

Supporting surveillance capacity for antimicrobial resistance: Regional Networks and Educational Resources

Summary

This study was commissioned as part of the 'Fleming Fund: supporting surveillance capacity for antimicrobial resistance' for the project 'An analysis of networks and education resources supporting drug resistant infection surveillance in low and middle income countries (LMICs)'. The study objectives were to identify and describe drug resistance surveillance networks in LMICs and identify available educational resources that could support effective implementation of such networks.

We defined an anti-microbial resistance (AMR) surveillance network as a group of institutions (nationally) or countries (regionally/globally) that gather, analyse, compile and share the results of any aspect of antimicrobial resistance (e.g. antimicrobial resistance, antimicrobial use and antimicrobial quality). Publications with potential descriptions of, or references to, LMIC anti-microbial resistance (AMR) surveillance networks and educational resources from January 2000 to June 2016 were sought from electronic databases and from individuals involved in, or with knowledge of, such networks. A data extraction tool was designed to capture all aspects of an AMR surveillance network which we identified from the literature and our own experience and that of others working in AMR surveillance in LMICs. Only educational resources that were freely available were accessed and their content, scope and origin were documented.

Telephone interviews were conducted with key individuals associated with AMR surveillance networks that had been selected because the networks had national or international scope and represented a range of geographical locations and infections. Information collected covered data collection, technical support, training and external quality assurance. It also covered mechanisms for sharing data, standard operating procedures, and best practice, and barriers and enablers to the implementation and maintenance of the surveillance networks. Information was included on all the networks we identified but not all of the information was verified by interviews. This is important to note since it is possible that some of the identified networks may no longer be operational.

Twenty regional and international AMR surveillance networks were identified. Most of these provided routine AMR surveillance in specific regions (i.e. Europe, US, Central Asia, Latin America and Eastern Europe) or globally on certain topics (i.e. paediatric infections, tuberculosis, HIV, pneumonia, meningitis, gonorrhoea). In addition to the routine surveillance networks, we identified several research networks involved in AMR surveillance. These covered general AMR in different regions (i.e. Asia) or specific target groups (i.e. paediatrics), or organisms (i.e. salmonella, TB, E coli, nosocomial). We also identified four AMR surveillance networks for infections transmitted through food, water and zoonoses.

We identified a limited number of educational resources relevant for supporting AMR surveillance which are freely accessible on-line. These covered generic issues to do with AMR surveillance or public health surveillance in general and some focused on specific organisms or target groups such as data managers, laboratories or paediatricians. These resources will need to be reviewed by the

different players involved in AMR surveillance so that they can determine whether or not they meet their needs.

The European EARS-NET model seems to have been successful and could be considered for expanding to other regions such as central Asia. Coordination of activities and sharing of 3 information across these three types of networks (routine, research, food/water/zoonoses) may be beneficial to maximise synergy and avoid duplication particularly of laboratory testing. Africa seems to be particular poorly served in terms of AMR surveillance networks. In-depth analysis of some of the more and less successful AMR surveillance networks would be helpful in guiding future programme about what works and does not work in different contexts.

International and Regional Networks Identified

Network Acronym	Full Network Name
ANSORP	Asian Network for Surveillance of Resistance Pathogens
BIRDY	Bacterial Infections and antibiotic Resistant Diseases among Young children in low-income countries
CDC GDD	US CDC Global Disease Detection programme
CAESAR	Central Asian and Eastern European Surveillance of AMR Network
EARSnet	European Antimicrobial Resistance Surveillance network
FWDnet	Food and Waterborne Diseases and zoonoses network
GABRIEL	Global Approach for Biological Research on Infectious Epidemics in Low income countries
GARPEC	Global Antimicrobial Resistance, Prescribing, and Efficacy Among Neonates and Children
GASP	Gonococcal Antimicrobial Surveillance Program
GFN	Global Foodborne infections Network
GLOBAL Project	WHO Global Project on anti-TB drug resistance surveillance
HIVResNet	Global HIV Drug Resistance Surveillance Network
INICC	International Nosocomial Infection Control Consortium
ISRAR	International Surveillance of Reservoirs of Antibiotic Resistance
ReLAVRA	Red Latinoamericana de Vigilancia a las Resistencias Antimicrobianas
SENTRY	SENTRY Antimicrobial Surveillance Program
SIREVA	System of Networks for Surveillance of the Bacterial Agents Responsible for Pneumonia and Meningitis
SMART	Study for Monitoring Antimicrobial Resistance Trends
WHO GSS	WHO Global Salmonella Surveillance

