



Antimicrobial Resistance Containment in Africa

Sabiha Essack

B. Pharm., M. Pharm., PhD

South African Research Chair in Antibiotic Resistance & One Health
College of Health Sciences, University of KwaZulu-Natal

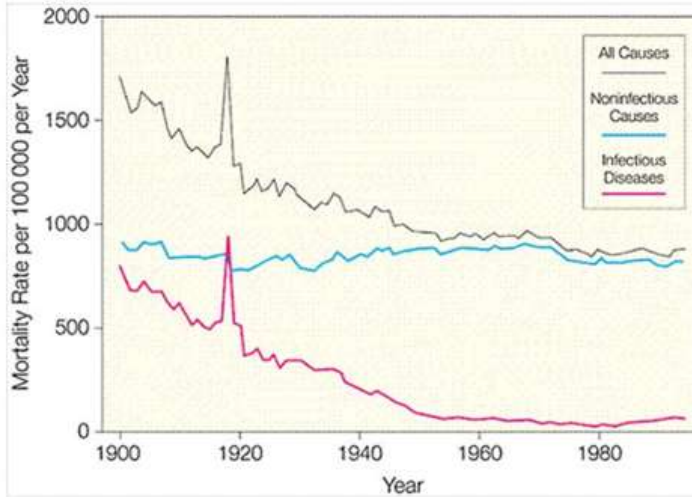


Overview

- Antibiotics and Antibiotic Resistance
- The “Quintessential One Health Issue”
- The Global Scale
- The Global Impact
- The African Context
- The Global Antibiotic Resistance Movement
- African Mobilization
- Containment and Mitigation Strategies
- The Way Forward

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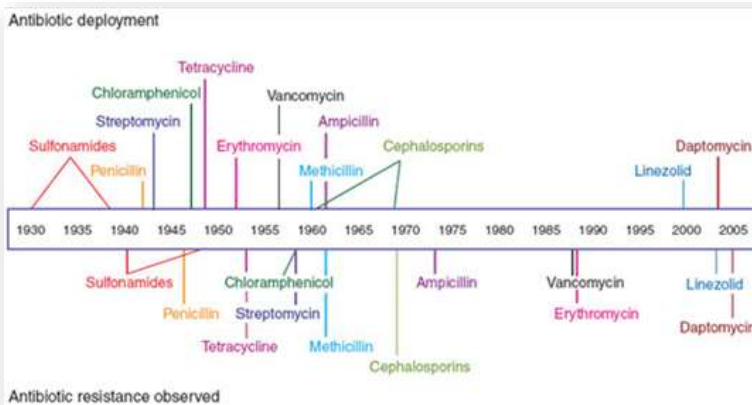
Antibiotics



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Armstrong G et al., JAMA 1999 281: 61-66

Antibiotic Resistance



WADA Bad Bugs, No Drugs: No ESCAPE!

100% the effects of antibiogram drug

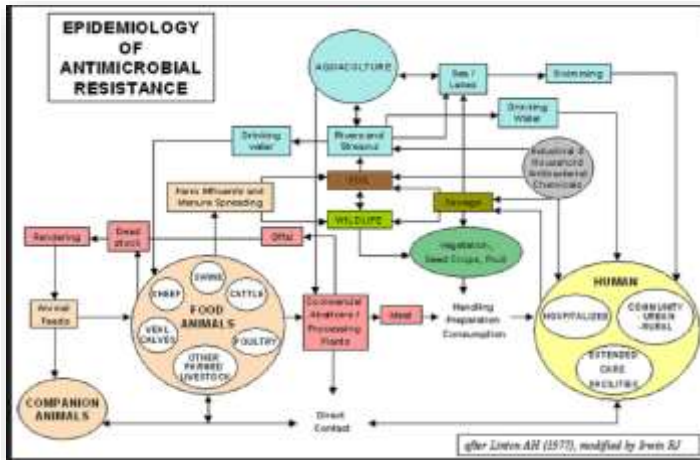
- Enterococcus faecium
- Staphylococcus aureus
- Klebsiella pneumoniae
- Acinetobacter baumannii
- Pseudomonas aeruginosa
- Enterobacter species

- Regulatory approvals for antibiotics have declined
- Clinically relevant resistance has increased

<http://image.slidesharecdn.com/aerosolezedabx-casereport-130416090250-phpapp02/95/aerosolezed-abx-case-report-7-638.jpg?cb=1366122483>
<http://www.pwc.com/gx/en/governance-risk-compliance-consulting-services/resilience/publications/antimicrobial-resistance-and-public-health.html>

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The Quintessential One Health Issue



- Global public health strategy encouraging interdisciplinary collaboration and communication on health at the human-animal-environmental interface.
- "...the collaborative effort of multiple disciplines – working locally, nationally and globally – to attain optimal health of people, animals and our environment."

