

EPRUMA – Core competencies on AMS for farmers: objectives and application

What is a core competency?

The EU-JAMRAI uses the [ECDC's definition](#) of a core competency referring to “the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development” that should be a minimum pre-requisite, common to all professionals in this field.

Objectives

Antimicrobial resistance (AMR) is a major public health issue that impacts all health professionals' practices in human and animal health on a daily basis. As overuse and misuse of antibiotics is a key driver of AMR, antimicrobial stewardship programmes, which have been defined by WHO¹, as a “coherent set of actions which promote the responsible use of antimicrobials”, should be implemented both in human and animal health.

The training of farmers and veterinarians on antimicrobial stewardship (AMS) thus constitutes a major element to act on in order to tackle AMR. However, training and curricula are very heterogeneous across Europe. Therefore, a list of common core competencies which could be used as a reference for the training of veterinarians and farmers across Europe would be very useful.

Core competencies' unmet needs in animal health and examples of existing core competencies

The 2019 Council Conclusions on the next steps towards making the EU a best practice region in combatting antimicrobial resistance encourages the development of common guidelines on AMS² that should be included in the training of the animal health workforce.

In human health, WHO identified major gaps in terms of awareness and knowledge of AMR. In 2018 they published [a competency framework](#) for health workers' education and training on antimicrobial resistance based on the mapping of training and education resources around the world which was then refined by a WHO expert consultation group. Classified into four domains and targeting four categories of health workers, this framework provides a reference tool that can be used all over the world (see annex 1).

At European level, the ESCMID (European Society for Clinical Microbiology and Infectious Diseases) generic competencies working group developed [a consensus-based set of generic competencies](#) in antimicrobial prescribing and stewardship for European prescribers through a literature review followed by a structured consensus procedure (RAND-modified Delphi procedure with two questionnaire rounds, a meeting in between, and a final review) (see annex 2).

Regarding animal health, the European Coordinating Committee on Veterinary Training (ECCVT), consisting of the European Association of Establishments of Veterinary Education (EAEVE), the European Board of Veterinary Specialisation and FVE, developed a list of generic core competencies for veterinarians “[Day One competences](#)” in order to meet the overall required veterinary competencies established by the EU; this list mentions a responsible use of medicines, including responsible use of antimicrobials and antiparasitics (competence n°2.8). However, detailed core competencies on AMS within the scope of animal health for the training of farmers do not yet exist at the European level, to the best of our knowledge.

How could to develop such core competencies for farmers?

As concluded by the European Council in March 2020, lifelong learning is a joint responsibility shared by three basic pillars: the public sector, employers and individuals. The public sector has a particular role in providing education and training and in offering financial and non-financial support for skills development and recognition. Employers have a key role in upskilling and reskilling their employees when needs for new skills arise. While support from the public

¹ WHO (2019). Antimicrobial stewardship programmes in health-care facilities in low and middle income countries - a WHO practical toolkit, <https://www.who.int/publications/i/item/9789241515481>.

² Council Conclusions on the next steps towards making the EU a best practice region in combatting antimicrobial resistance, 14 June 2019, n°36, 37, <https://data.consilium.europa.eu/doc/document/ST-9765-2019-INIT/en/pdf>

sector and employers is crucial, individuals need to acknowledge their responsibility in engaging in their own lifelong learning pathways.

However, given that employment skills are generally in the hands of the Member States, there is no coordinated and general perspective of what a worker's CV should include. In this regard, there must be a sectoral agreement that enhances training without reducing competitiveness and the EU could consider funding a structured consensus procedure involving all the EU Member States in order to list these core competences on AMS as a frame of reference for the training of farmers across the European Union.

The fact that there is a minimum of skills gives security and stability at work, so we would agree to provide a standard of skills for our farmers and farm workers.

In the end, having a list of common core competencies which could be used as a reference for the training of veterinarians and farmers across Europe would be very useful. Based on farmers' experience, partnerships and network, EU farmers could use their knowledge and some developed guidance documents to design a list of core competencies on AMS targeting the training of farm workers and assess the training needs for the animal production sector in Europe.

