

Antimicrobial optimisation: an interactive workshop for hospital pharmacists

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- Nothing to declare



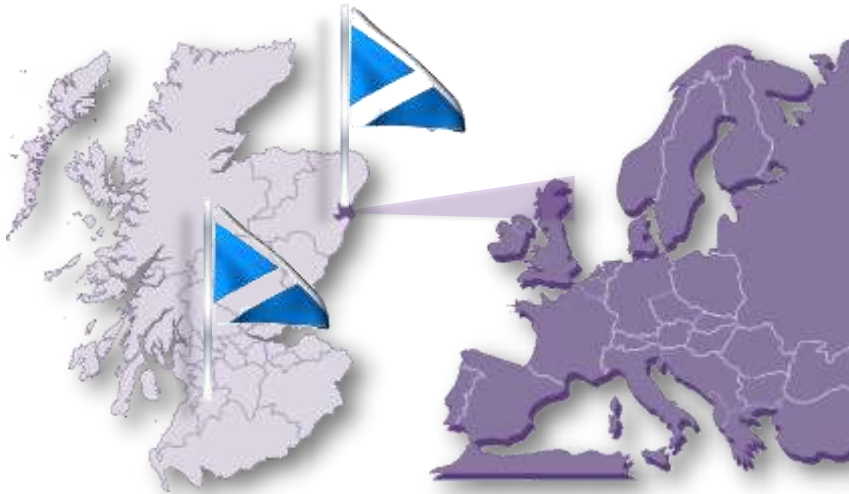
Workshop plan



- Welcome and introductions
- What is antimicrobial stewardship? (30 mins) 
- Demonstration/discussion of stewardship tools using examples from Scotland
- Group activities (40 mins) 
- Discussion and final thoughts (20 mins)

Learning objectives

- To understand the importance of appropriate antimicrobial treatment and the implications associated with misuse of antimicrobials
- To explore the different strategies which can be employed by hospital pharmacists to optimize antimicrobial therapy
- To consider ways of ensuring pharmaceutical care is delivered to patients receiving antimicrobials



- Antimicrobials are one of the most frequently prescribed medicines in hospital



- Around 20% of antimicrobial prescriptions in hospital may be inappropriate



Introduction to antimicrobial stewardship

Dr Jacqueline Sneddon
Healthcare Improvement Scotland

Outline of presentation

- Current position of antimicrobial resistance (AMR) in Europe
- What is antimicrobial stewardship?
- Key elements of a stewardship programme
- ‘Start Smart then Focus’
- Role of the pharmacist in stewardship



Antibiotic resistance is now as serious a threat as terrorism and could trigger an 'apocalyptic scenario', warns UK's top doctor

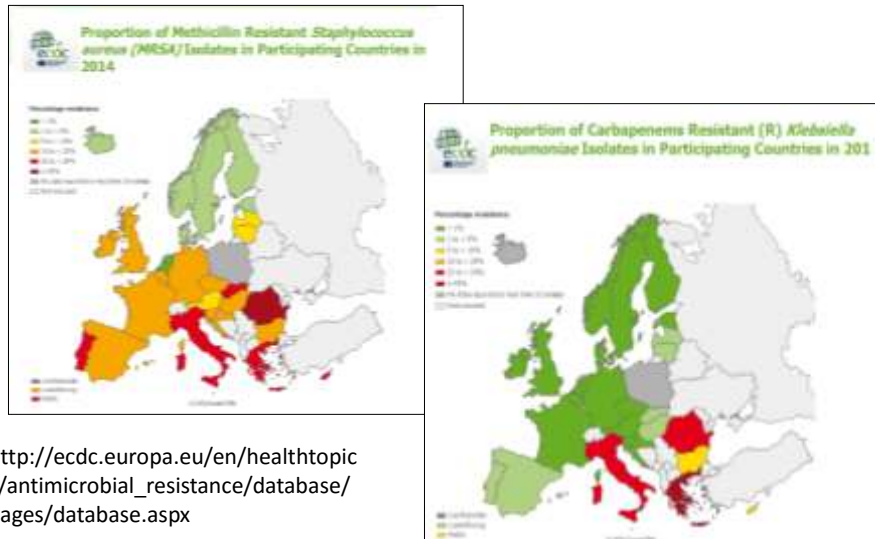
- Dame Sally Davies said people may die from routine infections after surgery within 20 years
- This is due to a lack of effective antibiotics
- Says situation so serious that the issue should be added to Government's list of civil emergencies

