Better and Safer Care for Kids

Annie Moulden and Andrew Hallahan

Overview

- North Shore 1995
- Nambour 2013
- Charts, processes and guidelines
- Reducing Variations in Care
- Building a Safety Culture

Preventable harm in health care

The Quality in Australian Health Care Study. Wilson R et al, MJA Nov 1995

- Review of 14,000 records
- 16.6% associated with an adverse event
- 51% were considered preventable
- The outcome of the adverse event for 4.9% of patients was death

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Health Care

The Quality in Australian Health Care Study

Ross McL Wilson, William B Runciman, Robert W Gibberd, Bernadette T Harrison, Liza Newby and John D Hamilton

A review of the medical records of over 14 000 admissions to 28 hospitals in New South Wales and South Australia revealed that 16.6% of these admissions were associated with an "adverse event", which resulted in disability or a longer hospital stay for the patient and was caused by health care management; 51% of the adverse events were considered preventable. In 77.1% the disability had resolved within 12 months, but in 13.7% the disability was permanent and in 4.9% the patient died. ***(Med J Aust 1995; 163: 458-471)***

Iatrogenic injuries or adverse patient events (AEs) in hospitalised patients have been recognised for a long time, but their epidemiology has not been well documented. Over 30 years ago, Shimmel reported that 20% of patients admitted to a university hospital suffered iatrogenic injury, and that 20% of the injuries were serious or fatal.[1]

In United States hospitals, AEs have been studied in the context of malpractice litigation and negligence. The Medical Insurance Feasibility Study of the California Medical Association reported a 4.6% incidence for all measured classes of "potentially compensable events" occurring in 1974,[2] and the 1984 Harvard Medical Practice Study (HMPS), reported by Brennan and colleagues, showed that adverse events occurred in 3.7% of hospitalisations, with 27.6% of these being caused by medical negligence and 69% by human error.[3-5] An AE rate of 11% in the medical service of an urban US teaching hospital was reported earlier this year: 42.5% of the AEs were judged to be preventable, and 80% caused disability lasting at least one month, a minimum of four added hospital days, or death.[6]

Leape,[7] in reviewing these studies, wondered why this issue has not received more attention and suggested that the magnitude of the problem has not been appreciated because hospital-acquired injuries are usually not reported systematically (in comparison with car or aircraft accidents). The medical culture of striving for "error-free practice", the fear of litigation, and the lack of definitions of the scope and nature of the problem, inhibited routine reporting of AEs. Until these issues are addressed preventive measures cannot be undertaken.[7]

A feasibility study by the Australian Institute of Health and Welfare in three hospitals in 1992[8] concluded that, with some modifications, the methods used by the HMPS could be successfully applied to a review of the medical records of admissions to Australian hospitals. The major value of such a study would be quality improvement, and hence a measure of preventability should replace determination of negligence. This would enable the study to be conducted in a positive and constructive environment, rather than in a negative or potentially antagonistic one. The 1994 Quality in Australian Health Care Study (QAHCS) was commissioned by the Commonwealth Department of Human Services and Health to determine the proportion of admissions associated with an AE in Australian hospitals.

We report on the adequacy of the methods used, the characteristics of patients with AEs, the major diagnostic categories and specific specialties associated with AEs, and measures of disability and preventability. Human and system-based factors identified as contributing to AEs are discussed, focusing on possible areas for prevention in the future.

For editorial comment, see page 453.
See also commentaries on pages 472 and 475.

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What types of harm….

- Diagnostic
  - Error in or delay in diagnosis
  - Failure to employ an indicated test
  - Failure to act on results
- Treatment
  - Error in the performance of an operation or procedure
  - Error in administering treatment
  - Medication error
- Preventative
  - Failure to provide prophylaxis
  - Inadequate monitoring or follow up

