



# Matching Michigan -the Manchester Experience

J Moore

J Logan

ICM

CMFT



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Central Manchester University Hospitals



NHS Foundation Trust

# Healthcare associated infections



infections acquired as a consequence of a person's treatment by a healthcare provider, or by a healthcare worker in the course of their duties.

They are often identified in a hospital setting, but can also be associated with medical care delivered in the community.

# Reducing HCAIs



Coalition Government has reaffirmed the commitment to improve outcomes for patients

devolution of responsibility to clinicians and the public, with an improved focus on quality

Patient safety and ensuring quality care remain at the heart of the approach to Reducing HCAIs, with the Care Quality Commission strengthened in its role as an effective quality inspectorate

*Health Secretary Andrew Lansley, 2010*

Gastrointestinal 22%



Urinary Tract Infections 20%



Lower Respiratory Tract Infections 20%



# HCAIs 2004-06

Prevalence data (2004)  
300,000 patients in  
England acquired a  
HCAI whilst in hospital  
  
= 8% of patients  
being admitted to  
hospital develop HCAI



Surgical Site Infections 14%



Bloodstream Infections  
(bacteraemia) 7%



Skin & Soft Tissue Infections 10%



Country	Date of Collection	Prevalence
Scotland	2005-06	9.5
England	2006	8.2
Wales	2006	6.4
Northern Ireland	2006	5.4
Republic of Ireland	2006	4.9

Source: Four Country Healthcare Associated Infections Prevalence Study 2006: Hospital Infection Society Journal of Hospital Infection 1-19 and Results from the Scottish National HAI Prevalence Study 2006: Journal of Hospital Infection (2008): 69, 62-68

8% HCAI rate

Cost NHS more than £1 billion a year

EU	2007	7.6
UK	2006	7.6
Denmark	2003	8.7
France	2006	5.4
Greece	2000	9.3
Italy	2002	7.5
Netherlands	2007	6.9
Portugal	2003	8.7
Sweden	2004-6	9.5
USA	2006	5.0-10.0
Canada	2002	10.5

Source: National Audit Office Commissioned Research: J A Roberts and BD Cookson (January 2009): The management prevention and

