

# Outbreaks of Neonatal Septicaemia in Public Hospitals

## Have we learnt anything?

T Avenant

4<sup>th</sup> FIDSSA CONGRESS 2011



UNIVERSITEIT VAN PRETORIA  
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## Dirty hands caused babies' deaths

BLOEMFONTEIN, SOUTH AFRICA - Mar 25 2004 17:02

0 Comments and 0 Reactions

A pharmacy assistant's dirty hands were the main reason why six babies died earlier this month in the Pelonomi hospital in Bloemfontein.

 Tweet 0

 Recommend

### ARTICLE TOOLS

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- Pelonomi Hospital
- Council of Health Service Accreditation of Southern Africa
- 2 to 6 February 2004
- “One of the three element where the score is to improve is infection control where the **management of infection control, prevention and control and infection education to staff are to be prioritised.**” (sic)



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**ATTENTION: ALL MEDIA**

**DATE: 8 JUNE 2005**

**EMBARGO: FOR IMMEDIATE RELEASE**

**UPDATE: OUTBREAK- MAHATMA GANDHI  
MEMORIAL HOSPITAL**

# Analysis of Klebsiella Outbreak in Neonatal Nursery at Mahatma Gandhi Hospital

## Final report

### Conclusion

1. Although molecular characterisation of the isolates has not as yet taken place, these findings indicate that this is an outbreak of *Klebsiella pneumoniae* infection due to **contamination of one of the intravenous medications.**
2. The reasons are
  - a. multiple-use of units of intravenous medication
  - b. **inadequate hand washing practices.**

# Analysis of Klebsiella Outbreak in Neonatal Nursery at Mahatma Gandhi Hospital

## Final report

3. The underlying cause for multiple-use of medication is attempts to **limit costs**
4. The underlying causes for inadequate hand wash practices are
  - a. **inappropriate hand wash facilities**
  - b. **relying on chlorohexidine-alcohol solutions at the bedside (these are often applied in too small quantities and insufficiently rubbed in)**
  - c. inappropriate use of gloves
  - d. **understaffing**



**It's all my own,  
says rock star / 12**

**Emotional strain of  
attaining happiness / 17**

**Thembisa seeks  
Pop Idols fame / 3**



# Daily Dispatch

UNDED 1872

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Thursday  
July 12 2007  
R3.20



# Why Frere's babies die

2007

# National Task Team Report on Frere Hospital

- Physical facilities
  - Maintenance deficient
- Equipment
  - Some equipment old and need replacement
- Hygiene and infection control
  - Basins not optimal
  - *The Quality and Infection Control Policy should be robustly enforced and the manager given strong support by top management of the hospital and the clinical senior staff.*
- Human resources
  - Under staffed at all levels

# National Task Team Report on Frere Hospital

- Clinical Aspects
  - Perinatal Outcomes
  - Clinical protocols
  - Statistics
  - Audit
  - Clinical practice
- Management
  - The Management of the Hospital does not have the capacity, the delegations, empowerment or the environment to effectively manage the hospital effectively.
- Service delivery plan

# Charlotte Maxeke



**+ SECTION27** incorporating the  
AIDS Law Project  
catalysts for social justice

**25 January 2011**

**SECTION27 COMMENT ON RELEASE OF REPORT ON INVESTIGATION INTO INFANT  
DEATHS AT CHARLOTTE MAXEKE ACADEMIC HOSPITAL IN GAUTENG**

# Charlotte Maxeke Report



- **Norovirus**
- **Contributing Factors**
  - **Crowding**
    - Less space between cribs
    - Not enough staff
    - More outside visitors
  - **Facility and resources**
    - Lack of routine supplies
      - **Towels, antiseptic spray**
    - Insufficient equipment e.g. oximeters – **cross infection**
    - **Lack of space** e.g. locker facilities
    - Structural challenges in design e.g. **basins and ventilation**

# Charlotte Maxeke Report



- Maintenance and operating procedures
  - Preparation of formula feeds
  - Infection control practices, handwashing
  - Quality control
    - Standard operating procedures
    - Maintenance of equipment
    - Waste management
- Staffing
  - Norms not met, increased pressure

**Have we learnt anything?**

# Overcrowding – Current situation

“A shortage of beds forced staff at a Gauteng hospital to place two critically ill babies in one bed in the neonatal intensive care unit this weekend.

