart failure and a no-added-salt diet (60 to 100mmol per day) should be recommended. More severe salt restriction may be necessary in patients with severe heart failure.

Oxygen

Patients with acute pulmonary oedema will be hypoxemic and will require oxygen. Carbon dioxide retention is usually not a problem except in patients with cor- pulmonale or very severe pulmonary oedema.

Quitting smoking; It causes less oxygen-rich blood circulates through the body. Smoking also leads to clumping or stickiness in the blood vessels feeding the heart.

Maintaining or losing weight: Sudden weight gain or loss can be a sign of developing heart failure, or the heart failure is progressing. Weigh yourself at the same time each morning, preferably before breakfast and after urinating. gain three or more pounds in one day, five or more pounds in one week, or whatever amount need to be reported to the doctor

Being physically active:. Schedule moderate exercise at the same time every day so it becomes a regular part of your lifestyle.

Managing stress: Take 15 to 20 minutes a day to sit quietly, breathe deeply and think of a peaceful scene. When you get angry, count to 10 before responding to help reduce your stress.

Avoiding flu and pneumonia with vaccinations {Flu and pneumonia pose greater dangers for people who have heart failure (or any heart condition) than for healthy people.

Pneumonia is a lung infection that keeps your body from using oxygen as efficiently as it should. Your heart has to work harder to pump oxygenated blood through the body. If you have heart failure, you should avoid putting this extra stress on your heart.

Pharmacological management of heart failure

Treatment of mild to moderate heart failure

ACE inhibitor therapy virtually all patients with clinical heart failure should receive an angiotensin converting enzyme (ACE) inhibitor as initial therapy. Asymptomatic patients should also receive an ACE inhibitor if there is significant left ventricular dysfunction (i.e., left ventricular ejection fraction <40%).

Dosing regimens for ACE inhibitors in heart failure are listed

Drug	Starting dose	Target maintenance dose
Captopril	6.25mg twice daily	50mg 3 times daily
Enalapril	2.5mg daily	to 20mg twice daily 10
Lisinopril	2.5mg daily	to 40mg daily 20

Table :Dosing regimens for ACE inhibitors in heart failure

The risk of first-dose hypotension can be minimised by starting therapy with low doses of ACE inhibitors. In patients already taking high doses of potent diuretics, the dose should be reduced several days before commencing ACE inhibitor therapy. The risk of first-dose hypotension is increased in patients:

- ◇ In older age groups
- ◇ With dehydration usually from high doses of potent diuretics
- ◇ With postural hypotension
- ◇ With significant hyponatraemia
- ◇ With severe or acutely decompensated heart failure on multiple other vasoactive drugs, e.g. For hypertension.

If the patient's response to ACE inhibitor mono-therapy is inadequate, add a diuretic (see and/or increase the dose of the ACE inhibitor,

Diuretic therapy

.–In patients with normal renal function, receiving the combination of an ACE inhibitor and diuretic,

Potassium-sparing diuretic or potassium supplement (**Potassium chloride 600mg sustained release)** will occasionally be needed.

Drug	Dose	Frequency
Furosemide 20 to 40mg	mg PO once daily; may be 20-80 increased by 20-40 mg q6-8hr; not to exceed 600 mg /day	Daily
Hydrochlorothiazide 25mg	,to 50mg orally 25	Daily

Table :Standard doses of diuretics

If hypokalaemia proves difficult to correct, hypomagnesaemia may be present, use

Magnesium aspartate 1 to 3g orally, daily in divided doses.

Digoxin therapy

There are two indications for the use of digoxin in patients with heart failure.

1. In patients with AF to control rapid ventricular rate.
2. As a third-line drug in patients with sinus rhythm (SR) when heart failure is not adequately controlled by optimal doses of ACE inhibitors and diuretics.

In patients with normal renal function, the half-life of digoxin is at least 24 hours, the patient will require at least 5 days (5 half-lives) to achieve a steady-state. If the patient requires more rapid digitalisation, e.g., AF with rapid ventricular rate, give

- **Digoxin** 0.5 to 1mg orally immediately, followed by 0.25 to 0.5mg orally, every 4 to 6 hours, up to 1.5 to 2mg in the first 24 hours, FOLLOWED BY Digoxin 62.5 to 500 micrograms orally, daily, according to age, plasma creatinine and plasma digoxin level.

Alternative to ACE inhibitor

Some patients are unable to tolerate ACE inhibitors because of adverse effects such as cough or skin rashes. In these patient's **angiotensin II receptor blockers provide (Losartan)** an alternative approach to inhibition of the renin-angiotensin system.

Severe heart failure

Patients with severe heart failure should be hospitalized and require bed rest.

Arrhythmias

Arrhythmia" means the irregular. It may due skipped beat, added beat, is **"fluttering,"** or is beating too fast **(tachycardia**) or too slow (**bradycardia**). Arrhythmias can be an emergency, or they may be harmless. It can be caused by:

- **Heart disease** Heart failure)
- Injury from a **heart attack**
- Electrolytes (such as sodium or **potassium)**
- Changes in the heart muscle (**Myopathies**)

Arrhythmias secondary to heart failure

All arrhythmias are more frequent in patients with heart failure. In general, the more severe the underlying heart disease and the heart failure, the more severe and frequent the arrhythmias.

Atrial tachyarrhythmia

Atrial fibrillation and, to a lesser extent, atrial flutter, are common in heart failure. They usually reflect atrial enlargement and are a consequence of the pro-arrhythmic effect of atrial stretch. In patients with substantial atrial enlargement, maintenance of SR following reversion is unlikely in the longer term. This limits the therapeutic options to ventricular rate control combined with judicious use of antithrombotic therapy

Ventricular tachyarrhythmia

Sudden death is the mode of death in more than 50 percent of patients with heart failure. Most of these deaths are due to ventricular fibrillation, with or without preceding ventricular tachycardia. Should patients with serious underlying heart disease causing heart failure receive routine antiarrhythmic therapy in an attempt to prevent arrhythmic sudden death?

There are no adequately powered randomized trials in heart failure to answer this question on the basis of objective evidence.

-Management of arrhythmia in HF

Implantable defibrillators have an important and increasing role in this patient population. Appropriate patient selection is the major focus of this research.

Antiarrhythmic drug therapy is still suboptimal; A**miodarone** is generally well tolerated in heart failure, with a low risk of pro-arrhythmia. For these reasons, many clinicians use Amiodarone relatively freely in heart failure. Its use should be limited to those patients with higher grade ventricular arrhythmias. At the least, but it is important for patients with symptomatic arrhythmias and atrial arrhythmias, and in selected patients with advanced HF. As new therapies emerge and implantable devices increase in complexity, close collaboration between electro physiologists and cardiologists who manage HF will be increasingly important. To prevent paroxysms, seek specialist advice.

CNS DISORDERS

Alzheimer's disease

Overview

Alzheimer's disease is the most common type of dementia, associated with an ongoing decline of brain functioning. It can affect memory, thinking skills and other mental abilities. The exact cause of Alzheimer's disease is not yet fully understood, although a number of things are thought to increase the risk of developing the condition. These include:

- ◇ increasing age
- ◇ a family history of the condition
- ◇ untreated depression, although depression can also be one of the symptoms of Alzheimer's disease
- ◇ lifestyle factors and conditions associated with cardiovascular disease

Signs and symptoms

Alzheimer's disease is a progressive condition, which means the symptoms develop gradually over many years and eventually become more severe. The first sign of Alzheimer's disease is usually minor memory problems, this could be forgetting about recent conversations or events, and forgetting the names of places and objects. As the condition develops, memory problems become more severe and further symptoms can develop, such as:

- ◇ Confusion, disorientation and getting lost in familiar places
- ◇ Problems with speech and language
- ◇ Problems moving around without assistance or performing self-care tasks
- ◇ Personality changes, such as becoming aggressive, demanding and suspicious of others.
- ◇ Hallucinations (seeing or hearing things that are not there) and delusions (believing untrue things)

Diagnosis

. Alzheimer's disease is not a "normal" part of the ageing process. There's no single test that can be used to diagnose Alzheimer's disease. And it's important to remember that memory problems do not necessarily mean you have Alzheimer's disease. If Alzheimer's disease is suspected, you may be referred to a specialist to:

Treatment

There's currently no cure for Alzheimer's disease, but medicines are available that can help relieve some of the symptoms. Memantine It works by blocking the effects of an excessive amount of a chemical in the brain

called glutamate. Memantine is used for moderate or severe Alzheimer's disease. It's suitable for those who cannot take or are unable to tolerate Acetylcholine (AChE) inhibitors. It's also suitable for people with severe Alzheimer's disease who are already taking an AChE inhibitor. Side effects can include headaches, dizziness and constipation but these are usually only temporary.

Medicines to treat challenging behavior

In the later stages of dementia, a significant number of people will develop what's known as

BEHAVIOURAL AND PSYCHOLOGICAL SYMPTOMS OF DEMENTIA (BPSD).

The symptoms of BPSD can include:

- ◇ anxiety
- ◇ aggression
- ◇ delusions and hallucinations

These changes in behaviour can be very distressing for both the person with Alzheimer's disease and their carer.

Risperidone OR Haloperidol, antipsychotic medicines, for those showing persistent aggression or extreme distress.

Risperidone should be used at the lowest dose and for the shortest time possible as it has serious side effects. Haloperidol should only be used if other treatments have not helped.

Autism spectrum disorder

Autism spectrum disorder (ASD) is a developmental disorder that affects communication and behaviour. Although autism can be diagnosed at any age, it is said to be a "developmental disorder" because symptoms generally appear in the first two years of life.

Criteria for diagnosis

- ◇ Difficulty with communication and interaction with other people
- ◇ Restricted interests and repetitive behaviours
- ◇ Symptoms that hurt the person's ability to function properly in school, work, and other areas of life

Signs and Symptoms of ASD

- ◇ Social communication/interaction behaviours may include:
- ◇ Making little or inconsistent eye contact
- ◇ Tending not to look at or listen to people

Causes and Risk Factors:

While scientists don't know the exact causes of ASD, research suggests that genes can act together with influences from the environment to affect development in ways that lead to ASD. Some risk factors include:

- ◇ Having a sibling with ASD
- ◇ Having older parents
- ◇ Having certain genetic conditions—people with conditions such as Down syndrome, fragile X syndrome, and Rett syndrome are more likely than others to have ASD
- ◇ Very low birth weight

Diagnosing ASD

By looking at a person's behaviour and development. ASD can usually be reliably diagnosed by the age of two. It is important for those with concerns to seek out assessment as soon as possible so that a diagnosis can be made, and treatment can begin. A developmental paediatrician—a doctor who has special training in child development

- ◇ A child psychologist and/or child psychiatrist—a doctor who has specialized training in brain development and behaviour
- ◇ A neuropsychologist—a doctor who focuses on evaluating, diagnosing, and treating neurological, medical, and neurodevelopmental disorders

Evaluation

The evaluation may assess, which IA called Applied Behaviour Analysis. ABA)

- ◇ Cognitive level or thinking skills
- ◇ Language abilities
- ◇ Age-appropriate skills. Hearing test

Treatment

Will involve Occupational, Speech and Physical therapy.

Anxiety & depression

GENERALISED ANXIETY DISORDER (GAD)

Diagnosis-

Generalised anxiety disorder (GAD) can be difficult to diagnose. In some cases, it can also be difficult to distinguish from other mental health conditions, such as depression.

Symptoms

- worrying significantly affects your daily life, including your job and social life and is extremely stressful upsetting and uncontrollable
- Feeling worried nearly every day for at least 6 months

To help with the diagnosis, carry out a physical examination or blood tests to rule out other conditions that may be causing your symptoms, such as:

- Anaemia (a deficiency in iron or vitamin B12 and folate)
- An overactive thyroid gland (hyperthyroidism)

Treatment

Generalised anxiety disorder (GAD) is a long-term condition, but a number of different treatments can help.

Psychological therapies for GAD.

1. If you have been diagnosed with GAD, you'll usually be advised to try psychological treatment before prescribed medication.

2. **Cognitive behavioural therapy (CBT)**
   Cognitive behavioural therapy (CBT) is one of the most effective treatments for GAD.

3. **Applied relaxation**
   Applied relaxation focuses on relaxing your muscles in a particular way during situations that usually cause anxiety. The technique needs to be taught by a trained therapist but generally involves
4. learning how to relax your muscles
5. learning how to relax your muscles quickly and in response to a trigger, such as the word "relax"

Medication

The main medications you may be offered to treat GAD are described below.

1. Selective serotonin reuptake inhibitors (SSRIs)'

SSRIs can be taken on a long-term basis but, as with all antidepressants, they can take several weeks to start working.

2. Serotonin and noradrenaline reuptake inhibitors (SNRIs)

This type of medicine increases the amount of serotonin and noradrenaline in your brain.

Examples of SNRIs are shown in the table below which are used in both anxiety and depression. SNRIs can also increase blood pressure, so your blood pressure will be monitored regularly during treatment. As with SSRIs, some of the side effects (such as feeling sick, an upset stomach, problems sleeping and feeling agitated or more anxious) are more common in the first 1 or 2 weeks of treatment, but these usually settle as your body adjusts to the medication.

	Fluoxetine	Paroxetine	Sertraline	Citalopram	Escitalopram
Depression	Yes	Yes	Yes	Yes	Yes
Generalized anxiety disorder		Yes			Yes
Obsessive–compulsive disorder	Yes	Yes	Yes		

Table: Serotonin Reuptake inhibitors indication

Tricyclic antidepressant	Starting dose (mg)	Therapeutic range (mg/day)
Imipramine	10-25	150-300
Clomipramine	25	25-250
Selective serotonin reuptake inhibitor	Starting dose (mg)	Therapeutic range (mg/day)
Citalopram	10	10-60
Fluoxetine	5-10	10-80
Fluvoxamine	50	50-300
Paroxetine	10	10-50
Sertraline	25	50-200

Table: Therapeutic Ranges of Antidepressant medication

Pregabalin

This is a medication known as an anticonvulsant, which is used to treat conditions such as epilepsy, but it's also been found to be beneficial in treating anxiety.

Benzodiazepines

Benzodiazepines are a type of sedative that may sometimes be used as a short-term treatment during a particularly severe period of anxiety.

This is because they help ease the symptoms within 30 to 90 minutes of taking the medication.

Although benzodiazepines are very effective in treating the symptoms of anxiety, they can't be used for long periods.

This is because they can become addictive if used for longer than 4 weeks. Benzodiazepines also start to lose their effectiveness after this time.

For these reasons, you won't usually be prescribed benzodiazepines for any longer than 2 to 4 weeks at a time.

Referral to a specialist

As part of this plan, you may be offered a treatment you haven't tried before, which might be one of the psychological treatments or medications mentioned above. Or a combination of a psychological treatment with a medication, or a combination of 2 different medications.

CLINICAL DEPRESSION

The symptoms of depression can be complex and vary widely between people. If you're depressed, you may feel sad, and hopeless and lose interest in things you used to enjoy.

The symptoms persist for weeks or months and are bad enough to interfere with your work, social life and family life.

There are many other symptoms of depression and you're unlikely to have all of those listed on this page.

Psychological symptoms

The psychological symptoms of depression include:

- continuous low mood or sadness
- feeling hopeless and helpless
- feeling guilt-ridden
- feeling irritable and intolerant of others
- having suicidal thoughts or thoughts of harming yourself

Physical symptoms

- moving or speaking more slowly than usual

- changes in appetite or weight (usually decreased, but sometimes increased)
- low sex drive (loss of libido)
- changes to the menstrual cycle
- disturbed sleep – for example, finding it difficult to fall asleep at night or waking up very early in the morning

Social symptoms

- avoiding contact with friends and taking part in fewer social activities
- neglecting your hobbies and interests
- having difficulties in your home, work or family life

Severities of depression

Depression can often come on gradually, so it can be difficult to notice something is wrong. Many people try to cope with their symptoms without realising they're unwell. It can sometimes take a friend or family member to suggest something is wrong.

- mild depression – has some impact on your daily life
- moderate depression – has a significant impact on your daily life
- severe depression – makes it almost impossible to get through daily life; a few people with severe depression may have psychotic symptoms

Grief and depression

- ◇ It can be difficult to distinguish between grief and depression. They share many of the same characteristics, but there are important differences between them.
- ◇ **Grief is an entirely natural response to a loss,** while depression is an illness.
- ◇ People who are grieving find their feelings of sadness and loss come and go, but they're still able to enjoy things and look forward to the future.
- ◇ **In contrast, people who are depressed constantly feel sad. They find it difficult to enjoy anything or be positive about the future.**

Other types of depression

There are different types of depression and some conditions where

depression may be one of the symptoms. These include:

- Postnatal depression – sometimes new mothers, fathers or partners develop depression after they have a baby; this is known as postnatal depression and it's treated similarly to other types of depression, with talking therapies and antidepressant medicines
- Bipolar disorder – also known as "manic depression", bipolar disorder there are spells of both depression and excessively high mood (mania); the depression symptoms are similar to clinical depression, but the bouts of mania can include harmful behaviour, to self and others.
- Seasonal affective disorder (SAD) – also known as "winter depression", SAD is a type of depression with a seasonal pattern usually related to winter

Read more about diagnosing depression

Diagnosis-

There are no physical tests for depression, but some urine or blood tests to rule out other conditions that have similar symptoms, such as an underactive thyroid.

Treatment

Treatment for depression usually involves a combination of self-help, talking therapies and medicines. The treatment will be based on the type of depression.

Mild depression

suggest waiting a short time to see if it gets better by itself. In this case, after 2 weeks to monitor your progress. This is known as watchful waiting.

Exercise

There's evidence that exercise can help depression, and it's one of the main treatments for mild depression. You may be referred to a group exercise class.

Mild to moderate depression

mild to moderate depression that is not improving, or moderate depression, you may find a talking therapy helpful.

There are different types of talking therapies for depression, including Cognitive Behavioural Therapy (CBT) and counselling.

Moderate to severe depression

Antidepressants

There are many different types of antidepressants.

Combination therapy

A course of antidepressants plus talking therapy, particularly if your depression is quite severe.

A combination of an antidepressant and CBT usually works better than having just one of these treatments.

Mental health teams

In severe depression, a mental health team is made up of psychologists, psychiatrists, specialist nurses and occupational therapists.

Antidepressants are medicines that treat the symptoms of depression. There are many different types available. These are not addictive but can cause some withdrawal symptoms if one stops taking them suddenly or misses a dose.

Selective serotonin reuptake inhibitors (SSRIs)

Paroxetine (Seroxat), fluoxetine (Prozac) and citalopram (Cipramil).

They help increase the level of serotonin, which is thought to be a "good mood" chemical.

SSRIs work just as well as older antidepressants and have fewer side effects, although they can cause nausea, headaches, a dry mouth, and problems having sex. However, these side effects usually improve over time.

Some SSRIs are not suitable for children and young people under 18 years of age. Research shows that the risk of self-harm and suicidal behaviour may increase if they're taken by under-18s.

Fluoxetine is the only SSRI that can be prescribed for under-18s and, even then, only when a specialist has given the go-ahead. (Refer to tables for indication & Dosage under Anxiety)

Tricyclic antidepressants (TCAs)

Tricyclic antidepressants (TCAs) are a group of antidepressants used to treat moderate to severe depression.

TCAs, including imipramine and amitriptyline, have been around for longer than SSRIs.

They work by raising the levels of serotonin and noradrenaline in the brain. These both help lift the mood. The side effects usually ease within 10 days as they get used to the medicine.

Vortioxetine

Vortioxetine (Brintellix or Lundbeck) is recommended by the National Institute for Health and Care Excellence (NICE) for treating adults who are having a first or recurrent major depressive episode if the current episode has not responded to 2 other antidepressants.

Common side effects associated with vortioxetine include abnormal dreams, constipation, diarrhea, dizziness, itching, nausea, and vomiting.

Other antidepressants

New antidepressants, such as venlafaxine (Efexor), duloxetine (Cymbalta or Yentreve) , and mirtazapine (Zispin Soltab), work in a slightly different way from SSRIs and TCAs.

Venlafaxine and duloxetine are known as serotonin-noradrenaline reuptake inhibitors (SNRIs). Like TCAs, they change the levels of serotonin and noradrenaline in your brain.

Studies have shown that an SNRI can be more effective than an SSRI, but they're not routinely prescribed because they can lead to a rise in blood pressure.

Withdrawal symptoms

Antidepressants are not addictive in the same way that illegal drugs, but may cause some withdrawal symptoms when you stop taking them.

Brain stimulation

Brain stimulation is sometimes used to treat severe depression that has not responded to other treatments. Electromagnetic currents can be used to stimulate certain areas of the brain to try to improve the symptoms of depression.

Lithium

If you have tried several different antidepressants and there's been no improvement, your doctor may offer you a medicine called lithium in addition to your current treatment.

There are 2 types: lithium carbonate and lithium citrate. Both are usually effective, but if you're taking one that works for you, it's best not to change.

If the level of lithium in your blood becomes too high, it can become toxic. You'll therefore need blood tests every 3 months to check your lithium

levels while you're on the medicine.

You'll also need to avoid eating a low-salt diet because this can also cause the lithium to become toxic.

NB:

- ◇ **Avoid antidepressants.** The treatment for bipolar depression is different from regular depression. Antidepressants can make bipolar disorder worse or trigger a manic episode. Try mood stabilizers first and never take antidepressants without them.
- ◇ Corticosteroids, ACE inhibitors, and isoniazid, as well as illicit stimulant drugs, may also induce mania
- ◇ Compliance with mood stabilizers can be poor, as patients may lose insight during manic episodes
- ◇ It is usually best to use one mood stabilizer drug rather than a combination treatment, although in difficult cases this may be necessary
- ◇ When using anticonvulsants as mood stabilizers, monitor electrolytes, liver function, and blood picture, seeking to identify serious adverse effects early

Schizophrenia

Schizophrenia is a chronic and severe mental disorder that affects how a person thinks, feels, and behaves. People with schizophrenia may seem like they have lost touch with reality. Although schizophrenia is not as common as other mental disorders, the symptoms can be very disabling.

Signs and Symptoms

Symptoms of schizophrenia usually start between ages 16 and 30. In rare cases, children have schizophrenia too. The symptoms of schizophrenia fall into three categories: positive, negative, and cognitive.

Positive symptoms

- ◇ Hallucinations.
- ◇ Delusions
- ◇ Thought disorders (unusual or dysfunctional ways of thinking)
- ◇ Movement disorders (agitated body movements)

Negative symptoms: Flat affect" (reduced expression of emotions via facial expression or voice tone)

- ◇ Reduced feelings of pleasure in everyday life
- ◇ Difficulty beginning and sustaining activities
- ◇ Reduced speaking

Cognitive symptoms:

- ◇ Trouble focusing or paying attention
- ◇ Problems with "working memory" (the ability to use information immediately after learning it)

Treatments and Therapies

Schizophrenia causes many symptoms, including:

- ◇ Delusions (believing things that aren't true).
- ◇ Hallucinations (seeing or hearing things that aren't there)
- ◇ Jumbled or confused thinking and speaking
- ◇ Odd and random movements like strange posture

The medications for schizophrenia are called antipsychotics. They ease symptoms such as delusions and hallucinations. These drugs work on chemicals in the brain such as dopamine and serotonin. which medication is best by looking at the following:

- ◇ How well it works on his symptoms
- ◇ How much it will cost
- ◇ Side effects
- ◇ How easily he can get it
- ◇ How often he has to take it

Two types of antipsychotic drugs treat schizophrenia.

Atypical" antipsychotics are newer and have fewer side effects than the older drugs. They include (Not included in the EML0

Typical" antipsychotics are older medicines. They include:

- ◇ Chlorpromazine
- ◇ Fluphenazine (Prolixin)

	Average dose Range	Maximum daily Dose
Chlorpromazine	200mg - 600mg	900mg

DURATION

	Minimum number of Weeks to wait	Maximum number of Weeks to wait
Little or no Response	weeks 3	weeks 6
Partial response	weeks 4	weeks 10

Depot antipsychotic

Use if adherence to oral medication is a problem or if patients request it for convenience If sedation is required Fluphenazine Decanoate 12.5mg - 50mg IMI monthly OR Zuclopenthixol Decanoate 200mg - 400mg IMI monthly

Indications for referral

a. Diagnostic clarification

b. Poor response to drugs on code

c. Intolerable side effects to drugs on code

d. Prominent negative symptoms

e. Psychotic disorder with mood symptoms

Specific considerations

Elderly

A lower starting dose and more gradual dose increases because of a greater risk for adverse effects, including orthostatic hypotension, confusion, anticholinergic effects, acute extrapyramidal side effects (EPSE), and tardive dyskinesia.

Children

There is relatively little data about the safety and efficacy of conventional antipsychotics in children and adolescents, and even less for the atypical agents. Children are at greater risk for acute dystonic reactions than older patients.

Pregnancy

- Avoid if possible, or use the lowest effective dose. Neonatal adverse effects observed include generalized hypertonicity and dystonic reactions. Little data is available for atypical antipsychotics, and conventional agents are generally preferred. Consider supervised
- Avoid if possible, or use the lowest effective dose. Neonatal adverse effects observed include generalized hypertonicity and dystonic reactions. Little data is available for atypical antipsychotics, and conventional agents are generally preferred. Consider supervised dose reduction or temporary discontinuation 7–10 days before delivery.
- Lactation
- Avoid if possible, or seek specialist advice and monitor infants for toxicity, some of these medicines come in long-lasting injectable forms that you take only once every 1-3 months. This can help with making blood levels more regular and help with not forgetting to take the medications.

Many of these medicines interact with other drugs you might take. One study found that haloperidol interacts with 58 different drugs. And clozapine interacts with 55 drugs. Antipsychotics can also interact with

herbal supplements, foods, and drinks.

These antipsychotic drugs come in a long-lasting form:

- Aripiprazole (Abilify Maintena)
- Aripiprazole lauroxil (Aristada)
- Fluphenazine (Prolixin)
- Haloperidol (Haldol)
- Olanzapine pamoate (Zyprexa Relprevv)
- Paliperidone (Invega Sustenna, Invega Trinza)
- Risperidone (Risperdal Consta)

Psychosocial Treatments

These treatments are helpful after patients and their doctors find a medication that works. Learning and using coping skills to address the everyday challenges of schizophrenia helps people pursue their life goals, such as attending school or work. Individuals who participate in regular psychosocial treatment are less likely to have relapses or be hospitalized. For more information on psychosocial treatments,

Epilepsy

Overview:

Epilepsy is a chronic disorder, the hallmark of which is recurrent, unprovoked seizures. A person is diagnosed with epilepsy if they have two unprovoked seizures (or one unprovoked seizure with the likelihood of more) that were not caused by some known and reversible medical condition like alcohol withdrawal or extremely low blood sugar.

The seizures in epilepsy may be related to a brain injury or a family tendency, but often the cause is completely unknown. The word «epilepsy» does not indicate anything about the cause of the person›s seizures or their severity.

Many people with epilepsy have more than one type of seizure and may have other symptoms of neurological problems as well. Sometimes EEG (electroencephalogram) testing, clinical history, family history, and outlook are similar among a group of people with epilepsy. In these situations, their condition can be defined as a specific epilepsy syndrome.

Types of seizures

1. Simple partial seizures (focal ‹auras›: stiffness or twitching in part of the body, such as an arm or hand, strange smell or taste and one remains awake and aware while this happens. These seizures are sometimes

known as «warnings» or «auras» because they can be a sign that another type of seizure is about to happen.

2. Complex partial (focal) seizures: During a complex partial seizure, one loses a sense of awareness and makes random body movements.

3. Tonic-clonic seizures: A tonic-colonic seizure, previously known as a «grand mal», is what most people think of as a typical epileptic fit. They happen in two stages.

4. tonic stage – lose consciousness, your body goes stiff, and you may fall to the floor colonic stage – limbs jerk about, you may lose control of your bladder or bowel, you may bite your tongue or the inside of your cheek, and you might have difficulty breathing. The seizure normally stops after a few minutes, but some last longer.

5. Absence seizure: An absence seizure, which used to be called a «petit mal», is where you lose awareness of your surroundings for a short time. They mainly affect children but can happen at any age. During an absence seizure, a person may:

a. stare blankly into space

b. look like they›re «daydreaming»

c. flutter their eyes

6. The seizures usually only last up to 15 seconds and you won›t be able to remember them, they can happen several times a day.

7. Myoclonic seizures a myoclonic seizure is where some or all of your body suddenly twitches or jerks, like you›ve had an electric shock. They often happen soon after waking up. Myoclonic seizures usually only last a fraction of a second, but several can sometimes occur in a short space of time. You normally remain awake during them.

8. Clonic seizures Colonic seizures cause the body to shake and jerk like a tonic-clonic seizure, but you don›t go stiff at the start. They typically last a few minutes and you might lose consciousness.

9. Tonic seizures Tonic seizures cause all your muscles to suddenly become stiff, like the first stage of a tonic-clonic seizure. This might mean you lose balance and fall over.

10. Atonic seizures. Atonic seizures cause all your muscles to suddenly relax, so you may fall to the ground. They tend to be very brief and you›ll usually be able to get up again straight away.

Seizure triggers

For many people with epilepsy, seizures seem to happen randomly. But sometimes they can have a trigger, such as:

- ◇ stress
- ◇ a lack of sleep
- ◇ waking up
- ◇ drinking alcohol
- ◇ some medications and illegal drugs
- ◇ in women, monthly periods
- ◇ flashing lights (this is an uncommon trigger)
- ◇ Keeping a diary of when you have seizures and what happened before them can help you identify and avoid some possible triggers.

Treatment- Medication

AEDs (Anti-Epileptic Drugs) work by controlling the electrical activity in the brain that causes seizures. They do not cure epilepsy and are not used to stop seizures while they are happening. AEDs work best if they are taken regularly, around the same time each day. Up to 70% of people (7 in 10) could have their seizures fully controlled (stop having seizures) with the right AEDs.

AEDs are the most commonly used treatment for epilepsy. They help control seizures in about 70% of people. AEDs work by changing the levels of chemicals in your brain. They don›t cure epilepsy but can stop seizures from happening.

Types of AEDs: Common types included in the EML:

The best type for you will depend on things like the type of seizures you have, your age, and if you›re thinking of having a baby. The tables below show the Antiepileptic Drugs Approved for the Treatment of Seizures and the standard doses.

Choice of EML.

Drug	Indication	Dose
Carbamazepine Tablets, 100 mg, 200 mg	Generalized tonic-clonic seizures, partial seizures	ADULT initially 100 mg twice daily, increased gradually according to response to a usual maintenance dose of 0.8-1.2 g daily in divided doses; ELDERLY reduce initial dose; CHILD 10-20

Drug	Indication	Dose
Diazepam Injection diazepam 5 mg/ml, 2-ml ampoule Rectal solution, diazepam 2 mg/ml	Status epilepticus or emergency management of recurrent epileptic seizures,	ADULT 10-20 mg, repeated if necessary after 30-60 minutes; may be followed by intravenous infusion to a maximum of 3 mg/kg over 24 hours; by slow intravenous injection, CHILD 200 to 300 micrograms/kg (or 1 mg per year of age); by rectum as solution, ADULT, and CHILD over 10 kg, 500 micrograms/kg, ELDERLY 250 micrograms/kg; repeated if necessary, every 12 hours;
Ethosuximide Capsules, ethosuximide 250 mg Syrup, ethosuximide 250 mg/5 ml	Absence seizures,	ADULT and CHILD over 6 years initially 500 mg daily, increased by 250 mg at intervals of 4- 7 days to a usual dose of 1-1.5 g daily (occasionally, up to a maximum of 2 g daily); CH I LD under 6 years initially 250 mg daily, increased gradually to the usual dose of 20 mg/kg daily
Phenobarbital Tablets, phenobarbital 15 mg, 30 mg, 60 mg, 100 mg Elixir (Oral solution), phenobarbital 15 mg/5 ml	Generalized tonic-clonic seizures, partial seizures, by mouth	by intravenous injection (dilute injection 1 in 10 with water for injections
	Febrile convulsions, Neonatal seizures	neonate 5-10 mg/kg every 20-30 minutes up to a plasma concentration of 40 mg/litre
	Status epilepticus,	By intravenous injection (dilute injection 1 in 10 with water for injections), ADULT 10 mg/kg at a rate of not more than 100 mg/minute (up to a maximum total dose of 1 g); CHILD 5-10 mg/kg at a rate of not more than 30 mg/minute

Drug	Indication	Dose
Ethosuximide Capsules, ethosuximide 250 mg Syrup, ethosuximide 250 mg/5 ml	Absence seizures	, by mouth, ADULT and CHILD over 6 years initially 500 mg daily, increased by 250 mg at intervals of 4- 7 days to a usual dose of 1-1.5 g daily (occasionally, up to a maximum of 2 g daily); CH I LD under 6 years initially 250 mg daily, increased gradually to the usual dose of 20 mg/kg daily
Phenytoin sodium Tablets, phenytoin sodium 25 mg, 50 mg, 100 mg Capsules, phenytoin sodium 25 mg, 50 mg, 100 mg Injection (Solution for injection), phenytoin sodium 50 mg/ml, 5-ml ampoule	Generalized tonic-clonic seizures, partial seizures	by mouth, ADULT initially 3-4 mg/kg daily (as a single dose or in 2 divided doses), increased gradually at intervals of 2 weeks as necessary (with plasma-phenytoin concentration monitoring); usual dose 200-500 mg daily; CHILD initially 5 mg/kg daily in 2 divided doses; usual dose, range 4-8 mg/kg daily (maximum 300 mg)

Drug	Indication	Dose
Sodium valproate Castro-resistant tablets (Enteric-coated tablets), sodium valproate 200 mg, 500 mg	Generalized tonic-clonic seizures, partial seizures, absence seizures, atonic seizures; myoclonic seizures	by mouth, ADULT initially 600 mg daily in 2 divided doses, preferably after food, increased by 200 mg daily at 3-day intervals to a maximum of 2.5

Includes simple partial, complex partial, and secondarily generalized seizures.

As adjunctive therapy

1. Surgery to remove a small part of the brain that's causing the seizures
2. Procedure to put a small electrical device inside the body that can help control seizures
3. A special diet (ketogenic diet) that can help control seizures. Some people need treatment for life. But you might be able to stop if your seizures disappear over time. You may not need any treatment if you know your seizure triggers and can avoid them.

Ketogenic diet:

The name ketogenic means that it produces ketones in the body. (keto = ketone; genic = producing) Ketones are formed when the body uses fat for its source of energy Usually the body uses carbohydrates (such as sugar, bread, pasta) for its fuel. Because the ketogenic diet is very low in carbohydrates, fats become the primary fuel instead. The body can work very well on ketones (and fats).

The "classic" ketogenic diet is a special high-fat, low-carbohydrate diet that helps to control seizures in some people with epilepsy. It is usually recommended the ketogenic diet for children whose seizures have not responded to several different seizure medicines.

Special cases

Febrile convulsions

- ◇ Occur in about 3% of children between 6 months and 5 years and are associated with a fever from a source outside the CNS
- ◇ Long-term prevention with phenobarbitone or valproate is rarely justified, considering the adverse effects of treatment and the usually favourable prognosis of disease; they may be considered for children with prolonged and recurrent convulsions

◇ Diazepam (oral or rectal) may be used intermittently at the onset of fever for prevention of seizures; diazepam (IV or rectal) should be used for the treatment of prolonged seizures (see—Convulsive status epilepticus below)

Convulsive status epilepticus

- Prolonged and uncontrolled seizures are associated with a high incidence of serious morbidity and mortality; prompt treatment is required
- Provide basic life support (oxygen by nasal cannula, mask, or ventilator; maintenance of blood pressure and blood glucose concentration)
- First give fast-acting benzodiazepine (usually diazepam, alternatively clonazepam), either by slow IV injection or rectally (if IV access cannot be obtained), to control seizure
- Give long-acting antiepileptic drug (e.g., phenytoin by slow IV injection) to prevent recurrence of seizure; monitor blood pressure and ECG during the injection because of the risk of hypotension and cardiac arrhythmia
- If status epilepticus persists, give anesthetic doses of phenobarbitone or Thiopentone; assisted ventilation is usually required because of the risk of severe respiratory depression

Epilepsy in women

Several antiepileptic drugs (carbamazepine, phenytoin, barbiturates) induce hepatic enzymes and increase the metabolism of many drugs, including oral contraceptive pills. There is a high risk of oral contraceptive failure with these antiepileptic drugs; non-hormonal contraception is preferable. High dose combined contraceptive pill (at least 50 micrograms ethinyloestradiol) is necessary to achieve effective contraceptive plasma concentrations. Medroxyprogesterone depot is also suitable. Oral contraceptive failure is not necessarily accompanied by breakthrough bleeding.

Pregnant women should never stop their medication. Seizures during pregnancy can cause a slowing of the fetal heart rate. Decreased oxygen to the fetus. Fatal injury, premature separation of the placenta from the uterus (placental abruption), or miscarriage due to trauma, such as a fall, during a seizure. However, they should avoid taking valproic acid because of the risk of harm to the fetus. They should also continue taking folic acid 5mg daily

Headaches

Headaches are one of the most common medical complaints; most people experience them at some point in their life. They can affect anyone regardless of age, race, and gender.

The World Health Organization (WHO) reports that almost half of all adults worldwide will experience a headache in any given year.

As headaches can be a symptom of a serious condition, it is important to seek medical advice if they become more severe, regular, or persistent.

For example, if a headache is more painful and disruptive than previous headaches, worsens, or fails to improve with medication, or is accompanied by other symptoms such as confusion, fever, sensory changes, and stiffness in the neck, a doctor should be contacted immediately.

Primary headaches

Primary headaches are stand-alone illnesses caused directly by the overactivity of, or problems with, structures in the head that are pain-sensitive.

This includes the blood vessels, muscles, and nerves of the head and neck. They may also result from changes in chemical activity in the brain.

Secondary headaches

Secondary headaches are symptoms that happen when another condition stimulates the pain-sensitive nerves of the head. In other words, the headache symptoms can be attributed to another cause.

These include:

- alcohol-induced hangover
- brain tumour
- blood clots
- bleeding in or around the brain
- "brain freeze," or ice-cream headaches
- carbon monoxide poisoning
- concussion
- dehydration
- glaucoma
- teeth-grinding at night
- influenza
- overuse of pain medication, known as rebound headaches
- panic attacks
- stroke

As headaches can be a symptom of a serious condition, it is important to seek medical advice if they become more severe, regular, or persistent. For example, if a headache is more painful and disruptive than previous headaches, worsens, or fails to improve with medication or is accompanied by other symptoms such as confusion, fever, sensory changes, and stiffness in the neck, a thorough medical examination is required immediately.

Cluster headaches

Cluster headaches are uncommon but very severe headaches, and they occur five times more often in men than women. Although anyone can get cluster headaches, the typical patient is a middle-aged man with a history of smoking.

The problem gets its name because the headaches tend to come in clusters, with one to eight headaches a day during a one- to three-month period every year or two, often at the same time of year. The pain always strikes one side of the head and is very severe. The eye on the painful side is red and watery, the eyelid may droop, and the nose runs or is blocked. The attack starts abruptly and lasts for 30 to 60 minutes. Most sufferers become restless and agitated during the attack; unable to sit still, they pace, jog in place, or beat their heads against a wall. Nausea and sensitivity to light and sound may accompany the pain.

Treatment.

Inhaling high-flow oxygen soon after the onset of the headache can often stop the attack. Sumatriptan is often effective for cluster headaches, particularly when given by injection. Other triptans may also help. (Dihydroergotamine injections), or other treatments. The most effective medication for preventing cluster headache attacks is verapamil, a calcium channel blocker.

Migraine

Migraines occur less often than tension headaches, but they are usually much more severe. They are two to three times more common in women than men,

It is believed that migraines are caused by changes in the brain's blood flow and nerve cell activity. Genetics plays a role since 70% of migraine victims have at least one close relative with the problem.

Migraine triggers. Although a migraine can come on without warning, it is often set off by a trigger. The things that set off a migraine vary from person to person, but a migraine sufferer usually remains sensitive to the same triggers. The table lists some of the most common ones.

Major migraine triggers

- ◇ Changing weather: rising humidity, heat
- ◇ Lack of sleep or oversleeping
- ◇ Fatigue
- ◇ Emotional stress
- ◇ Sensory triggers: bright or flickering lights, loud noises, strong smells
- ◇ Dietary triggers:
  - ○ missing a meal
  - ○ alcohol, especially red wine
  - ○ chocolate
  - ○ nitrates in cured meats and fish
  - ○ aged cheese
  - ○ an increase or decrease in caffeine
  - ○ MSG (often present in Asian and prepared foods)

Migraine symptoms. Migraines often begin in the evening or during sleep. In some people, the attacks are preceded by several hours of fatigue, depression, and sluggishness or by irritability and restlessness. Because migraine symptoms vary widely, at least half of all migraine sufferers think they have sinus or tension headaches, not migraines.

About 20% of migraines begin with one or more neurological symptoms called an aura. Visual complaints are the most common. They may include halos, sparkles or flashing lights, wavy lines, and even temporary loss of vision. The aura may also produce numbness or tingling on one side of the body, especially the face or hand. Some patients develop aura symptoms without getting headaches; they often think they are having a stroke, not a migraine.

The majority of migraines develop without an aura. In typical cases, the pain is on one side of the head, often beginning around the eye and temple before spreading to the back of the head. The pain is frequently severe and is described as throbbing or pulsating. Nausea is common, and many migraine patients have a watering eye, a running nose, or congestion. If these symptoms are prominent, they may lead to a misdiagnosis of sinus headaches. One way to remember the features of migraine is to use the word POUND

P is for pulsating pain.

O for the one-day duration of severe untreated attacks.

U for unilateral (one-sided) pain.

N for nausea and vomiting.

D for disabling intensity.

Without effective treatment, migraine attacks usually last for four to 24 hours. When you're suffering a migraine, even four hours is far too long and that's why early treatment for a migraine is so important.

Migraine treatment. If you spot a migraine in its very earliest stages, you may be able to control it with over-the-counter pain relievers. Acetaminophen, aspirin or ibuprofen, and a combination of pain medications and caffeine are all effective — if you take a full dose very early in the attack. The anti-nausea drug metoclopramide may enhance the activity of NSAIDs.

Triptan provides complete relief within two hours for up to 70% of patients; the response is best if treatment is started early. Some patients require a second dose within 12 to 24 hours.

Because triptans can affect blood flow to the heart as well as the head, patients with cardiovascular disease should not use them. Patients who take antidepressants in the SSRI family should also avoid triptans.

Migraine prevention. Some people can prevent migraines simply by avoiding triggers. Others do well with prompt therapy for occasional attacks. However, patients who suffer frequent migraine attacks often benefit from preventive medications. Effective drugs include beta-blockers (such as propranolol, and atenolol), certain antidepressants (such as amitriptyline), and certain antiseizure medications (such as valproate). Difficult cases may benefit from referral to a headache specialist.

Bedwetting

Bed wetting also called night time incontinence or nocturnal enuresis is involuntary urination while asleep. Generally, before the age of 7 years is of no concern. After the age of 7, some children of children still wet the bed. Bedwetting may be a sign of an underlying medical condition that needs medical attention.

Causes:

It is not known, but various factors may play a role:

- ◇ Small bladder i.e., not developed.
- ◇ In the ability to recognize a full bladder, the nerves that control the bladder are slow to mature.
- ◇ A hormonal imbalance, some children do not produce enough Antidiuretic hormone (ADH)
- ◇ Sleep apnea is a condition when breathing is interrupted often due to inflamed or enlarged tonsils.
- ◇ Urinary tract infection (UTI)

- ◇ Diabetes
- ◇ Chronic constipation
- ◇ Defects in the nerves that control the urinary system
- ◇ Psychological factors
- ◇ Attention deficit/ Hyperactivity disorder

Investigation and treatment

Long-Standing

Primary = never been dry

Exclude:

- General Medical Condition
  - ◇ Neurological e.g., seizures
  - ◇ Spinal disorders
  - ◇ Urological disorders, including bladder dysfunction
  - ◇ Drugs
  - ◇ Psychosocial, E.g., abuse, inadequate toilet training

Diagnosis of Enuresis:

- ◇ Repeated voiding of urine
- ◇ Minimum developmental age of 5 years
- ◇ Twice a week for at least 3 months

Management:

- ◇ Reassure
- ◇ Education to parent
- ◇ Behavior modification - bladder training, fluid restriction
- ◇ Medication - imipramine 10 - 50mg nocte, start low and titrate dose
- ◇ Monitor pulse and BP
- ◇ Monitor cardiac S/E

Recent onset

☐ Secondary= Been dry and now wetting self

Exclude:

Biological - medical, e.g., Urinary tract infection - investigate accordingly

- ◇ Seizure - investigate accordingly
- ◇ Psychosocial
- ◇ Family disorganized, neglect, sexual abuse
- ◇ Diabetes

Treat as for enuresis (see above)

Stroke

Overview

A **stroke** is a medical condition in which poor blood flow to the brain results in cell death. There are two main types of stroke: ischemic, due to lack of blood flow, and hemorrhagic, due to bleeding. Both result in parts of the brain not functioning properly. The sooner a person having a stroke gets care, the better.

Signs of stroke

- ◇ Paralysis
- ◇ Numbness or weakness in the arm, face, and leg, especially on one side of the body
- ◇ Trouble speaking or understanding speech
- ◇ Vision problems, such as trouble seeing in one or both eyes with vision blackened or blurred, or double vision
- ◇ Trouble walking
- ◇ Severe, sudden headache with an unknown cause

A stroke requires immediate medical attention. Prompt treatment is key to preventing the following outcomes:

Stroke medications (Acute treatment of ischemic stroke)

General supportive measures

- ◇ Adequate oxygenation; consider oxygen via mask or nasal prongs
- ◇ Maintain fluid and electrolyte balance; consider IV line
- ◇ Avoid hyperglycaemia; consider insulin
- ◇ Control seizures; consider early use of anticonvulsant drugs if the person has had a seizure
- ◇ Simple analgesics for headache
- ◇ Antipyretics for fever
- ◇ Blood pressure commonly increases in acute stroke; it is unclear whether therapeutic alteration of elevated systemic blood pressure is beneficial or detrimental for people with acute stroke;

Consider treatment of sustained severe hypertension (egg systolic blood pressure over 220 mm hg, diastolic blood pressure over 110 mm hg); avoid rapid lowering of blood pressure:

- ◇ ≤67 kg: 15 mg IVP bolus over 1-2 minutes, THEN 0.75 mg/kg IV infusion over 30 minutes (not to exceed 50 mg), and THEN 0.5 mg/kg IV over the next 60 minutes (not to exceed 35 mg over 1 hr)
- ◇ >67 kg (100 mg total dose infused over 1.5 hr): 15 mg IVP bolus over 1-2 minutes, THEN 50 mg IV infusion over next 30 minutes, and THEN remaining 35 mg over next 60 minutes

- ◇ 3-hr infusion
- ◇ <65 kg: 0.075 mg/kg IVP bolus over 1-2 minutes, then 0.675 mg/kg infused over the rest of the first hr, THEN
- ◇ 0.25 mg/kg IV for the next 2 hr
- ◇ ≥65 kg: (100 mg total dose infused over 3 hr): 6-10 mg IVP bolus over 1-2 minutes, THEN 50-54 mg infused over the rest of the first hr (i.e., 60 mg in 1st hr including 6-10 mg bolus), THEN 20 mg/hr for the next 2 hr

Several medications are used to treat strokes. The goal of some medications is to prevent a second stroke, while others aim to prevent a stroke from happening in the first place.

The most common stroke medications include:

Antiplatelet drugs. These medications prevent blood clots by making it more difficult for the blood's platelets to stick together. The most common antiplatelet drugs include aspirin

- ◇ There is no evidence that high-dose aspirin (e.g., 1200–1500 mg daily) or combination antiplatelet treatment (aspirin and dipyridamole) are significantly more effective than low-dose aspirin (e.g., 75–300 mg daily) for primary prevention of stroke.
- ◇ There is currently no clear indication for the use of antiplatelet treatment in people at low risk (e.g., healthy middle-aged or elderly people) or intermediate risk (e.g., uncomplicated diabetes, hypertension, or hypercholesterolemia) of stroke.

Early use (within 48 hours) of aspirin (150–300 mg daily) in ischaemic stroke results in a small reduction of about 10 deaths or recurrent strokes per 1000 people during the first few weeks.

Heparin:

There is little evidence to support the routine use of heparin, even among selected subgroups of people (e.g., cardioembolic or vertebra-basilar strokes). Any intensive heparin regimen (e.g., medium dose SC or IV) confers greater hemorrhagic hazard than benefit.

Low-dose SC heparin reduces the risk of venous thrombosis and should be considered in people who remain immobile after the first week.

Tissue plasminogen activator (tPA).

This emergency medication can be provided during a stroke to break

up a blood clot causing the stroke. It's the only medication currently available that can do this, but it must be given within 3 to 4.5 hours. Symptoms of a stroke begin. This drug is injected into a blood vessel so the medication can start to work as quickly as possible, which reduces the risk of complications from the stroke.

Dosing considerations (acute ischemic stroke)

- ◇ Exclude intracranial hemorrhage as the primary cause of stroke signs and symptoms before initiation of treatment (see Contraindications)
- ◇ Administer as soon as possible but within 3 hr after onset of symptoms; Monitor and control blood pressure during and following administration
- ◇ In patients without recent use of oral anticoagulants or heparin, treatment can be initiated before the availability of coagulation study results
- ◇ Discontinue if the pre-treatment INR (International normalized ratio) is >1.7 or the aPTT is elevated

The recommended total dose for acute myocardial infarction (AMI) is based on patient weight, not to exceed 100 mg, regardless of the selected administration regimen (accelerated or 3 hr) accelerated infusion (1-1/2 hr)

Contraindications for anticoagulants:

Anticoagulant therapy for acute stroke may only be considered after a brain imaging study has excluded hemorrhage and estimated the size of the infarct. Early anticoagulation should be avoided when potential contraindications to anticoagulation are present, such as a large infarction (based upon clinical syndrome or brain imaging findings), uncontrolled hypertension, or other bleeding conditions. Although there is no standard definition, many stroke experts consider large infarcts to be those that involve more than one-third of the middle cerebral artery territory or more than one-half of the posterior cerebral artery territory

Trigeminal neuralgia

Trigeminal neuralgia is sudden, severe facial pain. It's often described as sharp shooting pain or like having an electric shock in the jaw, teeth, or gums.

It usually happens in short, unpredictable attacks that can last from a few seconds to about 2 minutes. The attacks stop as suddenly as they start. In most cases, trigeminal neuralgia affects just one side of the face, with the pain usually felt in the lower part of the face. Very occasionally the pain can affect both sides of the face, although not usually at the same time.

The pain can improve or even disappear altogether for several months or years at a time (remission), although these periods tend to get shorter with time. Some people may then develop a more continuous aching, throbbing, or burning sensation, sometimes accompanied by sharp attacks.

Causes of trigeminal neuralgia?

Trigeminal neuralgia is usually caused by compression of the trigeminal nerve. This is the nerve inside the skull that transmits sensations of pain and touch from your face, teeth, and mouth to your brain. Trigeminal neuralgia affects more women than men, and it usually starts between the ages of 50 and 60. It's rare in adults younger than 40.

Drug for Trigeminal pain

Several treatments can offer some relief from the pain caused by trigeminal neuralgia. Most people with trigeminal neuralgia will be prescribed medicine to help control their pain, although surgery may be considered for the longer term in cases where medicine is ineffective or causes too many side effects.

Avoiding triggers

The painful attacks of trigeminal neuralgia can sometimes be brought on, or made worse, by certain triggers, so it may help to avoid these triggers if possible. For example, Wind, it may help to wear a scarf wrapped around your face in windy weather. A transparent dome-shaped umbrella can also protect your face from the weather. If the pain is triggered by a draught in a room, avoid sitting near open windows or the source of air conditioning.

Avoid hot, spicy or cold food or drink if these seem to trigger the pain. Using a straw to drink warm or cold drinks may also help prevent the liquid from coming into contact with painful areas of your mouth. It's important to eat nourishing meals, so consider eating mushy foods or liquidizing your meals if you're having difficulty chewing.

Certain foods seem to trigger attacks in some people, so you may want to consider avoiding things such as caffeine, citrus fruits, and bananas.

Medicines

As painkillers like paracetamol are not effective in treating trigeminal neuralgia, you'll usually be prescribed an anticonvulsant – a type of medicine used to treat epilepsy – to help control your pain. Anticonvulsants were not originally designed to treat pain, but they can help to relieve

nerve pain by slowing down electrical impulses in the nerves and reducing their ability to send pain messages.

- ◇ They need to be taken regularly, not just when the pain attacks happen, but you can stop taking them if the episodes of pain cease and you're in remission.
- ◇ It's important to increase your dosage slowly. If the pain goes into remission, you can gradually reduce the dosage over a few weeks. Taking too much too soon, or stopping the medicine too quickly can cause serious problems.
- ◇ At the start, a type of anticonvulsant called carbamazepine, although several alternative anticonvulsants are available if this is ineffective or unsuitable.

Carbamazepine

The anticonvulsant carbamazepine is currently the only medicine licensed to treat trigeminal neuralgia. It can be very effective initially but may become less effective over time. It is usually taken at a low dose once or twice a day, with the dose being gradually increased and taken up to 4 times a day until it provides satisfactory pain relief.

Other medicines

Carbamazepine may stop working overtime. In this case, or if you experience significant side effects while taking it, you should be referred to a specialist to consider alternative medicines or procedures. There are several specialists you may be referred to for further treatment, including neurologists specializing in headaches, neurosurgeons, and pain medicine specialists.

In addition to carbamazepine, a number of other medicines have been used to treat trigeminal neuralgia, including:

- ◇ oxcarbazepine
- ◇ lamotrigine
- ◇ gabapentin
- ◇ pregabalin
- ◇ baclofen

None of these medicines are specifically licensed for the treatment of trigeminal neuralgia, which means they have not undergone rigorous clinical trials to determine whether they're effective and safe to treat the condition.

Peripheral neuropathy

Overview

Peripheral neuropathy refers to the conditions that result when nerves that carry messages to and from the brain and spinal cord and to the rest of the body are damaged or diseased.

The peripheral nerves make up an intricate network that connects the brain and spinal cord to the muscles, skin, and internal organs. Peripheral nerves come out of the spinal cord and are arranged along lines in the body called dermatomes. Typically, damage to a nerve will affect one or more dermatomes, which can be tracked to specific areas of the body. Damage to these nerves interrupts communication between the brain and other parts of the body and can impair muscle movement, prevent normal sensation in the arms and legs, and cause pain.

Types of Peripheral Neuropathy

Several different kinds of peripheral neuropathies stem from a variety of causes. They range from carpal tunnel syndrome (a traumatic injury common after chronic repetitive use of the hands and wrists, such as with computer use) to nerve damage linked to diabetes.

Neuropathies are typically classified according to the problems they cause or what is at the root of the damage. There also are terms that express how extensively the nerves have been damaged.

Causes

Many factors can cause peripheral neuropathies, so it is often difficult to pinpoint the origin. Neuropathies occur by one of three methods:

Acquired neuropathies are caused by environmental factors such as toxins, trauma, illness, or infection. Known causes of acquired neuropathies include:

- ◇ Diabetes
- ◇ Several rare inherited diseases
- ◇ Alcoholism
- ◇ Poor nutrition or vitamin deficiency
- ◇ Certain kinds of cancer and chemotherapy used to treat them
- ◇ Conditions where nerves are mistakenly attacked by the body's immune system or damaged by an overaggressive response to injury
- ◇ Certain medications
- ◇ Kidney or thyroid disease
- ◇ Infections such as Lyme disease, shingles, or AIDS

Hereditary neuropathies are not as common. Hereditary neuropathies

are diseases of the peripheral nerves that are genetically passed from parent to child. The most common of these is Charcot-Marie-Tooth disease type 1. It is characterized by weakness in the legs and, to a lesser degree, the arms -- symptoms that usually appear between mid-childhood and age 30. This disease is caused by degeneration of the insulation that normally surrounds the nerves and helps them conduct the electrical impulses needed for them to trigger muscle movement.

Idiopathic neuropathies are from an unknown cause. As many as one-third of all neuropathies are classified in this way.

Treatment

Treatment goals are to manage the condition causing your neuropathy and to relieve symptoms. If your lab tests indicate no underlying condition, your doctor might recommend watchful waiting to see if your neuropathy improves.

Medications

Besides medications used to treat conditions associated with peripheral neuropathy, medications used to relieve peripheral neuropathy signs and symptoms include:

Pain relievers. Over-the-counter pain medications, such as nonsteroidal anti-inflammatory drugs, can relieve mild symptoms. For more severe symptoms, your doctor might prescribe painkillers.

Medications containing opioids, such as tramadol or oxycodone, can lead to dependence and addiction, so these drugs generally are prescribed only when other treatments fail.

Anti-seizure medications. Medications such as gabapentin and pregabalin developed to treat epilepsy, may relieve nerve pain. Side effects can include drowsiness and dizziness.

Topical treatments. Capsaicin cream, which contains a substance found in hot peppers, can cause modest improvements in peripheral neuropathy symptoms. You might have skin burning and irritation when you apply the cream, but this usually lessens over time. Some people, however, can't tolerate it.

Lidocaine patches are another treatment you apply to your skin that might offer pain relief. Side effects can include drowsiness, dizziness, and numbness at the site of the patch.

Antidepressants. Certain tricyclic antidepressants, such as amitriptyline, doxepin, and nortriptyline, have been found to help relieve pain by interfering with chemical processes in your brain and spinal cord that cause you to feel pain.

The serotonin and norepinephrine reuptake inhibitor duloxetine and the extended-release antidepressant venlafaxine also might ease the pain of peripheral neuropathy caused by diabetes.

Side effects of antidepressants may include dry mouth, nausea, drowsiness, dizziness, decreased appetite, and constipation.

Therapies

Various therapies and procedures might help ease the signs and symptoms of peripheral neuropathy.

Transcutaneous electrical nerve stimulation (TENS). Electrodes placed on the skin deliver a gentle electric current at varying frequencies. TENS should be applied for 30 minutes daily for about a month.

Plasma exchange

Intravenous immune globulin. These procedures, which help suppress immune system activity, might benefit people with certain inflammatory conditions.

Plasma exchange involves removing your blood, then removing antibodies and other proteins from the blood and returning the blood to your body. In immune globulin therapy, you receive high levels of proteins that work as antibodies (immunoglobulins).

Physical therapy. If you have muscle weakness, physical therapy can help improve your movements. You may also need hand or foot braces, a cane, a walker, or a wheelchair.

Surgery. If you have neuropathies caused by pressure on nerves, such as pressure from tumors, you might need surgery to reduce the pressure.

Alternative medicine

Some people with peripheral neuropathy try complementary treatments for relief. Although researchers haven't studied these techniques as thoroughly as they have most medications, the following therapies have shown some promise:

Acupuncture. Inserting thin needles into various points in your body might reduce peripheral neuropathy symptoms. You might need multiple sessions before you notice improvement. Acupuncture is generally considered safe when performed by a certified practitioner using sterile needles.

Alpha-lipoic acid. This has been used as a treatment for peripheral neuropathy in Europe for years. Discuss using alpha-lipoic acid with your doctor because it can affect blood sugar levels. Other side effects can

include stomach upset and skin rash.

Herbs. Certain herbs, such as evening primrose oil, might help reduce neuropathy pain in people with diabetes. Some herbs interact with medications, so discuss the herbs you're considering with your doctor.

Amino acids. Amino acids, such as acetyl-L-carnitine, might benefit people who have undergone chemotherapy and people with diabetes. Side effects might include nausea and vomiting.

Lifestyle and home remedies

To help you manage peripheral neuropathy:

Take care of your feet, especially if you have diabetes. Check daily for blisters, cuts, or calluses. Wear soft, loose cotton socks and padded shoes. You can use a semi-circular hoop, which is available in medical supply stores, to keep bedcovers off hot or sensitive feet.

