GUIDELINES

For

GENERAL PRACTITIONERS

2024

Press record

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FOREWORD

It is a great honor for me to write a foreword to Guidelines for General Practitioners by General Practitioners' society, Myanmar Medical Association (Central).

General practitioners are the primary health providers in the community looking after the majority of the people of our country. They are being trusted and depend upon by every families in the surrounding area where they practice. The first and foremost care by the General Practitioners are the most important for all the people.

Guidelines based on a critical appraisal of scientific evidence (evidence-based guidelines) clarify which interventions are of proved benefit and document the quality of the supporting data. They alert clinicians to interventions unsupported by good science, reinforce the importance and methods of critical appraisal, and call attention to ineffective, dangerous, and wasteful practices.

Clinical guidelines can improve the quality of clinical decisions. They offer explicit recommendations for clinicians who are uncertain about how to proceed, overturn the beliefs of doctors accustomed to outdated practices, improve the consistency of care, and provide authoritative recommendations that reassure practitioners about the appropriateness of their treatment policies.

The Myanmar Medical Association together with the GP society has been helping out with the CME and CPD program for the Member doctors both inhouse sessions and online courses. This guideline is one of the essential parts of this CPD for the GPs.

I would like to congratulate the GP society for their effort for producing this guideline and also, I would like to encourage them to review and updated regularly.

Professor Aye Aung
President
Myanmar Medical Association

April, 2024

PREFACE

We are writing this letter to express our sincerest gratitude and appreciation for the successful completion of the **second edition** of the **General Practitioners' Guidelines**. This accomplishment is the result of an exceptional collaborative effort, and we would like to extend our thanks to all those involved.

The General Practitioners' Guidelines has been an invaluable resource since its inception with the launch of the first edition in November 2017. As per the initial plan, the guidelines were intended to be updated every three years to ensure the most up-to-date information reaches Myanmar General Practitioners, enhancing their knowledge in primary healthcare and family health.

However, the unforeseen outbreak of the Covid-19 pandemic disrupted our plans and posed numerous challenges for the team. In-person meetings became impossible due to safety concerns, making it necessary for us to find alternative means of communication and collaboration. Despite the adversity faced, the team members demonstrated remarkable resilience and adaptability by utilizing online platforms and technology to continue the update process.

We would like to extend our deepest gratitude to the dedicated team members who persevered and worked tirelessly during these trying times. Their commitment, professionalism, and unwavering dedication to the project enabled us to overcome the obstacles posed by the pandemic and successfully complete the second edition of the guideline.

Furthermore, we would like to express our sincere appreciation to the specialist societies that actively contributed to the development of the guidelines. Their expertise and invaluable insights have ensured that the content remains current, accurate, and relevant, enabling our General Practitioners to provide the highest quality of care to their patients.

We would also like to extend our heartfelt thanks to the esteemed President of the Myanmar Medical Association, for their continuous support and guidance throughout this endeavor. Their leadership and unwavering commitment to advancing medical knowledge in Myanmar have been instrumental in the success of this Guidelines.

Moreover, the decision to distribute the guideline as electronic copies reflects our commitment to ensuring easy access for all Myanmar General Practitioners. By making it available in this format, we aim to facilitate the dissemination of updated knowledge, thus empowering our healthcare professionals to deliver the best possible care to the community.

In conclusion, we would like to express our deepest gratitude to all those who contributed to the development and distribution of the General Practitioners' Guidelines Second Edition. The unwavering supports and collective efforts have made a significant impact on enhancing primary healthcare and family health care in Myanmar.

Once again, thank you for your outstanding dedication, resilience, and invaluable contributions. We look forward to our continued collaboration in advancing medical knowledge and improving healthcare outcomes for all.

Dr Khine Soe Win and Dr Win Zaw April, 2024
General Practitioners' Society (Central)
Myanmar Medical Association

EDITORIAL

It is my privilege to inform you that our updated and revised edition of "**Guidelines for General Practitioners**" will be published very soon and it is my great pleasure to be the editor-in-chief of this guideline book. There are various reasons for revising and updating the previous edition.

This is the fact that some important topics, for example, malaria and family violence are missing in the first edition and some clinical practice guidelines like Diabetes Management have been changed during the interim period. Of course, this opportunity arises due to the emergence of COVID-19 in the world. As all you know, Medicine is an ever-changing science; we need to consider updating our guidelines at least five- yearly. Hence the time is up now!

Education is achieved by assimilating information from many resources and readers of this book can enhance their learning experience in terms of reflecting in their daily Family/General Practice. We all take immerse pride in contributing good educational resource dedicated to Myanmar General Practitioners. The editors and authors anticipate that the readers will both enjoy and profit from their work in preparing this volume.

Happy studying and learning,

Dr Win Lwin Thein
Editor-in chief
Vice President (GP Society)
April, 2024

ACKNOWLEDGEMENT

We would like to thank all our talented and hard-working colleagues who have contributed to the ongoing development of the **Guidelines for General Practitioners**.

Especially, we would like to highlight the significance of the second edition which appears when the family medicine development process in Myanmar is being idle. Many factors are impeding the developing process lately, which has been accelerated previously by the commitment of the MOHS, the medical universities, and the General Practitioners' Society before the COVID-19 pandemic started.

No one can deny that the Myanmar health care system is lacking a strong and effective primary care task force. The best solution to mend this defect is retraining the thousands of general practitioners who are working individually across the country. Here comes the role of family medicine to train these GPs and primary care doctors to be able to use its principles effectively and, in turn, strengthen primary care.

Many GPs are using some family medicine principles consciously or unconsciously in varying degree of competency. Person-centered care, continuity of care, and family-oriented care became the culture of most practices for a long time. But only a few GPs can enjoy the most effective coordinated care and seamless continuity of care with secondary and tertiary care providers. The reasons behind this would be the absence of standardization in general practitioners' service quality and unawareness of the value of family medicine practitioners by other specialties and the public.

To resolve this ambiguity, primary care doctors should be involved in the retraining programs and thereafter CME/CPD and other life-long-learning programs which prescribe family medicine curricula.

We also acknowledge the effort of the contributors to make this new edition more family medicine-oriented, in addition to the Family Medicine chapter at the beginning of the book. We genuinely believe that the new edition will be a better reference for the GP/FP who wants to practice quality primary care and for future family medicine programs in Myanmar.

Finally, we would like to thank all academic writers who contributed to the General Practice Guidelines-first edition. Without their kind support, this second edition could never have happened.

Regards,

Dr. Tin Aye and Dr. Kyaw Thu

General Practitioners' Society (Central), MMA **April, 2024**

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SYMBOLS AND ABBREVIATIONS

AAA abdominal aortic aneurysm
ABC airway, breathing, circulation
ABCD airway, breathing, circulation, dextrose
ABO A, B and O blood groups
ACE angiotensin-converting enzyme
ACEI angiotensin-converting enzyme inhibitor
ACTH adrenocorticotrophic hormone
ADHD attention deficit hyperactivity disorder
ADT adult diphtheria vaccine
AFP alpha-fetoprotein
AI aortic incompetence
AIDS acquired immunodeficiency syndrome
AIIRA angiotensin II (2) reuptake antagonist
AKF acute kidney failure
ALE average life expectancy
ALL acute lymphocytic leukaemia
ALP alkaline phosphatase
ALT alanine aminotransferase
AMI acute myocardial infarction
AML acute myeloid leukaemia
ANA antinuclear antibody
ANF antinuclear factor
AP anterior–posterior
APH ante-partum haemorrhage
ASD atrial septal defect
ASIS anterior superior iliac spine
ASOT antistreptolysin O titre
AST aspartate aminotransferase
AV atrioventricular
AZT azidothymidine
BCC basal cell carcinoma
BCG bacille Calmette-Guérin
BMD bone mass density
BMI body mass index
BP blood pressure
BPH benign prostatic hyperplasia
Ca carcinoma
CABG coronary artery bypass grafting
CAD coronary artery disease
CAP community acquired pneumonia
CBT cognitive behaviour therapy
CCF congestive cardiac failure
CCU coronary care unit
CD4 T helper cell
CD8 T suppressor cell
CDT combined diphtheria/tetanus vaccine
CEA carcinoembryonic antigen
CFS chronic fatigue syndrome
CHD coronary heart disease
CHF chronic heart failure
CIN cervical intraepithelial neoplasia
CK creatinine kinase
CKD chronic kidney disease
CKF chronic kidney failure
CML chronic myeloid leukaemia
CMV cytomegalovirus
CNS central nervous system
COAD chronic obstructive airways disease
COC combined oral contraceptive
COCP combined oral contraceptive pill
COPD chronic obstructive pulmonary disease
COX cyclooxygenase
CPA cardiopulmonary arrest
CPAP continuous positive airways pressure
CPK creatine phosphokinase
CPR cardiopulmonary resuscitation
CR controlled release
CREST calcinosis cutis; Raynaud's phenomenon; oesophageal involvement; sclerodactyly; telangiectasia
CRF chronic renal failure
CR(K)F chronic renal (kidney) failure
CRP C-reactive protein
CSF cerebrospinal fluid
CT computerised tomography
CTS carpal tunnel syndrome
CVA cerebrovascular accident
CVS cardiovascular system
CXR chest X-ray
DBP diastolic blood pressure
DC direct current
DHA docosahexaenoic acid
DI diabetes insipidus
DIC disseminated intravascular coagulation
dL decilitre
DMARDs disease modifying antirheumatic drugs
DNA deoxyribose-nucleic acid
DRABC defibrillation, resuscitation, airway, breathing, circulation
drug dosage bd—twice daily, tid/tds -three times daily, qid/qds -four times daily
ds double strand
DS double strength
DSM diagnostic and statistical manual (of mental disorders)
DU duodenal ulcer
DUB dysfunctional uterine bleeding
DVT deep venous thrombosis
EBM Epstein-Barr mononucleosis (glandular fever)
EBV Epstein-Barr virus
ECG electrocardiogram
ECT electroconvulsive therapy
EDD expected due date
EEG electroencephalogram
ELISA enzyme linked immunosorbent assay
ESRF end-stage renal failure
ESR(K)F end stage renal (kidney) failure
ERCP endoscopic retrograde cholangiopancreatography
esp. especially
ESR erythrocyte sedimentation rate
FB foreign body
FBE full blood count

FEV1 forced expiratory volume in 1 second
fL femtolitre = (1e–15) litre
FSH follicle stimulating hormone
FUO fever of undetermined origin
FVC forced vital capacity
g gram
GA general anaesthetic
GABHS group A beta-haemolytic streptococcus
GBS Guillain-Barré syndrome
GFR glomerular filtration rate
GI glycaemic index
GIT gastrointestinal tract
GLP glucagon-like peptide
GnRH gonadotrophin-releasing hormone
GO gastro-oesophageal
GORD gastro-oesophageal refl ux
GP general practitioner
G-6-PD glucose-6-phosphate
GU gastric ulcer
HAV hepatitis A virus
anti-HAV hepatitis A antibody
Hb haemoglobin
HbA haemoglobin A
anti-HBc hepatitis B core antibody
HBeAg hepatitis B e antigen
anti-HBs hepatitis B surface antibody
HBsAg hepatitis B surface antigen
HBV hepatitis B virus
HCG human chorionic gonadotropin
HCV hepatitis C virus
anti-HCV hepatitis C virus antibody
HDL high-density lipoprotein
HEV hepatitis E virus
HFM hand, foot and mouth
HFV hepatitis F virus
HGV hepatitis G virus
HIV human immunodeficiency virus
HNPCC hereditary nonpolyposis colorectal cancer
HPV human papilloma virus
HRT hormone replacement therapy
HSV herpes simplex viral infection
IBS irritable bowel syndrome
ICE ice, compression, elevation
ICS inhaled corticosteroid
ICS intercondylar separation
ICT immunochromatographic test
IDDM insulin dependent diabetes mellitus
IDU injecting drug user
IgE immunoglobulin E
IgG immunoglobulin G
IgM immunoglobulin M
IHD ischaemic heart disease
IM, IMI intramuscular injection
inc. including
IPPV intermittent positive pressure variation
IR internal rotation
ITP idiopathic (or immune) thrombocytopenia purpura
IUCD intrauterine contraceptive device
IUGR intrauterine growth retardation
IV intravenous
IVI intravenous injection
IVP intravenous pyelogram
IVU intravenous urogram
JCA juvenile chronic arthritis
JVP jugular venous pulse
KA keratoacanthoma
kg kilogram
KOH potassium hydroxide
LA local anaesthetic
LABA long acting beta agonist
LBBB left branch bundle block
LBO large bowel obstruction
LBP low back pain
LDH/LH lactic dehydrogenase
LDL low-density lipoprotein
LFTs liver function tests
LH luteinising hormone
LHRH luteinising hormone releasing hormone
LIF left iliac fossa
LMN lower motor neurone
LNG levonorgestrel
LRTI lower respiratory tract infection
LSD lysergic acid
LUQ left upper quadrant
LUTS lower urinary tract symptoms
LV left ventricular
LVH left ventricular hypertrophy
mane in morning
MAOI monoamine oxidase inhibitor
mcg microgram (also µg)
MCV mean corpuscular volume
MDI metered dose inhaler
MDR multi-drug resistant TB
MI myocardial infarction
MRCP magnetic resonance cholangiography
MRI magnetic resonance imaging
MS multiple sclerosis
MSM men who have sex with men
MSU midstream urine
N normal
NAD no abnormality detected
NGU non-gonococcal urethritis
NHL non-Hodgkin's lymphoma
NIDDM non-insulin dependent diabetes mellitus
nocte at night
NSAIDs non-steroidal anti-inflammatory drugs
NSU non-specific urethritis
(o) taken orally
OA osteoarthritis
OCP oral contraceptive pill
OGTT oral glucose tolerance test
OSA obstructive sleep apnoea
OTC over the counter
PA posterior–anterior
PAN polyarteritis nodosa
Pap Papanicolaou
pc after meals
PCA percutaneous continuous analgesia
PCB post coital bleeding

PCL posterior cruciate ligament
PCOS polycystic ovarian syndrome
PCP pneumocystis carinii pneumonia
PCR polymerase chain reaction
PCV packed cell volume
PDA patent ductus arteriosus
PEF peak expiratory flow
PEFR peak expiratory flow rate
PET pre-eclamptic toxaemia
PFT pulmonary function test
PH past history
PID pelvic inflammatory disease
PLISSIT permission: limited information: specific suggestion: intensive therapy
PMS premenstrual syndrome
PMT premenstrual tension
POP plaster of Paris
POP progestogen-only pill
PPI proton-pump inhibitor
PPROM preterm premature rupture of membranes
PR per rectum
prn as and when needed
PROM premature rupture of membranes
PSA prostate specific antigen
PSIS posterior superior iliac spine
PSVT paroxysmal supraventricular tachycardia
PT prothrombin time
PTC percutaneous transhepatic cholangiography
PU peptic ulcer
PUO pyrexia of undetermined origin
pv per vagina
qds, qid four times daily
RA rheumatoid arthritis
RBBB right branch bundle block
RBC red blood cell
RCT randomised controlled trial
RF rheumatic fever
Rh rhesus
RIB rest in bed
RICE rest, ice, compression, elevation
RIF right iliac fossa
RPR rapid plasma reagin
RR relative risk
RSV respiratory syncytial virus
RT reverse transcriptase
rtPA recombinant tissue plasminogen activator
SAH subarachnoid haemorrhage
SARS severe acute respiratory distress syndrome
SBE subacute bacterial endocarditis
SBO small bowel obstruction
SBP systolic blood pressure
SC/SCI subcutaneous/subcutaneous injection
SCC squamous cell carcinoma
SCG sodium cromoglycate
SIADH syndrome of secretion of inappropriate antidiuretic hormone
SIDS sudden infant death syndrome
SIJ sacroiliac joint
SL sublingual
SLE systemic lupus erythematosus
SLR straight leg raising
SND sensorineural deafness
SNHL sensorineural hearing loss
SNRI serotonin noradrenaline reuptake inhibitor
SOB shortness of breath
sp species
SR sustained release
SSRI selective serotonin reuptake inhibitor
SSS sick sinus syndrome
stat at once
STI sexually transmitted infection
SVC superior vena cava
SVT supraventricular tachycardia
T3 tri-iodothyronine
T4 thyroxine
TB tuberculosis
tds, tid three times daily
TENS transcutaneous electrical nerve stimulation
TFTs thyroid function tests
TG triglyceride
TIA transient ischaemic attack
TIBC total iron binding capacity
TM tympanic membrane
TMJ temporomandibular joint
TNF tissue necrosis factor
TOF tracheo-oesophageal fistula
TORCH toxoplasmosis, rubella, cytomegalovirus, herpes virus
TPHA Treponema pallidum haemoglutination test
TSE testicular self-examination
TSH thyroid-stimulating hormone
TT thrombin time
TV tidal volume
U units
UC ulcerative colitis
U & E urea and electrolytes
µg microgram
UMN upper motor neurone
URTI upper respiratory tract infection
US ultrasound
UTI urinary tract infection
U ultraviolet
VC vital capacity
VDRL Venereal Disease Reference Laboratory
VF ventricular fibrillation
VMA vanillyl mandelic acid
VSD ventricular septal defect
VT ventricular tachycardia
VUR vesico-ureteric reflux
VWD von Willebrand's disease
WBC white blood cells
WCC white cell count
WHO World Health Organization
WPW Wolff-Parkinson-White
XL sex linked

CHILD HEALTH

- Acute Diarrhoea
- Dysentery
- Vomiting
- Cough / Difficulty in Breathing
- Stridor
- Croup
- Bronchiolitis
- Cough and Cold
- Asthma
- Pneumonia
- Childhood TB
- Convulsions
- Differential Diagnosis of Rashes
- Chicken Pox
- Measles
- Rubella
- Meningococcaemia
- Dengue Haemorrhagic Fever
- Shock
- Anaphylaxis
- Oedematous Child
- Acute Malnutrition in Children
- Immunization for Children in Myanmar
- Burns and Scald

ACUTE DIARRHOEA

Definition

- Passage of unusually loose or watery stools, usually at least three times in a 24 hour period

History

A careful feeding history is essential in the management of a child with diarrhoea. Inquiries should also be made about:

- frequency of stools
- number of days of diarrhoea
- blood in stools
- report of a cholera outbreak in the area
- recent antibiotic or other drug treatment
- attacks of crying with pallor in an infant.

