

# **Ethiopia's Experiences on Antimicrobial Resistance Prevention and Containment**

Presented at: Establishing and Strengthening Regional Integrated Surveillance and Laboratory Networks for Disease Control, Prevention, and Clinical Care in Africa  
March 27-29<sup>th</sup>, 2017

Organized by: Africa CDC, WHO and ASLM

Tenaw Andualem

- Member and Coordinator, Ethiopian AMR Containment Advisory Committee
- Coordinator, Ethiopian APUA and INRUD

28 March 2017, Addis Ababa

## UNGA September 21, 2016, New York: AMR was the 4<sup>th</sup> health agenda that followed a Political Declaration

H.E., Ban Ki-moon called AMR “a fundamental, long-term threat to human health, sustainable food production and development....These trends are undermining hard-won achievements under the MDGs, including against HIV/AIDS, TB, malaria and the survival of mothers and children. If we fail to address this problem quickly and comprehensively, AMR will make providing high quality universal health coverage more difficult, if not impossible.”

“...Without AMR containment, the SDGs for 2030, such as ending poverty, ending hunger, ensuring healthy lives, reducing inequality, and revitalizing global partnerships are unlikely to be achieved ...” (World Bank Sep 2016)

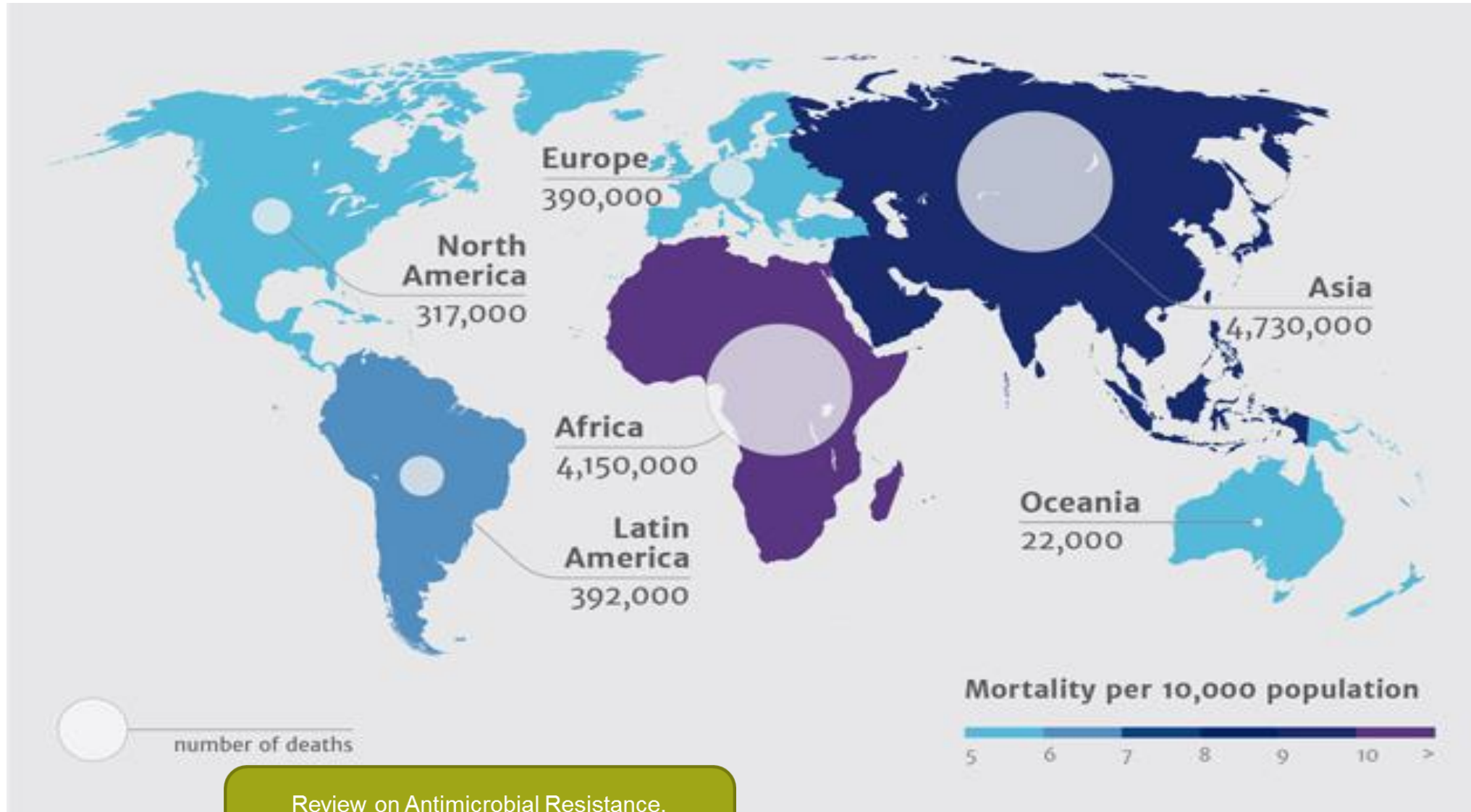
# Outline

- Public Health and Economic Impacts of AMR
- Evidences on Antimicrobials Resistance Containment
- Ethiopian Experiences on AMR Prevention and Containment
- Summary and lessons
- Recommendation for enhanced AMR containment in Africa

# Public Health Impacts of AMR

1. Increased Premature Deaths
2. Prolonged illness, infectiousness, transmission of Resistant MOs
3. AMR infections are at increased risk of worse clinical outcomes
4. MDR infections lead to limited or nonexistent alternatives
5. AMR limit the use of technologies:
  - Transplants
  - Cancer Chemotherapy
  - Surgery
  - Rheumatoid arthritis
  - Dialysis
6. AMR threatens hard won health-related MDGs and achieving SDGs and Public Health Response to communicable diseases

# Deaths attributable to AMR every year



Review on Antimicrobial Resistance.  
*Antimicrobial Resistance: Tackling a Crisis for the Health and Wealth of Nations.* 2014.

# Economic Impacts of AMR

## Societal costs thrice than direct healthcare costs

### Increased Direct Costs

- Increased costs of disease surveillance
- Longer hospital stays
- Additional investigations, such as laboratory tests and x-rays
- MDR infections lead to expensive and more toxic alternative treatments
- Greater likelihood of death due to inadequate or delayed treatment
- Increased annual investment and spending in healthcare, high for low income countries

### Increased Indirect Costs

- Reduced quality of life and productivity
- Longer absenteeism for patients and care takers, increased costs to firms and leading to increased product prices
- Increased burden and psychosocial impact
- Increases in cost of private insurance coverage
- Additional number of people living in poverty to 24 million in high AMR impact scenario <sup>1</sup>
- AMR effects go beyond the health sector i.e. affecting GDP, 3.8% & may double by 2050 <sup>1</sup>
- Reduced output and trade in livestock and livestock products<sup>1</sup>

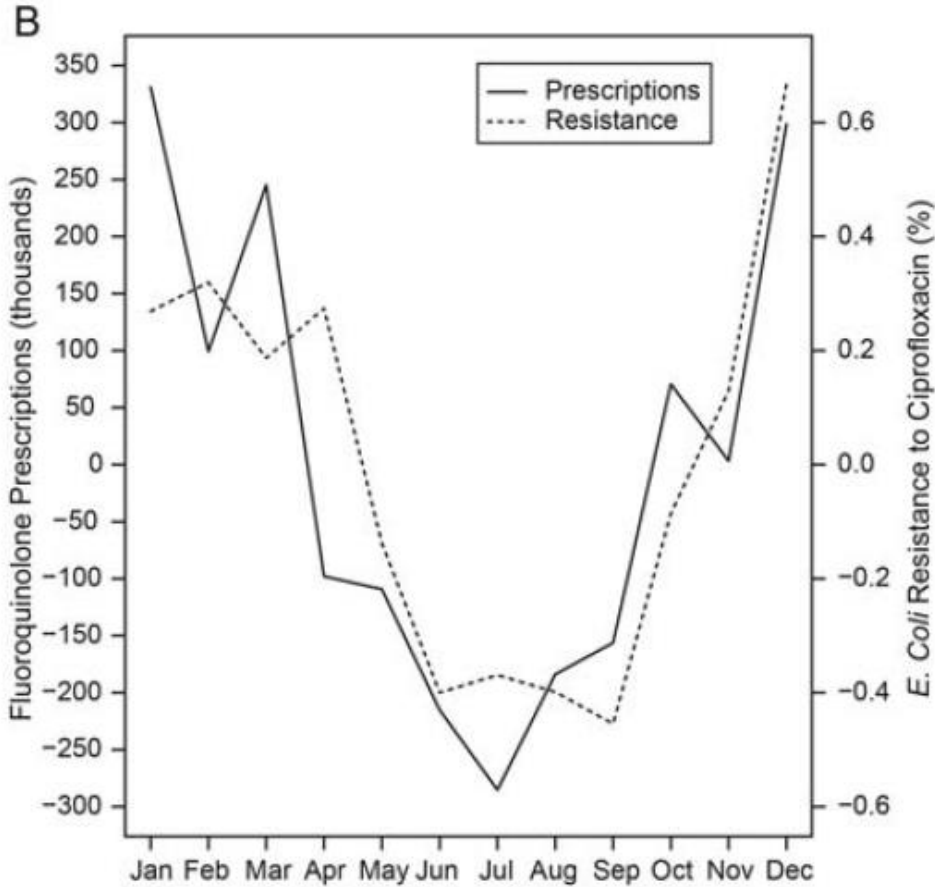
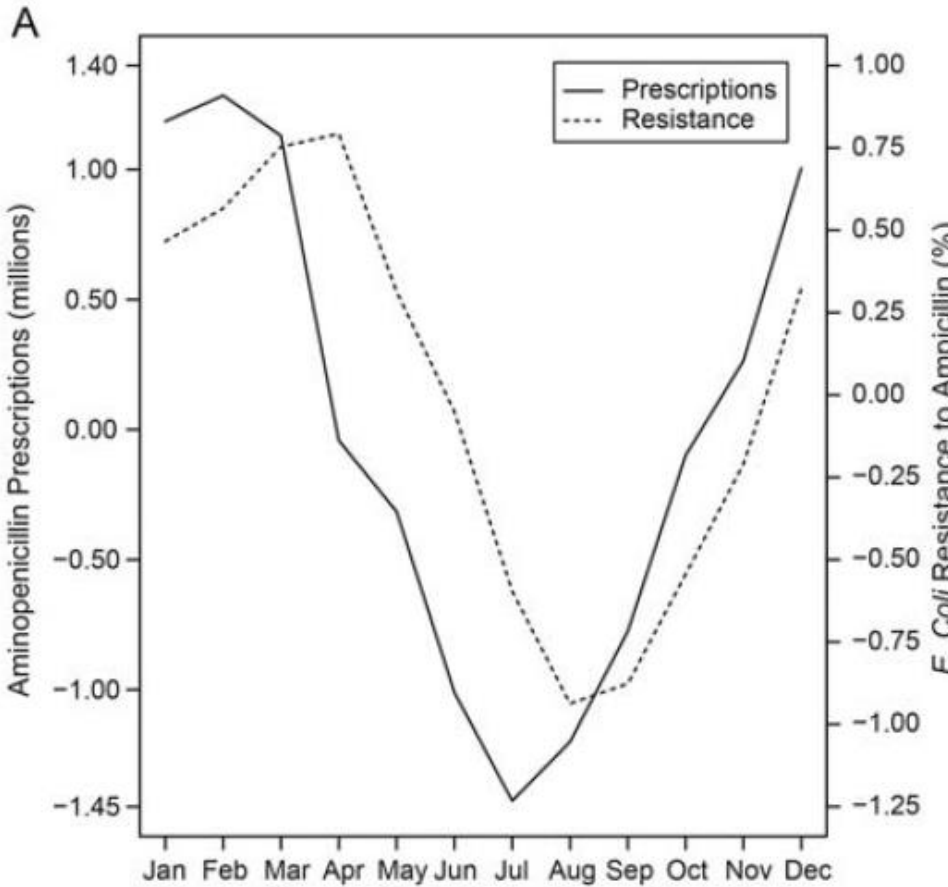
<sup>1</sup> World Bank September 2016