Exercise. Regular exercise, such as walking three times a week, can reduce neuropathy pain, improve muscle strength, and help control blood sugar levels. Gentle routines such as yoga and tai chi might also help.

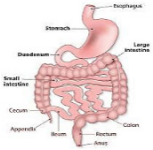
Quit smoking. Cigarette smoking can affect circulation, increasing the risk of foot problems and other neuropathy complications.

Eat healthy meals. Good nutrition is especially important to ensure that you get essential vitamins and minerals. Include fruits, vegetables, whole grains and lean protein in your diet.

Avoid excessive alcohol. Alcohol can worsen peripheral neuropathy.

Monitor your blood glucose levels. If you have diabetes, this will help keep your blood glucose under control and might help improve your neuropathy.

GASTROINTESTINAL DISORDERS



Functional GI disorders are those in which the gastrointestinal (GI) tract looks normal but doesn't work properly. They are the most common problems affecting the GI tract (including the colon and rectum). Constipation and irritable bowel syndrome (IBS) are two common examples**.**

Many factors may upset the GI tract and its motility (or ability to keep moving), including:

- ◇ Eating a diet low in fiber.
- ◇ Not enough exercise.
- ◇ Traveling or other changes in routine.
- ◇ Eating large amounts of dairy products.
- ◇ Stress.
- ◇ Resisting the urge to have a bowel movement.
- ◇ Resisting the urge to have bowel movements due to pain from hemorrhoids.
- ◇ Overusing laxatives (stool softeners) that, over time, weaken the bowel muscles.
- ◇ Taking antacid medicines containing calcium or aluminum.
- ◇ Taking certain medicines (especially antidepressants, iron pills, and strong pain medicines such as narcotics).
- ◇ Pregnancy.

Constipation

Constipation means it's hard to have a bowel movement (or pass stools), they are infrequent (less than three times a week) or incomplete. Constipation is usually caused by inadequate "roughage" or fiber in the diet or a disruption of the regular routine or diet.

Constipation causes a person to strain during a bowel movement. It may cause small, hard stools and sometimes anal problems such as fissures and hemorrhoids. Constipation is rarely the sign of a more serious medical condition.

Treatment:

- Increasing the amount of fibre.
- Regular exercising.
- Moving your bowels when you have the urge (resisting the urge causes constipation).

- If these treatment methods don't work, laxatives are a temporary solution. Note that the overuse of laxatives can make symptoms of constipation worse. Always follow the instructions on the laxative medicine, as well as the advice of your doctor.

Irritable bowel syndrome (IBS)

Irritable bowel syndrome (also called spastic colon, irritable colon, or nervous stomach) is a condition in which the colon muscle contracts more often than in people without IBS. Certain foods, medicines, and emotional stress are some factors that can trigger IBS.

Symptoms of IBS include:

- Abdominal pain and cramps.
- Excess gas.
- Bloating.
- Change in bowel habits such as harder, looser, or more urgent stools than normal.
- Alternating constipation and diarrhoea.

Treatment:

◇ Avoiding caffeine.
◇ Increasing fibre in the diet.
◇ Monitoring which foods trigger IBS (and avoiding these foods).
◇ Minimizing stress or learning different ways to cope with stress.
◇ Sometimes taking medicines as prescribed by your healthcare provider.

Structural GI disorders are those in which the bowel looks abnormal and doesn't work properly. Sometimes, the structural abnormality needs to be removed surgically. Common examples of structural GI disorders include haemorrhoids, diverticular disease, colon polyps, colon cancer and inflammatory bowel disease.

Anal disorders

Haemorrhoids

Haemorrhoids are swollen blood vessels that line the anal opening. They are caused by chronic excess pressure from straining during a bowel movement, persistent diarrhoea or pregnancy.

There are two types of haemorrhoids: internal and external.

Internal haemorrhoids

Internal haemorrhoids are blood vessels on the inside of the anal opening. When they fall into the anus as a result of straining, they become irritated and start to bleed. Ultimately, internal haemorrhoids can fall enough to prolapse (sink or stick) out of the anus.

Treatment

Include improving bowel habits (such as avoiding constipation, not straining during bowel movements and moving your bowels when you have the urge).

- Using elastic bands to eliminate the vessels.
- Removing them surgically. Surgery is needed only for a small number of patients with very large, painful and persistent haemorrhoids.

External haemorrhoids

External haemorrhoids are veins that lie just under the skin on the outside of the anus. Sometimes, after straining, the external hemorrhoidal veins burst and a blood clot forms under the skin. This very painful condition is called a pile.

Treatment

includes removing the clot and vein under local anaesthesia and /or removing the haemorrhoid itself.

ANAL FISSURES

Anal fissures are splits or cracks in the lining of the anal opening. The most common cause of an anal fissure is the passage of very hard or watery stools. The crack in the anal lining exposes the underlying muscles that control the passage of stool through the anus and out of the body. An anal fissure is one of the most painful problems because the exposed muscles become irritated from exposure to stool or air, and leads to intense burning pain, bleeding or spasm after bowel movements.

Initial treatment for anal fissures includes pain managment, dietary fibre to reduce the occurrence of large, bulky stools and sets of baths (sitting in a few inches of warm water). If these treatments don't relieve pain, surgery might be needed to repair the sphincter muscle.

Perianal abscesses

Perianal abscesses can occur when the tiny anal glands that open on the inside of the anus become blocked, and the bacteria always present in these glands cause an infection. When pus develops, an abscess forms. Treatment includes draining the abscess, usually under local anaesthesia in the doctor's office.

Anal fistula

An anal fistula often follows drainage of an abscess and is an abnormal tube-like passageway from the anal canal to a hole in the skin near the opening of the anus. Body wastes travelling through the anal canal are diverted through this tiny channel and out through the skin, causing itching and irritation. Fistulas also cause drainage, pain and bleeding. They rarely heal by themselves and usually need surgery to drain the abscess and "close off" the fistula.

Other perianal infections

Sometimes the skin glands near the anus become infected and need to be drained. Just behind the anus, abscesses can form that contains a small tuft of hair at the back of the pelvis (called a pilonidal cyst). Sexually transmitted diseases that can affect the anus include anal warts, herpes, AIDS, chlamydia and gonorrhoea.

Common Intestinal Parasites

Intestinal parasites cause significant morbidity and mortality. Diseases caused by Enterobius vermicularis, Giardia lamblia, Cyclostome duodenale, Nicator americanus, and Entamoeba histolytica occur in Yemen.

E. vermicularis, or pinworm, causes irritation and sleep disturbances.

Diagnosis can be made using the "cellophane tape test." Treatment includes mebendazole and household sanitation.

Giardia causes nausea, vomiting, malabsorption, diarrhoea, and weight loss. Stool ova and parasite studies are diagnostic. Treatment includes metronidazole. Sewage treatment, proper handwashing, and consumption of bottled water can be prevented.

duodenal and N. americanus are hookworms that cause blood loss, anaemia, pica, and wasting. Finding eggs in the faces is diagnostic. Treatments include albendazole, mebendazole, pyrantel pamoate, iron supplementation, and blood transfusion. Preventive measures include wearing shoes and treating sewage.

E. histolytica can cause intestinal ulcerations, bloody diarrhoea, weight loss, fever, gastrointestinal obstruction, and peritonitis. Amoebas can cause abscesses in the liver that may rupture into the pleural space, peritoneum, or pericardium. Stool and serologic assays, biopsy, barium studies, and liver imaging have diagnostic merit. Therapy includes luminal and tissue amebicides to attack both life-cycle stages. Metronidazole, chloroquine, and aspiration are treatments for liver abscesses. Careful sanitation and the use of peeled foods and bottled water are preventive.

Treatment and Prevention of Parasite Infections

PARASITE	TREATMENT	PREVENTION
Enterobius vermicularis	Primary: Mebendazole (Verm ox), 100 mg orally once Secondary: Pyrantel pamoate (Pin-Rid), 11 mg per kg (maximum of 1 g) orally once; or albendazole (Ablaze), 400 mg orally once If persistent, repeat treatment in two weeks. Do not give to children younger than two years.	Treat household contacts. Clean bedrooms, and bedding.
Giardia lamblia	Adults: Metronidazole (Flagyl), 250 mg orally three times daily for five to seven days- Pregnant women with mild symptoms: consider deferring treatment until after delivery. Pregnant women with severe symptoms: paromomycin (Humatin), 500 mg orally four times daily for seven to 10 days; metronidazole is acceptable. Children: albendazole, 400 mg orally for five days. Asymptomatic carriers in developed countries: treat using regimen for adults or children. asymptomatic carriers in developing countries: not cost-effective to treat because of high reinfection rate.	Use proper sewage disposal and water treatment (flocculation, sedimentation, filtration, and chlorination). Consume only bottled water in endemic areas. Water treatment options: Boil water for one-minute Heat water to 70 C (158 F) for 10 minutes Portable camping filter Iodine purification tablets for eight hours. Daycare centres: Proper disposal of diapers Proper and frequent handwashing
Ancylostoma duodenale, Necator americanus	Albendazole, 400 mg orally once Mebendazole, 100 mg orally twice daily for three days Pyrantel pamoate, 11 mg per kg (maximum of 1 g) once Iron supplementation is beneficial even before diagnosis or treatment initiation. Packed red blood cells (as needed) can minimize risk of volume overload in severely hypo-proteinemic patients. Confirm eradication with follow-up stool examination two weeks after discontinuation of treatment.	Use proper and continued shoe wear. Use proper sewage disposal.

PARASITE	TREATMENT		PREVENTION
Entamoeba histolytica	Intestinal disease: use both luminal amebicide (for cysts) and tissue amebicide (for trophozoites)		Use proper sanitation to eradicate cyst carriage. Avoid eating unpeeled fruits and vegetables. Drink bottled water. Use iodine disinfection of nonbottled water.
	Luminal:		
		Iodoquinol (Yodoxin), 650 mg orally three times daily for 20 days	
		Paromomycin, 500 mg orally three times daily for seven days	
		Diloxanide furoate (Furamide), 500 mg orally three times daily for 10 days (available from CDC)	
	Tissue:		
		Metronidazole, 750 mg orally three times daily for 10 days	
	Liver abscess:		
		Metronidazole, 750 mg orally three times daily for five days, then paromomycin, 500 mg three times daily for seven days	
		Chloroquine (Aralen), 600 mg orally per day for two days, then 200 mg orally per day for two to three weeks (higher relapse rates)	
	Aspirate if:		
		Pyogenic abscess is ruled out; there is no response to treatment in three to five days; rupture is imminent; pericardial spread is imminent	

CDC = Centres for Disease Control and Prevention.

table Advantages and Disadvantages of Amoebicidal Agents

Diarrhoea

Diarrheal diseases are very common and, in most cases, self-limiting. Diarrhoea is defined either as the presence of more than three bowel movements per day, water content exceeding 75%, or a stool quantity of at least 200–250 g per day.

ACUTE DIARRHEA

lasts for no longer than 14 days and is typically caused by viral or bacterial infection or food poisoning.

Chronic diarrhoea

is often caused by underlying gastrointestinal or endocrinological conditions, such as inflammatory bowel disease or hyperthyroidism.

Diarrhoea is present if one of the following criteria is fulfilled:

1. Frequent defecation: ≥ 3 times per day
2. Altered stool consistency: increased water content (Take the shape of the container)
3. Increase in stool quantity: more than 200–250 g per day
   - ○ Acute diarrhoea: lasting ≤ 14 days
   - ○ Persistent diarrhoea: lasting > 14 days
   - ○ Chronic diarrhoea: lasting > 30 days

Etiology of Diarrhea

Infectious causes

		Conditions
Viral		• Norovirus infection • Rotavirus infection • Adenovirus infection (mainly serotype 3, 40, and Cytomegalovirus infection
Bacterial		• Campylobacter enteritis, Shigellosis, Salmonellosis, Cholera • Diarrheagenic E. coli infection (travellers' diarrhoea), Yersiniosis (especially in day-care) • Clostridium difficile infection (antibiotic-associated diarrhoea) • Typhoid fever, Mycobacterium avium-intracellular • Tropheryma whipplei (i.e., Whipple disease), Legionella infection
Parasitic	**Protozoan**	• Giardiasis, Amebiasis, Cryptosporidiosis,
	Helminth infections	• Toxocariasis, Enterobiasis, Ascariasis, Trichinosis, Taenia , infections (taeniasis), Hookworm infection, Diphyllobothriasis

Non-infectious

	Conditions
Foodborne toxins	• S. aureus intoxication, Botulism, Bacillus cereus infection • Tetrodotoxin, ciguatoxin

	Conditions
Food poisoning	• Aflatoxin, Histamine toxicity • Chemical contaminants (e.g., lead, cadmium, insecticides, arsenic) Mushroom poisoni[n]g]
Gastrointestinal	• Malnutrition: vitamin deficiency (e.g., pellagra)
	• Malabsorption or maldigestion ○ Celiac disease, Lactose intolerance ○ Exocrine pancreatic insufficiency (e.g., due to chronic pancreatitis) ○ Diabetic autonomic neuropathy ○ Bile acid diarrhoea (e.g., due to ileal resection, biliary-enteric fistula, cholestasis, post-cholecystectomy) ○ Amyloidosis of the gastrointestinal tract
	• Colitis ○ Inflammatory bowel disease ○ Crohn disease ○ Ulcerative colitis ○ Irritable bowel syndrome ○ Microscopic colitis ○ Ischemic colitis ○ Radiation colitis
	Tumour/stenotic processes: paradoxical diarrhoea (involuntary seepage of liquid faeces in patients with chronic constipation)

Risk factors and disease transmission

Transmission by direct contact and droplets

- Day care attendance, nursing home residency, hospitalization
- Contaminated food and water (see "traveller's diarrhoea")
- Animal exposure

Clinical features

- Acute or chronic diarrhoea (see "Definition" above)
- Further possible symptoms [9]
  - ○ Fever
  - ○ Abdominal pain and cramping
  - ○ Blood in stool
  - ○ Nausea and vomiting in cases of gastroenteritis
  - ○ Signs of dehydration (e.g., low blood pressure, dry mucous membranes, decreased urine output) in severe cases
  - ○ Chronic cases: malnutrition and, in children, failure to thrive

self-induced diarrhoea

- diarrhoea, usually by laxative abuse (often occurs in individuals with factitious disorders)

- Epidemiology
  - ○ Most prevalent in women
  - ○ Patients are usually employed in the health field.
  - ○ History of multiple hospital admissions
- Clinical features: chronic watery diarrhoea without an identifiable cause

Diagnostics

- Laboratory tests: metabolic acidosis, metabolic alkalosis, hypokalaemia, hypermagnesemia
- Colonoscopy: may show melanosis coli in cases of anthraquinone abuse (e.g., Senna, aloe Vera)

Treatment

- Correction of electrolyte disturbances and dehydration
- Referral to psychotherapy

The workup for diarrhoea includes a detailed patient history (e.g., recent travel), physical examination, and laboratory tests to assess severe cases.

Laboratory tests

Laboratory tests are usually not required in acute cases and are instead reserved for diagnosis of severe or chronic disease.

Indications

- Diarrhoea lasting > 4 days
- High fever
- Blood in stools
- Suspicion of IBD
- Immunosuppression

Tests

CBC: may show anemia or leukocytosis

- ◇ Stool samples
- ◇ Leukocytes
- ◇ Ova and/or parasites

Stool culture:

- a test used to identify bacteria, viruses, fungi, or parasites in stool often in the context of a suspected gastrointestinal infection.
- Stool cultures are not generally recommended, as the tests are expensive and have low sensitivity.
- Indications: suspected invasive bacterial enteritis, severe illness, or fever (> 38.5°), required hospitalization, and/or stool tests positive for leukocytes/occult blood/lactoferrin

Treatment

Because most cases of acute diarrhoea are self-limited, symptomatic treatment is most common, focusing on oral rehydration. Therapy rarely involves medication.

- Rehydration (especially in children)
  - Mild to moderate dehydration: oral rehydration therapy with electrolyte-containing fluids, e.g., apple juice or oral rehydration solution
  - Severe cases: consider hospitalization; hydration with IV 0.9% sodium chloride
- Antidiarrheal agents (e.g., loperamide)
  - May be given in mild to moderate cases
  - Should be avoided if there is fever or blood in stools (indicative of systemic disease)
- Antibiotics: are generally not indicated
- Other: treatment of the underlying condition in the case of chronic diarrhoea

Peptic ulcer disease

Peptic ulcer disease occurs when open sores, or ulcers, form in the stomach or first part of the small intestine. Many cases of peptic ulcer disease develop because a bacterial infection eats away the protective lining of the digestive system. People who frequently take pain relievers are more likely to develop ulcers. studies have revealed two main causes of ulcers:

- Helicobacter pylori (H. pylori) bacteria.
- Pain-relieving NSAID medications.

H. pylori bacteria

H. pylori commonly infects the stomach. About 50% of the world's population has an H. pylori infection, often without any symptoms. Researchers believe people can transmit H. pylori from person to person, especially during childhood.

However, for most people, the presence of H. pylori doesn't have a negative impact. Only 10% to 15% of people with H. pylori end up developing ulcers.

Not everyone who takes NSAIDs will develop ulcers. NSAID use coupled with an H. pylori infection is potentially the most dangerous. People who have H. pylori and who frequently use NSAIDs are more likely to have damage to the mucus layer, and their damage can be more severe. Developing an ulcer from NSAID use also increases if you:

- Take high doses of NSAIDs.

- Are 70 years or older.
- Are female.
- Use corticosteroids (drugs your doctor might prescribe for asthma, arthritis or lupus) at the same time as taking NSAIDs.
- Use NSAIDS continuously for a long time

Can coffee and spicy foods cause ulcers?

It's a common misconception that coffee and spicy foods can cause ulcers. In the past, you might have heard that people with ulcers should eat a bland diet. But now we know that if you have an ulcer, you can still enjoy whatever foods you choose as long as they don't make your symptoms worse.

Symptoms.

◇ Some people with ulcers doesn't experience any symptoms. But signs of an ulcer can include:
◇ Gnawing or burning pain in your middle or upper stomach between meals or at night.
◇ Pain that temporarily disappears if you eat something or take an antacid.
◇ Bloating.
◇ Heartburn.
◇ Nausea or vomiting.

In severe cases, symptoms can include:

- Dark or black stool (due to bleeding).
- Vomiting.
- Weight loss.
- Severe pain in your mid- to the upper abdomen.

Diagnosis.

Endoscopy

If you have severe symptoms, your provider may recommend an upper endoscopy to determine if you have an ulcer. In this procedure, the doctor inserts an endoscope (a small, lighted tube with a tiny camera) through your throat and into your stomach to look for abnormalities.

H. Pylori tests

Tests for H. pylori are now widely used and your provider will tailor treatment to reduce your symptoms and kill the bacteria. A breath test is the easiest way to discover H. pylori. Your provider can also look for it with a blood or stool test, or by taking a sample during an upper endoscopy.

Treatment

For most people, doctors treat ulcers with medications, including:

- **Proton pump inhibitors (PPI):** These drugs reduce acid, which allows the ulcer to heal. PPIs include Omeprazole and Nexium®.
- **Histamine receptor blockers (H2 blockers):** These drugs also reduce acid production and include Tagamet®, Pepcid®, Zantac® and Axid®.
- **Antibiotics:** These medications kill bacteria. Doctors use them to treat H. pylori.
- **Protective medications:** Like a liquid bandage, these medications cover the ulcer in a protective layer to prevent further damage from digestive acids and enzymes. commonly recommend Carafate® or Pepto-Bismol®.

Non–bismuth-based quadruple **therapy** (10 days of a proton pump inhibitor, amoxicillin 1 g, clarithromycin 500 mg [Biaxin], and metronidazole 500 mg [Flagyl] or tinidazole 500 mg [Tindamax] twice daily) has the highest success rate in eradicating H. pylori, although other regimens may also be used.

Type	Regimen	Duration	Eradication rate	Comments
First line				
Standard triple therapy	PPi, amoxicillin 1 g, and clarithromycin 500 mg twice daily	7 to 10 days (up to 14 days)	70% to 5%	Preferred
	Ppi, clarithromycin 500 mg, and metronidazole 500 mg twice daily	10 to 14 days	70% to 5%	
Sequential therapy	Ppi and amoxicillin 1 g twice daily, followed by ppi, clarithromycin 500 mg, and tinidazole 500mg or metronidazole 500 mg twice daily	10 days (5 days for each regimen)	> 84%	Needs validation in the united states

Treatment Regimens for Helicobacter pylori Infection

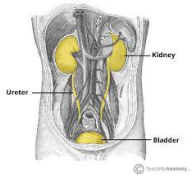
Second line				
Type	**Regimen**	**Duration**	**Eradication rate**	**Comments**
Non–bismuth-based quadruple therapy (concomitant therapy)	Ppi, amoxicillin 1 g, clarithromycin 500 mg, and tinidazole 500 mg or metronidazole 500 mg twice daily	10 days	90%	Less complex than sequential therapy with similar eradication rates
Bismuth-based quadruple therapy	Bismuth subsalicylate 525 mg or subcitrate 300 mg, metronidazole 250 mg, and tetracycline 500 mg, four times daily; and PPI twice daily	10 to 14 days	75% to 90%	May also be used if first-line therapy fails
Levofloxacin-based triple therapy	PPI and amoxicillin 1 g twice daily, and levofloxacin 500 mg once daily	10 days		Needs validation in United States; should be used as salvage therapy only

PPI = proton pump inhibitor.

Eradication heals most duodenal ulcers and greatly diminishes the risk of recurrent bleeding.[3] A systematic review found that treatment of H. pylori infection is more effective than antisecretory non-eradicating therapy (with or without long-term maintenance antisecretory therapy) in preventing recurrent bleeding from peptic ulcer. Current data suggest that increasing the duration of therapy to 14 days significantly increases the eradication rate.

GENITO-URINARY TRACT DISORDERS

Urinary tract infections (UTIS)



Can affect different parts of the urinary tract, including the bladder (cystitis), urethra (urethritis) or kidneys (kidney infection). Most UTIs can be easily treated with antibiotics. UTI symptoms may be difficult to spot in people with dementia. Children with UTIs may also, appear generally unwell – babies may be irritable, not feed properly and have a high temperature of 37.5C or above, Wet the bed or wet themselves Deliberately hold in their urine because it stings

Causes

Most UTIs in women (roughly 85%) are caused by a bacterium known as Escherichia coli (E. coli). Other types of bacteria, such as Staphylococcus saprophyticus may infrequently be present.

UTI symptoms in women and men are similar. However, urinary tract infections occur more frequently in women than in men. This is because a woman's urethra (the tube that empties urine from the bladder) is shorter and closer to the anus than in men, allowing easier entry of bacteria like E. Coli into the urethra.

Menopause, lowered levels of oestrogen, and elevated vaginal pH also increase the risk of UTI. Women are also more likely to get an infection after sexual activity or when using a diaphragm and spermicide for birth control. Other risk factors for the development of UTIs include catheter use, urinary tract structural abnormalities, diabetes, and a suppressed immune system.

Things you can do yourself

- ◇ Mild urinary tract infections (UTIs) often pass within a few days. To help ease the pain while your symptoms clear up:
- ◇ Take paracetamol – you can give children liquid paracetamol
- ◇ Place a hot water bottle on your tummy, back or between your thighs
- ◇ Rest and have plenty of fluids – this helps your body to flush out the bacteria
- ◇ It may also help to avoid having sex until you feel better.
- ◇ One cannot pass a UTI on to your partner, but sex may be uncomfortable.

Important

Avoid taking NSAIDs like ibuprofen or aspirin if you have a kidney infection. This may increase the risk of kidney problems.

There are some things you can do to try to prevent a UTIs.

Do

- wipe from front to back when you go to the toilet
- try to fully empty your bladder when you pee
- drink plenty of fluids
- take showers instead of baths
- wear loose cotton underwear
- pee as soon as possible after sex
- change your baby's or toddler's nappies regularly

Don't

- Do not use perfumed bubble bath, soap or talcum powder
- Do not hold your pee in if you feel the urge to go
- Do not wear tight, synthetic underwear, such as nylon
- Do not wear tight jeans or trousers
- Do not use condoms or diaphragms with spermicidal lube on them – try non-spermicidal lube or a different type of contraception

Treatment of UTI:

There are multiple types of antibiotics used to treat urinary tract infections (UTIs). Different treatments may be recommended in different areas of the country based on regional patterns of antibiotic resistance. Most patients with an uncomplicated UTI will begin treatment without any special diagnostic test, although a urinalysis may be performed by taking a urine sample.

In a urinalysis, the chemical components, the urine colour, clarity, and a view of a sample under the microscope are determined. A urine culture may be ordered, too, but is not always needed to start treatment. A urine culture can define the specific bacteria causing the UTI in more complicated cases or in the case of treatment failure.

Symptoms like burning and stinging while urinating will usually clear up within one day after starting treatment. Be sure to finish your entire course of medication. If symptoms are still present after 2 to 3 days, further investigations may be required. More extensive diagnostic procedures or imaging tests like an X-ray may be required if you continue to have frequent UTIs.

Choice of Antibiotic for UTI Treatment

Amoxicillin+clavulanic acid 500mg + 125mg q8h ORAL

Treatment duration: 3-5 days

Active against some ESBL-producing isolates **OR**

Nitrofurantoin ORAL

50 mg q6h (modified release formulation

50 mg q6h (immediate-release formulation)

Treatment duration: 5 days

Nitrofurantoin is the preferred treatment option for acute lower UTI and is active against most ESBL-producing isolates **OR**

Sulfamethoxazole+trimethoprim

800 mg+160 mg q12h ORAL

Treatment duration: 3 days

Resistance is high in many settings and NOT active against

most ESBL-producing isolates **OR**

Trimethoprim 200 mg q12h ORAL

Treatment duration: 3 days

Natural remedies.

- ◇ A supplement called D-mannose.
- ◇ Cranberry juice or tablets probiotic called lactobacillus
- ◇ Research suggests D-mannose might help prevent UTIs in women who are not pregnant.

It's not clear if cranberry products or lactobacillus help.

Be aware that D-mannose and cranberry products can contain a lot of sugar.

Are quinolones safe?

The fluoroquinolones, such as ciprofloxacin (Cipro) and levofloxacin (Levaquin) have also been commonly used for simple UTIs; however, FDA safety recommendations strongly suggest that this class be reserved for more serious infections and only be used if other appropriate antibiotics are not an option.

- An FDA safety review found that both oral and injectable fluoroquinolones (also called "quinolones") are associated with serious and potentially disabling side effects involving tendons, muscles, joints, nerves and the central nervous system. These adverse effects can occur soon after administration to weeks after exposure, and may potentially be permanent.
- Patients should be informed about the use of fluoroquinolones and their side effects with their healthcare provider.

However, certain oral fluoroquinolones may be appropriate for more

complicated UTIs, including pyelonephritis and complicated UTIs in men with prostate involvement. For the outpatient treatment of uncomplicated pyelonephritis, the following quinolones may be appropriate. Based on resistance patterns (>10%), an initial dose of a long-acting parenteral antimicrobial, such as ceftriaxone, may be needed, or a 24-hour dose of an aminoglycoside. ciprofloxacin.)

The use of an intravenous (IV) antibiotic for a UTI?

If pregnant, have a high five, or cannot keep food and fluids down, the patient may be admitted ted to the hospital so as to have treatment with intravenous (IV) antibiotics for a complicated UTI. and continue with oral antibiotics when your infection starts to improve.

In areas with fluoroquinolone resistance exceeding 10%, in patients with more severe pyelonephritis, those with a complicated UTI who have allergies to quinolones, or are unable to tolerate the drug class, intravenous therapy with an agent such as ceftriaxone, or an aminoglycoside, such as gentamicin or tobramycin, may be appropriate. Your ongoing treatment should be based on susceptibility data received from the laboratory.

Pyelonephritis

Pyelonephritis is inflammation of the kidney, typically due to a bacterial infection. Symptoms most often include fever and flank tenderness. Other symptoms may include nausea, burning with urination, and frequent urination. Complications may include pus around the kidney, sepsis, or kidney failure. When repeated or persistent attacks occur, the condition is called chronic pyelonephritis. The chronic form is rare, but it happens more often in children or people with urinary obstructions.

Acute pyelonephritis is a sudden and severe kidney infection. It causes the kidneys to swell and may permanently damage them. Pyelonephritis can be life-threatening.

Treatment

Ambulatory younger women who present with signs and symptoms of uncomplicated acute pyelonephritis may be candidates for outpatient therapy. They must be otherwise healthy and must not be pregnant. Studies have shown that outpatient therapy for selected patients is as safe as inpatient therapy for a comparable group of patients and is much less expensive. Initially should be treated vigorously with oral or IV fluids, antipyretic pain medication, and a dose of parenteral antibiotics.

Admission is usually appropriate for patients who are severely ill, pregnant, or elderly or who have comorbid disorders that increase the complexity of management or the complication rate (e.g., diabetes mellitus, chronic

lung disease, congenital or acquired immunodeficiency). Admission may also be advisable for patients whose social situation is unstable, because of the possibility of poor compliance or poor follow-up.

Emergency surgery may be indicated in a patient with fever or positive blood culture results persisting longer than 48 hours; in a patient whose condition deteriorates; or in a patient who appears toxic for longer than 72 hours. These patients may have an abscess, emphysematous pyelonephritis, or an obstructing calculus.

The aetiology may not be immediately evident, but an unexpected change in the clinical picture warrants immediate evaluation for potential surgical intervention.

Antibiotic Selection

Antibiotic selection is typically empirical because the results of blood or urine cultures are rarely available by the time a decision must be made. Initial selection should be guided by local antibiotic resistance patterns. Culture results from specimens collected before the initiation of therapy should be checked in 48 hours to determine antibiotic efficacy. The pathogen in community-acquired infections is usually E coli or other Enterobacteriaceae

First-line therapy

- ◇ Ciprofloxacin (Cipro) 500 mg PO BID for 7d **OR**
- ◇ Ciprofloxacin extended-release (Cipro XR) 1000 mg PO daily for 7d **OR**

If fluoroquinolone resistance,

- ◇ Cefotaxime 1 g q8h IV/IM for 7 days

OR

- ◇ Ceftriaxone 1 g q24h IV/IM for 7 days

AND/OR

- ◇ Amikacin 15 mg/kg q24h IV for 7 days

AND/OR

- ◇ Gentamicin 5 mg/kg q24h IV for 7 days

Catheter-related urinary tract infection (UTI)

Transmission and Pathogens

This occurs because urethral catheters inoculate organisms into the bladder and promote colonization by providing a surface for bacterial adhesion and causing mucosal irritation. The presence of a urinary catheter is the most important risk factor for bacteriuria. Once a catheter is placed, the daily incidence of bacteriuria is 3-10%. Between 10% and 30% of

patients who undergo short-term catheterization (i.e., 2-4 days) develop bacteriuria and are asymptomatic. and. about 80% of nosocomial UTIs are related to urethral catheterization;
Enteric pathogens (e.g., Escherichia coli) are most commonly responsible, Enterobacter species and yeast also are known to cause infection. Candida, especially Candida albicans, is the second-most-common organism that can cause catheter-associated urinary tract infection or asymptomatic colonization, although the isolation of fungi from urine rarely indicates active infection.

Risk factors for bacteriuria

In patients who are catheterized include longer duration of catheterization, colonization of the drainage bag, diarrhoea, diabetes, absence of antibiotics, female gender, renal insufficiency, errors in catheter care, catheterization late in the hospital course, and immunocompromised or debilitated states (Refer to CDC guidelines 2009 (for prevention of catheter-associated urinary tract infections (UTIs))

Symptoms

Catheter-related urinary tract infection (UTI) generally is nonspecific; most patients present with fever and leucocytosis. Pyuria and elevated bacterial colony counts are seen in all patients in whom a catheter has been in place for more than a few days. In this situation, their presence is not synonymous with a UTI.

Treatment & Management

In some patients with bacteriuria, removal of the catheter suffices. To reduce the risk of urinary tract infection (UTI), antibiotic treatment may be considered in patients with asymptomatic bacteriuria that persists 48 hours after removal of a short-term indwelling catheter. A specimen for urine culture should be obtained before initiation of antibiotic therapy, in patients whose symptoms resolve promptly, 7 days is the recommended duration of antibiotic treatment. In those with a delayed response or with bacteraemia, 10-14 days of treatment is recommended. A regimen of quinolone may be considered. In women older than 65 years who develop a UTI after removal of an indwelling catheter and who have no upper urinary tract symptoms, a 3-day antimicrobial regimen may be considered.

Cystitis

Cystitis is an inflammation of the bladder. In most cases, the cause of cystitis is a urinary tract infection (UTI). A UTI happens when bacteria enter the bladder or urethra and begin to multiply. Cystitis is usually caused by a bladder infection. It's a common type of urinary tract infection (UTI), particularly in women, and is more of a nuisance than a cause for serious concern. Mild cases will often get better by themselves

within a few days. However, some people experience episodes of cystitis frequently and may need regular or long-term treatment. There's also a chance that cystitis could lead to a more serious kidney infection in some cases, so it's important to seek medical advice if your symptoms do not improve.

Signs and symptoms of cystitis

- ◇ The main symptoms of cystitis include:
- ◇ Pain, burning or stinging when on urination
- ◇ Needing to urinate more often and urgently than normal
- ◇ Urine that's dark, cloudy or strong-smelling
- ◇ Pain low down in the tummy

Possible symptoms in young children include:

- ○ A high temperature (fever) of 38C or above.
- ○ Weakness or irritability.
- ○ Reduced appetite and vomiting

causes

Most cases are thought to occur when bacteria that live harmlessly in the bowel or on the skin get into the bladder through the tube that carries urine out of your body (urethra). It's not always clear how this happens. Increase the risk of getting it, including:

- ◇ Having sex
- ◇ Wiping the bottom from back to front after going to the toilet
- ◇ Having a thin tube inserted into the urethra to drain the bladder (urinary catheter)
- ◇ Younger than 1 or older than 75
- ◇ Pregnancy
- ◇ Using a diaphragm for contraception
- ◇ Having diabetes

Women may get cystitis more often than men because their bottom (anus) is closer to their urethra and their urethra is much shorter, which means bacteria may be able to get into the bladder more easily.

Treatment

If you have been having mild symptoms for less than 3 days or you have had cystitis before and do not feel you need to see a doctor,

- ◇ Take paracetamol or ibuprofen
- ◇ Drink plenty of water
- ◇ Hold a hot water bottle on your tummy or between your thighs
- ◇ Avoid having sex
- ◇ Urinate frequently
- ◇ Wipe from front to back when you go to the toilet

Gently wash around your genitals with a skin-sensitive soap. Some people believe that cranberry drinks and products that reduce the acidity of their urine (such as sodium bicarbonate or potassium citrate) will help. But there's a lack of evidence to suggest they're effective. Recurring cystitis will need a low dose of antibiotics for you to take continuously over several months.

Interstitial cystitis

If you have long-term or frequent pelvic pain and problems peeing, you may have a condition called interstitial cystitis. This is a poorly understood bladder condition that mostly affects middle-aged women. Unlike regular cystitis, there's no obvious infection in the bladder and antibiotics do not help. But remedies to reduce the symptoms may help, such as alkalinising the urine

Urinary incontinence

Urinary incontinence is the unintentional passing of urine. It's a common problem thought to affect millions of people. There are several types of urinary incontinence, including:

1. Stress incontinence – when urine leaks out at times when the bladder is under pressure; for example, when you cough or laugh, is usually the result of the weakening of or damage to the muscles used to prevent urination, such as the pelvic floor muscles and the urethral sphincter
2. Urge incontinence – when urine leaks as you feel a sudden, intense urge to pee, or soon afterwards, is usually the result of overactivity of the detrusor muscles, which control the bladder.
3. Overflow incontinence (chronic urinary retention) – when unable to fully empty your bladder, which causes frequent leaking, is often caused by an obstruction or blockage in your bladder, which prevents it from emptying fully.
4. Total incontinence – when the bladder cannot store any urine at all, which causes you to pass urine constantly or have frequent leaking, may be caused by a problem with the bladder from birth, a spinal injury, or a small, tunnel-like hole that can form between the bladder and a nearby area (fistula).

It's also possible to have a mixture of both stress and urge urinary incontinence. Certain things can increase the chances of urinary incontinence, including, Pregnancy, obesity, a family history of incontinence and increasing age – although incontinence is not an inevitable part of ageing

Medicines that may cause incontinence

Some medicines can disrupt the normal process of storing and passing urine or increase the amount of urine you produce. These include:

1. Angiotensin-converting enzyme (ACE) inhibitors
2. diuretics
3. some antidepressants
4. hormone replacement therapy (HRT)
5. sedatives

Stopping these medicines, if advised to do so by a doctor, may help resolve your incontinence.

Treatment

Non-surgical treatments: some simple measures to see if they help improve the symptoms. These may include:

- ◇ lifestyle changes such as losing weight and cutting down on caffeine and alcohol
- ◇ pelvic floor exercises, where you strengthen your pelvic floor muscles by squeezing them
- ◇ bladder training, where you learn ways to wait longer between needing to urinate and passing urine

You may also benefit from the use of incontinence products, such as absorbent pads and handheld urinals. Medicine may be recommended if you're still unable to manage

Medicine for stress incontinence

If stress incontinence does not significantly improve with lifestyle changes or exercises, However, if you're unsuitable for surgery or want to avoid an operation, you may benefit from an antidepressant medicine:

Duloxetine. This can help increase the muscle tone of the urethra, to help keep it closed. The tablets are taken twice a day and assessed after 2 to 4 weeks to see if the medicine is beneficial or causing any side effects. Possible side effects of duloxetine can include nausea, dry mouth, extreme tiredness (fatigue) and constipation. Do not suddenly stop taking duloxetine, as this can also cause unpleasant side effects., reduce the dose gradually. Duloxetine is not suitable for everyone, however, so a GP will discuss any other medical conditions you have to determine if you can take it.

Medicines for urge incontinence

Antimuscarinic are used if bladder training is not effective for your urge incontinence. Antimuscarinic may also be prescribed if you have overactive bladder syndrome, which is the frequent urge to urinate that can happen with or without urinary incontinence. The most common types of antimuscarinic medicines used to treat urge incontinence include

1. Oxybutynin
2. Tolterodine
3. Darifenacin

These are usually taken as a tablet that you swallow, 2 or 3 times a day, you will usually start taking a low dose to minimise any possible side effects. The dose can be increased until the medicine is effective.

Medicine for nocturia:

A low-dose version of a medicine called desmopressin may be used to treat nocturia, which is the frequent need to get up during the night to urinate, by helping to reduce the amount of urine produced by the kidneys.

Glomerulonephritis

Glomerulonephritis occurs on its own or as part of another disease, such as lupus or diabetes (Diabetes nephropathy), Post streptococcal infection. Sometimes the disease runs in families and sometimes the cause is unknown. Severe or prolonged inflammation associated with glomerulonephritis can damage the kidneys. Treatment depends on the type of glomerulonephritis.

Symptoms

- ◇ Pink or cola-coloured urine from red blood cells in the urine (haematuria)
- ◇ Foamy urine due to excess protein (proteinuria)
- ◇ High blood pressure (hypertension)
- ◇ Fluid retention (oedema) with swelling evident in face, hands, feet and abdomen

Diagnosis

a. **Kidney biopsy**
b. **Urine test.** A urinalysis might show red blood cells and red cell casts in your urine,
c. **Blood tests.** increased blood levels of creatinine or urea, are red flags.

Treatment.

Treatment depends on Whether it is an acute or chronic form of the disease, the underlying cause, And the type and severity of the signs and symptoms. Some cases of acute glomerulonephritis, especially those that follow a strep infection, might improve on their own and require no treatment. If there's an underlying cause, such as high blood pressure,

an infection or an autoimmune disease, treatment will be directed to the underlying cause. In general, the goal of treatment is to protect your kidneys from further damage.

Therapies for associated kidney failure

For acute glomerulonephritis and acute kidney failure, dialysis can help remove excess fluid and control high blood pressure. The only long-term therapies for end-stage kidney disease are kidney dialysis and kidney transplants. When a transplant isn't possible, often because of poor general health, dialysis is the only option.

Restrict your salt intake to prevent or minimize fluid retention, swelling, and hypertension

Consume less protein and potassium to slow the build-up of wastes in your blood

Maintain a healthy weight

Control your blood sugar level if you have diabetes

Benign prostate enlargement

Benign prostate enlargement (BPE) is the medical term to describe an enlarged prostate, a condition that can affect the passage of urine. BPE is common in men aged over 50. It's not cancer it's not usually a serious threat to health and does not carry a risk of having prostate cancer. The risk of prostate cancer is no greater for men with an enlarged prostate than it is for men without an enlarged prostate. Symptoms of benign prostate enlargement

- ◇ Difficulty starting urine
- ◇ A frequent need to pee.
- ◇ Difficulty in fully emptying the bladder.

In some men, the symptoms are mild and do not need treatment. In others, they can be very troublesome. (I.e., weak stream, hesitancy, urinary frequency, urgency, nocturia, terminal dripping, or urge incontinence.)

Diagnosis:

Primarily based on digital rectal examination

Treatment

Treatment for an enlarged prostate will depend on the severity of symptoms. If you have mild symptoms, you do not usually need immediate treatment, but you'll have regular prostate check-ups, and non-pharmacotherapy, be advised to make lifestyle changes, such as:

- ◇ drinking less alcohol, caffeine, and fizzy drinks
- ◇ limiting intake of artificial sweeteners
- ◇ exercising regularly
- ◇ drinking less in the evening

Medicines

If lifestyle changes don't help or aren't suitable medicine

To treat moderate to severe symptoms of an enlarged prostate, medicines Medicine to reduce the size of the prostate and relax your bladder:

- ◇ Alpha-blockers: Alpha-blockers relax the muscle in the prostate gland and at the base of the bladder, making it easier to pass urine. Commonly used alpha-blockers are tamsulosin and alfuzosin.
- ◇ 5-alpha reductase inhibitors: 5-alpha reductase inhibitors shrink the prostate gland if it's enlarged. Finasteride and Dutasteride are the two 5-alpha reductase inhibitors available.
- ◇ Desmopressin: Desmopressin slows down urine production so less urine is produced at night.

NB: Avoid sympathomimetics, anticholinergics, and opioids. Surgery is usually only recommended for moderate to severe symptoms that have failed to respond to medicine.

GYNAECOLOGY & OBSTETRICS

Period Problems

Regular periods are a sign that the body is working normally. One should have regular periods unless you are pregnant, breastfeeding, postmenopausal, or have a medical condition that causes your periods to stop. Irregular, painful, or heavy periods may be signs of a serious health problem. Irregular periods also can make it harder to get pregnant.

Dysmenorrhea

Pain that one gets with the menstrual period is the most common problem women have with their periods. More than half of women who have periods get some pain around their period. Some women may get just a feeling of heaviness in the abdomen or tugging in the pelvic area. Other women experience severe cramps different from premenstrual syndrome (PMS) pain.

A majority of period pain can be relieved by over-the-counter nonsteroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen, or aspirin. Starting an over-the-counter NSAID medicine when your period first starts may also lessen heavy menstrual bleeding[4] and help control the pain better.

There are two types of dysmenorrhea:

Primary dysmenorrhea.

This is the most common type of dysmenorrhea. The pain is usually caused by contractions of the uterus (womb). The uterus contracts during your period to help the uterine lining leave the body. Teens may get dysmenorrhea soon after they get their first period. For most women, primary dysmenorrhea gets less painful as they get older. However, some women get severe menstrual pain. The risk for dysmenorrhea may be higher if you:

- ◇ Got your first period before age 11
- ◇ Have longer or heavier periods
- ◇ Smoke
- ◇ Have high levels of stress

Treatment / Management:

A patient whose history and clinical presentation suggest primary dysmenorrhea may be treated symptomatically and provided with appropriate follow-up.

Self-medication with analgesics and nonsteroidal anti-inflammatory drugs (NSAIDs) and direct application of heat are common effective strategies.

NSAIDs and hormonal contraceptives are the most used therapeutic modalities for the management of primary dysmenorrhea. These agents

have different mechanisms of action and can be used adjunctively in refractory cases. Lack of response to NSAIDs and hormonal contraceptives (or a combination thereof) may increase the likelihood of a secondary cause for dysmenorrhea.
A patient whose presentation is less clear or whose vital signs or physical findings are abnormal deserves a more thorough workup, including full laboratory studies, pelvic ultrasonography, and potentially an obstetrics/gynecology consultation.
Note:
NSAIDs are contraindicated in patients with renal insufficiency, peptic ulcer disease, gastritis, bleeding diatheses, or aspirin hypersensitivity.

Secondary dysmenorrhea.
This type of dysmenorrhea is usually caused by another health problem. Pain from secondary dysmenorrhea usually gets worse as you get older. It also lasts longer than normal menstrual cramps. Problems that cause secondary dysmenorrhea include:

- **Endometriosis.** Is the most common etiology, this condition happens when the lining of the uterus grows outside of the uterus where it does not belong. In response to monthly changes in levels of the hormone estrogen, this lining breaks down and bleeds outside of the uterus and can cause swelling and pain.
- **Uterine fibroids.** Fibroids are tumors that grow in or on the wall of the uterus. They are almost always not cancerous. Some women with fibroids experience pelvic pain and vaginal bleeding at times when they do not have their period.
- **Ovarian cysts**. Cysts are fluid-filled sacs on the ovary. Ovarian cysts usually don't cause any symptoms, but some can cause pain during your period or at ovulation.
- **congenital or acquired obstructive and non-obstructive abnormalities**, such as Mullerian malformations, adenomyosis, leiomyomas, pelvic masses, and infection.

The onset of secondary dysmenorrhoea can occur at any time depending on the underlying condition, and people with secondary dysmenorrhoea share some of the same characteristics and pathways to pain as those with primary dysmenorrhoea, such as increased uterine prostaglandins. Symptoms that should prompt consideration of secondary dysmenorrhoea include worsening pelvic pain, abnormal bleeding, vaginal discharge, dyspareunia, and a lack of response to treatment such as non-steroidal anti-inflammatories (NSAIDs) or hormonal treatments.

Treatment / Management:

Treatment of secondary dysmenorrhea involves correction of the underlying organic cause. Specific measures (medical or surgical) may be required to treat pelvic pathologic conditions (e.g., endometriosis) and to ameliorate the associated dysmenorrhea. Periodic use of analgesic agents as adjunctive therapy may be beneficial.

Non-steroidal anti-inflammatory drugs

NSAID drugs inhibit cyclo-oxygenase, the enzyme that allows for the production of prostaglandins, and have a direct analgesic effect in the central nervous system. They are considered the first-line therapy for primary dysmenorrhoea. All currently available NSAID drugs are of comparable efficacy and safety. NSAIDs should be taken on a regular dosing regimen and ideally should be initiated 1–2 days before the onset of menses and continued in regular dosing intervals through the first 2–3 days of bleeding, correlating with the highest levels of prostaglandins. Patients reported lower pain scores when using a regimen with a higher loading dose followed by a lower scheduled amount over a traditional same-dose regimen. Only one-third of young patients take their recommended daily dosage, highlighting the need for prescribers to emphasize the recommended dosing regimen. Up to 20% of patients report minimal or no relief. NSAIDs can be associated with gastrointestinal side effects, which can be ameliorated by taking with food or switching to a COX-2 inhibitor.

The NSAIDs specifically approved by the US Food and Drug Administration (FDA) for treatment of dysmenorrhea are as follows:

- Diclofenac
- Ibuprofen
- Ketoprofen
- Meclofenamate
- Mefenamic acid
- Naproxen

Aspirin may not be as effective as these NSAIDs, and acetaminophen may be a useful adjunct for alleviating only mild menstrual cramping pain.

Hormonal therapies

Both combined and progesterone-only hormonal therapies can be used to treat dysmenorrhoea and should be offered to adolescent and adult patients with dysmenorrhoea who are not currently planning pregnancy unless contraindications exist.

- Combined oral contraceptives are effective for treating dysmenorrhoea in up to 90% of patients. They work by inhibiting ovulation and

preventing endometrial proliferation, which decreases prostaglandin, progesterone, and vasopressin production. Continuous or extended use of hormonal contraceptives is recommended over cyclic use. There is an increased risk of venous thromboembolism with oral contraceptives and use in some patients might be contraindicated.

- Progesterone-only hormonal treatments can also be effective treatments for dysmenorrhoea, including oral progestogens, levonorgestrel implants, depot medroxyprogesterone acetate, and levonorgestrel-releasing intrauterine systems (LNG-IUS). In most cases, they work by inhibiting ovulation and inducing endometrial atrophy, which reduces menstrual bleeding. LNG-IUS has been shown to improve both primary and secondary dysmenorrhoea and is safe to use in nulliparous and multiparous patients. Irregular bleeding is common with progesterone-only options.

Other pharmacological interventions

Various supplements and medications have been evaluated for dysmenorrhoea. Most either lack sufficient evidence of benefit or have unacceptable side effects.

Ginger has a range of anti-inflammatory actions, including inhibition of cyclo-oxygenase and lipoxygenase activity.4 Evidence supports that ginger can be an effective treatment for dysmenorrhoea and has the added benefit of anti-emetic properties.

Non-pharmacological interventions

Several non-pharmacological interventions are effective in treating dysmenorrhoea. Regular exercise has been shown to improve dysmenorrhoea symptoms, probably through increased blood flow and endorphin release and lowering stress and anxiety. There is low-quality evidence that 45–60 minutes of exercise of any intensity three or more times per week provides a clinically significant reduction in menstrual pain. Local heat, in the form of heated pads or patches, increases blood flow and improves tissue oxygenation; it is comparable to ibuprofen for treating dysmenorrhoea and is superior to paracetamol or no intervention. High-frequency transcutaneous electrical nerve stimulation (TENS) is superior to placebo for dysmenorrhoea and is helpful in approximately 30% of cycles in people with severe dysmenorrhoea, whereas lower doses of NSAIDs are required to manage pain in the remaining cycles. Low-quality data supports the effectiveness of acupuncture and acupressure, and these therapies can be considered for those wishing to use complementary or alternative therapies. Many studies have evaluated various types and

methods of physiotherapy for dysmenorrhoea. Overall, almost all studies of physiotherapy have shown a significant improvement in pain intensity among patients with dysmenorrhoea.

IRREGULAR PERIODS

☐Irregular periods are periods that don't follow a typical pattern. They might:

- come earlier than expected
- come later than expected
- be shorter than usual
- be longer than usual

A normal menstrual cycle can range from 21 to 35 days. The menstrual begins on the first day of your period. It continues until the first day of your next period. Your period (when you bleed) usually lasts from 3 to 7 days.

If you always have about the same number of days between periods, your menstrual cycle is regular. The average menstrual cycle length is 28 days.

Any change in your normal menstrual cycle may be a cause for concern. A change in your cycle could be:

- A period more often or less often than is normal for you
- bleeding is heavier than usual (heavy periods)
- bleeding is lighter than usual
- period is longer or shorter than is normal
- have spotting (bleeding) between periods
- period does not come at all (amenorrhoea)

period can be irregular:

- after childbirth
- after a miscarriage
- after a termination (abortion)
- in the years leading up to menopause (perimenopause)

Irregular periods are normal for teenage girls. Teen girls' periods may be irregular for the first few years before becoming more regular.

Causes of irregular periods include:

- **Eating disorders.** Irregular or missed periods can be signs of eating disorders, most often anorexia nervosa. But any eating disorder,

including bulimia nervosa and binge eating disorder.

- **Thyroid problems**, such as hyperthyroidism. overactive thyroid, causes your thyroid to make more thyroid hormone than your body needs. Hyperthyroidism can also cause fewer and lighter menstrual periods than normal.
- **High amounts of prolactin in the blood.** This condition is called hyperprolactinemia. Prolactin is the hormone that causes breasts to grow during puberty and makes breastmilk after childbirth. It also helps control the menstrual cycle.
- **Certain medicines,** such as those for epilepsy or anxiety
- **Polycystic ovary syndrome (PCOS), is** a condition that usually causes multiple ovarian cysts, hormonal imbalance, and irregular periods. About 1 in 10 women with irregular menstrual cycles have PCOS.
- **Primary ovarian insufficiency (POI).** POI happens when the ovaries stop working normally before age 40. It can happen as early as the teenage years. Unlike women who go through premature menopause, women with POI may still have periods, though they are most often irregular. Women with POI may also still get pregnant.
- **Pelvic inflammatory disease (PID).** Irregular periods can be a sign of PID, an infection of the reproductive organs. PID is most often caused by a sexually transmitted infection (STI).
- **Stress.** Studies show high levels of chronic (long-term) stress can lead to irregular periods.
- **Uncontrolled diabetes.** Type 1 and type 2 diabetes can cause irregular periods, but getting your diabetes under control can help your periods become more regular.
- **Obesity.** The extra fat in the body makes the hormone estrogenic. The extra estrogen changes the normal menstrual cycle and can cause missed, irregular, or heavy periods.

Treatment / Management:

Because there are so many possible causes of irregular periods, your treatment will depend on the likely cause.

It could be hormonal birth control, such as a hormonal IUD, or a pill.

(Hormonal birth control is sometimes prescribed by doctors for women's health concerns other than preventing pregnancy).

Heavy periods

A heavy period is when your period lasts longer than eight days or you

lose more than 80 mL of blood each period. It's a common problem for people aged between 30 and 50.

The amount of blood loss can change at different life stages. For example, in teenage years or in the lead-up to menopause.

If there is heavy bleeding, the periods may be:

- have cramps or pain in the lower abdomen
- look pale or feel tired or dizzy due to low iron levels.

There are some common signs. For example:

- Need to change period product (e.g., pads, tampons, menstrual cup) every two hours or less
- Need to change period product overnight
- Notice blood clots that are bigger than a 50-cent coin
- Period lasts more than eight days
- Periods stop you from doing things you normally do.

Causes of heavy bleeding include:

- **Problems with ovulation.** If the hormones get out of balance or if ovulation does not happen the uterine lining can build up too much and bleed heavily and in an unpredictable pattern.
- **Problems with the uterine lining.** If the hormones or uterine lining get out of balance, the uterine lining can bleed too much. This can cause heavy bleeding as the lining is pushed out during the next menstrual period.
- **Thyroid problems.** Heavy bleeding can be a sign of hypothyroidism, or underactive thyroid. Hypothyroidism happens when your thyroid does not make enough thyroid hormones.
- **Uterine fibroids.** Fibroids are made of muscle tissue that grows in or on the wall of the uterus. They are almost always not cancer. They can cause pain and heavy or irregular bleeding.
- **Uterine polyps.** Polyps are an overgrowth of the endometrial tissue that lines the inside of the uterine wall. They are usually small. They are usually not cancer but can cause heavy or long periods.
- **Certain medicines.** Some medicines, such as blood thinners, can cause heavy or long periods.
- **Pregnancy problems.** Unusual or not regular heavy bleeding can be caused by a miscarriage (an early pregnancy that ends) or an ectopic pregnancy. An ectopic pregnancy is when the fertilized egg implants outside of the uterus (womb) where it does not belong, putting a woman's life in danger. Ectopic pregnancies can never end

in a healthy pregnancy and are a medical emergency.

- **Bleeding disorders.** Haemophilia and von Willebrand's disease are inherited bleeding disorders that cause heavy bleeding during periods. Studies show that up to one in five white women with heavy periods has a bleeding disorder. Bleeding disorders are less common in African-American women, affecting about one in 20 African-American women with heavy bleeding. For many women, heavy menstrual bleeding is the only sign they have a bleeding disorder.
- **Obesity.** The extra fat in the body makes the hormone estrogen. The extra estrogen changes the normal menstrual cycle and can cause missed, irregular, or heavy periods.

Treatment / Management:

- certain medicines (e.g., anti-inflammatory drugs or tranexamic acid)
- hormonal treatments (e.g. a Mirena® intrauterine device (IUD) or the Pill)
- progestins (synthetic forms of the progesterone hormone).
- Treatment for low iron levels
- If medicines don't reduce bleeding, discuss other options such as surgery. Depending on the cause of the bleeding, you might need to have:

◇ A hysteroscopy – a day procedure to assess the inside of the uterus and remove fibroids or polyps if required

◇ An endometrial ablation – a day procedure to remove the lining of the uterus (not recommended if want to have children in the future).

◇ In some cases, when medical or other surgical procedures haven't helped to manage bleeding, may need to have a hysterectomy (an irreversible operation to remove the uterus and often the fallopian tubes).

Unusual or abnormal bleeding

Abnormal Uterine Bleeding: Bleeding from the uterus is different from what is normal for a woman who is not pregnant. This bleeding may vary in how long, how regular, and how often it occurs.

Bleeding in any of the following situations is considered abnormal uterine bleeding:

- Bleeding or spotting between periods
- Bleeding or spotting after sex
- Heavy bleeding during period
- Bleeding that soaks through one or more tampons or pads every

hour

- Bleeding that lasts more than 7 days
- Menstrual cycles that are longer than 35 days or shorter than 21 days
- "Irregular" periods in which cycle length varies by more than 7 to 9 days
- Not having a period for 3 to 6 months
- Bleeding after menopause

Causes of unusual bleeding include:

- **Problems with ovulation** Lack of ovulation can cause irregular, sometimes heavy, menstrual bleeding. If not ovulate for several menstrual cycles, areas of the endometrium (the tissue that lines the uterus) can become too thick. This condition can occur during the first few years after starting periods and perimenopause. It also can occur in women with certain medical conditions, such as polycystic ovary syndrome (PCOS) and hypothyroidism.
- **Fibroids and polyps** Fibroids are noncancerous growths that form from the muscle tissue of the uterus. Polyps are another type of noncancerous growth. They can be found inside the uterus or on the cervix. Both can cause irregular or heavy menstrual bleeding.
- **Adenomyosis** in this condition, the endometrium grows into the wall of the uterus. Signs and symptoms may include heavy menstrual bleeding and menstrual pain that worsens with age.
- **Bleeding disorders** When a woman's blood does not clot properly, there can be heavy bleeding. women may have a bleeding disorder if she has had heavy periods since first started menstruating. Other signs include heavy bleeding after childbirth or during surgery, gum bleeding after dental work, easy bruising, and frequent nosebleeds.
- **Medications** Hormonal birth control methods can cause changes in bleeding, including breakthrough bleeding (bleeding at a time other than period). Some medications, such as blood thinners and aspirin, can cause heavy menstrual bleeding. The copper intrauterine device (IUD) can cause heavier menstrual bleeding, especially during the first year of use.
- **Cancer** Abnormal uterine bleeding can be an early sign of endometrial cancer. Most cases of endometrial cancer occur in women in their mid-60s who are past menopause. It usually is diagnosed at an early stage when treatment is most effective. A condition that can lead to endometrial cancer is called endometrial intraepithelial neoplasia (EIN). It also causes abnormal uterine bleeding. Treatment of this

condition can prevent endometrial cancer.

- **Other causes** of endometriosis and other problems related to the endometrium can cause heavy menstrual bleeding. Other causes of abnormal uterine bleeding include those related to pregnancy, such as ectopic pregnancy and miscarriage. Pelvic inflammatory disease (PID) also can be a cause. Sometimes, there is more than one cause.

