



**Brunel**  
University  
London

# Nurses in antimicrobial stewardship interventions- missing opportunities, wasted talent?

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## **Hosted by Jude Robinson**

President, Infection Prevention Society

[www.webbertraining.com](http://www.webbertraining.com)

November 19, 2024



# Declaration of interests

**Talk only my opinion and not necessarily my employers' or affiliated institutions'**

- > Brunel University London, UK
- > Imperial College London (hon), UK
- > University of Balearic Islands (hon), Spain
- > Universitat Oberta de Catalunya, Spain
- > Primary Care International, UK
- > Shifa al-Tameer Millat University, Pakistan



# Objectives

- Explore barriers and facilitators for participation of nurses in AMS
- Recognise opportunities and models for nursing leadership and involvement in AMS
- Describe evidence about nurse-focused interventions in AMS



**Governments**  
healthcare system leaders,  
and private actors **should**  
expand funding and  
opportunities to increase the  
**ESSENTIAL**  
**health workers**  
on the **frontline** of fighting resistance



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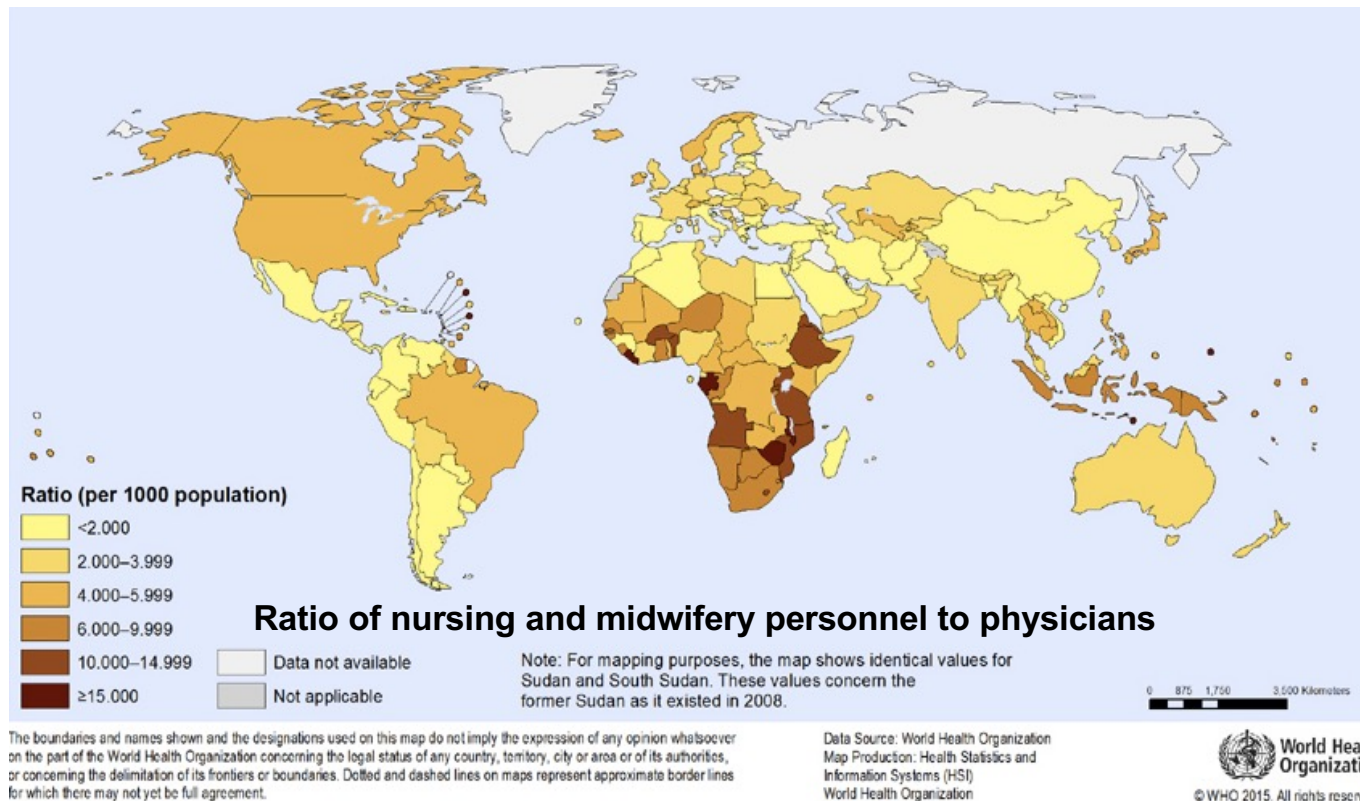
**12 900 000**

health-care workers

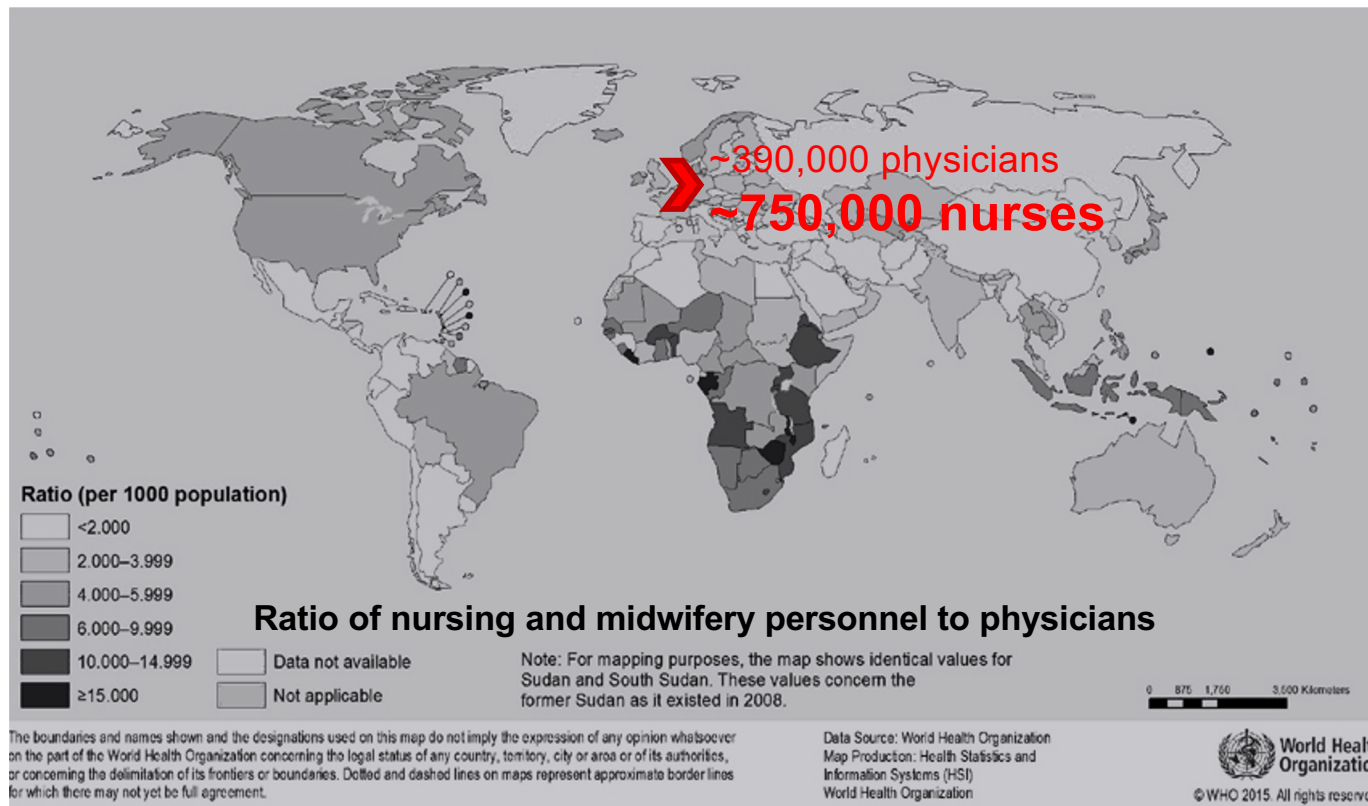
**by 2035**



# Nurses, the largest healthcare workforce



# Nurses, the largest healthcare workforce



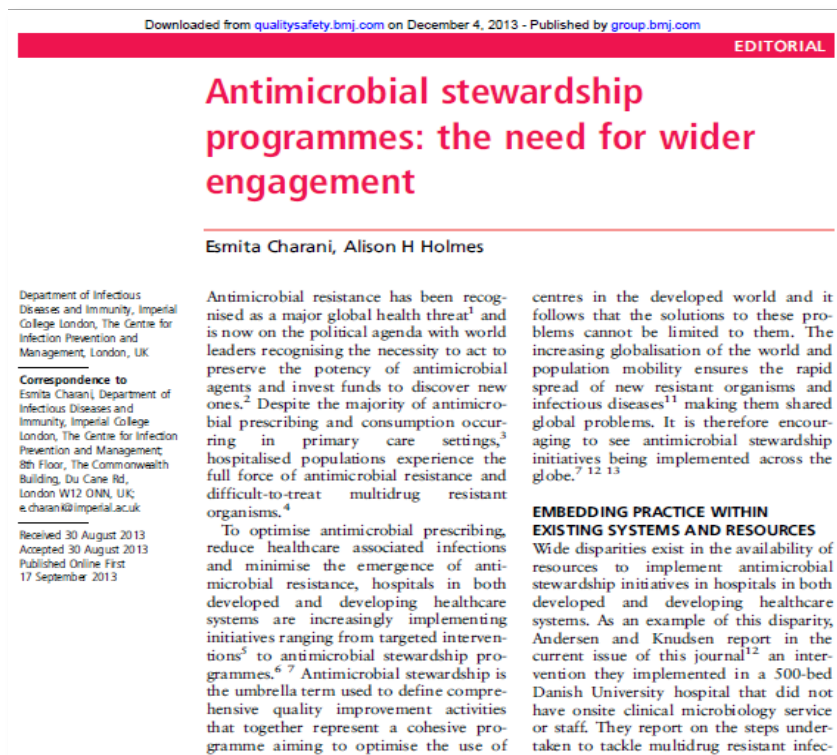
# Widening participation in stewardship...

## ‘AMS 2.0’

Typical core of:

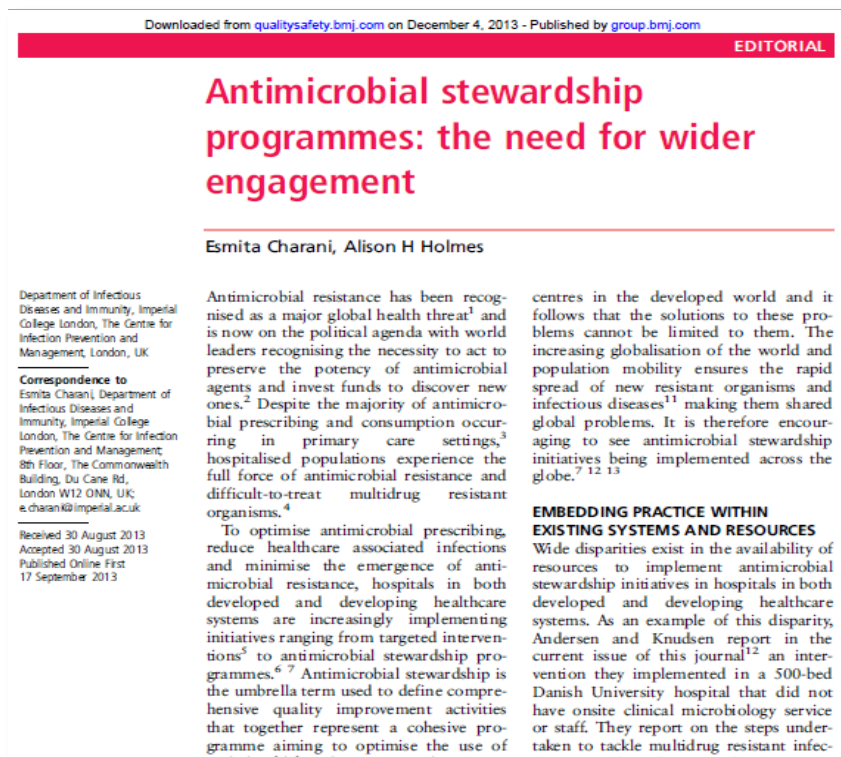
- Infectious diseases physician
- Clinical microbiologist
- Clinical pharmacist with expertise in infection

**Other members could be specialist nurses, for example infection prevention or stewardship nurses...**





# Widening participation in stewardship...



## ‘AMS 2.0’

Typical core of:

- Infectious diseases physician
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**Other members could be specialist nurses, for example infection prevention or stewardship nurses...**

**‘inter-professional effort across the continuum of care’**

**”...use existing systems and structures...”**

# Nursing stewardship focus often just clinical

*Clinical Infectious Diseases*  
**INVITED ARTICLE**  
 CLINICAL PRACTICE: Elie J. C. Goldstein, Section Editor

## The Critical Role of the Staff Nurse in Antimicrobial Stewardship—Unrecognized, but Already There

Richard A. Orent,<sup>1</sup> Elie J. C. Goldstein,<sup>1</sup> and Alfred Iellitto,<sup>2</sup> MD

<sup>1</sup>Yale-New Haven Hospital, Yale School of Medicine, School of Nursing, Boston, and <sup>2</sup>Yale School of Medicine, Department of Health, Behavior, and Society, Yale University, New Haven, Connecticut

The emergence and worldwide spread of antimicrobial resistance presents a global health crisis that both the US Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) have labeled a grave threat to human health [1]. The “perfect storm” of widespread antibiotic use, pharmaceutical industry retreat from new antibiotic development [2], and spread of antibiotic resistant organisms [3], combined with rapid, accessible international travel [4] has captured the attention of healthcare professionals, national governments, the media, and the public at large. The main immediately available strategy to address this problem is the utilization of currently available antibiotics and resources in the most judicious manner to achieve the best clinical results, while limiting the development and propagation of multi-drug resistant microorganisms.

