

Health Care associated Infections

QI

we can measure what is happening,
we can intervene and we can reduce them

Prof Peter Collignon
Microbiology and Infectious Disease
The Canberra Hospital
Australian National University



What are health-care associated infections?

- Any infection that occurs following a health care procedure
 - All “hospital onset” infections
 - But also many other
 - have a community onset but related to medical care
 - wound infection
 - Many blood stream infections

Examples

- Blood stream infections
 - IV catheters
- Wound infections
 - After surgery
 - May be deep seated
- Urinary tract
 - Catheters
- Respiratory tract
 - Ventilators
 - drugs

Health care infections are very common

- Very common;
 - various studies in many countries
 - Likely between 5 -10% of all admissions develop a new infection
- Most are relatively minor
 - UTI, superficial wound
- But many Serious and Life threatening
 - Blood stream
 - Prosthetic joints etc

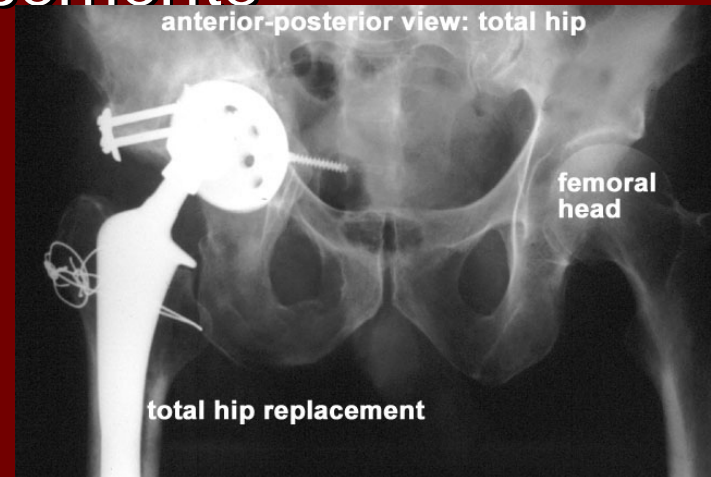
Serious infections and deaths are common

- Blood Stream infections
 - Frequently Staph aureus (MRSA and MSSA)
 - Most from IV catheters
 - In Australia IV episodes likely about 4,000 per year
 - In USA more than 200,000 per year
- High mortality attached (and morbidity)
 - With MRSA BSI - 35%
 - CNS lower but still >5%
 - In Australia thus about 400 deaths per year
 - USA 20,000 deaths from JUST IV catheters!

Serious Morbidity is common

Prosthetic joint infection (e.g. hip)

- To cure need 2 major operations, 8- 10 weeks incapacitated.
- > \$100,000 per episode
- 1 to 2% of all joint replacements
 - when things go well!



Blood stream infections; serious associated morbidity

- Blood stream infections
 - Renal failure, osteomyelitis, prolonged antibiotic therapy etc



How hazardous is healthcare?

