Feasibility study on implementing a rapid response program at a Nigerian teaching hospital

Experience and lessons learned

Presented by: Sabair Lee, MD
Anesthesia Resident
Johns Hopkins Hospital

Advisor: Promise Ariyo, MD MPH
Assistant Professor
Johns Hopkins Hospital

Background / Setting

- Lagos University Teaching Hospital (LUTH)
- 761 bed tertiary hospital
- 6 bed ICU
- 3 ventilators

- Nigeria: 186 million
- Lagos: 21 million
- Lower middle income class
- Life expectancy: 54 years
- Healthy life expectancy: 46

https://www.bbc.com/news/world-africa-13949550

The problem

- Burden of critical illness in developing countries
  - Account for 90% of trauma, maternal, and infection related deaths[2-3]

- In-hospital mortality in Nigeria as high as 23.9%[4]

- Majority of deaths in young and middle-aged adults

Failure to Recognize →

Failure to Respond →

Failure to Rescue:
- Interval of assessments
- Workload
- Communication
- Experience
- Resources

The solution?

- Adverse events preceded by abnormal physiology for several hours

- Rapid response system
  - Event recognition and response trigger
  - Crisis response

- Early intervention improves patient outcomes[5]

- Institute of Health Care Improvement (IHI)
  - 3,700 U.S. hospitals enrolled
- Only two studies in Africa:
  - Uganda and Tanzania[7-8]
  - MEWS and risk of mortality
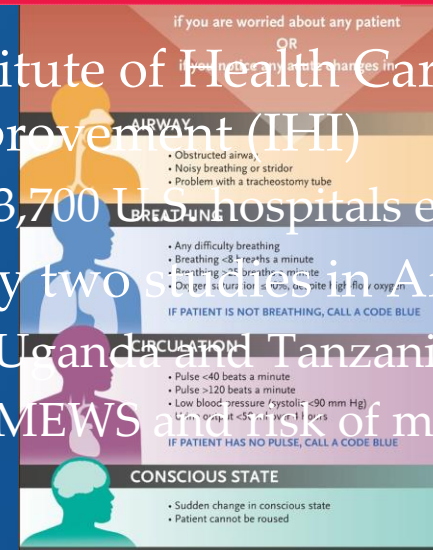
The reality…

"Often the doctor on call does not pick up. When a doctor finally arrives, we have been doing CPR for 30 minutes"

"Some nurses don't have phone credit to call the doctor for an emergency"

"Sometimes we perform CPR even though we know the patient won't survive, just to satisfy the family"

Objectives

- Develop clinical processes
    - Documentation of vitals
    - Rapid response system
    - Telecommunication
- Develop quality improvement group
    - Leadership
    - Education and training
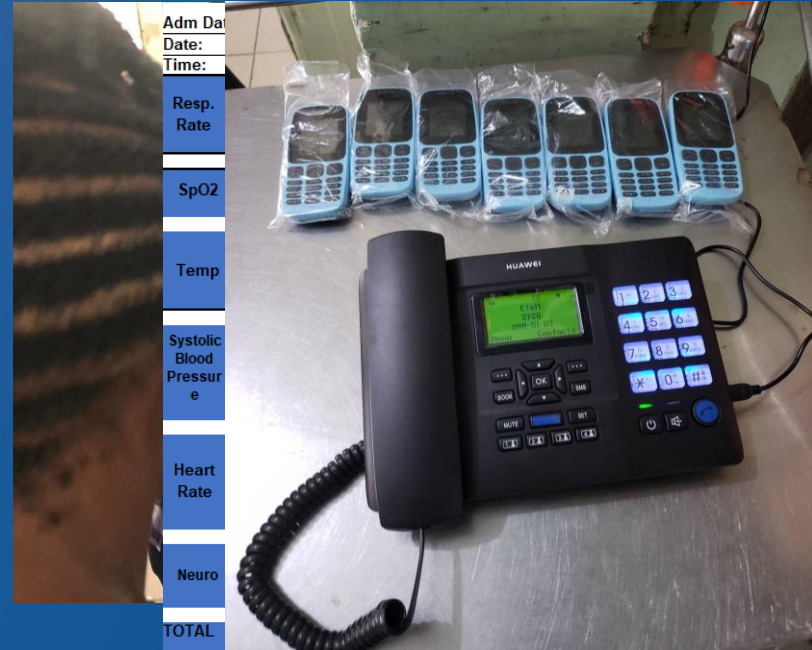   - Data collection

Methods

- One-year prospective interventional cohort study
- Pre-implementation education and training
- Pilot study for 6 months
  - 4 Adult medical wards
  - 1 Surgical ward
- Local physician research assistant
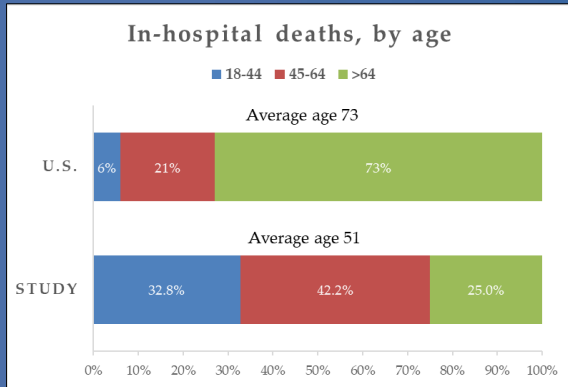
Rapid response system components

