Inverting the Pyramid

Professor S Bhagwanjee
Departments of Anesthesiology and Global Health
Seattle, Washington
Disclosures
Nil

Acknowledgement
ACART
GSA
... if you don’t know where you’re going you will end up where you didn’t want to be ...

Yogi bear
What is leadership?

Leadership has been defined as the relationship between the individual/s who lead and those who take the choice to follow, while it refers to the behaviour of directing and coordinating the activities of a team or group of people towards a common goal.
What is Management?

Health care managers oversee the personnel, facility operations, finances, and information technology of a health care organization, with the goal to improve the efficiency and quality of patient care while reducing costs.
Quality Care?

Quality of care is defined as the degree to which the probability of achieving the expected health outcomes is increased and in line with updated professional knowledge and skills within health services.
Leaders vs Managers

• Leadership is creating a vision, Management is getting things done
• Good managers should strive to be good leaders and good leaders, need management skills to be effective.
CARE SYSTEM

Supportive payment and regulatory environment → Organizations that facilitate the work of patient-centered teams → High performing patient-centered teams → Outcomes: Safe, Effective, Efficient, Personalized, Timely, Equitable

REDESIGN IMPERATIVES: SIX CHALLENGES
- Reengineered care processes
- Effective use of information technologies
- Knowledge and skills management
- Development of effective teams
- Coordination of care across patient-conditions, services, sites of care over time

Making change possible.
Focus on quality

• There is a need to focus on quality care in Africa

• Substantial experience with QI in Africa shows impressive potential for broad-based process improvement

- Complex psychological, psychiatric or social interventions
- Targeted programmes by trained persons for specific issues
- Resuming existing social practices or support to new ones
- Support to ensuring practical needs are addressed in ways that enhance wellbeing and not opposite
Pyramid of Health

ICU

Sepsis patients
Pyramid of Health

Sepsis Patients

ICU
Pyramid of Health

UBUNTU

People

Sepsis Patients

ICU/Manager
Pyramid of Health

TOYOTA is numero 1: Everyone that works for Toyota is equal
Emotional intelligence

The capacity to be aware of, control, and express one's emotions, and to handle interpersonal relationships judiciously and empathetically.
Emotional intelligence

- Self-Awareness.
- Self-Regulation.
- Motivation.
- Empathy.
- Social Skills.

Daniel Goleman
Pyramid of Health

LEADERSHIP vs TEAMERSHIP

People

Sepsis Patients

ICU/Manager
Pyramid of Health

- ICU/Manager
- Frontline providers
- Sepsis Patients
- People
Rapid response systems

Impact of a standardized rapid response system on outcomes in a large healthcare jurisdiction

Jack Chen, Lixin Ou, Arthas Flabouris, Ken Hillman, Rinaldo Bellomo, Michael Parr

Conclusions: The BTF program was associated with continued decrease in the overall cardiac arrests rates, deaths after cardiac arrest, hospital mortality and failure to rescue. In addition, among patients in the LMDRC group, it induced a new and significant post-intervention reduction in mortality which was never reported before.
Intensive care unit morbidity and mortality from eclampsia: An evaluation of the Acute Physiology and Chronic Health Evaluation II score and the Glasgow Coma Scale score

Satish Bhagwanjee, MBChB, FCA; Fathima Paruk, MBChB, FCOG; Jack Moodley, MD; David J. J. Muckart, MBChB, FRCS

From the Department of Obstetrics and Gynaecology and MRC/UN Pregnancy Hypertension Research Unit (Drs. Paruk and Moodley), and the Departments of Anaesthetics (Dr. Bhagwanjee) and Surgery (Dr. Muckart), University of Natal Medical School, Durban, South Africa.

<table>
<thead>
<tr>
<th>Organ Failure</th>
<th>Nonsurvivors (%) (n = 11)</th>
<th>Survivors (%) (n = 94)</th>
</tr>
</thead>
</table>
| Cardiovascular         | 3 (27.3)                  | 2 (2.1)
| Renal                  | 3 (27.3)                  | 12 (12.8)
| Respiratory            | 11 (100)                  | 88 (93.6)
| Hematologic            | 4 (36.4)                  | 4 (4.3)
| Central nervous system | 10 (90.1)                 | 18 (19.1)
| Total                  | 2.9                       | 1.3

*Statistically significant, p < .05.
Pre - ICU care

High risk patients

- Airway compromise
- Cardio-respiratory instability
- Seizures with ‘status’
- Low GCS: < 10

A. M. Kruger, S. Bhagwanjee

Department of Anaesthesia, Johannesburg Hospital and University of the Witwatersrand, Johannesburg, South Africa

Table 2. Causes of maternal deaths in 1995 and 1996 (n = 20)

<table>
<thead>
<tr>
<th></th>
<th>HIV+</th>
<th>HIV−</th>
<th>HIV status unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumonia</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncertain (died at home)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>1</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Haemorrhage</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Cardiomyopathy</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Pulmonary embolus</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Hodgkin’s lymphoma</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Amniotic fluid embolus</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4</td>
<td>6</td>
<td>10</td>
</tr>
</tbody>
</table>

*a* Aetiology of pneumonia unknown.