Annex – examples of core competencies on AMS

Annex 1: WHO (2018), WHO competency framework for health workers' education and training on antimicrobial resistance, extract p.6, <https://apps.who.int/iris/bitstream/handle/10665/272766/WHO-HIS-HWF-AMR-2018.1-eng.pdf?ua=1>

Antimicrobial resistance domains ^a	Category 1: All health workers ^b	Category 2: Prescribers ^c	Category 3: Non-prescribers ^d			Category 4: Public health officers/ health services managers ^e
			Nurses	Pharmacists	Laboratory scientists/ technicians	
<p>Foundations that build awareness of antimicrobial resistance</p> <p>Competency statement: Health worker demonstrates that they have the knowledge and awareness of effective approaches to control AMR, and has the skills/attitudes to implement change according to role and level of training.</p>	<p>Relevance: High</p> <p>Knowledge:</p> <ol style="list-style-type: none"> 1. Understand the development and main causes of AMR. 2. Understand the basic principles of infection prevention and control, i.e. hand hygiene to prevent transmission of infections. 3. Understand the impact of resistance on choice of antimicrobial therapy for treating infections. 4. Understand the morbidity, mortality and economic threat of AMR to human health. 5. Know the importance of optimizing use of antimicrobials in the human and animal sectors to prevent development of resistance. <p>Skills:</p> <ol style="list-style-type: none"> 1. Ability to interpret and communicate the use of appropriate policy guidelines on AMR. <p>Attitudes:</p> <ol style="list-style-type: none"> 1. Promote awareness of AMR and appropriate antimicrobial use amongst all health care workers, patient communities and the general public. 2. Act to protect the effectiveness of antimicrobials as an ethical imperative and a public good. 	<p>Relevance: High</p> <p>Knowledge:</p> <ol style="list-style-type: none"> 1. Understand the importance of antimicrobial choice, dosage, interval, duration, preparation and administration of antimicrobials. 2. Know the principles of microbiology in identifying pathogens from clinical samples. 3. Know the basic diagnostic role of the microbiology laboratory. 4. Understand local AMR epidemiology, resistance and susceptibility patterns and use of guidelines. 5. Patient counselling etiquettes, discussion techniques and psychology for patient communication. 6. <i>Understand the principles of empiric, syndromic or culture-based treatment options in relation to the selection of antimicrobials.</i> <p>Skills:</p> <ol style="list-style-type: none"> 1. Appropriate use of antimicrobials to treat and/or prevent common infections and syndromes. 2. Ability to communicate with patients on the appropriate use of antibiotics. 3. Ability to collect microbiology samples. <p>Attitudes:</p> <ol style="list-style-type: none"> 1. Promote a standard for the appropriate use of antimicrobials and manage patient expectations and demands especially when the use of antimicrobials is not indicated. 	<p>Relevance: High</p> <p>Knowledge:</p> <ol style="list-style-type: none"> 1. Understand the role of bedside nursing in antimicrobial stewardship programmes. <p>Skills:</p> <ol style="list-style-type: none"> 1. Assess the source of infection and identify appropriate measures. 2. Obtain allergy history, perform medication reconciliation, and record this in the medical record. <p>Attitudes:</p> <ol style="list-style-type: none"> 1. Contribute to a patient-centred focus in the clinical team, and monitor and communicate daily patient progress. 2. Contribute to public health literacy and general advocacy on the importance of infection prevention. 	<p>Relevance: High</p> <p>Knowledge:</p> <ol style="list-style-type: none"> 1. Understand the significance of antimicrobial choice, dosage, duration and preparation in the treatment of infections. <p>Skills:</p> <ol style="list-style-type: none"> 1. Advise patients and prescribers on the appropriate use of antimicrobials. 2. Practise safe disposal of unused antimicrobial medicines. <p>Attitudes:</p> <ol style="list-style-type: none"> 1. Advocate for patient safety and compliance in the prescription and use of antimicrobials in compliance with formulary protocols. 2. Critically assess information and pharmaceutical products as part of good procurement practices. 	<p>Relevance: High</p> <p>Knowledge:</p> <ol style="list-style-type: none"> 1. Understand the diagnostic role of the microbiology laboratory in detecting infections, resistance patterns, guiding patient management and informing AMR control strategies. <p>Skills:</p> <ol style="list-style-type: none"> 1. Collect and report data on antimicrobial product quality and sensitivity to national drug registration bodies. 2. Advise prescribers on correct microbiological testing procedures. 3. <i>Ability to carry out bacterial isolation, identification, susceptibility testing and reporting.</i> 4. <i>Provide facility-specific cumulative susceptibility reports for common bacterial pathogens against antibiotics that are recommended in the local or national guidelines.</i> 5. <i>Generate profiles of antimicrobial resistance for identified antimicrobial microorganism for public health decision-making.</i> <p>Attitudes:</p> <ol style="list-style-type: none"> 1. Advocate for and comply with laboratory and public health guidelines regarding antimicrobial susceptibility testing. 	<p>Relevance: High</p> <p>Knowledge:</p> <ol style="list-style-type: none"> 1. Understand the use of quality improvement frameworks to address gaps in AMR education. 2. Understand the potential for cost savings and health gains associated with effective infection control and appropriate antimicrobial use. 3. <i>Understand the roles and responsibilities of different stakeholders in antimicrobial stewardship teams. Members of the team could include, but are not limited to, the roles of physicians, pharmacists, infection preventionists, microbiologists, nurses and hospital administrators or others.</i> <p>Skills:</p> <ol style="list-style-type: none"> 1. Ability to determine and implement best approaches to antimicrobial stewardship interventions on the basis of context. 2. Ability to carry out resource allocation to implement and sustain antimicrobial stewardship programmes. 3. Develop policy advocacy and enforcement to manage AMR programmes. <p>Attitudes:</p> <ol style="list-style-type: none"> 1. Promote AMR awareness at health system, hospital and community levels.

