

# Hospital vs unit based stewardship: what is best?

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# Disclosures

## Philip Howard

- **Speaker fees:** Astellas, Gilead, Pfizer
- **Advisory boards:** Astellas, AstraZeneca, Danone, Gilead, MSD, Novartis, Pfizer, Sanofi
- **Educational grants** for conferences or research from: Astellas, Gilead, GSK, Novartis, Pfizer

## Jesus Rodriguez-Baño

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- **Educational grants** for conferences or research from: Novartis, Gilead
- Partner in IMI projects (funded by EFPIA and EU)

# Aims and objectives

- Aim of the workshop is to explore the merits and problems of hospital wide vs unit based antimicrobial stewardship
- At the end of the session, participants will be able to:
  - Describe the key elements of front end & rear end AMS
  - List the benefits & pitfalls of each approach
  - Decide which approach fits their own hospital

Question to participants?

**WHAT DO WE MEAN BY HOSPITAL  
VS UNIT BASED AMS?**

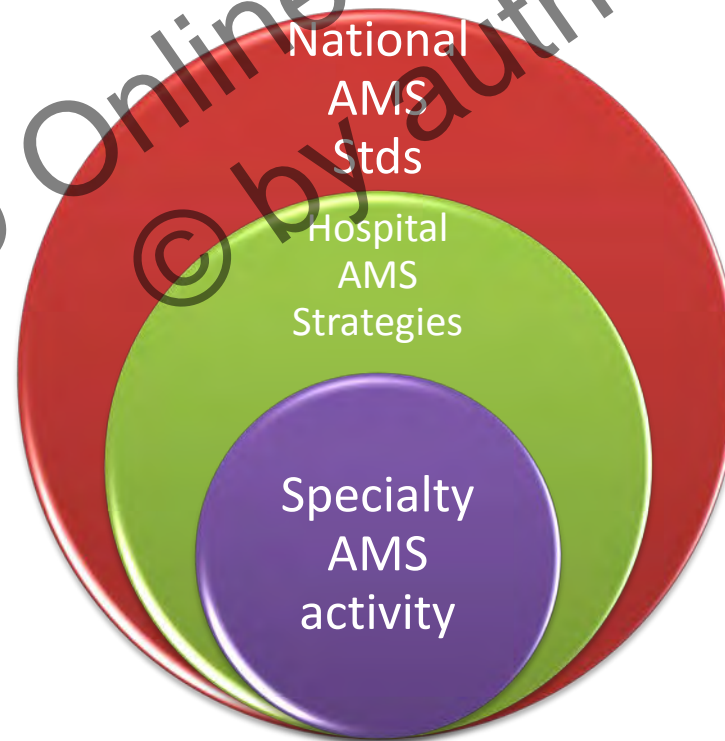
# AMS approaches

## Hospital wide AMS

- Strategies delivered centrally

## Unit based AMS

- Strategies delivered within a unit or at speciality level



# What system do you run?

- Hands up when we call out your approach
  1. Hospital-wide AMS system
  2. Unit-based AMS system
  3. Mixed AMS system
  4. Don't currently run an AMS programme (ie. Doctors can prescribe whatever and whenever they want)

# Getting to know each other: Jesús

- 900 bedded tertiary centre
- Core AMS team (2 IDs, 2 pharmacists, 2 CMs, 1 paediatrician, 1 ICU & 1 nurse)
- Written AMS program with indicators
  - Consumption, resistances
  - Quality of prescription (PPS, bacteraemia)
  - Clinical outcomes: mortality CAP, bacteraemia
- Activities
  - Hospital: local guideline, education, restricted drugs, 7th-day audits, active advise in bacteraemia and MDRO
  - Unit based: according to PPS data (case-vignette-based education, audits)

# Getting to know each other: Philip

- 2300 bed tertiary centre across 2 main sites (8 CM/3 ID)
- Core AMS team: 1 clin micro (0.2) & 2 AMS pharmacists
- Split approach: mainly unit based. Systems to drive AMS
- Hospital wide: AMS policy, web-based resource, formulary, restricted AB (code) system, AM section in Rx, proactive TDM support; bacteraemia, endocarditis + *C.diff* service; AM usage (DDD); reactive micro help-line; OPAT; no eRx
- Mixed: audit (some unit + hospital), education: e-learning, trainee doctor education + final year med students
- Unit: guideline development, monthly PPS by Ph, quarterly self-audit, dose optimisation (by Wd Ph support), micro AMS rounds (ITU, haem-onc, renal, liver, neonates, vascular, surgery, respiratory); local IPC+AMS meetings

