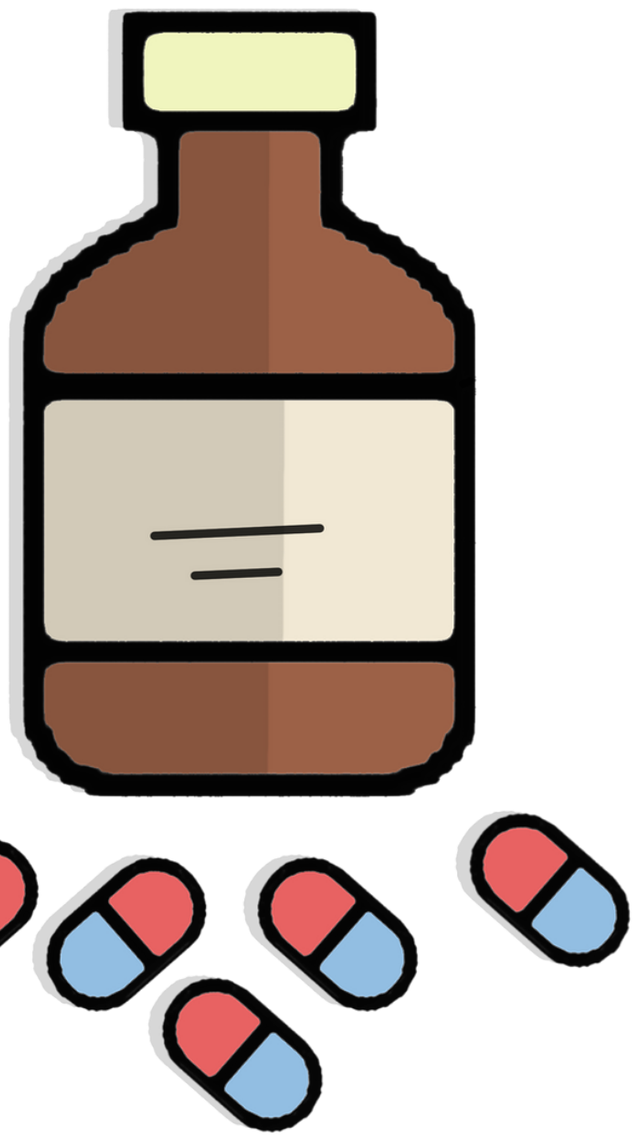
Treatment Manual

FOR FAMILY MEDICINES PRACTITIONERS

كتيب العلاج لممارسي طب الأسرة

2020



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for Family Medicine Practitioners

2020

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Prepared by National Medical Supplies Fund - Red Sea State, under the supervision of Ministry of Health R.S.S, with the support of AISPO and funded by the Italian Agency for Development Cooperation – August 2020

This publication "Treatment Manual for Family Medicine Practitioners" has been realized by the National Medical Supplies Fund-Red Sea State with the support of AISPO within the project DICTORNA AID 11118 funded by the Italian Agency for Development Cooperation.

هذا المنشور" كتيب العلاج لممارسي طب الأسرة ""تم تنفيذه من قبل الصندوق القومي للامدادات الطبية-البحر الاحمر بدعم من AISPO ضمن مشروع DICTORNA AID 11118 بتمويل من الوكالة الإيطالية للتعاون الإنمائي

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It is an honour to introduce *Treatment Manual for Family Medicine Practitioners 2020* concerning the common diseases in the Red Sea State.

The objectives are to provide quality, safe, and affordable medicines and also ensure the correct use of medicines at primary health care level.

We would like to stress that all Family Medicine Practitioners will benefit from the use of this document.

Gratitude goes to the Manual development task force for this valuable document.

Furthermore, we are thankful to the Italian Agency for Development Cooperation and AISPO for providing technical and financial support to develop this important manual.

Dr. Zaafran M. Ahmed El Zaki
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List of abbreviations

AA	Aldosterone antagonist
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A1C	Glycated haemoglobin
ACE	Angiotensin-converting enzyme
ACS	Acute Coronary Syndrome
AD	Alzheimer Disease
AL	Artemether-lumefantrine
ARB	Angiotensin II receptor blocker
BB	Beta blockers
CKD	Chronic kidney disease
COPD	Chronic Obstructive Pulmonary Disease
DM	Diabetes mellitus
FPG	Fasting Plasma Glucose
HF*p*EF	Heart failure with preserved ejection fraction
HF*r*EF	Heart failure with reduced ejection
HTN	Hypertension
ICS	Inhaled corticosteroid
LABA	long acting B2 agonist
LTM	leukotriene Modifier
MI	Myocardial Infarction
PAD	Peripheral arterial disease
SSRI	Selective Serotonin Reuptake Inhibitors
TIA	Transient ischemic attack

Foreword

The *Dictorna initiative* funded by the Italian Agency for Development Cooperation aims to provide both technical and financial support to the relevant Sudanese health institutions at Federal and State level for the promotion and integration of the *family medicine approach* in the Sudanese health system. Family health is characterized as a model to achieve people centered holistic healthcare for persons of all ages. *Family medicine*, in particular, is characterized by comprehensive, continuous, coordinated, collaborative, individual, family and community-oriented services, comprehensive medical care with a particular emphasis on the family unit, integrating biomedical, behavioral and social sciences, education and research.

Our main commitment in partnership with our Sudanese counterpart is to contribute to the improvement of the health of the population through the strengthening of the Primary Health Care System (PHC). We strongly believe that wealthy condition of the population contributes to social cohesion and stability and we are working tightly with our Sudanese friends in order to achieve the Universal Health Coverage in Sudan in line with the SDG #3 "*Ensure healthy lives and promote wellbeing for all at all ages*" and with the Agenda for Humanity "*Leave No One Behind*" responsibility.

This manual represents a tangible result of the collaboration between the Italian Cooperation system and the relevant Red Sea State health institutions with which we have established a long-lasting relationship of mutual satisfaction and esteem.

Khartoum, July 5th 2020

Vincenzo Racalbuto
Head of Office
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Preface

The Ministry of Health, Red Sea State, through its branch of the National Medical Supplies Fund (NMSF), remains committed to ensuring the access to quality assured affordable medicines for all citizens of the State. It is expected that these medicines would be used appropriately. Achieving these objectives requires, among others, appropriate and thoughtful prescribing, dispensing and use of medicines. This manual has been developed in collaboration with AISPO and the Italian Cooperation Office in Khartoum. Great thanks to them for their technical and financial supports and for their efforts for improving health services at Red Sea State.

Dr. Iqbal Mukhtar
Head of NMSF
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Introduction

There are published Treatment Guidelines for Community Health Workers and Medical Assistants. Although the impact of these publications on prescribing practice is not scientifically evaluated in Sudan, the feedback reveals that these guidelines are useful in promoting appropriate use of medicines. In the light of this positive feedback and the evidence published elsewhere on the positive impact of Standard Treatment Guidelines (STG) on the appropriate use of medicines, this manual has been developed. It has been prepared as a tool to assist and guide family medicine practitioners (FMP), who prescribe at primary care facilities in providing quality care to patients. It has been reviewed in response to new knowledge on medicines and diseases and the epidemiology of diseases in the Red Sea State.

The manual lists the preferred treatments for common health problems experienced by the citizens of the Red Sea State. The manual is designed to be used as a guide to treatment choices and as a reference book to help FMPs in the overall management of patients, such as when to refer. The guidelines are meant to be used by the FMPs at all levels within the health system, both public and private. It is recognized that the treatment guidance detailed in this booklet may differ from the FMPs' current practice. It is emphasized that the choices described here have the weight of scientific evidence to support them, together with the collective opinion of recognized FMPs and experts in clinical pharmacy.

Hypertension

Classification of Hypertension

Patient classification and management in adults (table 1) [2,3].

Table 1: Classification of BP and Hypertension and Recommended action

Classification	SBP (mm Hg)		DBP(mmHg)	Recommended response
Normal	<120	And	<80	Recheck every year if the age above 40 years
Pre hypertension	130-139	And	80-89	Recheck every 6 months (treat if DM or CKD)
Stage 1	140-159	And/or	90-99	Check every week for 1 month (treat if DM or CKD)
Stage 2	160-179	And/or	100-119	Confirm with two readings within 1 weak
Severe hypertension	>180	And/or	>120	Treat and refer to specialist

Pharmacological Goal BP values

Goals of Pharmacologic Therapy in Patients with HTN According to Clinical Condition are:

- ✓ <140/90 for most patients;
- ✓ <130/80 for patients with diabetes mellitus, (DM), significant chronic kidney disease(CKD), known coronary artery disease, non-coronary atherosclerotic vascular disease (ischemic stroke, transient ischemic attack [TIA], peripheral arterial disease [PAD], abdominal aortic aneurysm), or ≥10% Framingham 10-year risk of fatal coronary heart disease or nonfatal Myocardial Infarction(MI), and heart failure.

Non pharmacological management

Effects of lifestyle modifications on BP shown in (Table 2) [2, 3].