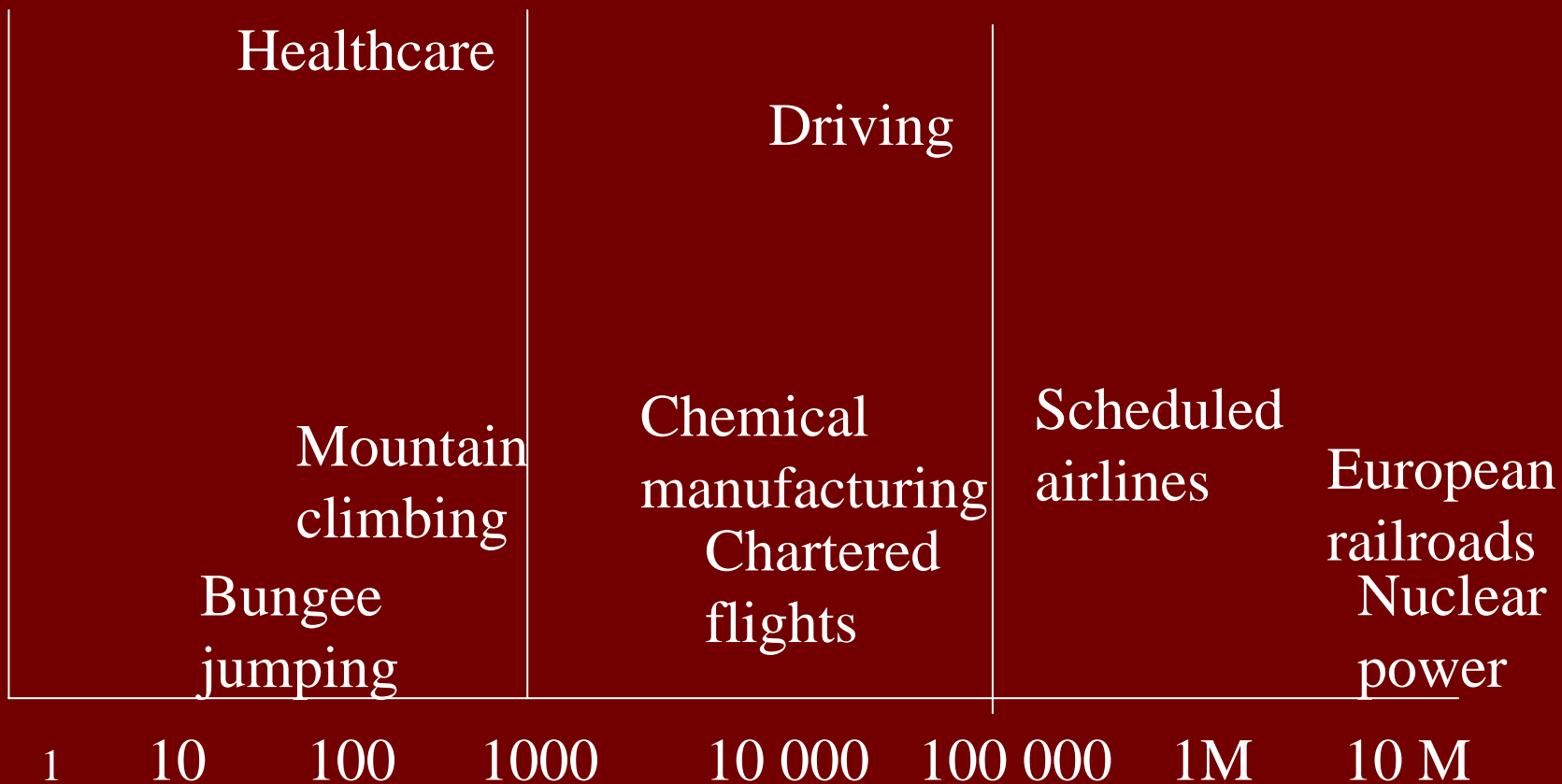
Dr. Lucien Leape Harvard Medical School

Total lives
lost per
year

Dangerous
($>1/1000$)

Regulated

Ultrasafe
($< 1/100\ 000$)



Healthcare

Driving

Mountain
climbing

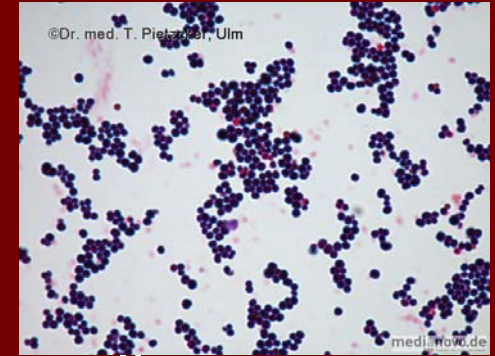
Chemical
manufacturing
Chartered
flights

Scheduled
airlines

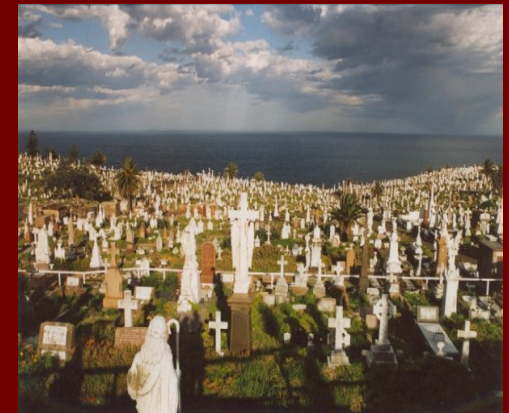
European
railroads
Nuclear
power

Number of encounters for each fatality

Staphylococcus aureus



- Common
 - Many sites esp blood, wounds
- Bacteraemia likely 7,000 per year in Australia
 - Two thirds healthcare associated
 - 50% hospital onset
 - 1/3 of community onset are health care related
 - 25% are MRSA
- High mortality in bacteraemia
 - Pre-antibiotics 82%
 - MSSA median 25%
 - MRSA median 35%



QI for Serious infections

- Review patients while still in wards
- Not just a lab or medical record based system
- Each episode is a sentinel event
 - Find causes, issues for each episode
- Timely Feedback
 - Both near when event occurs and latter
 - Written individual feedback
- Measure what is happening

Healthcare infections - measure them



Canberra Hospital what do we do? written feedback given for most

- Bacteraemia
 - All episodes
 - IV sepsis
 - Uro-sepsis
- Surgical sites
 - Cardiac
 - Neurosurgical
 - Joint replacement
 - Vascular
 - caesarean
- Poor behaviour of Staff
- MRO's
 - C.difficile
 - MRSA

Blood stream infections are common; more than 60% of these are health care associated

	2004	2005	2006	2007	2008
Community acquired	182 (12*)	158 (9*)	154 (15*)	171 (17*)	162 (12*)
Inpatient healthcare assoc.	118	133	145	127	139
Non inpatient healthcare assoc.	52	49	50	64	59
Maternally acquired	3	1	3	0	1
Total significant	355	341	352	362	361
* nursing home/ hostel residents					

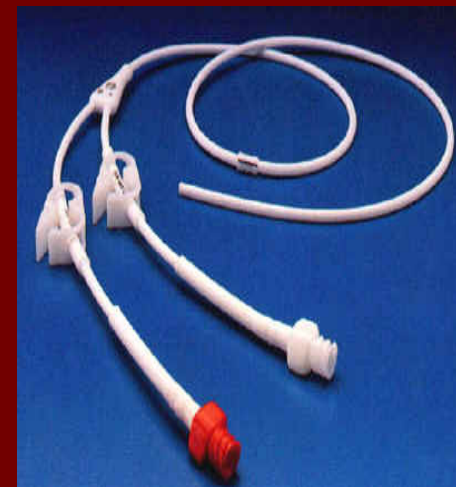
Many primary sites for BSI;

but IV catheters main site at most large hospitals

	2004	2005	2006	2007	2008
Gastrointestinal	59	80	66	75	73
Genito-urinary	70	65	74	76	57
Intravascular device related	42	48	56	49	57
Unknown	27	37	23	32	42
Respiratory	48	28	26	40	31
Skin and soft tissue	35	23	31	36	30
Musculo-skeletal	19	16	19	15	23
Haematological	20	29	20	17	22
Cardiovascular	14	7	17	11	11
Neurological	5	3	7	5	7
Primary Bacteraemia	14	5	9	6	4
Maternal	2	0	2	0	1
Other	0	0	1	0	0

