
# Vaccines and their importance in animal disease control and as alternative to antimicrobial

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English speaking Africa workshop on vaccination and alternatives to Antimicrobials 28-30 October 2025, Entebbe, Uganda

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# Overview of the Presentation

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- AU-PANVAC'S mission
- Trend of Vaccines Tested at AU-PANVAC
- Impacts of Antimicrobial-resistant (AMR)
- Factors aggravating AMRS
- The role of animal farming in AMR
- Significance of vaccines in reducing antibiotic use
- The role of vaccines in Combatting AMR
- Conclusion

# AU-PANVAC's Mission

"To promote the use of **GOOD QUALITY VACCINES** and **DIAGNOSTIC REAGENTS** for the control, eradication and surveillance of animal diseases in Africa."

# Trend of Vaccines Tested at AU-PANVAC

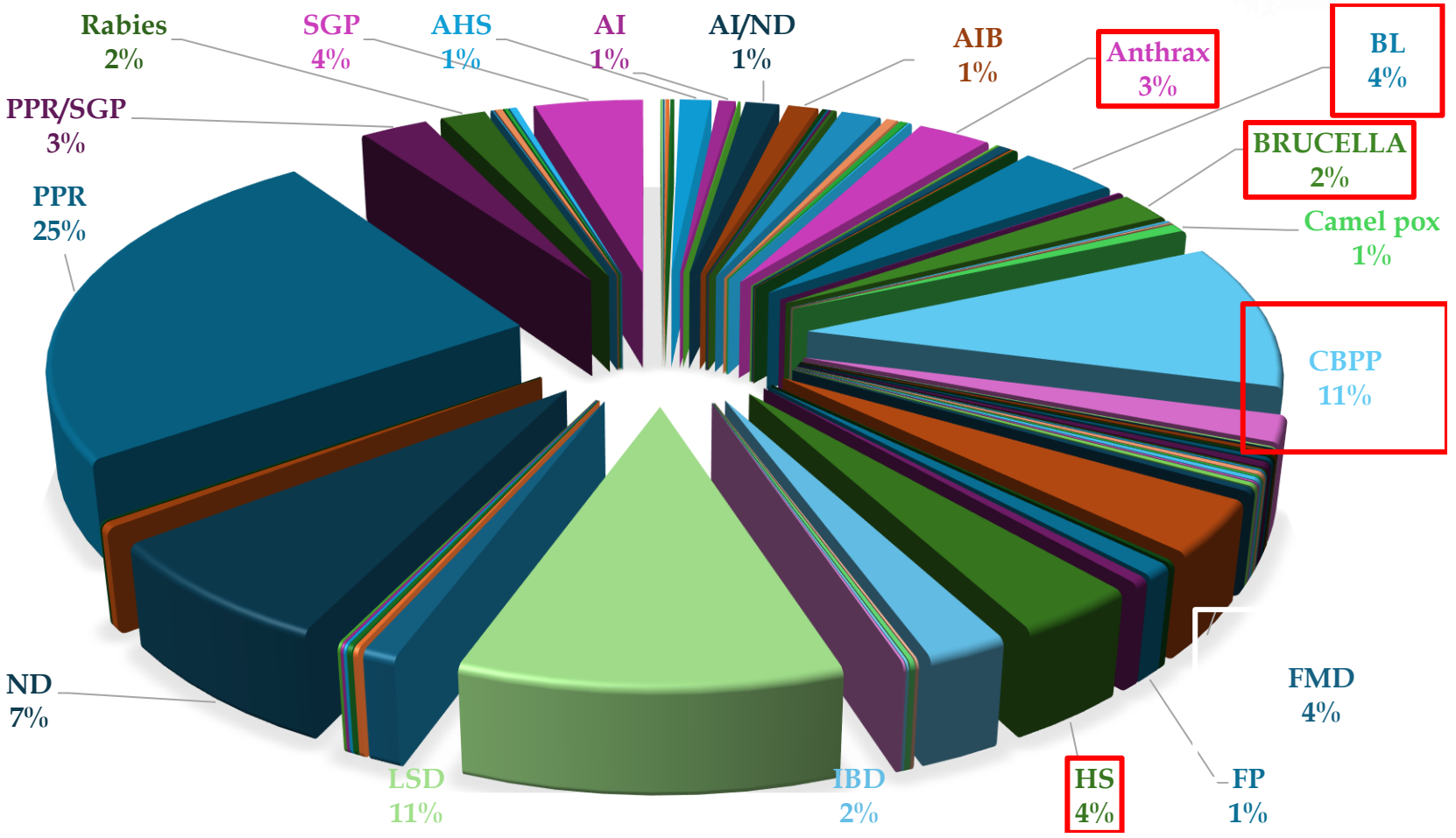
- **Currently AU-PANVAC Certifies annually :**
  - **More than 50 types of Vaccines**
  - 300 - 400 batches annually (≈ **3.5 Billion doses**)
  - **For all Animal Species** (***except Fish***)