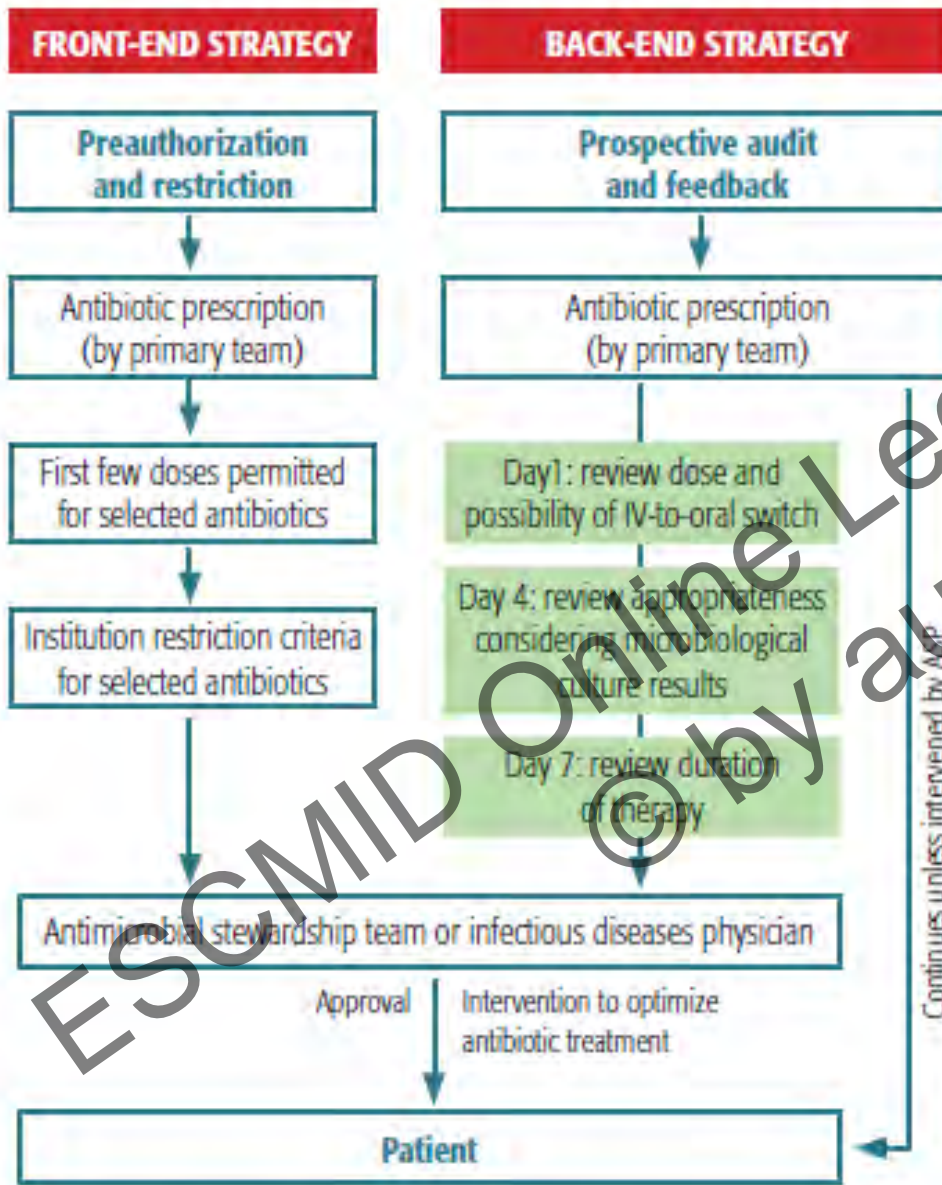


# Group work

- 4 groups of ~8 people
- 5 minutes – verbal feedback (3 min) when asked
- What works well – local examples:
  1. Hospital based activity
  2. Unit based activity
- Who can deliver your AMS?
  3. Low numbers in AMS team
  4. High numbers in AMS team

# Verbal Feedback

- One group – 3 mins max
- Others group to add
  1. Hospital based AMS
  2. Unit based AMS
  3. Who deliver AMS – low staffing
  4. Who deliver AMS – high staffing



Adapted from Chung GW et al. *Virulence* 2013; 4:1-7.