George Mukhari Hospital CEO Trevor Fisher yesterday confirmed that **15 babies had been placed in eight beds** in the unit.”



# Overcrowding

- Population increasing at rapid rate
- Nearly no new facilities built
- Capacity of existing facilities not increased in most cases
- In some units 10 – 30cm between incubators
- A immediate political response after outbreaks seems to be buying more incubators (or blame HIV☺)

**Why aren't we drowning yet?**

# Overcrowding – Coping strategies

## Kangaroo Mother Care

1. Thermal care through continuous skin to skin contact
  2. Support for exclusive breastfeeding
  3. Early home discharge
- Developed in response to high morbidity and mortality associated with overcrowding and sepsis



Photo: Dr E van Rooyen

# Kangaroo Mother Care



- Decrease pressure on NICU, High Care and Neonatal services
  - Babies cared for in different ward (not all cases)
  - Earlier discharge
- Fewer nosocomial infections
- Meta-analysis by Lawn
  - Decreased morbidity
    - Morbidity = severe infection such as sepsis, necrotizing enterocolitis and severe pneumonia
  - Decrease in mortality

Hall D et al. Transfusion Medicine, 2008,18

Lawn JE et al. International Journal of Epidemiology 2010;39

# Breastmilk



- Beneficial effects of human milk on decreasing rates of paediatric infections such as necrotizing enterocolitis (NEC) and sepsis clearly demonstrated.
- Donor breast milk encouraged as the milk of choice when a mother's own breast milk is not available
- Formula feeds often been implicated in outbreaks
- Establishment of donor breast milk banks in limited resource settings is feasible

# Nasal CPAP



<http://www.babylink.info>

- nCPAP can be safely and successfully implemented at Level 1 hospitals
- In study of Hendricks at Ceres Hospital it reduced transfers from 21% - 7%
  - Decreases overcrowding at larger hospitals
- ELBW infants with RDS can be successfully managed with nCPAP and in-out surfactant in a High Care ward
  - Decreases pressure on NICU
- Decrease in nosocomial pneumonia if not intubated

Hendriks H. et al African Journal of Primary Health Care & Family, Dec 2010  
Kirsten GF, 29<sup>th</sup> Conference on Priorities in Perinatal Care in South Africa, 2010  
Jeena P et al. Annals of Tropical Paediatrics (2002) 22

# Handwashing



- Implicated as major factor in all outbreaks
- Seems to be little or no improvement
- Message is getting to everyone – why no improvement?
- Practical issues
  - Basins
  - Crowding
  - Lack of soap and towels

# Handwashing



- Shown in many studies that compliance low
  - Physicians more
  - Not uniquely South African phenomenon
- Compliance falls during periods of understaffing and high workload
- Improved performance after “**education, training & performance feedback**” programmes
  - Does this apply in our understaffed conditions in long term?

# Facilities and Equipment

- After Frere report
  - New elbow operated taps, more basins
  - Ten fold increase in maintenance budget
  - Revitalization programmes for some larger hospitals
  - Fuchs Foundation – Healing Kids
    - Establish Kangaroo Mother Care facilities, Mother lodger units
    - Equipment - CPAP drivers
    - Breast-milk banks
  - Still large deficiencies
    - No capacity to care for increasing numbers of ELBW babies
    - Old infrastructure
    - Lack of maintenance
      - Equipment, Facilities



# Staffing

- Shortages at all levels remain
  - Clerks, porters
    - Nursing personnel burdened with extra duties
  - General assistants and cleaners
    - Cleanliness of wards and incubators
    - Waste not removed
    - Nursing personnel extra duties
  - Nurses
    - Poorer compliance to handwashing
    - Use of agency nurses
    - Nurses move from one section to another
    - No dedicated care
    - Training of temporary personnel in standard procedures

