



Strengthening Systems to Prevent Antimicrobial Resistance

The global problem of antimicrobial resistance

Antimicrobial resistance (AMR) is rising to dangerously high levels in all parts of the world. New resistance mechanisms, emerging locally but spreading globally, threaten our ability to treat common infectious diseases such as pneumonia, tuberculosis, and sexually transmitted infections. The underlying causes of the growth in AMR are many. Inappropriate use and prescription/administration of antimicrobials constitute a major source of AMR, as does poor infection prevention and control in health care facilities. Resource-constrained health systems are also hampered by weak surveillance and laboratory systems to detect AMR and poor coordination of health system response.

Addressing AMR requires multi-pronged, coordinated actions across all government sectors and society to reinforce infection prevention, surveillance, and response processes and ensure compliance with evidence-based prescribing practices. The World Health Organization (WHO) Global Action Plan, adopted by WHO Members in 2015, emphasizes five key strategies to address AMR:

1) Improve awareness and understanding of antimicrobial resistance

- 2) Strengthen knowledge through surveillance and research
- 3) Reduce the incidence of infection
- 4) Optimize the use of antimicrobial agents
- 5) Develop the economic case for sustainable investment in countering antimicrobial resistance

The United States Agency for International Development (USAID), through its Applying Science to Strengthen and Improve Systems (ASSIST) Project, has supported the application of improvement strategies to strengthen health systems and service delivery to prevent and mitigate AMR in the West Bank, Uganda, and Georgia.

West Bank improvement collaborative to reduce hospital-acquired infections (HAI)

In January 2017, the USAID ASSIST Project and the Ministry of Health (MOH) of the Palestinian Authority launched a national-level quality improvement collaborative to build the foundation for a long-term strategy for reducing HAIs in the Palestinian Territories. The nine-month project, which concluded in September 2017, created a robust learning network between 22 participating public and private hospitals and national and international experts to

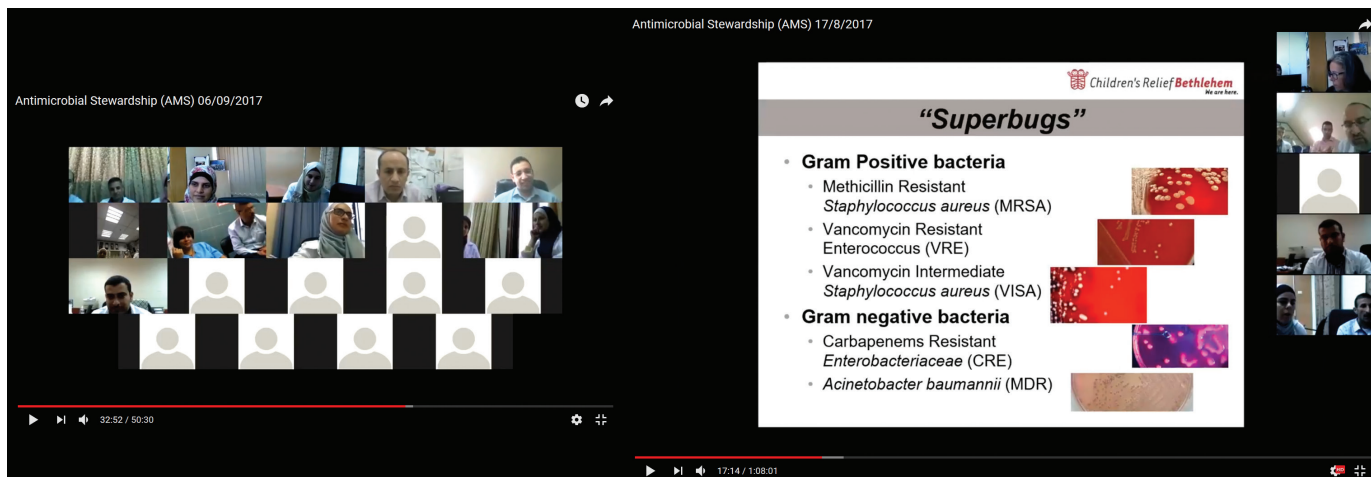
apply quality improvement methods to establish reliable processes for infection control and prevention, including transmission-based precautions and sepsis detection and treatment; antimicrobial stewardship; improvement of microbiologic laboratory processes and procedures; and active antibiotic management. The collaborative connected providers through both in-person and virtual mechanisms, creating an improvement community across a geographically vast and previously unconnected network of hospitals. Embedding the improvement activities within the existing health care system enabled sustainability of key improvement practices and led the MOH to undertake new initiatives to improve patient safety.

Key results:

- Use of transmission-based precautions in the participating hospitals improved from 53% in February to 84% in July. There was a similar upward trend in hand hygiene performance in the same period, with 77% of hospitals performing proper hand hygiene procedures in July, compared to a baseline of 64% in February.
- Hospital laboratories strengthened their capacity to test and identify bacterial samples. In May 2017, 16 hospitals performed bacterial testing, attempted antibiotic sensitivity testing,

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To foster learning, the West Bank HAI collaborative linked teams with biweekly web-based conference calls that included presentation of a clinical case by one hospital team followed by expert questions and answers with peer discussion.

and performed antibiotic sensitivity testing in line with manual. Of the 16, no hospital correctly identified all the bacteria samples to allow for antibiotic sensitivity testing. By August 2018, 18 hospitals were performing bacterial tests, and 10 of the 18 (55%) correctly identified all bacteria.

