Winnipeg Regional Health Authority | Office régional de la santé de Winnipeg
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WRHA Child Health Program
Emergency Department Pediatric Asthma Care Map
Standards Document and Charting Guidelines
Approved Initiative of the Winnipeg Regional Health Authority
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Preface

The provision of quality care is of paramount importance to health care providers, patients and families who are the recipients of that care. Care Maps, along with Clinical Practice Guidelines and outcome measures are currently considered important tools for maintaining and improving quality care. One must remember however, that quality improvement tools are just that – tools to help coordinate the entire patient process. Clinical judgment is the single most important factor in maintaining quality care. No care map or guideline will replace the experience and training of health care providers in determining the course of action and delivering high quality care to patients. The purpose of the Care Map is to provide a consistent standard of care and a systematic means of gathering patient information.

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Sponsoring Program: Child Health

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Implementation Guidelines

The Triage Nurse completes the initial respiratory assessment at the triage desk in order to determine the severity of the asthma exacerbation. This is guided by and documented in the Electronic Triage System**.** See Appendix B for the definitions of asthma and respiratory distress, which are also found in the Electronic Triage System (e-Triage system).

Following the triage assessment the Triage Nurse determines, based on the inclusion and exclusion criteria, if the patient is a candidate for the Emergency Department Pediatric Asthma Care Map. The Care Map section is completed on the eTriage system.

The Physician confirms the child's eligibility for the Pediatric Asthma Care Map and initiates the appropriate Physician Standard Order Sheet.

Inclusion Criteria

- < 17 years of age minus one day (Patient Care Manual, #80.135.017) with known asthma* who present with an acute exacerbation of asthma.
- Children triaged as moderate respiratory distress (level 2).
- Children triaged as moderate respiratory distress (level 2) that have received systemic Corticosteroids within the previous 7 days can be placed on the care map and receive the standard doses of Salbutamol and Ipratropium Bromide. Decisions about additional Corticosteroids would be Physician determined.
- Caution should be exercised for children with co-morbid conditions such as cardiovascular disease, chronic lung disease, and immunodeficiency syndromes. Inclusion in the care map for these children should be discussed with the Physician.

***** Known Asthma – A child who has been previously diagnosed with asthma*.

Exclusion Criteria

- Children who have evidence of upper airway obstruction, and
- Children with active chickenpox.

Discharge Criteria

The following criteria must be met prior to the patient being discharged from the Emergency Department:

Clinical

1. Oxygen saturation on room air while awake >92%.
2. Respiratory, neurological and cardiovascular status stable for 60 minutes following bronchodilator therapy.

Teaching

3. Discharge teaching completed including reasons to return to the Emergency Department during an exacerbation; the role, dosing and schedule of oral steroids, relievers and controllers; and a review of inhaler technique.

Follow Up

4. Family receives and understands a written Asthma Discharge Plan including recommendations for a follow-up visit with their Physician.
5. A discharge prescription is provided if medications are not available at home.

6. Referral to the Children's Asthma Education Centre (CAEC) or other recommended community asthma education program is completed. (Children's Hospital only - blue sheet pulled and placed in the CAEC folder).

Standards Of Care

The following defines standards of care for the pediatric asthma patient.

Oxygen Therapy

- Supplemental oxygen started immediately when oxygen saturation is <93%.
- Oxygen administered at 8* litres/min. using an appropriate sized facemask with nebulizer and is also used to administer the medication for wet nebulization.
- If the patient is unable to tolerate the mask, blow-by oxygen may be used.
- Oxygen saturation monitoring is done for all children requiring oxygen therapy.
- The Physician is notified if the oxygen saturations cannot be maintained >92%while on oxygen therapy.
- Oxygen is temporarily discontinued after the second facemask or third MDI treatment and oxygen saturation assessed after 20 minutes to determine further oxygen requirements.
- If oxygen therapy is no longer required, oxygen saturation will be measured with subsequent assessments.

*The Winnipeg Regional Health Authority has a contract to purchase the AirLife Misty Max 10 disposable nebulizer. The Whisper Jet nebulizer is also used at the Children's Hospital specifically for the neonatal population. Both manufacturers recommend that the driving gas flow be set at 8 L/min. to achieve the optimal particle size and deposition. This is a change from the previous recommended flow rate of 5-7 L/min.

