surgical care bundles for the reduction of surgical site infection: it all starts in the operating room

Wisconsin November 2015

Professor David Leaper

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and by exposing his microbes to non-lethal quantities of the drug make them resistant…. …..the time may come when penicillin may be bought by anyone in the shops. Then there is a danger that the ignorant man may easily underdose himself

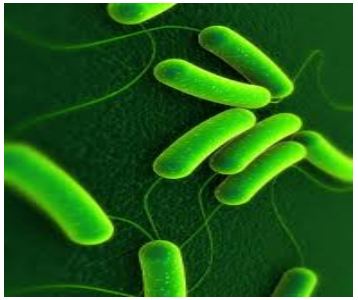
Alexander Fleming

the antibiotics

Healthcare Associated Infections

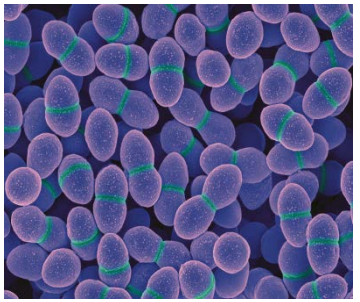
resistant/emergent organisms ("superbugs")

urinary tract infection
CAUTI



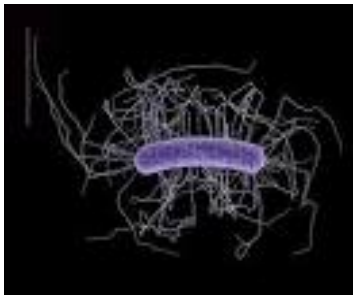
ESBLs, NDM

respiratory tract infection
VAP HAP



GRE

Clostridium difficile infection CDI



surgical site (and prosthetic) infection
bacteraemias, cSSTIs, CLABSIs

MRSA
MRCNS

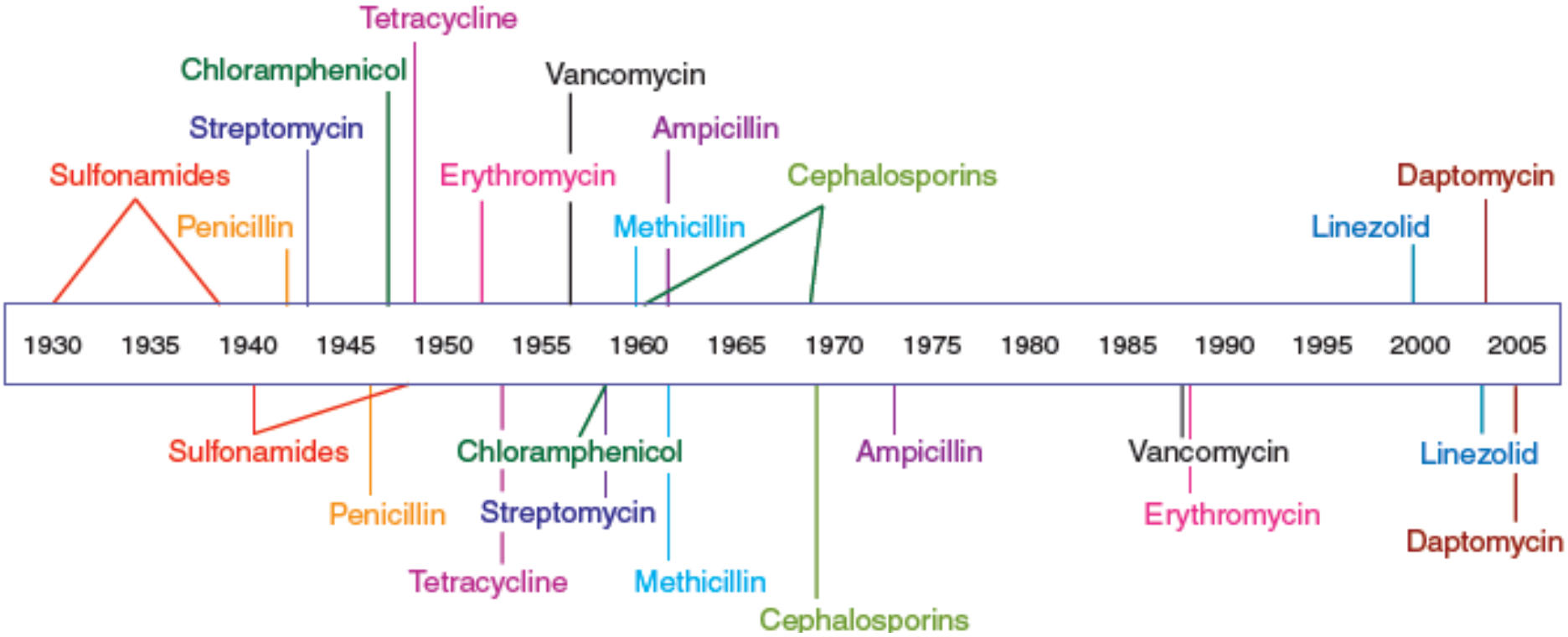
what are the costs of HCAIs?

- in the EU €5-10 billion each year
- added costs are three times more
- an average of 6.5 additional days in hospital
- 1 in 10 hospitalised patients acquires a skin infection

must reduce antibiotic use

new organisms - new antibiotics
…then we run out!

antibiotic introduced…..



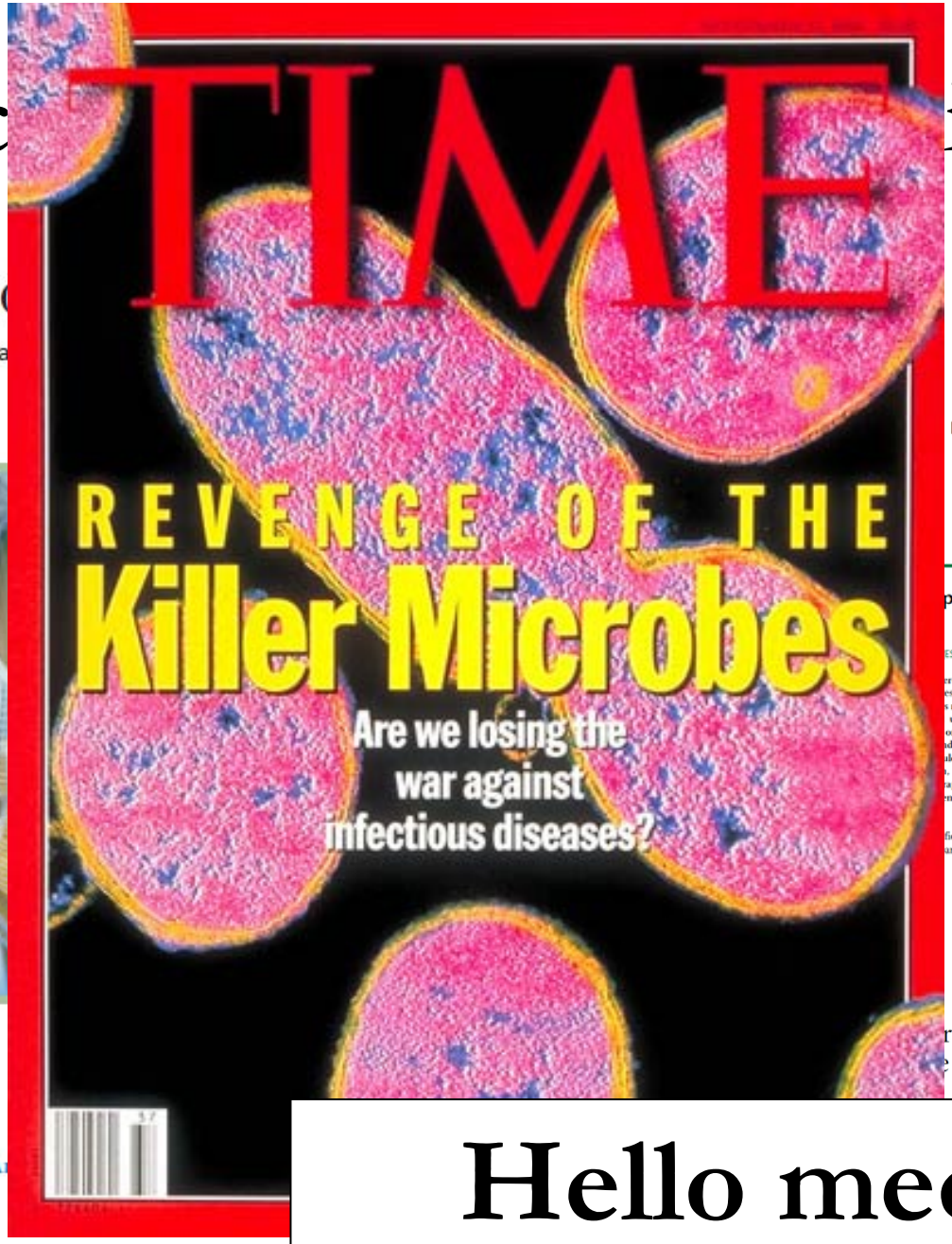
…..antibiotic resistance observed

Conc iotics

BAD BUGS, N

As Antibiotic Discovery Stagna
A Public Health Crisis Brews

IDSA
Infectious Diseases Society of A



resistance in Europe

potential

ESCMID)

Lancet Infect Dis 2005;
5: 115–19

erculosis, malaria,
esistant microbes.
s not delivered the
use in common
on investments is
d pharmaceutical
ld concentrate on
, regulators and
apeutic efficacy is
nts with defined

fields of bacterial
arasitic infections

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MAJOR ARTICLE

rug Development:

Hello media!!

managers and politicians

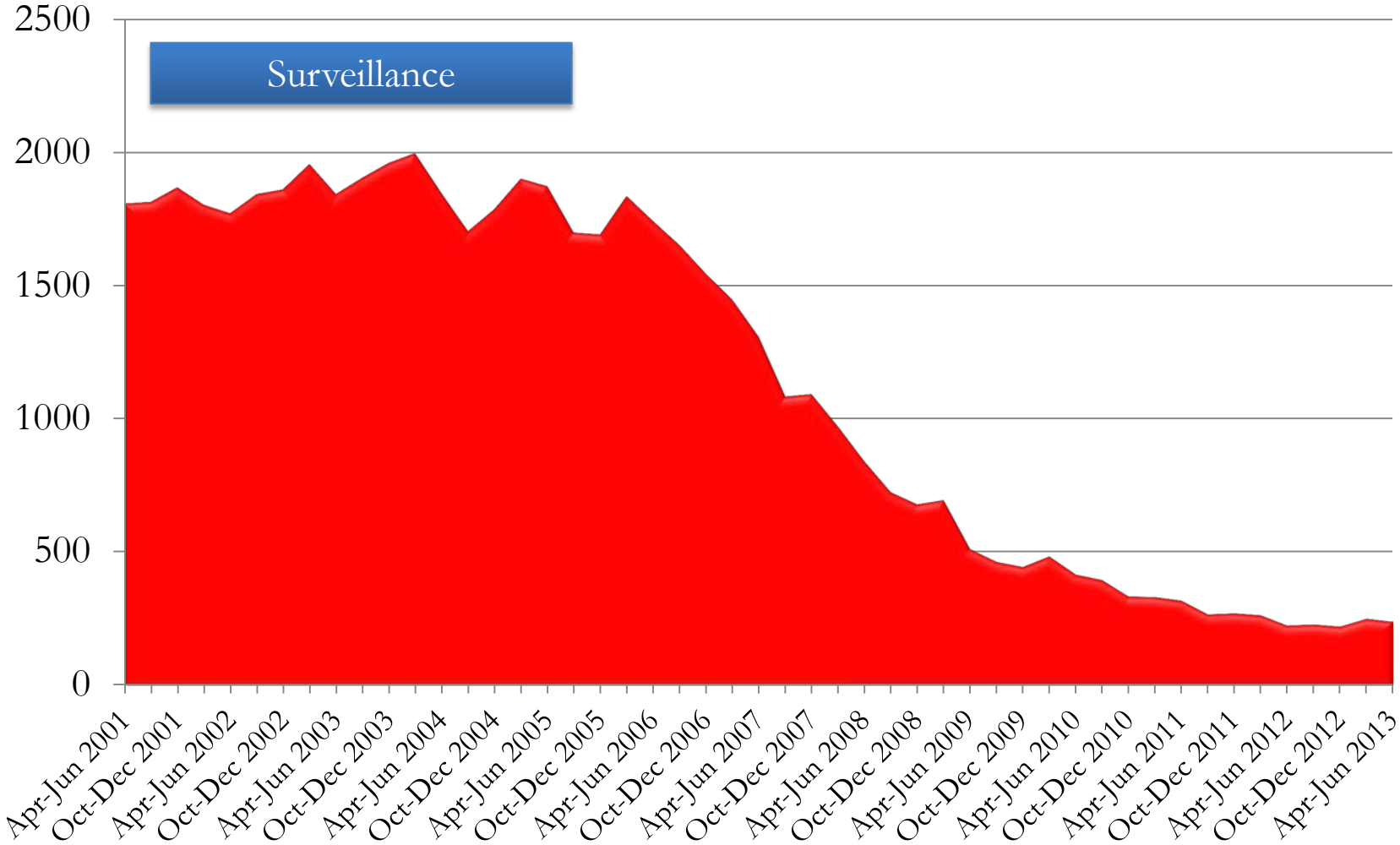
stop devolution of power to them from doctors /ICNs?

