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CHAT Asthma Quality and Safety Collaborative Comprehensive Site Workbook



Children's Hospital Association of Texas
The Association for the Advancement of Children's Healthcare in Texas

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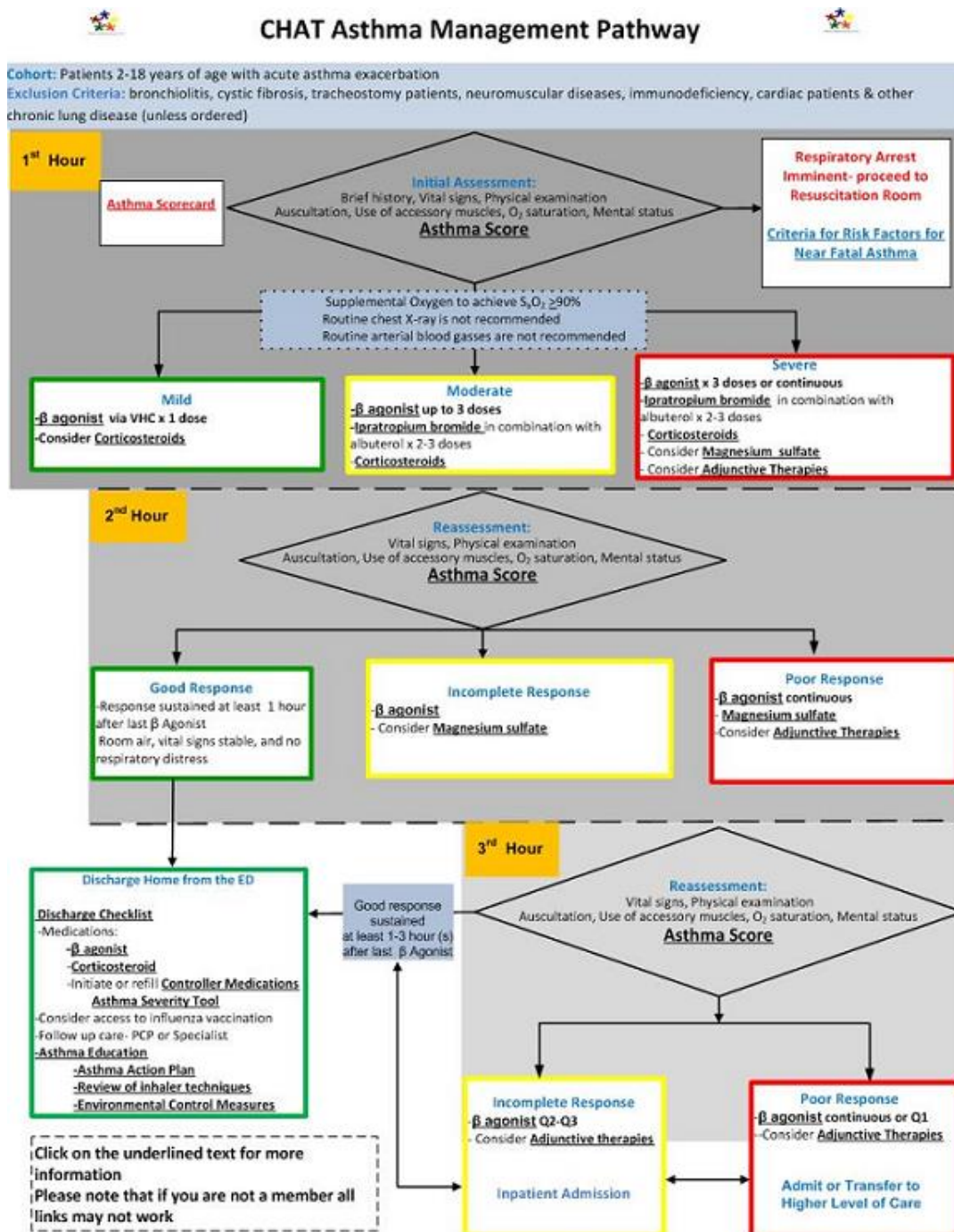
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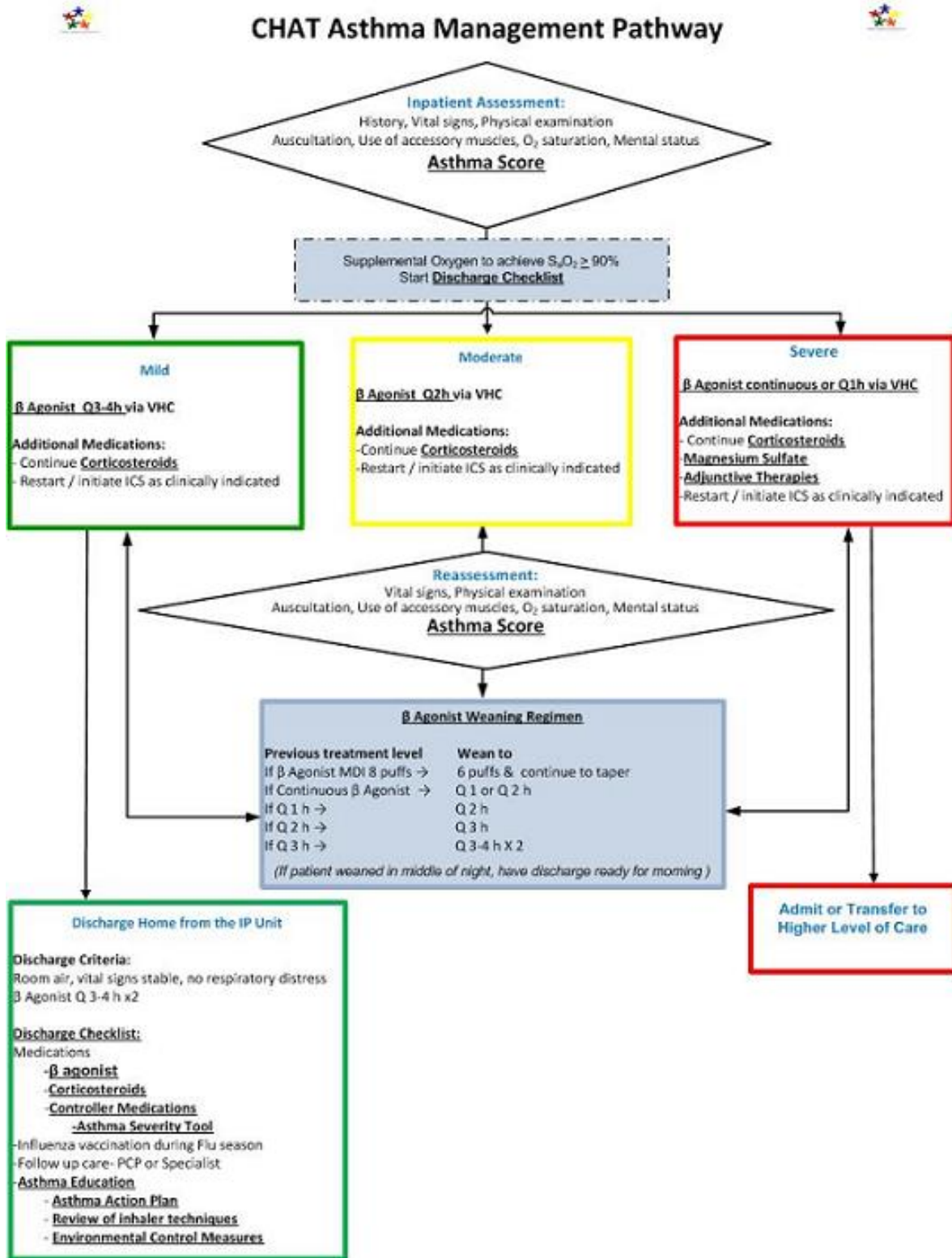
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EVIDENCE BASED PATHWAYS


The below document describes the CHAT evidence-based asthma pathways for Emergency Department (ED) and inpatient (IP) management. These pathways are developed to depict, in a stepwise approach, all the various steps taken from when the patient arrives in the ED to a possible IP admission. All the highlighted and bolded sections indicate the availability of more detailed scientific evidence and are also here included here as appendices.





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APPENDIX A. ASTHMA SCORECARD

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ASTHMA SCORECARD				
	Domain	Measure	Goal	IOM Domains
ED	Pharmacologic Therapies	Proportion of patients receiving treatment according to collaborative pathway	50% compliance [‡]	Effective Efficient Safe
		Time from ED triage to administration of β -agonist	30-60 minutes	Effective Efficient Safe Timely
		Time from ED triage to administration of steroids	60 minutes	Effective Efficient Safe Timely
	Patient Education	Proportion of asthma patients with a documented self-management plan [‡]	90% compliance	Effective Efficient Patient-Centered Safe
		Proportion of patients/families assessed for their understanding of the asthma management plan [‡]	90% compliance	Effective Patient-Centered
	Avoidable Events	Proportion of readmissions to hospital within 12 months	<2% (30 days) <18% (12 months)	Effective Efficient Safe
Inpatient	Pharmacologic Therapies	Proportion of patients receiving treatment according to collaborative pathway	50% compliance [‡]	Effective Efficient Safe
	Patient Education	Proportion of asthma patients with a documented self-management plan	90% compliance	Effective Efficient Patient-Centered Safe
		Proportion of patients/families assessed for their understanding of the asthma management plan	90% compliance	Effective Patient-Centered
	Avoidable Events	Proportion of readmissions to hospital within 12 months	<6.5% compliance	Effective Efficient Safe
		Average length of stay for asthma-related hospitalizations	<2 days	Efficient

[‡] Goal will be re-evaluated after current baseline/site benchmark is collected ^{*} Indicates optional measure

APPENDIX B. ASTHMA SCORES

1. Pediatric Asthma Score (PAS)

Table 1. The Pediatric Asthma Score (PAS)*

Score	1	2	3
Respiratory rate			
2-3 years	≤34	35-39	≥40
4-5 years	≤30	31-35	≥36
6-12 years	≤26	27-30	≥31
>12 years	≤23	24-27	≥28
Oxygen requirements	>95% on room air	90% to 95% on room air	<90% on room air or on any oxygen
Auscultation	Normal breath sounds to end-expiratory wheeze only	Expiratory wheezing	Inspiratory and expiratory wheezing to diminished breath sounds
Retractions	None or intercostal	Intercostal & substernal	Intercostal, substernal and supraclavicular
Dyspnea	Speaks in sentences, coos and babbles	Speaks in partial sentences, short cry	Speaks in single words/short phrases/grunting
Scoring Reference			
Asthma severity	Mild	Moderate	Severe
Percent of predicted peak flow	>70%	50%-70%	<50%
Pediatric asthma score	5-7	8-11	12-15

* Values from each category were added to compute total PAS and designation of asthma severity.

2. Pulmonary Score (PS)

TABLE 1. Pulmonary Index Score*

Score	Respiratory Rate (breaths/min)	Wheezing	I:E† Ratio	Accessory Muscle Use
0	<30	None	5/2	0
1	31-45	Terminal expiration	5/3-5/4	+/-
2	46-60	Entire expiration	1/1	++
3	>60	Inspiration and expiration	<1/1	+++

*Reprinted with permission from: Becker AB, Nelson NA, Simons ER. The pulmonary index assessment of a clinical score for asthma. Am J Dis Child. 1984; 138:574-6. Copyrighted 1984, American Medical Association.
†I:E = inspiratory to expiratory.

TABLE 2. Pulmonary Score

Score	Respiratory Rate (breaths/min)		Wheezing	Accessory Muscle Use— Sternocleidomastoid
	<6 Years	≥6 Years		
0	<30	<20	None	No apparent increase
1	31-45	21-35	Terminal expiration with stethoscope	Mild increase
2	46-60	36-50	Entire expiration with stethoscope	Increased
3	>60	>50	Inspiration and expiration without stethoscope	Maximal activity

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3. Pediatric Respiratory Assessment Measure (PRAM)

Signs	0	1	2	3
Suprasternal retractions	Absent		Present	
Scalene muscle contraction	Absent		Present	
Air entry*	Normal	Decreased at bases	Widespread decrease	Absent/minimal
Wheezing*	Absent	Expiratory only	Inspiratory and expiratory	Audible without stethoscope/silent chest with minimal air entry
O ₂ saturation	≥95%	92%-94%	<92%	

Figure 1. *If asymmetric findings between the right and left lungs, the most severe side is rated. Reprinted from The Journal of Pediatrics, Vol. 137, Issue 6. Chalut DS, Ducharme FM, Davis GM. The Preschool Respiratory Assessment Measure (PRAM): A responsive index of acute asthma severity. Pages 762-768, Copyright © 2000, with permission from Elsevier.

4. Respiratory Clinical Score

TABLE 1—Clinical Score

Variable	Clinical score, circle one			
	0 point	1 point	2 points	3 points
	Respiratory rate (breaths/min), Count respiratory rate for one full minute while patient is awake			
<2 months		≤60	61–69	≥70
2–12 months		≤50	51–59	≥60
1–2 years		≤40	41–44	≥45
2–3 years		≤34	35–39	≥40
4–5 years		≤30	31–35	≥36
6–12 years		≤26	27–30	≥31
>12 years		≤23	24–27	≥28
Retractions	None	Intercostal	Intercostal and substernal	Intercostal, substernal and supraclavicular
Dyspnea				
0–2 years	Normal feeding, vocalizations, and activity	1 of the following: difficulty feeding; decreased vocalization; or agitated	2 of the following: difficulty feeding; decreased vocalization; or agitated	Stops feeding, no vocalizations, or drowsy or confused
2–4 years	Normal feeding, vocalizations, and play	1 of the following: decreased appetite, increased coughing after play, hyperactivity	2 of the following: decreased appetite, increased coughing after play, hyperactivity	Stops eating or drinking, stops playing, or drowsy or confused
≥5 years	Counts to ≥10 in one breath	Counts to 7–9 one breath	Counts to 4–6 in one breath	Counts to ≤3 in one breath
Wheeze	Normal breathing; no wheezing present	End-expiratory wheeze only	Expiratory wheeze only (greater than end-expiratory wheeze)	Inspiratory and expiratory wheeze or diminished breath sounds or both

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5. Pediatric Asthma Severity Score (PASS)

TABLE 1. Clinical Findings Assessed

Clinical Finding	Definition	0	1	2
Wheezing	High-pitched expiratory sound heard by auscultation	None or mild	Moderate	Severe wheezing or absent wheezing due to poor air exchange
Air entry*	Intensity of inspiratory sounds by auscultation	Normal or mildly diminished	Moderately diminished	Severely diminished
Work of breathing	Observed use of accessory muscles, retractions, or in-breathing	None or mild	Moderate	Severe
Prolongation of expiration	Ratio of duration of expiration to inspiration	Normal or mildly prolonged	Moderately prolonged	Severely prolonged
Tachypnea	Respiratory rate above normal for age	Absent	Present	
Mental status	Observation of the child's state of alertness	Normal	Depressed	

*Not assessed separately at one of the participating EDs

6. Clinical Respiratory Score (CRS)

Mild ≤ 3 • Moderate = 4-7 • Severe = 8-12

Assess	Score 0	Score 1	Score 2
Respiratory Rate	<2 months <50 2-12 months <40 1-5 years <30 >5 years <20	<2 months 50-60 2-12 months 40-50 1-5 years 30-40 >5 years 20-30	<2 months >60 2-12 months >50 1-5 years >40 >5 years >30
Auscultation	Good air movement, expiratory scattered wheezing or loose rales/crackles	Depressed air movement, inspiratory and expiratory wheezes or rales/crackles	Diminished or absent breath sounds, severe wheezing, or rales/crackles or marked prolonged expiration
Use of Accessory Muscles	Mild to no use of accessory muscles, mild to no retractions OR nasal flaring on inspiration	Moderate intercostals retractions, mild to moderate use of accessory muscles, nasal flaring	Severe intercostals and substernal retractions, nasal flaring
Mental Status	Normal to mildly irritable.	Irritable, agitated, restless.	Lethargic
Room Air SpO2	> 95%	90-95%	<90%
Color	Normal	Pale to normal	Cyanotic, dusky

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APPENDIX C. CRITERIA FOR RISK FACTORS FOR NEAR FATAL ASTHMA

- Previous severe exacerbation (e.g., intubation or ICU admission)
- ≥ 2 hospitalizations or 3 ED visits in the past year
- Use of > 1 canister of Short Acting Beta Agonist (SABA) per month
- Difficulty perceiving airway obstruction or the severity of worsening asthma (parent &/or child)
- Low socioeconomic status or inner-city residence
- Illicit drug use
- Major psychosocial problems or psychiatric disease

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APPENDIX D. β AGONIST DOSES

Recommendations: In children and adolescents with acute asthma exacerbation, no significant difference exists for important clinical responses such as time to recovery of asthma symptoms, repeat visits, or hospital admissions when medications are delivered via HFA with Valved Holding Chamber (VHC) or nebulizer. HFA with Valved Holding Chamber (VHC) is preferred.

Continuous Albuterol is as effective as intermittent but should be reserved for children requiring administration more than every 1 hour and for children with life threatening asthma.

Albuterol nebulization solution (2.5mg/3ml, 5mg/ml)

Intermittent 0.15 mg/kg (MIN 2.5mg, MAX 10 mg)

5mg every 20minutes for up to 3 doses then every 1-4 hours as needed

Continuous 0.5 mg/kg/hour

15-20 mg/hr continuous

Albuterol HFA inhaler (90mcg/actuation)

Mild

- 6 puffs every 20minutes for up to 3 doses then every 1-4 hours as needed

Moderate-Severe

- 8 puffs every 20minutes for up to 3 doses then every 1-4 hours as needed

Levalbuterol nebulization solution (0.31mg/3ml, 0.63mg/3ml, 1.25mg/3ml)

0.075mg/kg (MIN 1.25mg, MAX 5mg)

Levalbuterol HFA inhaler (45mcg/actuation)

Mild

- 6 puffs every 20minutes for up to 3 doses then every 1-4 hours as needed

Moderate-Severe

- 8 puffs every 20minutes for up to 3 doses then every 1-4 hours as needed

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APPENDIX E. CORTICOSTEROIDS RECOMMENDATION • PRICING AND AVAILABILITY

Recommendation: Strong recommendation with good quality evidence that corticosteroids speed the resolution of airflow obstruction, reduce the rate of relapse, and may reduce hospitalizations, especially if administered within **ONE HOUR** of presentation to the ED.

- Oral prednisone has effects equivalent to those of intravenous methylprednisolone
- Dexamethasone is as effective as prednisone

Dosage:

- **Dexamethasone (DECADRON INTENSOL)** oral suspension 1mg/ml PO
- **Dexamethasone (DECADRON) Injection** 10 mg/mL (**Injection form for ORAL use**)
- **Dexamethasone (DECADRON) Intramuscular Injection** 10 mg/mL
- **Dexamethasone (DECADRON) PO TAB:** 0.5 mg, 2 mg, 4 mg

Loading dose = 0.6mg/kg; MAX: 10-16mg/dose

Second dose = 0.6mg/kg; MAX: 10-16mg/dose

(Oral route 2 doses, 24 hours apart)

- **PredniSOLONE (PRELONE, ORAPRED)** Oral Syrup 3 mg/mL
- **PredniSONE (DELTASONE) PO tab:** 1, 2.5, 5, 10, 20, 50 mg

Loading dose = 2 mg/kg/dose; MAX: 60 mg/dose

Continued dosage 2 mg/kg/day in 1-2 divided doses x 3-10days; MAX: 60 mg/day

If more than 10 days is necessary, consider a taper

- **Methylprednisolone sodium SUCCINATE (SOLU-MEDROL) Injection:**

Loading dose = 2 mg/kg/dose; MAX: 60 mg/dose

Continued dosage 1 mg/kg/dose every 6 hours for up to 5 days; MAX: 60 mg/dose

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- Dexamethasone
- Oral prednisolone
- Solumedrol
- Prednisone

Pharmacy	Program	Posting Date
CVS	Yearly \$15/Individual (90 day supply)	7/31/2012
HEB \$	\$5/Family never expires(inc pets); \$9.99 for 3x dose of \$5	2/28/2013
Kroger	No fee; \$10 for 3x dose of \$4	1/23/2013
Randalls	No fee	3/23/2013
Target	No fee; \$10 for 3x dose of \$4	3/31/2013
Walgreens	Yearly \$35/Family \$20/Individual; no savings on additional dose	3/21/2013
Walmart	No fee; \$10 for 3x dose of \$4	3/14/2013

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Med Name	Formulation	Numeric Dosage Unit	Qty	Pharmacy
Dexamethasone	tab	0.5 Mg	30	HEB \$5
		0.5 Mg	30	Kroger \$4
		0.5 Mg	30	Randalls \$4
		0.5 Mg	30	Target \$4
		0.5 Mg	30	Walmart \$4
		0.5 Mg	60	Walgreens \$10
		0.5 Mg	90	CVS \$11.99
		0.75 Mg	10	HEB \$5
		0.75 Mg	12	Target \$4
		0.75 Mg	12	Walgreens \$10
		0.75 Mg	12	Walmart \$4
		0.75 Mg	18	Kroger \$4
		0.75 Mg	18	Randalls \$4
		0.75 Mg	36	CVS \$11.99
		1 Mg	30	Walgreens \$15
		1.5 Mg	12	Randalls \$4
		1.5 Mg	45	Walgreens \$15
		4 Mg	6	Target \$4

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Med Name	Formulation	Numeric Dosage Unit	Qty	Pharmacy
Dexamethasone	Tab	4 Mg	6	Walmart \$4
		4 Mg	12	HEB \$5
		4 Mg	12	Kroger \$4
		4 Mg	12	Randalls \$4
		4 Mg	18	CVS \$11.99
		4 Mg	30	Walgreens \$10

Med Name	Formulation	Numeric Dosage Unit	Qty	Pharmacy
Prednisolone	Sol	15 mg/5ml	60	Walgreens \$15

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Med Name	Formulation	Numeric Dosage Unit	Qty	Pharmacy
Prednisone	Pack	5 Mg	21	HEB \$5
		5 Mg	21	Kroger \$4
		5 Mg	21	Randalls \$4
		5 Mg	21	Walgreens \$10
		5 Mg	48	Kroger \$4
		5 Mg	48	Walgreens \$15
		10 Mg	21	HEB \$5
		10 Mg	21	Kroger \$4
		10 Mg	21	Walgreens \$10
		10 Mg	48	Kroger \$4

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Med Name	Formulation	Numeric Dosage Unit	Qty	Pharmacy
Prednisone	Tab	1 Mg	30	HEB \$5
		1 Mg	90	CVS \$11.99
		1 Mg	90	Walgreens \$10
		2.5 Mg	30	HEB \$5
		2.5 Mg	30	Kroger \$4
		2.5 Mg	30	Randalls \$4
		2.5 Mg	30	Target \$4
		2.5 Mg	30	Walmart \$4
		2.5 Mg	60	Walgreens \$10
		2.5 Mg	90	CVS \$11.99
		5 Mg	30	HEB \$5
		5 Mg	30	Kroger \$4
		5 Mg	30	Randalls \$4
		5 Mg	30	Target \$4
		5 Mg	30	Walgreens \$10
		5 Mg	30	Walmart \$4
		5 Mg	63	CVS \$11.99
		5 Mg	90	CVS \$11.99
		10 Mg	30	HEB \$5
		10 Mg	30	Kroger \$4

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Med Name	Formulation	Numeric Dosage Unit	Qty	Pharmacy
Prednisone	Tab	10 Mg	30	Randalls \$4
		10 Mg	30	Target \$4
		10 Mg	30	Walgreens \$5
		10 Mg	30	Walmart \$4
		10 Mg	63	CVS \$11.99
		10 Mg	90	CVS \$11.99
		20 Mg	30	HEB \$5
		20 Mg	30	Kroger \$4
		20 Mg	30	Randalls \$4
		20 Mg	30	Target \$4
		20 Mg	30	Walgreens \$10
		20 Mg	30	Walmart \$4

APPENDIX F. IPRATROPIUM BROMIDE

Recommendation: Strong recommendation with high quality evidence for the use of ipratropium *bromide with beta agonist for three doses as adjunct therapy in children with moderate asthma exacerbations.*

Dosage:

Ipratropium bromide Nebulizer solution (500mcg/2.5ml)

- **Mild**
 - N/A

- **Moderate**
 - Children \leq 12 years: 250mcg every 20 min X 3 doses
 - Children > 12 years: 500 mcg every 20 min X 3 doses

- **Severe**
 - 500 mcg every 20 min X 3 doses

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APPENDIX G. MAGNESIUM SULFATE

Recommendation: Strong recommendation with moderate quality evidence for the use of IV magnesium sulfate as adjunct therapy when there is inadequate response to conventional therapy after the first hour in children with moderate to severe asthma exacerbations.