## USA (2010)

800,000 preventable infections

60,000 preventable deaths

\$27 billion excess cost

# HCAI

## NHS Focus on MRSA and C difficile



Mandatory national reporting MRSA - 2001 and C diff - 2004

In 2004 this appeared to be an intractable problem

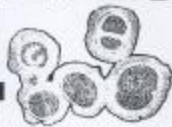
Where we were



**MRSA..THE  
FORGOTTEN  
MASSACRE**

**OUR SQUALID  
HOSPITALS**

**THE PLAGUE  
2004**



**Filthy NHS wards kill 5,000 a year**

**The deadly  
superbug  
that puts  
Britain's  
hospitals  
to shame**

# Interventions to reduce HCAIs



**NHS**

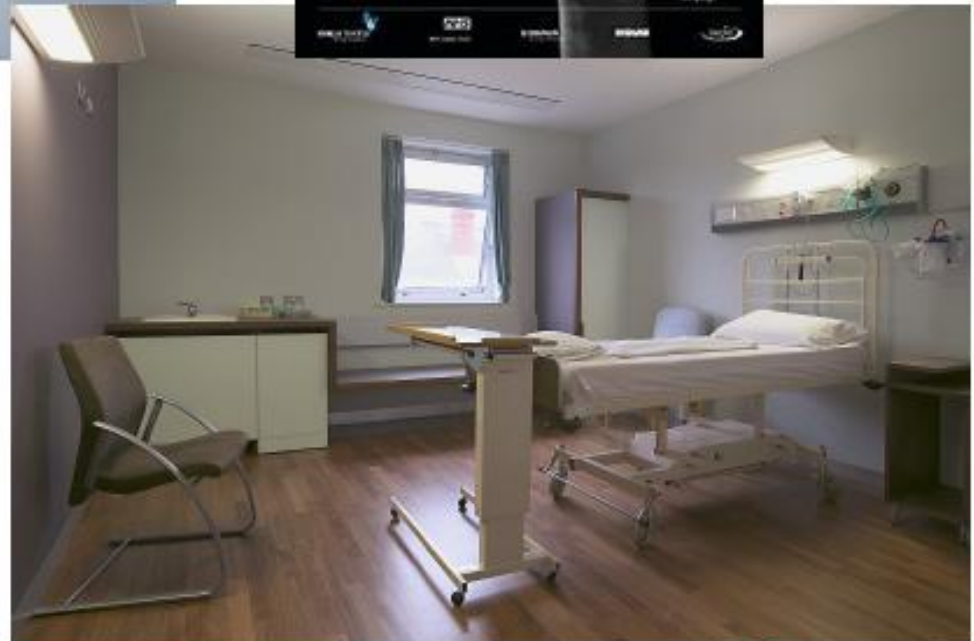


**Saving Lives:**  
reducing infection, delivering clean and safe care

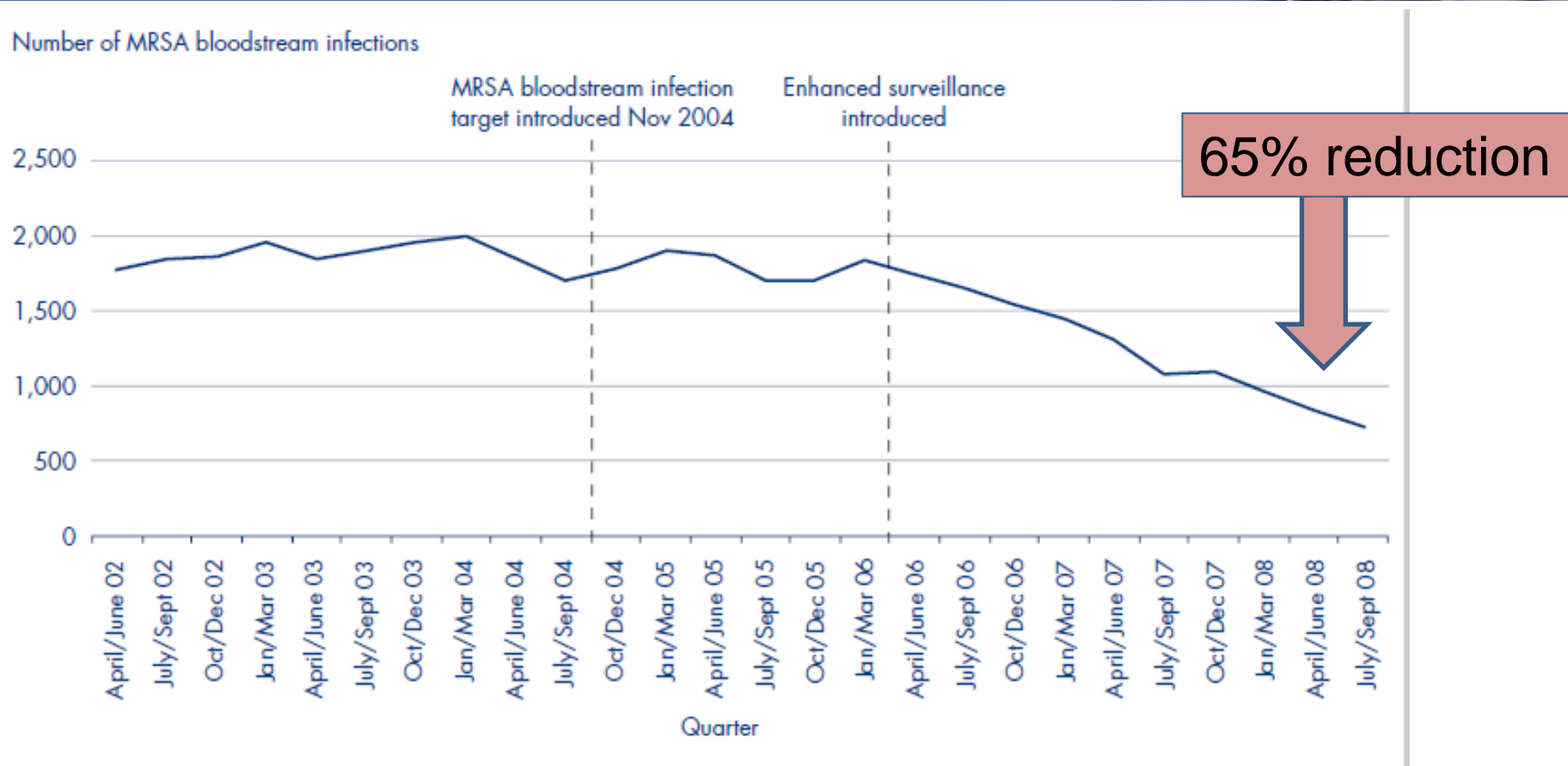
A rectangular graphic with a white top section containing the NHS logo, a blue middle section with a microscopic image of white blood cells, and a dark blue bottom section with white text.

