What Did the Romans Ever Do For Us?
Dr. Carole Fry, Public Health England
Broadcast live from the 2015 Infection Prevention Society conference

What did the Romans ever do for us?

Or do we learn from history?

Carole Fry
EM Cottrell lecture 2015

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Let’s go back to the very beginning….

….as it is a very good place to start

Semmelweis (1818 – 65)

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Florence Nightingale

“The very first requirement in a hospital is that it should do the sick no harm.”
— Florence Nightingale, Notes on Nursing: What It Is, and What It Is Not

Joseph Lister (1827-1912)
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Infection control beginnings

- In 1944, MRC recommended establishing an ICC in every hospital
- Published in 1959 – concern about Staphylococcal sepsis
- Also concerns about penicillin resistance
- Recommended the appointment of an Control of Infection Officer “the success of any scheme of control will depend on him”

EM Cottrell

- Theatre superintendent appointed by Dr Brendan Moore in 1959
- To act as a liaison officer to all those concerned with control of infection – record keeping a major part of the role
- Lancet paper stated that the appointment was a ‘successful experiment’
- Met resistance in some quarters, but soon other hospitals followed suit

Gardner et al. The Infection Control Sister – a new member of the infection control team in general hospitals. Lancet 1962;2:710-711
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What goes around comes around?
- Role of the environment/fomites
- AMR/AMS
- Adequate staffing
- Clear roles and responsibilities
- Monitoring & measuring
- Ventilation
- Hand hygiene
- Mattress cleaning
- Bed spacing
- Epidemiological investigation
- Cohorting
- Good communication and liaison
- New builds not less than 20% single rooms
- Outbreak management & control
- Good documentation & record keeping
- Avoid unnecessary dressing changes…

One microbiologist’s view
- When reviewing ‘Hospital-acquired infection – Ayliffe, Collins & Taylor (1982)

microbiology laboratory and the nursing administration, to whom alone she is officially responsible. One of the recurrent nightmares of consultant microbiologists must be a sudden outbreak of embarrassing contradictions and confusion in the wards owing to an inexperienced or incautious control of infection nurse. Even without a specific chapter on the prevention of this new hospital hazard, however, its incidence will be greatly diminished by the assiduous use of this sensible little book.

Selywn. S Hard Facts about hospital infection.
BMJ 1982;284: 1895 - 1896

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Watershed moment in IC

Recommendations for Prevention of HIV Transmission in Health-Care Settings
MMWR August 21, 1987 / 36(SU02);001
published by the Epidemiology Program Office, Centers for Disease Control, Public Health Service, U.S. Department of Health and Human Services, Atlanta, Georgia 30333.

Blood and body fluid precautions

Perspectives in Disease Prevention and Health Promotion Update: Universal Precautions for Prevention of Transmission of Human Immunodeficiency Virus, Hepatitis B Virus, and Other Bloodborne Pathogens in Health-Care Settings June 24, 1988 / 37(24);377-388

Aim of UP

- To protect HCWs from acquiring a blood borne virus – discovery of HIV was the catalyst for this
- 1988 – all body and body fluids containing visible blood, mucous membranes & non-intact skin to be considered a potential risk regardless of their infection status
- Historically IC precautions dictated by symptoms or confirmed diagnosis

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Development of UP

- Lynch & Jackson expanded UP to include all moist body substances – faeces, urine, sputum – greater protection for HCWs
- Over time, UP and BSI merged into standard precautions.
- Realisation, if implemented well, SP prevent cross infection and therefore protect patients also.

Standard Principles in England

- Epic 1 introduced standard principles for preventing hospital acquired infections which went beyond clinical practice
- Also adopted the term standard precautions
  - Environment
  - Hand hygiene
  - Appropriate use of PPE
  - Safe use of sharps
Evidence base?

SP7 Use an alcohol-based hand rub for decontamination of hands before and after direct patient contact and clinical care, except in the following situations when soap and water must be used:• when hands are visibly soiled or potentially contaminated with body fluids; and• when caring for patients with vomiting or diarrhoeal illness, regardless of whether or not gloves have been worn.

Class A

epic3: National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections in NHS Hospitals in England

It’s getting complicated

CDC now recommend:
- standard precautions
- transmission based precautions
  - contact precautions – wear gown & gloves (+/- isolation) patients with diarrhoea, MDRO, draining wounds, uncontrolled secretions, pressure ulcer (~15% US inpatients)
  - droplet precautions
  - airborne precautions
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MRSA

MRSA..THE FORGOTTEN MASSACRE

THE PLAGUE 2004
Filthy NHS wards kill 5,000 a year

OUR SQUALID HOSPITALS
The deadly superbug that puts Britain’s hospitals to shame

MRSA

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MRSA Target

- Announcement in November 2004 to 'halve MRSA infections by 2008'
- Baseline 2003-04; Start date April 2005
  - Monthly returns
- Performance management
- MRSA objectives followed – aimed at outliers
Achievable?

- Surveyed ICTS believed on average that 15% reduction in HAI was achievable (NAO 2000)
- First national infection reduction target

MRSA bacteraemias & interventions

Modern matrons  cleanyourhands  Saving Lives & CoP  Imp teams  Deep clean

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MRSA vs MSSA

Source: PHE annual commentary 2014/15

Time to onset bacteraemia

Source: PHE annual commentary 2014/15
Staphylococcus aureus – the next challenge?