Antimicrobial stewardship is such a programmatic approach to the thoughtful use of antibiotics [5]. It is hoped that education of all healthcare providers, as well as the general public about the rationale for antimicrobial stewardship will lead to a restraint in the use of antibiotics that was felt to be unnecessary in an earlier time when antibiotics were regarded as abundant and effective “miracle drugs.” Although conceptual guidelines for the ideal use of antibiotics were published in 1988 [6], and warnings regarding resistance to antibiotics were promulgated as far back as 1939 and 1948 [7], formal antimicrobial stewardship programs (ASPs) have developed only in the last 15 years [8]. The major currently recognized stakeholders in ASPs include pharmacy, infectious diseases, infection prevention, and microbiology professionals, with administrative (including financial and regulatory) support [9]. The sector currently absent from the formal organizational chart is nursing.

Repeatedly, in guidelines for the development of ASPs, broad-based, multidisciplinary involvement is highlighted as an essential feature to achieve the goals of antimicrobial stewardship [10–12]. Brief mention of including staff nurses is made in these recommendations, but is limited to at most 3 or 4 sentences. In 2 articles from the United Kingdom and from Australia [13, 14] and in the Institute for Health Improvement/Centers for Disease Control and Prevention (IHICDC) Antibiotic Stewardship Driver Diagram and Change Package [15], comment is made about nursing functions. However, in the latter, the mentioned secondary drivers are not explicitly assigned or attributed to nurses, and in the 2 infection control journal articles, the interventions are described as “should be implemented” [14] or “could impact” [13] antimicrobial stewardship efforts. We assert that staff nurses are already participating in these activities, albeit not in an acknowledged or integrated fashion. Because of this exclusion, they cannot contribute most effectively to the diverse goals of ASPs. The unintentional mischaracterization of the participation of nurses in ASPs as only potential rather than actual has the additional unintended consequence of diverting nursing from those very activities that nurses need to understand as critical attributes of antimicrobial stewardship.

The dichotomy between the omission of nurses from formal ASP guidelines and the reality of daily nursing practice becomes obvious if one examines a stepwise progression through a typical inpatient hospital admission. Table 1 lists the antimicrobial stewardship activities involved in the care of patients, with the traditional stewardship stakeholders who are assigned responsibilities or credit for their operational completion. On

Received 18 May 2015; accepted 4 August 2015; published online 11 August 2015.  
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 DOI: 10.1093/cid/civ447

84 • CID 2016;62 (1 January) • CLINICAL PRACTICE

Table 1. Overlap of Nursing Activities With Function Attribution in Current Antimicrobial Stewardship Models

	Nursing	Microbiology	Case Management	Pharmacy	Infectious Diseases	Infection Control	Inpatient Physician	Administration
<b>Patient admission</b>								
Triage and appropriate isolation	•					•		
Accurate allergy history	•			•	•		•	
Early and appropriate cultures	•				•		•	
Timely antibiotic initiation	•			•	•		•	•
Medication reconciliation	•			•			•	
<b>Daily(24 h) clinical progress monitoring</b>								
Progress monitor and report	•		•		•		•	
Preliminary micro results and antibiotic adjustment	•	•		•	•			
Antibiotic dosing and de-escalation	•			•	•		•	
<b>Patient safety &amp; quality monitoring</b>								
Adverse events	•			•	•		•	
Antibiotic Stewardship Driver Diagram and Change Package	•			•	•		•	
Change in patient condition	•			•	•		•	
Final culture report and antibiotic adjustment	•	•		•	•		•	
Antibiotic resistance identification	•	•		•	•		•	
<b>Clinical progress/patient education/charge</b>								
IV to PO antibiotic, outpatient antibiotic therapy	•		•	•	•		•	
Patient education	•			•	•		•	
Length of stay	•		•	•	•		•	
Outpatient management, long-term care,	•		•	•	•		•	

Abbreviations: IV, intravenous; PO, per os [oral].

# Emerging non-clinical nursing stewardship roles

**Table 1**

Recommendations for action

Area of nursing	Nursing organizations and constituencies	Recommended action
Practice	American Nurses Association; Nursing staff, managers, and directors across clinical care settings  American Nurses Credentialing Center American Association of Nurse Practitioners; Nurse practitioners; Other professional specialty nursing organizations American Organization of Nurse Executives; Chief nursing officers	<ul style="list-style-type: none"> <li>• Adopt antibiotic stewardship as a patient safety imperative</li> <li>• Provide robust education offerings on topics related to antibiotic resistance and antibiotic stewardship</li> <li>• Promote antibiotic time-outs</li> <li>• Partner and collaborate with antibiotic stewardship teams</li> <li>• Raise nursing awareness and provoke action</li> <li>• Promote the CDC Get Smart About Antibiotics Program</li> <li>• Include antibiotic stewardship in Magnet Recognition Program criteria</li> <li>• Raise nurse practitioner awareness and provoke action</li> <li>• Develop resources to support nurse practitioner engagement in antibiotic stewardship activities</li> <li>• Provide robust education offerings on topics related to antibiotic resistance and antibiotic stewardship</li> </ul>
Education	American Association of Colleges of Nursing; Nursing faculty and curriculum committees; Association for Professionals in Infection Control and Epidemiology	<ul style="list-style-type: none"> <li>• Spearhead strategic nursing engagement in organizational antibiotic stewardship programs</li> <li>• Leverage organizational resources</li> <li>• Ensure that nurses are recognized as influential members of patient care team in combating antibiotic resistance</li> <li>• Ensure nursing is represented on antibiotic stewardship teams</li> <li>• Position nursing as a leading partner in advancing strategies to reduce antibiotic resistance</li> <li>• Assure that basic and graduate level nursing curriculum includes benefits, risks, and management of antibiotic use, appropriate antibiotic use and administration, and role of nurses in antibiotic stewardship programs</li> <li>• Develop educational materials to support nurses for their role in antibiotic stewardship (eg, for nurse practitioner students, include curriculum regarding appropriate antibiotic prescribing and monitoring, including inappropriate antibiotic use, particularly for viral illnesses)</li> <li>• Deploy infection preventionists as staff educators and members of antibiotic stewardship programs</li> <li>• Assess the impact of nurse involvement in antibiotic stewardship on antibiotic use patterns</li> <li>• Examine antibiotic prescribing patterns among nurse practitioners</li> </ul>
Research	National Institute of Nursing Research; Nurse researchers; Professional specialty nursing organizations Association for Professionals in Infection Control and Epidemiology	<ul style="list-style-type: none"> <li>• Examine the impact of infection preventionist involvement in antibiotic stewardship on antibiotic use patterns</li> <li>• Examine the impact of infection prevention policies and programs</li> <li>• Describe how infection preventionists are engaging nursing in antibiotic stewardship efforts</li> <li>• Support and disseminate information regarding the <i>National Action Plan for Combating Antibiotic-Resistant Bacteria</i></li> <li>• Support the Centers for Medicare &amp; Medicaid Service's proposed antibiotic stewardship Condition of Participation and The Joint Commission's Antimicrobial Stewardship Standard (MM.09.01.01)</li> <li>• Suggest and promote nurse membership to national committees and agencies involved with antibiotic stewardship and related policies (eg, urge the Secretary of Health and Human Services to appoint a nurse member to the Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria, created by Executive Order 13676 in September 2015)</li> </ul>
Policy	American Academy of Nursing; Nursing policy leaders	



# Barriers to resolve before more nurses engage in antimicrobial stewardship

- **Foundational**
- Ownership/ 'branding'
- Educational
- Leadership



# Do nurses 'think they should do' AMS?

# NOT REALLY



# Do nurses 'think they should do' AMS?

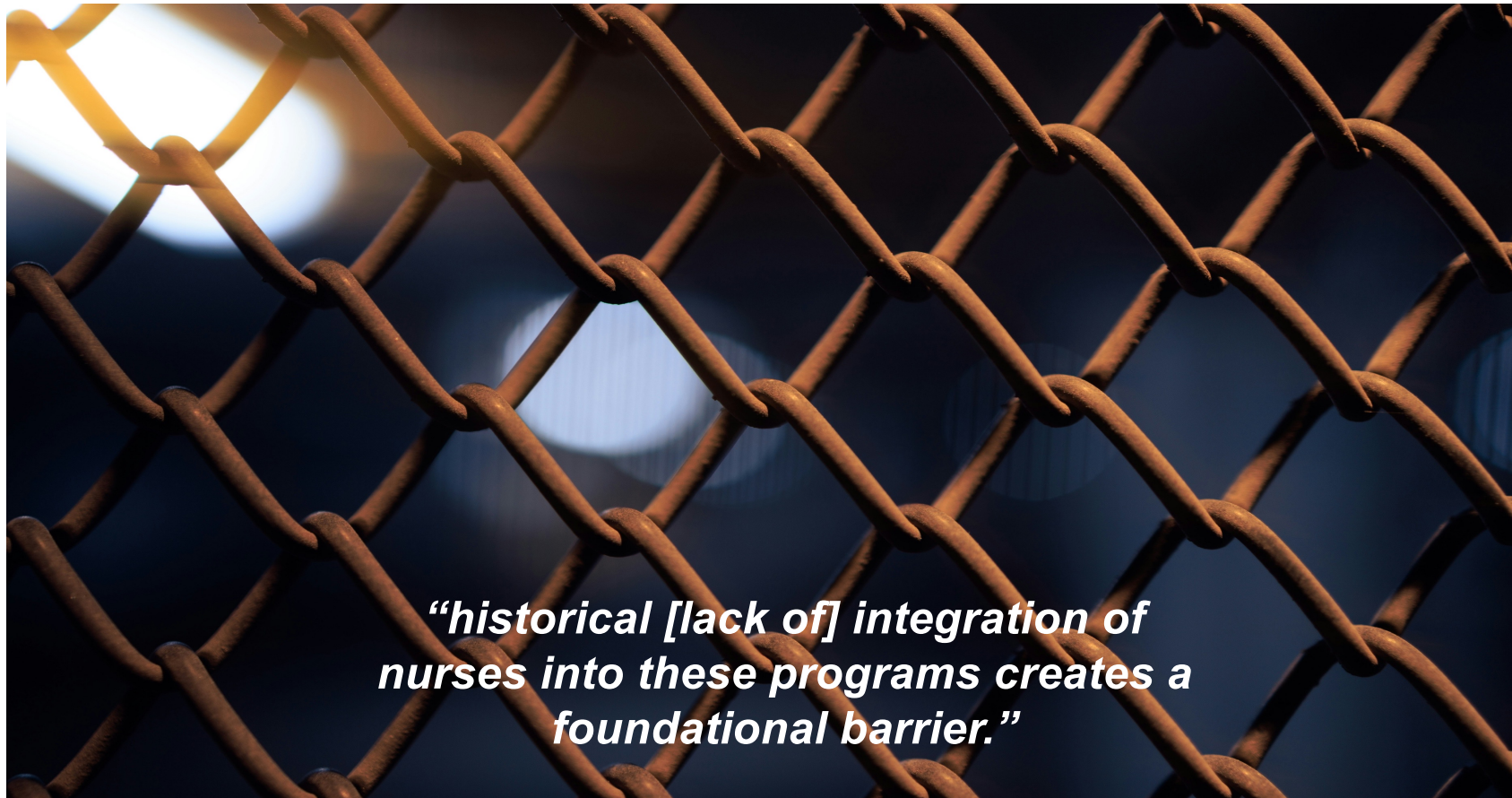
	Heard about AMS	Willing to participate in AMS
Anaesthetists	38%	51%
Pharmacists	80%	100%
Physicians	64%	55%
Surgeons	37%	48%
<b>Nurses</b>	<b>22%</b>	<b>43%</b>

# Do nurses 'think they should do' AMS?



*“nurses’ perception that they have been **“left out”** of antimicrobial stewardship efforts, leading them to consider antimicrobial stewardship has little relevance to their practice...”*

# Do nurses 'think they should do' AMS?



*“historical [lack of] integration of nurses into these programs creates a foundational barrier.”*





