Written responses to open questions of the webinar 'Balancing access to and stewardship of antimicrobials in LMICs' by Direk Limmathurotsakul, Souha S. Kanj and Sujith J. Chandy, originally broadcast on 1 July 2021.

See webinar recording here: https://revive.gardp.org/balancing-access-to-and-stewardship-of-antimicrobials-in-lmics/

Question	Direk	Souha	Sujith
My Name is Charity from Ghana. I like the educational programs to tackle AMR, but the question is how can this education get to the people that needs it. Most often Workshops are organise for people who already know what AMR. How can we address this issue?	Multi-facet approach is required to obtain the effectiveness of the intervention. Intervention focused on those who need the most is also the key. Any media that is made for AMR AMS in any workshops in local language for local settings should be made open access for other people to use as well.	Agree with Direk. We need to adapt to various settings to be able to adopt stewardship. It can start with simple messages on TV, radios and billboards. Using not only influenicial people in the field but also celebrities and "popular people" in the respective conutries.	We need to use as many channels as possible with clear, context-based messages and learning. This means the use of both traditional learning platforms as well as digital and social media. From a long-term perspective, it also means the development of simple modules in school which children can understand.
Excellent discussion and insights. To all participants - how is the demand for different antibiotics planned - how is burden of disease and causative organisms estimated in order to inform antibiotic procurement at national level, and prescribing at local level.	The need for more researches and actions on those planning is critically needed. It is also needed to categorize how much of the demand for antibiotics is rational as well.	The demand should be based on local national data which is lacking in many LMICs. However even small single center studies can give an idea about the problematic pathogens and the need for new agents on the market.	Unfortunately, in many countries, burden of different types of disease are not available in an accurate manner, and if available, only for some diseases. Due to the paucity of labs, determining the causative organisms for infections is also a challenge. Therefore, at a national level, antibiotic procurement estimations may become difficult. Local level estimations are relatively easier, especially within hospitals. This however needs documentation systems and a systematic effort to maintain a database.
I wondered if you have observed a reduction in AMR incidence and prevalence during 2016-2019 in Lebanon?		Yes we do. We were able to eradicate the endemic MDR Acinetobacter after stringing infection control practices in addition to a carbapenem spearing strategy. We will be presenting the data at ECCMID 2021.	

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How can we improve patient education in LMICs regarding antibiotic stewardship program?	Everyone should start by doing what they can to educate patients. It requires multi-facet approaches as noted by all speakers. Then, co-ordinated effort is required to make sure that message is co-ordinated and the credibility of alliance and intervention is clear.	It takes effort from the individual health care providers. If we train them well with clear simple messages, they can help relaying the messages to patients. Also TV programs, panflets, billboards, cartoon films using simple messages.	It is very important to understand the knowledge, attitude and practices of a community. Once that is done, one needs to prioritize the problems and target areas which need education and behaviour change in a targeted, context specific fashion with strategies which are sustainable and cost-effective. Above all, education needs to be with a step-by-step approach using innovative techniques and multi-dimensional learning platforms.
How can we implement ANTIMICROBIAL stewardship in India as during pandemic times, antibiotics are sold with no limits.		I defer to Sujith's opinion. As he lives there.	Antimicrobial stewardship in any country has to be done at various levels and using a multi-dimensional interventional approach. The situation with the pandemic had made things difficult initially, but the efforts with evidence generation has helped to distill which medicines may help. This evidence has now led to certain guidelines both globally and country wise. Its important that these guidelines are disseminated to relevant stakeholders with clear rationale and based on contexts. There will be challenges in guideline implementation, but this needs to be tackled by understanding the challenges and putting in place measures to surmount them.

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Clinicians often prescribe based on their experience - and a rapid diagnostic test that is negative doesn't influence them. Can you comment?	I think that there are many types of doctors. Also, sometimes, many thoughts or types are mixed in a single doctor. There is a type of doctors who think that this is the best for a single patient, a type who think that this is the best as it's following the norm (following what most doctors do, and it will rarely be wrong), and many other types. So, changing behaviours of doctors are not an easy task, top-down teaching alone is unlikely to be successful, and a social science study with behaviour change concept based on local context is commonly needed.	It very much depends on how well trained is the physisican, and how reliable are the tests. We tend to see more over-prescribing in younger physicians in some settings who lack confidence in their diagnostic abilities.	
I'm working in a NICU in a tertiary referral centre in Kampala, Uganda. The balance of stewardship, antimicrobial resistance vs limited diagnostics and a population who is at high risk of infection is very difficult. The vast majority of babies on the unit (generally over 50 babies at a time) are on antibiotics. Concurrently we have outbreaks of highly resistant gram negatives and a limited supply of antibiotics. Does the panel have experience of managing stewardship in intensive care units (neonatal or adult). How do you balance this risk?	I have limited experience working and discussing with NICU team. However, I would also like to add that infection control and hand-hygiene are usually needed to be strengthened as well. Also, strong feeling of overuse of antibiotic prophylaxis are not rare. So, team-based discussion with multiple interventions are usually needed.	Yes I do. We have a very active neonatal unit and for the stewardship program to achieve success, the neonatologist took ownership of the program. Rather than have the ID people dictate what is to be done. They were very happy to see their infection rates coming down and the rates of MDR pathogens decreasing. Engaging staff including physicians, and nursing is very improtant to achieve success	

