

## Predicting Admission of Children Presenting to the Emergency Department with Acute Asthma

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# Introduction

- Asthma is the most prevalent chronic illness of childhood.
- Acute asthma exacerbation is the most common complication.
- In Saudi Arabia, an average of 5.7% of all ED visits were secondary to acute asthma <sup>(1)</sup>
- Severity can be assessed by using a clinical score, like Pediatric Asthma Score (PSA)

# Pediatric Asthma Score

Variable	Asthma score		
	1 point	2 points	3 points
Respiratory rate (breaths/min)			
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 saturation (%)	>95 with room air	90-95 with room air	<90 with room air or supplemental oxygen
Auscultation	Normal breathing or end-expiratory wheezing	Expiratory wheezing	Inspiratory and expiratory wheezing, diminished breath sounds, or both
Retractions	None or intercostal	Intercostal and substernal	Intercostal, substernal, and supraclavicular
Dyspnea	Speaks in sentences or coos and babbles	Speaks in partial sentences or utters short cries	Speaks in single words or short phrases or grunts

# Objectives

- **Primary:**

- *To evaluate the utility of PSA and its components in predicting hospital admission for children presenting to ER with moderate to severe acute asthma exacerbation*

- **Secondary:**

- *to evaluate the seasonal variation of acute asthma presentation in children*

# Methods

- From November 2010 to March 2012
- Children 2–12 years of age who are presenting to the ED with acute asthma exacerbation were screened using the PAS at:
  - Baseline
    - 1<sup>st</sup> hour
    - 2<sup>nd</sup> hour
    - 3<sup>rd</sup> hour
    - 4<sup>th</sup> hour
- Patients can be discharged earlier if they fit discharge criteria
- Patients who were critically ill, had heart or chronic lung disease, or received systemic steroids within the past 7 days were excluded from the study, as well as patients with mild asthma

# Methods

- Statistical Analysis:

Receiver operator characteristic (ROC) curves were drawn to assess prediction of admission of PAS and each of its components (AUC) at (BL,1h,2h,3h,2h-BL)

# Results

- 906 visits by children with moderate-to-severe acute asthma were made to the ED.
- 157 admissions

Figure 2: Receiver operator characteristic curves of the acute asthma scores at (a) baseline, (b) 1<sup>st</sup> h, (c) 2<sup>nd</sup> h, (d) 3<sup>rd</sup> h, and (e) the difference in score between the 2<sup>nd</sup> h and baseline. RR: Respiratory rate, OS: Oxygen saturation

