

How far can we go in controlling Healthcare associated Infections: what is realistic?



Tackling healthcare associated infections outside of hospital – Learning Workshop 3

Wednesday 28th January 2009 9.30-16.45

Hardwick Hall, Sedgfield, TS21 2EH

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Health Protection Agency (HPA)

Regional Microbiology Network (RMN)

January 27, 2009

Agenda for today



- HCAI reduction**
- European perspective**
- Zero tolerance**
- ESBL**
- Norovirus**
- PVL**

**What is possible?
What is realistic?**



25 May 1961



20 July 1969



Courtesy of NASA



29 May 1953

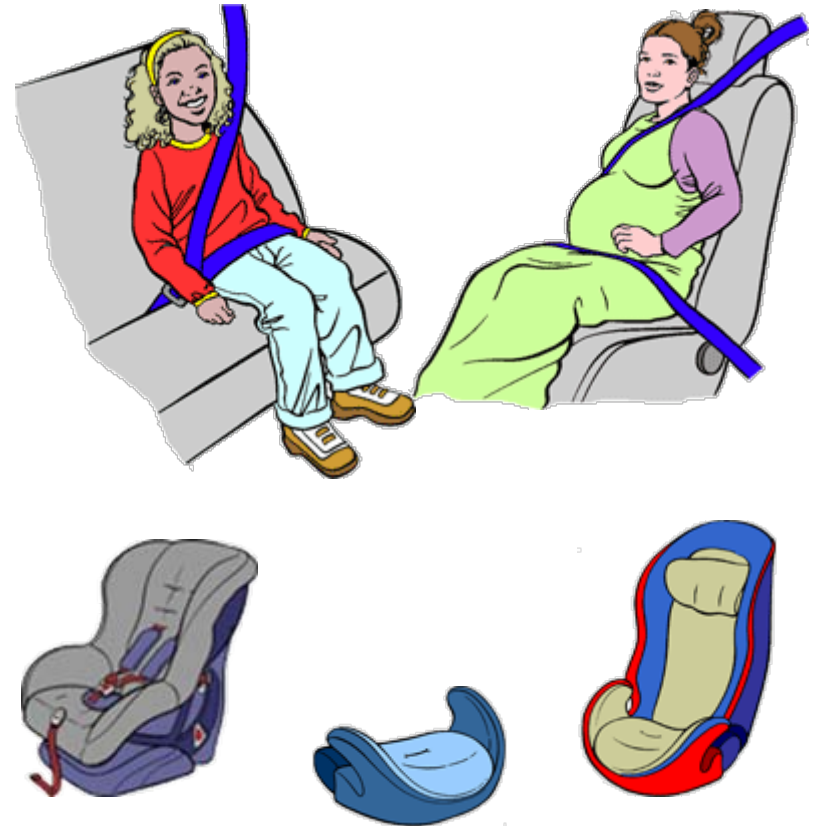
www.wikipedia.org

Successful campaigns



- There have been many national campaigns
- Please name some campaigns your recall?
- ???
- ???
- ???
- ???

Clunk click every trip



Courtesy of ROSPA

Importance of Training & Experience



US Airways Flight 1549

16 January 2009



**British Airways Flight BA
038 17 January 2008**



www.bbc.co.uk

The new Science Quality and Improvement



Japanese built Hitachi Javelin train

**Reduces travel time from SE
England**

83 minutes to 37 minutes

119 minutes to 84 minutes

112 minutes to 74 minutes

102 minutes to 61 minutes

www.bbc.co.uk

Healthcare associated infections



**A question of
quality in healthcare delivery
and
patient safety**

Potential for reduction

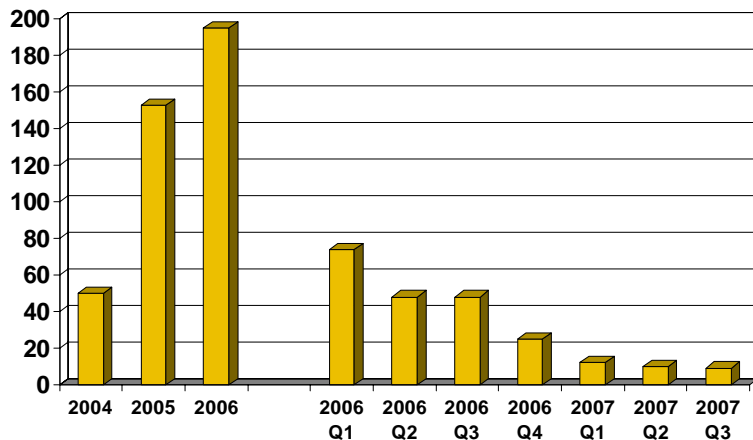


- Previous reports suggested that only 1/3 of HCAs are preventable
- Lessons from some European countries eg: Netherlands
- Evidence emerging from some Trusts in England
- Need to be more ambitious
- Stretch targets
- Once running a low level system – less burden

Clostridium difficile: can we get to low levels?



- can we eliminate *Clostridium difficile*
- We can reduce it significantly
- We can achieve very low levels
- Don't get left behind



What does Zero tolerance mean?

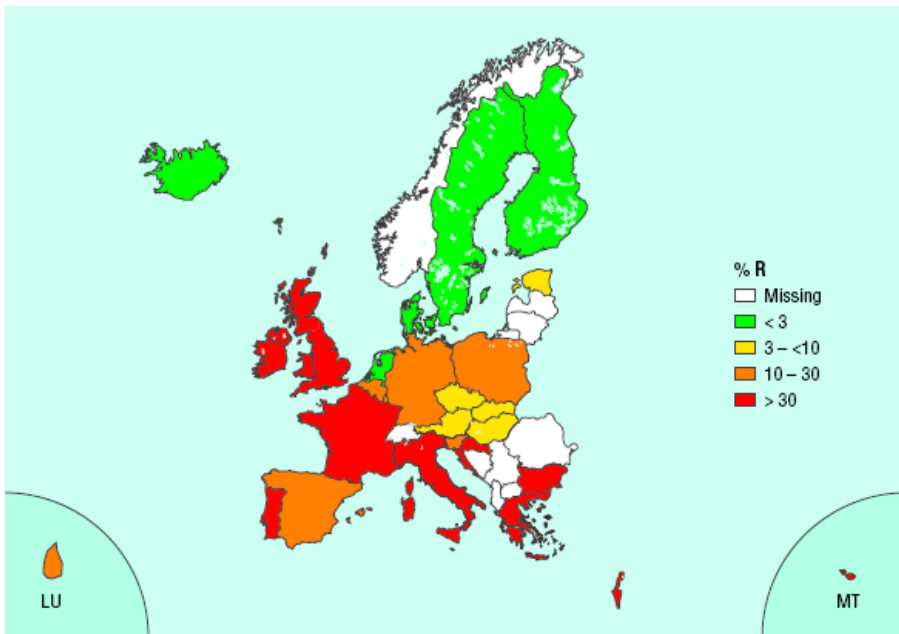
When a patient gets a HCAI is that a failure of healthcare delivery?

Yes and don't let anyone
tell you otherwise

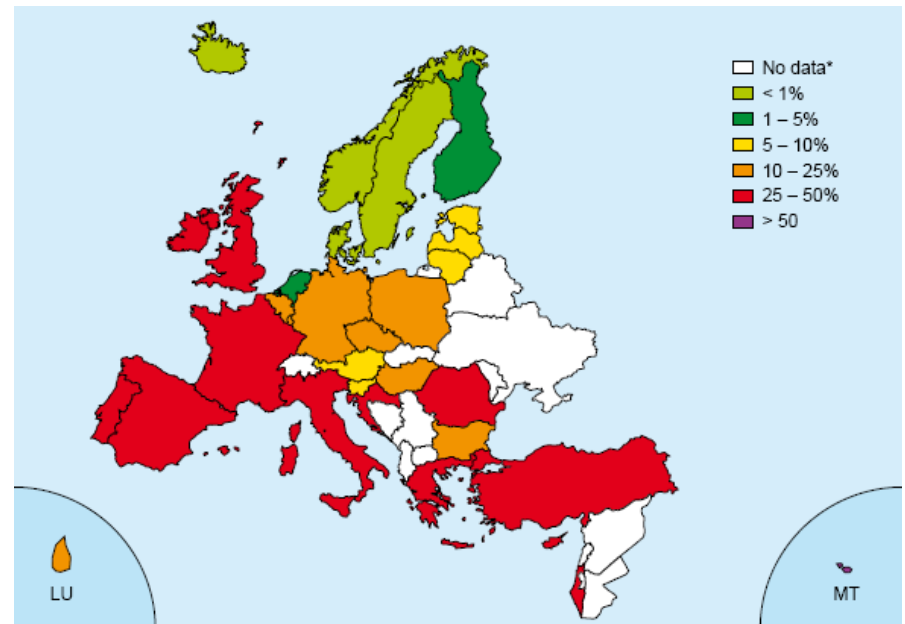
MRSA bacteraemias



EARSS report 2001



EARSS report 2007



EARSS reports

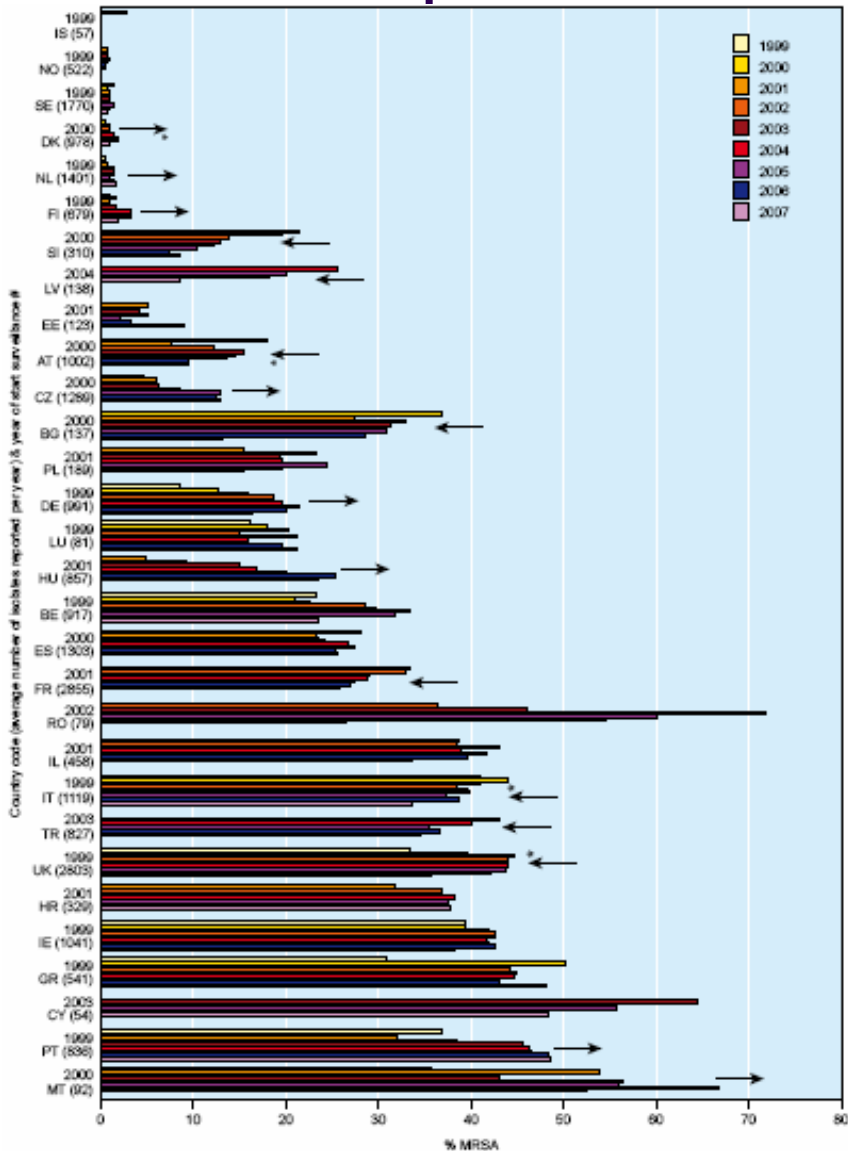


Figure 4.9. *Staphylococcus aureus*: trends of methicillin-resistance by country 1999-2007. Only the countries that reported 20 isolates or more per year and reported at least three years were included. The arrows indicate significant trends. The asterisks indicate significant trends in the overall national data that were, non-significantly, supported by data from laboratories reporting all nine years.

