GUIDELINE FOR DAY CARE MANAGEMENT OF SEVERE PNEUMONIA WITH OR WITHOUT MALNUTRITION

National Nutrition Services

National Newborn Health Program

HPNSP

স্বাস্থ্য ও পরিবার কল্যাণ মন্ত্রণালয়

GUIDELINE FOR DAY CARE MANAGEMENT OF SEVERE PNEUMONIA WITH OR WITHOUT MALNUTRITION

National Newborn Health Program and IMCI Section
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ABBREVIATION

CC – Community Clinic

CHCP – Community Health Care Provider

DGHS – Directorate General of Health Services

DCA – Day Care Approach

DGFP – Directorate General of Family Planning

FWA – Family Welfare Assistant

GAPPD – Global Action Plan for the Prevention and Control of Pneumonia and Diarrhoea

HA – Health Assistant

HCP – Health Care Provider

IMCI – Integrated Management of Childhood Illness

icddr,b – International Centre for Diarrhoeal Disease Research, Bangladesh

MOH&FW – Ministry of Health and Family Welfare

MOLGRD &C – Ministry of Local Government, Rural Development and Cooperatives

MAM – Moderate Acute Malnutrition

MHV – Multipurpose Health Volunteer

NGO – Non-Government Organization

PHC – Primary Health Care

SACMO – Sub-Assistant Community Medical Officer

SAM – Severe Acute Malnutrition

UH&FWC – Union Health and Family Welfare Centre

UHC – Upazila Health Complex

UPHC – Urban Primary Health Care

UNICEF – United Nations Children's Fund

WHO – World Health Organization

DEFINITION

Clinical improvement: Defined as if the child does not have any following sign/ symptoms- hypoxemia, fever, fast breathing, tachycardia, lower chest wall indrawing, danger signs, and crepitation on auscultation

Afebrile: Children will be considered as afebrile when the axillary temperature will be <37.5^{0}Celsius and will remain so for ≥ 24 hours

Fast breathing: will be defined as age-specific respiratory rates of ≥50 breaths per minute for 2 to up to 12 months of age and ≥40 breaths per minute for children 12 to 59 months of age

Lower chest wall indrawing: will be indicated if the lower chest wall goes inwards when child inhales

Danger signs: will refer to the all of the following danger signs: inability to breast feed or drink, lethargy, reduced level of consciousness, convulsions, central cyanosis, and head nodding

Hypoxaemia: will be defined when the oxygen saturation will be <90% with room air, as recorded by the pulse oximeter

Severe Acute Malnutrition (SAM): defined by the presence of severe wasting and/or bipedal oedema. A Child aged 6-59 months is classified as severe acute malnourished if S/he has one or more of the following-

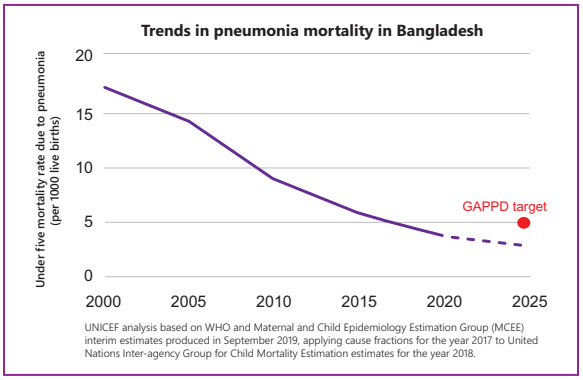
- MUAC <115 mm
- < -3 ZWH,
- Bipedal oedema
- either alone or in combination. SAM can be identified with or without complication. Presence of any of the complications with SAM requires facility-based inpatient treatment

Moderate Acute Malnutrition (MAM): defined as children having ≥ -3 and < -2 ZWH, or, MUAC ≥ 115 mm and <125 mm, either alone or in combination[17]

Hospital-acquired/nosocomial pneumonia: Nosocomial infections, also called "hospital-acquired infections", are infections acquired during hospital care which was not present or incubating at admission. Infections occurring more than 48 hours after admission are usually considered nosocomial[20]

1 INTRODUCTION

Pneumonia is the world's leading infectious killer of children, claiming the lives of more than 800,000 children under the age of five every year, more than 2,000 every day[1].



Despite remarkable progress in reducing under-five mortality in recent decades and existence of low cost and effective interventions, pneumonia remains the leading cause of morbidity and mortality among under five children in Bangladesh. Early childhood mortality due to pneumonia still puts a significant burden on families, communities and the health system. Between 1989 and 1993 pneumonia related deaths were at 27%, which reduced to 22% in 2011 and 18% in 2017-18[2]. In 2018, an estimated 24,000 children under five died of pneumonia in Bangladesh and this translates to an average of more than one child dying every hour in the country[3]. The average annual rate of reduction in pneumonia mortality was 8% between 2000–2018, and at this rate, Bangladesh will reach the 2025 GAPPD target by 2022[4].

1 UNICEF analysis based on WHO and Maternal and Child Epidemiology Estimation Group interim estimates produced in September 2019

2 BDHS 2011 and 2018

3 The 30 hig-burden countries include 22 countries with the highest absolute number of pneumonia deaths and the top 14 countries in terms of pneumonia-specific mortality rates. UNICEF analysis based on WHO and Maternal and Child Epidemiology Estimation Group interim estimates produced in September 2019, applying cause fractions for the year 2017 to UN Inter-Agency Group for Child Mortality Estimation estimates for the year 2018; WHO Global Health Observatory – Causes of deaths 2017

4 Risk Factors for Pneumonia: The Institute for Health Metrics and Evaluation (IHME) - Global Burden of Disease 2017

Lower and middle income countries carry a higher burden of deaths due to pneumonia compared to high income countries[5].

Malnutrition is established as a major underlying risk factor for developing severe pneumonia and related death in children. Poverty, urbanization & environmental contamination, overcrowding, indoor air pollution, poor care seeking practices, low literacy, poor nutrition status, poor breastfeeding practices, poor vaccination coverage and limited access to health services are the key risk factors for pneumonia in resource-limited settings[6]. Undernutrition especially, is known as a significant underlying cause of death in children with common infectious diseases such as pneumonia, diarrhoea; and associated with nearly half of all deaths in children younger than 5 years[7]. Interventions like improving nutrition, increasing vaccine coverage or boosting breastfeeding rates – are some of the key measures that reduce the risk of children dying from pneumonia. It is possible to deliver the necessary solutions to combat pneumonia to all children.

In Bangladesh, co-morbidity of pneumonia and malnutrition is prevalent and frequently associated with case fatality[6]. 31 per cent of children aged less than five years are malnourished and 2 per cent of them have severe acute malnutrition (SAM)[2]. Two-thirds of the malnourished children admitted to hospital are diagnosed with pneumonia[2] and one in every four pneumonic children is diagnosed with malnutrition[8] .