IV catheter infections can be reduced

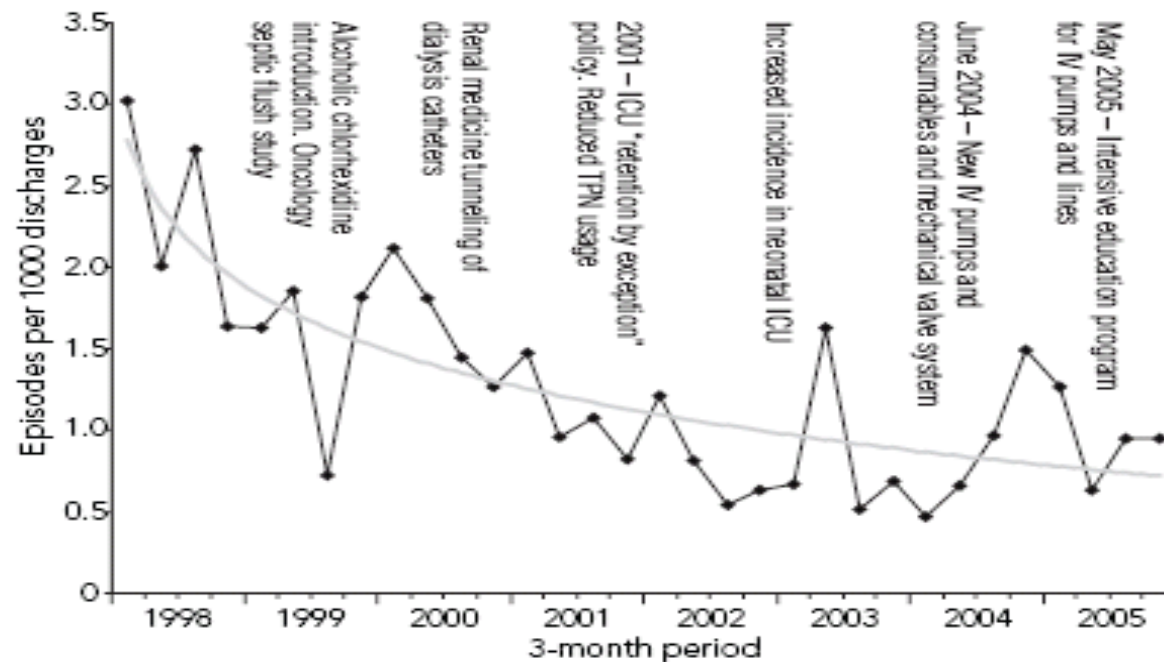
- Too many used
- In for too long
- Poor selection of most appropriate catheters
- Poor selection of sites
- Almost every doctor inserts them
 - including CVC's - even if little training
- CVC's used instead of peripheral catheters
 - for convenience BUT much higher per day risk



Infections can be reduced

BSI from IV catheter sepsis (The Canberra Hospital)

2 Rate of intravascular (IV) device-related bloodstream infection episodes per 1000 discharges, 1998–2005*



Trendline data: $y = -0.5946 \ln(x) + 2.7805$. *In 1990, the rate was 1.7/1000 discharges.⁴ ICU = intensive care unit. TPN = total parenteral nutrition. ◆

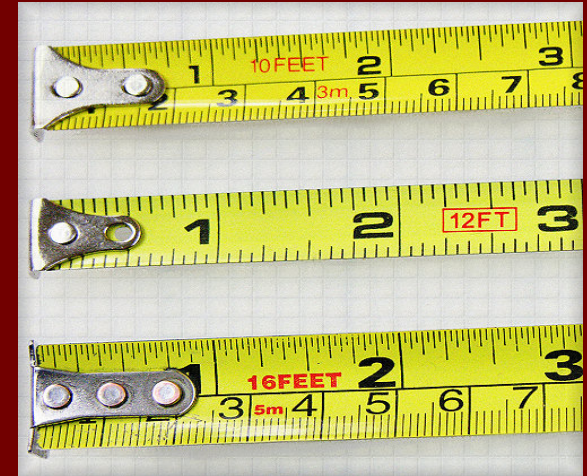
We can have an impact on all types of infections

- Surgical site
 - Hobart, Victoria, TCH, internationally
- Blood stream infections
 - Especially IV catheter
- Urinary tract
- Pneumonia

- All types
 - If you recognize there is a problem

What can we do?

- Recognize there is a problem
 - No self justification
- Measure what is happening
 - Meaningful and easy
 - Research
- Change things
 - Education
 - Interventions “ get buy-ins”
- Measure again

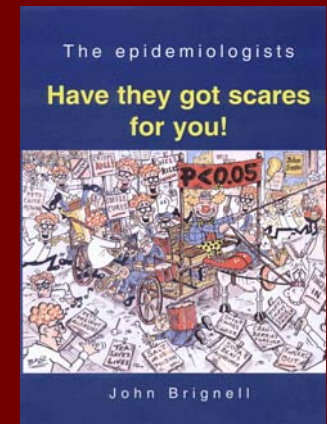
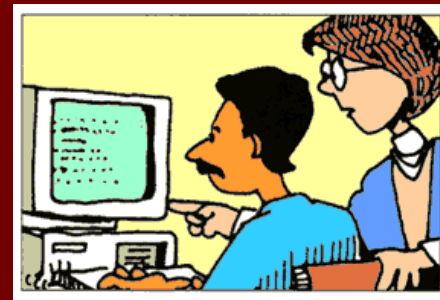


The best laid plans!