# Vaccines Received for QC: 2020-2024

- Bacterial

- Anthrax, BL, CBPP, CCPP, FT, FC, HS, Brucella,

- **Parasites** (ECF, coccidiosis)
- Viral (PPR, LSD,SGP..)

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# Impacts of Antimicrobial-resistant (AMR)

The use of antibiotics has enabled the successful treatment of bacterial infections, saving the lives and improving the health of many patients

worldwide.

However, the emergence and spread of AMR has been becoming threat to global health

The study finding showed in 2021 estimated of death of 4.7 m people related with AMR and will reach 8.2m by 2050, unless appropriate measures are taken (*Lacet vol 404 September 28, 2024)*


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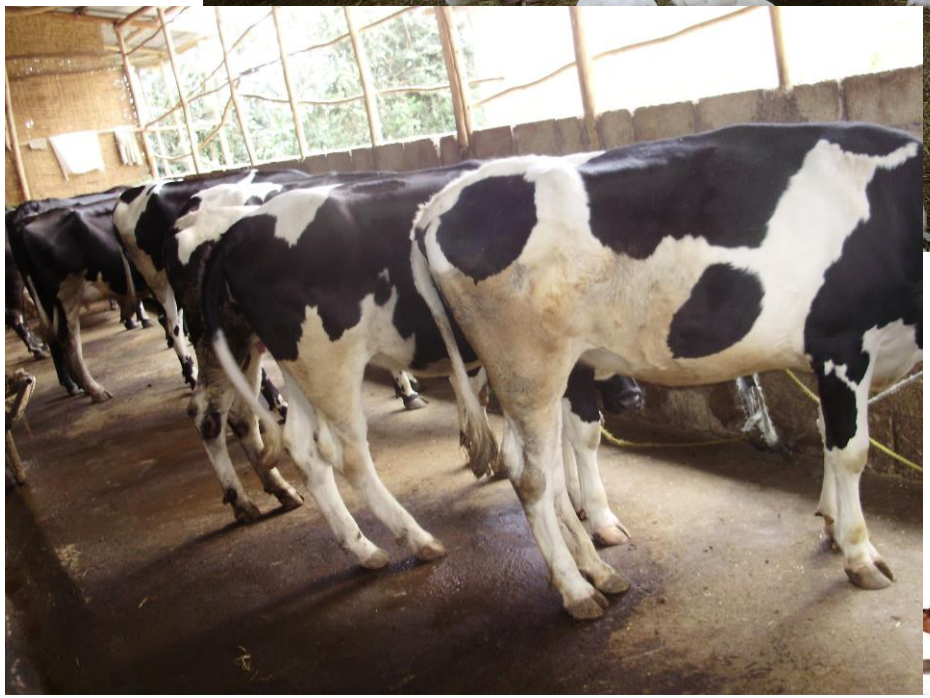
# Factors aggravating (AMR)

A continuous increase in the Global human population puts immense pressure on food resources.

