

Imperial College
London

Antibiotic Stewardship: A Tool for improving Outcomes

Stewardship

- Responsible caretaking; the concept is based on the premise that we don't own resources, but are managers of resources and are responsible to future generations for their condition

Antibiotic Stewardship

- Effective, timely treatment of infection
- Minimise collateral damage from unnecessary use. Individual and societal.
- Mindful of externality
- Driven by quality and safety, not cost control

Consider globally, nationally and locally

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Consider globally, nationally and locally

WHO urges countries to take measures to combat antimicrobial resistance



- WHO strongly recommends that governments focus control and prevention efforts in four main areas:
- Surveillance for antimicrobial resistance;
 - Rational antibiotic use, including education of healthcare workers and the public
 - Introducing or enforcing legislation related to stopping the selling of antibiotics without prescription;
 - Strict adherence to infection prevention and control measures, including the use of hand-washing measures

Antimicrobial resistance will be the theme of WHO's World Health Day 2011.

News release 20/8/10

Focus on stewardship in acute care.....

Not addressing

- Improved national surveillance of resistance

Nor the role of

- Developing improved vaccination
- Developing improved (near patient) diagnostics

The Acute Care Environment

- Misuse of antibiotics in hospitals drives development of antibiotic resistance.
- Large proportion of inpatients receive an antibiotic ·up to 50% of all antibiotic use can be inappropriate.
- Misuse of antibiotics may colonised or infected with antibiotic-resistant bacteria (MRSA, VRE, GNB) as well as *C.difficile*
- Prudent use of antibiotics can prevent the emergence and selection of antibiotic-resistant bacteria.
- Decreasing antibiotic use shown to result in lower incidence of *CDI*

Singh N, Yu VL.. Chest. 2000 May;117(5):1496-9.

Lesch CA, Itokazu GS,et al . Diagn Microbiol Infect Dis. 2001 Nov;41(3):149-54.

Lepper PM, Grusa E, et al. 2002 Sep;46(9):2920-5.

Ansari F, Erntell et al Clin Infect Dis. 2009 Nov 15;49(10):1496-504.

Davey P, Brown E, et al Cochrane Database Syst Rev. 2005(4).

Willemsen I, Groenhuijzen A,et al. Antimicrob Agents Chemother. 2007 Mar;51(3):864-7.

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Tacconelli E, De Angelis G,et al . Antimicrob Agents Chemother. 2009 Oct;53(10):4264-9.

Carling P, Fung T, et al Infect Control Hosp Epidemiol. 2003 Sep;24(9):699-706.

Fowler S, Webber A,. J Antimicrob Chemother. 2007 May;59(5):990-5.

Bradley SJ, Wilson AL,. J Antimicrob Chemother. 23. De Man P, Verhoeven BAN et al Lancet. 2000; 355(9208):973-8. Byl B, Clevenbergh P et al Clin Infect Dis. 1999 Jul; 29(1):60-6

Antibiotic use in Acute Care

Report on Point Prevalence Survey of Antimicrobial Prescribing in European Hospitals 2009 ESAC-3:

- 30% of inpatients were treated with antibiotics
- The proportion for treating HAI was 35%

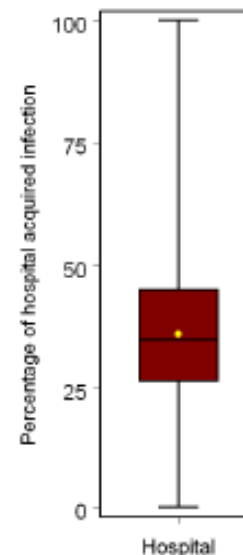
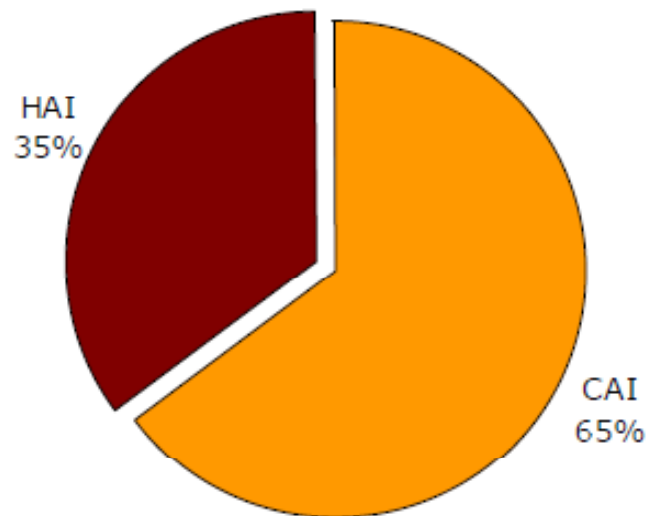