Beta$_2$-Agonists

- Administer short-acting inhaled beta$_2$-agonists for rapid reversal of airflow obstruction.
- The beta$_2$-agonists can be delivered by one of two routes, wet nebulization or MDI (metered dose inhaler) with a valved spacer. An example of a commonly used and well-evaluated valved spacer is the AeroChamber™. See Appendix D for information about correct AeroChamber™ choice for age.
- MDI's with spacers are an effective alternative to nebulizers for the treatment of children with an acute asthma exacerbation.
- Each Emergency Department will need to consider the cost implications of the utilization of the MDI with spacers for their program.

Wet Nebulization

- The standard dose of Salbutamol is 5mg/2.5 ml. There is evidence to support using a standard dose for all patients. This will minimize the potential for error and maximize consistency. The delivered dose will be self-regulated by the patient's own inhalation pattern.
- The first facemask will consist of Salbutamol 5mg/2.5ml. and Ipratropium Bromide 250mcg/ml.
- The second facemask will combine 2 doses of Salbutamol 5mg/2.5ml. (10mg in 5ml solution) plus 500mcg of Ipratropium Bromide (2ml of solution) for a total of 7ml. of solution.

Although combination products are available containing these two medications, they are not recommended, as the ratio would not lend itself to proper dosing.

- The first two facemasks are given back-to-back. The only interruptions are to administer the Corticosteroid, put more medication into the chamber and to complete nursing assessments.

MDI/Valved Spacer

- The standard dose for the MDI/spacer is Salbutamol 8 puffs (100mcg/puff) and Ipratropium Bromide 3 puffs (20mcg/puff). These two medications are given separately via the MDI/spacer. The puffs can be delivered 30 seconds apart as tolerated by the child. See instruction sheet W-00070G to review the appropriate technique
- The second dose of Salbutamol 8 puffs (100 mcg/puff) and Ipratropium Bromide 3 puffs (20mcg/puff) given by MDI/spacer is administered 20 minutes after the first treatment.
- The third dose of Salbutamol 8 puffs (100 mcg/puff) and Ipratropium Bromide 3 puffs (20mcg/puff) given by MDI/spacer is administered 20 minutes after the second treatment.

Combination products containing Ipratropium Bromide and Salbutamol are not recommended, as the ratio would not lend itself to proper dosing. In addition, previously marketed products have contained soy lecithin, which would be contraindicated in patients with soy or peanut allergies.

- The treatments are given 20 minutes apart. The only interruption is to give the Corticosteroid and complete the nursing assessments.
- The administration of 8 puffs of Salbutamol via the MDI/spacer is an excellent teaching opportunity. It is important to explain to families that the standard dose for Salbutamol treatment at home is 2 puffs q4h if required. If 2 puffs of Salbutamol are required more than q3h at home, this is a reason for them to bring their child to the hospital where the child is able to receive a higher dose because the child's vital signs and oxygen saturation would be monitored carefully. **It is important to stress to families that the use of the higher dose at home is NOT a safe practice.**
- The Physician reassesses the patient 60 minutes after the second facemask or third MDI/spacer treatment, or earlier if clinical deterioration is noted.
- After the initial two facemasks or third MDI/spacer treatment, if ongoing beta$_2$-agonist treatment is required, admission of the patient should be considered.
- If one additional inhalation or MDI/spacer treatment is required prior to discharge, it can be ordered on the physician standard order sheet.
- If no further facemasks are required, discharge planning is initiated.
- **Consult the Physician** if the patient has adverse reactions to beta$_2$-agonist treatment such as excessive coughing, increased irritability, tremor, increased wheezing, and significant tachycardia.
- **Significant tachycardia is defined as >220/min for children under 1 year of age and >180/min for children older than 1 year of age.**

Corticosteroids

- **Children who receive systemic Corticosteroids within one hour of presentation to the Emergency Department are more likely to be discharged.**
- Corticosteroids are given following completion of the first facemask.
- The choice of oral Corticosteroid (i.e. Prednisone, Prednisolone or Dexamethasone) is based on the patient's ability to tolerate the oral dosage form.
- Intravenous Methylprednisolone should be chosen for patients who are unable to tolerate oral medications.