Dosage: 40mg/kg; MAX 2 grams over 20 minutes

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APPENDIX H. ADJUNCTIVE THERAPIES

Terbutaline

Recommendation: Weak recommendation with low-quality evidence to use IV terbutaline in a monitored care setting for the treatment of children with severe asthma exacerbations.

Dosage:

- **Bolus**
 - 10 mcg/kg (Range 2-10 mcg/kg)

- **Infusion**
 - Starting dose 0.5 mcg/kg/min
 - (Range 0.5 mcg/kg-3 mcg/kg/min)
 - Titrate up in 0.5 mg/kg/min increments to MAX 3 mcg/kg/min

Non-Invasive Positive Pressure Ventilation

Recommendation: Strong recommendation with low quality evidence for the use of non-invasive positive pressure ventilation prior to intubation in children with severe asthma exacerbations.

Heliox

Not Recommended: Low quality evidence to use Heliox in the treatment of children with asthma exacerbations.

SQ Terbutaline or Epinephrine

Not Recommended: Low-quality evidence to use subcutaneous terbutaline or epinephrine with severe asthma exacerbations.

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Terbutaline

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Heliox

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APPENDIX I. CONTROLLER MEDICATIONS

For children with moderate to persistent asthma continue on prescribed controller medications. For those not on long-term control therapy, consider initiation of an inhaled corticosteroid.

Medication class	Generic name	Trade name	Manufacturer	Dosage form/device	Strength	Approved indication in US and Canada	
Inhaled corticosteroids	Beclomethasone dipropionate	QVAR [®]	Ivax	HFA	40 mcg/puff 50 mcg/puff ^a 80 mcg/puff 100 mcg/puff ^a	Asthma (age ≥ 5)	
		Vanceril ^{®b}	Schering	MDI	42 mcg/puff 84 mcg/puff	Asthma (age ≥ 5)	
	Budesonide	Pulmicort Flexhaler ^{®c}	AstraZeneca	DPI	90 mcg/dose 180 mcg/dose	Asthma (age ≥ 6)	
		Pulmicort Turbuhaler ^{®a}	AstraZeneca	DPI	100 mcg/dose 200 mcg/dose 400 mcg/dose		
		Pulmicort Respules ^{®c}	AstraZeneca	Inhalation suspension	0.25 mg/2ml 0.5 mg/2ml 1 mg/2ml	Asthma (age 1-8)	
	Ciclesonide	Alvesco ^{®d}	Sunovion (US) Nycomed Canada Inc (Canada)	HFA-MDI	80 mcg/puff 160 mcg/puff 100 mcg/dose ^a 200 mcg/dose ^a	Asthma (age ≥ 12)	
							AeroBid ^{®bc} AeroBid-M ^{®c}
		Flunisolide	AeroSpan ^{®e}	Acton	HFA	80 mcg/puff	Asthma (age ≥ 4)
			Bronalide ^{®b}	Boehringer Ingelheim (Canada)	MDI	250 mcg/puff	
		Fluticasone propionate	Flovent [®] HFA	GlaxoSmithKline	HFA	44 mcg/puff 50 mcg/puff ^a 110 mcg/puff 125 mcg/puff ^a 220 mcg/puff 250 mcg/puff ^a	Asthma (age ≥ 4)
	Flovent Rotadisk ^{®b}						
	Flovent Diskus [®]		GlaxoSmithKline	DPI	50 mcg/dose	Asthma (age ≥ 4 yrs)	

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Table 2. Long-term controller medication class, trade names, manufacturers, formulations, and indications^{1, 5-10}

Medication class	Generic name	Trade name	Manufacturer	Dosage form/device	Strength	Approved indication in US and Canada
					100 mcg/dose 250 mcg/dose 500 mcg/dose ^a	
	Mometasone furoate	Asmanex Twisthaler ^{®bc}	Schering	DPI	110 mcg/dose 220 mcg/dose	Asthma (age ≥ 4)
	Triamcinolone acetonide	Azmacort ^{®b}	Abbot	MDI – with spacer mouthpiece	75 mcg/dose	Asthma (age ≥ 6)
Leukotriene modifiers	Montelukast	Singulair [®]	Merck	Tablets Chewable tablets Granules	10 mg 4 mg, 5 mg 4 mg/packet	Asthma (age ≥ 1)
Leukotriene receptor antagonists	Zafirlukast	Accolate [®]	AstraZeneca	Tablets	10 mg ^c 20 mg	Asthma (age ≥ 5 yrs in US); (age ≥ 12 yrs in Canada)
5-lipoxygenase Inhibitor	Zileuton	Zyflo ^{®cc} Zyflo CR ^{®cc}	Critical Therapeutics	Tablets Extended release tablets	600 mg 600 mg	Asthma (age ≥ 12 yrs)
	Arformoterol	Brovana ^{®c}	Sunovion	Inhalation solution	15 mcg/2ml	Not approved for asthma (COPD only)
		Foradil Aerolizer ^{®cc}	Schering	DPI	12 mcg/capsule	Asthma (age ≥ 5 yrs)
		Foradil ^{®aa}	Novartis Pharmaceuticals Canada Inc.	DPI	12 mcg/capsule	Asthma (age ≥ 6 yrs)
Long-Acting Beta-2 Agonists	Formoterol fumarate/ Eformoterol	Oxeze Turbuhaler ^{®aa}	AstraZeneca (Canada)	DPI	6 mcg/capsule 12 mcg/capsule	Asthma (age ≥ 6 yrs)
		Oxis Turbuhaler ^{®af}	Astra Pharmaceuticals	DPI	6 mcg/puff 12 mcg/puff	Asthma (age ≥ 6 yrs)
		Serevent Diskus [®]	GlaxoSmithKline	DPI	50 mcg/blister	Asthma (age ≥ 4 yrs)
	Salmeterol xinafoate	Serevent Diskhaler ^{®aa}	GlaxoSmithKline	DPI	50 mcg/blister	Asthma (age ≥ 4 yrs)
Anti-IgE medications	Omalizumab	Xolair [®]	Genentech (US) Novartis Pharmaceuticals Inc (Canada)	Powder for subcutaneous injection	202.5 mg (delivers 150 mg/1.2ml)	Asthma (age ≥ 12 yrs)

Table 2. Long-term controller medication class, trade names, manufacturers, formulations, and indications^{1, 5-10}

Medication class	Generic name	Trade name	Manufacturer	Dosage form/device	Strength	Approved indication in US and Canada
		Advair Diskus [®]	GlaxoSmith Kline	DPI	100mcg/50mcg 250mcg/50mcg 500mcg/50mcg	Asthma (age ≥ 4 yrs)
	Fluticasone propionate/ Salmeterol xinafoate	Advair HFA ^{®c}	GlaxoSmith Kline	HFA	45mcg/21mcg 115mcg/21mcg 230mcg/21mcg	Asthma (age ≥ 12 yrs)
		Advair ^{®aa}	GlaxoSmith Kline	HFA	50 mcg/25 mcg 125mcg/25mcg 250mcg/25mcg	Asthma (age ≥ 12 yrs)
Combination products ⁹		Symbicort ^{®c}	AstraZeneca	HFA	80mcg/4.5mcg 160mcg/4.5mcg	Asthma (age ≥ 12 yrs)
	Budesonide/ Formoterol	Symbicort Turbuhaler ^{®aa}	AstraZeneca (Canada)	DPI	100mcg/6mcg 200mcg/6mcg	Asthma (age ≥ 12 yrs)
		Symbicort Forte Turbuhaler ^{®aa}	AstraZeneca (Canada)	DPI	400mcg/12/cg	Asthma (age ≥ 12 yrs)

Abbreviations: DPI = dry powder inhaler; HFA = hydrofluoroalkane propellant; MDI = metered dose inhaler.

Note: Unless otherwise noted, the products are available in both the US and Canada

^a This product is available in Canada only.

^b This product has been discontinued by the manufacturer.

^c This product is available in the US only.

^d The FDA approved dosing regimen for ciclesonide is twice daily.

^e This product is not yet available.

^f This product is not available in the US or Canada.

^g Dulera[®] (Zenhale[®] in Canada) (mometasone furoate/formoterol fumarate), now approved for treatment of asthma in people >12 years, is not included in this report because it was approved after our cutoff date for the inclusion of new medication.

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Table 3. Estimated comparative daily dosages for inhaled corticosteroids^{1, 11}

Drug	Low daily dose			Medium daily dose			High Daily Dose		
	Child 0-4 yrs	Child 5-11 yrs	≥12yrs & adults	Child 0-4 yrs	Child 5-11 yrs	≥12yrs & adults	Child 0-4 yrs	Child 5-11 yrs	≥12yrs & Adults
Beclomethasone CFC		84-336 mcg	168-504 mcg		336-672 mcg	504-840 mcg		> 672 mcg	> 840 mcg/d
42 mcg/puff		2-8 puffs/d	4-12 puffs/d		8-16 puffs/d	13-20 puffs/d		> 16 puffs/d	> 20 puffs/d
84 mcg/puff		1-4 puffs/d	2-6 puffs/d		4-8 puffs/d	7-10 puffs/d		> 8 puffs/d	> 10 puffs/d
Beclomethasone HFA		80-160mcg	80-240mcg		> 160-320 mcg	> 240-480 mcg		> 320 mcg	> 480 mcg
40 mcg/puff		2-4 puffs/d	2-6 puffs/d		4-8 puffs/d	6-12 puffs/d		> 8 puffs/d	> 12 puffs/d
80 mcg/puff		1-2 puffs/d	1-3 puffs/d		2-4 puffs/d	3-6 puffs/d		> 4 puffs/d	> 6 puffs/d
Budesonide CFC[†]		400-800 mcg	400-1200 mcg		800-1600 mcg	1200-2400 mcg		> 1600 mcg	> 2400mcg
200 mcg/dose		2-4 puffs/d	2-6 puffs/d		4-8 puffs/d	6-12 puffs/d		> 8 puffs/d	> 12 puffs/d
Budesonide DPI (Flexhaler)		180-400 mcg	180-600 mcg		> 400-800 mcg	> 600-1200 mcg		> 800 mcg	> 1200 mcg
90 mcg/dose		2-4 puffs/d	2-6 puffs/d		4-8 puffs/d	6-13 puffs/d		> 8 puffs/d	> 13 puffs/d
180 mcg/dose		1-2 puffs/d	1-3 puffs/d		2-4 puffs/d	3-6 puffs/d		> 4 puffs/d	> 6 puffs/d
Budesonide DPI (Turbuhaler)		180-400 mcg	180-600 mcg		> 400-800 mcg	> 600-1200 mcg		> 800 mcg	> 1200 mcg
200 mcg/dose		1-2 puffs/d	1-3 puffs/d		2-4 puffs/d	3-6 puffs/d		> 4 puffs/d	> 6 puffs/d
Budesonide suspension (Respules)	0.25-0.5mg	0.5mg		> 0.5-1mg	1mg		> 1mg	2mg	
0.25 mg/2ml inhalation	2-4 ml/d	4 ml/d		4-8 ml/d	8 ml/d		> 8 ml/d	16 ml/d	
0.5mg/2ml inhalation	1-2ml/d	2ml/d		2-4ml/d	4ml/d		> 4ml/d		
1 mg/2ml inhalation	0.5-1ml/d	1ml/d		1-2ml/d	2 ml/d		> 2 ml/d	4 ml/d	
Ciclesonide*			80-160 mcg			>160-320 mcg			>320 mcg/d
80mcg/puff			2 puffs/d			2-4 puffs/d			4-16 puffs/d
160mcg/puff			NA			2 puffs/d			2-8 puffs/d
Flunisolide		500-750 mcg	500-1000 mcg		1000-1250 mcg	>1000-2000 mcg		> 1250 mcg	> 2000 mcg
250 mcg/puff		2-3 puffs/d	2-4 puffs/d		4-5 puffs/d	4-8 puffs/d		> 5 puffs/d	> 8 puffs/d
Flunisolide HFA		160 mcg	320 mcg		320mcg	> 320-640 mcg		≥ 640 mcg	> 640 mcg
80 mcg/puff		2 puffs/d	4 puffs/d		4 puffs/d	4-8 puffs/d		> 8 puffs/d	> 8 puffs/d

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Table 3. Estimated comparative daily dosages for inhaled corticosteroids^{1, 11}

Drug	Low daily dose			Medium daily dose			High Daily Dose		
	Child 0-4 yrs	Child 5-11 yrs	≥12yrs & adults	Child 0-4 yrs	Child 5-11 yrs	≥12yrs & adults	Child 0-4 yrs	Child 5-11 yrs	≥12yrs & Adults
Fluticasone MDI	176 mcg	88-176 mcg	88-264 mcg	> 176-352 mcg	> 176-352 mcg	> 264-440 mcg	> 352 mcg	> 352 mcg	> 440 mcg
44 mcg/puff	4 puffs/d	2-4 puffs/d	2-6 puffs/d	6-15 puffs/d	4-10 puffs/d	6-10 puffs/d	> 8 puffs/d	> 8 puffs/d	> 10 puffs/d
110 mcg/puff	1 puff/d	1 puff/d	1-2 puffs/d	2-6 puffs/d	1-4 puffs/d	2-4 puffs/d	> 4 puffs/d	> 4 puffs/d	> 4 puffs/d
220 mcg/puff	NA	NA	1 puff/d	1-3 puffs/d	1-2 puffs/d	1-2 puffs/d	> 1 puffs/d	> 1 puffs/d	> 2 puffs/d
Fluticasone DPI (Rotadisk; Diskus)		100-200 mcg	100-300 mcg		> 200-400 mcg	> 300-500 mcg		> 400 mcg	> 500 mcg
50 mcg/dose DPI		2-4 puffs/d	2-6 puffs/d		4-8 puffs/d	6-10 puffs/d		> 8 puffs/d	> 10 puffs/d
100 mcg/dose DPI		1-2 puffs/d	1-3 puffs/d		2-4 puffs/d	3-5 puffs/d		> 4 puffs/d	> 5 puffs/d
250 mcg/dose DPI		NA	1 puff/d		1 puff/d	1-2 puffs/d		> 1 puff/d	> 2 puffs/d
Mometasone DPI (Asmanex Twisthaler)		100 mcg	200 mcg			400 mcg			> 400 mcg
110 mcg/dose (delivers 100mcg/dose)		1 puff/d	2 puff/d			4 puff/d			> 4 puffs/d
220 mcg/dose (delivers 200mcg/dose)		NA	1 puff/d			2 puffs/d			> 2 puffs/d
Triamcinolone MDI		300-600 mcg	300-750 mcg		> 600-900 mcg	> 750-1500 mcg		> 900 mcg	> 1500 mcg
75 mcg/puff		4-8 puffs/d	4-10 puffs/d		8-12 puffs/d	10-20 puffs/d		> 12 puffs/d	> 20 puffs/d

Abbreviations: HFA = Hydrofluoroalkane propellant; MDI = Metered dose inhaler; DPI = Dry powder inhaler; estimated dosing equivalency from Thorsson et al.¹² and Agertoft & Pedersen;¹³ CFC = Contains chlorofluorocarbons; substances known to destroy ozone in the upper atmosphere.

* FDA approved labeling for ciclesonide: Initial treatment for patients on prior therapy with bronchodilators alone: 80 mcg twice daily (for a total of 160mcg/day, considered low dose; maximum dose 320 mcg/day). Initial treatment for patients with prior therapy with inhaled corticosteroids: 80 mcg twice daily (maximum dose: 640 mcg/day). For patients with prior therapy with oral corticosteroids: 320 mcg twice daily (maximum dose: 640 mcg/day). Canadian labeling: Initial: 400 mcg once daily; maintenance: 100-800 mcg/day (1-2 puffs once or twice daily)

Reference:

Jonas D.E., Wines R.C.M., DelMonte M., et al. (April 2011). Drug Class Review: Controller Medications for Asthma: Final Update 1 Report [Internet]. Portland (OR): Oregon Health & Science University.

<http://www.ncbi.nlm.nih.gov/books/NBK56695/>.

<http://www.ncbi.nlm.nih.gov/books/NBK56695/pdf/TOC.pdf>

APPENDIX J.

**Mini Pediatric Asthma Control Tool
 (M-PACT)**

Please take time to fill out this checklist. This checklist can help doctors and nurses (and you!) to know how to best help your child manage his or her asthma.

- Children may have different *signs* of asthma.
- Signs of asthma get worse during an asthma *flare* (also known as an attack or exacerbation)

What are the signs of asthma for your child? (check all that apply)

- | | |
|---------------------------------------------------------|-------------------------------------------------------------|
| <input type="checkbox"/> Coughs | <input type="checkbox"/> Wheezes (a whistling in the chest) |
| <input type="checkbox"/> Gets mucus in his or her chest | <input type="checkbox"/> Gets short of breath |
| <input type="checkbox"/> Feels chest pain or tightness | <input type="checkbox"/> Breathes fast |

Think about the past 3 months

- How often did these things happen when your child was feeling his or her best and not having an asthma flare? (check one)

1. Asthma symptoms with running or sports
2. Asthma symptoms while asleep at night
3. He or she needed to take albuterol or other quick-relief medicine for asthma symptoms

	Never	Once or twice a month	Once or twice a week	Every other day	Every day	More than once a day
1. Asthma symptoms with running or sports						
2. Asthma symptoms while asleep at night						
3. He or she needed to take albuterol or other quick-relief medicine for asthma symptoms						

Responses in the shaded area above indicate the presence of **persistent asthma** symptoms

Reference

Sampayo, E.; Chew, A; Zorc, J.;(2010). Make an M-PACT on asthma: rapid identification of persistent asthma symptoms in a pediatric emergency department. *Pediatric Emergency Care*, 1, 1-5.

