Prevention of MRSA Bacteraemia in European Hospitals: Secrets of Success?

Dr. Michael A. Borg
Head: Dept of Infection Control
Mater Dei Hospital - Malta
Email: michael.a.borg@gov.mt

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jane@webbertraining.com

Objectives
- Provide an epidemiological overview of MRSA in Europe
- Current state of play related to MRSA bloodstream infection prevention
- Identify success stories
- Assess characteristics of successful campaigns
- Present new research identifying IPC practices in low prevalence European hospitals.
- Propose a behavioural hypothesis on MRSA prevalence in Europe

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The focus of this presentation

European Economic Area
EEC countries (30)

GDP per capita ($) - Days From Onset of the Bacteraemia

Why Staphylococcus aureus bacteraemia?

<table>
<thead>
<tr>
<th></th>
<th>Alive</th>
<th>Deceased</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSI - SAU</td>
<td>57</td>
<td>19</td>
<td>76</td>
</tr>
<tr>
<td>No BSI</td>
<td>287</td>
<td>30</td>
<td>317</td>
</tr>
<tr>
<td>Total</td>
<td>344</td>
<td>49</td>
<td>393</td>
</tr>
</tbody>
</table>

Mortality:
BSI - SAU: 25%; No BSI: 9.5%
Odds ratio: 3.19
p = <0.001

Data collected from Mater Dei Hospital 2007 / 8

Why MRSA bacteraemia?

Figure 1. Survival curves for intensive care patients with bacteraemia involving methicillin-sensitive or methicillin-resistant Staphylococcus aureus (MRSA) (n=39) and non-MRSA bloodstream infections (n=47) (log-rank test, P=0.01; Wilcoxon test, P=0.02). Blot et al: Arch Intern Med. 2002;162:2229-35.

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MRSA epidemiology in Europe

Methodology
- Online survey sent to members of European IC societies
  - March to October 2011
  - Translated to Spanish, French, German, Greek & Italian
- Denominator data collected:
  - Hospital demographic information,
  - MRSA proportions in blood culture isolates during previous year.
- Hospital practices
  - MRSA surveillance and follow up
  - Isolation & screening
  - Hand hygiene
  - Care of venous catheters
  - Antibiotic prescribing

Results
- 223 replies received from secondary / tertiary hospitals:
  - regional or academic institutions with ≥2 specialised services.
  - Respondents primarily IPC doctors or nurses
- MRSA bacteraemia proportions grouped:
  - ≤5%: 105 hospitals
  - 5-25%: 47 hospitals
  - >25%: 71 hospitals

MRSA proportions: 2004/5 vs 2009/10

Hospitals by region

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Validation

MRSA surveillance & follow up

Screening & isolation

Central venous catheter management

CVC care bundle

Hand hygiene

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Antibiotic prescribing

Practices correlated with MRSA control
- Routine daily surveillance
- Root cause analysis
- Isolation of high risk admissions
- Availability of isolation facilities
- Competency verification of staff in IV device management
- Mandatory hand hygiene training
- Accountability for poor performance
- Joint collaboration between microbiologists & clinicians in antibiotic prescribing

Conclusions
- Northern European hospitals show a strong emphasis on search and destroy
- Screening & presumptive isolation of high risk admissions

Conclusions
- Focus of French hospitals mainly focused on AHR based hand hygiene initiatives
- Improvement more moderate & over >10 years (Jarlier et al)

"The low prevalence in the Netherlands can largely be explained by our national search and destroy policy, in combination with restrictive antibiotic use."

MRSA patients are strictly isolated at hospital admission until screening cultures for MRSA prove negative (‘search’).

In case of MRSA carriage, individuals are kept in isolation and treated to eradicate MRSA (‘destroy’).

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Curbing Methicillin-Resistant Staphylococcus aureus in 38 French Hospitals Through a 15-Year Institutional Control Program

Vincent Jarlier, MD, FABM; David Frydman, MD; Christian Bonnetin, MD, PhD; Sandra Fornerier, MD; Anne Cathorne, MD; Laurence Marty, MD; Anne-Marie Andremon, MD, PhD; Guillaume Prost, MD, PhD; Anne Barre, MD; Jean-Claude, MD; Didier Goulet, PhD; Yves Guerin, MD, PhD; Transfert, MD, PhD; Jean-Louis Guindon, MD, PhD; Arlette Henry, MD, PhD; Fabrice Hugue, MD, PhD; Nathalie Lacombe, MD, PhD; Claude-James Molk, MD, PhD; Jean-Chiat Lomieux, MD, PhD; Michel Agence des Hôpitaux Universitaires de Paris; France; for the Collectif de Bactériologie-Virologie Hôpitaux Universitaires de l'Île de France

Arch Intern Med. 2010; 170:552-559

France
Phase 1 (1993-2000)
- Guidelines
- Hand washing
- Isolation in single-bed rooms
- Barrier precautions for MRSA patients
  - Disposable gloves worn before and discarded after patient contact,
  - Hand hygiene
  - Disposable aprons worn for extensive contacts,
  - Equipment (eg, stethoscope) dedicated to the patient.