Treatment / Management:

- May start by checking for problems that are most common in the age group.
- The medications that may be used include the following:
- Hormonal birth control methods—Irregular bleeding and heavy bleeding caused by problems with ovulation, PCOS, and fibroids often can be managed with certain hormonal birth control methods.
- Combined hormonal birth control pills, the skin patch, and the vaginal ring contain both estrogen and progestin. They can lighten menstrual flow and help make periods more regular. Taken continuously, they can reduce the number of periods you have or stop them completely.
- Progestin-only hormonal methods, including the hormonal IUD, pills, and injections, also may reduce bleeding. The IUD and injection may stop bleeding completely after 1 year of use.
- Hormone therapy can be helpful for heavy menstrual bleeding that occurs during perimenopause and can treat other perimenopausal symptoms, such as hot flashes, night sweats, and vaginal dryness. Premenopausal women also can take the hormonal birth control methods discussed above.
- Gonadotropin-releasing hormone (GnRH) agonists these drugs can stop the menstrual cycle and reduce the size of fibroids. They are used only for short periods (less than 6 months). Their effect on fibroids is temporary. Once you stop taking the drug, fibroids usually return to their original size.
- Tranexamic acid his prescription medication treats heavy menstrual bleeding. It comes in a tablet and is taken each month at the start of the menstrual period.
- Nonsteroidal anti-inflammatory drugs (NSAIDs) These drugs, which include ibuprofen, also may help control heavy bleeding and relieve menstrual cramps.
- If a woman has a bleeding disorder, treatment may include

medications to help her blood clot.

- If she has an infection, she may be given an antibiotic.

Amenorrhea

Amenorrhea is the absence or abnormal cessation of menses.
Amenorrhea can be classified as either primary or secondary amenorrhea.

Primary amenorrhea:

indicated when there has been a failure to menstruate by the age of 15 in the presence of normal secondary sexual development (2 standard deviations above the mean of 13 years), or within 5 years after breast development if that occurs before the age of 10. Failure to initiate breast development by the age of 13 (2 standard deviations above the mean of 10 years) also requires investigation.

secondary amenorrhea:

defined as the absence of menses for >3 months in girls or women who previously had regular menstrual cycles or 6 months in girls or women who had irregular menses, requires investigation.

(In women with regular menstrual cycles, a delay of menses for as little as 1 week may require the exclusion of pregnancy).

Causes of amenorrhea include:

- **Pregnancy:** Your period stops during pregnancy because your ovaries no longer release eggs. You may get some spotting (light vaginal bleeding), but this is common and usually does not mean a problem with the pregnancy. If you have spotting during pregnancy you should see your doctor or nurse to be sure. Learn more in our Pregnancy section.
- **Breastfeeding:** For some women, their periods do not come back until after breastfeeding ends. For others, their periods may return within a few months of giving birth. While your baby transitions from breastfeeding to other foods you may ovulate and not realize it. All women should talk to their doctor or nurse about birth control methods during breastfeeding if they do not want to get pregnant again right away. Learn more in our Breastfeeding section.
- **Eating disorders, especially anorexia nervosa:** Amenorrhea can happen if your body fat drops so low that ovulation stops. Anorexia often causes extreme weight loss leading to a very low body weight that is not healthy. This can cause periods to be less regular or stop completely.
- **Weight:** Gaining too much weight or losing too much weight can cause missed periods. Menstrual periods will usually restart after losing weight if you are overweight or gaining weight if you are

underweight.

- **Stress:** Long-term, severe stress can affect the part of your brain that controls reproduction. As a result, ovulation and your period can stop. Managing the stress can help restore normal menstrual cycles.11
- **Hormonal problems:** This includes problems with the reproductive organs or those caused by health conditions such as polycystic ovary syndrome (PCOS).
- **Other serious health problems,** including birth defects and tumors in the brain. Once these problems are treated, the period may start for the first time, or the period start again if it has stopped

Treatment / Management:

The management of primary and secondary amenorrhea should be directed at correcting the underlying etiology and preventing potential complications. Depending on the etiology, additional testing and monitoring are frequently indicated as well

Common Health Problems in Pregnancy

Constipation in pregnancy

Constipation during pregnancy is a common problem and nearly half of all pregnant women get constipated at some point. Constipation occurs when there is abdominal pain or discomfort, difficult and infrequent bowel movements, and the passage of hard stools.

causes constipation during pregnancy:

In general, worry, anxiety, minimal physical exercise, and a low-fiber diet may cause constipation. Constipation during pregnancy is due to the increase in progesterone hormones that relax the intestinal muscle causing food and waste to move slower through your system.

Sometimes iron tablets may contribute to constipation. Make sure pregnant women drinking plenty of water if they are taking iron supplements. They may need to switch to a different type of iron tablet.

prevent or treat constipation during pregnancy

- **Eat foods that are high in fiber,** Ideally, consume 25 to 30 grams per day of dietary fiber from fruits, vegetables, breakfast cereals, whole-grain bread, prunes, and bran. This helps ensure bulkier stools that are easier to poop.
- **Drinking plenty of fluids** is important, particularly when increasing fiber intake helps ensure softer stools. Drink 10 to 12 cups of fluids

each day. It is the combination of a high-fiber diet and plenty of liquids that best help you eliminate waste. Sweat, hot/humid climates, and exercise may increase the need for additional fluids.

- **Exercise routinely:** If pregnant women are inactive, a greater chance of constipation. Walking, swimming, and other moderate exercises will help the intestines work by stimulating the bowels. Schedule exercise three times a week for 20-30 minutes each.
- **Reduce or eliminate iron supplements:** Iron supplements may contribute to constipation. Good nutrition can often meet iron needs during pregnancy. Taking smaller doses of iron throughout the day rather than taking it all at once can reduce constipation

Laxative pills are NOT recommended for the treatment of constipation during pregnancy because they might stimulate uterine contractions and cause dehydration.

Mineral oils should NOT be used during pregnancy because they reduce nutrient absorption.

Cramp in pregnancy

Nearly half of all pregnant women suffer from leg cramps those painful involuntary muscle spasms that strike the calf, foot, or both. It is not uncommon to experience pregnancy leg cramps, particularly in the second and third trimesters.

What causes leg cramps during pregnancy?

While it isn't clear exactly what causes these muscle spasms, leg cramps may be caused by changes in circulation. Pressure from the growing baby may pit the nerves and blood vessels that go to the legs.

How to avoid and treat pregnancy leg cramps?

- Exercise regularly and include a stretching routine. For a simple calf stretch stand at arm's length from a wall, place your hands on the wall in front of you, and move your right foot behind your left foot with toes facing the wall. Slowly bend your left leg forward, keeping your right knee straight and your right heel on the floor. Hold the stretch for about 30 seconds, being careful to keep your back straight and your hips forward. Breathe deeply through the stretch. Repeat with the other leg.
- When spasms hit, gently perform the stretch on the affected side and then rest with your legs elevated. A warm bath, ice massage, or muscle massage may help too.
- Drink lots of water. Your urine will be clear or light yellow when

you're adequately hydrated.

- Wear support socks or stockings that provide some compression on your calves.
- Increase the calcium and magnesium in your diet by eating food such as whole grains, beans, dried fruit, nuts, and seeds.

Vaginal bleeding in pregnancy

Vaginal bleeding during pregnancy has many causes. Some are serious and others are not. Bleeding can occur early or later in pregnancy. Bleeding in early pregnancy is common. In many cases, it does not signal a major problem. Bleeding later in pregnancy can be more serious.

Causes of bleeding in early pregnancy

Implantation bleeding

In early pregnancy, you might get some harmless light bleeding, called "spotting". This is when the developing embryo plants itself in the wall of your womb. This type of bleeding often happens around the time your period would have been due.

Miscarriage

(the spontaneous loss of pregnancy before the 20th week).

symptoms of miscarriage include:

- ◇ Cramping and pain in the lower abdomen
- ◇ A discharge or fluid from the vagina
- ◇ A discharge of tissue from your vagina
- ◇ No longer experiencing the symptoms of pregnancy, such as breast tenderness and feeling sick

Ectopic pregnancy

An ectopic pregnancy is when a fertilized egg implants outside the womb – for example, in the fallopian tube.

It can cause bleeding and is dangerous because the fertilized egg can't develop properly outside the womb. The egg has to be removed, which can be done through an operation or with medicines.

Symptoms of an ectopic pregnancy tend to develop between 4 and 12 weeks of pregnancy but can happen later.

Other signs of ectopic pregnancy can include:

- Abdominal pain low down on one side
- Vaginal bleeding or a brown, watery discharge

- Pain in the tip of the shoulder
- Discomfort when urinating or defecation

However, these symptoms aren't necessarily a sign of a serious problem. They can sometimes be caused by other things, such as a stomach bug, but they need to be referred

Molar pregnancy

(a rare occurrence in which an abnormal fertilized egg develops into abnormal tissue instead of a baby)

Problems with the cervix, such as a cervical infection, inflamed cervix, or growths on the cervix

Causes of bleeding in later pregnancy

Placental abruption

This is a serious condition in which the placenta starts to come away from the womb wall. Placental abruption usually causes stomach pain, and this may occur even if there is no bleeding.

placenta previa

This is when the placenta is attached in the lower part of the womb, near to or covering the cervix. Bleeding from a low-lying placenta can be very heavy, advised to go into the hospital for emergency treatment, and a cesarean section will usually be recommended.

Placenta accreta

When the placenta (or part of the placenta) invades and is inseparable from the uterine wall, it is called the placenta accreta. Placenta accreta can cause bleeding during the third trimester and severe blood loss during delivery. Most cases can be found during pregnancy with a routine ultrasound exam. Sometimes, though, it is not discovered until after the baby is born. If pregnant women have placenta accreta, they are at risk of life-threatening blood loss during delivery. delivery carefully and make sure that all needed resources are available. Hysterectomy often needs to be done right after delivery to prevent life-threatening blood loss.

Preterm Labour:

(Which might result in light bleeding — especially when accompanied by contractions, dull backache, or pelvic pressure)

Problems with the cervix

such as a cervical infection, inflamed cervix, or growths on the cervix

Uterine rupture
A rare but life-threatening occurrence in which the uterus tears open along the scar line from a prior C-section

Itching in pregnancy

Itching is common in pregnancy. Usually, it's thought to be caused by raised levels of certain chemicals in the blood, such as hormones.

Later, as the bump grows, the skin of the tummy (abdomen) is stretched and this may also feel itchy.

However, itching can be a symptom of a liver condition called intrahepatic cholestasis of pregnancy (ICP), also known as obstetric cholestasis (OC).

Symptoms of ICP

The main symptom is itching, usually without a rash. For many women with ICP, the itching is often:

- more noticeable on the hands and feet, but can be all over the body
- worse at night

Other symptoms can include:

- dark urine
- pale stool
- yellowing of the skin and whites of the eyes (jaundice), but this is less common

Symptoms of ICP typically start from around 30 weeks of pregnancy, but it's possible to develop the condition as early as 8 weeks.

- mild or distressing, possibly worse at night
- anywhere on your body but may be worse on the palms of your hands and soles of your feet. Feeling itchy like this can be a sign of ICP and needs to be referred.

Intrahepatic cholestasis of pregnancy

Intrahepatic cholestasis of pregnancy (ICP) is a potentially serious liver disorder that can develop in pregnancy.

Normally, bile acids flow from the liver to the gut to help digest food.

In ICP, the bile acids do not flow properly and build up in the body instead. There's no cure for ICP, but When the baby is born ICP will get better. ICP seems to run in families, but it can happen even if there is no family history. It is more common in women of South Asian origin, affecting

around 1 in 70 to 80 pregnancies.

If you have had ICP in a previous pregnancy, you have a high chance of developing it again in another pregnancy. Some studies have found that babies whose mothers have ICP have a higher chance of being born prematurely or stillborn.

Because of the link with stillbirth, you may be offered induction of labor. This could be any time from 35 weeks, depending on the level of bile acids in your blood.

If you have ICP, you will probably be advised to give birth in a hospital under a consultant-led maternity team.

Diagnosis and treatment of ICP:

ICP is diagnosed by excluding other causes of the itch, these will include tests to check your liver function (LFT) and measure your bile acid levels (BA).

Monitoring the condition**:**

If you are diagnosed with ICP, regular liver function tests. There is no agreed guideline on how often these tests should happen, but the Royal College of Obstetricians & Gynecologists (RCOG) and the British Liver Trust advise weekly tests.

If the LFTs and bile acids are normal and the patients have severe itching, the blood tests should be repeated every week or 2, to keep an eye on them.

Treatment / Management:

To improve itching are of limited benefit but might include:

- Skin creams such as aqueous cream, with or without the addition of menthol
- Antihistamines, which may help you sleep at night
- Some women have found that having cool baths and wearing loose-fitting cotton clothing helps to reduce the itching.
- There is a medication called ursodeoxycholic acid, which may slightly reduce itching in a small number of women.

There is no treatment available that helps the baby or that will make the bile acid levels better. Ursodeoxycholic acid may reduce the chance of giving birth prematurely but it does not prevent stillbirth.

A daily dose of vitamin K may be recommended for a small number of women as rarely ICP may affect blood clotting. Most women will not need this

Vaginal discharge in pregnancy

All women, whether they're pregnant or not, have some vaginal discharge starting a year or two before puberty and ending after the menopause. It usually gets heavier just before the period. During pregnancy, it's normal to have more discharge than before.

In all women, healthy vaginal discharge is usually thin, clear, or milky white, and shouldn't smell unpleasant. If the discharge is:

- ◇ it smells unpleasant or strange
- ◇ it is green or yellow
- ◇ Itchy or sore around your vagina
- ◇ Pain when you pee

Any of these could be symptoms of a vaginal infection.

Swollen ankles, feet, and fingers in pregnancy

It's normal to get some swelling in pregnancy, particularly in the legs, ankles, feet, and fingers. It's often worse at the end of the day and further into the pregnancy.

Swelling that comes on gradually isn't usually harmful to the mother or the baby, but it can be uncomfortable.

- A sudden increase in swelling can be a sign of pre-eclampsia, a condition that affects some pregnant women, usually during the second half of pregnancy (from around 20 weeks) or soon after birth.
- A sudden increase in swelling in the face, hands or feet
- A very bad headache
- Problems with vision, such as blurring or flashing lights in the eyes
- Severe pain just below the ribs
- Vomiting with any of these symptoms

These could be symptoms of pre-eclampsia, which can lead to serious complications if it's not monitored and treated. Referrer

Morning sickness in pregnancy

Nausea and vomiting in pregnancy, often known as morning sickness, are very common in early pregnancy. It can happen at any time of the day or night, and some women feel sick all day long.

Morning sickness is unpleasant, and for some women, it can significantly affect their day-to-day life. But it doesn't put your baby at any increased risk. Nausea and vomiting of pregnancy usually start before 9 weeks of pregnancy. For most women, it goes away by 14 weeks of pregnancy. For some women, it lasts for several weeks or months. For a few women, it

lasts throughout the pregnancy.

Some women develop a severe form of pregnancy sickness called hyperemesis gravidarum. This can be serious, and there's a chance of (dehydration) or not getting enough nutrients from the diet (malnourishment). This may need specialist treatment, sometimes in hospital.

Sometimes urinary tract infections (UTIs) can also cause nausea and vomiting. A UTI usually affects the bladder but can spread to the kidneys.

Risk factors for morning sickness:

Any of the following can increase the risk of severe nausea and vomiting during pregnancy:

- ◇ Having twins or triplets
- ◇ Severe nausea and vomiting in a previous pregnancy
- ◇ Tendency to get motion sickness (for example, car sick)
- ◇ History of migraine headaches
- ◇ Morning sickness runs in the family
- ◇ Getting sick when taking contraceptives containing estrogen
- ◇ Obese (your body mass index (BMI) is 30 or more)
- ◇ Experiencing stress

Treatment / Management:

Unfortunately, there's no hard and fast treatment that will work for every woman's morning sickness. Every pregnancy will be different.

But there are some changes one can make to the diet and lifestyle to try to ease the symptoms. This change can include:

- ◇ asking vitamins
- ◇ Adjusting mealtimes
- ◇ Changing the types of foods, you eat
- ◇ Get plenty of rest (tiredness can make nausea worse)
- ◇ Avoid foods or smells that make you feel sick
- ◇ Eat something like dry toast or a plain biscuit before you get out of bed
- ◇ Eat small, frequent meals of plain foods that are high in carbohydrates and low in fat (such as bread, rice, crackers, and pasta)
- ◇ Eat cold foods rather than hot ones if the smell of hot meals makes you feel sick
- ◇ Drink plenty of fluids, such as water (sipping them little and often may help prevent vomiting)
- ◇ Eat foods or drinks containing ginger – there's some evidence ginger may help reduce nausea and vomiting (check with your pharmacist

before taking ginger supplements during pregnancy)

◇ Try acupressure – there's some evidence that putting pressure on your wrist, using a special band or bracelet on your forearm, may help relieve the symptoms

Anti-vomiting drugs:

If your nausea and vomiting are severe and don't improve after trying the above lifestyle a short-term course of an anti-vomiting medicine, called an antiemetic, that's safe to use in pregnancy. Often this will be a type of antihistamine, injection, or (suppository).

- Vitamin B6 is a safe, over-the-counter treatment that may be tried first for nausea and vomiting of pregnancy.
- Doxylamine, a medication found in over-the-counter sleep aids, can be added if vitamin B6 alone does not relieve symptoms.
- A prescription drug that combines vitamin B6 and doxylamine is available. Both drugs, taken alone or together, are safe to take during pregnancy and have no harmful effects on the fetus.

If nausea and vomiting are severe or if have hyperemesis gravidarum, you might need to stay in the hospital until symptoms are under control.

Contraception

The contraceptive pill

contains hormones that prevent pregnancy. There are two main types of pill.

◇ The **combined pill** contains estrogen and progestogen.

◇ The **progestogen-only pill** contains progestogen only.

Both types of pills are 99% effective when used perfectly. However, "typical use" puts the pill at about 91% effective (approximately 1 in 11 women taking the pill become pregnant each year). This "typical use" reflects real life where pills can easily be missed/forgotten. The way in which the two pills are used is slightly different.

◇ 99% effective (if taken perfectly).

◇ Makes periods lighter, more regular, and less painful.

◇ Can reduce the risk of ovarian, womb, and colon cancer.

◇ Can reduce acne.

◇ Doesn't protect against STI's.

◇ Temporary side effects such as headaches, nausea, sore breasts,

and mood swings.

- ◇ Can increase blood pressure.
- ◇ Have to remember to take every day for 21 days.
- ◇ Not suitable for women over 35 who smoke.

Combined pill pros & cons

- ◇ **The combined pill** is licensed to be taken every day for 21 days and then not taken for 7 days. During this 7-day break, you will usually have a period-like bleed. However, it is possible to miss out a bleed every now and then or even take the pill continuously. You should take the combined pill at roughly the same time every day. (antibiotics are no longer thought to interfere with the pill) being sick or having diarrhea can reduce the effectiveness of the combined pill. The **combined pill** is not suitable for women over 35 who smoke or for women who have certain medical conditions such as thrombosis, stroke, blood clot, heart disease, breast cancer, or diabetes. Some women can also be allergic to estrogen.
- ◇ **The progestogen-only pill** must be taken every day with no break. It should be taken at about the same time every day. If you take it later than 12 hours, or 3 hours for the older POPs, there is a danger that it will not work and you may become pregnant. **The progestogen-only pill** is not suitable for women with certain medical conditions such as liver disease or breast cancer.

Copper coil IUD

A copper coil is an intrauterine device (IUD). It is a small plastic and copper contraceptive device that is fitted into your uterus (womb). It stops pregnancy by slowly releasing copper, which prevents sperm from surviving in the cervix, uterus, or fallopian tubes. It may also stop fertilized eggs from implanting in the womb. There are two types of contraceptive coil, With hormones and without

Effectiveness of IUD

A copper coil IUD is 99% effective at preventing pregnancy and can last for 5 or 10 years. It starts working as soon as it is fitted and fertility will return to normal as soon as it is removed. Occasionally, the IUD can be pushed out by the uterus, or it can move which would stop it from working. This doesn't happen very often. Most women can use the copper coil IUD, including those who are HIV-positive. If the woman is already pregnant, has problems with your uterus or cervix, or has an untreated

STI then be advised about other methods of contraception.

Pros & Cons of IUD

- ◇ 99% effective (if taken perfectly).
- ◇ Can make periods lighter.
- ◇ Safe to use when breastfeeding.
- ◇ Works if you can't take estrogen.
- ◇ Doesn't protect against STI's.
- ◇ Temporary side effects such as headaches, nausea, sore breasts, and mood swings.
- ◇ Can cause ovarian cysts.
- ◇ Can cause acne.

Emergency contraception

Emergency Hormonal Contraception (EHC) is designed to prevent pregnancy when your normal methods of birth control have failed. For example; if you forget to take the pill , or if a condom splits, or if for some reason you weren't able to use any type of contraception. The sooner you use emergency contraception, the more effective it is.

There are two types of EHC pills:

Levonelle, is only effective if taken within 72 hours (3 days) of having unprotected sex, although it may work up to 96 hours. **Ulipristal acetate (UPA or EllaOne)**, is also an 'EHC that is effective up to 120 hours (5 days) after having unprotected sex, however, it is also most likely to work if taken as soon as possible.

Certain conditions will make the 'morning after pill' less effective. If you throw up (vomit) within 3 hours of taking the pill then the hormones won't have been absorbed into your body. If you are taking other medication then it can also reduce the effectiveness of the morning-after pill.

Side effects

Side effects of the 'morning after pill' may include; headaches, stomach ache, feeling sick or changes to your next period – it could be earlier, later, lighter or heavier.

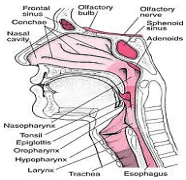
- ◇ **Levonelle: Best** taken within 3 days
- ◇ **UPA (EllaOne):** Must be taken within 5 days

Hormonal IUD

A hormonal IUS or intrauterine system is a small plastic t-shaped device with a sleeve that releases a low dose of progesterone hormone into the uterus (womb). There are 4 different types that release a different dose of hormone: Jaydess which lasts 3 years and is the lowest dose, Kyleena which has a slightly higher dose of hormone but lasts 5 years,

EAR/ NOSE & THROAT (ENT)

Otitis externa



Overview

Otitis externa is most commonly caused by infection (usually bacterial, although occasionally fungal), but it may also be associated with a variety of non-infectious systemic or local dermatologic processes.). The two most characteristic presenting symptoms of otitis externa are otalgia (ear discomfort) and Otorrhea (discharge in or coming from the external auditory canal). The ear discomfort can range from pruritus to severe pain that is exacerbated by the motion of the ear, including chewing. Otorrhea is also quite variable. Its characteristics often may give a clue to its etiology

Differentiating Causes of Otorrhea

CAUSE	CHARACTERISTIC
OTITIS EXTERNA	
ACUTE BACTE-RIAL	Scant white mucus, but occasionally thick
FUNGAL	Typically, fluffy and white to off-white discharge, but may be black or grey,
OTITIS MEDIA	
ACUTE	Purulent white to yellow mucus with deep pain
SEROUS	Clear mucus, especially in the presence of allergies
CHRONIC	Intermittent purulent mucus without pain

Treatment

Topical medications

Topical antimicrobials, with or without topical corticosteroids, are the mainstay of treatment for uncomplicated acute otitis externa. Commonly studied antimicrobial agents include aminoglycosides, polymyxin B, and quinolone, the addition of topical corticosteroids yields more rapid improvement in symptoms such as pain, canal edema, and erythema.

Common Antimicrobial Otic Preparations for Otitis Externa

Component	Dosage	Comments
Ciprofloxacin 0.3%/ dexamethasone 0.1% (Ciprodex)	Twice daily	Low risk of sensitization, can be used if T. membrane perforated. Only when the Tympanic membrane is not intact
Neomycin/polymyxin B/ hydrocortisone, solution or suspension	Three to four times daily	The first choice is ototoxic; higher risk of contact hypersensitivity; avoid chronic/ eczematous otitis externa and in perforated treatment.
Ofloxacin 0.3%	Once to twice daily	Low risk of sensitization. Can be used with perforated. membrane

Oral antibiotics

Systemic antibiotics should be used only when the infection has spread beyond the ear canal, or when there is uncontrolled diabetes, immunocompromised, a history of local radiotherapy, or an inability to deliver topical antibiotics.

Analgesia

Oral analgesics are the preferred treatment. First-line analgesics include NSAI and acetaminophen. Opioid combination pills may be used when symptom severity warrants.

Chronic otitis externa

The treatment of chronic otitis externa depends on the underlying causes. Because most cases are caused by allergies or inflammatory dermatologic conditions. Treatment includes the removal of offending agents and the use of topical or systemic corticosteroids. Otorrhea over weeks to months, particularly with an open tympanic membrane, suggests the presence of chronic suppurative otitis media.

Acute otitis media (AOM)

Overview

AOM is a complication of Eustachian tube dysfunction that occurred during an acute viral upper respiratory tract infection. In 50% to 90% of cases of are. Streptococcus pneumoniae, Haemophilus influenza, and Moraxella catarrhalis are the most common organisms[4] H. influenza has become the most prevalent organism among children with severe or refractory AOM.

Management

Acute otitis media should begin with adequate analgesia. Antibiotic. Therapy can be deferred in children two years or older with mild symptoms.

Treatment

Amoxicillin (80 to 90 mg/kg per day in 2 divided doses) OR

Amoxicillin-clavulanate (90 mg/kg per day of amoxicillin, with 6.4 mg/kg per day of in 2 divided doses)

Recommended first-line treatment (Initial immediate or delayed antibiotic) treatment,'.

Analgesics are recommended for symptoms of ear pain, fever, and irritability. Analgesics are particularly important at bedtime Ibuprofen and Paracetamol are effective in dose (10 mg/kg three times daily). Ibuprofen was more effective for pain relief than acetaminophen, Ibuprofen is preferred, given its longer duration of action and its anti-inflammatory effect

Chronic suppurative otitis media

Patients with chronic suppurative otitis media (CSOM) respond more frequently to topical therapy than to systemic therapy. Successful topical therapy consists of 3 important components:

- ◇ Selection of an appropriate antibiotic drop,
- ◇ Regular aggressive aural toilet, and
- ◇ Control of granulation tissue.

Inpatient care is rarely necessary for Patients who present with suspected intracranial complications.

Antibiotic Drops

The antibiotic should have an appropriate spectrum of activity that includes gram-negative organisms (especially pseudomonads) and gram-positive organisms

Aminoglycosides and fluoroquinolones are antibiotics that meet this initial criterion. Topical

Neomycin and polymyxin B: t (polymyxin B). Neomycin has remained fairly effective over the last 2 decades for gram-positive organisms, but it has lost almost all of its effectiveness for combating gram-negative organisms.

Gentamicin, dexamethasone, and tobramycin: Gentamicin- and tobramycin-containing ophthalmic drops have been widely used off-label for the treatment of otologic infections.

Bacterial resistance

Some controversy surrounds the development of bacterial resistance due to topical treatment. Recent studies have not identified any increase in bacterial resistance through topical antibiotic administration. Specifically, the concentration in quinolone to topical drops overwhelms the most resistant pseudomonal and staphylococcal strains. Failure of topical antibiotic delivery to the pathogenic organisms should be considered a cause of persistent infections.

Sinusitis

Overview

Sinusitis occurs when mucus builds up and the sinuses become inflamed It is often referred to sinusitis as rhinosinusitis because inflammation of the sinuses nearly always occurs with inflammation of the nose known as rhinitis.

Symptoms

- ◇ Thick, green, or yellow nasal discharge,

- ◇ Facial pain and pressure
- ◇ Reduced sense of smell

In more advanced cases, the following symptoms may also be present: Fever, halitosis, (foul-smelling breath), and headache. If these symptoms continue for 12 weeks or longer, it may be diagnosed as **chronic sinusitis**.

Aetiology:

Sinusitis can stem from various factors, but it always results from fluid and mucous build-up becoming trapped in the sinuses. These fuels the growth of germs. Which can be:

1. **Viruses**: In adults, 90% result from a virus
2. **Bacteria**: In adults, 1 case in 10 is caused by bacteria
3. **Fungi**: Either the sinuses react to fungi in the air, as in allergic fungal sinusitis (AFS), or fungi invade them, as in chronic indolent sinusitis.

Treatment

Antibiotics: Overuse and abuse of antibiotics have been causing a major increase in antibiotic resistance. Therefore, patients with sinus symptoms should consider taking an antibiotic only if symptoms (including discolored nasal discharge) persist beyond 4 weeks.

- **Decongestant sprays Corticosteroids** These sprays at the normal dose are not absorbed into the bloodstream and could be used in high doses can help to shrink swollen nasal passages and should be used for no more than three to four days. **Including** (fluticasone propionate), (triamcinolone),
- **Pseudoephedrine** Phenylephrine, not to use if you have high blood pressure or a heart condition.) Can cause insomnia and. If used for more than three days can cause worse symptoms when you stop the medication. This is called the rebound effect.
- **Antihistamines** these medications help to relieve the symptoms but they can cause excessive drying and slow the drainage process.
- **Pain relievers** **Acetaminophen**, and NSAI (**ibuprofen**)

Mastoiditis

Overview

In acute purulent otitis media, inflammation often extends into the mastoid antrum and air cells, resulting in fluid accumulation. In a few patients, bacterial infection develops in the collected fluid, typically with the same organism causing the otitis media; pneumococcus is most common.

Symptoms begin days to weeks after the onset of acute otitis media and include fever and persistent, throbbing otalgia. Nearly all patients have signs of otitis media and purulent **Otorrhea**. Redness, swelling, tenderness, and fluctuation may develop over the mastoid process; the pinna is typically displaced laterally and inferiorly.

Treatment:

Mastoidectomy A subperiosteal abscess usually requires a simple mastoidectomy, in which the abscess is drained, the infected mastoid cells are removed, and drainage is established from the antrum of the mastoid to the middle ear cavity.

IV ceftriaxone IV antibiotic treatment is initiated immediately with ceftriaxone 1 to 2 g (children, 50 to 75 mg/kg) once a day and **continued for ≥ 2 weeks;**

Oral treatment with a quinolone may be acceptable. Subsequent antibiotic choice is guided by culture and sensitivity test results.

Tonsillitis

Overview

Most cases of tonsillitis are caused by infection with a common virus, but bacterial infections also may cause tonsillitis Appropriate treatment for tonsillitis depends on the cause,

- **Young age.** Tonsillitis most often occurs in children, but rarely in those younger than age 2 years. Tonsillitis caused by bacteria is most common in children ages 5 to 15, while viral tonsillitis is more common in younger children.
- **Frequent exposure to germs.** School-age children are in close contact with their peers and are frequently exposed to viruses or bacteria that can cause tonsillitis.

The most common bacterium causing tonsillitis is Streptococcus pyogenes (group A streptococcus). it's important to get a prompt and accurate diagnosis. Surgery to remove tonsils, once a common procedure to treat tonsillitis, is usually performed only when bacterial tonsillitis occurs frequently, does not respond to other treatments, or causes serious complications.

Symptoms

Tonsillitis most commonly affects children between preschool ages and the mid-teen years. Common signs and symptoms of tonsillitis include:

- ◇ Red, swollen tonsils
- ◇ White or yellow coating or patches on the tonsils
- ◇ Sore throat
- ◇ Difficult or painful swallowing

- ◇ Fever
- ◇ Enlarged, tender glands (lymph nodes) in the neck
- ◇ Bad breath
- ◇ Temperature 38C or above

In young children who are unable to describe how they feel; signs of tonsillitis may include:

- Salivating due to difficult or painful swallowing
- Refusal to eat

Tonsillitis Diagnosis

Physical exam. Red or swollen or have Bus on them. Swelling neck and pain.

You might need tests to find the cause of your tonsillitis. They include:

throat swab. For saliva and cells from the throat for culture and sensitivity for strep bacteria. **A blood test**. Your doctor may call this a complete blood cell count (CBC). It looks or high and low numbers of blood cells to show whether a virus or bacteria caused your tonsillitis. If results are not available for rapid strep test, culture, or Monospot*

Monospot test (is a blood **test** used to determine whether you have contracted the Epstein-Barr virus, the virus that causes infectious mononucleosis

Treatment

Tonsillitis usually has to run its course. To help ease the symptoms:

- ◇ Get plenty of rest
- ◇ Drink cool drinks to soothe the throat
- ◇ Take paracetamol or ibuprofen (do not give aspirin to children under 16)
- ◇ Gargle with warm salty water (children should not try this)

Adult dosage:

- Penicillin V 500 mg PO BID for 10d or 250 mg PO QID for 10d **or**
- Benzathine penicillin G 1.2 million U IM once **or,** Amoxicillin 500-875 mg PO q12h or 250-500 mg PO q8h for 10d **or**
- Penicillin V 25-50 mg/kg/day divided q6h for 10d **or**
- Benzathine penicillin G 25,000 U/kg IM once (maximum 1.2 million U) **or**
- Amoxicillin 50 mg/kg/day PO in 2 or 3 divided doses for 10d **or**
- Amoxicillin-clavulanate 500-875 mg PO q12h for 10d
- Cefdinir 14 mg/kg PO once daily for 10d **or**

- Cefuroxime 10 mg/kg PO BID for 4-10d

Adult dosage if penicillin allergic:

- Azithromycin 500 mg PO daily for 5d **or**
- Clarithromycin 250 mg PO q12h for 10d **or**
- Erythromycin base 500 mg PO QID for 10d **or**
- Clindamycin 7 mg/kg/day in 3 divided doses (maximum 1.8 g/d) for 10d

Pediatric dosage if penicillin allergic:

- Azithromycin 12 mg/kg PO once daily for 5d **or**
- Clarithromycin 250 mg PO q12h for 10d **or**
- Erythromycin succinate 20 mg/kg PO BID for 10d **or**
- Cefuroxime 250 mg PO once daily for 4d

Drug therapy

Pediatric dosage:

If tonsillitis caused by group A streptococcus or another strain of streptococcal bacteria isn't treated, or if antibiotic treatment is incomplete, your child has an increased risk of rare disorders such as:

Complications: Rheumatic fever inflammatory disorder that affects the heart, joints, and other tissues

Post streptococcal glomerulonephritis is an inflammatory disorder of the kidneys that results in inadequate removal of waste and excess fluids from blood

Peritonsillar abscess (PTA)

also known as **quinsy**, is pus due to an infection behind the tonsil. Symptoms include fever, throat pain, trouble opening the mouth, and a change to the voice, and is usually worse on one side. Complications may include blockage of the airway or aspiration pneumonitis.

They are typically due to infection by several types of bacteria. Often it follows streptococcal pharyngitis. They do not typically occur in those who have had a tonsillectomy. Diagnosis is usually based on the symptoms Medical imaging may be done to rule out complications. Treatment is by removing the pus, antibiotics, (Similar to tonsillitis) sufficient fluids, and pain medication. Steroids may also be useful. Hospital admission is generally unnecessary.

Traumatic perforation of the tympanic membrane

Traumatic causes of tympanic membrane perforation include

- ◇ Insertion of objects into the ear canal
- ◇ Concussion caused by an explosion or open-handed slap across the ear
- ◇ Head trauma (with or without basilar fracture)
- ◇ Sudden negative pressure (egg, strong suction applied to the ear canal)

Penetrating injuries of the tympanic membrane may result in dislocations of the ossicular chain, fracture of the stapedius footplate, displacement of fragments of the ossicles, bleeding, a perilymph fistula from the oval or round window resulting in leakage of perilymph into the middle ear space, or facial nerve injury.

Symptoms and Signs

Traumatic perforation of the tympanic membrane causes sudden severe pain sometimes followed by bleeding from the ear, hearing loss, and tinnitus. Hearing loss is more severe if the ossicular chain is disrupted. Vertigo suggests injury to the inner ear. Purulent otorrhea may begin in 24 to 48 hours, particularly if water enters the middle ear

Diagnosis

- ◇ Otoscopy
- ◇ Audiometry

Any blood obscuring the ear canal is carefully suctioned. Irrigation and pneumatic otoscopy are avoided. Extremely small perforations may require photomicroscopy. I. Patients with a large tympanic membrane defect should also be evaluated, because the displaced flaps may need to be repositioned.

Treatment

- Ear kept dry
- Oral or topical antibiotics if dirty injury

Often, no specific treatment is needed. The ear should be kept dry; routine antibiotic ear drops are unnecessary. However, prophylaxis with oral broad-spectrum antibiotics or antibiotic ear drops is necessary if contaminants may have entered through the perforation as occurs in dirty injuries. If the ear becomes infected, amoxicillin 500 mg orally every 8 hours is given for 7 days. Although most perforations close spontaneously, surgery is indicated for a perforation persisting > 2 months. Persistent conductive hearing loss suggests disruption of the ossicular chain, necessitating surgical exploration and repair.

Common cold (acute rhinitis)

Symptoms of acute rhinitis are almost universal with infections by the rhinoviruses which cause the common cold. For individuals who desire preparation for symptomatic relief, the options include oral pseudoephedrine or a topical decongestant. These drugs should not be used by patients taking monoamine oxidase inhibitors, e.g., phenalgine, tranylcypromine, and pseudoephedrine should not be used by hypertensive patients**.**

- ◇ Pseudoephedrine **hydrochloride** 60mg orally, every 6 to 8 hours or 120mg (sustained-release) orally, every 12 hours **OR**
- ◇ Oxymetazoline hydrochloride 0.05% solution, 2 or 3 drops or sprays into each nostril, 2 or 3 times a day **OR**
- ◇ Tramazoline **hydrochloride** 0.118% solution, 1 or 2 sprays into each nostril, 3 or 4 times a day (may be increased to 6 times in 24 hours if necessary) **OR**
- ◇ Xylometazoline 0.1% solution, 2 or 3 drops into each nostril, 1 to 3 times a day or 1 spray into each nostril, 2 to 4 times a day**.**

Patients must be advised not to use topical vasoconstrictor drugs for more than a few days because rebound nasal congestion can occur with prolonged use.

There is no evidence that antihistamines control the symptoms of the common cold. If acute rhinitis is accompanied by fever or nasal pain, paracetamol or aspirin may be of benefit. Do not use aspirin in children or teenagers due to the possible association with Reye's syndrome.

ACUTE ALLERGIC RHINITIS

Acute allergic rhinitis is caused by environmental allergens and can be aggravated by chemical irritants such as noxious fumes or active or passive smoking. If possible, the cause of the allergy should be established and the patient advised on the minimization of allergen exposure
Chlorpheniramine Tab 4mg, should not use Chlorpheniramine if you have narrow-angle glaucoma, a blockage in your stomach or intestines, an enlarged prostate if you are unable to urinate, or if you are having an asthma **attack**.

Dose: Tablets or syrup: 4 mg orally every 4 to 6 hours. Maximum dose 32 mg/day. 3 months to 5 months:
Usual Paediatric Dose for Cold Symptoms

Tablets or syrup: 1 to 2mg every 4 to 6 hours. Maximum dose 32 mg/day. and avoidance of irritants where applicable. For rapid relief of symptoms such as sneezing and rhinorrhoea, nonsedating antihistamines can be helpful.

Antihistamines often fail to relieve nasal congestion so a decongestant, such as **pseudoephedrine**, may need to be added. If a topical decongestant is used in addition to the antihistamine, patients must be advised not to use it for more than a few days because rebound nasal congestion can occur.

Persistent and recurrent rhinitis

Overview

If symptoms are continuous and not controlled the diagnosis should be reviewed. In children who have rhinitis for more than 3 months a bacterial infection may be present. A course of antibiotics, such **as Cotrimoxazole**, may be helpful, particularly in preschool children. School-age children are more likely to respond to antihistamines.

If the diagnosis is confirmed as a persistent (perennial) allergic rhinitis, the treatment approach resembles that used in asthma. If the allergens cannot be avoided then preventive medication can be prescribed. An antihistamine or decongestant (see acute rhinitis) can be used for relief if the preventive medication does not control all of the symptoms. For prevention use

Beclomethasone dipropionate 50 microgram, 2 sprays into each nostril, twice daily **OR**

Budesonide 100 micrograms, sprayed into each nostril, each morning**.**

A mast cell stabilizer is a second-line approach to prevention but may be preferred to corticosteroids as first-line therapy in children.

Sodium cromoglycate **2**% solution, 1 spray into each nostril, 4 to 6 times a day, or 4% solution, 1 spray into each nostril, 2 to 4 times a day**.**

For severe and persistent rhinitis that has not responded to topical corticosteroids, a short course of **prednisolone or prednisone**, e.g., for 10 days, should control symptoms. Prednisolone or prednisone should not be used long-term for this indication.

Epiglottitis

The epiglottis is the flap of tissue located just above the windpipe (trachea) that directs the flow of air and food in the throat.

Epiglottitis is a rare, but potentially life-threatening infection. It causes

sudden swelling of the epiglottis, which often worsens rapidly, sometimes within hours. Without timely treatment, the epiglottis can become so large that it blocks the windpipe, making it hard to breathe. This can cause death.

Signs and symptoms

Severe sore throat that comes on suddenly, Fever, Shortness of breath or difficulty breathing, especially when lying down., and a loud sound heard when breathing in (called stridor). And Difficulty swallowing

Treatment

Epiglottitis is an emergency important tests and treatment should be done in the hospital. Blood tests and/or throat swabs are done to determine which organism is causing the infection. Antibiotics usually are given through an intravenous line (into a vein). Most people begin to recover within 24 to 48 hours after receiving antibiotics.

Once the infection is under control, antibiotics can be taken by mouth until treatment is complete. Additional medicines may be given to control fever and pain.

Croup

Overview:

Is a childhood condition. Croup is a viral illness causing a barking cough and harsh breathing Most attacks are mild and get better on their own or with one dose of steroid medicine It causes the windpipe (trachea), the airways to the lungs (the bronchi), and the voice box (larynx). As the swelling gets worse, the airways get tighter and it becomes difficult to breathe.

It is usually caused parainfluenza virus is the most common cause. Several other viruses can also cause croup. These include: • Influenza A and B (flu viruses) • Measles virus (if not vaccinated) • Rhinovirus (common cold virus) •

The virus is transmitted through close contact and contaminated objects or surfaces. It is often spread by breathing in droplets from infected people coughing or sneezing. Who gets croup? It can occur at any age but is most common between 6 months and 3 years old.

Symptoms of croup

Children with croup have a distinctive barking cough (like a sea lion) and will make a harsh sound, known as stridor when they breathe in. They may also have a hoarse voice and find it difficult to breathe because their airway is blocked. Stridor is often most noticeable when children are upset or coughing. Symptoms tend to be worse at night and sometimes come

on suddenly in the middle of the night. Other problems that could mimic croup include: - Inhaling a small object such as a peanut Epiglottitis. – a very rare but very serious infection of the epiglottis

Croup Treatment & Management

Current treatment approaches include corticosteroids and nebulized epinephrine; steroids have proven beneficial in severe, moderate, and even mild croup. In the straightforward cases of croup, antibiotics are not prescribed, as the etiology is viral.

Lack of improvement or worsening of symptoms can be due to a secondary bacterial process, which requires the use of antimicrobials for treatment. Typically, patients with a bacterial component would have had moderate-to-severe croup assessment scores, requiring inpatient care and observation. Infants and children with severe respiratory distress or compromise may require oxygenation with ventilation support, initially with a bag-valve-mask device.

Urgent care or emergency department treatment of croup

Depends on the patient's degree of respiratory distress. Most children with mild croup symptoms can be successfully treated at home by their caregivers. Cool mist from a humidifier and/or sitting with the child in a bathroom (not in the shower) filled with steam generated by running hot water from the shower, helps minimize symptoms.

Suggestions for home treatment of mild croup include:

Any infant/child who presents with significant respiratory distress/ complaints of "stridor at rest" must have a thorough medical evaluation to ensure the patency of the airway and maintenance of effective oxygenation and ventilation.

Medicines & Doses for Croup Treatment

Historically, cool mist administration was the mainstay of treatment for croup. Hospitals had "croup rooms" filled with cool mist. Theoretically, mist moistens airway secretions, decreases their viscosity, and soothes the inflamed mucosa.

Corticosteroids

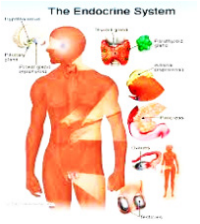
A single dose of dexamethasone is effective in reducing the overall severity of croup if administered within the first 4-24 hours after the onset of illness. The long half-life of dexamethasone (36-54 h) often allows for a single injection or dose to cover the usual symptom duration of croup.

- **Dexamethasone** dosed at 0.15 mg/kg is as effective as 0.3 mg/kg or 0.6 mg/kg (with a maximum daily dose of 10 mg) in relieving the symptoms of mild-to-moderate croup has shown the same efficacy if administered intravenously (IV), intramuscularly (IM), or orally (PO). The route of administration is patient-dependent as based on the patient's age, ability to tolerate orals, and severity of presenting illness.
- **Prednisone** : In calculating an appropriate prednisone dose, it is important to know that dexamethasone is 6.67 times more potent and has a long half-life of 36-56 hours, versus a median half-life of 18-36 hours for prednisone

. Despite the low risk, their use should be carefully evaluated for children with diabetes, an underlying Immunocompromised state, or those recently exposed to or diagnosed with varicella or tuberculosis, due to the potential risk of exacerbating the co-current disease process).

ENDOCRINE DISORDERS

Diabetes mellitus



Overview

Diabetes mellitus is a chronic lifelong condition associated with abnormally high levels of sugar glucose in the blood. Due to. Inadequate production of insulin or. Inadequate sensitivity of cells to the action of insulin.

Classification: of diabetes

Diabetes is classified into the following general categories:

1. **Type 1** diabetes (due to autoimmune β cell destruction, usually leading to absolute insulin deficiency)
2. **Type 2** diabetes (due to a progressive loss of β-cell insulin secretion frequently on the Overview of insulin resistance)
3. **Gestational diabetes** mellitus (GDM) (diabetes diagnosed in the second or third trimester of pregnancy that was not overt diabetes before gestation)
4. **Prediabetes**" is the term used for individuals whose glucose levels do not meet the criteria for diabetes but are too high for normal patients (Glycohemoglobin, HbA1C, Haemoglobin A1C test 5.7-6.4%).
5. Type 1 diabetes and type 2 diabetes are heterogeneous diseases in which clinical presentation and disease progression may vary considerably. Classification is important for determining therapy, but some individuals cannot be classified as having type 1 or type 2 diabetes at the time of diagnosis.

Diagnostic tests

Type 2 Diabetes Diagnosis Criteria

- A fasting plasma glucose (FPG) level of 126 mg/dL (7.0 mmol/L) or higher, or
- A 2-hour plasma glucose level of 200 mg/dL (11.1 mmol/L) or higher during a 75-g oral glucose tolerance test (OGTT), or
- A random plasma glucose of 200 mg/dL (11.1 mmol/L) or higher in a patient with classic symptoms of hyperglycemia or hyperglycaemic crisis

The goals of treatment are as follows:

- ◇ Microvascular (i.e., eye and kidney disease) risk reduction through control of glycemia and blood pressure
- ◇ Macrovascular (i.e., coronary, cerebrovascular, peripheral vascular) risk reduction through control of lipids and hypertension,
- ◇ Metabolic and neurologic risk reduction through control of glycemia

Specific treatment of type 1 diabetes

All patients with type 1 diabetes require therapy with insulin. The Diabetes Control and Complications. It is now standard practice to commence insulin on an ambulatory basis with specialist consultation, except in children or when clinical severity dictates the need for hospitalization.

Basal bolus insulin regime Basal-bolus treatment was used to achieve optimum blood glucose control even from the time of diagnosis. The basal-bolus regimen involves the administration of short-acting or very short-acting insulin and an intermediate-acting or long-acting insulin. The dose of the short-acting or very short-acting insulin is adjusted according to the blood glucose level at the time of dosing and the intended meal intake.

Short-acting OR very-short-acting insulin (approximately 60% of daily requirement) subcutaneously, 3 times daily, before meals, TOGETHER WITH

Intermediate-acting OR long-acting insulin (approximately 40% of daily requirement) subcutaneously, before bedtime,

The use of very short-acting insulin in basal-bolus regimens reduces the risk of overnight hypoglycemia and also the postprandial glucose rise. In children, the self-injection of a midday dose while at school may prove difficult and unreliable, making twice-daily insulin preferable and generally providing equally good control.

Split-mixed insulin regimen

Split-mixed insulin regimen involves once or twice daily administration of a combination of insulins. If the dosage is split, approximately two-thirds of the total daily dose is generally given in the morning and one-third before the evening meal. Both the doses and proportions of insulins used are individualized according to self-monitoring of blood glucose.

Insulin 12 to 24 units subcutaneously, daily, as a mixture of **short-acting insulin** (one-third of daily requirement) and intermediate-acting or **long-acting** insulin (two-thirds of daily requirement) in 1 or 2 divided doses, given 30 minutes before the morning and evening meals,

Specific management of type 2 diabetes

Diet and regular exercise to promote weight loss can often achieve good control of type 2 diabetes and should be tried before prescribing medications. If adequate control has not been obtained by these measures.

Oral hypoglycaemic therapy

Oral hypoglycaemic therapy with either an **insulin secretogogues** (sulfonylurea, Glitinide) or an **insulin sensitizer** (Biguanide, Glitazone) is required. However, these therapies are only effective in the presence of continuing beta cell function.

Oral hypoglycaemic agents before an adequate trial of diet and exercise are recommended only if symptoms are severe or blood glucose levels are consistently above 20mmol/L.

The standard choice of oral hypoglycaemic therapy in type 2 diabetes depends on the patient's weight. Generally, overweight patients should be commenced on M**etformin**.

Sulfonylureas

Most sulfonylureas are used in twice daily dosage and there is no advantage in prescribing more than one sulfonylurea concomitantly. A concerning feature of sulfonylureas is their propensity to cause weight gain which can partially negate their positive effects on **stimulation of insulin secretion.** The box below represents some sulfonylureas that can be taken in the indicated dose.

- ◇ Glibenclamide 2.5mg orally, 1 to 2 times daily (maximum 20mg daily)
- ◇ Gliclazide 40mg orally, 1 to 2 times daily (maximum 320mg daily)
- ◇ Metformin 0.5 to 1g orally, 1 to 3 times daily, with food.
- ◇ glimepiride 1mg orally, daily (maximum 4mg daily)
- ◇ Glipizide 2.5mg orally, 1 to 2 times daily (maximum 40mg daily)

Combination therapy for diabetes

If glycaemic targets are not achieved using either an insulin secretagogue or insulin sensitizer alone at the maximum dose, it is common practice to use a combination of insulin secretagogues and insulin sensitizer. The rationale for the use of the combination derives from their different modes of action. If adverse effects are a problem it is acceptable to use the agents in combination below their maximum dosages. The use of

combination therapy may defer the need for insulin.

Insulin therapy in type 2 patients

Overview

If glycaemic targets cannot be met with a combination of insulin treatment should be instituted. Approximately 30 percent of patients with type 2 diabetes eventually require insulin;

Prior to initiating insulin therapy, exclude factors that may have led to reduced control of blood glucose, including concurrent illnesses (egg asymptomatic urinary tract infection, thyrotoxicosis), and consider cessation of other drugs affecting glycemia, egg thiazides, estrogens, corticosteroids. If these factors have been excluded, it is important not to delay the commencement of insulin.

Starting dose of insulin

It is now common to commence insulin on an ambulatory basis in adults. In patients with type 2 diabetes, insulin is commenced using the following doses: If the dosage is split,

Intermediate-acting insulin **OR biphasic** insulin 12 to 16 units subcutaneously, in divided doses daily,

Split-mixed insulin regime involves once or twice daily administration of a combination of insulins.

Insulin 12 to 24 units subcutaneously, daily, as a mixture of short-acting insulin (one-third of daily requirement) and intermediate-acting or long-acting insulin (two-thirds of daily requirement) in 1 or 2 divided doses, given 30 minutes before the morning and evening meals.

approximately two-thirds is generally given in the morning and one-third before the evening meal. Both the doses and proportions of insulins used are individualized according to self-monitoring of blood glucose.

Special circumstances in the management of diabetes

1. Exercise

In anticipation of exercise, it is necessary to increase caloric intake or decrease insulin dose to avoid hypoglycemia during or after exercise. It is recommended, in anticipation of short bursts of exercise, that 1 carbohydrate exchange (i.e., 15g of carbohydrate for every 30 to 45 minutes of moderate exercise) be taken.

For exercise anticipated to last more than 1 hour, a decrease in the insulin dosage according to the intensity and duration of exercise should be

undertaken. The reduction in insulin dosage will vary between 10 and 20 percent of the dose of short-acting insulin prior to the exercise.

2. Concurrent illness

Management of patients during concurrent illness should involve:

- ◇ Review of therapy and treatment of concurrent illness
- ◇ Consider the use of short-term insulin therapy
- ◇ Referral to a specialist center if vomiting ± hypoglycemia, ketosis or severe hyperglycemia persists.

As metabolic control may deteriorate rapidly during illness of any kind, patients must be instructed on actions they should take.

3. In Acute illness

Acute illness is usually associated with increased secretion of counter-regulatory hormones and decreased activity even in the face of reduced caloric intake. This frequently leads to an increase in insulin requirements. Blood glucose and urinary ketones should be monitored frequently, i.e., 1- to 4-hourly. The appearance of ketones suggests the need for further insulin and fluids and can herald the onset of ketoacidosis.

If illness is not accompanied by nausea or vomiting, give the usual dose of insulin with a 10 to 20 percent increase in short-acting insulin, if blood glucose is above 12mmol/L.
Gestational diabetes

Gestational diabetes mellitus (sometimes referred to as GDM) is a form of diabetes that occurs during pregnancy. Most women will no longer have diabetes after the baby is born. However, some women will continue to have high blood glucose levels after delivery. It is diagnosed when higher than normal blood glucose levels first appear during pregnancy. It usually occurs around the 24th to 28th week of pregnancy. All pregnant women should be tested for gestational diabetes at 24-28 weeks of pregnancy (except those women who already have diabetes).

Women at increased risk
Women at risk of developing gestational diabetes:

- ◇ Are aged 40 years or over
- ◇ Have a family history of type 2 diabetes or a first-degree relative (mother or sister) who has had gestational diabetes
- ◇ Are above the healthy weight range
- ◇ Have previously given birth to a large baby (weighing more than 4.5kg)
- ◇ Are taking some types of anti-psychotic or steroid medications
- ◇ Have gained weight too rapidly in the first half of pregnancy.

Gestational diabetes may also occur in women with no known risk factors.

Diagnosis

Gestational diabetes is diagnosed using an oral glucose tolerance test (OGTT). This is done at a pathology lab. (See diagnosis of Diabetes)
Managing gestational diabetes

Gestational diabetes is managed by monitoring blood glucose levels, adopting a healthy eating plan, and performing regular physical activity. gestational diabetes aims to keep blood glucose levels equal to those of pregnant women who don't have gestational diabetes. The treatment always includes special meal plans and scheduled physical activity, and it may also include daily blood glucose testing and insulin injections. The following targets for women who develop gestational diabetes. More or less stringent glycemic goals may be appropriate for each individual.

- ◇ Before a meal (pre-prandial): 95 mg/dl or less
- ◇ 1 hour after a meal (postprandial): 140 mg/dl or less.
- ◇ 2 hours after a meal (postprandial): 120 mg/dl or fewer sources

Medicines

After changing your diet and exercising regularly, blood sugar is not controlled, >30 weeks in 1 to 2 weeks. (fasting blood glucose is >110 mg/dl (6.1 mmol/l), one-hour postprandial glucose is >140 mg/dl (7.8 mmol/l), or pregnancy weight gain is >12 kg (26.5 pounds).

Pharmacologic therapy is needed,

Metformin is taken as a tablet up to 3 times a day, usually with or after meals. OR **Glibenclamid**e.

Insulin is recommended if:

- ◇ The patient cannot take metformin or it causes side effects
- ◇ Blood sugar levels aren't controlled with metformin
- ◇ The baby is very large or you have too much fluid in your womb (polyhydramnios)

Insulin is taken as an injection, which you'll be shown how to do yourself. Depending on the type of insulin injection before meals, at bedtime, or on waking. Blood sugar levels usually increase as pregnancy progresses, so your insulin dose may need to be increased over time.

Hyper & hypoglycaemia

Most people feel symptoms of hypoglycemia when their blood sugar is 70 milligrams per decilitre (mg/dL) or lower. Hyperglycaemia doesn't cause symptoms

until **glucose** values are significantly elevated - usually above 180 to 200 milligrams per deciliter (mg/dL), or 10 to 11 millimoles per liter (mmol/L) and develops slowly over several days or weeks. Signs and symptoms of

low blood sugar (happen quickly), Each person's reaction to low blood sugar is different. Learn the signs and symptoms of when your blood sugar is low.

. A low blood sugar level triggers the release of adrenaline, the "fight-or-flight" hormone. Adrenaline can cause the symptoms of hypoglycemia such as a thumping heart, sweating, tingling, and anxiety.

If the blood sugar level continues to drop, the brain does not get enough glucose and stops functioning as it should. This can lead to blurred vision, difficulty concentrating, confused thinking, slurred speech, numbness, and drowsiness. If blood sugar stays low for too long, starving the brain of glucose, it may lead to seizures, coma, and very rarely death.

Treatment of hypoglycaemia:

The "15-15 Rule"

The 15-15 rule-have 15 grams of carbohydrate to raise your blood sugar and check it after 15 minutes. If it's still below 70 mg/dl, have another serving.

Repeat these steps until your blood sugar is at least 70 mg/dl. Once your blood sugar is back to normal, eat a meal or snack to make sure it doesn't lower again. This may be:

4 ounces (1/2 cup) of juice or regular soda (not diet)

1 tablespoon of sugar, honey, or corn syrup

Hard candies, jellybeans, or gumdrops-see food label for how many to consume

Treating severe hypoglycemia

Glucagon is a hormone produced in the pancreas that stimulates your liver to release stored glucose into your bloodstream when your blood sugar levels are too

Thyroid diseases

The thyroid's primary function is to control the body's metabolism it produces hormones, T4 and T3, which tell the body's cells how much energy to use. When the thyroid produces too much hormone, the body uses energy faster than it should. (Hyperthyroidism). When the thyroid doesn't produce enough hormone, the body uses energy slower than it should develop. Women are 5 to 8 times more likely than men to have thyroid problems.

Hyperthyroidism

The most common cause of hyperthyroidism (also called thyrotoxicosis) is Graves' disease. Other causes include toxic multinodular goiter, toxic

adenoma, and thyroiditis.

Diagnosis is confirmed with thyroid function tests (low thyroid stimulating hormone (TSH) with high free thyroxine (T4) or high free levothyroxine (T3). Exclude thyroiditis, if suspected, by thyroid scan; definitive treatment of thyroiditis is usually not needed because of spontaneous remission. Exclude specific drug precipitants (e.g., amiodarone, lithium, and IV contrast media).

The main treatments are medicines, radioactive iodine treatment or surgery. Thionamides are commonly used to treat an overactive thyroid. The main types used are Carbimazole and Propylthiouracil. After discontinuation of drugs,

- ◇ 3-4 months for the next 18 months to confirm continuous remission
- ◇ FT4, FT3, TSH, and TSH-binding inhibitory immunoglobulin (TBII) were measured every one to two months for the first 6 months.

Neomercazole Is a pro-drug of Methimazole, 5mg three to four times daily. It should not be given to pregnant or lactating mothers and not be given to children under one year.

Children 5mg mg daily.

Propylthiouracil_r 50-milligram Propylthiouracil (PTU). 8 hours apart, each day. Daily dosage varies from 100 to 600 milligrams, depending on the seriousness of your condition.). Then, doses are gradually decreased and finally discontinued when the patients can maintain (normal FT4 and TSH) for at least 6 months with the minimum maintenance dose other day or PTU 50 mg every other day). Should be avoided in children due to pronounced Hepatotoxicity. It is preferred for pregnant women during the first trimester and thyroid storm

Both Carbimazole and Propylthiouracil can cause agranulocytosis. Iodine; May be used in Special cases

Hypothyroidism

The objective of Treatment is:

Maintain normal growth and intellectual development in hypothyroid children.

Common causes of primary hypothyroidism include Hashimoto's thyroiditis, radioactive iodine treatment, and thyroid surgery.

Diagnosis is confirmed with thyroid function tests (elevated thyroid stimulating hormone (TSH) with low or low-to-normal free thyroxine, T4). Exclude the possibility of secondary hypothyroidism (TSH typically normal with low free T4) due to pituitary or hypothalamic disease; if present, assess the need for glucocorticoid replacement as this may need to be instituted before thyroid replacement treatment. Exclude specific drug

precipitants (e.g., amiodarone, lithium).