Epidemiologists; are they a hindrance?

- Too much time, effort and manpower to get the perfect denominator
 - risk adjustment SSI
 - Line days for IV BSI
- This should Not be research but quality improvement



US; report cards public reporting

PERSPECTIVE

INFECTION-CONTROL REPORT CARDS — SECURING PATIENT SAFETY

Infection-Control Report Cards — Securing Patient Safety

Robert A. Weinstein, M.D., Jane D. Siegel, M.D., and P.J. Brennan, M.D.

N ENGL J MED 353;3 WWW.NEJM.ORG JULY 21, 2005

Need to collect and have readily available some easy to measure but important RATES

- Will not be popular with hospitals
 - Always reason why my rates are worse than someone else's

BUT

- We need to do it

Media will love it




Lawyers will like it even more!



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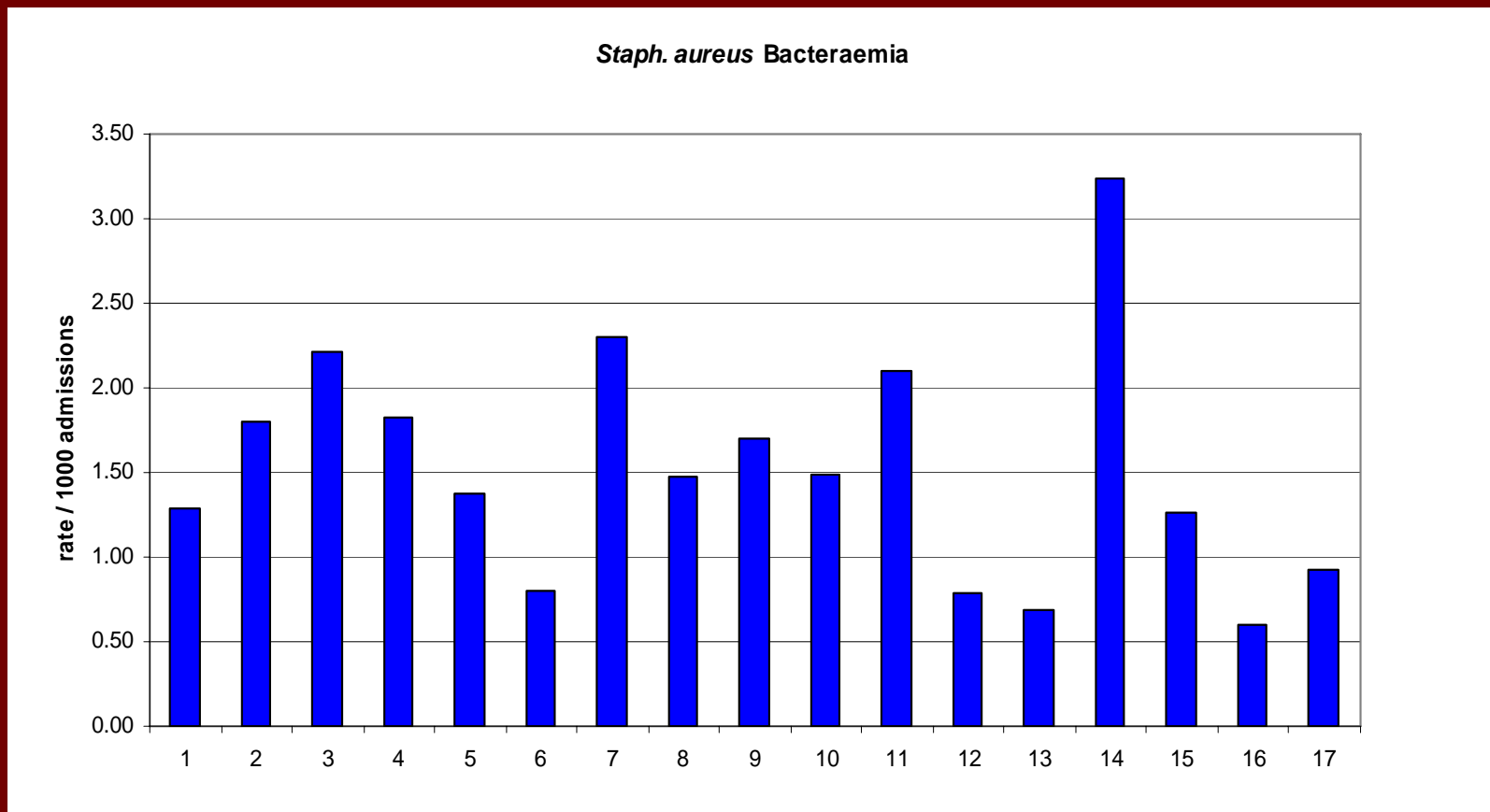
JUNE 2007 WWW.LSDM.COM 125

What do we need to measure in all hospitals

- *S. aureus* blood stream infection rates
 - All episodes- community and hospital onset
 - Separate MRSA and MSSA
 - Per 1,000 hospital separations
 - Should be on the web for each hospital
 - Based on pathology systems