The current COVID-19 crisis has affected Bangladesh as WHO declared COVID-19 a worldwide pandemic on 11th March 2020 and Bangladesh reported its first positive case on 8th March, 2020. Recognizing the threat posed by the COVID-19 pandemic, the Government of Bangladesh has developed the Bangladesh Preparedness and Response Plan (BPRP) for COVID-19 with an objective to prevent and control of COVID-19 in Bangladesh and reduce the impact on the health, wellbeing and economy of the country. While the impact of COVID-19 pandemic and control measures like lockdowns may have reduced the transmission, it affected the economic and social activities in the country. It caused reduced access and utilization of essential MNCH services, especially for the vulnerable populations like

5 Roberton et al (2020) Early estimates of the indirect effects of the COVID-19 pandemic on maternal and child mortality in low-income and middle-income countries: a modelling study, The Lancet, July 01, 2020 http://www.thelancet.com/journals/langlo/article/PIIS2214-109X(20)30229-1/fulltext

6 United Nations Children's Fund; Committing to child survival: a promise renewed. Progress report 2015 http://www.unicef.org/publications/index_83078.html

7 Chisti MJ, Tebruegge M, La Vincente S, Graham SM, Duke T. Pneumonia in severely malnourished children in developing countries - mortality risk, aetiology and validity of WHO clinical signs: a systematic.

8 Chowdhury F, Shahid ASMSB, Ghosh PK, Rahman M, Hassan MZ, et al. (2020) Viral etiology of pneumonia among severely malnourished under-five children in an urban hospital, Bangladesh. PLOS ONE 15(2): e0228329. https://doi.org/10.1371/journal.pone.0228329

children. The number of consultations form IMCI-N corners reduced from average of around 600,000 per months in the previous years to 184,000 in May 2020 at the most severe lock down[9]. Due to indirect adverse effects of COVID-19 on both the supply and demand of critical and essential health services, there is a clear risk of an increase in maternal, new-born and child mortality as predicted by the experts. The Lancet medical journal estimates that if there is a further reduction in health services in Bangladesh, more than 28,000 children under five could die within the next six months[10].To address this situation, MOH&FW with relevant stakeholders such as UNICEF, Save the Children, WHO, and icddr,b etc. are working to revitalize the essential MNCH services, including IMCI-N. The importance of improving management of acute respiratory diseases, especially pneumonia is evident in the context of COVID-19 and the introduction of DCA will lessen the burden of bed occupancy rate, free up additional hospital beds which can be utilized for admitting other critically ill children and is feasible from January 2021 onwards.

1.1 How to Use this Guideline

The guideline provide clear step by step actions for the DCA approach for management of Severe Pneumonia with or without malnutrition. This guideline complements the existing National IMCI Guidelines in Bangladesh (2019), which focuses on the integration of the management of malnutrition with on-going pneumonia treatment for children 2-59 months within day care approach. This guideline should be used for the treatment of Severe Pneumonia with or without malnutrition through Day Care Approach.

1.2 Who should Use this Guideline

The guideline should be used by:

- Doctor, and Nurses, Paramedics responsible for the direct care and treatment of children with pneumonia with or without malnutrition.
- Community health workers who are responsible for referral (FWA, HA, CHCP, MHV)
- Supervisors responsible for monitoring and supervision
- Policy makers and program managers

9 Bangladesh HMIS presented in UNICEF COVID-9 dashboard https://dashboard.unicefbangladesh.org/health.php

10 Roberton et al (2020) Early estimates of the indirect effects of the COVID-19 pandemic on maternal and child mortality in low-income and middle-income countries: a modelling study, The Lancet, July 01, 2020 http://www.thelancet.com/journals/langlo/article/PIIS2214-109X(20)30229-1/fulltext

2 DAY CARE APPROACH IN BANGLADESH (DCA)

2.1 Rationale

Management of severe pneumonia requires hospitalization for supportive care. Several developing countries, including Bangladesh, do not have enough hospitals or paediatric hospital beds to accommodate the demand for admission of all the children with severe pneumonia with or without malnutrition and other co-morbidities. Additionally, mothers of ill children have other children at home to take care and household responsibilities that prevent their ability to attend the child during hospitalization, which is often mandatory for the entire duration of hospital stay. Furthermore, transportation cost for long-distance travel to the hospital, lack of adequate childcare facility at home represents significant additional limitations to hospitalization.

Globally, alternative treatment modalities such as "day-care model" are therefore being sought for children who cannot be hospitalised but are too sick to be managed at home.

In Bangladesh, icddr,b compared Day Care Approach of management with that of hospital management by a randomized, controlled trial. The study result showed that, hospital management of severe pneumonia is a huge economic burden particularly for household due to indirect costs. The new management approach (DCA) is economically viable and dominant alternative that has good value for money. Management of severe childhood pneumonia by day care approach is an alternative to hospitalisation, and can reduce the treatment cost by half and on the other hand it will reduce pressure to the hospitalisation as well.

Based on the trial, they also said that around 80 to 90 percent children with severe pneumonia with or without malnutrition can be effectively treated under this approach in the existing healthcare system in Bangladesh.

2.2 Urban and Rural Areas

The health systems of Bangladesh are bifurcated, urban healthcare falls under the responsibility of the Local Government Institutes (City Corporations & Municipalities) guided by Local Government Division (LGD) in the Ministry of Local Government Rural Development and Cooperatives (MOLGRD&C), and rural healthcare by the Ministry of Health and Family Welfare (MOHFW). The City Corporations & Municipalities are responsible for providing primary health care, public health promotion and nutrition services in urban areas. MOH&FW however, is the designated ministry for all matters related to health and nutrition, and for ensuring and arranging health and nutrition services for the entire country, including urban and rural.

Rural areas

In the Government sector, two community-based workers - a Family Welfare Assistant (FWA) and a Health Assistant (HA) and a community clinic (CC) run by a Community Health Care Provider (CHCP) serve a population of 6000 to 7000. Another first level outpatient clinic - e.g., Union Health and Family Welfare Centres (UH&FWCs) - serves a population of about 20,000. It is staffed by one Sub Assistant Community Medical Officer (SACMO) and one Family Welfare Visitor (FWV). Sub-district hospitals (Upazilla Health Complex) with both inpatient and outpatient facilities serve a population of about 200,000. In rural areas, DCA for management of Severe Pneumonia with or without malnutrition will be implemented through the Upazila Health Complexes.

Urban areas

In urban areas, NGO run urban health clinics with support from MOLGRD&C projects provide primary health care services for children. In Urban areas, DCA for management of severe pneumonia with or without malnutrition will be implemented through urban primary health clinics run by NGO and child hospital of City Corporation and including model clinics of UNICEF.

