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Middle East Forum on Quality and Safety in Healthcare 2016

Inspiring Innovation in Healthcare

13 - 15 May 2016 QNCC, Doha, Qatar

# Managing Patient Deterioration in HMC The Qatar Early Warning System (QEWS)

Dr David Vaughan

PROGRAM DIRECTOR

Dr Ibrahim Fawzy

PROGRAM EXECUTIVE

Mr Colin Hackwood

PROGRAM MANAGER

# Agenda



## Introductions

David Vaughan

## Part A

Background to QEWS

David Vaughan

## Part B

Clinical Significance of QEWS

Ibrahim Fawzy

Describe how such systems may fail

Ibrahim Fawzy

## Part C

Delivery large-scale programs

Colin Hackwood

## Summary

Current QEWS Performance & Beyond

David Vaughan



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# Session Objectives & Outcomes



- 1) Describe the QEWS safety net system
- 2) Understand the role of Early Warning System in the early detection of clinical deterioration in a patient's condition
- 3) Describe how such systems may fail
- 4) Describe how to achieve large scale implementation through the adoption of a systematic framework
- 5) Knowledge of current system performance since introduction across HMC
- 6) Describe how you can improve the performance of your system locally

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# Part A

Dr David Vaughan

PROGRAM DIRECTOR

# Background



- “Unexpected” clinical deterioration occurs commonly in healthcare systems around the world
- Usually preceded by changes in vital signs and other physiological and/or laboratory test derangement
- Respiratory Rate
- Blood Pressure
- Heart Rate
- Mental Status
- Low Glucose

# Reasons for Failure to Rescue



- Monitoring technology only used in certain units
- Ward monitoring is usually intermittent (e.g. q 8)
- Regular assessment by nurse and doctor may be infrequent
- Vital signs measurement may be incomplete
- When VS are abnormal, there may not be a criteria for escalation
- Individual judgment is used, which is often variable
- If alert is issued, may often go through a long chain of command
- Staff may not be available to respond

*Jones DA, DeVita MA, Bellomo R. Rapid-response teams. N Engl J Med. 2011 Jul 14;365(2):139–46.*

# Pre-Implementation Objectives



- Establish legitimate Corporate-level and Facility governance structures
- Develop policies and protocols to support sustainable implementation;
- Develop a suite of population-specific, standardized observation charts for use by all clinicians in non-continuous monitoring environments;
- A functional Rapid Response System within all facilities;
- An appropriate education model to train to all HMC staff to program requirements;
- A relevant evaluation model that will support continuous professional improvement; and
- An electronic medical record platform that will support improved documentational practices by nurses and physicians.

*Jones DA, DeVita MA, Bellomo R. Rapid-response teams. N Engl J Med. 2011 Jul 14;365(2):139–46.*

# Supporting Evidence



THE NEW ENGLAND JOURNAL of MEDICINE

REVIEW ARTICLE

CURRENT CONCEPTS

## Rapid-Response Teams

Daryl A. Jones, M.D., M.B., B.S., Michael A. DeVita, M.D.,  
and Rinaldo Bellomo, M.D., M.B., B.S.

**R**APID-RESPONSE TEAMS HAVE BEEN INTRODUCED TO INTERVENE IN THE care of patients with unexpected clinical deterioration. These teams are key components of rapid-response systems, which have been put in place because of evidence of “failure to rescue” with available clinical services, leading to serious adverse events.<sup>1</sup> A serious adverse event may be defined as an unintended injury that is due in part to delayed or incorrect medical management and that exposes the patient to an increased risk of death and results in measurable disability.<sup>2</sup> Rapid-response systems aim to improve the safety of hospital-ward patients whose condition is deteriorating. These systems are based on identification of patients at risk, early notification of an identified set of responders, rapid intervention by the response team, and ongoing evaluation of the system’s performance and hospital-wide processes of care.<sup>1</sup> Rapid-response systems have been implemented in many countries and across the United States.<sup>3-4</sup>

Rapid-response teams differ from traditional code teams in a number of ways (Table 1). They assess a greater number of hospitalized patients at an earlier stage of clinical deterioration, with the aim of preventing serious adverse events such as cardiac arrests and unexpected deaths. Thus, rapid-response teams assess patients in whom respiratory, neurologic, or cardiac deterioration develops rather than patients who have already had a respiratory or cardiac arrest.<sup>5</sup>

Whether rapid-response systems are effective is controversial. Their introduction was prompted by five before-and-after comparisons that were single-center studies.<sup>6-11</sup> These studies showed a reduction in the rate of cardiac arrests and a greater effect with a greater “dose” of care from the rapid-response team (i.e., a larger number of assessments per 1000 admissions).<sup>12</sup> However, a major multicenter, cluster-random-

From the Australian and New Zealand Intensive Care Research Centre, Department of Epidemiology and Preventive Medicine, Monash University, Melbourne, VIC (D.A.J.); and the Department of Intensive Care, Austin Hospital, Heidelberg, VIC (D.A.J., R.B.) — both in Australia; and the Departments of Critical Care Medicine and Internal Medicine, University of Pittsburgh School of Medicine, Pittsburgh (M.A.D.). Address reprint requests to Dr. Bellomo at the Intensive Care Unit, Austin Hospital, Studley Rd., Heidelberg, VIC, 3084 Australia, or at [rinaldo.bellomo@austin.org.au](mailto:rinaldo.bellomo@austin.org.au).

N Engl J Med 2011;365:139-46.  
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# Challenges to Implementation



Cultural

Logistical

Political

Anthropological

Social

Technical

Medical

Financial



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# Program Benefits

## Benefits to HMC

Standardized and uniform policy and process for the management of deterioration in the conditions of in-patients

Decreased critical incidence and mortality

Leader of best practice clinical measures within GCC

Reduction of operational costs due to reduction in length of stay

Decreased operational burden



# Comparison Between Code & Rapid Response Teams



| Typical Feature                             | Traditional Code Team                                                              | Rapid Response Team                                           |
|---------------------------------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------|
| Calling Criteria                            | No recordable pulse; No recordable BP; Absence of respiratory effort; unresponsive | Low BP; Rapid HR; Respiratory Distress; altered consciousness |
| Condition that the team assesses and treats | Cardiac Arrest; Respiratory Arrest; Airway Obstruction                             | Sepsis, pulmonary edema, arrhythmias; respiratory failure     |
| Team Composition                            | Anesthesia Fellow; ICU Fellow; residents; ICU nurse                                | Anesthesia Fellow; ICU Fellow; residents; ICU nurse           |
| Call Rate (no/ 1000 admissions)             | 0.5-5                                                                              | 20-40                                                         |
| In-hospital Mortality (%)                   | 70-90                                                                              | 0-20                                                          |

Jones DA, DeVita MA, Bellomo R. Rapid-response teams. *N Engl J Med*. 2011 Jul 14;365(2):139–46.