Table 3. Causes of maternal deaths in 2000 and 2001 (n = 35)

<table>
<thead>
<tr>
<th></th>
<th>HIV+</th>
<th>HIV−</th>
<th>HIV status unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumonia</td>
<td>10</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Multi-organ failure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulmonary embolus</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gastrointestinal bleed</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haemorrhage</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sepsis</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liver failure</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intracranial bleed</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiomyopathy</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>2</td>
<td>17</td>
</tr>
</tbody>
</table>
ICU Triage

- Treatment futile
- Admit and treat (First come first serve)
- No need for ICU
The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3)
CONFERENCE REPORTS AND EXPERT PANEL


Results: The Surviving Sepsis Guideline panel provided 93 statements on early management and resuscitation of patients with sepsis or septic shock. Overall, 32 were strong recommendations, 39 were weak recommendations, and 18 were best-practice statements. No recommendation was provided for four questions.

Conclusions: Substantial agreement exists among a large cohort of international experts regarding many strong recommendations for the best care of patients with sepsis. Although a significant number of aspects of care have relatively weak support, evidence-based recommendations regarding the acute management of sepsis and septic shock are the foundation of improved outcomes for these critically ill patients with high mortality.

Keywords: Evidence-based medicine, Grading of Recommendations Assessment, Development, and Evaluation criteria, Guidelines, Infection, Sepsis, Sepsis bundles, Sepsis syndrome, Septic shock, Surviving Sepsis Campaign
Critical care and the global burden of critical illness in adults

Neill KJ Adhikari, Robert A Fowler, Satish Bhagwanjee, Gordon D Rubenfeld

Critical care has evolved from treatment of poliomyelitis victims with respiratory failure in an intensive care unit to treatment of severely ill patients irrespective of location or specific technology. Population-based studies in the developed world suggest that the burden of critical illness is higher than generally appreciated and will increase as the population ages. Critical care capacity has long been needed in the developing world, and efforts to improve the care of the critically ill in these settings are starting to occur. Expansion of critical care to handle the consequences of an ageing population, natural disasters, conflict, inadequate primary care, and higher-risk medical therapies will be challenged by high costs at a time of economic constraint. To meet this challenge, investigators in this discipline will need to measure the global burden of critical illness and available critical-care resources, and develop both preventive and therapeutic interventions that are generalisable across countries.

<table>
<thead>
<tr>
<th>Population in 2004 (x10^7)</th>
<th>Number of deaths in 2004 (x10^4)†</th>
<th>Estimated potential burden of selected critical illnesses per year (x10^4)‡</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total (x10^4)</td>
<td>Infection (x10^4)</td>
</tr>
<tr>
<td>----------------------------</td>
<td>---------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>High-income countries</td>
<td>949818</td>
<td>8008</td>
</tr>
<tr>
<td>East Asia and Pacific</td>
<td>1892113</td>
<td>14000</td>
</tr>
<tr>
<td>Europe and central Asia</td>
<td>475096</td>
<td>5684</td>
</tr>
<tr>
<td>Latin America and Caribbean</td>
<td>549187</td>
<td>3499</td>
</tr>
<tr>
<td>Middle East and north Africa</td>
<td>324542</td>
<td>2114</td>
</tr>
<tr>
<td>South Asia</td>
<td>1493430</td>
<td>15778</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>749269</td>
<td>11662</td>
</tr>
<tr>
<td>World</td>
<td>6436826</td>
<td>58772</td>
</tr>
</tbody>
</table>

Data are number (percentage of total in region). Percentages do not add up because other causes of death are not listed. Data for population and deaths are from the Global Burden of Disease project, available at http://www.who.int/healthinfo/global_burden_disease/en/index.html. †Classification was done according to the World Bank income and geographical categories used in the disease control priorities project (details available at http://www.dcp2.org/pubs/G80). World totals include some countries and territories that are not part of the World Bank regions. Infection includes categories of infectious or parasitic diseases and respiratory infections; maternal conditions include sepsis, haemorrhage, hypertensive disorders, obstructed labour, and abortions; cardiovascular diseases include rheumatic, ischaemic, hypertensive, inflammatory, and cerebrovascular diseases; injuries include both unintentional and intentional causes. ‡Data are estimates based on estimates of North American population yearly incidence of mechanical ventilation, acute lung injury, and sepsis and severe sepsis; extrapolated to other regions based on population. These estimates are for illustration purposes only and assume that those other regions have similar intensive care capacity, underlying risk factors for the outcomes listed, and age-distributions and sex-distributions to North America. These numbers can best be interpreted as the burden of critical illness given capacity and population similar to North America.