## Front end (Hospital)

- Antimicrobial policy “rule book”
- Formulary & restriction
- Guidelines or pathways for treatment & prophylaxis
- **Less popular with prescribers**

## Back end (Unit based)

- Antimicrobial review: commonly indication, IVOS, TDM, allergy, C&S results, ADRs. Less commonly: bacteraemia, specific AB, dose optimisation.
- Audit & direct feedback to prescribers
- Diagnostic tools eg. procalcitonin
- **More labour intensive**

# 5 Essential & 4 additional AMS Strategies

## Hospital

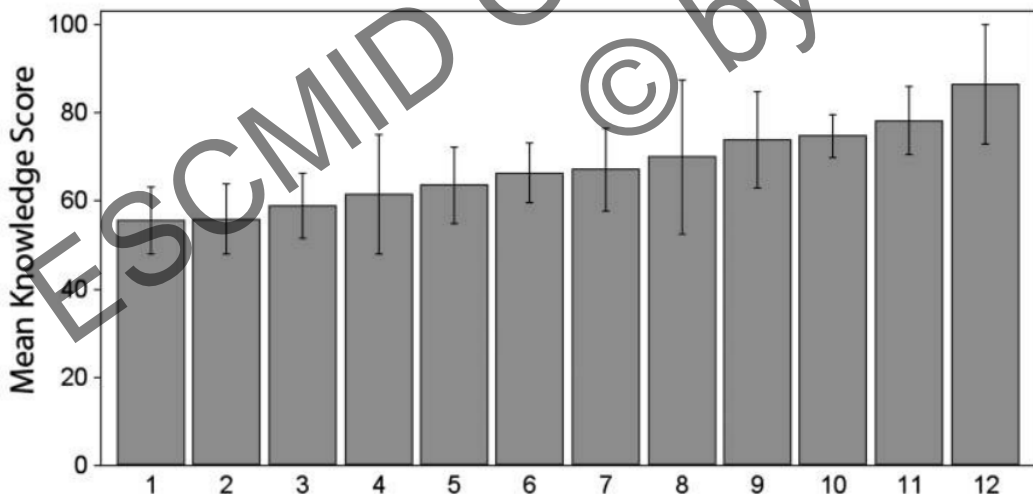
- AMS Structure & Governance
- 1. Formulary with restriction and prior approval
- 2. Selective reporting by micro in line with AM guidelines
- IT – e-Rx, decision support, on-line approvals
- Antibigrams

## Unit

1. Clinical Guidelines
  2. Monitoring performance of reporting (usage data, auditing use, quality use indicators)
  3. Review antimicrobial prescribing with intervention & direct feedback
- POC interventions: streamlining, IVOS, dose optimisation, TDM
  - Education

# Which specialty should we target for AMS?

- Complexity of patients? ITU, haematology, renal, liver?
- Mortality rate of specialty: elderly, emergency medicine
- Highest antibiotic users?
- Lower AMS knowledge of specialty: surgery
- Everywhere – using local available resources
- Laggards – low %, hard work



Abbo 2011 ICHE

Specialty

Specialty:

- 1 Surgical Subspecialties
- 2 Physical Medicine and Rehabilitation and others
- 3 Anesthesiology
- 4 Obstetrics and Gynecology
- 5 Pediatrics
- 6 Internal Medicine sub-specialties
- 7 Orthopedics
- 8 Emergency Medicine
- 9 General Surgery
- 10 Internal and Family Medicine
- 11 Critical Care
- 12 Infectious Diseases

# AMS resources

- Hospital board – monitor and drive improvement
- Committees - DTC, IPC
- AMS core team – Dr (ID or micro), AMS pharmacist
- Wider AMS committee: Snr Mgr, Intensivist, Surgeon, Anaesthetist, Snr Pharmacist, Snr nurse, IT / epidemiologist, IPC, trainee Dr, Ward nurse, primary care / community
- Unit level – Mgr, Snr Dr, Snr Nurse, IPC lead, AMS champion(s) – Dr & Nurse
- Ward level – Dr, nurse, pharmacist, IPC, scientist, technician. AMS champion – Dr & nurse
- Process systems to drive AMS where possible

# Key issues in specific wards: ICU

- Empirical therapy
  - When to immediately start vs. wait
  - Opportunities to avoid broad spectrum regimens
- Definitive therapy
  - De-escalation strategies
  - Appropriate dosing
  - Duration of therapy

# Key issues in specific wards: Haematology

- Antifungal stewardship
- Duration of therapy
- Pathogen-directed therapy



# Key issues in specific wards: Surgical wards

- Surgical prophylaxis
- Empirical therapy: coverage
- Duration of therapy
- Local audit & feedback

# Key issues in specific wards: Pneumology – Internal Medicine

- Empirical and definitive therapy in CAP, COPD
- Switching to oral
- Duration of therapy