Treatment of hypothyroidism

Thyroxine 50 to 100 micrograms orally, daily, increasing where necessary over 3 to 6 months to 100 to 200 micrograms daily (1.5 to 3 microgram/kg/day) to achieve TSH levels of 0.5 to 2mU/L.

The severity of the disorder is best assessed from clinical rather than laboratory criteria. If there is a disturbance of consciousness or hypothermia, the possibility of myxoedema coma must be considered. In patients under 60 years of age, in the absence of ischaemic heart disease, commence with

In the elderly, especially in the presence of ischaemic heart disease, commences with

Thyroxine 25 to 50 micrograms orally, daily, gradually increasing over 3 to 6 months to 100 to 150 micrograms daily (1.5 to 3 microgram/kg/day).

If symptoms of cardiac ischemia worsen, avoid increasing the dose and appropriate investigations initiated.

Thyroxine has a half-life of about a week, it is given once daily. Replacement therapy takes at least a month to reach steady-state levels. Dose changes should be considered only every 3 to 4 weeks. Subtle dose adjustments can be achieved by prescribing different strength tablets on alternate days, e.g., 50 micrograms alternating with 100 micrograms

When there is no contraindication to full thyroxine replacement, a TSH level of about 1mU/L with a serum thyroxine level in the high-normal range, usually indicates optimal therapy.

Levothyroxine 25 micrograms orally, twice daily. Then stopped 7 to 10 days before the scan to allow TSH levels to rise transiently. Thyroxine is recommenced in full dosage immediately after a clear scan.

In patients who have had previous ablative treatment, an alternative rescanning protocol that causes less severe symptoms of hypothyroidism can be used by reducing the thyroxine dose to 50 micrograms daily, followed by scanning when the serum TSH, measured every 2 weeks, exceeds 40mU/L.

Elderly patients

Commence thyroxine replacement very cautiously; maintenance replacement dose in the elderly may be less than in younger people. In patients with Ischaemic heart disease commence thyroxine replacement

very cautiously; full replacement dose may not be appropriate in ischaemic heart disease.

Pregnancy

Monitor thyroid function at least once each trimester; increased thyroxine dosage may be required from the first trimester; reassess thyroxine maintenance dosage 6–8 weeks postpartum.

Congenital hypothyroidism

Replacement therapy should begin as early as possible, under careful supervision, to prevent intellectual disability. Usual dosage (8–10 micrograms/kg daily) may be increased up to 15 micrograms/kg daily in children with severe disease, e.g., athyreosis. Monitor intellectual and physical development and thyroid function test results.

Treatment endpoints

Monitor clinical symptoms and thyroid function test results.

In primary hypothyroidism, adjust thyroxine dosage to achieve TSH in the normal range. Monitor TSH concentration 2, 4, and 10 months after initiation of treatment; monitor annually thereafter, more frequently in children.

In hypothyroidism due to hypothalamic or pituitary disease, TSH cannot be used as an indication of adequate replacement. Adjust thyroxine dosage to achieve T4 in the mid-to-upper normal range.

Risk of osteoporosis

There is concern that overtreatment of hypothyroidism (as shown by suppressed TSH) or use of suppressive treatment may be associated with an increased rate of bone density loss; clinical significance is uncertain.

Subclinical hypothyroidism

Characterized by mild elevation in TSH (often asymptomatic) with normal T4; the risk of conversion to overt hypothyroidism is higher in people with thyroid peroxidase antibodies and rising TSH. Monitor thyroid function every 6–12 months. The decision to begin T4 replacement should be individualized.

1. In hypothyroidism, thyroxine replacement is lifelong except for some people with hypothyroidism following subacute or postpartum thyroiditis; in these cases, cease thyroxine replacement after 3–6 months and assess TSH after 6–8 weeks to determine whether hypothyroidism is permanent
2. Allow at least 6 weeks after adjustment in thyroxine dosage before checking TSH as thyroxine has a long half-life
3. Failure to respond to thyroxine is most often due to lack of compliance;

occasionally absorption is impaired by food, disease of the small intestine, or binding to other drugs in the gut (e.g., cholestyramine); thyroxine clearance is increased by interacting drugs, e.g., enzyme inducers metabolism of many drugs is reduced in hypothyroidism; to avoid toxicity, use lower doses of hypnotics, digoxin, anesthetic agents and analgesics until the person is euthyroid

Osteoporosis

Overview

Objective of treatment: To prevent fractures and associated morbidity in people with low bone density or a history of fracture. Before starting treatment

1. Exclude other diseases that may cause bone fragility by clinical assessment and appropriate investigations, e.g., metastatic cancer, multiple myeloma, and osteomalacia.
2. Consider specific causes, especially in men or where bone density is more than 2.5 standard deviations (SD) below young mean value, e.g., hypogonadism, hyperthyroidism, hyperparathyroidism, liver disease, malabsorption syndromes, Cushing's disease.
3. Exclude the effect of other drugs e.g., Hydrogen pump inhibitors

Treatment

Treatment is considered a treatment in people with the presence or history of osteoporotic fracture or when bone density is more than 2.5 SD below the young mean value, especially if they have other risk factors for fracture.

Calcium intake

- ◇ Adequate calcium intake should be part of routine management; the target total intake should be approximately 1500 mg daily in postmenopausal women.
- ◇ Supplementation may reduce bone loss in osteoporosis, particularly in late postmenopausal women with a low dietary calcium intake; less effective than other treatments when used as sole therapy.

Vitamin D3 (cholecalciferol) and vitamin D2 (ergocalciferol)

- ◇ Increase bone density and seem to decrease the risk of hip and vertebral fracture, in combination with calcium supplementation; further data are required to confirm these findings.
- ◇ May be particularly useful in institutionalized elderly women with low calcium intake and little sunlight exposure.

Calcitriol

- ◇ Reduces rate of bone mineral density loss in postmenopausal

osteoporosis; may reduce risk of vertebral fractures; further efficacy data are required.
- ◇ Regular monitoring of plasma calcium concentration is required because of high risk of hypercalcemia and hypercalcemia.

Hormone replacement therapy (HRT)

Using estrogen alone or estrogen and progesterone But it is less used now due it the risk of cancer and cardiovascular effects

- ◇ Often considered as first-line treatment in the prevention and treatment of postmenopausal osteoporosis; increases bone mineral density and reduces risk of fractures; other beneficial and adverse effects of HRT are important to consider.
- ◇ Relieves menopausal vasomotor and urogenital symptoms.
- ◇ Observational studies suggest that long-term cardiovascular morbidity and mortality may be improved; further efficacy data are required.
- ◇ The risk of breast cancer with long-term use is slightly increased.
- ◇ Estrogens must be used in combination with a progestogen in women with intact uterus to prevent increased risk of endometrial cancer.
- ◇ The risk of venous thromboembolism is slightly increased; do not use in women with active thromboembolic disorders.

Bisphosphonates

- ◇ Second-line agents in the treatment of postmenopausal osteoporosis in women unable or unwilling to take HRT, or if HRT is ineffective.
- ◇ Increase bone density (less than HRT); alendronate and risedronate have been shown to decrease the risk of vertebral fractures in postmenopausal women with osteoporosis; long-term effects on bones due to skeletal retention are yet to be determined.
- ◇ Poor oral absorption; must be taken with water only, not food.
- ◇ Risk of oesophageal adverse effects with alendronate which may be severe; administration instructions must be followed carefully.
- ◇ Risk of osteomalacia with continuous use and high doses of etidronate; intermittent administration in cycles alternating with calcium is required.
- ◇ Selective estrogen receptor modulator (raloxifene). Increases bone density in postmenopausal women but less than estrogen; decreases risk of vertebral fractures in postmenopausal women at increased risk of osteoporosis, but not risk of non-vertebral fractures.
- ◇ Increased risk of venous thromboembolism similar to that of HRT.
- ◇ Seems to decrease the risk of breast cancer; long-term data are needed to confirm these results; does not seem to increase the risk of endometrial cancer.

- ◇ Improves lipid profile; lowers LDL cholesterol but has no effect on HDL cholesterol and triglycerides.
- ◇ Does not cause vaginal bleeding and breast discomfort but may aggravate hot flushes.
- ◇ May be useful as a second-line treatment of postmenopausal osteoporosis in women at risk of breast cancer.

Other drugs:

Tibolone combines oestrogenic, progestogenic, and androgenic activity. It has been recently approved in Australia for the treatment of vasomotor menopausal symptoms and prevention of bone loss. There is no data about its effect on the risk of fractures

- ◇ Calcitonin is not approved for use for osteoporosis in Australia. There is limited evidence for long-term prevention of fractures. Expenses, adverse effects, and difficulties with administration limit use in most countries.
- ◇ Anabolic steroids should not be used for osteoporosis because of the lack of evidence of efficacy in preventing fractures and the risk of serious adverse effects.
- ◇ Fluoride should not be used for osteoporosis until further studies confirm effective and safe **regimens.**

Special cases in osteoporosis

Glucocorticoid-induced osteoporosis**:** Measure bone density in people commencing glucocorticoids if they are likely to take steroids long term.

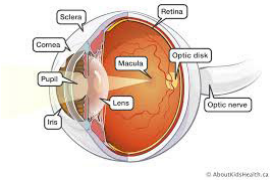
- ◇ Use the lowest effective dose of glucocorticoids.
- ◇ Use topical or inhaled preparations when possible.
- ◇ Most treatments used for glucocorticoid-induced osteoporosis may prevent bone loss but none has been shown to decrease the incidence of fractures.
- ◇ Maintain adequate calcium intake, by using calcium and vitamin D supplementation if necessary
- ◇ Look for glucocorticoid-induced hypogonadism in men.
- ◇ Consider hormone replacement therapy in postmenopausal women
- ◇ Bisphosphonates may be helpful, though further evaluation in clinical trials is required; caution is advised in younger people because long-term effects remain uncertain.
- ◇ Calcitriol is marketed for the prevention of glucocorticoid-induced osteoporosis; the risk of hypercalcemia limits its use.

Osteoporosis in men

- ◇ Secondary causes of osteoporosis are more common (egg hypogonadism, excess alcohol) and need specific treatment.

Few data are available about specific treatment and prevention of osteoporosis in men; all treatments, except for estrogens and raloxifene, may be as effective in men as in women; seek specialist advice

COMMON EYE DISEASES



The majority eye problems can be diagnosed and managed by a general practitioner. as they present in a similar way to more serious diseases. However, some certain signs and symptoms must be considered a Red flag and should be immediately referred to Eye Specialist

Red Flag Symptoms

1. sudden short flashes of light in the eye, blurring or distortion of vision and a shadow or 'dark curtain' spreading across the vision: alert to retinal detachment, which will lead to blindness without prompt treatment.
2. Abnormal pupillary reactions: may indicate acute glaucoma or anterior uveitis
3. Moderate to severe eye pain or photophobia: could indicate acute uveitis, corneal ulcer, meningitis, eye injury or infection.
4. Marked redness of one eye: the greater the redness, the more likely that the cause is serious. Ciliary injection, which is not always obvious, occurs with inflammation of deeper structures. It is indicated by redness, and dilated blood vessels that can be seen between the sclera (white of the eye) and the iris.
5. Reduced visual acuity as measured with a Snellen chart or the near vision testing card: could suggest macular degeneration, glaucoma, cataract, diabetic retinopathy, optic neuritis or retinal detachment.
6. Loss of peripheral vision: may indicate glaucoma, retinal vessel occlusion or detached retina.
7. Seeing halos or rainbows around light: could indicate corneal oedema or cataract.
8. Foreign body or penetrating eye injury.

Conjunctivitis (Pinkeye)

Conjunctivitis, also known to many as pinkeye is a condition that inflames the tissues lining the back of your eyelids and covering your sclera (conjunctiva). As a result of this, your eyes can turn itchy, red, blurry, teary and discharging, sometimes also giving you a feeling that something is in your eyes. It is also one of the most commonly prevailing eye problems.

Though it is highly contagious (readily affecting children), but rarely serious, quite unlikely to damage your vision, more so when identified and treated early

Types of conjunctivitis

Allergic conjunctivitis Mostly affects people already suffering from seasonal allergies, when they contact with something that triggers an allergic reaction within their eyes.

Giant Papillary Conjunctivitis: Caused due to long term presence of a foreign body in an eye, affecting people wearing hard or rigid contact lenses or the soft ones not being replaced frequently.

Bacterial Conjunctivitis:

This is the type of eye infection caused mostly by streptococcal or staphylococcal bacteria that's transferred to your eyes via your own respiratory system or skin.

Treatment,

An antibiotic, usually given topically as eye drops or ointment, for bacterial conjunctivitis. Antibiotics may help shorten the length of infection, reduce complications, and reduce the spread to others Antibiotics may be necessary in the following cases:

- With discharge (pus)
- When conjunctivitis occurs in people whose immune system is compromised
- When certain bacteria are suspected

Mild bacterial conjunctivitis may get better without antibiotic treatment and without causing any complications. It often improves in 2 to 5 days without treatment but can take 2 weeks to go away completely.

If topical antibiotic considered necessary in the g circumstances:

- ◇ Consider a delayed prescription for 3 days to see if symptoms resolve with self-care and without antibiotic eye drops.
- ◇ Prolonged or recurrent use of any topical antimicrobial agent should be avoided where possible as it leads to the emergence of antimicrobial resistance.
- ◇ Fusidic acid has minimal Gram-negative activity. Note that in contact lens wearers, infection may be Gram-negative
- ◇ Chloramphenicol is not recommended in pregnancy or breastfeeding.

1. Viral conjunctivitis:

Contagious viruses thriving in the common cold are mostly responsible for the spread of this type of conjunctivitis, thus affecting people by exposure to the sneezing or coughing of someone suffering from an upper respiratory tract infection.

Treatment

Most cases of viral conjunctivitis are mild. The infection will usually clear up in 7 to 14 days without treatment and without any long-term consequences. However, in some cases, viral conjunctivitis can take 2 to 3 weeks or more to clear up.

It may be necessary to prescribe antiviral medication to treat more serious forms of conjunctivitis. For example, conjunctivitis is caused by herpes simplex virus or varicella-zoster virus. Examples: Zovirax® (Aciclovir) eye ointment, Virgan (Ganciclovir) eye gel Eye drops:

Antibiotics will not improve viral conjunctivitis; these drugs are not effective against viruses

Infectious keratitis

Infectious keratitis is an emergency that requires medical attention as it can progress quickly. This condition is an infection of the cornea, the transparent covering of the ocular surface (of the iris and the pupil).

Keratitis can be bacterial or viral with bacteria being the most common culprits. Severe cases of keratitis can result in vision loss if left untreated.

Inappropriate use of contact lenses is one of the leading causes of bacterial keratitis

Treatment for this type of infection will depend on what causes it.

Allergic conjunctivitis

If the irritation is allergic conjunctivitis, your doctor may prescribe one of many different types of eyedrops for people with allergies. These may include medications that help control allergic reactions, such as antihistamines and mast cell stabilizers, or drugs that help control inflammation, such as decongestants, steroids, and anti-inflammatory drops.

Treatment

Conjunctivitis caused by an allergen (such as pollen or animal dander)

usually improves by removing the allergen from the person's environment.

Allergy medications and certain eye drops (topical antihistamines and vasoconstrictors), including some prescription eye drops, can also provide relief from allergic conjunctivitis. In some cases, your doctor may recommend a combination of drugs to improve symptoms. Your doctor can help if you have conjunctivitis caused by an allergy.

Differentiating Bacterial from Viral Conjunctivitis

Bacterial conjunctivitis can be differentiated from viral conjunctivitis based on discharge (mucopurulent vs. watery), age of the affected child (preschool-aged vs. school-aged children), and whether the infection is bilateral or unilateral (See the table below)

Differentiation between viral & Bacteria conjunctivitis

BACTERIA	VIRAL
Mucopurulent discharge	Watery discharge
Bilateral	Unilateral
Preschool (,4yrs)	Older children (>7yrs)
Otitis media	Pharyngitis
No adenopathy	Adenopathy

Bacterial Conjunctivitis

Gentamicin 0.3% EYE DROPS 1 drop in the affected eye q6h

Treatment duration: 5 days **OR**

Ofoxacin 0.3% EYE DROPS 1 drop in the affected eye q6h

Treatment duration: 5 days **OR**

Tetracycline 1% EYE OINTMENT 1 cm in the affected eye q6h

Treatment duration: 5 days

Gonococcal Conjunctivitis

All dosages are for normal renal function

Ceftriaxone 250 mg IM

Treatment duration: Single dose **COMBINED WITH**

Azithromycin 1 g ORAL

Treatment duration: Single dos

Neonatal conjunctivitis

Ophthalmia neonatorum, Preliminary presumptive treatment pending culture confirmation should be based on the clinical picture and the findings on Gram, Giemsa, and Papanicolaou stains. Prior to birth, consider the risk of transmission of chlamydial, gonococcal, herpetic, and streptococcal pathogens to the fetus during vaginal delivery. Obtain cervical cultures if indicated and manage appropriately, including the possibility of a Caesarean delivery.

To confirm the presence of a sexually transmitted disease in the neonate, examine and treat the mother and her sexual partner(s). If necessary, therapy can be modified when the results of culture and sensitivity are known. The treatment prior to laboratory results should include topical erythromycin ointment and an IV or IM third-generation cephalosporin.

Guidelines for primary care management for eye injury

Always examine an eye injury with gentle hands, avoiding any pressure on the eye.

Eyelid margin laceration

1. Check for any other injury involving the eye
2. Apply an eye pad and shield
3. Refer for surgical repair.

Foreign body

1. Instil anesthetic eye drops
2. Remove the foreign body gently either using a cotton bud or by irrigation
3. Apply antibiotic ointment and an eye pad
4. Check after 24 hours

Prophylaxis

Topical 0.5% erythromycin and 1% tetracycline are considered equally effective for prophylaxis of ocular gonorrhoea infection in new-born infants.
Silver nitrate, Povidone-Iodine, and Erythromycin are all effective in the prevention of non-gonococcal non-chlamydial neonatal conjunctivitis. There is no agent that is currently effective in preventing the transmission of *C trachomatis* from mother to baby. Erythromycin or silver nitrate could prevent vertical transmission
Povidone-iodine solution (2.5%) is effective in preventing neonatal ophthalmia. Silver nitrate is the best agent in areas where the incidence of penicillinase-producing *N gonorrhoeae* (PPNG) is significant.

The recommendations in the 2012 Redbook are for 2 drops of 1% silver nitrate or a 1 cm ribbon of antibiotic ointment (either erythromycin or tetracycline) placed into the lower conjunctival sac; both acceptable regimens for the prophylaxis of neonatal conjunctivitis. Erythromycin ointment is considered the best regimen for prophylaxis against neonatal conjunctivitis because of its efficacy against gonococcal and non-gonococcal non chlamydial pathogens

N.B. Refer if unable to remove the foreign body or if any complication develops. (An iron foreign body on the cornea may leave a small rust ring after removal. Generally, this does not require any further treatment).

Corneal abrasion

1. Identify the corneal abrasion with fluorescein dye
2. Apply antibiotic eye ointment
3. Apply an eye pad for 24 hours

Prompt treatment of gonococcal conjunctivitis is important since this organism can penetrate an intact corneal epithelium and rapidly cause corneal ulceration. Due to the rapid progression of gonococcal conjunctivitis, patients with acute neonatal conjunctivitis should be treated for gonococcal conjunctivitis until culture results are available; the treatment is altered according to the laboratory results.

A. In cases of chlamydial conjunctivitis,

1. systemic treatment is necessary because of the significant risk for life-threatening pneumonia.
2. Infants with a potentially sexually transmitted disease, such as gonorrhea or chlamydia, should undergo evaluation for other sexually transmitted diseases, such as syphilis and HIV should the mother and her sexual partner(s).

B. Neonatal Chlamydial Conjunctivitis

1. This infection is treated with oral erythromycin (50 mg/kg/d divided qi) for 14 days. Topical treatment alone is ineffective. Topical erythromycin ointment may be beneficial as an adjunctive therapy.
2. Since the efficacy of systemic erythromycin therapy is approximately 80%, a second course sometimes is required.

C. Treatment of Neonatal Herpetic Conjunctivitis

1. Neonates with a suspected herpes simplex infection should be treated with systemic acyclovir to reduce the risk of a systemic infection.
2. An effective dose is 60 mg/kg/day IV divided 3 times daily.
3. The recommended minimal duration is 14 days, but a course as long

as 21 days may be required.

D. Infants with neonatal HSV keratitis should also receive a topical ophthalmic drug, most commonly 1% trifluridine drops or 3% vidarabine ointment. Topical ganciclovir 0.15% gel is now also available,

1. Topical antibiotics can also be considered to prevent secondary bacterial infections in cases with significant epithelial defects.
2. Repeat the same procedure (2 and 3) if the abrasion has not healed completely after 24 hours
3. Apply antibiotic eye ointment 3 times a day for 3 day

N.B. Refer if no improvement after 3 days.

Eye Perforation

1. Do not apply any pressure on the eye
2. Do not instill any medication unless there will be a delay before specialist care
3. Apply an eye shield very gently

N.B. This is always an emergency and must be referred immediately. If there will be a delay before specialist care, instill an antibiotic and also give a systemic antibiotic.

Hyphemia (blood in the anterior chamber

1. Apply eye pads to both eyes (if the patient can tolerate double padding)
2. Advise bed rest and supervise for 5 days

N.B. Refer if blood has not cleared after 3 days or immediately if the intraocular pressure rises so that the eye surgeon can release the blood surgically.

Blunt injury to an eye may also cause other injuries (see diagrams). Refer for specialist care if significant injury is seen or if the visual acuity is < 6/18. Rest is advised until the complication has resolved. A further examination after one month is advisable.

Burns: fire or chemical

1. Immediately irrigate the injured eye with copious clean water. Continue for 10 to 15 minutes, or longer if necessary
2. Apply antibiotic ointment and an eye pad

N.B. This is always an emergency and must be referred immediately after irrigation.

Points to remember

◇ Take an accurate history and convey it to any other health worker treating the patient

- ◇ Always attempt to check the visual acuity before treating and referring (except in the case of burns)
- ◇ Refer all patients with a visual acuity of worse than 6/18
- ◇ Always use gentle hands in examination

Dry eyes (keratoconjunctivitis sicca),

It is a collective term for the discomfort, watering, and blurring of vision that results from abnormal composition and production of tears and abnormal ties of the surface of the eye. It affects more women, older people, and those with diabetes, Parkinson's disease, or low androgen levels.

Causes

1. Dry eyes are also a known side-effect of certain medications, including antihistamines, anticholinergic drugs, estrogens, amiodarone, and isotretinoin. Contact lens wearers are especially at risk of dry eyes and some eye drops can cause drying.
2. It can be a consequence of eye surgery, including the increasingly popular laser procedures to correct refractive errors.
3. Diagnosis is usually made based on the history.

Treatment; Artificial tears are usually the first line of treatment. They come as liquid, gel, or ointment and many formulations are available over the counter. preservative-free preparations may be needed if there is an inflammatory reaction to the preservatives

Glaucoma

Glaucoma is an eye condition where the eye's optic nerve is damaged, getting worse over time. Mostly, it results in pressure build-up within the fluid in the eye, which can potentially damage the optic nerve responsible for transmitting images to your brain.

This increased pressure also referred to as intraocular pressure, might also lead to permanent vision loss if it continues for a longer period. If left untreated, glaucoma can result in permanent blindness in a matter of a few years.

Types of Glaucoma

Glaucoma is segregated into two basic types:

1. Open-angle Glaucoma: The most common type, also referred to as 'wide-angle glaucoma' is an eye condition where the trabecular meshwork (the drain structure of the eye) looks normal, but the flow of fluid within it is not the way it should be.
2. Angle-closure Glaucoma: Westerners suffer less from this type of glaucoma than Asians. It is also known as acute or chronic angle-

closure or narrow-angle glaucoma. This affects the drainage of your eyes because the angle between your cornea and iris gets too narrow, thus building up excessive pressure in your eye. This condition is also linked with farsightedness and cataracts.

Signs and Symptoms of Glaucoma

Signs and symptoms of both types of glaucoma vary significantly.

1: Symptoms of Open-Angle Glaucoma

No definite symptoms initially, the later ones include:

- Tunnel vision
- Peripheral vision loss, gradually affecting both eyes in most cases

2: Symptoms of Angle-Closure Glaucoma

Angle-closure glaucoma needs immediate treatment or it can result in blindness in a day or two. Some of its symptoms include:

- Severe pain in eyes accompanied by nausea and vomiting in most cases
- Sudden visual disturbance in low-light conditions
- Halos around lights
- Blurred vision
- Redness of the eyes

Treatment Options

The damage caused by glaucoma can't be reversed. However, treatment and regular check-ups can help slow or prevent vision loss, especially if you catch the disease in its early stages. Glaucoma is treated by lowering your eye pressure (intraocular pressure). Depending on your situation, your options may include prescription eyedrops, oral medications, laser treatment, surgery, or a combination of any of these.

Eyedrops

Glaucoma treatment often starts with prescription eyedrops. These can help decrease eye pressure by improving how fluid drains from your eye or by decreasing the amount of fluid your eye makes. Depending on how low your eye pressure needs to be, more than one of the eyedrops below may need to be prescribed.

Prescription eyedrop medications include:

1. Prostaglandins. These increase the outflow of the fluid in the eye (aqueous humor), thereby reducing your eye pressure. Medicines in this

category include latanoprost (Xalatan), travoprost (Travatan Z), tafluprost (Zioptan), bimatoprost (Lumigan) and latanoprostene bunod (Vyzulta).

Possible side effects include mild reddening and stinging of the eyes, darkening of the iris, darkening of the pigment of the eyelashes or eyelid skin, and blurred vision. This class of drug is prescribed for once-a-day use.

2. Beta blockers. These reduce the production of fluid in your eye, thereby lowering the pressure in your eye (intraocular pressure). Examples include timolol (Betimol, Istalol, Timoptic) and betaxolol (Betoptic).

* Possible side effects include difficulty breathing, slowed heart rate, lower blood pressure, impotence, and fatigue. This class of drug can be prescribed for once- or twice-daily use depending on your condition.

3. Alpha-adrenergic agonists. These reduce the production of aqueous humour and increase the outflow of the fluid in your eye. Examples include apraclonidine (Iopidine) and brimonidine (Alphagan P, Qoliana).

* Possible side effects include an irregular heart rate, high blood pressure, fatigue, red, itchy, or swollen eyes, and dry mouth. This class of drug is usually prescribed for twice-daily use but sometimes can be prescribed for use three times a day.

currently available, alpha-adrenergic receptor agonists are used either as monotherapy, as second-line therapy, or in fixed combination with beta-blockers. Non-selective adrenergic agonists such as epinephrine and dipivefrin are infrequently used today for the treatment of glaucoma or ocular hypertension and have been replaced by alpha-2-selective agonists. The use of apraclonidine for IOP reduction in glaucoma or OHT is limited due to a high rate of follicular conjunctivitis. The alpha-2-selective agonist in use today is brimonidine. The brimonidine purity formulations are preferred to the brimonidine benzalkonium chloride (BAC) formulation

4. Carbonic anhydrase inhibitors. These medicines reduce the production of fluid in your eye. Examples include dorzolamide (Trusopt) and brinzolamide (Azopt). Possible side effects include a metallic taste, frequent urination, and tingling in the fingers and toes. This class of drug is usually prescribed for twice-daily use but sometimes can be prescribed for use three times a day.

5. Rho kinase inhibitor. This medicine lowers eye pressure by suppressing the Rho kinase enzymes responsible for fluid increase. It is available as netarsudil (Rhopressa) and is prescribed for once-a-day use.

Possible side effects include eye redness, eye discomfort, and deposits forming on the cornea.

6. Miotic or cholinergic agents. These increase the outflow of fluid from the eye. An example is pilocarpine (Isopto Carpine). Side effects include headache, eye ache, smaller pupils, possible blurred or dim vision, and near-sightedness. This class of medicine is usually prescribed to be used up to four times a day. Because of potential side effects and the need for frequent daily use, these medications are not prescribed very often anymore.

If multiple eye drops or artificial tears are needed, space them out at least five minutes in between types of drops.

Oral medications

If eyedrops alone don't bring your eye pressure down to the desired level, an oral medication, is usually a carbonic anhydrase inhibitor.(Actazolamide) Possible side effects include frequent urination, tingling in the fingers and toes, depression, stomach upset, and kidney stones.

Surgery and other therapies

Other treatment options include laser therapy and various surgical procedures. The following techniques are intended to improve the drainage of fluid within the eye, thereby lowering pressure:

Retinal disorder

Age-dependent macular degeneration(ADMD)

commonly referred to as AMD (Age-Related), which outnumbers the victims of glaucoma and cataracts combined.

Macular degeneration is the name given to the damage to the central portion of the retina, known as the macula. With its ability to focus central vision in the eye, the macula helps us read, view objects in detail, recognize colors and faces, drive a car, and get a detailed image of an object.

Presently, macular degeneration makes it to the list of incurable eye diseases with its two basic types, i.e., 'dry AMD' and 'wet AMD'. The 'dry' (atrophic) type makes up about 85% – 90% of the total victims of AMD, while the rest 10% – 15% fall under the 'wet (exudative) AMD'.

Signs and Symptoms of Macular Degeneration

No definite signs and symptoms exist through earlier stages of macular degeneration other than a gradual or sudden change in the quality of your vision followed by the appearance of straight lines as distorted.

Some other symptoms in the later stages include:

- ◇ Blurriness of central vision
- ◇ Partial vision loss marked by the formation of blind spots (scotomas)
- ◇ Problem seeing in dim light
- ◇ Objects appearing smaller than their actual size, as viewed with one eye and then the other

Treatment

There is currently no cure for AMD, and treatment efforts are directed at maintaining useful central vision for as long as possible. Treatment varies depending on the type of AMD and individual characteristics of the condition.

Various treatments available for wet AMD include:

- Ranibizumab (Lucentis), Aflibercept (Eylea), and Bevacizumab (Avastin)drugs are the most common treatments used. These drugs are injected into the vitreous cavity of the eye, reducing leakage from the blood vessels under the retina. Since this is not a cure, the majority of patients receiving these treatments will require lifelong therapy at 1-3 monthly intervals.
- Laser Photocoagulation is a concentrated beam of high-energy laser light, directed onto the retina, to seal the leaky blood vessels. If this treatment modality is suitable, it may reduce the need for ongoing treatment with injections.

Diabetic Retinopathy

Diabetic retinopathy is basically a diabetes complication, which affects eyes by causing damage to the blood vessels spread throughout the light-sensitive tissues of the retina (the back of the eye).

Anyone having type 1 or type 2 diabetes can develop this eye condition, especially those who have diabetes for a long time with fluctuating blood sugar levels. Usually, both eyes get affected by diabetic retinopathy.

Signs and Symptoms of Diabetic Retinopathy

There might not be any noticeable symptoms through the early stages of this eye condition. When it progresses to later stages, the following symptoms might appear eventually:

- Dark spots or strings floating through your vision (floaters)
- Impaired color recognition
- Fluctuating vision
- Blurred vision

- Vision loss

Treatment Options

There is no reliable way to cure retinopathy once it has progressed to advanced stages. However, photocoagulation (laser treatment for retinopathy) comes in handy in preventing vision loss if chosen before the retina is severely damaged.

Another treatment option for diabetic retinopathy in its earlier stages is vitrectomy, a process through which vitreous gel is surgically removed while the retina has not been severely damaged.

Trachoma

Trachoma is the leading infectious cause of blindness worldwide. It is caused by an obligate intracellular bacterium called Chlamydia trachomatis. The infection is transmitted by direct or indirect transfer of eye and nose discharges of infected people, particularly young children who harbor the principal reservoir of infection. These discharges can be spread by particular species of flies.

After years of repeated infection, the inside of the eyelid can become so severely scarred (trachomatous conjunctival scarring) that it turns inwards and causes the eyelashes to rub against the eyeball (trachomatous trichiasis), resulting in constant pain and light intolerance; this and other alterations of the eye can lead to scarring of the cornea. Left untreated, this condition leads to the formation of irreversible opacities, with resulting visual impairment or blindness.

Prevention and Control

Elimination programs in endemic countries are being implemented using the WHO-recommended SAFE strategy. This consists of:

- **Antibiotics to clear the infection**, particularly mass drug administration of the antibiotic azithromycin, which is donated by the manufacturer to elimination programs, through the International Trachoma Initiative;
- **S**urgery to treat the blinding stage (trachomatous trichiasis);
- **F**acial cleanliness; and
- **E**nvironmental improvement, particularly improving access to water and sanitation.

INFECTIOUS DISEASES

Onchocerciasis

Onchocerciasis – or "river blindness" – is a parasitic disease caused by the filarial worm Onchocerca volvulus transmitted by repeated bites of infected blackflies (Simulium spp.).

Signs and symptoms

Onchocerciasis is an eye and skin disease. Symptoms are caused by the microfilariae, which move around the human body in the subcutaneous tissue and induce intense inflammatory responses when they die

Treatment:

The treatment for onchocerciasis is ivermectin 0.15 mg/kg orally once every 12 months for 3 to five years Patients with heavy ocular infection may require retreatment every 6 months. Retreatment may be considered at intervals as short as 3 months.

Dosage guidelines based on body weight:
15 to 25 kg: 3 mg orally one time
26 to 44 kg: 6 mg orally one time
45 to 64 kg: 9 mg orally one time
65 to 84 kg: 12 mg orally one time
85 kg or more: 0.15 mg/kg orally one time

Malaria

Malaria is a life-threatening disease caused by parasites that are transmitted to people through the bites of infected female Anopheles mosquitoes. It is preventable and curable**.**

Symptoms

In a non-immune individual, symptoms usually appear 10–15 days after the infective mosquito bite. The first symptoms – fever, headache, and chills – may be mild and difficult to recognize as malaria in malaria-endemic areas, people may develop partial immunity, allowing asymptomatic infections to occur. Pregnant women and children are more at risk.

Diagnosis of malaria

All cases of suspected malaria should have a parasitological test (microscopy or Rapid diagnostic test (RDT)) to confirm the diagnosis. Both microscopy and RDTs should be supported by a quality assurance program. Good practice statement

Treatment

Treating uncomplicated P. falciparum malaria

Treat children and adults with uncomplicated P. falciparum malaria (except pregnant women therapies Artemether Combined Therapy (ACT) See the table below)

- Artemether + Lumefantrine
- Artesunate + Amodiaquine
- Artesunate + Mefloquine
- Dihydroartemisinin + Piperaquine
- Artesunate + Sulfadoxine-Pyrimethamine (Sp) Strong

Revised dose recommendation for dihydroartemisinin + piperaquine in young children Children< 25kg treated with dihydroartemisinin + piperaquine should receive a minimum of 2.5 mg/kg body weight per day of dihydroartemisinin and 20 mg/kg bw per day of piperaquine daily for 3 days.

Duration of ACT treatment

ACT regimens should provide 3 days 'treatment with an artemisinin derivative. Strong recommendation, high-quality evidence

Reducing the transmissibility of treated Falciparum infections

In low-transmission areas, give a single dose of 0.25 mg/kg bw primaquine with ACT to patients with Falciparum malaria (except pregnant women, infants aged< 6 months, and women breastfeeding infants aged< 6 months) to reduce transmission. Testing for glucose-6-phosphate dehydrogenase (G6PD) deficiency is not required.

Treating uncomplicated P. falciparum malaria in special risk groups

The first trimester of pregnancy

Treat pregnant women with uncomplicated Falciparum malaria during the first trimester with 7 days of quinine + clindamycin.

Infants Less than 5 kg body weight

Treat infants weighing< 5 kg with uncomplicated Falciparum malaria with ACT at the same mg/kg bw target dose as for children weighing 5 kg.

Preventing relapse in P. vivax or P. ovale malaria

The G6PD status of patients should be used to guide the administration of primaquine for preventing relapse.

To prevent relapse, treat P. vivax or P. ovate malaria in children and adults (except pregnant women, infants aged< 6 months, women breastfeeding infants aged < 6 months, women breastfeeding older infants unless they are known not to be G6PD deficient, and people with G6PD deficiency) with a 14-day course (0.25-0.5 mg/kg bw daily) of primaquine in all transmission settings.

In people with G6PD deficiency, consider preventing relapse by giving primaquine base at 0.75 mg/kg bw once a week for 8 weeks, with close medical supervision for potential primaquine-induced hemolysis.

When G6PD status is unknown and G6PD testing is not available, a decision to prescribe primaquine must be based on an assessment of the risks and benefits of adding primaquine.

Pregnant and breastfeeding women

In women who are pregnant or breastfeeding, consider weekly chemoprophylaxis with chloroquine until delivery and breastfeeding are completed, then, based on G6PD status, treat with primaquine to prevent future relapse. Conditional

Treat adults and children with severe malaria (including infants, pregnant women in all trimesters, and lactating women) with intravenous or intramuscular artesunate for at least 24 hours and until they can tolerate oral medication. Once a patient has received at least 24 h of parenteral therapy and can tolerate oral therapy, complete treatment with 3 days of ACT (add single dose primaquine in areas of low transmission).

Revised dose recommendation for parenteral artesunate in young children: Children weighing< 20 kg should receive a higher dose of artesunate (3 mg/kg bw per dose) than larger children and adults (2.4 mg/kg bw per dose) to ensure equivalent exposure to the drug.

Parenteral alternatives where artesunate is not available

If artesunate is not available, use artemether in preference to quinine for treating children and adults with severe malaria.

Treating severe malaria:

Treating cases of suspected severe malaria pending transfer to a higher-level facility (pre-referral treatment)

Pre-referral treatment options

Where complete treatment of severe malaria is not possible but injec-

tions are available, give adults and children a single intramuscular dose of artesunate, and refer them to an appropriate facility for further care. Where intramuscular artesunate is not available use intramuscular artemether or, if that is not available, use intramuscular quinine.

Where intramuscular injection of artesunate is not available, treat children< 6 years old with a single rectal dose (10mg/kg bw) of artesunate, and refer immediately to an appropriate facility for further care. Do not use rectal artesunate in older children and adults.

Chemoprevention for special risk groups, Intermittent preventive treatment in pregnancy

In malaria-endemic areas in Africa, provide intermittent preventive treatment with SP(SP-IPTp*) to all women in their first or second pregnancy as part of antenatal care. Dosing should start in the second trimester and doses should be given at least 1 month apart, to ensure that at least three doses are received.

Intermittent preventive treatment in infants

In areas of moderate-to-high malaria transmission in Africa, where SP is still effective, provide intermittent preventive treatment with SP to infants (< 12 months of age) (SP-IPTi) * at the time of the second and third rounds of vaccination against diphtheria, tetanus and pertussis (DTP) and vaccination against measles.

* SP-IPTi intermittent preventive treatment in infants is a full therapeutic course of antimalarial medicine delivered to infants through routine immunization services, regardless of whether the child is infected with malaria

NB When possible, use:

- ◇ fixed-dose combinations rather than co-blistered or loose, single-agent formulations; and
- ◇ for young children and infants, pediatric formulations, with a preference for solid formulations (e.g., dispersible tablets) rather than liquid formulations.

Vaccines against malaria

RTS, S/AS01 (RTS,S) IS the first and, to date, the only vaccine to show that it can significantly reduce malaria, and life-threatening severe malaria, in young African children. it acts against p. falciparum, the deadliest malaria parasite globally and the most prevalent in Africa. among children who received 4 doses in large-scale clinical trials, the vaccine prevented

approximately 4 in 10 cases of malaria over a 4-year period.

Formulation and dosage of artemisinin-based combinations

Artemisinin-based combinations are known to improve cure rates, reduce the development of resistance and they might decrease transmission of drug-resistant parasites. The total effect of artemisinin combinations (which can be simultaneous or sequential) is to reduce the chance of parasite recrudescence, reduce the within-patient selection pressure, and prevent transmission.

Anti-Malarial Drug Combinations	
Artesunate + Amodiaquine	
Efficacy and advantages	Better efficacy than amodiaquine alone (cure rate >90%); Well tolerated
Disadvantages	Neutropenia; Pharmacokinetic mismatch ?
Dose	Artesunate 4mg/kg and amodiaquine 10mg base/ kg once a day 3 days
Status	Approved
Artesunate + Sulfadoxine-Pyrimethamine (SP)	
Efficacy and advantages	Well tolerated; Efficacy dependent on the level of pre-existing resistance to SP
Disadvantages	Pharmacokinetic mismatch; adverse effects on SP
Dose	Artesunate 4mg/kg once daily for 3 days and SP single dose of 25mg/kg and 1.25mg/kg respectively
Status	Approved (in areas where SP efficacy is high); Resistance to SP limits the use
Artemether + Lumefantrine (Coartem,™ Riamet™)	
Efficacy and advantages	As effective, and better tolerated, as artesunate plus mefloquine; No serious adverse reactions were documented
Disadvantages	Irreversible hearing impairment
Dose	Artemether 1.5mg/kg and Lumefantrine 9mg/kg at 0, 8, 24, 36, 48 and 60 hours
Status	Approved; Not recommended for use in pregnancy and lactating women
Non-Artemisinin based combinations	
SP + Amodiaquine	
Advantages	Similar pharmacokinetic profiles
Disadvantages	Adverse effects of amodiaquine and SP

Dose	Amodiaquine 10mg/kg daily for 3 days; SP single dose as above
Status	Approved (In areas where the efficacy of both amodiaquine and SP remain high – countries in West Africa)
Atovaquone + Proguanil (Malarone™)	
Advantages	Synergistic activity; Good safety and tolerability in children and adults
Disadvantages	High cost; Restricted availability; Contra-indicated in case of hypersensitivity or renal insufficiency
Dose	Atovaquone 20mg/kg and Proguanil 8mg/kg once daily for 3 days
Status	Approved; Highly efficacious against P. falciparum, including strains that are resistant to chloroquine and mefloquine, with cure rates of 94-100%

Abbreviations

ACT - artemisinin-based combination therapy, bw -body weight, -Cl -confidence interval, DTP -_diphtheria, tetanus and pertussis (vaccine), GRADE Grading of Recommendations Assessment, Development and Evaluation G6PD g glucose-6-phosphate dehydrogenase, HRP2 -histidine-rich protein 2, IPTp - intermittent preventive treatment in pregnancy, -IPTi -intermittent preventive treatment in infancy, PCR- polymerase chain reaction, PjHRP2 Plasmodium falciparum histidine-rich protein-2 pLDH parasite-lactate dehydrogenase, Pvdhfr Plasmodium vivax dihydrofolate reductase gene, RDT -rapid diagnostic test, RR -relative risk, or risk ratio, SMC - seasonal malaria chemoprevention, SP -Sulfadoxine-pyrimethamine

Leishmaniasis

Leishmaniasis is a parasitic disease caused by a protozoa parasite from over 20 Leishmania species. Over 90 sand fly species are known to transmit Leishmania parasites. There are 3 main forms of the disease:

1. **Visceral leishmaniasis** (VL), also known as kala-azar is fatal if left untreated in over 95% of cases. It is characterized by irregular bouts of fever, weight loss, enlargement of the spleen and liver, and anemia.
2. **Cutaneous leishmaniasis** (CL) is the most common form of leishmaniasis and causes skin lesions, mainly ulcers, on exposed parts of the body, leaving life-long scars and serious disability or stigma.

3. **Mucocutaneous leishmaniasis** leads to partial or total destruction of mucous membranes of the nose, mouth, and throat-
Transmission

Leishmania parasites are transmitted through the bites of infected female phlebotomine sand flies, which feed on blood to produce eggs. Some 70 animal species, including humans, have been found as natural reservoir hosts of Leishmania parasites.

Diagnosis:

In visceral leishmaniasis, diagnosis is made by combining clinical signs with parasitological, or serological tests (such as rapid diagnostic tests). In cutaneous and mucocutaneous leishmaniasis serological tests have limited value and clinical manifestation with parasitological tests confirms the diagnosis

Treatment:

Leishmaniasis is a treatable and curable disease, which requires an immunocompetent system because medicines will not get rid of the parasite from the body, thus the risk of relapse if immunosuppression occurs. All patients diagnosed with visceral leishmaniasis require prompt and complete treatment.

Recommended treatment regimens for visceral leishmaniasis,

Visceral Leishmaniasis caused by L. Donovan in East Africa (Ethiopia, Eritrea, Kenya, Somalia, Sudan and Uganda) and Yemen

Combination: pentavalent antimonial (20 mg Sb5+/kg per day intramuscularly or intravenously) plus paromomycin (15 mg [11 mg base] per kg body weight per day intramuscularly) for 17 days (A)

OR

Liposomal amphotericin B: 3–5 mg/kg per daily dose by infusion given over 6–10 days up to a total dose of 30 mg/kg (B)

Post-kala-azar dermal Leishmaniasis

Pentavalent antimonial: 20 mg Sb5+/kg per day intramuscularly or intravenously for 30–60 days, when indicated (C)

OR

Liposomal amphotericin B: 2.5 mg/kg per day by infusion for 20 days, when indicated (C)

Visceral leishmaniasis caused by L. infantum: Mediterranean Basin, Middle, East, Central Asia, South America

1. Liposomal amphotericin B: 3–5 mg/kg per daily dose by infusion given

over a 3–6 days period, up to a total dose of 18–21 mg/kg (B)

2. Pentavalent antimonial: 20 mg Sb5+/kg per day intramuscularly or intravenously

for 28 days (B)

Recommended treatment regimens for Old World cutaneous leishmaniasis

No ant leishmanial treatment. Local therapy

- ◇ L. major
- ◇ 15% paromomycin/12% methyl-benzethonium chloride ointment twice daily for 20 days (A)
- ◇ Intralesional antimonial, 1–5 ml per session plus cryotherapy (liquid nitrogen: – 195 °C), both every 3–7 days (1–5 sessions)
- ◇ thermotherapy, 1–2 sessions with localized heat (50 °C for 30 s)
- ◇ intralesional antimonial or cryotherapy independently, as above)
- ◇ Systemic therapy
- ◇ L. major
- ◇ fluconazole, 200 mg oral daily for 6 weeks (A)
- ◇ pentavalent antimonial, 20 mg Sb5+/kg per day intramuscularly
- ◇ or intravenously for 10–20 days (D)

Recommended treatment regimens for mucocutaneous leishmaniasis

- ◇ pentavalent antimonial: 20 mg/kg per day intramuscularly or intravenously for 30 days)
- ◇ pentavalent antimonial: as above plus oral pentoxifylline at 400 mg/8 h for 30 days
- ◇ amphotericin B deoxycholate: 0.7–1 mg/kg by infusion every other day up to 25–45 doses

Leprosy

Overview

Leprosy is an infectious disease caused by the bacteria Mycobacterium leprae, an acid-fast, rod-shaped bacillus. The disease mainly affects the skin, the peripheral nerves, the mucosa of the upper respiratory tract, and the eyes. Leprosy is curable and treatment in the early stages can prevent disability.

In the classification based on skin smears, patients showing negative smears at all sites are grouped as paucibacillary leprosy (PB), while those showing positive smears at any site are grouped as having multibacillary leprosy (MB).

Treatment.

Multi-drug therapy (MDT)

Rifampicin is given once a month. No toxic effects have been reported in the case of monthly administration. The urine may be colored slightly reddish for a few hours after its intake, this should be explained to the patient while starting MDT.

Clofazimine is most active when administered daily. The drug is well tolerated and virtually non-toxic in the dosage used for MDT. The drug causes brownish-black discoloration and dryness of the skin. However, this disappears within a few months after stopping treatment. This should be explained to patients starting an MDT regimen for MB leprosy.

This drug is very safe in the dosage used in MDT and side effects are rare. The main side effect is allergic reactions, causing itchy skin rashes and exfoliative dermatitis. Patients known to be allergic to any of the sulpha drugs should not be given dapsone.

MB child treatment (10–14 years):

Once a month: Day 1 – 2 capsules of rifampicin (300 mg+150 mg) – 3 capsules of clofazimine (50 mg X 3) – 1 tablet of dapsone (50 mg) Once a day: Days 2–28 – 1 capsule of clofazimine every other day (50 mg) – 1 tablet of dapsone (50 mg) Full course: 12 blister packs for children younger than 10, the dose must be adjusted according to body weight.

MB adult treatment:

Once a month: Day 1 – 2 capsules of rifampicin (300 mg X 2) – 3 capsules of clofazimine (100mg X 3) – 1 tablet of dapsone (100 mg) Once a day: Days 2–28 – 1 capsule of clofazimine (50 mg) – 1 tablet of dapsone (100

mg) Full course: 12 blister packs

PB child treatment (10–14 years):

Once a month: Day 1 – 2 capsules of rifampicin (300 mg+150 mg) – 1 tablet of dapsone (50 mg) Once a day: Days 2–28 – 1 tablet of dapsone (50 mg) Full course: 6 blister packs for children younger than 10, the dose must be adjusted according to body weight

PB adult treatment:

Once a month: Day 1 – 2 capsules of rifampicin (300 mg X 2) – 1 tablet of dapsone (100 mg) Once a day: Days 2–28 – 1 tablet of dapsone (100 mg) Full course: 6 blister packs

(MB) Multibacillary leprosy, (PB) Paucibacillary leprosy

Influenza (avian and other zoonotic)

Overview

Humans can be infected with avian, swine and other zoonotic influenza viruses, such as avian influenza virus subtypes A(H5N1), A(H7N9), and A(H9N2) and swine influenza virus subtypes A(H1N1), A(H1N2) and A(H3N2). Human infections are primarily acquired through direct contact with infected animals or contaminated environments, these viruses have not acquired the ability of sustained transmission among humans. There are four types of influenza viruses: types A, B, C, and D: **Influenza type A viruses** are of most significance to public health due to their potential to cause an influenza pandemic. Influenza.

Diagnosis

Rapid influenza diagnostic tests (RIDTs) have lower sensitivity compared to PCR and their reliability depends largely on the conditions under which they are used.

Treatment

Evidence suggests that some antiviral drugs, notably neuraminidase inhibitors (oseltamivir, zanamivir), can reduce the duration of viral replication and improve prospects of survival, however, ongoing clinical studies are needed. The emergence of oseltamivir resistance has been reported.

- Treatment is recommended for a minimum of 5 days but can be extended until there is satisfactory clinical improvement. Most recent A(H5) and A (H7N9) viruses are resistant to adamantane antiviral drugs (e.g., amantadine and rimantadine) and are therefore not recommended for monotherapy.

- Presence of co-infection with bacterial pathogens can be encountered in critically ill patients.

Influenza (seasonal)

Seasonal influenza is an acute respiratory infection caused by influenza viruses that circulate in all parts of the world. There are 4 types of seasonal influenza viruses, types A, B, C, and D. Influenza A and B viruses circulate and cause seasonal epidemics of disease. Only influenza-type A viruses are known to have caused pandemics. The A (H1N1) is also written as A(H1N1) pdm09 as it caused the pandemic in 2009 and subsequently replaced the seasonal influenza A(H1N1) virus which had circulated before 2009.

Signs and symptoms

Seasonal influenza is characterized by a sudden onset of fever, cough (usually dry), headache, muscle and joint pain, severe malaise (feeling unwell), sore throat, and a runny nose. The cough can be severe and can last 2 or more weeks. Most people recover from fever and other symptoms within a week without requiring medical attention. However, influenza can cause severe illness or death, especially in people at high risk (see below). Hospitalization and death occur mainly among high-risk groups

Treatment

Patients with uncomplicated seasonal influenza:

Patients who are not from a high-risk group should be managed with symptomatic **treatment** and are advised, if symptomatic, to stay home to minimize the risk of infecting others in the community. Treatment focuses on relieving symptoms of influenza such as fever. Patients should monitor themselves to detect if their condition deteriorates and seek medical attention. Patients who are known to be in a group at high risk for developing severe or complicated illnesses are:

- ◇ pregnant women at any stage of pregnancy
- ◇ children aged between 6 months to 5 years
- ◇ elderly individuals (aged more than 65 years)
- ◇ individuals with chronic medical conditions
- ◇ healthcare workers.

should be treated with antivirals in addition to symptomatic treatment as soon as possible.

Vaccination is also recommended for these groups.

Neuraminidase inhibitors (i.e., oseltamivir) should be prescribed as soon as possible (ideally, within 48 hours following symptom onset) to maximize

therapeutic benefits. Administration of the drug should also be considered in patients presenting later in the course of illness.

- Treatment is recommended for a minimum of 5 days but can be extended until there is satisfactory clinical improvement.
- All currently circulating influenza viruses are resistant to adamantane antiviral drugs (such as amantadine and rimantadine), and these are therefore not recommended for monotherapy.

Meningococcal meningitis

Meningococcal meningitis, a bacterial form of meningitis, is a serious infection of the meninges that affects the brain membrane. It can cause severe brain damage and is fatal in 50% of cases if untreated. It is caused by Neisseria meningitidis bacteria and is of particular importance due to its potential to cause large epidemics. Twelve types of N. meningitides, called serogroups, have been identified, six of which (A, B, C, W, X, and Y) can cause epidemics.

Transmission

Neisseria meningitidis only infects humans; there is no animal reservoir. The bacteria are transmitted from person to person through droplets of respiratory or throat secretions from carriers. Smoking, close and prolonged contact – such as kissing, sneezing or coughing on someone, or living in close quarters with a carrier – facilitates the spread of the disease. Transmission of N. meningitidis is facilitated during mass gatherings (recent examples include the Haj pilgrimage and jamborees).

Symptoms

The average incubation period is four days but can range between two and 10 days. The most common symptoms are a stiff neck, high fever, sensitivity to light, confusion, headaches, and vomiting. In addition, in infants bulging fontanelle.

Diagnosis

Initial diagnosis of meningococcal meningitis can be made by clinical examination followed by a lumbar puncture showing a purulent spinal fluid. The bacteria can sometimes be seen in microscopic examinations of the spinal fluid.

Treatment.

Meningococcal disease is potentially fatal and should always be viewed as a medical emergency. Admission to a hospital or health center is necessary. Isolation of the patient is not necessary. Appropriate antibiotic treatment must be started as soon as possible, ideally after the lumbar puncture has been carried out if such a puncture can be performed immediately.

First choice:
Cefotaxime 2 g q6h IV-for 5-7 days **OR**
Ceftriaxone 2 g q12h IV for 5-7 days
Second Choice:
Amoxicillin 2 g q4h IV 5-7 days **OR**
Ampicillin 2 g q4h IV 5-7 days **OR**
Benzylpenicillin 4 million IU (2.4 g) q4h IV 5-7 days **OR**
Chloramphenicol 1 g q6h IV 5-7 days

Prevention

1. Vaccination

There are three types of vaccines available:

1. Polysaccharide vaccines are used during a response to outbreaks, mainly in Africa: They are either bivalent (serogroups A and C), trivalent (A, C, and W), or tetravalent (A, C, Y, and W). They are not effective before 2 years of age. They offer a 3-year protection but do not induce herd immunity.
2. Conjugate vaccines are used in prevention (into routine immunization schedules and preventive campaigns) and outbreak response:
   a. They confer longer-lasting immunity (5 years and more), prevent carriage, and induce herd immunity.
   b. They can be used as soon as one year of age.
   c. Available vaccines include:
      i. Monovalent C
      ii. Monovalent A
      iii. Tetravalent (serogroups A, C, Y, W).
3. Protein-based vaccine, against N. meningitidis B. and used in outbreak response.

2. Chemoprophylaxis

Antibiotic prophylaxis for close contacts, when given promptly, decreases the risk of transmission. Ciprofloxacin antibiotic is the antibiotic of choice, and ceftriaxone is an alternative.

Tuberculosis

Overview

Tuberculosis (TB) is caused by bacteria (Mycobacterium tuberculosis) that most often affect the lungs. Tuberculosis is curable and preventable. TB is spread from person to person when people with lung TB cough, sneeze, or spit, they propel the TB germs into the air. A person needs to inhale only a few of these germs to become infected. About one-quarter of the

world's population has latent TB, which means people have been infected by TB bacteria but are not (yet) ill with the disease and cannot transmit the disease. When a person develops active TB disease, the symptoms (such as cough, fever, night sweats, or weight loss) may be mild for many months. This can lead to delays in seeking care and results in transmission of the bacteria to others.

Symptoms and diagnosis

Common symptoms of active lung TB are cough with sputum and blood at times, chest pains, weakness, weight loss, fever, and night sweats.

Diagnosis

Microscopy detects only half the number of TB cases and cannot detect drug resistance. The use of the rapid test Xpert MTB/RIF® has expanded substantially since 2010, when WHO first recommended its use. The test simultaneously detects TB and resistance to rifampicin, the most important TB medicine. Diagnosis can be made within 2 hours and the test is now recommended by WHO as the initial diagnostic test in all persons with signs and symptoms of TB.

Treatment

TB is a treatable and curable disease. Active, drug-susceptible TB disease is treated with a standard 6-month course of 4 antimicrobial drugs that are provided with information and support to the patient by a health worker or trained volunteer. Without such support, treatment adherence is more difficult. (Direct Observation Treatment (DOT)

recommended formulations of TB separate drugs

Drug	Dose form	Strength
Isoniazid	Tablets	100mg, 300mg
Rifampicin	Tablets /Capsules	150mg, 300mg
Pyrazinamide	Tablets	400mg
Ethambutol	Tablets	100mg, 400mg
Streptomycin	.Powder for inj	1.0G

Tb standardized treatment regimens

Essential antituberculosis drugs

There are three main properties of antituberculosis drugs:

1. Bactericidal activity,
2. Sterilizing activity and the
3. Ability to prevent resistance.

The essential antituberculosis drugs possess these properties to different extents.

Isoniazid and rifampicin are the most powerful bactericidal drugs, active against all populations of TB bacilli.

Rifampicin is the most potent sterilizing drug available.

Pyrazinamide and streptomycin are also bactericidal against certain populations of TB bacilli.

Pyrazinamide is only active in an acid environment.

Streptomycin is bactericidal against rapidly multiplying TB bacilli.

Ethambutol and thioacetazone are used in association with more powerful drugs to prevent the emergence of resistant bacilli.

a WHO does not recommend twice-weekly regimens.

b WHO discourages the use of thioacetazone because of the risk of severe toxicity,

Fixed-dose combination tablets

Tablets of fixed-dose drug combinations have several advantages over individual drugs.

WHO strongly recommends the use of fixed-dose combination tablets for the treatment of TB. The recommended formulations currently available are shown in

WHO recommended formulations of essential antituberculosis drugs?

Fixed-dose combinations of drugs

Drug	Dose form	Strength for daily use	Strength for use 3 times weekly
isoniazid + rifampicin	Tablet tablet or ack of granules, tablet	75 mg +150 mg 150 mg +300 mg 30 mg+ 60 mg	150 mg+ 150 mg 60 mg+ 60 mg
isoniazid + ethambutol isoniazid + thioacetazone	tab	150 mg+ 400 mg 100 mg+ 50 mg 300 mg+ 150 mg	150 mg+ 150 mg + 500mg

isoniazid + rifampicin + pyrazinamide	tablet	75 mg+ 150mg +400 mg, 30 mg+ 60 mg+ 150 mg	150 mg+ 150 mg + 500mg
isoniazid + rifampicin + pyrazinamide + ethambutol	tablet or pack of granules" tablet	75 mg+ 150 mg+ 400 mg + 275 mg	

It should be noted that intermittent initial phase therapy is not recommended when the continuation phase of isoniazid and ethambutol is used.

Standard code for TB treatment regimens

Treatment regimens for TB have a standard code. Each antituberculosis drug has an abbreviation. (shown in Table).

A TB treatment regimen consists of two phases, an initial phase and a continuation phase

- ◇ The number before a phase is the duration of that phase in months**.**
- ◇ Letters in parentheses indicate fixed-dose combinations of those drugs.
- ◇ A number in subscript (e.g., $_3$) after a letter or letters in parentheses indicates the number of doses of that drug per week
- ◇ If there is no subscript number, treatment is daily (or 6 times weekly, excluding for instance Sundays).