2.3 Structure and Modality of Day Care

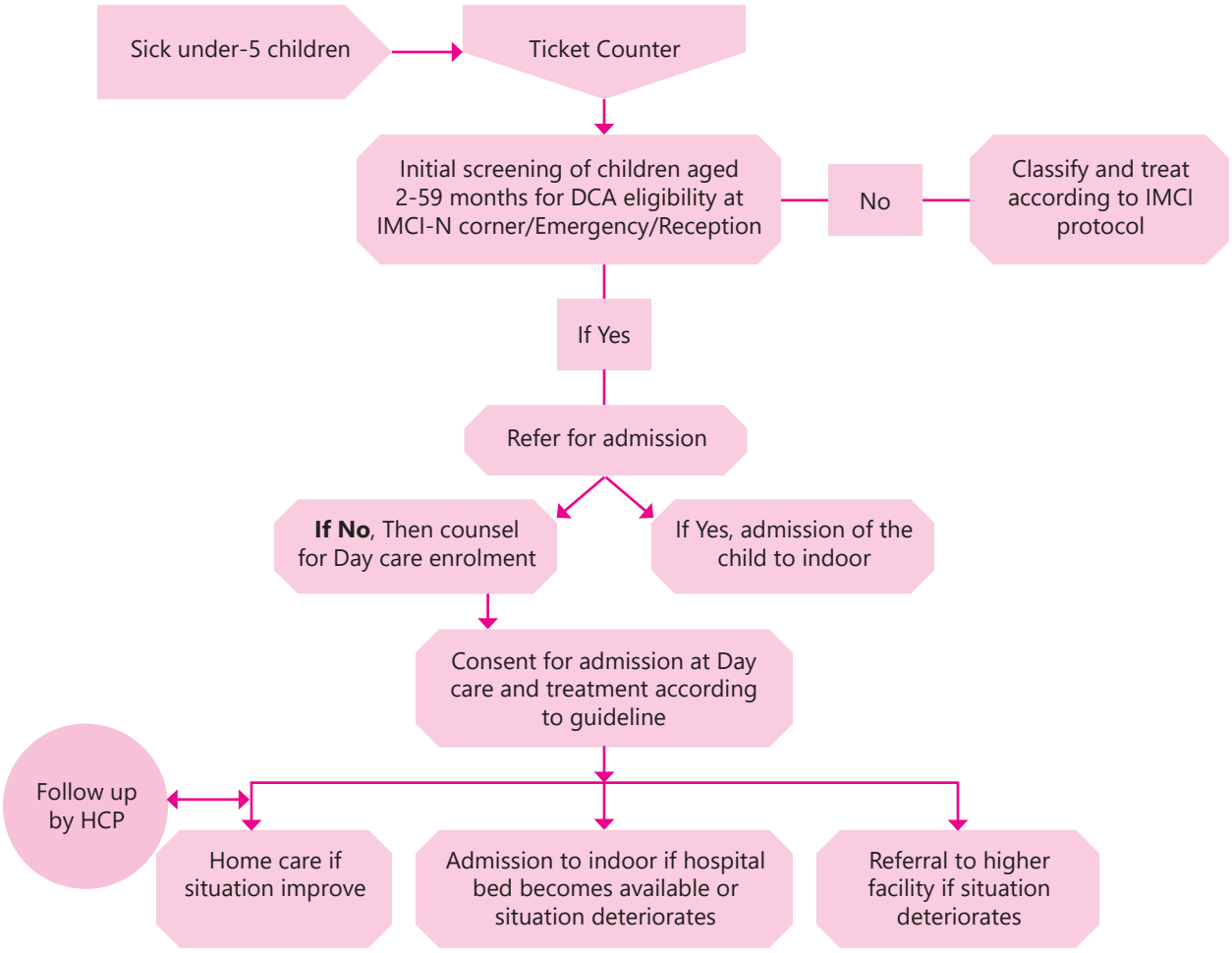
Day Care Approach (DCA) for severe pneumonia

The DCA enables treatment for children with severe pneumonia on a day-care basis in clinics/hospitals, in the same safe and effective way as if the child was

admitted patient in to the hospital, and it is simple and cost-effective[11]. Furthermore, Community Care can be expanded through day care treatment approach targeting treatment of severe pneumonia in children who will not get admission to hospital or mother/caregiver does not want to get admission.

Children will come to the IMCI-N corner/Emergency/Reception. He/she will be assessed by a trained nurse and finally evaluated by the physician or paediatrician and will be enrolled for Day care management or referred to the higher facility if required.

2.4 Implementation Matrix



11 H Ashraf,1 S A Jahan,1 N H Alam,1 R Mahmud,1 S M Kamal,2 M A Salam,1 N Gyr3 Day-care management of severe and very severe pneumonia, without associated co-morbidities such as severe malnutrition, in an urban health clinic in Dhaka, Bangladesh.

Day care approach within existing outpatient clinics with few modifications

- Modified with adequately trained staff (doctors, nurses, health workers etc.)
- Operating the clinic 7 days a week (9.00 AM-5:00 PM in urban areas and 8:30 AM to 2.30 PM in rural areas)
- On call service, if necessary

Logistic support

Facility Readiness	Equipment	Medicines	Recording/Reporting
1. Adequate space for at least 4 pediatrics beds 2. Safe water for drinking (jug and cups) 3. Electric Cattle and Micro oven 4. IEC materials such as leaflet, posters	1. MUAC tapes 2. Pulse oximeter 3. Oxygen cylinder 4. Oxygen delivery Devices (head box, mask, nasal canula, nasal prong,) 5. Electric suction machine / foot operating suction machine 6. Weighing scale salter and bathroom scale 7. Height scale/Stadiometer and Infanto-meter 8. Nebulizer 9. ARI Timer/Watch with second's hand or digital 10. Watch/Wall clock 11. Weight machine for infant 12. Infrared thermometer / Thermometer	1. Inj.Ceftraixone I/M (250mg, 500mg) 2. Salbutamol solution 3. Infusion and injection materials such as Cannula, Butterfly needle, Syringe, micropore cotton, disinfectant. 4. Half strength baby saline 5. Normal saline	1. Consent form 2. Register 3. Reporting form 4. Follow-up form 5. Referral slip

*** **Considering the Covid-19 pandemic situation, preventing protocol of Covid-19 at the day-care centres' will be strictly maintained, such as:**

- Wear mask
- Hand washing
- Maintaining social distance
- Day Care should be cleaned with disinfectant every morning
- Availability of mask and hand sanitizer at the Day care centre

3 ASSESSMENT OF PNEUMONIA

Classification and Treatment of Pneumonia

The recommendations for the management of pneumonia in health facilities have recently been modified[12][13][14]. Integrated Management of Childhood Illness (IMCI) at health facility level has also been updated accordingly.

3.1 Classification of Cough or Difficult Breathing

Main symptoms: Cough or difficult breathing

GENERAL DANGER SIGNS

- The child unable to drink or breastfeed
- The child vomit everything
- The child had convulsion
- The child is lethargic or unconscious
- The child convulsing now

12 Recommendations for management of common childhood conditions, Evidence for technical update of pocket book recommendations. Geneva: World Health Organization; 2012 (http://www.who.int/maternal_child_adolescent/documents/management_childhood_conditions/en).