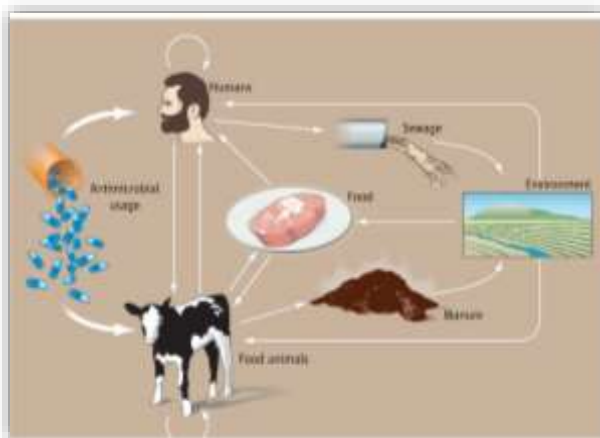
http://www.phac-aspc.gc.ca/cipars-picra/gfx/2b_e.gif

<http://www.onehealthinitiative.com/about.php>

https://www.avma.org/KB/Resources/Reports/Documents/onehealth_final.pdf

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The Quintessential One Health Issue (2)



There is fluidity of

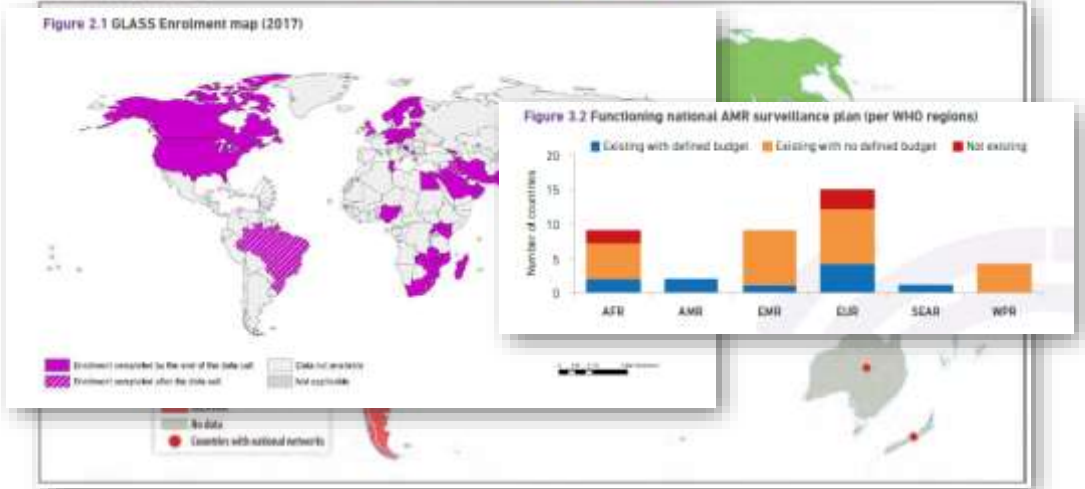
- antibiotic-resistant bacterial clones,
- antibiotic resistance genes, and
- associated mobile genetic elements