Why a sore throat could soon be fatal: Bugs are becoming more resistant to antibiotics, warn health chiefs 'A post-antibiotic era means, in effect, an end to modern medicine as we know it,' warns WHO chief Dr Margaret Chan

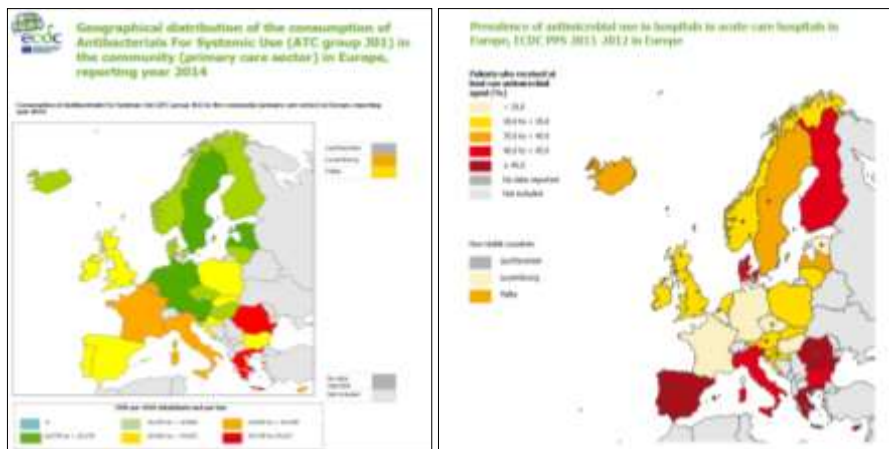
<https://www.youtube.com/watch?v=-ZGxT9nAiZo>



European resistance data



European antimicrobial consumption



Relationship between use and resistance

Clinical Infectious Diseases 2007;44:159–77

Table 2. Causal associations between antimicrobial use and the emergence of antimicrobial resistance.

Changes in antimicrobial use are paralleled by changes in the prevalence of resistance.

Antimicrobial resistance is more prevalent in health care-associated bacterial infections, compared with those from community-acquired infections.

Patients with health care-associated infections caused by resistant strains are more likely than control patients to have received prior antimicrobials.

Areas within hospitals that have the highest rates of antimicrobial resistance also have the highest rates of antimicrobial use.

Increasing duration of patient exposure to antimicrobials increases the likelihood of colonization with resistant organisms.

NOTE. A causal association between antimicrobial use and the emergence of antimicrobial resistance has been reviewed elsewhere [9, 19–22] and is strongly suggested on the basis of several lines of evidence that are derived from patient and population levels of analysis, colonization and infection data, and retrospective and prospective studies [23–31]. Adapted from [16].

Why is this a problem?

- Impact on patient care
 - ↓ survival with resistant infections
 - ↑ duration of stay
 - ↑ costs
- Hampers the control of infectious diseases and jeopardises health-care gains to society
- Threat of a return to the pre-antibiotic era as few new antibiotics in development

Antimicrobial Stewardship

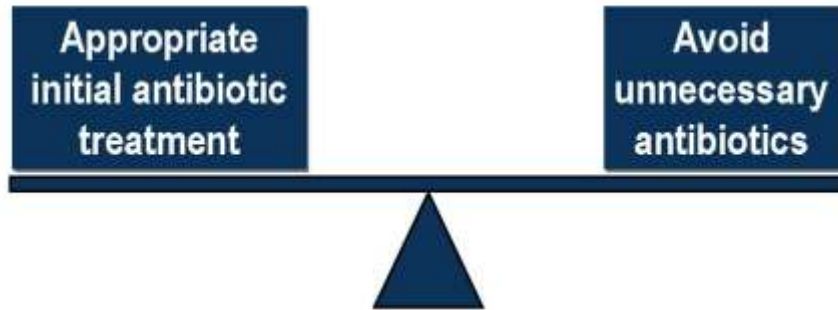
- One of key methods to address antimicrobial resistance along with infection control and improved environmental decontamination
- Overuse and misuse of antimicrobials is well documented in the literature – room for improvement through optimisation of use
- Effective stewardship shown to reduce Healthcare Associated Infections with associated benefits for patient outcomes - morbidity and mortality

What is Antimicrobial Stewardship?