<http://www.ncbi.nlm.nih.gov/pubmed/20042916>

APPENDIX K. ASTHMA MULTI-DISCIPLINARY DISCHARGE CHECKLIST

ASTHMA EDUCATION ON ARRIVAL to ER/FLOOR

****Initiate on arrival; must be completed in order to discharge patient****

1. Asthma Action Plan/Education (Physician fills out. Checked by nurse, RT, or asthma educator)

Last name, Initial and Date/Time on Completion

- _____ **Green Zone:**
 - Control Medicine – name, dose, method & frequency
- _____ **Yellow Zone:**
 - Control Medicine – name, dose, method & frequency
 - Quick Reliever – name, dose, method & frequency
 - Educate on when to call PCP
- _____ **Red Zone:**
 - Control Medicine – name, dose, method & frequency
 - Quick Reliever – name, dose, method & frequency
 - Educate on when to call 911
- _____ Educate patient in their preferred language
- _____ Educate patient on inhaler techniques, specific triggers, co-morbid conditions, zones above, and general care
- _____ Educate patient on medications including medication reconciliation and new medication availability, cost, and compliance
- _____ Primary Care Provider(PCP)/Clinic follow up appointment arranged
 - Primary Care Provider(PCP)/Clinic follow up name and phone number
 - Date & time of follow-up appointment or when to follow-up with physician

2. Discharge Planning

Last name, Initial and Date/Time on Completion

- _____ Asthma Action Plan completed and in chart
- _____ Asthma Education ordered
- _____ Patient meets discharge criteria → MD, nurse, RT notified
- _____ Asthma Action Plan completed by RT/asthma educator
- _____ Asthma Education completed
- _____ Primary Care Provider(PCP)/Clinic follow up appointment arranged
- _____ Family education completed in their preferred language and family signs plan
- _____ Flu shot administered during flu season
- _____ Discharging nurse verifies asthma discharge checklist is complete prior to discharge

THE IMPLEMENTATION PACKAGE

The implementation package describes recommended strategies endorsed by the CHAT Asthma Safety and Quality Collaborative and it includes the following:

- Key driver diagram
- Intervention bundle, inclusive of hospital-level intervention involving aspects of direct patient care and the hospital-level intervention involving structure and process components which impact care
- Asthma best practices matrix identified among CHAT hospitals
- Discharge Checklist



Implementation Key Driver Diagram

Aim: To Improve the efficiency and effectiveness of asthma care in CHAT hospitals (ED and IP settings)

Goal: To reduce asthma-related length of stay by 20% within 3 months from implementation of the intervention

KEY DRIVERS

Improve timelines of stabilization

Standardize discharge plan

Early discharge

Transition to home/self-care

Prevention and revisit

CHANGE STRATEGIES

Emergency Center:

- Decrease time to first beta-agonist treatment
- Decrease time to first steroid treatment

Inpatient:

- Space beta-agonist treatment aggressively, as patient's respiratory status allows
- Wean oxygen aggressively, as patient's respiratory status allows
- Initiate discharge checklist early

Emergency Center:

- Decrease time to first beta-agonist treatment
- Decrease time to first steroid treatment
- Wean oxygen aggressively, as patient's respiratory status allows
- Team approach to communication (RT, Nursing, and MDs)
- Standardization of severity scoring
- Implement a discharge checklist

Inpatient:

- Space beta-agonist treatment aggressively, as patient's respiratory status allows
- Wean oxygen aggressively, as patient's respiratory status allows
- Asthma action plan written on admission
- Asthma education ordered on admission
- Conditional discharge order with discharge criteria written on admission
- Team approach to communication (RT, Nursing, and MDs)
- Standardization of severity scoring
- Implement a discharge checklist

Emergency Center and Inpatient:

- Assess chronicity / severity
 - Start controller medicine if indicated
 - Refer for Pulmonary follow-up if indicated/available
- Confirm PCP and discuss treatment plan with PCP before DC
- During flu season, administer influenza vaccine or link patient to resources to receive vaccine prior to discharge

Emergency Center and Inpatient:

- Discharge checklist
 - Initiate early education, communication, and discharge goals via multi-disciplinary team approach (RT, Nursing, and MD)
 - Asthma action plan
 - Asthma education: including inhaler techniques, triggers, co-morbid conditions, and treatment plan
 - Medication education: including medication reconciliation and new medication availability, compliance, and cost
 - Have printed resources in various languages
 - Review all resources prior to discharge

Emergency Center and Inpatient:

- Standardization of asthma action plan
- EB order set
- EMR-driven orders (flu)
- Patient navigators/ follow-up, if available

PATIENT AND HOSPITAL-LEVEL INTERVENTIONS

Patient and Hospital-Level Interventions	
Key Drivers	Change Strategies
<p>Improve timelines of stabilization</p>	<p>Emergency Center:</p> <ul style="list-style-type: none"> • Decrease time to first beta-agonist treatment • Decrease time to first steroid treatment <p>Inpatient:</p> <ul style="list-style-type: none"> • Space beta-agonist treatment aggressively, as patient’s respiratory status allows • Wean oxygen aggressively, as patient’s respiratory status allows • Initiate discharge checklist early
<p>Standardize discharge plan</p>	<p>Emergency Center:</p> <ul style="list-style-type: none"> • Decrease time to first beta-agonist treatment • Decrease time to first steroid treatment • Wean oxygen aggressively, as patient’s respiratory status allows • Team approach to communication (RT, Nursing, and MDs) • Standardization of severity scoring • Implement a discharge checklist <p>Inpatient:</p> <ul style="list-style-type: none"> • Space beta-agonist treatment aggressively, as patient’s respiratory status allows • Wean oxygen aggressively, as patient’s respiratory status allows • Asthma action plan written on admission • Asthma education ordered on admission • Conditional discharge order with discharge criteria written on admission • Team approach to communication (RT, Nursing, and MDs) • Standardization of severity scoring • Implement a discharge checklist
<p>Early discharge</p> <p>Early discharge</p>	<p>Emergency Center:</p> <ul style="list-style-type: none"> • Decrease time to first beta-agonist treatment • Decrease time to first steroid treatment

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Patient and Hospital-Level Interventions	
Key Drivers	Change Strategies
cont.	<ul style="list-style-type: none"> • Wean oxygen aggressively, as patient’s respiratory status allows • Team approach to communication (RT, Nursing, and MDs) • Standardization of severity scoring <p>Inpatient:</p> <ul style="list-style-type: none"> • Space beta-agonist treatment aggressively, as patient’s respiratory status allows • Wean oxygen aggressively, as patient’s respiratory status allows • Asthma action plan written on admission • Asthma education ordered on admission • Conditional discharge order with discharge criteria written on admission • Team approach to communication (RT, Nursing, and MDs) • Standardization of severity scoring
Transition to home/ self-care	<p>Emergency Center and Inpatient:</p> <ul style="list-style-type: none"> • Assess chronicity /severity <ul style="list-style-type: none"> ○ Start controller medicine if indicated ○ Refer for Pulmonary follow-up if indicated/available • Confirm PCP and discuss treatment plan with PCP before DC • During flu season, administer influenza vaccine or link patient to resources to receive vaccine prior to discharge • Discharge checklist <ul style="list-style-type: none"> ○ Initiate early education, communication, and discharge goals via multi-disciplinary team approach (RT, Nursing, and MD) <ul style="list-style-type: none"> ▪ Asthma action plan ▪ Asthma education: including inhaler techniques, triggers, co-morbid conditions, and treatment plan ▪ Medication education: including medication reconciliation and new medication availability, compliance, and cost ▪ Have printed resources in various languages ▪ Review all resources prior to discharge

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Patient and Hospital-Level Interventions	
Key Drivers	Change Strategies
Prevention and revisit	Emergency Center and Inpatient: <ul style="list-style-type: none">• Standardization of asthma action plan• EB order set• EMR-driven orders (flu)• Patient navigators/ follow-up, if available

ASTHMA BEST PRACTICES MATRIX

What (best practice/ strategy)	Brief description	Implementing institution	Identify the roles of the people implementing this best practice	Targeted impact of this practice	How to be achieved (specific steps)?
Rapid delivery of steroid upon arrival in the ED	Triage standing delegation order for nurse to initiate steroid treatment for known asthmatics with current exacerbation	TCH	<ul style="list-style-type: none"> Nursing Physician champion Respiratory care Epic integration person Nurse and physician educator 	<p>Who: Nursing</p> <p>What: Triage order set</p> <p>How: EMR based or paper based with nursing education for when to evoke the standing order</p>	<ul style="list-style-type: none"> Establish a standing order set for known asthmatics to have steroids delivered at triage Gain nursing and pharmacy approval Integrate into workflow (Epic) Measure steroid time to delivery
Resident – driven QI initiatives	Residents to pick metrics to follow from list of CHAT metrics	El Paso Children’s Hospital	Residents	<p>Who: Patients</p> <p>What: Education</p> <p>How: QI projects</p>	<ul style="list-style-type: none"> Residents to meet on a quarterly basis and establish a QI project to implement based on CHAT Asthma metrics
Get Well Network	TV system in patient room that can be pre-loaded or assigned educational videos blocking access to the TV, games, and internet if needed	Cook	<ul style="list-style-type: none"> Nursing RT Care Partner Education 	<p>Who: Patient</p> <p>What: Education</p> <p>How: Video modules</p>	<ul style="list-style-type: none"> Identify existing video educational modules Identify needed video educational modules Gain approval from key stakeholders Implement standards
Building a specific pathway for linking a clinical score to	Clinical Respiratory Score (CRS) informs asthma	TCH	<ul style="list-style-type: none"> Physicians Respiratory care Nursing 	<p>Who:</p> <ul style="list-style-type: none"> Physicians Respiratory care 	<ul style="list-style-type: none"> Create/adopt scoring system Create EB pathway Management of

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What (best practice/ strategy)	Brief description	Implementing institution	Identify the roles of the people implementing this best practice	Targeted impact of this practice	How to be achieved (specific steps)?
an activity (Respiratory Assessment and Management Protocol –RAMP)	management in the RAMP			•Nursing	asthma is informed by the asthma respiratory score (specific scores will inform different levels of asthma management)
				What: Asthma assessment and management protocol / RAMP	
				How: <ul style="list-style-type: none"> •Asthma order sets are derived from the RAMP •The RAMP is posted on the intranet 	
MDI administration in the ED	Preference of MDI over Neb for mild patients not requiring ipratropium bromide	TCH	<ul style="list-style-type: none"> • Physicians • Respiratory care 	Who: Respiratory care	<ul style="list-style-type: none"> • Incorporate MDI practice into revised version of the asthma management protocol • Change order set to have only the MDI option • Educate ED physicians and respiratory care
				What: Asthma protocol / RAMP	
				How: <ul style="list-style-type: none"> •Respiratory care workflow •Asthma protocol / RAMP 	
Discharge checklist	Checklist initiated on admission and final check done by Charge Nurse before discharge (Lubbock / Dell)	Lubbock / Dell	<ul style="list-style-type: none"> • Nursing (Lubbock / Dell) 	Who: Nursing (Lubbock / Dell)	<ul style="list-style-type: none"> • Establish discharge requirements at time of admission (Lubbock / Dell) • Meets JC requirements (Lubbock / Dell) • Double checked and signed by discharge
				What: Discharge checklist (Lubbock / Dell)	

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What (best practice/ strategy)	Brief description	Implementing institution	Identify the roles of the people implementing this best practice	Targeted impact of this practice	How to be achieved (specific steps)?
				How: <ul style="list-style-type: none"> • Hard copy in front of chart and completed before discharge (Lubbock / Dell) • Copy on CPOE (Dell) 	nurse and Charge nurse before discharge(Lubbock / Dell)
Standardization of asthma action plan	Create a standardized TCH asthma action plan for use across the IDS	TCH	<ul style="list-style-type: none"> • Physicians • Respiratory care • Asthma educators • Nursing 	Who: <ul style="list-style-type: none"> • Asthma educator • Nursing What: Asthma action plan How: EMR based	<ul style="list-style-type: none"> • Adopt a standardized asthma action plan • Integrate into EMR • Educate: <ul style="list-style-type: none"> ○ Physicians ○ Respiratory care ○ Asthma educators ○ Nursing
Discharge – Q3h x 2	The inpatient weaning strategy of beta-agonists was changed after a successful pilot on two units. Children can now be discharged at a beta-agonist frequency of every 3 hours, after 2 doses at this frequency (previously, 2 every-4-hour doses were required). All other discharge criteria must also be met.	TCH	<ul style="list-style-type: none"> • Physicians • Respiratory care • Nursing 	Who: <ul style="list-style-type: none"> • Physicians • Patients What: Shortening time to discharge/length of stay How: Changing the beta-agonist weaning strategy	<ul style="list-style-type: none"> • Change the final beta-agonist weaning frequency on the RAMP to Q3h X 2 • Send e-mail to all medical staff explaining the change • Educate physicians and staff to new RAMP

ASTHMA MULTI-DISCIPLINARY DISCHARGE CHECKLIST

ASTHMA EDUCATION ON ARRIVAL to ER/FLOOR

****Initiate on arrival; must be completed in order to discharge patient****

3. Asthma Action Plan/Education (Physician fills out. Checked by nurse, RT, or asthma educator)
Last name, Initial and Date/Time on Completion

- _____ **Green Zone:**
 - Control Medicine – name, dose, method & frequency
- _____ **Yellow Zone:**
 - Control Medicine – name, dose, method & frequency
 - Quick Reliever – name, dose, method & frequency
 - Educate on when to call PCP
- _____ **Red Zone:**
 - Control Medicine – name, dose, method & frequency
 - Quick Reliever – name, dose, method & frequency
 - Educate on when to call 911
- _____ Educate patient in their preferred language
- _____ Educate patient on inhaler techniques, specific triggers, co-morbid conditions, zones above, and general care
- _____ Educate patient on medications including medication reconciliation and new medication availability, cost, and compliance
- _____ Primary Care Provider(PCP)/Clinic follow up appointment arranged
 - Primary Care Provider(PCP)/Clinic follow up name and phone number
 - Date & time of follow-up appointment or when to follow-up with physician

4. Discharge Planning

Last name, Initial and Date/Time on Completion

- _____ Asthma Action Plan completed and in chart
- _____ Asthma Education ordered
- _____ Patient meets discharge criteria → MD, nurse, RT notified
- _____ Asthma Action Plan completed by RT/asthma educator
- _____ Asthma Education completed
- _____ Primary Care Provider(PCP)/Clinic follow up appointment arranged
- _____ Family education completed in their preferred language and family signs plan
- _____ Flu shot administered during flu season
- _____ Discharging nurse verifies asthma discharge checklist is complete prior to discharge

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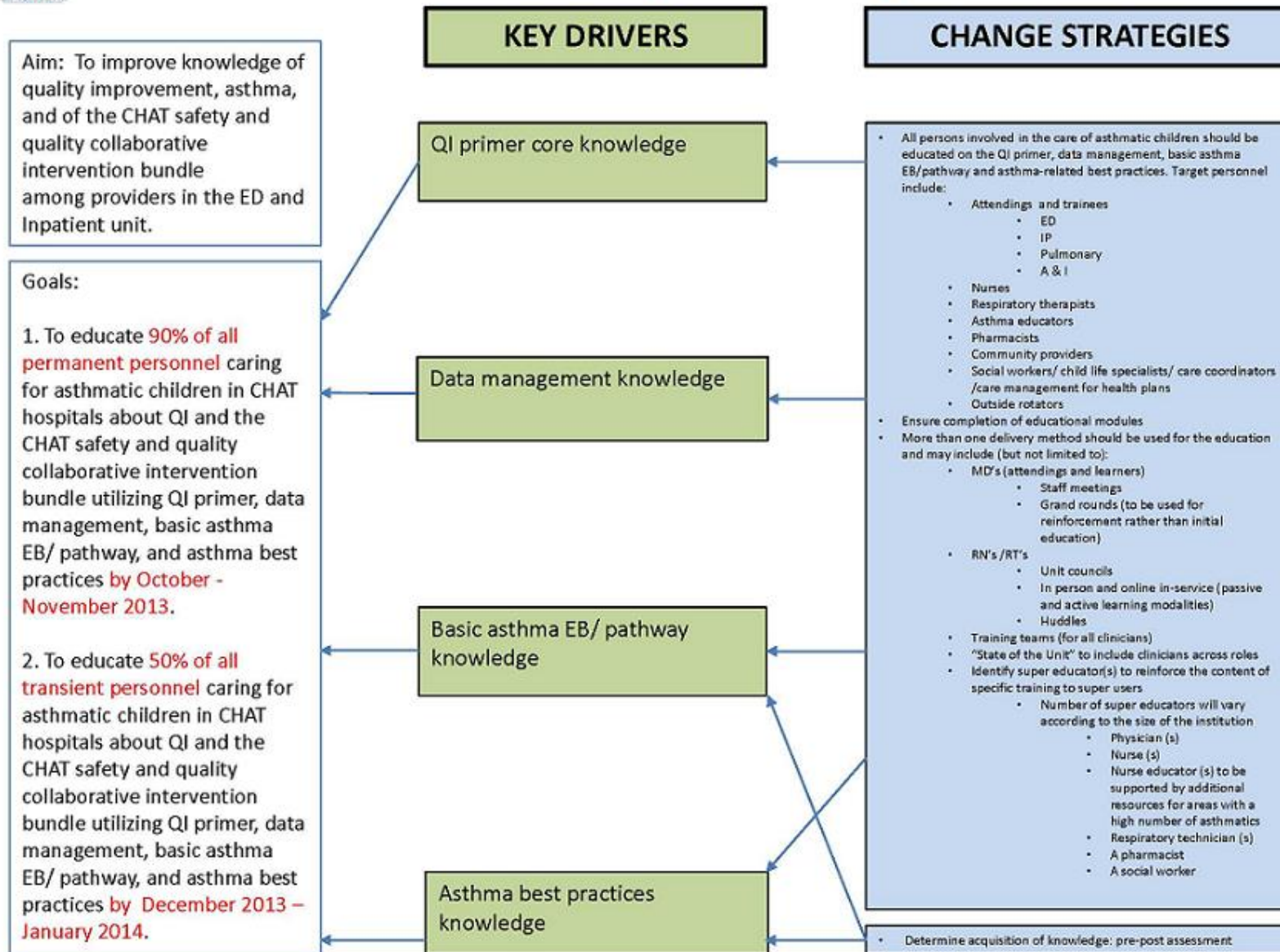
EDUCATION

The below documents describe educational strategies as well as education primers to train personnel providing care to asthmatic children in CHAT hospitals.

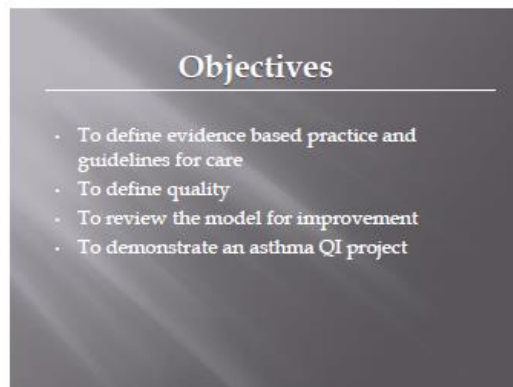
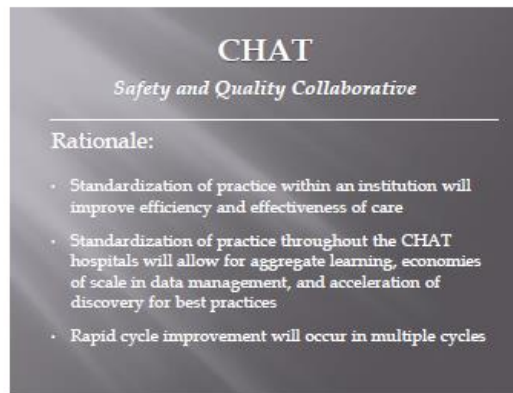
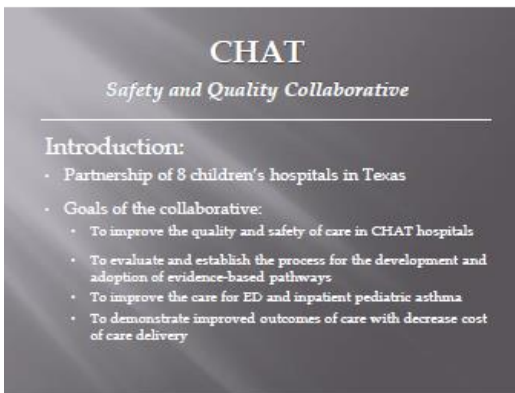
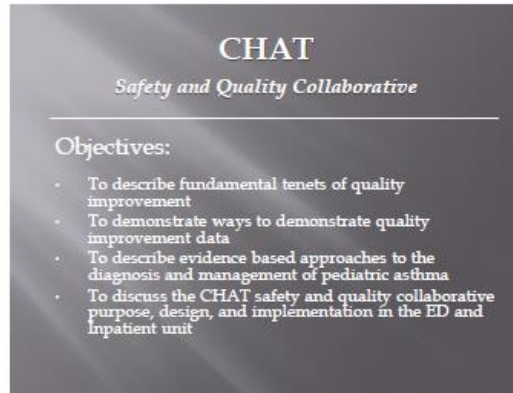
- Key driver diagram
 - Educational strategies and related timeline (for delivery) agreed upon the collaborative to train all personnel providing care to asthmatic children
- Education primer inclusive of QI and data primers, EB pathways (for both the ED and IP setting), and intervention bundle. Please note that there are two versions:
 - An abbreviated version (with a less detailed description pertaining to the QI and data primers) to be viewed by all personnel providing care to asthmatic children
 - A full version, if a more specific explanation is desired
- Brief education for the Unit Council
 - Abbreviated version of the education primer (without the QI and data primers to be delivered separately/ at a different time at the discretion of each institution through some learning management system)
- Pre and post assessments
 - These include the same questions measuring beliefs, attempt to change, and didactic knowledge among personnel caring for asthmatic children
 - These assessments will be used pre delivery of the CHAT collaborative educational inservice and post after that inservice is done and additional educational modules are accessed by clinician participants
- Additional data primers
 - CHAT Introduction to Data Analysis Tools
 - <http://youtu.be/JAxcTy8yGXo>
 - Control Charts for Attributes Data
 - <http://youtu.be/jn89c0MUJIQ>
 - Control Charts for Variables Data
 - <http://youtu.be/KCevEIQb3e4>
 - Statistical Process Control
 - <http://youtu.be/xsMe00l7kT8>
 - While the first video includes a more general description pertaining to data analyses tools, the other three offer a more specific explanation of SPC and control charts



CHAT Asthma Education Key Driver Diagram



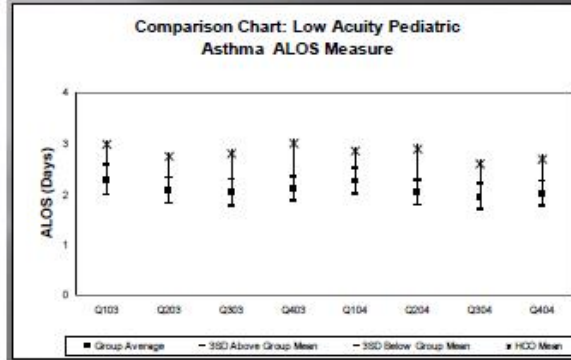
EDUCATION PRIMER • ABBREVIATED VERSION
With a less detailed description pertaining to the QI and data primer



A philosophy

- Evidence based practice is not an intermittent choice
- EBP is about how we make decisions
- Not all decisions can be supported with *good* evidence
 - But all should be supported with the **best** evidence
 - Care delivered must be "transparent"

What are the possible causes for these results?



Variations in practice

AAP action plans: >200 asthma action plans at one institution alone

Therapies differed

- Beta agonist weaning
- Oxygen weaning (5 min to 24 hours)
- Education
- Social work
- Chronic care management

The purpose of EBGs: minimizing variation

- Wide variations in practice are often not related to differences among patients
- Minimizing variations in practice can improve quality of health care delivery
- Variation in clinical practice
 - Variation in beliefs
 - Variation in interpretation of evidence
 - Variation in response when evidence is lacking

EBP Guidelines

- Integrate best evidence for recommendations
 - Help translate what we know into usable knowledge
- Are tailored to values and preferences
- Provide transparency where evidence lacks and default to consensus is necessary
- Limitations:
 - No protocol fits every patient and
 - No protocol (perfectly) fits any patient
 - Target the applicability to 80%

Quality?