13 Pocket book of hospital care for children: Guidelines for the management of common illnesses. Second edition. Geneva: World Health Organization; 2013 (http://www.who.int/maternal_child_adolescent/documents/child_hospital_care/en).

14 Integrated Management of Childhood Illness (IMCI) (revised). Geneva, World Health Organization/The United Nation Children's Fund (UNICEF), 2014 (http://www.who.int/maternal_child_adolescent/documents/IMCI_chartbooklet/en/).

If yes, then	Signs	Classification
	Any General Danger signs **Stridor in a calm child**	**Very severe Disease or Severe Pneumonia**
	Look, listen and measure	
	Count the breaths in one minute Look for chest indrawing Listen for stridor Listen for wheezing Measure arterial oxygen saturation (SpO2) level with pulse oximeter **If wheezing and either fast breathing or chest indrawing:** Give a trial of rapid acting inhaler Salbutamol for up to three times 20 minutes apart. Count the breaths and look for chest indrawing again, and then classify. **Child must be calm during examination** **If possible, do SARS-CoV-2 test for children to exclude.	COUGH or DIFFICULT BREATHING

***Children with any danger sign are most likely to have infections with invasive bacteria and diseases which may be life threatening.**

****Children who have fast breathing, but do not have any danger sign should be classified as pneumonia. In about 80% cases by this sign health worker can detect pneumonia.**

Classification table for cough or difficult breathing

Signs	Classify	Identify Treatment (Urgent pre-referral treatments are in bold print)	At Day care
Any general Danger sign or Stridor in calm child or Oxygen saturation (SpO2) <90%	**Pink** **SEVERE PNEUMONIA OR VERY SEVERE DISEASE**	- Give first dose of intramuscular Gentamicin and first dose of oral Amoxicillin - Refer **URGENTLY** to hospital - Give Diazepam if convulsing now- - Give inhaled Salbutamol if wheezing	Child will be identified for Day care enrollment using the inclusion criteria described Will follow the DCA protocol described below

Signs	Classify	Identify Treatment (Urgent pre-referral treatments are in bold print)	At Day care
Chest indrawing Or Fast breathing	**Yellow** **PNEUMONIA**	- Give oral Amoxicillin for 5 days - m If wheezing (or disappeared after inhaler Salbutamol) give an inhaler Salbutamol for 5 days - Soothe the throat and relieve the cough with a safe remedy - If coughing for more than 14 days or recurrent wheeze, refer for possible TB or asthma assessment - Advise mother when to return immediately - Follow-up in 3 days	
No signs of pneumonia or very severe disease	**Green:** **COUGH OR COLD**	- If wheezing (or disappeared after inhaler Salbutamol) give an inhaled Salbutamol for 5 days - Soothe the throat and relieve the cough with a safe remedy - If coughing for more than 14 days or recurrent wheezing, refer for possible TB or asthma assessment - Advise mother when to return immediately - Follow-up in 5 days if not improving	

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Fast breathing

If the child is sick	Fast breathing is
2 months up to 12 months	50 breaths per minute or more
12 months up to 5 years	40 breaths per minute or more

15 IMCI Chart Booklet-2019

3.1 Inclusion Criteria for Day Care Enrolment

- Age: 2 to 59 months
- Child with cough or difficult breathing with Hypoxemia (SPO_2 < 90% on pulse oximetry)
- Unavailability of hospital beds for inpatient admission
- Refusal for admission
- Treatment failure cases of pneumonia from community after oral antibiotic for two days
- Child with cough or difficult breathing with chest indrawing (child's parents are not confident to take child at home)
- Severe pneumonia with associated illnesses:
  - Moderate Acute Malnutrition (MAM) [WHZ score between -3 and ≤ -2 or MUAC between 115 mm and <125 mm]
  - Severe under-weight [Weight-for-Age Z-score <-3 WAZ]
  - Diarrhea with no or some dehydration
- Resident within 1 hour of travel distance from hospital

3.2 Exclusion Criteria for Day Care Enrolment

- Unconsciousness
- Convulsion (current or history of convulsion in recent illness)
- Lethargy
- Hypothermia
- Cyanosis
- Shock (low volume pulse, Low or non-recordable BP, capillary refill time more than 3 sec)
- Child with Grunting
- Child with Stridor
- Child who vomits everything

3.3 Assessment of Moderate Acute Malnutrition (MAM)

Moderate Acute Malnutrition (MAM) is defined as children having a Weight-for-Height/Length Z-score (between-3 WHZ and ≤ -2 WHZ; or MUAC between 115 mm and <125 mm either alone or in combination for children aged 6-59 months. Children with MAM will be included in the Day care approach of pneumonia management because they form the bulk of patients with pneumonia contributing to about 15% of all under-five deaths.

Children will be evaluated for MAM at IMCI-N corner through MUAC measurement and if MUAC found between 115 mm and <125 mm, those children will be referred to the day-care where they will be further assessed and again evaluated at day care with Weight-for-Height/Length Z-score. If a child assessed with WHZ/WLZ <=-3 with any of the below complications, they will be referred to the SAM unit at the nearby hospitals/UHC for facility-based management of complicated SAM. A systematic referral mechanism will be implied to track/follow-up those SAM children admitted for treatment. They are to be again referred to the Day-care/Community if they recover from the complication and become normal or MAM.

Table: Common complications associated with SAM

Oedema	Grade ++ and Grade +++
Oedema with wasting	Any grade of oedema with MUAC< 115 mm and/or WLZ or WHZ<-3)
Appetite/anorexia	Poor appetite or unable to eat
Vomiting	Persistent vomiting (≥3 per hour)
Temperature	Fever (>39°C or 102.2°F axillary) or hypothermia (<35°C or 95°F axillary)
Respiratory rate	Rapid breathing according to IMCI guidelines for age: ≥60 /min for children <2 months ≥50 /min for children 2-up to 12 months ≥40 /min for children 12-59 months
Anaemia	Severely pale (severe palmer pallor)with or without difficulty breathing
Infection	Extensive infection requiring parenteral treatment
Alertness	Very weak apathetic unconscious fitting/convulsions
Hydration status and dehydrating diarrhoea	Dehydration based primarily on a recent history of diarrhoea vomiting fever or sweating not passing urine for last 12 hours and on recent appearance of clinical signs of dehydration as reported by the caregiver

3.4 Assessment of Severe Acute Malnutrition (SAM)

SAM is identified by the presence of severe wasting and/or bi-pedal oedema.