(driven by the media)

- **clean your hands**
- **bare below the elbows**
- **deep clean hospitals (bring back Matron)**
- **targets: waiting lists (difficult in UK)**
- **search and destroy (difficult in UK)**
- **stop taking samples**
- **intravascular catheter care (High Impact Intervention)**
- **good antibiotic stewardship (local formularies)**

quarterly MRSA bacteraemia

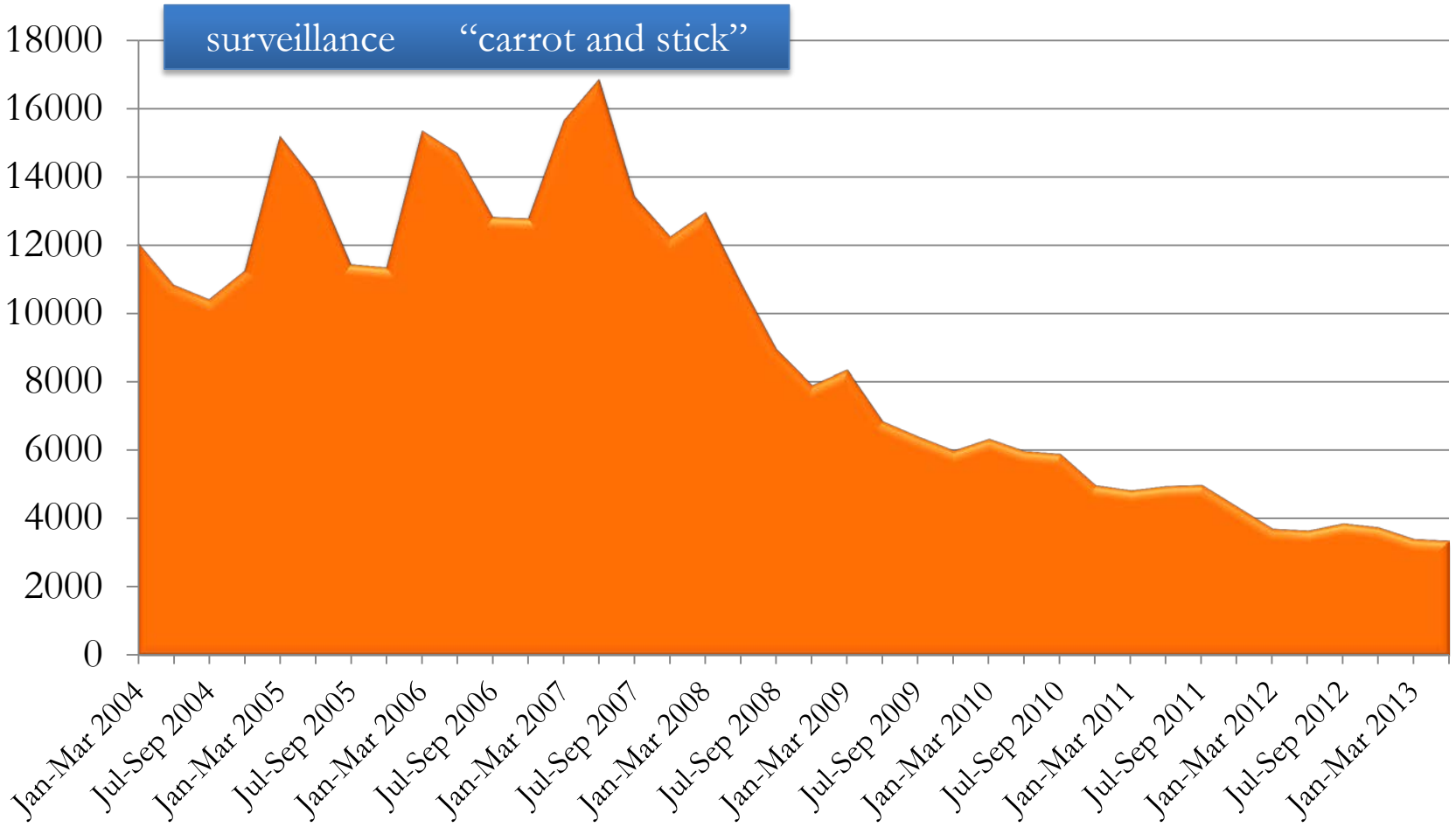
(England: 2001-12)



Infection Control lectures are usually considered to be ‘therapeutic’ for staff with sleep deprivation disorders

quarterly *C. difficile*

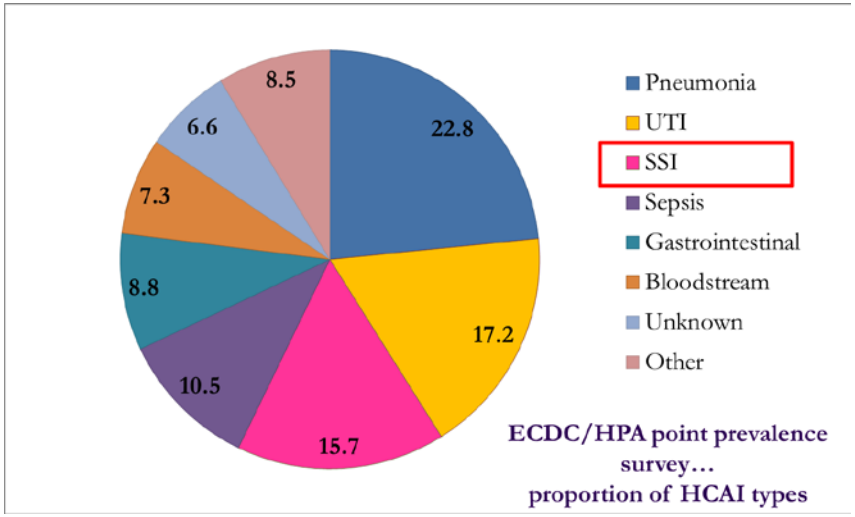
(England 2004-2011)



epidemiology of SSI

- 2.5-5% of all operations
- third most common HCAI **(now the commonest?)**
- most common nosocomial infection among surgical patients (30 -40%)
- 7.3 additional postoperative days at an additional cost of $3,152 per patient (US)
- 9.8 additional postoperative days at an additional cost of €2,000 per patient (Europe)
- one third of postoperative deaths are attributable, at least in part, to SSIs

HCAIs point prevalence study… why are SSIs NOT falling?



when should antibiotics be given for surgical infections?

- cellulitis
- lymphangitis
- bacteraemia
- SIRS and MODS, MOF and DEATH
- definite pathogens (β-haemolytic streptococcus)
- large numbers (critical colonisation-infection)
- host defences (immunosuppression, diabetes)

antibiotic stewardship

definitions are critical

categories of surgical wounds

(prosthetic surgery?)

clean

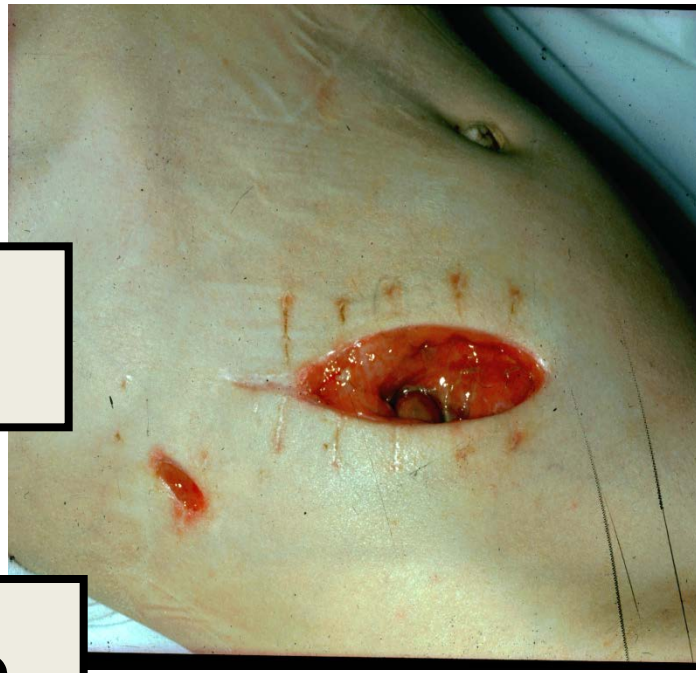
clean contaminated

contaminated

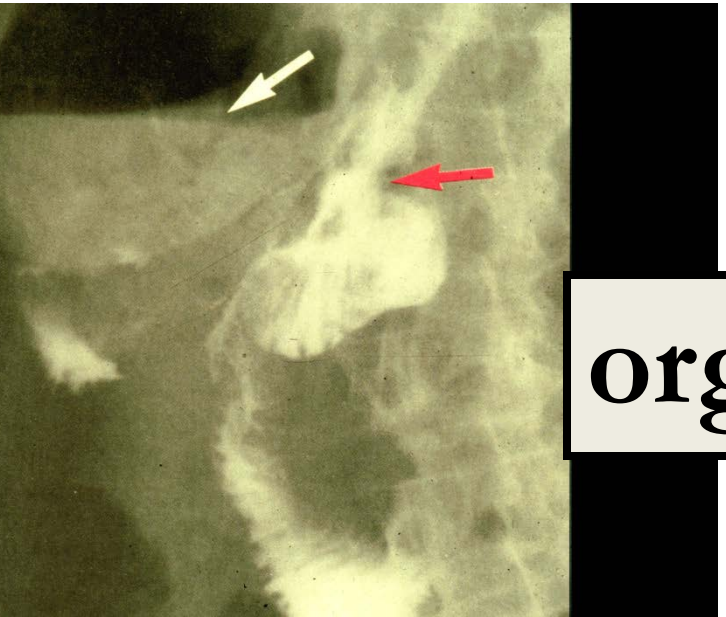
dirty

classification of surgical site infection……real patients!

superficial



deep



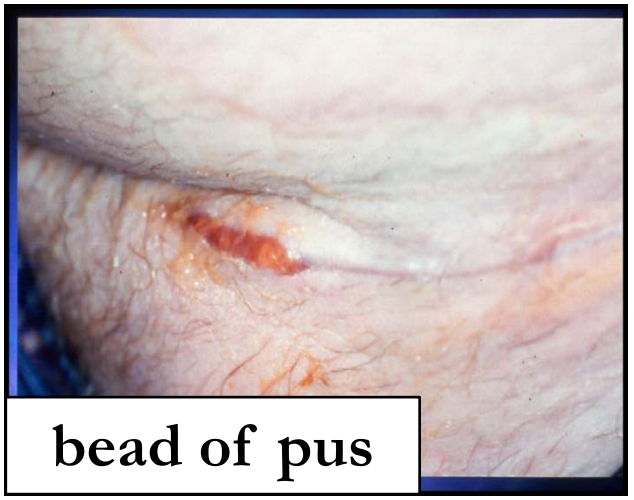
organ space

Culver et al Am J Med 1991; 91: 152S-157S

CDC definition

(most commonly used)

categorical data



bead of pus

total disaster

30 days (1 year prosthetics)