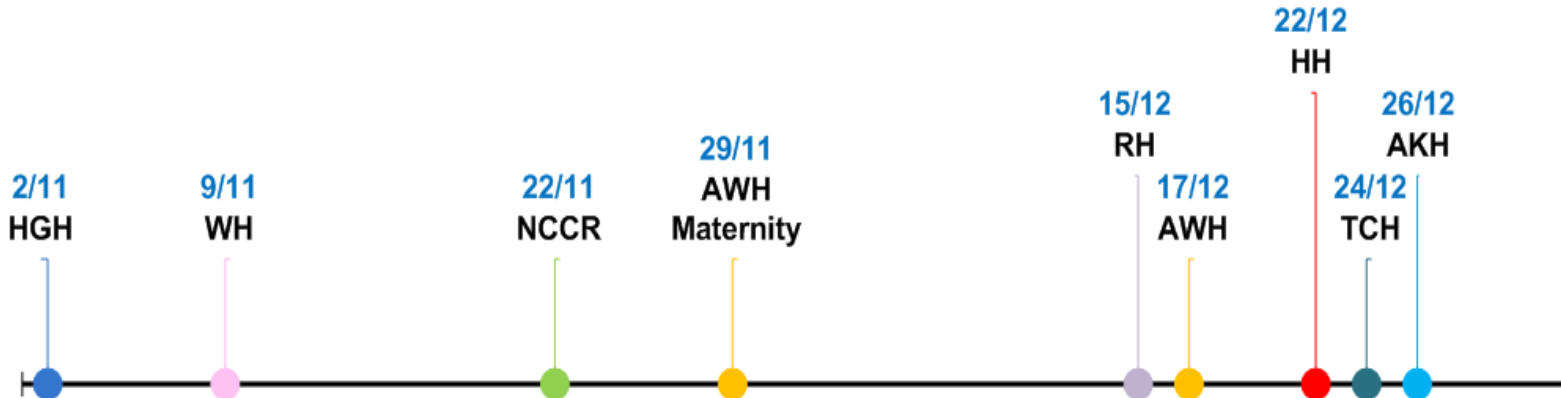
# Deteriorating Patient Response System



## Qatar Early Warning System (QEWS)



### Go Live Dates



01/11/2015

01/01/2016

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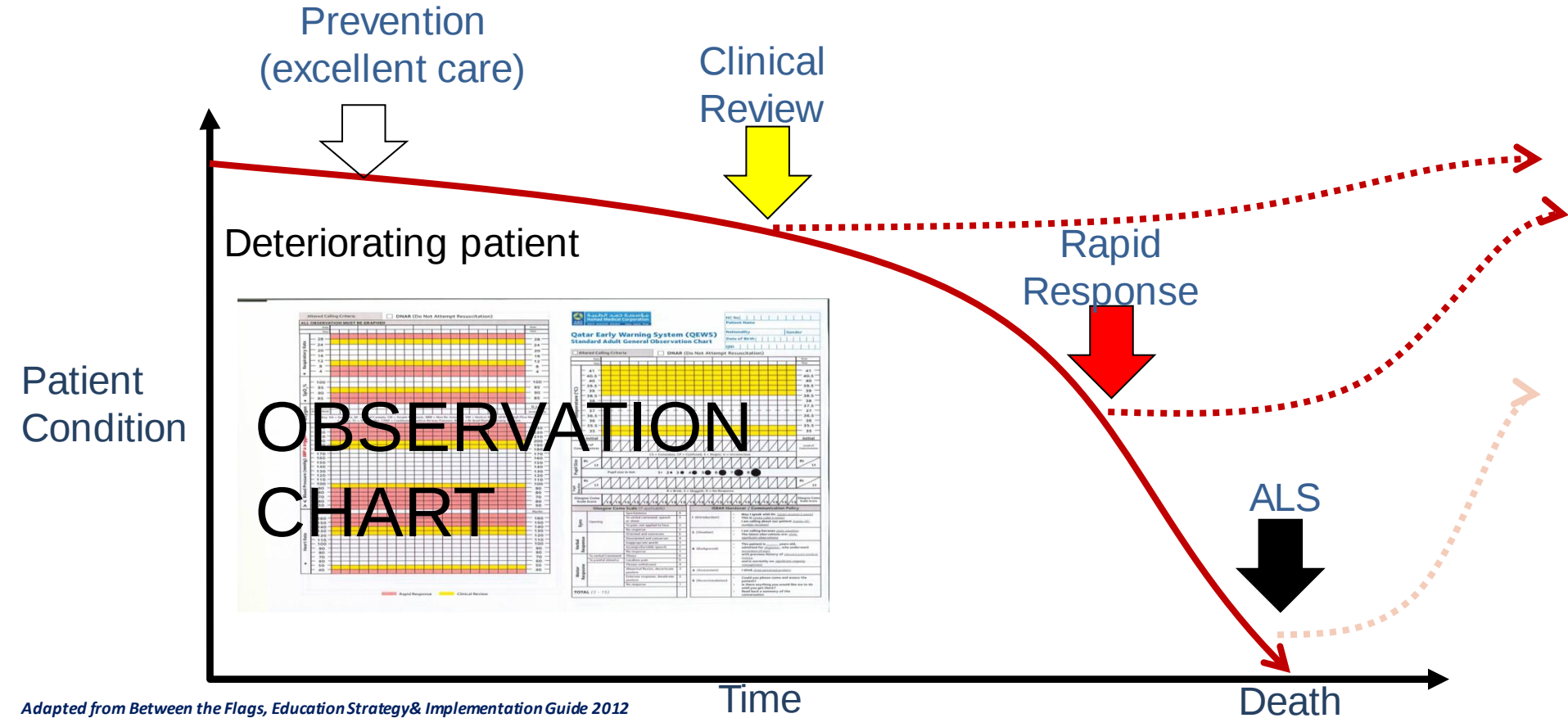


# Part B

Dr Ibrahim Fawzy

PROGRAM EXECUTIVE

# Slippery Slope of Deterioration



Adapted from *Between the Flags, Education Strategy & Implementation Guide 2012*



# Clinical Reviews & Rapid Response Teams

## Clinical Reviews (24/7 coverage)

**Defined** the 'home', 'attending' or 'admitting' team

## Rapid Responses (24/7 coverage)

Responders must be capable of identifying and responding to all acute inpatients

Must have ACLS certification

**Defined**

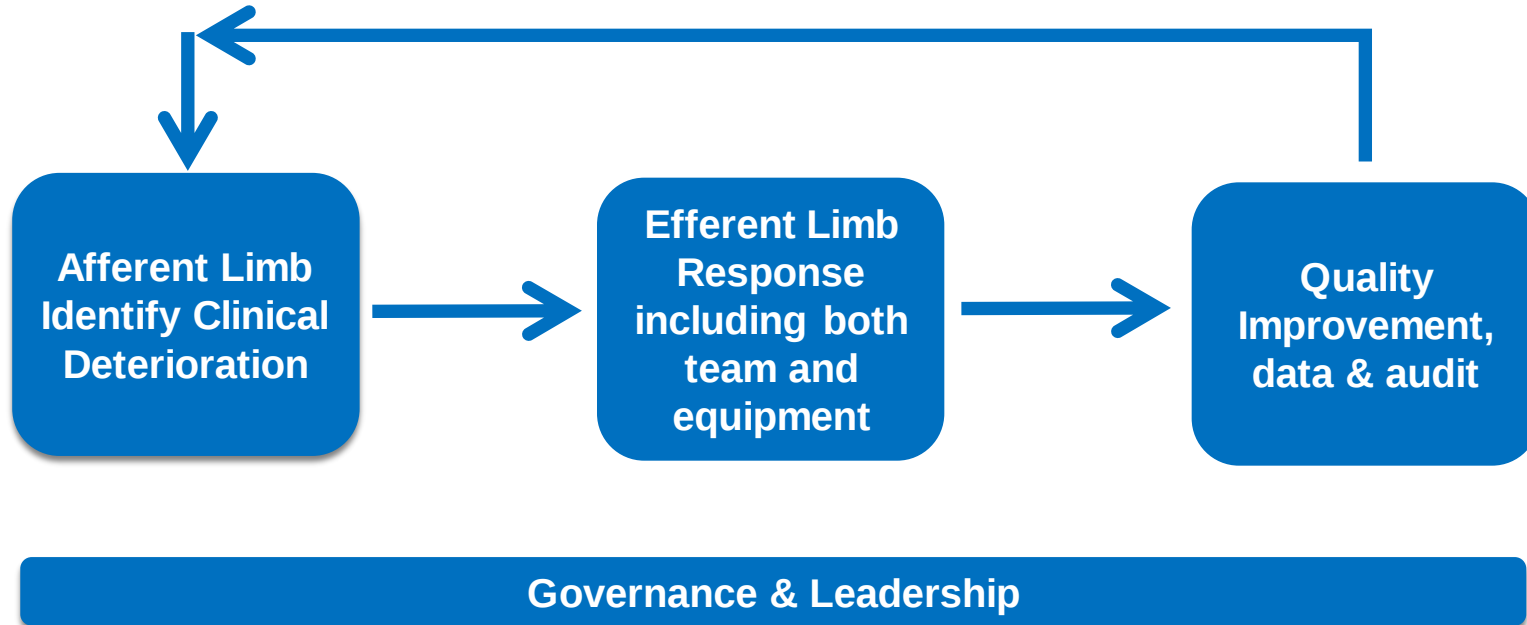
“ideal membership”

Senior physician x 1

Senior/skilled nurse x 1

Respiratory Therapist (as needed) x1

# 4 Components To A Successful Rapid Response System



Jones DA, DeVita MA, Bellomo R. Rapid-response teams. *N Engl J Med*. 2011 Jul 14;365(2):139–46.