Table 2: Recommended Lifestyle Modifications

Modification	Recommendation	Approximate SBP reduction
Weight reduction	Maintain a normal body weight (BMI 18.5–24.9 kg/m2)	5–20 mm Hg per 10 kg weight loss
Adopt DASH eating plan (includes substantial K intake)	Consume a diet rich in fruits, vegetables, and low-fat dairy products with a reduced content of saturated and total fat	8–14 mm Hg
Reduce Na intake	Reduce Na intake to < 1500 mg/day [2]	2–8 mm Hg
Physical activity	Engage in regular aerobic physical activity such as brisk walking (at least 30 min/day most days of the week)	4–9 mm Hg

DASH = Dietary Approaches to Stop Hypertension

Pharmacological management

- ✓ Initiating therapy with a single antihypertensive drug is reasonable in adults with stage 1 Hypertension (HTN) and a BP goal of less than 130/80 mm Hg.
- ✓ Initiating antihypertensive drug therapy with two first-line agents of different classes is recommended in adults with stage 2 HTN and an average BP greater than 20/10 mm Hg above their BP target.

Monotherapy

First-line agents are Calcium Channel Blockers (*CCBs*), if not tolerated or high risk heart failure give thiazide related diuretics [1, 2].

Combination therapy:

- ✓ First step: CCBs or Thiazide +ACEI/ARB at low doses;
- ✓ Second step: CCBs or Thiazide +ACEI/ARB at full doses;
- ✓ Third step: CCBs + Thiazide +ACEI/ARB [1, 2, 3];
- ✓ Forth step: Add low-dose spironolactone, or use high-dose thiazide related diuretic, alpha-blocker or a beta-blocker [1].

First-line agents (Initial medication choice) for patients with comorbidities are described in the table below [2].

Table 3: First-line agents for patients with comorbidities

Compelling indication	Initial medication/s
Diabetes	ACEI, ARB, CCB or thiazide.
CKD	ACEI or ARB
Stroke or TIA	Thiazide, ACEI, or ARB
Coronary disease	BB + ACEI or ARB
HF*r*EF	ACEI, ARB ; BB; AA; as needed diuretic
HF*p*EF	Diuretic

ACE inhibitors: Captopril, Lisinopril, Enalapril and Ramipril.
ARB: Losartan, Candisartan, Valsartan.
CCB: Nifedipine, Amlodipine, Felodipine.
Thiazide: Chlorthalidone, Hydrochlorothiazide, Indapamide.
BB: Atenolol, Propranolol, Bisoprolol.
AA: Spiranolactone.

- ✓ An interval of at least 4 weeks should be allowed to determine response [1].
- ✓ Titrate to the maximum tolerated dose at each step of treatment.
- ✓ For more details about drug's preparation and its available strength, see (table 13).

Other drugs in the management of antihypertensive patient:
- ✓ Aspirin;
- ✓ Statins.

Considerations with specific antihypertensive agents:
- ✓ β-Blockers: Caution with asthma or severe Chronic obstructive pulmonary disease, DM (it can mask symptoms of hypoglycaemia);
- ✓ Thiazides: Can worsen gout;
- ✓ ACE inhibitors and ARBs: Contraindicated in pregnancy, Contraindicated with bilateral renal artery stenosis, and Monitor K closely;
- ✓ Calcium channel blockers: Monitor Dihydropyridine CCB for peripheral edema, reflex tachycardia, and orthostatic hypotension;
- ✓ Women: Oral estrogen-containing contraceptives can increase BP, and preferred medications for pregnant women include methyldopa, nifedipine and labetalol [2].

Diabetes Mellitus

Glycaemic therapy goals

- ✓ A1C less than 7.0% Obtain every 3- 6 months [1, 2].
- ✓ FPG or premeal 80–130 mg/dl.
- ✓ Postprandial glucose less than 180 mg/dl [2].

Blood-glucose concentration should be monitored at least four times a day, including before each meal and before bed [1].

Non pharmacological management

Life style modification and weight reduction for overweight patient ranging between 5-10% of body weight at time of diagnosis:

- ✓ Increased physical activity and structured exercise training with a minimum of 150 minutes/week;
- ✓ A diet consisting of restricted calorie and saturated animal fat content. Simple sugars are excluded with encouragement of a high fibre diet such as vegetables and fruits;
- ✓ Smoking cessation [3].

Pharmacological management

Insulin therapy

Indicated for all diabetes type 1 patients, pregnant diabetic ladies, and type 2 patients with beta cell failure or oral therapy intolerance [3]. Insulin can be used in the newly diagnosed type 2 diabetic patient presenting with gross hyperglycaemia, severe hyperglycaemic symptoms, Ketonurea or Infection. They may later be evaluated for the need of permanent use of replacement with oral therapy [3].

Types of insulin agents categorized on the basis of duration after injection:

- ✓ Rapid acting;
- ✓ Short acting: Regular human insulin;
- ✓ Intermediate acting: Neutral protamine Hagedorn;
- ✓ Long acting: Insulin glargine [2].

Types of insulin regimens:

- ✓ basal-bolus insulin regimens;
- ✓ Mixed (biphasic) regimen (a common approach):
  0.3–0.6 unit/kg/day if insulin naïve. Two-thirds is given before the morning meal and One-third is given before the evening meal;
- ✓ Continuous subcutaneous insulin infusion [1, 2].

Oral anti-diabetic agents
It indicated for type 2 patients in combination with life style modification.

- ✓ Metformin: Initially 500 mg once daily for at least 1 week, dose to be taken with breakfast, then 500 mg twice daily for at least 1 week, then 500 mg 3 times a day, maximum 2 g per day [1].
- ✓ Sulphonyl urea's:
  - glibenclamide: Initially 5 mg daily, adjusted according to response, dose to be taken with or immediately after breakfast; maximum 15 mg per day;
  - glimepride: Initially 1 mg daily, adjusted according to response, then increased in steps of 1 mg every 1–2 weeks, increased to 4 mg daily, dose to be taken shortly before or with first main meal, the daily dose may be increased further, in exceptional circumstances; maximum 6 mg per day [1];
  - gliclazide.
- ✓ Thiazolidinediones:
  - Pioglitazone 15–30 mg once daily, adjusted according to response to 45 mg once daily.
- ✓ Dipeptidyl peptidase-4 (DPP-4) inhibitors:
  - Vildagleptin: 50 mg twice daily, reduce dose to 50mg once daily in the morning when used in dual combination with a sulfonylurea;
  - Sitagliptin: 100 mg once daily [1].

Treatment steps
Step 1: Initial drug therapy (Monotherapy)
- ✓ Metformin remains the initial drug of choice, unless contraindicated or adverse effects preclude its use. (Consider combination therapy if baseline A1C is 1.5% or greater above personal goal A1C) [2].

Step 2: Adding other types: Sulphonyl ureas, Thiazolidinediones, Dipeptidyl peptidase-4 (DPP-4) inhibitors or Insulin.

This is based on several criteria of the various oral and injectable agents:
a) Efficacy in lowering A1C (also focus on ability to lower fasting or postprandial glucose concentrations or both);
b) Existing comorbidities;
c) Risk of hypoglycaemia;
d) Effects on weight;

e) Adverse effect profile;
f) Cost;
g) Oral or injection patient preference [2].

Considerations with oral anti-diabetic agents are manifested in (table 4) [2].

Table 4: Comparison of Therapies for Type 2 Diabetes Hyperglycaemia

Agent / Variable	Sulfonyl Urea	Thiazolidine-dione	Gleptins	Metformin
Efficacy in lowering A1C	1%-1.4% (high)	0.5%- 1.4% (moderate)	0.5%- 0.8% (low)	1%- 2% (high)
Risk of Hypo-glycaemia	Common	Low	Minimal	Low
Effect on weight	Weight gain	Weight gain	Neutral	Weight loss
Contra-indications	- Hypersensitivity to sulphonamides. - Patients with hypoglycaemic unawareness - Poor renal function	- Hepatic impairment - Class III/IV heart failure - Existing fluid retention.	- Previous hypersensitivity to the agents - History of pancreatitis	- Renal impairment - Hepatic impairment - Congestive heart failure

Treatment of Inpatient DM (non–critically ill population)

- ✓ Assess glucose concentrations before meals and at bedtime, if eating. (Every 4–6 hours if taking nothing by mouth).
- ✓ Subcutaneous insulin administration is the most practical way to improve hyperglycaemia.

Oral diabetes agents are generally not recommended unless the patient is clinically stable and eating regularly [2].

Acute Diabetic Complications

1. Diabetic Ketoacidosis

Initial management

The patient should be referred to a hospital where appropriate investigation can be carried out. In the absence of potassium testing, hydration and an intramuscular dose of insulin may be given before transfer. (0.9 % sodium chloride infusion to be started 3 L in 3- 5 hrs. Insulin 0.1 unit/kg IM.) [3].

2. Hypoglycaemia

Treatment

a. Mild to moderate hypoglycaemia

- Oral ingestion of 15–20 g of glucose or equivalent;
- Repeat glucose concentration in 15 minutes and, if still less than 70 mg/dL, repeat ingestion of glucose;
- Once glucose is normalized, ingest snack or meal.

b. Clinically significant hypoglycaemia (altered consciousness, needs assistance from others)

- Intravenous dextrose 25 g dextrose (50 ml of 50% dextrose) [3].