- Afferent limb:
  - Event recognition and response trigger
  - Early warning score (EWS)
  - Communication tool
- Efferent limb:
  - Crisis response
- Process improvement
- Administration
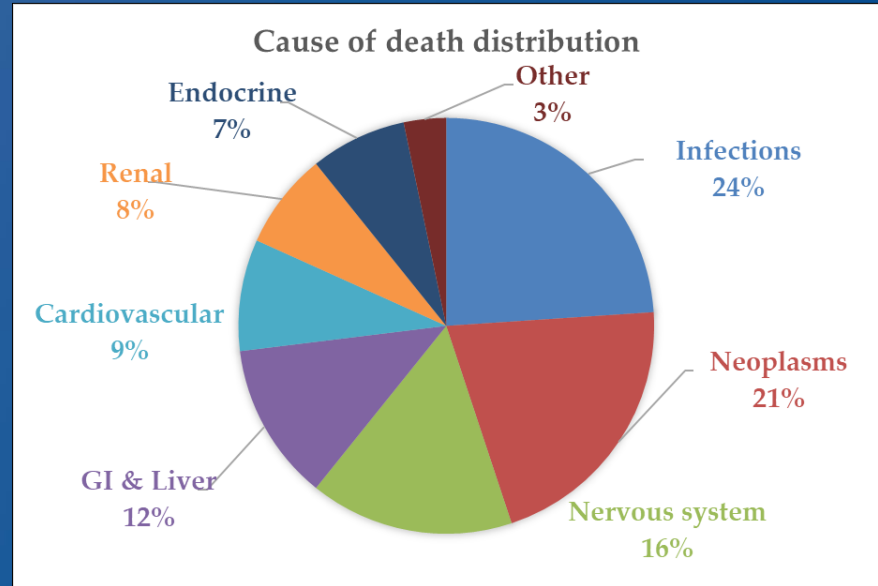
Baseline mortality: 6/2017 to 6/2018

Figure 1

In-hospital deaths, by age
■ 18-44 ■ 45-64 ■ >64

U.S. — Average age 73: 6% | 21% | 73%

STUDY — Average age 51: 32.8% | 42.2% | 25.0%

Admission and mortality in relation to sex			
Sex	Admission (%)	Mortality	Rate (%)
Male	942 (51.3)	189	20.1
Female	896 (48.7)	145	16.2
Total	1838 (100)	334	18.2

Table 1

Figure 2

Cause of death distribution

- Infections 24%
- Neoplasms 21%
- Nervous system 16%
- GI & Liver 12%
- Cardiovascular 9%
- Renal 8%
- Endocrine 7%
- Other 3%

Results: Preliminary RRT Data

Figure 3

Rapid response attendance by role

Figure 4

Number of team members present

Figure 5

Number of RRT calls per patient

Figure 6

Diurnal variation in RRT calls and Deaths
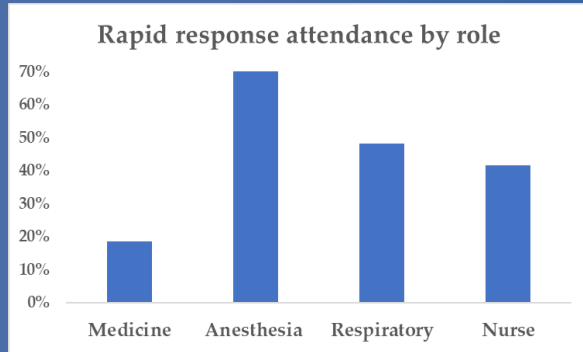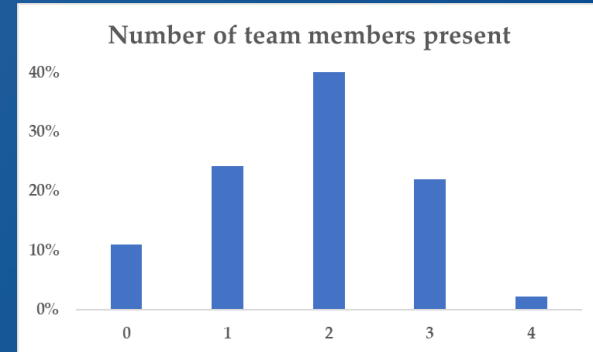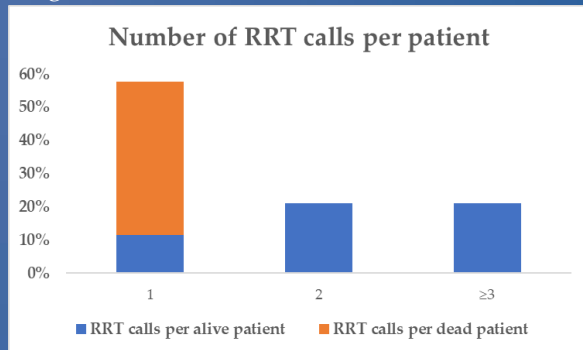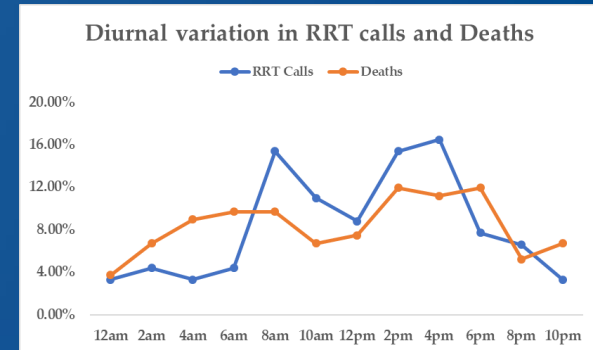
Nurse's attitudes to the RRP