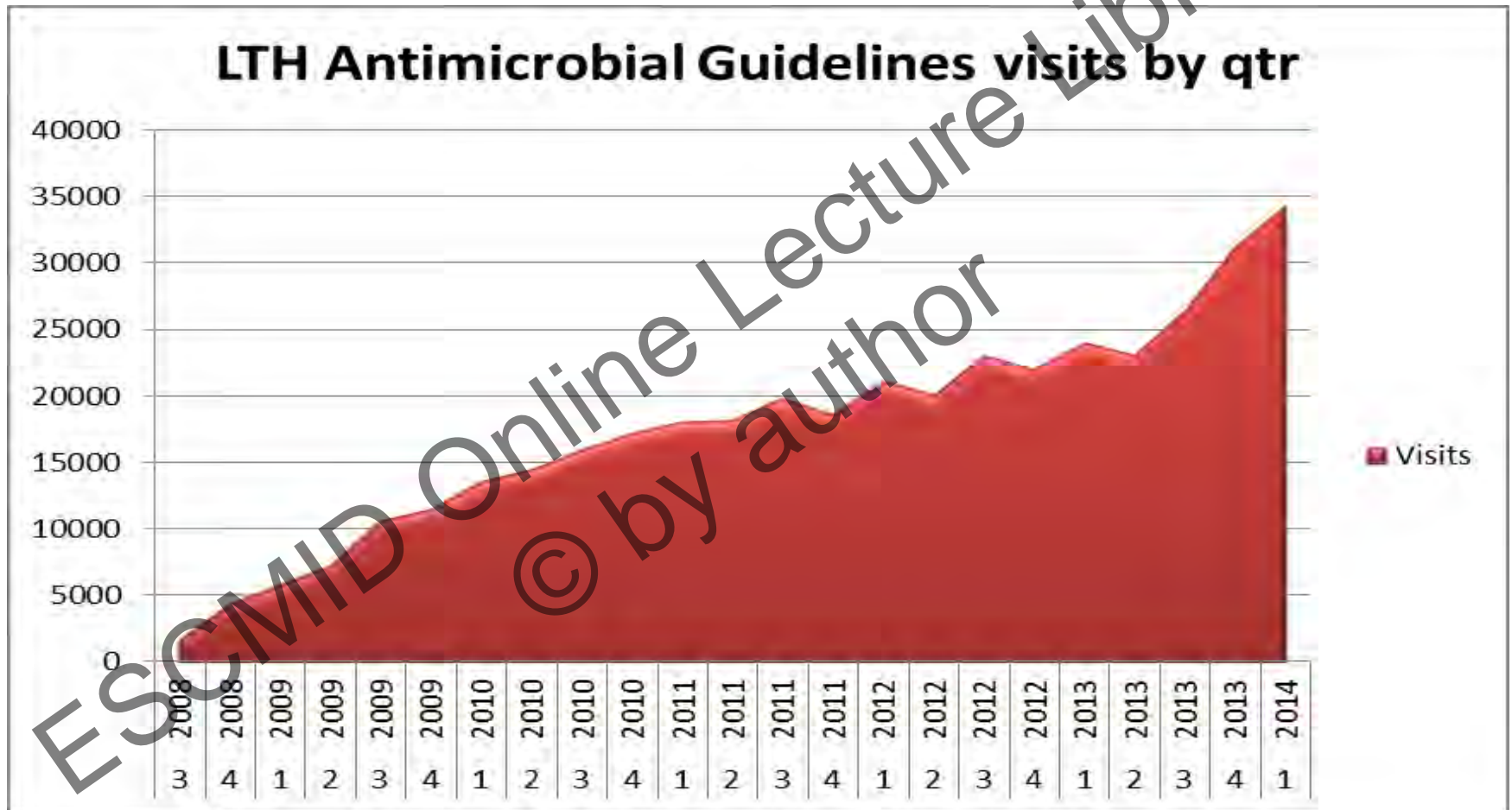
# Approaches

- “Individualise” according to size, receptivity, baseline prescription quality
  - Local protocols
  - Education (case-vignettes, formal sessions and courses, etc)
  - Audits
  - Ward rounds
  - Feed-back

# Guidelines, pathways & bundles

- Local development or adaptation of (inter)national guidelines by consensus
- Address local concerns
- Example: Leeds guidelines
  - Evidence-based development led by unit doctor supported by micro, specialty pharmacist and infection pharmacist
  - Present at specialty meeting, web-based peer review, all comments addresses & listed on guideline
  - Ability to comment on guideline in use & monitor usage
  - 12000 hits per month

# Consensus based guidelines = use



[nww.lhp.leedsth.nhs.uk/antimicrobials](http://nww.lhp.leedsth.nhs.uk/antimicrobials)