Improved diagnosis and treatment of childhood illnesses in Northern Uganda

From July 2015 to March 2017, ASSIST worked together with the MOH of Uganda to implement an improvement activity focused on Integrated Management of Newborn and Childhood Illness (IMNCI) in 20 facilities in three Northern Uganda districts. Teams identified gaps in IMNCI and used plan-do-study-act cycles to improve care. Tested changes included: establishing sick child triage; using non-clinical staff in assessment; internal supervision; and standardizing medical records to document essential clinical data. Intervention teams were supported with bi-weekly on-site coaching that included clinical and improvement capacity building. Bi-weekly monitoring of selected measures of IMNCI compliance using time series charts and before/after evaluation were used to determine effectiveness and cost-effectiveness of QI interventions.

Key results:

- Use of unnecessary antibiotics for cough or cold, malaria and diarrhea treatment was reduced among children aged 2 months-5 years:
 - Antibiotics prescribed for cough and cold were reduced by 56% ($p < 0.0001$) in intervention facilities
 - Attributable unjustified antibiotic treatment for malaria was reduced by 29% ($p < 0.0001$) and for treatment of diarrhea, by 47% in intervention compared to control facilities ($p < 0.0001$)
- Correct dosage of antibiotics for treatment of pneumonia among children 2 months-5 years improved from baseline of 0% to 80% at end line ($p < 0.0001$)
- Direct observation of outpatient visits of sick children demonstrated improved patient/caregiver counselling on correct administration of antibiotics from baseline 41% to 100% at end line, while the practice was nearly absent (2%) in control facilities at the end line
- Optimized use of antibiotics impacted the stock-out of essential antibiotics in the health facilities: While ampicillin and gentamicin were not available in 20-75% of the facilities at baseline, the assessment found universal availability of these drugs at end line, with no stock-out days

- The intervention proved to be cost-effective and saved 628 UGS per child with malaria and 226 UGS per child with cough or cold compared to the cost of intervention by reducing use of concurrent, unjustified antibiotics for these conditions.

Improved quality of childhood respiratory tract infection (RTI) diagnosis and treatment in clinics and rural medical practices in Georgia

To improve the quality of RTI diagnosis and treatment practices and rationalize antibiotic treatment at ambulatory and hospital levels, ASSIST worked with the Ministry of Labour, Health and Social Affairs (MoLHSA) in Imereti Region of Georgia. The intervention was part of the broader activity aimed at improving the quality of high-burden conditions, including cardiovascular disease, chronic obstructive pulmonary disease, and diagnosis and management of RTIs and asthma. The improvement intervention was evaluated through monthly monitoring by facility-based teams and prospective, non-randomized controlled before and after assessment of effectiveness and cost-effectiveness.

Key results:

- Justified use of an antibiotic in outpatient treatment of pediatric RTI increased from 19% at baseline to 97% at end line, a 64% adjusted attributable difference (95% CI: 44-84%) compared to the change in the control group
- Prescription of appropriate first-line antibiotics for treatment of eligible RTIs was higher at end line in intervention than control sites, with an adjusted attributable difference of 68% (95% CI 52-83%)
- At the baseline, adequate dosing was detected only in 39% of RTI outpatient and 75% of hospital pneumonia medical charts reviewed; end line data showed correct dosing at intervention clinics and hospitals in over 90% of charts

- The intervention reduced costs of unnecessary antibiotics and diagnostic tests by US\$5.20 per patient; the intervention to improve hospital management of pneumonia cost US\$2.90 per child, while the reduced use of broad spectrum Aminoglycosides alone produced incremental cost savings of US\$9.40 per child.

Lessons Learned

- ASSIST's evidence from different settings shows that there are cost-effective QI methods that can significantly improve the use of antimicrobial medicines and lower treatment costs. Scaling up these methods more widely in these settings would likely yield substantial health and economic benefits for patients and society.

- ASSIST's work has demonstrated that rationalizing antibiotic use can be an effective strategy to increase access to lifesaving antibiotics in resource-constrained settings and support universal health coverage.
- As noted by WHO, given that "the pipeline for new tools to combat drug resistance is almost dry," it is even more critical to effectively utilize available resources to combat AMR. QI is an effective tool to use resources more efficiently to address key drivers of AMR.

Resources Available

- [Using quality improvement to address hospital-acquired infections and antimicrobial resistance. AMR 2017](#)
- [Antibiotic Use Worldwide. The Lancet Infectious Diseases 2014; 14\(12\):1179.](#)
- [Improving rational antibiotic treatment of common childhood conditions in Uganda. AMR 2017](#)
- [The Economics of Reducing Antibiotic Use to Reduce Antimicrobial Resistance. AMR 2017](#)
- [Embedding quality improvement through a learning collaborative to reduce and sustain hospital-acquired infections in the West Bank. AMR 2017](#)
- [Improving Integrated Management of Newborn and Childhood Illnesses in Northern Uganda. Int J Integr Care 2017; 17\(3\):A34](#)
- [Rationale for improving integrated service delivery: reduced cost and improved care in Georgia. Int J Integr Care 2015; WCIC Conf Suppl.](#)
- [West Bank Hospital-Acquired Infections Collaborative Tools](#)
- [Palestinian Authority Ministry of Health Tools for Active Antibiotic Management and Reduction of Hospital-acquired Infections](#)

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