

# The need for a harmonised European nursing curriculum on antimicrobial stewardship

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Drug-resistant infections are a severe threat to the health of European citizens, European societies, and common European welfare. The need to implement coordinated and comprehensive interventions to promote the best possible use of antimicrobials in human and animal health and slow the progress of drug-resistant infections has been recognised by global stakeholders, including the European Commission (2017), in different high-level policies and national and international plans.

Several measures are generally included in campaigns and interventions to improve how antibiotics are used, including promoting institutional leadership and buy-in, surveillance of antibiotic consumption with feedback to prescribers and clinicians, development of local guidelines and protocols, and increased education for citizens and health care professionals. Although many recent interventions have recognised the importance of involving nurses in antimicrobial stewardship (Kirby et al, 2020), due to their proximity to the patient and their continued care and participation in antimicrobial management, crucial gaps remain in the education and understanding of nurses towards these competences related to antimicrobials (Courtenay et al, 2019; Castro-Sanchez, 2016).

Developing common educational pathways and competencies, as well as shared models of nursing care related to antimicrobial management can have benefits, enabling economies of scale and savings (for example, reducing time and resources wasted on duplicated documents), facilitating professional mobility and mutual learning (for example, allowing professionals from neighbouring countries to easily transfer their skills), and contributing towards more efficient evaluation of clinical and research experiences (for example, harmonising nursing-sensitive interventions related to antimicrobial use).

At the global level, the World Health Organization recently developed competencies for healthcare workers in antimicrobial stewardship, including nurses (WHO, 2018), emphasising not only clinical aspects but also education and leadership. Additionally, European practitioners, researchers and educators in clinical areas closely aligned with antimicrobial stewardship, such as infection prevention and control, have already established networks at European level, including the Study Group for Antibiotic Policies (ESGAP) and the European Committee on Infection Control (EUCIC) at the European Society of Clinical Microbiology and Infectious Diseases, fostering European

qualifications such as a master of infection prevention and control ([https://www.escmid.org/fileadmin/src/media/PDFs/3Research\\_Projects/EUCIC/EUCIC-Training\\_programme\\_October\\_2020\\_NMHH\\_V13.pdf](https://www.escmid.org/fileadmin/src/media/PDFs/3Research_Projects/EUCIC/EUCIC-Training_programme_October_2020_NMHH_V13.pdf)), and demonstrating existing gaps as well as areas for shared learning (Tsioutis et al, 2020, in press). Similar collaborations between clinical, academic, and non-governmental European nursing institutions could offer comparable opportunities related to antimicrobial stewardship, and thus this should be an area of support and encouragement.

Key areas to further explore include:

- Whilst the participation of nurses in the appropriate use of antibiotics has been advocated and encouraged, such participation has focused mostly on clinical, bedside tasks (i.e., ensuring the timely administration of antibiotics, or reminding prescribers about the need to stop a course of antibiotics) (Gotterson et al, 2020). These activities are without a doubt important, and can contribute to the better outcomes for patients. But it is essential to understand how nurses in leadership and executive positions can influence and support the development of nursing and nurses in antimicrobial stewardship. Current training and research are yet to engage with senior nursing leaders, in hospital, community and long-term care settings. Additionally, there are few interventions centred on key nursing policy- and decision-makers and how to secure their contribution towards stewardship.
- Across the European Union there are vast differences in the activities, roles, and competencies carried out by nurses, despite sharing common educational structures, under the auspices of different European directives. For such reasons, it is important to reflect upon how the participation of nurses in appropriate use of antimicrobials can be tailored to local conditions of education, practice, and competencies. Therefore, whilst it may be possible to agree on baseline competencies, further work would be needed to integrate AMS nursing roles in practice. For example, recent research in the UK identified 3 different models of AMS nursing, including nurse consultant and nurse specialist roles, which would be better suited to different types of organisations; other organisations would benefit more from increasing the skills of the whole nursing workforce, without developing and implementing new roles (Tables 1 & 2, Castro-Sanchez et al, 2019).

- Finally, it would be important to continue developing the evidence about the impact that nurses in AMS can have on clinical outcomes of patients and the economic return-on-investment of AMS nursing posts. Whilst there is much research demonstrating gaps in nursing education about antibiotics, or the impact that some nurse-focused interventions can have, there is much less good quality evidence about cost savings, which would then be a powerful argument to increase the number of nursing posts in the area.

**Table 1. Characteristics of antimicrobial stewardship nursing models**

Domains							
Antimicrobial stewardship nursing model	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)
Vertical (i.e. nurse consultant)	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
Hybrid (i.e. nurse specialist)	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
Horizontal (i.e. staff nurse)	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

**Table 2. Examples of antimicrobial stewardship nursing posts from UK network**

Domains							
Antimicrobial stewardship nursing posts*	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)
Nurse 1	Yes	Relation with infection prevention and control, pharmacy Evolving role focus on Carbapenamase-producing organism screening	Process	Staff Nurse	Infection Prevention & Sepsis Team, Nursing Directorate Substantive position	Hospital	Education
Nurse 2	Yes	Relation with infection prevention and control, pharmacy	Process	Staff nurse	Infection prevention and control, previously in pharmacy Substantive position	Hospital	Clinical, education
Nurse 3	Yes	Relation with infection prevention and control, pharmacy, antimicrobial stewardship team, university	Clinical outcomes, patient satisfaction, process	Advanced nurse practitioner	Infection Prevention and control/University Substantive position	Hospital	Clinical, education, policy, managerial
Nurse 4	Yes	Relation with infection prevention and control, antimicrobial stewardship team	Clinical outcomes, patient satisfaction, process	Lead nurse	Antimicrobial stewardship team Initial 1-year funding, then substantive position	Community and long-term care facilities	Clinical, education, policy
Nurse 5	Yes	Relation with infection prevention and control, antimicrobial stewardship team	Process	Staff nurse	Antimicrobial stewardship team. Substantive position	Hospital	Clinical
Nurse 6	Yes	Relation with infection prevention and control, and sepsis teams, but mainly on education for nurses	Clinical outcome, process	Staff nurse based within pharmacy	Antimicrobial stewardship team	Hospital	Clinical, quality improvement

\*None of these roles exemplify the 'horizontal' approach theorised in the paper. +Equally, all roles explored work closely with other professions

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