Malaria

Treatment of uncomplicated falciparum malaria
First-line treatment:

- ✓ Artemether-lumefantrine(AL) in form of tablet;
- ✓ The total **recommended dose** is 5 -24 mg/kg body weight artemether and 29 -144 mg/kg body weight lumefantrine [5];
- ✓ The recommended **dosage regimen** of the AL is verified in (table 5).

Table 5 : Dosage schedule for artemether–lumefantrine tablets.

Weight in Kgs	Day 1		Day 2		Day 3		Total number of tablets	Tablet strength
	Initially	8 hours after the 1st dose	24 hours after the 1st dose	12 hours after the 3rd dose	12 hours after the 4th dose	12 hours after the 5th dose		
<5	Adjust the dosing considering the weight							AL "20/120" dispersible tablets
5-14	1	1	1	1	1	1	6	
15-24	2	2	2	2	2	2	12	
25-34	3	3	3	3	3	3	18	AL "20/120" standard tablets
Children >34kg and adults	1	1	1	1	1	1	6	AL "80/480" standard tablets

Second-line treatment (Treatment failure)
Consider treatment failure when fever and parasitemia persist or recurs within 4 weeks after initial treatment.

- ✓ The second line treatment is Dihydroartemisinin + piperaquine tablets "DHAP"[5];
- ✓ The daily dose for adult and children > 25 kg is 4mg/kg of dihydroartemisinin + 18 mg/kg for piperaquine once a day;
- ✓ The dose for children <25 kg is 4 mg/kg per day of dihydroartemisinin + 24 mg/kg body weight per day of piperaquine (table 6).

Table 6: Dosage schedule for Dihydroartemisinin + pipraquine tablets (DHAP)

Body weight (Kg)	Day 1	Day 2	Day 3	Total number of tablets	DHAP tablet strength
<5	Adjust the dosing considering the weight				DHAP "20/160" dispersible tablets
5-6	0.5	0.5	0.5	1.5	
7-12	1	1	1	3	
13-23	1	1	1	3	DHAP "40/320" tablets
24-35	2	2	2	6	
36-74	3	3	3	9	
75 and above	4	4	4	12	

Third line treatment

Oral Quinine: The **oral quinine** dose for uncomplicated malaria is 10 mg /kg body weight, 8- hourly for 7 days (Table 7) [5].

Table 7: Dosage schedule for Quinine tablets

Age	Weight/kg	Number of tablets/dose (300 mg tab)
<1 year	5-6	¼
1-4 years	11-14	½
5-7 years	19-24	1
8-10 years	25-35	1 ¼
11-15 years	37-50	1 ½
Above 15 years	>50	2

Treatment of uncomplicated vivax malaria

P. vivax is susceptible to the first-line treatment (AL) with the same dosage prescribed in case of infection with *P. falciparum* (Table 5). For radical cure of *P. vivax* AL must be followed by primaquine. Primaquine is used in all cases of *P. vivax* malaria except pregnant women, infant age less than 6 months, breastfeeding mothers and people with known G6PD deficiency. The dose of primaquine for adult is 15 mg daily for 14 days. The dose for children is 0.25 mg/kg body weight for 14 days [5].

Treatment of Severe Malaria (SM)
Transfer patient to hospital urgently.

Pre-referral treatment for Severe Malaria at peripheral units
In most of the rural settings of the Sudan, it is usual to see patients with SM seeking care at the primary health care units. The health personnel in these units should refer the patients to the nearest hospital. Pre-referral treatment should be given. This could be Quinine IM or artesunate suppositories.
Quinine IM**:** 10 mg /kg body weight given after dilution with normal saline or distilled water [5].

Community acquired pneumonia in adult

Non pharmacological management

- ✓ Rest, drink plenty of fluids and avoid smoking;
- ✓ Simple analgesia such as paracetamol for pleuritic pain;
- ✓ Assess for volume depletion and may require i.v. fluids;
- ✓ Oxygen therapy to maintain SpO2 94-98 % [3].

Pharmacological management (Empirical)

a. Mild pneumonia (outpatient setting):

Table 8: Management of Mild Pneumonia

Organism	**With no modifying factors***	**With modifying factors***
S. pneumoniae *M. pneumoniae* *H. influenzae* *C. pneumoniae*	High dose amoxicillin + macrolides (azithromycin or clarithromycin)	- High dose amoxicillin + macrolides (azithromycin or clarithromycin), OR - High dose amoxicillin / clavulanate + macrolides (azithromycin or clarithromycin), OR - Oral cephalosporins (cefpodoxime or cefuroxime) + macrolides (azithromycin or clarithromycin) [2,3].

b. Moderate/severe Community –Acquired Pneumonia with inpatient facilities:

Table 9: Management of Moderate/severe Pneumonia

Organism	**With no modifying factors***	**With modifying factors***
S. pneumoniae *M. pneumoniae* *H. influenzae* *C. pneumoniae*	- Penicillin iv + Macrolides (azithromycin or clarithromycin) OR - Cephalosporins iv (cefotaxime or ceftriaxone) + Macrolides [2, 1].	Cephalosporins iv (cefotaxime or ceftriaxone) + Macrolides (azithromycin or clarithromycin), [1, 2, 3]

***** Modifying factors = high level macrolide resistance, Comorbidities (chronic obstructive pulmonary disease [COPD], diabetes mellitus, alcoholism, chronic

renal or liver failure, congestive heart failure, malignancy, asplenia, or immunosuppression) [2].

- ✓ Suggested duration of treatment 7 days, may extend if severe pneumonia [1].

Dosing for Medicines used for Community acquired pneumonia

Clarithromycin	500 mg twice daily (usually for 5-7 days
Azithromycin	500 mg once daily (usually for 3 days).
Amoxicillin	Oral: 1000mg twice daily.
Co-amoxiclav (amoxicillin/ clavulanate):	Adult: 875/125mg thrice daily.
Cefuroxime	Oral: 500 mg twice daily/ IV: 750-1500 mg every 8 hours
Cefpodoxime	Oral: 200mg twice daily.
Ceftriaxone	IV: 1–2 g once daily, 2 g dose to be used for Hospital-acquired pneumonia and severe cases
Cefotaxime	IV: 1-2 g every 8 hours
Benzylpenicillin	IV: 12-24 million unit/day divided in doses given every 4-6 hours

Urinary tract infection (UTI)

Non Pharmacological management

Patient should be advised to take plenty of fluids with frequent emptying of the bladder.

Pharmacological Management

Treatment is usually empirical using the appropriate antibiotic and should be started as soon as possible in order to avoid complications. Collect midstream urine for culture before commencing therapy.

a. Uncomplicated lower UTI

Non-pregnant women

First-line

Trimethoprim/sulfamethoxazole	160 mg/800 mg twice daily for 3 days
Nitrofurantoin monohydrate	100 mg twice daily for 5 days.

Alternatives

- ✓ An oral cephalosporin (cephalexin 250-500 mg four times per day or cefpodoxime 200 mg twice daily) for 5 days;
- ✓ A quinolone (e.g. ciprofloxacin 250 mg twice daily for 3 days), only when it is considered inappropriate to use other antibacterial agents due to disabling and potentially long-lasting side effects.

Men

Rare, consider urethritis, prostatitis.

- ✓ Trimethoprim/sulfamethoxazole 160 mg/800 mg twice daily for 7 days;
- ✓ A quinolone (e.g. ciprofloxacin 500 mg twice daily for 7 days), only when it is considered inappropriate to use other antibacterial agents due to disabling and potentially long-lasting side effects.

b. Uncomplicated Pyelonephritis Outpatient therapy

Consider longer duration of the treatment (7-14 days).

Trimethoprim/sulfamethoxazole	160 mg/800 mg twice daily
Ciprofloxacin	500 mg twice daily
Levofloxacin	750 mg once daily

- ✓ An oral cephalosporin (Cefpodoxime 200 mg twice daily OR cephalexin 500 mg four times per day).

c. Complicated UTI needing inpatient therapy (referral disease)

Fluoroquinolones	ciprofloxacin 400 mg IV every 12 hours) for 7 days
Ceftriaxone	2 g IV every 24 hours for 10-14 days
Ceftazidime	1-2 g every 8-12 hours

- ✓ Consider adding an aminoglycoside in the first few days [2, 9].

Meningitis

Transfer patient to hospital urgently.

- ✓ Benzyl penicillin sodium should be given before transfer to hospital, so long as this does not delay the transfer. (Adult: 4million units every 4 hours);
- ✓ Cefotaxime or ceftriaxone may be an alternative in penicillin allergy (adult: cefotaxime: 2 g every 4-6 hours; ceftriaxone: 2 g every 12 hours);
- ✓ Chloramphenicol may be used if history of immediate hypersensitivity reaction to penicillin or to cephalosporins, but beware of frequent serious adverse events (Serious and fatal blood dyscrasias) [1].

Skin and soft tissue infections (erysipelas, cellulitis)

Pharmacological management

- ✓ Elevation of the affected area;
- ✓ Treatment of underlying conditions;
- ✓ Analgesics;
- ✓ Antibiotic therapy

Empiric treatment of methicillin-resistant *Staphylococcus aureus* (MRSA) to be considered in case of

- recent hospitalization;
- recent antibiotic treatment;
- lack of clinical response despite broad-spectrum antibiotic treatment;
- Previous MRSA infection or known colonization.