Examination

Look for:

- Signs of some dehydration or severe dehydration:
  - restlessness or irritability
  - lethargy or reduced level of consciousness
  - sunken eyes
  - skin pinch returns slowly or very slowly
  - thirsty or drinks eagerly, or drinking poorly or not able to drink
- blood in stools
- signs of severe malnutrition
- abdominal mass
- abdominal distension.
- There is no need for routine stool microscopy or culture m children with non-bloody diarrhoea.

Classification of the severity of dehydration in children with diarrhoea

Classification	Signs or Symptoms	Treatment
Severe dehydration	Two or more of the following signs: • lethargy or • unconsciousness • sunken eyes • unable to drink or • drinks poorly • skin pinch goes back • very slowly C: 2 s)	• Referral to Hospital • Give fluids for severe dehydration (treatment plan C)
Some dehydration	Two or more of the following signs: • restlessness, • irritability • sunken eyes • drinks eagerly, thirsty • skin pinch goes back slowly	• Give fluid and food for some dehydration (diarrhea treatment plan B) • After rehydration, advise mother on home treatment and when to return immediately • Follow up in 5 days if not improving.

No dehydration	• Not enough signs to classify as some or severe dehydration	• Give fluid and food to treat diarrhoea at home • (diarrhoea treatment plan A) • Advise mother on when to return immediately • Follow up in 5 days if not improving.

- Being lethargic and sleepy are not the same. A lethargic child is not simply asleep: the child's mental state is dull and the child cannot be fully awakened; the child may appear to be drifting into unconsciousness.
- In some infants and children, the eyes normally appear somewhat sunken. It is helpful to ask the mother if the child's eyes are normal or more sunken than usual.
- The skin pinch is less useful in infants or children with marasmus or kwashiorkor, or obese children. Other signs may be altered in children with severe malnutrition.

Severe dehydration

- Referral to Hospital

Fluids for severe dehydration (treatment plan C)

Age(months)	First, give 30ml/kg in:		Then, give 70ml/kg in:
<12	1 hour		5 hours
>12	30min		2 hours and 30 min

- Reassess the patient every 1-2 hours. If hydration is not improving, give the IV drip more rapidly.
- After six hours (infants) or three hours (older patients), evaluate the patient using the assessment chart. Then choose the appropriate treatment plan (A, B or C) to continue treatment.
- If Ringer's Lactate Solution is not available, normal saline may be used
- Repeat once if radial pulse is still very weak or not detectable
- **Suspect cholera** in children over 2 years old who have acute watery diarrhoea and signs of severe dehydration, if cholera is occurring in the local area
- Assess and treat dehydration as for other acute diarrhoea
- Give oral antibiotic:
- Give an oral antibiotic to which strains of *V choleraein* the area are known to be sensitive. Possible choices are: erythromycin, ciprofloxacin and cotrimoxazole
- Tetracycline 12.5mg/kg/does 6hourly for 3days for children over 8years (OR)
- Norfloxacin 6mg/kg/dose 12hourly for 3years
- Prescribe zinc supplementation as soon as vomiting stops

Monitoring

- Reassess the child every 15-30 minutes until a strong radial pulse is present
- If hydration is not improving, give the IV solution more rapidly
- If signs of severe dehydration are still present, repeat the I V fluid infusion as outlined earlier
- If the child is improving but still shows signs of some dehydration, discontinue IV treatment and give ORS solution for 4 hours
- If there are no signs of dehydration, follow the guidelines for no dehydration

Some dehydration (PLAN B)

- Children should be given ORS solution, for the first 4 hours at a clinic while the child is monitored.

Treatment

- In the first 4 hours, give the child the following approximate amounts of ORS solution, according to the child's weight (or age if the weight is not known)
- Determine amount of ORS to give during first 4 hours

Age*	Up to 4 months	4 months up to 12 months	12 months up to 2 years	2 years up to 5 years
Weight	<6kg	6-<l0kg	10-<12kg	12-<20kg
Among of fluid	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) by 75. However, if the child wants more to drink, give more.

- Show the mother how to give the child ORS solution, a teaspoonful every 1-2 minutes if the child is under 2 years; frequents from a cup for an older child
- Advise breastfeeding mothers to continue to breastfeed whenever the child wants
- If the mother cannot stay for 4 hours, show her how to prepare ORS solution and give her enough ORS packets to complete the rehydration at home plus enough for 2 more days
- Reassess the child after 4 hours, checking for signs of dehydration listed earlier

If there is no dehydration, teach the mother the four rules of home treatment: (Swift to **Plan A)**

- Give extra fluid
- Give zinc supplements for 10-14 days
- Continue feeding
- Return if the child develops any of the following signs:
- Drinking poorly or unable to drink or break feed
- Becomes more sick
- Develops a fever
- Has blood in the stool
- If the child still has some dehydration, repeat treatment for another 4 hours with ORS solution, as above, and start to offer food, milk or juice and breastfeed frequently
- If signs of severe dehydration have developed, treatment for severe dehydration

No DEHYDRATION (PLAN A)

Treatment

- Treat the child as an outpatient.
- Counsel the mother on the 4 rules of home treatment:
- Give extra fluid, as follows;
    - If the child is being breastfed, advise the mother to breastfeed frequently and for longer at each feed. If the child is exclusively breastfed, give ORS solution or clean water in addition to breast milk. After the diarrhoea stops, exclusive breastfeeding should be resumed, if appropriate to the child's age
- In non-exclusively breastfed children, give one or more of the following:
    - ORS solution
    - Food- based fluids (such as soup, rice water and yoghurt drinks)
    - Clean water
- To prevent dehydration from developing, advise the mother to give extra fluids- as much as the child will take

    - For children <2 years, about 50-100 ml after each loose stool
    - For children 2 years or over, about 100-200 ml after each loose stool
    - Tell the mother to give small sips from a cup. lf the child vomits, wait l0minutes and then give more slowly. She should continue giving extra fluid the diarrhoea stops
- Give zinc supplements for 10-14 days
    - Up to 6 months 1/2 tablet (10mg) per day
    - 6months and more **1** tablet (20 mg) per day
    - Show the mother how to give the zinc supplements
    - Infants, dissolve the tablet in a small amount of clean water, expressed milk or ORS.
    - Older children, tablet can be chewed or dissolve

Suitable fluids

- Most fluids that a child normally takes can be used such as:
    - ORS solution (Low osmolarity)
    - salted drinks (e.g. rice water or a yoghurt drink)
    - vegetable or chicken soup with salt
    - plain water
    - water in which a cereal has been cooked (e.g. unsalted rice water)
    - yoghurt drinks
    - green coconut water
    - weak tea (unsweetened)
    - unsweetened fresh fruit juice.

Unsuitable fluids

- A few fluids are potentially dangerous and should be avoided during diarrhoea. Some examples are:
    - commercial carbonated beverages
    - commercial fruit juices
    - sweetened tea, Coffee

DYSENTERY

- Diarrhoea presenting with loose frequent stools containing blood
- Most episodes are due to *Shigella* and nearly all require antibiotic treatment

Diagnosis

- The diagnostic signs of dysentery are frequent loose stools with visible red blood
- Other findings
  - Abdominal pain
  - Fever
  - Convulsions
  - Lethargy
  - Dehydration
  - Rectal prolapse

Treatment

- **Following should be referred to hospital:**
  - Children with severe malnutrition
  - Young infants (<2 months old)
  - Children who are toxic and lethargic
  - Abdominal distension and tenderness
  - Convulsions
- Give an antibiotic
  - Give an oral antibiotic (for 5 days) to which most local strains of *Shigella* are sensitive.
  - Give ciprofloxacin at 15 mg/kg twice a day for 3 days if antibiotic sensitivity is unknown.
  - If local antimicrobial sensitivity is known, follow local guidelines.
  - Give ceftriaxone IV or IM at 50-80 mg/kg per day for 3 days to severely ill children or as second-line treatment.
  - Trimethoprim-sulphamethoxazole: dose TMP 4mg/kg/dose and SMX 20mg/kg/dose BD for 3 days (OR)
  - Norfloxacin-l0mg/kg/dose BD for 3days
- If not improved or presence of trophozoites form of *E. histolytica* in stool examination add Metronidazole (oral) -l0mg/kg/dose tds for 5days
- Zinc supplement

Follow-up

- Follow -up after two days
- Look for signs of improvement such as no fever, stools with less blood, improved appetite
- If there is no improvement after two days
  - Check for other conditions
  - Stop the first antibiotic
  - Give the child a second-line antibiotic which is known to be effective against *Shigella* in the area
  - If the two antibiotics, which are usually effective for *Shigella* in the area, have each been given for 2 days and produced no signs of clinical improvement.
  - Check for other conditions
  - Admit the child if there is another condition requiring hospital treatment
  - Otherwise treat as an outpatient for possible amoebiasis
- Give the child metronidazole
  - (l0mg/kg, 3 times a day) for 5 days

    - young infants (< 2 months)
- Examine the young infant for surgical causes of blood in the stools (for example, intussusception and refer to a surgeon, if appropriate
    - Give IM /IV ceftriaxone (l00mg/kg) once daily for 5 days

Supportive care

- Treatment of dehydration
- Assess the child for sings of dehydration and give fluids according to treatment Plan A, B or C as appropriate
- Nutritional management
- Ensuring a good diet is very important as dysentery has a marked adverse effect on nutritional status

Prevention of diarrhoea

1. Breast feeding - exclusive breast feeding for 6 months and continue at least 2 years
2. Use of safe water - by using cleanest available and protecting it from contamination water
3. Improves weaning practice - starts at 6 months old with good feeding practice (selecting nutritious foods and using hygienic practice)
4. Food safety - concerning the preparation & consuming of food
5. Hand washing
6. Use of latrines & safe disposal of stool of young children
7. Measles immunization

References:

1. *Pediatric Management Guidelines, Myanmar Pediatric Society-2nd Ed 2011*
2. *Guidelines for the management of common illnesses, WHO-2nd Ed-2013*

VOMITING

Definition

- **Vomiting** is a very common symptom in all paediatric age group. It may be associated with a variety of disturbances, both trivial and serious.
- **Regurgitation, possetting and vomiting:** The return of small amounts of food during or shortly after eating is called regurgitation.
- When this occurs in a baby at or after milk feeding is known as possetting. More complete emptying of the stomach is called vomiting.

Common causes of vomiting in different age group

- **Infancy**
  - Gastroenteritis
  - Gastro-oesophageal reflux
  - Overfeeding
  - Anatomic obstruction - pyloric stenosis, intussusception
  - Systemic infection particularly meningitis, pyelonephritis
- **Childhood**
  - Gastroenteritis
  - Systemic infection
  - Toxic ingestion or medication
  - Whooping cough
- **Adolescence**
  - Gastroenteritis
  - Systemic infection
  - Migraine
  - Pregnancy
  - Bulimia

Aetiology of vomiting

The causes of vomiting are numerous, but the following categories of disease should be considered:

1.	Infective	Gastroenteritis, Urinary tract infection, Meningitis, Tonsillitis, Otitis media or lower respiratory tract infection
2.	Intestinal obstruction	Intussusception, Pyloric stenosis, infection, Intestinal atresia, Acute appendicitis, Volvulus, strangulated hernia
3.	Gastro-oesophageal reflux	
4.	Intracranial pathology	Minor head injury, Raised intracranial pressure from subdural haematoma, Hydrocephalus, Intracranial tumour, Encephalitis, Meningitis
5.	Food allergy or intolerance	Cow's milk, egg, soy, rice intolerance
6.	Metabolic causes	Diabetic ketoacidosis, inborn errors of metabolism, Uraemia, Reye's syndrome, Hypercalcaemia
7.	Psychological cause	As a feature of cyclical vomiting or infrequently with excitement or anxiety
8.	Drugs and toxins	Cytotoxic agents, antibiotics, Theophylline, Opiates, Iron, Digoxin, Lead poisoning

Approach to the vomiting child

- In the infant the first step is to differentiate simple regurgitation from vomiting. If vomiting is truly the problem, the underlying diagnosis can usually be suspected by a thorough history and

physical examination.

History

General well- being

- The general health of the child, and particularly appetite, is a guide to the severity of the complaint.
- Significant vomiting is likely to be accompanied by poor weight gain, if not weight loss. Fever suggests an infective cause.

Characteristics of the vomiting

- The history should be able to differentiate posseting and regurgitation from true vomiting.
- Vomiting from infectious causes tends to be non-projectile, whereas the vomitus in pyloric stenosis can be dramatically projected over some distance.
- Paroxysm of coughing such as blood-stained vomiting indicates inflammation in the upper gastrointestinal tract.
- Bile-stained vomitus is serious sign, suggestive of intestinal obstruction and must be investigated urgently.

Associated symptoms

- Gasteroenteritis and other infections are usually accompanied by diarrhoea.
- Constipation suggests intestinal obstruction.
- Irritability or pain may accompany infection or reflux.
- Aspiration and apnoea are worrying signs of gastro-oesophageal reflux.

Adolescence

- In adolescents, question is somewhat different and needs to include symptoms of migraine, and consideration of gynaecological causes.
- Bulimia rarely presents as vomiting as the adolescent is careful to hide the symptom.
- If the nature or frequency of vomiting is difficult to establish from the history alone, a period of in-patient observation may be of value.

Physical examination

General examination

- A full examination is required to exclude infection in sites other than the gastrointestinal tract, particularly if there is fever.
- There may be signs of local or systemic infection.
- Height and weight should be plotted on the centile charts.
- Poor weight gain is indicative of dehydration in the short-term, and malnutrition in the longer term.
- Hypertension should be excluded.

Signs of dehydration

- Persistent vomiting leads to dehydration.

Abdomen

- Careful examination of the abdomen is essential and may reveal masses, tenderness or distension.
- The abdomen may be tender in gastroenteritis with increased bowel sounds.
- In the rate event of intestinal obstruction, the bowel sounds are tinkling or absent.
- In the vomiting infant, palpation of an olive is diagnostic of pyloric stenosis.

Worrying features in vomiting child for referral

- Bile-stained vomitus -this suggests intestinal obstruction and is always a serious sign which must be investigated urgently
- blood in the vomitus
- drowsiness

- refusal to feed
- malnutrition
- dehydration
- frequent severe abdominal pain
- bloody bowel movement
- fever higher than 102°F (39°C) once or 101°F (38.4°) for more than 3 d

Key points in evaluation of vomiting

- In the infant differentiate posseting from vomiting
- Look for evidence of infection whether gastroenteritis or extra-gastrointestinal
- Differentiate whether the child is dehydrated
- In the infant with projectile vomiting palpate the abdomen carefully for pyloric stenosis
- Suspect reflux in the infant or child with physical disability if there is failure to thrive, blood-stained vomitus, irritability, aspiration or apnoea
- Exclude hypertension as a cause

Management of vomiting

- Monitor for dehydration
- Dehydrated children require rehydration
- Can continue to eat a regular diet as tolerated
- Antiemetics might be recommended in certain situations (to reduce risk of dehydration in children who vomit repeatedly or to reduce motion sickness

REGURGIATION AND POSSETTING

- In the early weeks of life, many normal newborn babies regurgitate after feeds and provided thrive, reassurance only necessary.