Ipratropium

- A standard dose of 250mcg inhaled Ipratropium Bromide is added to the first wet nebulization.
- A dose of 500mcg inhaled Ipratropium Bromide (2ml. of solution) is added to the second wet nebulization.
- 3 puffs of Ipratropium Bromide are added to each MDI treatment.
- There is evidence to support using a standard dose for all patients. This will also minimize the potential for error and maximize consistency. The delivered dose is self-regulated by the patient's own inhalation pattern.

Diagnostics

- Following their clinical assessment of the patient, the Physician will determine diagnostic tests.

Capillary Blood Gas

- Is an option.

Diet

- Oral intake is determined by Nursing/Respiratory Therapist/Physician judgement.
- The Physician may place the child NPO if there is a history or evidence of intolerance of fluids.

Triage and Initial Assessments

- Triage assessment includes a brief focused history, a primary assessment and pertinent vital signs before categorizing the patient.
- The Nurse takes the patient from triage and completes the initial assessment that includes a review of past medical history, allergies, current medications, vital signs, weight, a complete respiratory assessment, and a brief review of other systems.
- A more detailed physical exam may be completed following initial treatment, if required.

Vital Signs

- Vital signs are taken during the initial assessment, prior to the administration of the inhalation treatments. These include temperature, heart rate, respiratory rate, and oxygen saturation. Blood pressures are required on patients who deteriorate, require Magnesium Sulphate or Methylprednisolone.
- At any time, the Nurse and/or Respiratory Therapist may do additional vital signs if the patient's condition warrants.

RESPIRATORY RATES BY AGE

Age	Breaths per Minute
Infant (< 1 year)	30 to 60
Toddler (1 to 3 years)	24 to 40
Preschooler (4 to 5 years)	22 to 34
School age (6 to 12 years)	18 to 30
Adolescent (13 to 18 years)	12 to 16

Normal Respiratory Rates by Age
Pediatric Advanced Life Support
American Heart Association 2011

HEART RATE RANGES AND MEAN

Age	Awake Rate	Mean
Newborn to 3 months	85 to 205	140
3 months to 2 years	100 to 190	130
2 years to 10 years	60 to 140	80
> 10 years	60 to 100	75

Normal Heart Rates by Age
Modified from Pediatric Advanced Life Support
American Heart Association 2011

TEMPERATURE RANGES FOR ALL AGES

Oral	Rectal or Tympanic	Axilla
36.5 – 37.5	37.0 – 37.8	36.1 – 37.1

Past Medical History/ Medications/Allergies
The Nurse/Respiratory Therapist who does the initial assessment does a more detailed history and assessment including past medical history, which includes previous hospital admissions, current medications, timing of last dose of medications and allergies.

Assessment

CNS

– "Alert and appropriate for age and/or developmental level" indicates the patient has spontaneous eye opening, is interactive, and is responding in a manner that is developmentally appropriate for their age and condition.
– Unless deterioration occurs, no further assessment of level of consciousness is required.

Respiratory

– The Nurse and/or Respiratory Therapist complete a respiratory assessment of the patient before initiation of the first facemask.
– Full assessment includes noting the child's ability to speak, presence of cough, shortness of breath, wheezing or absence of air movement, respiratory rate, breath sound intensity, adventitious sounds, accessory muscle use or retractions and oxygen saturation. Finding any of these signs requires a narrative description for any aspects not already described in the respiratory assessment table on the next page of the Care Map.
– Care is taken to ensure the child makes maximal respiratory effort when possible during the respiratory assessment.

Cardiovascular

– The cardiovascular assessment includes heart rate within normal range for the patient's age (as per the table above), no pallor or cyanosis of nail beds or mucous membranes, warm and dry skin and moist mucous membranes.
– A more detailed assessment of cardiovascular status is obtained if there are any abnormalities found during the physical exam or if there is a history of cardiovascular disease.