Oral therapy for patients with mild infections

Amoxicillin	1000 mg two times per day
Cephalexin	500 mg four times per day
Trimethoprim/sulfamethoxazole	160/800 mg two times per day (possibly active against MRSA);
Clindamycin	450mg three times per day (higher risk of Clostridiodes difficile infection, possibly active against MRSA).

Referral for parenteral therapy in severe cases (clinical progression despite at least 48 hours of treatment, systemic involvement)

Cefazolin	1-2 g every 8 hours
Ceftriaxone	1-2 g every 24 hours
Clindamycin	600-900 mg every 8 hours
Vancomycin	15-20 mg/kg every 8-12 hours (max 2 g per day, active against MRSA).

Tonsillitis

Pharmacological management

- ✓ Analgesics;
- ✓ Antibiotic therapy: to be used for suspected or confirmed bacterial infection.

Phenoxymethylpenicillin	Children <27 kg: 250mg orally two to three times a day for 10 days. Children >27 kg and adults: 500 mg orally two to three times daily for 10 days.
Amoxicillin	Children: 50 mg/kg per day orally in two or three divided doses for 10 days, maximum 1000 mg per day. Adults: 500 mg orally thrice daily for 10 days.
Benzathine penicillin (if adherence is a concern)	1.2 million units IM (600,000 units for children ≤ 27 kg) single dose.
If penicillin allergy: Macrolide	
Clarithromycin	Children: 7.5 mg/kg/dose (maximum 250 mg per dose) orally twice daily for 10 days. Adults: 250 mg orally twice daily for 10 days.
Azithromycin	Children: 12 mg/kg (maximum 500mg per dose) on the first day followed by 6 mg/kg per day (maximum 250mg per dose) for another 4 days. Adults: 500 mg orally once daily for 3 days or 500 mg orally on the first day followed by 250 mg orally once daily for another 4 days.
Clindamycin(high risk of *Clostridioides difficile* infection)	Children: 7 mg/kg (maximum 300 mg per dose) three times daily for 10 days. Adults: 300 mg three times daily for 10 days

Otitis

Acute Otitis Media

Suggested duration of treatment 5-7 days (may extend to 10 days if severely ill).

✓ Amoxicillin-clavulanate 875/125 mg every 12 hours orally.

If no improvement after 48-72 hours:

Cefpodoxime	200 mg orally twice daily
Cefuroxime	500 mg orally twice daily
If penicillin-allergic	
Clarithromycin	500 mg every 12 hours orally
Azithromycin	500 mg orally on the first day, followed by 250 mg for another 4 days
In severe infection, consider initial parenteral therapy with	
Amoxicillin-clavulanate	1.2 g every 8 hours
Cefuroxime	750 mg every 6–8 hours
Ceftriaxone	2 g daily

Consider symptomatic management [1, 3].
Otoscopy and referral for accurate diagnosis suggested for children.

Chronic Otitis media

Patients with perforation of the tympanic membrane:

✓ Ciprofloxacin eye drops used in the ear [unlicensed indications]

Alternatives:

✓ Ear drops containing aminoglycosides or polymyxins [unlicensed indications, high risk of ototoxicity]

If the otitis media has failed to settle with systemic antibacterial; treatment should be considered only by specialists [1].

Sexually transmitted diseases

In patients with suspected/confirmed sexually transmitted diseases, always test for HIV, syphilis and hepatitis B and C.

Pelvic inflammatory disease

Non pharmacological management

- ✓ Rest;
- ✓ Rehydration. Take plenty of fluid;
- ✓ Remove Intra uterine contraceptive device (IUCD) [3];
- ✓ Refrain from sexual activity.

Pharmacological management

- ✓ Single-dose of ceftriaxone 250 mg IM + doxycycline 100 mg orally twice daily + metronidazole 500 mg orally twice daily [1, 2];
- ✓ Duration of treatment 14 days (except i/m ceftriaxone);
- ✓ Contact tracing recommended (treat the partner).

In severely ill patients' initial treatment with:

- ✓ Ceftriaxone 2 g IV once daily + Metronidazole 500 mg IV twice daily + Doxycycline 100 mg twice daily, then switch to oral treatment with doxycycline + metronidazole to complete 14 days of treatment [1];
- ✓ If penicillin allergy: clindamycin 900 mg IV every 8 hours + gentamicin 3-5 mg/kg daily, then switch to oral treatment with doxycycline + metronidazole to complete 14 days of treatment.

Urethritis

Non pharmacological management

- ✓ Rest;
- ✓ Rehydration; Take plenty of fluid;
- ✓ Refrain from sexual activity.

Gonococcal urethritis

- ✓ Single-dose of ceftriaxone 250 mg IM + azithromycin 1000 mg orally (will cover also non-gonococcal urethritis).

Non-gonococcal urethritis

- ✓ Single-dose of azithromycin 1000 mg orally;
- ✓ Doxycycline 100 mg orally twice daily for 7 days;

Trichomoniasis

- ✓ Single-dose of metronidazole 2000 mg orally;
- ✓ Metronidazole 500 mg orally twice daily for 7 days.

Allergic rhinitis

Pharmacological management

a. Antihistamines

They reduce rhinorrhoea, sneezing, itching and conjunctivitis.

✓ Sedative antihistamine:	
Chlorpheniramine	Child 1–23 months: 1 mg twice daily [1]; Child 2–5 years: 1 mg every 4–6 hours; maximum 6 mg per day; Child 6–11 years: 2 mg every 4–6 hours; Adult and Child 12–17 years: 4 mg every 4–6 hours; maximum 24 mg per day.
✓ Non sedating antihistamines:	
Cetirizine	Child 2–5 years: 2.5 mg twice daily; Child 6–11 years: 5 mg twice daily; Adult and Child 12–17 years: 10 mg once daily
Loratadine	Child 2–11 years: 5 mg once daily; Child 2–11 years: 10 mg once daily; Adult and Child 12–17 years: 10 mg once daily.

Others: levocetrizine, Fexofenadine [1].

b. Relieve of nasal congestion

✓ Oral preparation**:**

Pseudoephedrine:

- Child 6–11 years: 30 mg 3–4 times a day orally;
- Adult and Child 12–17 years: 60 mg 3–4 times a day.

✓ Topical decongestants

Should not be used for more than 7 days (to avoid rebound congestion after sessation) [1,3].

Xylometazoline:

By intranasal administration using nasal drops:

- Child 6–11 years: 1–2 drops 1–2 times a day as required, for maximum duration of 5 days, 0.05% solution;
- Child 12–17 years: 2–3 drops 2–3 times a day as required, 0.1% solution;
- Adult: 2–3 drops 2–3 times a day as required, 0.1% solution.

By nasal spray:

- Adult and Child 12–17 years: 1 spray 1–3 times a day as required for maximum duration of 7 days.

Bronchial asthma

Non pharmacological management

Avoidance of triggers:

- ✓ B-blockers, NSAIDs, and aspirin;
- ✓ Environmental triggers eg. Pollutants, dust, grass pollen, smoke and chemical inhalants and fumes;
- ✓ Occupational triggers e.g. flour dust, smoke animal fur and hair;
  It is important to identify these triggers in order to avoid them.

Pharmacological management

Medications should be reviewed at each visit and adjusted against the condition of the patient.

A. Management of chronic bronchial asthma in adult and children >5 years of age:

Step 1

- ✓ Reliever therapy - start an intermittent use of a bronchodilators; **inhaled B2 agonist** (**Salbutamol**) 100 micrograms 2 puffs as needed.
  If inhaled B2 agonist is needed more than 2 times/wk (excluding pre-exercise doses) indicates inadequate control and need to step up treatment.

Step 2

- ✓ preventer (maintenance) therapy – start a regular **Inhaled corticosteroid (ICS)**
  - Inhaled Budesonide 200 micrograms 2 puffs 12 hourly. Or
  - Inhaled Fluticasone 125 micrograms 2 puffs 12 hourly. Or
  - Inhaled Beclomethsone 100 mcg 2 puff 12 hourly.

  Plus: Salbutamol 100 mcg 2 puffs as required.

Step 3

- ✓ If no improvement with step 2, then add **long acting B2 agonist (LABA)** 12 hourly. OR use combined preparation of LABA and ICS.
  - Fluticasone /Salmeterol 100/50 or 250/50 mcg 1 puff 12 hourly.
  - Budesonide/formeterol 160/4.5 mcg 1-2 puffs 12 hourly.

  Plus: Salbutamol 100 mcg 2 puffs as required.

Step 4 (to be started by an asthma specialist)

- ✓ Increase to Medium/ high dose of ICS in combination with LABA.
- ✓ Alternatives: leukotriene Modifier (LTM); oral montelukast 10 mg once daily or slow release theophylline.
  Plus: Salbutamol 100 mcg 2 puffs as required.

Step 5: (to be initiated by an asthma specialist)

- ✓ Add oral prednisolone 30-40 mg once daily.
- ✓ Oral salbutamol 4 mg tabs 8-12 hourly may be added.

