MEET THE PROFESSOR
– HOW I RUN MY MET TEAM

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Critical Care Canada Forum.
13th-16th November 2011
PATIENTS SUDDENLY DIE IN GENERAL HOSPITAL WARDS NOT IN ICU/OT/ED ENVIRONMENTS
• Up to 80% of patients with in-hospital cardiac arrest have changes in vital signs within eight hours before arrest [Schein RMH. Chest 1990; 98:1388-1392]

• Up to 41% of admissions to ICUs are potentially avoidable [McQuillan P. BMJ 1998;316:1853-1858]

• Patients admitted from general wards have higher mortality than those from the OR, ED or Recovery
HOSPITALS ARE A 19TH CENTURY CONSTRUCT

- Strong vertical components based on individuals
- Almost no horizontal silos
SILOS

• Individual doctor/patient relationship at the centre of training and practice

• Different tribes
  – Doctors
  – Nurses
  – Allied Health
  – Managers
  – Government

• Strong silos
  – Wards
  – Specialised care units
  – Emergency Department
  – Operating Rooms
HOSPITALS ARE A 19TH CENTURY CONSTRUCT

- Comprehensive monitoring and specialised staff – ER, ICU, OT, recovery, CCU
- General wards – low staff ratios, manual monitoring in random, inaccurate and non-standardised way
HOSPITAL POPULATION

- Older
- Multiple co-morbidities
- Complex drugs and interventions
- Societal expectations of medicine
- Reluctance of medicine to discuss its own limitations
OTHER FACTORS

- Medical specialisation
- Committee medicine
- Poor undergraduate training in acute medicine
- Disempowerment of nursing staff
- Medical hierarchies and politeness trumping patient care
SICK PATIENT

NURSE OBSERVES BUT CAN’T ACT

TRAINEE DOCTORS ACT BUT NOT TRAINED

SPECIALIST – TRAINED BUT NOT IN ACUTE MEDICINE

EVENTUALLY MULTIORGAN FAILURE/CARDIAC ARREST AND ADMITTED TO ICU

Systems to connect first signs with acute care specialists
Well Patient
Sick
Pre-arrest
Cardiac Arrest
DEAD

Time
# Medical Emergency Team Calling Criteria

All cardiac and respiratory arrests and all conditions listed below

<table>
<thead>
<tr>
<th>Acute Changes In:</th>
<th>Physiology:</th>
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<td><strong>Airway</strong></td>
<td>Threatened</td>
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| **Breathing**     | ALL RESPIRATORY ARRESTS  
(Respiratory rate < 5  
Respiratory rate > 36) |
| **Circulation**   | ALL CARDIAC ARRESTS  
(Pulse rate < 40  
Pulse rate > 140  
Systolic blood pressure < 90) |
| **Neurology**     | Sudden fall in level of consciousness  
(Fall in GCS of > 2 points)  
Repeated or prolonged seizures |
| **Other**         | Any patient whom you are seriously worried about who does not fit the above criteria |

To call the Medical Emergency Team, phone your emergency number and tell the operator where you are and the location of the patient.
EMERGENCY TEAM CALLS

Mean time <30 min/call
Equally distributed across days of week
Diurnal pattern – 0601 – 1200 h
more common

Resuscitation 2010;81:25
VARIATIONS IN RAPID RESPONSE SYSTEMS (RRS)

• Single criteria for calling
• Score criteria
• Single tier response
• Double tier response
• Outreach team
ICUs and RRSs

• Both novel and challenged existing hospital structure
• Both took time to be accepted
• Both required special skills, experience and knowledge
• Both require funding and staffing
• Neither have been unequivocally shown to have benefit
• Both systems built around the needs of seriously ill patients
LEVEL OF ILLNESS AND OUTCOME FOR RRS AND ICU PATIENTS THE SAME

Crit Care Resus 2008;10:24
Resus 2004;62:137
INTERVENTIONS

Emergency Team Calls
(ie non-cardiopulmonary arrest)

512 control hospitals
1864 MET hospitals
Only 5 of these were not critical care interventions
Only 1 had an assessment/examination

Resuscitation 2010;81:25
BORDERS BETWEEN ICUs and RRSs

- Variations in ICU admission and discharge criteria
- Variation in case mix in hospitals
- Variation in staffing numbers and skill levels in general wards

OFTEN RANDOM CHANCE ABOUT WHERE SERIOUSLY ILL ARE IN THE HOSPITAL
BORDERS BETWEEN ICUs and RRSs

- Designed around seriously ill patients
- Our hospital colleagues had little insight into how inappropriate their skills were for caring for the seriously ill
- Initial resistance to both ICUs and RRSs - now legitimate
- Concept closed / open ICUs / RRSs
BORDERS BETWEEN ICUs and RRSs

Austin Hospital, Melbourne – mature system; 50 calls/1000 patient admissions

- 2000 1700 ICU adm 250 MET calls
- 2008 2000 ICU adm 1600 MET calls
EXTENSION OF MET CONCEPT

- MET becomes surrogate dying team
- Intensivists make diagnosis of dying
- Parallel urgent Palliative Care response system
MET AND END-OF-LIFE CARE

• Multicentre international study
• About one-third of all calls were to make end-of-life decisions
• Many calls were made after hours
• Large workload for MET teams and huge problem in dealing with end-of-life in acute hospitals.

CCM 2011: in press
DOES A MET/RRS WORK?
SINGLE CENTRE STUDIES ALL SHOW A REDUCTION IN CARDIAC ARRESTS AND DEATHS

- System implementation is different from drug and procedural implementation
- A large Hawthorn effect is essential
50% reduction in CARDIAC ARRESTS after casemix adjustment odds ratio
0.5: 95% CI 0.35-0.73

BMJ 2002;324:387
The MET system reduces mortality

META ANALYSIS

30% reduction in paediatric mortality and cardiac arrest rates
30% reduction in adult cardiac arrest rates

NOT ACHIEVED BY ANY OTHER INTERVENTION
REDEFINING RESUSCITATION

Is about system implementation as well as individual clinical skills
EFFECTIVE IMPLEMENTATION OF RAPID RESPONSE SYSTEMS

1. Triggering criteria
2. Response – 24/7 of at least one person with advanced resuscitation skills
3. Ownership and administration within a hospital
4. Education
   • Awareness – EVERYONE
   • Basic resuscitation – NURSES AND ON-SITE MEDICAL STAFF
   • Advanced resuscitation – MINIMUM 1 PERSON 24/7
5. Key performance Indicators (KPIs)
   • Measure problem
   • Track implementation and maintenance
   • Measure effectiveness

ALL IMPLEMENTED SIMULTANEOUSLY
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Notes:
- Rapid Response
- Medical Review
THE FUTURE
– Changing Hospital Population

• LOS
• Older, sicker, more complex procedures
• Multiple co-morbidities
• Changing role of general ward
THE FUTURE

• Universal non-invasive signal generation monitoring
• Use algorithms from signals to triage patients
NEED TO CARE FOR CRITICALLY ILL PATIENTS
NOT CRITICAL CARE UNITS