**Bundles**  
**Central lines**  
**Pneumonia**  
**Urinary Tract**

<b>National targets</b>	<b>MRSA</b>	<b>50%</b>
	<b>C Diff</b>	<b>30%</b>
<b>Mandatory surveillance</b>		
<b>Additional resources</b>		
<b>Guidance</b>		

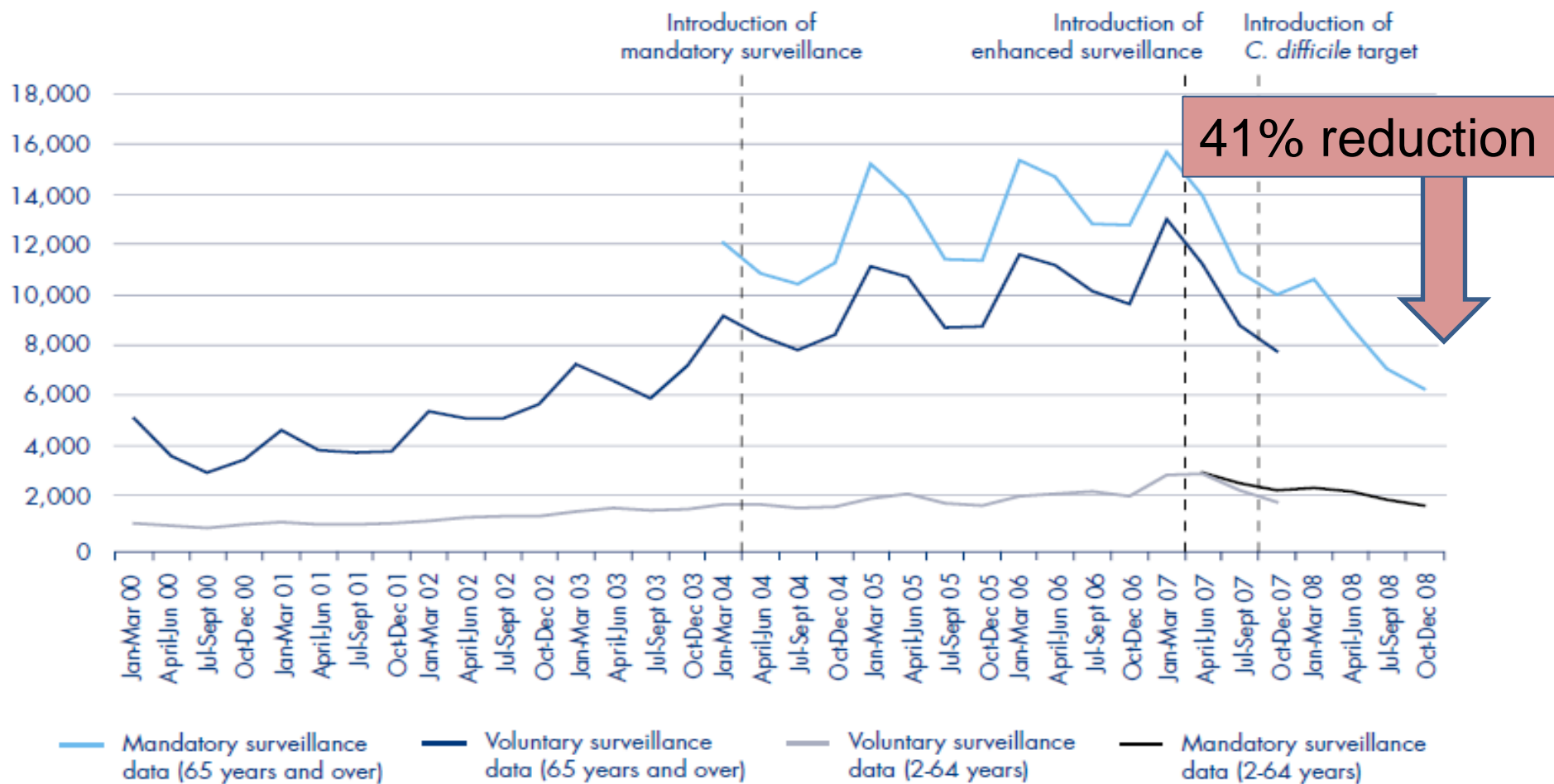


# Reducing HCAs MRSA bloodstream infections



# Reducing HCAs

## C diff



## What we have learned.....



1. The importance of leadership
2. The context in which this is placed in the organisation
3. Transformational vs transactional
4. Plans, process, pace