Observations concerning these AMR networks

These networks are very variable in terms of their organisation, geography, operation and diseases and organisms covered so it is not possible, or helpful, to directly compare them. However our research had identified some interesting observations and examples of innovative practice that may be useful for informing future regional AMR surveillance networks which are listed below.

- There are strong antimicrobial surveillance networks in the EU and Latin America regions (e.g. EARS-NET and ReLARVA).
- Central Asia has started to develop a regional network based on the EARS-NET model so this region may be considered for future investment to build up their AMR capacity.

- A significant proportion of AMR activities emanate from research projects and networks. These research-based networks may be in a good position to be able to identify laboratories that have capacity to do good quality AMR surveillance and which could therefore be brought into a formal regional AMR network.
- Research-based AMR networks are driven by project objectives and short-term funding cycles. They may therefore find it difficult to take a long-term strategic approach to tackling AMR challenges but clearly have an important role to play in any long-term AMR strategy determined by a global or regional agency.
- It will be important to verify which of these network is still active and to carry out in-depth analyses of successful and unsuccessful networks to learn lessons for future programmes about how to set up, manage, recruit members and coordinate such networks
- Despite the high burden of infectious diseases in Africa there appears to be very little AMR network coverage across the continent
- The SENTRY network has set up a good quality specimen bank, and charges for access and testing with isolates obtained from its network. This is an interesting model for ensuring financial sustainability of the network which is may be possible to replicate in other AMR networks that collect high quality data and samples.

This was a three-month study commissioned under the theme of '*Networks and Education Resources Supporting Drug Resistant Infection Surveillance in Low and Middle Income Countries*'¹. It complements the work performed at the same time under the theme '*An analysis of approaches to laboratory capacity strengthening for drug resistant infections in low and middle income countries*'. As the studies were conducted in a short time frame it is recognised that they are not entirely comprehensive; they are intended as starting point to help inform the UK government and its partners of areas of greatest need and how it may best build surveillance capacity in LMIC contexts. This is an independent study commissioned by the Wellcome Trust and funded by Department of Health as part of the Fleming Fund.



¹ <http://europepmc.org/grantfinder/grantdetails?query=pi:%22Bates+I%22+gid:%22202961%22>

Educational resources concerning AMR networks

Resource/ linked network	Type of Resource / intended use	Access	Website and contacts
React toolbox/ ReAct	<p>A web-based resource for taking action on antibiotic resistance. Throughout the toolbox a narrative text guides the user on how to work with the problem, combining practical advice with examples from the field and providing links to external resources that may be useful in different settings</p> <p>The Toolbox is intended for use by those already working with antibiotic resistance in some way, or are interested in taking action. The main target audience for the Toolbox is health care professionals, civil society organizations and policy makers in low-and middle-income countries.</p> <p>Focus on antibiotic resistance rather than surveillance networks</p>	Free, online web based- collaborative. You may copy and re-use content on the ReAct Toolbox website (that are not materials posted from and/or clearly cited from other sources), provided always that you give proper credit to ReAct.	<p>http://www.reactgroup.org/toolbox/</p> <p>ReAct - Action on Antibiotic Resistance Uppsala University Box 256, SE-751 05 Uppsala, Sweden Phone: +46 (0)18 471 66 07 Fax: +46 (0)18 471 66 09 E-mail: react@medsci.uu.se</p>
React resources / ReAct	<p>The resource centre includes a selection of published articles, reports and web tools to facilitate action on antibiotic resistance. Facts and Tools, Policy and Reports, ReAct-produced material, Reference Library.</p> <p>The Resource Centre is a searchable database, a web-based “library”, to help people gain easy access to scientific articles, policy documents and reports related to antibiotic resistance.</p>	Free, online	<p>http://www.reactgroup.org/resource-center.html</p>