Higher Demand for Animal Protein (meat, milk, and eggs)

- Increase Intensive Farming Systems (crowding, stress, and uniform genetics)
- Leads to a greater disease incidence in Animals



Increases use of AMs (treatment, prevention, and growth promotion)

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# Factors aggravating (AMR)

**Other factors such as:**

- climate change,
- Globalization (increase mobility, both human, and animals and animal products)

**Aggravating the disease incidence**

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# Factors aggravating (AMR)

## 1. Over use

- >73% of AMs sold globally are used in animals
- In USA, ≈ 70% AMs, which are used to treat human infections are sold for use in food animals


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# Factors aggravating (AMR)

In Africa, there are also various factors which aggravate AMR

**2. Misuse of AMs, Animal owners can purchase AMs without prescription and inject by themselves, under dose)**

**3 . Inefficient drug quality control regulation**, poor quality drugs are imported to Africa

- **Leading to rise in Antimicrobial Resistance**

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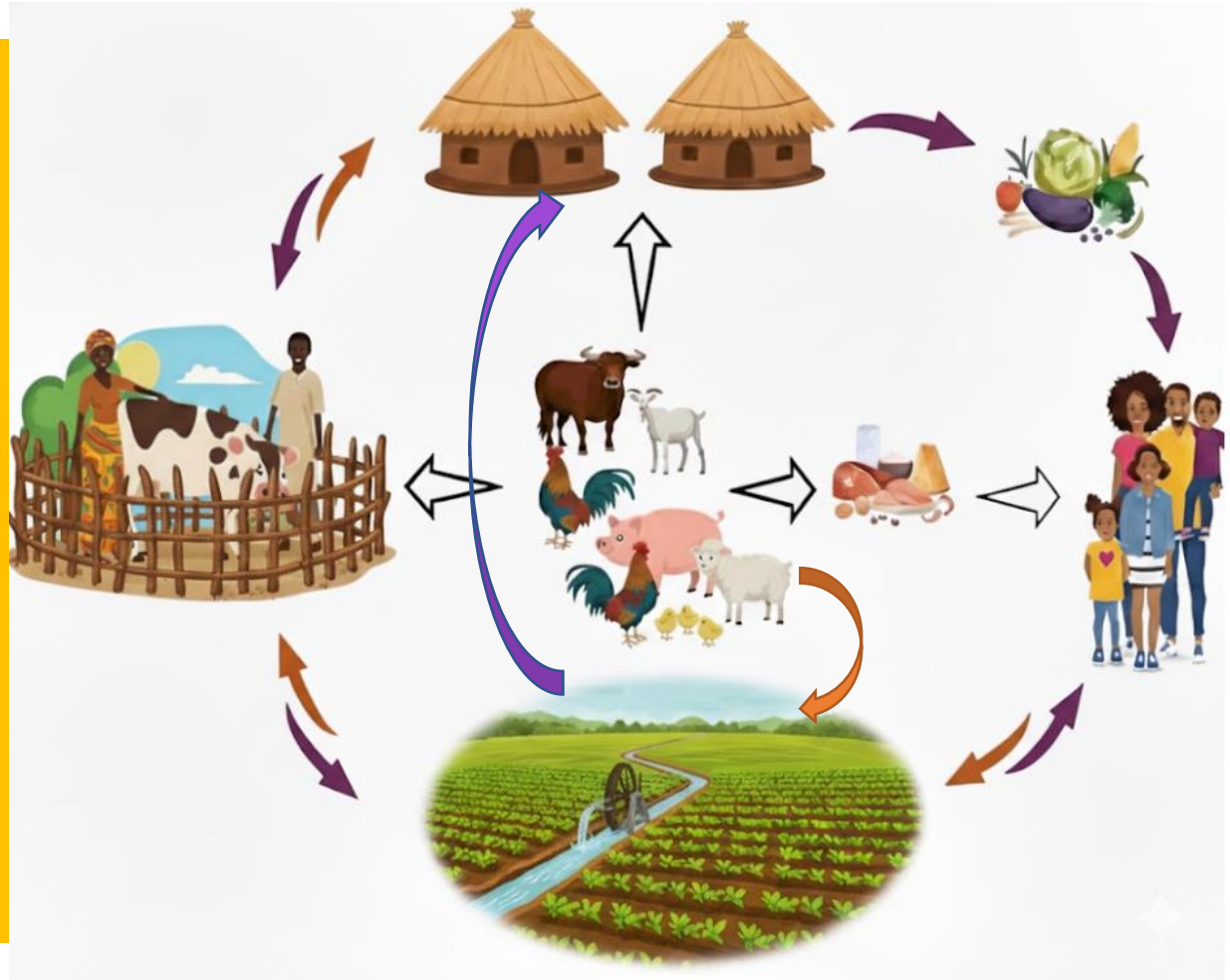
# The role of animal farming in AMR