Millions sought in brain-damage case

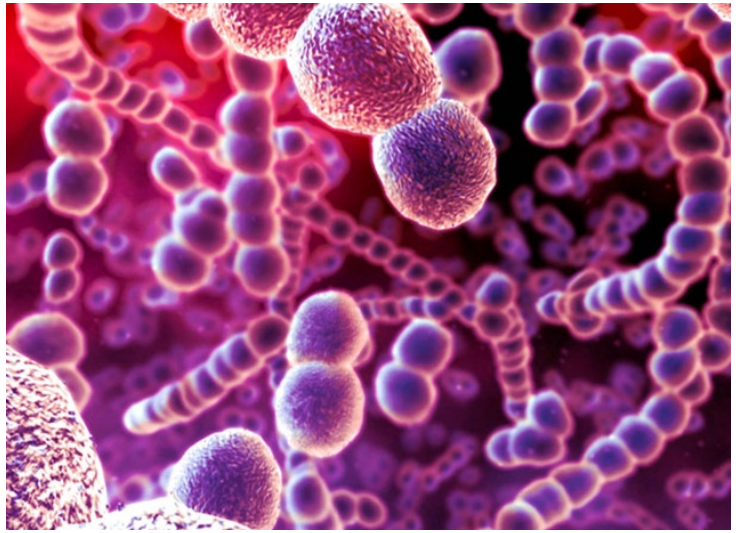
By Jewel Topsfield June 22, 2004

Nathan Liu, victim of a treatment that went wrong.

The Royal Children's Hospital in Parkville is being sued for millions of dollars after a four-week-old baby was left severely brain damaged when he was given an intravenous drip with 10 times the recommended dose of glucose.

Nathan Liu, who is now almost three, was admitted to the hospital on September 16, 2001, because his parents, Guilin and Lin Liu, were concerned by his persistent vomiting.

Nambour 2013



1. Lilli Sweet was six years of age when she died on Tuesday 27 August 2013 from complications associated with a severe bacterial infection.

2. At the time of her death, Lilli was known to have a medical condition, known as Hereditary Spherocytosis, which made her more susceptible to severe and life-threatening infections. She had a splenectomy (removal of the spleen) performed some two years previously. She was not receiving antibiotic prophylaxis in the time immediately preceding her death.

3. Lilli had a two day history of vomiting, diarrhoea, and headache and was not taking adequate fluid. On 25 August 2013, Lilli's mother appropriately took her to see a GP. The GP referred her to Nambour Hospital Emergency Department. In a letter of referral the GP clearly stated that Lilli had a splenectomy and that it was unclear as to whether she was fully immunised. He suggested bloods be taken for analysis and a paediatric review. Lilli was taken by her mother to Nambour Hospital immediately.

4. In the Nambour ED she continued to vomit and complained of headache. On arrival she had a mild temperature of 37.6°. It was noted that she had ceased prophylactic antibiotics post splenectomy in 2012. She was admitted to the paediatric ward on IV fluids and given panadol/nurofen. Her headache however persisted. Routine blood tests were not ordered in the ED. These were only ordered once she was admitted to the paediatric ward during the evening. Around midnight the doctor on night shift received advice of test results and that the white cell count was highly elevated at 46.5. No further action was taken in respect to this result. Subsequent expert review opined, that in an asplenic child, such a high white cell count indicates serious sepsis.

5. By the following morning, Lilli rapidly deteriorated with an increasing headache, high fevers and neck stiffness. It was at this time Lilli was commenced on intravenous antibiotics. Soon after, she became unresponsive and required emergency resuscitation. A CT scan demonstrated brain stem herniation. She was intubated, ventilated and transferred to the Royal Children's Hospital (RCH). Blood cultures grew a Streptococcus pneumoniae.