Mol 2005 JAC, McCahill 2007 Arch Surg,

# Formulary & approval systems

- **Formularies**: simple list → linked to treatment guidelines
- **Drug & therapeutic committee** review
  - Ideally linked to a guideline with an audit tool
- **Approval systems**
  - Manual: telephone using codes, but errors
  - Automated: pre-approval by indication
  - Electronic: web-based system with follow up if not on approved list
- **1<sup>st</sup> or 2<sup>nd</sup> dose approval** to ↓ time in severe sepsis
- **Full or part-time**: 24 hours / weekdays / daytime system
- **Follow up** of restricted supplies by pharmacy



# Day 3 review sticker for notes

|   |   |
|---|---|
| Start date of antibiotic therapy: / / 2007  | Date of review: / / 2007  |
| Review of initial <b>diagnosis</b>  | Significant <b>bacteriological results</b>  |
| <b>Antibiotic plan</b>  | Agent: _____<br>Route of administration: _____<br>Dosage: _____<br>Dosing interval: _____<br>Planned total duration: _____ days |
| If the patient receives iv antibiotic, is an <b>oral switch</b> possible?<br><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable (not on iv) | Give the reason for that choice:  |

**Figure 2.** Sticker used to improve documentation of the measures in the medical notes.

## Intravenous to Oral Antimicrobial Switch Strategy

Consider switch to oral antimicrobial therapy

- Reduce length of hospital stay
- Reduce adverse effects of IV therapy
- Improve patient comfort
- Save nursing time
- Reduce costs

**Let's GO PO**



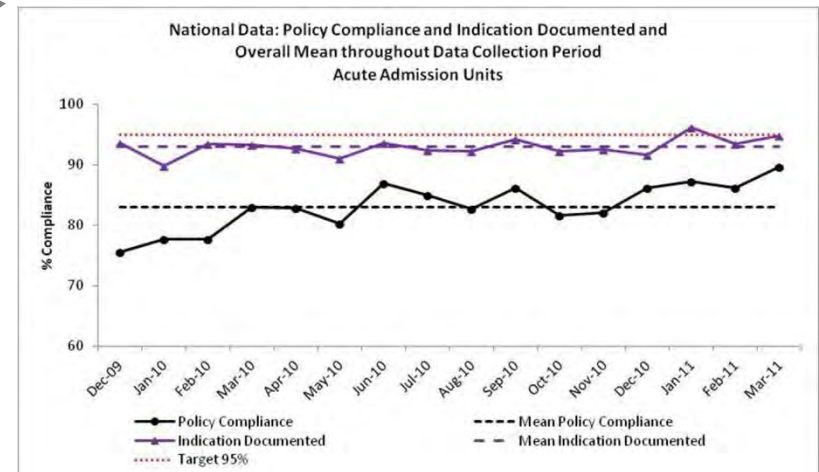
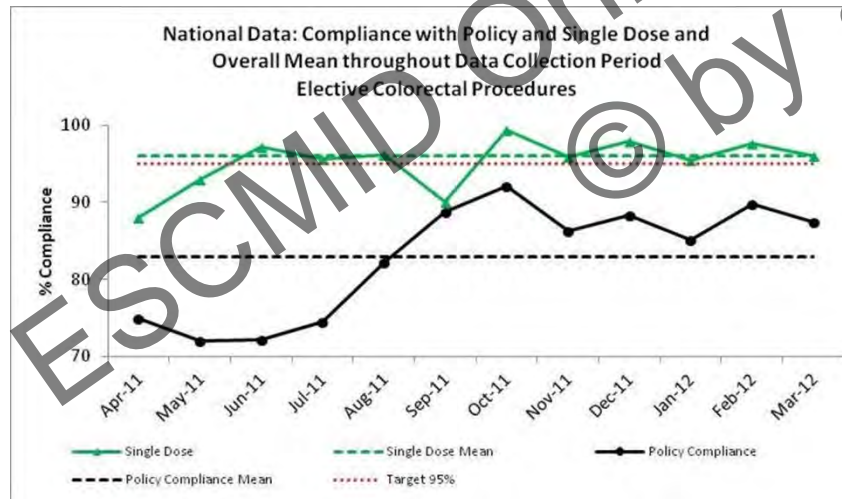
Pulcini JAC 2008; Dryden 2012 JAC; Mertz 2009 JAC;