Safe	Avoid injuries to patients from care intended to help them
Equitable	Provide care that does not vary in quality because of personal characteristics
Patient-Centered	Provide care that is respectful of and responsive to individual patient preferences, needs, values
Timely	Reduce waits and potentially harmful delays for both those who receive and those who give care
Efficient	Avoid waste of equipment, supplies, ideas, and energy
Effective	Services based on scientific knowledge to all who could benefit (avoid under-use and overuse, respectively)



Defining Quality

The degree to which health services for individuals and populations increase the **likelihood of desired health outcomes** and are consistent with current professional knowledge

KN Lohr, N Engl J Med, 1990

Traditional Quality Assurance

© 2005, Johns Hopkins AASP course

Quality Improvement

1. Reduce variation
2. Shift toward desired outcome

© 2005, Johns Hopkins AASP course

Model for Improvement

What are we trying to accomplish?

How will we know that a change is an improvement?

What change can we make that will result in improvement?

Adapted from: The Improvement Guide: A Practical Approach to Enhancing Organizational Performance, 2nd Ed.
 Gerald I. Langley, Ronald D. Moynihan, John M. Slocum, Thomas W. Stuebel, Edward L. Hines, and Lloyd F. Hines
 January 2009

Model for Improvement

What are we trying to accomplish?

How will we know that a change is an improvement?

What change can we make that will result in improvement?

• Aim statements (SMART goals/ aims)

- Specific
- Measurable
- Attainable
- Relevant
- Time bound

Model for Improvement

What are we trying to accomplish?

How will we know that a change is an improvement?

What change can we make that will result in improvement?

"In God we trust.
All others bring data."
W. E. Deming

Types of Measures

- Outcome Measures
 - Voice of the patient.
- Process Measures
 - Voice of the workings of the system.
 - Are the parts/steps in the system performing as planned?
- Balancing Measures
 - What happened to the system as we improved the outcome and process measures (e.g. unanticipated consequences, other factors influencing outcome)?

“All improvement will require change, but not all change will result in improvement!”

What can we do to make an improvement?

Model for Improvement

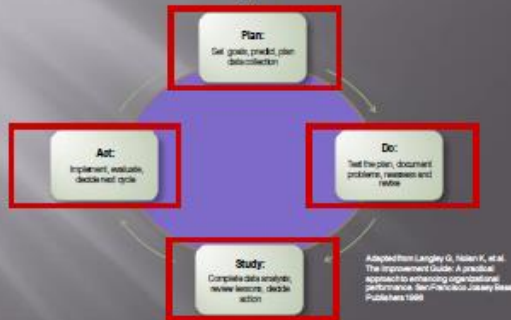
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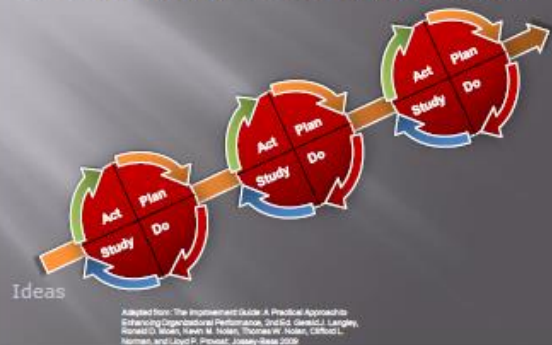
What change can we make that will result in improvement?



The PDSA Quality Improvement Cycle



Multiple PDSA cycles will result in the intended process improvement



Systems-based practice case: length of stay

- **Plan:** Defining the problem
 - Long mean length of stay for children with asthma
 - Lack of standardization for care regimens
 - Oxygen therapy
 - Beta agonist therapy
- Search the *evidence* and identifying a strategy:

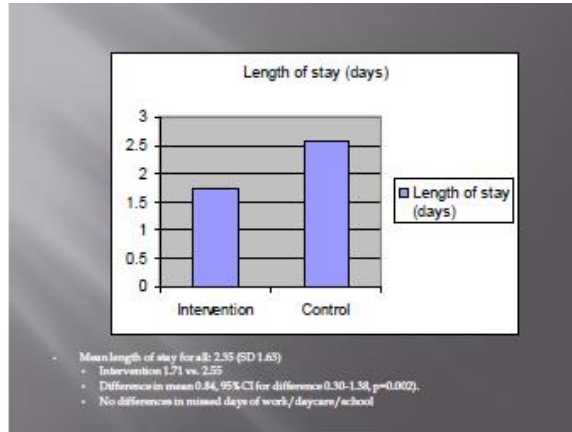
PI	Journal	Outcome measures
Wazeka	Pediatr Pulmonol, 2001	Hospital costs, length of stay
Kelly	Ann Allergy Asthma Immunol, 2000	LOS, teaching, chronic medication plan

Systems-based practice case: **Do**

- Asthma protocols and printed orders
 - Beta agonist weaning
 - Oxygen weaning
 - Education
 - Social work
 - Chronic care management

Systems-based practice case: **Study**

- Outcomes
 - LOS
 - Home
 - QOL
 - Displacement of resources: school days/work days missed
- 188 pediatric encounters
 - 143 controls
 - 45 interventions

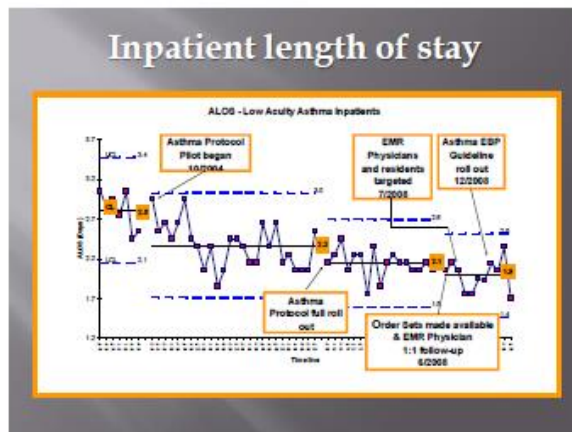


Systems-based practice: **Act**

- Decision support tools
 - Evidence based guidelines
 - Emergency Center order sets
 - Inpatient order sets
 - Special care units order sets
 - Community/PCP order sets
 - Hospital based action plan

Systems-based practice: Subsequent cycles

- Begin the discharge process early
- Use Evidence Based Practice guidelines
- Use standardized action plans



Cost savings

- Calculating cost savings
 - Use # of Admits for Asthma (2008 = 650)
 - Calculate days saved per year based upon ALOS decrease from 2.8 to 2.0 days
 - 2008 = 180 bed days
 - Inpatient capacity
 - Use last 6 month 2008 data to determine "variable direct cost" per day (\$1602)
 - Calculate savings in 2008 - \$521,040
 - Assumption: filling beds in early days with patients with higher margins per case
 - First day margins are better than 3rd day margins

CHAT

Safety and Quality Collaborative

Data primer/ Introduction to data analyses tools

Objectives

1. Define data
2. Explain some barriers to successfully using data
3. Explain the purpose and use of select quality data tools

What is Data?

Data is: Factual information used as a basis for reasoning, discussion, or calculation

Examples:

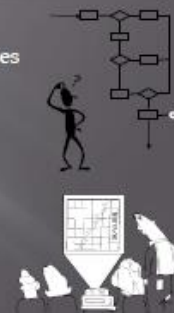
- Medications Given (Dosages, Routes, etc.)
- Vital Signs / Symptoms
- Patient Characteristics (Age, Sex, Race, etc.)
- Costs
- Therapies
- Staff Turnover, Working Hours, Ratios
- Times (Admission, Discharge, etc.)
- Anything we can document to measure performance

"We measure performance in healthcare for two basic purposes. We measure first as a basis for making judgments and decisions... Second, we measure as the basis for future improvements"

*Dennis O'Leary
Former President,
JCAHO*

Purpose of QI Tools

- Describe and improve processes
- Evaluate process or output variation
- Assist with decision-making
- Analyze data in a variety of ways
- Display information



QI Tools Help Answer 5 Questions

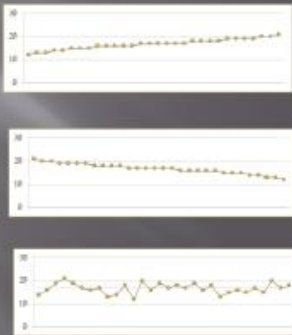
- Where am I?
- Where do I want to be?
- How do I get there?
- Am I still on the right path?
- How well did I do?

Histograms

- A bar graph that shows the distribution of CONTINUOUS data
- A snapshot of data taken from a process
- Summarize large data sets graphically

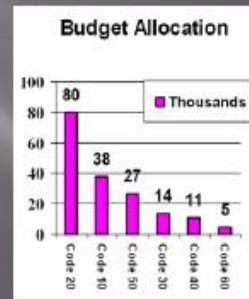
Histogram Analysis

- Histograms are a snapshot in time and show "distribution"
- They do NOT show trends over time

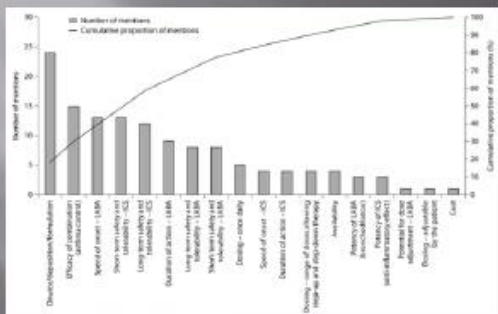


What is a Pareto Chart?

- Bar chart arranged in descending order of height from left to right
- Bars on left relatively more important than those on right
- Separates the "vital few" from the "useful many" (Pareto Principle)
- 80/20 Rule
 - 80% of the gain from 20% of the categories



Example - Pareto Chart



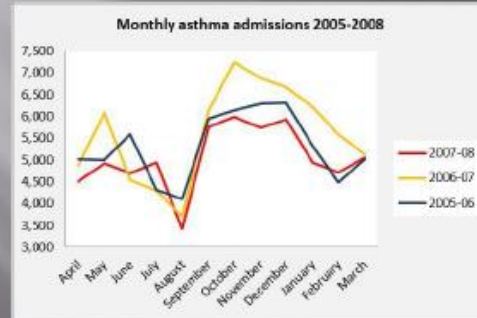
Why use a Pareto Chart?

- Breaks big problems into smaller pieces
- Displays causes or problems in priority order
- Identifies most significant factors
- Shows where to focus efforts
- Allows better use of limited resources

What is a Run Chart?

- A running record of process behavior *over time*
- Requires no statistical calculations
- Shows process behavior at a glance
- Can detect *some* special causes
- Time sequence is plotted on horizontal axis
- Measure of interest is always plotted on the vertical axis
- Center Line is the *mean* score

Example Run Chart



Improvement Strategies

After making a Run Chart or a Control chart, what's next?

The type of variation determines your approach:

SPECIAL CAUSE VARIATION?

- If negative, eliminate it
- If positive, emulate it

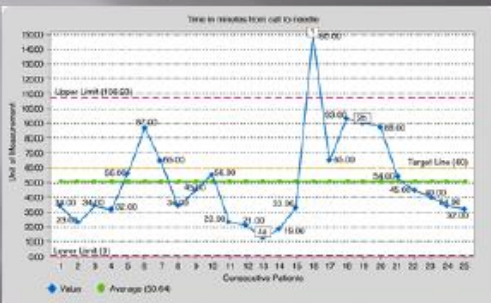
COMMON CAUSE VARIATION?

- Communicate that this is normal variation
- Don't "tamper" with individual data points!

What is a Control Chart?

A statistical tool used to distinguish between process variation resulting from common causes and variation resulting from special causes

Example Control Chart

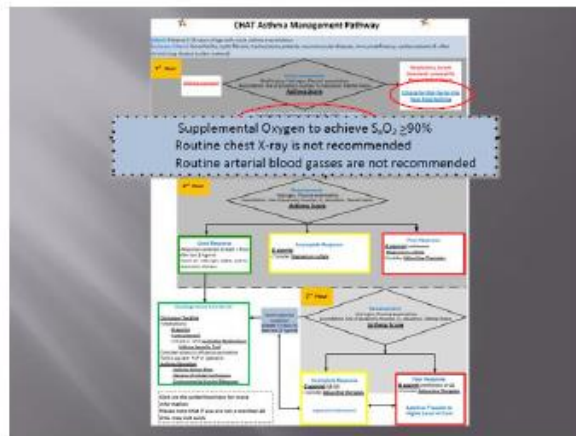
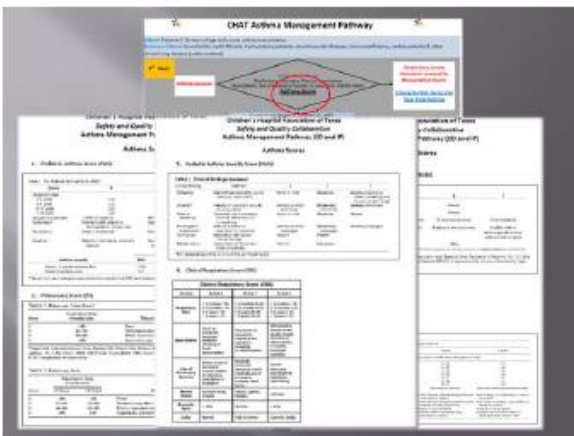


Why use Control Charts?

- Monitor process variation over time
- Differentiate between special cause and common cause variation
- Assess effectiveness of changes
- Communicate process performance

Asthma EB Pathway

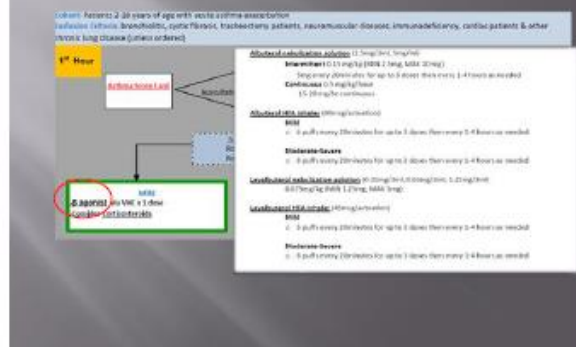
- Reflects continuum of care from initial ED evaluation through discharge from inpatient unit
- ED pathway is based on first 3 hours of management and escalation/ de-escalation of therapy
- Inpatient pathway is focused on weaning process and discharge management
- Hyperlinks will address evidence, best practice, dosages, references



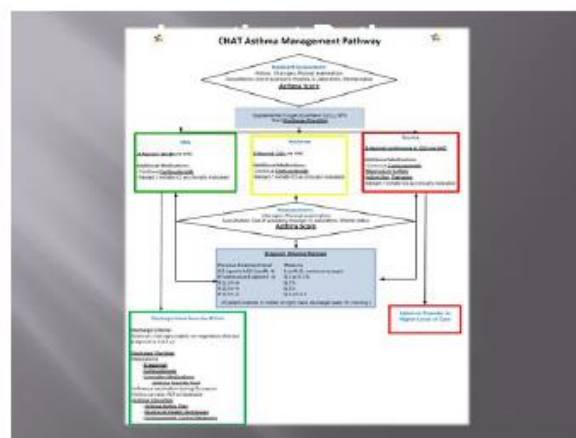
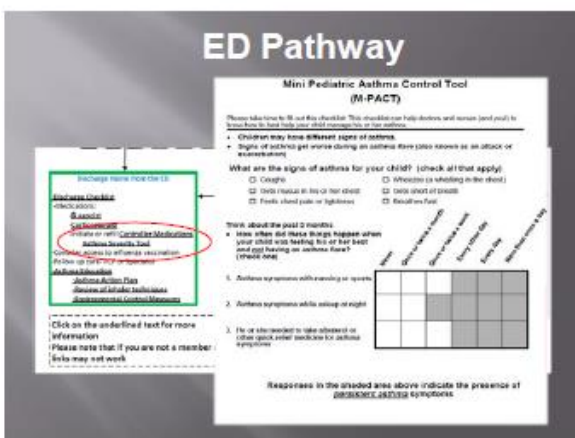
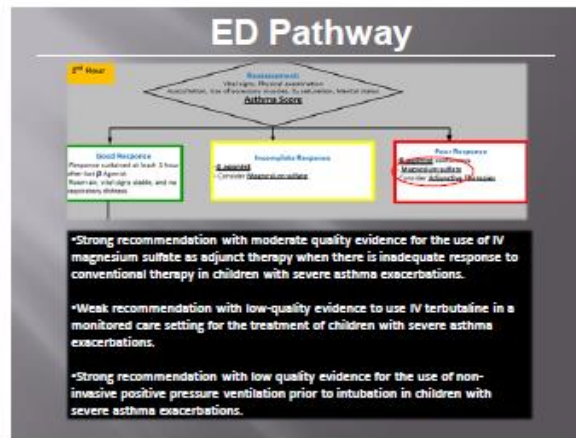
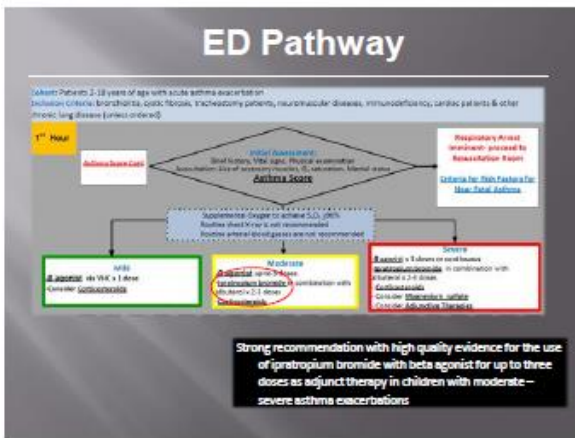
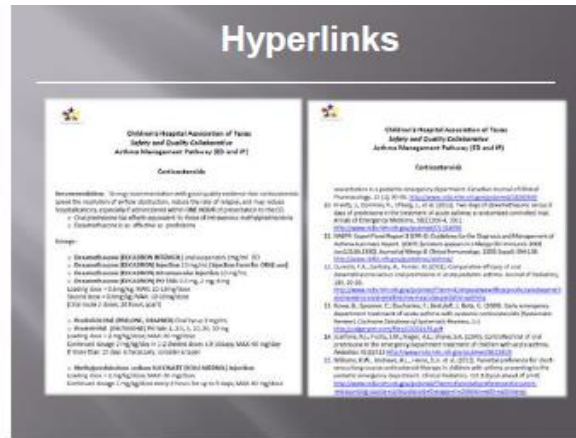
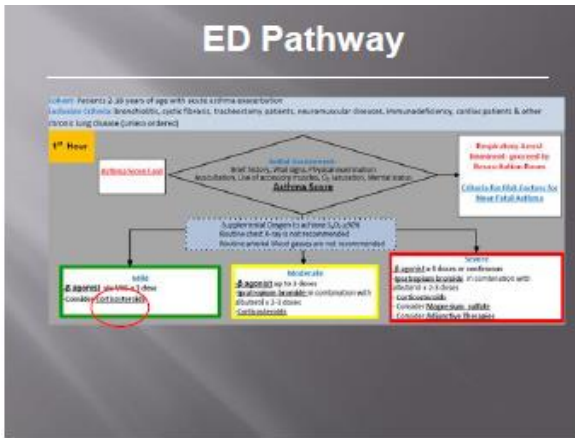
Risk Factors for Near Fatal Asthma

- Previous severe exacerbation (e.g., intubation or ICU admission)
- ≥ 2 hospitalizations or 3 EC visits in the past year
- Use of > 1 canister of Short Acting Beta Agonist (SABA) per month
- Difficulty perceiving airway obstruction or the severity of worsening asthma (parent &/ or child)
- Low socioeconomic status or inner-city residence
- Illicit drug use
- Major psychosocial problems or psychiatric disease

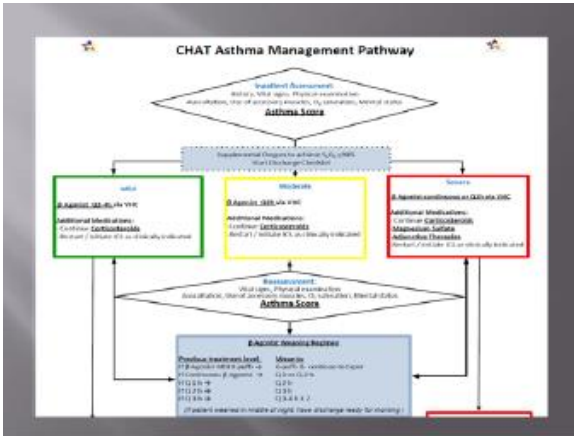
ED Pathway



CHAT Asthma Safety and Quality Collaborative Comprehensive Site Workbook



CHAT Asthma Safety and Quality Collaborative Comprehensive Site Workbook



Inpatient Pathway

Discharge Home from the IP Unit

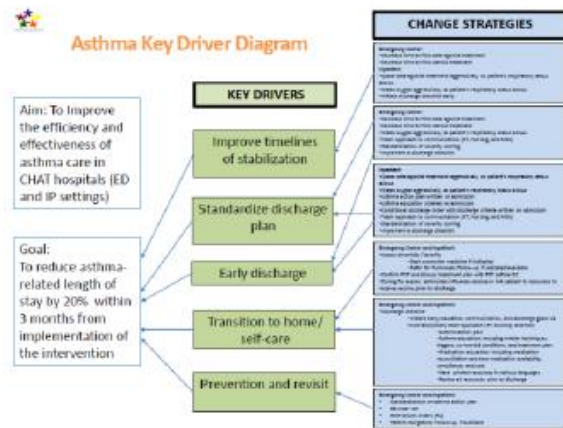
Discharge Criteria:
Room air, vital signs stable, no respiratory distress
β Agonist Q 3-4 h x2

Discharge Checklist:

Medications
 - β agonists
 - Corticosteroids
 - Controller Medications
 - Asthma Severity Tool

-Influenza vaccination during flu season
 -Follow up care- PCP or Specialist

Asthma Education
 - Asthma Action Plan
 - Review of Inhaler Techniques
 - Environmental Control Measures



CHAT Safety and Quality Collaborative

Key Elements of Evidence Based Pathway Recommendations

Recommendation: Strong recommendation with good quality evidence that corticosteroids speed the resolution of airflow obstruction, reduce the rate of relapse, and may reduce hospitalizations, especially if administered within one hour of presentation to the ED.

- Oral prednisone has effects equivalent to those of intravenous methylprednisolone
- Dexamethasone is as effective as prednisone

CHAT Safety and Quality Collaborative

Key Elements of Evidence Based Pathway Recommendations Cont.

Evidence For

Recommendation: Strong recommendation with high quality evidence for the use of ipratropium bromide with beta agonist for three doses as adjunct therapy in children with moderate to severe asthma exacerbations.