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Thank you very much to the panelist for this excellent discussion. It was mentioned that there is problem to access old antibiotics rather than new. But I was wondering if the most recent reserve antibiotics are available (CAZ/AVI, Ceftolozane-tazobactam, cefiderocol...) in the countries/regions. If not available, is it beacuse there is lack of knowledge/awareness, lack of registration or cost?	Available but limited. This is mostly due to cost, being reserved and being well managed with AMS team of those hospitals.		There is a problem with accessing both old as well as newer antibiotics, but often for different reasons. Some of the access determinants for newer antibiotics in certain countries include patient issues, high prices and therefore affordability issues, as well as a lack of diagnostic support.
The topic of structural aspects of AMR and antibiotics as infrastructure as been raised. What is the panels view of the impact of tendencies to equalizing care with pharmaceuticals.			Health and healing have many components and not just pharmaceuticals, though the latter occupy a prominent place. It is therefore important to make efforts so that health systems are strengthened in their entirety. Of course, it would be difficult to ensure this in some contexts due to a variety of reasons. In such situations, availability and access to medicines are very much needed.
Thank you for the interesting discussion. It will be great if the panelists could discuss the acess of antimicrobials in poultry and dairy industry.	At the moment, the access of antimicrobials in animal industry is high (i.e. easy to access). However, to steward the use of antibiotics in animal farming is not easy. All approaches are needed; and I also believe that customers and NGOs (together) are going to be the key drivers to the better use of antibiotics in animal agriculture as they can stimulate policy makers and industry effectively.	This is a very important point. The one health approach is essential to address resistance. China has for example banned colistin from animal feed, The Netherlans are looking into stopping the use of antifungal sprays on tulips as they have predisposed to increase fungal resistance. Some LMICs have started to address these issues but much more need to be done.	

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I agree that awareness is a key intervention for use of antibiotics among health workers and the general public. Is it enough to change behaviour? Sujith suggested, and I think correctly, to address the systemic contributors of antibiotic use: supply chain issues, access to health facilities, etc		Yes fully agree. Stewardship needs to be multifactoria to be effective. Addressive the issue from multiple angles.	AMR is a multi-dimensional complex phenomenon. Therefore using one strategy will not solve the problem. Behavioural change issues definitely need to be addressed, but having the required infrastructure, supply chain issues, access to healthcare etc. will definitely help if we are to truly move forward in a wholistic sense.
Sujith: The essential medicines list versus what the Pharm industry manufactures... what comes first? chicken or egg? which of these is the primary driver of access? demand or supply?		Fully agree with Sujith. Driver for access should always be patients need, however unfortunately on the ground drugs that generate more profit are easier to access the market in many LMICs.	I think both are important. Patients need medicines, but at the same time, availability, access and affordability are all practical issues. That is why having an essential list of medicines will help rationalize a list and allow those who are engaged in ensuring availability of medicines to prioritize medicines on the essential list. This is especially so when there are budgetary issues and when there is a need to ensure that the diseases contributing to a majority of the burden need to be covered.
Literatures suggest to incorporate social approach in the stewardship. I cannot agree more. However, the current documents at the global and also national level only provide guidelines in related to the technical elements of stewardship. How, in practice, shall the academics and stakeholders incorporate the "socio-cultural" aspects in national and hospital level stewardship?	To answer “how”, I think that more basic research in social science on AMR and AMS need support locally. Also, interventions on AMR and AMS should have social science element added to that as well. Local context is usually critical. So, funders, policy makers and stake holders should give more fund and credits to those who do more on this. Also, it is noted that the concept of social science evolves regularly; funders, policy makers and stake holders should promote up-to-date approaches/practices/study designs, etc of social science on AMR and AMS as well.		This element is being looked at more closely, especially through behaviour change and with the advent of behavioural sciences. It would be very important for research and teams working on AMR to be multi-disciplinary and incorporate behavioural interventions into strategies in order to have wholistic change. Additionally, there is a real need to have more implementation research and evidence generation so that the guidelines can be implemented in a feasible way.