# Antimicrobial review and prescriber feedback

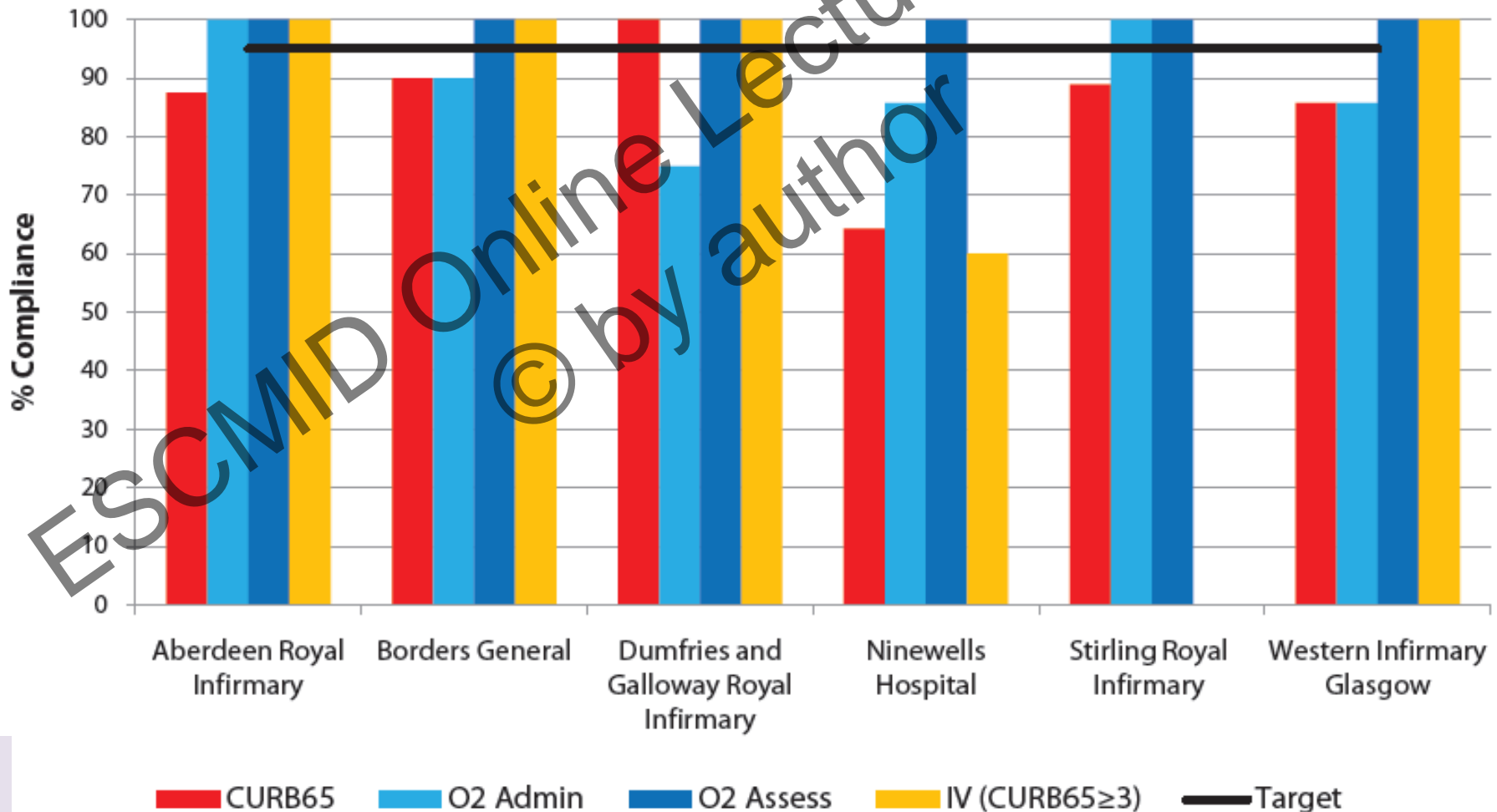
- Reviewing practice

- Individual episodes of care: loss of autonomy.  
Personal contact better than telephone or paging
- Quality improvement programmes: regular audit & feedback