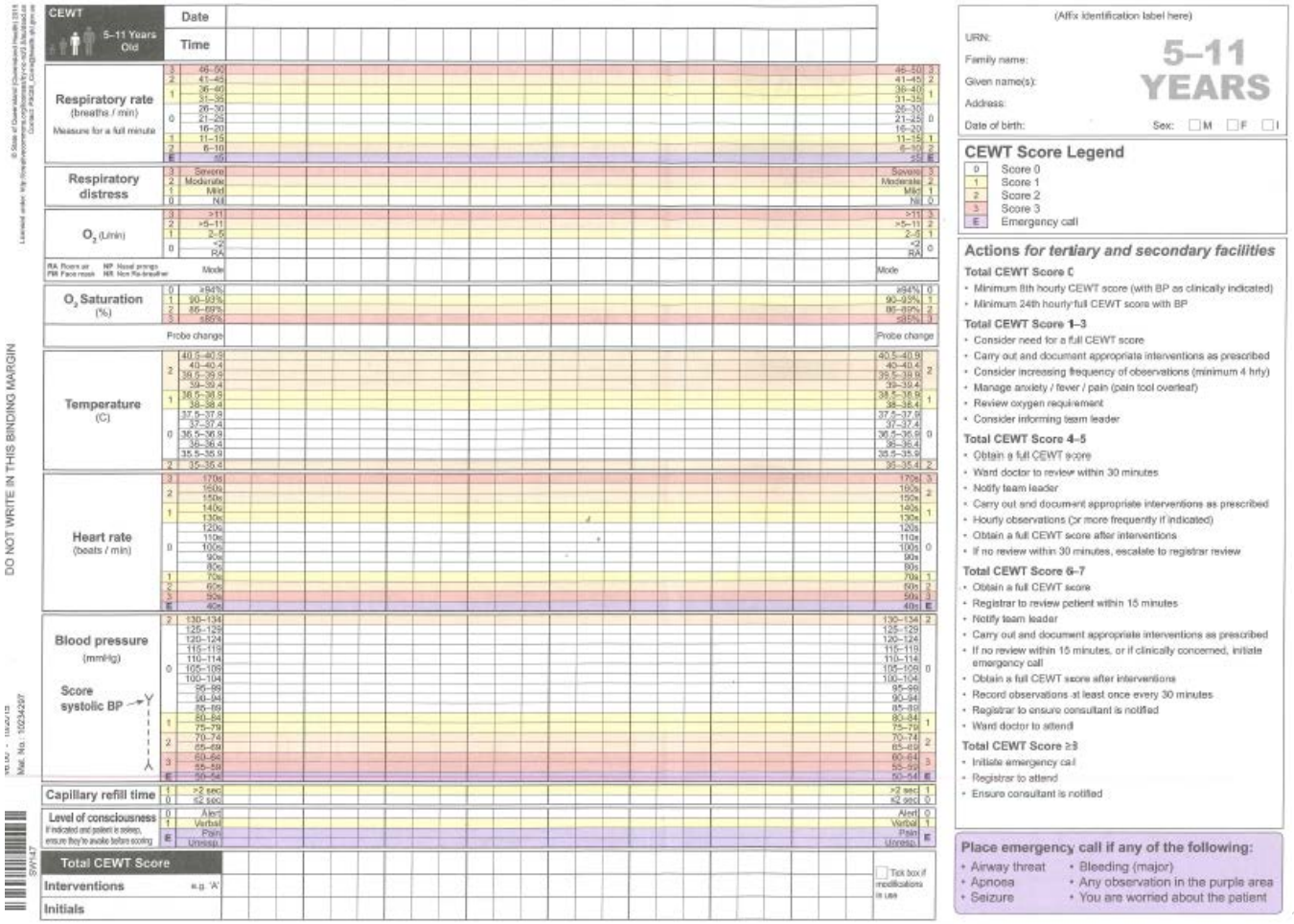
6. On arrival at the RCH Lilli was unresponsive with fixed dilated pupils. She died on 27 August 2013. A cause of death certificate issued with the cause of death being brain stem herniation due to pneumococcus. Her death was not initially reported to the coroner.

7. Subsequently as per protocol, the RCH conducted an internal death review. Concerns were raised about the management of Lilli at Nambour Hospital. The case was reported to the Office of the State Coroner on 24 September 2013.

We havent been idle….

- Every State has charts to assist in recognising deterioration
- Every Hospital in the country has an escalation process once deterioration has been recognised
- We have numerous Clinical Practice Guidelines on the management of sepsis and septic shock
- And yet … in every State last year, children died or had significant morbidity from a delayed diagnosis of sepsis

ViCTOR charts, QLD PEWS, Between the flags…



Children's Health Queensland Sepsis Guideline

Children's Health Queensland Hospital and Health Service

Guideline

Management of Paediatric Septic Shock

Document ID	CHQ-CPG	Version no.	1.0	Approval date	17/04/2015
Executive sponsor	Executive Director Medical Services			Effective date	17/04/2015
Author/custodian	Director PICM			Review date	17/04/2017
Supercedes	NEW				
Applicable to	CHQ clinical staff				
Authorisation	Sue McKee, General Manager Operations				

Purpose

The guideline provides recommendations for best practice management of septic shock in paediatric patients. The recommendations and flow diagram in Appendix 1 are consistent with recent international recommendations.[7]

Scope

This guideline relates to all CHQ clinical staff.