**Is AMR Reversible?**

**What Global Evidences do we have?**

**Changes in AMs use are paralleled by changes in the prevalence of AMR**

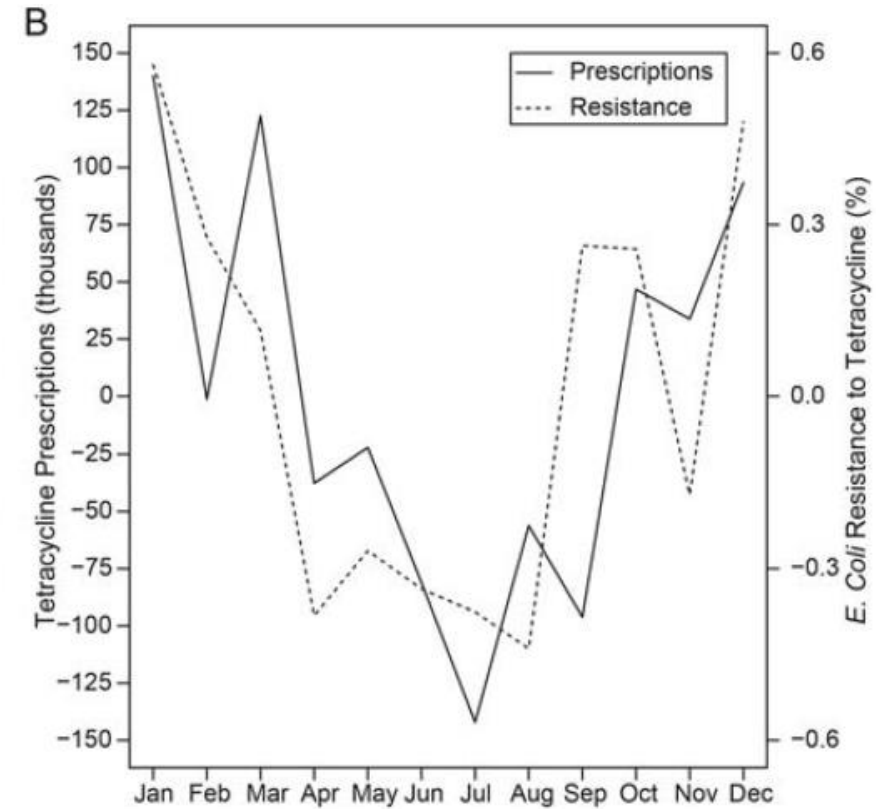
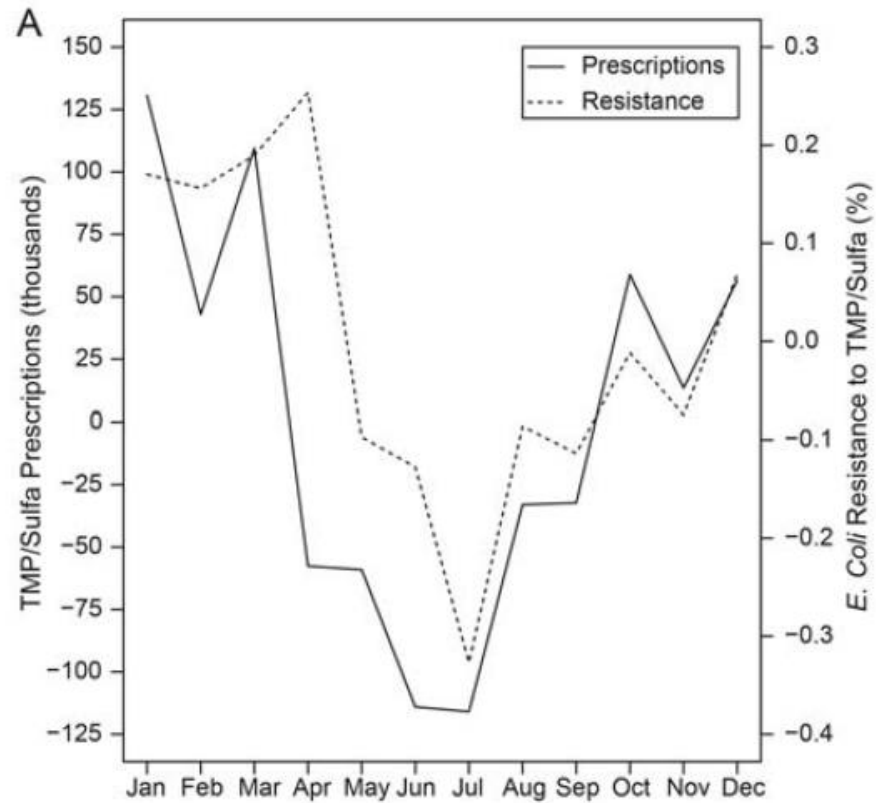
# Seasonal pattern of antibiotics prescriptions and *Escherichia coli* resistance, showing 1-month lag



Lova Sun, Eili Y.Klein, and Ramanan Laxminarayan July 2012. Seasonality and Temporal Correlation between Community Antibiotic Use and Resistance in the US. Clinical Infectious Diseases Advances Access 2012.