# Barriers to resolve before more nurses engage in antimicrobial stewardship

- Foundational
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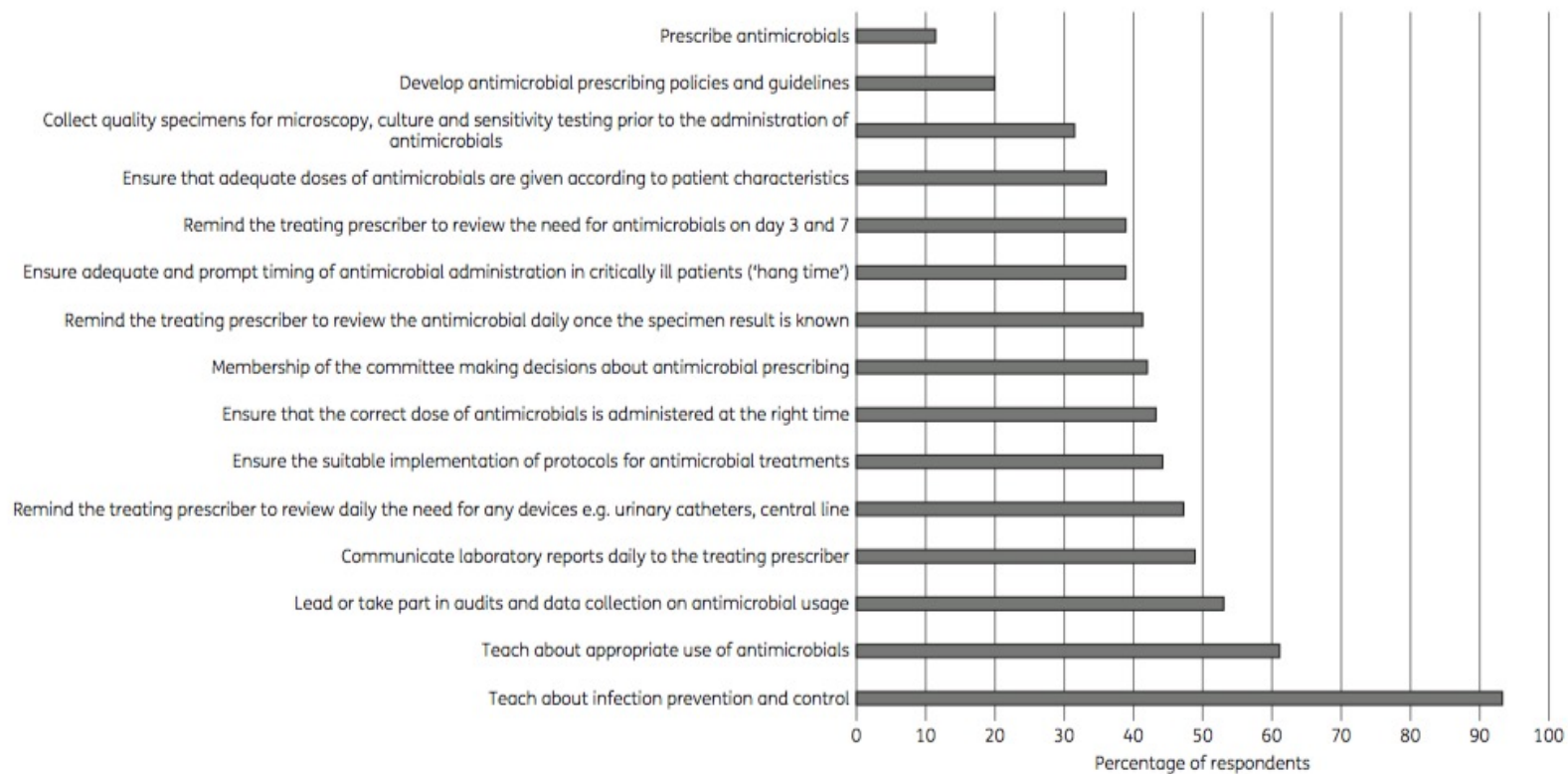


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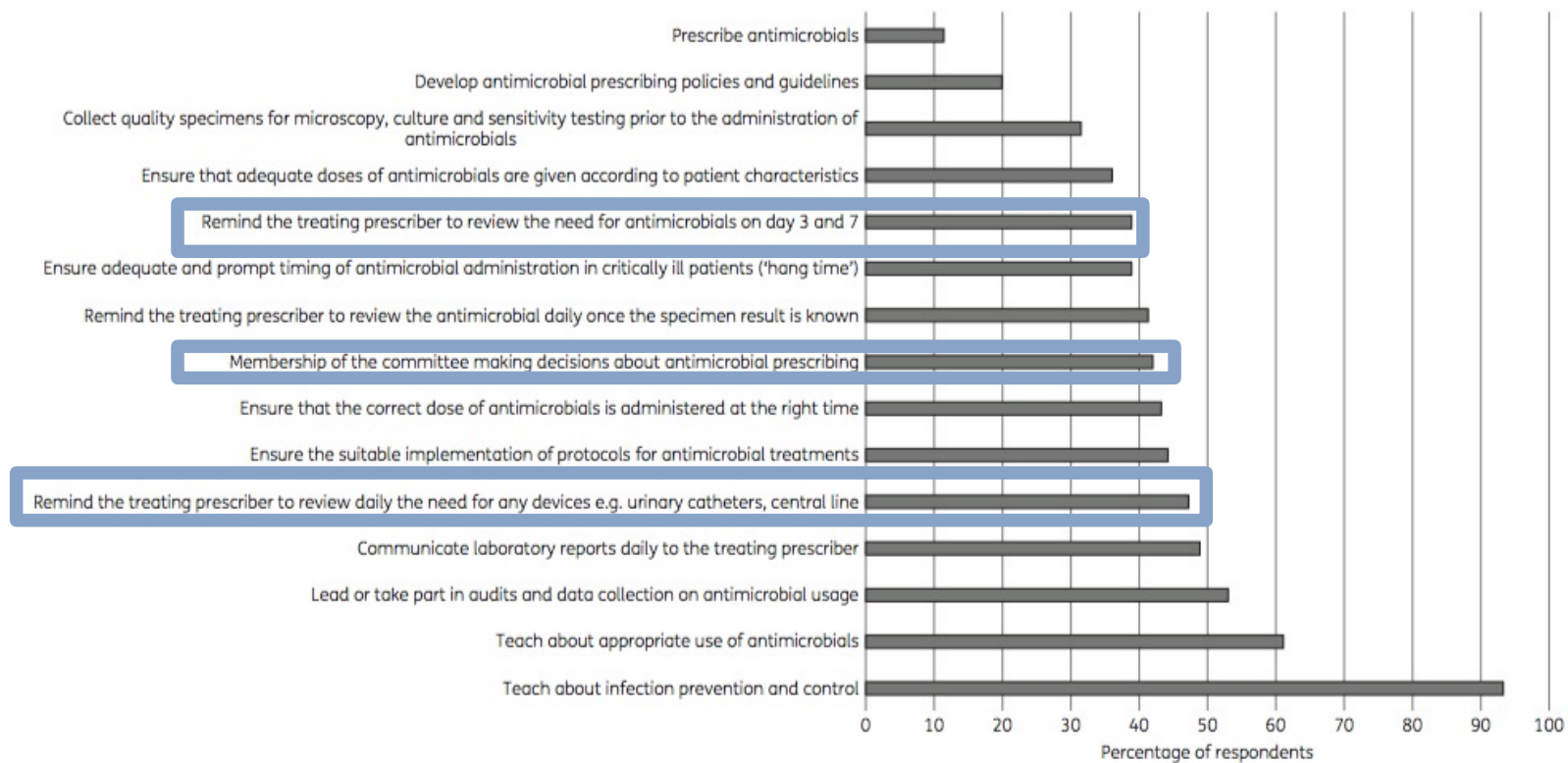


**Figure 1.** AMS tasks undertaken as part of the job. Some performed more than one type of task.

Bulabula et al. *Journal of Antimicrobial Chemotherapy*, 2018;73(5):1408–1415, <https://doi.org/10.1093/jac/dky023>



# Do nurses 'do' AMS?

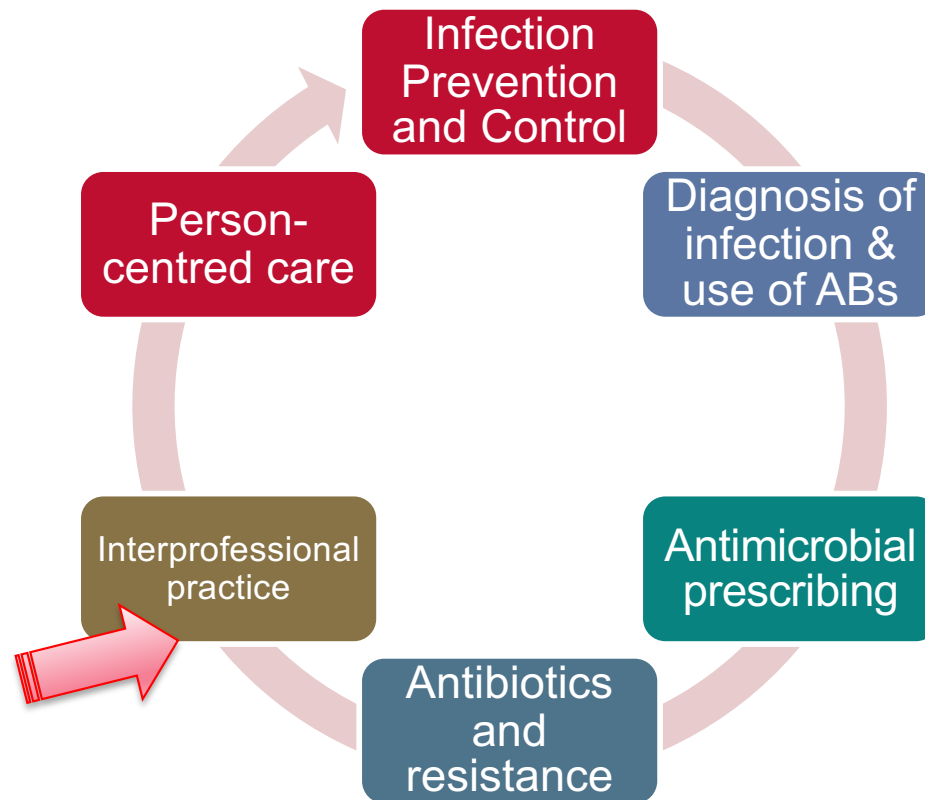


**Figure 1.** AMS tasks undertaken as part of the job. Some performed more than one type of task.

Bulabula et al. *Journal of Antimicrobial Chemotherapy*, 2018;73(5):1408–1415, <https://doi.org/10.1093/jac/dky023>



# Do nurses 'do' AMS? More than technical tasks



# The urine analysis, a powerful nurse-owned prescribing nudge

## Asymptomatic bacteriuria vs UTI

- > pyuria on urine analysis (UA)= x4-fold antibiotic use *regardless of culture performed, found negative or with low-colony count* (Lee et al, 2015)
- > Isolated bacteriuria often prompts AB prescription despite lack of symptoms (Walker et al, 2000)

**‘Heuristics’-driven** (i.e., colour, smell, appearance)  
UA/culture (Drekonja et al, 2019)

**“The confused patient”** (Stone et al, 2015)



Lee et al. BMC Infect Dis 2015;15:289; Walker et al. CMAJ. 2000;163:273–277; Drekonja et al. Infect Control Hosp Epidemiol. 2019;40:963-967; Stone et al. Infect Control Hosp Epidemiol. 2015;33:965–977.

# Do nurses 'do' AMS?

Figure 1. Summary of two Plan-Do-Study-Act (PDSA) cycles during intervention implementation

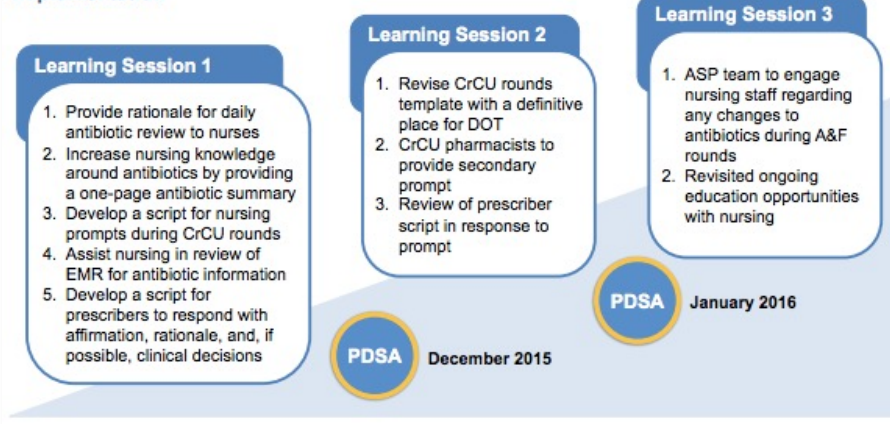


Figure 2. Proportion of patients on antibiotics for whom nurses discussed the antibiotics on CrCU rounds (ABX-PRT)