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# HOSPITAL

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search ID: rj00874

R9J

# Organisms Responsible for Outbreaks

- Bacteria
    - *Enterobacter*
    - *Klebsiella pneumoniae*, *K oxytoca*
    - *Acinetobacter*
    - MRSA
    - *Pseudomonas aeruginosa*
  - Fungi
    - Increased survival of ELBW babies, use of broad spectrum antibiotics, venous catheters and TPN for prolonged periods
  - Viruses
    - Rotavirus, Norovirus
    - RSV, Parainfluenza
    - nH1N1 Influenza A
- Y. M. Coovadia. Journal of Hospital Infection, Volume 14, Issue 4, November 1989
  - Pillay T et al. Journal of Hospital Infection (1999) 43
  - Holgate SL et al. Journal of Tropical Pediatrics, June 7, 2011

# Emergence of Resistant Organisms

- Often driven by inappropriate antibiotic management
- Good surveillance in academic centres
- NHLS public sector susceptibility data
  - Both local and national trends
  - *K. pneumoniae* > 50% ESBL producing, frequently multi-resistant
  - *E. coli* 6-16% ESBL, 76-91% susceptible to gentamicin
  - Acinetobacter 20 – 40% of isolates susceptible to carbapenems
- Global Antibiotic Resistance Partnership (GARP)

Gelband H. South African Medical Journal, Vol 101, No 8 (2011)

Crowther-Gibson P et al. South African Medical Journal, Vol 101, No 8 (2011)

# Judicious Use of Antibiotics

- Doctors much more aware
  - Education
  - Best Care...Always! (BCA)
- Antibiotic stewardship programmes
- Under- and post graduate medical training
- Use of third generation cephalosporins decreasing
- Guarded use of Vancomycin and Meropenem
  
- Knowledge needs to be disseminated

# Infection Control

- **Need buy in from managers**
- Due to pressure on units
  - Closure in most cases not an option during outbreaks
- A Dusé
  - Increasing numbers of vulnerable individuals
  - Be continuously aware of consequences of bad infection control practices
  - Good infection control practices can contain majority of infections by simple measures
  - Education is critically important\*

# Management

- But a doctor, working in one of the hospital's intensive care units, told The Times yesterday that there had been a **shortage of soap and paper towels for days before** the news of the babies' deaths hit the headlines.

"**Nobody**", the doctor said, **was taking note** of how dire the situation had become.

"**The day after the news broke we started getting loads of stock.** I saw the boxes being wheeled in. I wanted to take a huge giant roll of paper towel and hide it somewhere in case it happened again!"

**Shortages of basic equipment was nothing new** at the hospital, where they regularly run out of aprons and gloves.

When the stock room is empty, staff are merely told: "**The bills weren't paid.**"

# Management

We need to train our managers to understand the basic economics of infection control – the fewer the infections the less the cost to the health services. Investment in infection control pays high dividends

– Shaheen Mehtar

# New Challenges – Increased Survival of ELBW infants

- Tygerberg Children's Hospital
  - 8 neonatal intensive care beds for the 50,000 deliveries
  - <1000g are electively not admitted to the NICU
  - Survival
    - 43% in 1994 (head box oxygen, and formula feeding)
    - 55% in 2004 (KMC, breast milk feeding and nCPAP)
    - 76% in 2007 (in-out surfactant to those who failed nCPAP)
  - Result: Severe overcrowding of tertiary units

# New Challenges - Tuberculosis

- Nosocomial transmission of tuberculosis in Kangaroo Mother Care unit
- Four infants and one mother developed TB after exposed to source case
- Health care workers should be vigilant
- Symptom based screening
- Isolation of suspect cases
- Prophylaxis to contacts



# Conclusions

- Some valuable lessons have been learnt
- Most of the solutions are simple and easy to implement
- There are still enormous challenges that will have to be addressed before we will see the end of sensational headlines
  - Overcrowding
  - Hand washing
  - Understaffing
  - Equipment
  - Facilities
  - Infection control programmes
  - Management skills

# Acknowledgements

- Nicolette du Plessis
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