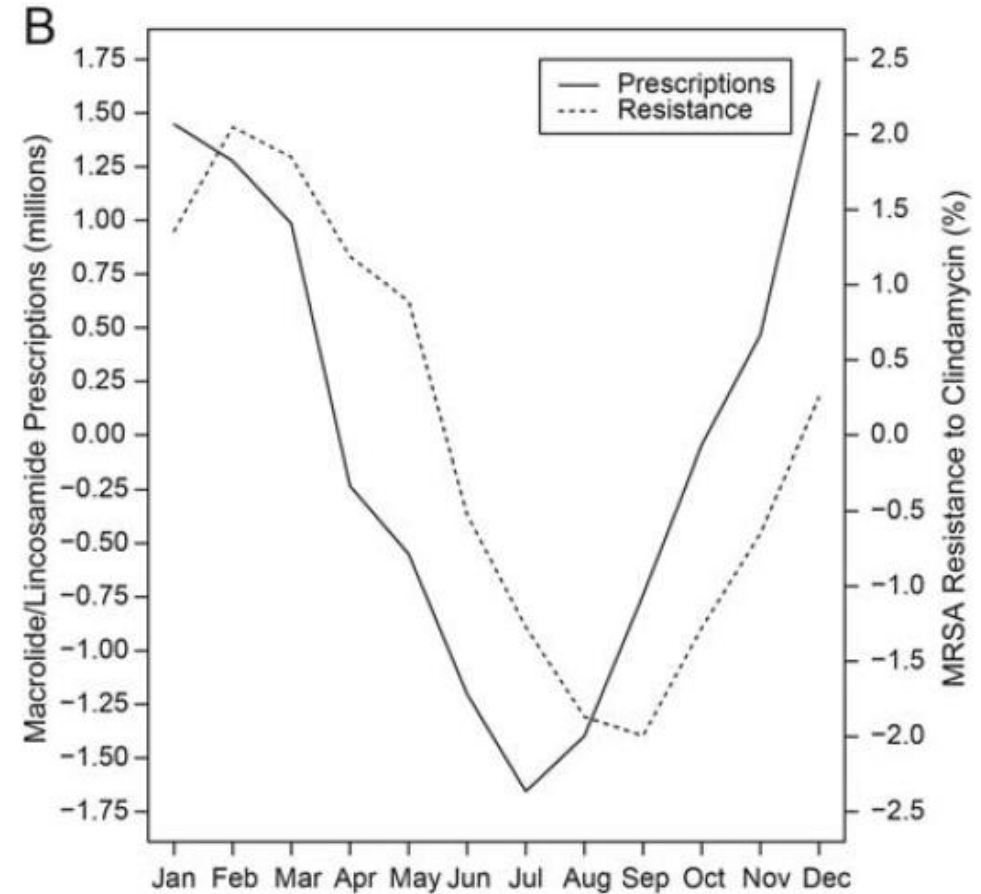
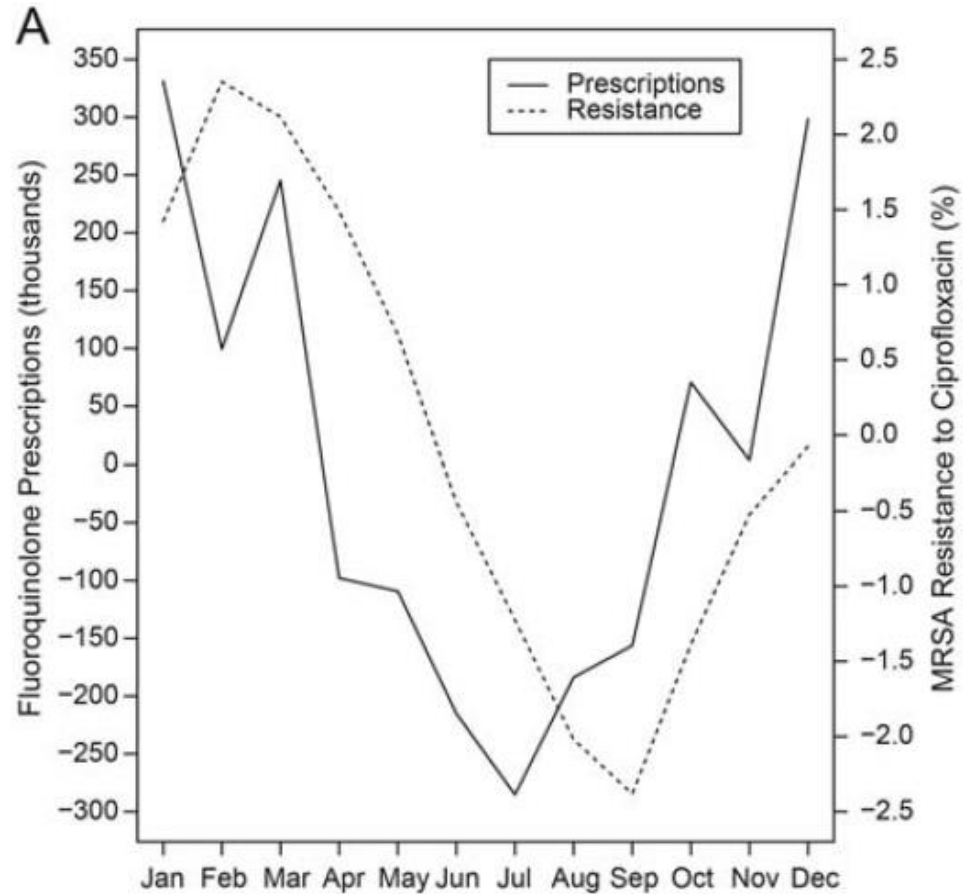


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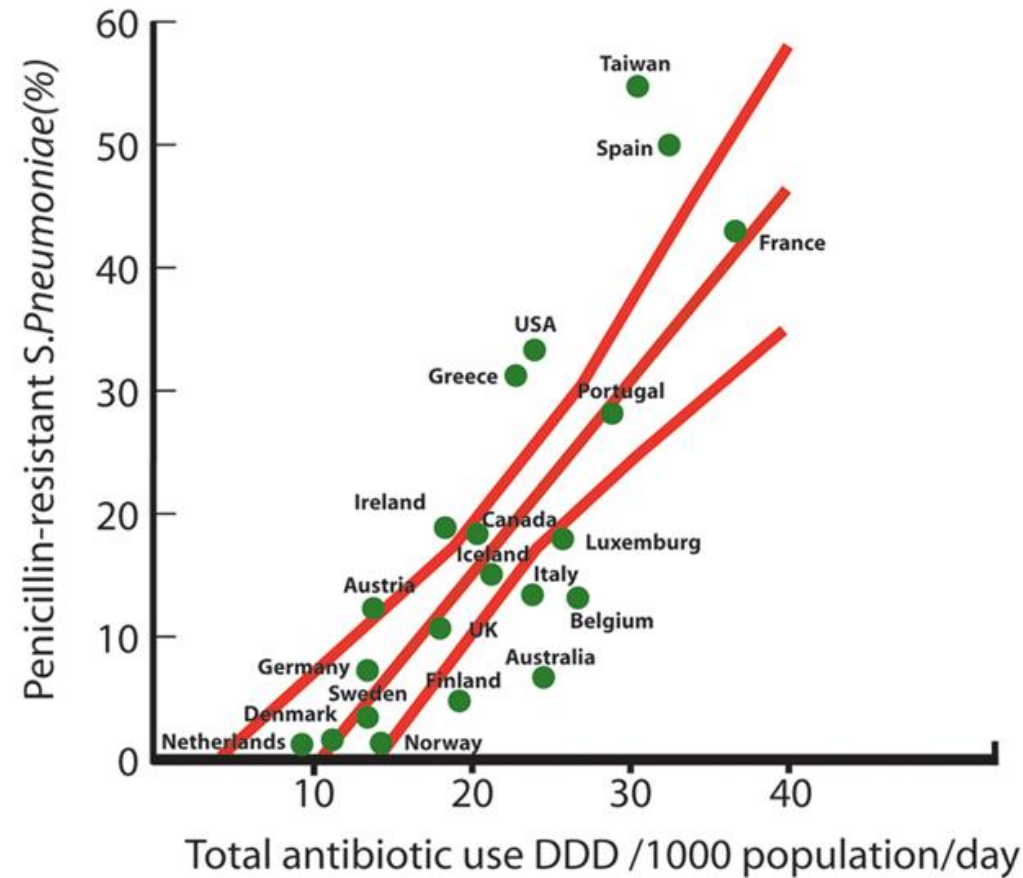
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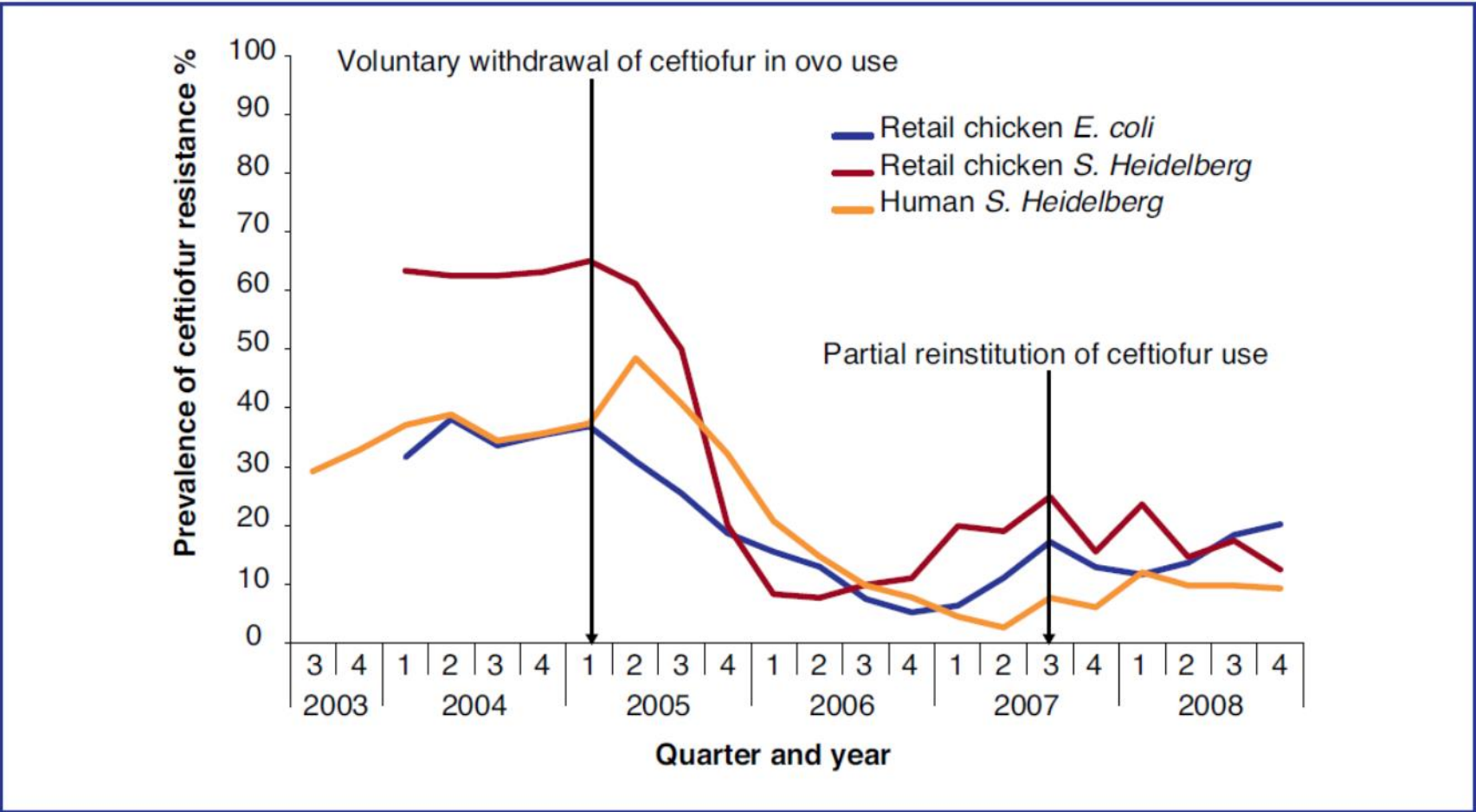


