

“DAMR – Disseminate antimicrobial resistance knowledge”: a joint approach in veterinary education



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

A Barbarossa^a, F Pasquali^b, F Gentilini^a

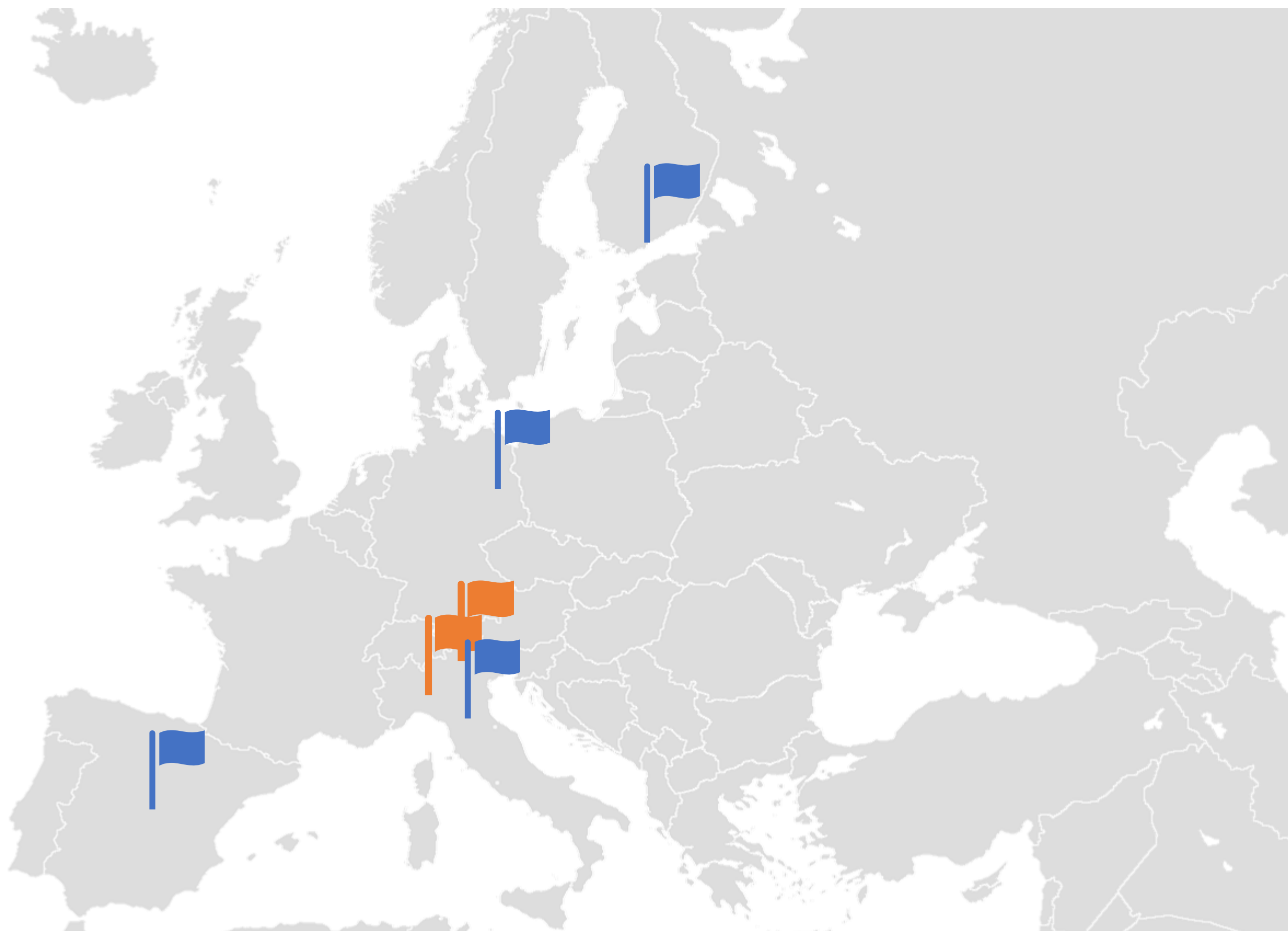
^a Alma Mater Studiorum – University of Bologna, Department of Veterinary Medical Sciences, Ozzano dell'Emilia (BO), Italy

^b Alma Mater Studiorum – University of Bologna, Department of Agricultural and Food Sciences, Ozzano dell'Emilia (BO), Italy

Introduction and aim

Beyond COVID-19 emergency, antimicrobial resistance (AMR) persists as one of the greatest threats for global health. At present, more concerns are arising regarding AMR, as the COVID-19 emergency can potentially worsen the AMR problem. According to CDC, in the first months of the pandemic, although 70% to 90% of antimicrobial agents were used against COVID-19, only 50% or less was effectively associated to secondary bacterial infections. But COVID-19 is having a broad impact also on human behaviors: on-line technologies showed up as crucial tools in keeping people socially connected although physically distant. New models of mobility, “virtual mobility”, have the potential to promote not only international connectivity but also inclusivity in a sustainable and affordable way. By virtual mobility, teaching activities can be accessible even to students otherwise excluded for personal, financial or pandemic-related reasons.