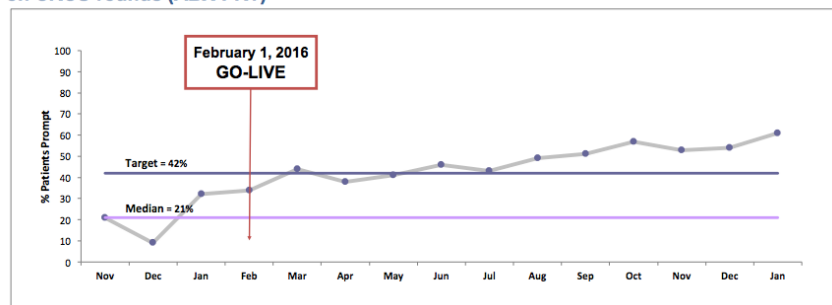
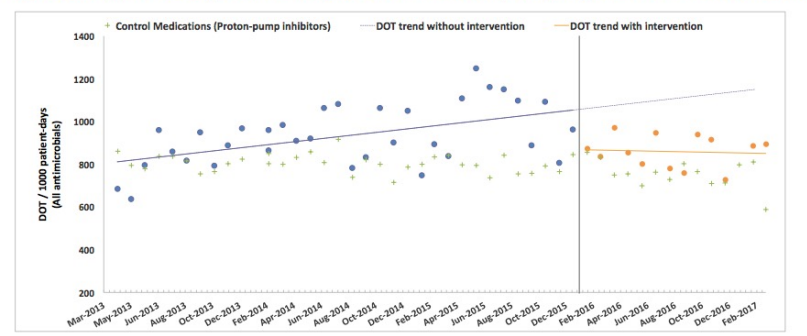
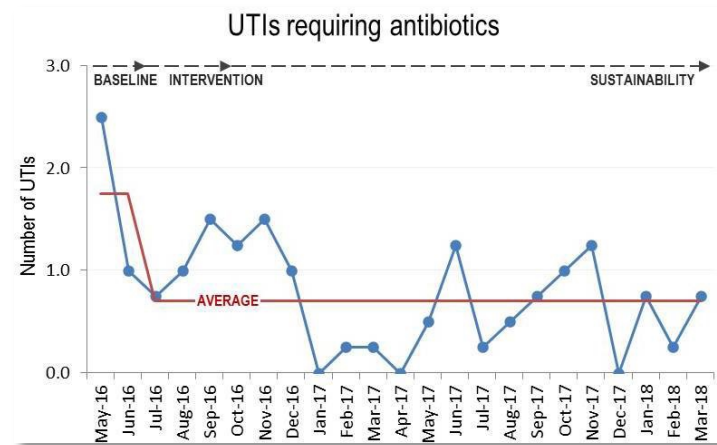


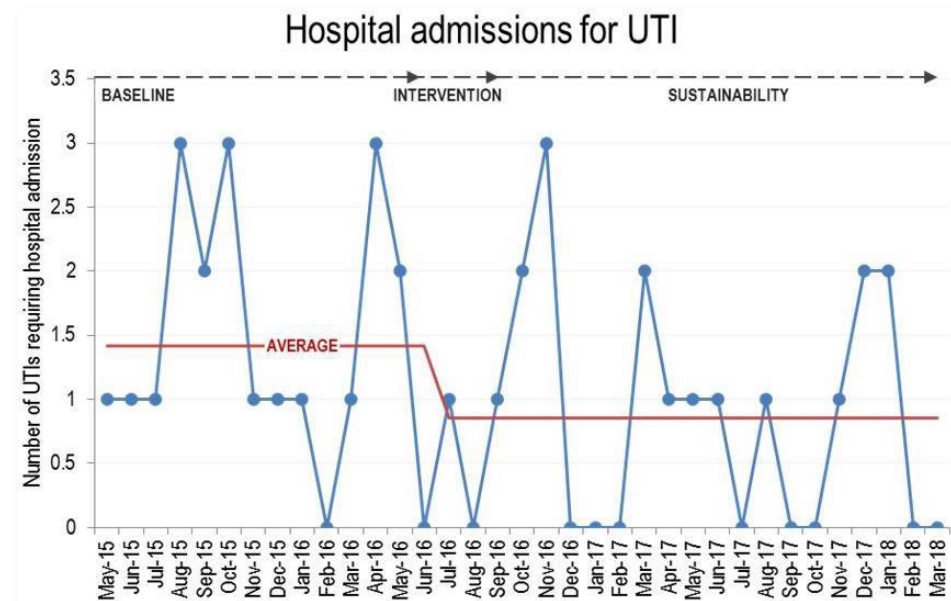
Figure 3. Segmented regression analysis of antimicrobial prompting on all antimicrobials DOT



# Reducing urinary tract infections in care homes by improving hydration



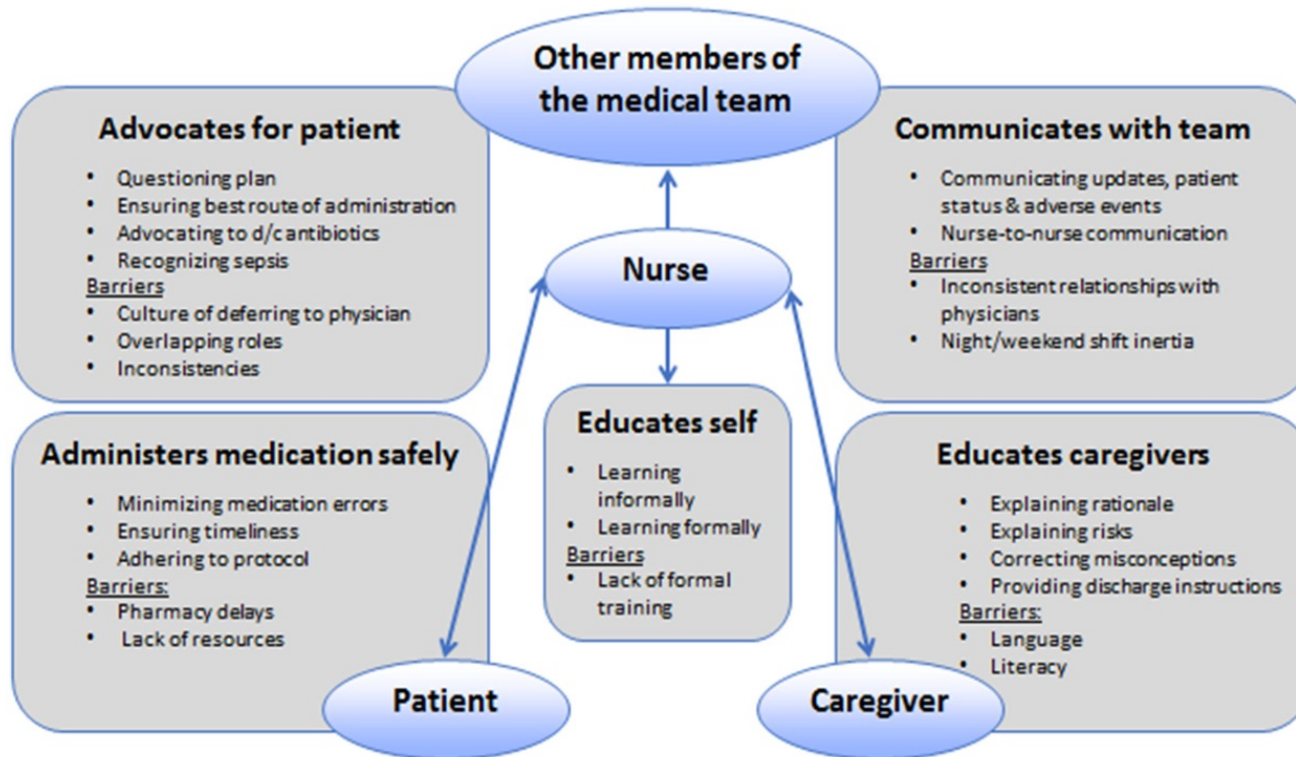
Average monthly numbers of urinary tract infections (UTIs) requiring antibiotics during the baseline, intervention and sustainability phase.



Average number of hospital admissions for urinary tract infections (UTIs) during baseline, intervention and sustainability phase.



# Do nurses 'do' AMS?



Nurses often perform AMS tasks without recognizing them as such, suggesting a lack of ownership of the AMS role.

# Do nurses 'do' AMS? It's not AMS, it's nursing...

- 01** Minimise unnecessary prescribing of antimicrobials
- 02** Ensure adequate timing of antimicrobial administration
- 03** Adopt necessary infection prevention and control measures
- 04** Obtain biological samples for M,C&S
- 05** Therapeutic drug monitoring, once adequate dosing
- 06** IV administration only in severely ill, unable to tolerate oral treatment
- 07** Review micro results daily, de-escalate to narrow-spectrum
- 08** Review intravenous treatment daily, switch to oral route promptly
- 09** Require single dose surgical prophylaxis regimens as appropriate



# Do nurses 'do' AMS? It's not AMS, it's nursing...

**01** Minimise unnecessary prescribing of antimicrobials **OK**

**02** Ensure adequate timing of antimicrobial administration **OK**

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**07** Review micro results daily, de-escalate to narrow-spectrum **OK**

**08** Review intravenous treatment daily, switch to oral route promptly **OK**

**09** Require single dose surgical prophylaxis regimens as appropriate **OK**



# ...and this is not poor AMS, but **poor nursing care**

**Table 1.** Potential under-dosing of antibiotics attributable to residual volume

Antibiotic <sup>4,3</sup>	Recommended dose	Recommended dilution	Infusion volume	Infusion volume administered to patient	Drug compound administered to patient	Drug compound left in iv administration set	Infusion volume	Infusion volume administered to patient	Drug compound administered to patient	Drug compound left in iv administration set
piperacillin/tazobactam	4 g/0.5 g 8 hourly	50–100 mL NaCl	50 mL	30.5 mL	61%	39%	50 mL	20 mL	40%	60%
ampicillin	1 g 6 hourly	100 mL NaCl	100 mL	80.5 mL	80.5%	19.5%	100 mL	70 mL	70%	30%
cefazolin	1–2 g 8 hourly	50–100 mL NaCl	50 mL	30.5 mL	61%	39%	50 mL	20 mL	40%	60%
ertapenem	1 g daily	50 mL NaCl	50 mL	30.5 mL	61%	39%	50 mL	20 mL	40%	60%
imipenem	1 g 8 hourly	100 mL NaCl	100 mL	80.5 mL	80.5%	19.5%	100 mL	70 mL	70%	30%
meropenem	1 g 8 hourly	NaCl no recommended volume	50 mL	30.5 mL	61%	39%	50 mL	20 mL	40%	60%
clarithromycin	500 mg 12 hourly	250 mL NaCl	250 mL	230.5 mL	92.2%	7.8%	250 mL	220 mL	88%	12%
vancomycin	500 mg 12 hourly	100 mL NaCl	100 mL	80.5 mL	80.5%	19.5%	100 mL	70 mL	70%	30%
colistin	360 mg 12 hourly	NaCl no recommended volume	50 mL	30.5 mL	61%	39%	50 mL	20 mL	40%	60%
Administration set					1				2	
Length of set					205 cm				270 cm	
Volume of set					14.5 mL				25 mL	
Estimated volume in drip chamber					± 5 mL				± 5 mL	
Total fluid in iv admin line					<b>19.5 mL</b>				<b>30 mL</b>	

Rout et al., J Antimicrob Chemother 2019; 74: 3418–3422



# If stewardship only means antibiotic prescribing for you...

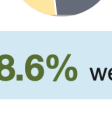


Of the total number of antibiotic items prescribed in primary care in 2022

73.3% of all antibiotic items were written by GPs



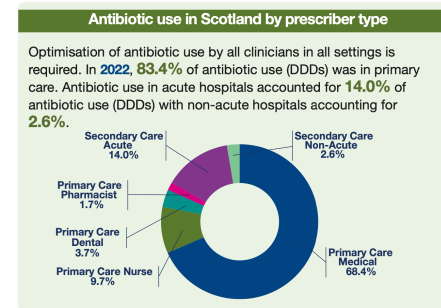
14.3% of items were written by nurse prescribers



8.6% were written by dentists



3.7% were written by pharmacists





# If stewardship only means antibiotic prescribing for you...

Table III. Mapping the Reasoned Action Approach (RAA) constructs to the Theoretical Domains Framework (TDF) to techniques for behaviour change

RAA constructs	TDF constructs	Techniques for behaviour change
Perceived norm	Social influences	Social process of encouragement, pressure and support; modelling/demonstration of behaviour by others
Perceived behavioural control	Beliefs about capabilities	Self-monitoring; graded task (starting with easy tasks); increase skills (problem-solving, decision-making, goal-setting); rehearsal of relevant skills; role-play; social processes of encouragement, pressure, support; self-talk; feedback; motivational interviewing
NMP/other nurse prescribers	Social influences	Social process of encouragement, pressure and support; modelling/demonstration of behaviour by others
Patient pressure	Environmental context and resources Emotion Social influences	Environmental changes Stress management, coping skills Social process of encouragement, pressure and support; modelling/demonstration of behaviour by others
Experience/confidence	Beliefs about capabilities	Self-monitoring; graded task (starting with easy tasks); increase skills (problem solving, decision making, goal setting); rehearsal of relevant skills; role-play; social processes of encouragement, pressure, support; self-talk; feedback; motivational interviewing

NMP, non-medical prescriber.

*“two thirds of the nurses felt under pressure from patients and relatives to prescribe antibiotics...”*


**BOLETÍN OFICIAL DEL ESTADO**


Núm. 200 Lunes 19 de agosto de 2024 Sec. III. Pág. 106686

### III. OTRAS DISPOSICIONES

#### MINISTERIO DE SANIDAD

**17079** *Resolución de 9 de agosto de 2024, de la Dirección General de Salud Pública y Equidad en Salud, por la que se valida la Guía para la indicación, uso y autorización de dispensación de medicamentos sujetos a prescripción médica por parte de las/os enfermeras/os: infección de tracto urinario inferior no complicada en mujeres adultas.*

La Comisión Permanente de Farmacia del Consejo Interterritorial del Sistema Nacional de Salud, en su reunión del 26 de junio de 2024, ha elaborado y aprobado la «Guía para la indicación, uso y autorización de dispensación de medicamentos sujetos a prescripción médica por parte de las/os enfermeras/os: infección de tracto urinario inferior no complicada en mujeres adultas. (Código de identificación: 202406-GENFITUMA)».