Either the first year of surveillance or the first year with 20 or more isolates reported.

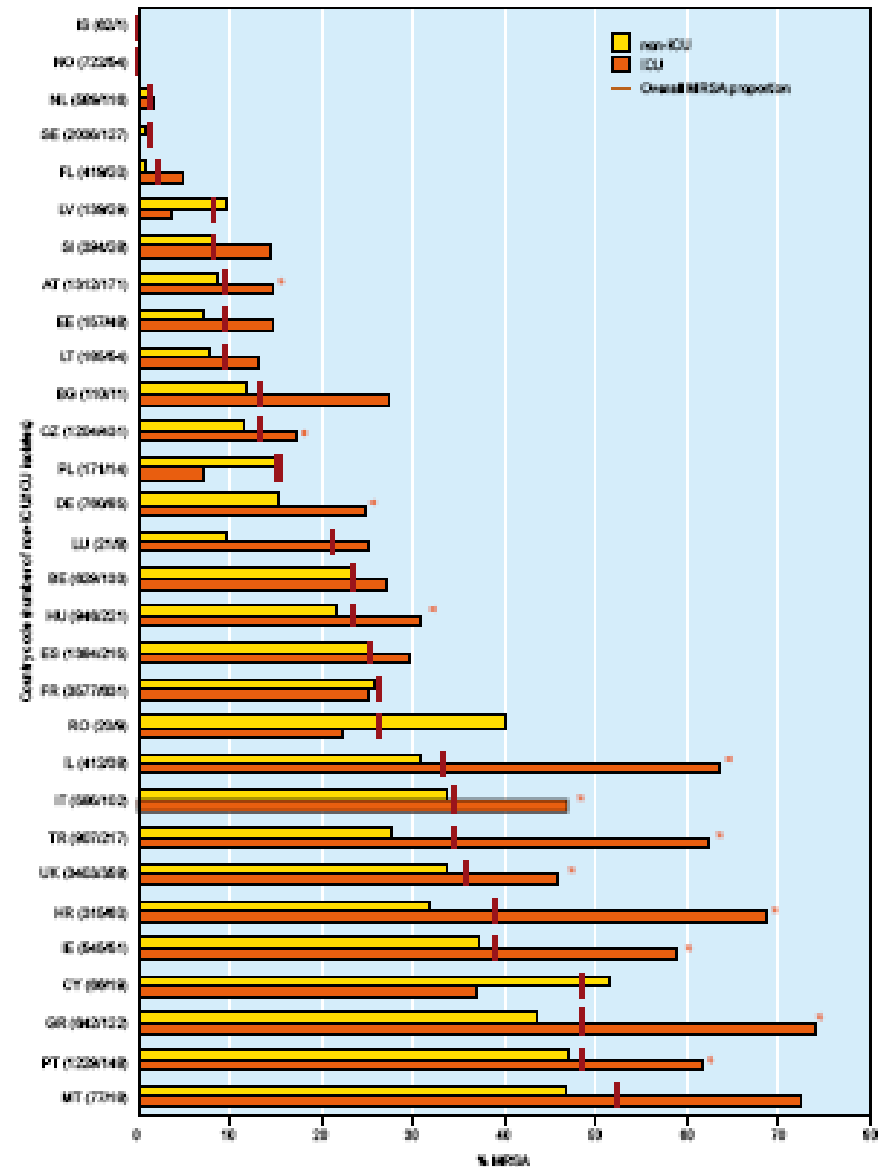
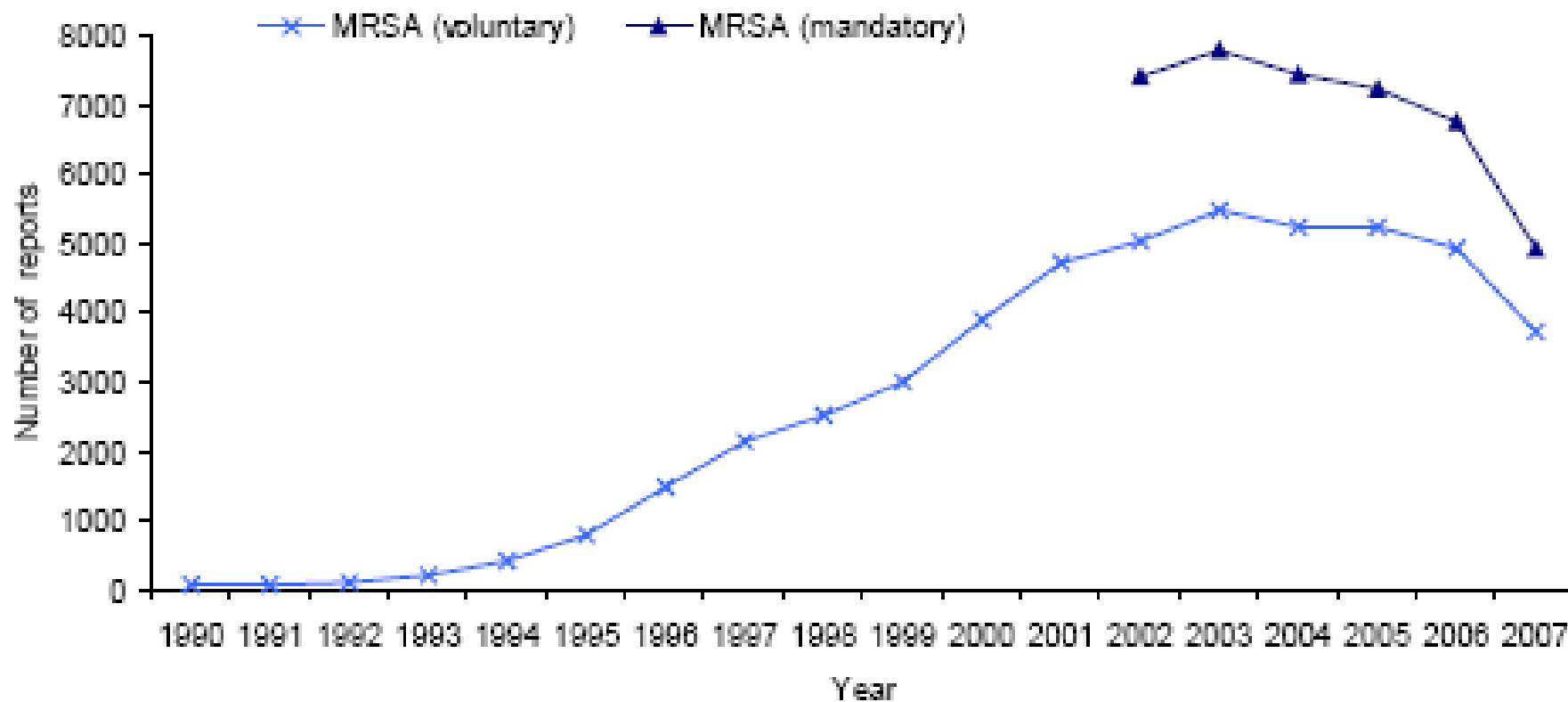


Figure 4.10. *Staphylococcus aureus*: proportion MRSA in ICU versus other hospital departments by country in 2007. Between brackets the number of isolates from non-ICU departments. The asterisks indicate a significant difference between the ICU and non-ICU MRSA proportions.

Regional & Trust trends in MRSA bloodstream infections since 2001



Figure 3: Meticillin-resistant *Staphylococcus aureus* bloodstream infection reports received under the voluntary and mandatory schemes in England, calendar year 1990 to 2007



MRSA Bacteraemias



Figure 6: Age and sex distribution, April 2008-March 2008

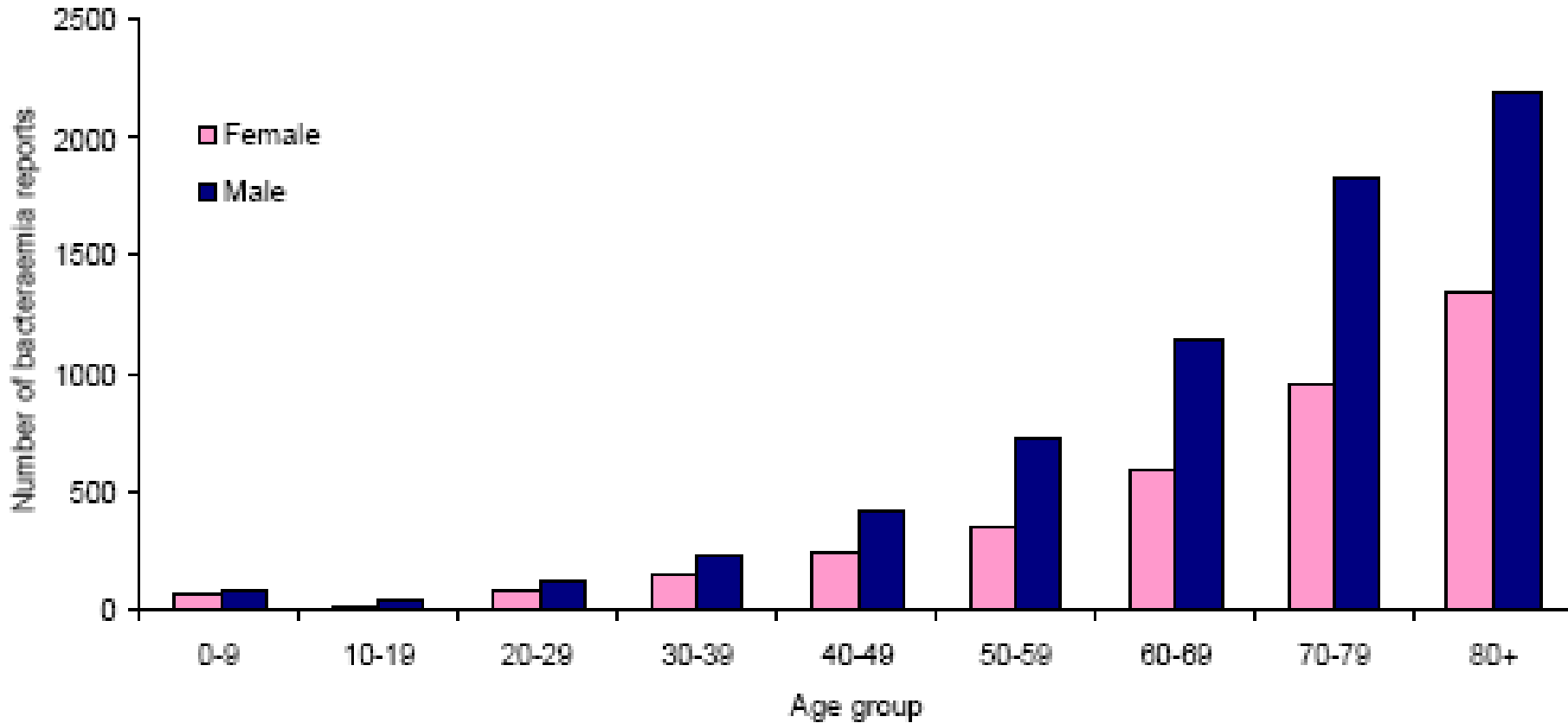


Figure 9: MRSA bloodstream infection rate (per 10 000 bed days) by speciality, April 2006 to March 2008.