Examples are shown below. An alternative drug (or drugs) appears as a letter (or letters) in square brackets [example not shown].

EXAMPLES

1 (HRZE)/4 (HR)J

The **initial phase** is 2 **(HRZE).** The duration of the phase is 2 months. Drug treatment is daily, with isoniazid (H), rifampicin (R), pyrazinamide (Z) and ethambutol (E) in fixed-dose combination.

The **continuation phase is 4 (HR)J.** The duration is 4 months, with isoniazid and rifampicin, in fixed-dose combination, 3 times per week

2 (HR)ZE/6 (HE)

The **initial phase is 2 (HR)ZE.** The duration of the phase is 2 months. Drug treatment is daily, with isoniazid (H) and rifampicin (R) in fixed-dose combination, plus pyrazinamide (Z) and ethambutol (E).

he **continuation phase** is 6 **(HE).** The duration of the phase is 6 months. Drug treatment is daily, with isoniazid (H) and ethambutol (E) in fixed-dose combination.

Recommended standardized treatment regimens

New cases

Treatment regimens have an **initial (or intensive**) phase **lasting two months** and a continuation phase usually lasting four or six months. During the initial phase, normally consisting of isoniazid, rifampicin, pyrazinamide, and ethambutol, the tubercle bacilli are killed rapidly. Infectious patients quickly become non-infectious (within approximately two weeks).. During the continuation phase, fewer drugs are necessary but for a longer time. The sterilizing effect of the drugs eliminates the remaining bacilli and prevents subsequent relapse.

Patients with a large bacillary load (smear-positive pulmonary TB and many HIV-infected patients with smear-negative pulmonary TB) have an increased risk of selecting resistant bacilli because a large population of bacilli develops spontaneous resistance to a single drug. Short-course chemotherapy regimens, consisting of 4 drugs during the initial phase and 2 drugs during the continuation phase, reduce this risk Such regimens are highly effective in patients with susceptible bacilli, and almost as effective in patients with initially isoniazid-resistant organisms.

Patients negative for HIV, with smear-negative pulmonary or extrapulmonary TB that is fully drug-susceptible, have little risk of selecting resistant bacilli because their lesions generally harbor fewer bacilli. However, since initial resistance to isoniazid is common in many areas, and HIV testing of tuberculosis patients is not routinely practiced, it is now recommended that ethambutol be included as a fourth drug during the initial phase of treatment for most patients with smear-negative and extrapulmonary TB. Ethambutol may be omitted for patients with non-cavitary, smear-negative pulmonary TB who are known to be HIV-negative, patients known to be infected with fully drug-susceptible bacilli, and young children with primary TB.

here are several possible regimens. The regimens recommended in each country's NTP depend on that country's budget, access of patients to PHC services, qualifications of health staff at

<table>
<tr><th rowspan="2">TB diagnos-tic category</th><th rowspan="2">TB patients</th><th colspan="2">TB treatment regimens'</th></tr>
<tr><th>Initial phase</th><th>Continuation phase</th></tr>
<tr><td rowspan="2">I</td><td rowspan="2">New smear-positive patients;
new smear-negative PTB with
extensive parenchymal
involvement; concomitant HIV
disease or severe forms of extra-
pulmonary Tibia</td><td>Preferred
2HRZEiii</td><td>Preferred
4HR
4 (HR)3</td></tr>
<tr><td>Optional
2 (HRZE)3
or
2HRZPV</td><td>Optional
4 (HR)3
or
6HP</td></tr>
<tr><td rowspan="2">II</td><td rowspan="2">Previously treated sputum smear-
positive PTB:
- relapse;
- treatment after default</td><td>Preferred
2 HRZES I 1 HRIS</td><td>Preferred
5 Hervas</td></tr>
<tr><td>Optional
2 (HRZES)3 /1 HRZE3</td><td>Optional
5 (HRE)3</td></tr>
<tr><td>II</td><td>treatment failure of Category
I vii in settings with: adequate program performance; representative DRS data showing high rates of MDR TB and/or capacity for DST of cases, and availability of Category IV regimens</td><td colspan="2">specially designed standardized or indi-vidualized
regimens are often needed for these pa-tients.
(See Section 4.9 and Chapter 5)</td></tr>
</table>

III	representative DRS data show low rates of MDR TB or individualized DST shows	**Preferred** 2 HRZES I 1 HRZE	**Preferred** 5 Hervas
	drug-susceptible disease or in settings of poor program performance, absence of representative DRS data, insufficient resources to implement Category IV treatment	**Optional** 2 (HRZES)3 /1 HRZE3	**Optional** 5 (HRE)3

Recommended treatment regimens for each diagnostic category

Plague

1. **Plague** is an infectious disease caused by the bacteria Yersinia pestis, a zoonotic bacterium, usually found in small mammals and their fleas. It is transmitted between animals through fleas. There are two main forms of plague infection, depending on the route of infection: bubonic and pneumonic.
2. **Bubonic** plague is the most common form of plague and is caused by the bite of an infected flea. Plague bacillus, Y. pestis, enters at the bite and travels through the lymphatic system. The lymph node then becomes inflamed, tense, and painful, and is called a 'bubo'. At advanced stages of the infection, the inflamed lymph nodes can turn into open sores filled with pus. Human-to-human transmission of bubonic plague is rare. Bubonic plague can advance and spread to the lungs, which is the more severe type of plague called pneumonic plague.
3. **Pneumonic** plague, or lung-based plague, is the most virulent form of plague. Incubation can be as short as 24 hours. Any person with pneumonic plague may transmit the disease via droplets to other humans. Untreated pneumonic plague, if not diagnosed and treated early, can be fatal. However, recovery rates are high if detected and treated in time (within 24 hours of onset of symptoms).

Transmission

Humans can be infected through:

i. the bite of infected vector fleas
ii. unprotected contact with infectious bodily fluids or contaminated materials
iii. the inhalation of respiratory droplets/small particles from a patient with pneumonic plague.

Signs and Symptoms

People infected with plague usually develop acute febrile disease with other non-specific systemic symptoms after an incubation period of 1 - 7 days, such as sudden onset of fever, chills, head and body aches, weakness, vomiting, and nausea.

Plague is a very severe disease in people, particularly in its septicemia (systemic infection caused by circulating bacteria in the bloodstream) and pneumonic forms, with a case-fatality ratio of 30% to 100% if left untreated. The pneumonic form is invariably fatal unless treated early. It is especially contagious and can trigger severe epidemics through person-to-person contact via droplets in the air.

Diagnosing plague

Confirmation of plague requires lab testing. The best practice is to identify Y. pestis from a sample of pus from a bubo, blood, or sputum. A specific Y. pestis antigen can be detected by different techniques. One of them is a laboratory-validated rapid dipstick test now widely used in Africa and South America, with the support of WHO.

Treatment

Begin appropriate IV therapy as soon as plague is suspected. Gentamicin and fluoroquinolones are typically first-line treatments. Duration of treatment is 10 to 14 days, or until 2 days after fever subsides. Oral therapy may be substituted once the patient improves.

The regimens listed below are guidelines only and may need to be adjusted depending on a patient's age, medical history, underlying health conditions, or allergies. Please use clinical judgment.

Antibiotic	Dose	Route of administration	Paediatric dose	Pregnant women
Streptomycin	1 g twice daily	IM	15 mg/kg twice daily (maximum 2 g/day)	

Gentamicin	5 mg/kg once daily, or 2 mg/kg loading dose followed by 1.7 mg/kg every 8 hours	IM or IV	2.5 mg/kg/dose every 8 hours	Same as adult
Levofloxacin	500 mg once daily	IV or po	8 mg/kg/dose every 12 hours (max 250 mg per dose)	
	500-750 mg twice daily	po	15 mg/kg/dose every 12 hours (maximum 400 mg/dose)	
Doxycycline	100 mg twice daily or 200 mg once daily	IV or po	20 mg/kg/dose every 12 hours (maximum 500 mg/dose)	Same as adult
	400 mg once daily	IV or po	Weight < 45 kg: 2.2 mg/kg twice daily (maximum 100 mg/dose) Weight ≥ 45 kg: same as adult dose	Same as adult

The table shows the options for Plague treatment

Rabies

Rabies is a vaccine-preventable, zoonotic, viral disease. Once clinical symptoms appear, rabies is virtually 100% fatal. In up to 99% of cases, domestic dogs are responsible for the majority of rabies virus transmission to humans. Yet, rabies can affect both domestic and wild animals. It is spread to people and animals through bites or scratches, usually via saliva.

Symptoms

The incubation period for rabies is typically 2–3 months but may vary from 1 week to 1 year, dependent upon factors such as the location of virus entry and viral load. Initial symptoms of rabies include a fever with pain and unusual or unexplained tingling, pricking, or burning sensation (paraesthesia) at the wound site. As the virus spreads to the central nervous system, progressive and fatal inflammation of the brain and spinal cord develops. There are two forms of the disease

1. Furious rabies results in signs of hyperactivity, excitable behavior, hydrophobia (fear of water), and sometimes aerophobia (fear of drafts or fresh air). Death occurs after a few days due to cardio-respiratory arrest.

2. Paralytic rabies accounts for about 20% of the total number of human cases. This form of rabies runs a less dramatic and usually longer course than the furious form. Muscles gradually become paralyzed, starting at the site of the bite or scratch. A coma slowly develops, and eventually, death occurs. The paralytic form of rabies is often misdiagnosed, contributing to the under-reporting of the disease.

Diagnosis

Current diagnostic tools are not suitable for detecting rabies infection before the onset of clinical disease, and unless the rabies-specific signs of hydrophobia or aerophobia are present, clinical diagnosis may be difficult.

Post-exposure prophylaxis (PEP)

Post-exposure prophylaxis (pep) is the immediate treatment of a bite victim after rabies exposure. This prevents virus entry into the central nervous system, which results in imminent death. Pep consists of extensive washing and local treatment of the bite wound or scratch as soon as possible after a suspected exposure;

I. a course of potent and effective rabies vaccine that meets WHO standards; and
II. The administration of rabies immunoglobulin (RIG), if indicated.

Starting the treatment soon after exposure to rabies virus can effectively prevent the onset of symptoms and death. All category II and III exposures assessed as carrying a risk of developing rabies require PEP. This risk is increased if:

i. the biting mammal is a known rabies reservoir or vector species
ii. the exposure occurs in a geographical area where rabies is still present
iii. the animal looks sick or displays abnormal behavior
iv. a wound or mucous membrane was contaminated by the animal's saliva
v. the bite was unprovoked
vi. the animal has not been vaccinated.

Local treatment of wounds

Elimination of rabies virus at the site of the infection by chemical or physical means is an effective mechanism of protection. Recommended first-aid procedures include immediate and thorough flushing and washing of the wound for a minimum of 15 minutes with soap and water, detergent, povidone iodine, or other substances of proven lethal effect on rabies virus. Other treatments, such as the administration of antibiotics and tetanus prophylaxis, should be applied as appropriate for other bite wounds.

Rabies vaccine and rabies immunoglobulin

Recommendations for post-exposure depend on the type of contact with the suspected rabid animal. WHO strongly recommends the discontinuation of the production and use of nerve tissue vaccine and their replacement with modern cell culture vaccines Intradermal vaccination is recommended as an alternative to intramuscular vaccination as it is safe, immunogenic, and dose and cost-sparing,

There are no contraindications to PEP; it can be safely given to infants, pregnant women, and immunocompromised individuals. Life-saving PEP. Prompt administration of rabies vaccine after exposure, combined with proper wound management and administration of rabies immunoglobulins where indicated, is almost invariably effective in preventing rabies, even after high-risk exposure.

PEP consists of a dose of human **rabies** immune globulin (HRIG) and **rabies vaccine** given on the day of the **rabies exposure**, and then a dose of **vaccine** given again on days 3, 7, and 14. WHO recommends a Fifth dose on day

Hepatitis

Hepatitis A

is a liver disease caused by the hepatitis A virus (HAV). The virus is primarily spread when an uninfected (and unvaccinated) person ingests food or water that is contaminated with the feces of an infected person (Fecal-oral). The disease is closely associated with unsafe water or food, inadequate sanitation, poor personal hygiene, and oral-anal sex. Unlike hepatitis B and C, hepatitis A does not cause chronic liver disease and is rarely fatal, but it can cause debilitating symptoms and fulminant hepatitis (acute liver failure), which is often fatal.

Symptoms

The incubation period of hepatitis A is usually 14–28 days. Symptoms of hepatitis A range from mild to severe, and can include fever, malaise, loss of appetite, diarrhea, nausea, abdominal discomfort, dark-colored urine, and jaundice (yellowing of the skin and whites of the eyes). Not everyone who is infected will have all of the symptoms. Adults have signs and symptoms of illness more often than children. The severity of disease and fatal outcomes are higher in older age groups. Among older children and adults, infection usually causes more severe symptoms, with jaundice occurring in more than 70% of cases. Hepatitis A sometimes relapses; the person who just recovered falls sick again with another acute episode. This is, however, normally followed by recovery.

Diagnosis

Cases of hepatitis A are not clinically distinguishable from other types of acute viral hepatitis. Specific diagnosis is made by the detection of HAV-specific Immunoglobulin G (IgM) antibodies in the blood. Additional tests include reverse transcriptase polymerase chain reaction (RT-PCR) to detect the hepatitis A virus RNA and may require specialized laboratory facilities.

Treatment

There is no specific treatment for hepatitis A. Recovery from symptoms following infection may be slow and may take several weeks or months. Most important is the avoidance of unnecessary medications. Acetaminophen/paracetamol and medication against vomiting should not be given. Hospitalization is unnecessary in the absence of acute liver failure. Therapy is aimed at maintaining comfort and adequate nutritional balance, including the replacement of fluids that are lost from vomiting and diarrhea. prevention several injectable inactivated hepatitis A vaccines are available internationally. All are similar in terms of how well they protect people from the virus and their side effects. No vaccine is licensed for children younger than 1 year of age. Nearly 100% of people develop protective levels of antibodies to the virus within 1 month after injection of a single dose of vaccine.

Hepatitis B

is a potentially life-threatening liver infection caused by the hepatitis B virus (HBV). It is a major global health problem. It can cause chronic infection and puts people at high risk of death from cirrhosis and liver cancer.

A safe and effective vaccine that offers 98-100% protection against hepatitis B is available.

Transmission

In highly endemic areas, hepatitis B is most commonly spread from mother to child at birth (perinatal transmission), or through horizontal transmission (exposure to infected blood), especially from an infected child to an uninfected child during the first 5 years of life. The development of chronic infection is very common in infants infected from their mothers or before the age of 5 years.

Hepatitis B is also spread by needlestick injury, tattooing, piercing, and exposure to infected blood and body fluids, such as saliva and, menstrual, vaginal, and seminal fluids. Sexual transmission of hepatitis B may occur,

The hepatitis B virus can survive outside the body for at least 7 days. During this time, the virus can still cause infection if it enters the body of a person who is not protected by the vaccine. The incubation period of the hepatitis B virus is 75 days on average but can vary from 30 to 180 days. The virus may be detected within 30 to 60 days after infection and can persist and develop into chronic hepatitis B.

Symptoms

Most people do not experience any symptoms when newly infected. However, some people have acute illness with symptoms that last several weeks, including yellowing of the skin and eyes (jaundice), dark urine, extreme fatigue, nausea, vomiting, and abdominal pain. A small subset of persons with acute hepatitis can develop acute liver failure, which can lead to death.

In some people, the hepatitis B virus can also cause a chronic liver infection that can later develop into cirrhosis (a scarring of the liver) or liver cancer. In infants and children, 80–90% of infants infected during the first year of life develop chronic infection.

Hepatitis C.

The Hepatitis C virus causes both acute and chronic infection. New HCV infections are usually asymptomatic. Some persons get acute hepatitis which does not lead to a life-threatening disease. Around 30% (15–45%) of infected persons spontaneously clear the virus within 6 months of infection without any treatment. The remaining 70% (55–85%) of persons will develop chronic HCV infection. Of those with chronic HCV infection, the risk of cirrhosis ranges between 15% and 30% within 20 years.

Transmission

The hepatitis C virus is a bloodborne virus. It is most commonly transmitted through:

1. injecting drug use through the sharing of injection equipment;
2. the reuse or inadequate sterilization of medical equipment, especially syringes and needles in healthcare settings;
3. the transfusion of unscreened blood and blood products;
4. sexual practices that lead to exposure to blood (for example, among men who have sex with men, particularly those with HIV infection or those taking pre-exposure prophylaxis against HIV infection).

Hepatitis C is not spread through breast milk, food, water or casual contact such as hugging, kissing, and sharing food or drinks with an infected person.

Symptoms

The incubation period for hepatitis C ranges from 2 weeks to 6 months. Following initial infection, approximately 80% of people do not exhibit

any symptoms. Those who are acutely symptomatic may exhibit fever, fatigue, decreased appetite, nausea, vomiting, abdominal pain, dark urine, grey-colored feces, joint pain, and jaundice (yellowing of skin and the whites of the eyes).

Testing and diagnosis

Because new HCV infections are usually asymptomatic, few people are diagnosed when the infection is recent. In those people who go on to develop chronic HCV infection, the infection is also often undiagnosed because it remains asymptomatic until decades after infection when symptoms develop secondary to serious liver damage. HCV infection is diagnosed by testing for anti-HCV antibodies with a serological test.

Treatment

A new infection with HCV does not always require treatment, as the immune response in some people will clear the infection. However, when HCV infection becomes chronic, treatment is necessary. The goal of hepatitis C treatment is cure.

Recommendations on hepatitis C treatment

In adolescents aged 12-17 years or weighing at least 36 kg with chronic HCV infection,

- sofosbuvir/ledipasvir for 12 weeks in genotypes 1, 4, 5 and 6
- sofosbuvir/ribavirin for 12 weeks in genotype 2
- sofosbuvir/ribavirin for 24 weeks in genotype 3.

In children aged less than 12 years with chronic HCV infection, WHO recommends:
• deferring treatment until 12 years of age. • treatment with interferon-based regimens should no longer be used. There is no vaccine for HCV.

Dengue and severe dengue

Dengue fever is a mosquito-borne tropical disease caused by the **dengue virus**. Symptoms typically begin 3 to 14 days after infection. These may include a high **fever**, headache, vomiting, muscle and joint pains, and a characteristic skin rash.

Symptoms

◇ people who get sick with dengue, symptoms can be mild or severe. Mild symptoms of dengue can be confused with other illnesses that

cause fever, aches and pains, or a rash. The most is **fever** with any of the following:

- ◇ Nausea, vomiting
- ◇ Rash
- ◇ Aches and pains (eye pain, typically behind the eyes, muscle, joint, or bone pain). Symptoms of dengue typically last 2–7 days. Most people will recover after about a week.

Treatment

- There is no specific medication to treat dengue.
- Treat the symptoms of dengue.
- **Rest** as much as possible.
- **Take paracetamol** to control fever and relieve pain. Do not take aspirin or ibuprofen!
- **Drink plenty of fluids** such as water or drinks with added electrolytes to stay hydrated.
- For mild symptoms, care for a sick infant, child, or family member at home.

Severe Dengue:

Severe dengue is a more serious form of disease that can result in shock, internal bleeding, and even death. One is more likely to develop severe dengue if he/she has had a dengue infection before. About 1 in 20 people who get sick with dengue will develop severe dengue. Infants and pregnant women are at increased risk for developing severe dengue.

Warning signs of severe dengue

Watch for signs and symptoms of severe dengue. Warning signs generally begin in the 24–48 hours after your fever has gone away. If you or a family member develops **any** of the following symptoms, immediately go to a local clinic or emergency room:

- ◇ Stomach or belly pain, tenderness
- ◇ Vomiting (at least 3 times in 24 hours)
- ◇ Bleeding from the nose or gums
- ◇ Vomiting blood, or blood in the stool
- ◇ Feeling tired, restless, or irritable
- ◇ The best options to treat these symptoms are acetaminophen or paracetamol.

NSAIDS (non-steroidal anti-inflammatory drugs), such as ibuprofen and aspirin should be avoided. This anti-inflammatory drug acts by thinning

the blood, and in a disease with risk of hemorrhage, blood thinners may exacerbate the prognosis Diagnostics

Several methods can be used for the diagnosis of DENV infection. These include virological tests (that directly detect elements of the virus) and serological tests, which detect human-derived immune components that are produced in response to the virus).

Dengue Vaccine

Globally a vaccine to prevent dengue (dengvaxia) is licensed and available in some countries for people ages 9-45 years old. The World Health Organization recommends that the vaccine only be given to persons with confirmed prior dengue virus infection: The vaccine manufacturer, Sanofi Pasteur, announced in 2017 that people who receive the vaccine and have not been previously infected with a dengue virus may be at risk of developing severe dengue if they get dengue after being vaccinated.

Chikungunya

Chikungunya" derives from a word in the Kimakonde language, meaning to become contorted", and describes the stooped appearance of sufferers with joint pain (arthralgia).

Transmission

Chikungunya virus is primarily transmitted to humans through the bites of infected mosquitoes, predominantly aedes aegypti and aedes albopictus. Humans are the primary host of chikungunya virus during epidemic periods. Blood-borne transmission is possible; cases have been documented among laboratory personnel handling infected blood and a healthcare worker drawing blood from an infected patient is a mosquito-borne virus. It is an RNA virus that belongs to the alphavirus genus of the family togaviridae.

Signs & Symptoms

The majority of people infected with chikungunya virus become symptomatic. The incubation period is typically 3–7 days (range, 1–12 days). The disease is most often characterized by acute onset of fever (typically >39°C [102°F]) and polyarthralgia. Joint symptoms are usually bilateral and symmetric and can be severe and debilitating. Other symptoms may include headache, myalgia, arthritis, conjunctivitis, nausea/vomiting, or maculopapular rash. Clinical laboratory findings can include lymphopenia, thrombocytopenia, elevated creatinine, and elevated hepatic transaminases.

Diagnosis & Reporting

Chikungunya virus infection should be considered in patients with acute onset of fever and polyarthralgia, especially travelers who recently

returned from areas with known virus transmission.

. Dengue and chikungunya viruses are transmitted by the same mosquitoes and have similar clinical features. The two viruses can circulate in the same area and can cause occasional co-infections in the same patient. Chikungunya virus infection is more likely to cause high fever, severe arthralgia, arthritis, rash, and lymphopenia, while dengue virus infection is more likely to cause neutropenia, thrombocytopenia, hemorrhage, shock, and death. It is important to rule out dengue virus infection because proper clinical management of dengue can improve outcome

Several methods can be used for diagnosis of chikungunya virus infection. Serological tests, such as enzyme-linked immunosorbent assays (ELISA), may confirm the presence of IgM and IgG anti-chikungunya antibodies. IgM antibody levels are highest 3 to 5 weeks after the onset of illness and persist for about 2 months. The virus may be directly detected in the blood during the first few days of infection as well.

Treatment

There is no vaccine to prevent or medicine to treat the chikungunya virus. Treat the symptoms:

Vaccination against chikungunya

There is no commercial vaccine available to protect against chikungunya virus infection. While several vaccine strategies are being pursued (as of mid-2020), of which some are in various stages of

clinical trials [3], they are still several years away from being licensed and available to the public. Prevention of infection by avoiding mosquito bites is the best protection.

- ◇ Get plenty of rest.
- ◇ Drink fluids to prevent dehydration.
- ◇ Take medicine such as acetaminophen (Paracetamol) to reduce fever and pain.
- ◇ Do not take aspirin and other non-steroidal anti-inflammatory drugs (NSAIDS until dengue can be ruled out to reduce the risk of bleeding).
- ◇ During the first week of infection, chikungunya virus can be found in the blood and passed from an infected person to a mosquito through mosquito bites.
- ◇ An infected mosquito can then spread the virus to other people.

Typhoid fever

Typhoid fever is a bacterial infection that can spread throughout the body, affecting many organs. Without prompt treatment, it can cause serious complications and can be fatal.

It's caused by a bacterium called Salmonella typhi, which is related to the bacteria that cause salmonella food poisoning.

Typhoid fever is highly contagious. An infected person can pass the bacteria out of their body in their (stools) or, less commonly, in their (urine).

If someone else eats food or drinks water that's been contaminated with a small, they can become infected with the bacteria and develop typhoid fever. Typhoid fever is most common in parts of the world that have poor sanitation and limited access to clean water. However, children with typhoid fever tend to have milder symptoms than adults.

Symptoms of Typhoid Fever

The main symptoms of typhoid fever are:

- ◇ a high temperature that can reach 39 to 40C
- ◇ headache
- ◇ general aches and pains
- ◇ cough
- ◇ constipation

As the infection progresses, you may lose your appetite, feel sick, and have a tummy ache and diarrhea. Some people may develop a rash. If typhoid fever isn't treated, the symptoms will continue to get worse over the following weeks and the risk of developing potentially fatal complications will increase.

Treatment

Typhoid fever requires prompt treatment with antibiotics.

If typhoid fever is diagnosed early, the infection is likely to be mild and can usually be treated at home with a 7- to 14-day course of antibiotic tablets.

More serious cases of typhoid fever usually require admission to the hospital so antibiotic injections can be given.

1. A short-course regime of **Ciprofloxacin** 500 mg orally twice daily for 7 days for the treatment of enteric fever, is preferred for pregnant women and children. Other quinolones (e.g., ofloxacin, norfloxacin, pefloxacin) usually are effective

2. **Azithromycin** given a 1 gram once on day 1, then 500mg q24h for total of 7 days.
3. **Ceftriaxone** appears to be safe and effective in the treatment of typhoid fever when administered in a single dose of 2 g for one day on an outpatient basis.

Complications

Complications caused by typhoid fever usually only occur in people who haven't been treated with appropriate antibiotics or who weren't treated straight away. In such cases, about 1 in 10 people experience complications, which usually develop during the third week of infection.

The 2 most common complications in untreated typhoid fever are:

- internal bleeding in the digestive system
- splitting (perforation) of a section of the digestive system or bowel, which spreads the infection to nearby tissue

Vaccination

Vaccination against typhoid fever is recommended if you're traveling to parts of the world where the condition is common.

vaccines available to prevent typhoid fever are:

- **Vi vaccine** – given as a single injection
- **Ty21a vaccine** – given as 3 capsules to take on alternate days.
- **Combined typhoid and hepatitis** A injections are also available for people aged 15 or over. Protection against hepatitis A lasts 1 year and protection against typhoid lasts 3 years.

The vaccines work by stimulating your body to create antibodies (infection-fighting proteins) that prevent you from getting ill if you become infected with the typhoid bacteria.

It also isn't usually recommended for children under 6, whereas children can have the Vi vaccine from 2 years of age.

It's unclear whether the Vi and Ty21a vaccines present a risk to pregnant or breastfeeding women. However vaccination should be considered if there's a significant risk of getting typhoid.

Cholera

Overview

Cholera is a bacterial disease usually spread through contaminated water. Cholera causes severe diarrhea and dehydration. Left untreated, cholera can be fatal within hours, even in previously healthy people. Cholera is

easily treated. Death from severe dehydration can be prevented with a simple and inexpensive rehydration solution.

Symptoms

Most cases of cholera that cause symptoms cause mild or moderate diarrhea that's often hard to tell apart from diarrhea caused by other problems. Others develop more serious signs and symptoms of cholera, usually within a few days of infection.

Symptoms of cholera infection can include:

- **diarrhoea.** Cholera-related diarrhea comes on suddenly and can quickly cause dangerous fluid loss — as much as a quart (about 1 liter) an hour. Diarrhea due to cholera often has a pale, milky appearance that resembles water in which rice has been rinsed.
- **Nausea and vomiting.** Vomiting occurs especially in the early stages of cholera and can last for hours.
- **Dehydration.** Dehydration can develop within hours after cholera symptoms start and range from mild to severe. A loss of 10% or more of body weight indicates severe dehydration.

Signs and symptoms of cholera dehydration include irritability, fatigue, sunken eyes, a dry mouth, extreme thirst, dry and shriveled skin that's slow to bounce back when pinched into a fold, little or no urinating, low blood pressure, and irregular heartbeat.

Treatment

What are the WHO guidelines for cholera management: Is very simple and easily understood and follow the following steps:

- Assess for dehydration (see Table)
- Rehydrate the patient and monitor frequently, then reassess hydration status.
- Maintain hydration; replace ongoing fluid losses until diarrhea stops.
- Administer an oral antibiotic to the patient with severe dehydration.

Feed the patient.

CONDITION	Well, alert	Restless	Lethargic or
		irritable	unconscious
			floppy
EYES	Normal	Sunken	Very sunken and dry
TEARS	Present	Absent	Absent
MOUTH and	Moist	Dry	Very dry
1.TONGUE			
THIRST	Drinks normall	Thirsty	Drinks poorly or
	not thirsty	drinks eagerly	not able to drink
2. FEEL:			
SKIN PINCH	Goes back	Goes back	Goes back very
	quickly	slowly	slowly
3. DECIDE:	**The patient has**	**If the patient has**	If the patient has
	No Signs Of	**Two Or More Signs**	two or more signs
	Dehydration	including at least	including at least
		one sign, there is	one sign, there is
		SOME DEHYDRATION	**SEVERE DEHYDRA-TION**

Detailed guidelines for the treatment of cholera are as follows

1.	Evaluate the degree of dehydration upon arrival
2.	Rehydrate the patient in 2 phases; these include rehydration (for 2-4 h) and maintenance (until Diarrhoea abates)
3.	Register output and intake volumes on predesigned charts and periodically review these data
4.	Use the intravenous route only (1) during the rehydration phase for severely dehydrated patients for whom an infusion rate of 50-100 mL/kg/h is advised, (2) for moderately dehydrated patients who do not tolerate the oral route, and (3) during the maintenance phase in patients considered high stool purges (i.e., >10 mL/kg/h).
5.	During the maintenance phase, use oral rehydration solution at a rate of 800-1000 mL/h; match ongoing losses with ORS administration
6.	Discharge patients to the treatment center if oral tolerance is greater than or equal to 1000 mL/h, urine volume is greater than or equal to 40 mL/h, and stool volume is less than or equal to 400 mL/h.

Complications

Dehydration can lead to a rapid loss of minerals in your blood that maintain the balance of fluids in your body. This is called an electrolyte imbalance.

Electrolyte imbalance electrolyte imbalance can lead to serious signs and symptoms such as:

Dehydration can lead to a rapid loss of minerals in your blood that maintain the balance of fluids in your body. This is called an electrolyte imbalance.

- **Electrolyte imbalance**
- **Muscle cramps.** These result from the rapid loss of salts such as sodium, chloride, and potassium.
- **Shock.** This is one of the most serious complications of dehydration. It occurs when low blood volume causes a drop in blood pressure and a drop in the amount of oxygen in your body. If untreated, severe hypovolemic shock can cause death in minutes.

Schistosomiasis (bilharziasis)

Several species of parasitic blood flukes (trematodes), of which the most important are Schistosoma mansoni, S. japonicum, S. mekongi and S. haematobium.

Transmission

Infection occurs in fresh water containing larval forms (cercariae) of schistosomes, which develop in snails. The free-swimming larvae penetrate the skin of individuals swimming or wading in water. Snails become infected as a result of excretion of eggs in human urine or feces.

Nature of the disease

Chronic conditions can develop when adult flukes live for many years in the veins (mesenteric or vesical) of the host where they produce eggs, which cause damage to the organs in which they are deposited. The symptoms depend on the main target organs affected by the different species, with S. mansoni, S. mekongi and S. japonicum causing hepatic and intestinal signs and S. haematobium causing urinary dysfunction.

You often don't have any symptoms when you first become infected with schistosomiasis, but the parasite can remain in the body for many years and cause damage to organs such as the bladder, kidneys, and liver.

The infection can be easily treated with a short course of medicine, so see your GP if you think you might have it.

Spread

The worms that cause schistosomiasis live in fresh water, such as Ponds, lakes, rivers, reservoirs, canals

You can become infected if you come into contact with contaminated water – for example when paddling, swimming, or washing – and the tiny worms burrow into your skin. Once in your body, the worms move

through your blood to areas such as the liver and bowel.

Symptoms Of Schistosomiasis

Many people with schistosomiasis don't have any symptoms or don't experience any for several months or even years.

You probably won't notice that you've been infected, although occasiona lly people get small, itchy red bumps on their skin for a few days where the worms burrowed in.

After a few weeks, some people develop:

- A high temperature (fever) above 38C
- An itchy, red, blotchy, and raised rash
- A cough
- Diarrhea
- Muscle and joint pain
- Abdominal (tummy) pain
- A general sense of feeling unwell

These symptoms, known as acute schistosomiasis, often get better by themselves within a few weeks. But it's still important to get treated because the parasite can remain in your body and lead to long-term problems.

Chronic schistosomiasis can include a range of symptoms and problems, depending on the exact area that's infected. For example, an infection in the:

- digestive system can cause anemia, abdominal pain, and swelling, diarrhea and blood in your poo
- The urinary system can irritate the bladder (cystitis), pain when peeing, a frequent need to pee, and blood in your pee
- heart and lungs can cause a persistent cough, wheezing, shortness of breath and coughing up blood
- The nervous system or brain can cause seizures (fits), headaches, weakness and numbness in your legs, and dizziness.

Without treatment, affected organs can become permanently damaged.

Treatments for schistosomiasis

Schistosomiasis can usually be treated successfully with a short course of a medication called praziquantel, which kills the worms. Praziquantel is most effective once the worms have grown a bit, so treatment may be

delayed until a few weeks after you were infected, or repeated again a few weeks after your first dose.

Steroid medication can also be used to help relieve the symptoms of acute schistosomiasis, or symptoms caused by damage to the brain or nervous system.

take precautions to avoid exposure to contaminated water.

Diagnosis

Examination of stool and/or urine for ova is the primary method of diagnosis for suspected schistosome infections.

Treatment

Praziquantel dose and Duration	
Schistosoma mansoni, S. haematobium, S. intercalatum	40 mg/kg per day orally in two divided doses for one day
S. japonicum, S. mekongi	60 mg/kg per day orally in three divided doses for one day

MOSCULO-SKELETAL DISORDERS

Gout

Gout is a form of inflammatory arthritis characterized by recurrent attacks of a red, tender, hot, and swollen joint. Pain typically comes on rapidly, reaching maximal intensity in less than 12 hours. The joint at the base of the big toe is affected in about half of cases. Normally, uric acid dissolves in your blood and passes through your kidneys into your urine. But sometimes either your body produces too much uric acid or your kidneys excrete too little uric acid. When this happens, uric acid can build up, forming sharp, needle-like urate crystals in a joint or surrounding tissue that cause pain, inflammation, and swelling.

Treatment

Gout medications can be used to treat acute attacks and prevent future attacks. Medications can also reduce your risk of complications from gout, such as the development of tophi from urate crystal deposits.

Medications to treat gout attacks

Drugs used to treat acute attacks and prevent future attacks include:

1. **Nonsteroidal anti-inflammatory drugs (NSAIDs).** NSAIDs include over-the-counter options such as ibuprofen as well as more powerful prescription NSAIDs such as indomethacin or celecoxib
2. **Colchicine.** a type of pain reliever that effectively reduces gout pain. The drug's effectiveness may be offset, however, by side effects such as nausea, vomiting, and diarrhea, especially if taken in large doses. After an acute gout attack resolves, a low daily dose of colchicine to prevent future attacks.
3. **Corticosteroids.** Corticosteroid medications, such as the drug prednisone, may control gout inflammation and pain. Corticosteroids are generally used only in people with gout who can't take either NSAIDs or colchicine. Side effects of corticosteroids may include mood changes, increased blood sugar levels, and elevated blood pressure.

Medications to prevent gout complications

Medications that block uric acid production**.** Drugs called xanthine oxidase inhibitors (XOIs), including allopurinol and febuxostat), block the synthesis of uric acid. Side effects of allopurinol include a rash and low blood counts. Febuxostat side effects include rash, nausea, reduced liver function, and an increased risk of heart-related death.

Medication that improves uric acid removal.
These drugs, called uricosurics, include probenecid (Probalan) and lesinurad Zurampic remove uric acid from the body. This may lower your uric acid levels and reduce the risk of gout, but the level of uric acid in your urine is increased. Side effects include a rash, stomach pain, and kidney stones. Lesinurad can be taken only along with an XOI.

Allopurinol dose

Usual Adult Dose for Gout

The dose will vary with the severity of the disease:
Initial dose: 100 mg orally once a day
-Increase in increments of 100 mg weekly until a serum uric level of 6 mg/dL or less is attained

Mild Gout:

-Average maintenance dose: 200 to 300 mg orally once a day

Moderately Severe Tophaceous Gout:
-Average maintenance dose: 400 to 600 mg orally/day in divided doses
Minimal Effective Dose: 100 to 200 mg per day
Maximum Dose: 800 mg per day (may be taken in divided doses.

Colchicine Dosage
Recent trial evidence demonstrates that low-dose colchicine (2 tablets followed by 1 tablet 1 hour later) is effective when prescribed within 12 hours of the onset of an acute gout flare, with a low incidence of gastrointestinal adverse effects 1 A higher dose (2 tablets followed by 1 tablet every hour for 6 hours) offered no additional clinical benefit, but increased the risk of gastrointestinal toxicity.

Safety and efficacy of low-dose colchicine in acute gout

mg initially followed by 0.6 mg every hour for 6 hours mg initially followed by 0.6 mg 1 hour later ‡ Statistically significant difference compared with placebo § Statistically significant difference compared with placebo and low- dose colchicine	High dose (4.8 mg t)	Low dose† (1.8 mg)

Prevention
During symptom-free periods, these dietary guidelines may help protect against future gout attacks:

a. **Drink plenty of fluids.** Stay well-hydrated, including plenty of water. Limit how many sweetened beverages you drink, especially

those sweetened with high-fructose corn syrup.

b. **Limit or avoid alcohol.** Talk with your doctor about whether any amount or type of alcohol is safe for you. Recent evidence suggests that beer may be particularly likely to increase the risk of gout symptoms, especially in men.
c. **Get your protein from low-fat dairy products.** Low-fat dairy products may have a protective effect against gout, so these are your best-bet protein sources.
d. **Limit your intake of meat, fish, and poultry.** A small amount may be tolerable, but pay close attention to what types — and how much — seem to cause problems for you.
e. **Maintain a desirable body weight.** Choose portions that allow you to maintain a healthy weight. Losing weight may decrease uric acid levels in your body. But avoid fasting or rapid weight loss, since doing so may temporarily raise uric acid levels.

Diagnosis

Blood test. Your doctor may recommend a blood test to measure the levels of uric acid and creatinine in your blood. Blood test results can be misleading, though. Some people have high uric acid levels but never experience gout. And some people have signs and symptoms of gout but don't have unusual levels of uric acid in their blood.

Osteoarthritis

Osteoarthritis is a condition that causes joints to become painful and stiff. It's the most common type of Arthritis.

Symptoms

The main symptoms of osteoarthritis are joint pain stiffness, and problems moving the joint. Some people also have symptoms such as: - swelling - tenderness - grating or crackling sound when moving the affected joints. For some people, the symptoms can be mild and may come and go. Other people can experience more continuous and severe problems which make it difficult to carry out everyday activities.

Causes

As part of normal life, the joints are exposed to a constant low level of damage. In most cases, your body repairs the damage itself and no symptoms are experienced. But in osteoarthritis, the protective cartilage on the ends of the bones breaks down, causing pain, swelling, and problems moving the joint. Bony growths can develop, and the area can become red and swollen. The exact cause is not known, but joint injury

– overusing the joint when it has not had enough time to heal after an injury or operation are contributing factor. other conditions (secondary arthritis) – osteoarthritis can happen in joints severely damaged by a previous or existing condition, such as:

- ◇ rheumatoid arthritis or gout
- ◇ age – your risk of developing the condition increases as you get older.
- ◇ family history – osteoarthritis may run in families, although studies have not identified a single gene responsible
- ◇ obesity – being obese puts excess strain on your joints, particularly those that bear most of your weight, such as your knees and hips
- ◇ being a woman – osteoarthritis is more common in women than men.

To help determine whether you have osteoarthritis, a GP will first ask you about your symptoms and examine your joints. Further tests – such as X-rays or blood tests – are not usually necessary, but may be used to rule out other possible causes, such as rheumatoid arthritis or a fractured bone.

Treatment

Osteoarthritis is a long-term condition and cannot be cured, but it doesn't necessarily get any worse over time and it can sometimes gradually improve. Several treatments are also available to reduce the symptoms.

- ◇ to help osteoarthritis include:
- ◇ lifestyle measures – such as maintaining a healthy weight and exercising regularly
- ◇ medication – to relieve your pain
- ◇ supportive therapies make everyday activities easier

In a few cases, where other treatments have not been helpful, surgery to repair, strengthen or replace

Pain Relief Medicines

Paracetamol

It's best to take it regularly rather than wait until your pain becomes unbearable. When taking paracetamol, always do not exceed the maximum dose stated on the pack.

Non-steroidal anti-inflammatory drugs (NSAIDs)

If paracetamol does not effectively control the pain of osteoarthritis, a non-steroidal anti-inflammatory drug (NSAID). Which works by reducing inflammation.

Some NSAIDs are available as creams (topical NSAIDs) that you apply directly to the affected joints. They can be particularly effective if you have osteoarthritis in the knees or hands. As well as helping to ease pain, they can also help reduce any swelling in the joints.

They may not be suitable for people with certain conditions, such as asthma, a stomach ulcer , or angina, or if one has had a heart attack or stroke. you're taking low-dose aspirin,

Opioids
Opioids, such as codeine, are another type of painkiller that may ease the pain if paracetamol does not work. Opioids can help relieve severe pain, but can also cause side effects such as drowsiness, nausea, and constipation. Codeine is combined with paracetamol in common

Capsaicin cream
works by blocking the nerves that send pain messages in the treated area, but it may take up to a month for the treatment to be fully effective.

Steroid injections
Steroids are a type of medication that contains manmade versions of the hormone cortisol and are sometimes used to treat particularly painful musculoskeletal problems. Some people with osteoarthritis may be offered steroid injections when other treatments haven't worked. The injection will be made directly into the affected area. You may be given an anesthetic first to numb the area and reduce the pain.

Surgery
Surgery for osteoarthritis is only needed in a small number of cases where other treatments haven't been effective or where one of your joints is severely damaged. However, surgery cannot be guaranteed to get rid of your symptoms altogether, and you may still experience pain and stiffness from your condition.

OROPHARYNGEAL CONDITIONS

Oral candidiasis (trush)

A fungal infection caused by candida albicans appears as thick white patches with an erythematous base, in adults is not contagious

It's common in babies and older people with dentures. It can be easily treated with medicines bought from a pharmacy.

Other symptoms in adults are:

- cracks at the corners of the mouth
- not tasting things properly
- an unpleasant taste in the mouth
- pain inside the mouth (for example, a sore tongue or sore gums)
- difficulty eating and drinking

. baby with oral thrush will have a white coating on their tongue. It may look like cottage cheese and it cannot be rubbed off easily.

Babies with oral thrush may not want to feed. and can pass oral thrush on through breastfeeding causing nibble thrush

It occurs more frequently in:

◇ taking antibiotics over a long time
◇ using asthma inhalers
◇ having chemotherapy as cancer treatment
◇ patients with malnutrition
◇ patients with diabetes
◇ patients taking long-term antibiotics.

Treatment:

Miconazole Oral Gel 25mg/ml 5 to 10 ml in mouth after food and retain near lesions 4 times daily.

Children < 2 years 2.5 ml 2 times daily

Children >2-6 years 5 ml 2 times daily

continue until 48 hours after lesions have cleared

If not available Gentian violet paint can be used

Nystatin liquid – 1ml dropped into the mouth FOUR times daily for 7 days or until 48 hours after the infection cleared Suspension should be taken after food and retained in the mouth for as long as possible (e.g. several minutes) before swallowing.

Miconazole 2% ORAL gel – 2.5ml (half a spoonful) FOUR times daily and continue for 7 days after infection cleared. The gel should be applied after food and retained in the mouth near oral lesions before swallowing •

Nystatin in primary and secondary care, **fluconazole** 50mg daily for 7

days (if immunocompromised 100mg daily) e.g. Patients living with HIV,

Gingivitis

Bacterial infection of the gingiva is usually secondary to bad oral hygiene. A special condition is acute necrotizing ulcerative gingivitis (ANUG) in children

The diagnosis is based on:

- Review your dental and medical history and conditions that may contribute to symptoms.
- Measuring the depth of the groove between your gums and teeth. A dental probe is inserted beside the tooth beneath the gumline, usually at several sites in the mouth. In a healthy mouth, the pocket depth is between 1 and 3 millimeters (mm). Pockets deeper than 4 mm may mean gum disease.
- Dental X-rays to check for bone loss in areas where the pockets are deeper.

Treatment:

- Adults: **Metronidazole** 250 mg orally 3 times per day for 5 days, and **Phenoxymethylpenicillin** 250 mg orally 4 times per day for 7 days.
- Children: **Metronidazole** 7.5 mg/kg orally 3 times per day for 5 days. And, **Phenoxymethylpenicillin** 12.5 mg/kg orally 4 times per day for 7 days.

Lifestyle and home remedies

Steps you can take at home to prevent and reverse gingivitis include:

- Brush your teeth twice a day or, better yet, after every meal or snack.
- Use a soft toothbrush and replace it at least every three months**.**
- Floss daily.
- Use a mouth rinse to reduce plaque between the teeth.

Mouth sores

Diagnosis:

A common condition, the main finding being single (at most 2 to 3) small ulcers (3 to 10mm) on the inside of the lips or throughout the remainder of the mouth. The ulcers are very painful and last for 1 to 2 weeks. They are usually not associated with fever or cervical lymphadenopathy

Causes of Mouth Sores

Several health conditions can cause mouth sores to develop, including:

- **Idiopathic:**

Idiopathic mouth sores occur but are not linked to an underlying health condition. Canker sores are an example of this type of mouth sore.

- **Autoimmune diseases:**

Some autoimmune diseases such as Crohn's disease, lichen planus, and systemic lupus erythematosus can cause sores to develop in the mouth.

- **Trauma:**

Trauma such as biting your cheek or burning your mouth can cause a mouth sore. In some cases, trauma from dental tools can also cause a mouth sore.

- **Hematologic:**

Hematologic disorders are disorders of the blood. Anemia and neutropen ia are blood disorders that can cause mouth sores.

- **Fever syndromes:**

Certain disorders that cause a fever without an infection (fever syndromes) can cause mouth sores.

- **Cancer:**

Certain types of cancers can cause painful mouth sores.

- **Food allergies**:

Some food allergies are a common cause of mouth sores.

- **Vesiculobullous disorders:**

These conditions only affect the mouth and are characterized by the mouth sores they cause.

- **Nutrient deficiencies:**

Being deficient in nutrients like iron, folate, zinc, or several B vitamins can lead to mouth sores.

- **Viral infections:**

• Viral infections such as herpes simplex, and shingles, can cause sores to develop in the mouth. COVID-19 has also been shown to cause oral lesions in some people.

- **Bacterial infections:**

Syphilis and tuberculosis are bacterial infections that can cause mouth sores.

- **Inherited disorders:**

Epidermolysis bullosa and chronic granulomatous disease can cause sores to develop in the mouth.

- **Oral infections:**

Some oral infections, such as gingivostomatitis, cause mouth sores. Gingivostomatitis is caused by a primary infection, such as herpes simplex.

Medication and Mouth Sores

If a mouth sore develops during medications, do not stop taking your medication without talking to your healthcare provider first. The mouth sores might be a temporary effect of the drug and will go away soon. If not, your provider may adjust your dose or switch you to a different medication

Medications that Can Cause Mouth Sores?

Several types of drugs can cause oral sores or ulcerations, including:

- Immunosuppressants (drugs that suppress the action of the immune system)
- Blood pressure medications
- Some inhalers that treat COPD or asthma
- Drugs used to treat specific heart issues caused by blood clots
- Medications designed to restore blood flow by opening blood vessels
- Protease inhibitors (a type of HIV medication)
- Some antibiotics
- Non-steroidal anti-inflammatory drugs (NSAIDs)
- Some antiviral medications
- Chemotherapy

Treatment

Treating mouth sores means treating the cause. Idiopathic mouth sores will typically clear up on their own within one to three weeks.

antiseptic mouthwashes, and anti-inflammatory medications to ease pain and promote healing. Diagnosis is important because. Some mouth sores are harmless, but others can indicate a severe health condition.

Dental abscess

A dental abscess is a build-up of pus in the teeth or gums caused by an infection. It needs urgent treatment by a dentist. A dental abscess will not

go away on its own.

Signs of a dental abscess include:

- ◇ Intense toothache or pain in the gums
- ◇ Redness inside the mouth, or outside the mouth on the face or jaw
- ◇ Sensitivity to hot or cold food and drink in the affected area
- ◇ A bad taste in the mouth
- ◇ Difficulty opening the mouth and chewing food
- ◇ A swollen face or jaw
- ◇ A high temperature

Causes of a dental abscess

You may get a dental abscess if:

- Tooth that has not grown out of your gums properly (an impacted tooth)
- tooth decay or gum disease
- injured teeth, gums, or mouth
- radiotherapy or chemotherapy

Treatment:

Amoxicillin 500mg every 8 hours (children: 15-30 mg/kg

Paracetamol 1 g (children: 10 mg/kg) every 6 hours as needed Alternative

Acetylsalicylic acid 600 mg orally, preferably after food, every 6 hours as needed. (not recommended for children)

Refer to the dentist for an emergency appointment.

POISONS MANAGEMENT.

Most poisonings are dose-related to dose and are determined by concentration over time. Toxicity may result from exposure to excess amounts of normally nontoxic substances. Some poisonings result from exposure to substances that are poisonous at all doses. Poisoning is distinguished from hypersensitivity and idiosyncratic reactions, which are unpredictable and not dose-related, and from intolerance, which is a toxic reaction to a usually nontoxic dose of a substance.

Poisoning is commonly due to ingestion but can result from injections, inhalation, or exposure to body surfaces (e.g., skin, eye, mucous membranes).

After exposure or ingestion and absorption, most poisons are metabolized, pass through the gastrointestinal tract (GI) tract, or are excreted. Occasionally, tablets (e.g.) aspirin, iron, enteric-coated drugs)

Symptoms and signs of poisoning vary depending on the substance. Also, different patients poisoned with the same substance may present with very different symptoms.

Symptoms typically begin soon after contact but, with certain poisons, are delayed. The delay may occur because only a metabolite is toxic rather than the parent substance (eg, methanol, ethylene glycol, hepatotoxins). Ingestion of hepatotoxins (eg, acetaminophen, iron, Amanita phalloides mushrooms) may cause acute liver failure that occurs one to a few days later. With metals or hydrocarbon solvents, symptoms typically occur only after chronic exposure to the toxin.

Ingested and absorbed toxins generally cause systemic symptoms. Caustics and corrosive liquids damage mainly the mucous membranes of the gastrointestinal (GI) tract, causing stomatitis, enteritis, or perforation. Some toxins (e.g., alcohol, hydrocarbons) cause characteristic breath odors. Skin contact with toxins can cause various acute cutaneous symptoms (eg, rashes, pain, blistering); chronic exposure may cause dermatitis.

Inhaled toxins are likely to cause symptoms of upper airway injury if they are water-soluble (e.g., chlorine, ammonia) and symptoms of lower airway injury and noncardiogenic pulmonary edema if they are less water-soluble (e.g., phosgene). Inhalation of carbon monoxide, cyanide, or hydrogen sulfide gas can cause organ ischemia or cardiac or respiratory arrest. Eye contact with toxins (solid, liquid, or vapor) may damage the cornea, sclera, and lens, causing eye pain, redness, and loss of vision.

Diagnosis of Poisoning

Consideration of poisoning in patients with altered consciousness or unexplained symptoms

History from all available sources

Selective, directed testing (Stomach contents& Blood)

The first step of diagnosis of poisoning is to assess the overall status of the patient. Severe poisoning may require rapid intervention to treat airway compromise or cardiopulmonary collapse. History is often the most valuable tool.

Physical examination sometimes detects signs suggesting particular types of substances (eg, toxidromes [see Annex 3, Table 2: Common Toxic Syndromes], breath odor, presence of topical drugs, needle marks or tracks suggesting injected drug use, stigmata of chronic alcohol use).

Testing

In most cases, laboratory testing provides limited help. Standard, readily available tests to identify common drugs of abuse (often called toxic screens) are qualitative, not quantitative. These tests may provide false-positive or false-negative results, and they check for only a limited number of substances.

Finding a drug of abuse on a screening test does not necessarily indicate that the drug caused the patient's symptoms or signs (e.g., a patient who had recently taken an opioid may be obtunded because of encephalitis rather than the drug).

For most substances, blood levels cannot be easily determined or do not help guide treatment. For a few substances (e.g., acetaminophen, aspirin, carbon monoxide, digoxin, ethylene glycol, iron, lithium, methanol, phenobarbital, phenytoin, and theophylline), blood levels may help guide treatment. Many authorities recommend measuring acetaminophen levels in all patients with mixed ingestions because acetaminophen ingestion is common, is often asymptomatic during the early stages, and can cause serious delayed toxicity that can be prevented by an antidote. For some substances, other blood tests (e.g., PT [prothrombin time]

Treatment of Poisoning

Supportive care

Activated charcoal for serious oral poisonings
Occasional use of specific antidotes or dialysis

Only rare use of gastric emptying
Seriously poisoned patients may require assisted ventilation or treatment of cardiovascular collapse. Patients with impaired consciousness may require continuous monitoring or restraints. The discussion of treatment for specific poisonings. (see the table)

Activated charcoal
Charcoal is usually given, particularly when multiple or unknown substances have been ingested. The use of charcoal adds little risk (unless patients are at risk of vomiting and aspiration) but has not been proven to reduce overall morbidity or mortality. When used, charcoal is given as soon as possible. Activated charcoal adsorbs most toxins because of its molecular configuration and large surface area. Multiple doses of activated charcoal may be effective for substances that undergo enterohepatic recirculation (eg, phenobarbital, theophylline) and for sustained-release preparations. Charcoal may be given at 4- to 6-hour intervals for serious poisoning with such substances unless bowel sounds are hypoactive. Charcoal is ineffective for caustics, alcohols, and simple ions (eg, cyanide, iron, other metals, lithium).
The recommended dose is 5 to 10 times that of the suspected toxin ingested. However, because the amount of toxin ingested is usually unknown, the usual dose is 1 to 2 g/kg, which is about 10 to 25 g for children < 5 years and 50 to 100 g for older children and adults. Charcoal is given as a slurry in water or soft drinks. It may be unpalatable and results in vomiting in 30% of patients. Administration via a gastric tube may be considered,

Gastric emptying
Gastric emptying, which used to be well-accepted and seems intuitively beneficial, should not be routinely done. It does not clearly reduce overall morbidity or mortality and has risks. Gastric emptying is considered if it can be done within 1 hour of a life-threatening ingestion. However, many poisonings manifest too late, and whether a poisoning is life-threatening is not always clear. Thus, gastric emptying is seldom indicated and, if a caustic substance has been ingested, is contraindicated.
If gastric emptying is used, gastric lavage is the preferred method. Gastric lavage may cause complications such as epistaxis, aspiration, or, rarely, oropharyngeal or esophageal injury. Syrup of ipecac has unpredictable effects, often causes prolonged vomiting, and may not remove substantial amounts of poison from the stomach. Syrup of ipecac may be warranted if the ingested agent is highly toxic and transport time to the emergency department is unusually long, but this is uncommon in the US.

Alkaline diuresis

Alkaline diuresis enhances the elimination of weak acids (eg, salicylates, phenobarbital). A solution made by combining 1 L of 5% D/W with three 50-mEq (50-mmol/L) ampules of sodium bicarbonate and 20 to 40 mEq (20 to 40 mmol/L) of potassium can be given at a rate of 250 mL/h in adults and 2 to 3 mL/kg/h in children. Urine pH is kept at > 8, and potassium must be repleted. Hypernatremia, alkalemia, and fluid overload may occur but are usually not serious. However, alkaline diuresis is contraindicated in patients with renal insufficiency.

Dialysis

Common toxins that may require dialysis or hemoperfusion include
Ethylene glycol, Lithium, Methanol, Salicylates, Theophylline
These therapies are less useful if the poison is a large or charged (polar) molecule, has a large volume of distribution (ie, if it is stored in fatty tissue), or is extensively bound to tissue protein (as with digoxin, phencyclidine, phenothiazines, or tricyclic antidepressants le substances from the blood),
Specific antidotes
For the most commonly used antidotes, see table 1(Common Specific Antidotes.) Chelating drugs are used for poisoning with heavy metals and occasionally with other drugs (see Table 2 Guidelines for Chelation Therapy). IV fat emulsions in 10% and 20% concentrations and high-dose insulin therapy have been used to successfully treat several different cardiac toxins (e.g., bupivacaine, and verapamil). For more details refer to the table below.

Table of Specific antidote and treatment of poison

TOXIC AGENT	ANTIDOTES AND SPECIFIC TREATMENTS ADULT DOSES are given for most drugs. This table is not intended for individual patient care. Please call the Missouri Poison Center for specific recommendations for an individual patient.
Acetaminophen	Acetylcysteine ORAL: (diluted to 5% solution): All ages: Loading: 140 mg/kg Maintenance: 70 mg/kg every 4 hrs for 5 doses starting 4 hrs after loading dose. MAX dose is for ³ 100 kg patient weight. OR Acetylcysteine (Acetadote®) IV: IMPORTANT: IV dosing regimens vary, check with your institution. FDA-approved dosing, All ages: #1: 150 mg/kg infuse over 1 hr; then #2: 50 mg/kg infuse over 4 hrs; then #3: 100 mg/kg infuse over 16 hrs. MAX dose is for ³ 100 kg patient weight.

Anticholinergic Delirium	Benzodiazepines: First-line treatment. Physostigmine (Antilirium®) IV/IM: Use with caution. Adult: 0.5-1 mg over 5-10 min by slow IV push. May repeat dose in 10-15 min if delirium persists and cholinergic excess is not present. Maximum dose 2 mg total during the first hour.
Arsenic	Dimercaprol (BAL in Oil®) Deep IM Only; for severe acute poisoning: All ages: 2.5-3 mg/kg every 4 hrs on Days 1-2, then a tapering schedule. Switch to Succimer as soon as tolerated. OR Succimer (Chemet®) ORAL (Off label, All ages): 10 mg/kg every 8 hrs for 5 days; then 10 mg/kg every 12 hrs for 14 days.
Benzodiazepine	Flumazenil IV: Not recommended for intentional overdose; may precipitate seizures. Adult: Initial 0.2 mg over 30 seconds; if needed, give additional 0.3 mg dose over 30 seconds Repeat doses: 0.5 mg over 30 seconds at 1 min intervals PRN to MAX cumulative dose of 3 mg
Beta Blocker	Glucagon (GlucaGen®) IV: 3-5 mg bolus slow IV push; If no response, repeat in 5-10 min up to total dose 10 mg. Immediately start continuous infusion at an hourly rate equal to effective bolus dose. High-Dose Insulin Euglycemic Therapy (HIET): Consider if other therapy is failing. See Calcium Channel Blocker below for dosing.
Botulism, Infant	BabyBIG® Botulism Immune Globulin IV (Human): 100 ± 20 mg per vial; Dose 50 mg/kg Available from California Department of Health, Infant Botulism Treatment & Prevention Program
Botulism, Other	Botulism AntiToxin Heptavalent (equine) Types A-G ("BAT"): All ages: 1 vial; weight based dosing. Call state Department of Health, which will contact CDC to obtain BAT from nearest CDC cache.
Calcium Channel Blocker	Calcium Chloride 10% IV OR Calcium Gluconate 10%: Initial: 0.2 to 0.6 mEq/kg bolus of Ca2+; Repeat Bolus every 15-20 min as needed, up to 3-4 doses. If needed, follow bolus dosing with a continuous infusion: 0.2 to 0.6 mEq/kg per hour of Ca2+; titrate based on response. High-Dose Insulin Euglycemic Therapy (HIET): D50W initial bolus if Blood Glucose < 200 mg/dL; maintain Blood Glucose at 100-200 mg/dL. Regular Insulin IV: Initial Loading: 0.5-1 unit/kg; followed immediately by Maintenance continuous infusion at 0.5-1 unit/kg per hour (match loading dose). If no BP response to insulin bolus in 20 min, repeat insulin bolus at a higher dose, and raise the infusion rate to match the re-bolus dose. Bolus dose and hourly infusion rate may be as high as 10 units/kg and 10 units/kg per hour or even higher in severe poisoning cases. Calcium channel blocker poisoning causes severe insulin resistance
Carbamate Insecticides	Atropine IV: for muscarinic effects of excessive secretions, bradycardia, diarrhea, etc.Adult: 1-2 mg slow IV push. Repeat if needed
Chloroquine Hydroxychloroquine	High-dose Diazepam for severe cardiotoxicity: All ages: 1-2 mg/kg infused over 30 min, followed by 1 mg/kg total over the next 24 hours by continuous infusion or by 0.08 mg bolus every 2 hrs.