# 4 Components of a Successful Rapid Response System



Afferent Limb  
Identify Clinical  
Deterioration

- Are we taking Vital Signs and charting correctly?
- Are we escalating appropriately and timely
- Have we identified plan of care?
- Have we communicated appropriately?
- Have we identified risks in advance?
- Has patient received appropriate care?

Jones DA, DeVita MA, Bellomo R. Rapid-response teams. *N Engl J Med*. 2011 Jul 14;365(2):139–46.

# 4 Components of a Successful Rapid Response System



**Efferent Limb  
Response including  
both team and  
equipment**

1. Has team arrived in time?
2. Has team the correct members?
3. Did team deliver appropriate care?
4. Did team debrief?
5. Do we do regular simulations

*Jones DA, DeVita MA, Bellomo R. Rapid-response teams. N Engl J Med. 2011 Jul 14;365(2):139–46.*

# 4 Components of a Successful Rapid Response System



Quality  
improvement,  
data & audit

- Do we have a clear data collection process (who, when, how etc.?)
- Do we use the data in real time?

Jones DA, DeVita MA, Bellomo R. Rapid-response teams. *N Engl J Med*. 2011 Jul 14;365(2):139–46.

# 4 Components of a Successful Rapid Response System



## Governance & Leadership

- Is there clear local and organizational governance?
- Are the leaders using the data to drive improvement?

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# Part C

Mr Colin Hackwood

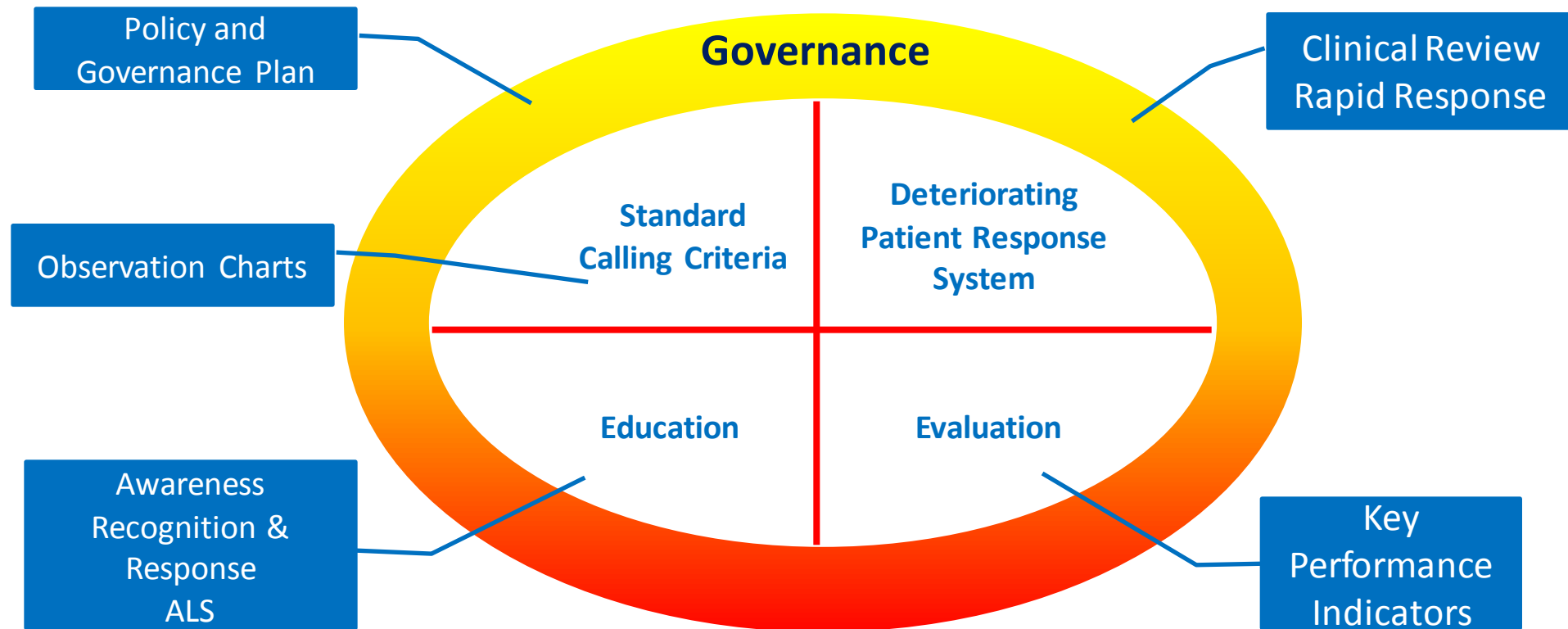
PROGRAM MANAGER

# What was the HMC Framework?

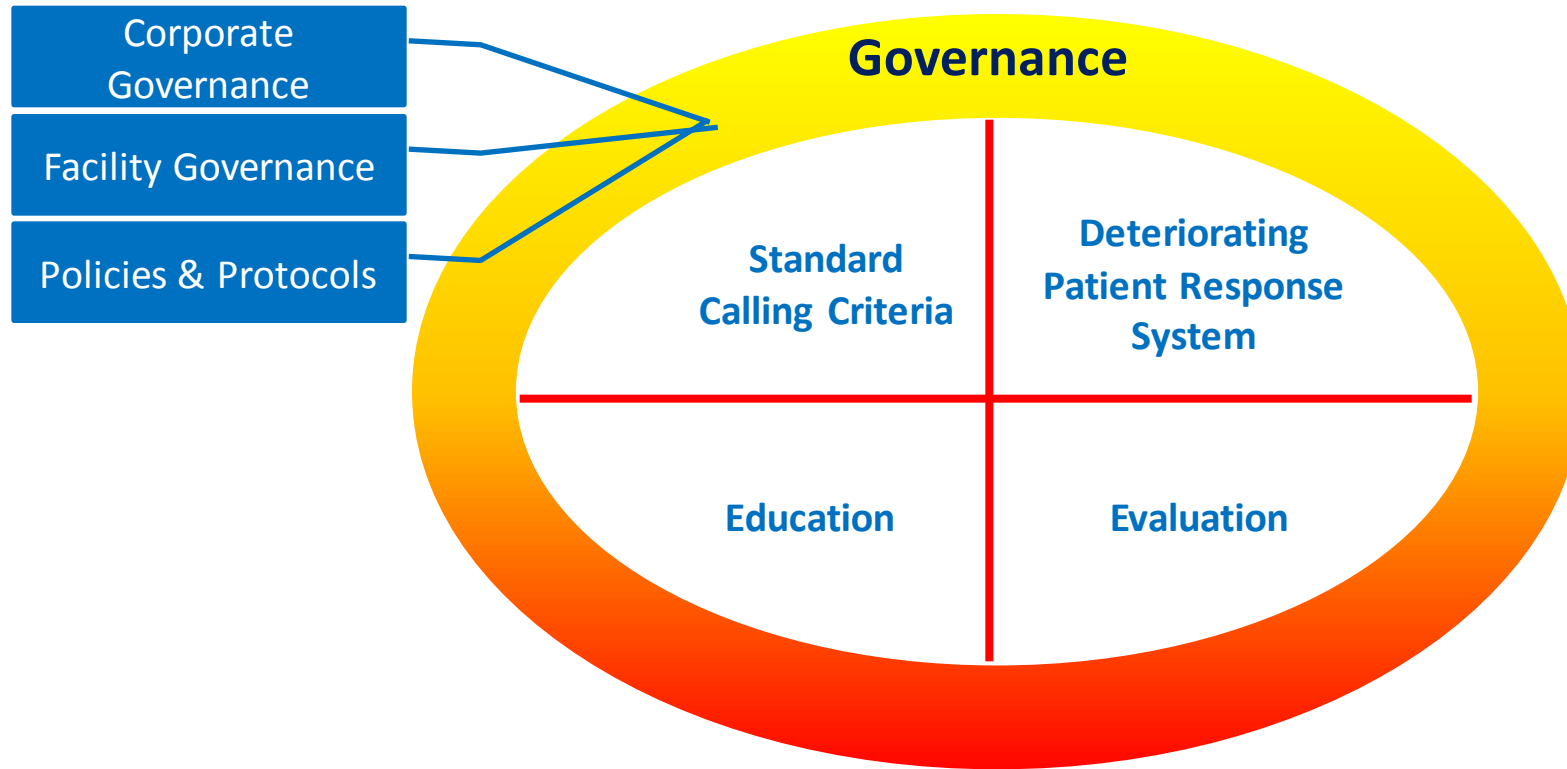


- Separate program of effort into addressable elements
- Benchmark delivery against global evidence
- Establish structures to support delivery
- Identify suitable and influential sponsors
- Identify personnel capable of delivery