Recommendation: Strong recommendation with moderate quality evidence for the use of IV magnesium sulfate as adjunct therapy when there is inadequate response to conventional therapy within the first hour in children with moderate to severe asthma exacerbations.

Recommendation: Strong recommendation with low quality evidence for the use of non-invasive positive pressure ventilation prior to intubation in children with severe asthma exacerbations.

CHAT Safety and Quality Collaborative

Key Elements of Evidence Based Pathway Recommendations Cont.

Evidence Against

Evidence Against: Routine use of Spirometry or Peak Flow, ABG/VBG, CXR to determine level of severity.

Not Recommended: Low quality evidence to use Heliox in the treatment of children with asthma exacerbations.

Not Recommended: Low-quality evidence to use subcutaneous terbutaline or epinephrine with severe asthma exacerbations.

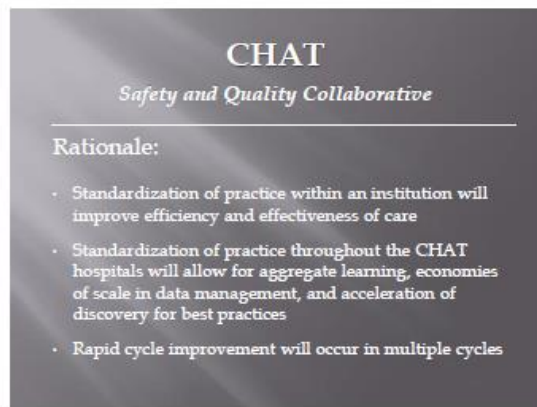
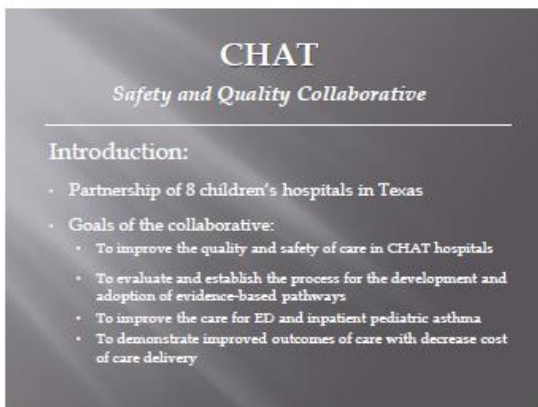
Evidence Inconclusive

Level of oxygen saturation to start or wean supplementation
 β agonist weaning regimen
 Discharge criteria
 Use of asthma score
 Initiating controllers in ED/inpatient



EDUCATION PRIMER • FULL VERSION

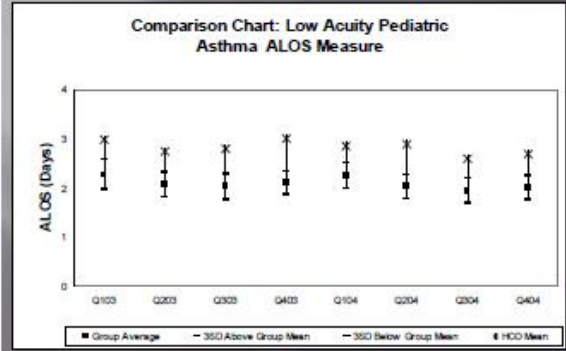
With a more detailed description pertaining to the QI and data prime



A philosophy

- EBP is not an intermittent choice
- EBP is about how we make decisions
- Not all decisions can be supported with *good* evidence
 - But all should be supported with the **best** available evidence
 - Care delivered must be “transparent”

What are the possible causes for these results?



Variations in Practice

- AAP action plans: >200 asthma action plans at TCH alone
Therapies differed
- Beta agonist weaning
 - Oxygen weaning (5 min to 24 hours)
 - Education
 - Social work
 - Chronic care management

Clinical practice guidelines

Systematically developed statements or recommendations to assist the practitioner about appropriate health care for specific clinical circumstances.

Institute of Medicine (1992). Guidelines for clinical practice: from development to use.

The purpose of EBGs: minimizing variation

- Wide variations in practice are often not related to differences among patients
- Minimizing variations in practice can improve quality of health care delivery
- Variation in clinical practice
 - Variation in beliefs
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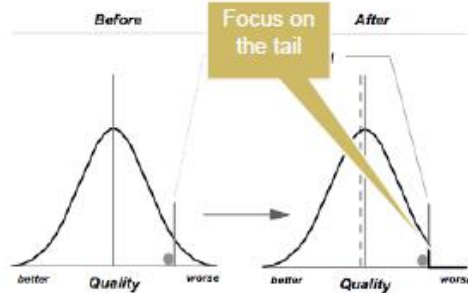
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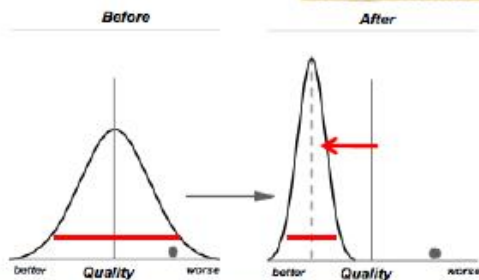
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Traditional Quality Assurance



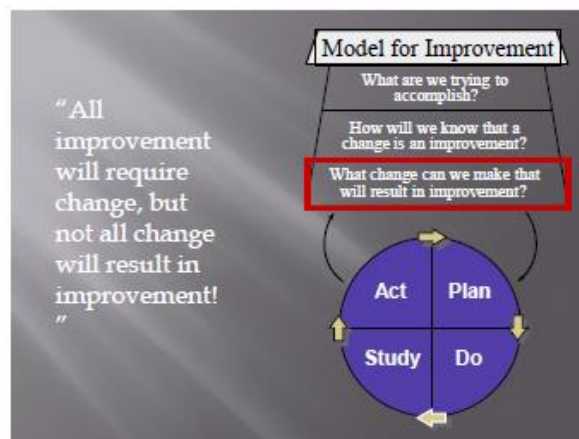
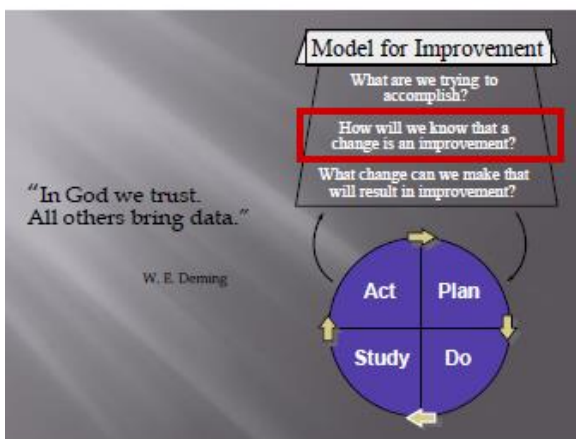
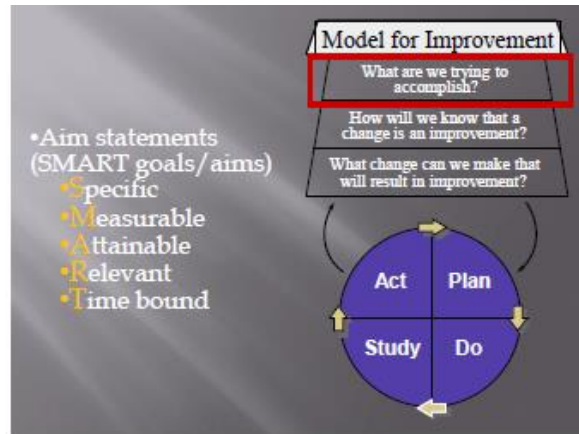
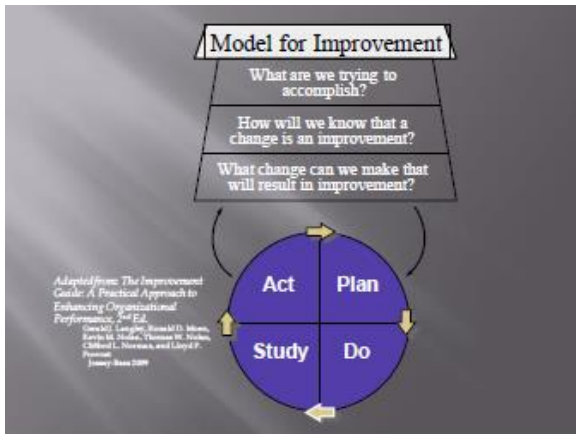
Quality Improvement

1. Reduce variation
2. Shift toward desired outcome

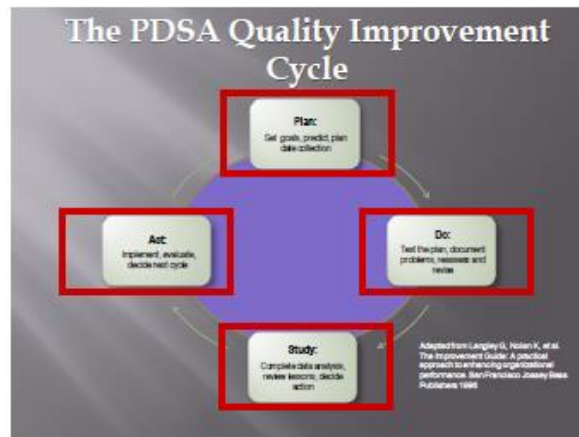


Quality Improvement

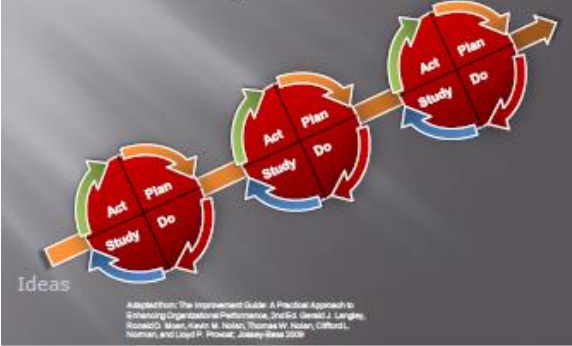
- Evidence based medicine
- Lean Methodology
- Six Sigma
- Model for Improvement



- ### Types of Measures
- Outcome Measures
 - Voice of the patient (or customer).
 - How is the system performing? What is the result?
 - Process Measures
 - Voice of the workings of the system.
 - Are the parts/steps in the system performing as planned?
 - Balancing Measures
 - Looking at the system from different directions/dimensions.
 - What happened to the system as we improved the outcome and process measures (e.g. unanticipated consequences, other factors influencing outcome)?



Changes That Result in Process Improvement



Systems-based practice case: length of stay

- Defining the problem
 - Long mean length of stay for children with asthma
 - Lack of standardization for care regimens
 - Oxygen therapy
 - Beta agonist therapy
- Search the evidence

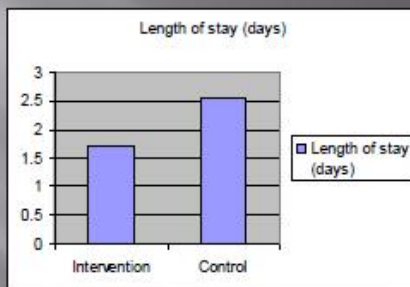
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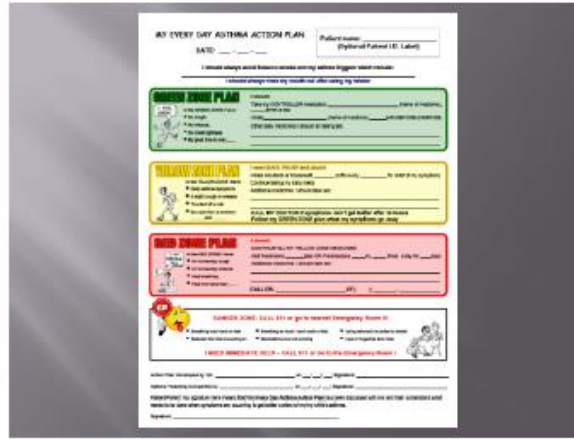
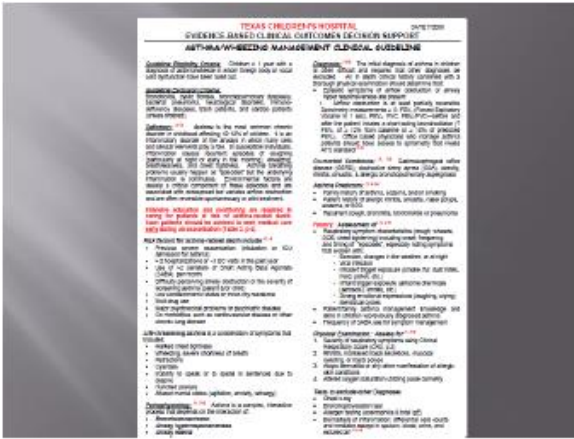


- Mean length of stay for all: 2.35 (SD 1.63)
 - Intervention 1.71 vs. 2.55
 - Difference in mean 0.84, 95%CI for difference 0.30-1.38, p=0.002.
 - No differences in missed days of work/daycare/school

Systems-based practice: Act

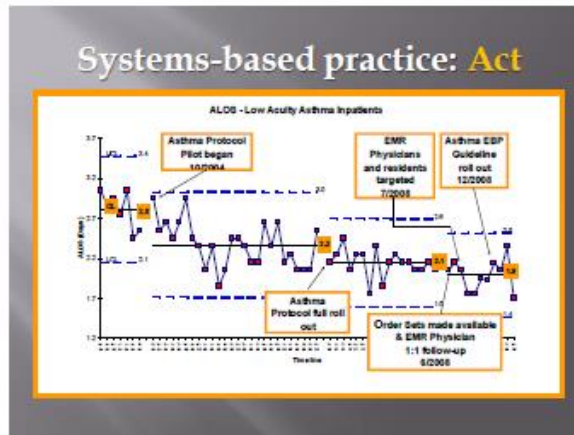
- Decision support tools on November 1, 2008
 - Evidence based guidelines
 - Emergency Center order sets
 - Inpatient order sets
 - Special care units order sets
 - Community/PCP order sets (coming soon)
 - Hospital based action plan

CHAT Asthma Safety and Quality Collaborative Comprehensive Site Workbook



Systems-based practice: Act

- Begin the discharge process early
- Use Evidence Based Practice guidelines
- Use standardized action plans



Cost savings

- Calculating cost savings
- Use # of Admits for Asthma (2008 = 650)
- Calculate days saved per year based upon ALOS decrease from 2.6 to 2.0 days
 - 2008 = 1701400 days
 - Building capacity
- Use last 6 month 2008 data to determine "variable direct cost" per day (\$1000)
- Calculate savings in 2008 = \$621,040
- Assumption: filling beds in early days with patients with higher margin per case
 - First day margins are better than 3rd day margins



CHAT

Safety and Quality Collaborative

Data primer/ Introduction to
data analyses tools

Objectives

1. Define data
2. Explain some barriers to successfully using data
3. Explain the purpose and use of select quality data tools

What is Data?

Data is:

Factual information used as a basis
for reasoning, discussion, or
calculation

What Things are Considered Data?

- Medications Given (Dosages, Routes, etc.)
- Vital Signs / Symptoms
- Patient Characteristics (Age, Sex, Race, etc.)
- Costs
- Therapies
- Staff Turnover, Working Hours, Ratios
- Times (Admission, Discharge, etc.)
- Anything we can document to measure performance

"We measure performance in healthcare for two basic purposes. We measure first as a basis for making judgments and decisions... Second, we measure as the basis for future improvements"

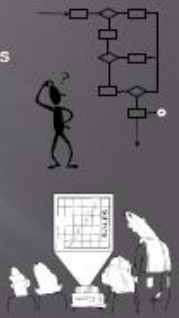
*Dennis O'Leary
Former President,
JCAHO*

Barriers To Putting Data Into Action

- Don't even know where to get data / info
- Paralysis by analysis
- No one is interested in it
- Incorrect interpretation of data
- Too complex to understand
- Defensiveness

Purpose of QI Tools

- Describe and improve processes
- Evaluate process or output variation
- Assist with decision-making
- Analyze data in a variety of ways
- Display information



QI Tools Help Answer 5 Questions

- Where am I?
- Where do I want to be?
- How do I get there?
- Am I still on the right path?
- How well did I do?

Basic Decision Making Toolbox

- Histogram
- Pareto Chart
- Scatter Diagram
- Run Chart
- Control Chart

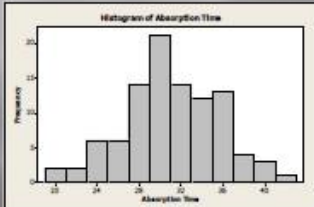
Histograms

- A bar graph that shows the distribution of CONTINUOUS data
- A snapshot of data taken from a process
- Summarize large data sets graphically
- Compare process results to specification
- Communicate information to the team
- Assist in decision making

Histogram Analysis

Descriptive Statistics:

Variable	N	Mean	St Dev	Minimum	Median	Maximum
Absorption Time	100	30.009	5.002	13.759	30.694	42.078



Mean (or Average):

$$\bar{X} = 30$$

Standard Deviation:

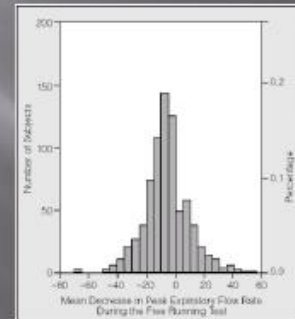
$$\sigma = 5$$

Histogram Example

Asthma Related Study

Of the 835 children who performed the free running test, 2 experienced considerable dyspnea, cough, and wheezing that prevented them from completing the test. There was a 10% decrease in PEFR in 285 (34%) subjects, a 15% decrease in 177 (21.2%), and a 20% decrease in 69 (8.2%).

Mean decreases in PEFR during the free running test are shown in the histogram in Figure 2. The distribution was skewed to the left and most values were between 0 and -20. The interval with the largest concentration of results (approximately 20% of the total sample) was between -5 and -10.



Histogram Analysis

- Histograms are a snapshot in time and show "distribution"
- They do NOT show trends over time

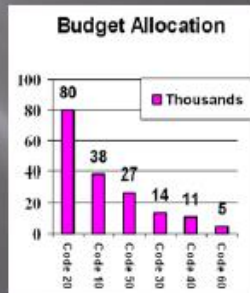


Basic Decision Making Tools

Pareto Chart

What is a Pareto Chart?

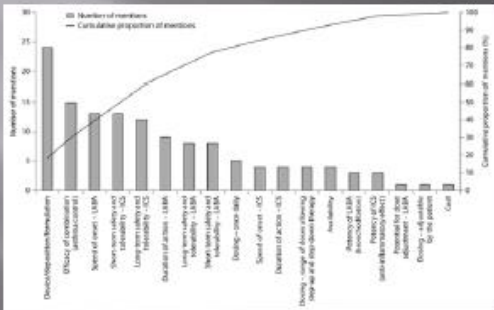
- Bar chart arranged in descending order of height from left to right
- Bars on left relatively more important than those on right
- Separates the "vital few" from the "useful many" (Pareto Principle)
- 80/20 Rule
 - 80% of the gain from 20% of the categories



Why use a Pareto Chart?

- Breaks big problems into smaller pieces
- Displays causes or problems in priority order
- Identifies most significant factors
- Shows where to focus efforts
- Allows better use of limited resources

Example - Pareto Chart



Basic Decision Making Tools

Scatter Diagram

Scatter Diagrams

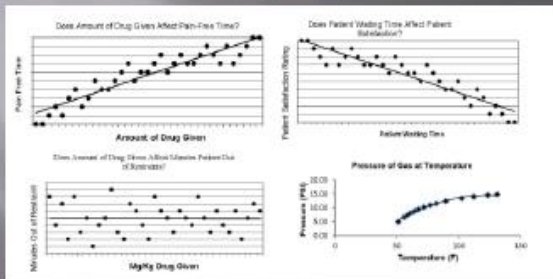
A graph of paired data points plotted on a table that helps identify the possible relationship between the changes observed in two different sets of variables

Why use Scatter Diagrams?

- Supplies the data to confirm a hypothesis that two variables are related
- Provides both a visual and statistical means to test the strength of a potential relationship
- Provides a good follow-up to a Cause and Effect Diagram to find out if there is more than just a consensus connection between causes and the effect

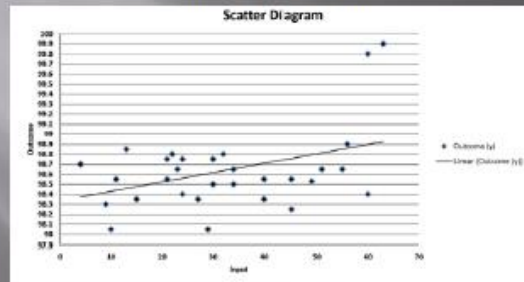
Interpreting Scatter Diagrams

Correlation



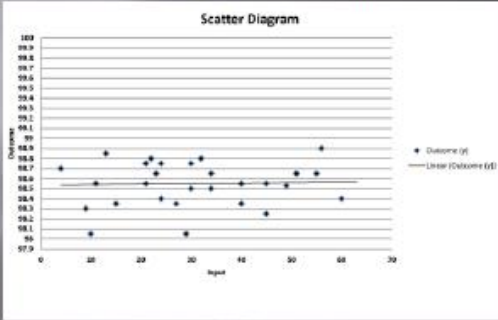
Interpreting Scatter Diagrams

Is there a correlation?



Interpreting Scatter Diagrams

Beware of False Correlation



Basic Decision Making Tools

Run Chart

What is a Run Chart?

A line graph of data points plotted in chronological order that helps detect special causes of variation

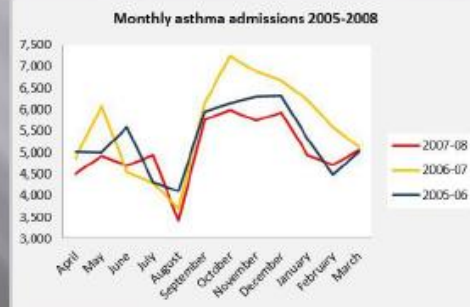
What is a Run Chart?

- A running record of process behavior *over time*
- Requires no statistical calculations
- Shows process behavior at a glance
- Can detect *some* special causes
- Time sequence is plotted on horizontal axis
- Measure of interest is always plotted on the vertical axis
- Center Line is the *mean* score

Run Chart



Example Run Chart



Basic Decision Making Tools

Control Chart

What is a Control Chart?