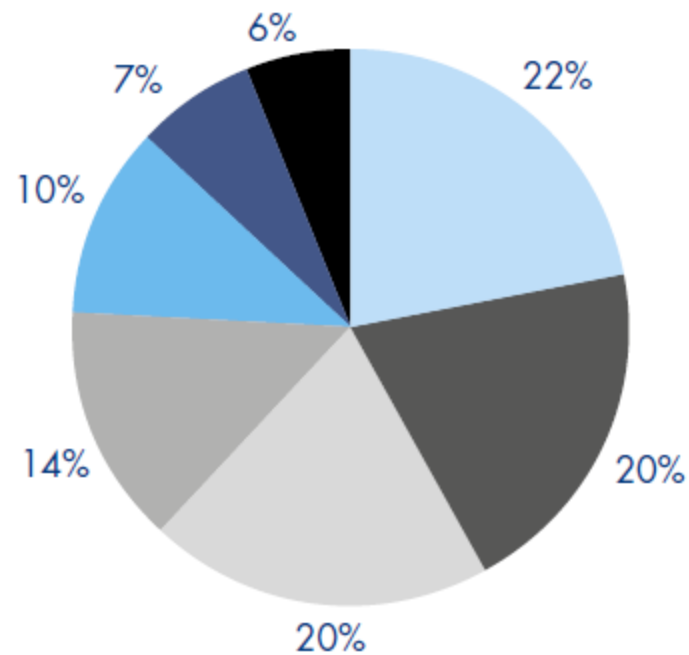


Guidance, evidence distilled into practical tools that organisations, departments, teams can use to baseline, prioritise, plan measure compliance and monitor progress



# 2010

## The forgotten HCAs



- Bloodstream
- Gastrointestinal
- Lower Respiratory Tract
- Surgical Site
- Skin and Soft Tissue
- Urinary Tract
- Other

**More than 80% of HCAI we don't actually know about**

**There doesn't appear to have been an automatic improvement in other HCAs with treatment of MRSA and C diff**

# Reducing other HCAIs 2010



**Focus now on other  
Healthcare Associated  
Infections**

**National targets  
Mandatory surveillance  
Additional resources  
Care bundles  
Leadership**

**HCAIs 2010 -  
Embedding a Culture of  
Patient Safety**

# Making the **safety of patients** everyone's **highest priority**

▶ Our vision is of an NHS with no avoidable death and no avoidable harm

Matching Michigan

Medication safety

Falls

Pressure areas

Making childbirth  
safer



# Catheter related blood

stream USA data

80,000 catheter-related BSI

1.8 to 5.2 per 1000 catheter-days for ICU patients

No UK C 28,000 deaths

\$2.3 billion cost

estimate 300,000 HCAI/yr

7% BSI

9000 CVC Catheter related BSI/yr

National Audit Office (NAO) estimates cost £6,209 per patient

# Reducing CVC-BSI 2006

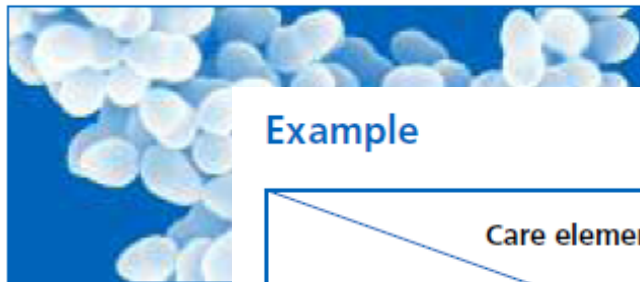


## Thames Valley Way - EPIC

Saving Lives: reducing infection, delivering clean and safe care

### High Impact Intervention No 1

#### Central venous catheter care bundle



#### Example

	Care elements	Care element 1	Care element	Care element	Care element	All elements
Observation						
1						
2						
3						
4						
5						
Total number of times an individual element was performed						
% when element of care was given						