within and between the human, animal, and environmental health sectors

Woolhouse MEJ & Ward MJ. Science 2013; 341: 1460

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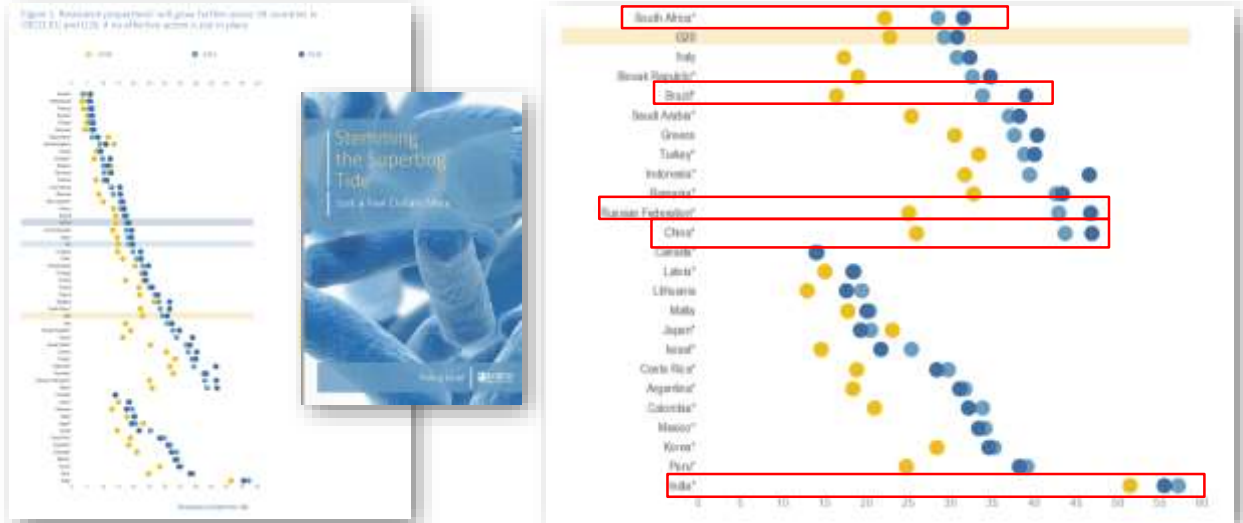
The Global Scale



<http://documents.worldbank.org/curated/en/323311493396993758/pdf/114679-REVISED-v2-Drug-Resistant-Infections-Final-Report.pdf>
<http://apps.who.int/iris/bitstream/handle/10665/259744/9789241513449-eng.pdf?sequence=1>

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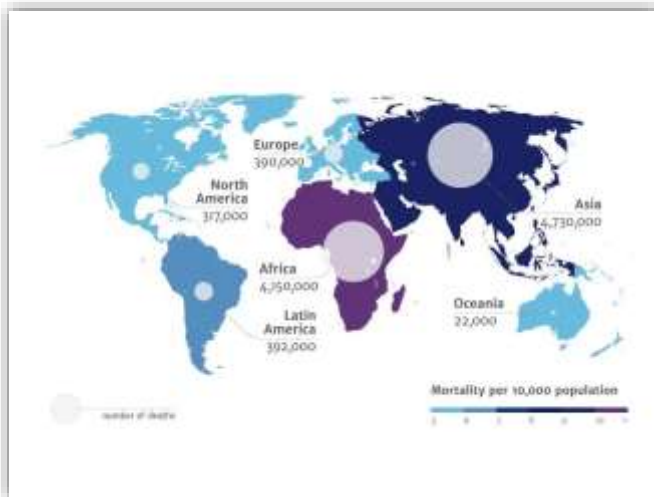
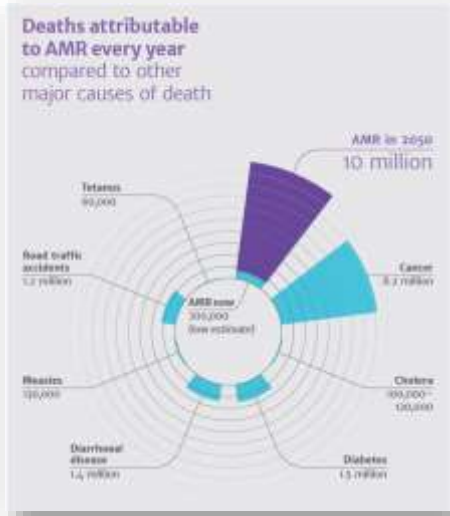
The Global Scale (3)



https://read.oecd-ilibrary.org/social-issues-migration-health/stemming-the-superbug-tide_9789264307599-en#page1