INFECTION	1st CHOICE ANTIMICROBIAL	Alternative antibiotic in the event of immediate type (eg. anaphylaxis) or delayed type (eg. rash) hypersensitivity to penicillins and cephalosporins
SEPTICAEMIA		
COMMUNITY ACQUIRED **SEPSIS (Non PICU)** (For neonates and infants ≤2 months old) **Note: If Meningitis suspected treat as stated under MENINGITIS**	**Ampicillin IV (or Amoxycillin IV)** • **If <1mth old:** Age dependent- Refer to Ampicillin/Amoxycillin neonatal dosing section • **If >1 mth old:** 50mg/kg/dose IV every 6 hours (Max 2gram/dose) Plus **Gentamicin IV** (See TDM section)** • **If < 1mth old:** Age dependent - Refer to Gentamicin neonatal dosing section • **If > 1mth old:** 7.5mg/kg IV once daily (Max 320mg/day) **Comment: If MRSA suspected or life threatening sepsis, see PICU Empirical Antibiotic Guidelines** Perform therapeutic drug monitoring for Gentamicin as advised by pharmacy.	**Immediate type hypersensitivity, seek ID advice**
COMMUNITY ACQUIRED **SEPSIS (Non PICU)** (For infants and children >2 months old)	**Cefotaxime IV** 50mg/kg/dose IV every 6 hours (Max 2gram/dose) **Note: If Meningitis suspected treat as stated under MENINGITIS**	**Immediate type hypersensitivity** Ciprofloxacin IV and Vancomycin IV and seek ID advice within 24hours

In this section

Guidelines Index

Guideline Development

Other Resources

Mailing lists

Feedback

SEPSIS – assessment and management

This guideline has been adapted for statewide use with the support of the Victorian Paediatric Clinical Network

Emergency Drug & Fluid Calculator

See also:

- Antibiotics guideline
- Febrile neutropenia guideline
- Febrile child guideline
- Intravenous fluid guideline
- Intraosseous access guideline

Background to condition

Septic children may present with:

- *warm* shock characterised by a wide pulse pressure and rapid capillary refill
- *cold* shock characterised by a narrow pulse pressure and prolonged capillary refill.

Note: The type of shock may change during resuscitation and needs to be continuously reassessed.

Early recognition and antibiotic administration has been shown to improve survival.

Children at increased risk of severe sepsis include:

- Neonates
- Immunosuppressed children
- Children with central venous access devices

Fluid resuscitation should be judiscious; inadequate as well as excessive fluid resuscitation may be harmful.

If, after assessment, you do not think that the patient is septic, refer Febrile child guideline. If you are unsure whether a child may have early signs of sepsis, senior clinician (or paediatrician on-call) review is necessary.

Assessment and Management

Time = 0 min

RECOGNITION –

Fever or hypothermia
Tachycardia
Hypotension
Warm shock – wide pulse pressure, rapid capillary refill
Cold shock – narrow pulse pressure, prolonged capillary refill
Tachypnoea +/- hypoxia
Altered conscious state
Unwell appearance

Call for help from experienced clinician
Apply oxygen 8L/min via face mask (→Resuscitation guideline)
Continuous cardiorespiratory monitoring

Time < 15 mins

IV ACCESS

If no IV access within 15 minutes insert IO
Take BC, venous gas and blood glucose (if easy bleed consider FBE, UEC, coags). Do NOT delay other therapy to take blood tests.
Lactate >4mmol/L is a sign of severe illness

Time < 30 mins

ANTIBIOTICS

Give initial antibiotics on cannulation as a push:
- Age <1 month – Cefotaxime iv 50mg/kg + Benzylpenicillin iv 50mg/kg
- Age ≥1 month – Cefotaxime iv 50mg/kg OR Ceftriaxone iv 50mg/kg (2g) + Flucloxacillin iv 50mg/kg (2g)
- (2g) for age < 1 month and age >/= 1 month