A child aged 6-59 months is classified as severe acute malnourished if s/he has one or more of the following:

- **Mid-upper arm circumference <115 mm**
- **Weight-for-length z-score (WLZ)* < -3 or Weight-for-length z-score (WHZ) <-3**
- **Bipedal oedema****

* WLZ is used for children less than 2 years of age

**Bipedal oedema may occur in kwashiorkor, marasmic kwashiorkor

There are uncertainties regarding the classification of children aged <6 months as SAM [5]. Until better information becomes available, a child aged <6 months should be classified as SAM if s/he has one or more of the following:

- **WLZ <-3**
- **Bipedal oedema**
- **Visible wasting***

* If length is <45 cm then calculation of WLZ is not possible[16]

****Considering Covid-19 pandemic situation for early admission, if a child's MUAC is <112 and oedema is present that it will be considered as SAM.[17]**

*****Screening and detection of children with severe acute malnutrition, and referral to SAM unit for treatment of severe pneumonia**

16 National Guidelines for the Facility-based Management of Children with Severe Acute Malnutrition in Bangladesh

17 Guideline to continue nutrition services during Covid-19 pandemic.

4 CASE MANAGEMENT

4.1 Management at day care (urban & rural areas)

Rural areas

- Day care will operate from **08:30 AM to 2.30 PM** in the rural areas on all days of the week including weekends and public holidays, until fulfilling the criteria for discharge (clinical end-points, defined as child who does not have hypoxemia, fever, fast breathing and tachycardia).
- Parents will bring their children to the UHCs at **8:30 AM** in the morning every day and return them back home at **2.30 PM**.
- At these UHCs, children will be assessed by the SSN/SACMO nurse working at the **IMCI-N corner** if available or at the **emergency** and finally evaluated by trained Paediatrician/Physicians.
- Children with pneumonia (i.e., not severe pneumonia) who **fail** to improve in the community level with oral Amoxicillin or DT for **two days** as well as those presenting with **severe pneumonia** (self-referred or identified by FWA/HAs/MHV) right from beginning will be assessed by the SSN/SACMO working at the IMCI-N corner at UHCs and finally evaluated by a trained Doctor/Nurse for any other associated general danger signs for DCA management.

Urban areas

- Day care will operate from in the urban areas from 09.00 AM to 05.00 PM on all days of the week including weekends and public holidays, until fulfilling the criteria for discharge (clinical end-points, defined as child who does not have hypoxemia, fever, fast breathing and tachycardia).

- Parents will bring their children to the Urban Health Clinics at **09.00** AM in the morning every day and return them back home at **5:00** PM.
- Children will be assessed by the Physicians/Paediatricians working at the Urban Primary Health clinics.
- Children with pneumonia (i.e., not severe pneumonia) **who fail** to improve in the community level with oral Amoxicillin or DT for **two days** as well as those presenting with severe pneumonia (self-referred or identified by CHWs / SPs right from beginning will be assessed by the Physicians/Paediatricians for any other associated general danger for DCA management.

Case management at day care

- After admission at the Day care centres, all children will be weighed without clothes with a weighing scale.
- Recumbent length/standing height will be measured to the nearest 0.01 cm with a locally made, portable length board using standardized techniques at the day-care centre.
- Length/height will be measured twice and the mean value will be used as the recorded value.
- A difference of <0.5 cm between measurements will be considered as acceptable.
- Thick secretions in the throat and nostrils will be removed by gentle suction with an electric suction machine.

A. Oxygen therapy

- The oxygen saturation will be measured routinely at the day-care centre by using pulse oximeter for every child after admission and before administration of oxygen therapy.
- Oxygen will be administered through oxygen cylinders by nasal cannula to all hypoxaemic children with oxygen saturation <90% in room air, as recorded by the pulse oximeter.
- Routine monitoring of hypoxaemic children will be performed at intervals of 30 minutes to 2 hours, depending on patient's condition, until oxygen saturation will remain stable at ≥90% with room air.

- Oxygen saturation will be routinely checked during oxygen therapy, as well as after removal of administered oxygen for 2 minutes.
- Children with hypoxaemia who will require prolonged oxygen therapy for more than 6 hours will be referred to the local hospitals in the urban and UHC/DH in the rural areas for hospitalization and continued care.
- Oxygen therapy will be re-started, if hypoxaemia persists. Children, who will remain hypoxaemic at 05:00 PM at the urban primary health clinics, or at 2:30 PM at the rural UHCs will be referred for inpatient admission to the local hospitals in the urban areas and UHC/DH in the rural areas and continued care.

B. Antibiotics

- All children will receive once-daily injections of intramuscular (IM) Ceftriaxone, in doses of 50 to 75 mg/kg, for ≥5 days.
- Ceftriaxone has been used successfully for outpatient treatment of most severe bacterial pneumonias in children and can be easily administered during daily clinic visits because of its single daily dose application
- Both Urban and Rural will follow the same treatment protocol.

C. Feeding

- Feeding of DCA children will have two components, one at the Urban Health Clinics/UHCs and another at home during night hours.
- Type of feeding of child with malnutrition depends on the severity of malnutrition.
- Children diagnosed as severe pneumonia with SAM will be referred to SAM unit for treatment.
- Children diagnosed as severe pneumonia with MAM will receive high energy and nutrient dense local foods fortified with micronutrients.
- Relactation method, assessment of breast feeding will be done.
- Infants and children >6 months of age will receive local foods such as Khichuri and Halwa fortified with micronutrients (MNP powder).
- Amount of local food/feed/child should be as per IYCF feeding practices.

- Breastfed children will continue breast feeding.
- All the above-mentioned therapeutic diets will be made locally available, as it will be prepared by the health care workers at their respective Urban Health Clinics in the urban areas and Upazilla Health Complex in the rural areas.
- No child will receive any nasogastric tube feeding at the Urban Health Clinics/ UHCs as well as at home at night.
- All malnourished children will receive capsules with vitamin A in a single dose of 100,000 IU for children aged 6-12 months and 200,000 IU for older than 12 months children after recovery.
- All the health care workers will be adequately trained to enquire about the intake of a vitamin A capsule in the recent past (Taken within last 1 month) and thus duplication will be avoided.

D. Diarrhoea

Children with diarrhoea additionally will receive current standard WHO oral rehydration solution for rehydration and fluid maintenance of ongoing losses through stool and emesis. The following chart[15] will be followed to correct diarrhoea.

Signs	Classify	Identify Treatment	Treatment at Day care
Two of the following signs: - Lethargic or unconscious - Sunken eyes - Not able to drink or drinking poorly - Skin pinch goes back very slowly	**Pink:** **SEVERE DEHYDRATION**	- **If child has no other severe classification:** - Give fluid for severe dehydration OR If child also has another severe classification: - Refer **URGENTLY** to hospital with mother giving frequent sips of ORS on the way - Advise the mother to continue breastfeeding - If child is 2 years or older and there is cholera in patient's area, give antibiotic for cholera - Give fluid, Zinc	

Signs	Classify	Identify Treatment	Treatment at Day care
Two of the following signs: - Restless, irritable - Sunken eyes - Drinks eagerly, thirsty - Skin pinch goes back slowly	**Yellow:** **SOME DEHYDRATION**	- Give fluid, Zinc supplementation and food for some dehydration If **child also has a severe classification:** - Refer URGENTLY to hospital with mother giving frequent sips of ORS on the way - Advise the mother to continue breastfeeding - Advise mother when to return immediately - Follow-up in 5 days if not improving	Child with no or some dehydration will be identified at Day care Child will be treated accordingly following by the chart below.
Not enough signs to classify as some or severe dehydration	**Green:** **NO DEHYDRATION**	- Give fluid, Zinc supplementation and food to treat diarrhoea at home (Plan A) - Advise mother when to return immediately - Follow-up in 5 days if not improving	

- In addition, they will be given Tablet Zinc 10 mg for children less than 6 months of age and 20 mg for older children daily for 10 days.
- Dehydration will be assessed by the modified WHO method and rehydration will be achieved over the usual 3-6 hours in well-nourished children and for prolonged period **(6-9 hours)** for malnourished children and without any intravenous infusions.