En aplicación de lo previsto en el artículo 6.4 del Real Decreto 954/2015, de 23 de octubre, por el que se regula la indicación, uso y autorización de dispensación de medicamentos y productos sanitarios de uso humano por parte de los enfermeros, las guías de práctica clínica y asistencial deberán ser validadas por la Dirección General de Salud Pública y Equidad en Salud, una vez examinado el texto concreto y al considerar que su contenido es adecuado y suficiente a los fines de la indicación, uso y autorización de dispensación por los enfermeros de medicamentos de uso humano sujetos a prescripción médica.

En su virtud, se acuerda:

1.º Validar la «Guía para la indicación, uso y autorización de dispensación de medicamentos sujetos a prescripción médica por parte de las/os enfermeras/os: infección de tracto urinario inferior no complicada en mujeres adultas. (Código de identificación: 202406-GENFITUMA)», aprobada en la reunión del 26 de junio de 2024 de la Comisión Permanente de Farmacia del Consejo Interterritorial del Sistema Nacional de Salud.

2.º Disponer su publicación en el «Boletín Oficial del Estado».

La presente resolución, que no pone fin a la vía administrativa, podrá ser recurrida en alzada ante la Secretaría de Estado de Sanidad, en el plazo de un mes a contar desde el día siguiente al de su publicación en el «Boletín Oficial del Estado», de conformidad con lo dispuesto en los artículos 121 y 122 de la Ley 39/2015, de 1 de octubre, del Procedimiento Administrativo Común de las Administraciones Públicas.

Madrid, 9 de agosto de 2024.–El Director General de Salud Pública y Equidad en Salud, Pedro Gullón Tosio.

**ANEXO**

**Guía para la indicación, uso y autorización de dispensación de medicamentos sujetos a prescripción médica por parte de las/os enfermeras/os: infección de tracto urinario inferior no complicada en mujeres adultas. (Código de identificación: 202406-GENFITUMA)**

Coordinadores:

Mikel Sánchez Fernández. Director de Planificación, Ordenación y Evaluación Sanitaria. Departamento de Salud. Gobierno Vasco.  
Inmaculada Moro Casuso. Subdirectora de Enfermería. Dirección de Asistencia Sanitaria. Dirección General Osakidetza.

BOE-A-2024-17079  
Verificable en <https://www.boe.es>

# Barriers to resolve before more nurses engage in antimicrobial stewardship

- Foundational
- Ownership/ 'branding'
- **Educational**
- Leadership



# Do nurses 'know' what to do in AMS?

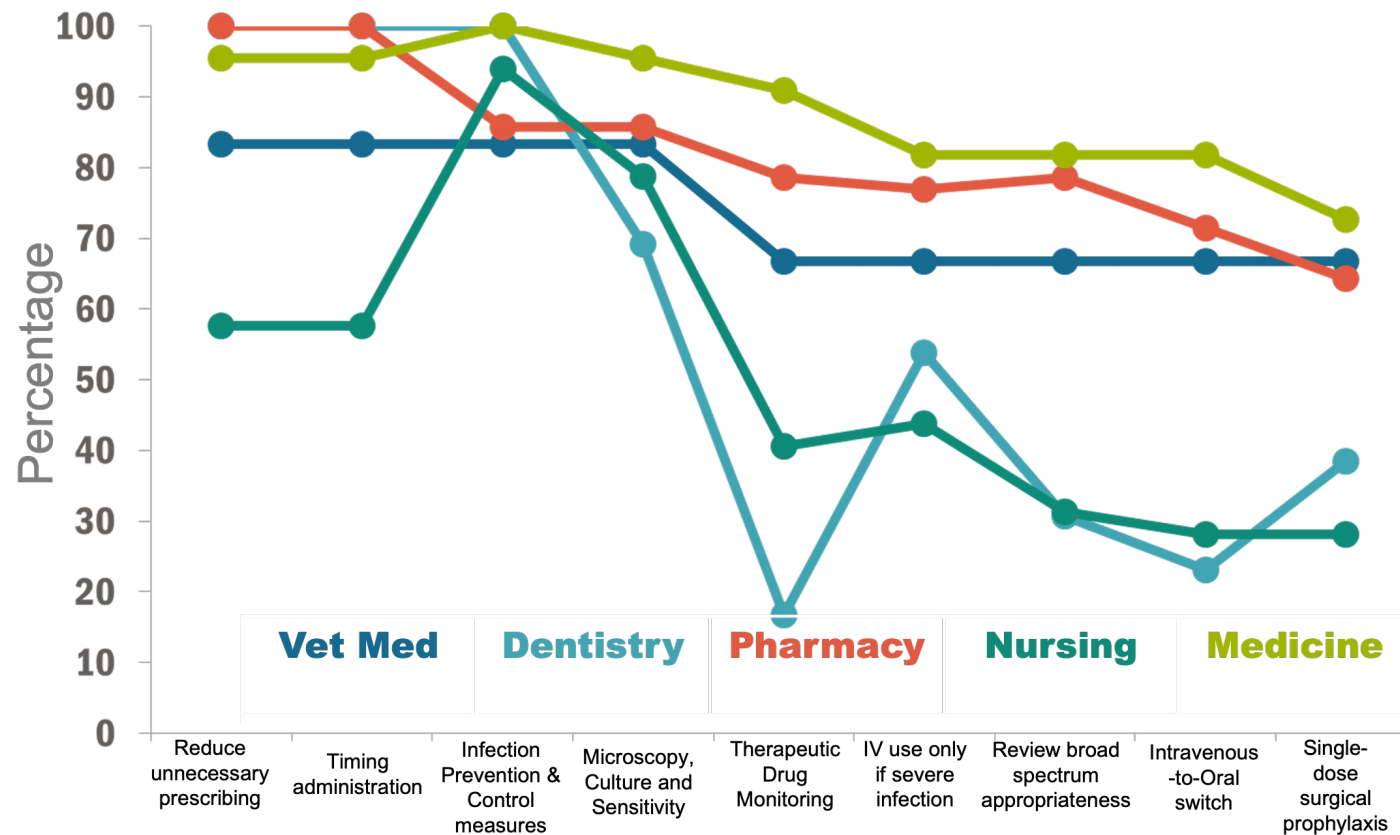
# NOT REALLY





# Do nurses 'know' what to do in AMS?

Frequency of antimicrobial stewardship principles, by discipline, UK 2013

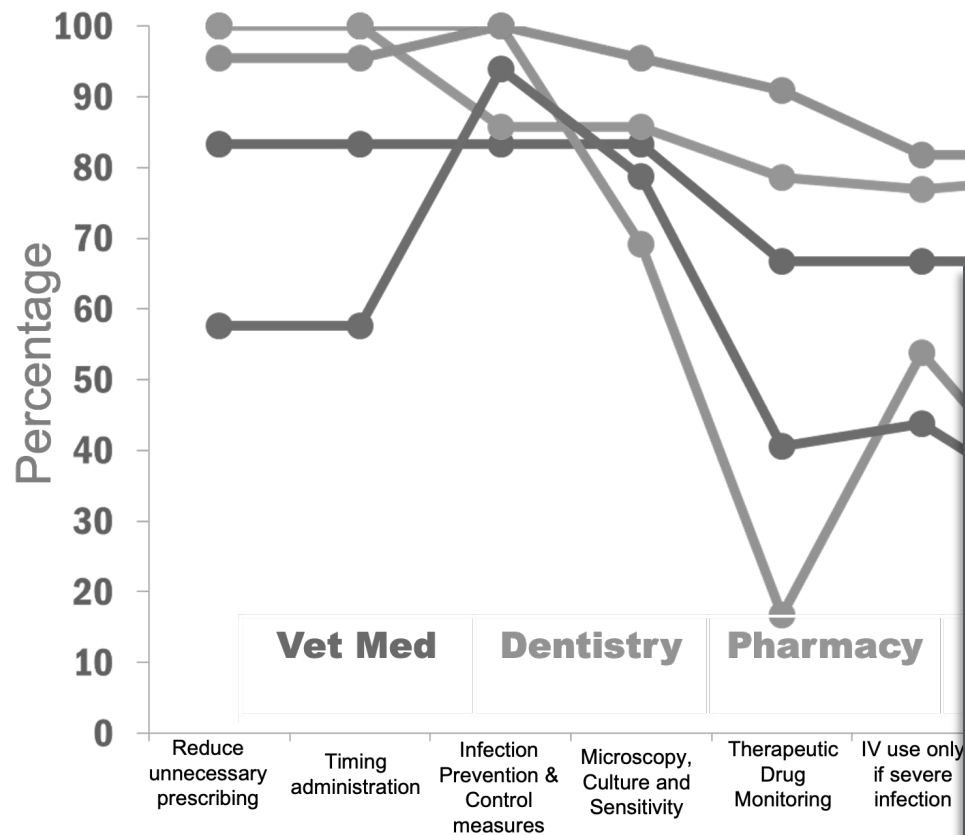


Castro Sanchez et al, 2016, PLOS ONE



# Do nurses 'know' what to do in AMS?

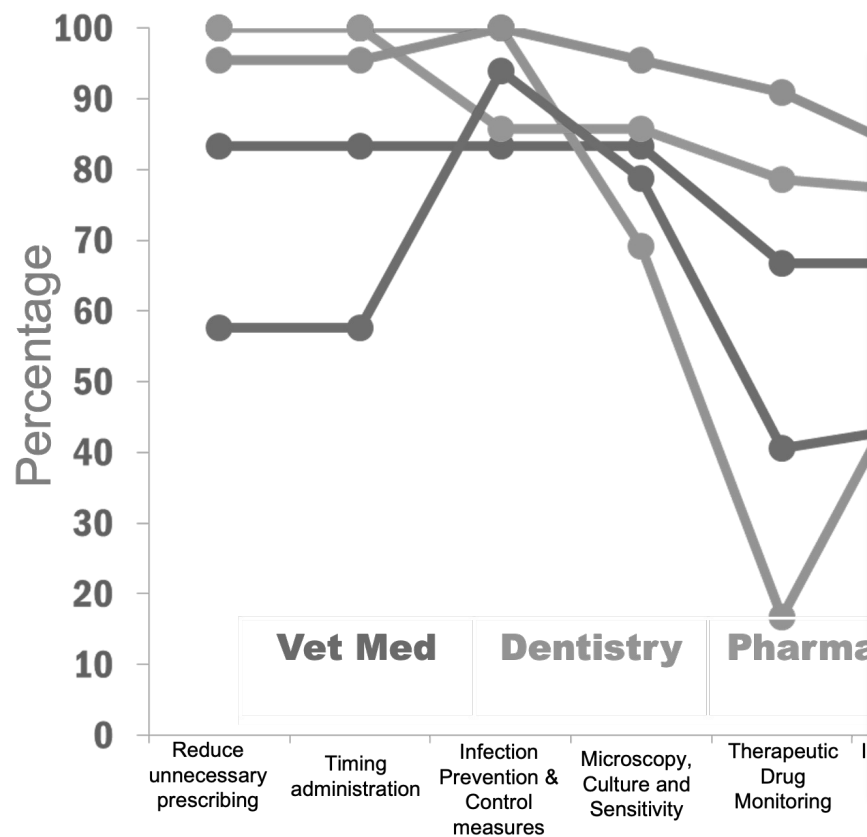
Frequency of antimicrobial stewardship principles, by discipline, UK 2013



Being an accountable professional	Promoting health and preventing ill health	Assessing needs and planning care	Providing and evaluating care	Leading and managing nursing care and working in teams	Improving safety and quality of care	Coordinating care	Annexe A: Communication and relationship management skills	Annexe B: Nursing procedures
2.5 promote and improve mental, physical, behavioural and other health related outcomes by understanding and explaining the principles, practice and evidence-base for health screening programmes	2.11 promote health and prevent ill health by understanding and explaining to people the principles of pathogenesis, immunology and the evidence-base for immunisation, vaccination and herd immunity, and	2.6 understand the importance of early years and childhood experiences and the possible impact on life choices, mental, physical and behavioural health and wellbeing	2.12 protect health through understanding and applying the principles of infection prevention and control, including communicable disease surveillance and antimicrobial stewardship and resistance	2.7 understand and explain the contribution of social influences, health literacy, individual circumstances, behaviours and lifestyle choices to mental, physical and behavioural health outcomes	2.8 explain and demonstrate the use of up to date approaches to behaviour change to enable people to use their strengths and expertise and make informed choices when managing their own health and making lifestyle adjustments	2.9 use appropriate communication skills and strength based approaches to support and enable people to make informed choices about their care to manage health challenges in order to have satisfying and fulfilling lives within the limitations caused by reduced capability, ill health and disability	2.10 provide information in accessible ways to help people understand and make decisions about their health, life choices, illness and care	

# Do nurses 'know' what to do in AMS?

Frequency of antimicrobial stewardship principles, by discipline, UK 2013



JOURNAL OF INTERPERSONAL CARE  
https://doi.org/10.1080/1360/2018.1461320

SHORT REPORT

## Defining antimicrobial stewardship competencies for undergraduate health professional education in the United Kingdom: A study protocol

Molly Courtenay, Enrique Castro-Sánchez, Rhian Deslandes, Karen Hodson, Roser Scott Reeves, and Marjorie Weiss

<sup>1</sup>School of Healthcare Sciences, Cardiff University, Cardiff, UK; <sup>2</sup>NHS Health Protection Research Unit in Antimicrobial Resistance, Imperial College London, UK; <sup>3</sup>Cardiff School of Pharmacy and Pharmaceutical Science, Cardiff University, Cardiff, UK; <sup>4</sup>Reading School of Pharmacy, Whiteknights, Reading, Berkshire, UK; <sup>5</sup>Wye Valley University Health Board and Social Care Research, Kingston and St George's, University of London, London, UK

### ABSTRACT

Multi-drug resistant infections have been identified as one of the greatest threats to human health. Healthcare professionals are involved in an array of patient care activities for which an understanding of antimicrobial stewardship is important. Although antimicrobial prescribing and stewardship competencies are developed for healthcare professionals who adopt the role of a prescriber, competencies do not cover other medicine-related stewardship activities. Undergraduate education provides an ideal opportunity to prepare healthcare professionals for these roles and activities. This report presents a protocol designed to provide national consensus on antimicrobial stewardship competencies appropriate for undergraduate healthcare professional education. A modified Delphi process will be used in which a panel of comprising members from across the United Kingdom, with expertise in prescribing and medicines, meet with regard to the education and practice of healthcare professionals, and antimicrobial stewardship, will be invited to take part in two survey rounds. The competencies developed will be a to all undergraduate healthcare professional education programmes. They will help to standardise content and enhance the impact of antimicrobial stewardship education.