purulent discharge or abscess

isolated organisms

1+ Celsian signs

wound separation or need for drainage

ASEPSIS

interval data

Additional treatment

Serous discharge

Erythema

Purulent exudate

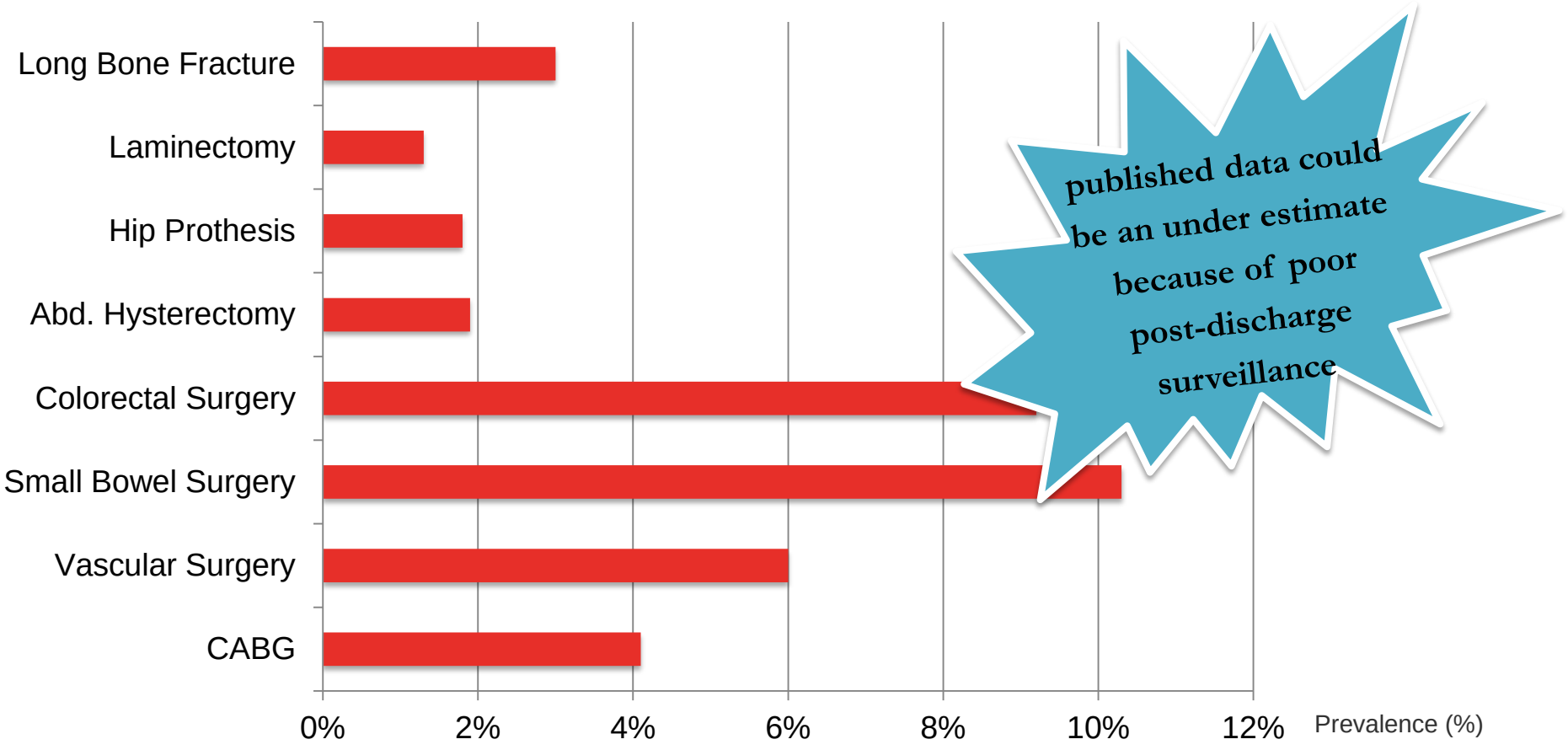
Separation of deep tissues

Isolation of bacteria

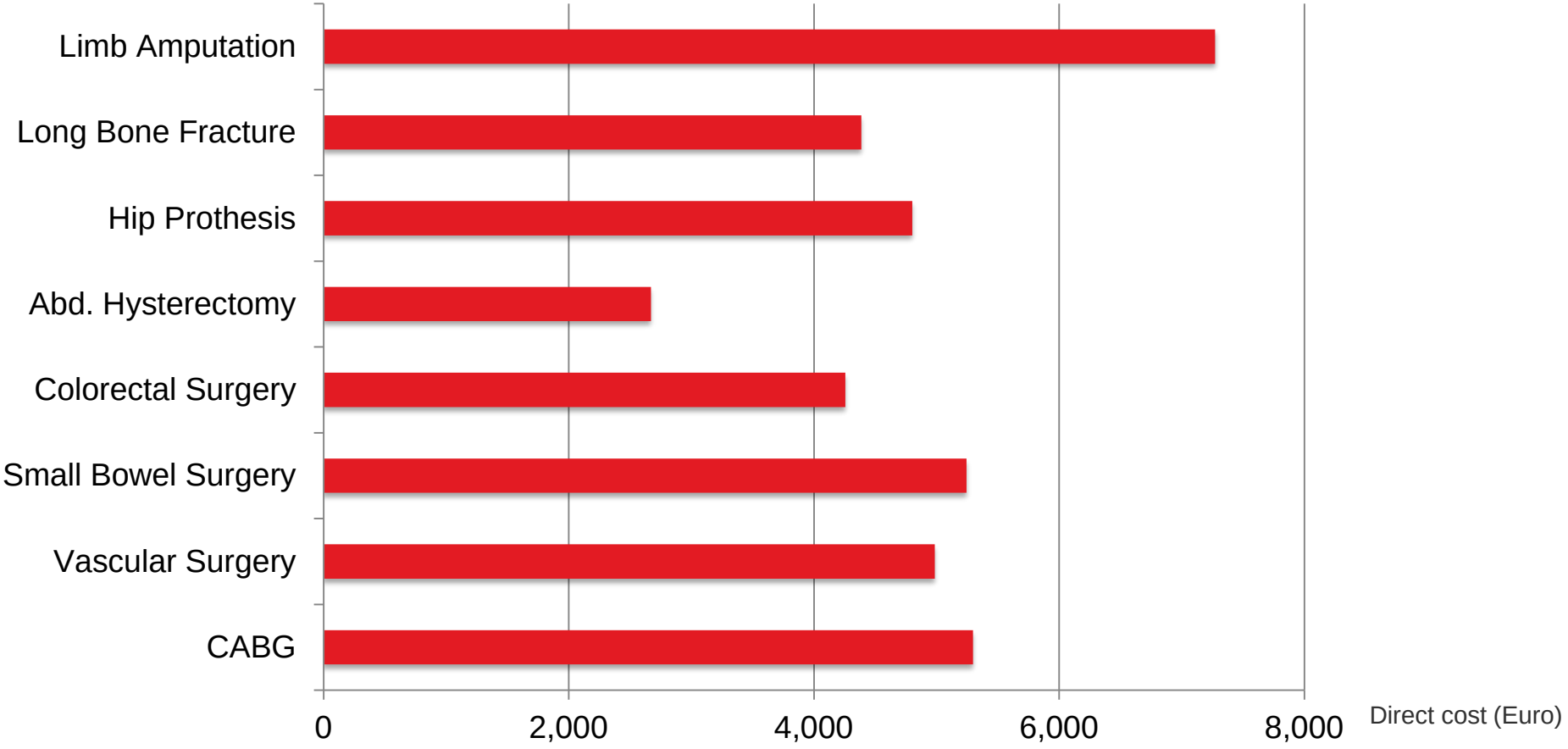
Stay in hospital >14 days

Wilson et al. Lancet 1986; i: 311-313

prevalence of SSI in hospitals



cost of SSI per incident



Mean additional Cost attributable to SSI

controversy in clean surgical wounds

accurate audit

(rates vary between 1.4% to over 15%)

post-discharge surveillance MUST go to 30 days (1 year)

independent unbiased blinded trained direct observer

scoring systems/diaries

Leaper et al. IWJ 2004; 1: 247-273

Melling et al. Lancet 2001; 358: 876-880

mandatory reporting:

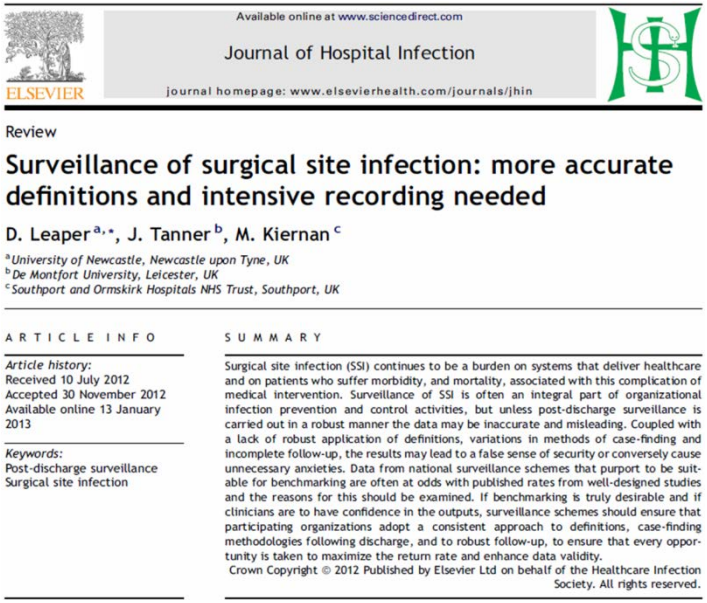
who undertakes it? who pays? primary care?

methods of surveillance

(all need full engagement)

- **in patient**
  i. notes review
  ii. swab microbiology reports
  iii. temperature charts
- **readmission data** (only serious and may go elsewhere)
- **post-discharge**
  i. out-patients review
  ii. questionnaires or telephone follow up
  iii. patient diaries (PROMs)
  iv. research data
  v. specialist appointment data

independent unbiased blinded trained direct observer



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Review

Surveillance of surgical site infection: more accurate definitions and intensive recording needed

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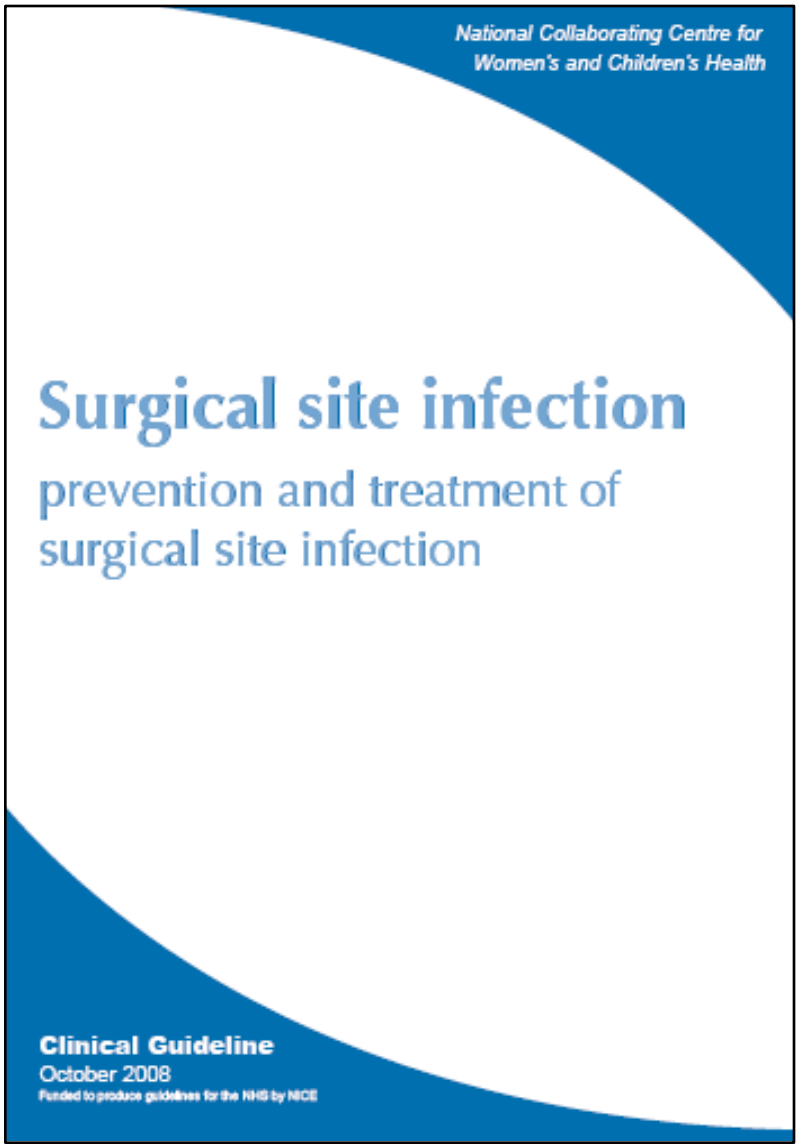
SUMMARY
Surgical site infection (SSI) continues to be a burden on systems that deliver healthcare and on patients who suffer morbidity, and mortality, associated with this complication of medical intervention. Surveillance of SSI is often an integral part of organizational infection prevention and control activities, but unless post-discharge surveillance is carried out in a robust manner the data may be inaccurate and misleading. Coupled with a lack of robust application of definitions, variations in methods of case-finding and incomplete follow-up, the results may lead to a false sense of security or conversely cause unnecessary anxieties. Data from national surveillance schemes that purport to be suitable for benchmarking are often at odds with published rates from well-designed studies and the reasons for this should be examined. If benchmarking is truly desirable and if clinicians are to have confidence in the outputs, surveillance schemes should ensure that participating organizations adopt a consistent approach to definitions, case-finding methodologies following discharge, and to robust follow-up, to ensure that every opportunity is taken to maximize the return rate and enhance data validity.


let's change perspective for a bit ...
how can the team prevent surgical site infection?

guidelines for compliance and to prevent SSIs



Perioperative actions

Hair removal
- Use a clipper with a disposable head.
- Shaving with a razor is not recommended.[5]

Prophylactic antimicrobial
- Appropriate antimicrobial administered within 60 minutes prior to incision.[13,14]

Normothermia
- Maintaining a body temperature above 36°C in the perioperative period has been shown to reduce infection rates.[16,17]

Glucose control
- Maintaining a glucose level <11mmol/l has been shown to reduce wound infection in diabetic patients.[15]

World Health Organization

SURGICAL SAFETY CHECKLIST (FIRST EDITION)

Before induction of anaesthesia ▸▸▸▸▸▸▸▸▸ Before skin incision ▸▸▸▸▸▸▸▸▸▸▸▸▸ Before patient leaves operating room

SIGN IN

- ☐ PATIENT HAS CONFIRMED
  - IDENTITY
  - SITE
  - PROCEDURE
  - CONSENT
- ☐ SITE MARKED/NOT APPLICABLE
- ☐ ANAESTHESIA SAFETY CHECK COMPLETED
- ☐ PULSE OXIMETER ON PATIENT AND FUNCTIONING
- DOES PATIENT HAVE A:

KNOWN ALLERGY?
- ☐ NO
- ☐ YES

DIFFICULT AIRWAY/ASPIRATION RISK?
- ☐ NO
- ☐ YES, AND EQUIPMENT/ASSISTANCE AVAILABLE

RISK OF >500ML BLOOD LOSS (7ML/KG IN CHILDREN)?
- ☐ NO
- ☐ YES, AND ADEQUATE INTRAVENOUS ACCESS AND FLUIDS PLANNED

TIME OUT

- ☐ CONFIRM ALL TEAM MEMBERS HAVE INTRODUCED THEMSELVES BY NAME AND ROLE
- ☐ SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE VERBALLY CONFIRM
  - PATIENT
  - SITE
  - PROCEDURE

ANTICIPATED CRITICAL EVENTS
- ☐ SURGEON REVIEWS: WHAT ARE THE CRITICAL OR UNEXPECTED STEPS, OPERATIVE DURATION, ANTICIPATED BLOOD LOSS?
- ☐ ANAESTHESIA TEAM REVIEWS: ARE THERE ANY PATIENT-SPECIFIC CONCERNS?
- ☐ NURSING TEAM REVIEWS: HAS STERILITY (INCLUDING INDICATOR RESULTS) BEEN CONFIRMED? ARE THERE EQUIPMENT ISSUES OR ANY CONCERNS?