Figure 17 Proportion of Hospital acquired infections

Antibiotic stewardship in Acute Care

- A marriage of infection control and antibiotic management
- Selection of antibiotics that does the least collateral damage
- Appropriate de-escalation when culture results are available.
- Optimise clinical outcomes
- Minimise unintended consequences of toxicity/emergence of resistance/selection of pathogenic organisms e.g. *Clostridium difficile*
- Essential part of patient safety *Delitt et al. Clin Inf Dis. 2007; 44:159-177*

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However....

- 30-40% of patients do not receive care according to evidence
- Significant proportion of antibiotic prescribing in acute setting is sub-optimal
- Hand hygiene compliance rarely exceeds 40%
- Staff adherence to best practice needs to be improved

Antibiotic stewardship in Acute Care

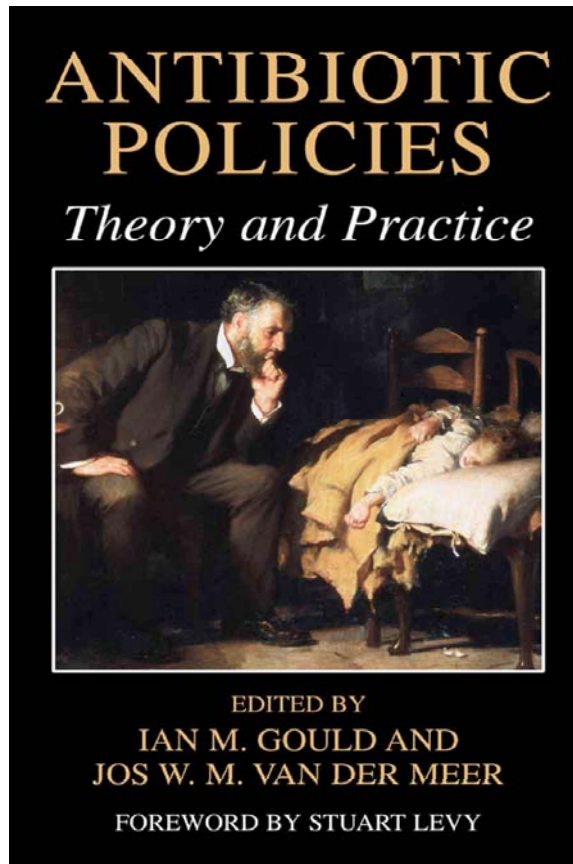
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However....

- 30-40% of patients do not receive care according to evidence
- 1/3 of patients in acute care receive antibiotics
- Significant proportion of antibiotic prescribing in acute setting is sub-optimal
- Hand hygiene compliance rarely exceeds 40%
- Staff adherence to best practice needs to be improved
- **How can we do better?**