### Introduction

Drug-resistant infections have been identified as one of the greatest threats to human health. Longer illnesses, increased mortality, prolonged stays in hospital, loss of protection for patients undergoing medical procedures, and increased costs are all direct consequences of infection with resistant micro-organisms (World Health Organization, 2015). In the European Union (EU), around 25000 patients die each year from infections with antimicrobial-resistant bacteria, resulting in health-care costs and lost productivity totalling at least €1.5 billion per year (WHO, 2015). Antimicrobial resistance is a multifaceted problem requiring multifactorial interventions to prevent its emergence and further spread (Fishman, 2006).

Antimicrobial stewardship (AMS) is an interprofessional effort that involves optimal, prudent antimicrobial use for patients across the continuum of care: acute, inpatient, long-term care, and outpatient settings (Fishman, 2006). Although the education of undergraduate healthcare students on AMS is a key activity for the containment of antimicrobial resistance, a survey of undergraduate programmes in human and veterinary medicine, dentistry, pharmacy and nursing in the United Kingdom (UK), identified that students receive inconsistent stewardship education, and only around a third of programmes included all the recommended AMS principles (Castro-Sánchez, Drumright, Gharbi, Farrell, & Holmes, 2016).

### Background

Over recent years there has been a growing concern about students' capacity to act in variable situations and less so that learners are expected to the educational process (CBE) emphasises the capacity to absorb and retain on & Kolars, 2012). CBE has improved simply by accumulating evidence (e.g., Ri Instead, with the increasing it is necessary for clinicians that both professional and it now associated with competent Antimicrobial prescribing (Public Health England (PHE) the Royal Pharmaceutical Society (RPS) framework for all prescribers for independent prescribers (who are able to prescribe professionals such as phar

CONTACT Molly Courtenay m.courtenay@cardiff.ac.uk; Health Sciences, School of Healthcare Sciences, Cardiff University, Cardiff, UK

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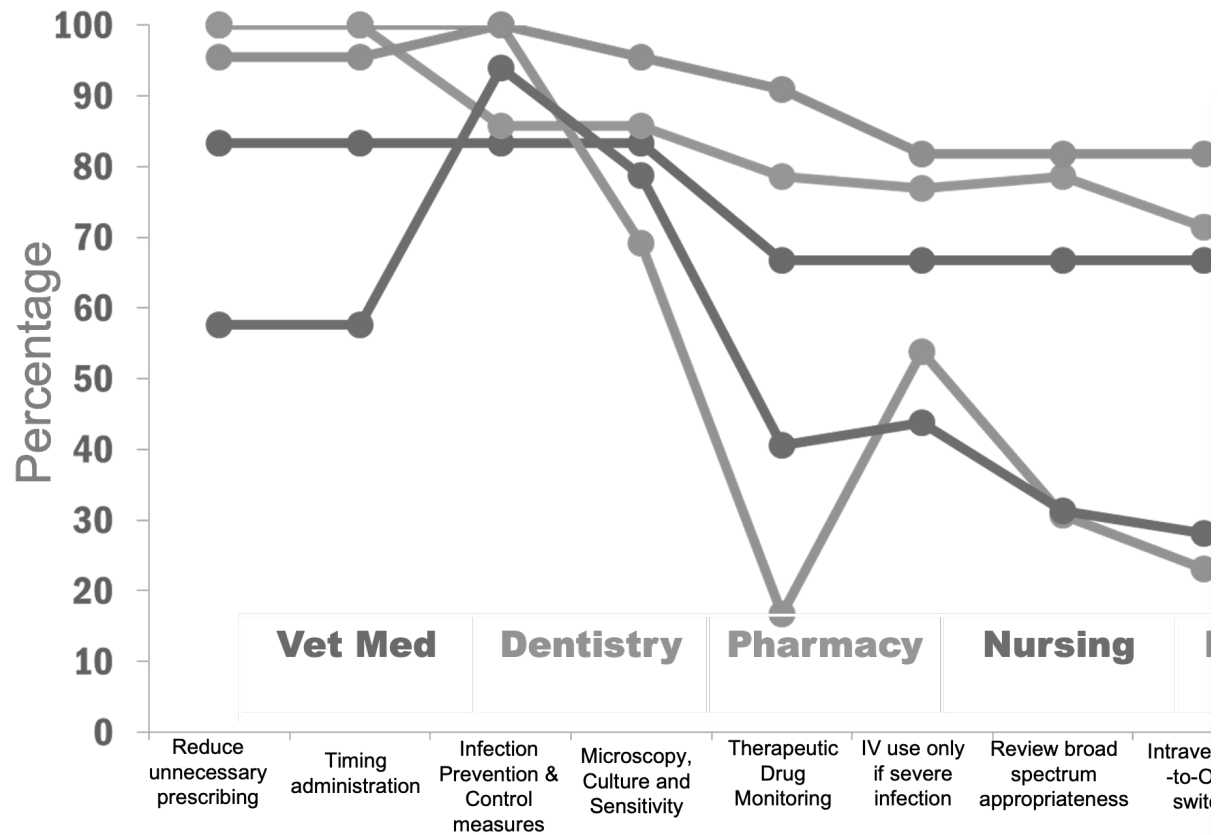
Table 1. Competency domains, and examples of their associated descriptors.

Domain	Descriptor examples
Domain 1: Infection prevention and control	Describe the different types of organisms that may cause infections Describe what a micro-organism is
Domain 2: Antibiotics and antimicrobial resistance	Recognise the symptoms of infection Describe at least two different ways that antibiotics may kill bacteria
Domain 3: The diagnosis of infection and the use of antibiotics	Explain how microbiology samples may aid diagnosis of infection Discuss the use of rapid point-of-care diagnostic testing in infection diagnosis
Domain 4: Antimicrobial prescribing practice	Describe why, and how, it is important to switch from IV antibiotics to oral therapy Explain how you would recognise and manage sepsis
Domain 5: Person-centred care	Support participation of patients/carers as integral partners when planning/delivering their care Share information with patients/carer in a respectful manner and in such a way that is understandable, encourages discussion, and enhances participation in decision-making
Domain 6: Interprofessional collaborative practice	Demonstrate an understanding of the roles, responsibilities, and competencies of other health professionals involved in antimicrobial treatment policy decisions Explain why it is important that healthcare professionals, involved in the delivery of antimicrobial therapy, have a common understanding of antimicrobial treatment policy decisions, the quality of antimicrobial use, and effective patient/client outcomes

Courtenay et al, 2018, J Interprof Care

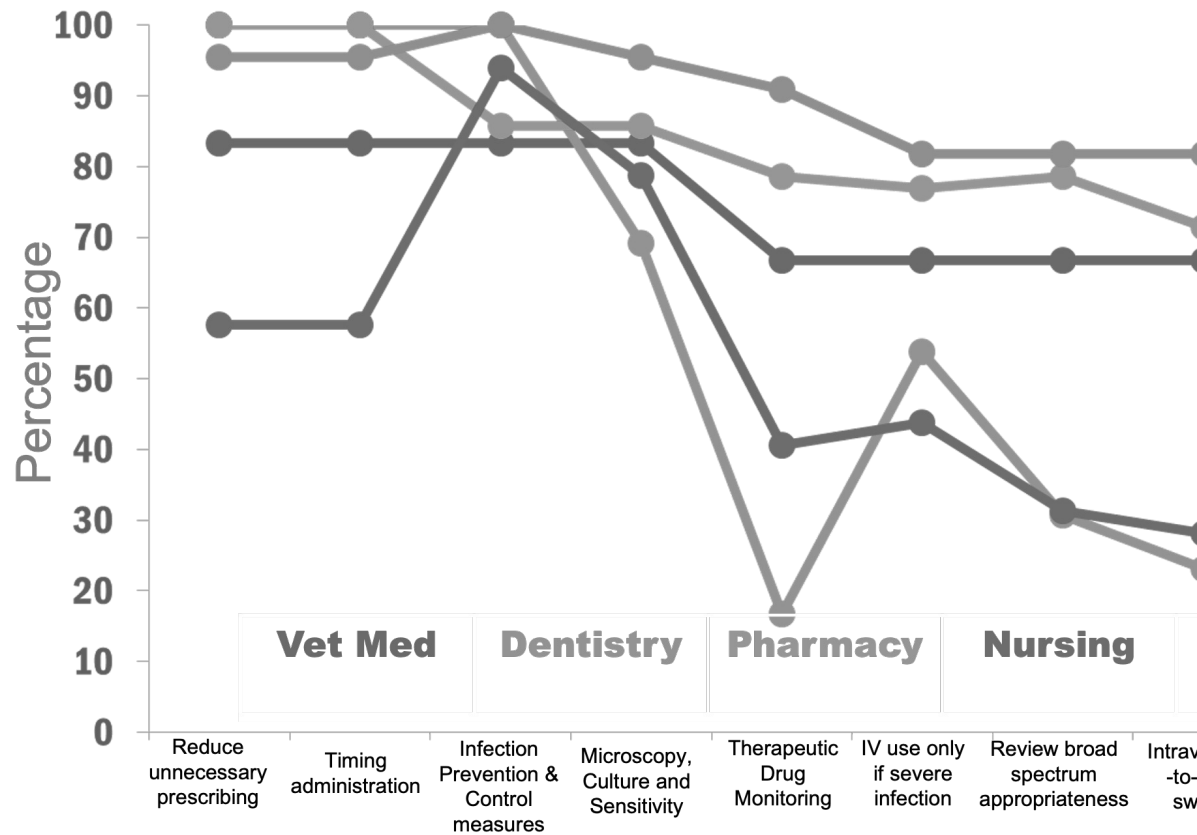
# Do nurses 'know' what to do in AMS?

Frequency of antimicrobial stewardship principles, by discipline, UK 2013



# Do nurses 'know' what to do in AMS?

Frequency of antimicrobial stewardship principles, by discipline, UK 2013



Antimicrobial resistance curriculum assessment tool for **medical education**

World Health Organization

# Do nurses 'know' what to do in AMS?

We know what students learn in university lectures,  
but...  
so far, no one has investigated what happens during  
**clinical placements** (50% of all degree hours!)

Version 2- 2023-11-15  
Ethics Ref: 42400-MHR-Oct/2023- 47631-1

 Brunel University London

## RESEARCH STUDY


'Learning about antimicrobial stewardship on clinical placements for undergraduate nursing students: a qualitative exploration'

### Nursing students needed!

**What is the study about?**  
Antibiotic resistant infections are a key health threat. This study aims to understand whether and how nursing students learn about these infections and antibiotics on clinical placements.

**Why participate?**

- You may contribute useful information which may improve current and future education about antibiotics.
- You may help address the challenge of infections which are difficult to treat.



**Who can participate?**

- **Student nurses** from any year, entry route (BSc, MSc), and field (adult, paediatric, etc) who
  - have **completed** at least one clinical placement, in any setting,
    - and can attend one interview via MS Teams, lasting 45-60 minutes.

Interested? Would like more information? Contact:  
**Dr Enrique Castro-Sánchez**  
[enrique.castro-sanchez@brunel.ac.uk](mailto:enrique.castro-sanchez@brunel.ac.uk)

This study has been approved by the College of Business, Arts and Social Sciences Research Ethics Committee, Brunel University London

# Can nurse-specific resources help?

CHAPTER 25

AUTHOR ENRIQUE CASTRO SANCHEZ

## THE ROLE OF THE NURSE IN STEWARDSHIP

**THE AIM OF THIS CHAPTER IS TO:**

This chapter justifies the participation of nurses in antimicrobial stewardship and the benefits of including them as core members of stewardship teams. Different areas encouraging the participation of nurses, such as operational and organisational factors are discussed.