Annex 2: O. J. Dyar, B. Beović, C. Pulcini, E. Tacconelli, M. Hulscher, et al.. ESCMID generic competencies in antimicrobial prescribing and stewardship: towards a European consensus. *Clinical Microbiology and Infection*, Elsevier for the European Society of Clinical Microbiology and Infectious Diseases, 2019, 25 (1), pp.13-19.

Box 2

ESCMID generic competencies in antimicrobial prescribing and stewardship.

Section 1: core concepts in microbiology, pathogenesis and diagnosing infections

- 1 Every independent prescriber must understand:
- 1.1 The nature and classification of microorganisms that commonly cause infections in humans
 - 1.2 The common microbiological aetiology of human infections, and the ways in which microorganisms are commonly acquired in community and hospital settings
 - 1.3 The differences between colonization (e.g. isolation of bacteria from a venous leg ulcer with no signs of inflammation) and infection
 - 1.4 That an inflammatory response can be due to both infectious and non-infectious causes (e.g. acute pancreatitis)
- 2 Every independent prescriber must know how to:
- 2.1 Take a thorough history and perform a physical examination to diagnose common infections and to assess their severity
 - 2.2 Use and interpret investigations that can help in informing diagnosis of an infection and in monitoring the response to treatment (e.g. microbiological investigations, biomarkers, point-of-care tests)