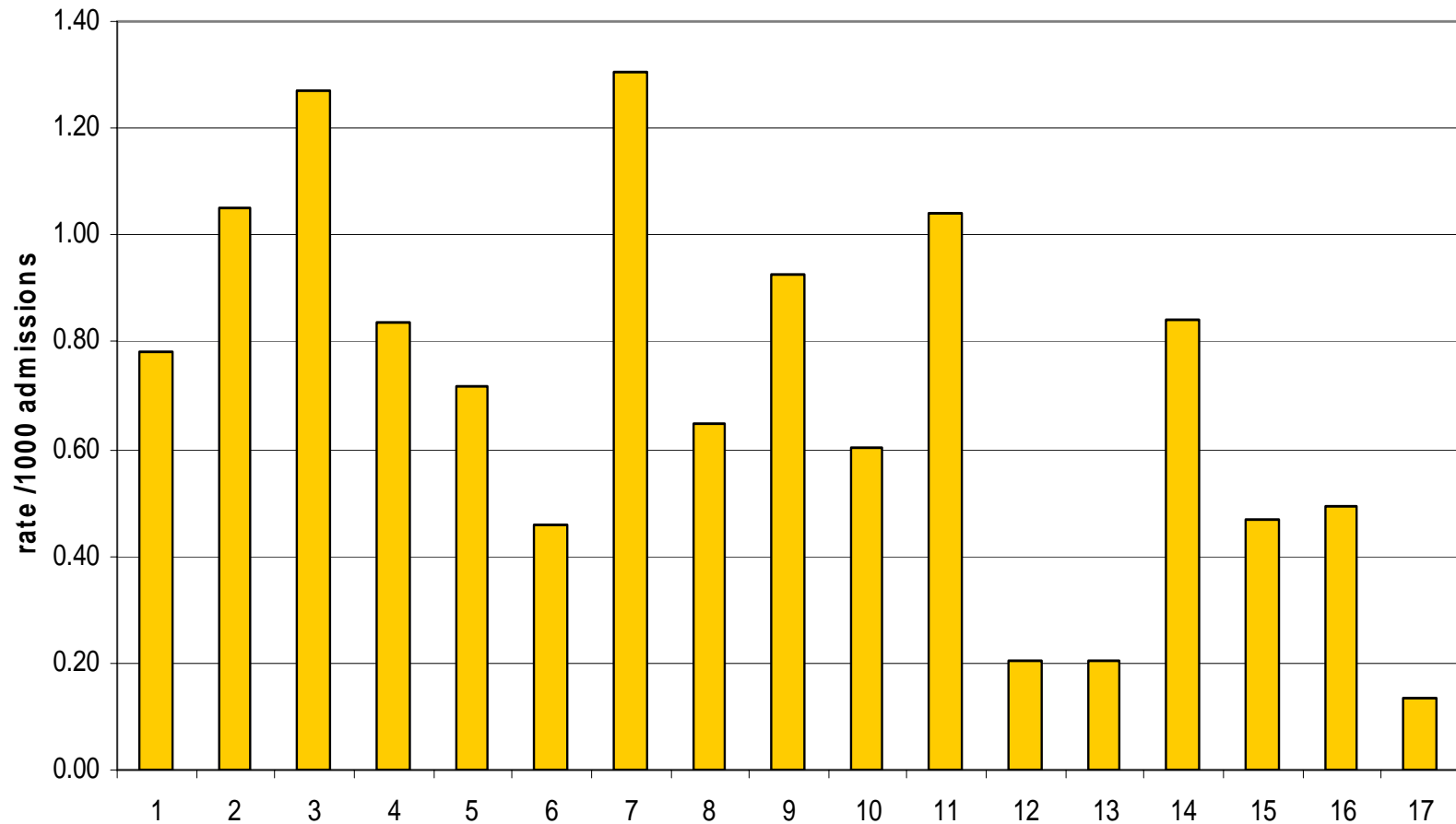
AGAR: Rates at different hospitals (total)

Collignon P, Nimmo GR, Gottlieb T, Gosbell IB;
Australian Group on Antimicrobial Resistance.
Staphylococcus aureus bacteremia, Australia.
Emerging Infect Dis. 2005 Apr;11(4):554-61.



Hospital onset

Hospital Acquired *Staph. aureus* Bacteraemia



SAB Canberra Hospital 2005

3 *Staphylococcus aureus* bloodstream (SAB) infections at the Canberra Hospital, 2005*

	MSSA	MRSA
Community associated	29	1 [†]
Inpatient health care associated	23	10 [†]
Non-inpatient health care associated	3	1
Total	55	12

MRSA = methicillin-resistant *S. aureus*. MSSA = methicillin-sensitive *S. aureus*.