# The 5 Elements of the QEWS Program



# The 5 Elements of the QEWS Program



# Program Governance



|                         |                                                                                                                                                                                                                         |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Corporate-level</b>  | QEWS Steering Committee                                                                                                                                                                                                 |
| <b>Facility-level</b>   | 8 Local QEWS committees established with the following functions: <ol style="list-style-type: none"><li>1. Facility Implementation</li><li>2. Performance Monitoring</li><li>3. Data Management and Reporting</li></ol> |
| <b>Corporate Policy</b> | CL 6111 - Recognition And Response To Clinically Deteriorating Patients                                                                                                                                                 |
| <b>Local Protocols</b>  | 8 Local Facility Protocols developed                                                                                                                                                                                    |



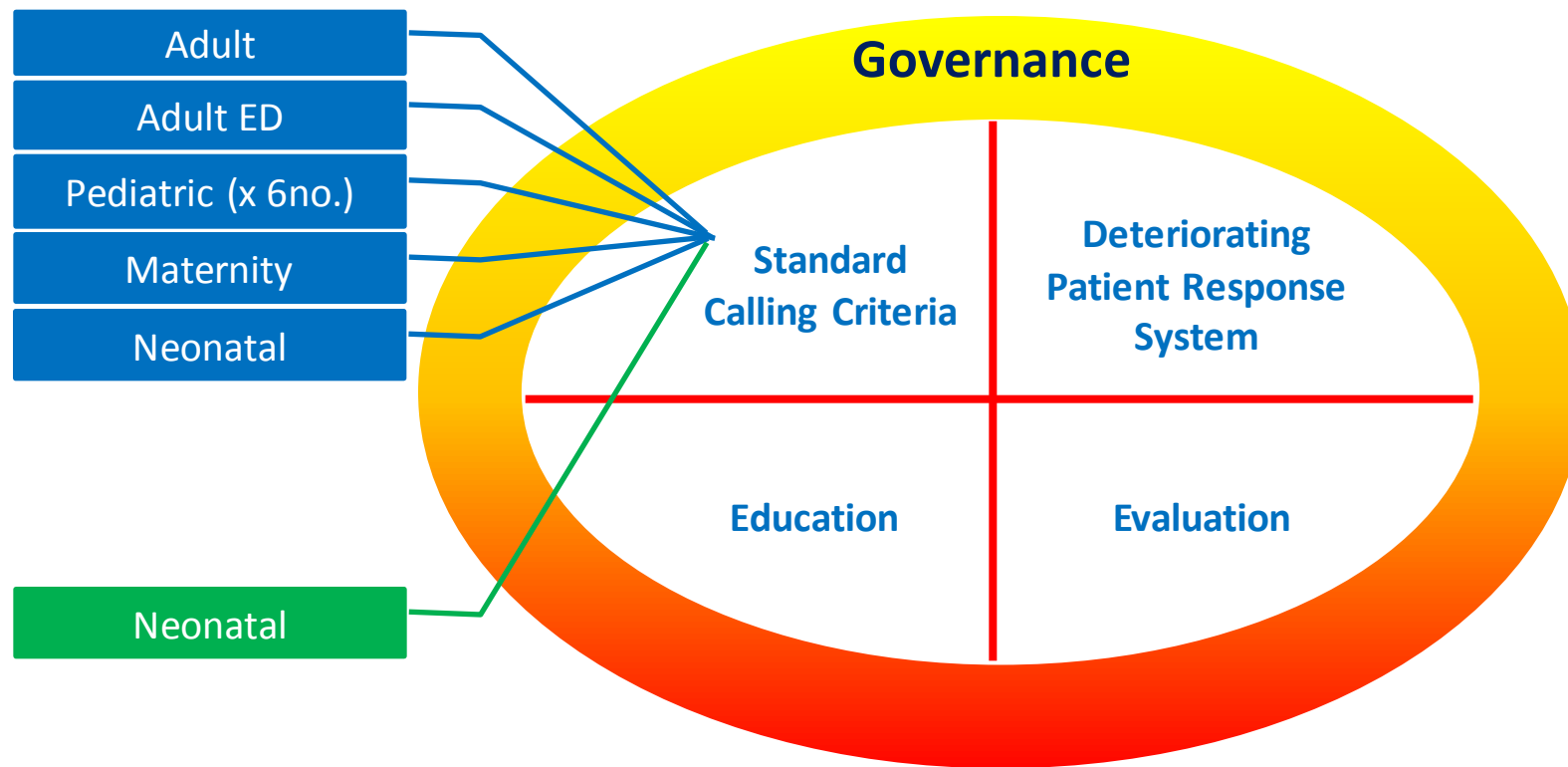
# Functions



| Structure                                   | Role                                                                                     | Notes                                                                                                           |
|---------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Corporate Committee<br>(Multi-disciplinary) | Design, approve strategy, tools and policies                                             | Four sub committees established;<br>1. Charts & tools<br>2. Education<br>3. Cerner<br>4. Evaluation and metrics |
| Local Committees<br>(Multi-disciplinary)    | Define local RRT membership, calling mechanism, data collection and escalation of issues |                                                                                                                 |



# The 5 Elements of the QEWS Program



# Charts and Standard Calling Criteria



- Appropriate tool chosen by senior clinicians across HMC
- Based on Between the Flags from New South Wales
- Charts tested on small scale across HMC in various units using PDSA approach and modifications made



☒ Altered Calling Criteria ☐ DNAR (Do Not Attempt Resuscitation)

**ALL OBSERVATION MUST BE GRAPHED**

| Time                  | Time | Time | Time |
|-----------------------|------|------|------|
| Respiratory Rate      | 28   | 24   | 20   |
| SpO <sub>2</sub> %    | 100  | 95   | 90   |
| O <sub>2</sub> Lpm    | 0    | 0    | 0    |
| Blood Pressure (mmHg) | 230  | 220  | 210  |
| Heart Rate            | 160  | 150  | 140  |
| Neurological          | A    | V    | P    |

Key: RA = Room Air, NC = Nasal Cannula, FM = Simple Face Mask, NB = Non Re-breather, VM = Venturi Mask, TC = Trach Collar, CP = Continuous Positive Airway Pressure, Bi = Bi-level Positive Airway Pressure

Color Legend: Rapid Response (Red), Clinical Review (Yellow)

## Qatar Early Warning System (QEWS) Standard Adult General Observation Chart

HC No: \_\_\_\_\_  
Patient Name: \_\_\_\_\_  
Nationality: \_\_\_\_\_ Gender: M/F  
Date of Birth: \_\_\_\_/\_\_\_\_/\_\_\_\_  
QID: \_\_\_\_\_

☒ Altered Calling Criteria ☐ DNAR (Do Not Attempt Resuscitation)

| Time                     | Time | Time | Time |
|--------------------------|------|------|------|
| Temperature (°C)         | 41   | 40.5 | 40   |
| Level of Consciousness   | CS   | CF   | S    |
| Pupil Size               | Rt   | Lt   | Rt   |
| Pupil Reaction           | Rt   | Lt   | Rt   |
| Glasgow Coma Scale Score | 15   | 15   | 15   |