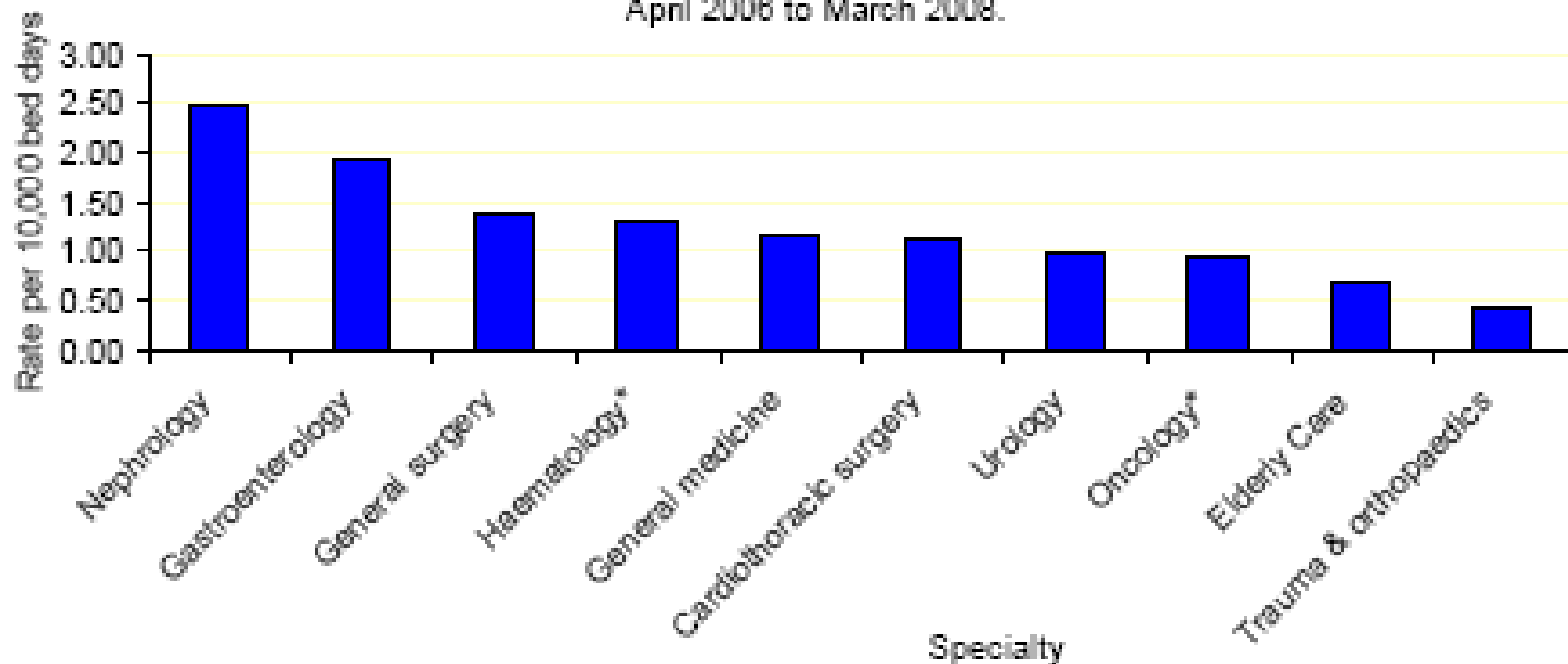
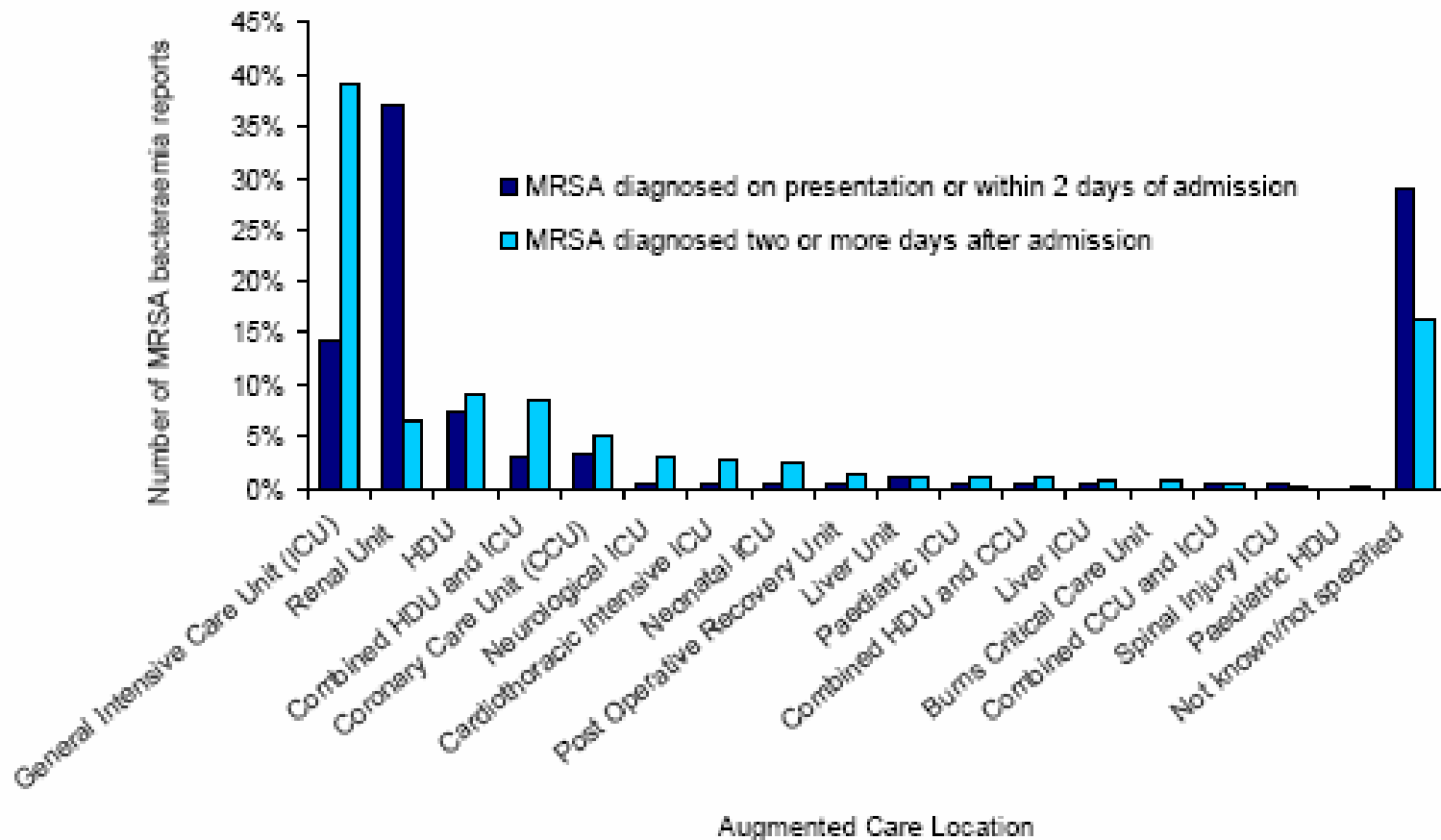


Figure 10: Most commonly reported augmented care location for MRSA bacteraemia detected either within two days or two or more days after admission April 2006 - March 2008.