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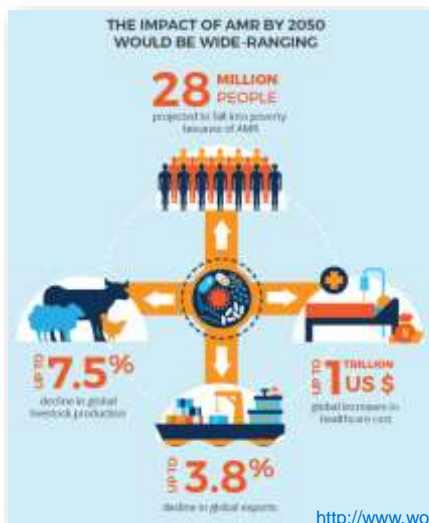
The Global Impact



https://amr-review.org/sites/default/files/World_Map.jpg

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The Global Impact (2)



AMR requires **unprecedented levels of global coordination**

AMR puts the **achievement of SDGs related to health, agriculture, animals, the environment and food directly at risk**. In addition, actions and objectives related to these SDGs are **closely related to individual AMR content areas**

In addition, AMR puts the **achievement of some SDGs indirectly at risk**, due to cascading impacts on economic wellbeing and inequality

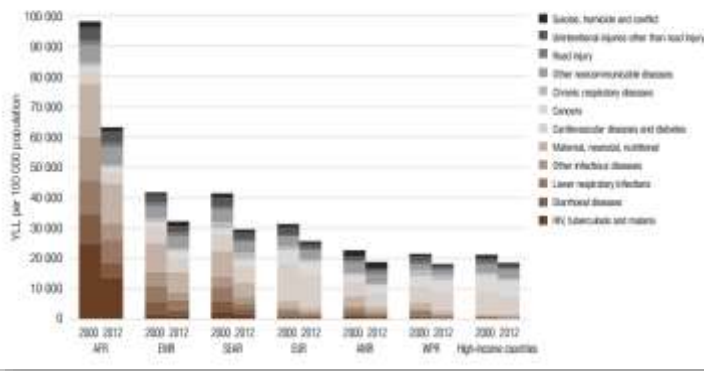
Further SDGs **minimize the negative impact of AMR** and have **implications for the implementation of global and national action plans**

<http://www.worldbank.org/en/news/infographic/2016/09/18/drug-resistant-infections-a-threat-to-our-economic-future>
http://www.who.int/antimicrobial-resistance/interagency-coordination-group/20170818_AMR_FfA_v01.pdf

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The African Context

Figure 18. Contribution of major causes of death to YLL per 100 000 population in low- and middle-income countries in each WHO region and in high-income countries worldwide, 2000 and 2012

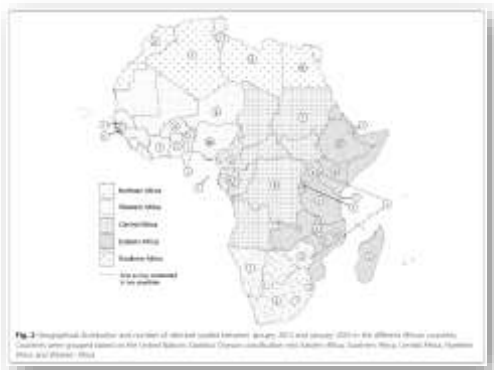


- The main cause of death in sub-Saharan Africa are communicable diseases (RTIs, diarrhoea and HIV/AIDS).
- Antimicrobial resistance confounds the successful management of infectious diseases.
- Capacities related to surveillance of antimicrobial use and resistance, infection control, drug legislation and distribution, veterinary sciences, health economy etc. are often limited in sub-Saharan Africa.

http://apps.who.int/iris/bitstream/10665/112738/1/9789240692671_eng.pdf

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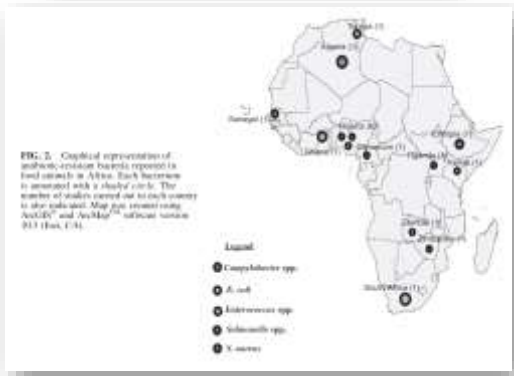
The African Context (2)