- This information is brought to the attention of the Physician who also assesses the patient and may decide to remove the patient from the Care Map.
- A detailed assessment includes aspects of:
  - Cardiac Rhythm
  - Peripheral perfusion status
    - Capillary refill time
    - Peripheral pulse rate/quality
    - Skin temperature
    - Edema
  - Heart sounds/murmurs
  - Evaluation of central pulses
  - Hydration status

Gastrointestinal (GI)

- A brief assessment that includes recent history of diarrhea, nausea or vomiting and tolerance of oral fluids is done.
- Oral intake is documented in the notes section.
- Patients without GI related complaints do not require detailed documentation of their GI status.

Psychosocial

- Documentation of the interaction noted between the pediatric patient and caregiver is required.
- If there is evidence of good interaction between the caregiver and child, where the caregiver shows appropriate concern for the child and demonstrates a reasonable level of understanding of the child's illness and treatment, no further assessment is required.
- **A referral must be made to Social work if other concerns are identified or if the family is unable to fill/refill a prescription (due to financial constraints).**
- Assessed language barrier should be managed individually with consults for interpreters as required.

Emergency Physician Assessment

- The Physician assesses the patient prior to the first facemask, and 60 minutes following the second facemask or third MDI treatment, and after each subsequent facemask and prior to discharge.

Ongoing Respiratory Assessment

- The Nurse and/or Respiratory Therapist assess the patient before initiation of the first facemask or MDI and following the second facemask or third MDI treatment.
- Assessments include heart rate, respiratory rate, and Pediatric Respiratory Assessment Measure (PRAM) score.
- The PRAM uses indrawing, retractions, wheezing, breath sound intensity and O_2 saturations to determine the severity score. See the following tool.

PRAM ASTHMA CLINICAL SCORE

Signs	0	1	2	3	Severity Classi-fication	PRAM Clinical Score
Suprasternal indrawing	Absent		Present		Mild	0-4
Scalene retractions	Absent		Present		Moderate	5-8
Wheezing	Absent	Expiratory only	Inspiratory and Expiratory	Audible without stethoscope/ Silent chest with minimal breath sound intensity	Severe	9-12
Breath sound intensity	Normal	Decreased at Bases	Wide-spread decrease	Absent/ minimal	Impending Respiratory Failure	12+ following lethargy, cyanosis, decreasing respiratory effort and/or rising pCO_2
Oxygen saturation on Room Air	Greater than 93%	90 – 93%	< 90%			

– If there has been deterioration such as increasing respiratory distress, or a new, persistent or increasing oxygen requirement, the Nurse and/or Respiratory Therapist completes a detailed assessment and notifies the Physician.

Discharge Teaching

– Any member of the multidisciplinary team may carry out teaching, i.e. Nurse, Physician, Respiratory Therapist, or Pharmacist.
– The pamphlet "Caring For Your Child's Asthma After An Emergency Department Visit" and the appropriate "How To Use" Inhaler Teaching Sheet is provided and reviewed with all families.
– Education for the family/child in the Emergency Department will focus on:
  o Reasons to return to the Emergency Department during an exacerbation.
  o The role, dosing and scheduling of oral steroids, relievers (symptom relief) and controllers (treat underlying inflammation).
– The family/child will demonstrate proper use of the prescribed inhalation device and receive corrective feedback. This is done for all children whether the device is already in use or not.
– Complete the referral to the Children's Asthma Education Centre (CAEC) or other recommended Community Asthma Education Program. Children's Emergency will pull the blue sheet and place it in the CAEC folder (in place of completing the Asthma Education Referral Form).

Disposition (Discharge or Admit)

– The Physician checks (✓) the box on the Standard Order Sheet when discharge criteria are met.
– Prior to discharge, the Physician is responsible for the following:
  o Completing a written Pediatric Asthma Discharge Plan and reviewing it with the family/patient, and

    - Ensuring discharge medications are ordered or that the patient has enough medication at home. If the child/adolescent has been given a dose of Dexamethasone, ensure that the family is given a prescription to take home with them. The family needs to be advised to give the medication the following day.
- A written Pediatric Asthma Discharge Plan includes:
    - Use of asthma medications until follow-up with Physician,
    - When to seek medical attention due to increased symptoms, and
    - Instructions to follow-up with their family Physician or Children's Clinic within 5 days of their child's visit to the Emergency Department.
- If a patient requires hospital admission, any subsequent medications and assessments done in the Emergency Department prior to transfer to the ward will be continued on the Physician Order Sheet and on the progress notes. If additional inhalation treatments are required prior to transfer to the ward, it is recommended that the standard doses continue to be used.