CS = Conscious, CF = Confused, S = Stupor, U = Unconscious

Pupil size in mm: 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8

B = Brisk, S = Sluggish, N = No Response, NR = Not Applicable

**Glasgow Coma Scale (if applicable)**

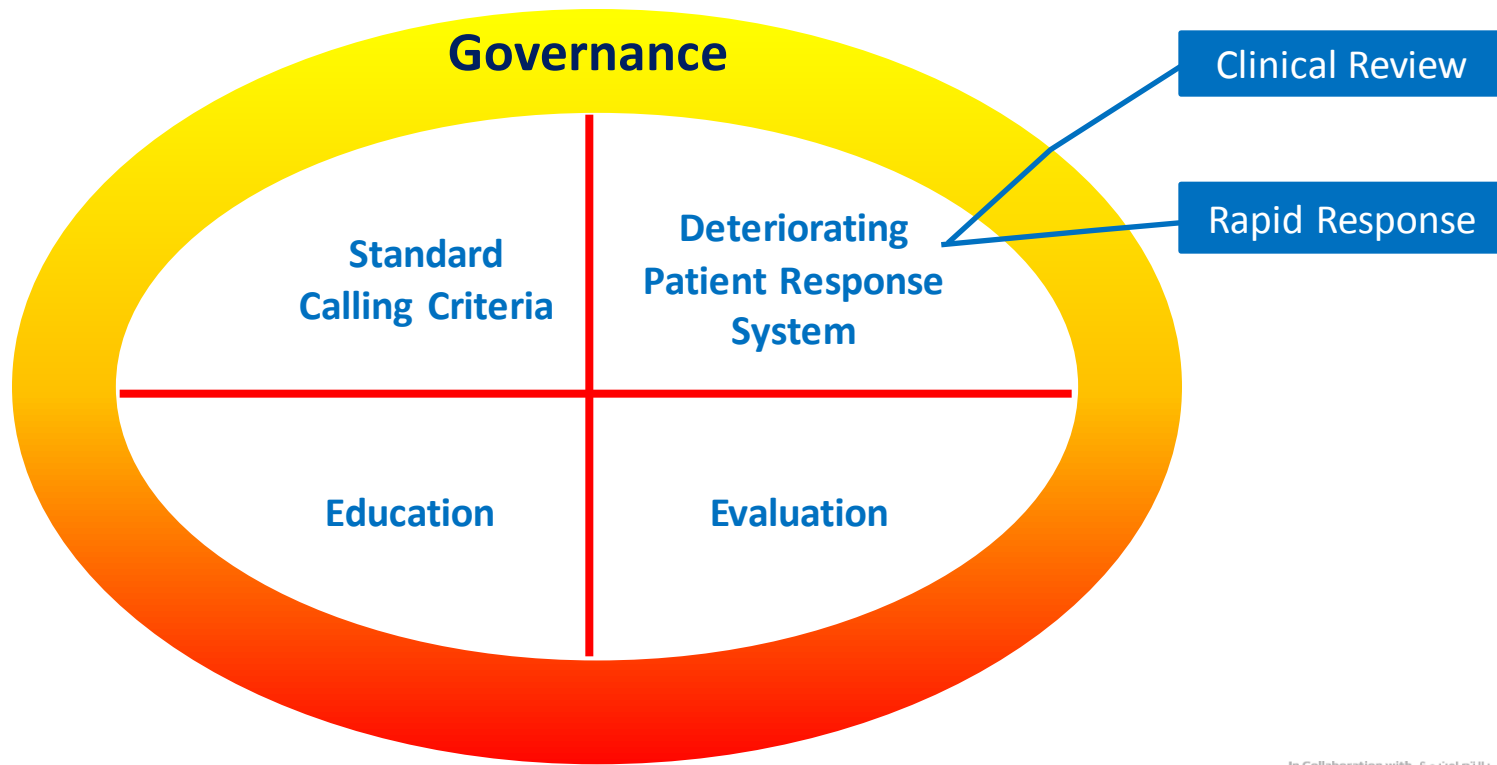
| Score | Score | Score | Score |
|-------|-------|-------|-------|
| 15    | 15    | 15    | 15    |

**ISBAR Handover / Communication Policy**

| Section         | Details                            |
|-----------------|------------------------------------|
| Eyes            | Opening                            |
| Verbal Response | To verbal command, speech or sound |
| Motor Response  | To verbal command                  |

**TOTAL (3 - 15)**

# The 5 Elements of the QEWS Program



# Rapid Response Teams



- Each facility must identify its team members and their calling system.
- Most use their code team, but at least one has developed a 24/7 nurse led team
- Identify scope of service

# Types of RRT in HMC



## Facility

## Description

1

Consultant-led (anesthesia, medicine, critical care)

2

Specialist who then escalates

3

Critical Care nurse-led

4

Code Blue team



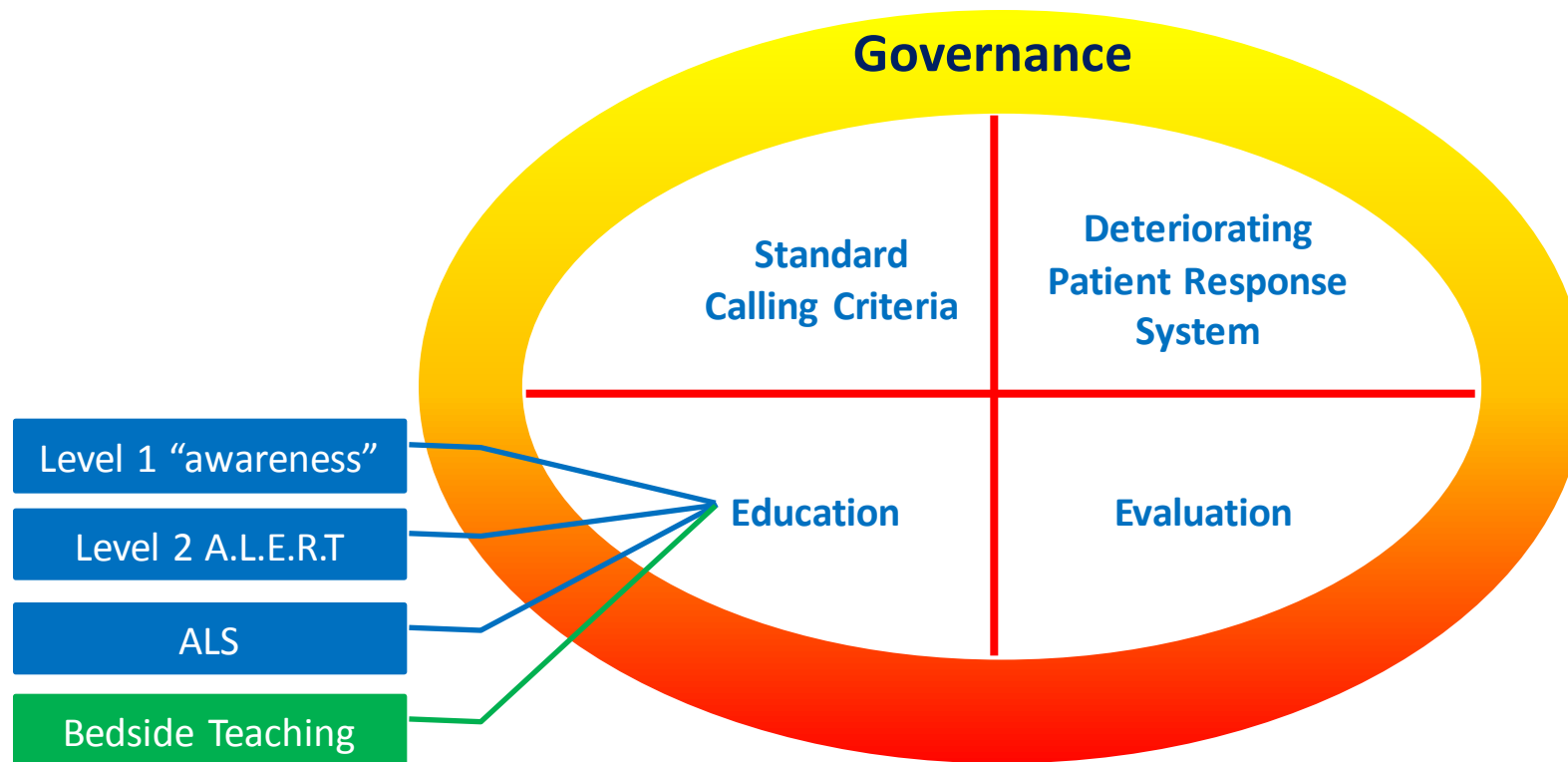
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# The 5 Elements of the QEWS Program