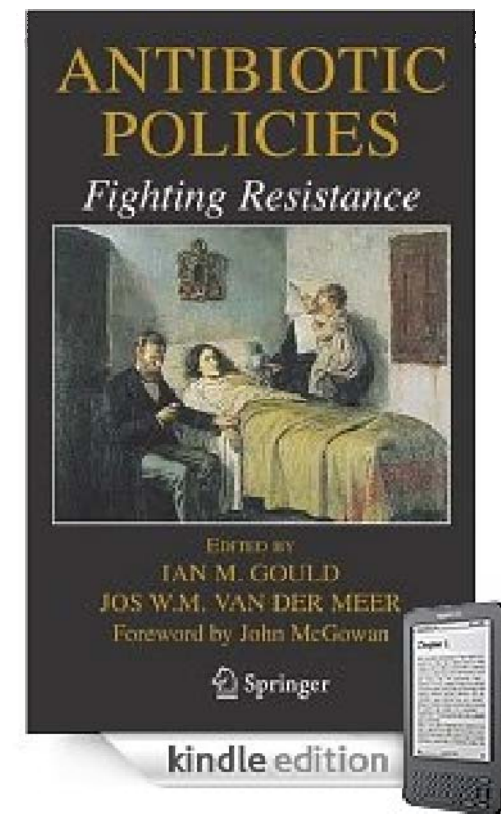
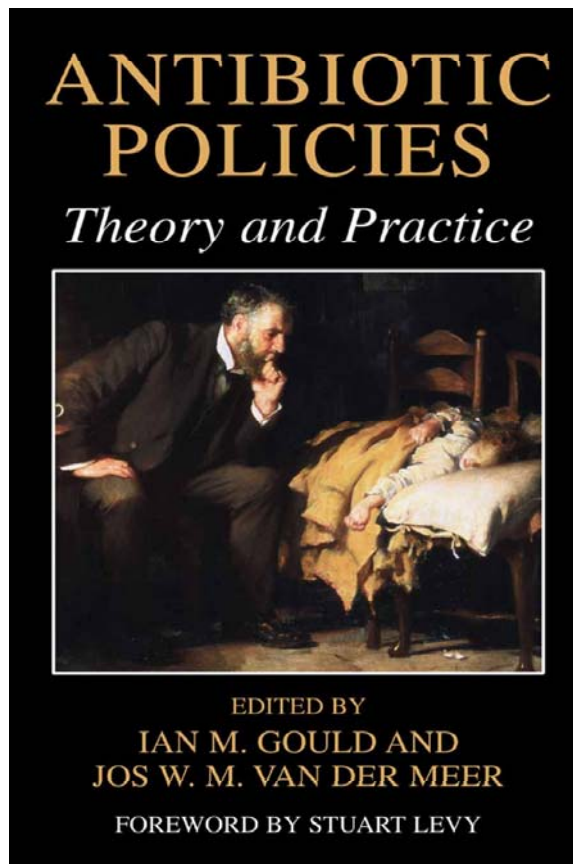
Much change....

Much change in approach, profile and attitudes



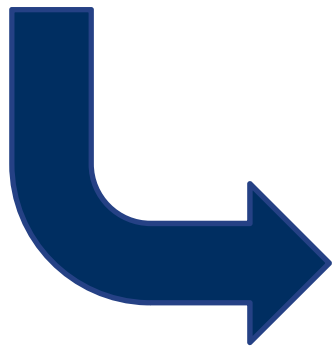
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Multifaceted strategies can address and decrease antibiotic resistance in hospitals

Antibiotic prescribing practices and decreasing antibiotic resistance can be addressed through multifaceted strategies including:



- Use of ongoing education
- Use of evidence-based hospital antibiotic guidelines and policies
- Restrictive measures and consultations from infectious disease physicians, microbiologists and pharmacists

Davey P, Brown E et al Cochrane Database Syst Rev. 2005(4):CD003543.

Carling P, Fung T et al Infect Control Hosp Epidemiol. 2003 Sep; 24(9):699-706.

Byl B, Clevenbergh P, et al. Clin Infect Dis. 1999 Jul; 29(1):60-6

Other Approaches

- Decision support
- Surveillance, benchmarking
- Audit, Performance management
- Quality improvement, Patient safety, check lists, care bundles.
- Organisational, DIPC, Role of Leadership
Saint S et al ICHE 2010 Sep;31(9):901-7,
- Behavioural
- Systems design (decision architecture, nudge etc)
- Regulation
- Broader professional involvement, AMTs
- Greater focus on principals

Application of care bundles

On initiation of prescription:

1. Clinical rationale for initiation
2. Appropriate specimens sent for microbiology culture and sensitivity
3. Adherence to local prescribing guidelines
4. Additional clinical interventions to manage infection (e.g. remove indwelling device, surgical procedure)

On continuation of prescription:

5. Daily review based on clinical response and laboratory results regarding:
 - » De-escalation, IV to Oral switch, Stopping
6. Correct therapeutic drug monitoring

Cooke, F.J., Holmes, A.H. (2007) The missing care bundle: antibiotic prescribing in hospitals. Int. J. Antimicrobial Agents; 30: 1, 25–29

Toth NR, Chambers RM, Davis SL. Am J Health Syst Pharm. 2010 May 1;67(9):746-9.

Pulcini C, Defres S, Aggarwal I, Nathwani D, Davey P. JAC 2008 Jun;61(6):1384-8.

Application of care bundles

On initiation of prescription:

1

2

3

4

Journal of Antimicrobial Chemotherapy (2008) **61**, 1384–1388
doi:10.1093/jac/dkn113
Advance Access publication 26 March 2008

JAC

Or

5

Design of a ‘day 3 bundle’ to improve the reassessment of inpatient empirical antibiotic prescriptions

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Int. J. Antimicrob. Agents, 2010, 35, 252–257

Toth NR, Chambers RM, Davis SL. *Am J Health Syst Pharm*. 2010 May 1;67(9):746-9.