HAS ANTIBIOTIC PROPHYLAXIS BEEN GIVEN WITHIN THE LAST 60 MINUTES?
- ☐ YES
- ☐ NOT APPLICABLE

IS ESSENTIAL IMAGING DISPLAYED?
- ☐ YES
- ☐ NOT APPLICABLE

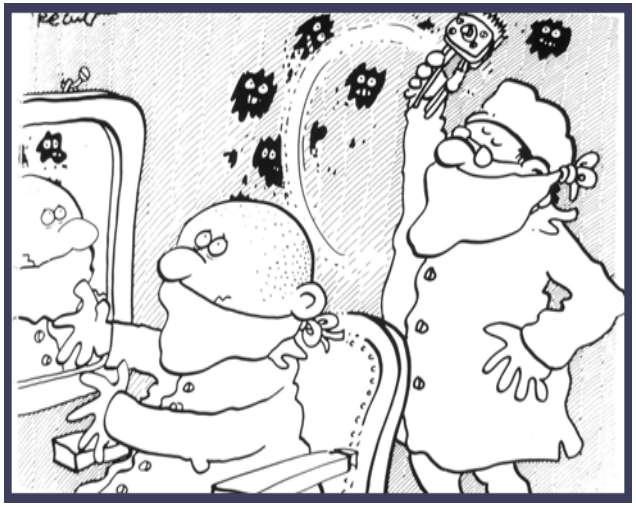
SIGN OUT

NURSE VERBALLY CONFIRMS WITH THE TEAM:
- ☐ THE NAME OF THE PROCEDURE RECORDED
- ☐ THAT INSTRUMENT, SPONGE AND NEEDLE COUNTS ARE CORRECT (OR NOT APPLICABLE)
- ☐ HOW THE SPECIMEN IS LABELLED (INCLUDING PATIENT NAME)
- ☐ WHETHER THERE ARE ANY EQUIPMENT PROBLEMS TO BE ADDRESSED
- ☐ SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE REVIEW THE KEY CONCERNS FOR RECOVERY AND MANAGEMENT OF THIS PATIENT

THIS CHECKLIST IS NOT INTENDED TO BE COMPREHENSIVE. ADDITIONS AND MODIFICATIONS TO FIT LOCAL PRACTICE ARE ENCOURAGED.

mostly level I evidence

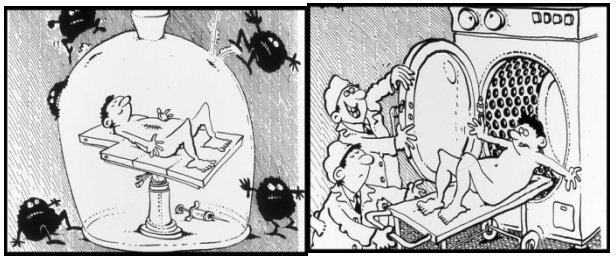
hair removal



traditional, improve view and access
perceived reduction infection rate
razors damage skin, sweat glands
abrasions potentially increase SSIs

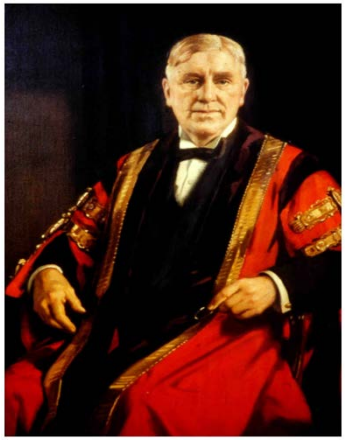
- **do not use hair removal routinely to reduce the risk of SSI**
- **if hair has to be removed, use electric clippers with a single-use head on the day of surgery**

antibiotic prophylaxis



give antibiotic prophylaxis to patients before:

- clean surgery involving the placement of a prosthesis or implant
- clean-contaminated surgery
- contaminated surgery
- but not:
- clean surgery without a prosthesis



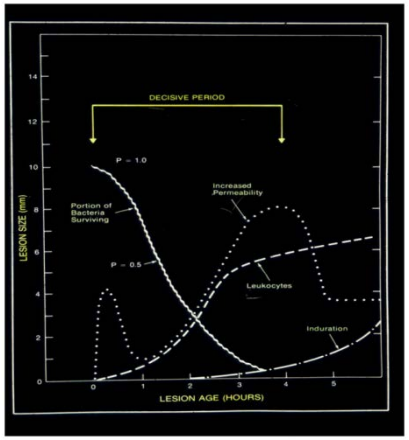
the decisive period

empirical choice depending on surgery
-decisive period
use local antibiotic formulary

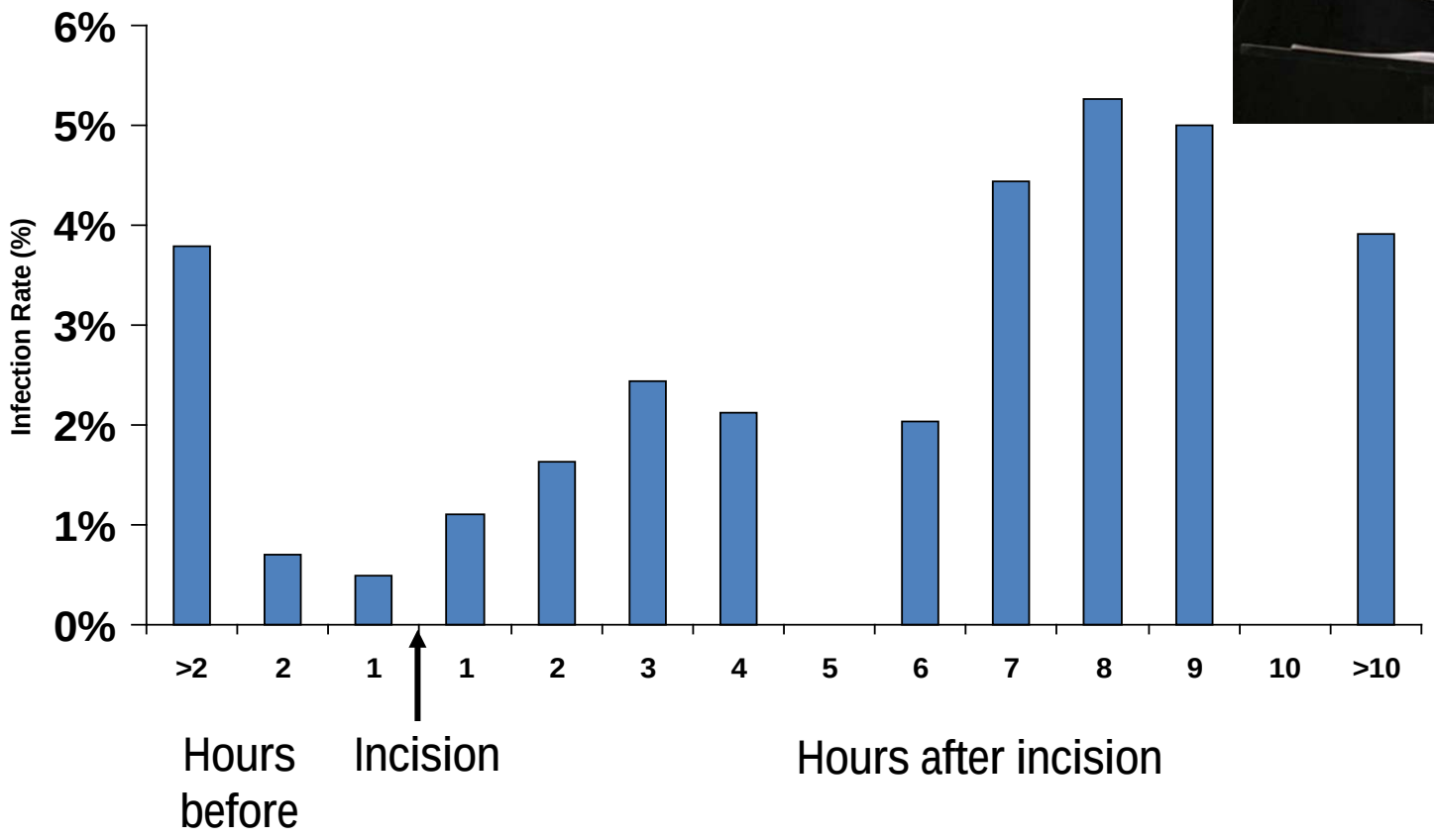
IV at induction of anaesthesia

repeat ONLY with excess blood loss, long operation or prosthetic surgery

any longer is therapy



relation between timing of prophylaxis and SSI rate



Classen et al. *N Engl J Med* 1992;326:281-285

causes of hypothermia (<36°C) in the operating theatre

- cold environment 21°C 55% RH
- exposure (particularly open abdomen)
- cold intravenous fluids
- cold anaesthetic gases
- vasodilatation (or inhibited vasoconstriction)
- anaesthetic agents
- increased BMR with increased oxygen requirements
- poor oxygen delivery with hypoxia and acidosis

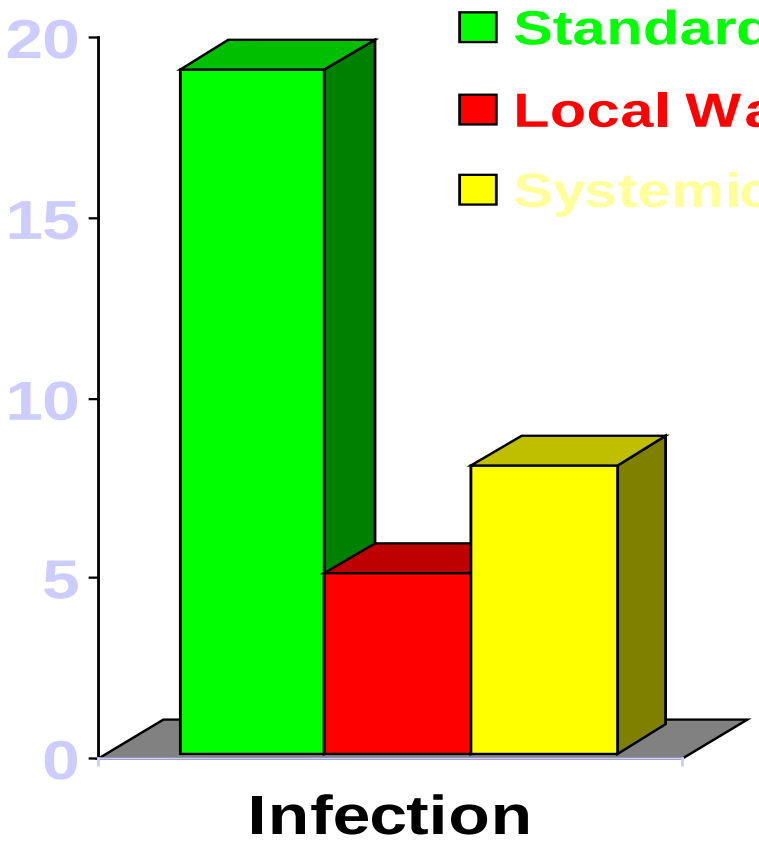
Kumar et al IWJ 2005; 2: 193-204

complications of hypothermia

- shivering increases O_2 demand by 4-5X
- shift in O_2 dissociation curve
- increased BMR not met by oxygen delivery
- acidosis if cardiopulmonary response inadequate
- relative organ ischaemia myocardial infarct
- prolonged drug action
- increased risk of pressure injuries
- increased risk of infectious complications
- surgical site infection

Kumar et al IWJ 2005; 2: 193-204

effect of warming on wound infection



infection rates	
standard	13.7%
local warming	3.6% (p= 0.003)
systemic warming	5.8% (p=0.028)

Melling et al. Lancet 2001; 358: 876-880

the significance of local warming

	all warmed patients	non-warmed patients	P value
infection	**4.7%**	**13.7%**	**0.001**
haematoma	2.2%	3.6%	0.29
seroma	4%	5.8%	0.28
aspirated	4%	6.5%	0.19
post-op ABs	**6.5%**	**15.9%**	**0.002**

benefits of peri-operative warming: existing clinical evidence

- wound infection
- blood transfusion
- cardiac events
- morbidity and mortality
- intensive care and overall hospital stay
- cost effective

Odom and Mahoney AANA J 1999; 67: 155-164

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Preventing Surgical-Site Infections in Nasal Carriers of *Staphylococcus aureus*

Lonneke G.M. Bode, M.D., Jan A.J.W. Kluytmans, M.D., Ph.D., Heiman F.L. Wertheim, M.D., Ph.D., Diana Bogaers, I.C.P., Christina M.J.E. Vandenbroucke-Grauls, M.D., Ph.D., Robert Roosendaal, Ph.D., Annet Troelstra, M.D., Ph.D., Adrienne T.A. Box, B.A.Sc., Andreas Voss, M.D., Ph.D., Ingeborg van der Tweel, Ph.D., Alex van Belkum, Ph.D., Henri A. Verbrugh, M.D., Ph.D., and Margreet C. Vos, M.D., Ph.D.

ABSTRACT

BACKGROUND

Nasal carriers of *Staphylococcus aureus* are at increased risk for health care–associated infections with this organism. Decolonization of nasal and extranasal sites on hospital admission may reduce this risk.

METHODS

In a randomized, double-blind, placebo-controlled, multicenter trial, we assessed whether rapid identification of *S. aureus* nasal carriers by means of a real-time polymerase-chain-reaction (PCR) assay, followed by treatment with mupirocin nasal ointment and chlorhexidine soap, reduces the risk of hospital-associated *S. aureus* infection.