Following this, some of the clinical roles and roles that can be readily assumed by nurses in hospitals and community settings are discussed, including prescribing. The chapter stresses some ideas about the importance of integrating non-clinical nursing staff, such as associates and therapists, into stewardship efforts and with other healthcare professionals.

Finally, the chapter identifies reasons behind the experiences already published reporting on the need of nurse-focused interventions, concluding with some of the remaining barriers to be addressed before participation of nurses in stewardship programmes can be extended and scaled up.

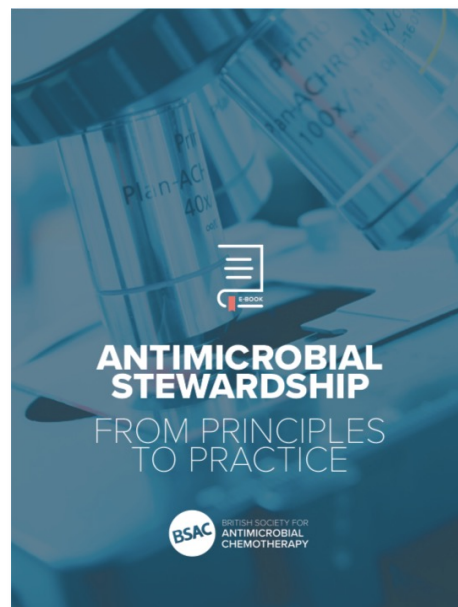
**LEARNING OUTCOMES**

On completion of this chapter, the participant should be able to:

- 1. Why should nurses be involved in antimicrobial stewardship?**
  - a. Describe drivers for participation of nurses in antimicrobial stewardship activities.
- 2. Expanding the participation of nurses in antimicrobial stewardship**
  - a. Identify how antimicrobial documents and policies consider nursing participation in stewardship.
  - b. Explain antimicrobial stewardship clinical tasks that could be adapted by nurses.
  - c. Consider the impact in antimicrobial usage of advanced nursing roles such as prescribing.
- 3. Public health and community nursing contribution to stewardship**
  - a. Critically argue some public health nursing behaviours that could be embedded within antimicrobial stewardship frameworks.
  - b. Reflect on emerging evidence involving nurses and long term care facilities that would benefit antimicrobial stewardship initiatives.
- 4. Integration between nursing roles and activities in AMR and other professionals**
  - a. Understand the areas for antimicrobial stewardship synergy and integration between nurses and other professionals.
- 5. Stewardship, a target for nurses in associate and elective positions.**
  - a. Discuss how nurses in associate and elective positions can contribute to and strengthen antimicrobial stewardship programmes.
- 6. Nurse-focused interventions in antimicrobial stewardship**
  - a. Reflect upon some existing nurse-centred stewardship interventions.
- 7. Barriers to resolve the participation of nurses in stewardship**
  - a. Examine some of the barriers to increased involvement of nurses in stewardship.
  - b. Evaluate existing initiatives implemented to address barriers to nurse involvement.

246 ANTIMICROBIAL STEWARDSHIP: From Principles to Practice

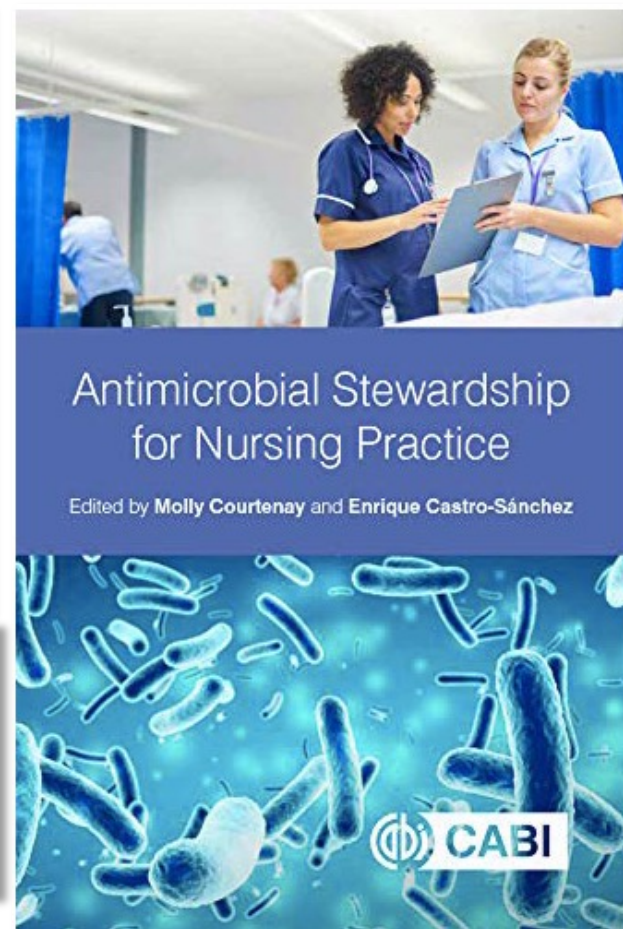
[RETURN TO CONTENTS](#) [RETURN TO START OF CHAPTER](#)



**ANTIMICROBIAL STEWARDSHIP**


FROM PRINCIPLES TO PRACTICE

BSAC BRITISH SOCIETY FOR ANTIMICROBIAL CHEMOTHERAPY



Antimicrobial Stewardship for Nursing Practice

Edited by Molly Courtenay and Enrique Castro-Sánchez



CABI

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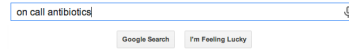
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## PUBLICATIONS

**GUIDELINES**

IN PROCESS

NURSES GUIDE ON ANTI-MICROBIAL RESISTANCE AMR AND VACCINATION



Castro-Sánchez E et al (2014) "On call: antibiotics"- development and evaluation of a serious antimicrobial prescribing game for hospital care. Games for Health. Springer Vieweg 2014; 1–8.





# It's not just about *what* nurses should do in AMS, but also *how* to do it...

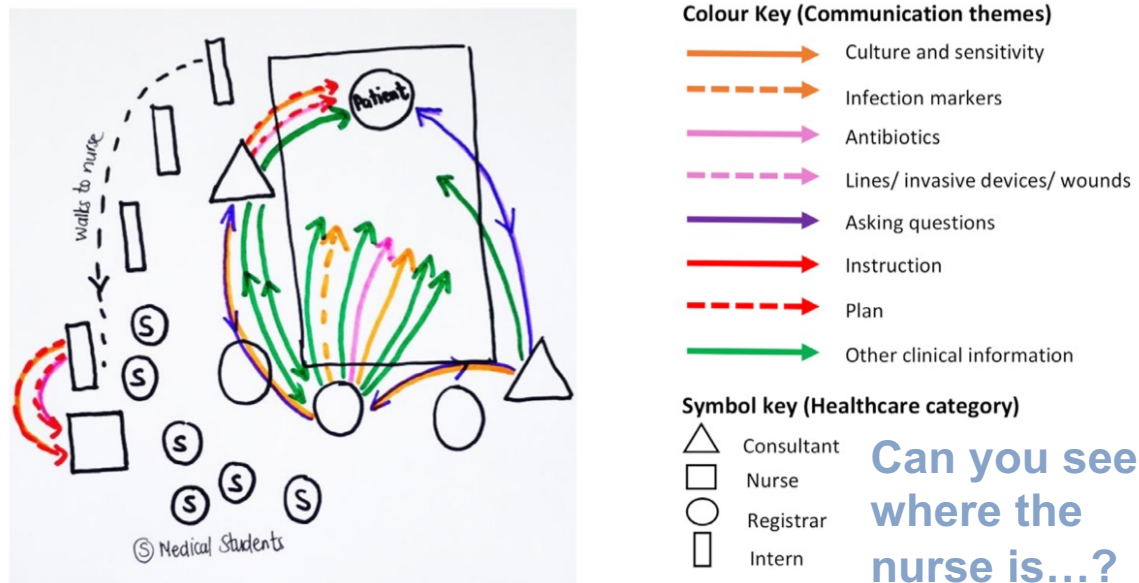
Mrs. X culture results are back from the laboratory. The culture is positive for \_\_\_\_\_. She is currently receiving the following antibiotic(s)\_\_\_\_\_. Do you want to continue this/these antibiotic(s)?”

“The sensitivities on Mrs. X culture(s) have been received from the laboratory. The report indicates the isolate is sensitive/resistant to\_\_\_\_\_. She is currently receiving the following antibiotic(s)\_\_\_\_\_. Do you want to continue this/these antibiotic(s)?”



# It's not just about *what* nurses should do in AMS, but also *how* to do it...

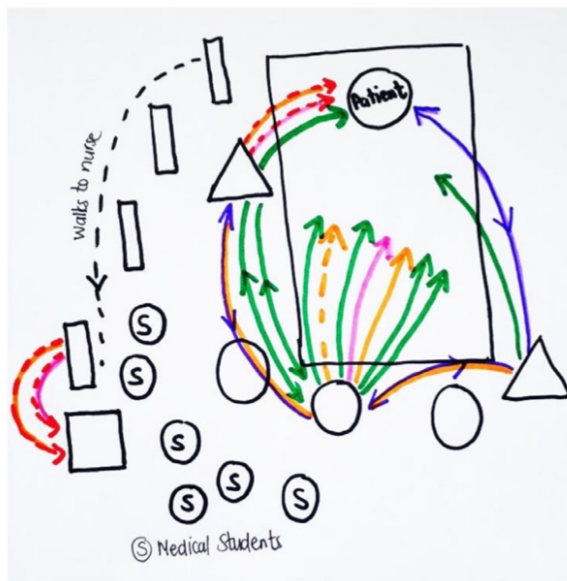
An example of a sociogram illustrating team communication



Description of communication captured by sociogram

# It's not just about *what* nurses should do in AMS, but also *how* to do it...

An example of a sociogram illustrating team communication



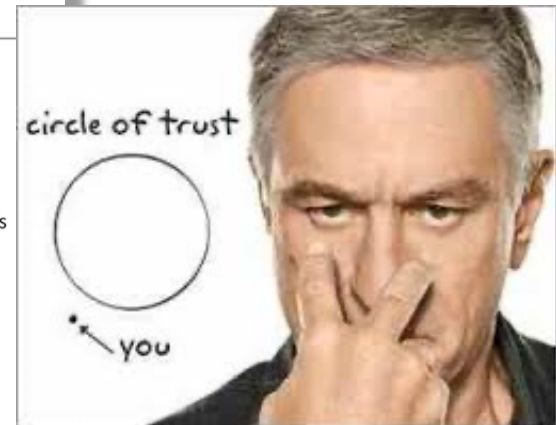
**Colour Key (Communication themes)**

- Culture and sensitivity
- Infection markers
- Antibiotics
- Lines/ invasive devices/ wounds
- Asking questions
- Instruction
- Plan
- Other clinical information

**Symbol key (Healthcare category)**

- △ Consultant
- Nurse
- Registrar
- ▭ Intern

Can you see where the nurse is...?



Description of communication captured by sociogram

# Barriers to resolve before more nurses engage in antimicrobial stewardship

- Foundational
- Ownership/ 'branding'
- Educational
- **Leadership**



# Nursing managers may not place nurse participation in AMS high enough



- Fostering a culture of AMS (Carter et al, 2017 & 2019)
- Advocating for nurse involvement in AMS, ensuring adequate education and support (Ladenheim et al., 2013)
- Lack of senior nursing recognition of importance of AMS reduces nurse interest (Linn & Jensen, 2022)

# Nursing managers may not place nurse participation in AMS high enough



- Strong leadership in defining and communicating nurses' roles (Manning & Pogorzelska-Maziarz, 2018)
- Lack of evaluation indicators for nurses' performance in antimicrobial stewardship (Zhao et al., 2023)
- Clear leadership needed to avoid feelings of 'encroaching on physicians' territory' (Tangeraas Hansen et al., 2023)



# Policy documents may not place nurse participation in AMS high enough

## 4.7. Nurses

The role of nurses within the clinical team is critical because of their regular contacts with patients and their role in administering medicines. Nurses make sure that antimicrobials are taken according to the prescription; they also monitor the response to antimicrobials (including potential adverse effects). In general, nurses are responsible for the administration of antimicrobials and for monitoring the patient and patient safety.

The role of nurse prescribers is also critical.

### Nurses should:

- Be actively involved in antimicrobial management as part of the multidisciplinary care team.
- Ensure timely administration of antimicrobials according to prescription.
- Provide advice and educate the patient on the proper use of antimicrobials.
- Utilise protocols and tools that enable you to independently detect patients with severe infections and then trigger diagnostic and treatment algorithms.
- Remind the clinician to reassess the antimicrobial treatment after 48 to 72 hours.

*"[...] however, given the context of the guidelines it is clear that **the contribution of nursing is not fully understood** and requires clarification. What such active involvement actually means, in the milieu of European healthcare systems and nursing practices, warrants further debate and perhaps a consensus [...]"*

## Nurses: an underused, vital asset against drug-resistant infections

Christopher J L Murray and colleagues have consolidated the evidence on the burden of drug-resistant infections, highlighting key pathogens and their unjust distribution worldwide, which demands a multifaceted, planetary response. The success of this response would benefit from an interprofessional approach, which formalises the involvement of nurses, the largest and often most trusted health workforce, yet underutilised against drug-resistant infections.

