

MULTI-CENTER IMPLEMENTATION OF A RAPID RESPONSE SYSTEM IN FOUR PEDIATRIC ACADEMIC HOSPITALS DEMONSTRATING EFFECTIVENESS

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On Behalf of the Ontario Pediatric Critical Care

Response Team Collaborative

Summary

- Review the history of the Ontario Pediatric Critical Care Team Collaborative
- Describe Methods
- Describe Data Collection
- Report Results
- Report Expansion of concept
- Limitations

History

- Ministry of Health and Long Term Care - Critical Care Strategy for the province of Ontario
- 2006 funded the development and implementation of a rapid response system into 4 academic pediatric hospitals

Objectives

- Primary

Determine effect of PMET on rate of code blue Events

- Secondary

Determine the effect of the PMET on rate of:

- ▣ PICU Readmission within 48 hours of discharge
- ▣ Urgent PICU admissions
- ▣ Mortality

Methods – Study Design

- Prospective observational study
- Prospective Data Collection
 - 2 years of full service January 29, 2007 – January 29, 2009

Compared to

- Retrospective Data Collection
 - Administrative Databases
 - October 31, 2004 – October 31, 2006

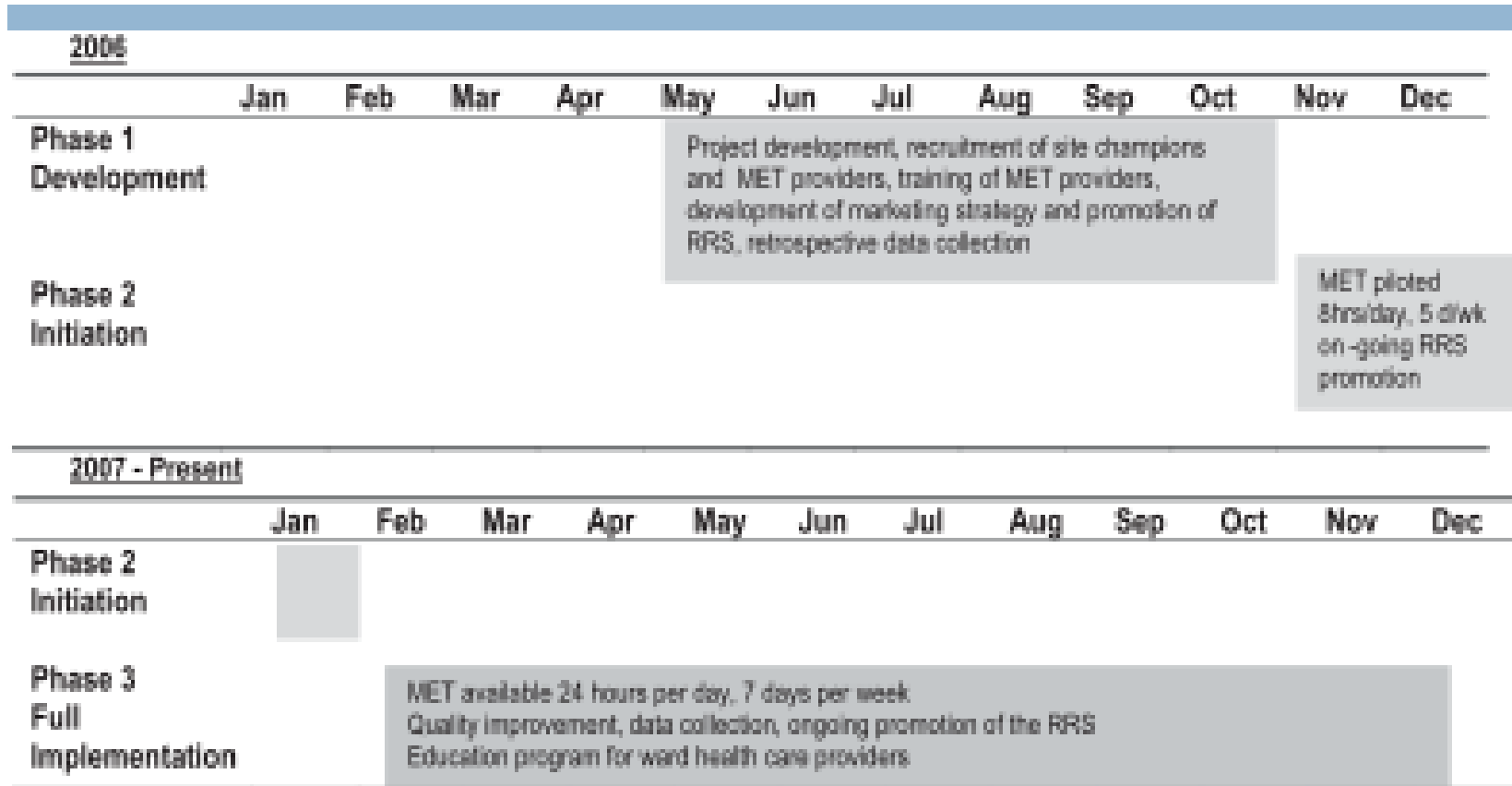
Methods- Setting

- Province of Ontario
- 13 million people
- 98% of all critically ill children admitted into one of the 4 academic tertiary pediatric hospitals

Methods-Setting

	Hospital Beds	PICU Beds	Cardiac Program	ECPR	Transplants
SickKids	300	32	✓	✓	✓
CHEO (Ottawa)	166	10	✓	x	x
MCH (Hamilton)	120	8	x	x	x
LHSC (London)	60	8	x	x	✓

Method-Development



In press Joint Commision Journal on Quality and Patient Safety. Lobos AT, June 2010.

Methods- Data Collection

Activation	A new referral to the PMET
Follow up Activation	Follow up visit to a patient triaged to remain on the ward
Follow up PICU Discharge	Follow up visit of a patient discharge from the PICU
Total Unplanned PICU Admission	Urgent + Readmission to PICU
Urgent PICU Admission	Activation leading to PICU admission
PICU Readmission	Patient readmitted to PICU within 48 hours of PICU discharge
Total Code Blue Events	Any activation of the Code Blue System