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Principles of safe antibiotic use

The Effective Antibiotic Prescribing Top Ten Tips

1. Institute antibiotic treatment immediately in patients with life-threatening infection
2. Prescribe in accordance with local policies & guidelines avoiding broad spectrum agents
3. Document in clinical notes indication(s) for antibiotic prescription
4. Send appropriate specimens to the microbiology lab draining pus and removing foreign bodies if indicated
5. Use antimicrobial susceptibility data to de-escalate/substitute/add agents and to switch from intravenous to oral therapy
6. Prescribe the shortest antibiotic course likely to be effective
7. Always select agents to minimise collateral damage
8. Monitor antibiotic drug levels when relevant (e.g. vancomycin)
9. Use single dose antibiotic prophylaxis wherever possible
10. Consult your local infection experts

<http://www.rcplondon.ac.uk/About-the-college/committees/Healthcare-Associated-Infections/Pages/Effective-Antibiotic-Prescribing.aspx>



Principles of safe and

Antibiotics

– Misuse leads to antibiotic resistance

The *Effective Antibiotic Prescribing*

1. Institute antibiotic treatment for infection
2. Prescribe in accordance with narrow spectrum agents
3. Document in clinical notes in
4. Send appropriate specimens and remove foreign bodies if indicated
5. Use antimicrobial susceptibility testing and to switch from intravenous to oral agents
6. Prescribe the shortest antibiotic course
7. Always select agents to minimize side effects
8. Monitor antibiotic drug levels where appropriate
9. Use single dose antibiotic prophylaxis where appropriate
10. Consult your local infection control team

Do not start antibiotics in the absence of evidence of infection

Have the appropriate cultures been collected before starting antibiotic therapy?

Do the culture results necessitate starting antibiotic therapy or modifying the current antibiotic therapy?

What is the optimal duration of antibiotic therapy for treating this type of infection in this patient?

What is the appropriate antibiotic dose for treating this kind of infection in this patient?

Does the choice of antibiotic therapy comply with your hospital's antibiotic guidelines and resistance patterns (antibiogram)?

Have you consulted your infectious disease physicians, microbiologists or pharmacists if appropriate?

EUROPEAN
ANTIBIOTIC
AWARENESS DAY



An EU initiative supported by the
Department of Health

Delivery of Antibiotic Strategy: Regulation and Self Assessment

Regulation: Code of practice, CQC

Self assessment: A Toolkit

- Operational delivery of antibiotic strategy
 - Evidence-based self-assessment toolkit (ASAT)
 - Optimising care and Benchmarking
 - To assess longitudinal progress of stewardship initiatives
 - *Cooke J, Alexander K, et al. (2010). Antimicrobial stewardship: an evidence-based, antimicrobial self-assessment toolkit (ASAT) for acute hospitals. JAC*

- 1) Antimicrobial management within the Trust-structures and lines of responsibility and accountability-high-level notification to the Board.
- 2) Operational delivery of an antimicrobial strategy-operational standards of good antimicrobial stewardship.
- 3) Risk assessment for antimicrobial chemotherapy.
- 4) Clinical governance assurance
- 5) Education and training
- 6) Antimicrobial pharmacist
-systems in place for ensuring optimum use.
- 7) Patients, Carers and the Public-address information needs

J Antimicrob Chemother 2010; **65**: 2669–2673
doi:10.1093/jac/dkq367 Advance Access publication 8 October 2010

**Journal of
Antimicrobial
Chemotherapy**

Antimicrobial stewardship: an evidence-based, antimicrobial self-assessment toolkit (ASAT) for acute hospitals

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¹University Hospital of South Manchester NHS Foundation Trust and Manchester Academic Health Science Centre, Wythenshawe Hospital, Manchester M23 9LT, UK; ²Central Manchester University Hospitals NHS Foundation Trust, Manchester M13 9WL, UK; ³Imperial College Healthcare NHS Trust, London W12 0HS, UK; ⁴Southampton University Hospitals NHS Trust, Southampton SO16 6YD, UK; ⁵Nottingham University Hospitals, Derby Road, Nottingham NG7 2UH, UK; ⁶Leeds Teaching Hospitals NHS Trust, Leeds LS1 3EX, UK; ⁷Sandwell and West Birmingham NHS Trust, Birmingham B18 7QH, UK; ⁸Dartford & Gravesham NHS Trust, Dartford DA2 8DA, UK; ⁹Guy's & St Thomas' NHS Foundation Trust, London SE1 7EH, UK

Much progress.....
But more can be done.