- Based on 144/1513 papers published between 2013-16
- 40% of countries did not have recent AMR data.
- The quality of microbiological data was of concern.
- The level of resistance to commonly prescribed antibiotics was significant:
 - 26.7% to penicillin in *S. pneumoniae*
 - 34.0% to amoxicillin in *H. influenzae*.
 - 88.1%, 80.7% and 29.8% to amoxicillin, trimethoprim and gentamicin in *E. coli* respectively.
 - 37.5% to quinolones in *N. gonorrhoea* with no ceftriaxone resistance reported.
 - Ciprofloxacin resistance in *S. typhi* was rare.
 - Carbapenem resistance was common in *Acinetobacter* spp. and *P. aeruginosa* but uncommon in Enterobacteriaceae

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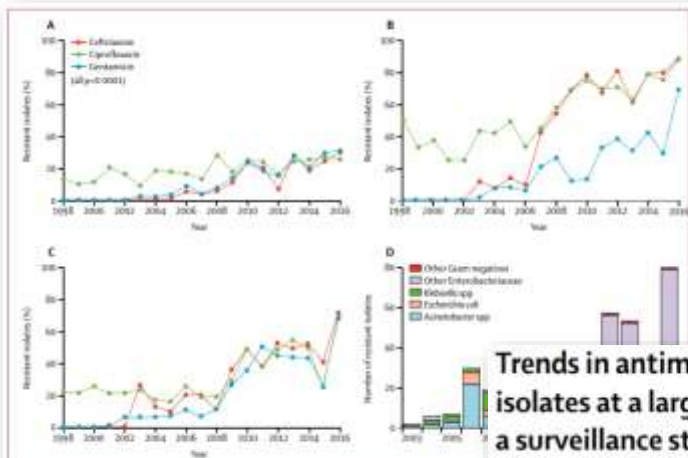
The African Context (3)



- Based on 17/465 papers published up to 2015
- ABR prevalence was highest in pigs (93.6%) followed by cattle (78.2%) and poultry (73.1%)
- MDR was highest in poultry (84.3%), followed by cattle (74.3%) & pigs (51.1%)
- ABR and MDR were 86.5% and 77.5% in *E. coli* respectively
- ABR and MDR were 80.9% and 34.6% in *Salmonella* spp. respectively
- ABR and MDR was higher on farms than abattoirs
- ABR in food animals poses a food safety and food security challenge

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Case Study: Ceftriaxone Resistance in Malawi



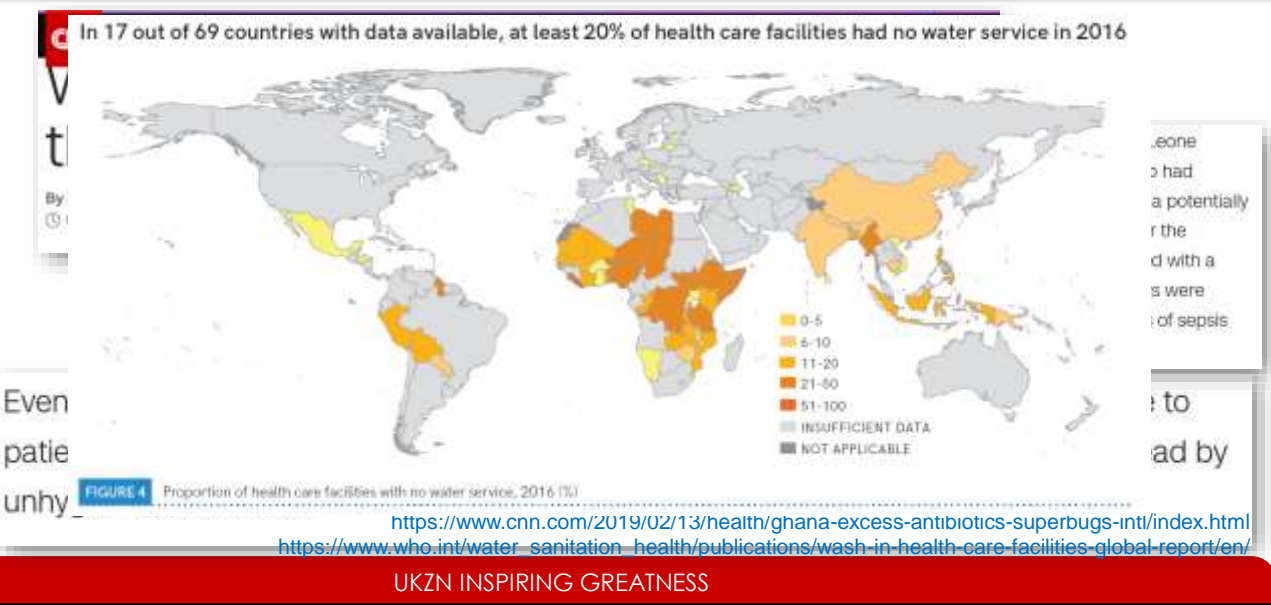
Trends in antimicrobial resistance in bloodstream infection isolates at a large urban hospital in Malawi (1998-2016): a surveillance study