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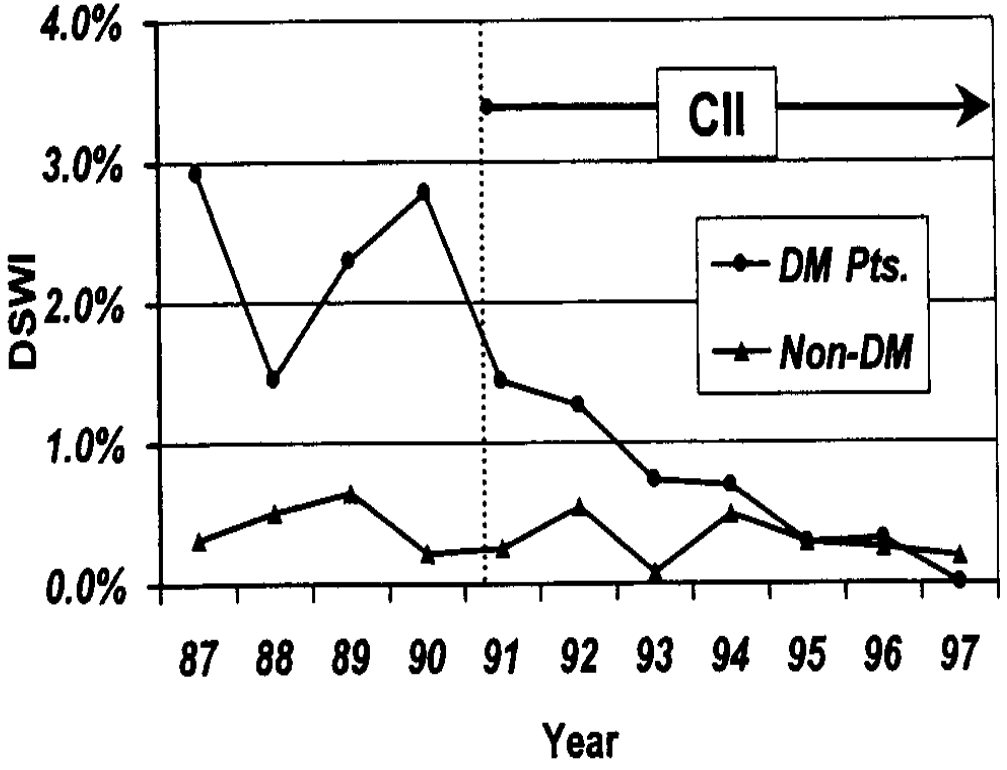
glucose control and sternal SSIs

continuous insulin infusion



Furnary et al. Ann Thorac Surg 1999:67:352

poor evidence

- preoperative showering
- specific patient and staff theatre wear
- minimizing movement in the operating theatre
- banning of hand jewellery and nail polish
- nasal decontamination of all *Staphylococcus aureus*, not just MRSA, to reduce the risk of SSI is effective (Bode et al 2010)
- mechanical bowel preparation (Cochrane Collaboration)
- operative rituals: hand decontamination, gloves, drapes and gowns, diathermy, antiseptic lavage and wound dressings

research opportunities

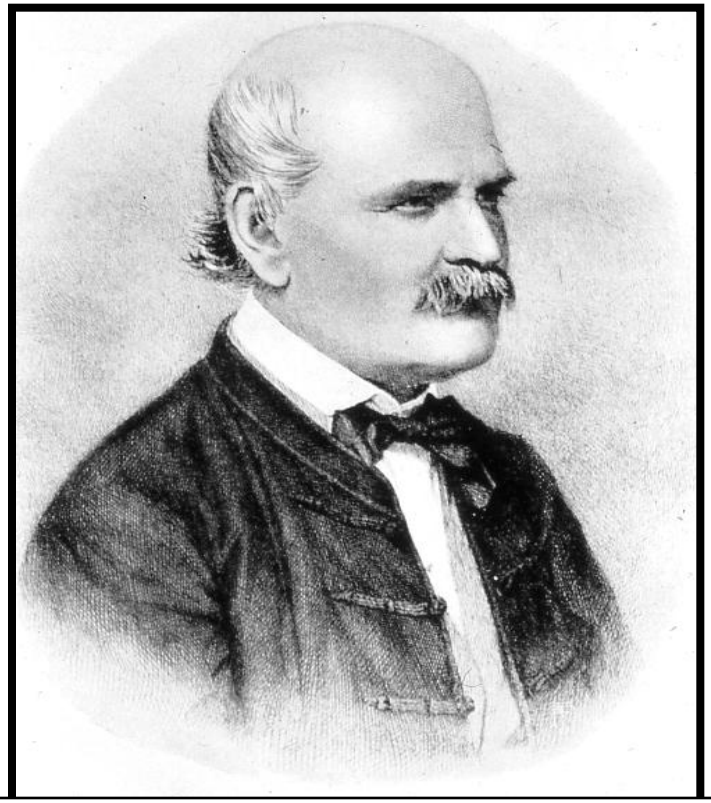
- cost effectiveness of new antiseptic incise drapes
- benefits of improved blood glucose control
- effectiveness of intra-cavity and wound lavage with modern antiseptics
- most appropriate suture closure methods
- antimicrobial sutures
- role of supplemental oxygen in the recovery room
- adaptation of chronic wound management for SSIs
  - in prevention
  - postoperatively after wound separation
  - interactive dressings and topical antiseptics
- effectiveness of modern debridement techniques
- most appropriate warming methods

Ambroise Pare (1510 - 1590)

poisoned firearm wounds

boiling oil of elders with a little theriac

digestive of egg yolk, rose oil and turpentine

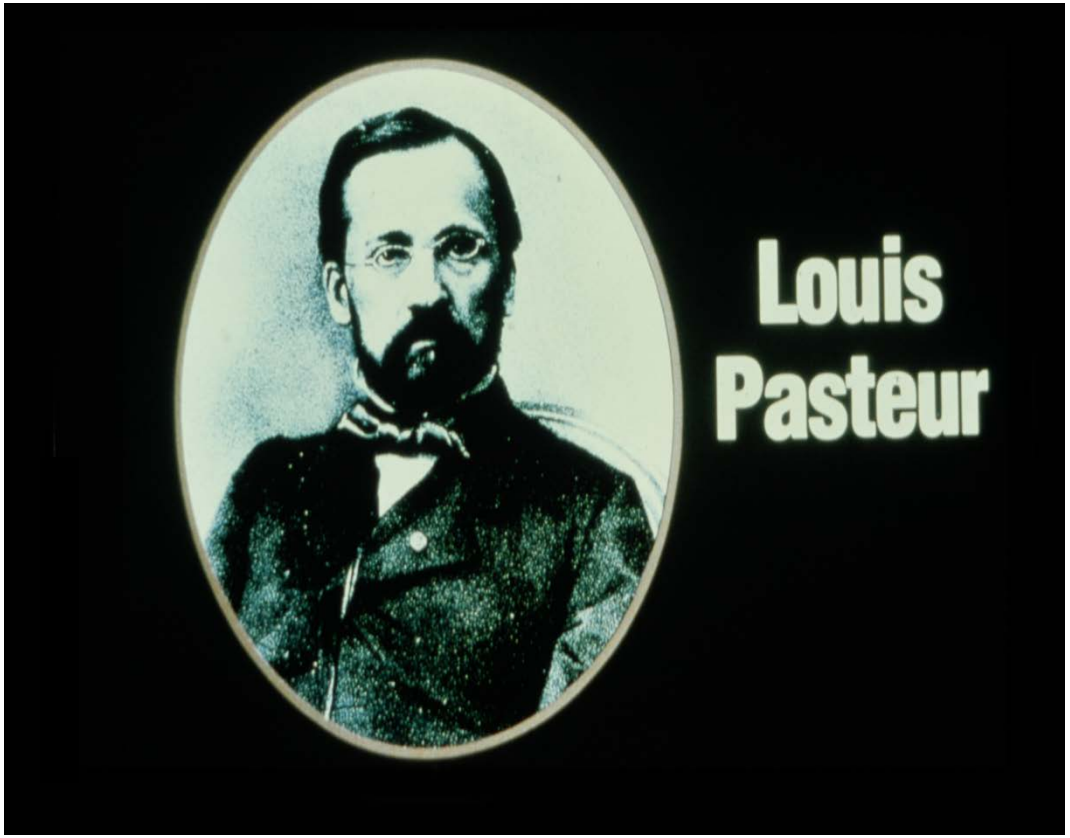


Ignaz Semmelweis

puerperal sepsis and handwashing before delivery

1846 11.4%

1848 1.3%



bacteria the cause of spoilt wine

not miasma/ “bad air”

dans les champs de l'observation le hasard ne favorise que les esprits préparés

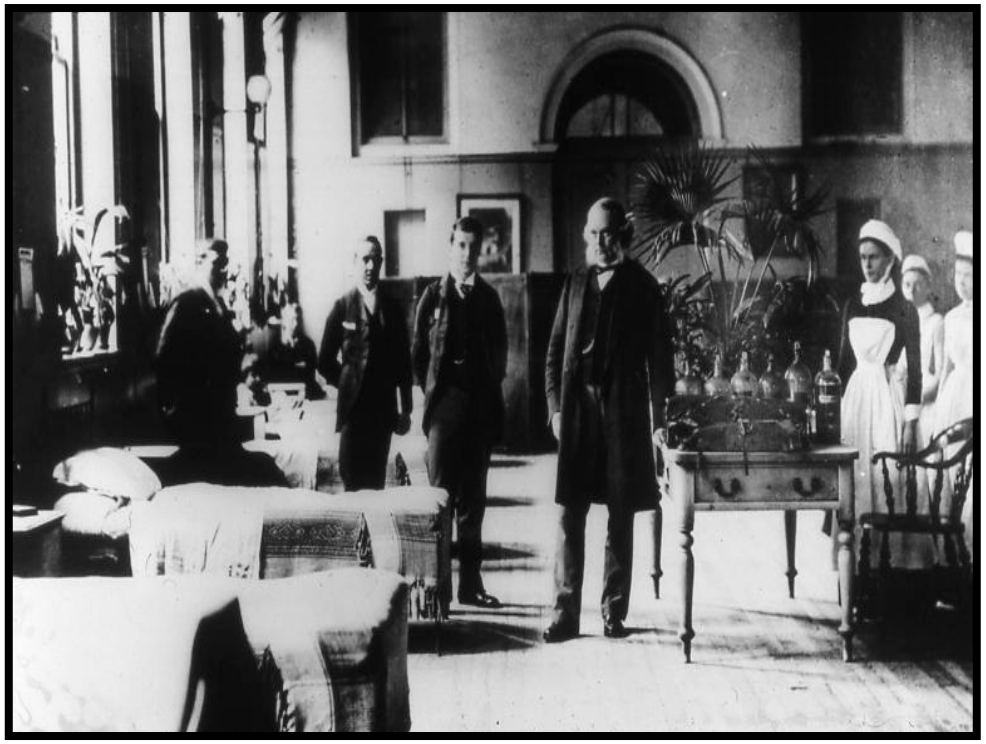
ANTISEPTICS

("antimicrobial" : antiseptic, antibiotic)

phenol

hexachlorophane
cetrimide
benzalkonium
honey, permanganate, etc..,

chlorhexidine
povidone iodine
triclosan
silver
polyhexamethylene biguanide



how can we do without antiseptics?

chlorhexidine-alcohol versus povidone-iodine for surgical site antisepsis

Darouiche et al. NEJM 2010

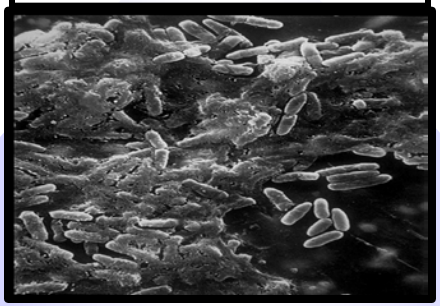
- multicentre (6 hospitals); 4 years
- 849: power and randomisation
- definition and surveillance of SSI
- 2% chlorhexidine 10% povidone iodine
- paint versus scrub and paint
- clean-contaminated category only
- 9.5% -16.1% overall; superficial and deep SSIs
- not sepsis or organ space

determinants for surgical site infection

host resistance

bacterial quantity and virulence

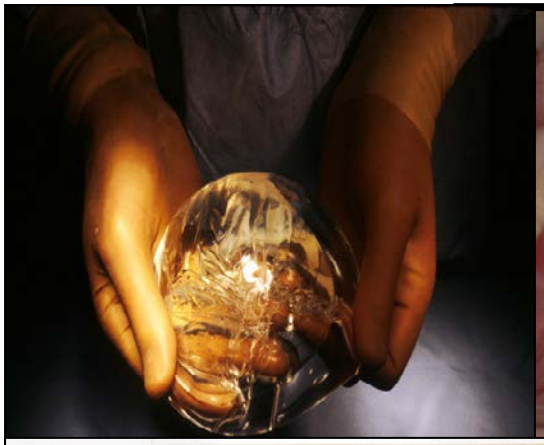
biofilm

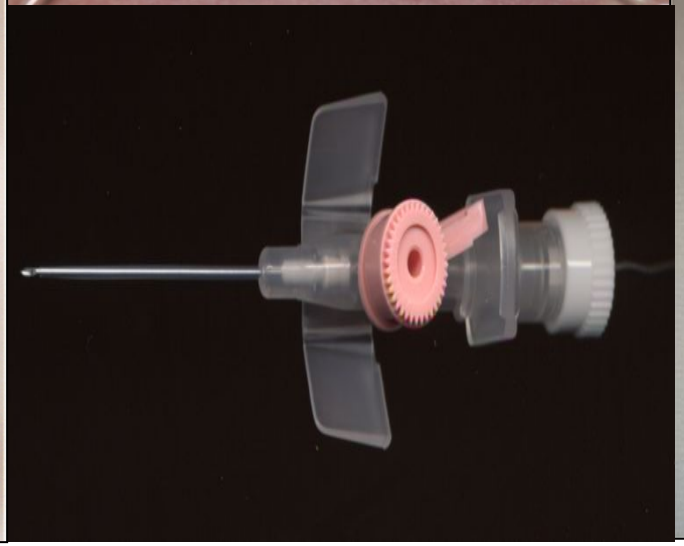


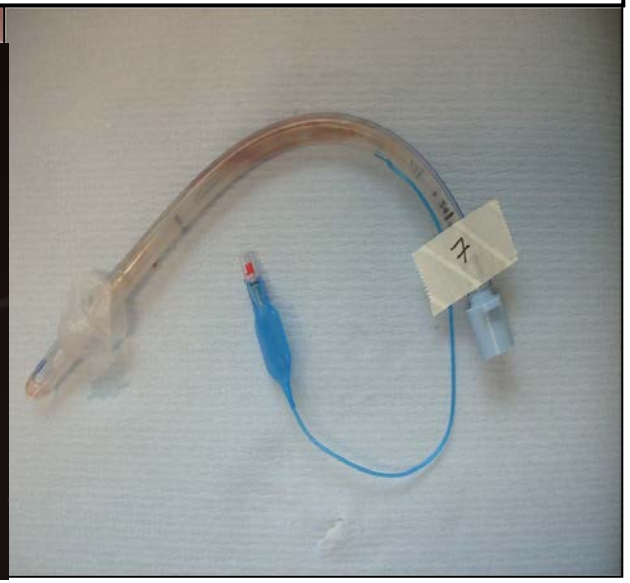
bacterial balance

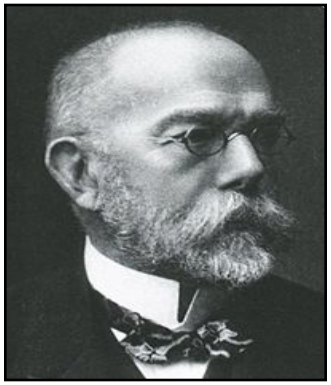
always consider any underlying pathology