What gaps to address?

Gap 1: Address and monitor unintended Consequences

- Must ensure patients receive early effective treatment and prompt care not compromised.
- Should build in balances/checks, mechanisms to mitigate and monitor potential unintended consequences, poorly treated infections etc
- Deliver on the Surviving sepsis care bundle-
(Obtain blood cultures prior to antibiotic administration and administer broad-spectrum antibiotic, *within 3 hrs of A&E admission*)

Gap 2: Measuring outcomes

- Measuring and benchmarking outcomes.
- Participation in national prescribing surveillance
- Nationwide involvement in standardised point prevalence studies
- Surveillance with feedback in effective formats for user and quality improvement
- Accessing the existing data from NHS

Gap 3 : Behaviour

What's missing? Charani et al JAC 2010

- Are policy and guidelines sufficient for sustainable change?
- Adopt a whole-system approach to support optimal prescribing choices. Support ing choice architecture
- Necessary to understand the factors that influence prescribing behaviour and decisions

Antibiotic prescribing is complex

- A social process
- Under influence of many determinants
- Selective toxicity
- Collateral impact not tangible at prescriber/patient level
- Expertise required but universally used
- Prescribing etiquette

- Guidelines and policy developed to help decision making
- These provide knowledge and awareness

- **BUT**

They may not shift attitudes and change practice

- The goal should be to make prudent prescribing the default and routine practice
- Do we need to investigate habitual behaviour as a first step to changing it?
- ‘Mindlines not guidelines’ *Gabbay, Le May 2004 BMJ 329*

Factors affecting behaviour are:

Personal, Social, Environmental

- Behaviour change a key element of optimising antibiotic prescribing
- Systematic reviews to date do not assess behaviour change
- An expanded approach to systematic review methodology developed
 - Inclusion of both qualitative and quantitative literature (1999-2009)

(E. Charani et al Behaviour change strategies to influence prescribing – a systematic review, work in progress)

Findings stress the need for:

- better understanding of prescribing behaviours to improve the quality of interventions and their outcomes
- targeted multi -disciplinary research

Need a different approach to interventions?

- Work with healthcare professionals to improve the choice environment
 - Environment of shared knowledge

Gap 3: Multidisciplinary engagement

Multidisciplinary approach has primarily included:

- Infectious Disease Physicians
- Clinical Microbiologists
- Clinical or Infectious Disease Pharmacists
- Epidemiologist
- At times, infection prevention and control teams

Can nurses contribute to antimicrobial stewardship?

How can Nurses Contribute?

- Duration of Treatment
- Route of antimicrobial administration
- Treatment Specificity
- Timing of antimicrobial administration
- Therapeutic drug monitoring
- Outpatient Antibiotic Therapy (OPAT)

Knox et al; MacDougall & Polk;

Lespirit & Brun-Buisson

Edwards et al. 2011

Oosterheert et al; Mertz et al

Inter-disciplinary Collaboration

A hospital's success and patient outcomes are strongly dependent on how effectively the members work together as a team

(Rafferty et al, 2001; Leonard et al, 2004)

Ward Rounds and MDTs

- Ward rounds enhance multidisciplinary decision making between nurses and other colleagues
- Nurses as 'knowledge brokers'
- Nurses have shown to influence prescribing decisions through:
 - Encouraging prescribing compliance with guidelines
 - Monitoring prescription decisions
 - Reducing prescribing errors

(Castledine, 2006; Jutel & Menkes, 2010)

Organisational Memory

Refers to the retrievable information contained within an organisation in formats such as spreadsheets and guidelines as well as in the minds of the organisation members (Paoli & Prencipe, 2003).