MRSA Bacteraemias – Mandatory reporting

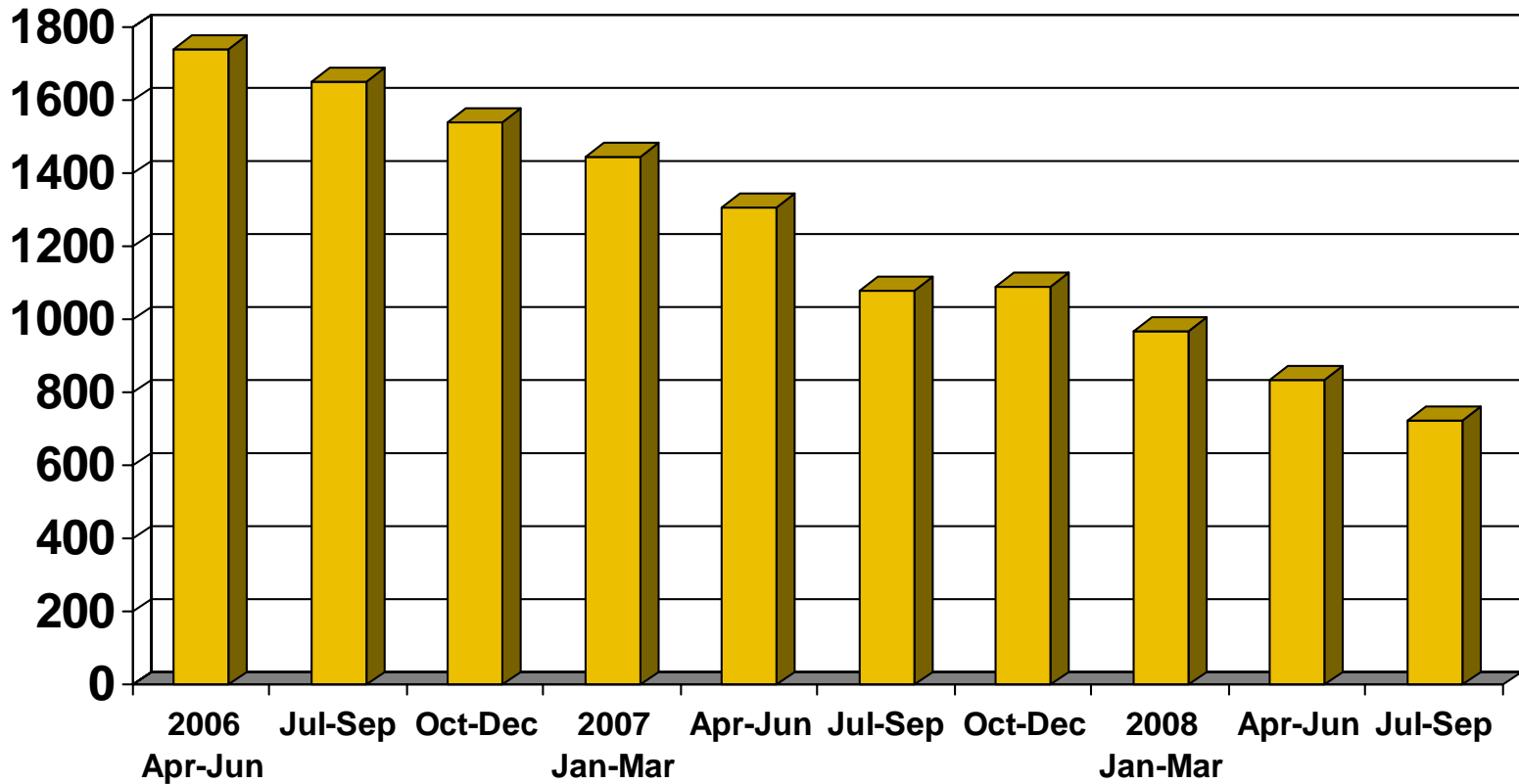
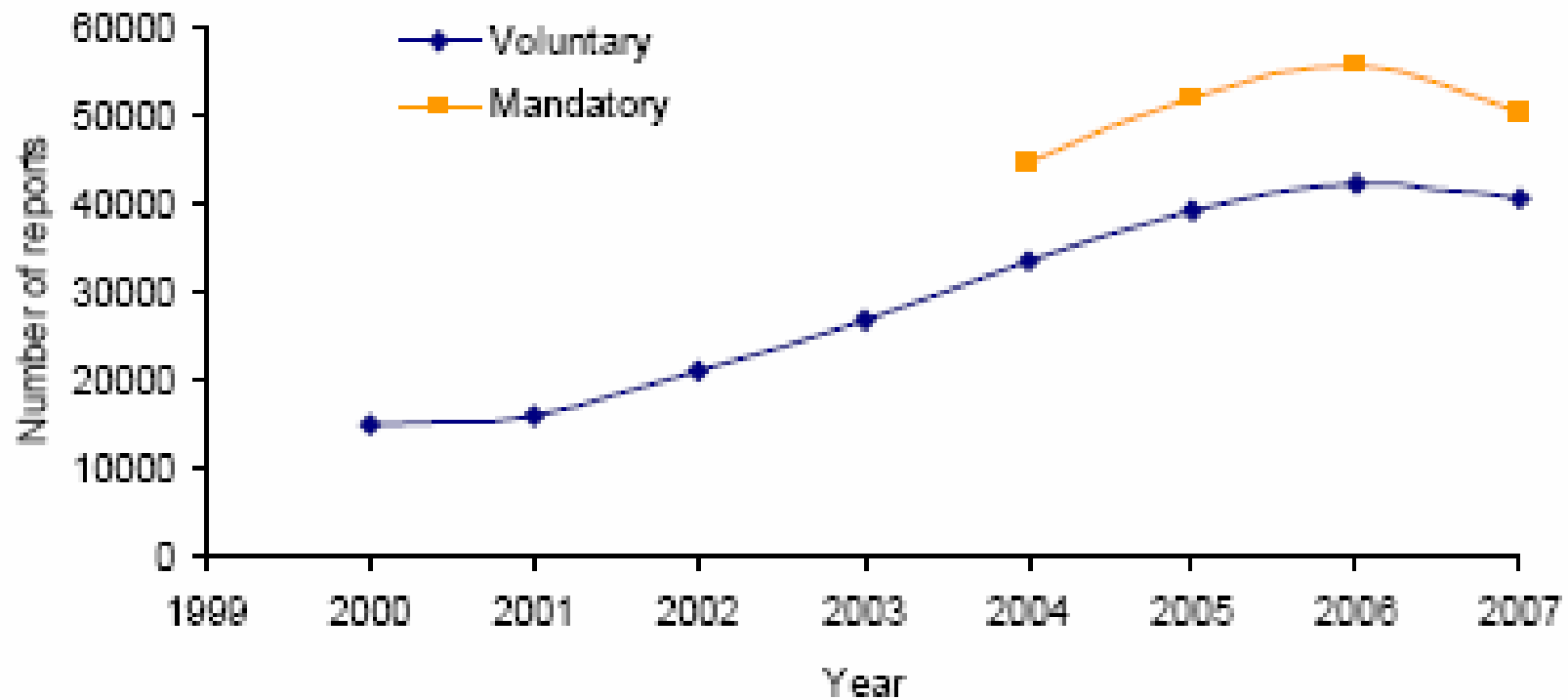
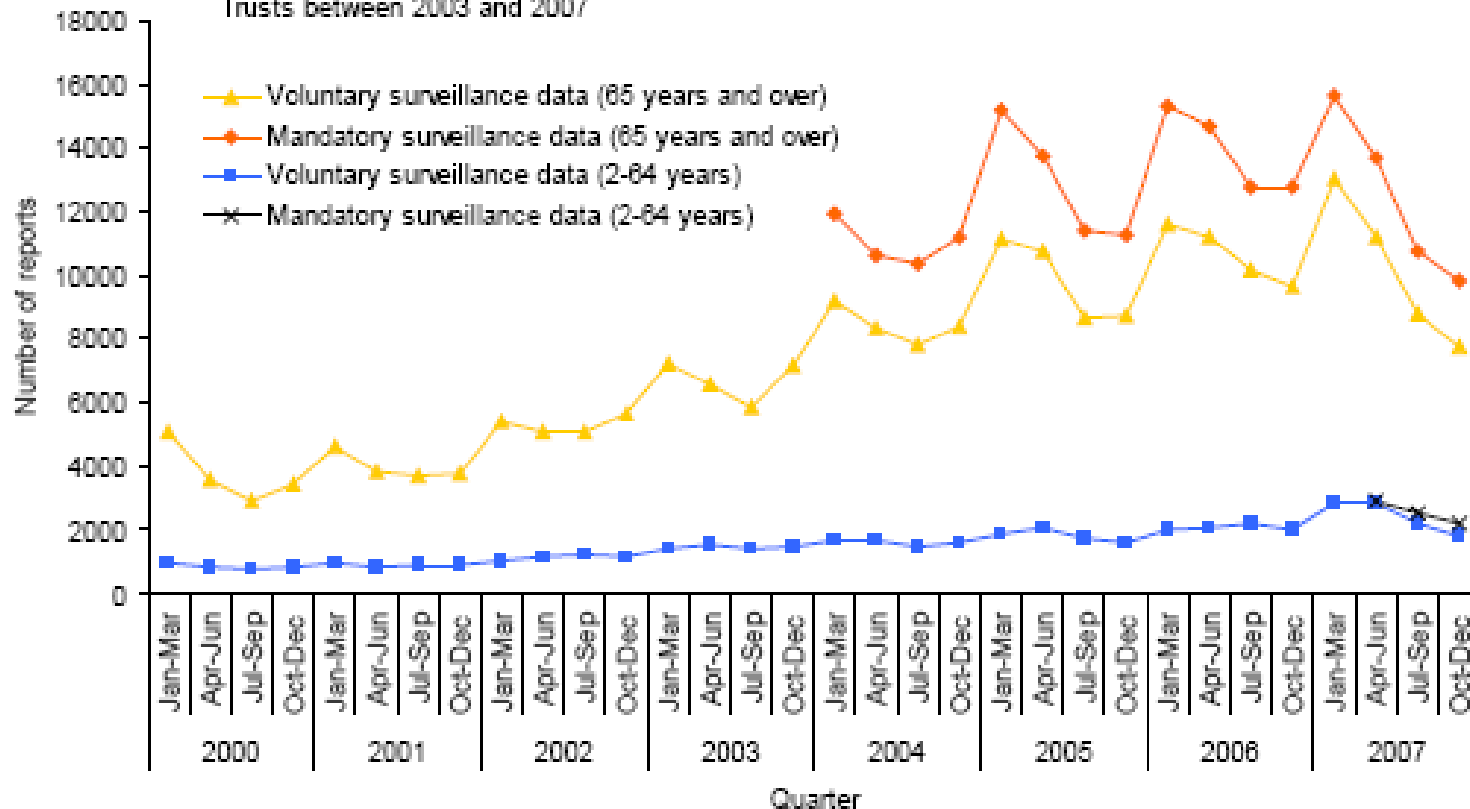


Figure 13: Trend in *C.difficile* reports for patients aged 65 years and over reported via the mandatory and voluntary reporting systems, 2000 to 2007



The data from both the mandatory surveillance system for *C. difficile* infection and the pre-existing voluntary system for patients aged 65 years and over showed peaks in reported case numbers in the January – March quarter of each year (Figure 14).

Figure 14: Quarterly number of reports of *C. difficile* infection received from English NHS acute Trusts between 2003 and 2007



Analysis of the voluntary data shows that seasonality in the younger age group is much less pronounced than in the older age group. This suggests that seasonality is driven by one or more risk factors to which exposure is greater in the older age group. Possible risk factors include disproportionately large increases in hospital admissions and increased antibiotic usage in elderly patients during the winter.

Surveillance of Healthcare Associated Infections Report: 2008

Figure 15: Regional reports of *C. difficile* infection by age group, April 2007 to March 2008 (mandatory surveillance)

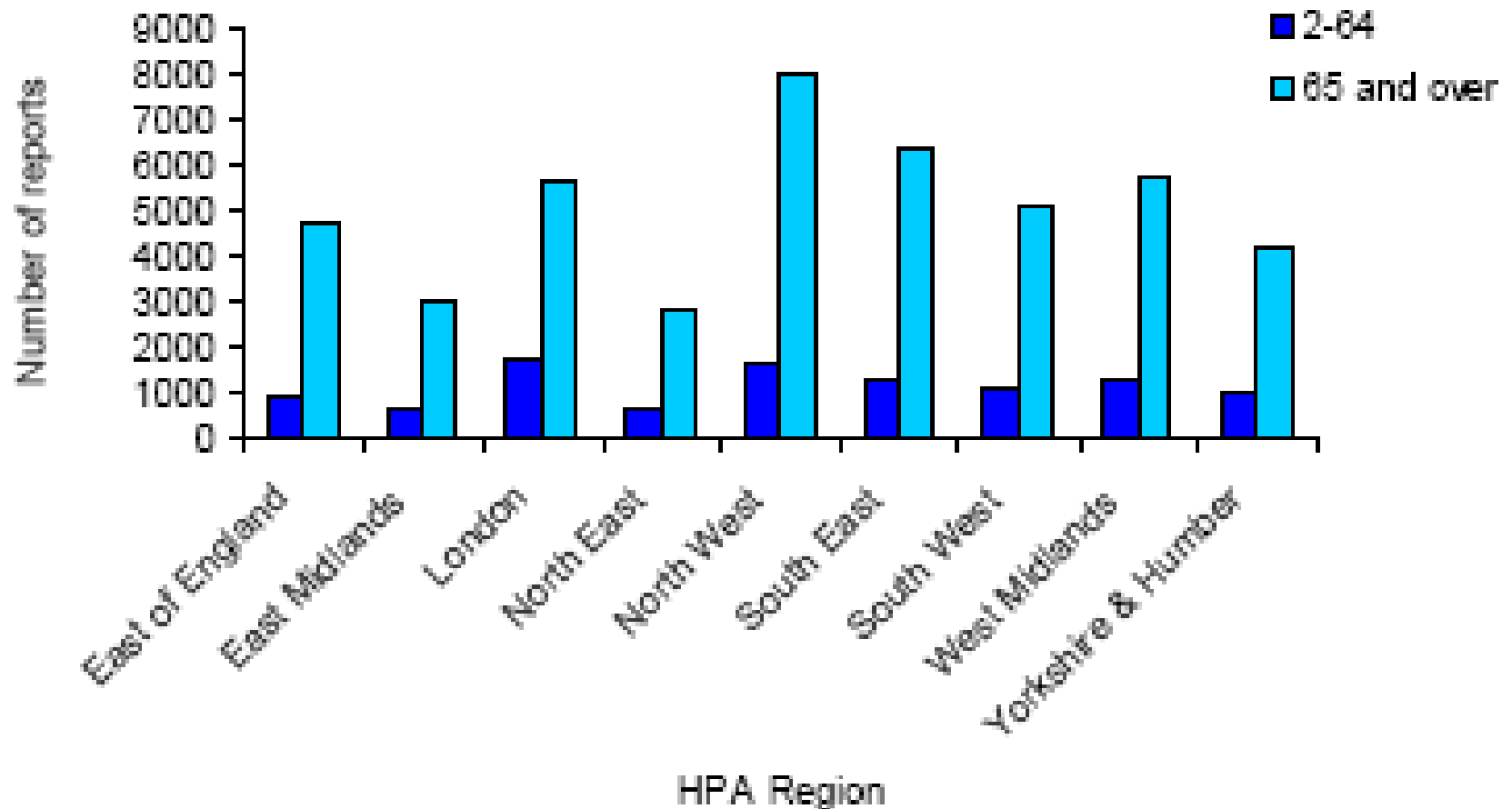
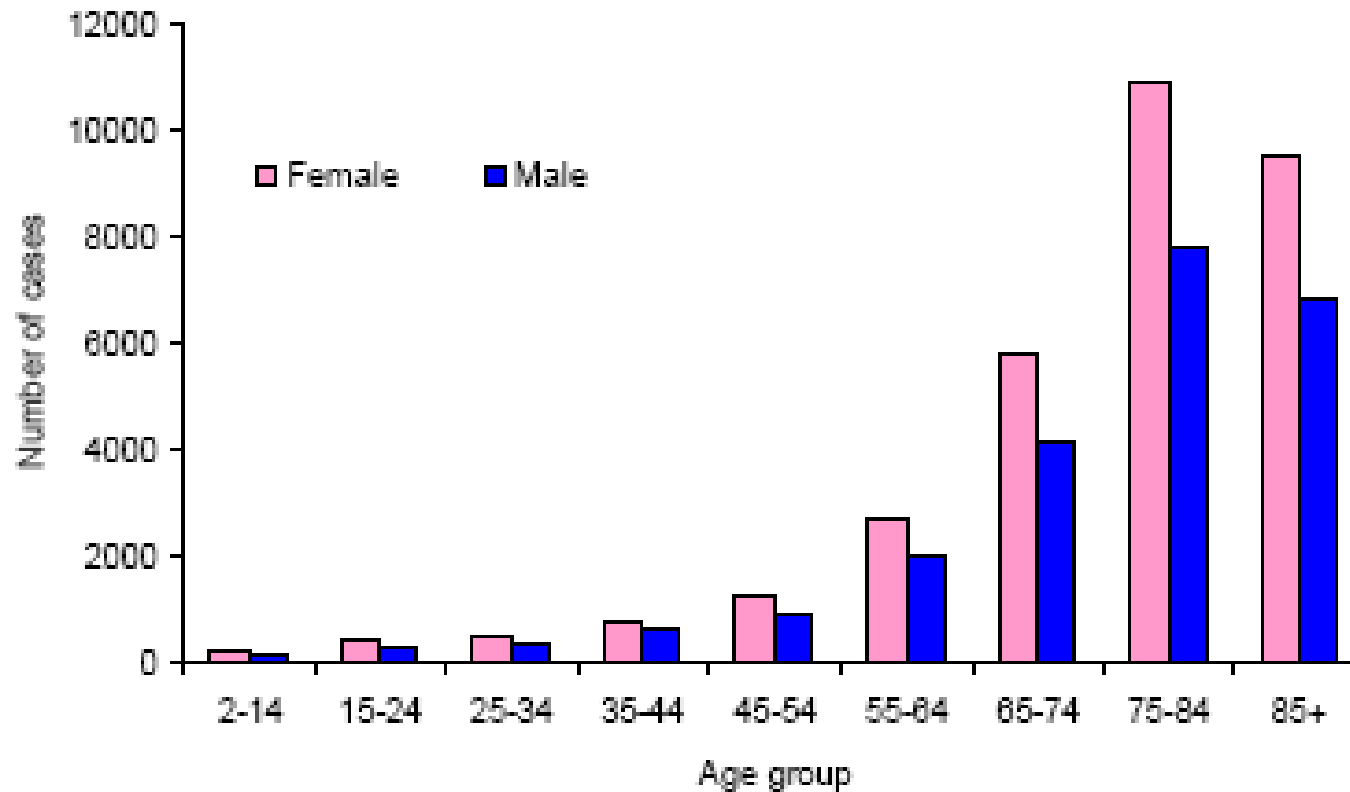