Table 1: Estimates of global burden of critical illness by World Bank region
### Stanger Hospital: Sepsis

<table>
<thead>
<tr>
<th></th>
<th>SEPSIS</th>
<th>NON-SEPSIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED ADMITS</td>
<td>344 (30%)</td>
<td>805 (70%)</td>
</tr>
<tr>
<td>MORTALITY</td>
<td>48 (13.9%)</td>
<td>80 (6.9%)</td>
</tr>
</tbody>
</table>

SEPSIS ACCOUNTS FOR 38% OF ALL FATALITIES
ICU BEDS WERE AVAILABLE FOR 2 PATIENTS (0.2%)

Pillay et al
Mortality rate: Stanger Hospital

<table>
<thead>
<tr>
<th>SEPSIS (%)</th>
<th>NON-SEPSIS (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admissions from ED 344 (29.9) 1150 (70.1)</td>
<td></td>
</tr>
<tr>
<td>Mortality 48 (139) 80 (6.9)</td>
<td></td>
</tr>
</tbody>
</table>

Sepsis accounts for 37.5% of fatalities

ICU admissions: 2 = 0.2%

Source of the Curve

- Predicted probability qSOFA in sepsis
- Predicted probability TEWS in sepsis
- Predicted probability SIRS in sepsis
- Predicted probability baseline in sepsis
- Reference Line

Pillay et al
Compliance with the 24-hour sepsis bundle was achieved in only 30% of eligible candidates ...

Figure 2

Compliance with the 6-hour sepsis bundle and hospital mortality (n = 101). NNT, number needed to treat; RR, relative risk.

I CAN'T SAY I'M ENTIRELY PLEASED WITH MY HIP REPLACEMENT.
Ownership NOT buy-in
People must believe in what they do (knowledge), they must be encouraged to do what’s right (attitude) and they must act appropriately (behavior)
Ownership produces actions
Buy-in produces lip service
Global challenge

• ... an inconsistent response to sepsis across the globe
• ... a lack of public awareness about sepsis
• ... paucity of data on the role of key stakeholders in addressing the problem of sepsis.

Variation in critical care services across North America and Western Europe *
Wunsch, Hannah; MD, MSc; Angus, Derek; MD, MPH; Harrison, David; Collange, Olivier; Fowler, Robert; Hoste, Eric; de Keizer, Nicolette; Kersten, Alexander; Linde-Zwirble, Walter; Sandiumenge, Alberto; Rowan, Kathryn

SA: Nursing ratios

SA: Availability of intensivists

SA: Time to transfer of critically ill patients


Fathima Paruk, Guy Richards, Juan Scribante, Sats Bhagwanjee, Mervyn Mer, Helen Perrie

Background. The emergence of multidrug-resistant, extensively resistant and pan-resistant pathogens and the widespread inappropriate use of antibiotics is a global catastrophe receiving increasing attention by health care authorities. The antibiotic prescription practices in public and private intensive care units (ICUs) in South Africa are unknown.

Objective. To document antibiotic prescription practices in public and private ICUs in South Africa and to determine their relationship to patient outcomes.

Methods. A national database of public and private ICUs in South Africa was prospectively studied using a proportional probability sampling technique.

Results. Two hundred and forty-eight patients were recruited. Therapeutic antibiotics were initiated in 182 (73.5%), and 54.9% received an inappropriate antibiotic initially. De-escalation was practised in 33.3% and 19.7% of the public and private sector patients, respectively. Antibiotic duration was inappropriate in most cases. An appropriate choice of antibiotic was associated with an 11% mortality, while an inappropriate choice was associated with a 27% mortality (p=0.01). The mortality associated with appropriate or inappropriate duration of antibiotics was 17.6% and 20.6%, respectively (p=0.42).

Conclusion. Inappropriate antibiotic prescription practices in ICUs in the public and private sectors in South Africa are common and are also associated with poor patient outcomes.

20% of ICU patients had sepsis, mortality rate was 22%.

Fig. 2. Mortality associated with appropriate and inappropriate choice and duration of antibiotics.

Process of Care

Have we reduced the likelihood of harm?

How often do we do what we are supposed to?

How often do we harm?

Have we created a culture of safety?