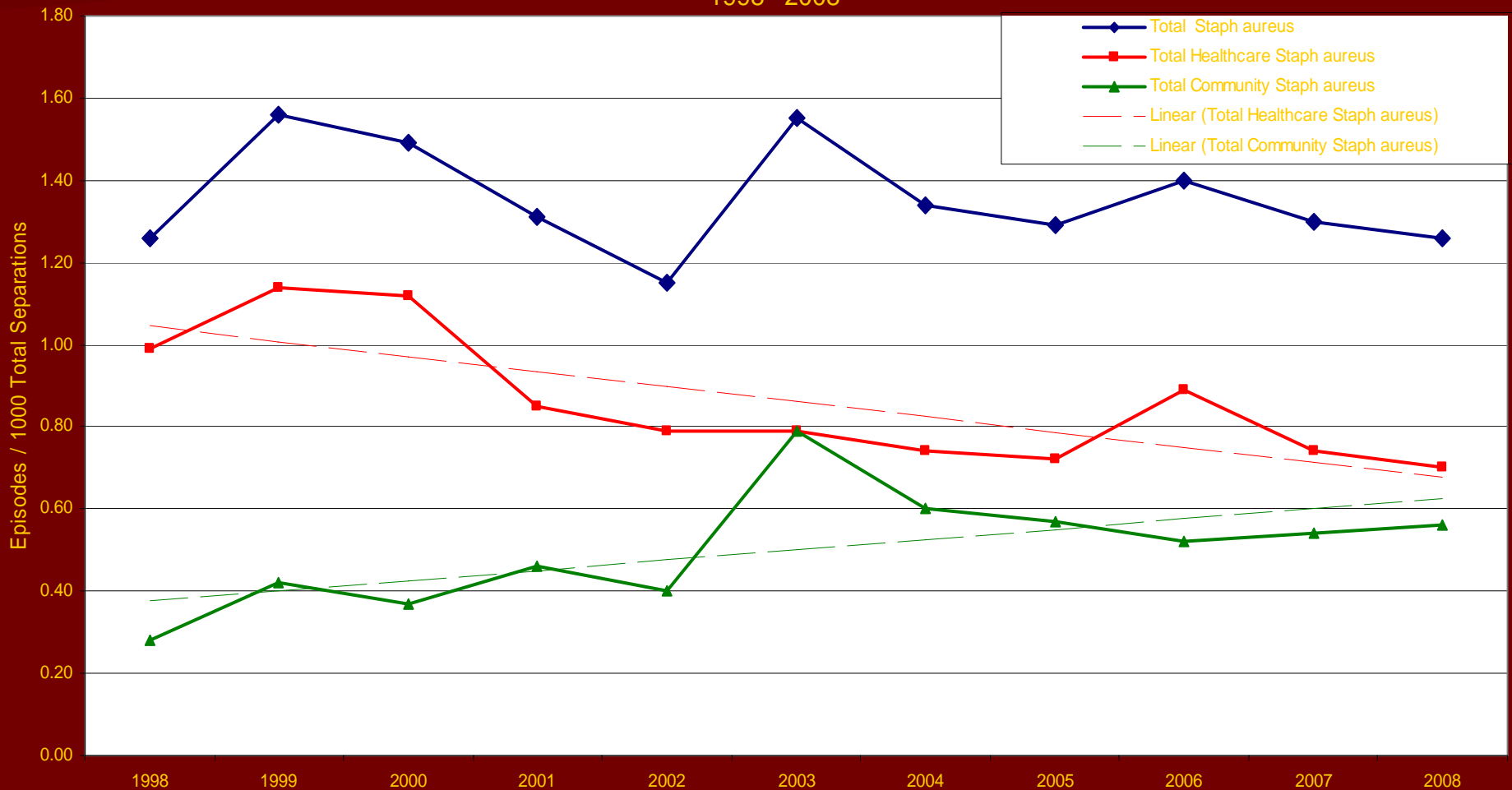
* In 2005, there were 51 122 separations, of which 29 361 were same-day patients, and 177 239 occupied bed days (OBDs). There were 37 health care-associated SAB episodes. Thus, the rates for health care-associated SAB infection were 0.7 per 1000 separations and 2.1 per 10 000 OBDs. † One episode in each group involved non-multiresistant MRSA. ◆

Canberra Hospital *S.aureus* bacteraemia

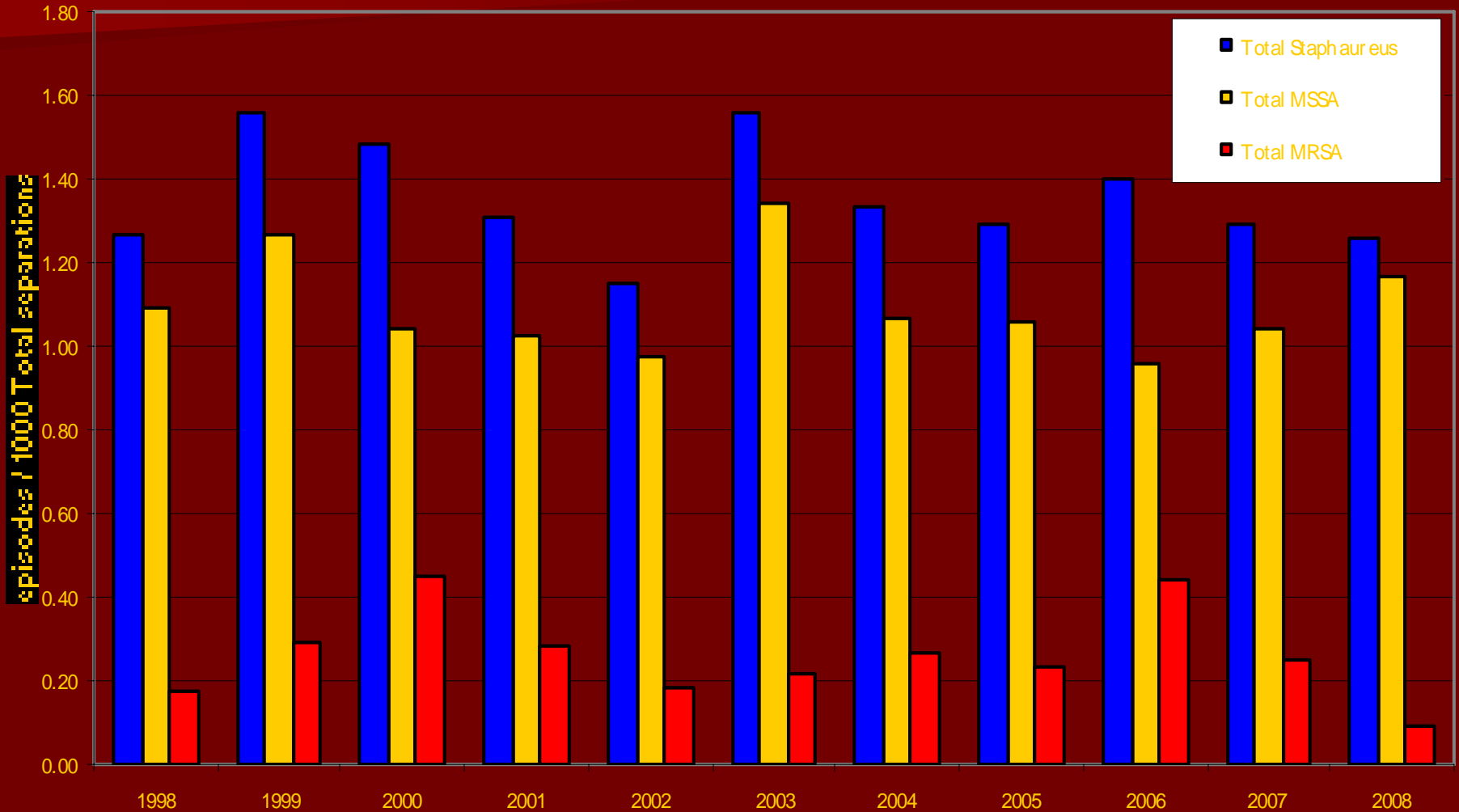
	Total <i>Staph. Aureus</i> bacteraemia			
	community acquired	inpt h/care associated	non-inpt h/care associated	Total
1998	14	27	18	59
1999	20	36	17	73
2000	17	45	11	73
2001	22	29	14	65
2002	19	28	9	56
2003	40	30	9	79
2004	29	25	11	65
2005	29	33	4	66
2006	29	38	12	79
2007	33	27	17	77
2008	36	30	15	81