GASTRO-OESOPHAGEAL REFLUX

- This is the commonest form of vomiting in infancy due to lax gastro-oesophageal sphincter. At times the vomiting commences soon after birth, but may be delayed a few weeks. After a feed a small amount is regurgitated and may continue until the next feed. At times, the vomiting is forceful. The vomitus may contain altered blood in infant with oesophagitis. Oesophagitis causes irritability and anorexia. Aspiration can manifest itself as episodes of choking and must be suspected in the baby with recurrent episodes of pneumonia.
- In mild cases a careful clinical assessment is sufficient, and confirmation of diagnosis is made by the response to treatment. In more severe or complex cases a barium swallow can be helpful. The severity and frequency of reflux can be documented by continuous pH monitoring (usually 24 hours) with a probe placed in the lower third of the oesophagus.
- In mild uncomplicated cases,
    - propping the child,
    - thickening the feeds and
    - attending to burping may resolve the problem.
- If oesophagitis is present H2 receptor antagonist as ranitidine or frequent use of antacids can be helpful.
- If symptoms do not respond to a good trial of medical agents, or recurrent aspiration apnoea are major problems, surgery is indicated, the commonest procedure being Nissen fundoplication.

PYLORIC STENOSIS

- Pyloric stenosis is caused by hypertrophy of and hyperplasia of pylorus muscle. It usually develops in the first 4-6 weeks of life, is commonest in first-born male children.
- Vomiting is characteristically projectile and generally occurs during or immediately after feeding. The infant is hungry and prepared to take another feed immediately.
- **Physical examination**
- reveals weight loss and varying degree of dehydration.
- Visible peristalsis from the left upper quadrant to the right is most prominent immediately after a feed or just prior to vomiting.
- Careful palpation should reveal a hard mobile tumour (the pylorus) just to the right of the epigastrium.
- Once tumour is felt, further investigation is unnecessary.
- If diagnosis is suspected the loss of acidity from the stomach results in hypochoraemic alkalosis and reduced sodium and potassium levels in the serum.
- **Treatment:** is surgical pyloromyotomy. If the infant is dehydrated, re-hydration must be take place prior to surgery.

INTUSSUSCEPTION

- Vomiting commences early in intussusception.
- A typical history is of dramatic onset of colicky abdominal pain, vomiting, pallor and lethargy.
- The passage of altered blood per rectum occurs in only about half the cases.
- A sausage shaped mass can be felt in the abdomen in 60% of the cases.

ACUTE APPENDICITIS AND PERITONITIS

- In appendicitis in childhood vomiting is the rule, but is preceded by pain.
- In the older child the physical signs are well known.
- However, in younger child (1-5) vomiting with or without diarrhoea may be the only symptom.
- **Physical examination** in this age group can be difficult and unreliable.
- It is only by **repeated examination** of abdomen and an ongoing high index of suspicion that the diagnosis will be made before widespread peritonitis has developed.

POISONING

- Accidental poisoning and attempted suicide need to be considered.
- Vomiting, respiratory and circulatory collapse in a previously well child should raise the possibility of poisoning.

Reference

1. *Module on Paediatrics, Family Medicine*

COUGH/DIFFICULTY IN BREATHING

History

- Pay particular attention to:
  - cough
  - duration in days
  - paroxysms with whoops or vomiting or central cyanosis
  - exposure to someone with TB (or chronic cough) in the family
- history of choking or sudden onset of symptoms
- known or possible HIV infection
- vaccination history: BCG; diphtheria, pertussis, tetanus (DPT); measles; *Haemophilus influenza* type b and pneumococcus
- personal or family history of asthma.

Examination

- The symptoms and signs listed below are a guide for the clinician to reach a diagnosis. Not all children will show every symptom or sign.

General

- central cyanosis
- apnoea, grunting, nasal flaring, audible wheeze, stridor
- head nodding (a movement of the head synchronous with inspiration indicating severe respiratory distress)
- tachycardia
- severe palmar pallor

Chest

- respiratory rate (count during 1 min when the child is calm)
- fast breathing:
  - < 2 months-60 breaths and above
  - 2-11 months-50 breaths and above
  - 5 years-40 breaths and above
- lower chest wall indrawing
- hyperinflated chest
- apex beat displaced or trachea shifted from midline
- raised jugular venous pressure
- **on auscultation**, coarse crackles, no air entry or bronchial breath sounds or wheeze
- abnormal heart rhythm on auscultation
- **percussion** signs of pleural effusion (stony dullness) or pneumothorax (hyper- resonance)
- ***Note:*** *Lower chest wall indrawing is when the lower chest wall goes in when the child breathes in; if only the soft tissue between the ribs or above the clavicle goes in when the child breathes, this is not lower chest wall indrawing.*

Abdomen

- abdominal masses (e.g. lymphadenopathy)
- enlarged liver and spleen

Investigations

- pulse oximetry to detect hypoxia and as a guide to when to start or stop oxygen therapy
- full blood count
- chest X-ray only for children with severe pneumonia or pneumonia that does not respond to treatment or complications or unclear diagnosis or associated with HIV

Differential diagnosis in a child presenting with cough or difficulty in breathing

Diagnosis	In Favour
Pneumonia	▪ Cough with fast breathing ▪ Lower chest wall indrawing ▪ Fever ▪ Coarse crackles or bronchial breath sounds ordullness to percussion ▪ Grunting
Bronchiolitis	▪ Cough ▪ Wheeze and crackles ▪ Age usually < 1 year
Asthma or wheeze	▪ Recurrent episodes of shortness of breath or wheeze ▪ Night cough or cough and wheeze with exercise ▪ Response to bronchodilators ▪ Known or family history of allergy or asthma
Tuberculosis	▪ Chronic cough(> 14 days) ▪ History of contact with TB patient ▪ Poor growth, wasting or weight loss ▪ Positive Mantoux test ▪ Diagnostic chest X-ray may show primary complex or miliary TB ▪ Sputum positive in older child
Pertussis	▪ Paroxysms of cough followed by whoop, vomiting, cyanosis or apnoea ▪ No symptoms between bouts of cough ▪ No fever ▪ No history of DPT vaccination
Croup	▪ Inspiratory stridor ▪ Current measles ▪ Barking character to cough ▪ Hoarse voice
Diphtheria	▪ No history of DPT vaccination ▪ Inspiratory stridor ▪ Grey pharyngeal membrane ▪ Cardiac arrhythmia
Foreign body	▪ History of sudden choking ▪ Sudden onset of stridor or respiratory distress ▪ Focal areas of wheeze or reduced breath sounds
Cardiac failure	▪ Raised jugular venous pressure in older children ▪ Apex beat displaced to the left ▪ Heart murmur (in some cases) ▪ Gallop rhythm ▪ Fine crackles in the bases of the lung fields ▪ Enlarged palpable liver

STRIDOR

Definition

- High pitched sound resulting from turbulent air flow due to obstruction in the upper airway
- Primarily inspiratory

Common causes

- should be considered according to onset
- **Acute stridor**
  - Infection: croup, epiglottis, diphtheria
  - Anaphylaxis
  - Inhaled foreign body
  - (Make certain that you have excluded other causes before treating as "croup" in case of acute onset)
- **Chronic stridor (weeks to months)**
  - Laryngomalacia

Initial assessment and management of stridor

- History taking and physical examination
- If patient is distressed, defer further examination until equipment and facilities are available for emergency airway management

Assess

- Chest recession
- Respiratory rate
- Grunting
- Accessory muscle use and flare of ala nasi
- Breath sounds and air entry
- Heart rate
- Skin color
- Mental status
- Monitor oxygen saturation with pulse oximeter if available and if the child accepts probe
- Give oxygen via face mask if it needs to maintain oxygen saturation >92%

If the child is ill, toxic looking and drooling

- Consider epiglottis or diphtheria
- REFER urgently.

CROUP

Key clinical features

- Acute onset of barking cough, inspiratory stridor and hoarseness
- Preceded by symptoms of a mild upper respiratory tract infection

Assessment of severity

Clinical assessment of croup (Wagener)

Severity

- **Mild** - Stridor with excitement or at rest, with no respiratory distress
- **Moderate** - Stridor at rest with intercostal, subcostal or sternal recession
- **Severe** - stridor at rest with marked recession, decreased air entry and altered level of consciousness
- Pulse oximetry is helpful but not essential.
- Arterial blood gas is not helpful because the blood parameters may remain normal to the late stage. The process of blood taking may distress the child.

Management

- **Mild Cases** - Outpatient
  - Dexamethasone-Oral or parenteral 0.15mg/kg single dose may repeat at 12, 24 hours
  - Prednisolone-1-2 mg/kg stat
  - if vomiting (+), Nebulised Budesonide -2mg single dose only.
- **Moderate and Severe cases –**
  - **REFER TO HOSPITAL.**

Reference

1. *Facility Based IMNCJ (F-IMNCJ) Participants Manual, WHO -2015*
2. *Pediatric Management Guidelines, Myanmar Pediatric Society-2nd Ed 2011*

BRONCHIOLITIS

- Bronchiolitis is a lower respiratory viral infection, which is typically most severe in young infants, occurs in annual epidemics and is characterized by airways obstruction and wheezing. It is most commonly caused by respiratory syncytial virus. Secondary bacterial infection may occur

Diagnosis

- Typical features of bronchiolitis, on examination, include:
  - wheezing that is not relieved by up to three doses of a rapid-acting bronchodilator
  - hyperinflation of the chest, with increased resonance to percussion
  - lower **chest wall indrawing**
  - **fine crackles** and **wheeze** on auscultation of the chest
  - **difficulty in feeding, breastfeeding** or drinking owing to respiratory distress
  - nasal discharge, which can cause severe nasal obstruction.

Treatment

- Most children can be treated at home, but those with the following signs of severe pneumonia should be treated in hospital:
  - oxygen saturation < 90% or central cyanosis.
  - apnoea or history of apnoea
  - inability to breastfeed or drink, or vomiting everything
  - convulsions, lethargy or unconsciousness
  - gasping and grunting (especially in young infants).

Follow-up

- Infants with bronchiolitis may have cough and wheeze for up to 3 weeks. As long as they are well with no respiratory distress, fever or apnoea and are feeding well they do not need antibiotics.
- High-risk infants include:
  - Premature babies
  - Babies <6 wk-old Children with underlying lung disease, congenital heart disease or immunosuppression.

COUGH AND COLD

- These are common, self-limited viral infections that require only supportive care.
- Antibiotics should not be given.
- Wheeze or stridor may occur in some children, especially infants.
- Most episodes end within 14 days

Diagnosis

- Common features:
  - cough
  - nasal discharge
  - mouth breathing
  - fever
- The following are **absent:**
  - general danger signs (e.g. cyanosis, convulsion, respiratory distress, drowsiness)
  - signs of severe pneumonia or pneumonia
  - stridor when the child is calm Wheezing may occur in young children

Treatment

- Treat the child as an outpatient.
- Soothe the throat and relieve the cough with a safe remedy, such as a warm, sweet drink.
- Relieve high fever (39 °C or 102.2 °F) with paracetamol if the fever is causing distress to the child.
- Clear secretions from the child's nose before feeds with a cloth soaked in water that has been twisted to form a pointed wick.
- Give normal fluid requirements plus extra breast milk or fluids if there is fever. Small frequent drinks are more likely to be taken and less likely to be vomited.
- Do **not** give any of the following:
  - an antibiotic (they are not effective and do not prevent pneumonia)
  - remedies containing atropine, codeine or codeine derivatives, or alcohol (these may be harmful) or mucolytics medicated nose drops.

Follow-up

- Advise the mother to:
  - feed the child
  - watch for fast or difficult breathing and return if either develops
  - return if the child becomes sicker or is unable to drink or breastfeed.
- *Reasons to prescribe antibiotics immediately*
  - Investigate further and/or give antibiotics (e.g. amoxicillin 500mg tds) if:
    - Systemically very unwell
    - Symptoms/signs of serious illness or complications, e.g. pneumonia
    - At high risk of serious complications because of pre-existing co-morbidity, e.g. significant heart, lung, renal, liver, or neuromuscular disease, immunosuppression, CF, or young children born prematurely

ASTHMA

Diagnosis

- Mainly based on clinical features
- Consider asthma if any of the following clinical features are present:
- **Persistent or frequent** episodes of **wheezing** in the absence of any other apparent cause
- **Activity-induced** cough or wheeze
- **Nocturnal** cough
- Symptoms **occur or worsen** in the presence of animals with fur, aerosol chemicals, changes in temperature, domestic dust mites, drugs, exercise, pollen, respiratory viral infections, smoke, strong emotional expression
- Recurrent URTIs or take **more than 10 days** to clear up
- Symptoms **improve to adequate** bronchodilator therapy
- **Family history** of asthma or atopy (eczema, rhinitis)

Assessment

History

- Present complaints
- Duration of illness
- Precipitants/Triggers
- Any disturbance of sleep or day time activity
- Any episodes of choking/vomiting/reflux
- Past History
- Age of onset
- Previous severe episodes -hospital admissions, emergency visits, PICU admissions, IV treatment
- Interim symptoms e.g. cough/ wheeze at night or with exercise
- Review the severity of symptoms e.g., exercise limitation, sleep disturbance, school absence
- Current medications
- Dose, method of delivery and emergency plan (action plan)
- Family History
- Atopy, pets and smoking

Physical examination

- Assess for
- Ability to speak
- Conscious level/ exhaustion
- Feeding and drinking
- Central cyanosis
- Accessory muscle use
- Sternal/Chest recession
- Respiratory rate
- Heart rate
- Wheeze on auscultation
- Pre and post nebulizer Sp02%

Management of Exacerbation of Asthma

(Refer to Algorithm for management of acute exacerbation of asthma in children)

Assessment of "Severity" during Acute Asthma exacerbations should be based on the following parameters.

	Mild	**Moderate**	**Severe**
	Admission unlikely	May need admission	Admission needed
Altered consciousness	No	No	Yes
Physical exhaustion	No	No	Yes
Talk in:	Sentences	Phrases	Words
Pulsus paradoxus	Not palpable	May be palpable	Palpable
Central cyanosis	Absent	Absent	Present
Rhonchi	Present	Present	Silent chest
Use of accessory muscle	Absent	Moderate	**Marked**
Sternal retraction	Absent	Moderate	**Marked**
Initial PEF	>60%	40-60%	<40%
Oxygen saturation	>93%	91-93%	<90%

N.B: *patients should be treated as in more severe category if features of more than one are present.*

- Chest X-ray is not helpful in management of acute asthma but should be done if the following is suspected:
  - Pneumothorax
  - Pneumonia
  - Collapse lung
- Blood gas assessment is necessary for severe exacerbations.

Long-term management of ASTHMA

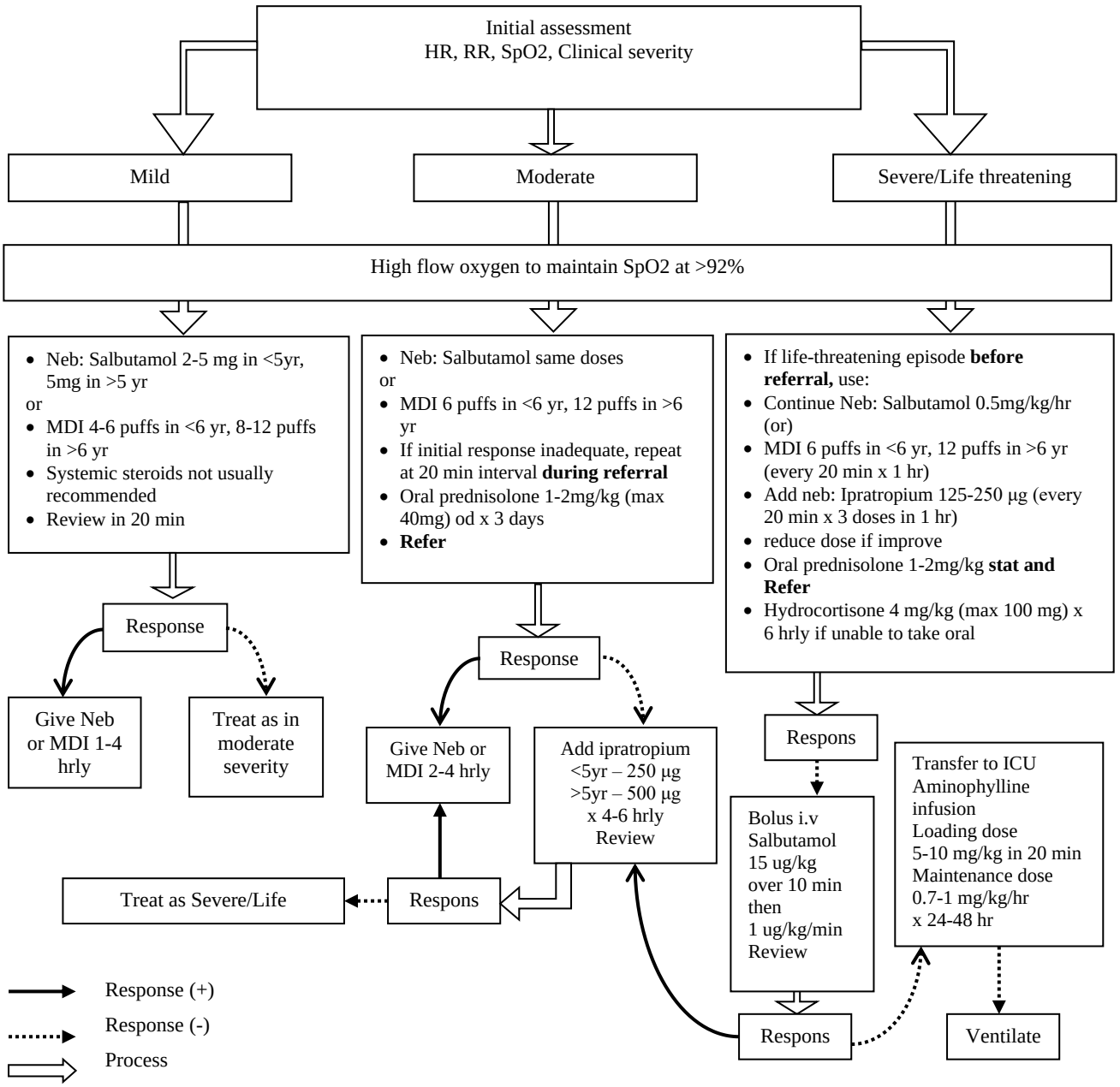
- The goal of asthma care is to achieve and maintain control of the clinical manifestations of the disease for prolonged periods. When asthma is controlled, patients can prevent most attacks, avoid troublesome symptoms day and night, and keep physically active.
- To reach this goal, four interrelated components of therapy are required:
  - **Component 1.** Develop patient/family/doctor partnership
  - **Component 2.** Identify and reduce exposure to risk factors
  - **Component 3.** Assess, treat, and monitor asthma
  - **Component 4.** Manage asthma exacerbations
  - **Component 5.** Special Considerations
- Every component is equally important for successful achievement of good asthma control.