Salbutamol inhaler should be used as required every 6 hours.
Evaluation of the stepping down between 3-6 months [2, 3].
For more details about preparations presents and its concentrations, go to table (13).

B. **<u>Management of chronic Bronchial Asthma in children 2-5 years of age</u>**
(children under 2 years of age should be referred to a paediatric specialist)

Step 1

- ✓ Intermittent reliever bronchodilator short acting B2 agonist;
- ✓ If inhaled short-acting beta2 agonist is used three times a week or more, or waking at night due to asthma symptoms at least once a week move to step 2.

Step 2

- ✓ Regular preventer therapy;
  - low dose ICS or
  - leukotriene modifier.

Plus: Inhaled short acting B2 as required.

Step 3

- ✓ Medium dose ICS with Leukotriene modifier (LTM).

Plus: Inhaled short acting B2 as required.

Step 4 (Persistent poor control)

- ✓ Refer to respiratory paediatrician.

Acute Asthma

- ✓ Patients with moderate asthma should be treated at home or in primary care according to response to treatment, while patients with severe or life-threatening acute asthma should start treatment as soon as possible and be admitted to hospital immediately following initial assessment.

- ✓ Supplementary oxygen should be given to all hypoxaemic patients with acute severe asthma to maintain a SpO2 level between 94–98%.
- ✓ A high-dose inhaled short-acting beta2 agonist; salbutamol nebulized, given as soon as possible (2.5-5 mg of nebulized solution every 15-30 minute).
- ✓ If the response is poor, consider continuous nebulisation with an appropriate nebulizer.
- ✓ Parenteral hydrocortisone 100 mg 6 hourly or oral prednisolone 40-50 mg daily.
- ✓ Nebulised ipratropium bromide may be combined with a nebulised Salbutamol in patients with acute severe or life-threatening asthma or in those with a poor initial response to Salbutamol to provide greater bronchodilation [1, 3]

Coronary heart disease

a. Acute Coronary Syndrome (ACS)

- ✓ Oxygen.
- ✓ Nitrates are used to relieve ischemic pain. If sublingual glyceryl trinitrate is not effective, i.v. glyceryl trinitrate or i.v. isosorbide dinitrate is given.
- ✓ Aspirin 300 mg to be chewed. If aspirin is given before arrival at hospital, a note saying that it has been given should be sent.
- ✓ Beta blockers.
- ✓ **Refer the patient urgently for further management [1, 3].**

Most patients will require standard angina treatment to prevent recurrence of symptoms.

b. Stable angina

- ✓ Sublingual glyceryl trinitrate, which can be taken immediately before performing activities that are known to bring on an attack.
- ✓ If attacks occur more than twice a week, regular drug therapy is required:
  - Betablocker (e.g. Atenolol, Bisoprolol), or
  - Calcium-channel blocker (e.g. amlodipine, felodipine, modified-release nifedipine) [1].

Response to treatment should be assessed every 2–4 weeks after initiating, titrating or changing drug therapy.

- ✓ if not adequate control:

a combination of a B-blocker + a dihydropyridine CCB (e.g. amlodipine, felodipine, nifedipine) should be used. (Caution advised; combination can cause heart block).

- ✓ Consider referring the patient to a specialist, if a combination of two drugs fails to control symptoms.
- ✓ ACEI /ARB as prevention of cardiovascular event [1].

Chronic coronary heart disease and chronic stable angina

Non pharmacological management

Life-style changes:

- ✓ Stopping smoking;
- ✓ Hypertension and DM should be well controlled;
- ✓ Physical activity for 30–60 minutes/day, 7 days/week;
- ✓ Reduced intake of saturated fats, trans fatty acids and cholesterol.

Pharmacological management

Aspirin	75–162 mg/day, Clopidogrel 75 mg/day, which can be used if aspirin contraindicated (e.g., allergy), or both in case of secondary prevention ACS.
Lipid-lowering therapy.	Atorvastatin 40 mg, 80 mg. Rosuvastatin 10 mg, 20 mg, or 40 mg [2].

- ✓ ACE Inhibitors (e.g. Captopril,) ARBs (e.g. Candesartan) [1, 2].
- ✓ Additional therapies for chronic stable angina (β-Blockers, CCBs, Nitrates) [2]

Status epilepticus

This serious condition should be treated promptly.

- ✓ Immediately inject diazepam 10 mg i.v. over 2 minutes. For children 0.2 – 0.3 mg / kg.
  The seizure will often stop at least temporarily [2,3].
- ✓ Ascertain ABCs (airway, breathing, and circulation); ensure the air way is patent, suck the pharynx, remove the vomitus and denture and insert an air way. This later should not be attempted during a convulsion since it will injure the tongue or break a tooth.
- ✓ Insert an i.v. line and run a glucose drip.
- ✓ Give Oxygen by face mask.
- ✓ Put a nasogastric tube.
- ✓ Lower temperature by tepid sponging.
- ✓ Carry a quick thorough medical examination.
- ✓ Refer patient urgently to a secondary care setting [2. 3].

Pain control in cancer patient

Pharmacological management

Pain relief should be given according to severity of pain (mild, moderate and severe). This should follow the WHO ladder for management of cancer pain:

- ✓ Step one: NSAID or paracetamol +/- adjuvant analgesic*;
- ✓ Step two: Tramadol +/- adjuvant analgesic;
- ✓ Step Three: Oral Morphine +/- adjuvant analgesic.

*Adjuvant analgesic: Antidepressants (e.g. amitriptyline), Anti convulsants (e.g. Gabapentin, carbamazepine, pregabalin), Benzodiazepines (e.g. Diazepam, lorazepam) and Corticosteroids.

Medicines

- ✓ Tramadol: adult and children over 12years: 50 -100 mg not more than every 4 hours (not more than 400 mg /day).
- ✓ Morphine:
  - Starting dose for opioid-naïve patients:

5 mg 4 hourly, a double dose at bed time.

  - Starting dose for patients being switched from Tramadol (full dose):

10 g four hourly. A double dose at bed time.

  - Following initial titration:

Usual dose 30 mg every 4 hours; up to 200 mg every 4 hours, higher dose may be required for some patients [1, 3].

Intestinal amoebiasis

Pharmacological management

First line	
Metronidazole	Adults: 500-750 mg every 8 hours with food for 7-10 days Children: 35-50 mg/kg daily in three divided doses (max 750mg per dose) with food for 7-10 days.
Second line	
Tinidazole	Adults: 2 g daily for 3 days Children (>3 years): 50 mg/kg in one dose (max 2000 mg) for 3 days [1, 3]
Treatment should be followed by a luminal agent	
Paromomycin	Adults: 25-30 mg/kg daily orally with food in three divided doses for 7 days. Children: 25-35 mg/kg/day orally with food in three divided doses for 7 days.

Diarrhoea and dehydration

- ✓ Assess degree of dehydration.
- ✓ Select treatment according to degree of dehydration and treat the underlying causes.
- ✓ Counsel mothers and teach them how to give ORS and Zinc.

Assessment of Severity and selection of treatment plan are prescribed in (table 10)

Table 10: Assessment of degree of dehydration and Hydration plan [6].

Plan A	Any 2 signs of the below	Counsel the mother on the 3 Rules of Home Treatment: 1. Give Extra Fluid, 2. Continue Feeding, 3. When to Return. **GIVE EXTRA FLUID** *(as much as the child will take)* ✓ **TELL THE MOTHER** • Breastfeed frequently and for longer time at each feed; • If the child is exclusively breastfed, give clean water in addition to breast milk; • If the child is not receiving breast milk or is not exclusively breastfed, give one or more of the following: food-based fluids such as soup, rice water and yoghurt, or clean water or ORS. **It is especially important to give ORS at home when:** • the child has been treated with Plan B or Plan C during this visit; • the child cannot return to a clinic if the diarrhoea gets worse. ✓ **TEACH THE MOTHER HOW TO MIX ORS** give the mother 2 packets of ORS to use at home**.** ✓ **SHOW THE MOTHER HOW MUCH FLUID TO GIVE IN ADDITION TO THE USUAL FLUID INTAKE** Up to 2 years: 50 to 100 ml after each loose stool. 2 years or more: 100 to 200 ml after each loose stool. **Tell the mother to:** • Give frequent small sips from a cup; • If the child vomits, wait 10 minutes. Then continue, but more slowly; • Continue giving extra fluid until the diarrhoea stops
1-Look		
General condition	Well alert	
Eyes	Normal and dry	
Tears	Present	
Mouth and tongue	Moist	
Thirst	Drinks normally, not thirsty	
Capillary refill	<2 second	
2-Feel		
Skin Pinch	Goes back quickly	
Fontanel	Normal	
Heart rate	Normal rate and volume	
3-Classification	**No signs dehydration**	
4-Hydration plan		

Plan B	Any 2 signs of the below
1-Look	
General condition	Restless, irritable
Eyes	Sunken
Tears	Absent
Mouth and tongue	Dry
Thirst	Thirst, drinks eagerly
Capillary refill	2-4 Seconds
2-Feel	
Skin Pinch	Goes back slowly
Fontanel	Depressed
Heart rate	Rapid rate , small volume
3-Classification	**Some signs of dehydration**
4-Hydration plan	

Give in clinic recommended amount of ORS over 4-hour period

- **DETERMINE AMOUNT OF ORS TO GIVE DURING FIRST 4 HOURS.**

Table11: Amount of ORS needed according to age and weight

AGE*	**Up to 4 months**	**4 months up to 12 months**	**12 months up to 2 years**	**2 years up to 5 years**
WEIGHT	< 6 kg	6 - < 10 kg	10 - < 12 kg	12 - <20kg
Amount of fluid over 4 hours in mls	200-400	400-700	700-900	900-1400

** Use the child's age only when you do not know the weight. The approximate amount of ORS required (in ml) can also be calculated by multiplying the child's weight in kg times 75 and give this amount of fluid every hour. One teacup is approximately 200mls*

✓ **SHOW THE MOTHER HOW TO GIVE ORS SOLUTION**

• Give frequent small sips from a cup;
• If the child vomits, wait 10 minutes. Then continue, but more slowly;
• Continue breastfeeding whenever the child wants;
• If the child wants more ORS than shown, give more.