E. Management of some dehydration

Treat some dehydration with ORS

In clinic, recommended amount of ORS over 4-hour period

Determine amount of ORS to give during first 4 hours

Weight	<6kg	6-<10kg	10 - < 12 kg	12 - < 20 kg
Age	**Up to 4 months**	**4 months up to 12 months**	**12 months up to 2 years**	**2 years up to 5 years**
Amount of fluid (ml) over 4 hour	200-450	450 - 800	800 - 960	960 - 1600

***Use the child's age only when you do not know the weight. The approximate amount of ORS required (in ml) can also be calculated by multiplying the child's weight (in kg) times 75**

- For infants under 6 months who are not breastfed, also give 100 - 200 ml clean water during this period if you use standard ORS.
- **Along with ORS feed child will be given family food according to age.**

Show the mother how to give ORS solution

- Give frequent small sips from a cup
- If the child vomits, wait 10 minutes. Then continue, but more slowly
- Continue breastfeeding whenever the child wants

After 4 hours

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

If the mother must leave before completing treatment

- Show her how to prepare ORS solution at home
- Show her how much ORS to give to finish 4- hour treatment at home
- **Explain the 4 Rules of Home Treatment**
  - GIVE EXTRA FLUID
  - CONTINUE FEEDING (exclusive breastfeeding if age less than 6 months, 6 to 2 years breast feeding with family food.)
  - GIVE ZINC (age 2 months up to 5 years)
  - WHEN TO RETURN immediately [15]

Children with both severe pneumonia and malnutrition will be treated according to day-care protocols. Parents/caregivers will be educated on home management including continuation of medicines, diets, provision of supportive care and take them back home.

Children who will fail to improve with the day-care management will be referred to hospital management (Local hospitals in urban areas and UHCs/ DHs in rural areas)

Day care management protocol (In short)

- TWO TIMES FOLLOW UP: MORNING (9.00AM TO 10:00 AM) AND AFTERNOON (1:30PM TO 2:30 PM) IN RURAL AND (4:00PM TO 5:00 PM) IN URBAN
- LAST ENROLEMENT TIME AT DAY CARE FOR RURAL IS 1.00 PM AND FOR URBAN IS 3.00 PM.
- HEIGHET, WEIGHT and MUAC MEASUREMENT
- SUCTION (IF REQUIRED)
- OXYGEN SATURATION MEASUREMENT
- OXYGEN THERAPY (IF REQUIRED)
- INJECTION CEFTRIAXONE, IN DOSES OF 50 TO 75 MG/KG FOR 5 DAYS
- ENERGY DENSE FAMILY FOOD FOR MAM
- PATIENTS VISIT DAILY UP TO 5 DAYS OR UNTIL DISCHARGE CRITERIA IS FULLFILLED
- PATIENT WITH HYPOXAEMIA AND/ OR WITH PROLONGED OXYGEN THERAPY > 6 HOURS Will BE REFERRED

Discharge criteria

Clinical end-points: If the child does not have any of the following symptoms

- Hypoxaemia (Oxygen saturation >90%)
- Fever
- Fast breathing and
- Tachycardia[16]

4.2 Follow-up

- CHWs/FWA/HAs/SPs/MHVs will perform the follow-up visits at the child's home on days 3, 6 and 14 by using a follow-up Chart.
- At each assessment, the child's general condition and nutritional status will be evaluated.
- The presence of any danger signs and any adverse events will also be evaluated during the home visits.
- Children who fail to show up in the morning will be visited by CHWs/FWA/HAs/SPS/MHVs at their homes.
- They will encourage the parents to comply with the daily visit to the Urban Primary Health Clinic, UHCs and will accompany them back to the Urban Primary Health Clinics/UHCs on the same day.
- The management described above will continue on each day of the week for at least 5 days, until there will be clinical improvement, defined as Child who does not have fever, fast breathing, lower chest wall indrawing, danger signs, no crepitation auscultation and hypoxaemia.
- The frequency and level of monitoring will also depend on the clinical condition of the children, but will take place at least once every 4 hours
- All the subjects will remain in the hospital beds during their stay at the day-care centres and families will stay with the child, similar to that in the hospital except for shorter duration of stay (6 hours in rural areas and 8 hours in the urban areas instead of 24 hours in the hospital).

4.3 Training of Personnel for the DCA

Day-care personnel including **Physicians/Nurses/SACMOs/Paramedics** will undergo a thorough training before intervention. All the above-mentioned staffs of the DCA will be taught how to enrol and provide care to eligible children. They will assess and identify the children who can be treated at Day care as well as identify the very severe children and SAM for referral to higher facility.