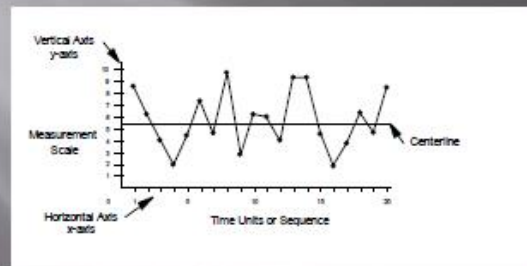
A statistical tool used to distinguish between process variation resulting from common causes and variation resulting from special causes

When people do not understand variation

- See trends where there are no trends
- Blame and give credit to others for things over which they have little or no control
- Build barriers, decrease morale, and create an atmosphere of fear
- Never be able to fully understand past performance, make predictions about the future and make significant improvements in processes

Control Chart

Elements of a Control Chart



Why use Control Charts?

- Monitor process variation over time
- Differentiate between special cause and common cause variation
- Assess effectiveness of changes
- Establish the basis for determining process capability
- Communicate process performance

Example Control Chart



CHAT Asthma Safety and Quality Collaborative Comprehensive Site Workbook

Improvement Strategies

After making a Run Chart or a Control chart, what's next?

The type of variation determines your approach:
SPECIAL CAUSE VARIATION?

- If negative, eliminate it
 - If positive, emulate it
 - But don't change the process!
- COMMON CAUSE VARIATION?
- If process is functioning at an unacceptable level, change the process!
 - Don't "tamper" with individual data points!

Resources



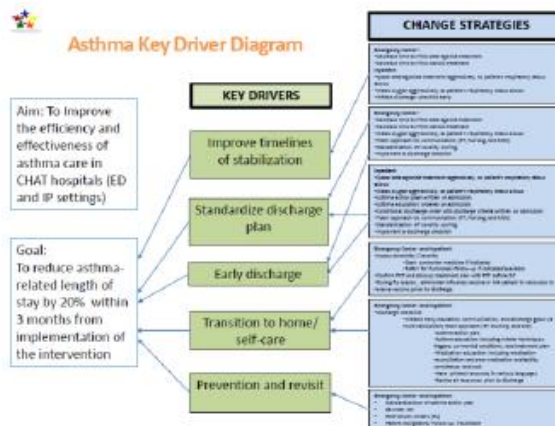
The Memory Jogger 2
- Goal GPC



The Quality Toolbox
- Nancy Tague

Asthma EB Pathway

- Reflects continuum of care from initial ED evaluation through discharge from inpatient unit
- ED pathway is based on first 3 hours of management and escalation/ de-escalation of therapy
- Inpatient pathway is focused on weaning process and discharge management
- Hyperlinks will address evidence, best practice, dosages, references



CHAT Asthma Management Pathway

ASTHMA MANAGEMENT PATHWAY TABLE

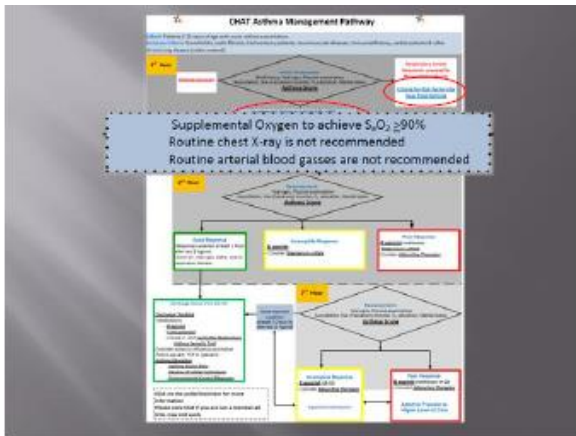
Step	Task	Responsible Party	Timeframe
1	Initial Assessment	ED/Inpatient	0-3 hours
2	Stabilization	ED/Inpatient	3-6 hours
3	Discharge Planning	ED/Inpatient	6-12 hours
4	Transition to Home	Home Care	12-24 hours
5	Prevention and Revisit	Home Care	Ongoing

CHAT Asthma Management Pathway

ASTHMA MANAGEMENT PATHWAY TABLE

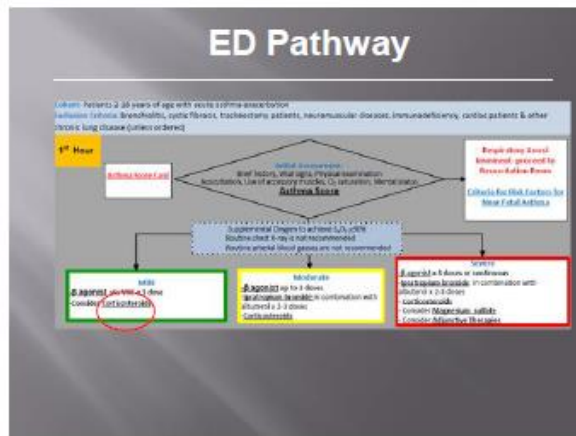
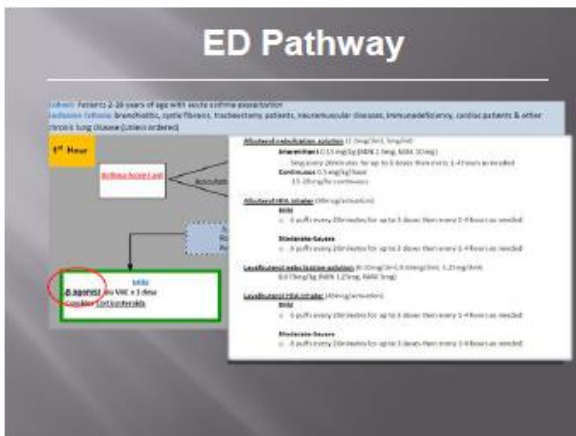
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CHAT Asthma Safety and Quality Collaborative Comprehensive Site Workbook



Risk Factors for Near Fatal Asthma

- Previous severe exacerbation (e.g., intubation or ICU admission)
- ≥ 2 hospitalizations or 3 EC visits in the past year
- Use of > 1 canister of Short Acting Beta Agonist (SABA) per month
- Difficulty perceiving airway obstruction or the severity of worsening asthma (parent &/or child)
- Low socioeconomic status or inner-city residence
- Illicit drug use
- Major psychosocial problems or psychiatric disease



Hyperlinks

Children's Hospital Association of Texas Asthma Management Pathway (M and P)

Contraindications:

- Hypersensitivity to any component of the formulation
- Use of concomitant therapy that may increase the risk of adverse effects (e.g., MAO inhibitors, tricyclic antidepressants, and other serotonergic agents)
- Use of concomitant therapy that may increase the risk of adverse effects (e.g., MAO inhibitors, tricyclic antidepressants, and other serotonergic agents)

Dosage:

- **Initial dose:** 2-4 puffs every 4-6 hours for up to 3 doses. Then every 2-4 hours as needed.
- **Maintenance dose:** 2-4 puffs every 4-6 hours for up to 3 doses. Then every 2-4 hours as needed.

Children's Hospital Association of Texas Asthma Management Pathway (M and P)

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- **Maintenance dose:** 2-4 puffs every 4-6 hours for up to 3 doses. Then every 2-4 hours as needed.

ED Pathway

Initial Assessment: Brief history, vital signs, Physical examination, Auscultation, Use of accessory muscles, SpO_2 saturation, Mental status.

Asthma Score

0-2 (Mild): SABA ≥ 2 puffs every 4-6 hours for up to 3 doses. Then every 2-4 hours as needed. Consider β_2 agonist (LABA) if needed.

3-4 (Moderate): SABA ≥ 2 puffs every 2-6 hours for up to 3 doses. Then every 2-4 hours as needed. Consider β_2 agonist (LABA) in combination with anticholinergic 2-3 doses. Consider Montelukast, Leukotriene Receptor Antagonists.

5-6 (Severe): SABA ≥ 2 puffs every 2-6 hours for up to 3 doses. Then every 2-4 hours as needed. Consider β_2 agonist (LABA) in combination with anticholinergic 2-3 doses. Consider Montelukast, Leukotriene Receptor Antagonists.

Strong recommendation with high quality evidence for the use of ipratropium bromide with beta agonist for up to three doses as adjunct therapy in children with moderate-severe asthma exacerbations

CHAT Asthma Safety and Quality Collaborative Comprehensive Site Workbook

ED Pathway

1st Hour

Assessment: Vital signs, Physical examination, Auscultation, Use of respiratory distress, O_2 saturation, SpO_2 trends, **Asthma Score**

Good Response
Response achieved at least 1 hour after last β_2 agonist. No or minimal distress. No or minimal wheezing and no respiratory distress.

Inadequate Response
Continue β_2 agonist and/or β_2 agonist + corticosteroid.

Alert Response
Additional corticosteroid. Consider β_2 agonist + corticosteroid + magnesium sulfate.

Discharge Home from the ED:

- **Strong recommendation with moderate quality evidence for the use of IV magnesium sulfate as adjunct therapy when there is inadequate response to conventional therapy in children with severe asthma exacerbations.**
- **Weak recommendation with low-quality evidence to use IV terbutaline in a monitored care setting for the treatment of children with severe asthma exacerbations.**
- **Strong recommendation with low quality evidence for the use of non-invasive positive pressure ventilation prior to intubation in children with severe asthma exacerbations.**

ED Pathway

Mini Pediatric Asthma Control Tool (M-PACT)

Please take time to fill out this checklist. This checklist can help doctors and nurses (and you!) to know how to best help your child manage their asthma.

- Children may have different signs of asthma.
- Signs of asthma get worse during an asthma flare (also known as an attack or exacerbation).

What are the signs of asthma for your child? (check all that apply)

Coughs Wheezes (a whistling in the chest)

Sleeps trouble in bed or the school Cries short of breath

Feels chest pain or tightness Feels very tired

Think about the past 2 months:

- How often did these things happen when your child was having fit or flare ups and not having an asthma flare? (check one)

1. Asthma symptoms with timing on a regular basis

2. Asthma symptoms with timing on a regular basis

3. Fit or flare ups but not on a regular basis or other signs and symptoms for asthma symptoms

Responses in the shaded area above indicate the presence of **RESPONSES** to symptoms

CHAT Asthma Management Pathway

Assessment: Vital signs, Physical examination, Auscultation, Use of respiratory distress, O_2 saturation, SpO_2 trends, **Asthma Score**

Supplemental Oxygen for asthma (O_2 2-6LPM)

Good Response
Response achieved at least 1 hour after last β_2 agonist. No or minimal distress. No or minimal wheezing and no respiratory distress.

Inadequate Response
Continue β_2 agonist and/or β_2 agonist + corticosteroid.

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CHAT Asthma Management Pathway

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Inpatient Pathway

Discharge Home from the IP Unit

Discharge Criteria:

- Room air, vital signs stable, no respiratory distress
- β_2 Agonist Q 3-4 h x2

Discharge Checklist:

- β_2 agonist
- Corticosteroids
- Controller Medications
- Asthma Severity Tool
- Influenza vaccination during flu season
- Follow up care- PCP or Specialist
- Asthma Education
 - Asthma Action Plan
 - Review of Inhaler Techniques
 - Environmental Control Measures

CHAT

Safety and Quality Collaborative

Key Elements of Evidence Based Pathway Recommendations

Recommendation: Strong recommendation with good quality evidence that corticosteroids speed the resolution of airflow obstruction, reduce the rate of relapse, and may reduce hospitalizations, especially if administered within one hour of presentation to the ED.

- **Oral prednisone** has effects equivalent to those of intravenous methylprednisolone
- **Dexamethasone** is as effective as prednisone

CHAT

Safety and Quality Collaborative

Should you have any questions, please refer to (please insert: Name/ email/ phone number of the specific person (s) at each institution), your assigned resource / educator

CHAT

Safety and Quality Collaborative

Before and after this training, you will be asked to complete a brief assessment to determine your acquisition of knowledge

CHAT

Safety and Quality Collaborative

Questions

BRIEF PRESENTATION FOR THE UNIT COUNCIL



Children's Hospital Association of Texas
An Association for the Advancement of Children's Healthcare in Texas

Safety and Quality Collaborative

CHAT Asthma Collaborative

CHAT
Safety and Quality Collaborative

Objectives:

- To describe fundamental tenets of quality improvement
- To demonstrate ways to demonstrate quality improvement data
- To describe evidence based approaches to the diagnosis and management of pediatric asthma
- To discuss the CHAT safety and quality collaborative purpose, design, and implementation in the ED and Inpatient unit

CHAT
Safety and Quality Collaborative

Introduction:

- Partnership of 8 children's hospitals in Texas
- Goals of the collaborative:
 - To improve the quality and safety of care in CHAT hospitals
 - To evaluate and establish the process for the development and adoption of evidence-based pathways
 - To improve the care for ED and inpatient pediatric asthma
 - To demonstrate improved outcomes of care with decrease cost of care delivery

CHAT
Safety and Quality Collaborative

Rationale:

- Standardization of practice within an institution will improve efficiency and effectiveness of care
- Standardization of practice throughout the CHAT hospitals will allow for aggregate learning, economies of scale in data management, and acceleration of discovery for best practices
- Rapid cycle improvement will occur in multiple cycles

CHAT
Safety and Quality Collaborative

Key Elements of Evidence Based Pathway Recommendations

Recommendation: Strong recommendation with good quality evidence that corticosteroids speed the resolution of airflow obstruction, reduce the rate of relapse, and may reduce hospitalizations, especially if administered within one hour of presentation to the ED.

- **Oral prednisone** has effects equivalent to those of intravenous methylprednisolone
- **Dexamethasone** is as effective as prednisone

CHAT
Safety and Quality Collaborative

Key Elements of Evidence Based Pathway Recommendations Cont.

Evidence For

Recommendation: Strong recommendation with high quality evidence for the use of **ipratropium bromide** with beta agonist for three doses as adjunct therapy in children with moderate to severe asthma exacerbations.

Recommendation: Strong recommendation with moderate quality evidence for the use of **IV magnesium sulfate** as adjunct therapy when there is inadequate response to conventional therapy within the first hour in children with moderate to severe asthma exacerbations.

Recommendation: Strong recommendation with low quality evidence for the use of **non-invasive positive pressure ventilation** prior to intubation in children with severe asthma exacerbations.

CHAT Asthma Safety and Quality Collaborative Comprehensive Site Workbook

CHAT Safety and Quality Collaborative

Key Elements of Evidence Based Pathway Recommendations Cont.

Evidence Against

Evidence Against: Routine use of Spirometry or Peak Flow, ABG/VBG, CXR to determine level of severity.

Not Recommended: Low quality evidence to use Heliox in the treatment of children with asthma exacerbations.

Not Recommended: Low quality evidence to use subcutaneous terbutaline or epinephrine with severe asthma exacerbations.

Evidence Inconclusive

Level of oxygen saturation to start or wean supplementation
 β agonist weaning regimen
 Discharge criteria
 Use of asthma score
 Initiating controllers in ED/inpatient

CHAT Asthma Best Practices Matrix

What Best Practice/Strategy?	Best Description	Implementing Institution	Identify the role of the people implementing the best practice	Expected impact of this practice	How to be achieved (with the strategy)?
Rate of delivery of a steroid upon arrival in the ED	Trigger steroid dispensation order for severe to critical asthma treatment for children admitted with current exacerbation	SCU	<ul style="list-style-type: none"> Respiratory Pharmacy Registered nurse ED respiratory nurse Nurse and physician educator 	When: Nowing	<ul style="list-style-type: none"> Establish a weaning order set for the steroid (prednisone) to have already initiated per trigger Send trigger alert placement approval Integrate into workflow (EHR) Measure success time to delivery
Respiratory volume in ED inpatient	Respirator to peak volume to follow Best Practice of CAPT program	ED from Children's Hospital	Respirator	When: Transition	<ul style="list-style-type: none"> Respirator to meet on a patient's needs and establish a CAP program to maintain on team on their asthma score
ED Visit Network	ED visits to patient room that are not needed or required to be in the ED, phone, and internet if needed	ED	<ul style="list-style-type: none"> Respiratory IT Care Partner Educator 	When: Transition	<ul style="list-style-type: none"> Identify existing video educational material Identify existing video educational material Gain approval from the institution Implement practice

CHAT Asthma Best Practices Matrix Cont.

What Best Practice/Strategy?	Best Description	Implementing Institution	Identify the role of the people implementing the best practice	Expected impact of this practice	How to be achieved (with the strategy)?
Use of a specific pathway for linkage of ED visit to primary care (pediatric) assessment and management (CAPT) EBP	Initial Assessment Unit (ED) asthma action plan management in the ED	ED	<ul style="list-style-type: none"> Pharmacy Respiratory nurse Nursing 	<ul style="list-style-type: none"> Reduce ED length of stay Reduce ED patient volume Reduce ED patient volume Reduce ED patient volume 	<ul style="list-style-type: none"> Develop a CAPT program to maintain on team on their asthma score
ED admission to the ED	Patients with ED visit who are not admitted to the ED	SCU	<ul style="list-style-type: none"> Pharmacy Respiratory nurse 	<ul style="list-style-type: none"> Reduce ED length of stay Reduce ED patient volume Reduce ED patient volume Reduce ED patient volume 	<ul style="list-style-type: none"> Develop a CAPT program to maintain on team on their asthma score
Discharge criteria	Discharge criteria on admission and follow-up care for the ED visit	ED/SCU	<ul style="list-style-type: none"> Respiratory nurse Pharmacy Nursing 	<ul style="list-style-type: none"> Reduce ED length of stay Reduce ED patient volume Reduce ED patient volume Reduce ED patient volume 	<ul style="list-style-type: none"> Develop a CAPT program to maintain on team on their asthma score

CHAT Asthma Best Practices Matrix Cont.

What Best Practice/Strategy?	Best Description	Implementing Institution	Identify the role of the people implementing the best practice	Expected impact of this practice	How to be achieved (with the strategy)?
Implementation of asthma action plan	Order a standardized CAPT asthma action plan for use across the ED	SCU	<ul style="list-style-type: none"> Pharmacy Respiratory nurse ED respiratory nurse Nursing 	<ul style="list-style-type: none"> Reduce ED length of stay Reduce ED patient volume Reduce ED patient volume Reduce ED patient volume 	<ul style="list-style-type: none"> Develop a CAPT program to maintain on team on their asthma score
Respiratory volume in ED	The expected weaning strategy of weaning order set for the ED visit	SCU	<ul style="list-style-type: none"> Pharmacy Respiratory nurse Nursing 	<ul style="list-style-type: none"> Reduce ED length of stay Reduce ED patient volume Reduce ED patient volume Reduce ED patient volume 	<ul style="list-style-type: none"> Develop a CAPT program to maintain on team on their asthma score



Children's Hospital Association of Texas
An Association for the Advancement of Children's Hospital Care

MEMBERSHIP INFORMATION FOR ALL CHAT

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1. **Membership Categories** (Check to see if you are a member)

1. **Individual**

2. **Corporate**

3. **Life**

4. **Student**

5. **Child**

6. **Family**

7. **Healthcare Provider**

8. **Healthcare Provider (Student)**

9. **Healthcare Provider (Retiree)**

10. **Healthcare Provider (Life)**

11. **Healthcare Provider (Life)**

12. **Healthcare Provider (Life)**

13. **Healthcare Provider (Life)**

14. **Healthcare Provider (Life)**

15. **Healthcare Provider (Life)**

16. **Healthcare Provider (Life)**

17. **Healthcare Provider (Life)**

18. **Healthcare Provider (Life)**

19. **Healthcare Provider (Life)**

20. **Healthcare Provider (Life)**

CHAT Safety and Quality Collaborative

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CHAT
Safety and Quality Collaborative

Before and after this training, you will be asked to complete a brief assessment to determine your acquisition of knowledge

CHAT
Safety and Quality Collaborative

Questions

PRE ASSESSMENT

1. Your unit

- ED
- IP
- Pulmonary
- A & I

2. Your role in providing care to asthmatic children

- Attendings and trainees
- Nurses
- Respiratory therapists
- Asthma educators
- Pharmacists
- Social workers/ child life specialists/ care coordinators /care management for health plans
- Outside rotators

3. Number of years providing care to asthmatic children

4. I believe that reducing variation in pediatric asthma treatment practices and subsequently in outcomes improves effectiveness and efficiency of patient care

- Strongly Disagree
- Disagree
- Agree
- Strongly Agree

5. I intend to use the CHAT pediatric asthma evidence-based pathway

- Strongly Disagree
- Disagree
- Agree
- Strongly Agree

6. I have identified change strategy (ies) in the CHAT Asthma Safety and Quality Collaborative Intervention Bundle that I intend to pursue in my institution

- Strongly Disagree
- Disagree
- Agree
- Strongly Agree

Questions for Medical Staff Only

7. Anticholinergic (i.e. Atrovent/Ipratropium Bromide) has been demonstrated to improve outcomes of care in the ED and in the Inpatient unit

- True False

8. Magnesium has been demonstrated to improve outcomes of care in severe patients in the ED

- True False

9. Valve holding chamber for β agonist has been demonstrated to improve outcomes of care in the inpatient unit for children 2-18 years of age

- True False

POST ASSESSMENT

1. Your unit

- ED
- IP
- Pulmonary
- A & I

2. Your role in providing care to asthmatic children

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CHAT Asthma Safety and Quality Collaborative Comprehensive Site Workbook

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CHAT Asthma Safety and Quality Collaborative Comprehensive Site Workbook

METRICS

The measurement grid contains specifications for the measures to be collected over the life of the collaborative in both the ED and IP settings (Tables 1 and 2). Goals are to be reevaluated after current baseline/ institutional benchmark data is collected.

Timeline for measurement

Baseline: provide 3 months (October - December 2013) of the measures as delineated in tables 1 and 2.
Action period: This is expected to run through November 2015 to be then reevaluated.

A copy of the data collection form is also included.