#### Aim

To reduce the inc

**Hand washing**  
**Aseptic technique as indicated**  
**Cleaning of the skin with chlorhexidine**  
**Avoiding femoral site where possible**  
**Date of insertion**

# Reducing CVC-BSI 2006

## Michigan Way - Keystone Project



### *The* NEW ENGLAND JOURNAL *of* MEDICINE

ESTABLISHED IN 1812

DECEMBER 28, 2006

VOL. 355 NO. 26

## An Intervention to Decrease Catheter-Related Bloodstream Infections in the ICU

Peter Pronovost, M.D., Ph.D., Dale Needham, M.D., Ph.D., Sean Berenholtz, M.D., David Sinopoli, M.P.H., M.B.A., Haitao Chu, M.D., Ph.D., Sara Cosgrove, M.D., Bryan Sexton, Ph.D., Robert Hyzy, M.D., Robert Welsh, M.D.

An Intervention to Decrease Catheter-Related Bloodstream  
Infections in the ICU



- Statewide safety initiative 2003-05
- 108 ICU in Michigan
- 375,757 catheter-days
- Surveillance period followed by intervention
  
- Over 18 months
- Reduced CVC-BSI from 7.7 at baseline to 1.4 at 18 months ( $P < 0.002$ )

*The* **NEW ENGLAND**  
**JOURNAL of MEDICINE**

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An Intervention to Decrease Catheter-Related Bloodstream  
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## Team leaders

- patient safety instru
- asked to disseminate
- knowledge
- supported though st
- meeting and conferen
- calls

## Hand washing

Full barrier precautions

Cleaning of the skin with chlorhexidine

Avoiding femoral site where possible

Removing unnecessary lines

## Central line cart

CVC checklist

Providers stopped if practices not  
standard

Feedback of results



# BMJ

## RESEARCH

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### Sustaining reductions in catheter related bloodstream infections in Michigan intensive care units: observational study

Peter J Pronovost, professor,<sup>1</sup> Christine A Goeschel, director, patient safety and quality initiatives,<sup>1</sup>

**2010**



Sustaining reductions in catheter related bloodstream infections in Michigan intensive care units: observational study

Peter J Pronovost, professor,<sup>1</sup> Christine A Goeschel, director, patient safety and quality initiatives,<sup>1</sup>

Follow-up further 18 months of the  
Keystone Michigan group  
87% of original units involved  
300, 310 catheter days

	Mean	Median (/1,000)
Baseline	7.7	2.7 (0.6-4.8)
Intervention period	1.3	0 (0.0-2.4)
Sustainability period	1.1	0 (0.0-1.2)

# Making the **safety of patients** everyone's **highest priority**

▶ Our vision is of an NHS with no avoidable death and no avoidable harm

Matching Michigan

97% of NHS trusts in England

Aimed at reducing CVC-BSI rates

Electronic Surveillance tool (RICC)

CVC-BSI associated, related or suspected

Interventions

# Implementing Matching Michigan at CMFT



- Audit
- Enabling change
- Changing practice beyond critical care
- Other opportunities

# Implementing Matching Michigan at CMFT



- Unique trust with paediatric, neonatal and adult services – including cardiac
- Tertiary and super-tertiary referral centre

# Implementing Matching Michigan at CMFT



**Attendance at Matching Michigan Nov 2009**

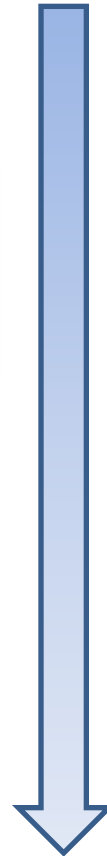
**Matching Michigan Steering Group Nov 2009  
Microbiology  
Paeds, Cardiac and Adults**

**Data collection RICC  
Dec – March 2010**

**Monthly microbiology led meeting**



AUDIT



# Current CVC practice 2010



## CVC Audit in Jan 2010 (re-audit cf 2007)

- Insertion
- Maintenance
- Removal

Consistent improvement across all areas  
of central line practice from 2007 to 2010  
2000 lines/ yr inserted