# Education & Training Model



| Tier    | Description                                        | Comments                                                                         |
|---------|----------------------------------------------------|----------------------------------------------------------------------------------|
| Level 1 | eLearning Module (HITC)<br>Bedside teaching (NMER) | >11000 completed<br>>90% completed across all facilities                         |
| Level 2 | A.L.E.R.T<br>(or equivalent)                       | Training of frontline clinical staff on-going                                    |
| Level 3 | Advanced Life Support                              | Prioritization of training for RRT members<br>without ALS certification on-going |

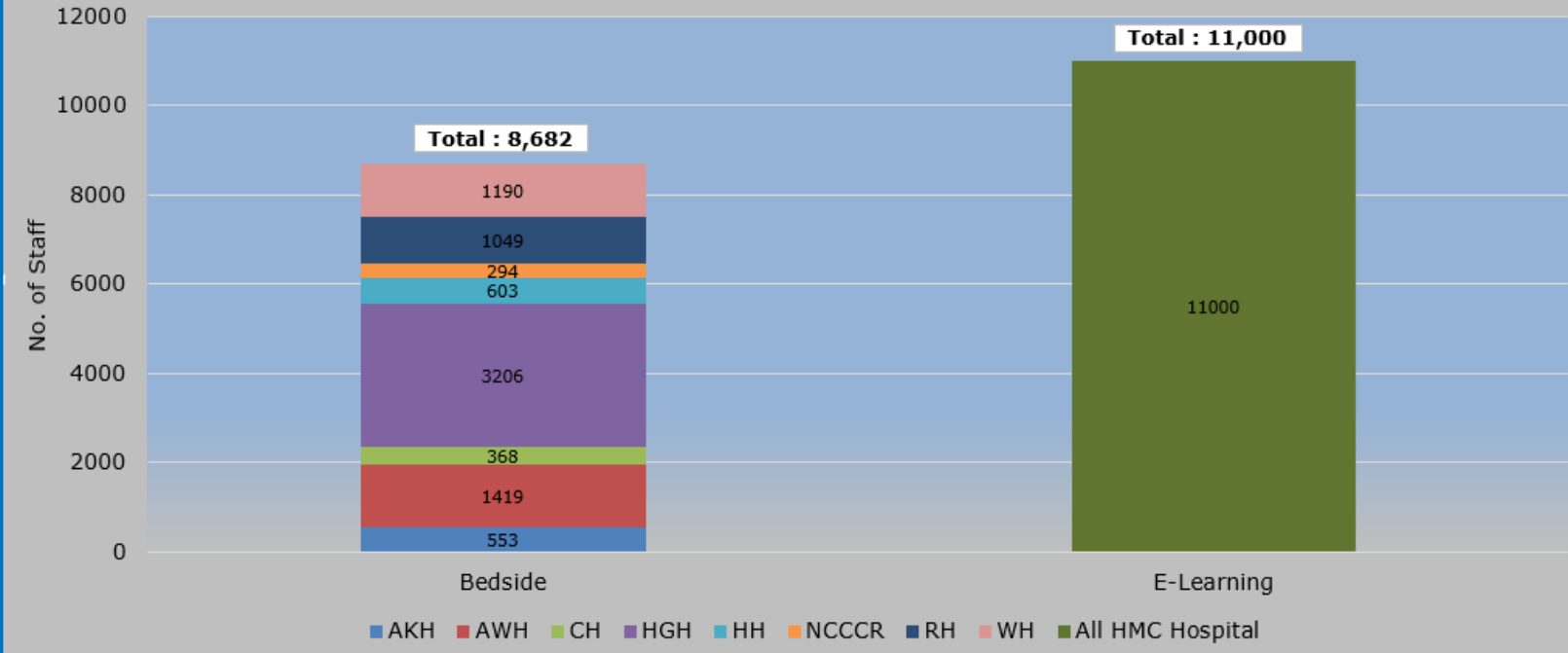


# Level 1 Education



## Staff Completion on QEWS Level 1 Education

as of March 2016





# Educating Patients & Families

### AN IMPORTANT MESSAGE FOR FAMILIES

If you are worried your child is getting sicker, tell your bedside nurse right away  
If you are still worried that your child needs more help you should follow steps

**STEP 1**

Ask to speak to the nurse in charge of the shift. Tell them why you are worried and ask them to look at your child

**STEP 2**

If the nurse in charge has seen your child but you are still worried, ask the nurse to call for a doctor to look at your child. This is called a 'clinical review'.

**STEP 3**

If the doctor has seen your child but you are still very worried, ask your nurse to make a 'Rapid Response' call.

Help will arrive very quickly.

We understand that you know your child best and we would like to work with you to make sure your child gets the best care

Further information can be provided by your healthcare team.

### رسالة هامة لأهل الطفل

إذا كنت قلق بشأن وضع طفلك الصحي، فقم بإخبار الممرضة المسؤولة عن طفلك فوراً  
إذا كنت قلق وشعرت بأن طفلك يحتاج اهتمام أكثر من الطاقم الطبي، اتبع الخطوات التالية إذا ما كنت قلق وشعرت بأن طفلك يحتاج اهتمام أكثر من الطاقم الطبي

**الخطوة الاولى**

اطلب الممرضة مسؤولة القسم والفرعما بأنك قلق بشأن وضع طفلك الصحي، لتقوم بمعاينة وتشخيص وضعه الصحي

**الخطوة الثانية**

إذا ما زلت قلق بعد معاينة وضع طفلك من قبل مسؤولة القسم، اطلب من الممرضة أن تطلب بالتطبيق الهلوات لمعاينة طفلك وتقديم الرعاية اللازمة  
هذا يسمى 'المراجعة الطبية'

**الخطوة الثالثة**

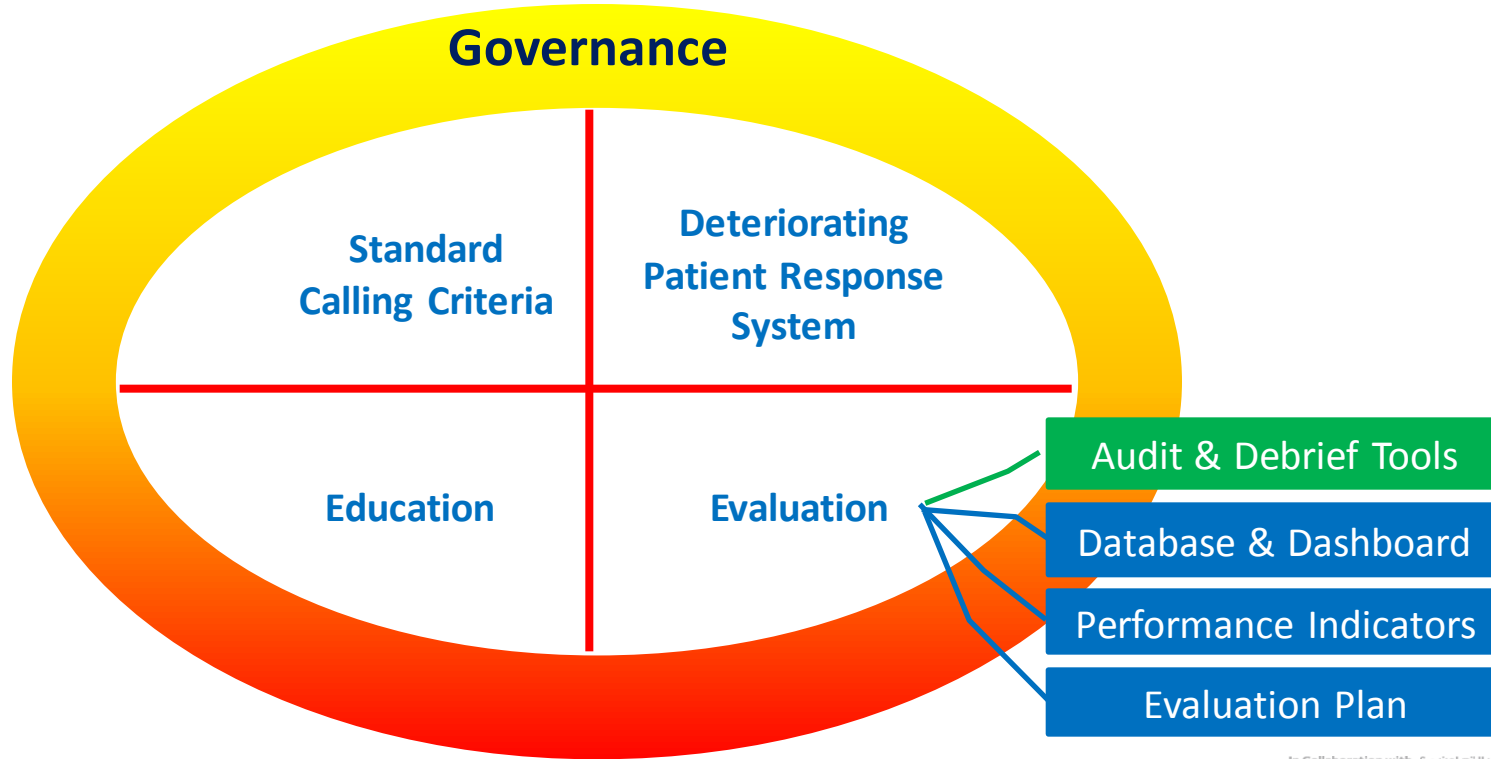
إذا ما كنت قلقاً أكثر، اطلب من الممرضة أن تطلب من الطبيب لمعاينة طفلك فوراً  
هذا يسمى 'مكالمة الاستجابة السريعة'