Although the worldwide nursing shortage threatens their contribution in antimicrobial resistance and activities to meet the Sustainable Development Goals, expanding antimicrobial stewardship nursing practice could future-proof health-care provision allowing medical specialists to focus on complex drug-resistant infections.

Regardless of the increasing number of nurses prescribing antimicrobials, or their influence on prescribing as knowledge brokers,<sup>1</sup> at least three of the strategies proposed by Murray and colleagues—infection prevention and control, vaccination, and minimised use in humans—have substantial input from nurses. Addressing infections has historically been embraced by nurses, with many infection outcomes being influenced by nursing care. However, the value of nurses in stewardship should not just be centred on clinical work. Nurses are involved across the entire health economy and are excellent advocates to promote self-care and a salutogenic approach, and foster health literacy of antimicrobial resistance through effective communication and education. Nursing leadership and activism have been robust in advocating for improvements to determinants of infections.<sup>2</sup> Further nursing action in antimicrobial stewardship requires closing

the gaps in education<sup>3</sup> and awareness of antimicrobial competencies<sup>4</sup> and stewardship models that recognise the nursing contribution. Additionally, antimicrobial stewardship nursing research could benefit from investment to achieve its full potential.

The planetary threat of drug-resistant infections should encourage the inclusion of nurses in the global response, eager as they are to embrace their potential.

We declare no competing interests.

\*Enrique Castro-Sánchez, Jo Bouzouguet, Molly Courtney, Rose Gallagher, Frances Gotterson, Elizabeth Manias, Jo McEwen, Val Ness, Rita Olans, Maria Clara Padoveze, Briette du Toit, Miquel Ferrer-Vari  
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- 1 Murray CJL, Butta KS, Shanson F, et al. Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis. *Lancet* 2022; **398**: 689–705.
- 2 Gotterson F, Bouling K, Manias E. Nurse role and contribution to antimicrobial stewardship: an integrative review. *Int J Nurs Stud* 2021; **117**: 103727.
- 3 Boina WE, Haraway G, McNeill C, et al. Nurses for health equity: guidelines for tackling the social determinants of health. 2021. <https://www.well.org/qa/important/nurses-for-health-equity-guidelines-for-tackling-the-social-determinants-of-health/> (accessed July 12, 2022).

www.thelancet.com Vol 400 September 3, 2022

Castro-Sanchez et al, 2018, CMI

# Networking may help



## 1<sup>st</sup> International Nursing Summit on Antimicrobial Stewardship, 2016



## 2<sup>nd</sup> International Nursing Summit on Antimicrobial Stewardship (AMS) Wednesday 22<sup>nd</sup> November 2023, 13:00 – 17:00 UTC+00:00 Webinar on Microsoft Teams, register [here](#)

To celebrate World AMR Awareness Week 2023, the College of Business, Arts and Social Sciences at Brunel University London is hosting the 2<sup>nd</sup> International Nursing Summit on AMS on 22<sup>nd</sup> Nov 2023. The Summit brings together clinical experts, leaders, researchers, and educators, all involved in AMS nursing.

<b>13:00 WELCOME</b> Enrique Castro-Sánchez, Brunel University London, UK.	
<b>13:05 EDUCATIONAL DEVELOPMENTS IN AMS NURSING</b>	
13:10 <b>Bar Oomen</b> , European Specialist Nurses Organisation, Belgium	
13:20 <b>Vanessa Vázquez Torres</b> , Spanish Society of Infection Prevention and Control Nurses, Spain	Challenges integrating Infection Prevention and Control nurse experts into AMS teams
13:30 <b>Jo McEwen</b> , NHS Tayside, Scotland	AMS nursing in Scotland: an overview of education gaps and activities.
13:40 Panel Q&A	
<b>13:55 AMS NURSING: NATIONAL EXPERIENCES</b>	
14:00 <b>Rose Gallagher</b> , Royal College of Nursing, UK	AMS in action – the nursing contribution and future opportunities.
14:10 <b>Elisa Afonso</b> , Anglia Ruskin University, UK	How to take AMS into the undergraduate nursing curriculum?
14:20 <b>Susan Bowler</b> , Nottingham University Hospitals NHS Trust, UK	Nurse evaluation of a local antibiotic intravenous to Oral Switch (IVOS) prompt tool.
14:30 Panel Q&A	
<b>14:45 BREAK</b>	
<b>14:55 EMERGING AREAS OF AMS NURSING</b>	
15:00 <b>Vasiliki Parlama</b> , Brunel University London, UK	Antibiotic stewardship programmes in intensive care units.
15:10 <b>Rita Bos</b> , HBO-AGZ Avans Hogeschool, Breda, Netherlands	Dutch nurses' perceptions and views on their role regarding appropriate antimicrobial use.
15:20 <b>Molly Courtenay</b> , Cardiff University, UK	Consensus-based national AMS competencies for UK undergraduate healthcare professional education.
15:30 Panel Q&A	
<b>15:45 AMS NURSING: INTERNATIONAL EXPERIENCES</b>	
15:50 <b>Fatima Aldawood</b> , Ministry of National Guard Health Affairs, Saudi Arabia	An antimicrobial stewardship nurse in Saudi Arabia.
16:00 <b>Ermita Tartari Bonnici</b> , University of Malta, Malta	Antimicrobial Stewardship: an Erasmus+ blended intensive programme for healthcare professionals.
16:10 <b>Maria Clara Padoveze</b> , University of Sao Paulo, Brazil	The experience of Brazilian Nurses Network Tackling Antimicrobial Resistance (REBRAN).
16:20 Panel Q&A	
<b>16:35 CLOSING REMARKS</b>	
<b>16:50 CLOSING</b>	

## 2<sup>nd</sup> International Nursing Summit on Antimicrobial Stewardship, 2023





# Networking may help



## 6th Infection Control Africa Network Congress 2016

Indaba Hotel & Conference Centre • Fourways  
Johannesburg • South Africa  
25 – 28 September

### Monday 26 September

SESSION 3	AMS WORKSHOP – ROLE OF THE CLINICAL NURSE IN AMS IN AFRICA
VENUE	AUDITORIUM
Chair	<i>Ravathi Gunturu</i>
14h00 – 16h00	<p>14h00-14h20 The role of the registered nurse in the implementation of an antimicrobial stewardship programme - <i>Briette du Toit (South Africa)</i></p> <p>14h20-14h40 Successful participation of nurses in AMS programmes worldwide: Examples, barriers and facilitators - <i>Enrique Castro Sanchez (UK) (Supported by BSAC)</i></p> <p>14h40-15h00 Playing the part: Nurses in antimicrobial stewardship - <i>Rachel Kamau (Kenya)</i></p> <p>15h00-15h30 Main barriers to ASPs and how to overcome them - <i>Gabriel Levy Hara (Argentina)</i></p> <p>15h30 – 16h00 Discussion on AMS – the role of the clinical nurse; led by <i>Ravathi Gunturu, Gabriel Levy Hara, Enrique Castro Sanchez, Briette du Toit, Dilip Nathwani, Timothy Walsh, Shaheen Mehtar</i></p>

## NURSING

AMS FORUM

A professional meeting place for all nurses involved and with an interest in antimicrobial stewardship



HOME | FORUM | RESOURCES | CONTACT



### Welcome

The AMS Nursing Forum is open to all nurses with an interest in antimicrobial stewardship. It is an online meeting place for nurses to share and access resources and learn about each other. Join us today. Registration is free of charge and enables you to load resources, access information about other members and participate in the discussion forum. The forum provides a place to share ideas, expertise, access and upload resources and ultimately build a community of nurses seeking to improve appropriate and effective antibiotic use.



# How to do AMS nursing? Examples of existing roles

Antimicrobial stewardship nursing model	Domains						
	Interprofessional working	Strategic influence-Relation with other structures	Clinical outcomes (What measure of impact? Process?)	Individual identity	Funding/Managerial structures	Setting of practice (hospital, community...)	Role components (clinical, educational, quality, policy, managerial)
<b>Vertical (i.e. nurse consultant)</b>	Yes	High strategic influence; focal relation with comparable figures/roles within own profession (i.e. nurse consultant) or others (i.e. pharmacy consultant); collaboration/leadership across aligned areas (i.e. AMS & IPC/AMS & sepsis etc).	May be difficult to robustly attribute impact or clinical improvements to the role in view of indirect work (i.e. influencing others)  Feasible to attribute process improvements.	Novel professional figure/role, supported by similar professionals in other clinical areas, or professionals from other disciplines.	Mainstream human resources funding.  May be difficult to evaluate value-for-money.  Appointed by board-level managers from own or other professions.	Hospital or community, but most likely hospital.	All, with emphasis on planning/ evaluation/ management of organisational practice.
<b>Hybrid (i.e. nurse specialist)</b>	Yes	Some strategic influence as part of specialist services; advisory relation with own and other professions across multiple areas.	Easy to attribute impact or clinical improvements due to focus on planning and delivery of clinical services, education.	Traditional role with some expanded or novel skills/responsibilities which may have been jurisdiction of other professionals or disciplines.	Funding may be short-term or pilot before substantive, based on results.  Appointed by manager or lead of specialist team, which may not be a nurse (i.e. consultant pharmacist or physician in AMS)	Hospital or community.	All, with mixture of planning, evaluation and delivery of services.
<b>Horizontal (i.e. staff nurse)</b>	No	Limited or minimal strategic influence; most relations within own ward/team, with frequent contact with specialist/advisory roles (i.e. IPC specialists).	Feasible to attribute impact or clinical improvements in antimicrobial stewardship interventions deployed	Traditional role, supported by similar professionals in same or other clinical areas.	Mainstream human resources funding.  Appointed by ward manager/nurse in charge.	Hospital or community.	Mainly clinical, educational, quality and managerial service delivery.

Castro-Sanchez et al, 2019, ARIC



# How to do AMS nursing? Examples of existing roles



- **Vertical model**
  - 1 single professional
  - Specialist/Consultant nurse
  - Visibility!
  - Rest of structures, roles untouched
  - Impact?
  - Sustainability?

# How to do AMS nursing? Examples of existing roles

Nottingham University Hospitals  
NHS Trust, promoting IV-to-PO  
switch among nurses



Courtesy Sue Bowler, 2023

# How to do AMS nursing? Examples of existing roles

## Horizontal model

- Distributed AMS nursing role
- Embedded in generalist practice
- Visibility?
- Rest of structures, roles untouched
- Sustainable
- Synergy with other professions
  - Pharmacy, other specialists, etc



# How to do AMS nursing? Examples of existing roles

## Hybrid model

- Not just one professional, but expanded/enhanced roles among existing specialists
- Visibility
- Some structural changes
- Sustainable
- Synergy with other professions
  - Pharmacy, other specialists, etc



# Excellent models worldwide to draw upon, not just Global North!

**BMC Health Services Research** 

Research article **Open Access**

## Building capacity for antiretroviral delivery in South Africa: A qualitatively programmatic study

18212010 Task shifting of antiretroviral treatment from doctors to primary-care nurses in South Africa (STRETCH): a pragmatic, parallel, cluster-randomised...  
Submitted Document reuse

J Stein<sup>1\*</sup>, S E Bateman<sup>2</sup>

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\* Corresponding author

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**Abstract**  
 Background: Robust evidence of the effectiveness of task shifting to nurses in low- and middle-income countries (LMICs) is needed to support the scaling up of antiretroviral treatment (ART) and to decentralise care. We undertook a pragmatic, parallel, cluster-randomised trial to assess the impact of a task shifting intervention on the delivery of ART in South Africa. The intervention was a 2-week training course for nurses, followed by a 6-month period of on-site supervision and support. The primary outcome was the proportion of patients who were started on ART within 2 weeks of referral to the intervention group. Secondary outcomes were the proportion of patients who were started on ART within 4 weeks, the proportion of patients who were started on ART within 6 weeks, and the proportion of patients who were started on ART within 8 weeks. The intervention group had a significantly higher proportion of patients who were started on ART within 2 weeks (50% vs 35%, *P* = 0.001) compared with the control group. There was no significant difference in the proportion of patients who were started on ART within 4, 6, or 8 weeks. The intervention group had a significantly higher proportion of patients who were started on ART within 2 weeks (50% vs 35%, *P* = 0.001) compared with the control group. There was no significant difference in the proportion of patients who were started on ART within 4, 6, or 8 weeks. The intervention group had a significantly higher proportion of patients who were started on ART within 2 weeks (50% vs 35%, *P* = 0.001) compared with the control group. There was no significant difference in the proportion of patients who were started on ART within 4, 6, or 8 weeks.

**Keywords:** Task shifting, Antiretroviral treatment, Primary care, South Africa, Pragmatic trial, Cluster-randomised trial

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# A different perspective on AMS nursing?



**Better IPC in LMICs would prevent 337 000 AMR-associated deaths**  
(95% CI 250 200–465 200)



**Universal access to WASH would prevent 247 800 AMR-associated deaths**  
(95% CI 160 000–337 800)



**Ensuring child vax would prevent 181 500 AMR-associated deaths**  
(95% CI 153 400–206 800)

# Thank you!

- **AMS programmes must consider interdisciplinarity**
- **Currently, AMS nurse participation clinically oriented- underused?**
- **Organisational determinants must be evaluated before starting/expanding any AMS nursing interventions**

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