A series of multi-professional interventions across all care settings to improve the use of antimicrobials

- ▶ timely and optimal selection, dose and duration of an antimicrobial
- ▶ aim for the best clinical outcome for the treatment or prevention of infection
- ▶ with minimal toxicity to the patient and minimal impact on resistance and other ecological adverse events such as *C. difficile* infection

Antimicrobial Stewardship

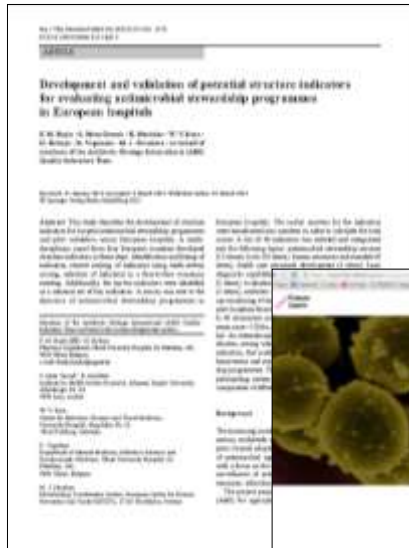


A balancing act

Medscape

Key elements of any Antimicrobial Stewardship programme

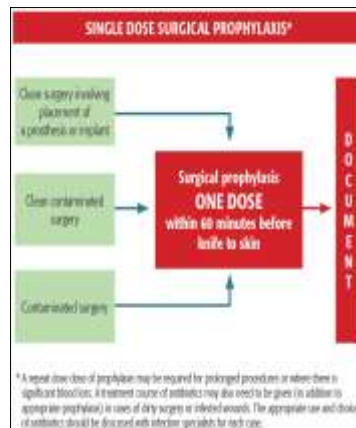
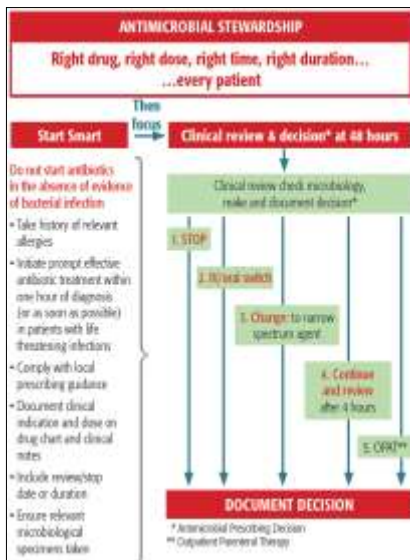
- Multi-professional Antimicrobial Management Team across both community and hospital supported by senior managers
- Engagement of the clinical community
- Antimicrobial guidance and formulary with restrictions on use of specific antimicrobials
- Surveillance of antimicrobial use and resistance
- Method of measuring compliance with guidance and evaluating impact of interventions to improve prescribing practice
- Education programme for healthcare staff and the public



Further resources on antimicrobial stewardship



'Start smart then focus'



<https://www.gov.uk/government/publications/antimicrobial-stewardship-start-smart-then-focus>

SSTF - Pharmacist Responsibilities

- Ensure allergy status is correct and complete
- All patients on antibiotics for treatment of infection reviewed daily.
- Review should include:
 - Is an antibiotic indicated?
 - i.e. has the diagnosis of infection been substantiated and is it an infection that requires antibiotic therapy
 - Is the antibiotic appropriate?
 - Consider drug choice, route, dose, duration
 - Check micro results (can we de-escalate to narrow spectrum agents)
 - Is the antibiotic working?
 - Check radiology reports, inflammatory markers, observations, end of bed review
 - Can the antibiotic be stopped?
 - Can the antibiotic be switched to oral?
- All interventions made should be documented in the medical notes and discussed with the clinical team.

Stewardship role of the pharmacist in hospital practice

- Approximately 1/3 of patients in hospital are prescribed an antibiotic and up to 1/2 of these prescriptions may be incorrect or inappropriate.
 - Examples include antibiotic not required, wrong dosage, penicillin use in allergic patients, prolonged courses, broad spectrum rather than narrow spectrum.
- Clinical pharmacists working on wards should promote use of policies to ward staff, ensure alert antibiotic procedures are followed and help to educate medical and nursing staff.
- Clinical Pharmacists and Pharmacy staff in Dispensary and Sterile Units should check all orders/prescriptions comply with local policy.

Antimicrobial Pharmacists

What do they do?