biofilms are ubiquitous





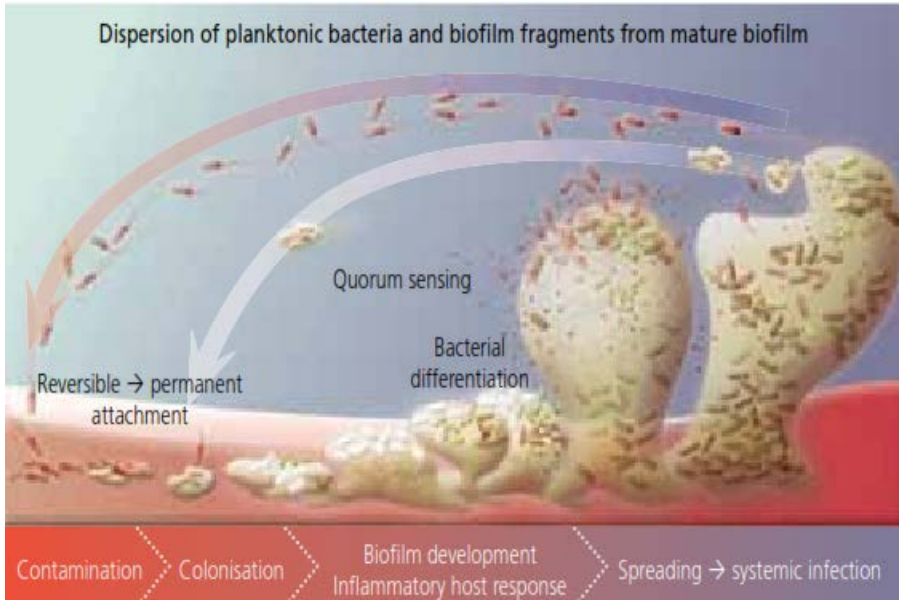




biofilms

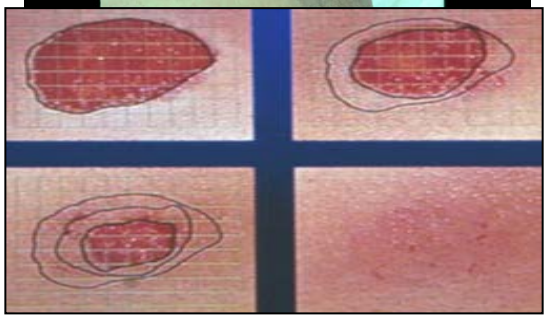
(Koch's postulates upside down)

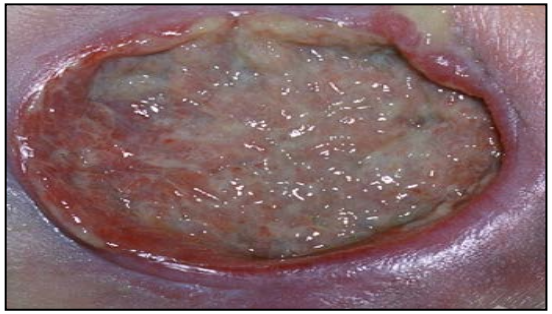
- complex microenvironment - bacteria and glycocalyx
- intercellular communication (quorum sensing)
- resist host-defences and antibiotics
- exist in acute and chronic wounds?
- promote inflammation (nitric oxide, cytokines, MMPs)



biofilm management

- undertake comprehensive holistic and local wound assessment
- suspect biofilm when there is static healing or slimy exudate
- vigorous cleansing
- maintenance debridement
- antiseptics cadexomer iodine, silver, PHMB, honey, chlorhexidine
- systematic antibiotics

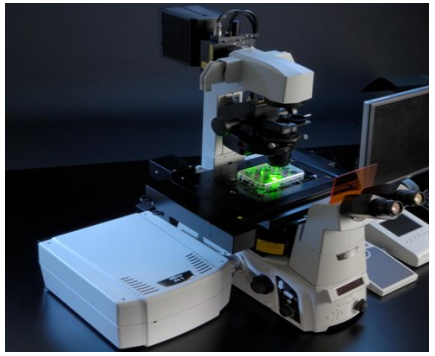


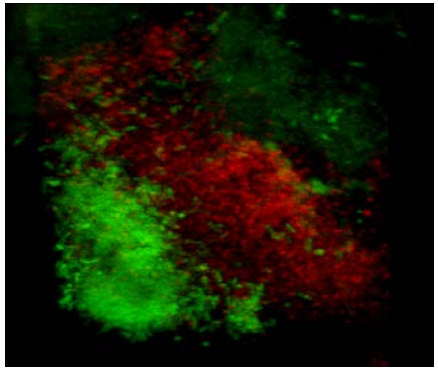


biofilms…we could do with a diagnostic
(swabs and biopsies unhelpful)

structural analysis

confocal laser scanning microscopy



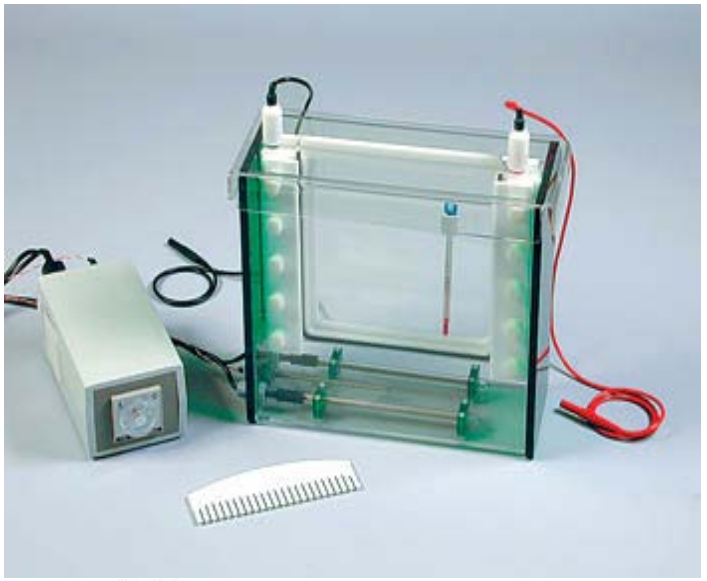


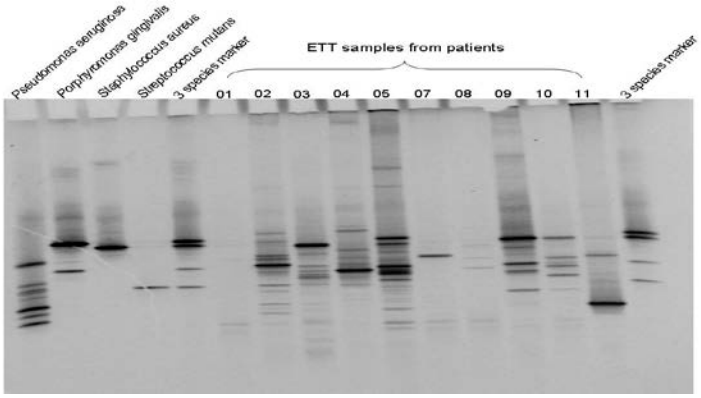
Pseudomonas aeruginosa
(PsaerFITC green)

Staphylococcus aureus
(Cy5 red)

molecular analysis

DNA extraction
Denaturing Gel Gradient Electrophoresis (DGGE)
Polymerase Chain Reaction (PCR)





infection or failure to heal?

……are biofilms involved?

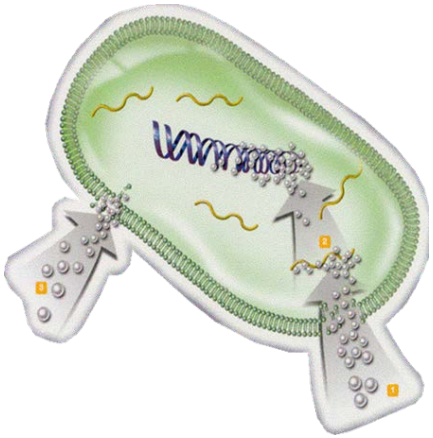
potential for antiseptic (triclosan) sutures to prevent biofilm in surgical wounds

- wide spectrum antimicrobial in deep tissues
- good for clean prosthetic surgery?

  -orthopaedics, vascular
- colorectal (dirty)surgery?
- potential in resistance? MRSA
- reduction of antibiotic use?
- reduction of biofilm and reformation? (prosthetics)

does it risk selection of antibiotic resistant organisms or transmissible resistance in human pathogens?

antiseptic use in sutures



potential advantages

- wide spectrum antimicrobial in deep tissues
- relates to non-specific action of antiseptics
- good for many classes of surgery including prosthetics
- reduction of antibiotic use?

potential dangers

- selection of resistant human pathogens from environment? …. none yet
- selection of resistance to antiseptics and antibiotics? …. none yet
- promotion of transmission of resistant forms? …. none yet


SCCP/1251/09

Directorate-General for Health & Consumers

Scientific Committee on Consumer Safety

SCCS

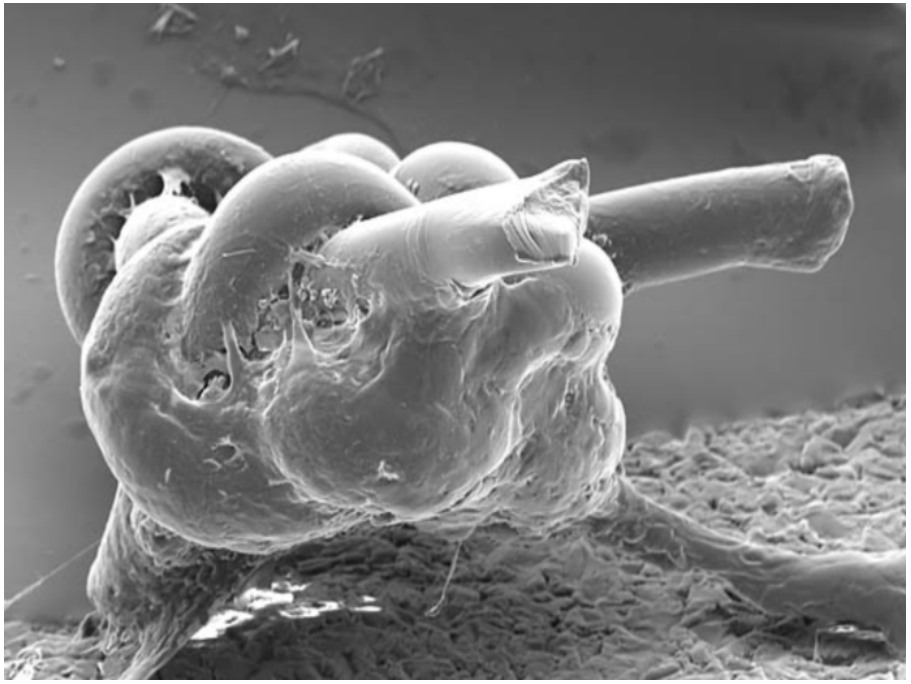
Opinion on triclosan

Antimicrobial Resistance

Scientific Committees

The SCCS approved this opinion at its 7th plenary of 22 June 2010 after public consultation

the SCCS recommended prudent use of triclosan, for example in applications where a health benefit can be demonstrated

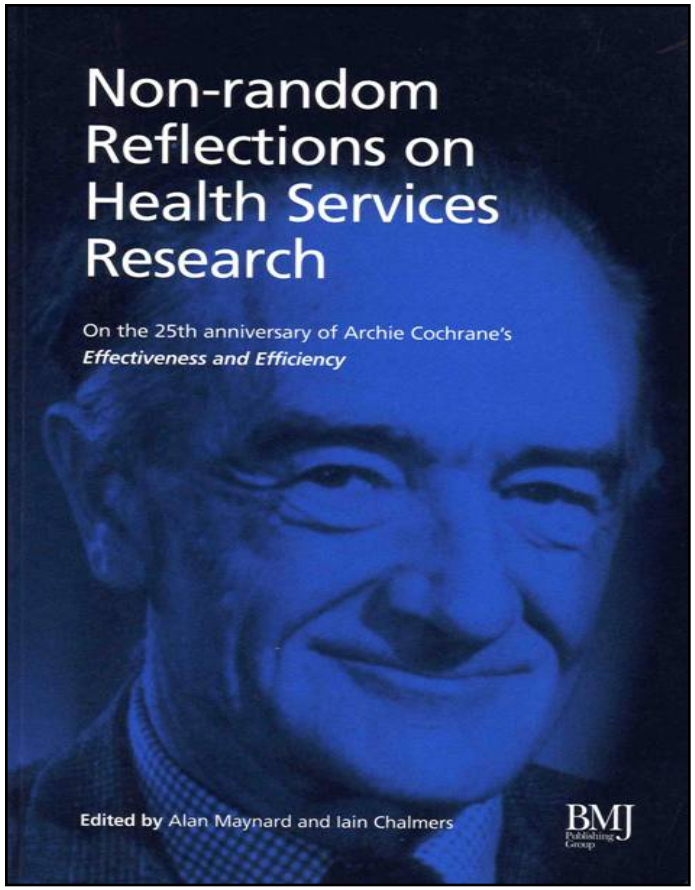


antiseptic use in sutures

any belief that the controlled trial is the only way would mean not that the pendulum had swung too far, but that it had come right off its hook

Austin Bradford Hill
MRC trials 1950s:
RCT the gold standard

the myth of the RCT?