- Farm animals are playing a key role to the development and spread of AMR genes/bacteria.
- Contaminate human through the environment, food products and by direct contact
- **AMR is becoming a significant global health concern, Needs ONE HEALTH APPROACH**



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# Significance of vaccines in reducing antibiotic use

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# Significance of vaccines in reducing antibiotic use

## Poultry Vaccines with % Reduction in Antibiotic Use

| Disease | Causative Agent | Reduction in Antibiotic Use | Study Area / Country | Reference / Source |
|---|---|---|---|---|
| **Colibacillosis** | *E. coli (APEC)* | Up to 50% | Israel, USA | Peighambari et al., Avian Dis, 2000; Landman & van Eck, Avian Pathol, 2015 |
| **Necrotic Enteritis** | *Cl. perfringens* | Up to 60% | USA | Hofacre et al., Avian Dis, 2018 |
| **Fowl Cholera** | *P.multocida* | 40–50% | USA | Schultze et al., Avian Dis, 2013 |
| **Infectious Coryza** | *A. paragallinarum* | 35–45% | Brazil | Ferreira et al., Pesq Vet Bras, 2017 |
| **Mycoplasmosis (CRD)** | *M.gallisepticum* | 30–50% | USA, Israel | Ley, Avian Pathol, 2003 |
| **Salmonellosis** | *S. Enteritidis* | 30–50% | EU | EFSA, 2021 |