→ Antibiotics guideline, Febrile neutropenia guideline

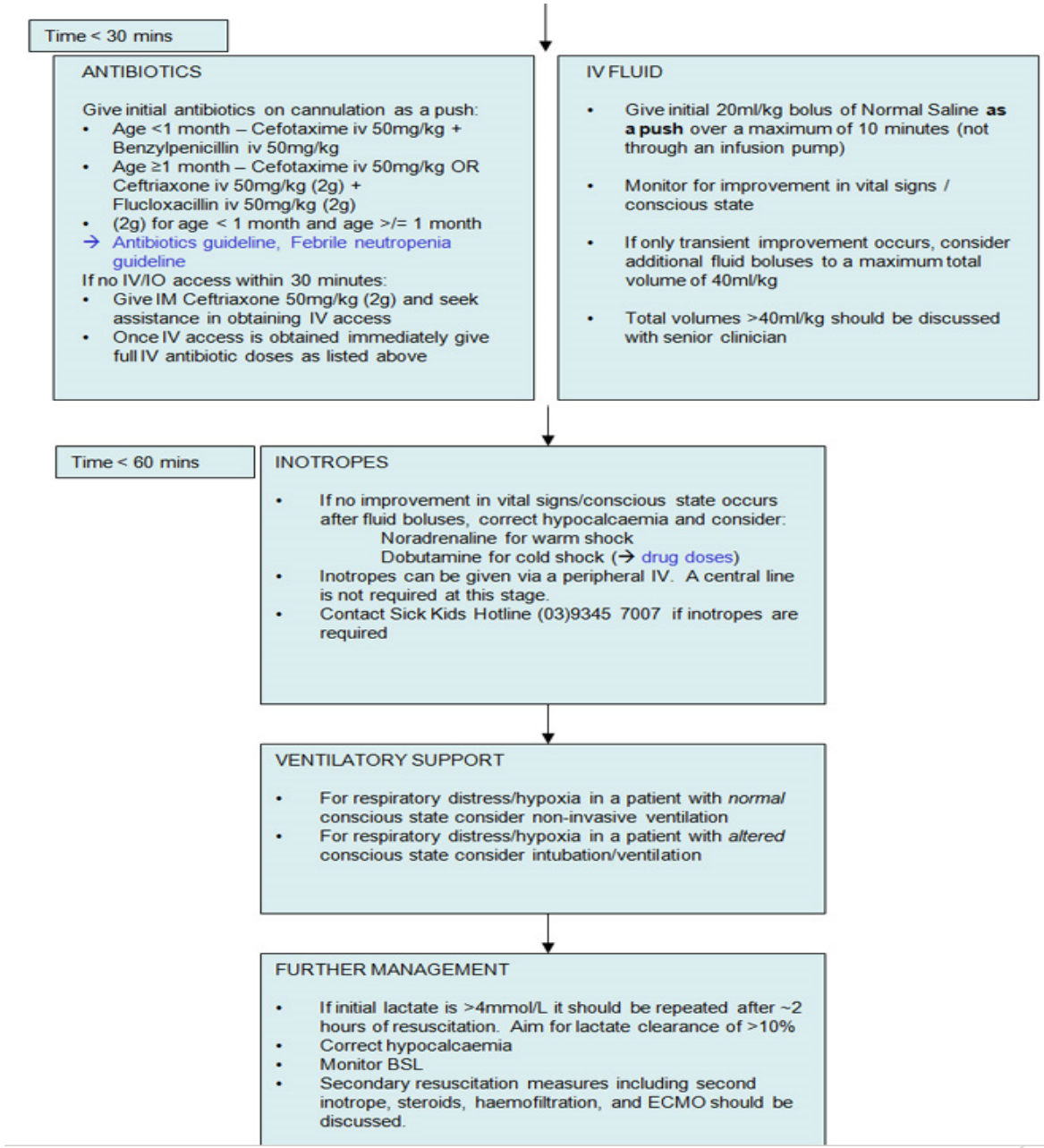
If no IV/IO access within 30 minutes:
- Give IM Ceftriaxone 50mg/kg (2g) and seek assistance in obtaining IV access

IV FLUID

- Give initial 20ml/kg bolus of Normal Saline **as a push** over a maximum of 10 minutes (not through an infusion pump)
- Monitor for improvement in vital signs / conscious state
- If only transient improvement occurs, consider additional fluid boluses to a maximum total volume of 40ml/kg
- Total volumes >40ml/kg should be discussed