- Report of meticillin susceptible, vancomycin-resistant *Staphylococcus aureus*
- Conclusion ‘Emergence of vancomycin resistance in MSSA would indicate that this resistance trait might be poised to disseminate rapidly among *S.aureus* and represents a major public health threat’.
Surveillance in the UK

It is embarrassing to admit, in the first issue, that we have no idea of the size and shape of infection in hospitals in the United Kingdom. Action aimed at controlling hospital-acquired infection cannot be well-founded in the absence of credible figures for its frequency. To derive this information, a national prevalence survey of hospital infection is

...while in the US - SENIC

- Initiated by CDC in 1974
- 6586 hospitals
- HAI rates could be reduced with an effective IC programme (↓32%) and 1 ICN: 250 beds
- Hospitals without an effective programme HAI rates ↑
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HCAI prevalence

- 6% of patients in Acute Hospitals had a HCAI in 2011
- Estimated 243,746 patients per year
- Prevalence of HCAI decreasing; in 2006 prevalence was 8.2%
- Pneumonia/Lower respiratory tract, Urinary tract infections & Surgical site infections account for c. 60% of all HCAI
- Top three HCAI pathogens: E. coli 17%, S. aureus 15%, & C. difficile 12.4%
- Next PPS: 2016
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Consumption of antimicrobials of Antibacterials For Systemic Use (ATC group J01) in the community (primary care sector) in Europe, reporting year 2013

Antibiotic Resistance of *Escherichia coli* in United Kingdom

http://resistancemap.cddep.org/

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Data – we’ve got lots

- English surveillance programme for antimicrobial utilisation and resistance (ESPAUR) Report 2014
- Annual Epidemiological Commentary: Mandatory MRSA, MSSA and E. coli bacteraemias and C. difficile infection data, 2014/15
- Surveillance of Surgical Site Infections in NHS Hospitals in England 2013/14

Public reporting of HCAI

- MRSA bacteraemias - followed by
  - Orthopaedic SS1
  - Glycopeptide resistant enterococci
  - Clostridium difficile infection
  - Meticillin sensitive Staphylococcus aureus
  - E.coli bacteraemias
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Public reporting

Do these data inform the public?

Source: NHS Choices

Martin, M; Ziegler, W; Hansen, S; Gastermeier, P et al. JHI 83 (2013) 94-98

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State HAI Reporting Laws

MrSA Laws

Highlighted States have Enacted MRSA Legislation

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Public reporting

- Difficult for the public to interpret
- Public are consumers
- Risk of hospital league tables
- Currently a blunt instrument
- No strong evidence that public reporting improves patient safety

Public reporting of data

- Transparency important
- Risk of skewed reporting/data to avoid sanctions
- Need to agree granularity of reporting eg: organisation, unit, clinician
- ‘Destructive triangulation has arisen between administrators, clinicians & infection control departments that has lead to consequences beyond those intended by monitoring agencies’.

Infectivity increases as disease progresses
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EVD epidemic West Africa

ECDC November 2014

EVD epidemic West Africa

WHO sitrep 08/06/15

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Risk to HCWs

- Health-care workers have frequently been infected while treating patients with suspected or confirmed EVD. This has occurred through close contact with patients when infection control precautions are not strictly practiced.

Prevention of transmission

In the absence of an effective vaccine, rigorous adherence to infection prevention and control practice is required:

- Personal protective equipment
- Hand hygiene
- Spatial separation
- Clean to dirty workflows
- Discipline in donning and doffing
- Training

Table 5: Ebola virus disease infections in health workers in Guinea, Liberia, and Sierra Leone

<table>
<thead>
<tr>
<th>Country</th>
<th>Cases</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guinea</td>
<td>156</td>
<td>100</td>
</tr>
<tr>
<td>Liberia*</td>
<td>176</td>
<td>182</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>307</td>
<td>244</td>
</tr>
<tr>
<td>Total</td>
<td>881</td>
<td>513</td>
</tr>
</tbody>
</table>
Staff safety is paramount

- All clinical activity needs to be planned – healthcare workers should only proceed when it is safe to do so, and if they have the appropriate level of training
- Clean to dirty work flows should be maintained

Staff safety

- The need for clear instructions for putting on and removal of personal protective equipment (PPE)
- PPE buddies must be trained
- Healthcare facilities need to plan in advance how they will manage suspect cases and the staffing implications, eg maximum PPE working times, need for breaks
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Trexlor isolator

Patient transport isolator

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EVD treatment centres

Donning and doffing PPE

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Conclusions – what next?

US approach – aspirational?

Moving toward elimination of healthcare-associated infections: A call to action

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APIC pillars of HAI elimination

E. coli bacteremia

Mandatory Surveillance 2014, 20% E. coli bacteremia
HCAI, c. 7k cases a year
Conclusions

- Progress over last 10 years, with dramatic changes
- Changes in HCAI prevalence related to reductions in incidence of MRSA and CDI
- Increasing incidence & prevalence Gram negative resistance
- ICU (all ages) & Surgical specialties - highest risk
- Cognisant of the ever changing health and social care infrastructures

Conclusions

Whilst we have to look to the future, we must also learn from the past.

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