سوف تصل المساعدة بأسرع وقت ممكن

نريد أن نعمل معكم لتقديم أفضل رعاية طبية ممكنة لطفلك لأننا مدركين بأنك أنت أفضل من يعرف وضع طفلك

نصحتك الحصول على المزيد من المعلومات من الفريق الطبي المتواجد في القسم

# The 5 Elements of the QEWS Program



# Evaluation



- Three Corporate (Mandatory) Metrics
  - eLearning education (HITC)
  - Rapid Response Team activation rate
  - Cardiac arrest rate

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# Summary

Dr David Vaughan

PROGRAM DIRECTOR

# Rapid Response activation rate



THE NEW ENGLAND JOURNAL OF MEDICINE

## REVIEW ARTICLE

### CURRENT CONCEPTS

## Rapid-Response Teams

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Rapid-response teams differ from traditional code teams in a number of ways (Table 1). They assess a greater number of hospitalized patients at an earlier stage of clinical deterioration, with the aim of preventing serious adverse events such as cardiac arrests and unexpected deaths. Thus, rapid-response teams assess patients in whom respiratory, neurologic, or cardiac deterioration develops rather than patients who have already had a respiratory or cardiac arrest.<sup>5</sup>

Whether rapid-response systems are effective is controversial. Their introduction was prompted by five before-and-after comparisons that were single-center studies.<sup>6–11</sup> These studies showed a reduction in the rate of cardiac arrests and a greater effect with a greater “dose” of care from the rapid-response team (i.e., a larger number of assessments per 1000 admissions).<sup>12</sup> However, a major multicenter, cluster-random-

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N Engl J Med 2011;365:139–46.  
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“Successful rapid-response systems consistently deliver a high response “dose” (>25 calls per 1000 admissions).

Mature academic systems have at least 40 calls per 1000 admissions”

HMC facilities are already reporting activation rates of 25/1000 discharges

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# Evidence



- 5 studies (single center) showed a substantial improvement in before & after comparison, following introduction of a RRT
- A large multi-center randomized trial (Merit) failed to show effectiveness
- Two meta-analyses have failed to show reduction in cardiac arrest rates

# Outcome



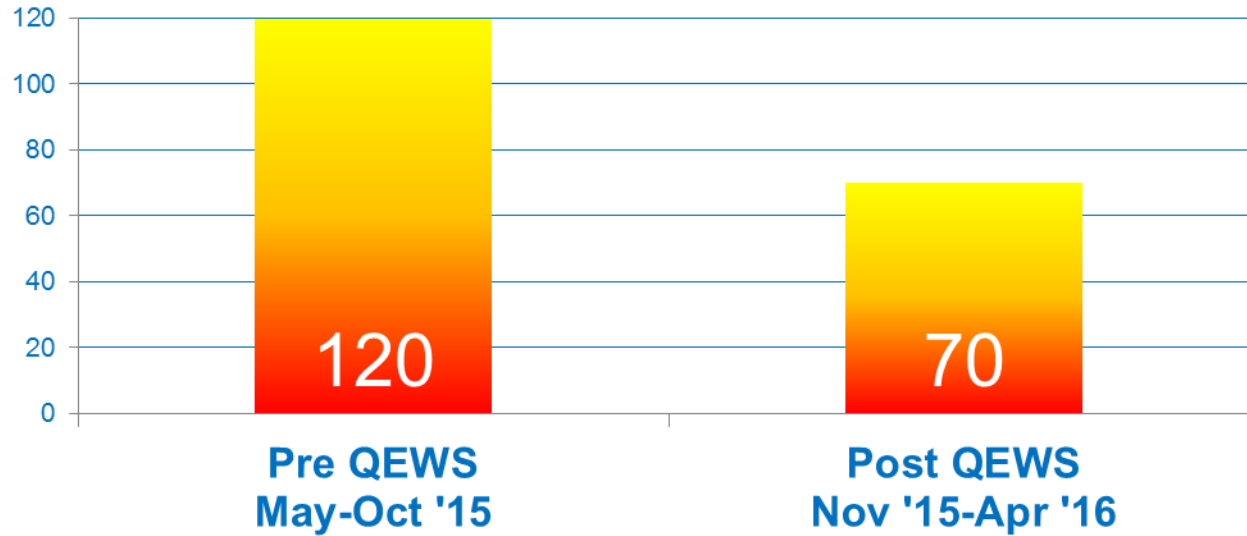
RRT Call Rate and CPR Code Rate per 1,000 Discharges  
All HMC Facilities\*



# Outcome



## No. of CPR Calls Across HMC Pre- and Post-Implementation



# Anecdotes



“I feel **safer**”

(Al Khor Hospital patient)

“The standardized observation chart has made my job **easier**”

(Emergency Department Consultant)

“There has been a **culture change**”

(Executive Director of Nursing)

“The implementation of Pediatric QEWS has **empowered** our nursing staff to **act** upon and obtain medical assistance in an **early** stage of patients deterioration. e.g. since implementation of Ped QEWS nursing staff have been able to pick up abnormalities / changes in vital sign earlier – this has resulted in many cases of Sepsis being recognized at the earliest point and implementation / initiation of antibiotic treatment in **under one hour**”

“Pediatric nurses often recognize deterioration in patients through intuition rather than through routine measurement of vital signs. Adding the ‘concern’ sign to the Rapid Response System has provided opportunities for nurses to act upon their intuitive feelings. e.g. patient was inadvertently given wrong medication – patient and mother reported to nurse 20 minutes later that the patient did not feel well. Although the child’s vital signs were normal the nurse felt that the child did not look well and called the RRT – outcome – patient treated rapidly on the unit and **did not need transfer** to high level of care (PICU)”

(Ms Judith Nelmes, Director of Nursing Pediatrics, HGH)

“This is how HMC should deliver **large-scale** system programs”

(Director of Nursing)

# Corporation Wide Results (30 April, 2016)



- 42% reduction in cardiac arrest rate
- Equates to >100 lives saved per year across HMC
- Rapid Response Team activation rate is a world class standard

# Lessons Learned



- Large scale improvement initiatives can demonstrate rapid results
- Taking a systems approach is critical
- Aligning internal stakeholders and resources
- Clinicians (nurse, doctor, RT) are essential
- Alignment with organizational strategy, accreditation and external initiatives