Section 2: antimicrobial prescribing

- 1 Every independent prescriber must understand:
- 1.1 How and where to access relevant guidance on antimicrobial prescribing and stewardship
 - 1.2 When not to prescribe antimicrobials (e.g. antibiotics for viral infections, or when there is bacterial colonization)
 - 1.3 That best practices for some infections may not include antimicrobial treatment (e.g. incision and drainage of abscesses, removal of foreign material)
- 2 Every independent prescriber must understand how to select the appropriate antimicrobial, using relevant guidance when possible, as well as the key elements of initiating prescribing an antimicrobial:
- Obtaining relevant microbiological cultures or relevant tests before commencing treatment
 - The timing of antimicrobial administration in different situations (e.g. as soon as possible for life-threatening infections, less urgently for chronic bone infections)
 - The choice and dose of agent, and the route of administration
 - The duration of treatment, review dates and stop dates
- 3 Every independent prescriber must understand the key elements of continuing and rationalizing antimicrobial therapy:
- Monitoring antimicrobial levels when indicated, and adjusting doses (e.g. for patients with renal impairment)
 - Changing antibiotics according to microbiology results and clinical condition, ideally to a narrower spectrum (de-escalation), or if needed to a broader spectrum (escalation)
 - Reviewing antibiotic therapy at 48–72 hours and regularly thereafter in hospitalized patients, and in appropriate situations in the community
 - Switching antibiotics from intravenous to oral administration as soon as possible when indicated (according to guidelines)
 - Stopping antimicrobials if there is no evidence of infection based on clinical findings and investigations (e.g. negative microbial cultures, imaging reports)
- 4 Every independent prescriber must understand the need to document the important details of the antimicrobial treatment plan (e.g. agent, dosing, administration route, clinical indication, duration and review dates) in the prescription chart, medical records and transfer notes to other healthcare institutions
- 5 Every independent prescriber must understand:
- 5.1 That empirical treatment should be guided by local antimicrobial susceptibility patterns
 - 5.2 The clinically relevant spectrum of activity for commonly prescribed antimicrobials
 - 5.3 The basic principles of pharmacokinetics and pharmacodynamics
- 6 When prescribing an antimicrobial, every independent prescriber must know:
- 6.1 The antimicrobial class that the agent belongs to, and the contraindications to its use
 - 6.2 The name and class of antimicrobial being prescribed, if prescribing by trade name
- 7 Every independent prescriber must understand single prophylactic dosing for surgical and other procedures for which prophylaxis has been shown to be effective, and that additional prophylactic antimicrobial doses can occasionally be needed (e.g. when the duration of the operation/procedure is prolonged)
- 8 Every independent prescriber must know:
- 8.1 Common antimicrobial and drug/food interactions
 - 8.2 Common side-effects of antimicrobials, including allergy, how to monitor for them, and what to do when they are suspected (e.g. documenting allergic reactions in patient records, reporting side-effects)
- 9 Every independent prescriber must understand any legal requirements for prescribing antimicrobials in their country, and comply with these when prescribing

Section 3: antimicrobial stewardship

- 1 Every independent prescriber must understand that:
- 1.1 Antimicrobials need to be used responsibly to prevent the emergence and spread of antimicrobial resistance
 - 1.2 Optimizing antimicrobial use can limit the common side-effects and collateral damage related to treatment (e.g. their disruptive effects on the normal host flora, which may lead to *Clostridium difficile* infection, super-infection with *Candida* spp.)
 - 1.3 It is important to avoid unnecessary uses of antimicrobials, especially those with a broad spectrum
 - 1.4 Transmission of microorganisms in community and hospital settings can significantly amplify antimicrobial resistance
- 2 Every independent prescriber must understand local stewardship policies based on national (or international where these do not exist) evidence-based guidelines
- 3 Every independent prescriber must understand and engage with any locally or nationally agreed quality measures for assessing antimicrobial prescriptions (e.g. compliance with guidance, adverse events, reviews of antibiotic therapy at 48–72 hours in hospitalized patients)
- 4 Every independent prescriber must know how to communicate with patients and their carers, nurses, pharmacists and other healthcare professionals about:
- 4.1 When antimicrobials are not needed
 - 4.2 Complying with the duration and frequency of administration of their prescribed antimicrobials
- 5 Every independent prescriber must recognize that it is a duty of care to co-operate with others more expert than oneself, such as the antimicrobial stewardship team, when such expertise is needed