Table 2

	Strongly disagree/ Disagree	Uncertain	Strongly agree/ Agree
1. The RRT can be used to prevent a minor problem from becoming a major problem (n=17)	0.0	0.0	100.0
2. The RRT is not helpful in managing sick patients on the ward (n=17)	88.2	0.0	11.8
3. I don't like calling RRT because I will be criticised for not looking after my patient well	100.0	0.0	0.0
4. Using the RRT system increases my work load when caring for a sick patient (n=17)	76.5	0.0	23.5
5. When one of my patients is sick I call the covering doctor before calling a RRT (n=17)	35.3	29.4	35.3
6. I would call a RRT on a patient I am worried about even if their vitals signs are normal (n=17)	82.4	0.0	17.6
7. RRT calls teach me how to better manage sick patients in my ward (n=17)	5.9	0.0	94.1

Conclusion

Issues

- Resources
  - Human
  - Equipment
  - Financial
- Communication tool
- Resident-wide strike
- Hawthorne effect
- Culture

Successes

- Defined quality improvement team and leadership
- Culture of patient safety
- Nurse satisfaction
- Academic partnership

"The RRT is the most beautiful thing. Now families can be at peace knowing that we are doing our best to save the patient."

Future directions

- Activation criteria
- Expanding to other units
- Solidifying response team components
  - Team composition
  - Interventions
- Facilitating end of life care

Acknowledgements

- Mentor, Advisor, and PI:
  - Dr. Promise Ariyo, Anesthesia, Johns Hopkins Hospital
- Key Co-Investigators and mentors:
  - Dr. Sampson, Anesthesia & Critical Care, Johns Hopkins Hospital
  - Dr. Latif, Anesthesia & Critical Care, Johns Hopkins Hospital
  - Dr. Brad Winters, Anesthesia & Critical Care, Johns Hopkins Hospital
  - Dr. Pandian, School of Nursing, Johns Hopkins
  - Dr. Bankole, Neurosurgery, Lagos University Teaching Hospital
- Funding:
  - StAAR Investigator Award, Johns Hopkins Hospital
  - Paul S. Lietman Travel Grant, Johns Hopkins Center for Global Health

References

1. World Health Organization. Nigeria: WHO Statistical Profile. 2015. Available at: https://www.who.int/gho/countries/nga.pdf. Accessed July 7, 2018.
2. Mock C, Joshipura M, Goosen J, Lormand JD, Maier R. Strengthening trauma systems globally: the Essential Trauma Care Project. J Trauma. 2005 Nov;59(5):1243–1246.
3. Requejo JH, Merialdi M, Bustreo F. Improving global maternal health: progress, challenges, and promise. Curr Opin Obstet Gynecol. 2011 Dec;23(6):465–470.
4. Chijioke A, Kolo PM. Mortality Pattern at the Adult Medical Wards of a Teaching Hospital in Sub-Saharan Africa. International Journal of Tropical Medicine 2009;4(1):27-31.
5. Maharaj R, Raffaele I, Wendon J. Rapid response systems: a systematic review and meta-analysis. Crit. Care 2015;19:254.
6. Jones DA, DeVita MA, Bellomo R. Rapid-response teams. *N. Engl. J. Med.* 2011;365(2):139-146. doi:10.1056/NEJMra0910926.
7. Rylance J, Baker T, Mushi E, Mashaga D. Use of an early warning score and ability to walk predicts mortality in medical patients admitted to hospitals in Tanzania. Trans. R. Soc. Trop. Med. Hyg. 2009;103(8):790-794.
8. Kruisselbrink R, Kwizera A, Crowther M, et al. Modified Early Warning Score (MEWS) Identifies Critical Illness among Ward Patients in a Resource Restricted Setting in Kampala, Uganda: A Prospective Observational Study.