Component 1: Develop patient / family / doctor partnership

- Interactive education of patient and family using all available methods is an integral part of management.
- They should learn to
  - Avoid risk factors
  - Take medications correctly
  - Understand the difference between "controller" and "reliever" medications
  - Monitor asthma control status using symptoms and, if available, PEF in children older than 5 years of age
  - Recognize signs that asthma is worsening and take action
  - Seek medical help as appropriate

Component 2: Identify and reduce exposure to risk factors

- Risk factors should be identified and exposure to risk factor should be reduced or, if possible, avoided.
  - Multiple factors that are ubiquitous to environment - tobacco smoke, drugs, allergens and additives, house dust mites, animals with fur, cockroaches, outdoor pollens and mold, indoor mold
  - Should not avoid exercise (use preventive therapy - rapid acting Beta2 agonist inhalation or oral Leucotriene antagonist)
  - Influenza vaccination should be provided to patients with asthma when vaccination to the general population is advised. However, routine influenza vaccination of children and adults with asthma does not appear to protect them from asthma exacerbations or improve asthma control



Component 3: Assess, Treat, and Monitor Asthma

- Assessing Asthma control is reviewed by day and night time symptom, limitation of activities, need for reliever/rescue treatment, and exacerbations.
- If possible, monitor lung function (PEF or FEVl).

Classification of asthma by level of control

Table: Assessment of Asthma Control in Children 5 years and younger

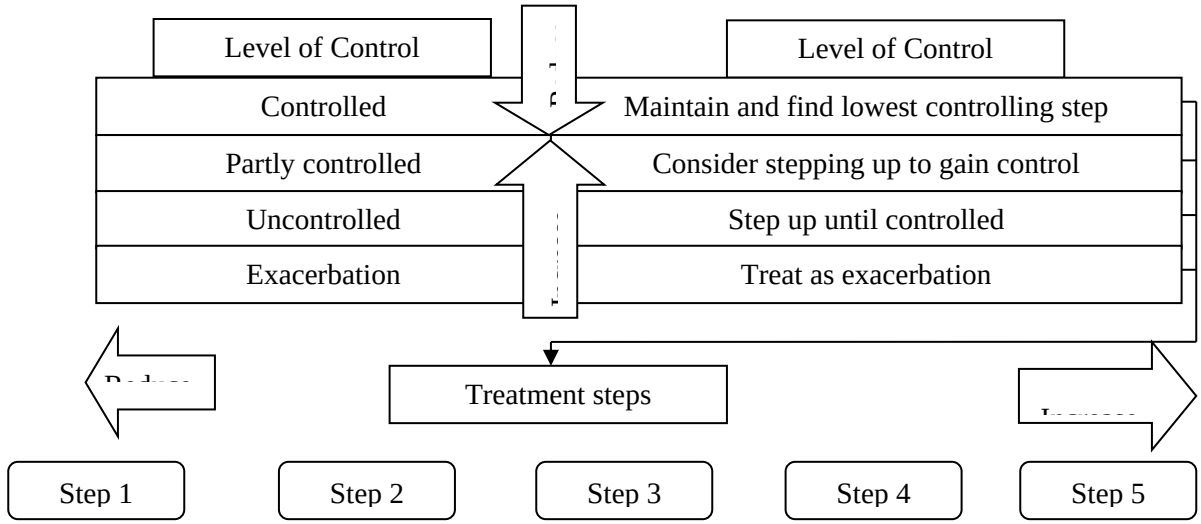
A. Level of asthma control in **young children**				
In the past 4 weeks, has the child had		Well controlled	Partly controlled	Uncontrolled
Day time symptoms for more than a few minutes	Yes □No D	None of these	1-2 of these	3-4 of these
Any activity limitation due to asthma? (run/play less than other children, tires easily during walks/playing)	Yes □No D			
Reliever needed more than once a week?	Yes □No D			

Any night waking or night coughing due to asthma?	Yes □No D			
B. Risk factors for poor asthma outcomes in young children				
Risk factors for flare-up (exacerbations) in the next few months Uncontrolled asthma One or severe exacerbation in the previous year The start of the child's flare-up season (especially if autumn/fall) Exposures: tobacco smoke, indoor or outdoor air pollution, indoor allergens (e.g. house dust mite, cockroach, pets, mold) especially in combination with viral infection Major psychological or socio-economic problems for child or family Poor adherence with controller medication or incorrect inhaler technique ***Risk factors for fixed airflow limitation*** Severe asthma with several hospitalization History of bronchiolitis ***Risk factors for medication side-effects*** Systemic: frequent courses of OCS, high dose and/or ICS Local: moderate/high dose or potent ICS, incorrect inhaler technique, failure to protect skin or eyes when using ICS by nebulizer or spacer with face mask				

Day to day management of asthma will depend on how well the patient's symptoms are controlled.

Figure. Management Approach Based on Control

For Children older than 5 years and adolescents



	Asthma education Enviroment control			
As needed rapid-acting β_2 agonist	As needed rapid-acting β_2 agonist			
	Select one	Select one	Add one or more	Add one or more
Controller Options	Low-dose inhaled ICS*	Low-dose ICS plus long-acting β_2 agonist	Medium- or high-dose ICS plus long-acting β_2 agonist	Oral glucocortico-steroid (lowest dose)
	Leukotriene modifier**	Medium- or high-dose ICS	Leukotriene modifier	Anti-IgE treatment
		Low-dose ICS plus Leukotriene modifier	Sustained release theophylline	
		Low-dose ICS plus sustained release theophylline		

- Alternative reliever treatments include inhaled anticholinergic, short-acting oral $_2$ agonists, some long acting $_2$ agonist, and short-acting theophylline.
- Regular dosing with short and long-acting $_2$ agonist is not advised unless accompanied by regular use of an inhaled glucocorticosteroid.

Adjusting medication:

- If asthma is not controlled on the current treatment regimen, step up treatment. Generally, improvement should be seen within 1 month. But first review the patient's medication technique, compliance, and avoidance of risk factors
- If asthma is partly controlled, consider stepping up treatment, depending on whether more effective options are available, safety and cost of possible treatment options, and the patient's satisfaction with the level of control achieved
- If control is maintained for at least 3 months, step down with a gradual, stepwise reduction in treatment. The goal is to decrease treatment to the least medication necessary to maintain control.
- For the children younger than 5 years of age start low-dose inhaled corticosteroids for partly controlled cases. For children uncontrolled or partly controlled with low-dose inhaled steroids, either double the ICS dose or add Leukotriene antagonists.

Low daily dose of inhaled corticosteroids for children 5 year and younger

Drug	Low Daily Dose(µg)
Beclomethasone dipropionate	100
Budesonide	200
Fluticasone	100

Choice of Inhaler Device For Children

Age Group	Preferred Device	Alternative Device
Younger than 4 Yrs	Pressurized metered-dose Inhaler plus spacer with mask	Nebulizer with face mask
4-6 yrs	Pressurized metered-dose Inhaler plus spacer with mouthpiece	Nebulizer with face mask
Older than 6 Yrs	Dry powder inhaler, or Breath-actuated pressurized metered-dose inhaler, or Pressurized metered-dose inhaler with spacer	Nebulizer with mouthpiece

Component 4: Manage acute asthma exacerbations

- should be based on clinical severity Primary therapies for exacerbations include
- Repetitive administration of rapid-acting inhaled $_2$ - agonist
- Early introduction of systemic glucocorticosteroids
- Oxygen supplementation
- Closely monitor response to treatment with serial measures of lung function is necessary.

References

1. *British guideline on the management of asthma. A national clinical guideline. May 2008, Revised June 2016.*
2. *Pocket guide for asthma management and prevention (For adults and children older than 5 years).Global initiative for asthma. Updated 2017.*
3. *Pocket guide for asthma management and prevention in children 5 years or younger. Global Initiative for asthma. Updated 2017.*
4. *Global Initiative for asthma (GINA) Teaching slide set,January 2013*

PNEUMONIA

- Pneumonia is caused by viruses or bacteria. It is usually not possible to determine the specific cause of pneumonia by clinical features or chest X-ray appearance.
- Pneumonia is classified as severe or non-severe on the basis of clinical features, the management being based on the classification.
- Antibiotic therapy should be given in most cases of pneumonia and severe pneumonia.
- Severe pneumonia may require additional supportive care, such as oxygen, to be given in hospital.

Classification of the severity of pneumonia

Siens and Symptoms	Classification	Treatment
• Cough or difficulty in breathing with: • Oxygen saturation < 90% or central cyanosis • Severe respiratory distress (e.g. grunting, very severe chest indrawing) • Signs of pneumonia with a general danger sign (inability to breastfeed or drink, lethargy or reduced level of consciousness, convulsions)	**Severe pneumonia**	REFER to hospital. • Give oxygen if saturation< 90%. • Manage airway as appropriate. • Give recommended antibiotic. • Treat high fever if present.
• Fast breathing: • ≥50 breaths/min in a child aged 2-11 months • ≥40 breaths/min in a child aged 1- 5 years • Chest indrawing	**Pneumonia**	Home care • Give appropriate antibiotic. • Advise the mother when to return Immediately if symptoms of severe pneumonia. • Follow up after 3 days.
No signs of pneumonia or severe Pneumonia	**No pneumonia: cough or cold**	Home care • Soothe the throat and relieve cough with safe remedy. • Advise the mother when to return. • Follow up after 5 days if not improving • If coughing for more than 14 days, • Refer to chronic cough (Asthma, Pertussis, TB, Foreign body, HIV)

Diagnosis

- Cough or difficult breathing plus at least one of the following signs:
  - fast breathing: age 2-11 months, 50/min and above
  - age 1-5 years, 40/min and above
  - lower chest wall indrawing

Treatment

- Treat child as outpatient.
- Advise carers to give normal fluid requirements plus extra breast milk or fluids if there is a fever. Small frequent drinks are more likely to be taken and less likely to be vomited

Antibiotic therapy

- Give the first dose at the clinic and teach the mother how to give the other doses at home.
- Give oral amoxicillin:
  - In settings with high HIV infection rate, give oral amoxicillin at least 40 mg/kg per dose twice a day for 5 days.

    - In areas with low HIV prevalence, give amoxicillin at least 40 mg/kg per dose twice a day for 3 days
- Second choice: Co-amoxiclav (30 mg of Amoxycillin/kg/dose 8 hourly) OR Azithromycin Child over 6 months 10 mg/kg once daily (max. 500mg once daily) for 5 days
- Avoid unnecessary harmful medications such as remedies containing atropine, codeine derivatives or alcohol.

Follow-up

- Encourage the mother to feed the child. Advise her to bring the child back after 3 days, or earlier if the child becomes sicker or is unable to drink or breastfeed. When the child returns, check:
    - Whether the breathing has improved (slower), there is no chest indrawing, less fever, and the child is eating better; complete the antibiotic treatment.
    - If the breathing rate and/or chest indrawing or fever and/or eating have not improved, exclude a wheeze.
    - If no wheeze, admit to hospital for Investigations to exclude complications or alternative diagnosis.
    - If signs of severe pneumonia are present, admit the child to hospital and treat as above.
- Address risk factors such as malnutrition, indoor air pollution and parental smoking.

CHILDHOOD TB

Risk factors for Developing Childhood Tuberculosis

- Presence of one or more of the following risk factors
    - Close contact (household, close relatives, caregiver, neighbour and teacher) with a newly diagnosed smear positive case as well as smear negative-culture positive case
    - Age <5 years of age
    - HIV infection
    - Severe malnutrition, measles and immunosuppressive drugs or illnesses
    - Absence of BCG vaccination
    - Failure to thrive or weight loss (documented)

Criteria to Identify TB Suspect in Children

- The child can be considered as a TB-suspect if 2 out of 3 following features are present.
- Fever (38°C) for more than 2 weeks and/ or cough for more than 2 weeks
- Failure to gain weight (Weight loss if known/consult weight chart)
- History of contact with suspected or diagnosed TB patient

Symptom suggestive of childhood TB

- Cough for more than 2 weeks which is not improving with full course of antibiotic and/or bronchodilators
- Fever (>38°C) for >2 weeks after exclusion of common causes of fever (e.g. malaria)
- Failure to gain weight (Weight loss if known/see weight chart)
- Unexplained loss of appetite

MDR TB should be suspected in a child with TB-related symptoms who has:

- History of previous treatment for TB within the past 12 months
- Close contact with a person known to have MDR-TB
- Close contact with TB case that has died, failed TB treatment or is non-adherent to TB treatment
- Failure to improve clinically - persistence of symptoms, failure to gain weight after 2 to 3 months of first-line TB treatment, including persistence of positive smear or culture

Signs suggestive of childhood TB

Pulmonary tuberculosis:

- Signs of persistent pneumonia after full course of appropriate antibiotics (ATB)

Highly suggestive Extra-pulmonary tuberculosis (EPTB):

- Pleural effusion
- Acute vertebral gibbus
- Non-painful glands with draining sinus

Suggestive EPTB

- Meningitis not responding to antibiotics
- Pericardial effusion
- Swollen non-painful joints
- Significant enlarged lymph glands more than 2 cm in diameter and more than 2 in number with no known local cause and not responding to usual antibiotics
- Distended abdomen with ascites
- Clinical features indicative of Tuberculin hypersensitivity (e.g. erythema nodosum phlyctenular

conjunctivitis)

Diagnosis

- Diagnosis is very difficult in children due to non-specific features and the radiological features are not as easy to interpret as in the adult.
- However, in children with risk factors who have suspicious clinical criteria, more definitive diagnosis can be made if appropriate investigations are done

Diagnosis to be based on a combination of

- History of contact.
- Risk factors
- Clinical presentation
- Bacteriological confirmation (Sputum/CSF/Biopsy examination wherever possible)
- Imaging-Chest X-ray /CT
- Immunological evidence of TB infection Mantoux test (Positive if induration >10 mm after 48-72 hours) (not a strong factor to be considered for diagnosis of active TB disease)

Diagnostic Tests

Bacteriological confirmation

- A definitive diagnosis of TB can be achieved only by the demonstration of presence of mycobacterium bacillus in the lesion or its product.
- The main laboratory methods used to detect *Mycobacterium tuberculosis* in a sample from a child suspected of having TB are smear for acid-fast bacilli, Xpert MTB/RIF assay (using real-time PCR) or mycobacterial culture.
- Xpert MTB/RIF (and culture if available) is recommended in all children that are suspected of having MDR-TB.