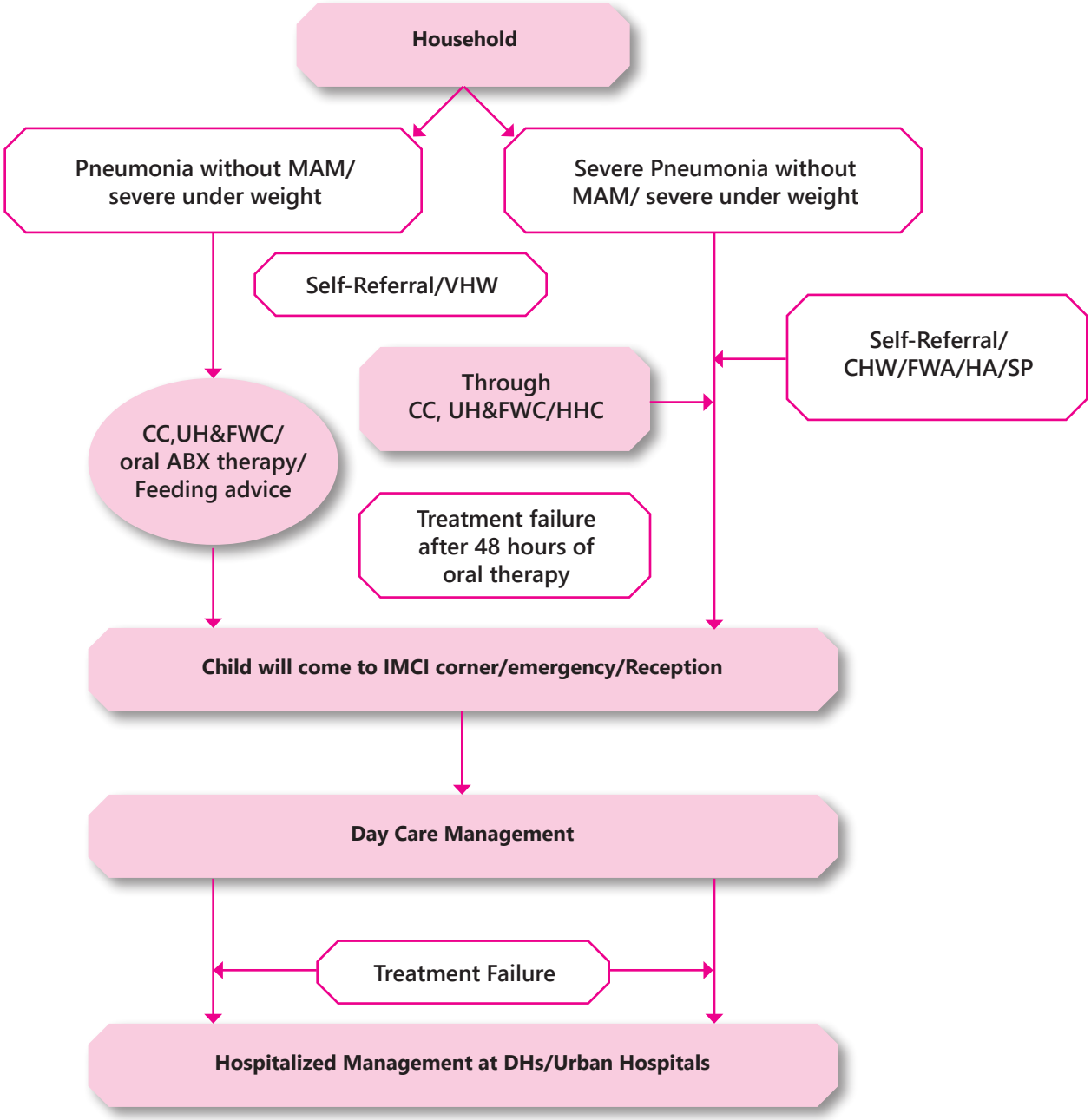
The **CHWs/FWAs/HAs/MHVs** will be trained to identify children with severe pneumonia and malnutrition and will be able to refer them for management at Day-care and follow -up the children. They will also learn to prepare and administer

the diets to the children and to educate and motivate mothers to comply with therapies and follow-up. All the day-care centres of urban primary health clinic and rural UHCs will be provided with adequate equipment such as Paediatric beds, pulse oximeter, nebulizer, suction machine, weighing scale, food balance and oxygen cylinder for oxygen therapy etc. Provisions for referral of any sick child who will need hospitalization (hospitals in the urban areas and DHs in the rural areas) will be ensured.[16]

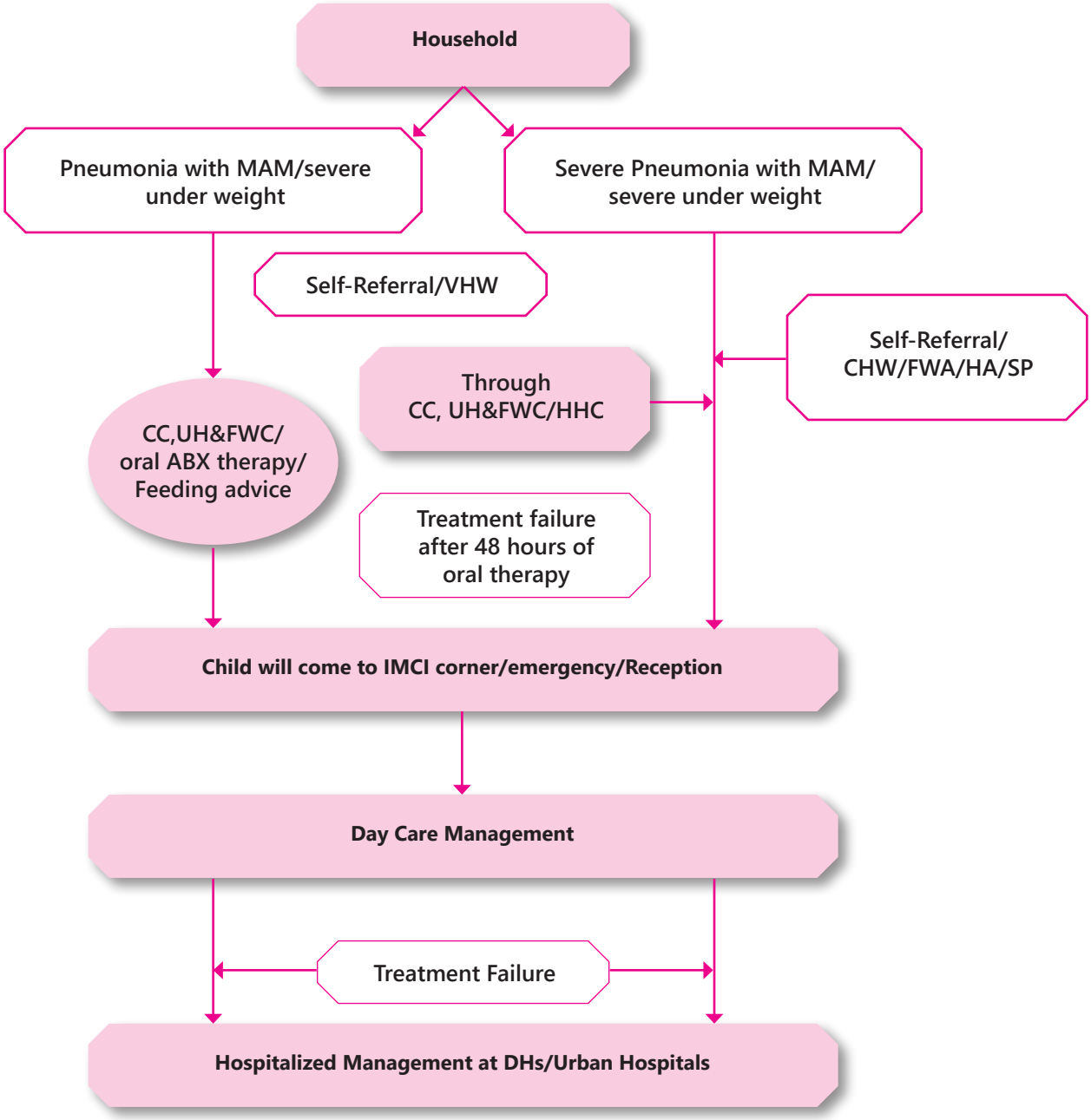
4.4 Referral: Effective Referral Network

- Children with pneumonia with/without malnutrition will be identified by the CHW/SPs in the urban areas, or self-referred by the parents/caregivers to the **Urban primary health clinics** in the urban areas.
- Children with **pneumonia with/without malnutrition** will be identified by the FWAs/HAs/MHVs in the rural areas, or self-referred by the parents/caregivers to the **UHCs** in the rural areas.