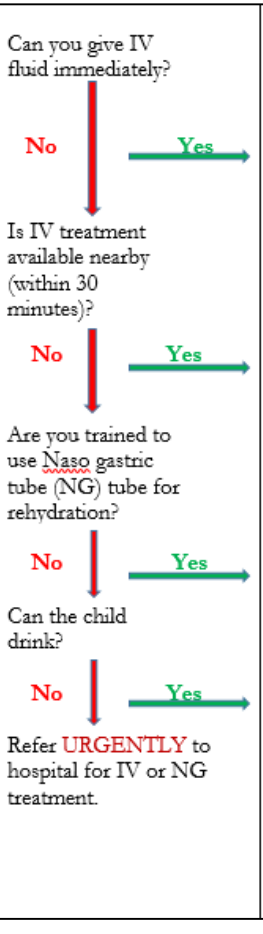
✓ **AFTER 4 HOURS**

• Reassess the child and classify the child for dehydration;
• Select the appropriate plan to continue treatment;
• Begin feeding the child in clinic.

✓ **IF THE MOTHER MUST LEAVE BEFORE COMPLETING TREATMENT**

• Show her how to prepare ORS solution at home;
• Show her how much ORS to give to finish 4-hour treatment at home;
• Explain the 3 Rules of Home Treatment

Plan C	Any 2 signs of the below
1- Look	
General condition	Lethargic or un conscious
Eyes	Very sunken
Tears	Absent
Mouth and tongue	Very dry
Thirst	Drinks poorly
Capillary refill	>4 seconds
2-Feel	
Skin Pinch	Goes back very slowly
Fontanel	Very depressed
Heart rate	Very rapid rate, small or not palpable volume
3-Classification	
	Severe dehydration
4-Hydration plan	



• **Start IV fluid immediately**
• If the child can drink, give ORS by mouth while the drip is set up.
• Give100ml/kg Ringer's Lactate Solution (or, if not available, normal saline) divided as follows

Age	First give 30 ml /kg in:	Then give 70 ml/kg in:
Infants (under 12months)	1 hour*	5 hours
Children(12months-5 year)	30 minutes*	2.5 hours

•Repeat once if redial pulse is still very week or not detectable.
. **Reassess the child every 1- 2 hours while awaiting transfer.** If hydration status is not improving, give
the IV drip more rapidly.
• Also give ORS (about 5 ml/kg/hour) as soon as the child can drink: usually after 3-4 hours (infants) or 1-2hours (children).
• Reassess an infant after 3 hours if he is still at the clinic. Classify dehydration. Then choose the appropriate plan (A, B, or C) to continue treatment.

Refer URGENTLY to hospital for IV treatment. If the child can drink, provide the mother with ORS and show her how give frequent sips during the trip.

Start rehydration by tube (or mouth) with ORS solution: give 20 ml/kg/hour for 6 hours (total of 120 ml/kg).

• **Reassess the child every 1-2 hours while waiting transfer:**
-If there is repeated vomiting or abdominal distension, give the fluid more slowly.
-If hydration status is not improving after 3 hours, send the child for i.v. therapy.

• After 6 hours reassess the child if he is still at the clinic. Classify dehydration. Then choose the
appropriate plan (A, B, or C) to continue treatment.

NOTE: If the child is not referred to hospital, observe the child at least 8 hours after rehydration to be sure the mother can maintain hydration giving the child ORS solution by mouth.

Depression in elderly patient

Up to 80% of patients with Alzheimer Disease (AD) have depression.

Non pharmacologic management

- ✓ Person-centred interventions: Consider long-standing habits, values, and beliefs of patient; use distraction, music, aromatherapy, and pet therapy;
- ✓ Psychotherapy and exercise [2].

Pharmacologic management

Treatment Options after Non pharmacologic efforts ineffective:

- ✓ Selective Serotonin Reuptake Inhibitors (SSRI); or
- ✓ Mirtazapine [2].

SSRI are:

- ✓ **Fluoxetine** 20–60 mg/day,
- ✓ **Sertraline** 50–200 mg/day,
- ✓ **Paroxetine** 10–60 mg/day,
- ✓ **Fluvoxaminea** 10–60 mg/day,
- ✓ **Citalopram** 20–40 mg/day,
- ✓ **Escitalopram** 10–20 mg/day.

A withdrawal syndrome with SSRI has been observed, especially for the drugs with shorter half-lives (**Fluoxetine and Fluvoxamine)**, so a gradual dose reduction (e.g. over 2–4 weeks) may be indicated.

Three phases of therapy:

- ✓ Short term remission phase, which may take 12 weeks;
- ✓ Continuation: The goal of this phase is to keep the symptoms in remission using full-dose therapy. This phase usually continues for 4–9 additional months to keep the patient in remission;
- ✓ Maintenance: The duration of this phase is determined on an individual basis.

Hormonal contraception

Hormonal contraception is:

- ✓ Combined contraceptives:
  - Combined oral contraceptive (COC) pills;
  - Transdermal patch;
  - Vaginal ring.
- ✓ Progestin-only:
  - Progestin-only pill (POP or minipill);
  - Progestin-only injectable;
  - Implanted rod.

For more details, see table (13)

Table 12: Adverse effects of Estrogen and Progestin

Adverse effects attributed to oestrogen	Adverse effects caused by progestin
Nausea, vomiting	Headaches
Bloating, edema	Increased appetite
Irritability	Increased weight gain
Cyclic weight gain	Depression, fatigue
Cyclic headache	Changes in libido
Hypertension	Androgenic adverse effects
Breast fullness, tenderness	(a) Hair loss, hirsutism
	(b) Acne, oily skin

Contraindications for combined hormonal contraceptives:

- ✓ Less than 21 days postpartum for women with no risk factors for DVT (regardless of breastfeeding status), 42 days for women with risk factors for DVT (according to CDC recommendations);
- ✓ Smoker 35 years and older;
- ✓ Several risk factors for CVD;
- ✓ Blood pressure greater than 160/100 mm Hg;
- ✓ Vascular disease;
- ✓ Current DVT or pulmonary embolism or history of DVT or pulmonary embolism;
- ✓ Complicated diabetes showing nephropathy, neuropathy, or retinopathy;
- ✓ Presence of liver tumours, severe cirrhosis, or active viral hepatitis;

- ✓ Major surgery with prolonged immobilization;
- ✓ Current or history of ischemic heart disease;
- ✓ Stroke (history of cerebrovascular accident);
- ✓ Complicated valvular heart disease;
- ✓ Migraine headache with aura;
- ✓ Current breast cancer;
- ✓ Systemic lupus erythematosus with positive or unknown antiphospholipid antibodies;
- ✓ Complicated solid organ transplantation: Acute or chronic graft failure, rejection, cardiac allograft vasculopathy [2].

Contraindications of Progestin-only Contraceptives:

- ✓ Suspected or demonstrated pregnancy;
- ✓ Active hepatitis, hepatic failure, jaundice;
- ✓ Inability to absorb sex steroids from GI tract (i.e., active colitis);
- ✓ Concurrently taking medications that increase hepatic clearance (CYP inducers). Note: Medroxyprogesterone acetate okay to use with CYP inducers.
- ✓ Taking an antibiotic such as rifampin or rifabutin [2].

Drugs in pregnancy

- ✓ During the first trimester drugs can produce congenital malformations (teratogenesis).
- ✓ During the second and third trimesters drugs can affect the growth or functional development of the foetus.
- ✓ Drugs given shortly before term or during labour can have adverse effects on labour or on the neonate after delivery.
- ✓ Drugs should be prescribed in pregnancy only if the expected benefit to the mother is thought to be greater than the risk to the fetus, and all drugs should be avoided if possible during the first trimester [1].