- New clinical specialist role developed in UK since 2000
- Key member of antimicrobial team tasked with local delivery of stewardship
- Key attributes:
 - Experienced clinical pharmacist
 - Skills for data analysis and audit
 - Ability to teach multi-professional groups
 - Confident communicator
 - Leadership skills

Input to direct patient care

- Support ward clinical staff in identifying and resolving issues with antimicrobial therapy
- Promote/enforce antimicrobial policies including:
 - Alert (restricted) agents
 - Intravenous to oral switch therapy (IVOST)



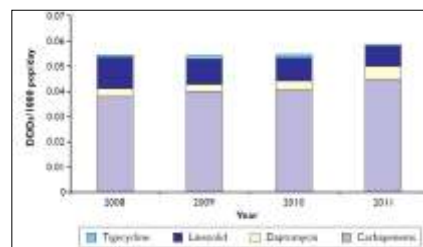
Specific pharmacist role

- Gentamicin and vancomycin
 - Major source of errors and incidents
 - Training of nursing and medical staff is important role
 - Often lack of information on dose and sample times
 - Lots of interventions required to improve care and ↓ risk
 - On-line calculators plus prescription & monitoring charts can help



Surveillance of antimicrobial use

- Standardised information on antibiotic use to measure trends and identify priorities for improvement (based on quality or cost)
- Antibiotic use measured in Defined Daily Dose and may be related to hospital activity e.g. Admissions, Occupied Bed Days
- Surveillance framework
 - Data at hospital, unit or ward level
 - Total use and selected antibiotics



Audit activities



- Point prevalence surveys
- Compliance with local antibiotic policy
- Prescribing indicators
- Vancomycin and gentamicin prescribing
- Intravenous to oral switch therapy (IVOST)
- Targeted audits based on trends in antibiotic use or HAI rates

Example of point prevalence survey data from Scotland 2011

Prevalence= 32.3%
(95% CI 30.9-33.8)

10.3% of patients received
3 or more AM

Indication for prescribing	Antimicrobials prescribed	
	N	%
Community acquired infection	3 131	55.3
Hospital acquired Infection	1 285	22.7
Surgical prophylaxis	482	8.5
Medical prophylaxis	431	7.6
Long term / Intermediate care acquired Infection	78	1.4
Other	70	1.2
Not recorded	187	3.3
Total	5 664	100

* Clinician defined hospital infection. Symptoms started 48 hours after admission to hospital

Treatment of infection (n=4494)

- Respiratory infection (31.2%), SSTI (18.0%), UTI (13.8%) and GI (13.5%)
- Amoxicillin (15.6%), co-amoxiclav (10.0%), metronidazole (9.0%)

Quality improvement initiatives

Improving management of common infections using improvement methodologies:

- Community acquired pneumonia care bundle
- Staph. aureus bacteraemia – algorithm for diagnosis and management
- Sepsis 6 care bundle which includes measure to improve antibiotics given within 1 hour of diagnosis

Educational activities



- Nursing staff - Gent & vanc, IVOST policy, Alert Antibiotics
- Medical staff - Gent & vanc , antibiotic policies
- Hospital pharmacy staff - Alert antibiotics, MRSA eradication, Hand hygiene, audit results
- Pre-registration pharmacists
- Community pharmacists
- Pharmacy and medicine undergraduates - Pharmacokinetics, Antimicrobial use

Summary

- Antimicrobial stewardship is essential to contain antimicrobial resistance and preserve the activity of antibiotics.
- All healthcare professionals have a role in antimicrobial stewardship.
- All pharmacists can help to promote and deliver stewardship to optimise antimicrobial therapy for patients.

PRESCRIBING INDICATORS

Hospital – based empirical prescribing: Antibiotic prescriptions are compliant with the local antimicrobial policy and the rationale for treatment is recorded in the clinical case note in $\geq 95\%$ of sampled cases.

Example							
Measures	Example Patients					Exposure Date	% Compliance
	A	B	C	D	E		
Indication documented in patient's notes	Yes	Yes	No	No	Yes	05	60%
Antibiotics Compliant with Policy	No	Yes	-	-	Yes	20	80%