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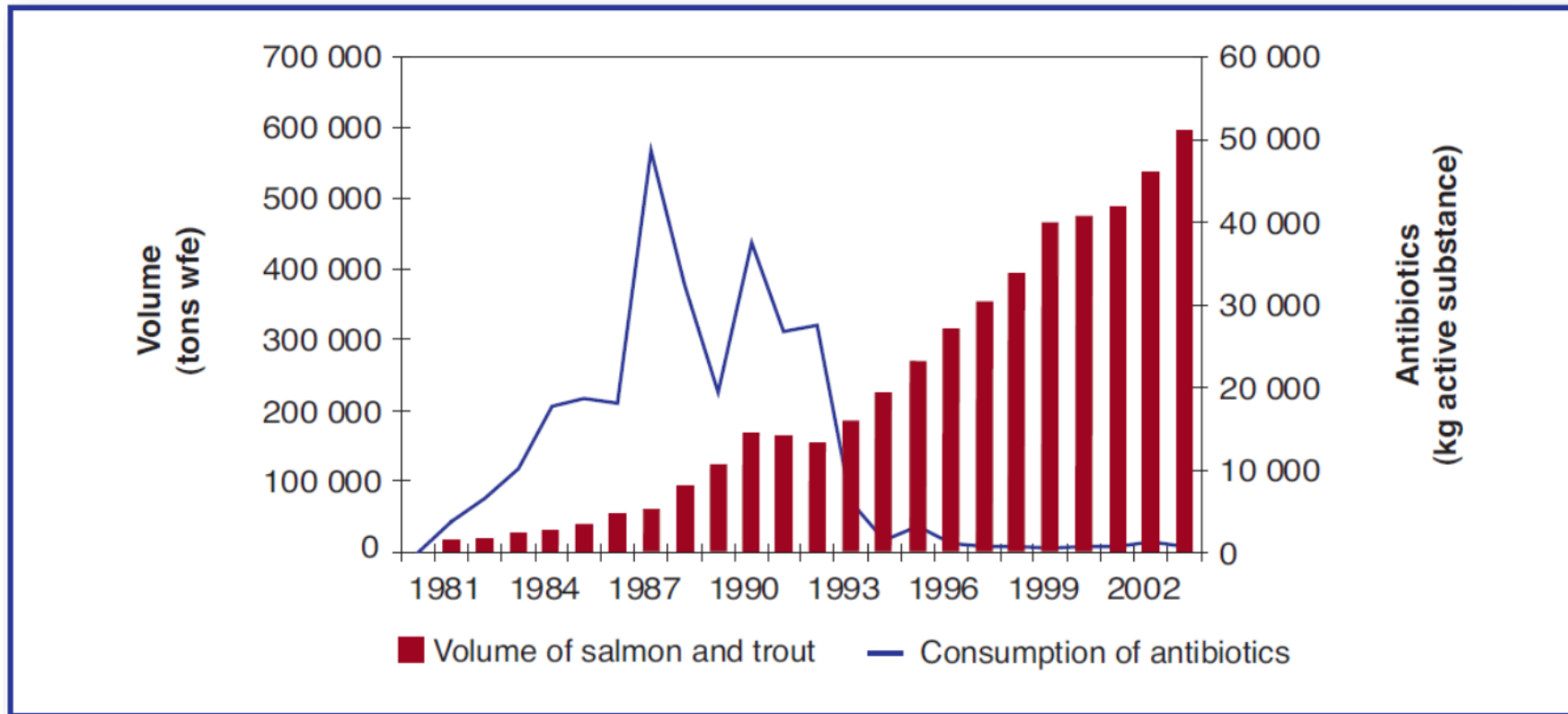
# Relationship between antibiotics consumption and AMR for *S. pneumoniae*: the more use, the more AMR