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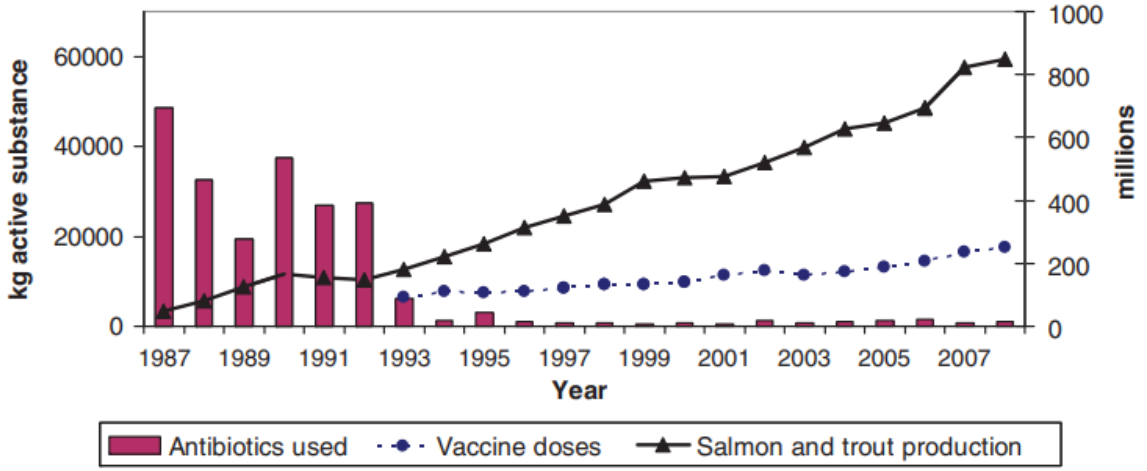
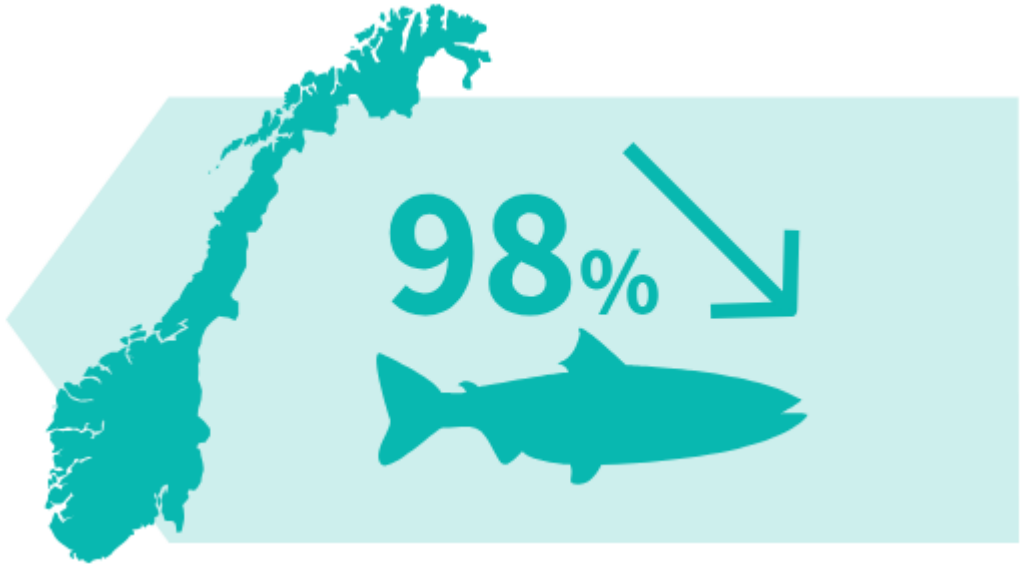
# Significance of vaccines in reducing antibiotic use…

## Impact of vaccines on antibiotic use in fish




- Norway is known for Aquaculture,
- Antibiotic consumption was high in 1980-90s
- Reduced antibiotic use through vaccination

- Currently, Antibiotic use fell ≈98% following the introduction of an effective vaccine against a key bacterial diseases

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# Significance of vaccines in reducing antibiotic use..

## Swine Vaccines with % Reduction in Antibiotic Use

| Disease | Causative Agent | Reduction in Antibiotic Use | Study Area / Country | Reference / Source |
|---|---|---|---|---|
| Neonatal Diarrhea | E. coli (Enterotoxigenic) | Up to 74% | China | Zhang et al., Vet Microbiol, 2021 |
| Ileitis | Lawsonia intracellularis | Up to 80% | USA | Zoetis Field Study, 2020 |
| Enzootic Pneumonia | M.hyopneumoniae | 30–40% | Belgium | Maes et al., Vet Rec, 2018 |
| Salmonellosis | S. Typhimurium | 30–50% | Germany | Wallmann et al., J Anim Sci, 2013 |
| Pleuropneumonia | Actinobacillus pleuropneumoniae | 40–50% | Australia | Pointon et al., Anim Prod Sci, 2010 |

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# Significance of vaccines in reducing antibiotic use…

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## Impact of swine viral vaccines on antibiotic use in Pig


Porcine circovirus type 2 (PCV-2) causes generalised immuno-suppression in pig, predispose to secondary bacterial infections.