## Particular areas of improvement

- General cleanliness

## Central Venous Catheters – Insertion, Maintenance and Removal

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Clinical Audit Report

August 2010

Clinical Audit Lead(s): John Logan – Lead Nurse, Critical Care  
John Moore – Consultant, Anaesthetics

Person(s) responsible for action plan: John Logan

Person(s) responsible for dissemination: John Logan

Clinical Audit Facilitator: Chris Gamble

# Implementing Matching Michigan at CMFT



**Attendance at Matching Michigan Nov 2009**

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Microbiology  
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**Data collection RICC  
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AUDIT

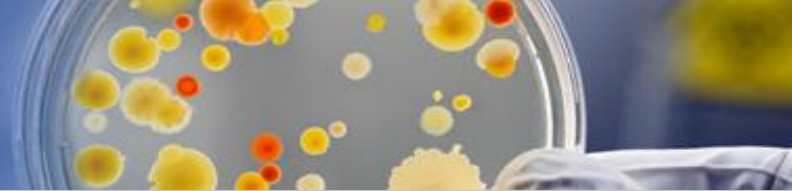
**Monthly microbiology led meeting**

**Interventions – March 2010**

**Local ICU safety group**



# Interventions



## REDUCING CVC BLOODSTREAM INFECTIONS

Collect and  
submit data

Reporting infections in critical  
care (RICC)

Technical  
interventions

CVC insertion checklist

CVC trolley inventory

CVC-BSI fact sheet

DH high impact interventions

Non-technical  
interventions

Science of safety

Learning from incidents

Communications and  
teamwork

Executive and clinical  
partnerships

# Technical interventions



Central Manchester University Hospitals NHS Foundation Trust

Place patient sticker here

## CVC Insertion Checklist

This checklist should be completed by an observer, who will tend to be the assistant. If a significant breach of aseptic technique is observed the observer must highlight this to the operator and if necessary consider stopping the procedure.

Procedure Date:	Time:	Assistant:
Operator:		Observer:

Procedure	Catheter type	Insertion site	
Elective	Multi-lumen	Subclavian	
Emergency	Dialysis	Jugular	
Re-wire	Introducer/Sheath	Femoral	
Ultrasound used?	PICC	Right	Left
Yes <input type="checkbox"/>	No <input type="checkbox"/>		

There are the essential steps to take before, during and after the procedure.

### Before the procedure

1	Hands washed by operator and assistant	Yes	<input type="checkbox"/>
2	2% Chlorhexidine Gluconate / 70% isopropyl alcohol formulation (chloraprep 2% with tint) applied procedure site and allowed to dry	Yes	<input type="checkbox"/>
3	Use a large drape to cover the patient in a sterile manner	Yes	<input type="checkbox"/>

### During the procedure

4	Sterile gloves and sterile gown worn by operator	Yes	<input type="checkbox"/>
5	Apron and gloves (non-sterile) worn by assistant		<input type="checkbox"/>
6	Sterile field maintained	Yes	<input type="checkbox"/>
7	Sterile sheath and sterile gel used with ultrasound probe (if applicable)	Yes	<input type="checkbox"/>

### After the procedure

8	Injection site caps placed using sterile technique	Yes	<input type="checkbox"/>
9	Sterile dressing (Tegaderm / Opsite 3000) applied using sterile technique and dated	Yes	<input type="checkbox"/>

### Complications

Pneumothorax	<input type="checkbox"/>	Arterial puncture	<input type="checkbox"/>	Malposition	<input type="checkbox"/>	Haemorrhage	<input type="checkbox"/>
2 <sup>nd</sup> person required	<input type="checkbox"/>	Unable to cannulate	<input type="checkbox"/>	Other	<input type="checkbox"/>	None	<input type="checkbox"/>

Date of catheter removal		Infection detected	Yes <input type="checkbox"/>	No <input type="checkbox"/>	If yes, date of positive culture	
Reason for					Culture result	