Clonidine	Naloxone IV: All ages: Initial: 5 mg IV. If inadequate response after 2-3 min, repeat 5 mg IV.
Cyanide	Hydroxocobalamin (Vitamin B12-a, Cyanokit®) IV: preferred in fire victims with concurrent CO poisoning. Adult: 5 grams over 15 min; May repeat 5 grams over 15-120 min for severe toxicity. OR Sodium Nitrite/Sodium Thiosulfate Kit (Nithiodote®) IV: Adult: Sodium nitrite 300 mg (10 mL) at 2.5-5 mL/min; then Na thiosulfate 12.5 grams (50 mL) at 5 mL/min. May repeat HALF dose if symptoms return
Digoxin or other Cardiac Glycoside drugs or botanicals	Atropine IV: for bradycardia or AV block: 0.5-1 mg every 3-5 min; MAX total dose: 3 mg. Digoxin Immune Fab (DigiFab®) IV: Dose (in vials) = Serum Digoxin Level (ng/mL) x Weight (kg) ÷ 100 (Round up to nearest whole vial.) Use HALF - dose or 2 vials initially in patient who needs therapeutic digoxin effect then reassess.
Drug-Induced Dystonic Reaction	Benzodiazepines IV or IM: Adjunct treatment for acute dystonia. Diphenhydramine IV or IM or ORAL: All ages: 0.5-1 mg/kg (MAX single dose 50 mg)
Ethylene Glycol	Fomepizole IV: All ages: Loading Dose: 15 mg/kg; then Maintenance Dose: 10 mg/kg every 12 hrs for 4 doses, then 15 mg/kg every 12 hrs until ethylene glycol or methanol levels < 20 mg/dL. Adjust dose during dialysis. OR Ethyl Alcohol PO if fomepizole not available. Discontinue PO ethanol once fomepizole is available.
Heparin UFH and LMWH	Protamine Sulfate IV: Give by slow IV over 10 min. MAX single dose 50 mg: 1 mg for every 100 units of heparin remaining in the patient; 1 mg for every 1 mg of enoxaparin; 1 mg for every 100 anti-Xa IU of dalteparin or tinzaparin.
Hydrofluoric Acid Dermal exposure	Calcium Gluconate Gel 2.5% (Calgonate®, H-F Gel®): Apply liberally to burn until pain resolution. Alternative: 1 g calcium gluconate mixed with 40 mL water-soluble lubricant. Alternative: 500-600 mg calcium carbonate tabs crushed & mixed with 20 mL water-soluble lubricant.

Iron Acute overdose	Deferoxamine (Desferal®) IV: for significantly symptomatic acute overdose. All ages: Start slowly at 5-10 mg/kg per hour and increase to 15 mg/kg per hour for 8-12 hrs, MAX 6 grams/day
Isoniazid (INH)	Benzodiazepines IV: Use with Vitamin B6 for management of seizures. Pyridoxine (Vitamin B6) IV: All ages: 1 gram for each gram of INH ingested to MAX 5 gram single dose by slow IV push. If INH ingested is unknown, use 5 g pyridoxine. May repeat as needed until seizures controlled.
Lead	Succimer (Chemet®) ORAL: for BLL > 45 mcg/dL in Child or > 80 mcg/dL in Adult. All ages: 10 mg/kg every 8 hrs for 5 days; then 10 mg/kg every 12 hrs for 14 days, in a lead-free environment. Combination parenteral chelators, reserved for BLL ≥ 70 mcg/dL in patients with lead encephalopathy. Dimercaprol (BAL in Oil®) IM only: 3-4 mg/kg/dose every 4 hrs for 2-7 days. Use in conjunction with Calcium Disodium EDTA. Calcium Disodium EDTA (Versenate®) IV or Deep IM: (Begin treatment with 2nd dose of Dimercaprol.) 25 mg/kg/day IV over 8-12 hrs for 5 days. Max daily dose: Child: 1,000 mg, Adult: 2,000-3,000 mg.
Local Anesthetic (Systemic Toxicity)	Lipid Emulsion 20% (Intralipid®) IV: All ages: Bolus: 1.5 mL/kg (MAX: 100 mL) 20% lipid emulsion over 1-3 min; may repeat bolus for persistent asystole or pulseless electrical activity. Immediately follow with 0.25 mL/kg per min by continuous infusion to total dose of 8-10 mL/kg (MAX: 1 liter), usually 30-60 min.
Mercury	Succimer (Chemet®) ORAL: All ages: 10 mg/kg every 8 hrs for 5 days; then 10 mg/kg every 12 hrs for 14 days. Dimercaprol (BAL in Oil®) Deep IM: Initial dose: 5 mg/kg for 1 dose. Subsequent doses: 2.5 mg/kg, once or twice daily for 10 days OR Switch to Succimer when tolerated.
Methanol	Fomepizole IV: See Ethylene Glycol above for dosing. OR Ethyl Alcohol PO if fomepizole not available. Discontinue PO ethanol once fomepizole is available
Methemoglobin	Methylene Blue (Provayblue®) IV: All ages: Initial: 1 mg/kg IV over 5-30 min; Repeat dose: 1 mg/kg after 1 hr if methemoglobin > 30%.
Opiate/Opioid	Naloxone IV or IM or Sub-Q: Adult: 0.4 to 2 mg (MAX 10 mg); Repeat every 2-3 min as indicated by response. Continuous infusion of 2/3 of total initial bolus per hour if needed, for long acting opioid agents.
Oral ingestions, Various	Activated Charcoal (Actidose Aqua®) ORAL: Limited indications: If patient presents within 1-2 hrs of a significant ingestion and has not/will not develop CNS depression or vomiting, can consider administration of aqueous charcoal suspension. Infant: 1 gram/kg; Child: 25 grams; Teen & Adult: 50-100 grams

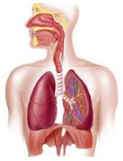
Organophosphate Insecticides	Atropine IV: for management of muscarinic symptoms. Diazepam IV: Adjunct for management of CNS symptoms (confusion, agitation, seizures). Pralidoxime (Protopam®) IV: adjunct treatment with atropine and diazepam for severe skeletal muscle nicotinic effects (muscle fasciculation, weakness, poor respiratory effort): Initial: 30 mg/kg over 15-30 min (MAX: 2,000 mg). A 2nd dose can be given in 1 hour, and additional doses every 10-12 hrs if muscle weakness persists.
Sulfonylurea Oral Hypoglycemic Drugs	Dextrose IV: treatment as needed to correct hypoglycemia. Octreotide (SandoStatin®) Sub-Q: adjunct for recurrent hypoglycemia after initial dextrose dose. Adult: 50 mcg Sub-Q; repeat every 6-12 hrs if hypoglycemia recurs; 2-3 doses usually sufficient.
Warfarin/related anticoagulants	Vitamin K1 (Phytonadione) IV, Mephyton® ORAL: Initial: 2.5-10 mg; Repeat: every 12-24 hrs if needed. Modify dosage based on INR and clinical condition.

RESPIRATORY DISEASES

UPPER RESPIRATORY DISORDERS (URTIS)

Sinusitis, rhinitis etc. See Under Ear, Nose & Throat

Lower respiratory tract infection (LRTIS)



Bronchitis is an inflammation of the bronchial tubes, the airways that carry air to your lungs. It causes a cough that often brings up mucus. It can also cause shortness of breath, wheezing, a low fever, and chest tightness. There are two main types of bronchitis: acute and chronic.

Acute bronchitis

In an immunocompetent adult or child, acute bronchitis is most often viral and does **not** require antibiotic therapy.

Amoxicillin 500mg orally, 8-hourly for 5 days, OR **Doxycycline** 200mg orally, initially, then 100mg daily for 5 days.

Pneumonia

Overview

Community-acquired pneumonia (CAP) occurs in individuals who are not in hospital or have been in hospital for <48 hours, who are not institutionalized, and not significantly immunocompromised. It is important to recognize severe CAP so that appropriate intensive care and broad-spectrum antibiotic therapy can be given promptly. The choice of antibiotic for CAP is usually empirical because the clinical presentation and X-ray appearances are not sufficiently specific to direct therapy against any one of the likely causative organisms. When a specific pathogen has been implicated, the routine use of ceftriaxone or Cefotaxime for nonsevere CAP provides no additional benefit over the Penicillins.

CAP is usually caused by a single organism. Streptococcus pneumoniae is the most frequent pathogen in CAP. It is also responsible for most cases of severe illness and death, particularly in the elderly.

Treatment is usually for 5 to 10 days for most bacterial causes; Severe or complicated cases may need prolonged treatment. Potential causes of treatment failure are often to misdiagnosis or comorbidity.

Adults with community-acquired pneumonia

In addition to Streptococcus pneumoniae, other important causes of bacterial CAP in adults include Mycoplasma pneumoniae, Chlamydia

pneumoniae, and Legionella species. Haemophilus influenza is responsible for about 10 percent of cases of CAP, predominantly in those with chronic obstructive pulmonary disease.

Antibiotices treatment:

First Choice

Amoxicillin 1g q8h ORAL for 5-10 days **OR**

Phenoxymethylpenicillin (as potassium) 500mg (800 000 IU) q6h ORAL for 5-10 days

Second Choice:

Amoxicillin + clavulanic acid 875 mg+125 mg q8h ORAL for 5-10 days **OR**

Doxycycline 100mg q12h ORAL

For children:

Amoxicillin 80-90 mg/kg/day ORAL

• Oral weight bands:

3-<6 kg	250 mg q12h
6-<10 kg	375 mg q12h
10-< 15 kg	500 mg q12h
15-<20 kg	750 mg q12h
≥20 kg	500 mg 48h or 1 g q12h

Severe cases of community-acquired pneumonia:

Adults:

First Choice:

Cefotaxime 2 g q8h IV/IM—for 5 days **OR**

Ceftriaxone 2 g q24h IV 1 g q24h IM for 5 days

Second choice:

Amoxicillin+clavulanic acid 1 g+200 mg q8h IV

A higher daily dose can be considered:

1 g+200 mg q6h for 5 days

Children:

Amoxicillin 50 mg/kg/dose IV/IM

≤1wk of life: q12h

> 1wk of life: q8h **OR**

Ampicillin 50 mg/kg/dose IV/IM

≤1wk of life: q12h

> 1wk of life: q8h **OR**

Benzylpenicillin 30 mg/kg/dose

(50 000 IU/kg/dose) q8h IV **COMBINED WITH**

Gentamicin IV/IM

Neonates: 5 mg/kg/dose q24h

Children: 7.5 mg/kg/dose q24h

Bronchial asthma

Overview

Breathing difficulty. Coughing, wheezing, shortness of breath, and chest tightness are classic asthma symptoms. Severe asthma can make it hard to talk or be active. It is also referred to as "bronchial asthma. **In adults** can occur at any age, although it's more common in people under age 40. People are more likely to get it if they have a family history of asthma, allergies, or eczema. **In children, s**ymptoms can vary from episode to episode in the same child. Symptoms of asthma to look for include:

Frequent coughing spells may happen during play, at night time, or while laughing. It's important to know that coughing may be the only symptom.

In the treatment of long-term asthma, All patients, regardless of management step, should be given a prescription for a short-acting beta agonist and instructed in its appropriate use. Inhaled corticosteroids improve asthma control more effectively in children and adults than any other single long-term controller medication

Treatment of asthma should be guided by a new system of classification that assesses severity at initial evaluation and control at all subsequent visits. Asthma severity is determined by current impairment (as evidenced by impact on day-to-day activities) and risk of future exacerbations (as evidenced by frequency of oral systemic corticosteroid use), and allows categorization of disease as intermittent, persistent-mild, persistent-moderate, and persistent-

Severity	Intermittent	Persistent-mild	Persistent-moderate	Persistent-severe
Symptoms	≤ 2 days / week	> 2 days per week, but not daily	Daily	Throughout the day
Night-time awakenings	≤ 2 times/r month	3 to 4 times per month	> Once per week, but not nightly	Often 7 times per week

Salbutamol for symptoms control	≤ 2 days / week	> 2 days per week, but not more than once per day	Daily	Several times per day
Interference with normal activity	None	Minor limitation	Some limitation	Extremely limited

severe. Initial treatment is guided by the disease severity category. The degree of control is also determined by the analysis of current impairment and future risk

Classification of asthma severity

Ideally, asthma severity is determined before initiating therapy. The EPR-3 guideline classification divides asthma severity into four groups: intermittent, persistent-mild, persistent-moderate, and persistent-severe. "Mild-intermittent," a classification in previous reports, has been eliminated. This term only applies to mild disease, and not to patients with periods of moderate or severe exacerbation.

Classification of a patient's disease also depends on current impairment and future risk. Impairment is determined by patient symptoms and objective measurement of lung function. The guideline recommends that, at a minimum, assessments of the patient's symptoms include daytime symptoms, night-time awakenings, frequency of short-acting beta-agonist use for symptom relief, and inability to do (or difficulty with) normal activities because of symptoms (Table 1). Spirometry is recommended as a component of the determination of current impairment**.** As mentioned previously, future risk is categorized by the frequency of oral systemic corticosteroid use.

Evaluation of asthma severity

The paradigm on which the EPR-3 report is based focuses on two aspects of asthma evaluation (i.e., severity and control) in determining the level of treatment, and two concepts (i.e., current impairment and future risk) in guiding treatment choice at each level of care.

Severity and Control of Asthma

The key elements of assessment and monitoring are refined to include the separate but related concepts of severity, control, and responsiveness to treatment. Classifying severity is emphasized for initiating therapy; assessing control is emphasized for monitoring and adjusting therapy. Asthma control is now weighted equally with asthma severity in determining appropriate therapy, with the recognition that asthma severity can change over time and is most readily recognized by ongoing care of asthma.

Treatment of Asthma

Treatment of mild attacks of asthma (children and adults)

Salbutamol 100 microgram Metered Dose Inhaler (MDI), 4 to 10 puffs (preferably via a large-volume spacer) or 2.5 to 5mg by nebuliser, 3- to 4-hourly

Children: **salbutamol** 100 microgram MDI, 2 to 4 puffs (preferably via a large-volume spacer) or 2.5mg (<5 years) to 5mg (>5 years) by nebuliser, 3- to 4-hourly, Child should be observed for at least 1 hour after the attack subsides. If improvement is maintained the child can usually be sent home.

Continuing management: will depend on severity and control (Refer to Evaluation, Classificatio and management)

(Mild symptoms less than twice a week. Nighttime symptoms less than twice a month.)

Classifying Asthma Severity and Initiating Treatment for Patients 12 Years and Older

If inhaled short $beta_2$ agonists are required more than 3 or 4 times weekly, preventive treatment should be introduced. If the use of inhaled short-acting $beta_2$ agonists exceeds 2 inhalations 2–3 times daily, this is a sign of loss of asthma control and requires an increase of preventive treatment. <800 micrograms daily beclomethasone or budesonide or <400 micrograms daily fluticasone.800–1600 micrograms daily beclomethasone or budesonide or 400–800 micrograms daily fluticasone. >1600 micrograms daily beclomethasone or budesonide or >800 micrograms daily fluticasone.

SEXUALLY TRANSMITTED DISEASES

Overview

STDs are sexually transmitted diseases. This means they are most often -- but not exclusively- spread by sexual intercourse. HIV, chlamydia, genital herpes, genital warts, gonorrhea, some forms of hepatitis, syphilis, and trichomonas are STDs. Some of the most common STDs are:

- ◇ Unusual discharge from the vagina, penis, or anus.
- ◇ Pain when peeing.
- ◇ Lumps or skin growths around the genitals or anus rash.
- ◇ Unusual vaginal bleeding.
- ◇ Itchy genitals or anus.
- ◇ Blisters and sores around the genitals or anus

Chlamydia

Chlamydia is 1 of the most common sexually transmitted infections (STDs). It's passed on through unprotected sex (sex without a condom) and is particularly common in sexually active teenagers and young adults.

Symptoms of chlamydia

Most people with chlamydia do not notice any symptoms and do not know they have it. If you do develop symptoms, you may experience:

- Pain when urinating
- Unusual discharge from the vagina, penis, or bottom
- In women, pain in the tummy, bleeding after sex, and bleeding between periods
- In men, pain, and swelling in the testicles

If you think you're at risk of having a sexually transmitted infection (STI) or have any symptoms of chlamydia, visit a GP, community contraceptive service, or local genitourinary medicine (GUM) clinic to get tested.

Transmission

Chlamydia is a bacterial infection. The bacteria usually spread through sex or contact with infected genital fluids (semen or vaginal fluid). Chlamydia cannot be passed on through casual contact, such as kissing and hugging, or from sharing baths, towels, swimming pools, toilet seats, or cutlery.

Complications

Although chlamydia does not usually cause any symptoms and can normally be treated with a short course of antibiotics, it can be serious if it's not

treated early on.
If left untreated, the infection can spread to other parts of your body and lead to long-term health problems, such as pelvic inflammatory disease (PID), epididymal-orchitis (inflammation of the testicles), and infertility. It can also sometimes cause reactive arthritis.

Test for chlamydia

Testing for chlamydia is done with a urine test or a swab test. You can also buy chlamydia testing kits to do at home.

Chlamydia treatment

Chlamydia can usually be treated easily with antibiotics. When used properly, antibiotics can cure the disease and prevent further complications. Treatment, however, does not prevent infections in the future, and reinfection is common.1 There are both recommended and alternative antibiotic regimens, with specific recommendations for women who are or may be pregnant.

Medicines for (Non-Pregnant Adults)

- ◇ Doxycycline)—100 mg orally twice a day for seven days
- ◇ Azithromycin)-1 gram orally in a single dose.
- ◇ If doxycycline and azithromycin are not available, WHO suggests one of the following options:

• erythromycin 500 mg orally four times a day for 7 days;
• ofloxacin 200–400 mg orally twice a day for 7 days; or
• tetracycline 500 mg orally four times a day for 7 days.

Uncomplicated chlamydial infection in pregnant and breastfeeding women:

For pregnant and breastfeeding women with uncomplicated chlamydial infection, WHO recommends:

- Azithromycin 1 g orally as a single dose.

When azithromycin is not available, WHO suggests one of the following options:

- Amoxicillin 500 mg orally three times a day for 7 days; or
- Erythromycin 500 mg orally four times a day for 7 days.

Newbern's and Children

Chlamydia infection in newborns and children is far less common than infection in adults. If a child is found to be infected with chlamydia, the first step (other than stabilizing the child) is to determine if the infection was transmitted during delivery or contracted afterward.

Newborns who develop eye infections or pneumonia (after contracting

chlamydia from a mother with untreated chlamydia during a vaginal birth) require treatment, intravenous antibiotics are often needed.

Older children (mid-teens and up) should be treated as adults, but younger children, especially those who are prepubescent, should be evaluated by a physician skilled in evaluating STDs in children.

Infections in the first three years of life may be persistent infections from birth, but any infection in a child requires consideration of child sexual abuse.

Treatment of Other Types

Two other conditions caused by Chlamydia trachomatis are very common worldwide:

- **Lymphogranuloma venereum (LGV):** Lymphogranuloma venereum is treated in the same way as standard genital chlamydia infections, but a longer course of therapy is used (21 days instead of seven).5 Other care may also be required to treat genital ulcers or abscessed inguinal nodes if they occur.
- **Trachoma:** Trachoma is the leading preventable cause of blindness worldwide and often requires aggressive treatment with antibiotics and surgery; addressing unsanitary living conditions is also necessary

Gonorrhoea

Overview

Gonorrhoea is a sexually transmitted infection (STI) caused by bacteria called Neisseria gonorrhoeae or gonococcus. It used to be known as "the clap". The bacteria are mainly found in discharge from the penis and vaginal fluid. Gonorrhoea is easily passed between people through:

i. unprotected vaginal, oral, or anal sex
ii. sharing vibrators or other sex toys that have not been washed or covered with a new condom each time they're used

The bacteria can infect the entrance to the womb (cervix), the tube that passes urine out of the body (urethra), the rectum, and, less commonly, the throat or eyes. The infection can also be passed from a pregnant woman to the baby. If you're. Without treatment, gonorrhea can cause permanent blindness in a newborn baby. Gonorrhoea is not spread by kissing, hugging, swimming pools, toilet seats, or sharing baths, towels, cups, plates or cutlery. The bacteria cannot survive outside the human body for long.

Symptoms

Typical symptoms of gonorrhea include a thick green or yellow discharge from the vagina or penis, pain when urinating, and, in women, bleeding between periods. However around 1 in 10 infected men and almost half

of infected women do not experience any symptoms. Gonorrhoea can be easily diagnosed by testing a sample of discharge picked up using a swab. In men, testing a sample of urine can also diagnose the condition.

Treating gonorrhea

Gonorrhoea is usually treated with a single antibiotic injection and a single antibiotic tablet. With effective treatment, most of your symptoms should improve within a few days. You should avoid having sex until you have been told you no longer have the infection. Previous successful treatment for gonorrhea does not make you immune to catching it again.

gonococcal infections, WHO suggests:

• ceftriaxone 1g intramuscularly as a single dose.

If ceftriaxone is not available or refused, WHO suggests:

• cefixime 800mg orally and performing test of cure.

WHO suggests:

• cefixime 800 mg orally plus azithromycin 2 g orally.

If test of cure is not possible or when oropharyngeal infection is diagnosed or is a potential concern, When resistance, allergy or availability of cephalosporins is a concern, WHO suggests one of the following options:

• spectinomycin 2 g intramuscularly as a single dose plus azithromycin 2 g orally; **OR**

• gentamicin 240 mg intramuscularly as a single dose plus azithromycin 2g orally. reatment for gonorrhea does not make you immune to catching it again.

If treatment failure occurred after a WHO-recommended therapy and reinfection is assessed to be unlikely, WHO suggests retreating with a regimen not used previously from one of the following options and performing test of cure:

• ceftriaxone 1g intramuscularly as a single dose plus azithromycin 2g orally, only if ceftriaxone was not used previously;

• spectinomycin 2g intramuscularly as a single dose plus azithromycin 2g orally; **OR**

• gentamicin 240 mg intramuscularly as a single dose plus azithromycin 2g orally.

Trichomoniasis

Trichomoniasis is a sexually transmitted infection (STI) caused by a tiny parasite called Trichomonas vaginalis (TV). **The symptoms** of Trichomoniasis are similar to those of many other sexually transmitted infections (sits), so it can sometimes be difficult to diagnose.

Symptoms

In women can cause: Abnormal vaginal discharge that may be thick, thin, or frothy and yellow-green in color

- ◇ Producing more discharge than normal, which may also have an unpleasant fishy smell
- ◇ Soreness, swelling, and itching around the vagina – sometimes the inner thighs also become itchy
- ◇ Pain or discomfort when passing urine or having sex

Trichomoniasis in men

Can cause:

- ◇ Pain when peeing or during ejaculation
- ◇ Needing to pee more frequently than usual
- ◇ Thin, white discharge from the penis
- ◇ Soreness, swelling, and redness around the head of the penis or foreskin

Trichomoniasis can usually be diagnosed after an examination of the genitals and a laboratory test carried out on a swab taken from the vagina or penis.

Transmission

Trichomoniasis is caused by a tiny parasite called Trichomonas vaginalis. In women, this parasite mainly infects the vagina and the tube that carries urine out of the body (urethra). In men, the infection most commonly affects the urethra, but the head of the penis or prostate gland, a gland near the bladder that helps produce semen, can become infected in some cases.

The parasite is usually spread by having sex without using a condom. It could also be spread by sharing sex toys if you do not wash them or cover them with a new condom before use. Trichomoniasis is not thought to be passed on through oral or anal sex. You also cannot pass on trichomoniasis through:

- ◇ Kissing or hugging
- ◇ Sharing cups, plates, or cutlery
- ◇ Toilet seats

Treatment of Trichomoniasis

Trichomoniasis is unlikely to go away without treatment, but it can be effectively treated with antibiotics.

Most men and women are treated with

Metronidazole, **500mg twice a day for 5 to 7 days**.

It's important to complete the whole course of antibiotics and avoid having sex until the infection clears up to prevent reinfection.

Genital warts

Genital warts are a common sexually transmitted viral infection (STI) passed on through vaginal, anal, and, rarely, oral sex**.**

Symptoms

- ◇ 1 or more painless growths or lumps around your vagina, penis, or anus
- ◇ itching or bleeding from your genitals or anus
- ◇ a change to your normal flow of pee (for example, sideways) that does not go away
- ◇ a sexual partner who has genital warts, even if you have no symptoms
- ◇ You could have genital warts.
- ◇ The genital warts virus can be passed on whether or not there are visible warts. Many people with the virus do not have symptoms but can still pass it on.

Transmission

- ◇ skin-to-skin contact, including vaginal and anal sex
- ◇ sharing sex toys
- ◇ rarely, oral sex

The virus can also be passed to a baby from the mother at birth, but this is rare. You cannot get genital warts from:

- kissing
- things like towels, cutlery, cups, or toilet seats

Treatment

can help get rid of the warts and prevent the infection from being passed on.

The type of treatment you'll be offered depends on what your warts are like. The doctor or nurse will discuss this with you.

- **Podophyline or Sulphur cream or liquid:** Apply this to warts yourself a few times a week for several weeks, but in some cases, you may need to go to the clinic every week for a doctor or nurse to apply it – these treatments can cause soreness, irritation or a burning

sensation

- **surgery:** a doctor or nurse can cut, burn, or laser the warts off – this can cause irritation or scarring

It may take weeks or months for treatment to work, and the warts may come back. In some people, the treatment does not work. There's no cure for genital warts, but it's possible for your body to clear the virus over time.

Genital herpes

Genital herpes is a sexually transmitted infection (STI) passed on through vaginal, anal and oral sex. Treatment from a sexual health clinic can help. Symptoms clear up on their own but can come back. Small blisters that burst to leave red, open sores around your genitals, anus, thighs, or bottom

- ◇ tingling, burning, or itching around your genitals
- ◇ pain when you pee
- ◇ in women, vaginal discharge that's not usual for you

These can be symptoms of genital herpes.

Go even if you have not had sex for a long time, as blisters can take months or years to appear.

Symptoms might not appear for weeks or even years after you're infected with the herpes virus. If you have genital herpes, your previous sexual partners should get tested.

Genital herpes is very easy to pass on (contagious) from the first tingling or itching of a new outbreak (before any blisters appear) to when sores have fully healed.

Transmission

- ◇ from skin-to-skin contact with the infected area (including vaginal, anal and oral sex)
- ◇ when there are no visible sores or blisters
- ◇ if a cold sore touches your genitals
- ◇ by transferring the infection on your fingers from someone else to your genitals
- ◇ by sharing sex toys with someone who has herpes

You cannot get genital herpes from objects such as towels, cutlery, or cups – the virus dies very quickly when away from your skin

Treatment for genital herpes

There's no cure. Symptoms clear up by themselves, but the blisters can come back (an outbreak or recurrence).

- ◇ Antiviral medicine to stop the symptoms getting worse – you need to start taking this within 5 days of the symptoms appearing
- ◇ Antiviral drugs commonly used to **treat genital herpes** symptoms:

acyclovir (zovirax)

- ◇ Initial treatment: 200 mg po q4hr while awake (5 times daily) for 10 days or 400 mg po q8hr for 7-10 days
- ◇ Intermittent treatment for recurrence: 200 mg po q4hr while awake (5 times daily) for 5 days; initiate at earliest sign or symptom of recurrence
- ◇ These are all taken in pill form. Severe cases may be **treated** with the intravenous (iv) drug acyclovir, 10-15 mg/kg iv q8hr for 10 days; up to 14-21 days
- ◇ Cream for the pain

Antiviral medicine may help shorten an outbreak by 1 or 2 days if you start taking it as soon as symptoms appear. But outbreaks usually settle by themselves, so you may not need treatment.

Recurrent outbreaks are usually milder than the first episode of genital herpes.

Over time, outbreaks tend to happen less often and be less severe. Some people never have outbreaks.

Some people who have more than 6 outbreaks in a year may benefit from taking antiviral medicine for 6 to 12 months.

If you still have outbreaks of genital herpes during this time, you may be referred to a specialist.

If you have been diagnosed with genital herpes and you're having an outbreak:

Do

- keep the area clean using plain or salt water to prevent blisters from becoming infected
- apply an ice pack wrapped in a flannel to soothe pain
- apply petroleum jelly (such as Vaseline) or painkilling cream (such as 5% lidocaine) to reduce pain when you pee
- wash your hands before and after applying cream or jelly
- pee while pouring water over your genitals to ease the pain

Don't

- do not wear tight clothing that may irritate blisters or sores
- do not put ice directly on the skin
- do not touch your blisters or sores unless you're applying cream
- do not have vaginal, anal, or oral sex until the sores have gone away

Pubic lice

Pubic lice (sometimes called crabs) are tiny insects that live on coarse human body hair, such as pubic hair. **As well** as being found in pubic hair, the lice are also sometimes found in:

- ◇ underarm and leg hair
- ◇ hair on the chest, abdomen, and back
- ◇ facial hair, such as beards and mustaches
- ◇ eyelashes and eyebrows (very occasionally)

Unlike head lice**, pubic lice don't live in scalp hair.**

Transmission

Pubic lice aren't related to poor personal hygiene. They're usually spread through close bodily contact with an infected person. The lice crawl from hair to hair, but can't fly or jump. They need human blood to survive, so will only leave the body to move from one person to another.

The most common way pubic lice are spread is through sexual contact, including vaginal, anal, and oral sex. Using condoms and other methods of barrier contraception doesn't protect you against pubic lice. Other types of close bodily contact, such as hugging and kissing, can also spread the lice. It's also possible – though much rarer – for pubic lice to be spread through sharing clothes, towels, and bedding.

Symptoms

After getting pubic lice, it can take several weeks before any symptoms appear. Symptoms are the same for men and women and include:

- ◇ itching in the affected areas, especially at night
- ◇ inflammation and irritation caused by scratching
- ◇ black powder in your underwear
- ◇ blue spots or small spots of blood on your skin, such as on your thighs or lower abdomen (caused by lice bites)

Itching is the most common symptom of pubic lice and is an allergic reaction to their saliva. The itching is usually worse at night because that's when the lice are most active.

Pubic lice are usually easy to diagnose by examining the affected area. The use a magnifying glass to look for signs of the lice, such as pale-coloured eggs or the lice themselves.

Treatment of pubic lice

- ◇ Increase personal hygiene – bathe or shower regularly (at least weekly)
- ◇ Change and launder clothes, especially underwear, regularly (at least weekly), or throw away affected clothing.
- ◇ Wash clothing and bedding recently used by an infected person in hot water (greater than 70ºc).

- ◇ Group or mass treatment for disease control the preferred method for mass treatment is the blowing of insecticidal powder between the body and underclothes. A suitable powder consists of talcum powder mixed with permethrin (0.5%), DDT (10%), lindane (1%), or another insecticide.
- ◇ Pubic lice can be treated at home with insecticide cream, lotion, or shampoo. By one of the above insecticides predations.

Some treatments only need to be applied to the affected area, but sometimes the whole body must be treated, taking care to avoid the eyes. The treatment usually needs to be repeated 7 days later to get rid of any lice that have hatched during that time. If the treatment doesn't work, you may need to use another type. This is because pubic lice can develop resistance to some treatments. The two commonly used insecticides to treat pubic lice are **Malathion Lotion and Permethrin 5% Cream.**

Water-based (aqueous) products are preferred over alcohol-based treatments (which may cause even more skin irritation).

To prevent reinfestation, anyone you have had close bodily contact with, including any sexual partners you have had in the past 3 months, should also be treated, even if they don't have symptoms.

Syphilis

Syphilis is a bacterial infection that's usually caught by having sex with someone who's infected**.** It can usually be cured with a short course of antibiotics. You can catch syphilis more than once, even if you have been treated for it before.

Symptoms of syphilis

The symptoms of syphilis are not always obvious and may eventually disappear, but one will usually remain infected unless it is treated. Some people with syphilis have no symptoms.

Symptoms can include:

- ◇ Small, painless sores or ulcers that typically appear on the penis, vagina, or around the anus, but can occur in other places such as the mouth
- ◇ A blotchy red rash that often affects the palms of the hands or soles of the feet
- ◇ Small skin growths (similar to genital warts) that may develop on the vulva in women or around the bottom (anus) in both men and women
- ◇ White patches in the mouth
- ◇ Tiredness, headaches, joint pains, a high temperature (fever), and swollen glands in your neck, groin, or armpits

If it's left untreated for years, syphilis can spread to the brain or other parts

of the body and cause serious long-term problems.

The test for syphilis usually involves a blood test and removing a sample of fluid from any sores using a swab (similar to a cotton bud).

Transmission

Syphilis is mainly spread through close contact with an infected sore. This usually happens during vaginal, anal, or oral sex, or by sharing sex toys with someone who's infected. Anyone who's sexually active is potentially at risk. It may be possible to catch syphilis if you inject yourself with drugs and you share needles with somebody who's infected, or through blood transfusions. Pregnant women with syphilis can pass the infection to their unborn baby.

Syphilis cannot be spread by using the same toilet, clothing, cutlery, or bathroom as an infected person.

. Syphilis in pregnancy

If a woman becomes infected while she's pregnant, or becomes pregnant when she already has syphilis, it can be very dangerous for her baby if not treated. Infection in pregnancy can cause miscarriage, stillbirth, or a serious infection in the baby (congenital syphilis). Screening for syphilis during pregnancy is offered to all pregnant women so the infection can be detected and treated before it causes any serious problems.

Symptoms - Syphilis stages

The symptoms of syphilis are similar for men and women. They're often mild and difficult to recognize, and you may pass on the infection without knowing you have it.

The symptoms tend to change over time and may come and go. Even if the symptoms do improve, there's still a risk you could pass the infection on or develop serious problems if you don't get treatment.

Early symptoms of syphilis

The first symptoms of syphilis usually develop around 2 or 3 weeks after infection, although they can start later than this. This stage of the infection is known as "primary syphilis".

- ◇ The main symptom is a small, painless sore or ulcer called a chancre that you might not notice
- ◇ The sore will typically be on the penis, vagina, or around the anus, although it can sometimes appear in the mouth or on the lips, fingers, or buttocks
- ◇ Most people only have one sore, but some people have several

- ◇ you may also have swollen glands in your neck, groin, or armpits

These symptoms usually pass within 2 to 8 weeks. But if the infection isn't treated, it may progress to a second stage.

Late symptoms of syphilis

Further symptoms may develop a few weeks after the initial symptoms have passed. This is known as "secondary syphilis".

Symptoms of secondary syphilis include:

- ◇ A blotchy red rash that can appear anywhere on the body, but often develops on the palms of the hands or soles of the feet
- ◇ Small skin growths (similar to genital warts) – on women these often appear on the vulva and for both men and women they may appear around the anus
- ◇ White patches in the mouth
- ◇ flu-like symptoms, such as tiredness, headaches, joint pains and a high temperature (fever)
- ◇ Swollen glands
- ◇ Occasionally, patchy hair loss

These symptoms usually pass within a few weeks, although they may come and go over several months before they disappear.

This is known as "latent syphilis" and it can last for decades and lead to serious problems if not treated. It's still possible to pass on the infection during this stage, although this usually only happens within 2 years of becoming infected.

Treatment

Syphilis can be cured with the right antibiotics. However, treatment will not undo any damage that the infection has already caused

- ◇ A single intramuscular injection of long-acting **Benzathine penicillin G** (2.4 million units administered intramuscularly) will cure a person who has primary, secondary, or early latent syphilis.
- ◇ Three doses of long-acting Benzathine penicillin G (2.4 million units administered intramuscularly) at weekly intervals is recommended for individuals with late latent syphilis or latent syphilis of unknown duration. Treatment will kill the syphilis bacterium and prevent further damage, but it will not repair damage already done.

Although data to support the use of alternatives to penicillin is limited, options for non-pregnant patients who are allergic to penicillin may include doxycycline, tetracycline,

Neurosyphilis, ceftriaxone. These therapies should be used only in conjunction with close clinical and laboratory follow-up to ensure appropriate

serological response and cure.

Persons who receive syphilis treatment must abstain from sexual contact with new partners until the syphilis sores are completely healed. Persons with syphilis must notify their sex partners so that they also can be tested and receive treatment if necessary.

Special Considerations

Pregnancy

Parenteral penicillin G is the only therapy with documented efficacy for syphilis during pregnancy. Pregnant women with syphilis in any stage who report penicillin allergy should be desensitized and treated with penicillin (see Management of Persons Who Have a History of Penicillin Allergy).

Jarisch-Herxheimer Reaction

The Jarisch-Herxheimer reaction is an acute febrile reaction frequently accompanied by headache, myalgia, fever, and other symptoms that can occur within the first 24 hours after the initiation of any therapy for syphilis. Patients should be informed about this possible adverse reaction and how to manage it if it occurs. The Jarisch-Herxheimer reaction occurs most frequently among persons who have early syphilis, presumably because bacterial burdens are higher during these stages. Antipyretics can be used to manage symptoms, but they have not been proven to prevent this reaction. The Jarisch-Herxheimer reaction might induce early labor or cause fatal distress in pregnant women, but this should not prevent or delay therapy).

Syphilis is still treatable at this stage, but it's sometimes not possible to reverse any damage that's already been done. Without treatment, a syphilis infection can last for years or decades without causing any symptoms. Eventually, it can spread to parts of the body such as the brain or nerves, and cause serious and potentially life-threatening problems. This is known as "tertiary syphilis". People with tertiary syphilis may experience:

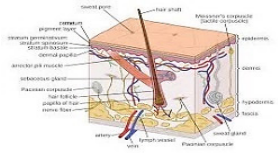
- ◇ meningitis, strokes, dementia symptoms
- ◇ coordination, numbness
- ◇ vision problems or blindness, heart problems

MB.:

1. Combinations of some penicillin preparations (e.g., Bicillin C-R, a combination of benzathine penicillin and procaine penicillin) are not appropriate treatments for syphilis, as these combinations provide inadequate doses of penicillin
2. A recent view (CDC) asserts that sensitive patients to penicillin must desensitized, there is no other way

SKIN DISEASES

Scabies



Scabies is a cutaneous parasitosis due to the presence of the mite Sarcoptes scabies hominis within the epidermis. It exists in two forms: ordinary scabies, relatively benign and moderately contagious; and crusted scabies, favored by immune deficiency, extremely contagious and refractory to conventional treatment.

Person-to-person transmission takes place chiefly through direct skin contact, and sometimes by indirect contact (sharing clothing, bedding the challenge in management is that it must include simultaneous treatment of both the patient and close contacts, and at the same time, decontamination of clothing and bedding of all persons undergoing treatment, in order to break the transmission cycle.

Ordinary scabies

Itching, worse at night, very suggestive of scabies if close contacts have the same symptom and – Typical skin lesions:

Scabies burrows (common): fine wavy lines of 5 to 15 mm, corresponding to the tunnels made by the parasite within the skin. Burrows are most often seen in the interdigital spaces of the hand and flexor aspect of the wrist but may be present on the areolae, buttocks, elbows, and axillae. The back and the face are spared. Burrows may be associated with vesicles, corresponding to the entry point of the parasite in the skin. Secondary skin lesions: resulting from scratching (excoriations, crusts) or super-infection (impetigo).

Crusted (Norwegian) scabies

Thick, scaly, erythematous plaques, generalized or localized, resembling psoriasis, with or without itching (50% of cases). Delay in diagnosis may lead to a scabies epidemic.

Treatment (In all cases)

Close contacts of the patient are treated simultaneously, even in the absence of symptoms.

– Clothing and bedding (including that of contacts) are changed after each treatment. They are washed at ≥ 60 °C then dried in the sun, or exposed to sunlight for 72 hours, or sealed in a plastic bag for 72 hours.

Ordinary scabies topical treatment

Topical scabicides are applied over the entire body (including the scalp post-auricular areas, umbilicus, palms, and soles), avoiding mucous membranes, and face, and the breasts in breastfeeding women. Particular attention should be paid to common infestation sites.

The preferred treatment is 5% permethrin cream:

Children 2 months and over and adults: one application, with a contact time of 8 hours, then rinse thoroughly. Repeat the application after 7 days. or, if not available, 25% benzyl benzoate lotion (See the table below for dilution (depending on age), contact time, and number of applications). the patient must not wash his hands while the product is in use (or the product should be reapplied if the hands are washed). In children under 2 years, the hands must be wrapped to prevent accidental ingestion of the product and contact with the eyes. Topical scabicides should not be applied to broken or inflamed skin. Treatment of secondary bacterial infection, if present, should be initiated 24 to 48 hours before use of topical scabicides).

	Children < 2 Yrs.	Children 2 to 12 yrs.	Children > 12 yrs. & adults	Pregnant women
Dilution	The lotion must be diluted before use: 1 part 25% lotion + 3 parts water	Lotion must be diluted before use:1 part 25% lotion + 1 part water	Use undiluted 25% lotion	Use undiluted 25% lotion
Contact time	12 hours (6 hours for infants < 6 months) then rinse thoroughly	24 hours then rinse thoroughly	24 hours then rinse thoroughly	12 hours then rinse thoroughly
Number of applications	One application	Two applications (e.g., 24 hours apart, with a rinse between the 2 applications; or 2 successive applications, 10 minutes apart, when the first application has dried with a rinse after 24 hours)		One application

Table. contact time and number of applications for permethrin

Oral treatment of Scabies.

Treatment with **ivermectin PO (200 micrograms/kg single dose)** is an alternative: it is more practical than topical treatment (e.g., in the case of an epidemic or for treating contacts) and can be started right away in the case of secondary infection. A single dose may be sufficient; a second dose 7 days later reduces the risk of treatment failure. Ivermectin is not recommended for children < 15 kg or pregnant women (safety

not established). Administration of ivermectin to patients with loiasis carries a risk of severe neurological complications when significant Loa loa microfilaremia is present.

ivermectin PO single dose:

Weight	15 to 24 kg	25 to 35 kg	36 to 50 kg	51 to 65 kg
Ivermectin 3 mg tab	1 tab	2 tabs	3 tabs	4 tabs

NB: Treatment effectiveness is judged on clinical grounds. Itching may persist for 1 to 3 weeks after elimination of the parasite. Persistence of typical burrows beyond 4 weeks should lead to suspicion of treatment failure (insufficient treatment, e.g., the scalp was not included in topical treatment or the patient washed his hands during the treatment period), or early re-infestation (contacts and environment not treated). In these cases, patients and contacts should be retreated. Persistent itching may be due to another condition, initially masked by scabies

Treatment combines simultaneous administration of oral ivermectin and topical scabicide at regular intervals, e.g., every week for 2 to 3 weeks or more, according to severity and clinical response.

Crusts should be softened (salicylic acid ointment) and removed before applying local treatment (otherwise, local treatment is ineffective).

As exfoliated skin scales may spread the parasite, the patient should be isolated during the treatment, staff should use protection (gloves, gowns and hand washing after contact), and environment (bedding, floors and surfaces) should be decontaminated.

Lice (pediculosis)

Pediculosis is a benign contagious parasitic infection due to 3 species of lice specific to humans: head lice, body lice, and pubic lice. Transmission from person to person occurs through direct or indirect contact. It mainly affects children:

Itching and scratch marks (nape of the neck and around the ears), which may become secondarily infected (impetigo) in prolonged infestation; the presence of live lice and/or live (shiny, grey) nits attached to the hair shaft within 5 mm of the scalp.

Body lice mainly affect populations living under poor conditions (refugees, prisoners, the homeless): itching and scratch marks (back, belt line, and armpits), often inflamed and infected; the presence of lice and nits in the clothing (parasites are not found on the body).

Treatment of Body lice

Mass treatment (outbreak): Apply 30 to 60 g (2 to 4 heaped soup spoons) of 0.5% permethrin powder to the inside of the clothes and underclothes in contact with the skin (front and back, neck and waistline, sleeves and socks) in a fully clothed patient, then rub in the powder by hand. Leave for 12 to 24 hours. Treat other clothing (including headwear) and bedding in a plastic bag with 0.5% permethrin powder. Repeat in 8 to 10 days if the infestation persists.

Individual treatment: Disinfection of clothing and bedding as above or as for head lice.

Superficial Fungal Infections

Candidal diaper dermatitis

Erythema of the perianal area with peripheral desquamation and sometimes pustules. Secondary infection may develop

Buttocks must be kept clean (ordinary soap and water) and dry. – Avoid humidity: according to the context, expose the buttocks to air or change diapers more frequently; remove plastic pants – Protect the skin with zinc oxide ointment if diarrhea is present. – If diaper dermatitis is severe and persistent despite these measures, consider an intestinal infection, (nystatin PO: 100 000 IU 4 times daily for 20 days)

Treatment

4% dimeticone lotion

children 6 months and over and adults: leave on hair for 8 hours, then rinse thoroughly. keep away from flames and/or intense heat sources (including cigarettes) during application and until rinsing (risk of ignition). or, if dimeticone is not available or in children 2 to 6 months:1% permethrin lotion. Children 2 months and over and adults: leave on hair for 10 minutes, then rinse thoroughly.

– Repeat application of either treatment after 7 days.

– Decontaminate combs, headwear and bedding (wash ≥ 60°c/30 minutes, iron or dry in the sun or, if not feasible, seal in a plastic bag for 2 weeks). – teat as above contacts with live lice and/or live nits. Do not treat those with dead nits alone (dull, white, > 1 cm from scalp).

Head lice: apply lotion to the scalp and dry hair, paying particular

attention to the areas behind the ears and around the nape of the neck. Do not reduce or exceed the recommended duration of application

Other candidiasis

- Candidiasis of skin folds: miconazole 2% cream, one application 2 times daily for 2 to 4 weeks

- Oral candidiasis: (Stomatitis),– Vulvovaginal candidiasis: **Abnormal vaginal discharge**,

Dermatophytosis causes various clinical lesions, depending on the anatomic site involved: scalp, globous (hairless) skin, folds, or nails.

Scalp ringworm, Tinea capitis

Common in children. Depending on the species: One or more round, scaly, erythematous plaques with the ends of broken hairs. Inflammation, suppuration, crusting, and peripheral lymphadenopathy (kerion). Permanent hair loss (favus). Some scalp ringworms are contagious:

simultaneously examine (and treat) symptomatic contacts. shave or cut hair short on and around the lesions. Local treatment: 2 times daily, clean with soap and water, dry, and apply miconazole 2% cream or Whitfield's ointment for 2 weeks or longer if necessary.

Treatment.

Administer systemic treatment as local treatment alone does not cure scalp ringworm:

griseofulvin PO for 6 weeks minimum (up to 8 to 12 weeks)

Children 1 to 12 years: 10 to 20 mg/kg once daily (max. 500 mg daily)

Children ≥ 12 years and adults: 500 mg to 1 g once daily, depending on severity

or itraconazole PO

Children: 3 to 5 mg/kg once daily for 4 to 6 weeks (max. 200 mg daily)

Adults: 200 mg once daily for 2 to 4 weeks

• Suppurative lesions: treat superinfection (see Impetigo) before applying local antifungal treatment.

• For painful kerion: paracetamol PO.

In pregnant lactating/breastfeeding women: oral antifungals are contraindicated. Apply a topical treatment (miconazole 2% cream or

Whitfield's ointment) to limit the spread of infection until it is possible to treat orally.

Glabrous skin Ringworm of the body, Tinea corporis

Erythematous, scaly, pruritic macule with a well-demarcated, raised, vesicular border and central healing.

Treatment For non-widespread, localized tinea:

Local treatment: 2 times daily, clean with soap and water, dry, and apply miconazole 2% cream or Whitfield's ointment for 2 to 4 weeks or for 2 weeks after clinical resolution.

- Reserve oral antifungals for particularly extensive lesions: griseofulvin PO for 4 to 6 weeks or itraconazole for 2 weeks.

Folds Tinea pedis (athlete's foot),

Interdigital spaces (Tinea pedis), pruritus, fissure, and whitish scales in the 3rd and/or 4th interdigital spaces,

Groin (Tinea cruris)

Circumscribed, pruritic, erythematous plaque, with a pale center surrounded by vesicular- pustules, extending outward from the groin.

Treatment

Topical treatment as above. If oozing lesions use miconazole 2% cream only (do not use Whitfield's ointment).

Bacterial skin infections

Impetigo

Impetigo is the most common bacterial skin infection in children two to five years of age. There are two principal types: Nonbullous (70% of cases) and **Bullous** (30% of cases). Nonbullous. Impetigo, or impetigo contagiosa, is caused by Staphylococcus aureus or Streptococcus pyogenes and is characterized by honey-colored

crusts on the face and extremities. Impetigo primarily affects the skin or secondarily infects insect bites, eczema, or herpetic lesions.

Nonbullous impetigo

Nonbullous impetigo is the most common presentation, comprising 70% of cases. Nonbullous It starts as maculopapular lesions that transition into thin-walled vesicles that rapidly rupture, leaving superficial, sometimes pruritic or painful erosions covered by the classic honey-colored crusts

other diseases[6] Diabetes or other underlying systemic conditions

Treatment

1. Topical antibiotics are more effective than placebo and preferable to oral antibiotics for limited impetigo. Oral penicillin should not be used for impetigo because it is less effective than other antibiotics.
2. Oral erythromycin and macrolides should not be used to treat impetigo because of emerging drug resistance.

also increase susceptibility. The course of infection can last two to three weeks if untreated. Once the crust dries, the remaining area heals without scarring. Nonbullous impetigo is usually caused by S. aureus, but S. pyogenes can also be involved, especially in warmer, more humid climates.

Bullous impetigo

is caused only by S. aureus and is characterized by large, fragile, flaccid bullae that can rupture and ooze yellow fluid. It usually resolves within two to three weeks without scarring. The pathognomonic collarette of scales on its periphery develops after the bullae rupture, leaving a thin, brown crust on the remaining erosions. These larger bullae form because of exfoliative toxins produced by S. aureus strains that cause loss of cell adhesion in the superficial epidermis.

Bullous impetigo is typically found on the trunk, axilla, and extremities, and in intertriginous (diaper) areas It is the most common cause of ulcerative rash on the buttocks of infants. Systemic symptoms are uncommon but can include fever, diarrhea, and weakness.

Diagnosis

The diagnosis of Nonbullous and bullous impetigo is nearly always clinical. Differential diagnosis includes many other blistering and rash disorders. Skin swabs cannot differentiate between bacterial infection and colonization

Complications

Impetigo is usually a self-limited condition, and although rare, complications can occur. These include cellulitis (Nonbullous form), septicemia, osteomyelitis, septic arthritis, lymphangitis, lymphadenitis, guttate psoriasis, staphylococcal scalded skin syndrome, and acute post-streptococcal glomerulonephritis, with

post-streptococcal glomerulonephritis being the most serious.

Treatment

Topical Antibiotics for Impetigo

MEDICATION	INSTRUCTIONS
Fusaric acid 2% ointment	Apply to affected skin three times daily for seven to 12 days
Mupirocin 2% cream (Bactroban)NML	Apply to affected skin three times daily for seven to 10 days; re-evaluate after three to five days if no clinical response Approved for use in persons older than three months
Retapamulin 1% NML ointment (Altabax NML	Apply to affected skin twice daily for five days. Total treatment area should not exceed 100 cm^2 in adults or 2% of total body surface area in children. Approved for use in persons nine months or older

Retapamulin* is a novel pleuromutilin antibacterial and the first new topical antibacterial in nearly 20 years. Pleuromutilin, derived from the fungus Clitopilus passeckerianus, have antibacterial activity against gram-positive bacterial organisms.

NML = not in the Yemen EML

Oral antibiotics

Drug	Adult seven-day dose	Children seven-day dose
Amoxicillin/ clavulanate (Augmentin)†	875/125 mg every 12 hours	Younger than three months: 30 mg per kg per day. Three months or older: 25 to 45 mg per kg per day for those weighing less than 40 kg (88 lb); 875/125 mg every 12 hours for those weighing 40 kg or more. Based on mg per kg per day of the amoxicillin component in divided doses every 12 hours
Cephalexin	250 mg every six hours or 500 mg every 12 hours	25 to 50 mg per kg per day in divided doses every six to 12 hours

Oral antibiotic therapy can be used for impetigo with large bullae or when topical therapy is impractical. Treatment for seven days is usually sufficient, but this can be extended if the clinical response is inadequate and antibacterial susceptibility has been confirmed. There is no clear evidence-based preference among the different classes of oral antibiotics. Comparison studies also show no significant difference in cure rates between topical and oral antibiotics

Topical disinfectants for impetigo

Disinfectants appear to be less effective than topical antibiotics and are not recommended.[8] Studies comparing hexachlorophene with bacitracin and hydrogen peroxide with topical fluidic acid found the topical antibiotic to be more effective

Skin viral infection

Herpes simplex

Recurrent viral infection of the skin and mucous membranes due to the Herpes simplex virus. Recurrent lesions have a different presentation than primary infection.

Clinical features

– Recurrent herpes labialis: tingling feeling followed by an eruption of vesicles on an erythematous base, located on the lips ('fever blisters') and around the mouth, they may extend onto the face. Recurrence corresponds to a reactivation of the latent virus after a primary infection. No associated malaise, adenopathy, or fever.
– Carefully consider other sites: buccal (**Stomatitis**, , genital (**Genital ulcers**,), ophthalmic, and secondary bacterial infections.

Treatment

Clean with soap and water 2 times daily until the lesions have healed.
– For patients with secondary bacterial infections: antibiotic treatment as for **impetigo**.

Herpes zoster (shingles)

Acute viral infection due to the varicella-zoster virus. Chickenpox is the primary infection and herpes zoster is the reactivation of the latent virus.

Clinical features

- ◇ Unilateral neuralgic pain is followed by an eruption of vesicles on an erythematous base, that follows the distribution of a nerve pathway.
- ◇ Lesions most commonly occur on the thorax, but herpes zoster may also develop on the face with a risk of ophthalmic complications.
- ◇ Herpes zoster is more common in adults than in children.

Treatment

– Similar to that of herpes simplex, with the addition of systematic analgesics: paracetamol PO

– Aciclovir PO given within the first 48 hours after the eruption of lesions is only indicated for severe forms: necrotic or extensive lesions or lesions on the face which may spread to the eyes

Other skin disorders

Atopic Eczema

Atopic eczema (atopic dermatitis) is the most common form of eczema, a condition that causes the skin to become itchy, dry, and cracked**.** It is more common in children, often developing before their first birthday. But it may also develop for the first time in adults.

It's usually a long-term (chronic) condition, although it can improve significantly, or even clear completely, in some children as they get older.

Symptoms of atopic eczema

Atopic eczema causes the skin to become itchy, dry, cracked, and sore. Some people only have small patches of dry skin, but others may experience widespread inflamed skin all over the body. Inflamed skin can become red on lighter skin, and darker brown, purple, or grey on darker skin. This can also be more difficult to see on darker skin.

Although atopic eczema can affect any part of the body, it most often affects the hands, insides of the elbows, backs of the knees, and the face and scalp in children.

People with atopic eczema usually have periods when symptoms are less noticeable, as well as periods when symptoms become more severe (flare-ups).

Typically, to be diagnosed with atopic eczema you should have had an itchy skin condition in the last 12 months and 3 or more of the following:

Causes

The exact cause of atopic eczema is unknown, but it's clear it is not down to one single thing.

Atopic eczema often occurs in people who get **allergies**. "Atopic" means sensitivity to allergens.

It can run in families and often develops alongside other conditions, such as **asthma** and **hay fever**.

The symptoms of atopic eczema often have certain triggers, such as soaps, detergents, stress, and the weather. Sometimes **food allergies** can play a part, especially in young children with severe eczema. It may be helpful to keep a food diary to try to determine whether a specific food makes your symptoms worse.

Allergy tests are not usually needed, although they're sometimes helpful in identifying whether a food allergy may be triggering symptoms.

Treatment

Treatment for atopic eczema can help to relieve the symptoms and many cases improve over time. But there's currently no cure and severe eczema often has a significant impact on daily life, which may be difficult to cope with physically and mentally. There's also an increased risk of skin infections.

- ◇ Many different treatments can be used to control symptoms and manage eczema, including:
- ◇ Self-care techniques, such as reducing scratching and avoiding triggers.
- ◇ **Emollients** (moisturizers) – used every day to stop the skin becoming dry.
- ◇ **Topical corticosteroids** – creams and ointments used to reduce swelling and redness during flare-ups
- ◇ **Antihistamines** for severe itching.

Emollients

Emollients are moisturizing treatments applied directly to the skin to reduce water loss and cover it with a protective film. They're often used to help manage dry or scaly skin conditions, such as atopic eczema.

Choosing an emollient

Several different emollients are available. Talk to a pharmacist for advice on which emollient to use. You may need to try a few to find one that works for you.

- ◇ You may also be advised to use a mix of emollients, such as:
- ◇ an ointment for very dry skin
- ◇ a cream or lotion for less dry skin
- ◇ an emollient to use instead of soap
- ◇ an emollient to use on your face and hands, and a different one to use on your body

Topical corticosteroids

Topical corticosteroids can be prescribed in different strengths, depending on the severity of your atopic eczema and the areas of skin affected. They can be

- ◇ very mild (such as hydrocortisone)
- ◇ moderate (such as betamethasone valerate
- ◇ strong (such as a higher dose of betamethasone valerate and betamethasone dipropionate)
- ◇ very strong (such as clobetasol propionate and diflucortolone valerate)

Apply it once a day as there's no evidence there's any benefit to applying it more often. continue to use it until 48 hours after the flare-up has cleared so the inflammation under the skin surface is treated

Oral Corticosteroid

Corticosteroid tablets are rarely used to treat atopic eczema nowadays, but may occasionally be prescribed for short periods of 5 to 7 days to

help bring particularly severe flare-ups under control. Longer courses of treatment are generally avoided because of the risk of potentially serious side effects.

Antihistamines

They can help relieve the itching associated with atopic eczema. e.g., Chlorpheniramine

They can either be sedating, which causes drowsiness, or non-sedating.

Complications

People with atopic eczema can sometimes develop further physical and psychological problems., bacterial, viral or fungal skin infection

Seborrheic dermatitis

Seborrheic dermatitis is an inflammatory chronic dermatosis that can be localized on areas rich with sebaceous glands. This dermatosis is more common in infected patients with HIV.

Clinical features

Erythematous plaques covered by greasy yellow scales that can be localized on the scalp, the face (nose wings, eyebrows, edge of the eyelids), sternum, spine, perineum, and skin folds.

Treatment

- ◇ Clean with soap and water 2 times daily; shampoo the scalp.
- ◇ Hydrocortisone 1% cream: one application once daily or 2 times daily to the affected area only, in thin layer, for 7 days maximum
- ◇ Do not apply if pre-existing bacterial infection; treat first the infection (**Impetigo**).