Sputum examination

- Indicated in children older than 8 years or in any younger children who is able to provide a good quality sputum
- Sputum should be collected spot, early morning and spot strategy
- Gastric lavage (aspiration)-Indicated in children less than 8 years or in children who is unable to produce sputum (Should be carried out after 4 hours of not eating or drinking (starvation))

Chest X ray

- No specific radiological signs
- Features suggestive in the diagnosis of TB
- Unequivocal hilar lymph gland enlargement with or without parenchyma opacification
- Miliary mottling (especially in HIV non-infected host)
- Large pleural effusion (≥⅓ of pleural cavity) in children >5 years
- Apical opacification with cavitation (adult type disease; very rare in children, common in adolescents)

Tuberculin skin tests (TST)

- Tuberculin skin tests are useful in the diagnosis of TB infection in young children for contact tracing.
- It is also useful as an adjunct test where the diagnosis of TB is uncertain.
- TB should never be ruled out in children based on a negative TST result.
- Induration >10 mm is considered positive irrespective of whether BCG has been administered (not a strong factor to be considered for diagnosis of active TB disease)

- Induration >5 mm is considered positive in HIV positive children
- Negative TST never rule out TB in children

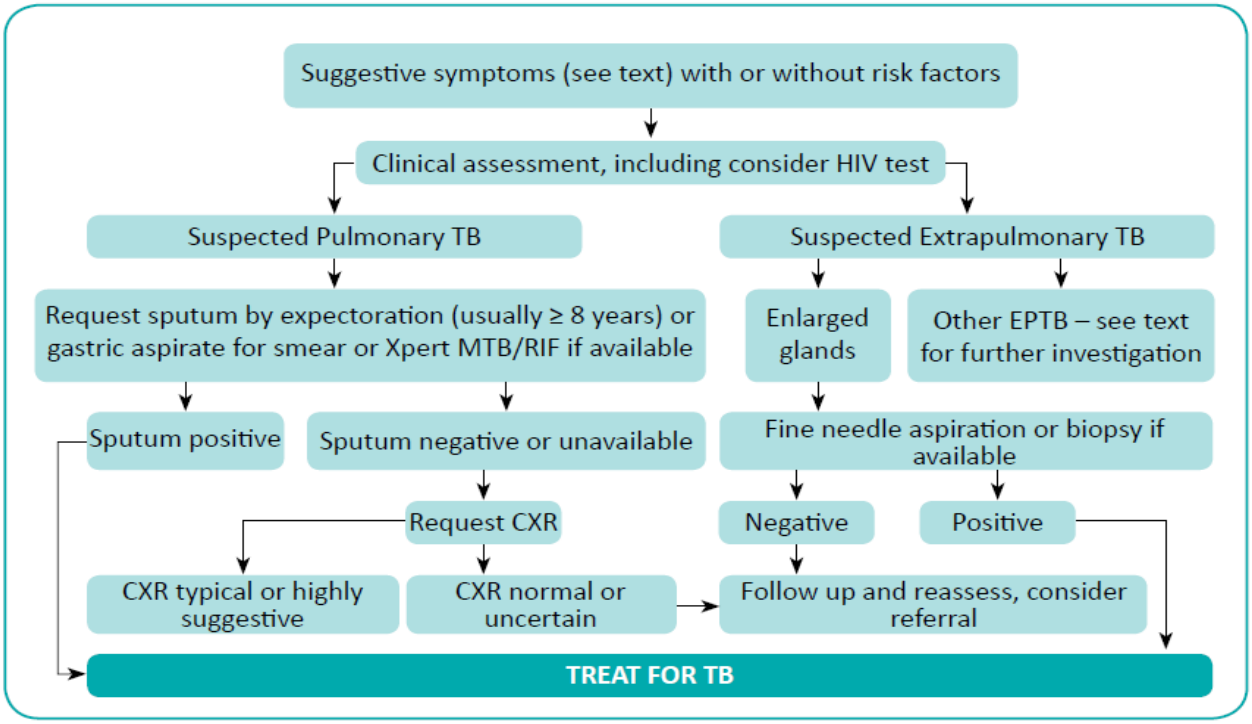
Interferon-gamma release assays (IGRAs)

- should not replace the tuberculin skin test (TST) in low- and middle-income countries for the diagnosis of latent TB infection in children or for the diagnostic work-up of children (irrespective of HIV status) suspected of TB disease in these settings.
- *Commercial sero-diagnostics should not be used in children suspected of active pulmonary or extra-pulmonary TB, irrespective of their HIV status.*

Diagnostic tests for other extra-pulmonary

Disease	Special investigation
Cervical / other lymph glands	Biopsy / Fine needle aspiration (FNA)
TB Meningitis	lumbar puncture (LP), Computerized Tomography (CT) of brain
TB Arthritis	Aspiration, biopsy
TB Abdomen/ascites	Ultrasound (US), Analysis of Aspiration
TB Vertebra	Vertebral X-ray; CT/MRI of vertebral column
TB pleural Effusion	Pleural tap for cytology

General Approach to diagnosis of TB in children



Treatment of TB in children

- Effective management of TB relies on
  - Rapid diagnosis of TB
  - Rapid detection of drug resistance
  - Rapid initiation of effective treatment regime
- The main objectives of anti-TB treatment are to:
  - Cure the patient with TB (by rapidly eliminating most of the bacilli);
  - Prevent death from active TB or its late effects;
  - Prevent relapse of TB (by eliminating the dormant bacilli);
  - Prevent the development of drug resistance (by using a combination of drugs);

- Decrease TB transmission to others (smear-positive cases)

Type of TB Patient	TB cases	Regimen	
		Intensive phase	Continuation phase
New case	-Children <8 years of age (exception: see below)	2HRZ	4HR
	• Children ≥8 years of age • Children <8 years of age with severe forms of pulmonary/extra pulmonary TB or who are HIV-infected	2HRZE	4HR
	• Meningitis/disseminated TB disease • Osteoarticular TB	2HRZE	10HR
Previously treated case	• Relapse • Treatment after failure • Treatment after loss to follow-up	3HRZE	5HRE
MDR-TB		**Specially designed standardized or individualized regimens (refer to Myanmar National guidelines on Management of MDR-TB)**	

Recommended treatment regimens for children in each TB diagnostic Category

Recommended doses of first line anti-TB drug

Drug	Recommended daily dosing	
	Dose and range (mg/kg)	Maximum (mg)
Isoniazid (H)	10 (7-15)	300
Rifampicin (R)	15 (10-20)	600
Pyrazinamide (Z)	35 (30-40)	
Ethambutol (E)	20 (15-25)	

Indications for Hospitalization

- TB meningitis
- Miliary TB
- Respiratory distress in any form of TB
- Spinal TB
- Severe adverse events (e.g. hepatoxicity)

Follow up

- Ideally, each child should be assessed at least at the following intervals: 2 weeks after treatment initiation, and at two, five and six-month.
- The assessment should include, as a minimum; symptom assessment, assessment of treatment adherence, enquiry about any adverse events and weight measurement.
- Medication dosages should be adjusted to account for any weight gain.
- Adherence should be assessed by reviewing the treatment card, and pill count or blister pack count.
- A follow - up sputum sample for smear microscopy at 2, 5 and 6 months after treatment initiation should be obtained for any child who was smear-positive at diagnosis.

- Follow up chest radiographs not routinely required in children
- Indications for follow up CXR
    - Extensive pulmonary involvement
    - Continued symptoms
    - Treatment failure regardless of smear positivity

Contact tracing and management

- Young children living in close contact with a source case of smear-positive pulmonary TB are at particular risk of TB infection and disease.
- The risk of infection is greatest if the contact is close and prolonged such as the contact an infant or toddler has with a mother or other caregivers in the household and especially so if the index case is not treated.

The main purposes of child contact screening are to:

- Identify symptomatic children (e.g. children of any age with undiagnosed TB disease);
- Provide preventive therapy for susceptible individuals (e.g. asymptomatic children of <5 years of age in close contact with a smear-positive pulmonary TB case)

Definitions

Source case - A case of pulmonary TB (usually sputum smear positive) which results in infection or disease among contacts

Contacts for screening- All close contacts of a source case of any age, including young children < 5 years, should be screened for symptoms suggestive of TB.

Close contact- Living in the same household as a source case or in frequent contact with a source case (e.g caregiver, grandparents, relatives)

Strategy for Contact Tracing-

Contact tracing should be reinforced in two ways:

- Through index adult case (Detection of TB in close contacts of usually adult source case particularly sputum smear positive cases) (downstream tracing)
- Through close contacts of childhood TB cases (Detection of source case for a paediatric TB patient, also known as reverse contact tracing) (upstream tracing)
- Parents and caregivers are to be strongly encouraged to bring children for contact screening to health centre (passive contact screening). Alternatively, if the child is found with TB disease, his/her family members and neighbours should also undergo TB screening.

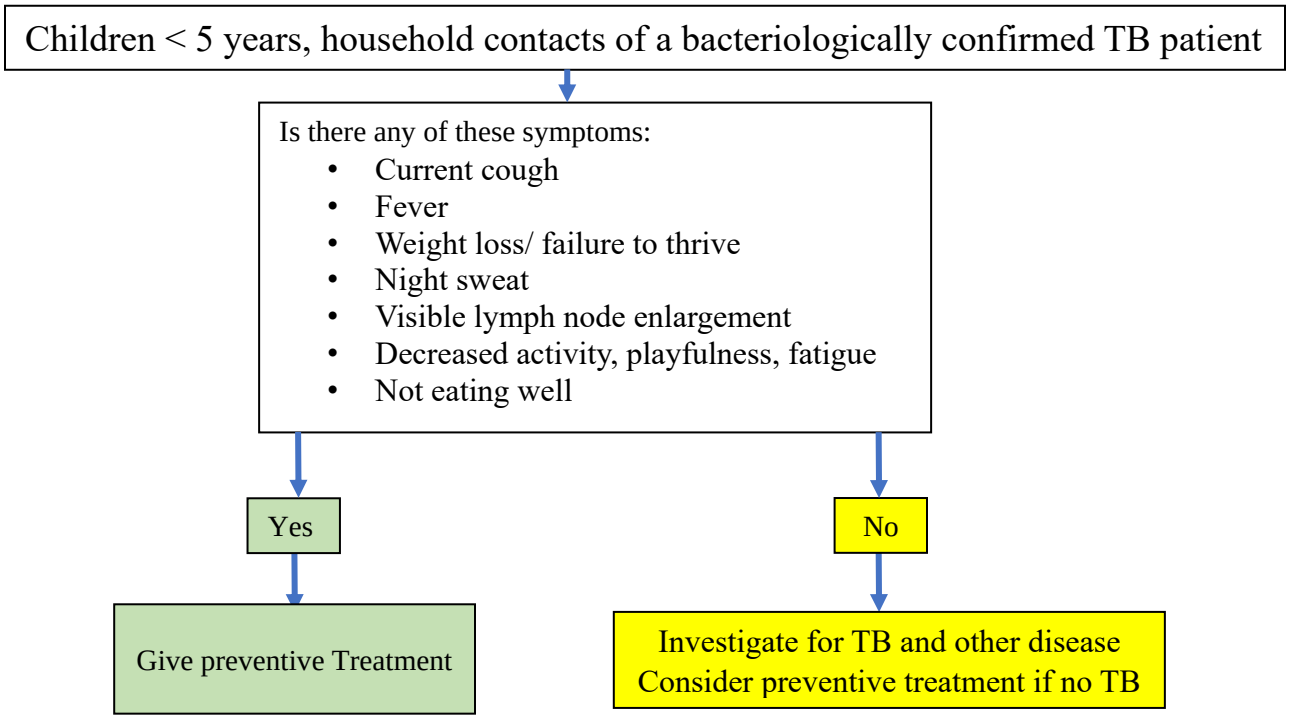
Approach to Contact screening-

- Three main steps used for contact screening
    - clinical screening: symptoms assessment of all contacts of any age, including children
    - clinical evaluation for TB: any contact with symptoms suggestive of TB should be further evaluated for TB, e.g. sputum, Chest X-ray etc.
    - contacts who are younger than 5 years of age or HIV-infected of any age, and do not have active TB should be offered preventive therapy

Tuberculosis Preventive Treatment (TPT)

- Asymptomatic children under 5 years of age after exclusion of active TB, exposed to an adult with infectious (smear positive) TB from the same household, will be given 6 months of Isoniazid (10mg/kg daily) or daily Rifampicin (15mg/kg)/Isoniazid (10mg/kg) for 3 months.

Algorithm for screening HIV negative infants and children less than 5 years household contacts of people with TB



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1. *Revised national guideline on management of tuberculosis in children, NTP/WHO(2016)*
2. *Guidelines for the Management of DR-TB in Myanmar (2017)*
3. *National Tuberculosis Management Guideline, Republic of South Africa, 2014*
4. *Management of Drug-Resistant TB in Children: A Field Guide. Boston, USA 2015, 2nd Edition*
5. *Guidance for national tuberculosis programme on the management of tuberculosis in children, 2nd Edition. WHO 2014*
6. *Latent tuberculosis infection, WHO 2018*
7. *Pediatric Management Guidelines, Myanmar Pediatric Society, 3rd Edition,2018*

CONVULSIONS

- A child with coma or convulsions is always an emergency. When a child comes with convulsion, it is need to differentiate convulsion with fever or convulsion without fever. Febrile convulsion is the commonest cause of convulsion in children but serious disease like meningitis and encephalitis should be considered in every child with convulsion.

Common causes of convulsions with fever

- Febrile convulsion
- Pyogenic meningitis
- Cerebral malaria
- Encephalitis
- TB meningitis
- Brain abscess

Common causes of convulsions without fever

- Epilepsy
- Hypertensive encephalopathy
- Lead encephalopathy
- Sub-duralhaematoma
- Brain tumour

FEBRILE CONVULSION

Definition

- Convulsions occurring in association with fever in children between 6 months and 6 years of age, in whom there is no evidence of intracranial pathology or metabolic derangement

	Simple febrile convulsion	**Complex febrile convulsion**
Duration	<15 minutes	>15 minutes
Type	Generalized	Focal
Recurrence	Not recur during one febrile episode	>one seizure during one febrile episode

Investigations

- Most febrile convulsion follows acute viral infection and investigations are usually not necessary.
- Appropriate investigations should be done only when underlying infection is suspected.

Management

First aid measures for seizure

- Semi prone position
- Check Airway, Breathing and Circulation.
- Adequate airway and suction, 02
- Clothing must be loosened. Excess clothing removed.
- Don't put anything into mouth
- To control fits if more than 4 minutes - PR Diazepam - 0.3 - 0.5 mg/kg

Control fever

- Take off clothing and give tepid sponging.

- Antipyretic e.g. oral or rectal Paracetamol 15 mg/kg 4-6 hourly.

Not all children need to be admitted. The main reasons for admission are: -

- To exclude intracranial pathology especially infection
- Fear of recurrent fits
- To investigate and treat the cause of fever
- To allay parental anxiety, especially if they are staying far from the hospital.

Reassess the child

Exclusion of other intracranial causes of fits

- Meningitis - signs of meningism, tense or bulging anterior fontanelle, prolonged or frequent fits (check Full blood count, Lumbar puncture)
- Encephalitis - change in sensorium, neurological signs may be present
- Cerebral malaria - came from or travelled to malaria endemic area, change m sensorium, (check Malaria parasites)
- Features of Complex febrile convulsion
- Persistent lethargy

Prevention of recurrence

- Generally, not recommended because
    - The risks and potential side effects of antiepileptic medications outweigh the benefits.
    - No medication has been shown to prevent the future onset of epilepsy.
- Long term prophylaxis with daily anticonvulsants is not routinely used even if episodes are frequent. However intermittent prophylaxis (like oral diazepam at the start of temperature and every 8 hours for 24 hours only) can be considered for such children with frequent episodes.

Risk factors for recurrent febrile convulsion

- Family history of febrile convulsion in **1st** degree relative
- Early onset (<lyear)
- Low grade fever during 1st febrile convulsion
- Brief duration (<1-2 hour) between onset of fever and seizure

Risk factors for epilepsy

- Family history of epilepsy in **1st**degree relative
- Underlying neurodevelopmental abnormality
- Complex febrile convulsion

DIFFERENTIAL DIAGNOSIS OF RASHES

RASHES

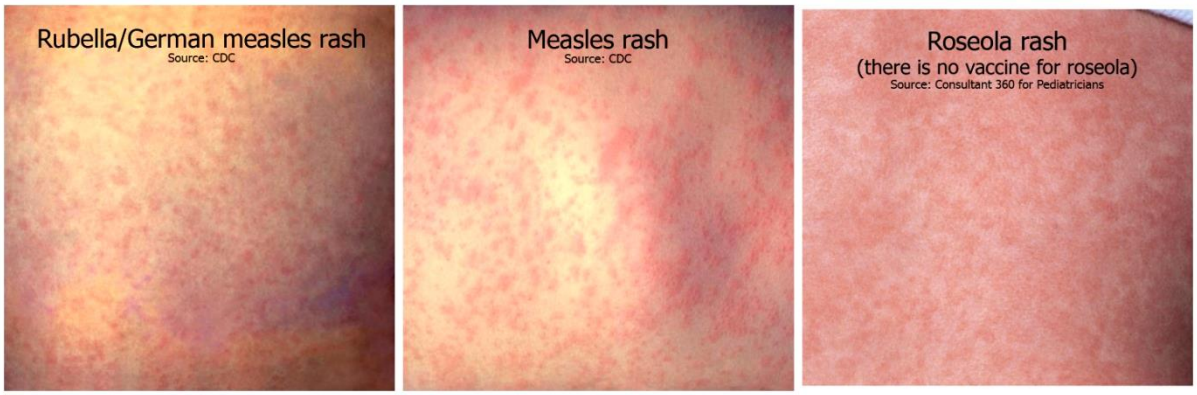
- Eruptions of skin and mucous membrane accompanied by inflammation.