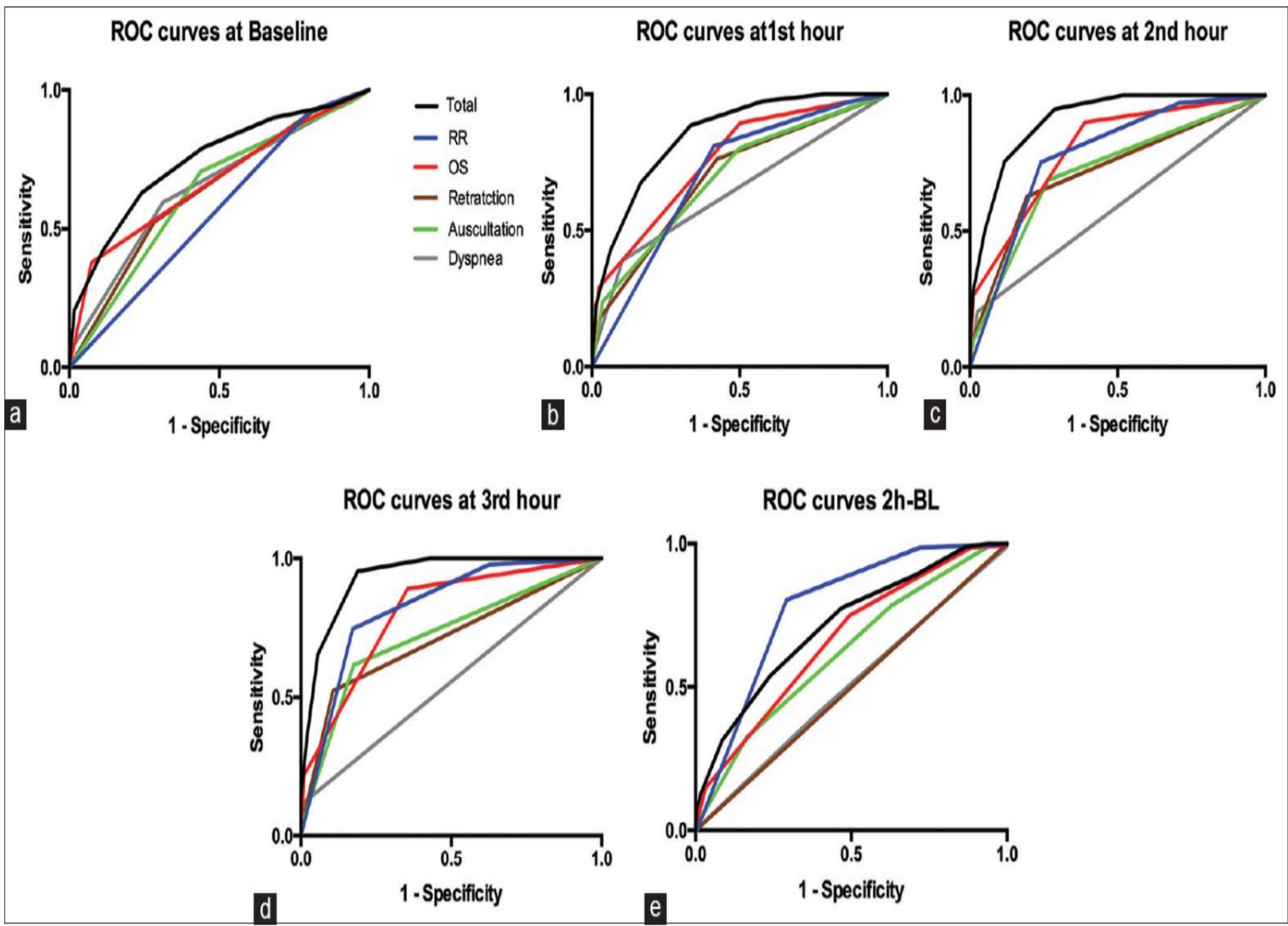
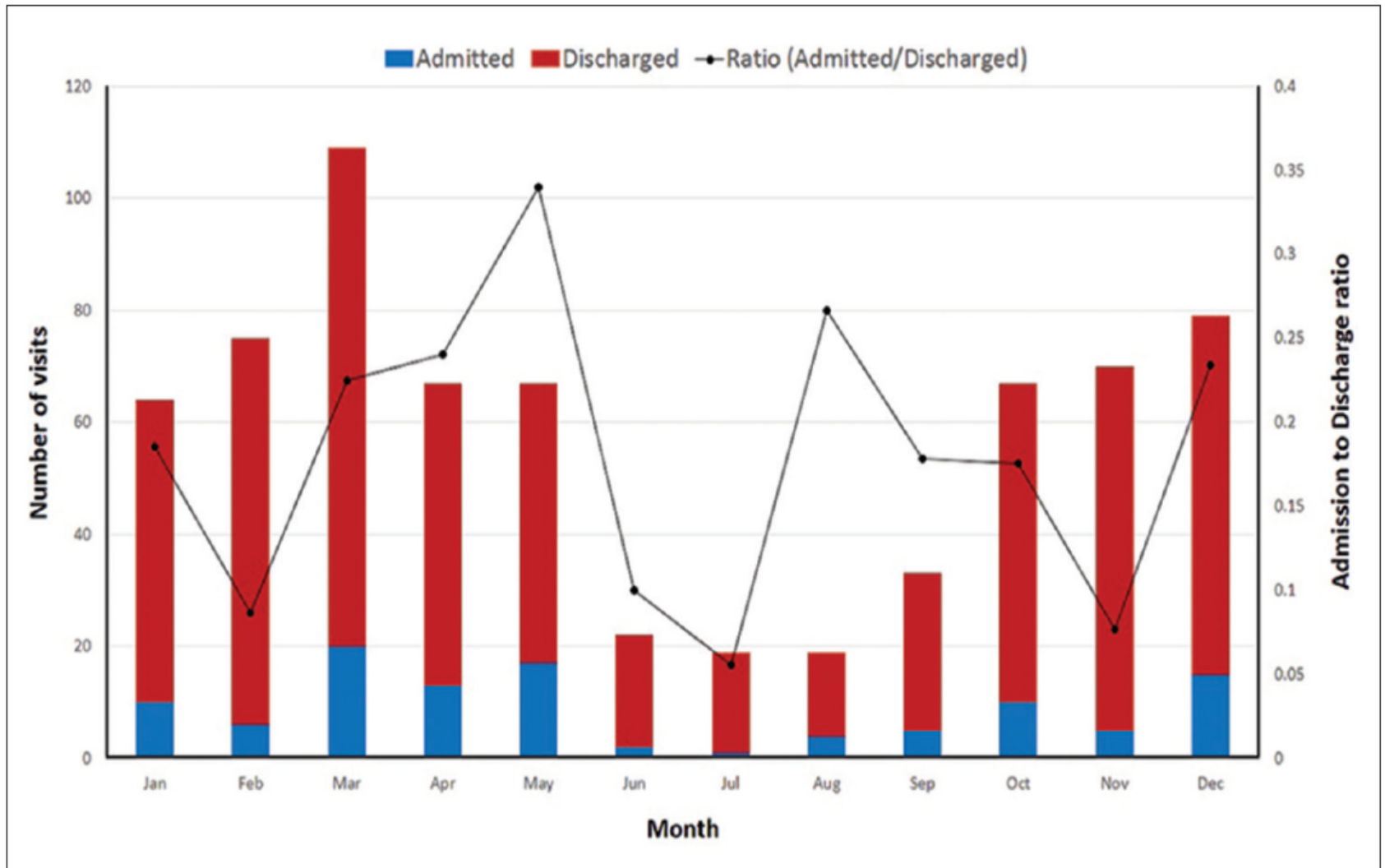




Figure 1: Frequency chart showing the distribution of admitted and discharged children with acute asthma and their ratio from the emergency department over 1 year



# Discussion

- The small difference in the AUC between the 2<sup>nd</sup> and 3<sup>rd</sup> h suggests that more patients could possibly be admitted earlier at the 2<sup>nd</sup> h.
- PRAM score also showed improvement in predictability of admission with time (2)
- Many asthma scoring systems lack OS and RR.  
(3), (4), (5)

# Conclusion and Message

- Admitting more children with acute asthma earlier based on their asthma score, especially when ED beds are on very high demand, could save a lot of valuable time and money.
- There is a great need to have a standardized acute asthma severity score that includes all the important clinical determinants of acute asthma and gives each one an appropriate weight

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# Thank You

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