Some known teratogens [2]:

Androgens Angiotensin-converting enzyme inhibitors Angiotensin II receptor blockers Anticonvulsants Antineoplastics Cocaine Diethylstilbestrol Fluconazole (high doses) Iodides Isotretinoin Lead Mercury	Methotrexate Methimazole Lithium Paroxetine Penicillamine Statins Tetracyclines Thalidomide Vitamin A (higher than recommended daily doses) Warfarin

Examples of Drugs Used in Pregnancy (if benefit outweighs risk) [2]:

Acetaminophen Cetirizine Erythromycin Cephalosporins Penicillin Pyridoxine/doxylamine

Some Drugs with Known Pregnancy Risks: Should Be Used with Caution [2]:

Aminoglycosides
Antithyroid drugs
Aspirin
Barbiturates
Benzodiazepines
Caffeine
Chloramphenicol
Diuretics
Isoniazid
Narcotic analgesics (chronic)
Nicotine
NSAIDs
Oral hypoglycemics
β-Blockers

Dental and oral conditions

a) Dental and orofacial pain:

Analgesics should be used judiciously in dental care as a temporary measure until the cause of the pain has been dealt with. The choice of an analgesic for dental purposes should be based on its suitability for the patient.

- **Ibuprofen**
  Adult: Initially 300–400 mg 3–4 times a day; increased if necessary up to 600 mg 4 times a day; maintenance 200–400 mg 3 times a day, may be adequate.
- **Diclofenac sodium**
  Adult: 75–150 mg daily in 2–3 divided doses.

- **Paracetamol**
  Adult: 0.5–1 g every 4–6 hours; maximum 4 g per day.

b) Oral infections:

Bacterial infections

Antibacterial drugs should only be prescribed for the treatment of oral infections on the basis of defined need.

They may be used in conjunction with (but not as an alternative to) other appropriate measures, such as providing drainage or extracting a tooth. If the oral infection fails to respond to antibacterial treatment within 48 hours the antibacterial should be changed, preferably on the basis of bacteriological investigation. In severe oral infections, a sample should always be taken for bacteriology.

Phenoxymethyl penicillin	- Child 1–11 months: 62.5 mg 4 times a day. - Child 1–5 years: 125 mg 4 times a day. - Child 6–11 years: 250 mg 4 times a day. - Adults and Child >12 years: 500 mg 4 times a day; increased if necessary up to 1 g 4 times a day.
Amoxicillin	- Child 1–11 months: 125 mg 3 times a day. - Child 1–4 years: 250 mg 3 times a day. - Child 5–11 years: 500 mg 3 times a day. - Adult and Child >12years: 500 mg 3 times a day; increased if necessary up to 1 g 3 times a day, use increased dose in severe infections.

Co-amoxiclav	- Child 12–17 years: 250/125 mg every 8 hours for 5 days. - Adult: 250/125 mg every 8 hours for 5 days.
Cephalosporins (offer little advantage over the penicillins in dental infections):	
Cefalexin	- Child 1month–11 years: 12.5 mg/kg twice daily by mouth. - Child 12–17 years: 500 mg 2–3 times a day. - Adult: 250 mg every 6 hours, alternatively 500 mg every 8–12 hours; increased to 1–1.5 g every 6–8 hours, (increased dose to be used for severe infections).
Cefradine	- Child 7–11 years: 25–50 mg/kg daily in 2–4 divided doses.5 - Adult and Child >12 years: 250–500 mg 4 times a day, alternatively 0.5–1 g twice daily; increased if necessary up to 1 g 4 times a day, (increased dose may be used in severe infections).
Tetracyclines: in adults, can be effective against oral anaerobes but the development of resistance has reduced their usefulness for the treatment of acute oral infections.	
Doxycycline	Adult and Child >12 years: Initially 200 mg daily for 1 dose, then 100 mg once daily.
Macrolides alternative for oral infections in penicillin-allergic patients or where a beta-lactamase producing organism is involved. However, many organisms are now resistant to macrolides or rapidly develop resistance; their use should therefore be limited to short courses.	
Clarithromycin	- Child 1 month–11 years (body-weight up to 8 kg): 7.5 mg/kg twice daily - Adult: 250 mg twice daily usually for 7–14 days, increased to 500 mg twice daily, if required in severe infections.
Azithromycin	- Child 6 months–17 years: 10 mg/kg once daily (max. per dose 500 mg) for 3 days - Adult: 500 mg once daily for 3 days, alternatively, initially 500 mg once daily for 1 day, then 250 mg once daily for 4 days.
Clindamycin	Used for the treatment of dentoalveolar abscess that has not responded to penicillin or to metronidazole. - Adult: 150–300 mg every 6 hours; increased if

	necessary up to 450 mg every 6 hours. Adult: 600 mg every 8 hours
Metronidazole	is an alternative to a penicillin where the patient is allergic to penicillin or the infection is due to betalactamase- producing anaerobes. - Child 1–2 years: 50 mg every 8 hours for 3–7 days. - Child 3–6 years: 100 mg every 12 hours for 3–7 days. - Child 7–9 years: 100 mg every 8 hours for 3–7 days. - Child 10–17 years: 200–250 mg every 8 hours for 3–7 days. - Adult: 400 mg every 8 hours for 3–7 days.
Fusidic acid	May be prescribed as Sodium Fusidate ointment.
Fungal Infection	Oral candidiasis.
Nystatin	- Child: 100 000 units 4 times a day usually for 7 days, and continued for 48 hours after lesions have resolved. - Adult: 100 000 units 4 times a day usually for 7 days, and continued for 48 hours after lesions have resolved.
Viral Infection	Viral infections are the most common cause of a sore throat. They do not benefit from anti-infective treatment. The management of primary herpetic gingivostomatitis is a soft diet, adequate fluid intake, and analgesics as required. The use of chlorhexidine mouthwash will control plaque accumulation if tooth brushing is painful and will also help to control secondary infection in general.
Chlorhexidine	- Child: Rinse or gargle 10 mL twice daily (rinse or gargle for about 1 minute). - Adult: Rinse or gargle 10 mL twice daily (rinse or gargle for about 1 minute) [1]

Poisoning and toxicology

Refer immediately to a hospital.

The hospital may call Khartoum Medicines Information Center to advise what type of treatment to use.

Khartoum Medicines Information Center

4141

0123 410 540 after 10 pm only

Antimicrobial rational use

Antibacterial considerations before starting therapy

- ✓ Viral infections should not be treated with antibacterial. However, antibacterial may be used to treat secondary bacterial infection (e.g. bacterial pneumonia secondary to influenza);
- ✓ Samples should be taken for culture and sensitivity Testing; 'blind' antibacterial prescribing for unexplained pyrexia usually leads to further difficulty in establishing the diagnosis;
- ✓ Knowledge of prevalent organisms and their current sensitivity is of great help in choosing an antibacterial before bacteriological confirmation is available;
- ✓ Generally, narrow-spectrum antibacterial are preferred to broad-spectrum antibacterial unless there is a clear clinical indication (e.g. life-threatening sepsis).
- ✓ An inadequate dose may also increase the likelihood of antibacterial resistance.
- ✓ Duration of therapy depends on the nature of the infection and the response to treatment.
- ✓ Courses should not be unduly prolonged because they encourage resistance, they may lead to side-effects and they are costly.
- ✓ When the pathogen has been isolated treatment may be changed to a more appropriate antibacterial if necessary.
- ✓ If no bacterium is cultured the antibacterial can be continued or stopped on clinical grounds [1].

Levels of prescribing

For rational use of medicine, Federal Ministry of Health in Sudan regulates prescribing of medication in levels emphasized in (table 13) [4].

AA: Medicines used in health facilities run by community health workers.
A: Medicines used in health centers run by medical assistants (in addition to AA)
B: Medicines used in health centers run by medical officers (in addition to AA, A).
C: Medicines used in hospitals with specialist departments (in addition to AA, A, B).
S: Medicines used in specialized centers (in addition to AA, A, B, and C).

Table 13: Route of administration, Dosage form, Strength, and Level of use

The Medicine/Drug	Route, Dosage form, and Strength	Level of use
1-Anti bacterial medicines		
Amoxicillin	**Capsule**: 250 mg ,500 mg	A
	Powder for oral suspension: 125 mg/5ml, 250 mg/5 ml	A
Amoxicillin +Clavulanic acid	**Oral liquid**: 125 mg/5 ml+31.25 mg/5 ml 250 mg/5 ml+62.5 mg/5 ml	C
	Tablets: 500 mg+125mg	C
	Injection: 500/100 mg (powder for reconstitution)	C
	Injection: 1000/200 mg	C
Benzathine penicillin	**Powder for injection**: 2.4 million IU ,1.2 million IU, 600000IU in 5ml vial	B
Benzyl penicillin	**Powder for injection:** 600 mg (1 million IU), 3g (5million IU) in 5 ml vial.	A
Cefaclor	**Capsule**: 500mg	C
Cephalexin	**Powder for oral suspension**: 125mg/5ml, 250mg/5ml	B
Cefazolin	**Injection**: 1g vial	C
Cefepime	**Powder for injection:** 1g, 0.5 g	S
Cefixime	**Capsule:** 200 mg, 400 mg	C