# Next Steps

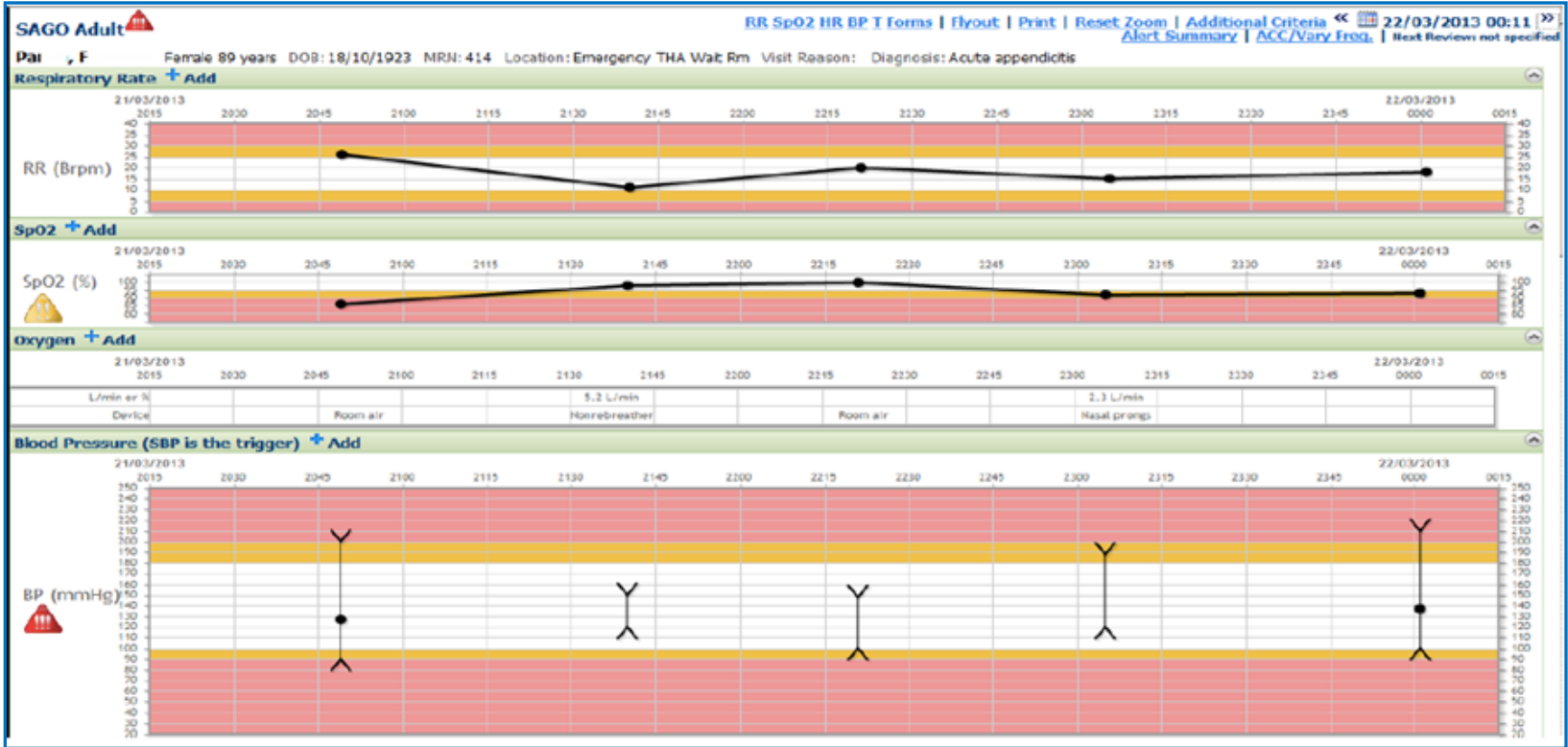


- Where to from here?
- Cerner
- Sepsis
- Continual Improvement
  - Audit
  - Ask to see your data
  - Debrief all cases
  - Local governance is critical





# QEWS Phase II CERNER Enhancements



In Collaboration with 

# Acknowledgements



| Role                                                                                                                                                                                                                     | Names                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Program Sponsors                                                                                                                                                                                                         | Dr Hanan Al Kuwari, Prof Mike Richmond, Prof Anne Marie Cannaby, Dr Adeel Butt                                                                                                                                                                                                                        |
| <b><u>Program Delivery</u></b><br>Program Director<br>Program Steering Committee Chair<br>Clinical Director<br>Program Manager<br>Program Team<br><br>Online Education<br>Bedside Education<br>Electronic Medical Record | Dr David Vaughan<br>Dr Yousuf Maslamani<br>Dr Charles Pain<br>Mr Colin Hackwood<br>Dr Mylai Guerrero, Ms Khawla Athamneh, Mr Awad Amayreh, Dr Madonna Andaya, Ms Ana Jimena, Dr Needa Khan<br>Dr Khalid Saifeldeen<br>NMER Educators & Facility Educators<br>Dr Alex Tuli & Mr Russell Mayne (CERNER) |
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# Acknowledgements



| Role                                                     | Names                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Office of the Chief Medical Officer                      | Dr Hans Kerkkamp, Mr Ross MacDonald, Dr Mylai Guerrero, Ms Shasiya Kandoth                                                                                                                                                                                                                                            |
| Hamad Healthcare Quality Institute                       | Ms Minara Chowdhury, Mr Dieter Burckhardt, Mr Joe San Koh, Ms Najia Rizvi, Ms Ghada El Mandoury, Mr Mark Agramon, Mr Glenn Giducos, Ms Catherine Jamias, Mr Rashid Peedikayil                                                                                                                                         |
| Facility Governance                                      | Ms Colene Daniel, Ms Lara Waywell, Mr Wilson Ross, Dr Mahmoud Heidous, Mr Philip Lowen, Ms Liz Thiebe, Mr Mohamed Al-Jusaiman, Prof Abdulbadi AbuSamra, Dr Amal Abousad, Dr Hanadi AlHamad, Dr Hani Al Kilani, Dr Hilal Al Rifai, Prof David Barlow, Mr Glenn Ocampo, Mr Ali Naimat, Mr Segla Tro, Josephine Tindogan |
| Critical Care Center/Network                             | Mr David Selwood, Dr Abdulsalam Saif, Dr Ahmed Lutfi, Dr Faisal Malmstrom, Mr Maged Al Hijah                                                                                                                                                                                                                          |
| HICT/CIS                                                 | Dr AbdulWahab Abubaker Al Musleh, Mr Rida Miladi, Mr Clive Gibbons, Mr Grant Goodman, Dr Kiran Hegde, Mr Ananth Rao, Mr Punith Hareesh, Mr Ashraf Sharief, Dr Wafik Awni Musbah Sakallah, Mr Shameer Sam                                                                                                              |
| Nursing Informatics, Medical Records, Medical Education, | Dr Wasmiyah, Mr Richard Browne, Dr Abdulatif Al Khal, Dr Mohammed El- Tawil, Ms Banan Al- Arab, Amal Al Thlatheny, Zehra Mazhar, Dr Dabia Al Mohannadi, Dr Ahmed Badar, Dr Baha, Dr Suresh                                                                                                                            |



# Acknowledgements



| Population    | Program Champions                                                                                                                                                                                                  |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Maternity EWS | Dr Huda Saleh, Dr Najah Ali, Dr Shamsa Ahmad, Dr Mahmoud Abu Jubara, D Mohamed Ibrahim Amin Alloub, Dr Hussein Sharara, Ms Faiza Bahnas, Mr Hector Molina, Ms Yolennis Fajardo, Ms Tamara Shdafat, Ms Eufemia Ongo |
| Pediatric EWS | Dr Mohammad Al Janahi, Dr Najeh Khalid, Dr Adiba Hamad, Dr Magda Youssef, Ms Fiona Riordan, Ms Leena Varghese, Ms Nagwa Mohd                                                                                       |
| Neonatal EWS  | Dr Ghassan Abdo, Dr Fouad Ghanem                                                                                                                                                                                   |
| ED EWS        | Dr Stephen Thomas, Dr Dominic Jenkins, Dr Kaleelullah Farook, Dr Yogdutt Sharma, Mr Andrew Frazer                                                                                                                  |



# Thank you for your attention



## Questions?