



# Assessing the implementation of national antimicrobial prescribing and stewardship competencies into undergraduate curricula

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## INTRODUCTION

The first national antimicrobial prescribing and stewardship competences (AMPS) to be developed world-wide were published in 2013 as part of implementing the UK 5 year AMR strategy.<sup>1</sup>

The competences consist of five domains, each of which include statements that describe the activity and outcomes that prescribers should be able to demonstrate.

The five dimensions consist of:

- I. Infection prevention and control (five statements).
- II. Antimicrobial resistance and antimicrobials (six statements).
- III. The prescribing of antimicrobials (eight statements).
- IV. Antimicrobial stewardship (eight statements).
- V. Monitoring and learning (four statements).

This study set out to understand how the AMPS competences were being embedded into undergraduate curricula of healthcare related professions.

## METHODS

To assess the implementation of the published competences in undergraduate curricula. The online survey was circulated to all Heads of Schools of healthcare courses in England following pilot by six schools:

- Nursing (72 schools)
- Medicine (34 schools)
- Veterinary medicine (7 schools)
- Dentistry (15 schools)
- Pharmacy (26 schools)

As part of the survey, the respondents were requested to complete a gap analysis to determine if, for each of the courses there are learning content to address each of the 31 statements in the competences. Responses were analysed using descriptive analysis.

**Figure 1: AMPS Competencies**

**COMPETENCY 2: Antimicrobial resistance and antimicrobials**  
All independent prescribers should be knowledgeable in:

6. The modes of action of antibiotics and other antimicrobials.
7. Knowledge of the spectrum of activity for commonly prescribed antimicrobials.
8. The appropriate use of antimicrobial agents for:
  - prophylaxis to minimise the risk of infection
  - treatment of infections
9. The use of microbiological and other investigations to diagnose and monitor the response to treatment of infections and their complications, such as severe sepsis, for individual patient care and for public health purposes.
10. The mechanisms of antimicrobial resistance, including:
  - intrinsic or acquired resistance
  - the importance of selection advantages, eg the greater ability for some to colonise, to alter virulence, and how this can be an amplification process for antimicrobial resistance

Responses were received from 45 universities providing 147 health related courses in England. A total of 100 course responses were submitted; including 17 Medical courses, 13 Pharmacy courses, 22 independent prescribing courses, 5 Dental courses, 24 Nursing courses, 13 Midwifery courses and 7 Allied Health Professional courses.

Competency Domain	Average implementation
1 Infection Prevention and Control.	91%
2 Antimicrobial resistance & antimicrobials	75%
3 Prescribing antimicrobials	66%
4 Antimicrobial Stewardship	62%
5 Monitoring and learning	40%

Figure 2: Average implementation of the statements within each of the five competency domains

Of the respondents, 86% were aware of the national AMPS competencies. Since their publication in 2014, 39% of responding schools had updated their courses in light of the competencies listed; including additional modules and revised teaching content within existing modules. Compliance with each competency domain and with antimicrobial stewardship competency statements specifically are explored in figures 2 and 3.

### Highest compliance

- “Avoiding the unnecessary use of broad-spectrum antimicrobials” (80%)
- “Documentation in the prescription chart and/or in patients’ clinical records, the clinical indication, route, dose, duration and review date of antimicrobials” (77%)

### Lowest compliance

- “Awareness of PHE national guidance and use of TARGET Antibiotics toolkit for primary care” (30%)
- “Reviewing antimicrobial prescriptions choosing one of the five antimicrobial prescribing decisions as per ARHAI Guidance – Start Smart – then Focus for secondary care” (46%).

Figure 3: Spotlight on compliance with Antimicrobial Stewardship Competency Statements

A range of methods were used to deliver the content for antimicrobial resistance especially blended teaching (classroom and online activities), classroom based teaching and learning during work-experience placements (figure 4).