Documentation Guidelines

Basic Standard Order Sheet Documentation Guidelines:

- Do not leave any section blank.
- Indicate N/A for items that are not appropriate for your patient. This indicates that the item has been addressed.
- Standard orders are identified with a solid black box (■). These are initiated on all patients and are pre-printed on the Standard Order Sheet, provided there are no allergies.
- Individualized orders are identified with a blank box (☐). These require a Physician's order to activate them. To activate the order place a "✓" inside a box.
- Space is provided for additional orders on the order sheet.

Medication and General Order Section:

- Is completed by the Physician when he/she determines that the child is eligible to be placed on the Care Map.
- The Physician documents the date, time and signs the medication/intravenous and general order section.

Printed Name/Initial Section:

- Enter printed name and initials. Initials are subsequently used throughout the Care Map.

Emergency Department Pediatric Asthma Assessment Record:

- The Nurse and/or Respiratory Therapist who takes the patient from triage completes the assessment record.
- Date and time of the assessment is documented.
- Allergies, vital signs, weight, past medical history and current medications with time of last dose are documented.
- If the child is crying and the Nurse is not able to obtain vital signs, document "unable" on the Care Map along with the reason (i.e. "crying").

- The Nurse and/or Respiratory Therapist assessment reflects charting by exception where only abnormal assessments are charted. The relevant body systems (Neurological, Cardiovascular, etc) are assessed according to defined norms. If the assessment is normal, check mark the appropriate systems box. Abnormal assessments require a narrative entry in the space provided. The exception is the respiratory system, which will always require a narrative note.

Respiratory Assessment Section:
- Can be completed by the Nurse and/or Respiratory Therapist.
- Document date and time of all assessments. Assessments are done pre-mask 1 and post-mask 2 for wet nebulization and pre-MDI 1 and post-MDI 3.
- The Respiratory Assessment Table is completed using the PRAM Clinical Scoring Tool (page 9). In addition to PRAM, heart rate and respiratory rate are also documented.

Progress Note Section:
- Chart items as required within this section, including social information or assessments by other professional disciplines, i.e. social work, respiratory therapy.

Discharge Teaching Section:
- The Nurse, Physician, Respiratory Therapist or Pharmacist may complete discharge teaching.
- The individual who completes the teaching initials the appropriate section.
- Referral to the Children's Asthma Education Centre (CAEC) or other recommended Community Asthma Education Program is completed. (Children's Hospital only – blue sheet pulled and printed name/initial section, placed in the CAEC folder).

Pre-Printed Medication Administration Record (MAR):
- Document the date, time and initial the administration of medications on the pre-printed MAR.
- If 1 additional inhalation or MDI treatment is required prior to discharge it can be ordered on the Physician Standard Order Sheet by the Physician and documented on the MAR. The child can remain on the Care Map for 1 additional treatment.
- If no further treatments are required, discharge planning is initiated.

Emergency Physician Documentation Record:
- The date and time of the assessment is documented. Documentation is done on the ED documentation record.
- The Physician documents the discharge diagnosis and follow-up on the ED Documentation Record.
- The Physician ensures that all discharge criteria have been met.
- A discharge prescription is given if medications are not available at home. The Physician is responsible for ensuring discharge medications are ordered or that the patient has enough of the appropriate medication at home.
- The Physician completes the Pediatric Asthma Discharge Plan and gives it to the family. One copy is left on the chart.
- The Physician, Nurse, Respiratory Therapist and/or Unit Clerk documents the date and time and initials when the patient leaves the department.
- If the Care Map is discontinued, the Physician writes the reason on the Emergency Documentation Record.

If the child/adolescent requires hospital admission, any subsequent medications and assessments done in the Emergency Department prior to transfer to the ward will be documented on a Physician Order Sheet, MAR and on the Vital Sign Record.