Urticaria

– Papules: transient, erythematous, oedematous, pruritic, resembling nettle stings.

– Look for a cause: food or drug (particularly antibiotic) allergy, insect bites; the invasive stage of a bacterial or parasitic infection (ascariasis, strongyloidiasis, ancylostomiasis, schistosomiasis, loiasis), viral infection (hepatitis B or C); generalized disease (cancer, lupus, dysthyroid, vasculitis).

Treatment

– If the pruritus is intense, antihistamines for a few days:
loratadine PO
Children over 2 years and under 30 kg: 5 mg (5 ml) once daily
Children over 30 kg and adults: 10 mg (1 tab) once daily
OR
chlorphenamine PO (Oral)
Children 1 to < 2 years: 1 mg 2 times daily
Children 2 to < 6 years: 1 mg 4 to 6 times daily (max. 6 mg daily)
Children 6 to < 12 years: 2 mg 4 to 6 times daily (max. 12 mg daily)
Children ≥ 12 years and adults: 4 mg 4 to 6 times daily (max. 24 mg daily; 12 mg daily in elderly patients)

Discoid eczema

Discoid eczema, also known as nummular or discoid dermatitis, is a long-term (chronic) skin condition that causes skin to become itchy, swollen and cracked in circular or oval patches. Without treatment, discoid eczema can last for weeks, months or even years. It may also keep coming back – often in the same area that was affected previously.

Symptoms of discoid eczema

Discoid eczema causes distinctive circular or oval patches of eczema. It can affect any part of the body, although it does not usually affect the face or scalp. Over time, the patches may become dry, crusty, cracked, and flaky. The center of the patch also sometimes clears, leaving a ring of discolored skin that can be mistaken for **ringworm**.

Causes of discoid eczema

The cause of discoid eczema is unknown, although it may happen as a result of having particularly dry skin. Some people with discoid eczema also have a history of **atopic eczema**, which often happens in people who are prone to **asthma** and **hay fever**. However, unlike atopic eczema, discoid eczema does not seem to run in families.

Treatment

Discoid eczema is usually a long-term problem, but medicines are available to help relieve the symptoms and keep the condition under control., Treatments include:

- **Emollients** – moisturizers applied to the skin to stop it becoming dry.

- **Topical corticosteroids** – ointments and creams containing a steroid that are applied to the skin and may relieve severe symptoms.
- **Antihistamines** – medicines that can reduce itching

VACCINATION GUIDELINES

Children's immunizations

The children's vaccines necessary in Yemen are:

- ◇ **BCG** Bacillus Calmette-Guérin (TBC vaccine)
- ◇ **DPT** Diphtheria, Pertussis, Tetanus vaccine
- ◇ **OPV** Oral Polio vaccine
- ◇ **Measles** See YTG 13.4.4.
- ◇ **Tetanus** See YTG 7.6.
- ◇ Additionally, may be given:
- ◇ **For Hepatitis B** and Meningococcal Meningitis, see following table

Vaccination for pilgrims and travelers

Pilgrims should receive the following vaccinations before engaging on pilgrimage:

- ◇ **Meningococcal vaccine**
- ◇ **Yellow fever vaccine**

Travellers to Africa and a number of South American countries also need to receive:

- ◇ **Yellow fever vaccine**

These vaccinations are done upon request in the Health Office in Sana'a, Aden, Taiz, Hudaydah and Mukalla,

How to prepare and give vaccinations

Type of vaccination	Dose	Time / No of doses	Route of injection	Injection site
BCG	<1 yr., 0.05 ml; >1 yr.; 0.1 ml	1 dose immediately after delivery, or (within one month) during the first visit to a health facility	Intradermal	Deltoid area right
DPT	0.5 ml	1 dose at weeks 6,10 and 14, Note: minimal 4 weeks between each vaccination	Intramuscular	Middle of upper limb
Measles	0.5 ml	1 dose at 9 months	Subcutaneous	Deltoid area left

Oral Polio Vaccine	3 drops	1 dose at weeks 6,10 and 14, in addition to the preliminary dose immediately after delivery	Oral	oral
All above vaccinations to be completed before 1st year of age				
Hepatitis B	0.5 ml	One dose: -immediately after birth repeat at 1 month repeat at 6 months	Intramuscular	Adults: Deltoid, Infants: anterolateral thigh
Meningococcal Meningitis	0.5 ml	child over 1 year and adult 1 single dose	Intramuscular, or Subcutaneous**	Deltoid Deep a.m.

Re. Meningitis: Prophylaxis is not recommended except for people with high risk, e.g. family sharing food or otherwise in close contact with doctors and nurses. Vaccination is preferred. If not available **Rifampicin** 600 mg as prophylaxis, 2 times a day for 2 days. (Contact National TB Program for medicine)

Subcutaneous route to be used for patients with thrombocytopenia or hemophilia

VACCINE-PREVENTABLE DISEASES

Are all diseases caused by bacteria? All three can cause severe illness and death. Diphtheria and pertussis are spread from person to person. Tetanus enters the body through cuts or wounds

Diphtheria

Diagnosis:

Clinical-based diagnosis and prompt therapy are crucial. Confirmation by culture of specimen obtained from beneath the membrane or portion of it on specific media.

Treatment:

A single dose of diphtheria (equine) antitoxin (DAT) should be administered IM/IV after the test dose in clinical monitoring settings. The dose of DAT varied according to site and severity from 20,000 to 100,000 IU. Antimicrobial: Procaine penicillin IM, 50 mg/kg once daily, maximum 1.2 g per day. Aqueous benzylpenicillin (penicillin G): administered by intramuscular injection or slow intravenous infusion, 100,000 units/kg/day in a divided dose every 6 hours. Erythromycin orally or intravenously every six hours, 10–15 mg/kg every 6 hours, maximum 500 mg per dose or 2 grams a day. All for 14 days.

Supportive measures include bed rest, hydration, a high-calorie liquid or soft diet, and suction of secretions as needed. Monitoring and supportive care to prevent and treat complications, e.g., airway obstruction and myocarditis.

Prevention:

Isolation of patient, antibiotics for close contacts (Benzathine Penicillin IM, single dose, 600,000 units for children ≤5 years; 1,200,000 units for those >5 years, or oral azithromycin 10 mg/kg on day one followed by 5 mg/kg for four additional days). Daily monitoring of temperature and throat examination should be conducted for 10 days following exposure. Those who are not fully vaccinated should receive an additional dose of the diphtheria-containing vaccine. Full vaccination is indicated after the patient recovers. All children must be vaccinated against diphtheria according to the national schedule

Tetanus

Is a bacterium found in dirt and soil mixed with animal wastes. This contaminated soil can enter the body through cuts and puncture wounds?

This is why we get a Tetanus vaccine when we step on a dirty nail. Tetanus causes painful tightening of the muscles all over the body. It is also called lockjaw because it can lead to "locking" of the jaw so the victim cannot open his or her mouth or swallow. Tetanus leads to death in up to 2 out of 10 cases. Of those who survive, nearly all will spend weeks on a ventilator

Management of Tetanus

Initial Supportive Therapy and Wound Care. Patients should be admitted to the ICU. Because of the risk of reflex spasms, a dark and quiet environment should be maintained. Prophylactic intubation should be considered in all patients with moderate-to-severe clinical manifestations.

Wound management: Recently acquired wounds with sharp edges that are well vascularized and not contaminated are least likely to develop tetanus. All other wounds are considered predisposed to tetanus. The most susceptible wounds are those that are grossly contaminated or that are caused by blunt trauma or bites., The current recommendation is to excise at least 2 cm of normal viable-appearing tissue around the wound margins. Abscesses should be incised and drained. Because of the risk of releasing tetanospasmin into the bloodstream.

Diet and activity: maintenance of adequate nutrition is extremely important. Because of the risk of aspiration, patients should not be given any food by mouth. Nutrition should be provided to seriously ill patients via naso-duodenal tubes, gastrostomy tube feedings, or parenteral hyperalimentation. Consultation with a nutritionist is helpful.

Worldwide, neonatal tetanus

This may be eliminated by increasing immunizations in women of childbearing age, especially pregnant women, and by improving maternity care. Administration of tetanus toxoid twice during pregnancy (4-6 weeks apart, preferably in the last 2 trimesters) and again at least 4 weeks before delivery is recommended for previously unimmunized gravid women. Maternal ant tetanus antibodies are passed to the fetus, and this passive immunity is effective for many months.

Pertussis

Pertussis, or whooping cough, is a highly contagious acute respiratory infection caused primarily by the bacterium Bordetella pertussis. It infects only humans and is transmitted by droplets from person to person by coughing. Patients are most contagious during the first 2 weeks after symptoms begin. The disease typically presents in three stages:

Catarrhal Stage: Mild symptoms resembling a cold, including runny nose, sneezing, and low-grade fever, last about 1-2 weeks.

Paroxysmal Stage: Characterized by intense bouts of repetitive cough (5 to 10 during a single expiration) that may be followed by deep inspiration (whoop) and vomiting. Coughing can cause venous congestion, facial discoloration, cyanosis, bulging eyes, protrusion of the tongue, salivation, and lacrimation. Cough is productive, non-purulent, thick, and sticky. The paroxysms can occur spontaneously or are precipitated by external stimuli, e.g., physical exercise, cold air, or feeding, and are common at night. Although paroxysms are exhausting, there are few clinical signs, and the child is afebrile and may appear well between attacks. This stage can last 1-2 months.

Convalescent Stage: Gradual recovery occurs over several weeks, though coughing may persist for months.

Complications of pertussis are common in infants under 6 months of age who have severe illness, apnea, and a high rate of hospitalization and death. Other complications include bronchopneumonia, otitis media, dehydration, metabolic alkalosis, and weight loss. Hernia, rib Fracture, subconjunctival hemorrhage, epistaxis, and ulceration of the tongue can occur due to excessive forceful coughing. Seizures, encephalopathy, and brain damage are most likely due to hypoxic injury related to asphyxia.

Diagnosis:

Leukocytosis and lymphocytosis. A chest x-ray may reveal thickened bronchial atlectasis and sometimes show a "shaggy" heart border. PCR from nasopharyngeal specimens is the preferred method. Culture of specimens from nasopharyngeal swabs is usually performed during the early phases of illness. Serology is most useful in patients presenting in the convalescent phase when culture and PCr are rarely positive.

Treatment:

Supportive care: minimizing stimuli, avoidance of irritants (e.g., smoke, dust), and maintaining a comforting environment. Using a cool mist humidifier, oxygen therapy, and gentle suction of pharyngeal secretions during paroxysms of coughing. Feeding care with small frequent meals, nasogastric tube, or parenteral route. Antimicrobials: The earlier a person, especially an infant, starts treatment, the better. It can reduce symptoms, infectivity, and duration of illnesses. Persons with pertussis remain infectious until 5 days after the start of effective antibiotics.

Antimicrobials: Macrolide antibiotics (azithromycin, clarithromycin, or

erythromycin) are recommended. Azithromycin dose is 10 mg/kg/day once a day for 5 days on an empty stomach. All patients should be cautioned if they have hepatic impairment and not to take azithromycin with aluminum or magnesium-containing antacids simultaneously because it can reduce drug absorption. Clarithromycin is given as 15 to 20 mg/kg per day in two divided doses for 7 days for children and 1 g/day in two doses for 7 days for adults. Treatment of complications according to additional antibiotics for secondary infections, anticonvulsants, oxygen supplementation, and assisted ventilation. Prevention:

Three pertussis vaccine formulations are available (DTP, DTaP for children, and Tdap for adolescents and adults). Pregnant women's immunization with Tdap between 27- and 36-weeks' gestation is expected to prevent the disease in infants during the first 2 months of life. For contacts, post-exposure prophylaxis is recommended within 21 days of exposure to an infectious case by using erythromycin for 14 days, azithromycin for 5 days, or clarithromycin for 7 days. Active immunization of all exposed persons (i.e., children, adolescents, and adults) who are not adequately vaccinated should be conducted. Both natural infection and vaccination induce similar immune responses, but immunity is waning with time, and vaccination is recommended according to public health guidelines to ensure adequate protection against future infections.

Poliomyelitis.

Poliomyelitis is a highly contagious infection of the motor neurons of the CNS caused by the poliovirus belonging to Enterovirus C. The virus is transmitted mainly through the fecal-oral route. Polio can be present in several forms, with varying degrees of severity. Approximately 70–90% of infected individuals do not exhibit symptoms but can still spread the virus to others. The mild abortive form accounts for about 5% of cases and presents with flu-like symptoms such as fever, sore throat, headache, nausea, vomiting, and abdominal pain. Symptoms typically resolve within a few days. Nonparalytic poliomyelitis occurs in about 1% of cases, lasts longer, and has more severe symptoms than abortive poliomyelitis, including neck pain and stiffness, a severe headache, and muscle weakness, which are features of aseptic meningitis. Paralytic poliomyelitis is the most severe form, occurring in less than 1% of infections. Started with flu-like symptoms followed by severe muscle pain, weakness, and flaccid paralysis, affecting limbs asymmetrically, with the legs being more commonly affected than the arms. The superficial and deep reflexes in the affected limbs are lost. Sensation is usually intact. Bulbar involvement may occur, affecting breathing and swallowing.

Diagnosis:

Isolation of poliovirus by throat and stool culture. Detection of the virus in CSF is less common, though a total leukocyte count increases to less than 3000/µL, protein less than 80 mg/dL, and glucose more than 60% of serum values. RT-PCR PCR is the most useful diagnostic tool. Imaging studies like MRI play a supportive role in confirming diagnosis and guiding treatment, particularly when laboratory testing is nonconclusive.

Treatment:

There is no specific antiviral therapy, and treatment is supportive. Rest, analgesics and antipyretics (heat therapy is helpful). No intramuscular injections should be given during the acute phase because it may increase the risk of paralysis. Physiotherapy and muscle strengthening exercise during the recovery phase. Patients with respiratory compromise may require mechanical ventilation. Bladder decompression for urinary retention.

Prevention

The most effective prevention against polio is vaccination. Both OPV and an inactivated poliovirus vaccine (IPV) have been used globally and are highlyeffective.

Measles

Measles is a highly infectious viral illness characterized by fever and rash caused by the RNA measles virus. The virus is transmitted by respiratory droplets or through small particle aerosols that remain suspended in the air room for several hours. In temperate climates, epidemic measles is a winter-spring disease, while in the tropics the hot, dry season is common. Symptoms start with fever, cough, coryza, and conjunctivitis, often associated with koplik spots, that appear as bluish-white spots "grains of salt on a red background" in the buccal mucosa opposite the 1st and 2nd upper molars and precede the rash. The maculopapular rash begins at the hairline of the forehead and behind the ears, and then spreads downward to the face, neck, trunk, arms, and legs. The rash begins as discrete, then progresses to confluence in larger blotches. The rash fades in the same sequences with brownish desquamation. Natural infection usually produces lifelong immunity.

Complications can be acutely related to a virus or superimposed bacterial infection, including blindness, diarrhea and dehydration, otitis media, pneumonia, reactivation of tuberculosis, encephalitis, seizures, coma, and death. Delayed complications are mainly subacute sclerosing

panencephalitis (SSPE) and post-measles immune amnesia. SSPE is a complication that appears 5-10 years after measle infection, characterized by progressive neurological deterioration, personality changes, declining school performance, convulsions, frequent myoclonic jerks, hypothalamic dysfunction, and diminishing cortical activity. Death typically occurs 1–3 years after initial diagnosis. Measles in pregnancy may lead to abortion, stillbirth, prematurity, low birth weight, and maternal death.

Diagnosis:

Based on clinical findings, CBC leukopenia and lymphopenia. Confirmation of measles infection by detection of specific IgM, a 4-fold increase in measles immunoglobulin G, RT-PCR, and viral culture.

Treatment:

Drinking plenty of fluid to avoid dehydration. Use acetaminophen or ibuprofen to reduce fever. Clean eyes with warm water and cotton wool. Avoid bright light if there is photophobia. Antibiotics are promptly indicated for secondary bacterial infection. Vitamin A once daily for 2 days. 50 000 IU for infants <6 months old, 100 000 IU for infants aged 6–11 months, and 200 000 IU for those ≥12 months. If there are clinical signs of vitamin A deficiency, an additional age-specific dose may be given 2 to 4 weeks later. Patients should be isolated until 4 days after the onset of the rash.

Prevention:

Measles can be prevented through two doses of the attenuated measles virus vaccine or the combined vaccine MMR.

Mumps

Mumps is a viral disease caused by the paramyxovirus and characterized by swelling of one or more of the salivary glands, usually the parotids. Mumps spreads through respiratory droplets or direct contact with saliva from an infected person. Prodromal symptoms include low-grade fever, malaise, headache, myalgia, and anorexia, followed by painful swelling of the parotid gland exaggerated by a sour drink. The swelling gland lifts the earlobe upward and outward, and the angle of the mandible is oblitrate. Parotitis usually starts unilateral followed by bilateral involvement. Mumps involve many systems, but the principal complications are aseptic meningitis, encephalitis, pancreatitis, orchitis, oophoritis, and hearing loss.

Diagnosis:

Is primary clinical; RT-PCR is more sensitive, and viral culture, and serology may be used.

Treatment:

No specific therapy and treatment are supportive; it includes rest, hydration, pain relief (paracetamol or ibuprofen), a cold compress on the swelling area, and scrotal support for orchitis.

Prevention:

Vaccination with MMR

Diphtheria

Diphtheria is a serious bacterial infection primarily caused by the toxogenic strain Corynebacterium diphtheriae. This infection predominantly affects the mucous membranes of the nose and throat, leading to significant health complications if left untreated. Transmission spreads through airborne droplets from coughs or sneezes, direct contact with infected individuals, or contaminated personal items. Diphtheria produces a powerful exotoxin that is capable of inhibiting protein synthesis in all cells, including myocardial, renal, and peripheral nerve cells. Symptoms typically appear 2 to 5 days after exposure, with mild fever, malaise, sore throat, and hoarseness. The pulse rate is increased disproportionately to fever. A thick adherent gray "pseudomembrane" covers the throat and tonsils, and attempts to remove it are followed by bleeding. Cervical lymphadenitis varies; in some cases, it is associated with edema of the soft tissues of the neck, giving the appearance of a (bull neck). In severe cases, duration > 3 days, respiratory difficulty and hemodynamic instability may occur. Diphtheria may be complicated by airway obstruction caused by membrane extension or dislodgement. Cardiac damage by toxins leads to myocarditis, dysrhythmias, heart failure, or sudden death. Neuritis of the palatal and pharyngeal nerves manifested as nasal speech and regurgitation of food through the nose are seen. Involvement of other cranial and peripheral nerves may occur.

Diagnosis:

Clinical based diagnosis and prompt therapy is crucial. Confirmation by culture of spicemen obtained from beneath the membrane or portion of it on specific media.

Treatment:

A single dose of diphtheria (equine) antitoxin (DAT) should be administered IM/IV after the test dose in clinical monitoring settings. The dose of DAT varied according to site and severity from 20,000 to 100,000 IU. Antimicrobial: Procaine penicillin IM, 50 mg/kg once daily, maximum 1.2 g per day. Aqueous benzylpenicillin (penicillin G): administered by intramuscular injection or slow intravenous infusion, 100,000 units/kg/

day in a divided dose every 6 hours. Erythromycin orally or intravenously every six hours, 10–15 mg/kg every 6 hours, maximum 500 mg per dose or 2 grams a day. All for 14 days.

Supportive measures include bed rest, hydration, a high-calorie liquid or soft diet, and suction of secretions as needed. Monitoring and supportive care to prevent and treat complications, e.g., airway obstruction and myocarditis.

Prevention:

Isolation of patient, antibiotics for close contacts (Benzathine Penicillin IM, single dose, 600,000 units for children ≤5 years; 1,200,000 units for those >5 years, or oral azithromycin 10 mg/kg on day one followed by 5 mg/kg for four additional days). Daily monitoring of temperature and throat examination should be conducted for 10 days following exposure. Those who are not fully vaccinated should receive an additional dose of the diphtheria-containing vaccine. Full vaccination is indicated after the patient recovers. All children must be vaccinated against diphtheria according to the national schedule.

Rubella (german measles)

Rubella, also known as German measles or three-day measles, is a contagious viral infection primarily affecting children and non-immune young adults. Rubella spreads when an infected person coughs or sneezes. While it is generally mild, it poses significant risks, especially during early pregnancy. Rubella symptoms that may precede the rash include a low-grade fever, malaise, headache, conjunctivitis, sore throat, and cough. A rash starts on the face and spreads to the rest of the body, lasting for about 3 days. The rash is erythematous, maculopapular, discrete, and fades without desquamation. There may be a generalized lymphadenopathy, usually in the suboccipital, post-uricular, and cervical nodes. Transient arthritis, or arthralgia, sometimes occurs. Purpura and encephalitis are rare complications. Rubella during early pregnancy can result in congenital rubella syndrome (CRS), the most serious complication. Clinical manifestations of CRS include fetal death and stillbirth, growth retardation, developmental delay, microcephaly, sensorineural deafness, cardiac anomalies (septal defects, patent ductus, pulmonary artery stenosis), eye involvement (cataract, microphthalmia, retinopathy, glaucoma), thrombocytopenia, and jaundice.

Diagnosis:

Clinical diagnosis is uncertain. Serologic testing for specific IgM and IgG. An immunoassay diagnosis is best made by demonstrating a fourfold rise in antibody titer between specimens drawn 1-2 weeks apart. Viral isolation and RT-PCR, especially for postnatal cases.

Treatment:

Supportive management, as there is no specific therapy. For CRS treatment is directed to alleviate the effects of complications.

Prevention:

Active immunization with MMR. Infected individuals should be isolated for 7 days after the appearance of rash. Pregnant women should avoid contact with suspected cases. Infants with CRS should be isolated as they are contagious until at least one year of age or two negative cultures. Women who are not immune should receive the vaccine postpartum before subsequent pregnancies.

Rotavirus

Rotavirus is a major cause of severe gastroenteritis and dehydration, particularly in children under five years old. The first infection is more severe, particularly in infants under 1 year, and reinfection is associated with reduced severity. The virus has a high transmission rate, predominantly through the fecal-oral route. In temperate climates seasonal variation is common and outbreaks occur during winter, while in tropical regions transmission occurs throughout the year. Additionally, factors like malnutrition and coexisting infections can play a role. The onset of rotavirus infection typically starts with a sudden onset of fever, malaise, vomiting, and watery diarrhea. Severe dehydration may occur, particularly in infants and young children, potentially leading to hospitalization. The duration of symptoms generally lasts between 3 and 7 days.

Diagnosis:

Routine testing for rotavirus is not performed in all cases of gastroenteritis because the results do not typically alter management. Detection of rotavirus antigens in stool samples using ELISA or immunochromatographic tests (ICT).

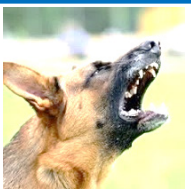
Treatment:

Encourage intake of fluids available at home and continue breastfeeding. Good diet management is important to reduce the nutritional defects caused by diarrhea. For children who require rehydration, feeding should be started 4 to 6 hours after the onset of therapy. Fluid replacement by administration of oral rehydration solution (ORS). In instances of severe dehydration, intravenous (IV) fluids may be necessary, typically administered in a hospital setting. Zinc supplementation (10–20 mg/day) for 10 to 14 days.

Prevention:

Rotavirus vaccination in all young infants. Two live attenuated vaccines, Rotarix® and RotaTeq®, are available. Other general preventive measures include exclusive breastfeeding for the first 6 months of age and the introduction of proper weaning foods. Good hygiene and sanitary practices include frequent handwashing with soap and water, avoiding undercooked foods, and ensuring clean drinking water.

ANIMAL BITES



Animal bites pose a major public health problem in children and adults worldwide. The health impacts of animal bites are dependent on the type and health of the animal species, the size and health of the bitten person, and accessibility to appropriate health care. Numerous animal species have the potential to bite humans; however, the most important are those arising from snakes, dogs, cats, and monkeys.

Snake Bites

Snake bites are most common among people living in rural, resource-poor settings, who subsist on low-cost, non-mechanical farming and other field occupations. Agricultural workers, women, and children are the groups most frequently bitten by snakes. Adding to the burden of these injuries is their socioeconomic impact on families and communities. Adult victims are often the wage earners or care providers of the family unit, and child victims can suffer lifelong disability-intensifying demands on families and communities

There are 8 poisonous snakes in Yemen, that include the family Elapidae (Arabian Copra) which have neurotoxic venom (nerve poison), that acts mainly on the central nervous system. The venom affects heart function and breathing but causes little or no damage at the bite site. Vipers have primarily hemotoxic and myotoxic venom, which produces severe damage at the bite site including complete necrosis of the surrounding tissue and affects the blood coagulation process.

Treatment

The cornerstone of care is complete immobilization of the affected body part and prompt transfer to a medical facility. Tourniquets and cutting wounds can worsen the effects of the venom and should not be used as first aid. The antivenom must be appropriate for snakes endemic to the region. Additional measures include wound cleansing to decrease infection risk, supportive therapy such as airway support, and administration of tetanus vaccine upon discharge if the person has been inadequately vaccinated. Frequently, victims of snake bites will require treatment with antivenom. (Polyvalent should be used).

Despite the widespread use of antivenom, there have been virtually no clinical trials to determine the ideal dose the dosage has remained a matter of much debate. The conventional dosing is based on the degree

of envenomation

Conventional dose of anti-snake venom

Degree of envenomation	Initial dose
Mild	5 vials (50 ml)
Moderate	5–10 vials (50–100 ml)
Severe	10–20 vials (100–200 ml)

the initial dose should be 8–10 vials to ensure that the majority of the victims are covered by the initial dose; this will also help keep the cost of ASV down to acceptable levels. As snakes inject the same amount of venom into children and adults, children should receive the same dose of antivenom as adults.

Response to infusion of antivenom is marked by normalization of blood pressure. within 15–30 minutes bleeding stops, though coagulation disturbances may take up to 6 hours to normalize. Neurotoxicity begins to improve within the first 30 min, but patients may require 24–48 hours for full recovery]

A repeat dose of ASV should be given when there is persistence of blood in-coagulability even after 6 h or continued bleeding after 1–2 h of the initial dose. ASV should also be repeated when there are worsening neurotoxic or cardiovascular signs even after 1–2 hr.

ASV administration

ASV can be administered either by slow intravenous injection at a rate of 2 ml/min or by intravenous infusion (antivenom diluted in 5–10 ml per kilogram body weight of normal saline or D_5 W and infused over 1 h). Slow intravenous injection has the

Treatment of ASV reaction

When the patient shows signs of a reaction, antivenom administration must be temporarily stopped and adrenaline (1 in 1000) given intramuscularly in an initial dose of 0.5 mg in adults or 0.01 mg/kg body weight in children. The dose can be repeated every 5–10 min if necessary.

After adrenaline, an anti-H1 antihistamine such as chlorpheniramine maleate (adult dose 10 mg, children 0.2 mg/kg) should be given intravenously. It may be followed by intravenous hydrocortisone (adult dose 100 mg, children 2 mg/kg).

Dog bites

Children make up the largest percentage of people bitten by dogs, with

the highest incidence in mid-to-late childhood. The risk of injury to the head and neck is greater in children than in adults, adding to increased severity, necessity for medical treatment, and death rates.

In some countries, males have a higher frequency of dog bites than females. Dog bites account for over 50% of animal-related injuries in people who are traveling.

Treatment

Treatment depends on the location of the bite, the overall health condition of the bitten person, and whether or not the dog is vaccinated against rabies. The main principles of care include:

- early medical management;
- irrigation and cleansing of the wound;
- primary closure if the wound is at low risk for developing infection;
- prophylactic antibiotics for high-risk wounds or people with immune deficiency;
- rabies post-exposure treatment depending on the dog's vaccination status;
- administration of tetanus vaccine if the person has not been adequately vaccinated.

Cat bites

Female adults have the highest rate of cat bites.

Treatment

Treatment depends on the location of the bite and the rabies vaccination status of the animal species inflicting the bite. The main principles of care include:

- early medical management including wound cleansing;
- prophylactic antibiotics to decrease infection risk;
- rabies post-exposure treatment depending on the animal vaccination status;
- administration of tetanus vaccine if the person has not been adequately vaccinated.

ANNEX 1. Variation in Drug response

Table 1: Some Serious Adverse Drug Reactions

Adverse Drug Reaction	Types of Drugs	Examples
Anemia (resulting from decreased production or increased destruction of red blood cells)	Certain antibiotics	Chloramphenicol
	Medications used to treat malaria or tuberculosis in people with G6PD enzyme deficiency	Chloroquine Isoniazid Primaquine
Angioedema (swelling of the lips, tongue, and throat causing difficulty breathing)	ACE inhibitors	Captopril Enalapril Lisinopril
Bone fractures	Proton pump inhibitors	Esomeprazole Lansoprazole Omeprazole
Blood clots	Birth control medications (all forms including patches and pills)	Drospirenone/ethinyl estradiol Norelgestromin/ethinyl estradiol
Confusion and drowsiness	Sedatives, including many antihistamines	Diphenhydramine
	Antidepressants (especially in older people)	Amitriptyline Imipramine
Decreased production of white blood cells, with increased risk of infection	Certain antipsychotic drugs	Clozapine
	Chemotherapy drugs	Cyclophosphamide Mercaptopurine Methotrexate Vinblastine
	Some medications used to treat thyroid disorders	Propylthiouracil
Kidney damage	NSAIDs (repeated use of excessive doses)	Ibuprofen Naproxen
	Aminoglycoside antibiotics	Gentamicin Tobramycin
	Some chemotherapy drugs	Cisplatin Methotrexate
	Antifungals	Amphotericin B
	Some other antibiotics	Tetracycline (outdated) Vancomycin

Adverse Drug Reaction	Types of Drugs	Examples
Liver damage	Some analgesics	Acetaminophen (use of excessive doses)
	Some medications used to treat tuberculosis	Isoniazid
	Iron supplements (in excessive amounts)	Ferrous sulfate, ferrous fumarate
	Antidepressants	Duloxetine
	Antibiotics	Tetracycline
Muscle tissue destruction (rhabdomyolysis)	Statins	Atorvastatin Simvastatin
Stomach or intestinal ulcers (with or without bleeding)	NSAIDs	Aspirin Ibuprofen Naproxen
	Anticoagulants	Heparin Warfarin
	Bisphosphonates	Alendronate Risedronate
Toxic epidermal necrolysis	Some antibiotics	Penicillins Quinolones Sulfonamides
	Anticonvulsants	Phenytoin Valproic acid
Ventricular tachycardia	Antiarrhythmics	Amiodarone Procainamide Sotalol
	Antipsychotics	Chlorpromazine Haloperidol Lithium

ACE = angiotensin-converting enzyme; G6PD = glucose-6-phosphate dehydrogenase; NSAIDs = nonsteroidal anti-inflammatory drugs

Table 2: Overview of Selected Serious Drug Interactions

Interaction	Potential effect	Time to effect	Recommendations and comments
Warfarin (Coumadin) plus ciprofloxacin (Cipro), clarithromycin (Biaxin), erythromycin, metronidazole (Flagyl) or trimethoprim-sulfamethoxazole (Bactrim, Septra)	Increased effect of warfarin	Generally, within 1 week	Select an alternative antibiotic.
Warfarin plus acetaminophen	Increased bleeding, increased INR	Any time	Use the lowest possible acetaminophen dosage and monitor INR.

Warfarin plus acetylsalicylic acid (aspirin)	Increased bleeding, increased INR	Any time	Limit aspirin dosage to 100 mg per day and monitor INR.
Warfarin plus NSAID	Increased bleeding, increased INR	Any time	Avoid concomitant use if possible; if coadministration is necessary, use a cyclooxygenase-2 inhibitor and monitor INR.
Fluoroquinolone plus divalent/trivalent cations or sucralfate (Carafate)	Decreased absorption of fluoroquinolone	Any time	Space administration by 2 to 4 hours.
Carbamazepine (Tegretol) plus cimetidine (Tagamet), erythromycin, clarithromycin, or fluconazole (Diflucan)	Increased carbamazepine levels	Generally, within 1 week	Monitor carbamazepine levels.
Phenytoin (Dilantin) plus cimetidine, erythromycin, clarithromycin or fluconazole	Increased phenytoin levels	Generally, within 1 week	Monitor phenytoin levels.
Phenobarbital plus cimetidine, erythromycin, clarithromycin or fluconazole	Increased phenobarbital levels	Generally, within 1 week	Clinical significance has not been established. Monitor phenobarbital levels.
Phenytoin plus rifampin	Decreased phenytoin levels	Generally, within 1 week	Clinical significance has not been established. Monitor phenytoin levels.
Phenobarbital plus rifampin	Decreased phenobarbital levels	Generally, within 1 week	Monitor phenobarbital levels.
Carbamazepine plus rifampin	Decreased carbamazepine levels	Generally, within 1 week	Clinical significance has not been established. Monitor carbamazepine levels.
Lithium plus NSAID or diuretic	Increased lithium levels	Any time	Decrease lithium dosage by 50% and monitor lithium levels.

Oral contraceptive pills plus rifampin	Decreased effectiveness of oral contraception	Any time	Avoid if possible. If combination therapy is necessary, have the patient take an oral contraceptive pill with a higher estrogen content (>35 µg of ethinyl estradiol) or recommend an alternative method of contraception.
Oral contraceptive pills plus antibiotics	Decreased effectiveness of oral contraception	Any time	Avoid if possible. If combination therapy is necessary, recommend the use of an alternative contraceptive method during the cycle.
Oral contraceptive pills plus troglitazone (Rezulin)	Decreased effectiveness of oral contraception	Any time	Have the patient take an oral contraceptive pill with a higher estrogen content or recommend an alternative method of contraception.
Cisapride (Propulsid) plus erythromycin, clarithromycin, fluconazole, itraconazole (Sporanox), ketoconazole (Nizoral), nefazodone (Serzone), indinavir (Crixivan) or ritonavir (Norvir)	Prolongation of QT interval along with arrhythmias secondary to inhibited cisapride metabolism	Generally, within 1 week	Avoid. Consider whether metoclopramide (Reglan) therapy is appropriate for the patient.
Cisapride plus class IA or class III antiarrhythmic agents, tricyclic antidepressants, or phenothiazine	Prolongation of QT interval along with arrhythmias	Any time	Avoid. Consider whether metoclopramide therapy is appropriate for the patient.
Sildenafil (Viagra) plus nitrates	Dramatic hypotension	Soon after taking sildenafil	Absolute contraindication.
Sildenafil plus cimetidine, erythromycin, itraconazole or ketoconazole	Increased sildenafil levels	Any time	Initiate sildenafil at a 25-mg dose.
HMG-CoA reductase inhibitor plus niacin, gemfibrozil (Lopid), erythromycin, or itraconazole	Possible rhabdomyolysis	Any time	Avoid if possible. If combination therapy is necessary, monitor the patient for toxicity.
Lovastatin (Mevacor) plus warfarin	Increased effect of warfarin	Any time	Monitor INR.

SSRI plus tricyclic antidepressant	Increased tricyclic antidepressant level	Any time	Monitor for anticholinergic excess and consider a lower dosage of tricyclic antidepressant.
SSRI plus selegiline (Eldepryl) or nonselective monoamine oxidase inhibitor	Hypertensive crisis	Soon after initiation	Avoid.
SSRI plus tramadol (Ultram)	Increased potential for seizures; serotonin syndrome	Any time	Monitor the patient for signs and symptoms of serotonin syndrome.
SSRI plus naratriptan (Amerge), rizatriptan (Mazalt), sumatriptan (Imitrex) or zolmitriptan (Zomig)	Serotonin syndrome	Possibly after initial dose	Avoid if possible. If combination therapy is necessary, monitor the patient for signs and symptoms of serotonin syndrome.

Table 3 Drug -Disease condition

Disease condition	Types of Drugs	Examples
Anemia (resulting from decreased production or increased destruction of red blood cells)	Certain antibiotics	Chloramphenicol
	Medications used to treat malaria or tuberculosis in people with G6PD enzyme deficiency	Chloroquine Isoniazid Primaquine
Angioedema (swelling of the lips, tongue, and throat causing difficulty breathing)	ACE inhibitors	Captopril Enalapril Lisinopril
Bone fractures	Proton pump inhibitors	Esomeprazole Lansoprazole Omeprazole
Blood clots	Birth control medications (all forms including patches and pills)	Drospirenone/ethinyl estradiol Norelgestromin/ethinyl estradiol

Disease condition	Types of Drugs	Examples
Confusion and drowsiness	Sedatives, including many antihistamines	Diphenhydramine
	Antidepressants (especially in older people)	Amitriptyline Imipramine
Decreased production of white blood cells, with increased risk of infection	Certain antipsychotic drugs	Clozapine
	Chemotherapy drugs	Cyclophosphamide Mercaptopurine Methotrexate Vinblastine
	Some medications used to treat thyroid disorders	Propylthiouracil
Kidney damage	NSAIDs (repeated use of excessive doses)	Ibuprofen Naproxen
	Aminoglycoside antibiotics	Gentamicin Tobramycin
	Some chemotherapy drugs	Cisplatin Methotrexate
	Antifungals	Amphotericin B
	Some other antibiotics	Tetracycline (outdated) Vancomycin

Disease condition	Types of Drugs	Examples
Liver damage	Some analgesics	Acetaminophen (use of excessive doses)
	Some medications used to treat tuberculosis	Isoniazid
	Iron supplements (in excessive amounts)	Ferrous sulfate, ferrous fumarate
	Antidepressants	Duloxetine
	Antibiotics	Tetracycline
Muscle tissue destruction (rhabdomyolysis)	Statins	Atorvastatin Simvastatin
Stomach or intestinal ulcers (with or without bleeding)	NSAIDs	Aspirin Ibuprofen Naproxen
	Anticoagulants	Heparin Warfarin
	Bisphosphonates	Alendronate Risedronate

Disease condition	Types of Drugs	Examples
Toxic epidermal necrolysis	Some antibiotics	Penicillins Quinolones Sulfonamides
	Anticonvulsants	Phenytoin Valproic acid
Ventricular tachycardia	Antiarrhythmics	Amiodarone Procainamide Sotalol
	Antipsychotics	Chlorpromazine Haloperidol Lithium
ACE = angiotensin-converting enzyme; G6PD = glucose-6-phosphate dehydrogenase; NSAIDs = nonsteroidal anti-inflammatory drugs		

Table 4: Some Possible Dietary Supplement–Drug Interactions

Dietary Supplement	Affected Drugs	Interaction(s)
Ashwagandha	Thyroid hormones	May increase thyroid hormone levels
	Antihyperglycemic drugs	May decrease blood glucose to unsafe levels
	Antihypertensive drugs	May augment antihypertensive and blood pressure-lowering effects
	Immunosuppressant drugs (eg, cyclosporine, mycophenolate, tacrolimus, prednisone, corticosteroids)	May interfere with drugs that suppress immune function
	Sedatives	May lead to excessive sleepiness

Dietary Supplement	Affected Drugs	Interaction(s)
Astragalus	Immunosuppressants (eg, cyclosporine, mycophenolate, tacrolimus)	May stimulate the immune system and thereby decrease the effectiveness of drugs that suppress the immune system such as those used after organ transplant
	Lithium	May decrease excretion of lithium which can result in increased blood levels and possible serious adverse effects
Bacopa	Anticholinergic drugs or drugs that can increase acetylcholine (eg, glaucoma or Alzheimer disease drugs)	May decrease the effect or anticholinergic drugs or increase the adverse effects of cholinergic drugs.
	Thyroid hormones	May increase thyroid hormone levels
	Drugs metabolized by the cytochrome P450 system (eg, warfarin, calcium channel blockers, antiseizure medications)	May increase the risk of bleeding or lower blood pressure with calcium channel blockers or sedation with antiseizure medications
Cannabidiol (CBD)	Sedatives and antidepressants (eg, benzodiazepines, phenobarbital, morphine, alcohol, SSRIs, tricyclic antidepressants)	Can increase the effect of these drugs and make people too drowsy
	Acetaminophen and valproic acid	May increase the chance of liver injury
	Antiseizure medications	May increase effect of these medications and may increase adverse effects
	Lithium	May increase lithium toxicity

Dietary Supplement	Affected Drugs	Interaction(s)
Chamomile	Barbiturates and other sedatives	May intensify or prolong effects of sedatives because its volatile oils have additive effects
	Iron supplements	May reduce iron absorption via tannins in the plant
	Warfarin	May increase risk of bleeding because chamomile contains phytocoumarins, which may have additive effects
	Drugs with estrogenic effects (eg, tamoxifen, hormone replacement therapy, oral contraceptives containing estrogens)	May interfere with the estrogenic effects of these drugs
	Cyclosporine	May increase cyclosporine serum concentrations
Chromium	Insulin, sulfonylureas	May lower blood glucose
	Thyroid replacement therapy	May decrease levothyroxine serum levels

Dietary Supplement	Affected Drugs	Interaction(s)
Coenzyme Q10	Warfarin	May decrease response to warfarin
	Antihypertensives	May augment antihypertensive and blood pressure-lowering effects
	Chemotherapy drugs	May interfere with the action of chemotherapy drugs due to antioxidant effects
Dehydroepiandrosterone (DHEA)	Anticoagulants (eg, warfarin)	Increases the risk of bleeding
	Antidepressants	May trigger mania
	Drugs with anti-estrogenic effects (eg, tamoxifen, anastrozole, and fulvestrant)	May decrease the anti-estrogenic effects
	Triazolam (a benzodiazepine).	May increase the sedative effect
	Bacille Calmette-Guerin (BCG) vaccine (for tuberculosis)	May decrease the effectiveness of the BCG vaccine

Dietary Supplement	Affected Drugs	Interaction(s)
Ephedra†	Stimulant drugs (eg, caffeine, epinephrine, phenylpropanolamine, pseudoephedrine)	Increases the stimulant effects of other drugs, increasing risk of irregular or rapid heartbeat and hypertension
	MAOIs	May intensify effects of these drugs and increase risk of adverse effects (eg, headache, tremors, irregular or rapid heartbeat, hypertension)
Feverfew	Antimigraine drugs (eg, ergotamine—see table Some Characteristics of Headache Disorders by Cause)	May increase heart rate and blood pressure because it has additive vasoconstrictive effects
	Antiplatelet drugs	May increase risk of bleeding because feverfew inhibits platelet aggregation (has additive effects)
	NSAIDs	Increased risk of bleeding, because both feverfew and NSAIDs may potentially cause bleeding
	Warfarin	May increase risk of bleeding because warfarin may have additive effects

Dietary Supplement	Affected Drugs	Interaction(s)
Garlic	Antihypertensives	May augment antihypertensive and blood pressure-lowering effects
	Antiplatelet drugs	May increase risk of bleeding because these drugs enhance garlic's inhibition of platelet aggregation and fibrinolytic effects
	Isonicotinylhydrazide (isoniazid, or INH)	May lower levels
	Protease inhibitors (eg, saquinavir)	Blood level of protease inhibitors reduced by garlic
	Warfarin	May increase risk of bleeding by augmenting warfarin's anticoagulant effects
	Tacrolimus (oral)	Can increase blood levels of tacrolimus, possibly enough to injure the liver

Dietary Supplement	Affected Drugs	Interaction(s)
Ginger	Antiplatelet drugs	May increase risk of bleeding by augmenting inhibition of platelet aggregation
	Warfarin	May increase risk of bleeding by augmenting warfarin's anticoagulant effects
Ginkgo	Antiseizure medications (eg, phenytoin)	May reduce efficacy of antiseizure medications because contaminants in ginkgo preparations may reduce antiseizure effects
	Antidepressants	May precipitate serotonin syndrome in patients on other antidepressant medications
	MAOIs (eg, tranylcypromine)	May intensify effects of these drugs and increase risk of adverse effects (eg, headache, tremors, manic episodes)
	NSAIDs	May increase risk of bleeding by augmenting inhibition of antiplatelet aggregation
	Warfarin	May increase risk of bleeding by augmenting warfarin's anticoagulant effects

Dietary Supplement	Affected Drugs	Interaction(s)
Ginseng	Antihyperglycemic drugs (eg, glipizide)	May intensify effects of these drugs, causing hypoglycemia
	Aspirin and other NSAIDs	May increase risk of bleeding by augmenting inhibition of antiplatelet aggregation
	Corticosteroids	May intensify adverse effects of corticosteroids because ginseng has anti-inflammatory effects May have immunostimulant effects and thus may attenuate the immunosuppressive effects of corticosteroids
	Digoxin	May increase digoxin levels
	Estrogens	May intensify adverse effects of estrogen
	MAOIs	Can cause headache, tremors, and manic episodes
	Opioids	May reduce the effectiveness of opioids
	Warfarin	May increase risk of bleeding by augmenting warfarin's anticoagulant effects
Goldenseal	Antihypertensives	Berberine content may increase antihypertensive effects
	Antihyperglycemics	Berberine may increase hypoglycemic effects
	Warfarin and heparin	May increase effects of warfarin and heparin, increasing risk of bleeding
Green tea	Warfarin	May reduce efficacy of warfarin, increasing risk of thromboembolism

Dietary Supplement	Affected Drugs	Interaction(s)
Holy Basil	Thyroid hormones	May decrease the efficacy of thyroid hormone drugs
	Anticoagulants and antiplatelets	May increase risk of bleeding

Dietary Supplement	Affected Drugs	Interaction(s)
Kava	Sedatives (eg, barbiturates, benzodiazepines)	May intensify or prolong the effects of sedatives
	Antiparkinsonian medications	May antagonize effects of levodopa and worsen Parkinson disease May reduce metabolism of ropinirole and thus cause dopamine toxicity
	Hepatotoxic drugs	May increase hepatotoxicity

Dietary Supplement	Affected Drugs	Interaction(s)
Licorice (glycyrriza glabra)‡		
	Antihypertensives	May increase salt and water retention and increase blood pressure, making antihypertensives less effective
	Chemotherapeutics	May decrease effects of paclitaxel and cisplatin
	Corticosteroids	May increase adverse effects of corticosteroids
	Digoxin	May decrease levels of potassium, which increases risk of digoxin toxicity
	Diuretics	May intensify the potassium-wasting effects of most diuretics and interfere with the effectiveness of potassium-sparing diuretics (eg, spironolactone)
	MAOIs	May intensify effects of these drugs and increase risk of adverse effects (eg, headache, tremors, manic episodes)
	Warfarin	May decrease effectiveness of warfarin

Dietary Supplement	Affected Drugs	Interaction(s)
Melatonin	Anticoagulants (such as warfarin)	May increase risk of bleeding
	Antiseizure medications	May decrease the effectiveness of antiseizure medications
	Benzodiazepines	May increase sedative effect
	Methamphetamine	May increase the adverse effects of methamphetamine
Milk thistle	Antihyperglycemic drugs	May intensify effects of these drugs, causing hypoglycemia
	Protease inhibitors (eg, indinavir, saquinavir)	May interfere with metabolizing enzymes, lowering blood levels of indinavir
	Sirolimus	May decrease sirolimus clearance in renal transplant patients with hepatic impairment
	Warfarin	May increase risk of bleeding by increasing effects

Dietary Supplement	Affected Drugs	Interaction(s)
Rhodiola	Antidepressants	May cause a rapid heart rate
	Anticoagulants (eg, warfarin)	May increase blood levels causing increased risk of bleeding
	Anti-inflammatory drugs	Increased blood levels and possibly adverse effects
	Immunosuppressants	May decrease effectiveness of immunosuppressants
	Antihyperglycemic medications	Can decrease blood glucose, triggering hypoglycemia
	Antihypertensive medications	Can decrease blood pressure further

Dietary Supplement	Affected Drugs	Interaction(s)
S-Adenosyl-L-Methionine	Antidepressants	May increase serotonin levels causing serotonin syndrome when given with serotonergic drugs, manifested by a rapid heart rate, anxiety, gastrointestinal symptoms, severe muscle rigidity, and possible seizures
	Levodopa	May decrease the effectiveness of levodopa
Saw palmetto	Antiplatelets and anticoagulants (eg, warfarin)	May increase effects and may cause bleeding
	Estrogens (eg, oral contraceptives and other products)	May decrease effectiveness of estrogens

Dietary Supplement	Affected Drugs	Interaction(s)
St. John's wort	Cyclosporine and tacrolimus	May reduce blood level of cyclosporine, increasing risk of organ transplant rejection
	Digoxin	May reduce blood level of digoxin, making it less effective, with potentially dangerous results
	Iron supplements	May reduce iron absorption
	MAOIs	May augment effects of MAOIs, possibly causing very high blood pressure requiring emergency treatment
	Nonnucleoside reverse transcriptase inhibitors	Increases metabolism of these drugs, reducing their efficacy
	Oral contraceptives	Increases metabolism of these drugs, reducing their efficacy
	Oxycodone, methadone, and tramadol	Decreases serum concentrations and analgesic effects of these drugs
	Photosensitizing drugs (eg, lansoprazole, omeprazole, piroxicam, sulfonamide antibiotics)	May increase sun sensitivity
	Protease inhibitors	May reduce blood level of protease inhibitors, reducing their efficacy
	SSRIs (eg, fluoxetine, paroxetine, sertraline)	May augment effects of these drugs
	Tricyclic antidepressants	May augment effects of these drugs
	Warfarin and other anticoagulants (eg, direct-acting oral anticoagulants)	May reduce blood level of warfarin and rivaroxaban, increasing risk of thromboembolism
Valerian	Sedatives (eg, barbiturates, benzodiazepines)	May intensify effects of sedatives

Dietary Supplement	Affected Drugs	Interaction(s)
Zinc	Antibiotics (eg, cephalexin, tetracyclines, quinolones)	May decrease absorption and effect of the antibiotics when taken within hours of zinc
	Cisplatin, penicillamine, and chelate integrase inhibitors (eg, dolutegravir)	May be inhibited or inactivated
	* Caution is required when dietary supplements are used because these products are not standardized and thus vary considerably and because information about their use is continually changing. The theoretical status of many published interactions does not obviate the need for cautious use. Before prescribing any drug, health care practitioners should ask patients whether they are taking dietary supplements and, if so, which ones. Practitioners must identify any potential adverse interactions of drugs and supplements taken by a patient and then determine appropriate drugs and dosages.	
† Sale of supplements containing ephedra is banned in the US.		
‡ This substance is true, natural licorice, not the more common, artificially flavored licorice candy.		
MAOIs = monoamine oxidase inhibitors; NSAIDs = nonsteroidal anti-inflammatory drugs; SSRIs = selective serotonin reuptake inhibitors.		

Annex 2. Availability of medicine & EML in yemen

The Essential Drug List carries the following indications:

L=Level

1- Health Units may use and all facilities above.

2- Health Centers may use and all facilities above

3- District Hospitals and facilities above

4- Governorate Hospitals and Specialists

S Specialists and Special Programs only

This means that a **District** hospital may only use the items marked **1, 2, and 3**.

A **Governorate** hospital may use the drugs marked 1, 2, 3 **and 4**

Drugs marked with "S" are reserved for specialists, each in his field.

e.g. A paediatrician or a surgeon working in a District hospital may select those drugs marked with 4 and S when they fall within the proven (not the perceived) field of competence.

Therefore she/he cannot use e.g. Cytotoxic drugs or TB drugs as these are not related to his area of work.

NB S* or S# indicate drugs considered to be needed in certain cases but have such a low turnover that they will not be stored by the Drug Fund. Case-to-case arrangements will be made when these are indeed needed, based on solid diagnostic evidence.

VEN-Indication

This is an international system to provide an indication on the individual importance of each drug

V=Vital first priority

These drugs are considered to be vital because if these are not available it can mean the death of the patient or result in irreparable damage example; adrenaline and insulin.