## RESULTS

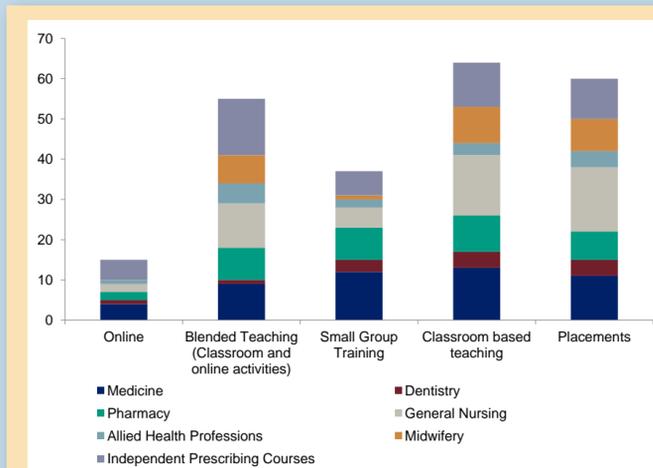


Figure 4: Delivery methods for antimicrobial resistance content within healthcare related undergraduate curricula

The most common method for assessing knowledge of antimicrobial resistance was multiple choice question examinations; other common methods included student portfolio and short answer examination (figure 5).

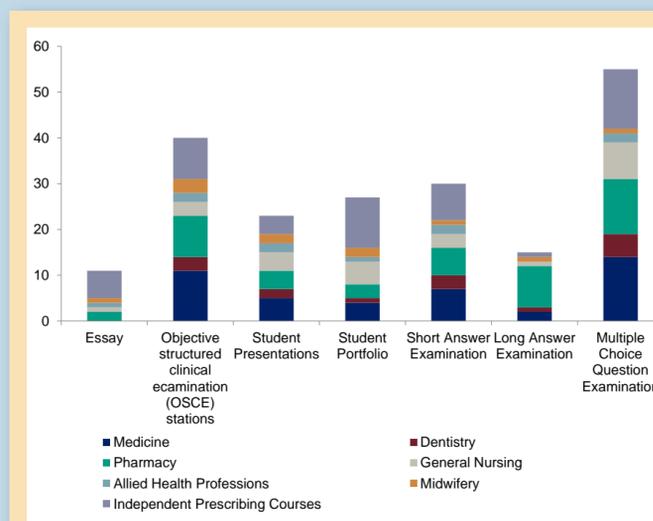


Figure 5: Examination methods used to evaluate undergraduate knowledge about antimicrobial resistance curricula content.

The average time dedicated to teaching antimicrobial resistance was 10 hours and teaching infection prevention and control (IPC) was 15.6 hours. Learning hours assigned to antimicrobial resistance & IPC activities in the undergraduate curricula offered by health related courses can be found in figure 6.

Course	Antimicrobial Resistance (average hours)	Infection Prevention and Control (average hours)
Dentistry	10 hours	9 hours
Pharmacy	27.7 hours	9.95 hours
Medicine	10.4 hours	11.2 hours
Midwifery	6.8 hours	19.2 hours
Nursing	4 hours	27 hours
Independent Prescribing	7.45 hours	16.5 hours
Allied Health	4 hours	16.5 hours

Figure 6: Average implementation of the statements within each of the five competency domains

18 universities (40%) confirmed they provided inter-professional learning for undergraduates from different professions learning any parts of the antimicrobial resistance and IPC content together.

## DISCUSSION

Our results show that healthcare courses in particular medicines, pharmacy and independent prescribing courses have learning content to meet more than 76% of the 31 competences statements in AMPS.

Feedback from respondents called for a national repository of resources and on-line learning packages. HEE are exploring supporting learning by making existing resources on the e-Learning for Health (eLfh) platform available to undergraduates; including modules on:

- “principles of antibiotic use”
- “antibiotics: mechanisms of action”
- “Reducing Antimicrobial Resistance: An Introduction”
- “antibiotic policies
- “prudent use of antibiotics”

In addition PHE and HEE have developed an e-learning module based on key AMPS competencies for a wide range of clinical and non-clinical staff working in health and social care settings

## ACKNOWLEDGEMENTS

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## REFERENCES

1. Ashiru-Oredope, D.; Cookson, B.; Fry, C. Developing the first national antimicrobial prescribing and stewardship competences. J. Antimicrob. Chemother. 2014, 69, 2886–2888.