Adapted from Donabedian (Donabedian, A. 1966)
Pyramid of Health

- People
- Sepsis Patients
- Frontline providers
- ICU
A roadmap for acute care training of frontline Healthcare workers in LMICs☆

Nirupa Shah², Satish Bhagwanjee³, Janet Diaz³, P.D. Gopalan⁴, John Adabie Appiah⁵, On behalf of the ACART Group (Acute Care for Africa Research and Training)

¹ Department of Global Health, University of Washington, Seattle, WA, USA
² Department of Anesthesiology and Pain Medicine, University of Washington, Seattle, WA, USA
³ Department of Medicine, California Pacific Medical Center, San Francisco, CA, USA
⁴ Department of Anesthesia, University of KwaZulu-Natal, Durban, South Africa
⁵ Kwame Nkrumah University of Science & Technology, Kumasi, Ghana
Key elements

- Target frontline workers
- Train the trainer
- Task shifting
- Health systems strengthening
Good Clinical Care Requires Team Work

Otherwise Patient Care and Patient Safety Will Be De-Railed

Good Communication is key
<table>
<thead>
<tr>
<th>TOPIC</th>
<th>CORE CONTENT</th>
<th>INTERACTIVE LEARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Team work</td>
<td>Stereotypes, roles and responsibilities, team culture</td>
<td>Role play: team culture using Pictionary, Group work: team building using Paper chain, Scenario: team building using septic shock</td>
</tr>
<tr>
<td>Triage, Sepsis diagnosis and stratification</td>
<td>Acute illness, define sepsis, stratify sepsis</td>
<td>Scenario: triage acute illness using cases, Scenario: sepsis diagnosis using cases, Scenario: sepsis stratification using cases</td>
</tr>
<tr>
<td>IPC</td>
<td>Describe infection prevention and control</td>
<td>Scenario: infection control and prevention using cases</td>
</tr>
<tr>
<td>IV Access</td>
<td>Describe IV, NGT, IO placement</td>
<td>Scenario: review local practice options</td>
</tr>
<tr>
<td>Oxygen</td>
<td>Define Big 5, describe why and how of oxygen therapy</td>
<td>Role play: Oxygen administration using septic shock</td>
</tr>
<tr>
<td>Resuscitation</td>
<td>Describe why and how of resuscitation</td>
<td>Role play: resuscitation using cases</td>
</tr>
<tr>
<td>Antimicrobial therapy</td>
<td>Describe why and how of antimicrobial therapy, repeat Big 5</td>
<td>Group work: develop antimicrobial therapy using sepsis diagnoses</td>
</tr>
<tr>
<td>Monitoring</td>
<td>Describe how and what to monitor, response to Big 5</td>
<td>Role Play: define monitoring and Big 5 using cases</td>
</tr>
<tr>
<td>Transfer</td>
<td>Describe why, who and how of transfer</td>
<td>Role play: describe transfer using sepsis diagnosis, therapy and monitoring</td>
</tr>
<tr>
<td>Quality / Developing ownership</td>
<td>Describe how and why of quality / ownership</td>
<td>Scenario and Role play: define quality metrics using Big 5 algorithm</td>
</tr>
<tr>
<td>Closure</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix A: Sample Sepsis algorithm: THE BIG 5

0 min
Recognize severe sepsis / septic shock

5 min
1. Implement IVC
2. Give highest flow of oxygen available
3. Place at least 1 peripheral IV
4. Give 1 litre of balanced solution (i.e. Lactated Ringers)
5. Give Antimicrobial IV

Monitor BP, HR, SaO2, RR, UO, chest crackles and Mental status

5-30 min

5-30 min

5-30 min

5-30 min

improvement

improvement

improvement

improvement

NO
YES

NO
YES

NO
YES

NO
YES

1. Give additional 500 ml bolus
2. Start adrenaline infusion, through PIV
3. History and exam, identify likely source of infection, is there need for surgical intervention? is there a need for additional antibiotics?
4. Call referral centre for help
5. Review treatment: is there any improvement or deterioration

Monitor BP, HR, SaO2, RR, UO, chest crackles and Mental status

30-60 min

30-60 min

30-60 min

30-60 min

improvement

improvement

improvement

improvement

NO
YES

NO
YES

NO
YES

NO
YES

1. Insert Foley and measure urine output
2. Give hydrocortisone (dose)
3. Give 500 ml crystalloid fluid
4. Titrated adrenaline
5. Give expanded antimicrobial therapy if indicated

Monitor BP, HR, SaO2, RR, UO, chest crackles and Mental status

60-90 min

60-90 min

60-90 min

60-90 min

improvement

improvement

improvement

improvement

NO
YES

NO
YES

NO
YES

NO
YES

1. Give 500 ml fluid if no signs of fluid overload
2. Titrated adrenaline
3. Call referral centre for help
4. Review treatment: is there any improvement or deterioration
5. Repeat triage, symptom and sign review

Monitor
Systems Thinking

“In Systems Thinking the interactions between the parts produce the whole and the parts are relevant as parts only because they produce and sustain the whole.”

Jackson, M.C. 2000. Systems Approaches To Management
Inverting the pyramid =

- Teamership
- Ownership
- Wholism
- Recognize errors and make changes
- Be open to new approaches