Community Vs Hospital infections

The Canberra Hospital
Staph. aureus Bacteraemia
Total & Place of Acquisition
(by Separations)
1998 - 2008



The Canberra Hospital Staph. aureus Bloodstream Infections 1998 - 2008



We can improve things

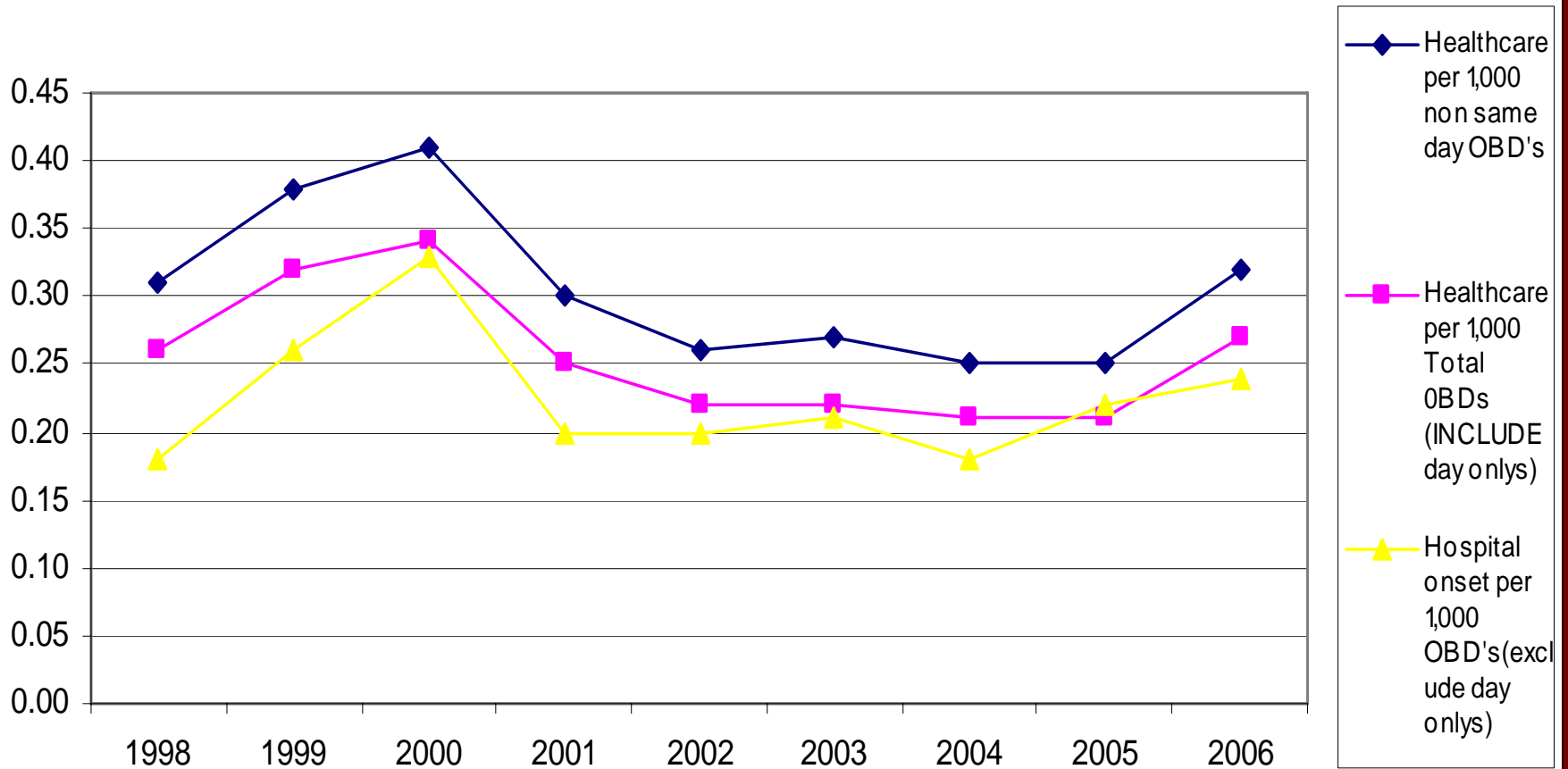
- Need to be motivated
- Both inside and outside pressure for better QI is needed
- We need to aim for major improvements