The Screening Resident will initiate the Pediatric Asthma Inpatient Care Map Physician's Order Sheet.

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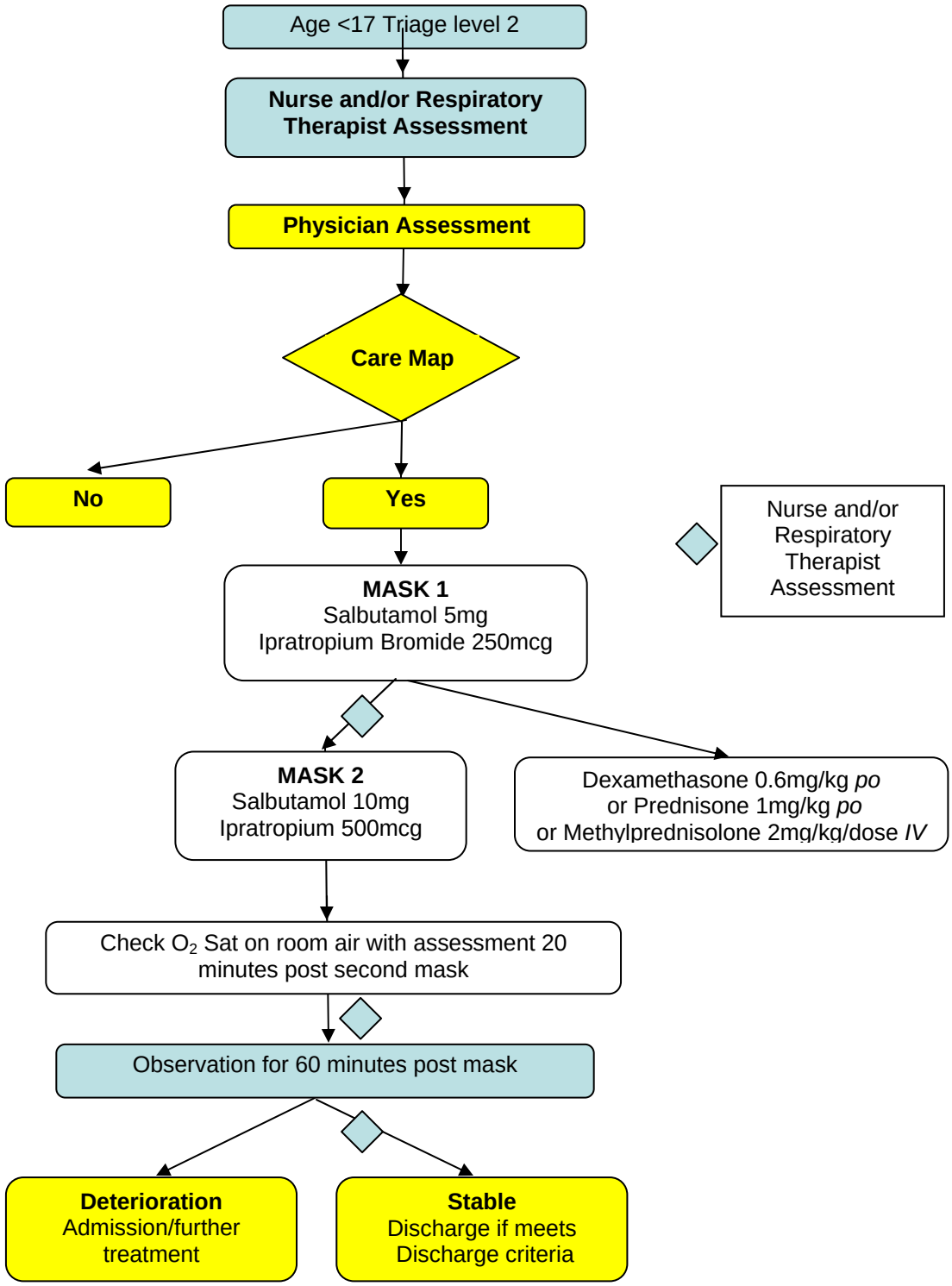
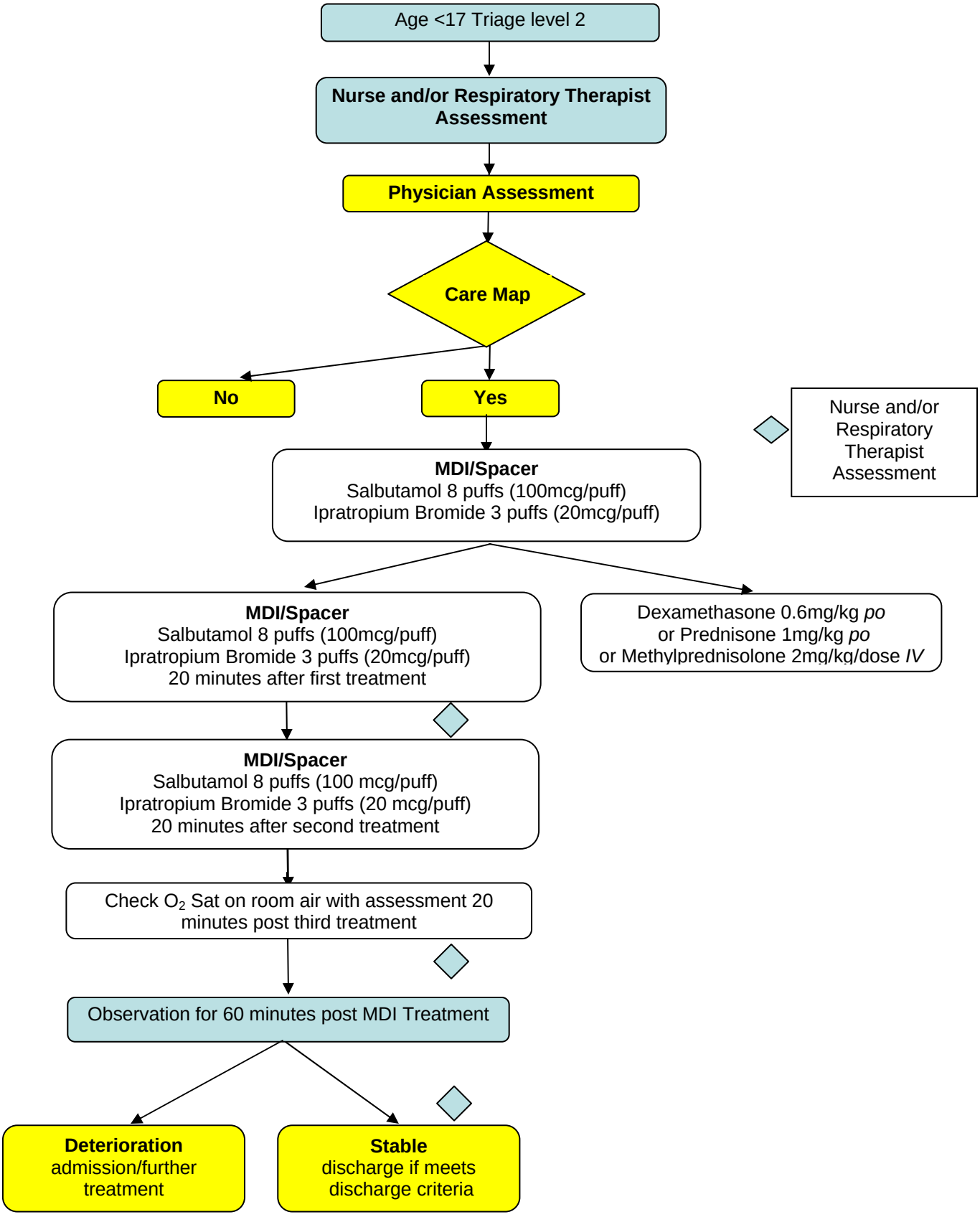
Appendix A
Emergency Department Flow Chart for Moderate Asthma Exacerbation (Wet Nebulization)



