AMR CoP ECHO Session – 6 July 2024

Thank you for the questions.

Q1: You mentioned the blood culture for identification of the bacteria of interest. Are there other Biomarkers that are being used to determine the bacteria of interest?

There are common markers to qualify a diagnosis of BSI and they include C-reactive protein (CRP), procalcitonin (PCT), and leukocyte counts. CRP and PCT could in most cases rule out BSI in critically ill patients. As almost no patients present with low CRP and ∼20% had low PCT, a low PCT could be used, along with other information, to guide clinical decisions.

For bacteria detection besides BioFire I mentioned in the presentation, there are others such as: multiplex panels, single molecular counting (SMC) immunoassay platform and ELISA and radioimmunoassay (RIAs). Each of them has to show advantages such as sensitivity, accuracy, reproducibility relevance, software for analysis and reporting and others.

Q2: How can we ensure that we have enough isolates for better understanding of AMR especially in human health were low sample volumes and low recovery rates is still a big challenge and the molecular advances to study AMR is still wanting?

You should consider the following steps when sampling people or healthcare facilities for AMR surveillance:

1. **Decide on your target population:** What is the most relevant population to which you want to generalize the findings of your study or surveillance program?
2. **Decide on the source population:** In most cases, this will be individuals attending healthcare facilities such as hospitals or primary healthcare centers, but it could also be healthy individuals, especially for surveillance for carriage rather than disease.

3. **Outline a sampling frame:** This might be a list of all hospitals or healthcare facilities in the target population. Remember that it is ideal to have at least 80% of the total target population listed in the sampling frame, although this can be difficult to achieve.
4. **Determine a sampling strategy, including how to select sampling units:** Consider using probability sampling methods.
5. **Calculate the required sample size:** This may require more than one calculation (such as the number of hospitals and then number of patients per hospital), and may require adjustment in light of non-statistical determinants of sample size. Be sure to consider whether you need to adjust the number of people to sample if the target bacterial species are not expected to be isolated from all samples.

There are three key statistical parameters that have to be specified when determining sample size. In general, if a study sample is too small, the precision, confidence level and power of a study will fall short. This means you can't reliably generalize the findings from your sample to the target population. Therefore, you need to understand and decide on appropriate values for each of these parameters in order to calculate the minimum sample size required.

To make life easier when designing a study there are several sample size calculators available online, including **Epitools** [Tip: hold Ctrl and click a link to open it in a new tab. (**Hide tip**)] and **Sample Size Calculators**. Which sample size calculator to choose depends on the objectives of a study. Many AMR studies aim to estimate a single proportion, such as the proportion of isolates that are resistant to a particular drug. Some also compare two proportions, for example the number of resistant isolates in patients in one region compared to another region. Similarly, AMU studies might aim to measure the total amount of AMU, or compare AMU between hospitals. There are appropriate sample size calculators available for both of these objectives. (Fleming Fund webpage)

Q3: How can surveillance cover agricultural and veterinary use of antimicrobials which has indirect effects on Human Health? Can this be achieved through a One Health approach?

In South African Annual report, animal antimicrobial procurement data was collected according to antimicrobial class together with respective kilograms of product procured and was disaggregated from all animal species to food producing animals and companion animals, as well as whether the indication was for therapeutic use or growth promotion. For import-related human and animal procurement data, the INN of antimicrobial products and active ingredients were collected, together with volumes entering the country.

There is huge variation in knowledge, attitudes and practices across countries, production types, sectors and individual farms, highlighting the complexity of reducing AMU globally. While increased knowledge and awareness is beneficial it is not always enough to reduce AMU. Farmers have acknowledged that several other barriers affect their ability to implement strategies, such as financial constraints, labor requirements, access to resources, perceptions about capabilities and feelings of uncertainty. In European countries, fostering a collaborative relationship between vets and farmers is necessary to elicit a shared ownership to combat AMR. In developing countries, drug vendors and peers are viewed as trusted and accessible sources of information. Therefore, strategies targeting these groups would be an effective approach for interventions surrounding awareness. Behavior change theories should also be included in strategy design, to address barriers experienced in agriculture in relation to AMU. Overall, careful consideration and an evidence-based approach is required to develop optimized intricate interventions and strategies, which elicit successful and sustained behavior change. (https://doi.org/10.1093/jacamr/dlab178)

Q4: Are there any AMR stewardship efforts in Veterinary Medicine in South Africa? If yes, can you share the experience.

Animal sector:

We have NAP - SOUTH AFRICAN ANTIMICROBIAL RESISTANCE NATIONAL STRATEGY FRAMEWORK; A ONE HEALTH APPROACH 2018 – 2024, which covers importance of AMS in human and animals.

Animal sector recommended an International Committee of the World Organization for Animal Health (OIE) published a set of guideline documents in 2003 for all OIE Member Countries relating to the public health risks of antimicrobial resistance, originating from the use of antimicrobial drugs in veterinary medicine. Animal sector register antimicrobials for use in animals under Act 101/1965 in terms of quality, safety and efficacy. All antimicrobials registered under Act 101/1965 are scheduled and dispensed through a prescription. MIC data with local strains (*Staph* spp, *E. coli* and *Salmonella* spp) have to be submitted pre-registration. The data must be derived from 30 herds from x 3 geographical areas. The list of registered products and package inserts is available on the SAHPRA website. All products are re-registered every 5 years and submitted within 3 years of registration.