Differentiated Code Blue Event	If CPR or PPV >30 sec or intubation or IV epinephrine

Results - Activity

- 2476 Activations
- Activation rate 40/1000 hospital admissions
- 7300 patients followed after PICU Discharge

Results - Activity

Activating Profession

- RN 57%
- MD 37%
- RT 2%
- Family 1%
- Other 3%

Activating Trigger

- 46% Respiratory Trigger
- 21% CVS Trigger
- 18% Health Care Provider Concern
- 11% Neurologic Trigger
- 3% Other

Results – Code Blue Events

	Pre- PMET	During PMET	Rate/1000 hospital admissions
Total Code Blue Events	210	150	4 vs 3 $p < 0.0001$
Differentiated Code Blue	69	66	1.9 vs 1.8 $p = 0.68$
Undifferentiated Code Blue	123	67	3.4 vs 1.9 $P < 0.0001$

Results - Admissions

	Pre PMET	During PMET	Rate/1000 hospital admissions
Hospital Admission	55469	55963	
PICU Admission	7068	7227	
Unplanned PICU Admission	951	1054	17 vs 18 p = 0.19
Urgent PICU Admission	751	891	13.5 vs 16 p = 0.19
PICU Readmission	200	163	3.6 vs 2.9 P < 0.0004

Results- Mortality

Mortality	Pre PMET	During PMET	Rate/1000 hospital admissions
Overall Hospital	553	540	10 vs 9.6 p = 0.65
Unplanned PICU Admission	86	68	1.6 vs 1.2 p = 0.02
Urgent PICU Admission	70	61	1.3 vs 1,1 p = 0.25
PICU Readmission	16	7	0.3 vs 0.1 p = 0.05

Conclusion

- 29% reduction in total Code Blue Events
- 20% reduction in PICU mortality secondary to unplanned admissions
- 57% reduction in PICU mortality secondary to PICU readmission

Where we are different

- Activation 40/1000
- PICU admission 30%
- Novel use of PMET to decrease PICU Readmission

Discussion

- No change in all cause hospital mortality
 - ▣ ?palliative care
- No change in differentiated code blue events
 - ▣ ?low numbers
- Hospital Interaction
 - ▣ ?consultants lower threshold to discharge with PMET “backup”

Future Goals

- Demonstrated a decrease in Total Code Blue events BUT only 40% with prior PMET involvement
 - PEWS
 - Mandatory Calling
- Determine the factors that are associated with readmission
- Examine the interventions the PMET instituted on patients that remained on the wards and prevented PICU readmission
- Examine whether PMET has altered the way deteriorating patients are managed by the ward teams