Place patient  
sticker here

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### During the procedure

# Non-technical interventions CMFT

## Hospital/Unit targets

Communication

Matching  
Michigan  
CMFT group



ICU

Patient  
Safety Group

ICU Team

Local ownership

Culture of  
safety

Advertisement of  
results

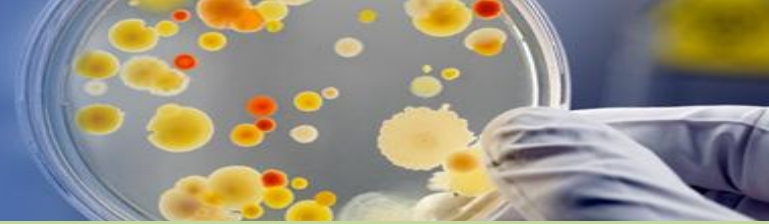
Trust

CMFT Safety  
Group

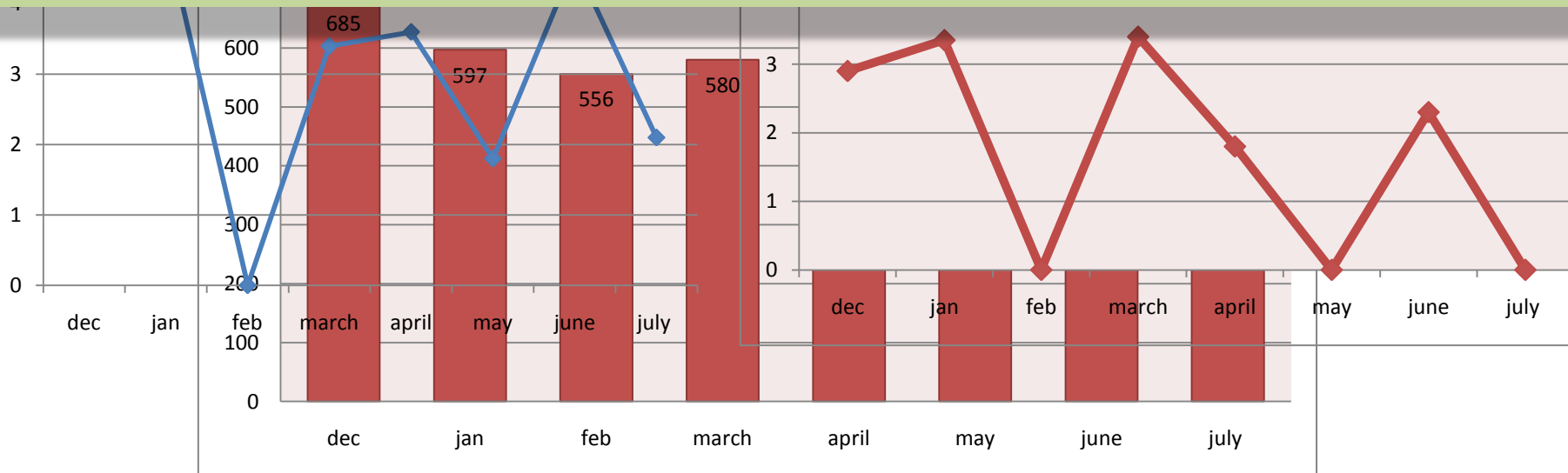
Other  
Quality Safety  
Initiatives

Ward Areas

# Our results for Adult ICU (CMFT)



Michigan data	Mean	Median (/1,000)
Baseline	7.7	2.7 (0.6-4.8)
Intervention period	1.3	0 (0.0-2.4)
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## Suspected and associated

**Mean rate 3.1**  
**Median rate 3.5**

## Associated, so positive culture

**Mean rate 1.7**  
**Median rate 2.0**

# Potential Problems with Matching Michigan



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An Intervention to Decrease Catheter-Related Bloodstream Infections in the ICU

suspected as well as related/associated

Which bits of the message

Should we all wear a mask?

CVC interventions was only one part of a systematic approach

- Daily goals chart
- VAP bundle
- comprehensive safety programme

**What about antibiotic coated lines?**

What about antibiotic coated lines?

**Spectrum**  
ANTIBIOTIC-IMPREGNATED CATHETERS



**Red flag patients:**  
**Long-term**  
**Difficult access**  
**Open abdomen**  
**Immunosuppressed**

Cost-benefit studies have suggested that if the baseline incidence of CVC BSI is  $>0.4$  BSI per 1000 catheter days **7 cases of BSI will be avoided**, and 1 death prevented for every 300 impregnated CVCs used.



*Other benefits of  
Matching Michigan process*

# How MM has helped within ICU practice



Empowering of doctor-nurse interaction

“Shall we take the line out today”

“He doesn’t really need the line,  
what about his catheter?”