- This can be achieved

Healthcare rates

– denominators are all the same

SAB Healthcare associated at Canberra Hospital



The difference between lawyers and ticks



Ticks fall off when you die

Individual surgeons





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EVERY WEEK A NEW BAFFLING CASE
THAT ONLY ONE TEAM CAN SOLVE

HOUSE

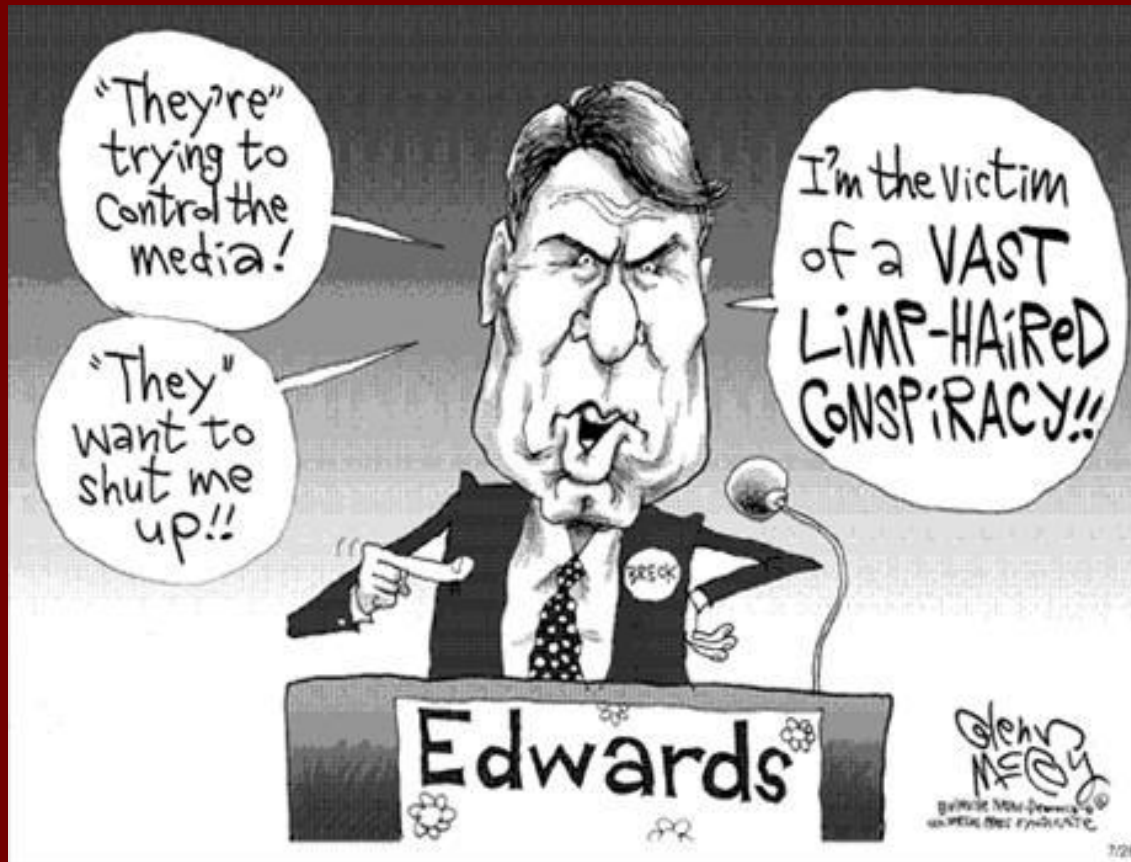
M.D.

FROM THE DIRECTOR OF THE USUAL SUSPECTS AND X-MEN
PREMIERES TUESDAY NOV 16 9/8C

Together, we can save a life



Just because you are paranoid
- does not mean they are not out
to get you



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trenches





ORIGINAL TELEVISION SOUNDTRACK
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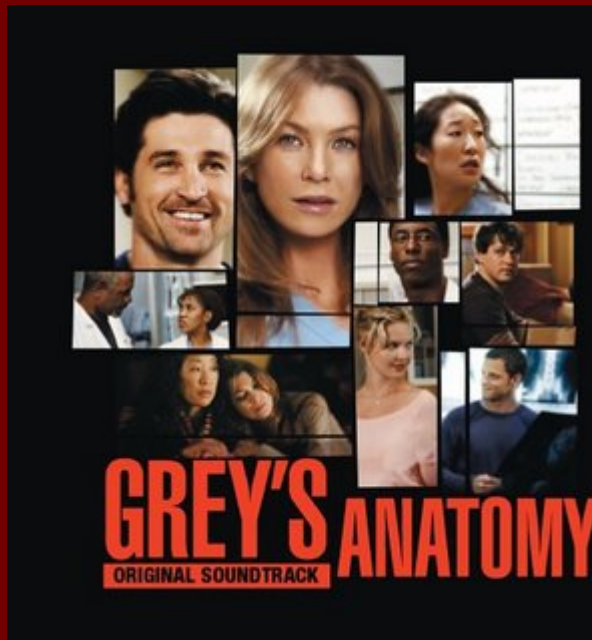


CHICAGO HOPE

MUSIC BY JEFF RONA • THEME BY MARK ISHAM



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Sydney Hospitals