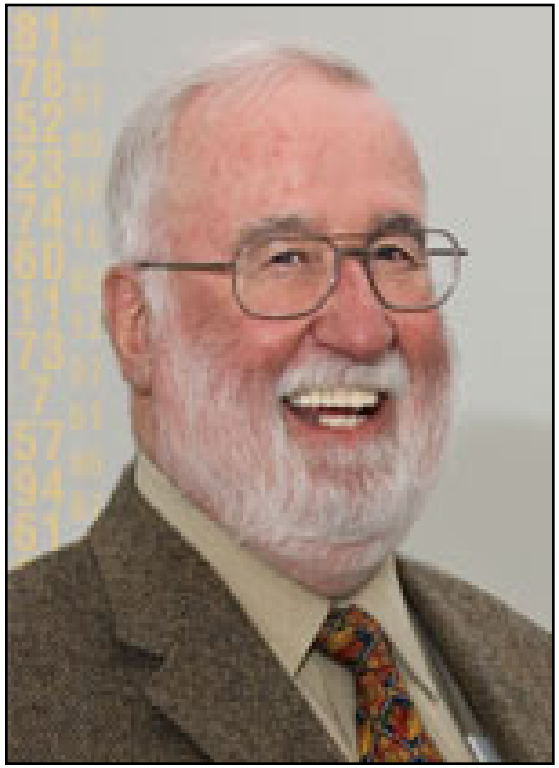


without level I evidence where do we go?

guidelines and protocols need evaluation of ALL the available data

evidence based medicine

David Sackett



- **conscientious, explicit, and judicious use of current best evidence in making decisions about care of individual patients**

- **integrating individual clinical expertise with the best external evidence from systematic research**

involves: evidence
experience
patients and carers
(and health economics?)

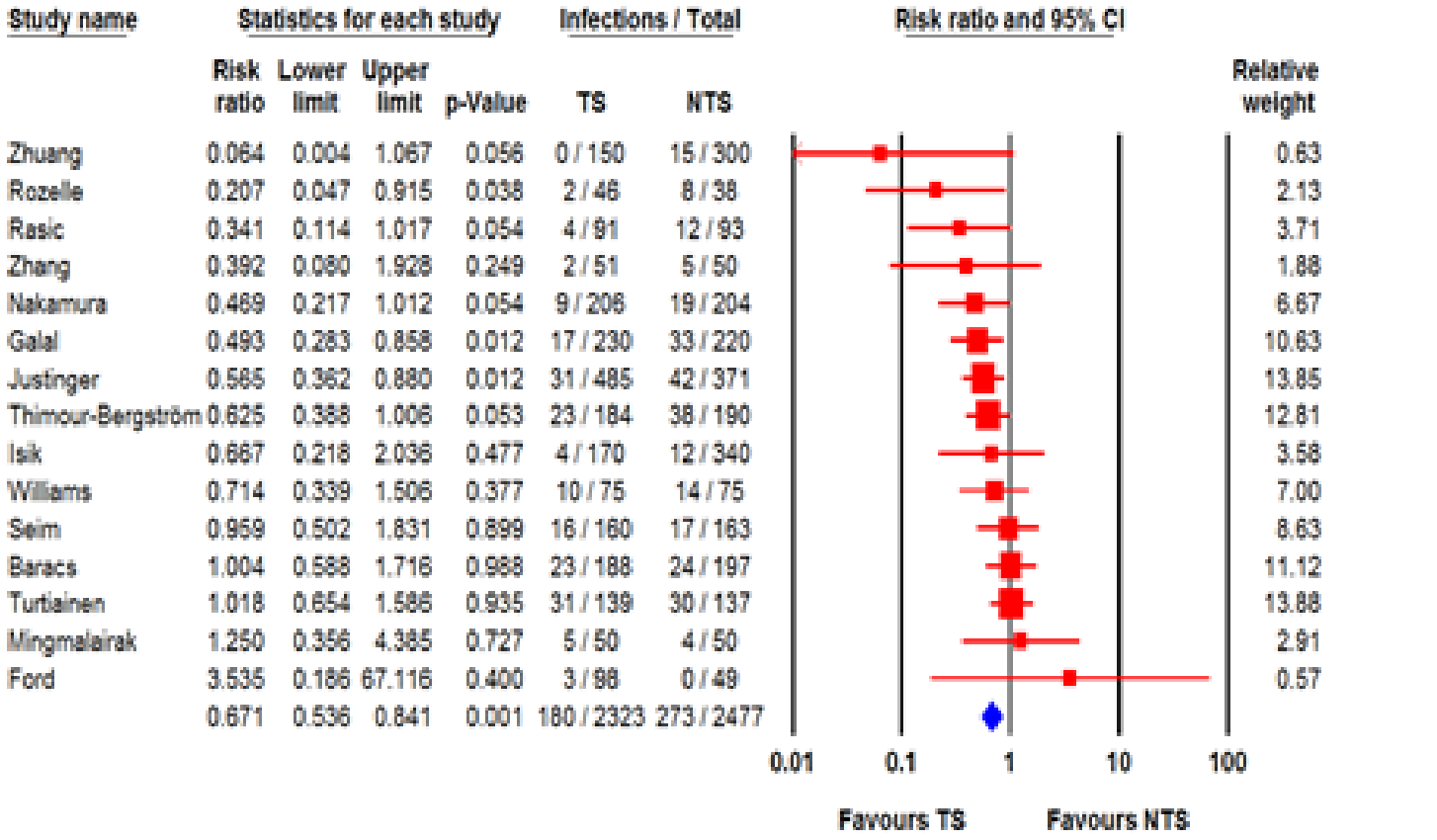
meta-analysis

- Chang et al Annals Surg 2012 836 patients 7 studies
  RR 0.77; 95% CI 0.40,1.51; p = 0.45(too early)
- Wang et al Brit J Surg 2013 3720 patients 17 studies
  RR 0.70; 95% CI 0.57, 0.85;p<0.001
- Edmiston et al Surgery 2013 3568 patients 13 studies
  RR 0.73; 95% CI 0.59, 0.91; p < 0.005

- **Daoud et al Surgical Infections 2014 4800 patients 15 studies**
  RR 0.67; 95% CI 0.54, 0.84; p = 0.0005

robustness of sensitivity analysis, publication bias, risk of bias, heterogeneity, classes and type of surgery

Random-effects pooled RR of SSIs - 15 RCTs



Forrest plot of the risk ratios overall

Daoud, Edmiston & Leaper. Surgical Infections 2014

antimicrobial sutures:

level I evidence that they work

meta-analysis of 15 eligible trials of plus sutures

Daoud, Edmiston & Leaper. Surgical Infections 2014

- **triclosan sutures (Vicryl plus, Monocryl plus and PDS plus) significantly reduce SSIs after clean, clean-contaminated and contaminated surgery**
- **no publication bias**
- **robust to removal of up to three trials**
- **overall effect: 33% reduction of SSIs (CI 0.53, 0.84; $p<0.0005$)**
- **this is level I evidence-based medicine**

the days of chromic catgut and silk……

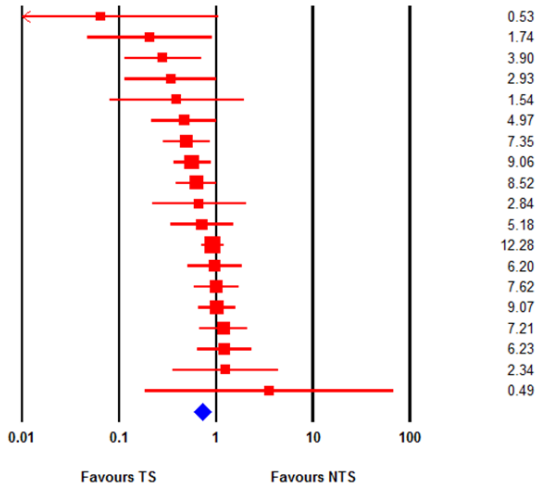
……..are gone

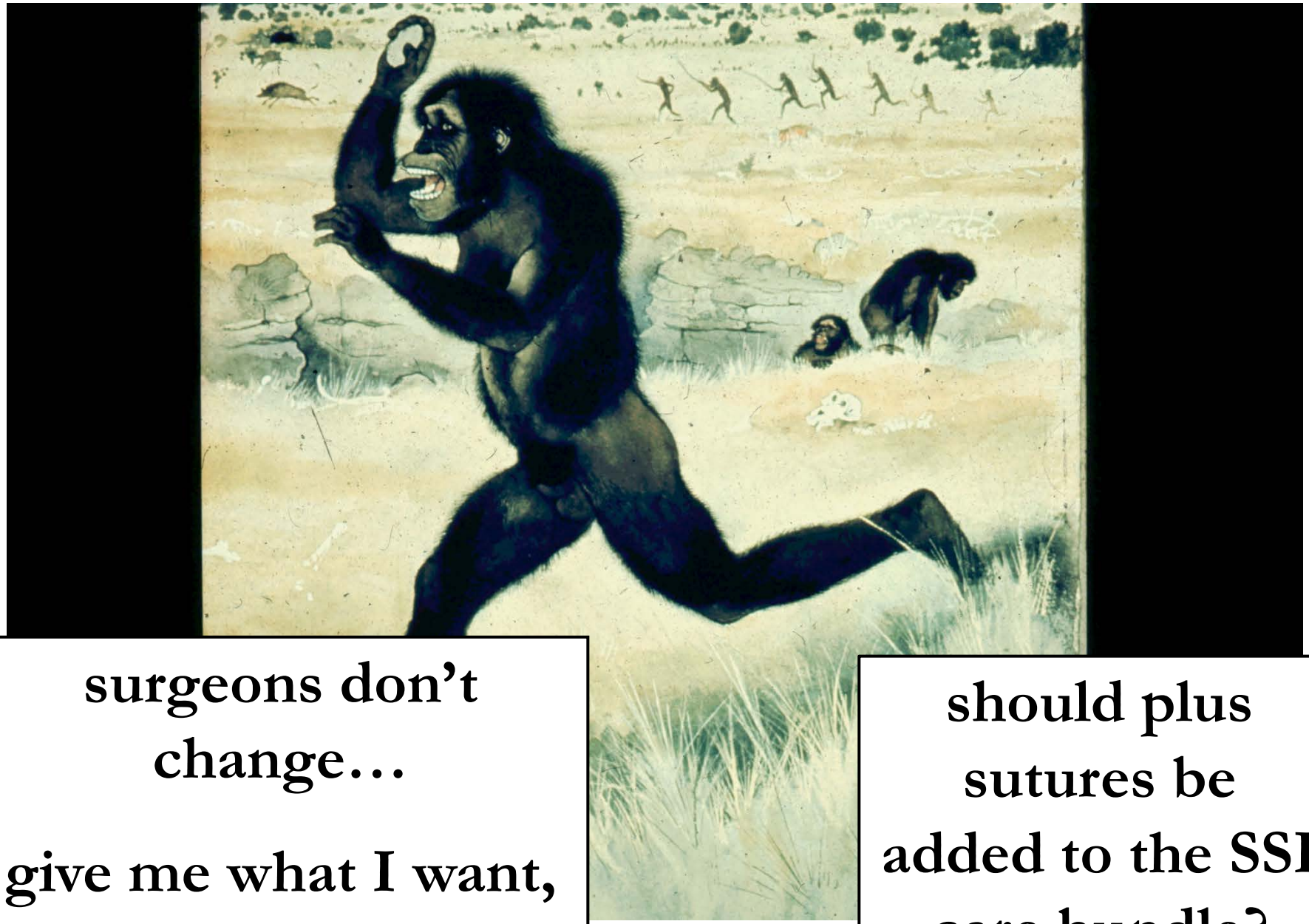
criticisms of the PROUD study

- why multicentre ? why did it take so long? where's the data on ITT?
- was there some "cherry-picking“ ? … was there sequential recruitment?
- definition of SSI is suspect; superficial SSIs dismissed
- deep SSIs agreed on by more than one assessor (which IS laudable) but using photographic evidence?
- why weren't subcuticular antimicrobial sutures used instead of clips?
- clip closure is more at risk of subsequent exogenous SSI
- were closures left to junior unsupervised staff? ... unacceptable level of fascial closure
- less deep SSIs in the antimicrobial suture group … underpowered?

Meta-analysis of SSI RR: 19 peer-reviewed RCTs 10-Oct-2015 status

Study name	Risk ratio	Lower limit	Upper limit	p-Value	Infections / Total TS	Infections / Total NTS	Relative weight
Zhuang	0.064	0.004	1.067	0.056	0 / 150	15 / 300	0.53
Rozelle	0.207	0.047	0.915	0.038	2 / 46	8 / 38	1.74
Ruiz-Tovar	0.283	0.114	0.704	0.007	5 / 50	18 / 51	3.90
Rasic	0.341	0.114	1.017	0.054	4 / 91	12 / 93	2.93
Zhang	0.392	0.080	1.928	0.249	2 / 51	5 / 50	1.54
Nakamura	0.469	0.217	1.012	0.054	9 / 206	19 / 204	4.97
Galal	0.493	0.283	0.858	0.012	17 / 230	33 / 220	7.35
Justinger	0.565	0.362	0.880	0.012	31 / 485	42 / 371	9.06
Thimour-Bergström	0.625	0.388	1.006	0.053	23 / 184	38 / 190	8.52
Isik	0.667	0.218	2.036	0.477	4 / 170	12 / 340	2.84
Williams	0.714	0.339	1.506	0.377	10 / 75	14 / 75	5.18
PROUD	0.923	0.707	1.206	0.557	87 / 587	96 / 598	12.28
Seim	0.959	0.502	1.831	0.899	16 / 160	17 / 163	6.20
Baracs	1.004	0.588	1.716	0.988	23 / 188	24 / 197	7.62
Turtiainen	1.018	0.654	1.586	0.935	31 / 139	30 / 137	9.07
Steingrimsson	1.192	0.677	2.098	0.543	23 / 193	20 / 200	7.21
Mattavelli	1.209	0.635	2.301	0.564	18 / 140	15 / 141	6.23
Mingmalairak	1.250	0.356	4.385	0.727	5 / 50	4 / 50	2.34
Ford	3.535	0.186	67.116	0.400	3 / 98	0 / 49	0.49
	0.724	0.588	0.892	0.002	313 / 3293	422 / 3467	





surgeons don't change…

give me what I want, not what I ask for!