Classification of rashes

- Maculopapular
- Nodular
- diffuse erythematous
- vesicobullous
- petechial

Differential diagnosis of maculopapular rashes

- Measles
- Rubella
- Roseolar infantum (6th disease)



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MEASLES

Causative agent	-	Measles virus
Age	-	All ages
Clinical syndrome	-	Fever, cough; coryza; conjunctivitis
Type of Rash	-	Koplik spots Maculopapular eruption of upper trunk, face; spreads to lower trunk, extremities; becomes confluent.
Distribution	-	Starts on face, move downward.
Similar Entitles	-	Enteroviral infection, Mycoplasma, Drug eruption.

ROSEOLA INFANTUM (EXANTHEM SUBITUM)

Causative agent	-	Herpes virus-6
Age	-	6 months-4 years
Clinical syndrome	-	Fever, irritability: rapid lysis of fever with appearance of rash
Type of Rash	-	Discrete macular or papular rash
Distribution	-	Trunk with extension to neck, extremities, face

Similar Entitles - Rubella

RUBELLA

Causative agent - Rubella virus
Age - All age
Clinical syndrome - In childhood: coryzal prodrome, the rash follows 1-5 days later.
Type of Rash - Maculopapular.
Distribution - It spreads from face to trunk within 24hr, and by the time limbs are involved. It is beginning to fade from the face. Occipital lymph-adenopathy is prominent. Encephalitis is rare. Arthralgia is commoner in adult women
Similar Entitles - Measles

Treatment

- To give appropriate treatment.

References

1. *Module on Paediatrics, Family Medicine*

CHICKEN POX

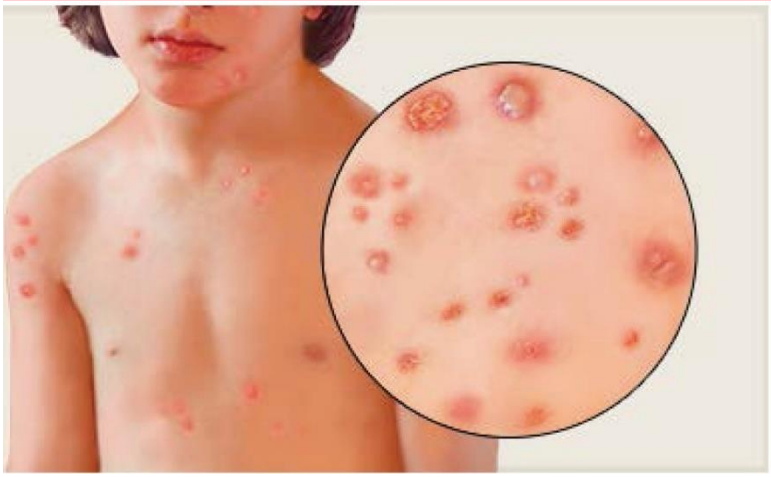
Causal Organism

- Varicella Zoster virus (VZV)
- Human herpes virus 3 (HHV3)
- DNA virus

Incubation Period

- 2 to 3 weeks
- Infectious period: 2 days before and up to 5 days after onset

Clinical Features



http://kidshealth.org/EN/images/illustrations/ChickenPoxPR-A-enlL.jpg

- Mild malaise, fever may or may not be present or absent
- ***Rash*** –
    - The rash as a crop of macules which within hour pass through a papular stage to become vesicular. The vesicular stage persists for 3 to 4 days becoming pustular and finally forming a crust.
    - The spots are superficial and vesicle may be irregular in shape and they are often surrounded by red areola.
- Lesions at different stages may be seen.
- The trunk is principally involved. Face, scalp and proximal part oflimbs By the time there is vesiculation - there is intense pruritus
- Enantham
- Vesiculation over palate, tongue and buccal membrane, conjunctiva and vagina

Differential Diagnoses

Differential diagnosis of vesicles and pustules

- Impetigo
- Scabies
- Dermatitis hepatiformis
- Eczema hepaticum or vaccinatum
- Erythema multiforme

Common Complications

- Secondary skin infection - cellulitis, erysipelas
- Pneumonitis
    - Usually in adult and immunocompromised children.

    - Present with acute respiratory distress syndrome or haemoptysis
    - **CXR** - Diffuse nodular infiltration, Miliary calcification
    - In a normal child - most likely to be bacterial due to *Streptococcal pneumoniae* and group A streptococcus or *Staphylococcus aureus*
- Neurological
    - Post infectious encephalitis
    - Cerebella ataxia - excellent prognosis
    - CSF - Mild lymphocytic pleocytosis , slight elevation of protein Reye syndrome (10%) secondary to chicken pox
    - Transverse myelitis
    - Acute infantile hemiplegia Guallian Barre syndrome
- Appendicitis
- Others
    - Myocarditis
    - Pericarditis
    - Endocarditis
    - Hepatitis
    - Glomerulonephritis

Treatment outline

Symptomatic therapy

- Non-aspirin antipyretics, cool baths and careful hygiene.
- Timely referral for severe cases

Indication for antiviral therapy and prevention

- Chicken pox in immunocompromised patients
- Healthy patients with unusually severe or complicated chicken pox.

For prevention

- A live attenuated vaccine is licensed in several countries. It appears safe for all individuals, including some immunocompromised children.
- Passive immunity can be induced by use of Varicella-Zoster immune globulin (VZIG). It is indicated within 96 hrs of exposure for susceptible individuals at risk for severe illness.

Candidates for VZIG

- Immunocompromised individuals
- Neonate of infected mothers who had onset of chicken pox within 5 days before delivery or within 48 hours after delivery
- Premature infants of less than 28 wks gestation or <l000gm regardless of maternal history
- Preterm infants (>28 wks of gestation) whose mother lacks prior history of chicken pox
- Possibly children older than 15 yrs or adults with a close exposure to Varicella.
- Pregnant women (Check antibody levels if immune status is unknown)

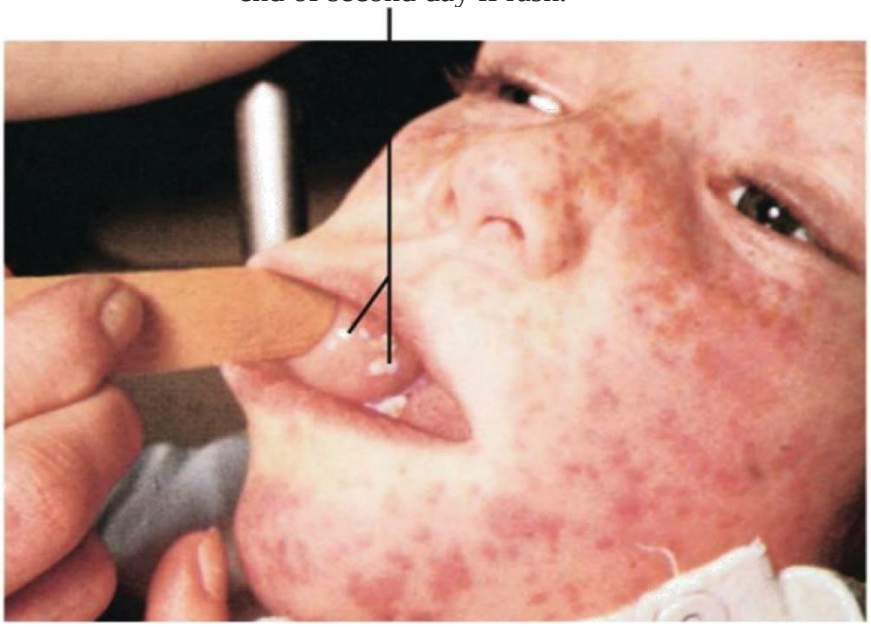
References

1. *Paediatric SID-2nd Ed:*
2. *Module on Paediatrics, Family Medicine*

MEASLES

Clinical features

- Age - common in preschool children
- **Prodromal phase**
    - Moderate elevation of temperature
    - Dry hacking cough
    - Running of nose
    - Sneezing
    - Redness of eye & excessive lacrimation
    - 2^{nd} or 3^{rd} day of illness,
        - Koplik spots appear on the inner side of cheek opposite the lower molar teeth. Single or multiple and appear as greyish or bluish white grains of sands surrounded by reddish areola. Koplik spots increase in number for 2-3 days and disappear by the end of second day if rash.



- **Exanthematous stage**
    - Maculopapular rash first appear behind the ear near the hairline on the forehead, face & neck spread to trunk, extremities, palms and soles within 3 days.
    - Rash starts disappearing after 4 to 5 days in the same order in which it appeared. It leaves behind a browny desquamation.
    - Anorexia and malaise are often present,
    - Moderate generalised lymphadenopathy may also seen,
- **Convalescent stage**
- **Modified measles -** in partially immune individuals
    - Symptoms are mild and duration of illness is shorter
- **Atypical measles** - in previously immunized person after exposure to natural infection.
- **Haemorrhagic measles** - high fever, convulsion, delirium, stupor and even coma.
    - Bleeding occur from the mouth, nose and bowel may result in death.

Differential diagnosis

1) Rubella

- Incubation period is 10-18 days
- Prodromal symptoms are minimal
- Rash is pink, maculopapular and discrete. Mid and last for 3-5 days. Lymph nodes enlarge characteristically even the occipital protuberance.

2) Exanthema subitum (Sixth Disease) caused by Human herpes virus - 6
    - High fever and irritability are present
    - Fever is gradually come down with the appearance of rash
    - Febrile convulsion are usual
3) Erythema infectiosum (Fifth Disease) caused by Parvovirus B19 Slapped cheek
    - Prodromal period is absent
    - No fever
4) Drug rash
    - History of drug ingestion is present
    - Itchiness is present
    - Features of hypersensitivity reaction are present
5) Infectious mononucleosis
    - Rash is associated with generalized lymphadenopathy and hepatosplenomegaly.
6) Meningococcaemic rash
    - Rash appears within 24 hours.
    - Fever, vomiting, malaise, irritability and stiff neck are present.
    - Petechiae and ecchymoses are seen.

Common complications

1. Respiratory complications
    - Otitis media, cervical lymphadenopathy, laryngitis, laryngotracheitis, interstitial pneumonia and bronchopneumonia
    - Flare up of the pulmonary tuberculosis
2. Non suppurative complications
    - GI tract - diarrhoea, cancrum oris, stomatitis, mesenteric lymphadenitis, malnutrition.
    - CNS - measles encephalitis, SSPE
3. Others.
    - Acute glomerulonephritis, Steven Johnson syndrome, DIC.

Supportive treatment

- Body and oral hygiene
- Adequate amount of fluid
- Good nourishing diet
- Fever is controlled by paracetamol and hydrotherapy
- Cough - clearing the mucus
- Vitamin A <1 yr 100,000 unit for 2 days.
  >1 yr 200,000 unit for 2 days.

Treatment of complications

- Antibiotics for pneumonia
- 02
- Diazepam and phenobarbitone for convulsion
- ORT for diarrhoea

Preventive measures

- Active immunization according to EPI
- Passive immunization - exposed infants and younger siblings, gamma globulin i.m.
- 0.25 ml/kg for <1 yr child and 0.5 ml/kg for>1 yr.
- Improve personal hygiene and environmental sanitation.

Referral

- Any general danger signs
- clouding of cornea,
- deep or extensive mouth ulcer

- Pus draining from the eye >2 days treatment with tetracycline eye ointment

References

1. *Paediatric SIG-2nd Edition*
2. *Module on Paediatrics, Family Medicine*

RUBELLA

Mode of transmission

- Droplet infection

Incubation period

- 18 to 21 days
- Infectious period: 5-7 days after rash develops

Clinical features

Prodromal stage

- Rare to have prodromal stage in children
- In female adult, there are malaise, headache, fever, and conjunctivitis and arthritis.

Appearance of rash

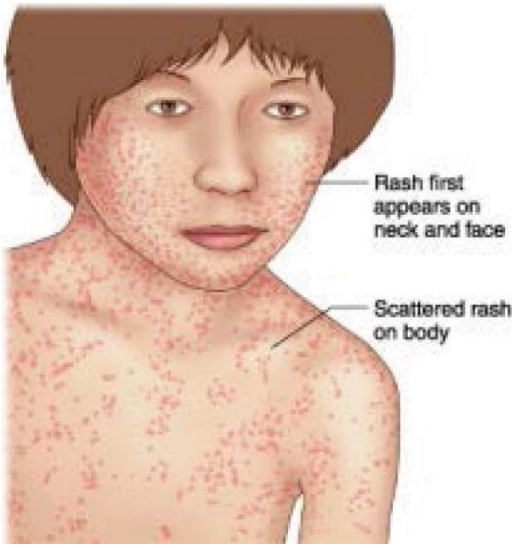
- Start over face (maculopapular rash)
- Soon spreads to cover the trunk and later the limbs
- Basic lesion appears as fine, pink macules which is originally discrete but can soon coalesce over the face and trunk

No desquamation of rashes

- Usually disappear 2 to 3 days

Lymph node enlargement

- Usually one week before the rash
- Cervical, post auricular and sub occipital glands are involved
- Tender and sometime unassociated with any rash



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CONGENITAL RUBELLA SYNDROME

- Most serious complication of rubella
- May occur when a non-immune mother acquires rubella in early pregnancy.
- Result in uterofoetal infection
- Most dangerous during first 12 week of pregnancy

Clinical features of congenital rubella syndrome

- Abortion, IUGR, SGA
- Microcephaly, mental retardation
- Heart defect - PDA, VSD, PS, TOF
- Deafness
- Ocular defect - Cataract, glaucoma, micro-ophthalmia, retinopathy

Differential diagnoses of rubella

- **Measles**
  - Main different from measles rash
  - Subclinical or clinical infection

    - Rash with no conjunctivitis, no desquamation
    - No staining
    - Associated with polyarthritis or arthralgia
- **Enteroviral infection** e.g. Echo Coxsackie virus
- **Infectious mononucleosis**
- **Scarlet fever**
- **Erythema infectiosum**
- **Various drug eruption/ rash (drug allergic rash)**

Management

Conservative treatment

- No specific treatment in rubella infection.
- Conservative management or symptomatic management only

Preventive measure & importance of prevention

- To prevent Congenital Rubella Syndrome especially for the girls before child bearing age
- Active immunization with MMR (Measles vaccine conjunction with mumps and rubella) vaccine
- First dose at one year of age, second dose - preschool or 12 to 14 year old
- Contraindication - immune deficiency, symptomatic HIV Infection, anaphylactic egg allergy

References

1. *Paediatric 510*
2. *Module on Paediatrics, Family Medicine*

MENINGOCOCCAEMIA

Clinical feature

	Symptoms	Signs
Meningitis	• Fever, Headache, Nausea, Vomiting, Rash, • Drowsiness or irritability • Neck and back pain and stiffness Convulsion	• Fever, Non-blanching rash • Neck stiffness, • +ve Kerning's sign • Opisthotonous, • Decreased conscious level
Meningococcal	• Fever, petechial / purpuric rash • shivering/ rigor, malaise and lethargy/confusion, Headache, nausea, vomiting, limb and joint pain • Absence of neck stiffness • Collapse	• Fever, petechial / purpuric rash
Septicaemia		**Shock** • Tachycardia, low pulse volume, cool peripheries, capillary refill time > 2 seconds • Hypotension (late sign) • Urine Output reduced (< 1 ml/ kg / hr) • Tachypnoea, Hypoxaemia • Decreased conscious level **Cardiac Insufficiency** Pulmonary Oedema, Hepatomegaly
Mixed picture of Meningitis and Septicaemia	Life threatening feature of meningococcal disease • (SHOCK) • Raised intracranial pressure	

Treatment Outline

- Immediate measures in meningococcal disease: need for **immediate referral** after giving first dose Antibiotic
- ANTIBIOTICS
  - Inj Ceftriaxone I/V 100mg/kg/24hr in once day (OR)
  - Inj Cefotaxime I/V 100mg/kg/24hr in 4 divided does
- Treatment of shock : A,B,C
  - : fluid - Colloid/Inotropes:
- Notification to local public health authority

Prevention

- Antibiotic **prophylaxis**
  - Household or close contacts
    - Rifampicin : Oral : <1 month 5mg/kg x BD x 2 days
      1month - 1yr 5mg/kg x BD x 2 days
      1 yr -12yr 10mg/kg x BD x 2days
      >12 years 600mg x BD x 2 days
    - Ciprofloxacin: Oral 2-5yr – 125 mg stat
      5-12yr 250 mg stat

Adult- 500mg (single dose Adult only)

- Health-care workers
  - Chemoprophylaxis rarely indicated
  - Only recommended in situations where there has been mouth to mouth contact or direct exposure to infectious droplets

Vaccination

- Vaccination
- Meningococcal vaccine to household and day care nursery contacts.
- Booster after 3 month and 12-18 month.