# Cephalosporin Resistance after stopping its use in Poultry in Quebec, Canada

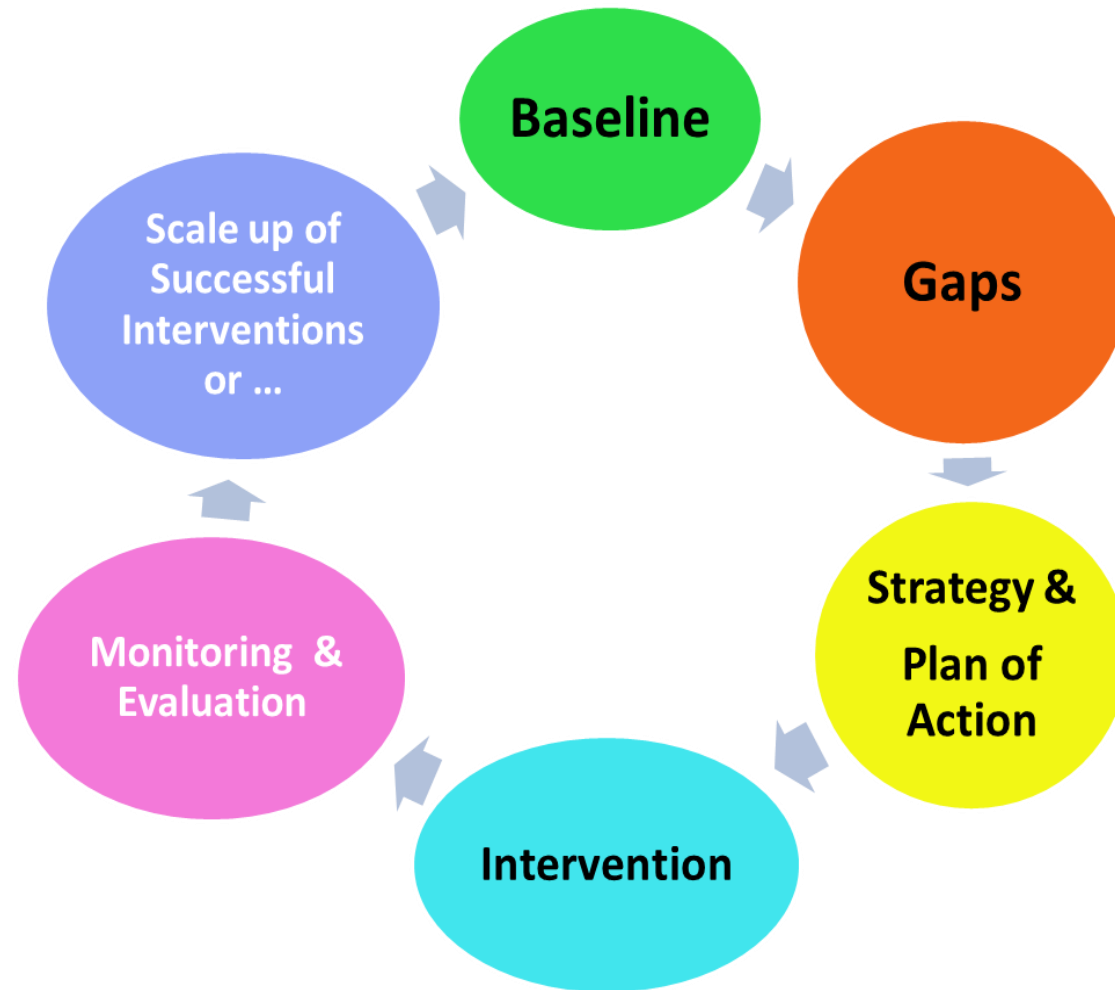


# Reduction of Antimicrobials Use after introduction of vaccines in aquaculture



**Ethiopia Experiences**  
**on**  
**Antimicrobial Resistance Prevention and Containment**

# Approaches to Prevention and Contain of AMR in Ethiopia



# Outline of Ethiopia AMR Containment Events

**Before 2006:** Efforts by Ethiopian chapter for APUA and Ethiopian INRUD

**2006:** TWG and stakeholders call for action meeting

**2008: Baseline on magnitude (surveillance/survey) and factors on AMR**

**2009:** Advocacy, dissemination and press releases

**2008 to date: One Health, multi-institution & multi-disciplinary AMR containment advisory committee**

**2011: AMR containment strategy and follow on Plan of Action (POA)**

**2009 to date:** Development/revision of Guidelines, manuals, and job aids for AMs stewardship

**2008 to date: Post marketing surveillance (PMS) of AMs at least once a year**

**2012 to date:** IPPS guidelines, TOTs, capacity building, supplies, and IECs

**2013 to date:** AMR containment advocacy commemoration day and antibiotics awareness week every year

**2008 to date: Multifaceted advocacy & interventions** (too many to list here) and evidences for scale up

**2010 to date:** Continued **empowerment and awareness raising** and evaluation

**2015 to date: Second revised five years AMR prevention & containment strategy 2015-2020**

**2014/5, 2016 and to date:** AMs use and AMR surveillance/survey (continued)

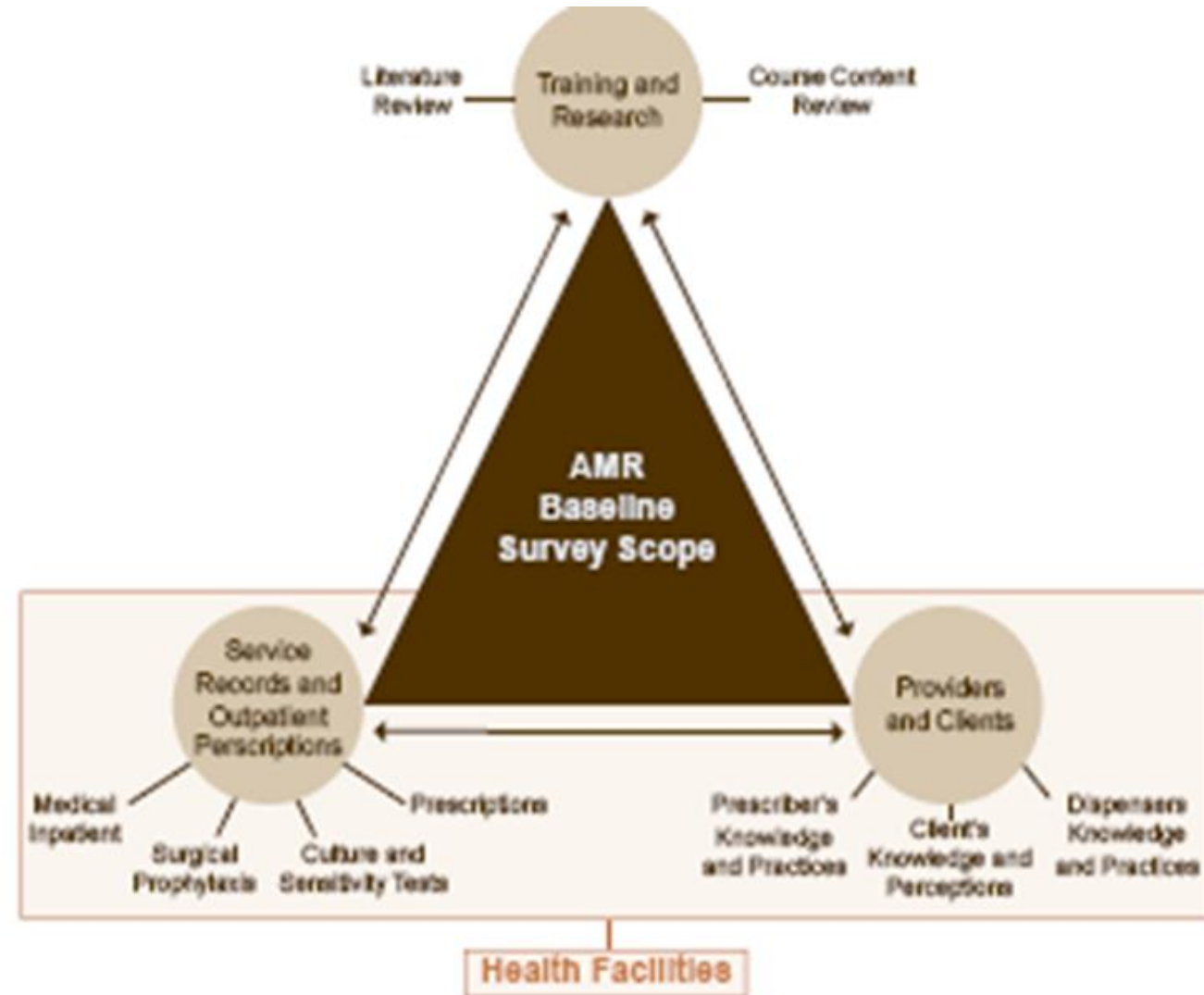
**2017 January:** Revised AMR Intervention POA