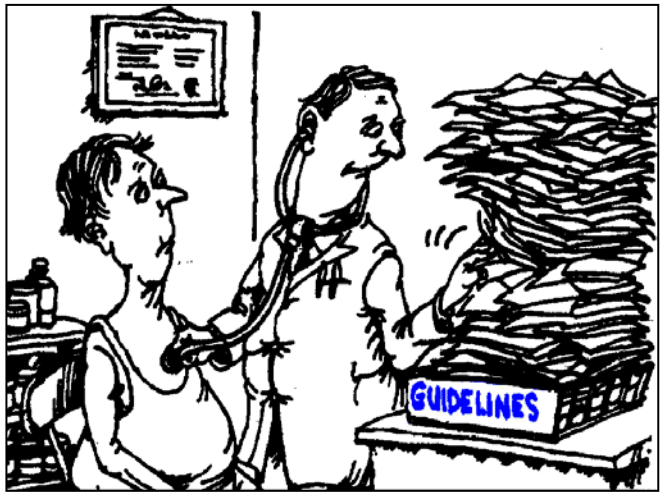
should plus sutures be added to the SSI care bundle?

extract from NICE guideline

implementation of the Guideline will not necessarily involve major changes in current practice but it does recommend the pooling of best practice into

"care bundles"

which should reduce the risk of SSI. The introduction of the Guideline into patient care needs to be across the whole spectrum of care from the decision to operate to recovery and return to normal life style



Perioperative actions

Hair removal
- Use a clipper with a disposable head.
- Shaving with a razor is not recommended.[5]

Prophylactic antimicrobial
- Appropriate antimicrobial administered within 60 minutes prior to incision.[13,14]

Normothermia
- Maintaining a body temperature above 36°C in the perioperative period has been shown to reduce infection rates.[16,17]

Glucose control
- Maintaining a glucose level <11mmol/l has been shown to reduce wound infection in diabetic patients.[15]

tactics to improve compliance (and surveillance?)

- understand
  - people resist change
  - "buy-in" HAS to be achieved
  - antibiotics can't do it alone
- emphasize
  - education
  - evidence
  - best interests of the PATIENT
- reward
  - replace the "culture of blame"

why aren't SSI rates falling?

NICE

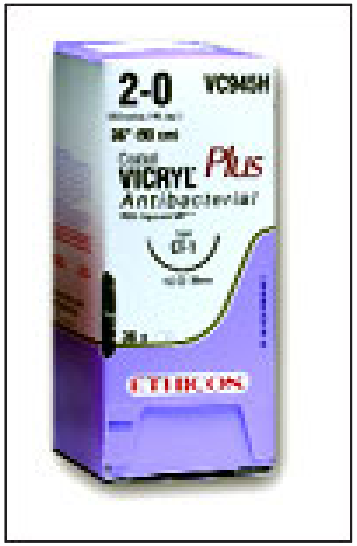
HII

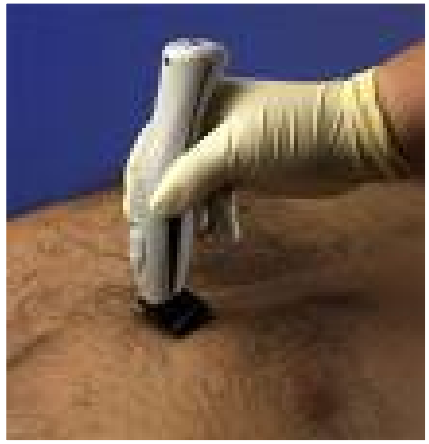
SCIP

SSI Care Bundle

smoking advice	no cost
pre-op body washing	£2
optimum nutrition	improve current practice
patient warming	£15
antibiotic prophylaxis	improve current practice
hair removal	£2
patient skin prep	£6
surveillance feedback	no cost
TOTAL COST	**£25 per patient**

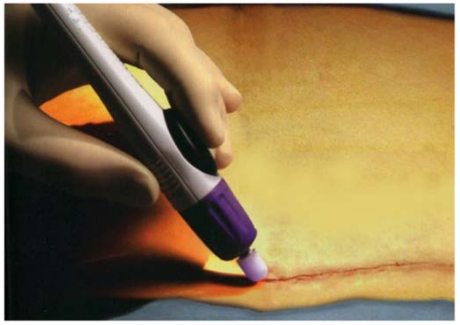

schülke
octenisan
cleaning
HiBi SCRUB PLUS
HOSPITAL USE ONLY


2-0
VICRYL Plus
Antibacterial

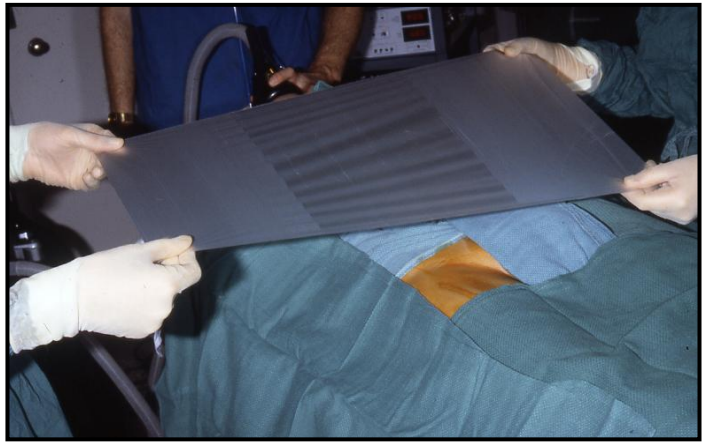



NUTRICIA
preOp
200 ml


FORTISIP
NEUTRAL FLAVOUR
High energy, nutritionally complete, neutral flavour milk shake style supplement.
NEW IMPROVED
200 ml
NUTRICIA




Neo-Predef
Baytril
Vetropolycin
GENTAMICIN SULFATE INJECTION



cost effectiveness (£25/bundle)

colorectal (315 patients)

1 year SSI Care Bundle £7,875

1 colorectal SSI cost: £10,366

1 colorectal SSI prevented = **cost effective**

breast (477 patients)

1 year SSI Care Bundle £11,925

1 breast SSI cost: £1,403

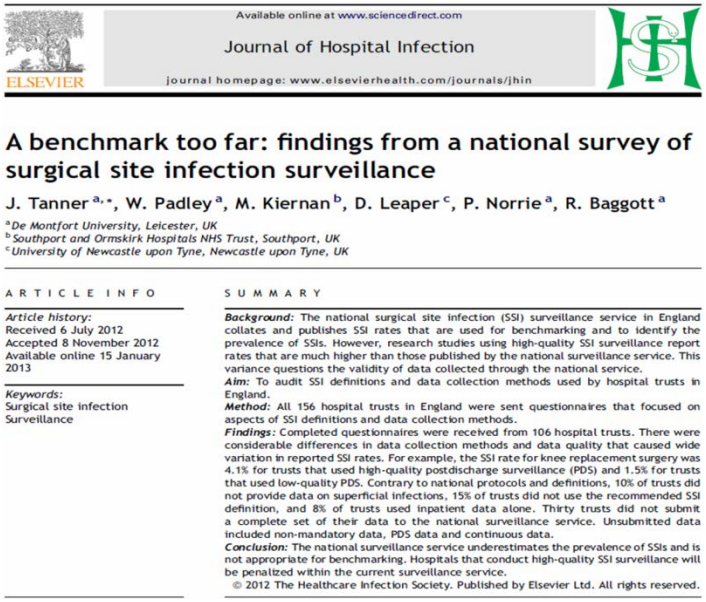
8 breast SSIs prevented = **cost effective**

post discharge surveillance

(how robust can it be?)

- **rolling programme**
  3 monthly or continuously by specialty?
- **who?** primary/secondary care… doctors nurses?
  i. on the ward
  ii. specialist nurses breast/stoma
  iii. out patient
  iv. governance sessions
  v. specialist appointment (with what cost?)
- **mandatory or voluntary?**
- **internationally comparable**

independent unbiased blinded trained direct observer



Available online at www.sciencedirect.com
Journal of Hospital Infection
journal homepage: www.elsevierhealth.com/journals/jhin

A benchmark too far: findings from a national survey of surgical site infection surveillance

J. Tanner [a,*], W. Padley [a], M. Kiernan [b], D. Leaper [c], P. Norrie [a], R. Baggott [a]
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SUMMARY
Background: The national surgical site infection (SSI) surveillance service in England collates and publishes SSI rates that are used for benchmarking and to identify the prevalence of SSIs. However, research studies using high-quality SSI surveillance report rates that are much higher than those published by the national surveillance service. This variance questions the validity of data collected through the national service.
Aim: To audit SSI definitions and data collection methods used by hospital trusts in England.
Method: All 156 hospital trusts in England were sent questionnaires that focused on aspects of SSI definitions and data collection methods.
Findings: Completed questionnaires were received from 106 hospital trusts. There were considerable differences in data collection methods and data quality that caused wide variation in reported SSI rates. For example, the SSI rate for knee replacement surgery was 4.1% for trusts that used high-quality postdischarge surveillance (PDS) and 1.5% for trusts that used low-quality PDS. Contrary to national protocols and definitions, 10% of trusts did not provide data on superficial infections, 15% of trusts did not use the recommended SSI definition, and 8% of trusts used inpatient data alone. Thirty trusts did not submit a complete set of their data to the national surveillance service. Unsubmitted data included non-mandatory data, PDS data and continuous data.
Conclusion: The national surveillance service underestimates the prevalence of SSIs and is not appropriate for benchmarking. Hospitals that conduct high-quality SSI surveillance will be penalized within the current surveillance service.

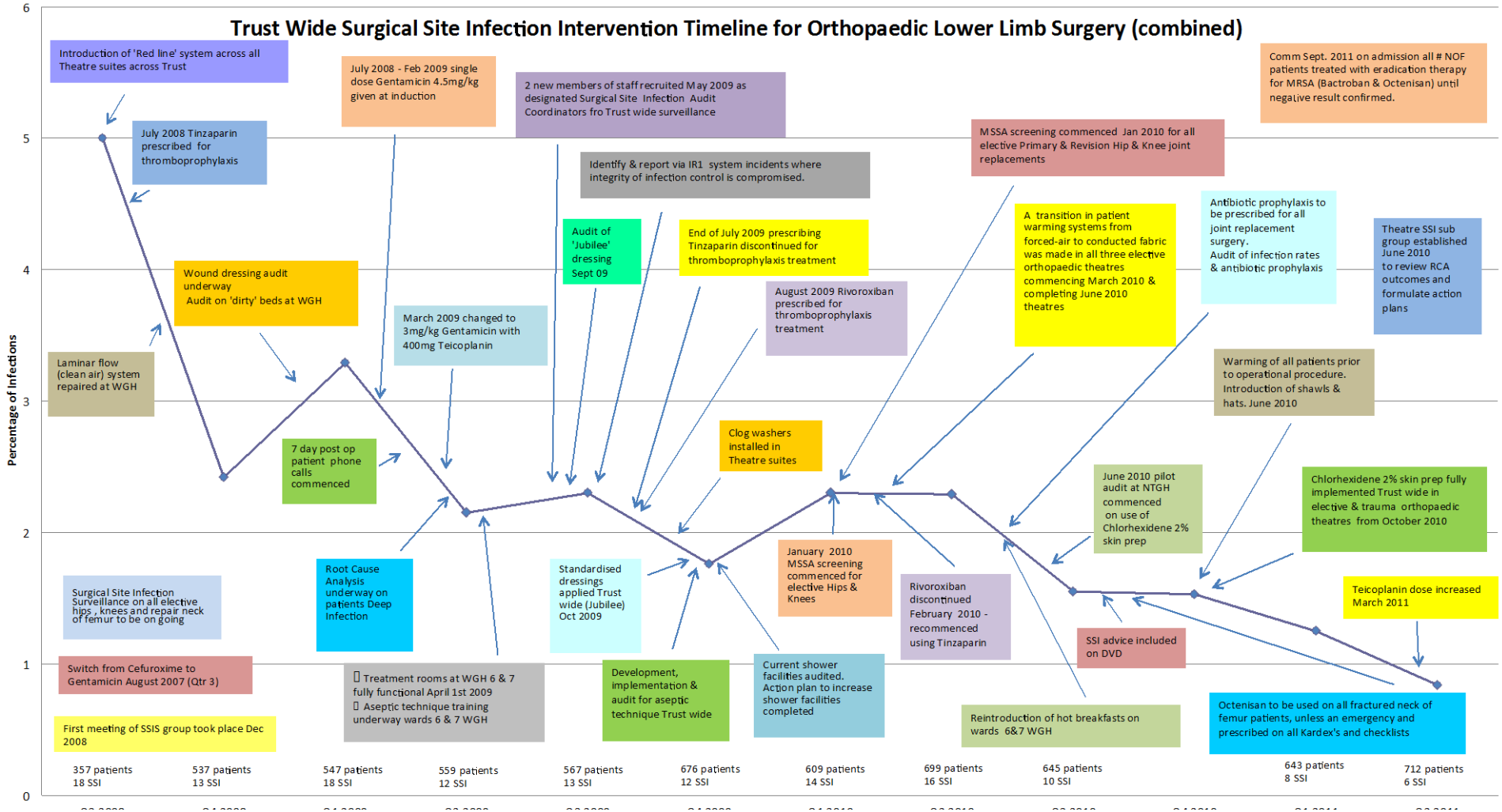
benchmarking and international comparisons

- **definitions**
- **robust surveillance**
  (not just readmission data)
- **systems for quality control**
- **needs regular audit/review**

1% SSI after hip replacement

0.5% SSI after knee replacement

Northumbria Healthcare NHS
NHS Foundation Trust



vancomycin powder in wounds?

he had never learned how to repair wounds [or manage infection]……this seemed a serious flaw in his magical education

Harry Potter

…and the Deathly Hallows

Jo Rowling 2007

what an inspiration!