	Powder for oral liquid: 100 mg/5 ml	
Cefotaxime	**Injection**: 500 mg, 1g per vial	C
Cefpodoxime	**Tablet:** 100 mg, 200 mg	C
Cefuroxime	**Injection**: 750 mg, 1.5 mg /vial	C
Ceftazidime	**Injection**: 250 mg, 1g /vial	C
Ceftriaxone	**Injection**: 250,1g / vial	C
Phenoxymethyl penicillin	**Tablets**: 250 mg ,500 mg	C
	Oral liquid: 125 mg/5 ml	C
Procaine penicillin	**Injection**: 1g (1 million) / vial	C
Azithromycin	**Capsule:** 250 mg, 500 mg	B
	Oral liquid: 200 mg/5 ml	B
Chloramphenicol	**Capsule:** 250 mg	B
	Powder for injection: 1g /vial	B
	Suspention for injection: 0.5 g/ml in 2ml vial	B
Ciprofloxacin	**Tablets**: 250 mg, 500 mg	C
	Solution for i.v. infusion: 2mg /ml	S
Clarithromycin	**Tablets:** 250 mg, 500 mg	B
	Oral liquid: 125 mg, 250 mg /5ml	B
	Injection: 500 mg /vial	C
Erythromycin	**Capsule or Tablet:** 250 mg	B
	Oral liquid: 125 mg/5ml	C
Clindamycin	**Capsule:** 150 mg, 300 mg	B
	Injection: 150 mg, 600 mg /ml	C
	Oral liquid: 75 mg /5 ml	C
Doxycycline	**Capsule or Tablet**: 100 mg	B
Gentamicin	**Injection:** 40 mg/ml 2ml	B
Metronidazole	**Tablets:** 250 mg, 500 mg	A
	Oral suspension: 200 mg/5ml	A
	Injection: 500 mg in 100 ml	B
Nitrofurantoin	**Tablets:** 100 mg	C
	Oral liquid: 25 mg/5 ml	C
Sulfamethoxazole+ Trimethoprim	**Tablets**: 100+20 mg, 400+80 mg	B
	Tablets: 800+160 mg	B
	Oral suspension: 200+40 mg/5 ml, 400+80 mg/5ml	AA
Vancomycin	**Injection**: 0.5 g, 1g	C
2- Antiameobic		
Diloxanide	**Tablets:** 500 mg	A
Metronidazole	**Tablets**: 250 mg , 500 mg	A
	Oral suspension: 200 mg/5ml	A

	Injection: 500 mg in 100 ml	B
3-Anti leishmaniasis		
Amphotericin B	**Injection:** 50 mg/vial	C
Liposomal Amphotericin	**Injection**: 50 mg/vial	C
4-Antimalarial		
Artemether + Lumefantrine	**Tablets:** 20 mg +120 mg, 80 mg +480 mg	AA
Dihydroartemisinin + Piperacillin	**Tablet**: 20 mg +160 mg, 40 + 320mg	B
Primaquine	**Tablets**:7.5 mg, 15 mg	B
Artesunate	**Injection:** 30 mg, 60 mg, 120 mg	AA
Quinine	**Tablets:** 300 mg	B
	Injection: 300 mg /ml in 2 ml ampoule IM or IV(5% glucose)	B
5-Cardiovascular system		
Antihypertensive medicine		
Amlodipine	**Tablets:** 5 mg, 10 mg	B
Amlodipine +Valsartan	**Tablets:** 5/80 mg, 5/160 mg , 10/160 mg	C
Atenolol	**Tablets:** 50 mg, 100 mg	B
Nifedipine	**Tablets:** immediate release: 5mg, 10 mg	C
	Tablets: sustained release: 20mg , 30mg, 60 mg	C
Captopril	**Tablets:** 25 mg, 50 mg	B
Chlorthalidone	**Tablets:** 25 mg ,50 mg	B
Methyldopa	**Tablets**:250 mg	B
Doxazosin	**Tablets:** 2mg. 4 mg	S
Enalapril	**Tablets:** 2.5 mg, 5	B
Hydr clorothiazide	**Tablets:** 25 mg, 50 mg	B
Indapamide	**Tablets:** 1.5 mg, 2.5 mg	B
Lisinopril	**Tablets:** 2,5 ,5 ,10 , and 20 mg	B
Losartan	**Tablets:** 25 , 50 mg	B
Propranolol	**Tablets:** 10 mg, 40 mg , 80 mg	B
Valsartan	**Tablets**: 40 mg, 80 mg	B
Anti-angina medicine		
Amlodipine	**Tablets**: 5 mg, 10 mg	B
Atenolol	**Tablets**: 50 mg, 100 mg	B
Bisoprolol	**Tablets**: 2.5 mg ,5 mg	B
Glyceryl Trinitrate	**Tablets**:(sublingual) 500 mcg	B
	Transdermal: 5 mg	C

	Injection: 1mg/ml 1ml	C
	Spray: 200 mcg	C
Isosorbid Dinitrate	**Tablets**: (sublingual): 5mg	B
	Tablets: 10mg, 20mg	B
	Tablets: (sustained release): 40 mg	B
	Injection: 1mg/ml	C
Isosorpid Mononitrate	**Tablets**: 20 mg, 40 mg	B
	Tablets: 60 mg	B
Propranolol	**Tablets:** 10 mg , 40 mg	B
Heart Failure		
Furosemide	**Tablets**: 40 mg	B
	Injection: 10 mg/ml in 2ml	B
Hydrochlorothiazide	**Tablets:** 25 mg	B
Metazolone	**Tablets:** 5mg	S
Bisoprolol	**Tablets**: 2.5 mg, 5 mg, 10 mg	C
Enalapril	**Tablets:** 2.5 mg , 5 mg, 10 mg	C
6- Contraceptives		
Oral hormonal contraceptives		
Ethinyl estradiol + levonorgestrel	**Tablets:** 30 mcg +150 mcg	B
	30 mcg +250 mcg	B
Ethinyl estradiol + levonorgestrel	**Tablets:** 35 mcg +1 mg	B
Levonorgestrel	**Tablets:** 30 mcg , 750 mcg, 1.5 mg	C
Norethisterone	**Tablets:** 5 mg	B
Progestogen	**Tablets:** 75 mcg	B
Injectable hormonal contraceptives		
Medroxy progesterone	**Injection:** 150 mg /ml in 1 ml	B
Norethisterone	**Injection:** 200 mg /ml in 1 ml	B
7- Analgesics		
Aspirin	**Tablets:** 100 mg , 300 mg	AA
Celecoxib	**Tablets:** 100 mg	S
Diclofenac potassium	**Tablets:** 50 mg	B
Diclofenac sodium	**Injection:** 75 mg	B
	Tablets: 25 mg , 50 mg	
	Tablets: 25 mg , 50 mg, 75mg , 100 mg	
	Suppositories: 12.5 mg, 100 mg	
	Gel: 1%	
Ibuprofen	**Tablets:** 200 mg, 400 mg, 600 mg	B
Indomethacin	**Tablets or Capsules:** 25 mg	C
Naproxen	**Tablets:** 250 mg , 500 mg	C
Paracetamol	**Tablets:** 500 mg	A

	Syrup: 125 mg/5 ml	A
	Suppository: 125 mg, 250 mg	B
	Infusion:10 mg/ml	B
Piroxicam	**Tablets**:10 mg, 20 mg	C
8- Oral antidiabetic medicines		
Glibenclamide	**Tablets:** 2.5 mg, 5 mg	B
Gliclazide	**Tablets:** 80 mg	B
Glimipride	**Tablets:** 1, 2, 3, and 4 mg	B
Metformin	**Tablets:** 500 mg, 850 mg	B
Vildagleptin	**Tablets:** 50 mg	C
Metformin+Vildagleptin	**Tablets:** 50+500 mg, 50+1000 mg	C
9- Anticonvulsants/ antiepileptics		
Diazepam	**Injection**: 5 mg/ ml in 2 ml ampoule	C
Lorazepam	**Tablets**: 1 mg	B
	Injection: 2mg/ml in 1ml ampoule. 4 mg/ml in 1 ml	B
Phenytoin	**Tablets**: 25 mg, 50 mg, 100 mg	B
	Injection: 50 mg/ml in 5 ml	
10- Respiratory system		
Beclomethsone	**Aerosol inhalation**: 50 mcg/ metered inhalation 250 mcg / metered inhalation	C
	Dry powder for inhalation: 50 mcg/ metered inhalation, 100 mcg	C
Budesonide	**Inhalation suspension:** 0.5 mg/2 ml	S
Budesonide+formeterol	**Inhaler:** 160 mcg50+4.5 mcg	S
Fluticasone	**Inhaler:** 50 mcg /metered inhalation 125 mcg , and 250 mcg	B
Fluticasone +Salmeterol	**Inhaler**: 250 mcg +50 mcg, 100+50 mcg	S
Ipratropium	**Aerosol inhalation:** 20 mcg/ metered inhalation	B
	Nebulizer solution: 250 mcg/ml	S
	Inhaler: 21 mcg / puff	AA
Montelukast	**Tablets:** 4, 5, 10 mg	S
salbutamol	**Tablets**: 2 mg, 4 mg	AA
	Aerosol inhalation: 100 mcg/ metered inhalation	B
	Syrup: 2 mg/5 ml	AA
	Respiratory Solution: 5 mg /ml	C
	i.v. infusion: 1mg/ml in 5 ml	C

Salmeterol	**Inhaler:** 25 mcg / metered inhalation, 100mcg	C
11- Anti depression		
Fluoxetine	**Capsules:** 20 mg	C
Fluvoxamine	**Tablets**: 50 mg, 100 mg	C
Sertraline	**Tablets**: 50 mg, 100 mg	C

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