E=Essential second priority

Unavailability causes great discomfort or pain. Examples; aspirin and erythromycin

N=Necessary third priority

They are regarded as needed but their availability will not cause the damage described above. If the budgets do not permit, they will not be purchased as priority will be

Essential List of Medicine 2022 For Yemen

N	Medicine Class and Generic Name	Dosage Form	Strength	Unit Volum	Health Facility Level	Ven calassifi-cation
	1. Anaesthetics					
	1.1 General Anaesthetics and Medical Gases					
1	Halothane	Inhalation		btl, 250ml	4	V
2	Isoflurane	Inhalation		btl. 250ml	4	V
3	Ketamine HCL	Injection	50mg/ml	vial,10ml	4	V
4	Nitrous Oxide	Inhalation		cylinder	3	V
5	Oxygen (medical gas)	Inhalation		cylinder	2	V
6	Propofol	Injection	10mg/ml	20, 50ml	4	V

7	Thiopental sodium	Pow. Injection	1gm	vial	4	V
	1.2 Local Anaesthetics					
1	Bupivacaine HCL, spinal	Injection	0.5%	amp, 4ml	4	V
2	Ephedrine	Injection	30mg/ml	amp,5ml	4	V
3	Lidocaine HCL	Injection	2%	vial, 50ml	2	V
4	Lidocaine HCL+Adrenaline 1/100,000 Injection		2%	vial, 50ml	2	E
	1.3 Preoperative Medication					
1	Atropine Sulfate	Injection	1mg/ml	amp, 1ml	3	V
2	Chloralhydrate	syrup	300mg/5ml	btl, 250ml	4	V
3	Diazepam	Injection	5mg/ml	amp, 2ml	3	V
4	Midazolam HCL	Injection	1mg/ml, 10mg/ml		4	V
5	Morphine	Injection	10mg/ml	amp, 1ml	4	V
6	Promethazine HCL	syrup	1mg/ml	btl 100ml	3	N
	2. Analgesics, Antipyretics, NS Anti-inflammatory and Medicines to Treat Go					
	2.1 Non-Opioids					
1	Acetylsalicylic Acid	Tablet	300 – 500mg		1	E
2	Allopurinol	Tablet	300mg		4	E
3	Diclofenac Sodium	Injection	25mg/ml	amp, 3ml	3	N
4	Ibuprofen	Tablet	200, 400mg		2	E
5	Meloxicam	Tablet	7.5 mg-15mg		2	N
6	Meloxicam	Injection	7.5 mg-15mg		3	N
7	Meloxicam	Supp	7.5 mg-15mg		2	N
8	Paracetamol	Tablet	500mg		1	E
9	Paracetamol	Supp	125-250-500		1	E
#	Paracetamol	syrup	24mg/ml	btl, 60, 100 ml	1	E
#	Paracetamol	Infusion	500mg/100ml		4	E
	2.2 Opioid Analgesics					
1	Codeine	Tablet	30mg		S	V
2	Fentanyl	Injection	50mcg/ml	amp,2ml	S	V
3	Fentanyl	Patch	25-100mcg		S	V
4	Methadone HCL	Oral Liquid	5mg, 10mg/5ml		S	V
5	Morphine Sulfate	Injection	10mg/ml	amp, 1ml	S	E
6	Morphine Sulfate	Tablet	10 – 200mg		S	E

7	Pethidine HCL	Injection	50mg	amp, 1 ,2ml	3	V
8	Tramadol HCL	Injection	100mg/2ml		S	V
	3. Antiallergics and Medicines used in Anaphylaxis					
1	Adrenaline (Epinephrine)	Injection	1mg/ml	amp, 2ml	2	V
2	Cetirizine	Tablet	10mg-20mg		2	E
3	Chlorpheniramine Maleate	Tablet (scored)	4mg		1	E
4	Chlorpheniramine Maleate	Injection	10mg/ml	amp, 1ml	2	E
5	Desloratadine	syrup	5mg-10mg		2	N
6	Dexamethasone (sodium phosphate)	Injection	4mg/ml	amp, 1ml	3	E
7	Hydrocortisone (sodium succinate)	Pow. Injection	100mg	vial	3	V
8	Loratadine	Tablet	10mg		3	E
9	Prednisolone	Tablet	5, 20mg		3	E
	4. Antidotes and other Sub_stances used in Poisonings					
1	Acetylcystine	Injection	200mg/ml	amp, 10ml	S#	V
2	Activated Charcoal	Powder	0.14% alkal.		S#	V
3	Atropine Sulfate	Injection	1mg/ml	amp, 1ml	3	V
4	Dantrolene	Pow. Injection	20mg/vial		3	V
5	Deferasirox	Disp. Tablet	500mg		S#	V
6	Deferiprone	Tablet (scored)	500mg		S#	V
7	Desferoxamine Mesilate	Pow. Injection	500mg	vial	S#	V
8	Dimercaprol	Injection	50mg/ml	amp 2ml	S#	V
9	Flumazenil	Injection	100mcg/ml	amp, 5ml	S#	V
10	Fomepizole	Injection	5mg/ml	amp	S#	V
11	Ipecacuanha	syrup	0.7ml extract	to 10ml	1	V
12	Naloxone	Injection	0.4mg/ml	amp, 1ml	S#	V
13	Neostigmine Methylsulphate	Injection	2.5mg/ml	amp, 10ml	S#	V
14	Penicillamine	Tablet (scored)	250mg		S#	V
15	Phytomenadione (Vit.K1)	Injection	10mg/ml	amp, 1ml	S#	V

16	Pralidoxime Mesilate	Injection	200mg/ml	amp, 5ml	S#	V
17	Protamine Sulphate	Injection	10mg/ml	amp, 5ml	S	V
18	Sodium Calcium Edetate	Injection	200mg/ml	amp, 5ml	S#	V
19	Sodium Nitrite	Injection	30mg/ml	amp 10ml	S#	V
20	Sodium Thiosulfate	Injection	250mg/ml	amp, 50ml	S#	V
	5. Anticonvulsants / Antiepileptics					
1	Carbamazepine	Tablet	200mg		3	V
2	Carbamazepine	syrup	100mg/5ml		S	N
3	Clonazepam	Oral Drop	2.5mg/ml		S	E
4	Clonazepam	Tablet	2mg		S	E
5	Diazepam	Injection	5mg/ml	amp, 2ml	2	V
6	Diazepam	Rectal	5mg/ml	Gel	2	V
7	Fosphenytoin	Injection	400mg-1200mg	amp	S	E
8	Lamotrigine	Tablet	25, 50mg		S	N
9	Levetiracetam	Injection	500 mg/5ml	amp	S	E
10	Levetiracetam	Tablet	500 mg		S	E
11	Levetiracetam	Syrup	500 mg/5ml	btl	S	E
12	Lorazepam	Injection	2mg/ml		S	N
13	Magnesium Sulphate	Injection	500mg/ml	amp, 10ml	4	E
14	Midazolam	Injection	5mg/ml-10mg/ml	amp	S	E
15	Phenobarbital	Tablet	60mg		2	V
16	Phenobarbital Sodium	Injection	200mg/ml		S	N
17	Phenytoin Sodium	Tablet	100mg		2	V
18	Phenytoin Sodium	Injection	50mg/ml	vial 5ml	S	N
19	Sodium Valproate	Tablet	200, 500mg		S	E
20	Sodium Valproate	syrup	200mg/5ml	btl 150ml	S	E
	6. Anti-infective Medicines					
	6.1 Anthelminthics 6.1.1 Intestinal Anthelminthics					
1	Albendazole	Chew.Table	400mg		1	E
2	Levamisole	Tablet	50mg-150mg		1	N
3	Mebendazole	Chew.Table	100, 500mg		1	E
4	Niclosamide	Tablet	500mg		2	N
5	Praziquantel	Tablet	600mg		2	V
6	Pyrantel Embonate	Chew.Table	250mg		1	E
	6.1.2 Antifilarials					

1	Albendazole	Chew.Table	400mg		S*	E
2	Diethylcarbamazine	Tablet	50, 100mg		S*	E
3	Ivermectin	Tablet	3mg		S*	E*
	6.2 Anti-Bacterials 6.2.1 Beta Lactams					
1	Amoxicillin	Capsule	500mg		2	V
2	Amoxicillin	Suspension	250mg/5ml	btl, 100ml	2	V
3	Amoxicillin+Clavulanic Acid	Tablet	625MG ,1000MG		3	N
4	Amoxicillin+Clavulanic Acid	Injection	600MG , 1200MG	Vial	S	N
5	Amoxicillin+Clavulanic Acid	Suspension	156MG , 312MG	btl.100	2	E
6	Ampicillin	Injection	500, 1000mg	Vial	3	E
7	Benzathine Benzyl Penicillin	Pow. Injection	1.2 M I.U.	Vial	3	V
8	Benzyl Penicillin (Crystalline Penicillin)	Pow. Injection	1 M I.U.	Vial	3	N
9	Cefadroxil	Capsule	500mg		3	N
10	Cefadroxil	Suspension	125-250mg	btl	3	N
11	Cefalexin	Suspension	125mg-250mg/5ml	btl	3	N
12	Cefazolin Sodium	Injection	1000mg	Vial	S	N
13	Cefotaxime, I.V/I.M	Pow. Injection	500, 1000mg		3	N
14	Ceftriaxone, I.V/I.M	Pow. Injection	500, 1000mg	Vial	3	N
15	Cefuroxime Sodium	Injection	750, 1500mg	Vial	S	N
16	Phenoxymethyl Penicillin (V)	Tablet	250,500,1000mg		1	E
17	Phenoxymethyl Penicillin (V)	Suspension	50mg/ml	btl, 100ml	1	E
18	Procaine Benzyl Penicillin	Pow. Injection	1.2 M I.U.	Vial	2	E
	6.2.2 Other Antibacterials					
1	Amikacin Sulphate	Injection	50, 250mg/ml	amp, 2ml	S	E
2	Azithromycin	Tablet	250, 500mg		3	N
3	Azithromycin	Suspension	200mg/5ml		3	N
4	Ciprofloxacin	Infusion	200mg	btl./100ml	2	E
5	Ciprofloxacin	Tablet (scored)	500mg		4	E
6	Clarithromycin	Tablet	500mg		3	N
7	Cotrimoxazole	Suspension	40/8 mg/ml	btl, 100ml	1	V

8	Cotrimoxazole	Tablet (scored)	400/80mg		1	V
9	Doxycycline HCL (or hyclate)	Tablet/Cap	100mg		4	E
10	Erythromycin	Tablet (scored)	250, 500mg		3	E
11	Erythromycin	Suspension	250mg/5ml	btl, 100ml	3	E
12	Gentamycin sulfate	Injection	40mg/ml	amp, 2ml	S	E
13	Metronidazole	Suspension	200mg/5ml	btl, 100ml	1	E
14	Metronidazole	Tablet (scored)	250, 500mg		1	E
15	Metronidazole I.V.	Injection	5mg/ml	vial,100ml	S	E
16	Nalidixic Acid	Suspension	300mg/5ml	btl, 100ml	4	E
17	Nitrofurantoin	Tablet (scored)	100mg		S	E
18	Nitrofurantoin	Syrup	100mg		S	N
19	Vancomycin HCL	Pow. Injection	0.25, 0.5, 1gm	Vial	S#	V
	6.2.3 Antileprosy Medicines					
1	Clofazimine	Capsule	50mg		S#	E
2	Dapsone	Tablet	50mg		S#	E
3	Rifampicin	Tablet	150mg		S#	V
	6.2.4 Antituberculosis Medicines					
1	Bedaquiline	Tablet	50mg-100mg		S	E
2	Capreomycin Sulphate	Pow. Injection	1gm	Vial	S	E
3	Cefazimine	Tablet	50-100mg		S	N
4	Cycloserine	Capsule	250mg		S	E
5	Delamanid	Tablet	25-50mg		S	N
6	Ethambutol	Tablet (scored)	400mg		S#	V
7	Ethambutol + Isoniazid + Pyrazinamide + Rifampicin Tablet		275+75+400+150mg		S#	E
8	Ethionamide	Tablet	125, 250mg		S	E
9	Isoniazid	Tablet	100, 300mg		S#	E
10	Isoniazid + Pyrazinamide + Rifampicin	Tablet	75+400+150mg		S#	E
11	Isoniazid + Pyrazinamide + Rifampicin	Disp.Tablet	50+150+75mg		S#	E

12	Isoniazid+Rifampicin	Tablet	75+150mg		S#	E
13	Isoniazid+Rifampicin	Disp.Tablet	50+75mg		S#	E
14	Levofloxacine	Tablet	250, 500mg		S	E
15	Linezolid	Oral liquid	100mg/5ml		S	N
16	Linezolid	Tablet	600mg		S	N
17	Linezolid + rifapentine	Tablet	300-300 mg		S	N
18	Moxifloxacin	Tablet	100-400mg		S	N
19	P-Aminosalicylic Acid	Granules	9.2gm	Sachet	S	E
20	Pretomanid	Tablet	200mg		S	N
21	Pyrazinamide	Tablet	400mg		S#	V
22	Rifabutin	Capsule	150mg		S#	E
#	6.3 Antifungal Medicines					
1	Amphotericin B	Pow. Injection	50mg	as sodium deoxycholate or liposomal complex	S*	N
2	Benzoic+Salicylic Acid (Whitfield's oint)	Oint	6 % + 3 %	tin/jar 1kg	1	E
3	Fluconazole	Capsule	150mg		S	E
4	Fluconazole	Injection	2 mg/mL	vial	S	E
5	Flucytosine	I.V Infusion	10mg/ml	btl, 250ml	S	E
6	Glycerin borax	Oral liquid			1	N
7	Griseofulvin	Tablet	125mg		4	E
8	Itraconazole	Capsule	100mg		S	E
9	Itraconazole	Syrup	50-100mg/5ml		S	E
10	Ketoconazole	Tablet	200mg		3	E
11	Miconazole (or equiv.)	Oral gel	24mg/ml	tube 40g	3	E
12	Miconazole (or equiv.)	Pessary	200-400mg/ovules		3	E
13	Miconazole Nitrate	Cream/Oint	2%	15 , 30g	3	N
14	Nystatin	Tablet, lozenges	100,000 & 500,000		3	E
15	Nystatin	Oral liquid	100,000 & 500,000		1	N
	6.4 Antiprotozoal Medicines 6.4.1 Antiamoebic and Antigiardiasis Medicines					
1	Diloxanide Furoate	Tablet	500mg		2	N

2	Metronidazole	Tablet (scored)	250, 500mg		1	E
3	Metronidazole	susp	200mg/5ml	btl, 100ml	1	E
4	Metronidazole I.V.	Injection	5mg/ml	vial,100ml	S	E
5	Secnidazole	Tab	500, 1000mg		2	E
	6.4.2 Antileishmaniasis Medicines					
1	Meglumine Antimoniate	Injection	30% eq.to appr 8.1% antimony (pentavalent)	Amp, 5ml	S	E
2	Miltefosine	Tablet	10, 50mg		S	E
3	Sodium Stibogluconate	Injection	100mg/ml	Vial, 30ml	S	E
	6.4.3 Antimalarial Medicines					
1	Artemether	Injection	80mg ,60mg,20mg/ml	Amp/1ml	3	V
2	Artemether + Lumefantrine	Tablet	20mg +120mg		3	V
3	Artesunate	Injection	60mg		4	V
4	Artesunate	Rectal	100, 200, 300mg		4	E
5	Artesunate+ S/P	Tablet	50+100mg/500mg+25		4	N
6	Chloroquine Phosphate	Tablet	100, 150mg		4	E
7	Doxycycline as hydrochloride	Tablets	100mg		4	E
8	Mefloquine HCL	Tablet	250mg		4	E
9	Primaquine Phosphate	Tablet	7.5mg		1	V
10	Quinine	Tablet	300mg		4	V
11	Quinine	Injection	300mg/ml	Amp 2ml	4	V
	7.Antimigraine Medicines					
1	Acetylsalicylic Acid	Tablet (scored)	300-500mg		1	E
2	Paracetamol	Tablet (scored)	250-500mg		1	E
3	Propranolol	Tablet (scored)	10, 20, 40mg		3	E
4	Sumatriptan	Tablet	50mg		S	N
	8.Antineoplastic and Immunosuppressives					

	8.1 Immunosuppressive Medicines					
1	Azathioprine	Tablet	50mg		S#	E
2	Cyclosporin	Capsule	25, 50, 100mg		S#	E
3	Mycophenolate Mofetile	Tablet	250, 500mg		S	V
4	Mycophenolate Sodium	Tablet	360mg		S	V
5	Prednisolone	Tablet	5mg ,20mg		S	V
6	Sirolimus	Tablet	1mg, 2mg		S	V
7	Tacrolimus	Capsule	0.5mg, 1mg		S	V
	8.2 Cytotoxic and Adjuvant Medicines					
1	Abiraterone	Tablet	250mg		S#	N
2	Afatinib	Tablet	40mg-		S#	N
3	All-Trans Retinoid Acid (ATRA)	Injection	45mg		S#	V
4	Bendamustine	Injection	45mg/0.5ml , 80mg/2ml		S#	V
5	Bevacizumab	Injection	100,400MG	vial	V	N
6	Bleomycin sulfate	Pow. Injection	15 mg	vial	S#	E
7	Bortezomib	Pow. Injection	1, 3.5mg		S#	N
8	Calcium folinate	Injection	3mg, 10mg/ml	Amp, 5,10ml	S#	E
9	Capecitabine	Tablet	150, 500mg		S#	E
10	Carboplatin	Injection	10mg/ml	10,15,45ml	S#	E
11	Cetuximib	Injection	40mg	vial	S#	N
12	Chlorambucil	Tablet	2mg		S#	E
13	Cisplatin	Pow. Injection	10, 50mg	vial	S#	E
14	Cyclophosphamide	Pow. Injection	200,500,1000mg	vial	S#	E
15	Cyclophosphamide	Tablet	25mg		S#	E
16	Cytarabine, preservative free	Injection	100mg/ml	1,5,10ml	S#	E
17	Dacarbazine	Pow. Injection	100, 200, 500mg	vial	S#	E
18	Dactinomycin	Pow. Injection	0.5mg	vial	S#	E
19	Dasatinib	Tablet	20,50,70,80,100,140mg		S#	V
20	Daunorubicin	Pow. Injection	20 or 50mg/vial	vial	S#	E

21	Denosumab	Injection	60mg	Vial	S#	N
22	Docetaxel	vial	40mg/ml	0.5, 2ml	S#	E
23	Doxorubicin HCL	Pow. Injection	10, 50mg	vial	S#	V
24	Epirubicin	Injection	50,100 mg	vial	S#	N
25	Erlotinib	Tablet	100 mg, 150 mg		S#	V
26	Etoposide	Capsule	25,50,100mg		S#	E
27	Etoposide	Injection	20mg/ml	amp, 5ml	S#	E
28	Everolimus	Tablet	2.5,5 mg		S#	N
29	Filgrastim	Injection	300mcg/ml	vial, 1ml	S#	V
30	Fluconazole	IV. Infusion	2mg/ml	vial, 100ml	S#	N
31	Fludarabine Phosphate	Pow. Injection	50mg	vial	S#	N
32	Fluorouracil	Injection	50mg/ml	5, 10ml	S#	V
33	Gefitinib	Tablet	250mg-		S#	N
34	Gemcitabine HCL	Pow. Injection	200, 1000mg	vial	S#	E
35	Human Recombinant Erythropoietin	Injection	10,000 IU	P.F.S	S#	v
36	Hydroxyurea	Capsule	500mg		S#	E
37	Ifosfamide	Pow. Injection	1, 2gm	vial	S#	E
38	Imatinib	Capsule	100, 400mg		S#	N
39	Irinotecan	Injection	20mg/ml	vial, 2, 5ml	S#	V
40	L-Asparaginase (Crisantaspase)	Pow. Injection	10,000 IU	vial	S#	E
41	Lenograstim	Pow. Injection	13.4, 33.6 M.IU	vial	S#	V
42	Liposomal Doxorubicin	Injection	20mg	vial	S#	V
43	Melphalan	Tablet	2mg		S#	N
44	Mercaptopurine	Tablet	50mg		S#	E
45	Mesna	Tablet	400mg		S#	V
46	Mesna	Injection	100mg/ml	Amp, 4ml	S#	V
47	Methotrexate	Tablet	2.5mg		S#	E
48	Methotrexate, preserv. free	Injection	25, 100mg/ml	2,10,20ml	S#	E
49	Nilotinib	Capsule	150, 200mg		S#	N
50	Oxaliplatin	Pow. Injection	50, 100mg	vial	S#	V
51	Paclitaxel	I.V. Infusion	6mg/ml	16.7, 25ml	S#	E

52	Paclitaxel Protein Bound	Injection	100mg	vial	S#	N
53	Pazopanib	Tablet	400mg		S#	N
54	Pegfilgrastim	Injection	10mg/ml	P.F.S., .6ml	S#	V
55	Pemetrexed	Injection	500mg	vial	S#	N
56	Procarbazine	Capsule	50mg		S#	N
57	Regorafinib	Tablet	40mg		S#	N
58	Rituximab	I.V. Infusion	10mg/ml	10,50ml	S#	E
59	Sorafenib	Tablet	200mg		S#	N
60	Sunitinib	Tablet	50mg		S#	N
61	Temozolomide	Capsule	100, 250mg		S#	V
62	Thalidomide	Tablet	100mg		S#	V
63	Tioguanine	Tablet	dosage form: 40 mg	Tablet	S#	N
64	Trastuzumab	Injection	45mg/0.5ml, 80mg/2ml		S#	V
65	Vinblastine	Pow. Injection	10mg	vial	S#	E
66	Vincristine Sulphate	Pow. Injection	1mg	vial	S#	V
67	Vinorelbine	I.V. Infusion	10mg/ml	vial 5ml	S#	V
68	Vinorelbine Tartrate	Tablet	20, 30mg		S#	V
69	Zoledronic Acid	I.V. Infusion	4mg	vial	S#	V
	8.3 Hormones and Antihormones					
1	Anastrozole	Tablet	1mg		S#	E
2	Bicalutamide	Tablet	50mg		S#	E
3	Dexamethasone	Oral liquid	2 mg/5 mL	liquid	3	E
4	Dexamethasone	Tablet	2 mg; 4 mg		3	E
5	Dexamethasone (as disodium phosphate	Injection	4 mg/mL	1 ml ampoule	4	N
6	Exemestane	Tablet	25mg		S#	N
7	Goserelin	Implant	3.6mg		S#	E
8	Hydrocortisone as sodium succinate	Pow. Injection	100 mg	vial.	3	E
9	Letrozole	Tablet	2.5mg		S#	N
10	Megestrol Acetate	Tablet	160mg		S#	E
11	Methylprednisolone	Injection	40mg/ml	Vial 1ml	S#	V
12	Prednisolone	Tablet	5, 20mg		3	E
13	Tamoxifen Citrate	Tablet	10, 20mg		S#	E

14	Triptorelin	Vial	3.7mg		S#	N
	9. Antiparkinsonism Medicines					
1	Benzhexol	Tablet (scored)	5mg		S	E
2	Levodopa + Carbidopa	Tablet (scored)	250+25mg		S	E
	10.Medicines Affecting the Blood					
	10.1 Antianaemic Medicines					
1	Ferrous Sulfate (65mg iron)	Tablet	200mg		1	E
2	Ferrous Sulhate+Folic acid	Tablet	60+400mg		1	E
3	Folic acid	Tablet	1 , 5mg		1	E
4	Human Recombinant Erythropoietin	Injection	2000, 4000 IU	P.F.S	S	N
5	Hydroxocobalamin (Vit B12)	Injection	1mg/ml	amp, 1ml	S	N
6	Iron sucrose	Injection	100mg/5ml		S	N
	10.2 Medicines Affecting Coagulation					
1	Acetylsalicylic Acid	Tablet (EC)	75-100mg		1	E
2	Apixaban	Tablet	5 mg		S	E
3	Clopidogril	Tablet	75mg		S	N
4	Enoxaparin	Injection	40, 60, 80mg	P.F.S.	S	E
5	Ethamsylate	Injection	250mg	amp	S	N
6	Ethamsylate	Tablet	250mg		S	N
7	Heparin Sodium	Injection	5,000 IU/ml	amp, 5ml	S	V
8	Phytomenadione (vit k1)	Tablet	10mg		S	N
9	Phytomenadione (vit k1)	Injection	10mg/ml	amp, 1ml	4	V
10	Protamine Sulphate	Injection	10mg/ml	amp, 5ml	S	V
11	Rivaroxaban	Tablet	10mg		S	N
12	Tranexamic Acid	Tablet	500mg		S	N
13	Tranexamic Acid	Injection	500mg		S	N
14	Warfarin Sodium	Tablet	1, 3, 5mg		S	V
	10.3 Other Medicines for Haemoglobinopathies					
1	Deferasirox	Disp. Tablet	125, 250mg		S	N

2	Desferoxamine Mesilate	Pow. Injection	500mg	vial	S	N
3	Hydroxyurea	Capsule	250, 500mg		S	N
	11.1. Blood Products and Plasma Substitutes					
1	Albumin, Human	Injection	20%	vial, 50ml	S	N
2	Dextran 70	Inj. Solution	6%	btl, 0.5ltr	S	N
3	Factor IX Fraction	dried	500 I.U.		S	V
4	Factor VIII Fraction	dried	250, 500 IU		S	V
5	Polygeline	injectable solution	3.5%		S	N
6	Polyoxifumarinum	Inj. Solution	Composition	btl, 400ml	S	N
	11.2. Immunoglobulins					
1	Human Anti-D (Rho) Immunoglobulin	Vial	250 I.U		S	N
2	Human Normal Immunoglobulin I.V	Vial	2.5, 5, 10gm		S	N
	12. Cardiovascular Medicines					
	12.1 Antianginal & antiarrhythmic Medicines					
1	Adenosine	Injection	6mg	AMP	V	N
2	Amiodarone HCL	Injection	50mg/ml	amp/3, 6ml	S	N
3	Amiodarone HCL	Tablet	100, 200, 300mg	amp, 2ml	S	N
4	Bisoprolol	Tablet	2.5-5mg		4	N
5	Carvedilol	Tablet	6.5,12,5,25,mg		S	N
6	Glyceryl Trinitrate	Sub/Tablet	0.5mg		S	E
7	Isosorbide Dinitrate	Tablet (scored)	5,10 ,20mg		S	E
8	Lidocaine HCL, preserv. free	Injection	20mg/ml	amp, 5ml	S	N
9	Metoprolol	Tablet	50,100mg		S	N
10	Propranolol	Injection	1mg/ml	amp, 1ml	4	E
11	Propranolol	Tablet (scored)	10, 40mg		3	N
12	Verapamil HCL	Tablet	40mg		S	N
13	Verapamil HCL	vial	2.5mg/ml	amp, 2ml	S	N

	12.2 Antihypertensive Medicines					
1	Amlodipine	Tablet (scored)	2.5, 5mg		3	N
2	Atenolol	Tablet (scored)	50, 100mg		4	N
3	Captopril	Tablet (scored)	25mg		S	N
4	Diltiazem HCL	Tablet/Cap	60, 120mg	SR	S	N
5	Enalapril hydrogen maleate	Tablet (scored)	2.5, 5, 10mg		S	N
6	Hydralazine HCL	Tablet (scored)	50mg		S	N
7	Hydralazine HCL	Injection	20mg/ml	amp, 1ml	S	N
8	Lisinopril	Tablet (scored)	10mg		S	N
9	lisinopril + amlodipine	Tablet	10 mg + 5 mg, 20 mg + 5 mg, 20 mg + 10		4	E
10	lisinopril + hydrochlorothiazide	Tablet	10 mg + 12.5 mg; 20 mg + 12.5 mg; 20		4	E
11	Losartan	Tablet	50mg		3	E
12	Magnesium Sulphate	Injection	500mg/ml	amp, 10ml	4	E
13	Methyldopa	Tablet	250mg		2	V
14	Nifedipine	Capsule	10mg		4	E
15	Propranolol	Tablet (scored)	10, 40mg		3	V
16	Sodium nitroprusside	Powder for infusion	50 mg in ampoule	amp	S#	V
17	Spironolactone	Tablet	25, 100mg		3	V
18	Telmisartan	Tablet	40, 80 mg		3	E
	12.3 Cardiac Glycosides					
1	Digoxin	Tablet	0.25mg		3	V
2	Digoxin	syrup	0.05mg/ml	btl, 60ml	S	V
3	Digoxin	Injection	0.25mg/ml	amp, 2ml	S	V
	12.4 Medicines in Shock					
1	Adrenaline (Epinephrine)	Injection	1mg/ml	amp, 1ml	2	V
2	Dobutamine	Injection	250mg/29ml	vial	S	V
3	Dopamine HCL	Injection	40mg/ml	vial, 5ml	S	E

4	Noradrenalin	Injection	4mg/ml	amp, 1ml	S	V
	12.5 Antithrombotic Medicines					
1	Acetylsalicylic Acid, (EC)	Tablet	75-100mg		1	E
2	Clopidogrel	Tablet	75 mg; 300 mg		3	E
	12.6 Thrombolytic Medicines					
1	Alteplase	Injection	50mg	vial	S	V
2	Streptokinase	Pow. Injection	1,500,000 IU	vial	S	N
	12.7 Lipid-lowering agents					
1	Atorvastatin	Tablet	20, 40mg		3	E
2	Fenofibrate	Tablet	160, 200mg		3	E
	13. Dermatological Medicines					
	13.1 Antifungal Medicines					
1	Benzoic+Salicylic Acid (Whitfield's oint)	Oint	6 % + 3 %	tin/jar 1kg	1	E
2	Miconazole Nitrate (or eq.)	Cream/Oint	2%	tube, 30g	3	E
	13.2 Anti-infective Medicines					
1	Fusidic Acid	Cream	2%	15-30g	3	E
2	Gentian Violet	Powder	For dilution	pack 25 g	1	E
3	Mupirocin	Oint	2%		3	E
4	Potassium Permanganate	Powder	For dilution	sachet/25g	1	N
5	Silver Sulfadiazine	Cream	1%	30-500g	2	V
	13.3 Anti-inflammatory and Antipruritic Medicines					
1	Betamethasone Valerate	Cream/Oint	0.1%	Tube, 30g	3	E
2	Calamine	lotion	5%	Btl, 100ml	1	N
3	Hydrocortisone Acetate	Cream	1%	Tube, 15g	2	N
	13.4 Keratolytic Agents					

1	Calcipotriol	Oint -Cream	0.005		4	N
2	Coal Tar	Ointment	6%		4	N
3	Podophyllum Resin	solution	10 to 25%		2	N
4	Salicylic Acid B.P.	Oint	5%	Tube, 30g	1	N
5	Silver Nitrate	Pencil	95%		2	N
6	Urea	Cream	20-40%		4	N
7	Zinc Oxide	Cream	10%	Tube, 30g	1	N
	13.5 Scabicides and Pediculicides					
1	Benzyl Benzoate	lotion	25%	100-500ml	2	N
2	Permethrin	Cream	5%		3	E
3	Permethrin	Lotion	1%		3	E
	14. Diagnostic Agents					
1	Amidotrizoate Sodium	Injection	76%	amp, 20ml	3	N
2	Barium Sulfate	Powder		drum	4	N
3	Fluorescein Sodium	Drops+ strips	1%	btl, 10ml	S	E
4	Meglumine Iotroxate 38%	Inj. Solution	5-8g iodine in 100-250ml	amp, 30ml	4	E
	15. Disinfectants and Antiseptics					
	15.1 Antiseptics					
1	Chlorhexidine Digluconate	Solution	5 %, to dilute	btl , 1 Ltr	1	N
2	Ethanol Absolute	Solution	90-99 %	btl , 20 Ltr	4	E
3	Methylated Spirit (Ethanol)	liquid	70-90% to dilute	btl , 20 Ltr	1	E
4	Povidone Iodine	Solution	10%	btl ,0.5-1Ltr	1	E
	15.2 Disinfectants					
1	Chlorine base compounds	Liquid, Powder, Solid	0.1% for solution		3	E
2	Chloroxylenol	Solution	4.8%		4	E
3	Formalin	liquid	10%		3	E
	16. Diuretics					
1	Furosemide	Injection	10mg/ml	amp, 2ml	2	V
2	Furosemide	Tablet (scored)	40mg		2	V
3	Hydrochlorothiazide	Tablet	12.5, 25mg		3	N
4	Indapamide	Tablet	2.5, 5mg		4	N

5	Mannitol	Inj. Solution	20%	100, 250ml	S	E
6	Spironolactone	Tablet	25, 100mg		3	V
	17. Gastrointestinal Medicines					
	17.1 Antacids and other Antiulcer Medicines					
1	Al/Mg Hydroxide/ Simethicone	Tablet	200+200+50mg		1	N
2	Famotidine	Tablets	20 , 40mg		1	N
3	Omeprazole	Injection	40mg	vial	3	E
4	Omeprazole	Capsule	20mg		2	N
5	Ranitidine HCL	Injection	25mg/ml	amp, 2ml	S	E
6	Pantoprazole	Injection	40mg	vial	S	N
7	Pantoprazole	Tablet	20 , 40mg		3	N
	17.2 Antiemetic Medicines					
1	Aprepitant	capsule	80,125,165mg		S*	N
2	Domperidone Maleate	Tablet	10mg		3	N
3	Granisetron HCL	Injection	1mg/ml	Amp /1ml	S	E
4	Metoclopramide HCL	Injection	5mg/ml	amp, 2ml	3	N
5	Ondansetron HCL	Injection	2, 4mg/ml	Amp /2ml	S*	N
6	Ondansetron HCL	Tablet	8mg		S*	N
7	Promethazine HCL	Elixir	1mg/ml	blt 100ml	3	N
8	Promethazine sugar coated	Tablet	25mg		2	N
9	Promethazine	Inj.	25mg		3	N
	17.3 Antihaemorrhoidal Medicines					
1	Antihaemorrhoidal + Hydrocortisone	Oint		tube, 30g	2	N
2	Antihaemorrhoidal + Hydrocortisone	Supp.			2	N
	17.4 Anti-inflammatory Medicines					
1	Sulfasalazine	Tablet	500mg		S	N
2	Sulfasalazine	Enema			S	N
	17.5 Antispasmodic Medicines					

1	Hyoscine Butylbromide	Tablet	10mg		1	N
2	Hyoscine Butylbromide	Injection	20mg/ml	amp,1ml	2	N
3	Drotaverine	Inj.	40mg	amp	2	N
4	Drotaverine	Tablet	40mg		1	N
	17.6 Laxatives					
1	Bisacodyl	Tablet	5mg		1	N
2	Lactulose	Oral Liquid	3.1-3.7g/5ml		2	E
3	Senna	Tablet	7.5mg		1	N
	17.7 Medicines used in Diarrhoea					
1	Oral Rehydration Salts	Powder	Dil. to 750ml/1000ml by	Sachet	1	V
2	Zinc Sulphate	Tablet	20mg		1	N
	18. Hormones, other Endocrine Medicines and Contraceptives					
	18.1 Adrenal Hormones and Synthetic Substitutes					
1	Dexamethasone (sodium phosphate)	Injection	4mg/ml	amp, 1ml	3	E
2	Fludrocortisone Acetate	Tablet	100mcg		4	V
3	Hydrocortisone	Tablet	10mg		4	N
4	Hydrocortisone (sodium succinate)	Pow. Injection	100mg	vial	3	V
5	Prednisolone	Tablet	5, 20mg		3	E
	18.2 Contraceptives					
1	Condoms				1	E
2	Copper-Containing Device	IUD			2*	E
3	Estrogen inj. (Estradiol valerate + Prasterone enanthate)	Injection	4/200mg		S	N
4	Estrogen cream	Cream			S	N
5	Ethinylestradiol +Levonorgestrel	Tablet	30/150mcg		1*	E
6	Levonorgestrel	Tab	0.03mg		1*	E

7	Levonorgestrel-Releasing implant	Implant	2-rod, Each=75mg (150mg total)		2*	E
8	Levonorgestrel-Releasing IUD	IUD	52mcg		2*	E
9	Norethisterone Enanthate	Oily Solution	350mcg/ml	amp/1ml	S*	E
10	Progesterone	Pills	35mcg		2*	E
	18.3 Estrogens					
1	Ethinylestradiol	Tablet	50mcg		S	N
	18.4 Progestogens					
1	Medroxyprogesterone Acetate	Injection	150mg/ml	Amp, 1ml	S	E
2	Norethisterone	Tablet	5mg		S	N
	18.5 Insulins and other Antidiabetic Agents					
1	Dapagliflozin	Tablet	5 , 10 mg		S	N
2	Desmopressin Acetate	Tablet	0.2mg		S	E
3	Empagliflozin	Tablet	10 , 25mg		S	N
4	Glibenclamide	Tablet	5mg		2#	E
5	Gliclazide	Tablet	80mg		3	E
6	Insulin (Intermediate-Acting)	Injection	100 IU/ml	vial,10ml	2#	V
7	Insulin (Soluble)	Injection	100 IU/ml	vial,10ml	2#	V
8	Insulin Mixtard (30/70)	Injection	100 IU/ml	vial,10ml	2#	V
9	Metformin HCL	Tablet	500, 1000mg		2#	N
	18.6 Thyroid Hormones and Antithyroid Medicines					
1	Carbimazole	Tablet	5mg		4	V
2	Levothyroxine (sodium)	Tablet	0.1mg		S	V
3	Propylthiouracil	Tablet	50mg		3	E
4	Potassium Iodide	Tablet	60mg		3	E
	19. Immunologicals					
	19.1 Diagnostic Agents					
1	Tuberculin (PPD)	Injection	10 IU/ml	amp, 1ml	S	E
	19.2 Sera and Immunoglobulins					

1	Antitetanus Immunoglobulin	Injection	500 IU	vial	4	V
2	Diphtheria Antitoxin	Injection	10,000 IU	amp,10ml	S	N
3	Hepatitis B immunoglobulin	Injection	200IU-500IU	Amp.	4	N
4	Rabies Immunoserum (hours)	Injection	200 IU/ml	amp, 5ml	3	V
5	Snake Venom Antiserum	Injection	polyvalent		3	V
	19.3 Vaccines Universal					
1	BCG Vaccine (Dried)	Injection	20 dose		1	V
2	Cholera vaccine	Oral drop	1 dose		1	V
3	Covid 19 vaccines	Injection	1 dose		1	V
4	Dengue vaccine	Injection	1 dose		1	V
5	Diphtheria anti toxin	Injection	1 dose		1	V
6	Diphth-Pertussis-Tetanus Vaccine	Injection	10 dose		1	V
7	Diphtheria-Tetanus Vaccine	Injection	10 dose		1	V
8	Human papilloma vaccine	Injection	1 dose		1	V
9	Influenzas vaccine	Injection	1 dose		1	V
10	Measles and Rubella Virus Vaccine	Injection	10 dose		1	V
11	Measles Vaccine	Injection	10 dose		1	V
12	Meningococcal Vaccine	Injection	10 dose		1	V
13	Penta Vaccine	Injection	1 dose		1	V
14	Pneumococcal Vaccine	Injection	1 dose		1	V
15	Poliomyelitis Vaccine	Injection	10 dose		1	V
16	Poliomyelitis Vaccine, live att.	oral Solution	10 , 20 dose		1	V
17	Retinol (Vit A)	SG Capsule	100,000, 200,000IU		1	V
18	Rota Vaccine	Injection	1 dose		1	V
19	Tetanus Toxoid Vaccine	Injection	10dose		1	V
20	Typhoid vaccine	Injection	1 dose		1	V
	Specific Groups/ Individuals:					
1	Hepatitis B Vaccine	Injection	single dose		4	E

2	Rabies Vaccine (verocell)	Injection	single dose set		2	V
	20. Muscle Relaxants and Antagonists					
1	Atracurium Besylate	Injection	10 mg/ml	amp, 5ml	4	V
2	Neostigmine Methylsulphate	Injection	2.5 mg/ml	amp, 10ml	4	E
3	Rocuronium Br,	Injection	10 mg/ml	amp, 5ml	4	V
4	Suxamethonium CL or Br	Injection	50 mg/2ml	amp , 2ml	3	V
5	Vecuronium Br.	Pow. Injection	10mg	Vial	4	V
	21. Ophthalmological Preparations					
	21.1 Anti-infective Agents					
1	Acyclovir	Eye Oint	3%	tube, 5 gr	S*	N
2	Ciprofloxacin	Eye Drops	0.3%		3	N
3	Erythromycin	Eye Oint	0.5%	tube, 5 gr	2	N
4	Gentamycin sulfate	Eye Drops	0.3%	btl, 5 ml	3	N
5	Moxifloxacin	Eye Drops	0.5%		3	N
6	Ofloxacin	Eye Drops	0.3%	btl, 10 ml	3	N
7	Tobramycin	Eye Drops	0.3%	btl, 5 ml	3	N
	21.2 Anti-inflammatory Agents					
1	Dexamethasone	Eye Drops	0.1%	btl, 5 ml	3	N
2	Diclofenac Sodium	Eye Drops	0.1%	btl, 5 ml	3	N
3	Naphazoline	Eye Drops	0.1%		3	N
4	Nepafenac	Eye Drops	0.1%		3	N
5	Olopatadines	Eye Drops	0.1%		3	N
6	Prednisolone sodium phosphate	Eye Drops	0.5%	btl, 5 ml	3	N
7	Sodium Cromoglicate	Eye Drops	2% - 4%	btl, 5 ml	3	N
	21.3 Anti fungal agents					
1	Econazole	Eye Drops	2%		4	N
2	Voriconazole	Eye Drops	1%		4	N
	21.4 Local Anaesthetics					
1	Tetracaine/ Amethocaine	Eye Drops	0.5%	btl, 10ml	S	N

	21.5 Miotics and Anti-glaucoma Medicines					
1	Acetazolamide	Tablet	250mg		4	N
2	Latanoprost	Eye Drop	0.005%		S	N
3	Pilocarpine	Eye Drop	2%	btl, 5 ml	4	E
4	Timolol	Eye Drop	0.1 - 0.5%	btl, 5 ml	S	N
	21.6 Mydriatics					
1	Atropine Sulfate	Eye Drop	1, 0.5 %	btl, 10 ml	S	V
2	Cyclopentolate	Eye Drop	1%		S	N
3	Tropicamide	Eye Drop	0.5%-1%	btl, 5 ml	3	N
	22. Oxytocics and Antioxytocics					
1	Carbetocin	Injection	100mcg/ml	amp.	3*	E
2	Methylergometrine Maleate	Tablet	0.2mg		2*	E
3	Methylergometrine Maleate	Injection	0.2mg/ml	amp, 1ml	3*	E
4	Mifepristone	Tablet	200mg		3*	E
5	Misoprostol	Tablet	200mcg		3*	E
6	Nifedipine	Capsule	10mg		3*	E
7	Oxytocin	Injection	10 IU/ml	amp, 1ml	3*	E
8	Salbutamol	Tablet	2 , 4mg		3*	E
	23. Dialysis					
	23.1 Haemodialysis					
1	Acid Bicarbonate	Solution	4-10 Litre	Canister	S*	V
2	Biopsy Needle	needle		Set	S*	V
3	Blood Line (A/V set)	Line		Set	S*	V
4	Dialysis Fistula Canula Needle (Arterial)			Set	S*	V
5	Dialysis Fistula Canula Needle (Venous)			Set	S*	V
6	Dialysis Machine Disinfectant	Solution			S*	V
7	Double Lumen Catheter	Catheter	Diff. Sizes	Set	S*	V
8	Haemodialysis Filter (High Flux)	Filter			S*	V
9	Haemodialysis Filter (Low Flux)	Filter			S*	V

10	Haemodialysis Machine w/Spare Parts			Machine	S*	V
11	Haemodialysis Patient Chair w/ Spare Parts			Chair	S*	V
12	Patient Data Management System (Hardware, Software)				S*	V
13	Ph Indicator Test Strips	Strips		Pack	S*	V
14	Sodium Bicarbonate ($NaHCO_3$)	Powder	600-1000 gm	Cartridge	S*	V
15	Sodium Chloride	Inj. Solution	0.9%	BAG/0.5-	S*	V
16	Softener Regeneration Salt Tablet				S*	V
17	Ultrapure Dialysate Filter	Filter			S*	V
18	Water Treatment Unit Disinfectant	Solution			S*	V
19	Water Treatment Unit w/Spare Parts			Unit	S*	V
	23.2 Continuous Renal Replacement Therapy (CRRT)/ Acute Dialysis					
1	CRRT/ Haemofilteration/ Multifilterate Machine w/Spare Parts			Machine	S*	V
2	Filterate Bag	Bag			S*	V
3	Haemofilteration Solution	Solution	Diff. Concentration	5-10Ltre	S*	V
4	Haemofilter	Filter			S*	V
5	Plasma Filter	Filter			S*	V
	23.3 Peritoneal Dialysis Solution					
1	Continuous Ambulatory Peritoneal Dialysis Machine (CAPD)				S*	V
2	Paediatric Peritoneal Dialysis System				S*	V

3	Patient Data Management System (Hardware, Software)				S*	V
4	Peritoneal Dialysis Consumables/ Accessories				S*	V
5	Peritoneal Dialysis Machine (APD)	Machine			S*	V
6	Peritoneal Dialysis Solution	Solution			S*	V
	24. Psychotherapeutic Medicines					
1	Amisulpride	Tablet	200mg		3	N
2	Amitriptyline HCL	Tablet	25mg		4	E
3	Aripiprazole tab	Tablet	10m		S	N
4	Chlorpromazine HCL	Tablet	100mg		4	V
5	Chlorpromazine HCL	Injection	25mg/ml	amp, 2ml	3	V
6	Clomipramine HCL	Capsule	25, 50mg		S	N
7	Clozapine	Tablet	2, 4mg		S	E
8	Diazepam	Tablet (scored)	5mg		3	E
9	Diazepam	Injection	5mg/ml	amp, 2ml	3	V
10	Fluoxetine HCL	Tablet	20mg		S	E
11	Flupenthixol + Melitracen	Tablet	0.5mg+10mg		2	N
12	Fluphenazine Decanoate	Injection	25mg/ml	amp, 1ml	S	E
13	Haloperidol	Tablet (scored)	5mg		S	E
14	Mirtazapine	Tablet	15mg		3	N
15	Olanzapine	Tablet	5 , 10mg		S	E
16	Promethazine	Injection	25mg		2	N
17	Risperidone	Tablet (scored)	2 , 3mg		S	E
18	Sertraline	Tablet	50mg		3	N
19	Trihexyphenidyl	Tablet	2mg		3	E
	25. Medicines Acting on the Respiratory Tract					
	25.1 Antiasthmatic Medicines					
1	Aminophylline	Injection	25mg/ml	amp,10ml	2	V

2	Beclomethasone Dipropionate	Inhalation	50mcg/dose	200 doses	S#	E
3	Budesonide + Formoterol	Dry pow. inhaler	100mcg+6mcg/dose		2#	V
4	Ketotifen fumarate	Tablet	1mg		S#	E
5	Salbutamol	syrup	2mg/5ml	btl, 100ml	2#	E
6	Salbutamol	Tablet (scored)	4mg		2#	V
7	Salbutamol Sulphate	Respirator Sol.	5mg/ml	By nebulizer	2#	V
8	Salbutamol Sulphate (Albuterol)	Aerosol	100mcg/dose		2#	V
9	Sodium Cromoglicate	spinhal	20mg/dose	set+caps	S#	N
10	Theophylline SR	Tablet	200mg		2#	E
	26.Solutions Correcting Water, Electrolyte and Acid-base Disturbances					
1	Glucose	Inj. Solution	40 , 50%	amp, 20ml	3	V
2	Glucose	Inj. Solution	5 , 10 %	0.5 ltr	2	V
3	Glucose+Sodium Chloride	Inj. Solution	5%+0.9% , 5%+0.45%		2	E
4	Hypertonic Solution (Sodium chloride)	Inj. Solution	3 %		4	V
5	Oral Rehydration Salt	Powder	Dil. to 750ml	Sachet	1	V
6	Potassium Chloride	Sol. for Dilution	7.5, 15 %		3	V
7	Sodium Bicarbonate	Injection	8.4%	10-20ml	S	V
8	Sodium Chloride	Inj. Solution	0.9%	0.5-1ltr	2	V
9	Sodium Lactate (Ringer's lactate)	Inj. Solution	compound	0.5 ltr	2	V
10	Water for Injection	Injection		5-10ml	4	V
	27. Vitamins and Minerals					
1	Alfacalcidol	Capsule	0.25, 1mcg		4	N
2	Ascorbic Acid	Tablet	50mg		3	N
3	Ascorbic Acid	Injection	500mg		3	N
4	Calcium Carbonate	Tablet	600mg		2	N
5	Calcium Gluconate	Injection	100mg/ml	amp,10ml	4	N
6	Multivitamin	Tablet/Cap			2	N

7	Phytomenadione (vit k1)	Tablet	10mg		S	N
8	Phytomenadione (vit k1)	Injection	10mg/ml	amp, 1ml	4	N
9	Pyridoxine HCL	Injection	100mg		4	N
10	Pyridoxine HCL	Tablet	25mg		4	N
11	Retinol (Vit A)	SG Capsule	100,000, 200,000IU		2	V
12	Vitamin B Complex	Injection		amp, 2ml	2	N
	28. Antiviral Medicines					
	28.1 Antiherpes Medicines					
1	Acyclovir	Tablet	200, 400, 800mg		4	E

	28.2 Antiretrovirals Based on current evidence and experience of use, medicines in the following classes of antiretrovirals are included as essential medicines for treatment and prevention of HIV (prevention of mother-to-child transmission, pre-exposure prophylaxis (where indicated) and post-exposure prophylaxis). WHO emphasizes the importance of using these products in accordance with global and national guidelines. WHO recommends and endorses the use of fixed- dose combinations and the development of appropriate new fixed-dose combinations, including modified dosage forms, non-refrigerated products and paediatric dosage forms of assured pharmaceutical quality. Scored tablets can be used in children and therefore can be considered for inclusion in the listing of tablets, provided that adequate quality products are available.					

	Nucleoside/ Nucleotide Reverse Transcriptase Inhibitors					
1	Lamivudine (3TC)	Oral liquid	50mg/5ml		4	E
2	Lamivudine (3TC)	Tablet	150mg		4	E
3	Zidovudine (ZDV or AZT)	Capsule	100, 250mg		4	E
4	Zidovudine (ZDV or AZT)	Oral liquid	50mg/5ml		4	E
5	Zidovudine (ZDV or AZT)	Tablet	300mg		4	E
	Non-nucleoside Reverse Transcriptase Inhibitors					
1	Efavirenz (EFV)	Tab 30	200 mg		4	E
2	Nevirapine (NVP)	Oral liquid	50mg/5ml		4	E
	Protease Inhibitors					
1	Darunavir+ Ritonavir (DAR/r)	Tab 60	600 – 100 mg		4	E
2	Lopinavir/Ritonavir (LPV/r)	Oral granules	40-10 mg		4	E
3	Lopinavir/Ritonavir (LPV/r)	Tab 60	100-25 mg		4	E
4	Lopinavir/Ritonavir (LPV/r)	Tab 120	200-50 mg		4	E
	Integrase Inhibitors					
1	Dolutegravir (DTG)	Tab 30	50 mg		4	E
2	Raltegravir (RAL)	Oral granules	10 mg/ml		4	E
3	Raltegravir (RAL)	Tab 60	25 or 100mg		4	E
	FIXED-DOSE COMBINATIONS					
1	Abacavir/Lamivudine (ABC/3TC)	Tab 60	600-300 mg		4	E
2	Abacavir/Lamivudine (ABC/3TC)	Tab 60	120-60 mg		4	E
3	Tenofovir/ Emtricitabine (TDF/ FTC)	Tab 30	300-200 mg		4	E
4	Tenofovir/ Emtricitabine/ Efavirenz (TDF/FTC/EFV)	Tab 30	300-200-600 mg		4	E

5	Tenofovir/ Lamivudine/ Dolutegravir (TDF/3TC/DTG)	Tab 30	300-300-50 mg		4	E
6	Zidovudine/ Lamivudine (AZT/3TC)	Tab 60	60-30 mg		4	E
7	Zidovudine/ Lamivudine (AZT/3TC)	Tab 60	300-150 mg		4	E

ANNEEX 3
Table of specific antidotes and poisons treatment

TOXIC AGENT	ANTIDOTES AND SPECIFIC TREATMENTS ADULT DOSES are given for most drugs. This table is not intended for individual patient care. Please call the Missouri Poison Center for specific recommendations for an individual patient.
Acetaminophen	Acetylcysteine ORAL: (diluted to 5% solution): All ages: Loading: 140 mg/kg Maintenance: 70 mg/kg every 4 hrs for 5 doses starting 4 hrs after loading dose. MAX dose is for ³ 100 kg patient weight. OR Acetylcysteine (Acetadote®) IV: IM-PORTANT: IV dosing regimens vary, check with your institution. FDA-approved dosing, All ages: #1: 150 mg/kg infuse over 1 hr; then #2: 50 mg/kg infuse over 4 hrs; then #3: 100 mg/kg infuse over 16 hrs. MAX dose is for ³ 100 kg patient weight.
Anticholinergic Delirium	Benzodiazepines: First-line treatment. Physostigmine (Antilirium®) IV/IM: Use with caution. Adult: 0.5-1 mg over 5-10 min by slow IV push. May repeat dose in 10-15 min if delirium persists and cholinergic excess is not present. Maximum dose 2 mg total during the first hour.

Arsenic	Dimercaprol (BAL in Oil®) Deep IM Only; for severe acute poisoning: All ages: 2.5-3 mg/kg every 4 hrs on Days 1-2, then a tapering schedule. Switch to Succimer as soon as tolerated. OR Succimer (Chemet®) ORAL (Off label, All ages): 10 mg/kg every 8 hrs for 5 days; then 10 mg/kg every 12 hrs for 14 days.
Benzodiazepine	Flumazenil IV: Not recommended for intentional overdose; may precipitate seizures. Adult: Initial 0.2 mg over 30 seconds; if needed, give additional 0.3 mg dose over 30 seconds Repeat doses: 0.5 mg over 30 seconds at 1 min intervals PRN to MAX cumulative dose of 3 mg
Beta Blocker	Glucagon (GlucaGen®) IV: 3-5 mg bolus slow IV push; If no response, repeat in 5-10 min up to total dose 10 mg. Immediately start continuous infusion at an hourly rate equal to effective bolus dose. High-Dose Insulin Euglycemic Therapy (HIET): Consider if other therapy is failing. See Calcium Channel Blocker below for dosing
Botulism, Infant	BabyBIG® Botulism Immune Globulin IV (Human): 100 ± 20 mg per vial; Dose 50 mg/kg Available from California Department of Health, Infant Botulism Treatment & Prevention Program

Botulism, Other	Botulism AntiToxin Heptavalent (equine) Types A-G ("BAT"): All ages: 1 vial; weight based dosing. Call state Department of Health, which will contact CDC to obtain BAT from nearest CDC cache.
Calcium Channel Blocker	Calcium Chloride 10% IV OR Calcium Gluconate 10%: Initial: 0.2 to 0.6 mEq/kg bolus of Ca2+; Repeat Bolus every 15-20 min as needed, up to 3-4 doses. If needed, follow bolus dosing with a continuous infusion: 0.2 to 0.6 mEq/kg per hour of Ca2+; titrate based on response. High-Dose Insulin Euglycemic Therapy (HIET): D50W initial bolus if Blood Glucose < 200 mg/dL; maintain Blood Glucose at 100-200 mg/dL. Regular Insulin IV: Initial Loading: 0.5-1 unit/kg; followed immediately by Maintenance continuous infusion at 0.5-1 unit/kg per hour (match loading dose). If no BP response to insulin bolus in 20 min, repeat insulin bolus at a higher dose, and raise the infusion rate to match the re-bolus dose. Bolus dose and hourly infusion rate may be as high as 10 units/kg and 10 units/kg per hour or even higher in severe poisoning cases. Calcium channel blocker poisoning causes severe insulin resistance
Carbamate Insecticides	Atropine IV: for muscarinic effects of excessive secretions, bradycardia, diarrhea, etc.Adult: 1-2 mg slow IV push. Repeat if needed
Chloroquine Hydroxychloroquine	High-dose Diazepam for severe cardiotoxicity: All ages: 1-2 mg/kg infused over 30 min, followed by 1 mg/kg total over the next 24 hours by continuous infusion or by 0.08 mg bolus every 2 hrs.

Clonidine	Naloxone IV: All ages: Initial: 5 mg IV. If inadequate response after 2-3 min, repeat 5 mg IV.
Cyanide	Hydroxocobalamin (Vitamin B12-a, Cyanokit®) IV: preferred in fire victims with concurrent CO poisoning. Adult: 5 grams over 15 min; May repeat 5 grams over 15-120 min for severe toxicity. OR Sodium Nitrite/Sodium Thiosulfate Kit (Nithiodote®) IV: Adult: Sodium nitrite 300 mg (10 mL) at 2.5-5 mL/min; then Na thiosulfate 12.5 grams (50 mL) at 5 mL/min. May repeat HALF dose if symptoms return
Digoxin or other Cardiac Glycoside drugs or botanicals	Atropine IV: for bradycardia or AV block: 0.5-1 mg every 3-5 min; MAX total dose: 3 mg. Digoxin Immune Fab (DigiFab®) IV: Dose (in vials) = Serum Digoxin Level (ng/mL) x Weight (kg) ÷ 100 (Round up to nearest whole vial.) Use HALF - dose or 2 vials initially in patient who needs therapeutic digoxin effect then reassess.
Drug-Induced Dystonic Reaction	Benzodiazepines IV or IM: Adjunct treatment for acute dystonia. Diphenhydramine IV or IM or ORAL: All ages: 0.5-1 mg/kg (MAX single dose 50 mg)

Ethylene Glycol	Fomepizole IV: All ages: Loading Dose: 15 mg/kg; then Maintenance Dose: 10 mg/kg every 12 hrs for 4 doses, then 15 mg/kg every 12 hrs until ethylene glycol or methanol levels < 20 mg/dL. Adjust dose during dialysis. OR Ethyl Alcohol PO if fomepizole not available. Discontinue PO ethanol once fomepizole is available.
Heparin UFH and LMWH	Protamine Sulfate IV: Give by slow IV over 10 min. MAX single dose 50 mg: 1 mg for every 100 units of heparin remaining in the patient; 1 mg for every 1 mg of enoxaparin; 1 mg for every 100 anti-Xa IU of dalteparin or tinzaparin.
Hydrofluoric Acid Dermal exposure	Calcium Gluconate Gel 2.5% (Calgonate®, H-F Gel®): Apply liberally to burn until pain resolution. Alternative: 1 g calcium gluconate mixed with 40 mL water-soluble lubricant. Alternative: 500-600 mg calcium carbonate tabs crushed & mixed with 20 mL water-soluble lubricant.
Iron Acute overdose	Deferoxamine (Desferal®) IV: for significantly symptomatic acute overdose. All ages: Start slowly at 5-10 mg/kg per hour and increase to 15 mg/kg per hour for 8-12 hrs, MAX 6 grams/day

Isoniazid (INH)	Benzodiazepines IV: Use with Vitamin B6 for management of seizures. Pyridoxine (Vitamin B6) IV: All ages: 1 gram for each gram of INH ingested to MAX 5 gram single dose by slow IV push. If INH ingested is unknown, use 5 g pyridoxine. May repeat as needed until seizures controlled.
Lead	Succimer (Chemet®) ORAL: for BLL > 45 mcg/dL in Child or > 80 mcg/dL in Adult. All ages: 10 mg/kg every 8 hrs for 5 days; then 10 mg/kg every 12 hrs for 14 days, in a lead-free environment. Combination parenteral chelators, reserved for BLL ≥ 70 mcg/dL in patients with lead encephalopathy. Dimercaprol (BAL in Oil®) IM only: 3-4 mg/kg/dose every 4 hrs for 2-7 days. Use in conjunction with Calcium Disodium EDTA. Calcium Disodium EDTA (Versenate®) IV or Deep IM: (Begin treatment with 2nd dose of Dimercaprol.) 25 mg/kg/day IV over 8-12 hrs for 5 days. Max daily dose: Child: 1,000 mg, Adult: 2,000-3,000 mg.
Local Anesthetic (Systemic Toxicity)	Lipid Emulsion 20% (Intralipid®) IV: All ages: Bolus: 1.5 mL/kg (MAX: 100 mL) 20% lipid emulsion over 1-3 min; may repeat bolus for persistent asystole or pulseless electrical activity. Immediately follow with 0.25 mL/kg per min by continuous infusion to total dose of 8-10 mL/kg (MAX: 1 liter), usually 30-60 min.
Mercury	Succimer (Chemet®) ORAL: All ages: 10 mg/kg every 8 hrs for 5 days; then 10 mg/kg every 12 hrs for 14 days. Dimercaprol (BAL in Oil®) Deep IM: Initial dose: 5 mg/kg for 1 dose. Subsequent doses: 2.5 mg/kg, once or twice daily for 10 days OR Switch to Succimer when tolerated.

Methanol	Fomepizole IV: See Ethylene Glycol above for dosing. OR Ethyl Alcohol PO if fomepizole not available. Discontinue PO ethanol once fomepizole is available
Methemoglobin	Methylene Blue (Provayblue®) IV: All ages: Initial: 1 mg/kg IV over 5-30 min; Repeat dose: 1 mg/kg after 1 hr if methemoglobin > 30%.
Opiate/Opioid	Naloxone IV or IM or Sub-Q: Adult: 0.4 to 2 mg (MAX 10 mg); Repeat every 2-3 min as indicated by response. Continuous infusion of 2/3 of total initial bolus per hour if needed, for long acting opioid agents.
Oral ingestions, Various	Activated Charcoal (Actidose Aqua®) ORAL: Limited indications: If patient presents within 1-2 hrs of a significant ingestion and has not/will not develop CNS depression or vomiting, can consider administration of aqueous charcoal suspension. Infant: 1 gram/kg; Child: 25 grams; Teen & Adult: 50-100 grams

Organophosphate Insecticides	Atropine IV: for management of muscarinic symptoms. Diazepam IV: Adjunct for management of CNS symptoms (confusion, agitation, seizures). Pralidoxime (Protopam®) IV: adjunct treatment with atropine and diazepam for severe skeletal muscle nicotinic effects (muscle fasciculation, weakness, poor respiratory effort): Initial: 30 mg/kg over 15-30 min (MAX: 2,000 mg). A 2nd dose can be given in 1 hour, and additional doses every 10-12 hrs if muscle weakness persists.
Sulfonylurea Oral Hypoglycemic Drugs	Dextrose IV: treatment as needed to correct hypoglycemia. Octreotide (SandoStatin®) Sub-Q: adjunct for recurrent hypoglycemia after initial dextrose dose. Adult: 50 mcg Sub-Q; repeat every 6-12 hrs if hypoglycemia recurs; 2-3 doses usually sufficient.
Warfarin/related anticoagulants	Vitamin K1 (Phytonadione) IV, Mephyton® ORAL: Initial: 2.5-10 mg; Repeat: every 12-24 hrs if needed. Modify dosage based on INR and clinical condition.

ABBREVIATIONS

ACE	Angiotensin converting enzyme	ADR	Adverse drug reactions
AF	Atrium fibrillation	AIDS	Acute Immuno Defiency Syndrome
AMI	Acute Myocardial Infarction	amp	Ampoule
AOM	Acute Otitis Media	APH	Antepartum hemorrhage
ARI	Acute Respiratory Infections	ARV	Anti-rabies vaccine
ATI	Anti-tetanus immunoglobulin	BCG	Bacillus Calmette-Guérin (TBC vaccine)
BP	Blood pressure	BP	British Pharmacopoea
BSA	Body surface area	btl	Bottle
caps	Capsule	CHD	Congestive Heart Disease
CHF	Congestive heart failure	cont	Container
CSF	Cerebro-spinal fluid	CVA	Cardiovascular accident
DPT	Diphtheria, Pertussis, Tetanus vaccine	dr	Drops
DVT	Deep venous thrombosis	EB	Ethambutol
ECG	Electrocardiogram	EDL	Essential Drugs List
EPI	Expanded Programme of Immunizations	ESR	Erythrocyte sedimentation rate
FBS	Fasting Blood Sugar	gr	Gram
Hb	Haemoglobin	HCl	Hydrochloride
HDC	Human Diploid Cell (rabies vaccine)	HF	Health Facility
HRIG	Human Rabies Immunoglobulin	HTN	Hypertension
HU	Health Unit	ICP	Intracranial pressure
ICU	Intensive Care Unit	IE	Infective Endocarditis
i.v	Intravenous	i.m	Intramuscular
INH	Isoniazid	inj	Injection
IU	International unit	IUD	Intra-uterine device
Kg	Kilogram	L	Authorized level of use
LP	Lumbar Puncture	mcrgr	microgram
MDR	Multiple Drug Resistance	ml	Mililitre
MoPH	Ministry of Public Health	MU	Mega (international) unit
NSAID	Non-steroidal anti-inflammatory drugs	NTP	National Tuberculosis Program
Oint	Ointment	OPD	Out-patient department
OPV	Oral Poliomyelitis vaccine	ORS	Oral Rehydration Salts
PHC	Primary Health Care	PID	Pelvic Inflammatory Disease
pow	Powder	PPH	Postpartum hemorrhage
PVP	Polyvinylpyrolidon (povidone)	2 PPBS	2 hour Post-Prandial Blood Sugar
RF	Rheumatic fever	RHD	Rheumatic heart disease
ROY	Republic of Yemen	RUD	Rational Use of Drugs
RVF	Rift Valley Fever	s/c	Subcutaneous
Sol	Solution	SR	Slow release

YTG	Yemen Treatment Guidelines	Susp	suspension
Tab	Tablet	TB/TBC	Tuberculosis
TTV	Tetanus toxoid vaccination	TSH	Thyroxine Stimulating Hormone
URTI	Upper respiratory tract infection	VMPF	Victorian Medical Postgraduate Foundation (Australia)
WHO	World Health Organization	YEM-DAP	Yemen Drug Action Programme
HG	Health Guides	NICE	National Institute of Medical excellence
MA	Medical Astants		

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Yemen Treatment Guidelines

& ESSENTIAL MEDICINES LIST

Signs and symptoms vary, some or all may be present, seek medical assistance.

Meningococcal
fever / headache
irritability / fretfulness
refusing to feed / loss of appetite
neck stiffness / sore and aching grunting / moaning /slurred speech extreme tiredness / floppiness / collapse nausea / vomiting / diarrhoea
eyes sensitive to light
convulsions / twitching
rash of red / purple pinprick spots or larger bruises

Whooping Cough
severe cough occurs in bouts 'whooping' sound
breathing in vomiting after a coughing bout
stop breathing momentarily may turn blue

Bronchitis
sore throat / blocked nose
fever and chills / aches and pains tiredness / headaches
difficulty breathing
tight chest / wheeziness
dry cough, then cough with phlem

Meningitis
eyes sensitive to light neck stiffness / joint pain
drowsiness
vomiting
fever / headache blotchy skin or rash

Mumps
fever
headache
fatigue
weight loss
pain when swallowing
swollen gland/s (in front of ear)- does not fade with pressure

Phlegm
Refer to 'Staying Healthy; Preventing Infectious Diseases in Early Childhood Education and Care Services'

Chicken Pox
mild fever & generally unwell
intensely itchy rash
blisters start on body move to head and limbs
possible ulcers in mouth
blisters burst and form scabs

Tonsilitis
sore throat / difficulty swallowing swollen glands under each side of jaw fever
bad breath
swollen tonsils, may have white or yellow pus

Epiglottitis
sore throat / difficulty swallowing difficulty talking
hoarse voice
fever
very sick looking drooling
stridor

Worms
itchy bottom restless sleep teeth grinding in sleep

Ear Infection
pulling at ear partial hearing loss irritability
fever
loss of balance loss of appetite

Croup
usually starts with a cold
noisy high pitched breathing
harsh barking cough difficulty breathing

Measles
fever & generally unwell runny nose
dry cough
sore red eyes
red and bluish spots in mouth
red spreading rash starts on face