# Audit of care bundles

## SNAP-CAP Results 15 April 2011

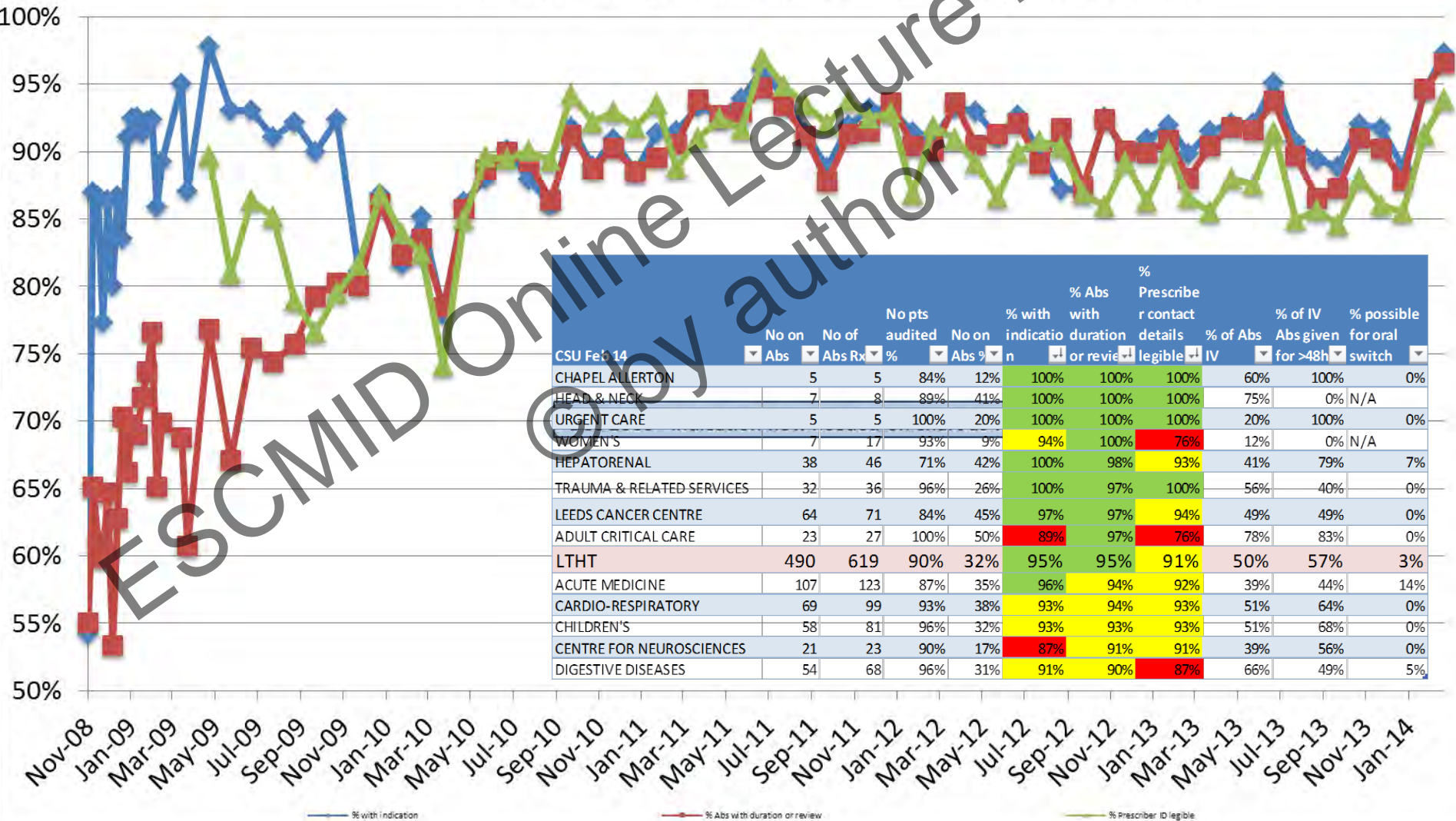


# Measuring performance of AMS

- Depends on IT available to you
- Surveillance data with outcomes: difficult without eRx
- Measuring the volume of antimicrobial usage
  - DDD/1000 OBD or DDD/1000 normalised bed days
  - Linked to infection rates or AMR
  - Local, regional, national or international
  - Control charts to monitor trends
  - Simple feedback to end users 😊 😐 😞
- Measuring quality of antimicrobial usage
  - Point prevalence surveys (national, regional or local)
- Process measures – key performance indicators
- Quality outcomes indicators - ↓ CDI or AMR