Reference

1. *Pediatric Management Guidelines-Myanmar Pediatric Society-May 2011*
2. *Paediatrics SIO*
3. *Module on Paediatrics, Family Medicine*

DENGUE HAEMORRHAGIC FEVER (DHF)

- **Dengue virus Infections:** Dengue Fever, Dengue Haemorrhagic Fever, Dengue Shock Syndrome
- **Dengue Fever (DF):** a flu-like illness that mostly affects older children and adults and rarely causes death
- **Dengue Haemorrhagic Fever (DHF):** is a serious viral disease transmitted by the bite of a mosquito. DHF is a more severe form of acute febrile illness associated with haemorrhagic diathesis and a tendency to develop fatal shock, **Dengue Shock Syndrome (DSS).**
- DHF is more common in children less than 15 years of age.

WHO case definition of DHF

- Acute sudden onset of high fever for 2- 7 days
- Haemorrhagic manifestations with at least a positive tourniquet test
- Platelet count <l00x 10^9/1
- Haemoconcentration (rising packed cell volume >20%) or other evidence of plasma leakage-for example, ascites, pleural effusions, low level of serum protein/albumin

Severity grading (WHO classification)

The disease severity of DHF has been classified into four grades according to the clinical hallmarks of bleeding and plasma leakage.

- Grade I - Only positive tourniquet test
- Grade II - Positive tourniquet test with spontaneous superficial bleeding
- Grade III - Shock
- Grade IV - Profound shock with unrecordable blood pressure and/or pulse

Stepwise approach

Step I. Overall assessment

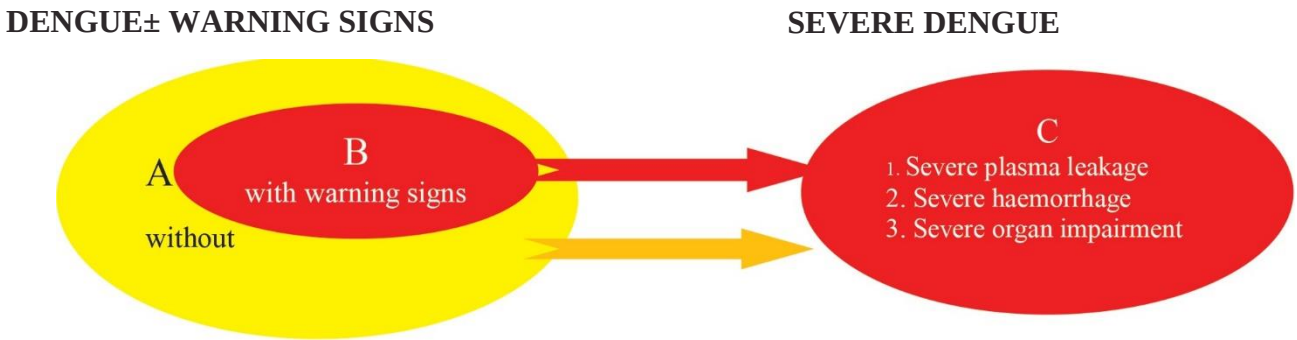
- History, including information on symptoms, past medical and family history
- Physical examination, including full physical and mental assessment
- Investigations, including routine laboratory and dengue-specific tests

Step II. Diagnosis, assessment of disease phase and severity

Step III. Management

- Management decisions
- Depending on the clinical manifestations and other circumstances, patients may:
- Be sent home (Group A)
- Require in-hospital management (Group B)
- Require emergency treatment (Group C)

Suggested dengue case classification and levels of severity



WHO New Grading of Dengue (2009)

CRITERIA FOR DENGUE± WARNING SIGNS		CRITERIA FOR SEVERE DENGUE
Probable dengue	**Warning signs***	
Live in/travel to dengue endemic area Fever and 2 of the following criteria • Nausea, vomiting • Rash • Aches and pains • Tourniquet test positive • Leucopenia • Any warning signs **Laboratory-confirmed dengue** *(Important when no sign of plasma leaka5<e)*	• Abdominal pain or tenderness • Persistent vomiting • Clinical fluid accumulation • Mucosal bleed • Lethargy, restlessness • Liver enlargement >2 cm • Laboratory: increase in haematocrit (HCT), concurrent with rapid decrease in platelet count. **(Requiring strict observation and medical intervention)*	1. **Severe plasma leakage leading to:** • Shock (DSS) • Fluid accumulation with respiratory distress 2. **Severe bleeding** as evaluated by clinician 3. **Severe organ involvement** • Liver: AST or ALT 2':1000 • CNS: Impaired conscious-ness • Heart and other organs

Overall assessment

History

- The history should include:
- Date of onset of fever / illness
- Quantity of oral intake
- Assessment for warning signs
- Diarrhoea
- Change in mental state / seizure / dizziness
- Urine output (frequency, volume and time of last voiding)
- Other important relevant histories, such as family or neighborhood dengue, travel to dengue endemic areas
- Travelling to malaria endemic area (consider malaria)

Physical examination

- The physical examination should include:
- Assessment of mental state
- Assessment of hydration status
- Assessment of hemodynamic status
- Checking for tachypnoea/acidotic breathing/pleural effusion
- Checking for abdominal tenderness/hepatomegaly/as cites
- Examination for rash and bleeding manifestations
- Tourniquet test (repeat if previously negative or if there is no bleeding manifestation)

Management decisions

Depending on the clinical manifestations and other circumstances, patients should be classified as:

- (*Group* A) - Patients who may be sent home
- (*Group* B) - Patients who require in-hospital management
- (*Group* C) - Patients who require emergency treatment
- Group A - Patients who may be sent home
- Are able to tolerate adequate volumes of oral fluids
- Pass urine at least once every six hours
- Do not have any of the warning signs

- Those with stable haematocrit (Hct) can be sent home after being advised to ***return to the hospital immediately if they develop any of the warning signs*** and to adhere to the following action plan
- **Fluids:** Encourage oral intake of oral rehydration solution (ORS), fruit juice and other fluids containing electrolytes and sugar to replace losses from fever and vomiting
- **Antipyretics:** paracetamol for high fever if the patient is uncomfortable. The interval of paracetamol dosing should not be less than six hours
- **Instruct** the care - givers that the patient should be brought to hospital immediately if any of the following occur:
- No clinical improvement
- Deterioration around the time of defervescense
- Severe abdominal pain
- Persistent vomiting
- Cold and clammy extremities
- Lethargy or irritability/ restlessness
- Bleeding (e.g. black stools or coffee - ground vomiting)
- Not passing urine for more than 4-6 hour

MANAGEMENT OF THE CHILD WITH SHOCK

Definition

- State of circulatory dysfunction leading to inadequate cellular perfusion and tissue hypoxia Inadequate perfusion of the body's vital organs resulting in anaerobic metabolism and tissue acidosis.
- Multiple end - organ failure and death if insufficient compensation to reverse these changes.

Compensated shock

- Prolong capillary refill and cold peripheries (reduce blood flow to non vital organs)
- Increase in heart rate (up to 200 beats per minute for a finite period of time)
- Increase in respiratory rate (to improve oxygen delivery)
- Reduce urine output (<0.5 ml/kg/hour)
- Agitation and confusion
- Blood pressure is maintained

Uncompensated shock

- Anuria
- (A further) reduction of conscious level: GCS <8, only response to pain (AVPU)
- Respiratory failure
- Hypotension (pre-terminal sign)
- In children, the two commonest forms of shock are;
- Hypovolaemic shock secondary to trauma or gastroenteritis
- Septic shock, i.e. distributive

Management chart for child with shock

Condition	Immediate Management
• drowsy restless cold extremities • reduced urine output • rapid thready pulse • low BP or narrow pulses pressure	• Clear airway • IV fluid (e.g. R/L or N/S or D/S 20ml/kg/hr)

In a child with shock, the following conditions should be considered

ASK	LOOK FOR	POSSIBLE DIAGNOSIS	INVESTI-GATION	MANAGEMNET
1. Diarrhoea, Vomiting	Two of the following signs: • Lethargic/ unconscious • Sunken eyes • Not able to drink or drinks poorly • Skin pinch goes back very slowly	Acute watery diarrhoea with severe dehydration	• Stool RE • Serum U, C&E if available	Treat as diarrhea (**See Plan C)**
Rapid Onset	• Rice water stool, • Fishy smell, • Washer woman's hands	SUSPECTED CHOLERA	• Rectal swab	>8yrs • Tetracycline 12.5mg/kg/dose 6H x 3 days • Norfloxacin6mg/kg/dose12H x 3 days

ASK	LOOK FOR	POSSIBLE DIAGNOSIS	INVESTI-GATION	MANAGEMNET
Ingestion of mushroom or Tapioca	Constricted pupil in mushroom poisoning	MUSHROOM OR TAPIOCA POISIONING		• Inj. atropine sulphate 0.02mg/kg IM or SC for mushroom poisoning • Refer to hospital
2. Fever with Diarrhoea	Febrile, Toxic Splenomegaly	Acute Watery diarrhoea with septicaemic shock		• Cefotaxime 50mg/kg I/V or I/M or • Ceftriazone 50mg/kg • Referred to hospital
Fever with septic foci	• Toxic • Febrile (or) hypothermia • Bounding pulse • Splenomegaly • Focus of infection ± • Pallor ±	Septicaemic shock		• Cefotaxime 50mg/kg I/V or I/M or • Ceftriazone 50mg/kg • Referred to hospital
High continuous fever < 7days with • vomiting • Bleeding manifestations (coffee ground vomiting /Melaena)	• Hypotension • Narrow pulse pressure 9<20 mmHg) • Hepatomegaly	Dengue Shock Syndrome (DSS)		• Treated as DSS
Acute onset Fever with skin rash	• Characteristic skin rash • Purpuric rash with central necrosis • Petechiae	Meningo-coccaemia		• IV N/S 20ml/kg bolus • if shock not revived give 2nd bolus of N/S
H/O travel to malaria endemic area within last 6 month	• Splenomegaly ± • Pallor ±	Algid malaria		• Inj: Artesunate I/V • N/S 20ml/kg bolus • Refer to Hospital
3. History of taking Drugs (eg. Penicillin/ **Streptomycin)**	• Dyspnoea • Wheezing ± • Vomiting, • Diarrhoea if due to streptomycin	Anaphylactic shock		• N/S 20ml/kg bolus • IM Adrenalin (1:1000 Solution) • >12 yrs→ 0.5 ml • 6- 12yrs→0.3ml • <6 yrs→0.15ml • Repeat after 5min if not better • Injection-Hydrocortisone • Injection-Chlorpheniramine
4. History suggestive of blood loss/any blunt injury	• Evidence of external injuries • Pallor ± • Abd: pain, rigidity	Shock due to blood loss		• N/S 20ml/kg • Refer to hospital

- If a child ***came in with shock***, the commonest causes of shock in children are considered in five groups
  - **Shock associated with diarrhea & vomiting**
  - **Shock associated with fever**
  - **Shock associated with some drugs**
  - **Shock after blood loss**
  - **Cardiogenic**

ANAPHYLAXIS

- Anaphylaxis is the most urgent of clinical immunologic events. It is defined as the clinical response to an immediate (type) immunologic reaction.
- Anaphylaxis is a severe allergic reaction, which may cause upper airway obstruction with stridor, lower airway obstruction with wheezing or shock or all three. Common causes include allergic reactions to antibiotics, to vaccines, to blood transfusion and to certain foods, especially nuts.
- Consider the diagnosis if any of the following symptoms is present and there is a history of previous severe reaction, rapid progression or a history of asthma, eczema or atopy.

Severity of anaphylaxis

Severity	Symptoms	Signs	Treatment
Mild	• Itching mouth • Nausea	• Urticaria • Oedema of the face • Conjunctivitis • Throat congestion	• Remove the allergen as appropriate • Give oral anti histamine
Moderate	• Cough or wheeze • Diarrhoea • Sweating	• Wheeze • Tachycardia • Pallor	• Give adrenaline 0.15ml ofl :1000 IM into the thigh; the dose may be repeated every 5-15 mints
Severe	• Difficulty in breathing • Collapse • Vomiting	• Severe wheeze with poor air entry • Oedema of the larynx • Shock • Respiratory arrest • Cardiac arrest	• If the child is not breathing, start basic life support • Give adrenaline 0.15 ml ofl:1000 IM and repeat every 5-15 min. • Give 100% oxygen. • Ensure stabilization of the airway, breathing, circulation and secure IV access • Administer 20 ml/kg normal saline 0.9% or Ringer's lactate solution IV as rapidly as possible. IfIV access is not possible, insert an intraosseous line

Reference

1) *Management of critically ill children, 2nd Edition 2005*
2) *Padiatric Management Guidelines, 2nd Edition 2011*
3) *Module on Paediatrics, Family Medicine*
4) *Pediatric Management Guidelines, Myanmar Pediatric Society-2nd Ed 2011*

OEDEMATOUS CHILD

- **Oedematous:** accumulation of the excess fluid in the interstitial space
- The cardinal sign of subcutaneous oedema is the pitting of the skin, made by applying firm pressure with the examiner's finger or thumb for a few seconds.
- The pitting may persist for several minutes. However, myxoedema due to infiltration of the tissues by a firm mucinous material does not pit on pressure, chronic lymphoedema may also fail to pit.

The contributing factors

- Increased hydrostatic pressure
  - e.g. portal hypertension, constructive pericarditis, Budd. Chiari syndrome
- Decreased oncotic pressure & decreased protein
  - e.g. inadequate intake, impaired production & loss of protein.
- Increased capillary permeability
  - e.g. allergic reaction & inflammatory reaction
- Low tissue tension
  - e.g. localization of slight edema in periorbital region, scrotum & vulva
- Sodium & water retention
  - e.g. Heart failure, AGN, Nephrotic Syndrome
- Impairment of lymphatic return
  - e.g. filariasis

Types and causes of oedema

1. Generalized oedema - due to transudation of salt & water
   - e.g. Hypoproteinaemia Congestive cardiac failure Acute glomerulonephritis
2. Localized edema due to increased permeability of small blood vessels.
   - e.g. Infection Trauma Bums, Malignant infiltration Lymphatic obstruction, Filariasis, Venous obstruction Thrombosis

Diagnosis of oedema

Most important: identify primary diseases of oedema Quickly evaluate the clinical features

A. GENERALIZED OEDEMA

Renal cause

e.g. Acute glomerulonephritis, Nephrotic syndrome

- starts from face
- H/O previous streptococcal infection may be resent in AGN.
- Hypertension may be present in AGN (Present or absent in Nephrotic syndrome)
- Hypoproteinaemia may be present in Nephrotic syndrome

Protein Energy Malnutrition

- Generalized oedema associated with muscle wasting
- Skin changes (flaky pavement dermatitis)
- Vitamin deficiencies (e.g. Vit A deficiency Bitot's spot)
- weight is <3rd centile
- <60% of expected weight

Heart failure

- Breathless & sleeps propped up.
- Swelling of the ankle is followed by generalized oedema
- History of migratory joint pain may be present in rheumatic valvular heart disease.
- cyanosis (+)
- Murmur (+) in PDA, VSD Fallot's tetralogy.
- Murmur (-) in paroxysmal tachycardia, coarctation of aorta, Fallot's tetralogy, in early infancy,

transposition of vessels, total anomalous pulmonary venous drainage, myocarditis, fibroelastosis or severe anaemia.

Hepatic cause

- Ascites is especially marked in cirrhosis of liver
- Portal hypertension with splenomegaly
- Hypoalbuminaemia (+)
- Enlarged liver in early stage with palmar erythema & spider nevi.
- Jaundice, collateral circulation in abdomen.

Angioneurotic oedema

- Sudden swelling of the eyelids with swelling of lip & tongue
- Rash may be(+)
- Previous similar attack with known allergic subject may be(+)
- eosinophilia (+)

Management of oedema

- Mild oedema without symptoms does not need special treatment. Oedema which gives the patient discomfort or the consequential complications should be ameliorated.