 Children's Hospital Association of Texas <i>An Association for the Advancement of Children's Health in Texas</i>				
ASTHMA SCORECARD				
	Domain	Measure	Goal	IOM Domains
ED	Pharmacologic Therapies	Proportion of patients receiving treatment according to collaborative pathway	50% compliance [†]	Effective Efficient Safe
		Time from ED triage to administration of β -agonist	30-60 minutes	Effective Efficient Safe Timely
		Time from ED triage to administration of steroids	60 minutes	Effective Efficient Safe Timely
	Patient Education	Proportion of asthma patients with a documented self-management plan [†]	90% compliance	Effective Efficient Patient-Centered Safe
		Proportion of patients/families assessed for their understanding of the asthma management plan [†]	90% compliance	Effective Patient-Centered
	Avoidable Events	Proportion of readmissions to hospital within 12 months	<2% (30 days) <18% (12 months)	Effective Efficient Safe
Inpatient	Pharmacologic Therapies	Proportion of patients receiving treatment according to collaborative pathway	50% compliance [†]	Effective Efficient Safe
	Patient Education	Proportion of asthma patients with a documented self-management plan	90% compliance	Effective Efficient Patient-Centered Safe
		Proportion of patients/families assessed for their understanding of the asthma management plan	90% compliance	Effective Patient-Centered
	Avoidable Events	Proportion of readmissions to hospital within 12 months	<6.5% compliance	Effective Efficient Safe
		Average length of stay for asthma-related hospitalizations	<2 days	Efficient

[†] Goal will be re-evaluated after current baseline/site benchmark is collected * Indicates optional measure

MEASURES

Table 1.

ED

<u>PROCESS AND OUTCOME MEASURES</u>				
<u>Measure</u>	<u>Statistics</u>	<u>Data Collection</u>	<u>Definitions</u>	<u>Potential Goal</u> (Goal to be reevaluated after current baseline/ institutional benchmark is collected)
			Exclude patients transferred from another institution or provider office	
ED - P 1. Pathway compliance proportion (ED).	N = # of patients receiving treatment in the ED according to the collaborative's pathways (e.g., based on severity, dosage, and medication type) among patients in the denominator. D= # of patients (2-18 years of age with acute asthma exacerbation) with primary or secondary dx of asthma in the ED.	Chart audit of a random sample of 20 patients per month who were identified with a primary or secondary dx of asthma in the ED. If desired, CHAT institutions have the option to audit the charts of all patients who were identified with a primary or secondary dx of asthma in the ED in a given month.	<ul style="list-style-type: none"> • The following EB components of the pathway need be followed: <ul style="list-style-type: none"> ○ Asthma score ○ Anticholinergic (i.e. Atrovent/ Ipratropium Bromide - 1st hour Moderate and Severe) ○ Magnesium (1st hour Severe) ○ Discharge checklist • If the pathway is not being followed, reasons need to be documented • No partial credits are acceptable. It is a all or none measure 	50% compliance (for the first 3 months to be then reevaluated)

CHAT Asthma Safety and Quality Collaborative
Comprehensive Site Workbook

PROCESS AND OUTCOME MEASURES				
Measure	Statistics	Data Collection	Definitions	Potential Goal (Goal to be reevaluated after current baseline/ institutional benchmark is collected)
			Exclude patients transferred from another institution or provider office	
ED -P2. Time from ED triage to administration of β agonist (1 st dose only).	<p>N= # of patients who were treated with β agonist in the ED among patients in the denominator. Need to indicate time of arrival and time of administration.</p> <p>D= # of patients (2-18 years of age with acute asthma exacerbation) with primary or secondary dx of asthma in the ED.</p>	<p>Chart audit of the same random sample (as of ED-P1) of 20 patients per month who were identified with a primary or secondary dx of asthma in the ED.</p> <p>If desired, CHAT institutions have the option to audit the charts of all patients who were identified with a primary or secondary dx of asthma in the ED in a given month.</p>	Arrival to the ED= time patients arrive to the ED (at RN's intake.)	60 minutes
<p>ED - P3.</p> <ul style="list-style-type: none"> Time from ED triage to administration of steroids (1st dose only) <ul style="list-style-type: none"> mean/ median time to delivery Percentage of patients who receive steroids within 1st hr of 	N= # of patients who were treated with steroids in the ED among patients in the denominator. Need to indicate time of arrival and time of administration.	Chart audit of the same random sample (as of ED-P1) of 20 patients per month who were identified with a primary or secondary dx of asthma in the ED.	Arrival to the ED= time patients arrive to the ED (at RN's intake).	60 minutes

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PROCESS AND OUTCOME MEASURES				
Measure	Statistics	Data Collection	Definitions	Potential Goal (Goal to be reevaluated after current baseline/ institutional benchmark is collected)
triage	D= # of patients (2-18 years of age with acute asthma exacerbation) with primary or secondary dx of asthma in the ED.	If desired, CHAT institutions have the option to audit the charts of all patients who were identified with a primary or secondary dx of asthma in the ED in a given month	Exclude patients transferred from another institution or provider office	
ED - P4. Proportion of asthma patients with a documented self-management plan (ED).	N = # of patients in the ED who received a documented self-management plan among patients in the denominator. D= # of patients (2-18 years of age with acute asthma exacerbation) with primary or secondary dx of asthma in the ED.	Chart audit of a random sample of 20 patients per month who were identified with a primary or secondary dx of asthma in the ED and were discharged from the ED rather than being admitted in the IP unit. If desired, CHAT institutions have the option to audit the	Optional Measure.	90% compliance

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PROCESS AND OUTCOME MEASURES				
Measure	Statistics	Data Collection	Definitions	Potential Goal (Goal to be reevaluated after current baseline/ institutional benchmark is collected)
		charts of all patients who were identified with a primary or secondary dx of asthma in the ED and were discharged from the ED rather than being admitted in the IP unit, in a given month.	Exclude patients transferred from another institution or provider office	
ED - P5. Proportion of patients/families assessed for their understanding of the asthma management plan (ED).	<p>N= # of ED patients with a primary or secondary diagnosis of asthma verbalizing understanding (as defined by the institution) of the documented asthma management plan.</p> <p>D= # of patients (2-18 years of age with acute asthma exacerbation) with primary or secondary dx of asthma treated in the ED with a documented asthma management plan.</p>	<p>Chart audit of a random sample of 20 patients per month who were identified with a primary or secondary dx of asthma in the ED and were discharged from the ED rather than being admitted in the IP unit.</p> <p>If desired, CHAT institutions have the option to audit the charts of all patients who were identified</p>	Optional Measure	90% compliance

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PROCESS AND OUTCOME MEASURES				
Measure	Statistics	Data Collection	Definitions	Potential Goal (Goal to be reevaluated after current baseline/ institutional benchmark is collected)
			Exclude patients transferred from another institution or provider office	
		with a primary or secondary dx of asthma in the ED and were discharged from the ED rather than being admitted in the IP unit, in a given month.		
ED – P 6. Proportion of patients with inhaled corticosteroids prescribed in the ED for home use.	<p>N = # of patients with inhaled corticosteroids prescribed in the ED for home use among patients in the denominator.</p> <p>D= # of patients (2-18 years of age with acute asthma exacerbation) with primary or secondary dx of asthma in the ED.</p>	<p>Chart audit of a random sample of 20 patients per month who were identified with a primary or secondary dx of asthma in the ED.</p> <p>If desired, CHAT institutions have the option to audit the charts of all patients who were identified with a primary or secondary dx of asthma in the ED in a given month.</p>	<p>Optional Measure.</p> <p>Although there is only one question addressing whether inhaled corticosteroids were prescribed or dispensed, the possible answers indicated in the data portal allow the calculation of these two metrics separately.</p>	

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PROCESS AND OUTCOME MEASURES				
Measure	Statistics	Data Collection	Definitions	Potential Goal (Goal to be reevaluated after current baseline/ institutional benchmark is collected)
			Exclude patients transferred from another institution or provider office	
<p>Submeasure of ED-P6 (inhaled corticosteroids prescribed in the ED for home use)</p> <p>ED – P7. Proportion of patients with inhaled corticosteroids dispensed in the ED for home use.</p>	<p>N = # of patients with inhaled corticosteroids dispensed in the ED for home use among patients in the denominator.</p> <p>D= # of patients (2-18 years of age with acute asthma exacerbation) with primary or secondary dx of asthma in the ED.</p>	<p>Chart audit of a random sample of 20 patients per month who were identified with a primary or secondary dx of asthma in the ED.</p> <p>If desired, CHAT institutions have the option to audit the charts of all patients who were identified with a primary or secondary dx of asthma in the ED in a given month.</p>	<p>Optional Measure</p> <p>Although there is only one question addressing whether inhaled corticosteroids were prescribed or dispensed, the possible answers indicated in the data portal allow the calculation of these two metrics separately.</p>	
ED- O1. Proportion of readmission to the ED within 12 months.	<p>N= # patients with a primary or secondary diagnosis of asthma with subsequent visits to the ED within a rolling 12 month-period.</p> <p>D= # of patients (2-18 years of age with acute asthma</p>	Chart audit of a random sample of the same 20 patients per month, to be followed within a rolling 12 month-period, who were identified with a primary or secondary dx	Need to report the initial date of ED visit and any of the readmission dates to the ED by patient (within a rolling 12 month-period). This is to calculate the following readmission measures: 14 days, 30 days, 3 months, and 6 months.	<ul style="list-style-type: none"> • < 2 % (30 Days) • < 18 % (12 Months)

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PROCESS AND OUTCOME MEASURES				
Measure	Statistics	Data Collection	Definitions	Potential Goal (Goal to be reevaluated after current baseline/ institutional benchmark is collected)
	exacerbation) with primary or secondary dx of asthma in the ED.	of asthma in the ED. If desired, CHAT institutions have the option to audit the charts of all patients who were identified with a primary or secondary dx of asthma in the ED in a given month, within a rolling 12 month-period.	Exclude patients transferred from another institution or provider office Readmission can be from ED <ul style="list-style-type: none"> • To ED • To IP/ OBS NOTE: Chart audit of a random sample of the same 20 patients per month was decided; this is to allow for identification of high-risk patients	
ED- O2. Average length of stay for asthma-related stay (non-admissions)	Average of total minutes length of stay for patients with asthma exacerbation discharged from ED with a primary or secondary diagnosis of asthma.	All patients with a primary or secondary diagnosis of asthma. Measures can be collected either as CY or FY.	Time of arrival to the ED and time of discharge from the ED need be collected.	To be identified

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Comprehensive Site Workbook

Table 2.
IP

PROCESS AND OUTCOME MEASURES				
Measure	Statistics	Data Collection	Definitions	Goal (Goal to be reevaluated after current baseline/ institutional benchmark is collected)
IP - P 1. Pathway compliance proportion (IP).	N = # of patients receiving treatment in the IP according to the collaborative's pathways (e.g., based on severity, dosage, and medication type) among patients in the denominator. D= # of patients (2-18 years of age with acute asthma exacerbation) with primary or secondary dx of asthma in the IP unit.	Chart audit of a random sample of 20 patients per month who were identified with a primary or secondary dx of asthma in the IP unit. If desired, CHAT institutions have the option to audit the charts of all patients who were identified with a primary or secondary dx of asthma in the IP unit in a given month.	Exclude patients transferred from another institution or provider office <ul style="list-style-type: none"> The following EB components of the pathway need be followed: <ul style="list-style-type: none"> Use of Valve Holding chamber for β agonist Discharge checklist Flu Shot (seasonal) Long term controllers prescribed excluding patients with intermittent asthma If the pathway is not being followed, reasons need to be documented No partial credits are acceptable. It is a all or none measure 	50% compliance (for the first 3 months to be then reevaluated)
IP- P4. Proportion of asthma patients with a documented self-management plan (IP).	N = # of patients in the IP unit who received a documented self-management plan among patients in the denominator D= # of patients (2-18 years of age with acute asthma	Chart audit of a random sample of patients* who were identified with a primary or secondary dx of asthma in the IP unit.		90% compliance

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PROCESS AND OUTCOME MEASURES				
Measure	Statistics	Data Collection	Definitions	Goal (Goal to be reevaluated after current baseline/ institutional benchmark is collected)
	exacerbation) with primary or secondary dx of asthma in the IP unit.	<p>*Use the same number of patients identified for JCAHO reporting (number as indicated by CHA or other vendors- to allow for validation).</p> <p>If desired, CHAT institutions have the option to audit the charts of all patients who were identified with a primary or secondary dx of asthma in the IP unit in a given month.</p>	Exclude patients transferred from another institution or provider office	

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PROCESS AND OUTCOME MEASURES				
Measure	Statistics	Data Collection	Definitions	Goal (Goal to be reevaluated after current baseline/ institutional benchmark is collected)
IP- P5. Proportion of patients/families assessed for their understanding of the asthma management plan (IP).	<p>N= # of IP patients with a primary or secondary diagnosis of asthma verbalizing understanding (as defined by the institution) of the documented asthma management plan.</p> <p>D= # of patients (2-18 years of age with acute asthma exacerbation) with primary or secondary dx of asthma treated in the IP unit with a documented asthma management plan.</p>	<p>Chart audit of a random sample of 20 patients per month who were identified with a primary or secondary dx of asthma in the IP unit.</p> <p>If desired, CHAT institutions have the option to audit the charts of all patients who were identified with a primary or secondary dx of asthma in the IP unit in a given month.</p>	<p>Exclude patients transferred from another institution or provider office</p>	90% compliance
IP- P6. Proportion of patients with inhaled corticosteroids prescribed in the IP unit for home use.	<p>N = # of patients with inhaled corticosteroids prescribed in the IP unit for home use among patients in the denominator.</p> <p>D= # of patients (2-18 years of age with acute asthma exacerbation) with primary or secondary dx of asthma in the IP</p>	<p>Chart audit of a random sample of 20 patients per month who were identified with a primary or secondary dx of asthma in the IP unit.</p> <p>If desired, CHAT institutions have the</p>	<p>Although there is only one question addressing whether inhaled corticosteroids were prescribed or dispensed, the possible answers indicated in the data portal allow the calculation of these two metrics separately.</p>	

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PROCESS AND OUTCOME MEASURES				
Measure	Statistics	Data Collection	Definitions	Goal (Goal to be reevaluated after current baseline/ institutional benchmark is collected)
	unit.	option to audit the charts of all patients who were identified with a primary or secondary dx of asthma in the IP unit in a given month.	Exclude patients transferred from another institution or provider office	
Submeasure of IP-P6 (inhaled corticosteroids prescribed in the IP unit for home use) IP- P7. Proportion of patients with inhaled corticosteroids dispensed in the IP unit for home use.	N = # of patients with inhaled corticosteroids dispensed in the IP unit for home use among patients in the denominator. D= # of patients (2-18 years of age with acute asthma exacerbation) with primary or secondary dx of asthma in the IP unit.	Chart audit of a random sample of 20 patients per month who were identified with a primary or secondary dx of asthma in the IP unit. If desired, CHAT institutions have the option to audit the charts of all patients who were identified with a primary or secondary dx of asthma in the IP unit in a given month.	Although there is only one question addressing whether inhaled corticosteroids were prescribed or dispensed, the possible answers indicated in the data portal allow the calculation of these two metrics separately.	
IP- O1. Proportion of readmission to hospital within 12 months.	N= # patients with a primary or secondary diagnosis of asthma	Chart audit of a random sample of the same 20 patients per month, to	Need to report the initial date of IP visit and any of the readmission dates to the IP	< 6.5%

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PROCESS AND OUTCOME MEASURES				
Measure	Statistics	Data Collection	Definitions	Goal (Goal to be reevaluated after current baseline/ institutional benchmark is collected)
	<p>with subsequent admissions within a rolling 12 month-period.</p> <p>D= # of patients* (2-18 years of age with acute asthma exacerbation) with primary or secondary dx of asthma in the IP unit.</p> <p>*Observation and inpatient unit patients</p>	<p>be followed within a rolling 12 month-period, who were identified with a primary or secondary dx of asthma in the IP unit.</p> <p>If desired, CHAT institutions have the option to audit the charts of all patients who were identified with a primary or secondary dx of asthma in the IP unit in a given month, within a rolling 12 month-period.</p>	<p>by patient (within a rolling 12 month-period). This is to calculate the following readmission measures: 14 days, 30 days, 3 months, and 6 months.</p> <p>Readmission can be from IP/ OBS</p> <ul style="list-style-type: none"> • To ED • To IP/ OBS <p>NOTE: Chart audit of a random sample of the same 20 patients per month was decided; this is to allow for identification of high-risk patients</p>	
IP- O2. Average length of stay for asthma-related hospitalization.	Average of total days length of stay for inpatients (acute and critical care, regardless of status) with a primary or secondary diagnosis of asthma.	<p>All patients with a primary or secondary diagnosis of asthma.</p> <p>Measures can be collected either as CY or FY.</p>	<p>Time of arrival to the ED, observation, inpatient unit and discharge from the observation and IP units need be collected</p>	< 48 hrs

DATA COLLECTION FORM

ED AND IP

Patient Demographics

1. Hospital code
 - 01 - Texas Children's Hospital (Houston)
 - 02 - Children's Medical Center (Dallas)
 - 03 - Children's Hospital of San Antonio
 - 04 - Dell Children's Medical Center (Austin)
 - 05 - Cook Children's Medical Center (Fort Worth)
 - 06 - Covenant Children's Hospital (Lubbock)
 - 07 - Driscoll Children's Hospital (Corpus Christi)
 - 08 - El Paso Children's Hospital
2. Patient
 - a. Name (First Name and Last name) _____
 - b. Patient ID used at each CHAT institution _____
 - c. Hospital account ID (for use by Hospital only) _____
 - d. DOB (MM/DD/YYYY): ___/___/___
 - e. Gender: Male /Female _
 - f. Insurance:
 - Private
 - State funded (Medicaid and CHIP)
 - g. Patient type
 - ED
 - IP
 - Obs
 - h. Patient Zip code _____
 - i. Diagnosis (ICD 9 - primary and secondary)
Primary OR secondary admission diagnosis must be asthma

ICD9

- 493 ASTHMA
- 493 EXTRINSIC ASTHMA
- 493 EXTRINSIC ASTHMA, UNSPECIFIED
- 493.01 EXTRINSIC ASTHMA WITH STATUS ASTHMATICUS
- 493.02 EXTRINSIC ASTHMA WITH EXACERBATION
- 493.1 INTRINSIC ASTHMA
- 493.1 INTRINSIC ASTHMA, UNSPECIFIED
- 493.11 INTRINSIC ASTHMA WITH STATUS ASTHMATICUS
- 493.12 INTRINSIC ASTHMA WITH EXACERBATION

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493.2	CHRONIC OBSTRUCTIVE ASTHMA
493.2	CHRONIC OBSTRUCTIVE ASTHMA, UNSPECIFIED
	CHRONIC OBSTRUCTIVE ASTHMA WITH STATUS
493.21	ASTHMATICUS
493.22	CHRONIC OBSTRUCTIVE ASTHMA WITH EXACERBATION
493.8	OTHER FORMS OF ASTHMA
493.81	EXERCISE INDUCED BRONCHOSPASM
493.82	COUGH VARIANT ASTHMA
493.9	UNSPECIFIED ASTHMA
493.91	UNSPECIFIED ASTHMA, WITH STATUS ASTHMATICUS
493.92	UNSPECIFIED ASTHMA, WITH EXACERBATION
	OTHER; IF OTHER PLEASE SPECIFY: ICD9 CODE

DATA COLLECTION FORM

ED

Pathway compliance (ED)	<ol style="list-style-type: none"> 1. Date of triage (MM/DD/YYYY): <u> </u>/<u> </u>/<u> </u> 2. Time of triage (in 24:00): <u> </u>:<u> </u>:<u> </u> 3. Asthma scoring instrument used: 4. Asthma score code (2 digits): <ol style="list-style-type: none"> a. 01 – Modified Pediatric Asthma Score (PAS) - Dell b. 02 - Respiratory Score – Covenant c. 03- Clinical Respiratory Score (CRS) d. Other score used e. Not used 5. Triage asthma score: Score field to be available for actual score entry if score is PAS, respiratory score, CRS, and other score used 6. Date of Anticholinergic (i.e. Atrovent/ Ipratropium Bromide) start (MM/DD/YYYY): <u> </u>/<u> </u>/<u> </u> 7. Time of Anticholinergic (i.e. Atrovent / Ipratropium Bromide) start (in 24:00): <u> </u>:<u> </u>:<u> </u> 8. Date of Magnesium start -MM/DD/YYYY): <u> </u>/<u> </u>/<u> </u> 9. Time of Magnesium start (in 24:00): <u> </u>:<u> </u>:<u> </u> 10. Date of discharge checklist completed (MM/DD/YYYY): <u> </u>/<u> </u>/<u> </u> 11. Time of discharge checklist completed (in 24:00): <u> </u>:<u> </u>:<u> </u> 12. Date of discharge from ED to home (MM/DD/YYYY): <u> </u>/<u> </u>/<u> </u> 13. Time of discharge from ED to home (in 24:00): <u> </u>:<u> </u>:<u> </u> 14. Patient disposition <ol style="list-style-type: none"> a. Date of transfer from ED to Obs (MM/DD/YYYY): <u> </u>/<u> </u>/<u> </u> b. Time of transfer from ED to Obs (in 24:00): <u> </u>:<u> </u>:<u> </u> c. Date of transfer from ED to Inpatient(MM/DD/YYYY): <u> </u>/<u> </u>/<u> </u> d. Time of transfer from ED to Inpatient (in 24:00): <u> </u>:<u> </u>:<u> </u> e. Date of transfer from ED to another hospital (MM/DD/YYYY): <u> </u>/<u> </u>/<u> </u> f. Date of transfer from ED to another hospital (in 24:00): <u> </u>:<u> </u>:<u> </u> g. Expired - Date of death (MM/DD/YYYY): <u> </u>/<u> </u>/<u> </u> h. Expired - Time of death (in 24:00): <u> </u>:<u> </u>:<u> </u>
Time from ED triage to administration of β agonist (1 st dose only)	<ol style="list-style-type: none"> 1. Date of β agonist start (MM/DD/YYYY): <u> </u>/<u> </u>/<u> </u> 2. Time of β agonist start (in 24:00): <u> </u>:<u> </u>:<u> </u>
Time from ED triage to administration of steroids (1 st dose only)	<ol style="list-style-type: none"> 1. Date of steroid start (MM/DD/YYYY): <u> </u>/<u> </u>/<u> </u> 2. Time of steroid start (in 24:00): <u> </u>:<u> </u>:<u> </u>
Asthma patients with a documented self-management plan (ED) (Optional Measure)	<ol style="list-style-type: none"> 1. Patient had a documented self-management plan (Y/N/NA) <u> </u>
Patients/families assessed for their understanding of the asthma management plan (ED) (Optional Measure)	<ol style="list-style-type: none"> 1. Patients/families assessed for their understanding of the asthma management plan (Y/N/NA) <u> </u>
Patients with inhaled corticosteroids prescribed or dispensed in the ED (Optional Measure)	<ol style="list-style-type: none"> 1. Were inhaled corticosteroids prescribed or dispensed the ED? <ol style="list-style-type: none"> a. Prescription given b. Dispensed for home use c. Already on d. Not given