Children with pneumonia/severe pneumonia without MAM/ severe underweight



Children with pneumonia/severe pneumonia with MAM/ severe underweight



5 WHEN TO REFER

5.1 Children Who Don't Improve

Presence of either any one or combination of more than one of the following:

- Appearance of any one or more of the general danger signs of severe pneumonia (inability to breastfeed or drink, lethargy or reduced level of consciousness, convulsions)
- Presence of hypoxaemia (oxygen saturation < 90%) in spite of receiving oxygen therapy after 6 hours
- Presence of central cyanosis in spite of giving oxygen for 6 hours
- Development of severe respiratory distress (e. g. grunting, very severe chest indrawing)
- Persistence of fever (>38 Celsius) after receiving treatment for 5 days
- Persistence of fast breathing (≥40 breaths/minute in 1-5 years old; ≥50 breaths/minute in 2- up to 12 months old) after receiving treatment for 5 days
- Persistence of crepitation on auscultation after receiving treatment for 5 days

5.2 Where to Refer

- Referral to UHCs (indoor)/DHs in rural areas
- Referral to hospitals (local paediatric hospitals/DH/MCH) in urban areas

6 MONITORING, RECORDING AND REPORTING

6.1 Recording and Reporting

- Paper-based register will be used to collect basic and clinical information of a child receiving treatment at the Day care
- A monthly reporting form comprising service indicators will be used for both paper-based and online reporting
- A standardized checklist will be used by Community Health Workers (CHWs) for follow up

6.2 Program Monitoring

- A standardized monitoring checklist will be used to monitor the facility readiness, service quality and performance
- A checklist should be introduced on effective counselling for Day care management

6.3 Indicators for DCA

- Number of Children aged 2-59 months with Severe Pneumonia enrolled within day-care approach
- Number of Children aged 2-59 months with Severe Pneumonia with malnutrition enrolled within day-care approach
- Number of Children aged 2-59 months with Severe Pneumonia discharged after completed treatment within day-care approach

- Number of Children aged 2-59 months with Severe Pneumonia with malnutrition discharged after completed treatment within day-care approach
- Number of Children aged 2-59 months with Severe Pneumonia with or without malnutrition received oxygen therapy within day-care approach
- Number of Children aged 2-59 months with malnutrition received treatment for malnutrition in day-care approach
- Number of Children aged 2-59 months with Severe Pneumonia referred from the Day-care
- Number of Children aged 2-59 months with Severe Pneumonia with malnutrition referred from the Day-care
- Number of Children aged 2-59 months with Severe Pneumonia with or without malnutrition received community 1st follow-up
- Number of Children aged 2-59 months with Severe Pneumonia with or without malnutrition received community 2nd follow-up

7 RECOMMENDATIONS

- Initiate feasibility study or implementation research for management of Severe Pneumonia with or without malnutrition through Day Care approach.
- Counsel parents on how to follow the recommended treatment regimen at home
- Provide supportive home care
- Follow-up sick children and refer to a health facility in case of complications
- Training of the health care professionals including community -based health worker on use and implementation of this Guideline
- Arrangement of food for Children and mothers/Caregiver.
- Arrangement of TV for showing promotional videos regarding pneumonia, diarrhoea, and nutrition etc.

ANNEXES

Annex 1:

IYCF feeding recommendations of family diet up to 2 years of age and IMCI feeding recommendations of family diet after two years of age:

IYCF feeding recommendations of family diet up to 2 years of age[19]

Age	**Frequency (per day)**	**Amount at each serving** (In addition to breast milk)	**Texture (thickness/ consistency)**	**Variety**
6 to 7 months (181 days) to 8 months	At least 2 times Mashed family food	½ bowl (250 ml)	Thick porridge/pap Mashed/ pureed family foods	Breastfeeding + Every day (rice, lentils, colorful and dark green leafy vegetables, fish, meat, eggs, liver) at least four types of food
9-11 months	At least 3 times foods and 1 to 2 times nutritious snacks	½ bowl (250 ml)	Finely chopped family foods Finger foods Sliced foods	
12-24 months	At least 3 times foods and 1 to 2 times nutritious snacks	1 bowl (250 ml)	Family foods Sliced foods	

Annex-2

IMCI feeding recommendations of family diet after two years of age[19]

Age	Frequency (per day)	Amount of at each serving (In addition to breast milk)	Texture (thickness/ consistency)	Variety
2 years and older	4 times foods and 1 to 2 times nutritious snacks	Give at least 1 bowl (250 ml) at each meal	Family foods	Animal-source foods and vitamin A rich fruit and vegetables

Annex-3:

Necessary drugs and logistics for management of Severe Pneumonia in children of 2 months to 59 months at day care[15]

Serial No	Item	Amount
1	Inj. Ceftriaxone (250mg and 500mg)	As per monthly demand
2	Amoxycillin DT or Amoxycillin Syrup	
3	Salbutamol Syrup	
4	Sterile water for Amoxycillin DT	
5	ARI Timer/Watch with second's hand or digital watch/Wall clock	1/day care at UHC and Urban Clinic
6	Thermometer	
7	Weight Machine	

Annex- 4:

Energy and nutrients dense local food recipes

Local foods such as Khichuri and Halwa can be used to manage MAM. Local recipes must be fortified with micronutrients including 15 essential micronutrients in order to ensure catch up growth.

Khichuri[18]:

Ingredient	Amount for 1 kg	Equivalent
Rice	120g	
Lentil (Masoor dal)	60g	
Oil (Soya)	70ml	
Potato	100g	
Pumpkin	100g	
Leafy Vegetables (Shak)	80g	
Onion (2 Medium)	50g	
Spices (Ginger, Garlic, turmeric, Coriander)	50g	
Water	1000ml	
Total Energy /KG	1442 kcal	
Directions for use		
Put the rice, lentils, oil, onion, spices and water in a pot and boil. Cut the potatoes and pumpkin into pieces and add to the pot after 20 minutes. Five minutes before the rice is cooked, add the cleaned and chopped leafy vegetable. The pot should be kept covered throughout cooking. Khichuri takes about 50 minutes to cook and can be kept at room temperature for 6-8 hours.		

18 National guidelines for Community based management of Acute malnutrition in Bangladesh https://www.who.int/csr/resources/publications/whocdscsreph200212.pdf

Halwa[19]:

Ingredient	Amount for 1 kg	Equivalent
Wheat atta (atta)	200g	
Lentils (masoor dal)	100g	
Oil (Siya)	100ml	
Molasses (brown sugar or gur)	125g	
Water	600ml	
Total energy/kg	2404 kcal	
Direction of Use		
Soak the lentils in water for 30 minutes and then mash. Roast the wheat flour on a hot pan for a few minutes, and then mix with the mashed lentils, oil and water. Melt the molasses and add to the mixture to make a thick paste. Halwa takes about 15 minutes to cook and can be kept at room temperature for 6-8 hours.		

icddr,b

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