# Scope of the AMR Baseline Survey

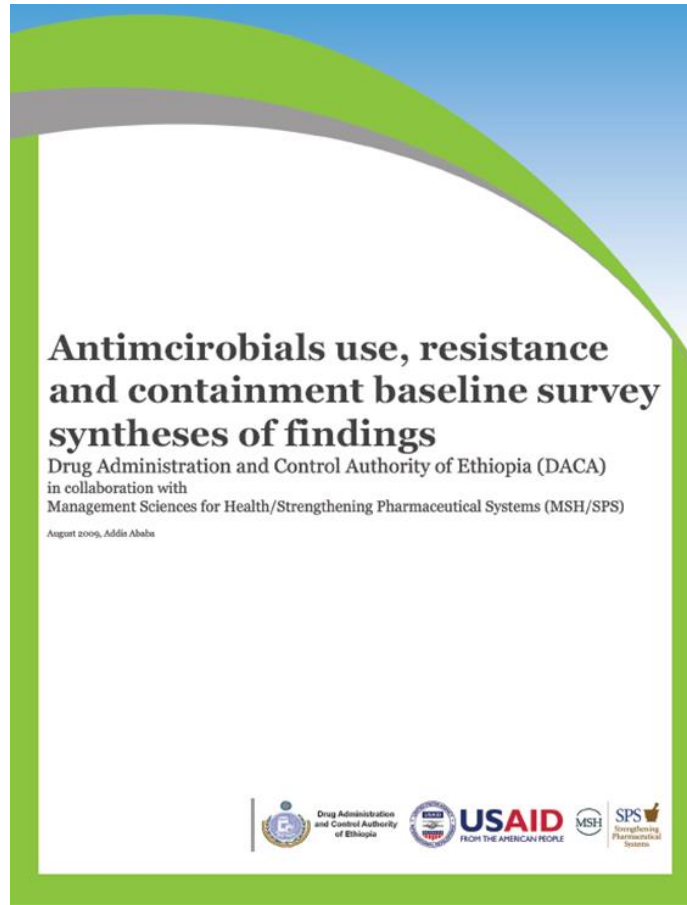


Washington, March 2008, AMR Baseline Scope and Resources

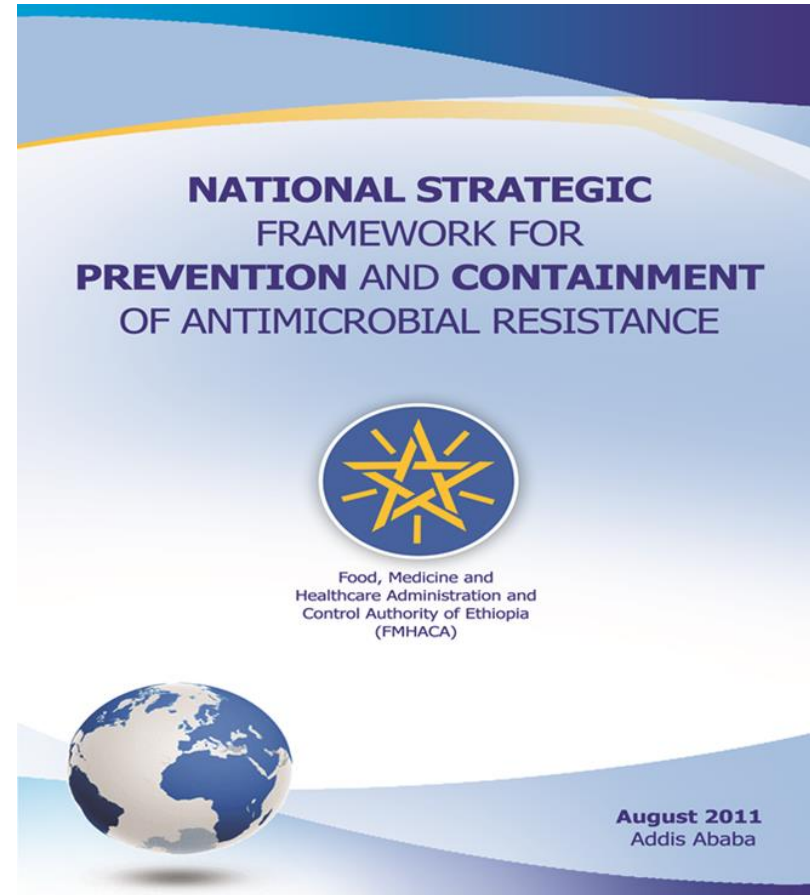


# AMR Baseline Reports Summary and Strategy

## Baseline Report: Magnitude, Trends and Determinants of AMR



## 2011 to 2014

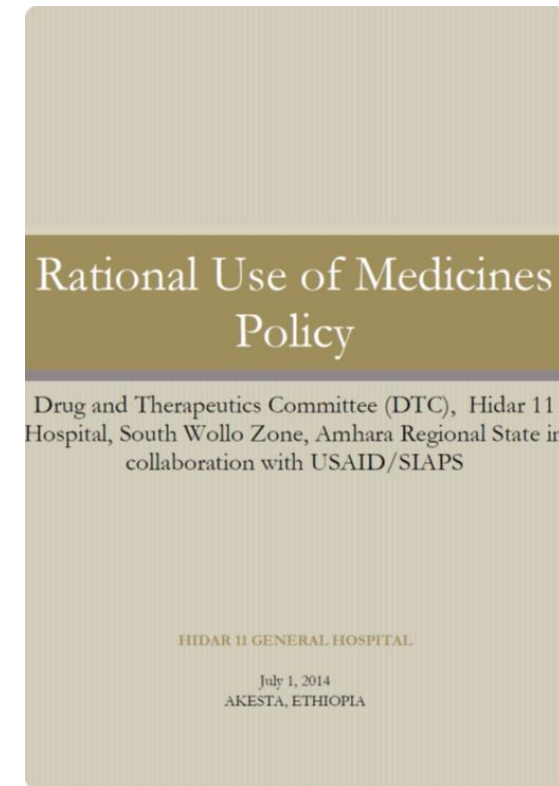
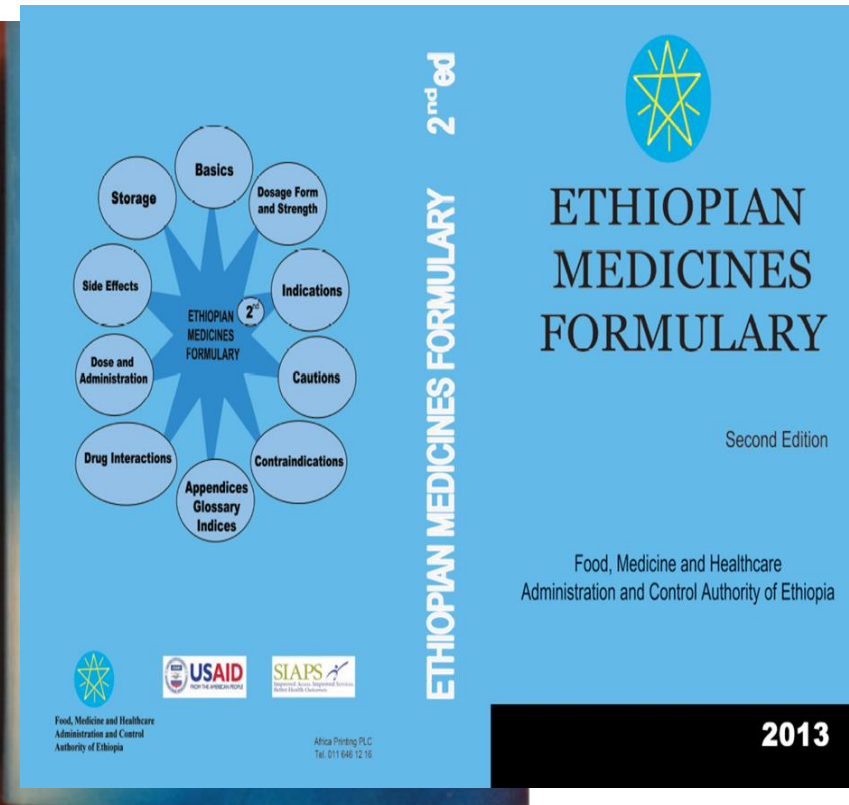
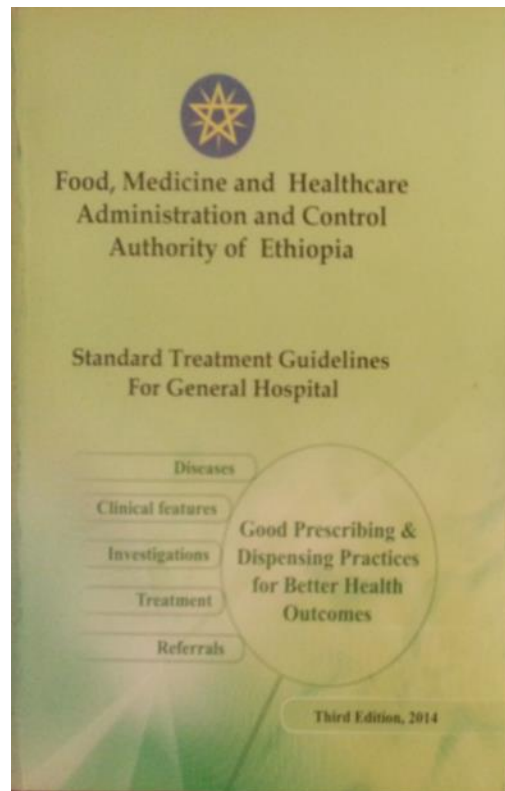


# Examples of Interventions, AMR Containment

## Educational, Managerial and Regulatory Interventions

- Medicines Use Evaluations, Clinical Audit, and Feedback and follow on interventions
- Standardization of practices and AMs use policy being tested
- Client and Community Empowerment & awareness: Adherence counseling, Group Educations, Mass media broadcasts, SBCC/IECs
- Capacity building pre-service and in service, CPD
- Establishing/strengthening of HFs IPCs, DTCs/AMs stewardship committees
- Application of Treatment Guidelines, lists, Formulary, Manuals and job aids
- Non-human use
- Interventions research and indicators
- Monitor AMs Use and AMR Trends over years
- Improving access to AMs
- Fight counterfeit and Post Marketing Surveillance of AMs