CHAT Asthma Safety and Quality Collaborative
Comprehensive Site Workbook

DATA COLLECTION FORM

IP

<p>Pathway compliance (IP)</p>	<ol style="list-style-type: none"> 1. Date of admission (MM/DD/YYYY): <u> </u>/<u> </u>/<u> </u> 2. Time of admission (in 24:00): <u> </u>:<u> </u> 3. Date of discharge checklist initiated (MM/DD/YYYY): <u> </u>/<u> </u>/<u> </u> 4. Time of discharge checklist initiated (in 24:00): <u> </u>:<u> </u> 5. Use valve holding chamber for β agonist (Y/N/NA) <ol style="list-style-type: none"> a. If used, date (MM/DD/YYYY): <u> </u>/<u> </u>/<u> </u> b. If used, start time (in 24:00): <u> </u>:<u> </u> 6. Flu shot given: <ol style="list-style-type: none"> a. If yes <ol style="list-style-type: none"> i. Date of flu shot (MM/DD/YYYY): <u> </u>/<u> </u>/<u> </u> ii. Time of flu shot (in 24:00): <u> </u>:<u> </u> b. If no <ol style="list-style-type: none"> i. Refused ii. Not available / Not in season iii. Already received iv. Not documented 7. Date of discharge checklist completed (MM/DD/YYYY): <u> </u>/<u> </u>/<u> </u> 8. Time of discharge checklist completed (in 24:00): <u> </u>:<u> </u> 9. Discharge criteria : Q3X2 <u> </u> , Q4X2 <u> </u> , other <u> </u> 10. Patient Disposition <ol style="list-style-type: none"> a. Date of discharge from IP to home(MM/DD/YYYY): <u> </u>/<u> </u>/<u> </u> b. Time of discharge from IP to home (in 24:00): <u> </u>:<u> </u> c. Date of transfer from IP to another hospital (MM/DD/YYYY): <u> </u>/<u> </u>/<u> </u> d. Time of transfer from IP to another hospital (in 24:00): <u> </u>:<u> </u> e. Expired- Date of death (MM/DD/YYYY): <u> </u>/<u> </u>/<u> </u> f. Expired -Time of death (in 24:00): <u> </u>:<u> </u>
<p>Asthma patients with a documented self-management plan (IP)</p>	<ol style="list-style-type: none"> 1. Patient had a documented self-management plan (Y/N/NA) <u> </u>
<p>Patients/families assessed for their understanding of the asthma management plan (IP)</p>	<ol style="list-style-type: none"> 1. Patients/families assessed for their understanding of the asthma management plan (Y/N/NA) <u> </u>
<p>Patients excluding those with intermittent asthma with inhaled corticosteroids prescribed or dispensed in the IP</p>	<ol style="list-style-type: none"> 1. Were inhaled corticosteroids prescribed or dispensed the IP? <ol style="list-style-type: none"> a. Prescription given b. Dispensed for home use c. Already on d. Not given

READMISSION DATA COLLECTION FORM

ED AND IP

b) Hospital code

- 01 - Texas Children's Hospital (Houston)
- 02 - Children's Medical Center (Dallas)
- 03 - Children's Hospital of San Antonio
- 04 - Dell Children's Medical Center (Austin)
- 05 - Cook Children's Medical Center (Fort Worth)
- 06 - Covenant Children's Hospital (Lubbock)
- 07 - Driscoll Children's Hospital (Corpus Christi)
- 08 - El Paso Children's Hospital

c) Patient

- a. Name (First Name and Last name) _____
- b. Patient ID used at each CHAT institution _____
- c. Hospital account ID (for use by Hospital only) _____
- d. DOB (MM/DD/YYYY): __/__/____
- e. Gender: Male /Female _
- f. Insurance:
 - Private
 - State funded (Medicaid and CHIP)
- g. Patient type
 - ED
 - IP
 - Obs
- h. Patient Zip code _____
- i. Triage /Admission date (MM/DD/YYYY): __/__/____
- j. Triage /Admission time (in 24:00): __:__
- k. Discharge date (MM/DD/YYYY): __/__/____
- l. Discharge time (in 24:00): __:__
- m. **Admission Diagnosis** - Primary OR secondary admission diagnosis must be asthma
- n. **Readmission Diagnosis** - Same cause for any diagnosis of asthma (even if it is primary, secondary, third or fourth diagnosis)

ICD9

- 493 ASTHMA
- 493 EXTRINSIC ASTHMA
- 493 EXTRINSIC ASTHMA, UNSPECIFIED
- 493.01 EXTRINSIC ASTHMA WITH STATUS ASTHMATICUS
- 493.02 EXTRINSIC ASTHMA WITH EXACERBATION
- 493.1 INTRINSIC ASTHMA

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493.1	INTRINSIC ASTHMA, UNSPECIFIED
493.11	INTRINSIC ASTHMA WITH STATUS ASTHMATICUS
493.12	INTRINSIC ASTHMA WITH EXACERBATION
493.2	CHRONIC OBSTRUCTIVE ASTHMA
493.2	CHRONIC OBSTRUCTIVE ASTHMA, UNSPECIFIED
	CHRONIC OBSTRUCTIVE ASTHMA WITH STATUS
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	OTHER; IF OTHER PLEASE SPECIFY: ICD9 CODE

CULTURE

The below documents describe strategies to enhance the promotion of quality improvement-related culture among CHAT hospitals. These include:

- Stakeholders matrix
 - To help identify stakeholders according to the Gladwell's classification
- The four conversations matrix
 - Strategies to influence change through different types of conversations
- Asthma-related stories (90 seconds elevator speech)
 - Stories of children with asthma illustrating both the gaps in quality of care delivery and the success stories for how CHAT hospitals are bridging that gap
- Strategies to influence people behaviors matrix
- Strategies to celebrate success
 - At the institutional as well as the aggregate level
- Talking points for the collaborative
 - Information about CHAT that would make for brief media snippets and /or discussions with legislators

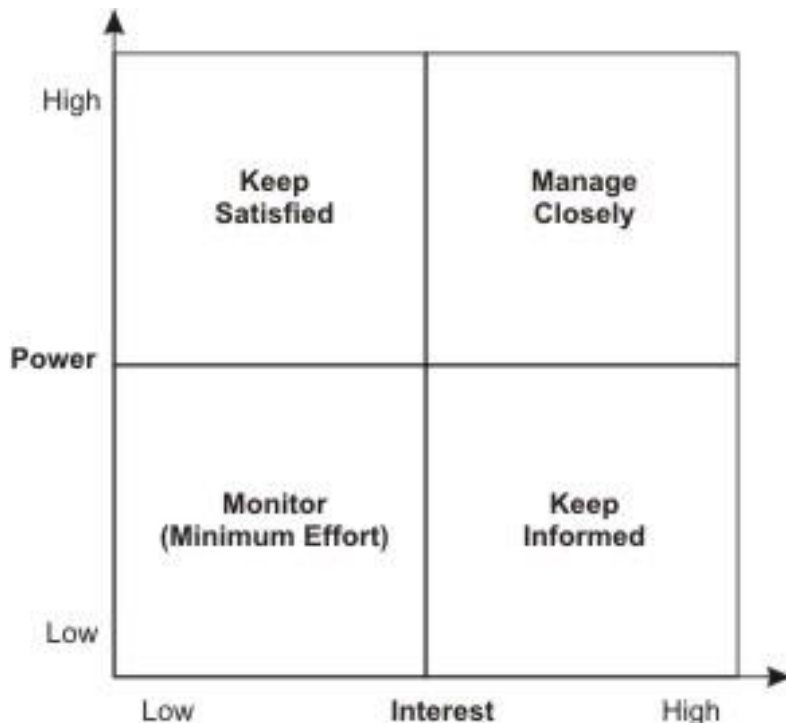
STAKEHOLDERS MATRIX

Stakeholders	Gladwell's Classification*	Who (Name and Role)	Stakeholder Priority Classification**	Strategies to engage stakeholder (s)
ED	Connectors "People Specialists"			
	Mavens "Information Specialists"			
	Salesmen			
IP Unit	Connectors "People Specialists"			
	Mavens "Information Specialists"			
	Salesmen			
People in the periphery (who may not be in the ED or IP settings however are important for the success of this collaborative)	Connectors "People Specialists"			
	Mavens "Information Specialists"			
	Salesmen			

Gladwell's Classification*

- Connectors “People Specialists”
 - Know lots of people, knack for making friends & acquaintances
 - Occupy many different worlds, subcultures & niches
 - Strength of weak ties- gives access to opportunities & worlds to which we don't belong
- Mavens “Information Specialists”
 - One who accumulates knowledge
 - Considered resources by their friends
 - Socially motivated, want to help others
 - Not a persuader
- Salesmen
 - Persuade when others are unconvinced
 - Persuasion can be subtle
 - Importance of little things (headphones & nodding)
 - Nonverbal cues more important than verbal
 - Works in ways difficult to appreciate
 - Microrhythms (drawn into personal interactions & dictate the terms of interaction)
 - Emotional Infection- infect each other with emotions; “outside-in” concept

Stakeholder Priority Classification **



- High power, interested people
- High power, less interested people
- Low power, interested people
- Low power, less interested people

STRATEGIES FOR ENGAGEMENT OF STAKEHOLDERS

- Prioritize stakeholders in the implementation of EB guidelines
 - High power, interested people: must fully engage and make the greatest efforts to satisfy
 - Administrators who influence resource supporting QI initiatives
 - Clinicians with positions of power to effect clinical venues of care
 - Ordering MDs engaged in QI initiatives
 - Academia
 - Section/ division chiefs
 - Decentralized quality leaders
 - Financial leaders
 - CFO and VP of finance
 - High power, less interested people: keep satisfied, but not so much that they become bored with your message
 - People influencing clinical care delivery, however not directing it / are not the strategists
 - Ordering MDs if not engaged in QI initiatives
 - Low power, interested people: keep adequately informed, and ensure that no major issues are arising. Can often be very helpful with the detail of your project.
 - Many of the clinicians and nurses who are not really active in the decision making process. These are on the periphery and some day may be influential
 - Low power, less interested people: monitor but do not bore them with excessive communication
 - People usually not involved in QI initiatives may have very little to do with asthma (possibly residents or fellows in training environment)

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THE FOUR CONVERSATION MATRIX

Conversations and Change

Initiative Conversations:

- Introduce new ideas, directions, or possible courses of action
- To start, launch, or open a new arena or avenue for consideration and investigation

Conversations for Understanding:

- Opportunities for participants to comprehend, appreciate, or understand something
- Allow participants to offer support; question or challenge reasons, assumptions, or logic

Conversations for Performance:

- Generate actions and results
- Specific requests and promises that serve as “calls for” action
- Creates a commitment to make something happen by a certain time

Closure Conversations:

- Close out those commitments by creating “endings”
- Summary reports
- Recognitions
- Acknowledgements

Using the Four Conversations*

Situation	Try This First	And Then This
<p>People are not doing what they said they would do when they said they would do it.</p>	<p>Initiative conversation - review the intended objectives and timelines, and the importance of a positive outcome.</p> <p>Understanding conversation- have a Q&A session to identify the issues.</p>	<p>Performance conversation - make requests and promises to resolve the issues.</p> <p>Closure conversation - follow up to review the results and amend agreements to keep moving ahead.</p>
<p>People are taking a long time to do things and running over deadlines.</p> <p>People are resisting.</p> <p>People seem confused, uncertain, or unclear even though you have explained things completely.</p>	<p>Review the performance conversation - see if your requests included deadlines, if you are getting good promises, and if you have been consistent in your follow-up.</p> <p>Closure conversation- acknowledge the resistance and ask people what will reduce or eliminate it.</p> <p>Performance conversations - make requests (If you have really a good understanding conversation, then understanding if not the issue).</p>	<p>Closure conversation - acknowledge the late performance and find out what they suggest to shorten the response time.</p> <p>Performance conversations – make the requests and promises for actions and results they say will reduce the resistance.</p> <p>Closure Conversation - acknowledge promises are not being kept and find out what is really behind the confusion. Amends agreements as needed.</p>
<p>People have ideas that agree with, but none of their ideas get put into action (a common complaint about meetings).</p>	<p>Performance conversations - make requests and promises. In meetings, do not adjourn until people have made promises and someone has recorded them.</p>	<p>Closure Conversation - acknowledge the results of the actions taken. At subsequent meetings, make follow-up one of the first agenda items.</p>

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* There is no ideal pattern or mix of the four conversations that change managers should or must follow. Nor is there a particular frequency with which they should use each type of conversation

Excerpted from:

Ford, J.D. & Ford, L.W. "Conversational Profiles: A Tool for Altering the Conversational Patterns of Change Managers". *Journal of Applied Behavioral Science* 2008; 44; p445-467.

Ford, J. & Ford, L. 2009. *The Four Conversations: Daily Communication That Gets Results*. San Francisco: Berrett-Koehler.

ASTHMA–RELATED STORY

90 Seconds Elevator Speech

Texas Children’s Hospital

Jenny Jones

One little girl “Jenny Jones” had been seen for asthma exacerbations in the TCH ED on 3 separate occasions in a 6 month period. Additionally she had been evaluated and treated in 2 other TCH affiliated ED settings, twice in a TCP office during that time frame.

One night she happened to be seen at TCH main campus ED, where Mrs. Jones was asked by the treating physician if they had been able to follow the directions in their asthma action plan. Mrs. Jones opened a folder with six different asthma action plans, and Mrs. Jones asked, “here, you tell me, what am I supposed to be doing.” Indeed, all six plans had different, and sometimes conflicting instructions. It was clear that even within the same system of care, silos had prevented Jenny Jones from receiving high quality, evidence based instructions to manage her own disease.

As a result, an EB standardized protocol (RAMP) was created to partner with a quality of care process improvement team for both the ED and IP unit. Over the years, the adoption of this protocol and its associated rapid cycle process improvement strategies for guideline driven care in asthma has reduced variation in treatment practices and improved patient outcomes.

Children’s Hospital of San Antonio

Maria G.

Maria G. is a 7-yr-old moderate persistent asthmatic, a “frequent flyer” at our Emergency Department, who presents to the ED for the second time in as many months, in moderate respiratory distress, wheezing and tachypneic. She is triaged quickly and taken to a room without delay. After a rapid assessment of the child’s condition, her ED physician tells Maria’s mother that he is ordering albuterol and Atrovent treatments, to be administered via inhaler with a spacer, along with oral steroid medication.

Maria’s mother becomes angry and threatens to take her daughter home “if that’s all you’re going to do for her!” She says that she can give her the inhaler at home by herself and demands to know why nebulized treatments are not being ordered instead. The mother continues, saying “Maria needs the nebulizer when she

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gets this way; the inhaler just doesn't work as well as the machine. We ALWAYS get the nebulizer when we come here, so why can't she get that now?"

After further discussion with the physician and the charge nurse, Maria's mother reluctantly agrees to stay but is clearly unhappy with the treatment plan. Maria's condition improves with the medications as originally ordered and she is ultimately able to be discharged home, with a follow-up appointment to see her pediatrician arranged for the next day. As she leaves the Department, Maria's mother is overheard saying to a family member that she is never bringing her daughter back to this hospital because "these new doctors don't know how to take care of kids right."

Cook Children's Health Care System

Here at Cook Children's Health Care System it is our mission to improve the health of all children in our region, through the prevention and treatment of illness, disease and injury. Following is a story that exemplifies the need for initiatives that simplify processes and reduce variation in care therefore reducing errors and increasing the quality and safety of care provided.

Asthma is a complex disease that at times can be difficult to treat for the practitioner when the patient is in severe respiratory distress. One of the evidenced based recommended treatments is Corticosteroid administration as soon as possible on arrival to the Emergency Department (ED). In the case of a patient that was seen in our ED, the child did not receive these steroids during her ED stay and therefore did not experience the benefit of them prior to going to the Pediatric Intensive Care Unit (PICU). The administration of this drug at initial presentation to the ED could have made a significant improvement in her response to the other treatments she received. Inevitably, it possibly could have made the difference between admit to the floor versus admit to the PICU.

Looking back at the cause, it was found that the physician had many patients that winter day, and really thought he had ordered the medicine. The nurse on duty did not remind the physician of the needed order and therefore the patient never received the medicine. The nurse may not have been aware of the benefit of corticosteroids and the recommendation that all of these kids get them unless contraindicated. Therefore we can ask, was the nurse empowered with the knowledge she needed to approach the physician and remind him? Did the physician have a set plan of action that was evidenced based, straightforward and easy to initiate?

As a result of stories like this, Cook has entered into a pediatric asthma collaborative with other Texas hospitals to create an evidenced based pathway to improve the prevention and treatment of asthma in our communities. Through this partnership we have developed a treatment plan that will decrease the variability of asthma care and aid in the education of care givers therefore improving patient responses and outcomes.

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There are countless other stories of children with asthma illustrating both the gaps in quality of care delivery and the success stories for how Children's Medical Center, Dell Children's Medical Center, Covenant Children's Hospital, Driscoll Children's Hospital, and El Paso Children's Hospital are bridging that gap.

STRATEGIES TO INFLUENCE PEOPLE BEHAVIOR

	Motivation	Ability
Personal	<p>Link to mission and value</p> <p>The key to personal motivation is to help people see the true implications of their actions and choices by connecting the new behaviors to deeply held values.</p> <p>Reemphasize that the adoption of EB pathways reduce variation in treatment practices and improve patient outcomes</p>	<p>Over Invest in Skill Building</p> <p>The key to personal ability is to overinvest in skill building—to build in extensive practice in the toughest, most realistic settings.</p> <p>Results show that a robust training initiative is at the heart of almost all successful influence strategies:</p> <p>Ensure that all personnel caring for asthmatic children is educated on quality collaborative intervention bundle utilizing QI primer, data management, basic asthma EB/ pathway, and asthma best practices</p>
Social	<p>Harness Peer Pressure</p> <p>Effective influencers understand that lots of small interactions shape and sustain the behavioral norms of an organization.</p> <p>Invest in the most influential people—both the formal leaders and the opinion leaders (ED, IP, and peripheral champions)</p>	<p>Create Social Support</p> <p>The key to building the social capital that will extend your influence into every corner of your organization is to spend time building trust with formal and informal opinion leaders.</p> <p>The most influential leaders invest their time and energy with two groups that can magnify their influence efforts:</p> <ul style="list-style-type: none"> • Formal leaders (managers at every level) • Informal leaders (opinion leaders)

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	Motivation	Ability
Structural	<p>Align Rewards and Ensure Accountability</p> <p>The key to rewarding change in behavior is to make the external rewards both real and valuable—they need to send a supportive message</p> <ul style="list-style-type: none"> • Celebrate and reward success • Create a culture of accountability 	<p>Change the Environment</p> <p>The key to changing an organization’s mental agenda is to change the data that routinely crosses people’s desks</p> <ul style="list-style-type: none"> • “Humanize” your QI data • Share periodically run charts/ control charts to communicate process performance

A potential problem encountered in the roll out could be resistance to change/ adopt new practice (s)/ embrace and participate in QI initiatives

Legend:

- White – heading
- Black – definition/ brief description
- Red- specific/ applied to the potential aforementioned problem

STRATEGIES TO CELEBRATE SUCCESS

At the Institutional and Aggregate Level

- Periodic celebratory lunches with personnel involved in the QI initiative (s)
- Post data illustrating performance in conference rooms/ break rooms
- Newsletters
- Periodic updates posted on the intranet about the work of the collaborative and related role of the specific institution

TALKING POINTS

- Asthma is one of the most common chronic disorders in childhood. In 2009, Texas had an estimated 872,000 (13.3 %) children (0-17 yrs) with reported lifetime asthma and 538,000 (8.2%) children with reported current asthma ⁽¹⁾
- In 2010, the Children’s Hospital Association of Texas (CHAT) hospitals provided care to children living in 241 of Texas’ 254 counties.⁽²⁾ According to 2006-2009 Texas Behavioral Risk Factor Surveillance System, about 13% of children with current asthma visited an emergency room or urgent care center because of asthma within the past 12 months ⁽¹⁾
- Asthma is also one of the leading causes of school absenteeism; between 2006-2009, 66.9 % of Texas’ children missed school days due to their asthma in the previous year, of whom 33.7 % missed between two and five days. ⁽¹⁾ Such burden is also sustained by asthmatics seen in CHAT hospitals, which provided care to 95% of Texas’ counties in 2010. ⁽²⁾ Thus, the opportunity that CHAT hospitals have to impact Texas’ children’s lives and their future is tremendous
- To improve pediatric asthma care in Texas, the CHAT Safety and Quality Collaborative was created in 2012. It is a partnership of the following 8 pediatric hospitals and their respective institutional partners in the state of Texas:
 - Texas Children’s Hospital (Houston)
 - Children’s Medical Center (Dallas)
 - Children’s Hospital of San Antonio
 - Dell Children’s Medical Center (Austin)
 - Cook Children’s Medical Center (Fort Worth)
 - Covenant Children’s Hospital (Lubbock)
 - Driscoll Children’s Hospital (Corpus Christi)
 - El Paso Children’s Hospital
- As pediatric hospitals have entered the APR-DRG era, higher standards of care and accountability have been established. Quality improvement increasingly becomes an essential component to ensure hospitals’ financial success by minimizing the cost of delivering children’s health care in Texas
- This collaborative offers the unique opportunity to identify pediatric asthma current practices and related degree of variation, and to reduce such variation in diagnostic and treatment practices, thus improving outcomes for children treated in our network of hospitals. Specifically, we have evaluated and established a systematic process for development and implementation of evidence-based asthma pathways for Emergency Department and inpatient management, through uptake of best practice strategies in an intervention bundle. In order to evaluate care improvement across the state, asthma-related performance measures were identified and a balanced scorecard was developed. ⁽³⁾All CHAT institutions will participate in data collection and analyses. Institution level data will provide

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information for rapid cycle process improvement at each site and aggregate level data will inform our state partnerships, advocates, insurers and legislators on the investment in quality improvement work.

- Thus, this initiative will help to position children's hospitals as leaders in improving the value of health care by increasing the quality and minimizing the cost of delivering children's health care in Texas

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