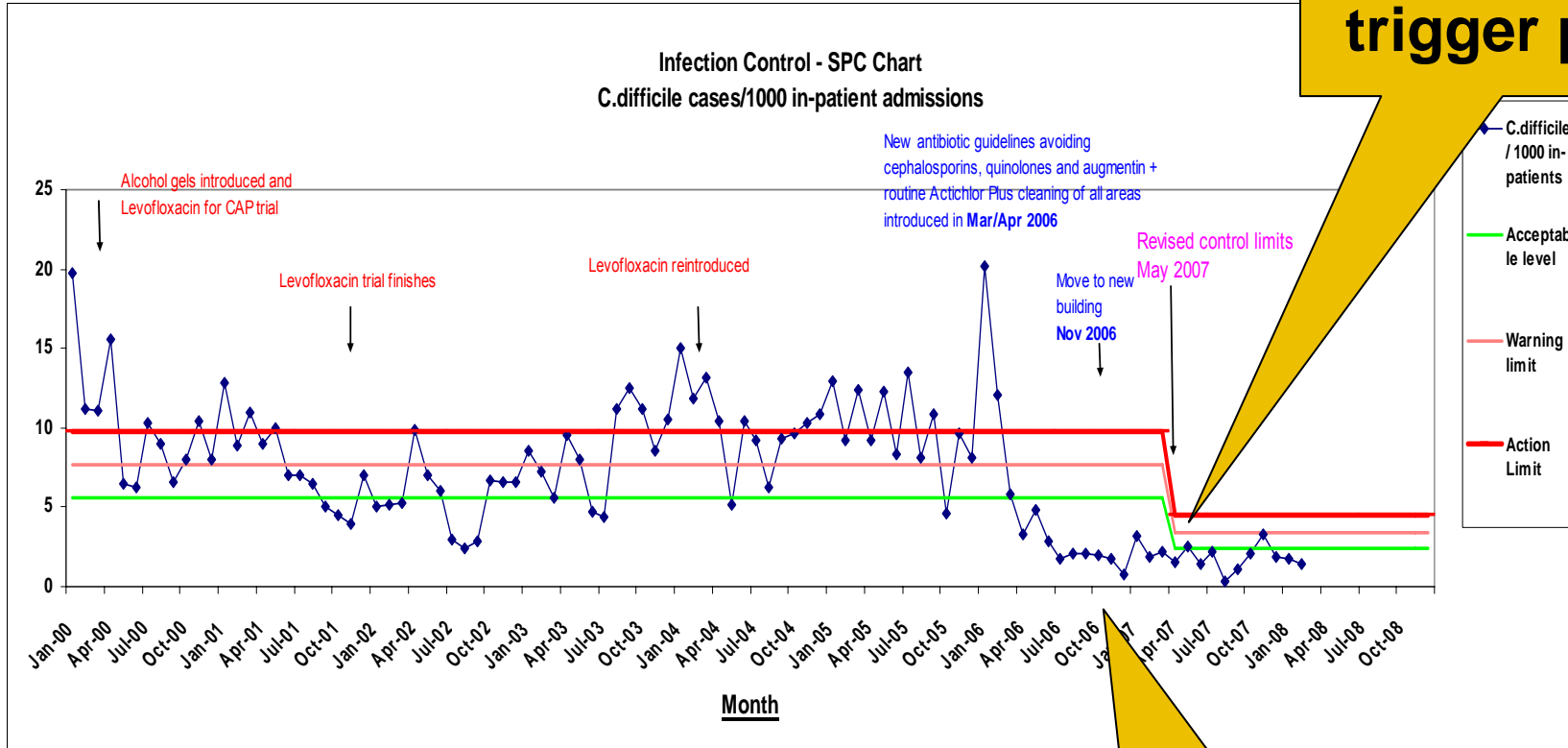
Figure 18: Age and sex distribution of *C. difficile* reports, April 2007 to March 2008
(mandatory surveillance)



A London Hospital



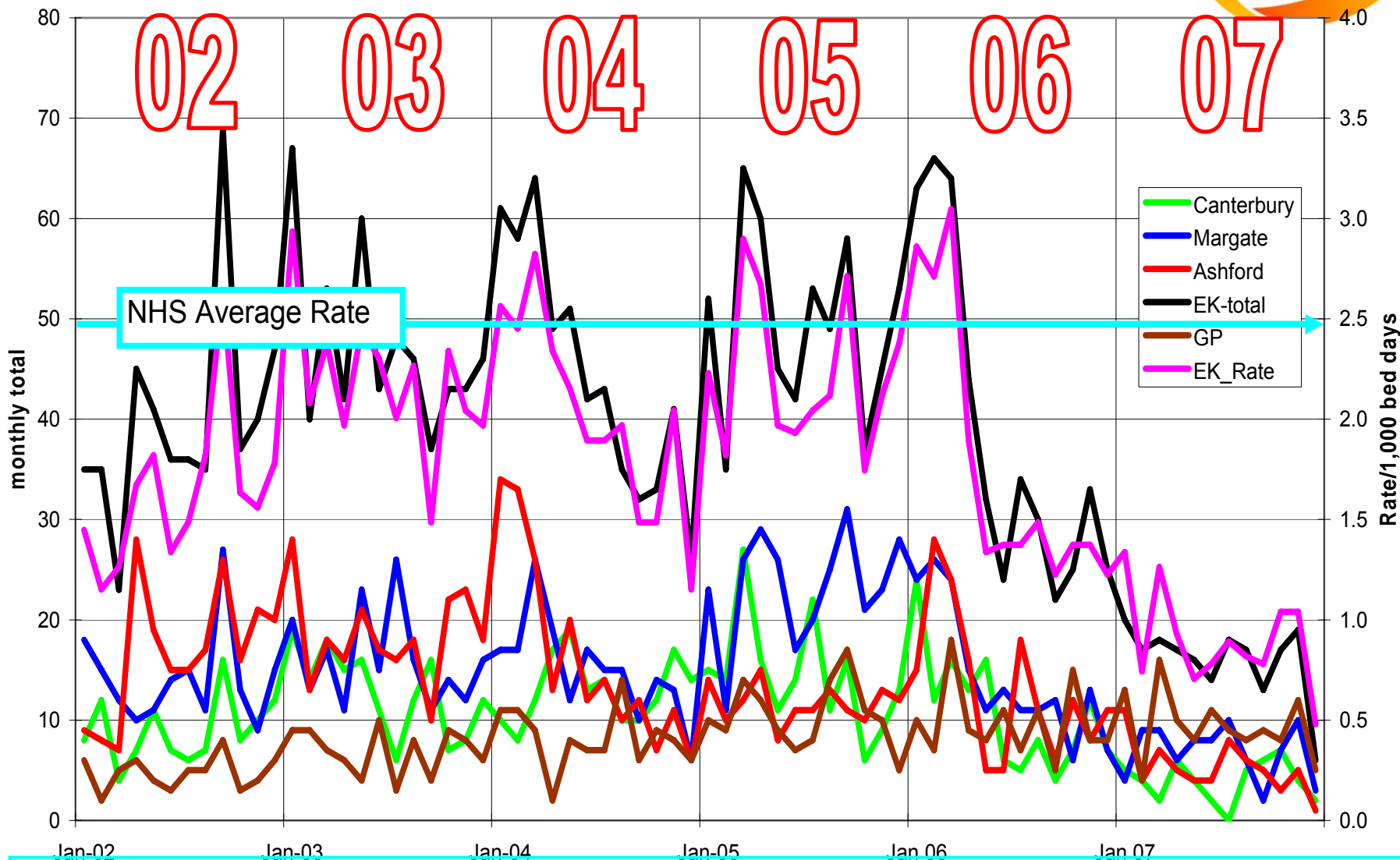
Discussion on trigger points



New PFI hospital

Patient safety – Quality in healthcare delivery – Zero tolerance

C difficile East Kent 2002-2007 [new cases only]
The EK rate is for age ≥ 65 yrs and includes PCT cases