# Examples of AMs Stewardship Job Aids and Guidelines



# Examples of Empowerment and Awareness Interventions

mass media, group education at HF's, adherence counseling, IEC/BCC

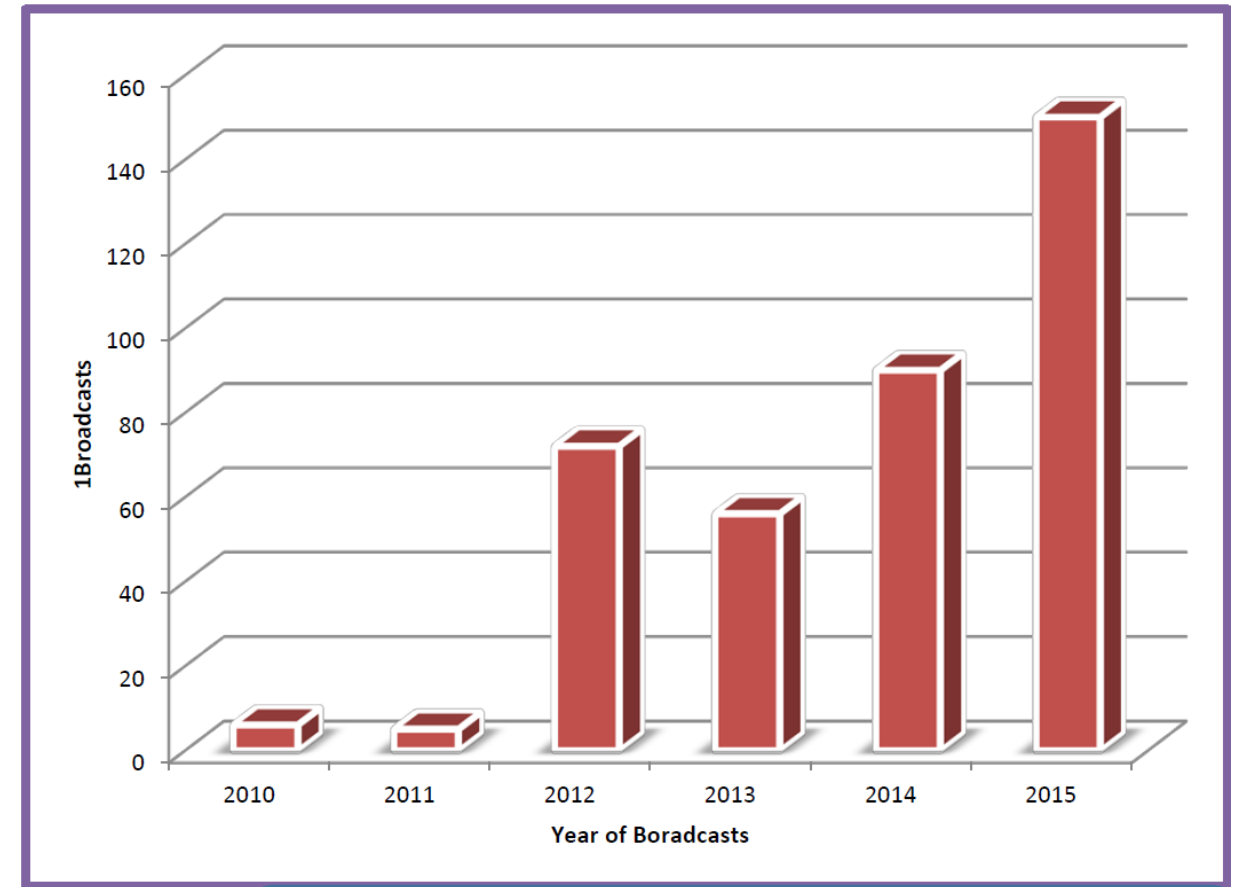
## Example of

## Live TV Programs on AMR Containment



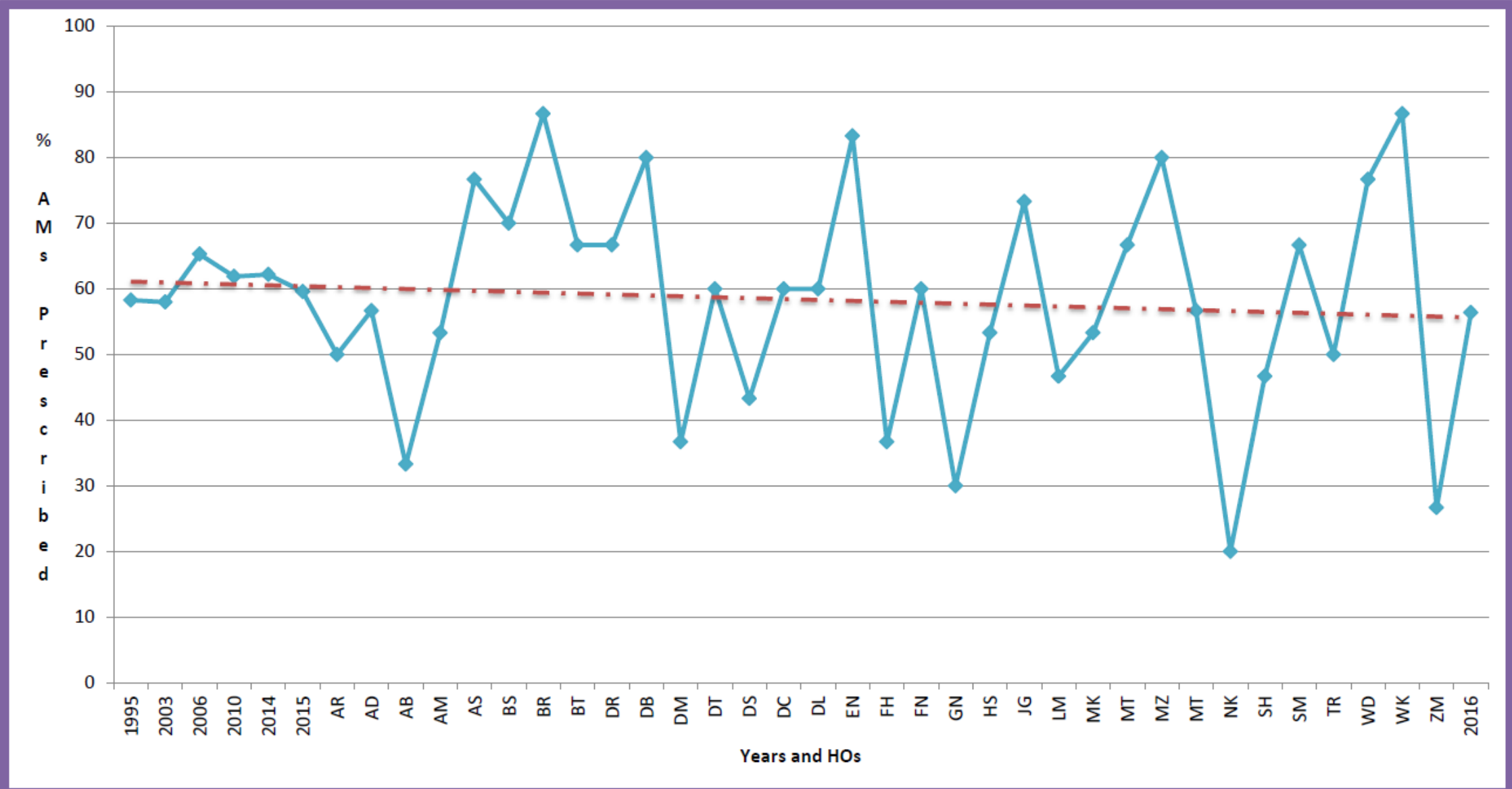
- Coverage and watched by audiences<sup>2</sup>
- Change in knowledge of the audiences<sup>3</sup>
- ?? Change in behavior and practices
- Changes on AMR use over time<sup>4</sup> (confounders)

## Number of Electronic and Print Mass Media Medicines Use Broadcasts by Year

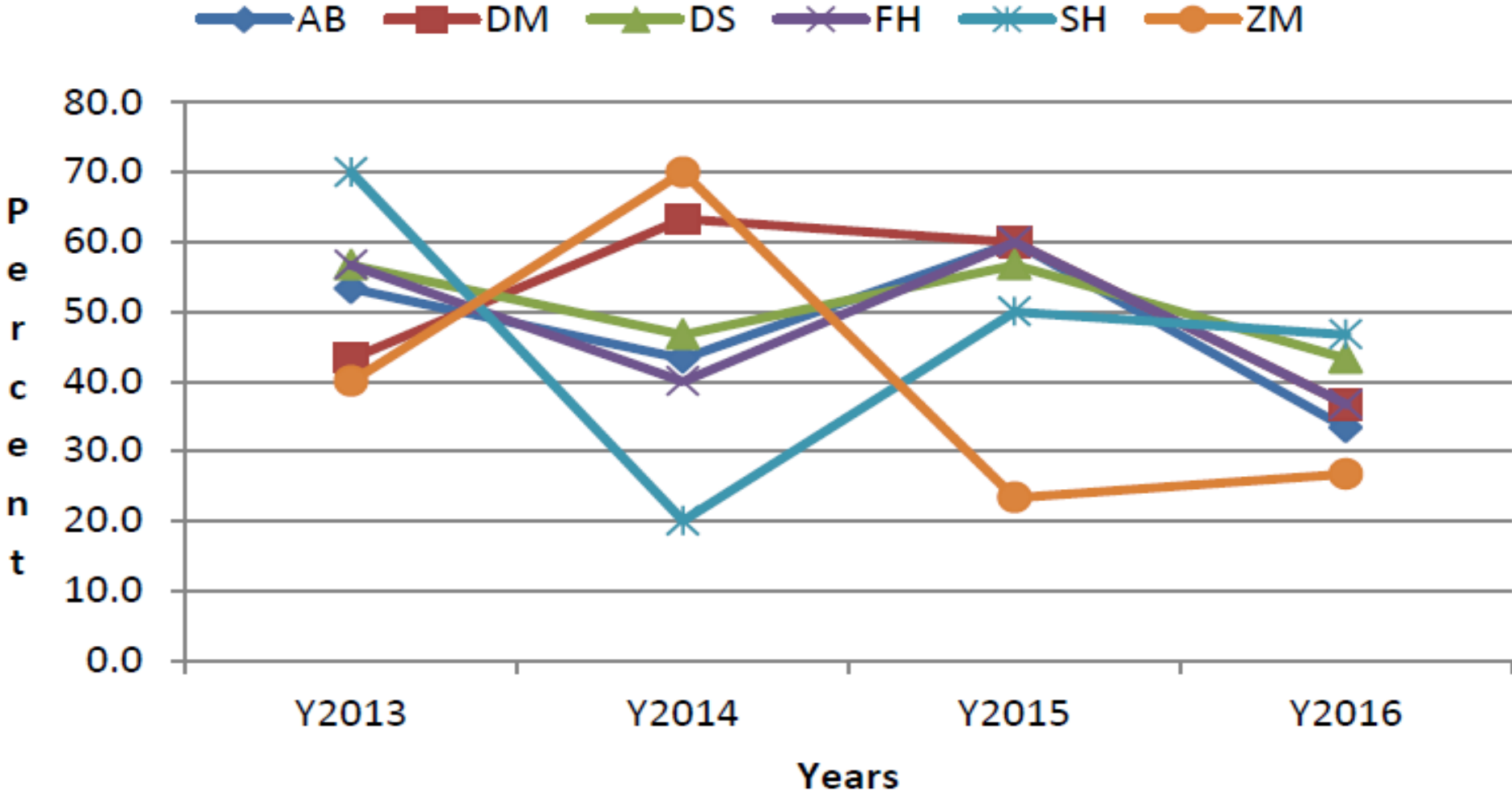


1. Tenaw Andualem (2015).
2. Tenaw Andualem, Habtamu Brihanu (2011).
3. USAID/SIAPS 2016.
4. Tenaw Andualem, et al (2016).