Organisational memory of antimicrobial therapy

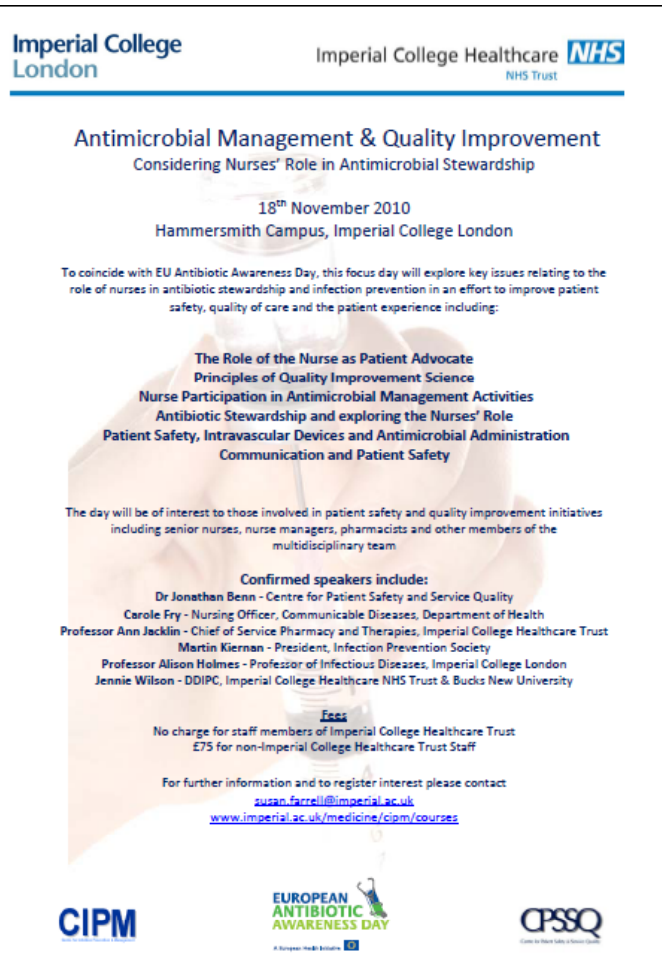
- Prescribing most commonly performed by junior doctors
- Outside area of expertise with varying levels of senior support
- High rotation of junior doctors
- Loss of local knowledge
- Antibiotic prescribing sits outside one specialty
- However, nurses can contribute to this local knowledge as the least transient population

Edwards, R, et al. (2011) *J. Infection Prevention* 12: 6-10

Charani E, et al. (2010) *J. Antimicrob Chemotherapy* 65: 2275-2277

Enhancing the nurses role in AS

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Imperial College London
Imperial College Healthcare NHS Trust

Antimicrobial Management & Quality Improvement
Considering Nurses' Role in Antimicrobial Stewardship

18th November 2010
Hammersmith Campus, Imperial College London

To coincide with EU Antibiotic Awareness Day, this focus day will explore key issues relating to the role of nurses in antibiotic stewardship and infection prevention in an effort to improve patient safety, quality of care and the patient experience including:

- The Role of the Nurse as Patient Advocate
- Principles of Quality Improvement Science
- Nurse Participation in Antimicrobial Management Activities
- Antibiotic Stewardship and exploring the Nurses' Role
- Patient Safety, Intravascular Devices and Antimicrobial Administration
- Communication and Patient Safety

The day will be of interest to those involved in patient safety and quality improvement initiatives including senior nurses, nurse managers, pharmacists and other members of the multidisciplinary team

Confirmed speakers include:
Dr Jonathan Benn - Centre for Patient Safety and Service Quality
Carole Fry - Nursing Officer, Communicable Diseases, Department of Health
Professor Ann Jacklin - Chief of Service Pharmacy and Therapies, Imperial College Healthcare Trust
Martin Kiernan - President, Infection Prevention Society
Professor Alison Holmes - Professor of Infectious Diseases, Imperial College London
Jennie Wilson - DDIPC, Imperial College Healthcare NHS Trust & Bucks New University

Fees
No charge for staff members of Imperial College Healthcare Trust
£75 for non-Imperial College Healthcare Trust Staff

For further information and to register interest please contact
susan.farrell@imperial.ac.uk
www.imperial.ac.uk/medicine/cipm/courses

CIPM
EUROPEAN ANTIBIOTIC AWARENESS DAY
CPSSQ

with
wer

EU Antibiotic Awareness
day 18th November, 2010
CIPM launched the first
Conference on Nurses' Role
in Antimicrobial Stewardship

Gap 4: Need a social science perspective: data are not enough

Addressing Antibiotic Stewardship as an organisational change issue need to consider :

- **Issues and agendas:** Political science concept of a crowded decision making agenda;
- **Power and influence:** Specialists and generalists, Who 'owns' antibiotic stewardship? Coalition building needs?
- **Governance framework**
- **Roles and relationships:** difficult move from a narrow technical role to a broader strategic role, coalition of supporters
- **Organisational culture and learning**
- **Supporting Knowledge bases**

E Ferlie.et al 2003 *British Journal of Management*, 14, S1: S1-14.

CONCLUSION,

Build on platform of what has been achieved

BUT

Address gaps and diversify and broaden involvement to increase effectiveness, to maintain momentum and for resilience and sustainability