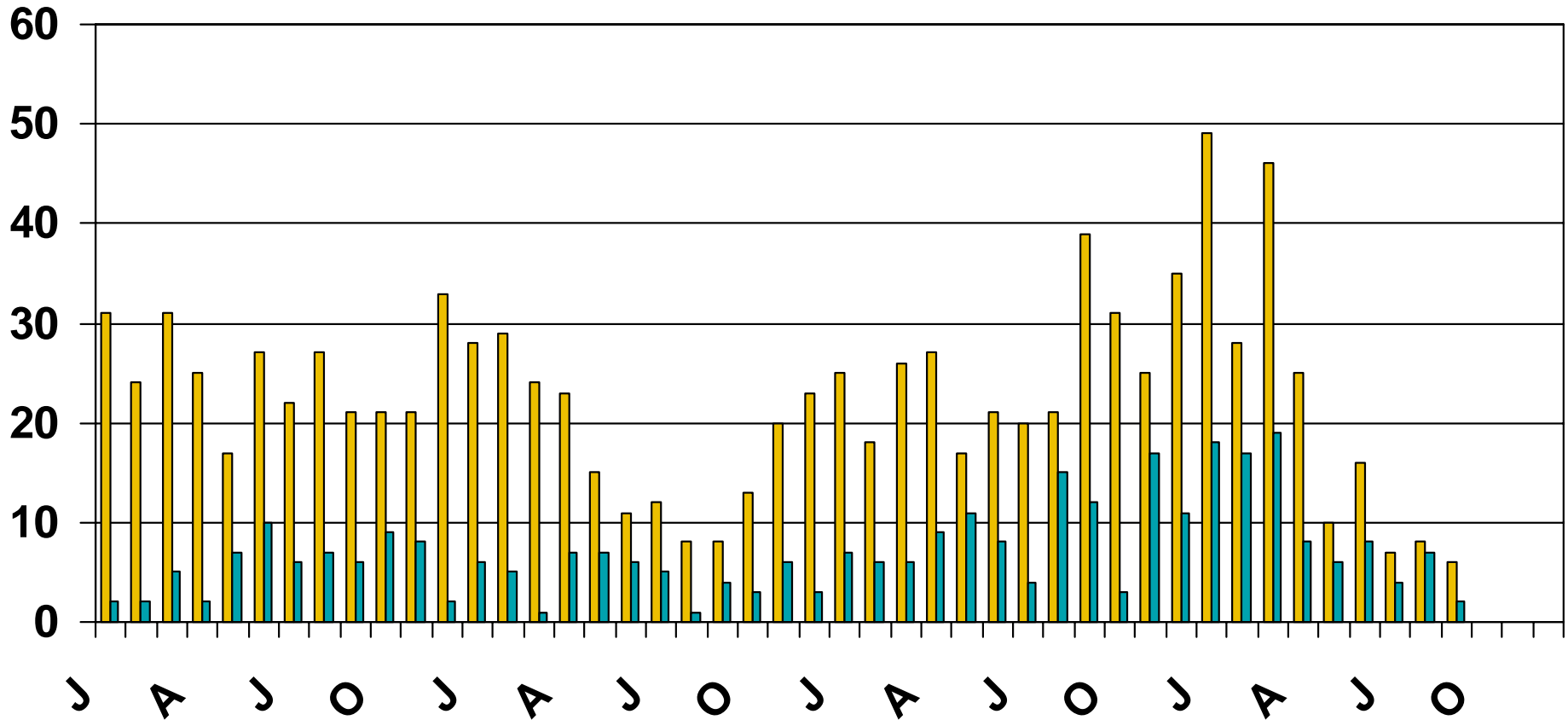


Patient safety – Quality in healthcare delivery – Zero tolerance

Control the hospital – the community problem disappears

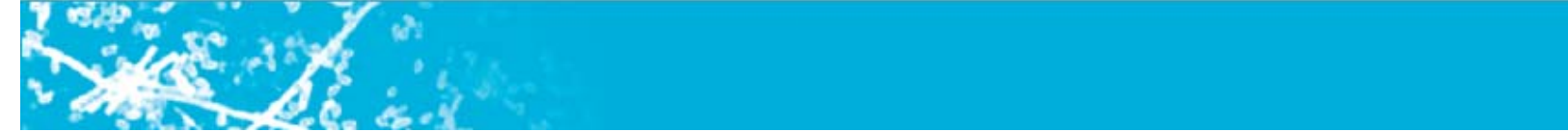


■ Hospital cases ■ Community cases



High Impact Intervention No 7

Care bundle to reduce the risk from *Clostridium difficile*



- Isolation of infected patients
- Enhanced environmental cleaning
- Prudent antibiotic prescribing
- Hand hygiene
- Personal protective equipment

**All five measures
100% of the time**

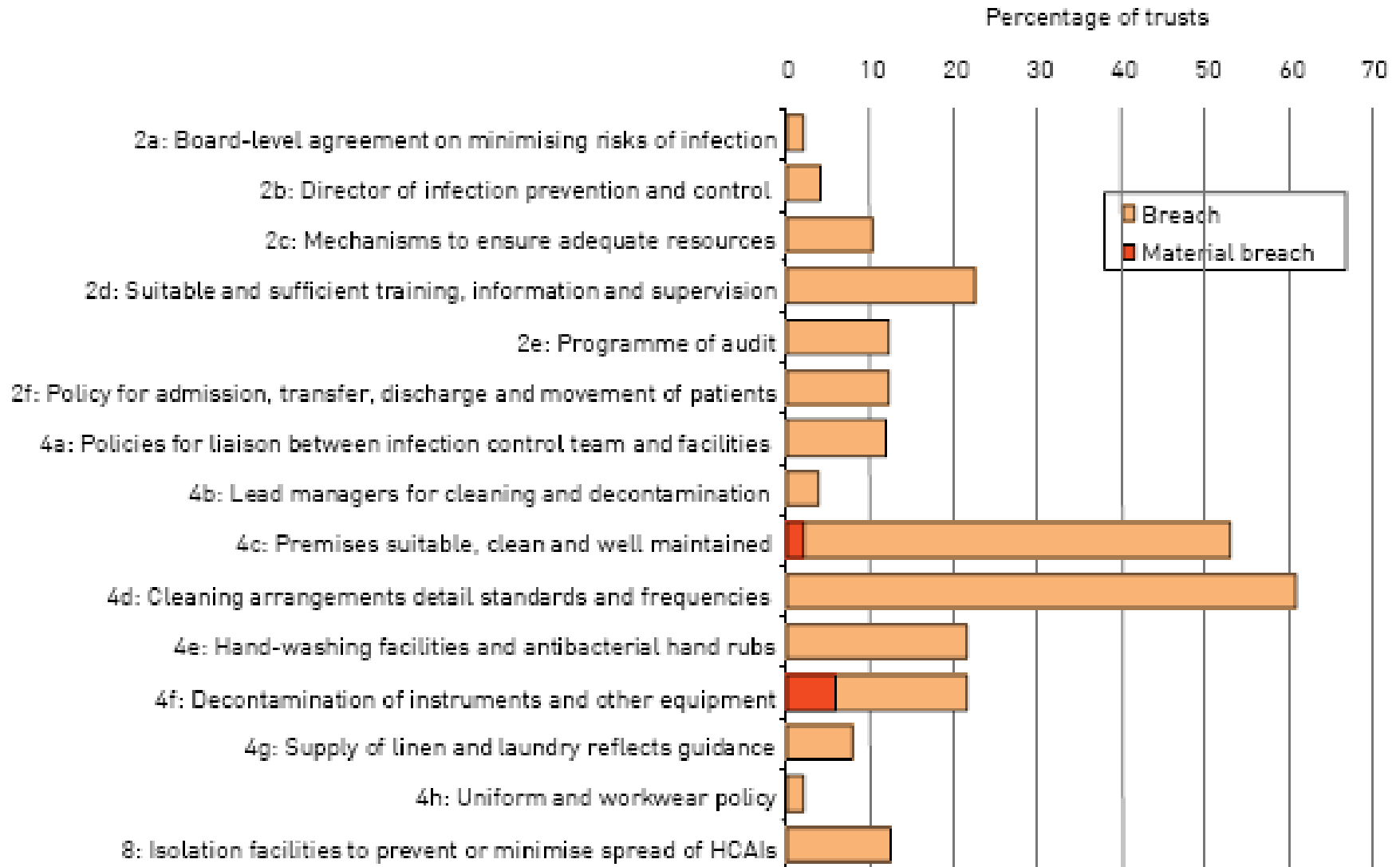
- Surveillance
- Compliance
- Whats happening**
- Root cause analysis**

Those most at risk of CDAD are older patients and those who have had a recent (within the last four weeks) course of antibiotics⁷. Five main factors have been identified as being necessary to reduce the incidence of CDAD^{2, 8} which if rigorously applied using a 'care bundle' approach would contribute to a reduction.

- Prudent antibiotic prescribing⁹
- Hand hygiene^{10, 11, 12, 13, 14, 15, 16, 17}
- Enhanced environmental cleaning^{14, 15, 16, 17, 18, 19}
- Isolation of infected patients^{18, 19, 20}
- Personal protective equipment^{19, 20}

Patient safety – Quality in healthcare delivery – Zero tolerance

Inspections of cleanliness and infection control: how well are acute trusts following the hygiene code?