Supportive management

- **Bed rest:** shifts blood volume into central circulation from the peripheral venous pooling; leads to an increase in cardiac output, renal and hepatic perfusion.
- **Sodium restriction:** restricting salt intake to amount **1** to 1.5 mEq/kg/ day is generally sufficient. This degree of restriction may be achieved by avoiding salty foods.
- **Water restriction:** In severe oedematous state, adequate water restriction is effective in preventing further oedema formation.

Medical therapy of oedema

- Treatment of underlying cause.

Refer

- Depend on the underlying cause

References

1. *Module on Paediatrics, Family Medicine*

ACUTE MALNUTRITION IN CHILDREN

Definition of Acute Malnutrition

- **Severe Acute malnutrition** is defined as wasting (thinness) and/or presence of bilateral pitting edema.
- **Moderate acute malnutrition** (MAM), is defined by moderate wasting.

Types of Acute Malnutrition

There are two types of acute malnutrition

- Moderate Acute malnutrition (MAM) and
- Severe Acute malnutrition (SAM) which is divided again into
    - SAM without complications and
    - SAM with complication.

Indicators	Moderate Acute Malnutrition (MAM)	Severe Acute malnutrition (SAM)
Bilateral Pitting Oedema	Absent	Present
Mid Upper Arm Circumference (MUAC)	≥115mm and <125mm	<115mm
Weight For Height (WFH) Z-Score	≥-3 SD and <-2SD	<-3SD

Integrated Management of Acute Malnutrition

There are **four components**:

1. Community Mobilization with active case finding among community

- It is a process aims to raise awareness of community (on what malnutrition is, what underlying causes of malnutrition are and its consequences) followed by increased community demand for IMAM services starting from Active Case Finding to Treatment services until child with Acute Malnutrition is cured.

2. Supplementary Feeding Programme (SFP) for MAM

- The children with Moderate Acute Malnutrition are provided with
    - Ready to Use Supplementary Food (RUSF) or
    - Fortified Blended Food (FBF) until their Mid Upper Arm Circumference(MUAC) reach 125 mm or
    - Weight For Height (WFH) Z-Score reach – 2 SD and above respectively.
- This service will be provided in community, based on the immunization platform, by Basic Health Staff (BHS) as Fixed site or Outreach service delivery in villages with RHC/SRHC.

3. Out-patient Therapeutic Programme (OTP) for SAM without complication

- The children with Severe Acute Malnutrition are treated with Ready to Use Therapeutic Food (RUTF).
- This service will be delivered as Fixed-site service or Outreach service, based on immunization service delivery platform, as well as may be delivered in hospital as Recovery Phase of SAM at

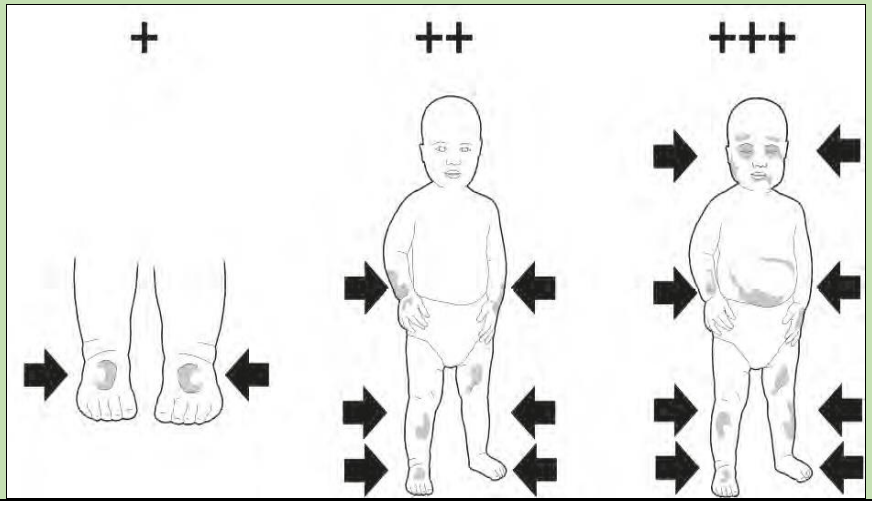
Inpatient Treatment Programme.

4. Inpatient Therapeutic Program (ITP) for SAM with complication

- When the child with Severe Acute Malnutrition has complications or oedema of +++, they are treated in
- hospital (which may range from Station Hospital to Tertiary Hospital).
- These four components are linking with each other.

Clinical Features of Acute Malnutrition

The clinical features of Acute Malnutrition are mentioned in the table below.[1]

Site	**Sign**
Face	Puffy Face (Kwaishorkor = oedematous malnutrition)/ Oldman face (Marasmus = severe wasting)
Eye	Dry eyes, pale conjunctiva, Bitot spots (vitaminA), periorbital edema
Mouth	Angular stomatitis, cheilitis, glossitis, spongy bleeding gums (vitaminC)
Hair	Dull, sparse, brittle hair; hypopigmentation; flagsign (alternating bands of light and normal color); broomstick eyelashes; alopecia
Skin	Loose and wrinkled (marasmus); Shiny and edematous (kwashiorkor); dry,follicular hyperkeratosis; patchy hyper- and hypopigmentation ("crazy paving" or "flaky paint" dermatoses); erosions; poor wound healing
Nails	Koilonychia; thin and soft nail plates, fissures, or ridges
Skeleton	Sign of Vit D deficiency –Rickette Rosery, Knock Knee
Musculature	Musclewasting, particularly buttocks and thighs; (Baggy Pants)
Abdmen	Distended: hepatomegaly with fatty liver; ascites may be present
CVS	Bradycardia, hypotension, reduced cardiac output,
Neurology	Global developmental delay, loss of knee and ankle reflexes, impaired memory
Haematology	Pallor, Petechiae
Behavioural	Lethargic, apathetic, irritable on handling
Oedma	(+) = Mild: both feet /ankle (++) = Moderate: both feet plus lower legs, hands or lower arms (+++) = Severe: generalized oedema including feet, legs, hands, arms and face 

Management of children with Acute Malnutrition

- Management of Acute Malnutrition in SAM without complication is different from that in SAM with complications.

1. Treatment of Severe Acute Malnutrition SAM without complication at OTP (Age 6 to 59 months)

1. Treat as OPD patient at hospital/ RHC/SRHC in (OTP Outpatient Therapeutic Programme).
2. Ready to use Therapeutic Food (RUTF) (150 – 200 kcal/kg/day) 1 Sachets 92gm of RUTF provides 500 Kcal. RUTF is an energy-dense, mineral/vitamin-enriched food that is equivalent to F-100. It is a groundnut paste composed of vegetable fat, peanut butter, skimmed milk powder, lactoserum, maltodextrin, sugar and mineral and vitamin complex
3. RUTF is the only food to be taken in the OTP treatment except Breastmilk.
4. Antibiotic to all children with SAM - Amoxil or Cotrimoxazole can be given
5. Vitamin A
6. Continue Breast Feeding
7. IYCF counselling
8. Immunizations

Routine medicines given in OTP

Drug Supplement	When	Age/Weight	Prescription	Dose
Vitamin A	4th week [4th visit)	6 – 12 months	100,000 IU	1 Dose
		> 12 months	200,000 IU	
		Do not give in child with Oedema		
No vitamin A dose is provided if the child is on F-75, F 100 or RUTF that comply with WHO specifications. Not already been taken in the past 2 months.				
Amoxycillin	At Admission	All SAM Cases	<5 kg→ 62.5 mg 5-10 kg→ 125 mg 10-20 kg→ 250 mg 20 -35 kg→ 375 mg >35 kg→ 500 mg	3 times a day for 5 days
Cotrimoxazole	At Admission	All SAM cases	24mg/kg	2 times a day for 5 days
Albendazole	4th week [4th visit)	<12 months	DO NOT GIVE	NONE
		12 – 24 months	200 mg	Single Dose
		≥24 months	400 mg	
Measles Vaccination	4th week [4th visit)	≥9 months	Give a second dose if received the first vaccination when SAM in ITP	

References

1. *National Guideline Integrated Management of Acute Malnutrition 2017; National Nutrition Centre, Department of Public Health and MOH S Myanmar*
2. *Nutrition, Food Security and Health; Nelson Textbook of Paediatrics 21st Edition; chapter 57, page 331-342*
3. *Protocol Integrated Management of Acute Malnutrition; Micheal Golden & Yuonne G, 2012*
4. *Training Course on Inpatient Management of Severe Acute Malnutrition WHO 2013*
5. *Update on Management of Severe Acute Malnutrition in Infants and Children. WHO guideline 2013*

IMMUNIZATION FOR CHILDREN IN MYANMAR

Vaccination guideline used by EPI in Myanmar

(၂၀၂၀) ခုနှစ်တွင် စတင်မည့် ပုံမှန်ကာကွယ်ဆေး ထိုး/တိုက်အစီအစဉ်

* Preferably within 24 hrs and at lease within 7 days

** At birth or at 2 months

- Immunization doses should be at least 28 days apart
- Additional immunizations like mass immunization and booster immunization should not be counted as regular doss
- Other vaccines available in private sector

Rota virus	PO 1.5 ml at lease every 4 weeks for 2 doses within 6-24 weeks of age (preferably within 6-16 weeks)
Mumps, Measles and Rubella	IM or deep SC 0.5 ml, first dose: 12-13 months of age, second dose: 40-60 months of age
Hepatitis A	IM 0.5 ml, 2 doses with 6-18 months interval, within 1-17 years of age
Influenza	IM 0.5 ml, 2 doses with 4 weeks interval for children who have not receives previously and within 6 months to 9 years of age, and then annually. One dose for children 9-17 years of age
Typhoid	IM 0.5 ml 1 dose for 2-17 years of age at least 2 weeks before potential exposure
Meningococcus A, C, W125 and Y	IM 0.5 ml, 1 dose for 1-17 years of age, repeat after 1 year if still at risk
Pneumococcus 23	IM or SC 0.5 ml, 1 dose for 2-17 years of age
Rabies	IM 1 ml 5 dose days, 0,3,7,14,28-30 after exposure

Chicken pox	SC 0.5 ml, 2 doses with 4-6 weeks interval for 1-17 years
Hep B immunization children of HB +ve mothers	IM HBIG (Hepatitis B immunoglobulin) 200 unit within 12-48 hours after delivery (no later than 7 days) + IM Hepatitis B vaccine 10 µg at 0,1,2 and 12 months of age or 0,1 months of age and then follows EPI

Recommended immunization schedule for HIV-exposed or HIV infected children

Vaccine	Age					
	At birth	2 month	4 month	6 month	9 month	18 month
BCG	BCG					
Hepatitis B	HVB					
Pentavalent DPT-Hib-HepB		Penta 1	Penta 2	Penta 3		
PCV		PCV 1	PCV 2	PCV 3		
Polio		Polio 1	Polio 2	Polio 3		
Measles				M 1	M 2	M 3
JEV					JEV	

Note

- BCG is recommended at birth for all babies born to HIV infected mothers.
- BCG is contraindicated in children with proved HIV-infection status
- Either IPV or OPV can be used.
- All the optional vaccines are considered according to feasibility and affordability.
- HIV-exposed infants and children should receive all vaccines in Expanded Programme for Immunization according to the National Schedules.

Recommendation for other altered immunocompetence

Corticosteroids

- 2mg/kg/day or 20 mg/day of prednisolone or equivalent x 14 days - should not receive live vaccine until therapy has been discontinued for at least one month. (same dose <14 days - 2 weeks, lower dose - may be vaccinated while on therapy)

Malignancies, transplant, immunosuppressive or radiation therapy

- Live vaccines are withheld depending on their immune status
- After chemotherapy for leukemia children may need to be reimmunized with age appropriate single dose of previously administered vaccine.

Preterm

- Same chronological age as term except Hepatitis B vaccine for infants weighing <2 mg at birth (should be deferred until 30 days of age if mother's is hepatitis B antigen negative. If positive, same as term)

Recommended intervals between vaccines

- For killed vaccines - any interval
- For killed and alive - any interval
- For live vaccine - same day or at least one month apart

Recommendation for future immunization programme

- Booster dose for Penta at 18 months and Td (Tetanus and Diptheria) at school entry
- To switch from MR to MMR
- Rota vaccine
- Meningococcal conjugated vaccine
- Human Papilloma Virus (HPV) vaccine
- Influenza vaccine

References

1. *Paediatric Management Guidelines, 3rd Edition, 2018*

MANAGEMENT OF THE CHILD WITH BURNS AND SCALD

- Common cause of injury, disability and permanent disfigurement in children
- Majority of thermal injury in childhood result from an accident in their home
- Toddlers are naturally inquisitive and tend to be burned by hot liquids

Classification

- According to **aetiology** –
  - ***Scalds,***
  - ***flame burn,***
  - ***electrical or chemical burn***
- According to **depth of burn**

Superficial or 1'[1] degree burn	**Partial thickness or 2nd degree burn**		**Full Thickness or 3rd degree burn**
	Superficial Partial Thickness	**Deep Partial Thickness**	
• Erythema and discomfort only • Healing-complete no scarring • Painful.	• Blisters • Basal layers not destroyed. • Regeneration is quick • Usually heals in 2-3 weeks • Extremely painful	• More severe with more damage to skin. • Skin will only survive and heal under the most optimal conditions	• skin totally destroyed • Requires skin grafting for closure. • Painless.

Body Surface Area

- The surface areas of the head and limbs change with age. For example, the surface area of the head of an infant is 19%, which is quite large.
- For each year of age 1% is subtracted from 19 and added to the figure for the lower extremities. ie. up to 10 years.
- "Rule of Nines" cannot be applied in children because of their head-chest size discrepancies, and limb differentials compared with the adults.
- Severity of bum depends on
  1) Depth of bum
  2) Percentage of Total Body Surface Area involvement (TBSA)
  3) Age of the patient
  4) Site-face, hands, feet and perineum

% **Body surface area in relation to age and region (Land-Brauder chart)**

Region \ **Age**	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10
Head/Neck	19	18	17	16	15	14	13	12	11	10	9
UL-Rt	9	9	9	9	9	9	9	9	9	9	9
UL-Lt	9	9	9	9	9	9	9	9	9	9	9
Chest-Front	9	9	9	9	9	9	9	9	9	9	9
Chest-Back	9	9	9	9	9	9	9	9	9	9	9
Rt-LL-Front	6.5	6.75	7	7.25	7.5	7.75	8	8.25	8.5	8.75	9
Rt LL-Back	6.5	6.75	7	7.25	7.5	7.75	8	8.25	8.5	8.75	9
Lt LL-Front	6.5	6.75	7	7.25	7.5	7.75	8	8.25	8.5	8.75	9
Lt LL-Back	6.5	6.75	7	7.25	7.5	7.75	8	8.25	8.5	8.75	9
Abdo-Front	9	9	9	9	9	9	9	9	9	9	9

Abdo-Back	9	9	9	9	9	9	9	9	9	9	9
Perineum	1	1	1	1	1	1	1	1	1	1	1
Percenta2e of Burn	..... %										

ASK	LOOK FOR	POSSIBLE DIAGNOSIS	MANAGEMENT
• **Type of burn** • **Burning agent due to hot liquid**	• A total surface area of burn< 10% of the body surface area (or) • partial thickness (or) • does not involve special areas	Minor burn	• Inj: TT 0.5 ml • Local application with silver sulphadiazine cream • Relieve pain
	• 10-20 % of total body surface area (or) • < 10% but full thickness	Moderate burn	Refer to Hospital
	• > 20 % of body surface area of any thickness (or) • <2 years of age or involve special area such as face, hands, • feet and perineum	Severe burn	Refer to Hospital

Local wound care

- Exposure therapy –
- With the **exposure method** a dry eschar forms over the bum wound and acts as a physiological dressing to prevent numerical proliferation of bacteria. It is useful for patients with bums & scalds over the face, genitalia and anal areas.
- **Semi-open technique** with topical chemotherapy. The topical application of chemotherapeutic agents is the main stay of infection prophylaxis.
- The most frequently used **topical agent** is silver-sulphadiazine. The bum wound is reassessed after one week. If the injury is superficial and partial thickness in depth, healing will occur spontaneously by regeneration from epidermal elements in the dermis.
- The deep partial thickness and full thickness injuries require **skin grafting.**

Prevention

- The best effective treatment of Bums is Prevention.
  1) Fire - safe cigarettes
  2) Smoke detectors
  3) Anti-scalding devices
- Public health education and legislative efforts are active measures to prevent bum injury.

Referral to tertiary unit

- Partial thickness bums, >10%
- Full thickness bums, >2%
- Bums of special area, face, neck, perineum, hands & feet
- Any inhalation injury
- All electrical and chemical injuries
- All suspected case of child abuse

Reference

1) *Pediatric Management Guidelines, Myanmar Pediatric Society (2011)*
2) *Management of Critically Ill Children-2005*