# Antimicrobials Prescribing Practices over 20 years and across Hospitals in Ethiopia



# Antimicrobials Prescribing Practices and Performance of Hospitals in Ethiopia (group 1)



**Where are we now?**

**So What?**



# Revised AMR Prevention & Containment Strategy: 2015 to 2020

5 Strategic Objectives and 16 Priority Areas, 126 Interventions

STRATEGY for the PREVENTION and CONTAINMENT of ANTIMICROBIAL RESISTANCE for ETHIOPIA

Second Edition, 2015 to 2020  
Addis Ababa  
October 2015



Ethiopian Food, Medicine and Healthcare Administration and Control Authority



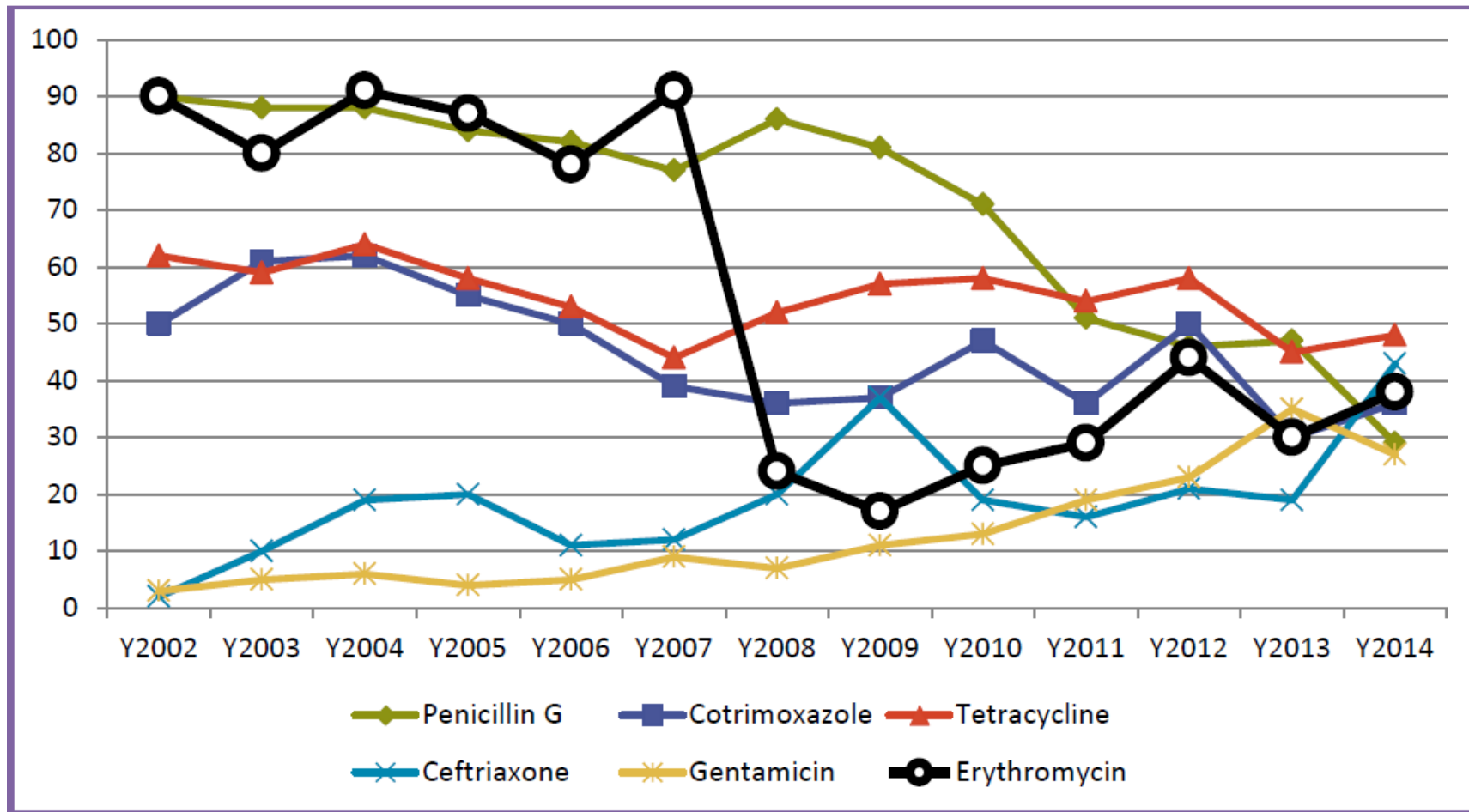
Ethiopian Food, Medicine and Healthcare Administration and Control Authority



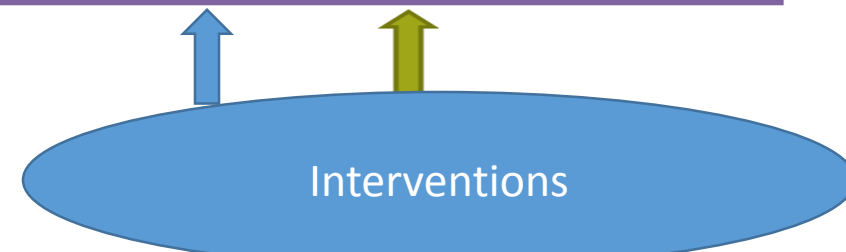
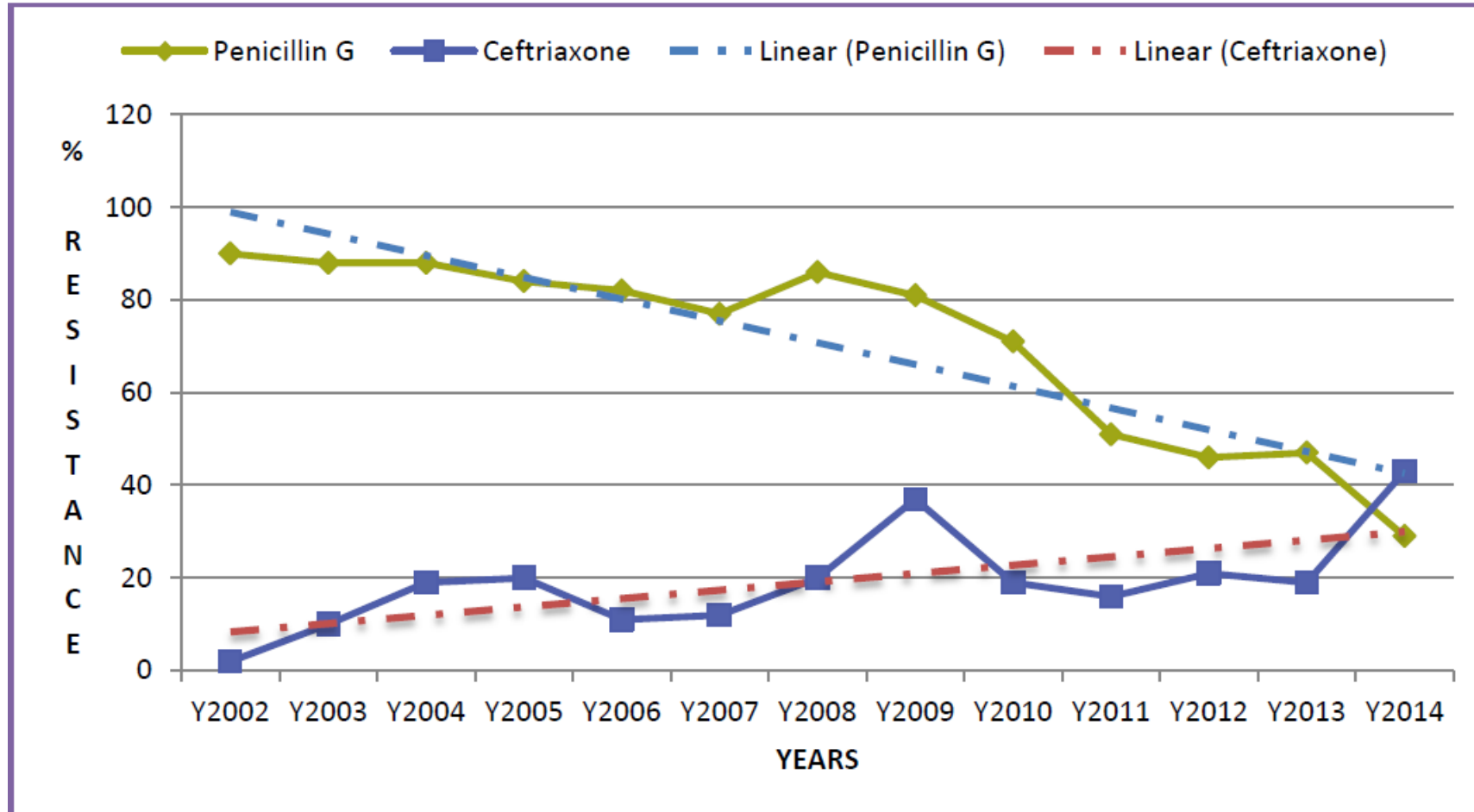
USAID  
FROM THE AMERICAN PEOPLE

SIAPS  
Systems for Improved Access to Pharmaceuticals and Services

# *Example* *Staphylococcus aureus* Resistance Over Years in Ethiopia



# *Staphylococcus aureus* Resistance Over Years in Ethiopia



# Look for evidences on Complementary/Alternative Options for MDR Containment

## AMs alone may not be the solution for MDRO treatment

1. Use of probiotics and prebiotics.
  - **Probiotics:** Live micro-organisms that confer a health benefit on the host when consumed in adequate amounts<sup>1</sup>
  - **Prebiotics:** non-digestible food ingredients that beneficially affect the host by selectively stimulating the growth and/or activity of bacteria in the colon, and thus improve host health<sup>1</sup>
2. **Silver nanoparticles** both effective and environmentally benign: Particles adhere to target microbes and become depleted of silver as they work against the bacteria & degrade easily<sup>2</sup>
3. **Antimicrobial Copper surfaces** reduce increasing Healthcare Associated Infections<sup>3</sup>
4. **Bacteriophages:** Virus infect and replicates within only target bacterium.
5. Daily **bathing with chlorhexidine-impregnated washcloths** reduce the risks of acquisition of MDROs and development of hospital-acquired infections<sup>5</sup>... reports of resistance<sup>6</sup>
6. **Lysins:** enzymes that directly & quickly act on bacteria
7. **Immune stimulation:** Boosts patient's immune system
8. **Antibodies:** bind to bacteria restricting their ability to cause disease

1. APUA 2012:30(2):3

2. Alexander P. Ritcher and et al July 2015: Nature July 2015

3. Journal of Infection Control and Hospital Epidemiology

## Summary and Lessons

- The importance of having a **Baseline** and AMR **Strategy** and **POA**
- Factors contributing to AMR are many. **No single best intervention.**
- Improving **access** (not excess) to- and promote rational use of AMs
- Strengthen AMs use and AMR surveillance
- Strengthen multi-sectoral and multidisciplinary **One Health approach**
- Evidenced based and generic interventions for scale up
- Empowerment and sustained awareness
- AMR Containment in the context of Health/Pharmaceutical Systems Strengthening
- Look for evidences for Alternative/Complementary interventions for MDR treatment
- Collaborations in innovation and sustain effectiveness

## **Recommendations for enhanced AMR Containment in Africa**

- The Impacts of AMR is high in Africa and will increase more unless effective, multifaceted and synergistic interventions are taken
- AMR is a long term threat
- African countries are at different levels of AMR containment
- African CDC to establish a coordinating unit and focal person on AMR containment: Mapping, networking, generating evidences, and sharing experiences among countries

# Acknowledgements

- Ethiopian Food, Medicines & Healthcare Administration & Control Authority
- USAID/SIAPS/MSH
- Ethiopian APUA and INRUD
- Ethiopian AMR containment advisory committee and member institutions and
- Electronic and print Mass Media
- All parts of the society who were part of this process

# Thanks

Tenaw Andualem:

[andualemte@yahoo.com](mailto:andualemte@yahoo.com)

Phone: 251 911 62 70 59