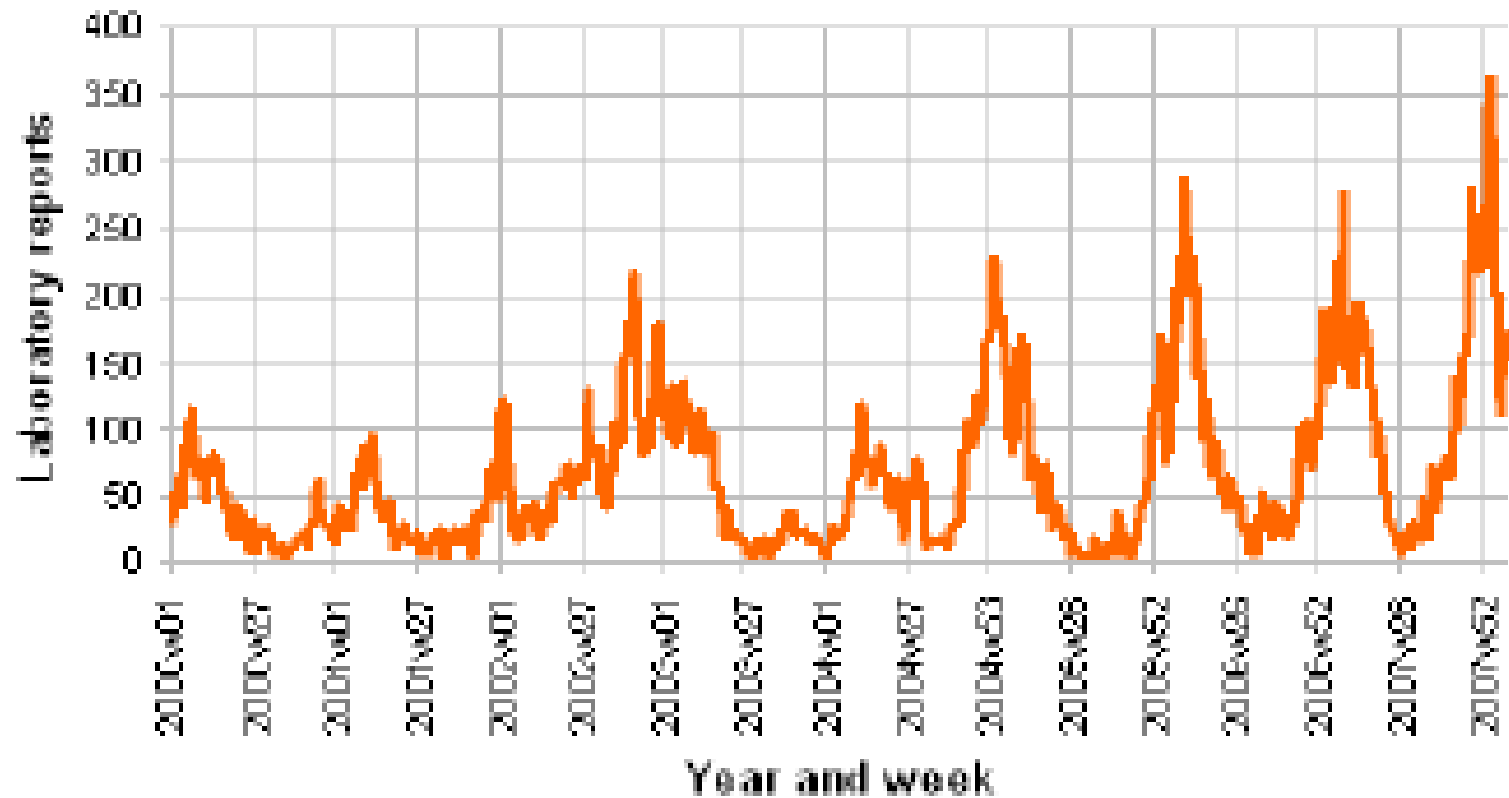


Viral Gastroenteritis

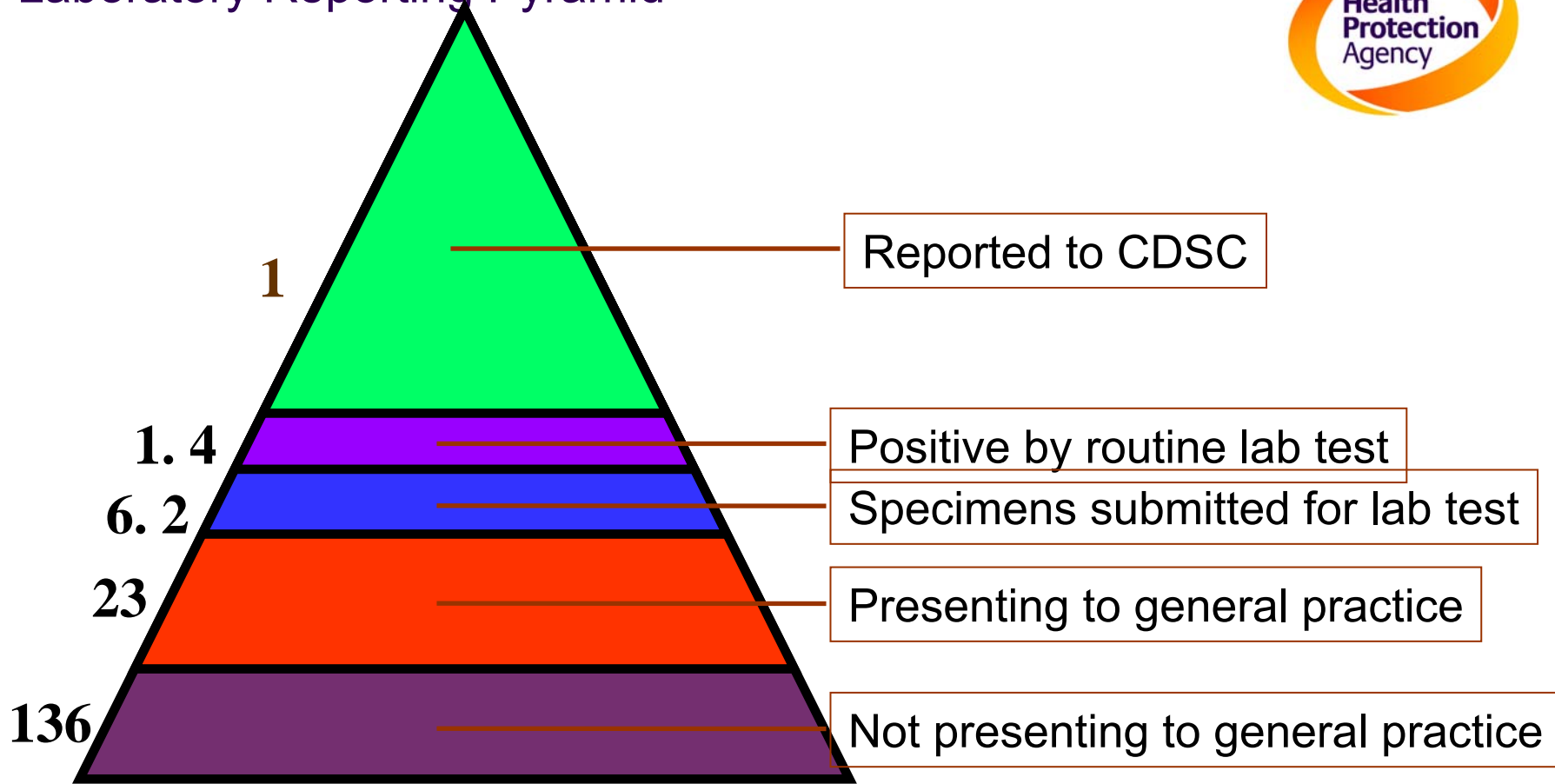


- Rotavirus**
- Enteric adenovirus**
- Calicivirus**
- Astrovirus**
- Norovirus**
 - Small round structured virus
 - Winter vomiting disease
- Small round virus**

Figure 12: Reports of laboratory confirmed norovirus gastroenteritis, 2000 to 2007



Laboratory Reporting Pyramid



1 in 5 people each year IID is common, 9.4 million estimated cases/yr

1 in 6 of these presents to a GP 1.5 million patients present to their GP

greater proportion of cases due to common bacterial pathogens are reported than cases due to common viral pathogens

Study of infectious intestinal disease in England: rates in the community, presenting to general practice, and reported to national surveillance

Jeremy G Wheeler et al

BMJ Vol 318 17th April 1999 1046 - 1050



	Community Cases	National Surveillance
Salmonella	3.2	1
Campylobacter	7.6	1
Rotavirus	35	1
Small round structured virus	1562	1

	Community Cases	National Surveillance
Salmonella	54400	17,000
Campylobacter	361,737	51676
Rotavirus	523,810	14,966
Small round structured virus	3,131,810	2005

Norovirus (Small round structured virus)

person to person

faecal oral route

risk of infection from aerosols of projectile vomiting

environmental contamination of toilets

contaminated food water especially bivalve molluscs

Rotavirus

Rotavirus groups A B C

(mainly group A in UK)

Person to person

Faecal oral

Environmental contamination

Features & Symptoms



High infectivity

High attack rate

Explosive

Point source

10-100 virus particles

airborne route

Main symptoms

Vomiting

- **Occasionally infrequent**

Diarrhoea

- **Short lived**

Other symptoms

Nausea

Abdominal cramps

Headache

Myalgia

Chills

Fever

Outbreaks



Care Homes

Hotels

Cruise Ships

Hospitals

Schools

Restaurants

Weddings

Foodborne

sea food

salads

sandwiches

fresh fruits

Waterborne

Municipal water

drinking water on ship

ice cubes

swimming pools

Small round structured virus

General Outbreaks England & Wales 1992 -1998



Year	92	93	94	95	96	97	98
Hospital	20	48	35	176	140	50	73
Institution	16	42	74	131	121	41	70
School 1	7	9	8	14	2	15	
Hotel 6	15	13	27	21	15	17	

Other areas affected:-

Private House

Restaurant

Pub

Army camp

Hall

University

Criteria for suspecting an outbreak is due to SRSV/Norovirus Kaplan's criteria



Short incubation	15 - 48 hours
Illness duration	12 - 60 hours
Vomiting in >50% symptomatic patients	
Patients and staff both affected	

Specimens

Microbiological Diagnosis



Why you need to take?

Who you take from?

What you take?

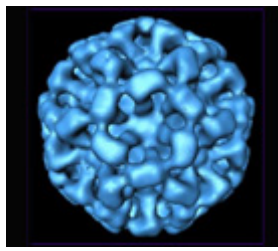
When you take?

How you take?

Give instruction?

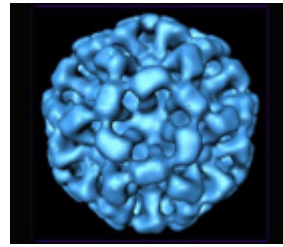
Request form?

Norovirus



- highly infectious
- most common cause of infectious gastroenteritis (diarrhoea and vomiting) in England and Wales
- generally mild and people usually recover fully within 2-3 days
- no long term effects that result from being infected
- Infections can occur at any age because immunity is not long lasting
- historically known as 'winter vomiting disease' due to its seasonality and typical symptoms
- Outbreaks of norovirus gastroenteritis are common in semi-closed environments such as hospitals, nursing homes, schools and cruise ships
- Closure of affected units often necessary to help control the outbreak
- vital that anyone who is feeling unwell with gastrointestinal symptoms, vomiting and or diarrhoea, should not visit Care homes/hospitals as this increases the risk of spreading the infection to patients and staff

Norovirus



- attention to good hygiene measures should be observed during outbreaks
- very important to wash your hands with soap and water after contact with someone who is ill and after using the toilet, especially if you are suffering from symptoms
- Thorough cleaning of hard surfaces with a bleach solution, paying particular attention to the toilet and toilet area and cleaning up vomit and the surrounding area quickly will help to reduce environmental contamination and reduce the risk of infection in others coming into contact with these surfaces later on.

- Numbers of norovirus fluctuate each year with laboratory reported cases representing only a small fraction of the number of cases that actually occur.
- Help prevent yourself or others becoming infected, is by practicing good hygiene. This includes thorough hand washing after using the toilet and before eating or preparing foods.
- All contaminated surfaces should be thoroughly disinfected after any episode of illness.
- Food preparation should also be avoided by those who have been ill until 48 hours after symptoms have disappeared
- no specific treatment for norovirus apart from letting the illness run its course, therefore it is important to drink plenty of fluids to prevent dehydration especially in the very young or elderly
- not unusual to see outbreaks because the virus spreads quickly in confined environments
- A study by the Health Protection Agency has shown that outbreaks of norovirus are shortened when control measures at healthcare settings are implemented quickly, such as closing wards to new admissions within 4 days of the beginning of the outbreak and implementing strict hygiene measures
- Seek help from your local Health Protection Unit .

