# PREVENTIVE APPROACHES TO ADDRESS ANTIMICROBIAL RESISTANCE IN VULNERABLE POPULATIONS

November 11, 2020

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# FOUNDATION PERSPECTIVE ON ANTIMICROBIAL RESISTANCE

- Our interest in AMR relates to our current health strategies in developing countries
  - Focused on supporting the development of transformative tools to reduce mortality and disease burden among the world's most vulnerable populations
  - Appropriate antibiotic use has the power to save lives in these populations
- The threat of AMR reinforces the importance of prevention of infections – which is a core focus of foundation work

# THE FOUNDATION CURRENTLY SUPPORTS PREVENTION, INFECTION CONTROL, AND APPROPRIATE USE OF ANTIBIOTICS

Our continued support for the following activities are expected to have a meaningful impact on AMR:

<u>Prevention</u>

- Vaccine development for RSV, GBS, typhoid, *Shigella*, cholera, pneumococcus, HIV, TB, and malaria
- Vaccine delivery to maximize coverage for vaccine-preventable disease

<u>Infection Control</u>

- Improved conditions for facility-based births

# AMR PRIORITY AREAS

- Collect better data on the burden of AMR among pathogens key to our strategies in low-income countries
- Better characterize AMR in vulnerable populations (e.g. newborns)
- Better quantify the impact of vaccines on AMR and their role as a key lever in addressing AMR
- Identify and de-risk promising innovative prevention tools and/or passive immunization approaches targeting antibiotic-resistant neonatal infections

# AMR STRATEGY: FOCUS AREAS FOR INVESTMENT

## AMR Strategy Focus

- Focus on prevention of infections and the associated mortality through vaccines, monoclonal antibodies, and microbiome approaches
  - Focus on neonatal sepsis
  - Continued vaccine development and delivery efforts for enteric disease, TB, HIV, malaria

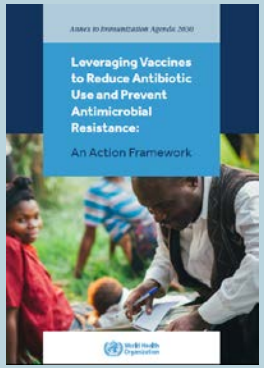
## Key Investments

- Surveillance and evidence generation to understand the etiologies and burden of illness ★
- Product development investments, including via CARB-X:
  - Vaccines ★
  - Monoclonal antibodies
  - Microbiome approaches
  - Innovations in infection prevention and control

# VACCINES TO ADDRESS AMR: BUILDING THE EVIDENCE BASE

## WHO AMR Vaccine Action Framework, 2020 (*forthcoming*)

1. Expand use of licensed vaccines to maximize impact on AMR
2. Develop new vaccines that contribute to prevention and control of AMR
3. Expand and share knowledge of vaccine impact on AMR




## WHO Value Attribution Framework for Vaccines Against AMR (2021)

- Platform to synthesize best available evidence for the impact of vaccine against AMR
- Tol support prioritization of decisions and investments about vaccine development

## CDDEP AMR and Vaccines Modelling Consortium (ARVaC)

- Integrated approach to model vaccine impact on
  1. Antimicrobial consumption
  2. Antimicrobial resistance
  3. Health and economic consequences
- Focus on low and middle-income countries

- Existing vaccines: Pneumococcus, typhoid, influenza, rotavirus
- Pipeline vaccines: RSV, shigella, TB, *K. pneumoniae*


Article

Childhood vaccines and antibiotic use in low- and middle-income countries

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# KLEBSIELLA PNEUMONIAE: LEADING ETIOLOGY OF NEONATAL SEPSIS IN LOW AND MIDDLE-INCOME COUNTRIES