Resource/ linked network	Type of Resource / intended use	Access	Website and contacts
Arpec	<p>Web based training programme will be developed by the ARPEC team. This will provide a range of educational modules on optimal antibiotic prescribing and antimicrobial resistance. Eventually it will be possible to modify the online content to produce country specific training, potentially containing data obtained from our collaborators. It is anticipated that making the training modules more relevant to the different countries will improve the training dissemination through ESPID and the EAP.</p> <p>An Educational Group was formed within ARPEC to tackle the issue of training in antibiotic use for children in Europe.</p> <p>A basic slide set directed at paediatricians in training likely to become community prescribers has been produced and is available online. Collaboration with ESPID (Education Committee) will lead to the development and implementation of an online training course on antibiotic utilization for children.</p>		http://www.arpec.sgul.ac.uk/training/videos

Resource/ linked network	Type of Resource / intended use	Access	Website and contacts
CDC-GDD	Shareable resources showcase the depth and diversity of the Global Disease Detection program as we work with countries to build capacity to find and stop outbreaks around the world		http://www.cdc.gov/globalhealth/healthprotection/gdd/resources/index.html
Integrated Surveillance of Antimicrobial Resistance Guidance from a WHO Advisory Group / WHO	Pdf document To provide WHO Member States with key information on designing a programme for integrated surveillance of antimicrobial resistance.	Downloadable document	http://apps.who.int/iris/bitstream/10665/91778/1/9789241506311_eng.pdf
Antimicrobial resistance (AMR) reporting protocol 2015 / EARS-net	Pdf document Data collection guidelines for reporting countries' data managers	Downloadable document	http://ecdc.europa.eu/en/activities/surveillance/EARS-Net/Documents/2015-EARS-Net-reporting-protocol.pdf
GLOBE portal (Global Link for Biomedical Expertise Online) / GABRIEL	A dedicated website for the network members to exchange and communicate their priorities and research results on infectious diseases and more particularly on the lower respiratory tract infections and tuberculosis.		http://gabriel.globe-network.org/en/gabriel/resources

Resource/ linked network	Type of Resource / intended use	Access	Website and contacts
standard molecular typing protocols / FWD-net	<p>For PFGE on Salmonella (excluding S. Typhimurium and S. Enteritidis) and E. coli isolates: PulseNet International 2013-03 PFGE protocol for Salmonella and E. coli</p> <p>For PFGE on Listeria monocytogenes isolates: PulseNet PFGE protocol for Listeria monocytogenes</p> <p>Alternative, comparable method for PFGE-typing of Listeria monocytogenes isolates is published by the European Union Reference Laboratory for Listeria monocytogenes</p>		http://ecdc.europa.eu/en/healthtopics/food_and_waterborne_disease/surveillance/Pages/index.aspx
Public health surveillance toolkit			http://siteresources.worldbank.org/INTPH/Resources/376086-1133371165476/PHSurveillanceToolkit.pdf
Core Elements of Hospital Antibiotic Stewardship Programs			http://www.cdc.gov/getsmart/healthcare/implementation/coreelements.html
National Healthcare Safety Network (NHSN)			http://www.cdc.gov/nhsn/acute-care-hospital/aur/

Resource/ linked network	Type of Resource / intended use	Access	Website and contacts
Guide for establishing laboratory-based surveillance for antimicrobial resistance			http://apps.who.int/medicinedocs/documents/s20135en/s20135en.pdf
Integrated Surveillance of Antimicrobial Resistance			http://apps.who.int/iris/bitstream/10665/91778/1/9789241506311_eng.pdf