Figure 4: Trends in resistance to second-line antimicrobial agents (cefepime, ceftazidime, and gentamicin) in bloodstream infection isolates at a large urban hospital in Malawi (1998-2016): a surveillance study. Patrick Musicha, Jennifer E Carrick, Marc Ber-Zur, Neil French, Clemens Moses, Brigitte Denis, Neil Kennedy, Jane Malweo, Maïta A Gordon, Chisomo L Mwafula, Robert S Haydenman, Denis B Foxenett, Nicholas A Frimley

<https://edition.cnn.com/2018/08/08/health/malawi-superbugs-antimicrobial-resistance-among-newborns-intl/index.html>

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Case Study: Antibiotics for Poor IPC in Ghana & Sierra Leone



The Global Antibiotic Resistance Movement

https://www.un.org/pga/71/wp-content/uploads/sites/40/2016/09/DGACM_GAEAD_ESCAB-AMR-Draft-Political-Declaration-1616108E.pdf

African Mobilization



81% (38/47)



13% (6/47)



2% (1/47)



40% (19/47)

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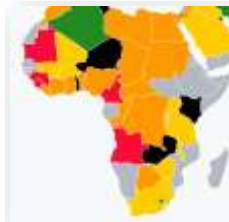
African Mobilization (2)



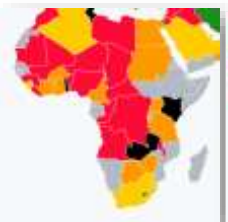
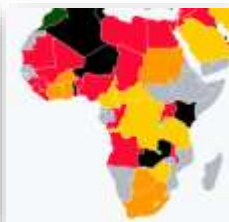
One Health Collaboration



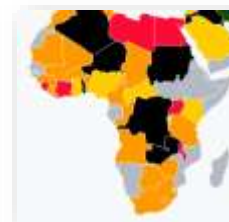
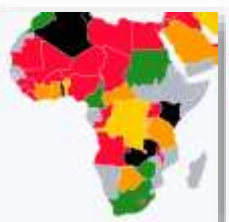
NAP on AMR



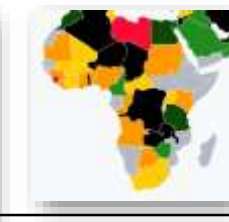
AMR Surveillance in Humans & Animals



Surveillance of Use in Humans, Animals & Plants



Hygiene & IPC



Legislation on Environmental Contamination

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Containment & Mitigation Strategies: CDDEP

- GARP advances policy analysis and policy development capacity in AMR.
- GARP chapters are national multi-sectoral working groups in LMICs
- Conduct situational analyses on antibiotic use and resistance in humans and animals to inform evidence-based, country- and context-specific interventions to:
 - preserve the effectiveness of antibiotics,
 - decelerate the spread of resistance,,
 - ensure access to antibiotics.
- Kenya, Mozambique, Namibia, Tanzania, Uganda, South Africa, Zimbabwe



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Containment & Mitigation Strategies: ReACT

ReAct Africa:

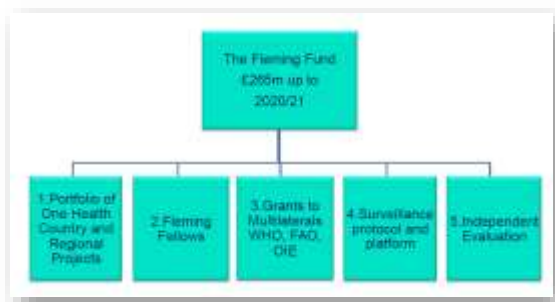
- Brings together experts and key stakeholders to form technical working groups on AMR.
- Provides technical assistance in the development and implementation of NAPs
- Raises awareness amongst the general public and the health, veterinarian and agricultural sectors on AMR.
- Facilitated Ghana's National Policy on AMR
- Partnered with GARD and CDDEP GARP to support the NAP process in Zimbabwe, Zambia and Rwanda.
- Also partnered with GARP-Kenya



<http://www.reactgroup.org/about-us/a-global-network/react-africa/>
<http://www.reactgroup.org/toolbox/>

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Containment & Mitigation Strategies: the Fleming Fund



- Build capacity in:
- Surveillance networks
 - AMR response capacity in low and middle income countries

<http://www.stidays.net/wp-content/uploads/2015/02/Penny-Robertson-Fleming-Fund-Programme-Lead1-The-Fleming-Fund.pdf>
<http://amr.lshtm.ac.uk/2016/11/17/report-amr-surveillance-low-middle-income-countries/>

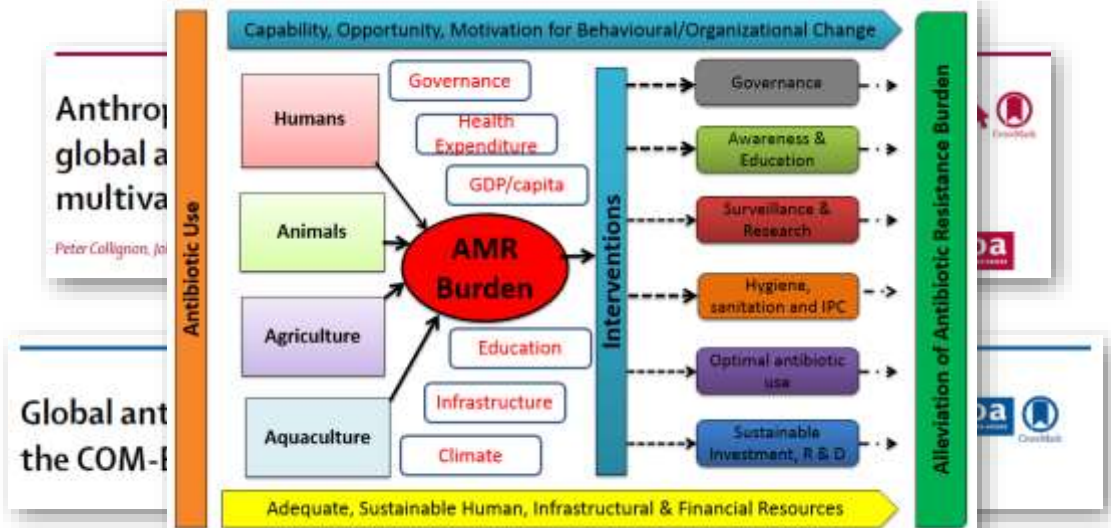
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Containment & Mitigation Strategies: Cognate Programmes



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The Way Forward



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The Way Forward (2)

- Antimicrobial resistance is a tragedy of the commons:
When individuals/groups act independently and in self-interest to the detriment of the best interests of the whole of society by depleting a common resource.
Hardin, G Science 1968. 162 (3859): 1243–1248.
- The prevention and containment of antibiotic resistance requires:
 - Evidence-based One Health solutions.
 - Research-based interventions adapted for country contexts.
 - Social compacts that suspend sectoral interests for the public good.
 - Unequivocal political leadership, commitment and governance.
 - Coordinated, multi-pronged, multi-stakeholder, multi-disciplinary partnerships for research and investment at global, regional and national levels.

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THANK YOU

essacks@ukzn.ac.za

@EssackSabiha

<http://sabihaessack.ukzn.ac.za>

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