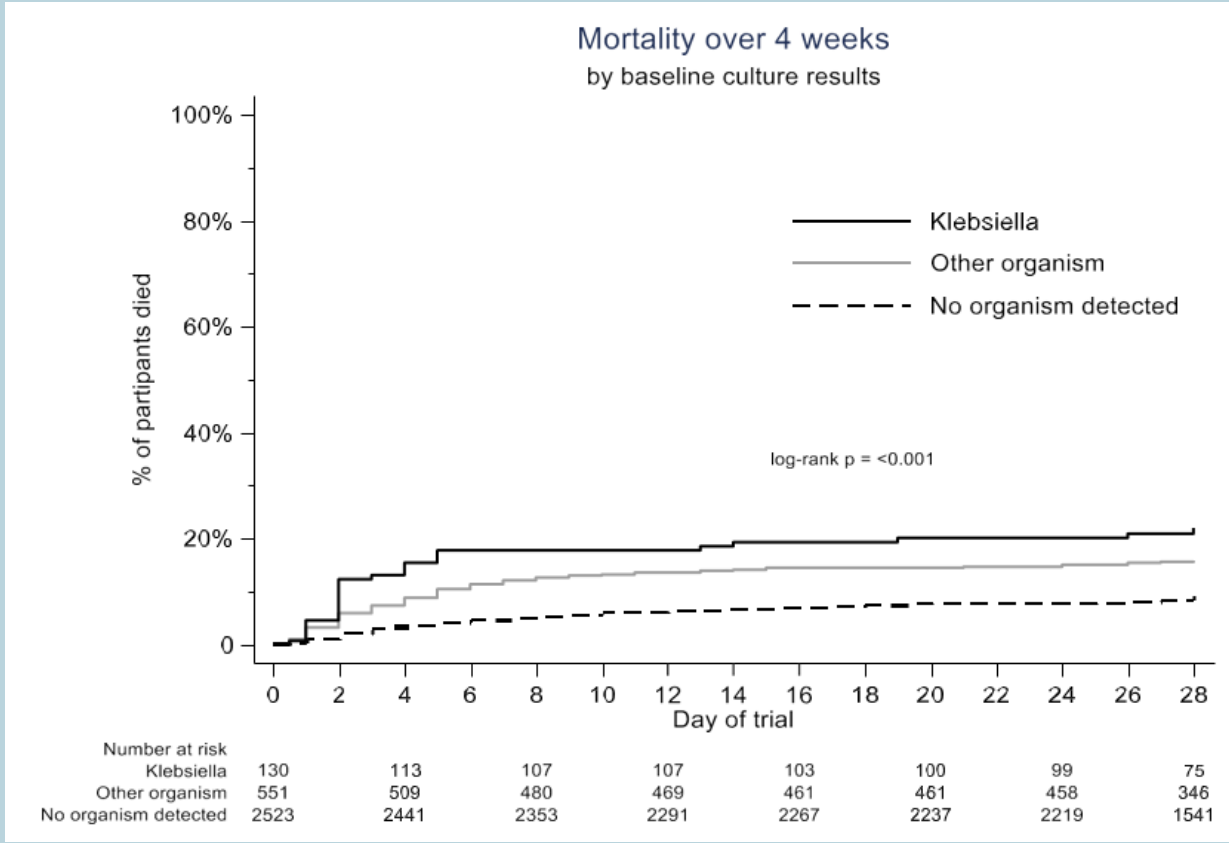
Global Antibiotic R&D Partnership (GARDP)

- Prospective, multinational, multicenter, observational cohort study of hospitalized infants with significant clinical sepsis
- *K. pneumoniae* leading cause of culture-confirmed sepsis
- higher risk of mortality in comparison to other organisms

CHAMPS Surveillance Platform

- *K. pneumoniae* accounts for:
  - 30% of neonatal infectious deaths
  - In causal chain of 16% of all neonatal deaths, and causes both early and late onset (hospital-acquired) illness

**28-day Mortality in Neonatal Sepsis Cases, GARDP Neonatal Observational Cohort Study, 2020**




CHAMPS: Child Health and Mortality Prevention Surveillance; GARDP NeoOBs Study Data (Unpublished)

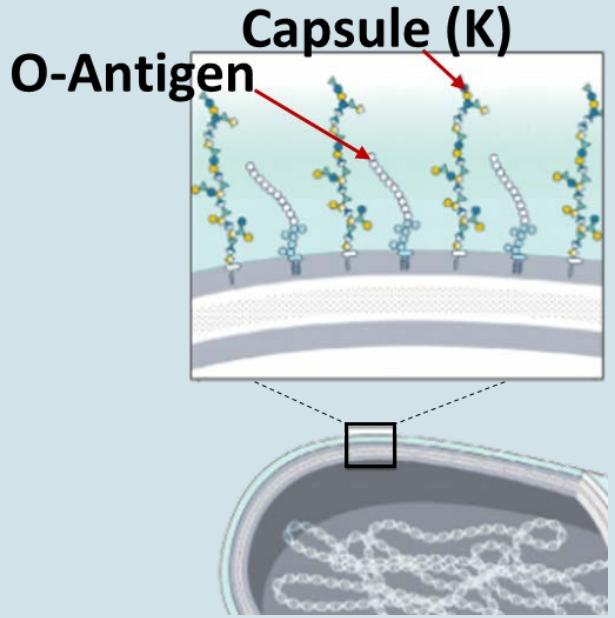
 

# *KLEBSIELLA PNEUMONIAE:* POTENTIAL MATERNAL VACCINE TARGET TO PREVENT NEONATAL SEPSIS

- Maternal immunization:
  - Newborn infants have immature immune system, not optimal target population for vaccination
  - Vaccine given to pregnant woman in 3rd trimester, transplacental transfer of antibodies can confer protection to newborn infant

- *Klebsiella pneumoniae*
  - 8 lipopolysaccharide (LPS) O-antigens and 77 capsular K antigens are potential targets for conjugate vaccine

- Current priorities:
  - Characterization of *K. pneumoniae* serogroups in neonatal sepsis from additional geographies
  - Establish whether antibodies directed at O and/or K antigens confer protection against *K. pneumoniae* infection
  - Support for appropriate vaccine candidates through CARB-X




BARNARDS=Burden of Antibiotic Resistance in Neonates from Developing Countries


THE WORK IS
COMPLICATED.
WHY WE DO IT IS NOT.