The DAMR project is a Una Europa (www.una-europa.eu) seed funded action coordinated by the University of Bologna, aimed to promote virtual mobility for dissemination of knowledge on AMR through the joint efforts of researchers from different fields and institutions. Four European Universities have been engaged as partners in DAMR (Bologna, Berlin Freie, Helsinki and Madrid Complutense) and two as third parties (Pavia and Bolzano), as shown in the map here below. In this context, joint teaching activities and surveys on AMR-related topics to be administered to students have been identified as useful educational tools.



Materials and methods

Teaching activities are based on virtual mobility educational formats called Joint Teaching Units (JTUs). Each JTu consists of a 40–45-minute video-lecture on a specific topic related to antimicrobial resistance, pre-recorded by one of the teachers involved in the project and made easily accessible on-line to students. After viewing the recording, students will be involved in live forums organized by teachers, where they can ask questions and furtherly discuss each topic. JTUs have been planned and disseminated in the context of already existing courses offered by the participating Universities. Degree programs may also decide to give students the opportunity to obtain 1 ECTS after taking part in a series of JTUs and passing a multiple-choice test on the topics covered.

In addition, a 5 minutes online survey will allow assessing the awareness of students of different cohorts on antibiotic resistance and on their future role to reduce the use and abuse of antibiotics in veterinary practice. During multiple web meeting involving all participants, researchers exchanged thoughts and shared inputs, creating a gradual consensus on building the survey. It will be spread online at the end of the JTUs using Qualtrics platform, to collect viewers feedback and assess the efficacy of the initiative.

Results

Overall, 17 JTUs, adjusted in order to not duplicate UNA EUROPA ONE HEALTH project educational activities, have been produced by researchers participating to the project and uploaded on the platform (titles and institution are listed in the table below). All JTUs will remain available during the 2021-22 academic year for more than 1,500 students enrolled in 30 different courses across the participating Universities.

Institution	Title of the Joint Teaching Unit
University of Bologna	Application of WGS to trace <i>L. monocytogenes</i> in a rabbit meat processing plant: the concept of persistence beyond resistance
University of Bologna	Network-based approaches to Food Safety and Antimicrobial Resistance: a survey
University of Bologna	Use of antibiotics in animal related practices
University of Bologna	<i>Acinetobacter</i> spp. sequencing for assessing the complete AMR profile using the Oxford Nanopore Minion device
University of Bologna	Prudent use of antimicrobials in veterinary medicine
University of Bologna	Nutritional strategies to reduce the antibiotic need in weaned pigs
Complutense University of Madrid	AMR, WGS and One Health
Complutense University of Madrid	Metagenomics and AMR using hybrid sequencing technologies
Complutense University of Madrid	Tracing evolution of AMR using WGS
Complutense University of Madrid	WGS and Phylogeny in prokaryotes and eukaryotes
Complutense University of Madrid	Integrins and WGS
Freie Universität Berlin	Antimicrobial Resistance: origins, mechanisms of resistance, transmission of resistance between bacteria
Freie Universität Berlin	Antimicrobial susceptibility testing of bacteria from animals
Bolzano Central Hospital	The perfect storm is knocking on my door
Pavia University	Mechanisms of antibiotic resistance and their genetic supports in Gram-negative bacteria of clinical importance
Pavia University	Molecular typing of Gram-negative MDR pathogens: different approaches for different aims
Free University of Bolzano	Antibiotic resistance genes and related cassettes into natural environments

The survey consists of 24 questions, grouped in 5 blocks covering responders' personal details, perception of the importance of AMR, perception of their own preparedness, practical knowledge and feedback on the proposed JTUs. Students' feedback will be collected from the synchronous and asynchronous forums, the results of the survey and speakers' experience.

The information acquired by the end of the project will be useful to shape the syllabus for a course dedicated to antimicrobial resistance and the prudent use of antimicrobials in animal productions and human medicine, to be offered within life sciences degree programs.

Conclusions

The DAMR project is a successful experiment of harmonized teaching based on the One Health approach, involving teachers and students from multiple European education establishments with expertise in the fields of veterinary medicine, human medicine, and food safety. This approach is proving to be a very helpful instrument in the present pandemic situation, and it can be easily replicated and furtherly improved in the future, expanding this international One Health virtual community.