Phase 2 (2001-)
- Alcohol-based hand-rub (ABHR)
  - Used to benchmark hospital performance in infection control

France – MRSA reduction

- Major improvements were evident in Intensive Care
- Less reduction in general wards esp medicine

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  - Screening & presumptive isolation of high risk admissions
  - Focus of French hospitals mainly focused on ABHR
  - Improvement more moderate & over >10 years (Jarlier et al)
- UK / Irish responding hospitals reported the presence of a wide range of interventions
  - Rapid & significant MRSA improvement (Wilson et al)

UK: a political initiative

Hospital superbug must be halved
Bloodstream infections with the hospital superbug MRSA must be halved in three years, the government has said.

Critics said more resources would be needed to meet the ambitious target.

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UK approach

Board to Ward
how to embed a culture of HCAI prevention in acute trusts

People

- 'Board to ward' culture:
  - everyone in the organisation understands their role and is accountable for it
- Director of Infection Prevention and Control (DIPC)
  - role right: ensure that the DIPC has the skills, responsibility and delegated authority to maximise impact.
- Provide comprehensive knowledge and skills assessment
  - Staff competencies assessment
- Rigorous personal objectives and individual appraisals

Processes

- Create and implement an infection prevention action & delivery plan
  - Objectives - Specific, Measurable, Achievable, Realistic and Time bound.
- Use High Impact Interventions
  - Emphasis on care bundles to increase the reliability of clinical processes.
- Care pathways for patients with C. difficile
- MRSA screening
  - Consistently applied
- Target environmental cleaning

Practices

- Improved knowledge and skills to perform key clinical procedures:
  - Including aseptic technique, taking blood cultures and inserting lines.
- Prudent antimicrobial prescribing
  - Robust prescribing policies including endorsement protocols.
- Root cause analysis
  - RCAs undertaken for every MRSA bacteraemia, with feedback to staff and prompt action on findings.
- Improved isolation implementation
- Set expectations for compliance with key policies:
  - Hand hygiene, dress codes, environmental cleanliness and antimicrobial prescribing
  - Consequences of non-cooperation and/or poor practice clearly understood and acted upon.

Performance

- Routine reports on compliance:
  - HCAI Key Performance Indicators (KPIs), use of HII bundles and levels of cleanliness regularly discussed at board level
- Link HCAI performance to clinical indicators:
  - Impact of HCAI on mortality rates and outcome measures emphasised with senior management and clinicians.
- Communicate and present performance information in ways that change behaviour
  - Reporting tools used to give insights into the effectiveness of interventions on HCAI reduction and cleanliness.
- Directly reinforce individual accountability:
  - Staff performance on HCAI and cleanliness tied into appraisals, performance objectives and reward & disciplinary processes.

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  - UK / Irish responding hospitals reported the presence of a wide range of interventions
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- Southern European hospitals have the policies but seem to face difficulties to translate them into effective practices
  - Infrastructural challenges,
  - Systems not conducive to achieve consistent performance, ownership and accountability

Why?

- No association with:
  - GDP per capita
  - Healthcare expenditure
  - Healthcare characteristics

Cultural dependency theory

- Infection prevention & control is ultimately dependent on correct behavioural practices
- Identified cultural dimensions have been linked with key behavioural traits:
  - risk tolerance, lack of ownership and discretionary practices
- It stands to reason that national cultural traits that influence behaviour will also have an impact on IPC performance

Understanding the epidemiology of MRSA in Europe: do we need to think outside the box?
M.A. Borg**, L. Camilleri**, B. Waisfiz**

Aims: To investigate the possible impact of national cultural dimensions on the epidemiology of MRSA in Europe.
Methods: Nation proportions of MRSA bacteraemia were sourced for countries participating in the EARS-Net surveillance network in 2010, and correlated with the national cultural dimension scores of Hofstede et al.

Conclusion: Implementation of ICAS programmes often requires behavioural change. Cultural dimensions appear to be key factors affecting perceptions and values among healthcare workers, which in turn are critical for compliance and uptake. Customizing ICAS initiatives to reflect the local cultural background may improve their chances of success.


dr. michael borg
mater dei hospital, malta

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**Note:** The content includes graphical representations and tables that are not transcribed in the text format due to the nature of the question.
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Take home messages

- Infection control works!
- There is no one universal model
- Different European countries have achieved MRSA bacteraemia reduction with different approaches
- Having the policies in place makes no difference; putting them into practice does
- Need to guarantee correct & consistent performance & encompass initiatives that are genuinely effective
- Behaviour change is the goal

April 17
CHLORHEXIDINE PATIENT BATHING AS A MEANS TO PREVENT HEALTHCARE ASSOCIATED INFECTIONS
Prof. Mark E. Rupp, University of Nebraska

April 24
(A Free Teleclass)
ARE WE TOO CLEAN FOR OUR OWN GOOD? THE HYGIENE HYPOTHESIS AND ITS IMPLICATIONS FOR HYGIENE, LIFESTYLE, AND PUBLIC HEALTH
Dr. Sally Bloomfield, London School of Hygiene and Tropical Medicine

May 5
(Free ... WHO Teleclass – Europe)
WORLD HAND HYGIENE DAY ... CLEAN YOUR HANDS – STOP THE SPREAD OF DRUG-RESISTANT GERMS
Prof. Didier Pittet, World Health Organization

May 8
VENTILATOR-ASSOCIATED EVENTS: A PATIENT SAFETY OPPORTUNITY
Dr. Michael Klompas, Harvard Medical School

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