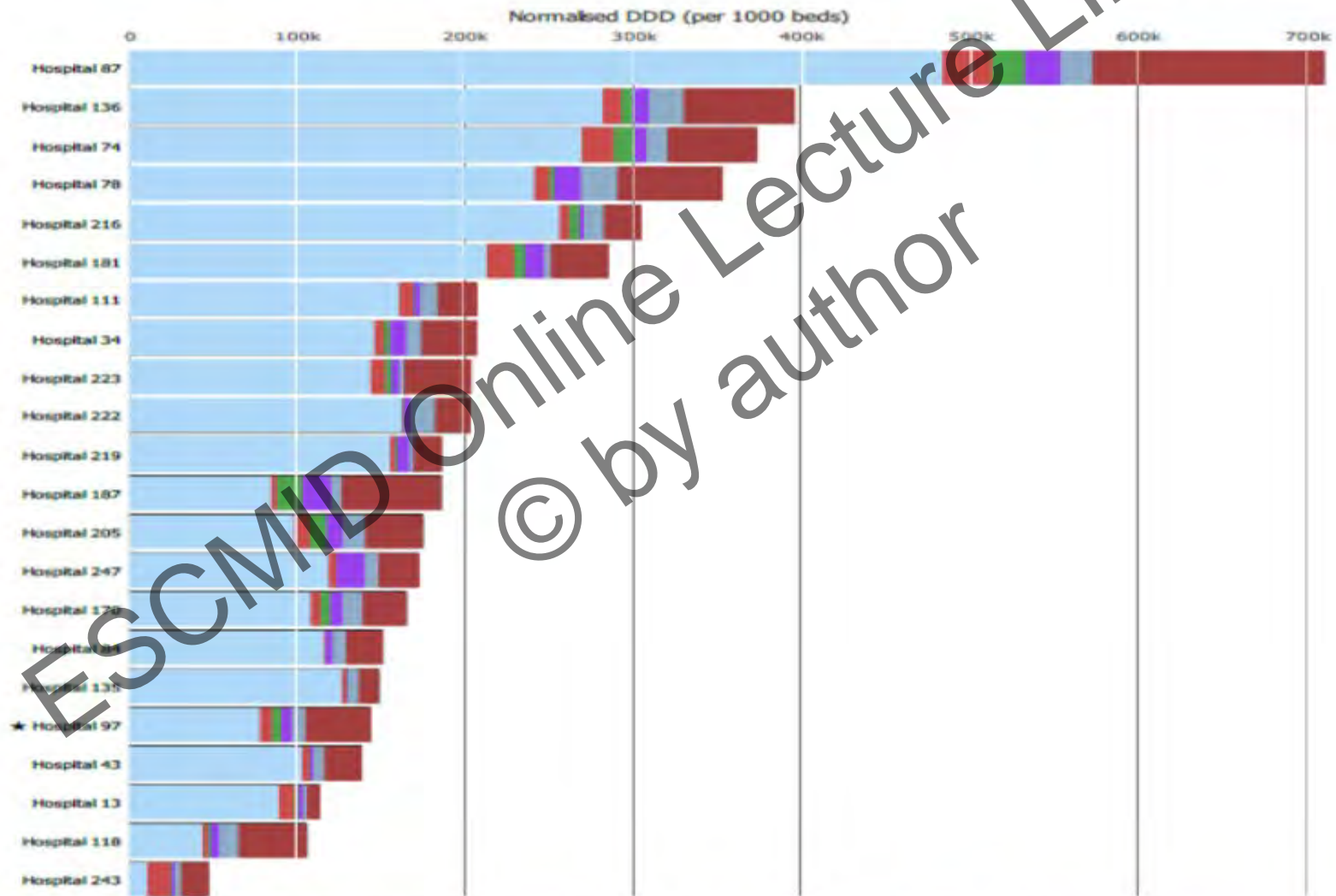
# Indication & duration on Rx with feedback

## Antimicrobial Medicines Code Compliance Audit



# UK Define: Benchmarking hospital prescribing

Antibiotics with higher Clostridium difficile risk Normalised DDD (per 1000 beds)



Note: Faint bars indicate that the Hospital is lacking at least 1 month's data in the date range specified.

- G01AA - Antibiotics
- J01CR - Combinations of penicillins, incl. beta-lactamase inhibitors
- J01DB - First-generation cephalosporins
- J01DC - Second-generation cephalosporins
- J01DD - Third-generation cephalosporins
- J01DI - Other cephalosporins and penems
- J01FF - Lincosamides
- J01MA - Fluoroquinolones

# Education

- Safe and prudent antimicrobial prescribing
  - Prescribing competencies (eg. UK)
- **All staff:** doctors, nurses, pharmacy, other HCPs, undergraduates, PATIENTS
  - Nurses: missed doses, prompt samples, challenging prescribing (non guidelines, IVOS)
  - Pharmacy: local educators, IVOS, de-escalate, etc
- **Active education:** academic detailing, consensus building and workshops better than passive
- **Pharma led education** might adversely affect prescribing behaviour
- **Simple, regular** and varied messages

# Computer technology

- **Electronic prescribing (CPOE)**
  - Include duration, indication, approval mechanism, order sets (prophylaxis, CAP)
- **Data warehousing**
  - drug – bug mismatches
  - Linked eRx, labs, pharmacy, medical records
- **Dose optimisation tools**
  - Vancomycin and aminoglycoside calculators
  - Dosing in obesity, renal impairment, etc
- **Decision support**
  - Web-based guidelines or Smartphone Apps

Hospital vs unit based  
stewardship: what is best?

BOTH – depending on the  
resource available

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