- Implications for future work patterns
- Encourages introduction of other low cost quality initiatives

# Outside ICU CMFT Central line project



Theatres

Ward areas

Training those putting the lines in

Ultrasound hub



Central Manchester University Hospital  
NHS  
HSC

Place patient  
sticker here

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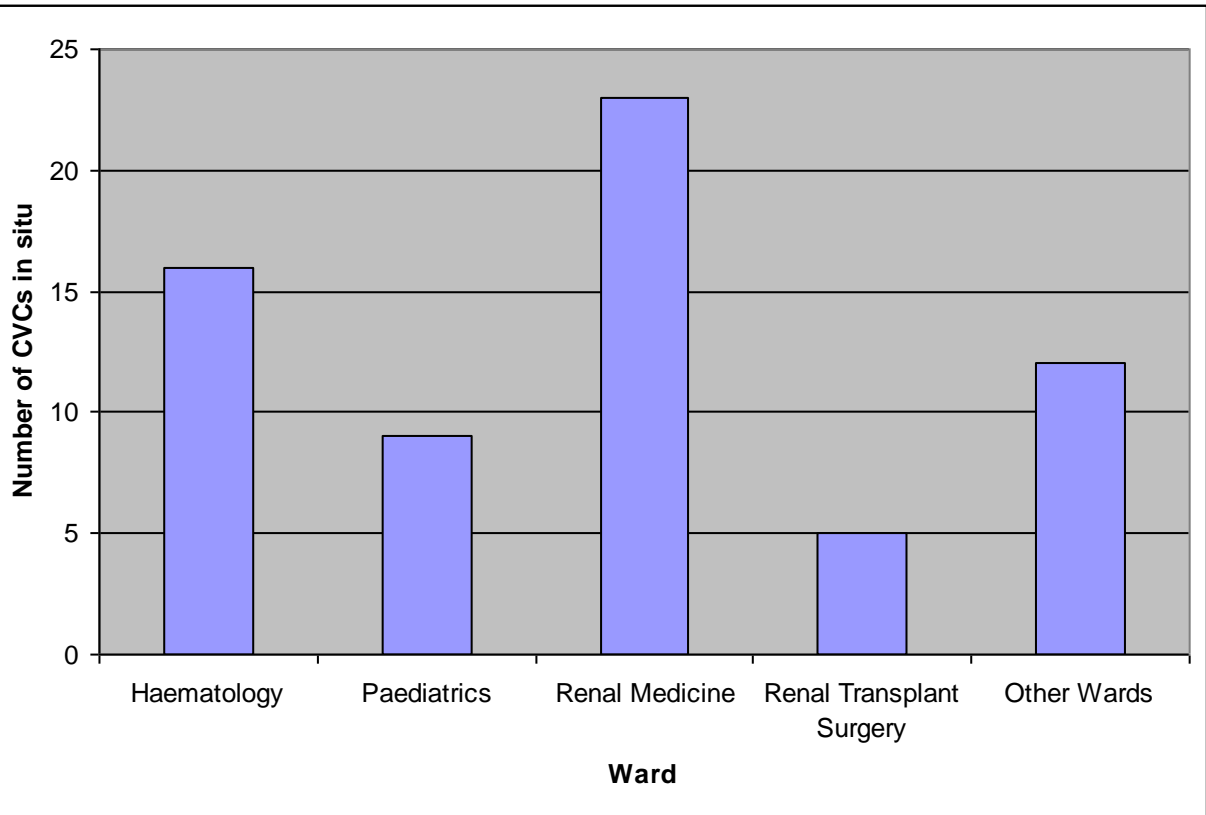
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# CVC use outside the ICU, CMFT Audit Aug 2010



Paul Loughnan  
John Moore  
CMFT 2010

VICTOR scoring seemed to be established on established CVCs were in situ. Although some areas still covering CVC with opaque dressings instead of taping lines.

15% of lines femoral  
**Action plan**  
Standardise CVC completion forms  
Quite varied levels of documentation  
Improve CVC awareness  
On some wards nurses not VICTOR scoring every line where on others, included in nurse handover  
**30,000+ CVC days exposure/yr!**

# Future of Matching Michigan



CVC infection rate for ICUs will become ultimately a national standard alongside MRSA and C Diff

**1<1000 CVC-BSI**

Need adoption full safety programme

Trial of AB coated lines particularly in red flag patients

Now attention towards other major HCAI

Urinary tract, pulmonary and surgical site infections

Questions?