Month _____ Year _____ Ward _____

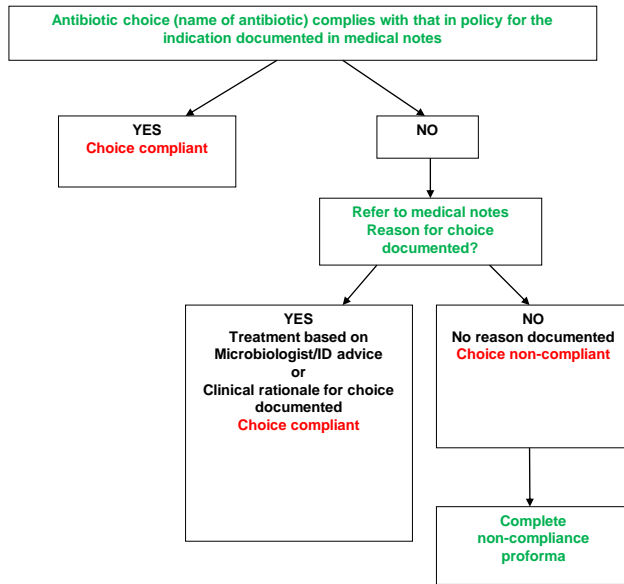
Week 1 Date	Patients				
Measures	1	2	3	4	5
Indication documented in patient's notes	Y/N	Y/N	Y/N	Y/N	Y/N
Antibiotics Compliant with Policy	Y/N	Y/N	Y/N	Y/N	Y/N

Week 2 Date	Patients				
Measures	1	2	3	4	5
Indication documented in patient's notes	Y/N	Y/N	Y/N	Y/N	Y/N
Antibiotics Compliant with Policy	Y/N	Y/N	Y/N	Y/N	Y/N

Week 3 Date	Patients				
Measures	1	2	3	4	5
Indication documented in patient's notes	Y/N	Y/N	Y/N	Y/N	Y/N
Antibiotics Compliant with Policy	Y/N	Y/N	Y/N	Y/N	Y/N

Week 4 Date	Patients				
Measures	1	2	3	4	5
Indication documented in patient's notes	Y/N	Y/N	Y/N	Y/N	Y/N
Antibiotics Compliant with Policy	Y/N	Y/N	Y/N	Y/N	Y/N

Total Monthly Exposure Date	Number Compliant	Total Patients
Indication documented in patient's notes		
Antibiotics compliant with policy		



Month _____ Year _____ Ward _____

Information	EXAMPLE	Patients				
		1	2	3	4	5
1. Indication for antibiotic	Celast					
2. Antibiotic(s) recommended in local policy	IV Amoxicillin plus IV benzylpenicillin					
3. Antibiotic(s) prescribed	IV benzylpenicillin					
4. Investigation of non-compliance	No documented reason for use of single agent. No antibiotics to support choice					
5. Action taken to address non-compliance	Raise awareness of policy with prescriber and nursing staff					

Point Prevalence Surveys (PPS) are used to audit the quality of antimicrobial prescribing.

Repeated use of PPS has been used at European and national level to map trends over time in relation to quality measures such as:

- % patients receiving an antibiotics,
- % intravenous antibiotics,
- % compliance with local antibiotic policy.

• Ideally a PPS is a snapshot taken on a single day across a whole hospital to collect information about patients prescribed antibiotics on that day.

• This is seldom practical so usually the PPS will be carried out over a period of 1 or 2 weeks to allow staff collecting data sufficient time to visit all wards.

• Large national PPS usually have a one or two month window for participating hospitals to collect and submit data.

European Surveillance of Antimicrobial Consumption (ESAC) dataset

Data element	Data options
Name of drug	From filtered WHO Drug list
Route	Parenteral, Oral, Rectal, Inhalation
Unit dose	Grams or MU, to 3 decimal places
Dosage frequency	1-12 per day, every (18,36,48) hours, twice per week, three times per week, continuous infusion
Indication	Coded list of indications
Indication group	Indication Group
Prophylaxis	Surgical, Medical
Diagnosis	Coded list of diagnoses
Day of therapy	1-28,29+,Long Term, Unknown
Is Review / Stop Date Documented	y/n/unknown
Reason in notes	y/n/unknown
Complies with (local) guidance	y/n/unknown
Date start Indication	DD/MM/YY (the date first antimicrobial was prescribed for indication)

http://ecdc.europa.eu/en/healthtopics/Healthcare-associated_infections/point-prevalence-survey/Pages/Point-prevalence-survey.aspx

Simplified version of PPS tool

Patient ID	
Name of drug	
Route	
Unit dose	
Dosage frequency	
Indication	
Complies with (local) guidance	

Group activities

- **Using the case studies provided, discuss the questions provided.**
- **Your group will be asked to focus on one case.**

- Antimicrobials are one of the most frequently prescribed medicines on the wards.



- Around 20% of antimicrobial prescriptions in hospital may be inappropriate.



- It is estimated that up to 50% of prescriptions are inappropriate.

Thank you for your participation

a very very last message.....

<https://www.youtube.com/watch?v=-G4cEYQBVu4>