Normal values

Age	Min sys BP (mmHg)	HR (bpm)	RR (bpm)
Term	50	100 - 170	40 - 60
3m	50	100 - 170	30 - 50
6m	60	100 - 170	30 - 50
1y	65	100 - 170	30 - 40
2y	65	100 - 160	20 - 30
4y	70	80 - 130	20
6y	75	70 - 115	16
8y	80	70 - 110	16
10y	85	60 - 105	16
12y	90	60 - 100	16
14y	90	60 - 100	16
17+y	90	60 - 100	16


Time < 30 mins
ANTIBIOTICS
Give initial antibiotics on cannulation as a push:
• Age <1 month – Cefotaxime iv 50mg/kg + Benzylpenicillin iv 50mg/kg
• Age ≥1 month – Cefotaxime iv 50mg/kg OR Ceftriaxone iv 50mg/kg (2g) + Flucloxacillin iv 50mg/kg (2g)
• (2g) for age < 1 month and age >/= 1 month
→ Antibiotics guideline, Febrile neutropenia guideline
If no IV/IO access within 30 minutes:
• Give IM Ceftriaxone 50mg/kg (2g) and seek assistance in obtaining IV access
• Once IV access is obtained immediately give full IV antibiotic doses as listed above
IV FLUID
• Give initial 20ml/kg bolus of Normal Saline as a push over a maximum of 10 minutes (not through an infusion pump)
• Monitor for improvement in vital signs / conscious state
• If only transient improvement occurs, consider additional fluid boluses to a maximum total volume of 40ml/kg
• Total volumes >40ml/kg should be discussed with senior clinician
Time < 60 mins
INOTROPES
• If no improvement in vital signs/conscious state occurs after fluid boluses, correct hypocalcaemia and consider:
Noradrenaline for warm shock
Dobutamine for cold shock (→ drug doses)
• Inotropes can be given via a peripheral IV. A central line is not required at this stage.
• Contact Sick Kids Hotline (03)9345 7007 if inotropes are required
VENTILATORY SUPPORT
• For respiratory distress/hypoxia in a patient with normal conscious state consider non-invasive ventilation
• For respiratory distress/hypoxia in a patient with altered conscious state consider intubation/ventilation
FURTHER MANAGEMENT
• If initial lactate is >4mmol/L it should be repeated after ~2 hours of resuscitation. Aim for lactate clearance of >10%
• Correct hypocalcaemia
• Monitor BSL
• Secondary resuscitation measures including second inotrope, steroids, haemofiltration, and ECMO should be discussed.

High Reliability

- Building systems that make it impossible to do the wrong thing
  - ATM – money / card – card / money
- Some other examples…

High Reliability in Health care …

- Is it possible to deliver?
- Can we design a system that improves reliability of care for sepsis

Flipping Health Care

- Flip the balance of care – from the hospital to the community
- Flip the balance of delivery – from individual providers to care teams
- Flip the balance of power – from the provider to the patient and family
- Flip the balance of costs – from treatment to prevention and co-production
- Flip the balance of emphasis from volume to value; and from health care to health

Behavioural change

- https://www.youtube.com/watch?v=P6iLULz_wOg

- Understand core beliefs when planning behavioural change
- Its the big ticket!

Workshop ….

- Design a system that improves reliability of care for children with sepsis
- You might want to consider
  - Enablers
  - Barriers
  - Staff Engagement
  - Decision Support
  - Sustainability

Reducing variations in care

- Measurement
- Enablers
- Barriers
- Staff Engagement
- Decision support
- Measurement
- Sustainability

Leadership drives Culture

Culture drives the rest …

Building a Safety Culture

- High Functioning Teams
  - Leadership
  - Situational awareness
  - Mutual support
  - Structured communication

Effective Teams

- Shared goals
- Clear role delineation
- Psychological safety
- Structured communication
- Small power gradient

Patient Safety Messages

- Don't jump to conclusions – premature closure or cognitive bias ie. two ronnies video available at https://www.google.com.au/search?q=two+ronnies+wallpaper&ie=utf-8&oe=utf-8&gws_rd=cr&ei=MNAdV76RIOPemAWNt4_gDw
- Arrogance or self-importance due to positional authority – USS ship and lighthouse video available at https://www.youtube.com/watch?v=GQm5P2KypeE
- Don't use inappropriate pranks or humour in front of patients – video of zapping the fly available at https://www.youtube.com/watch?v=jfPbQZdUsBo
- Don't make assumptions about what patients want without asking them what matters to them https://www.youtube.com/watch?v=fjJACryRAOA