Appendix B
Emergency Department Flow Chart for Moderate Asthma Exacerbation (MDI/Spacer)



Appendix C
Definitions

Asthma

Asthma is characterised by paroxysmal or persistent symptoms such as dyspnea, chest tightness, wheezing, sputum production and cough, associated with variable airflow limitation and a variable degree of hyper responsiveness of airways to endogenous or exogenous stimuli.

Emergency Department Electronic Triage System:

Mild Respiratory Distress (level 3)
Dyspnea; tachypnea; shortness of breath on exertion; no obvious work of breathing; O_2 saturation > 92%; able to speak in sentences; stridor without obvious airway obstruction; mild shortness of breath on exertion; frequent cough.

Moderate Respiratory Distress (level 2)
Restlessness; anxiety or combativeness; tachypnea, hyperpnea, mild increased use of accessory muscles; retractions; flaring; O_2 saturations 90-92%, speaking phrases or clipped sentences; stridor but airway protected; prolonged expiratory phase.

Severe Respiratory Distress (level 1)
Cyanosis; lethargy; confusion; inability to recognize caregiver; decreased response to pain, single word or no speech; tachycardia or bradycardia; oxygen saturation <90%, tachypnea or bradypnea; apnea; irregular respirations; exaggerated retractions; nasal flaring; grunting; absent or decreased breath sounds; upper airway obstruction (dysphagia, drooling, muffled voice, labored respirations and stridor); unprotected airway (weak to absent cough / gag reflex); poor muscle tone.

Asthma Exacerbation Severity Scale			
Respiratory Rate	MILD	**MOD**	SEVERE
Adults	< 25	25-25	>35
Children 0-12 months 1-5 years 6-12 years	 <50 <40 <30	 50-60 30-40 25-30	 >60 >40 >30
Accessory Muscle Indrawing	None	+	++
Wheeze	Soft end-exp	Loud expiratory	Loud insp + exp *
SPO_2 (Room Air)	> 95%	91-95%	<91%
PEFR (if measured) % predicted % Best	>60%	40-60%	<40%
* Absence of wheeze may indicate increased severity or imminent respiratory arrest			

Appendix D
Choosing The Best AeroChamber® For Your Patient

Choosing The Best AeroChamber® For Your Patient

The Aerochamber ®/ spacer ensures that inhaled medicine gets deeper into the smaller airways of the lungs. Proper fit and technique are critical for efficient aerosol delivery through holding chamber devices.



Infant fits 0-18mths.

- Should seal on face over the bridge of nose and cleft of chin
- May be too small for some larger infants/toddlers
- Maintain seal for 5 good breaths



Child fits 12mths-5yrs.

- Should seal on face over the bridge of nose and cleft of chin
- Maintain seal for 5 good breaths
- Not appropriate for most children 6 years and older



Adult fits >5yrs.

- Most children, age 5-6 years old should be able to use
- One slow deep inhalation and hold for 10 seconds
- It is acceptable for children to take 5 breaths and exhale into the spacer if unable to hold breath for 10 seconds

Note: Also Applies to Aerochamber® Plus
(Trudell Medical®)

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Listing of the Documents for the Emergency Department Pediatric Asthma Care Map System

Form Number	Care Map Component
W-00070A	Emergency Department Pediatric Asthma Assessment Record
W-00070B	Pediatric Asthma Discharge Plan
W-00070C	Pediatric Asthma Education Referral Form
W-00070D	Caring For Your Child's Asthma After An Emergency Department Visit
W-00070F	How to Use the Puffer (Metered Dose Inhaler or MDI)
W-00070G	How to Use the Puffer (Metered Dose Inhaler or MDI) and Pediatric Spacer
W-00070G	How to Use the Puffer (Metered Dose Inhaler or MDI) and Adult Spacer
W-00070H	How to Use the Diskus
W-00070H	How to Use the Turbuhaler
W-00070I	Emergency Department Pediatric Asthma Care Map Physician Standard Order Sheet Wet Nebulized
W-00070J	Emergency Department Pediatric Asthma Care Map Physician Standard Order Sheet Metered-Dose Inhaler/Spacer
W-00070K	Emergency Department Pediatric Asthma Care Map Medication Administration Record (MAR) Wet Nebulized
W-00070L	Emergency Department Pediatric Asthma Care Map Medication Administration Record (MAR) Metered Dose Inhaler/Spacer