Cruise Ships



www.pocruises.com

Aurora arrival in Gibraltar –
BBC Website 1-3 Nov 2003



Control Measures



Cohort Nursing

Exclude affected staff until symptom free for 48 hours**

Caution visitors of exposure

Exclude children from affected areas

Advise visitors not to visit if D & V

1,000 ppm hypochlorite to disinfect contaminated surfaces

Thoroughly clean all areas, change curtains before re-opening

72 hours after symptoms have subsided

Handwashing important

Dry hands

Wear gloves and apron

Avoid transfers

Minimise movement of staff



Cleaning up vomit and faeces

Wear disposable gloves and apron

Soak up excess liquid - use paper towels

Transfer these and any solid matter directly to clinical waste bag

Clean soiled area with detergent and hot water

Use disposable cloth

Disinfect contaminated area with freshly made 1,000 ppm (0.1%) hypochlorite solution ** corrosive & bleaching

Dispose of gloves, apron and cloths - clinical waste bag

Wash hands thoroughly - soap & water and dry them

Specific Materials



Contaminated linen & bed curtains

soluble alginate bags, avoid aerosols

Pillows should be laundered if possible, or disinfected with 0.1% hypochlorite

Contaminated carpets cleaned with hot water & detergent

Disinfect with hypochlorite if bleach resistant or steam cleaned

Contaminated surfaces cleaned with detergent and hot water then disinfected with 0.1% hypochlorite

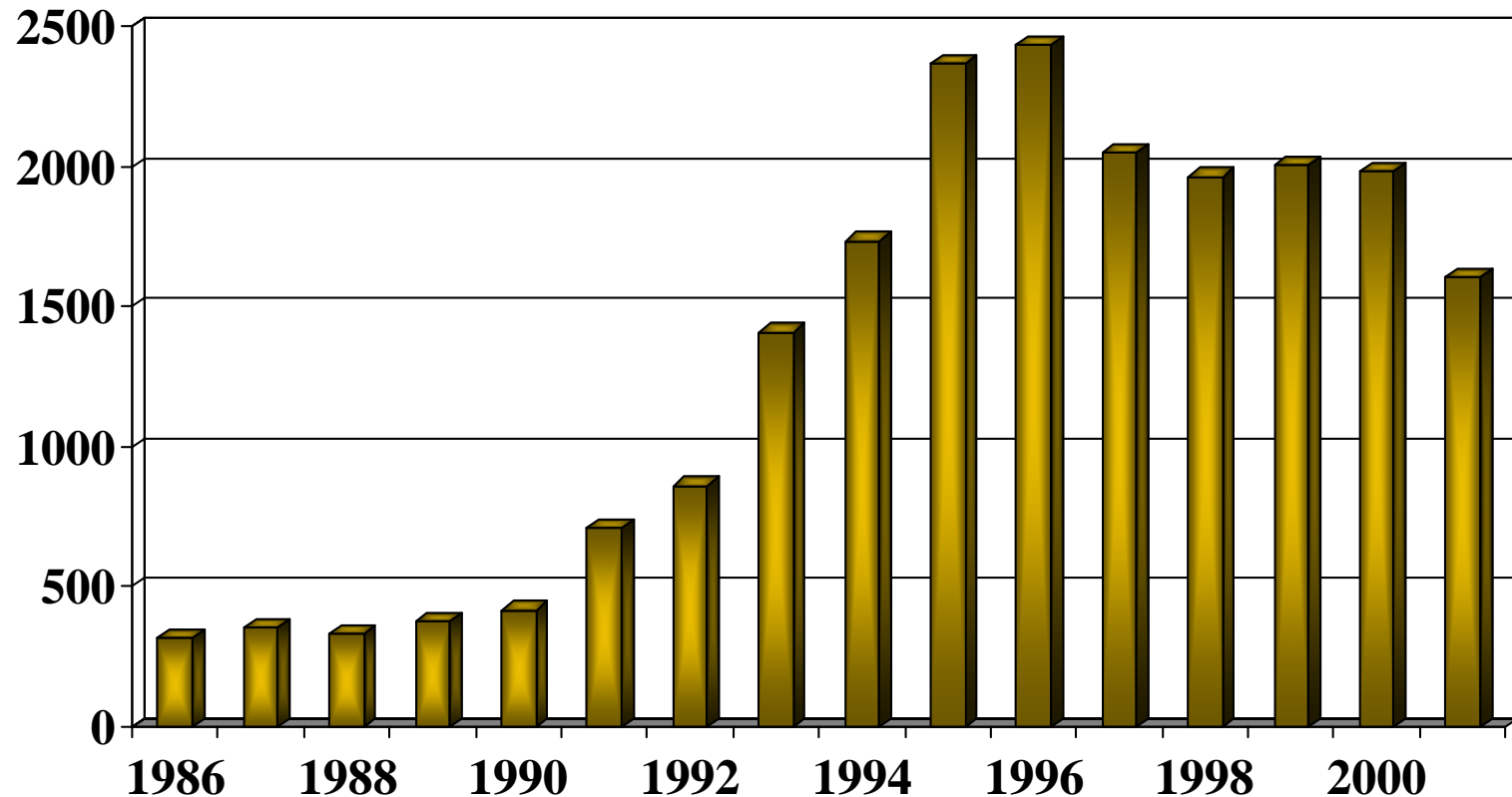
Horizontal surface, furniture, fixture & fittings, toilets

Cloths disposed off as clinical waste

Non-disposable mop heads - laundered in hot water

Norovirus (Small Round Structured Virus or Norwalk-like virus)

Laboratory reports to
PHLS Communicable Disease Surveillance Centre
1986 - 2001





Journal of Hospital Infection (2000) **45**: 1–10

Article no. jhin.2000.0662, available online at <http://www.idealibrary.com> IDEAL[®]



**REPORT OF THE PUBLIC HEALTH LABORATORY SERVICE
VIRAL GASTRO ENTERITIS WORKING GROUP**

Management of hospital outbreaks of gastro-enteritis due to small round structured viruses

P. R. Chadwick¹, G. Beards², D. Brown³, E. O. Caul⁴, J. Cheesbrough⁵, I. Clarke⁶,
A. Curry⁷, S. O'Brien⁸, K. Quigley⁹, J. Sellwood¹⁰ and D. Westmoreland¹¹

Staphylococcal infections



Potent toxins



Source CDC

Staphylococcal infections



□ Skin and soft tissue infections

- Boils (furunculosis), carbuncles, folliculitis, cellulitis, purulent eyelid

Infection

Cutaneous lesions $\geq 5\text{cm}$ in diameter, which need different treatment from smaller lesions

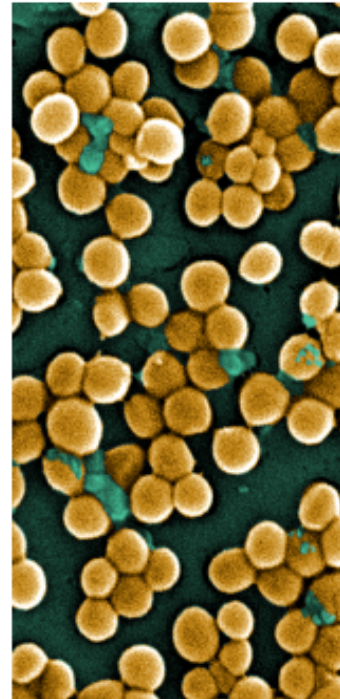
Pain and erythema out of proportion to severity of cutaneous findings

Necrosis



Guidance on the diagnosis and management of PVL-associated *Staphylococcus aureus* infections (PVL-SA) in England

Report prepared by the PVL sub-group of the Steering Group on Healthcare Associated Infection



Staphylococcal infections



❑ Invasive infections

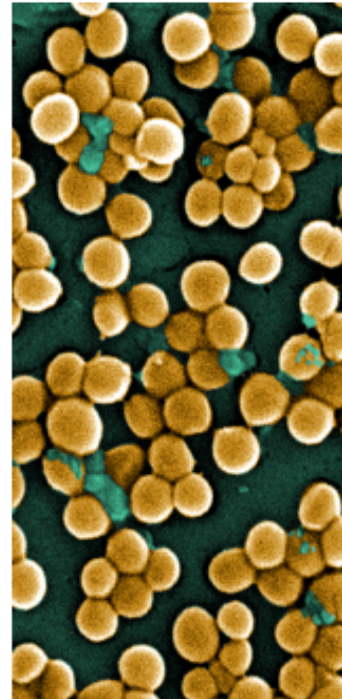
Necrotising pneumonia

- Necrotising fasciitis
- Osteomyelitis, septic arthritis, and pyomyositis
- Purpura fulminans



Guidance on the diagnosis and management of PVL-associated *Staphylococcus aureus* infections (PVL-SA) in England

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Staphylococcal infections



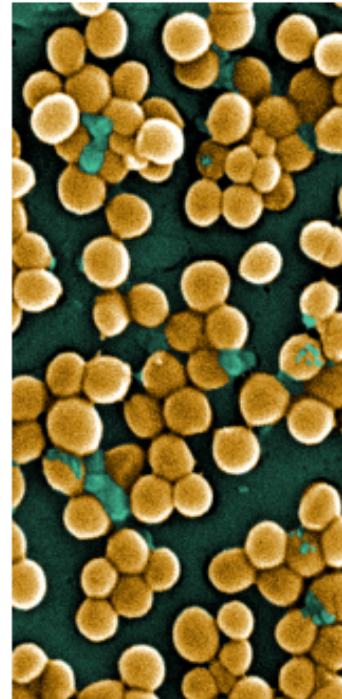
❑ The Five “C”s

- ❑ Contaminated items
- ❑ Close contact
- ❑ Crowding
- ❑ Cleanliness
- ❑ Cuts and other compromised skin integrity.



Guidance on the diagnosis and management of PVL-associated *Staphylococcus aureus* infections (PVL-SA) in England

Report prepared by the PVL sub-group of the Steering Group on Healthcare Associated Infection



ESBL

Extended spectrum beta lactamases



- ❑ **Common organisms that cause urinary tract infections**
 - ❑ *E. coli*
 - ❑ *Klebsiella pneumoniae*
- ❑ **Enzymes produced by organisms that attack penicillins and cephalosporins**
 - ❑ TEM, SHV, CTXM and many more
- ❑ **Such organisms are then resistant and not clinically effective**
- ❑ **Difficult to treat, few oral agents**
- ❑ **Spread**

Interaction between community & hospital



Hospital

Patients

Community

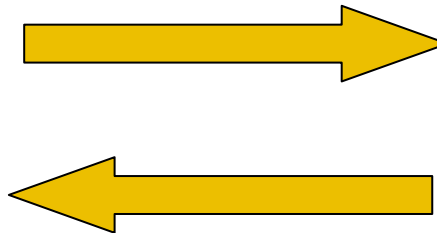
Relatives

Staff

Vehicles of transmission



Hospital and nursing home interaction



- Clostridium difficile***
- Norovirus**
- (MRSA)**
- Other alert organisms**



Introduction to infection control in care homes

This is a series of seven short films. These are designed to provide staff with an introduction to infection control.

These seven short films include:

- ▶ [Preventing Infection](#)
- ▶ [Hand Hygiene](#)
- ▶ [Person Protective Equipment](#)
- ▶ [Prevention of exposure to Blood and Body fluids](#)
- ▶ [Clinical Equipment](#)
- ▶ [General Equipment](#)
- ▶ [Management of Laundry](#)

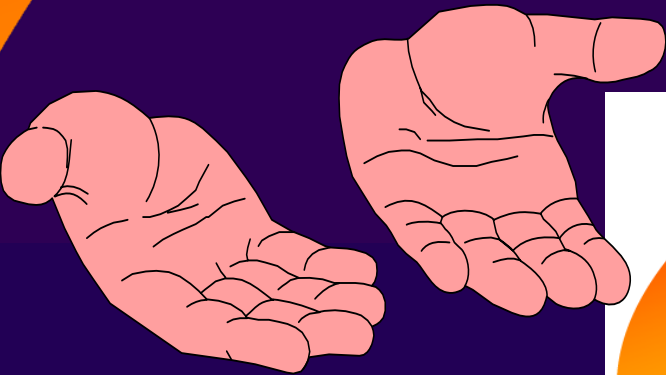
Infection control nurses have provided expert advice throughout filming and production of the training resource. Every effort has been made to ensure that the advice provided is based on the best available evidence while providing advice that can be easily adopted and put into practice. The DVD can be used to supplement existing infection control training programs for care homes. It will also provide practical assistance to help comply with the Department of Health Code of Practice as and when it is issued.

<http://www.hpa.org.uk/webw/HPAweb&Page&HPAwebAutoListName/Page/1229594195568?p=1229594195568>

Thank you for listening

Patient Safety

Community Safety



**PLEASE WASH
YOUR HANDS**

Acknowledgements:

To my colleagues in various NHS hospitals
BMJ Learning
Health Protection Agency website
Department of Health colleagues
DH Website

Bharat Patel
HPA
Consultant
Medical
Microbiologist

**28th
January
2009**