A study conducted on Austrian pigs found a 67% decline in antibiotic use on finishing farms when PCV-2 vaccines were used

# Significance of vaccines in reducing antibiotic use…

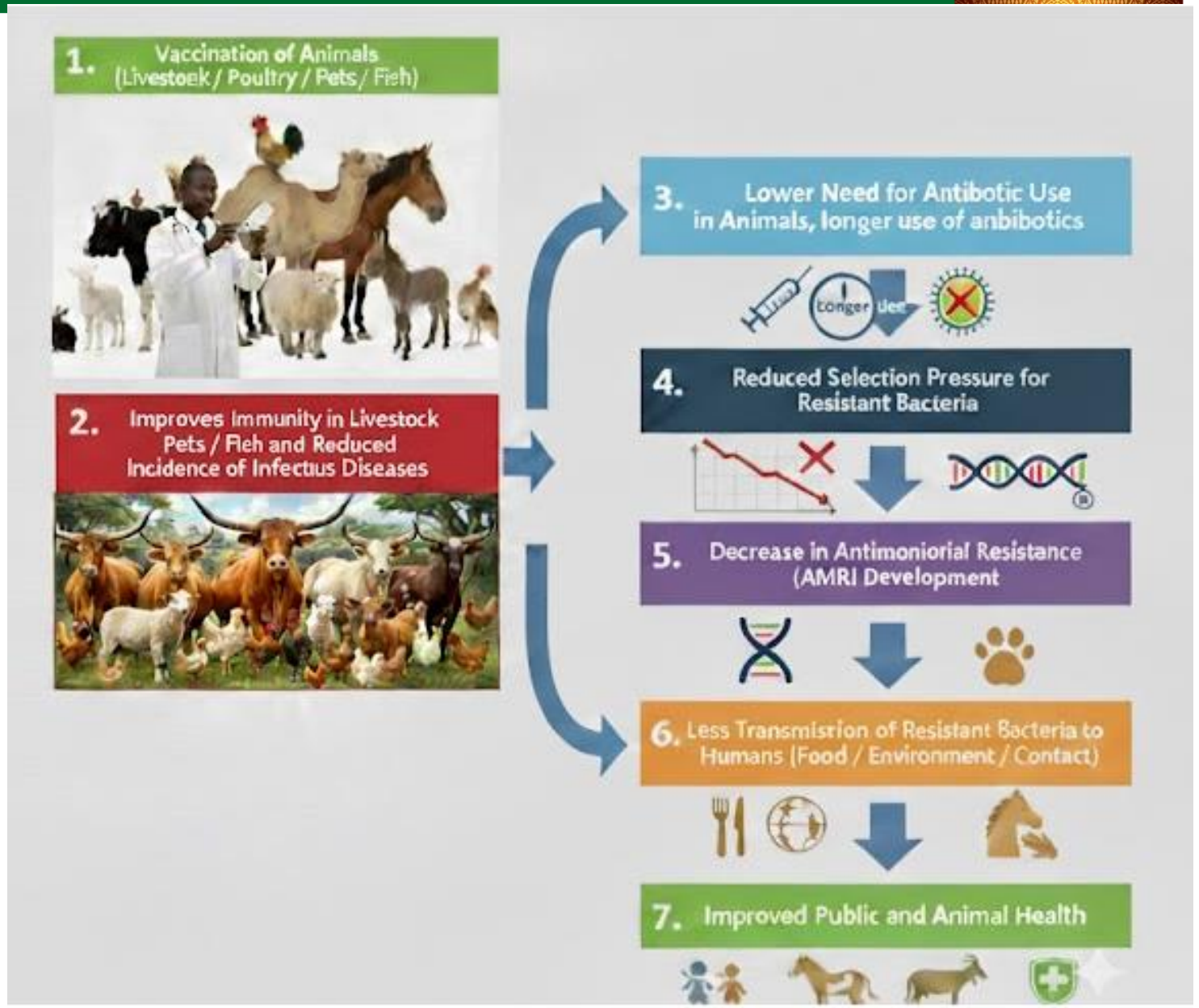
## Livestock Vaccines with % Reduction in Antibiotic Use

| Disease | Causative Agent | Species | Reduction in Antibiotic Use | Study Area / Country | Reference / Source |
|---|---|---|---|---|---|
| **Bovine Respiratory Disease (BRD)** | Multibacterial/viral (e.g. M. haemolytica, IBR virus) | Cattle | 60–70% | USA | Taylor et al., J Anim Sci, 2020 |
| **Infectious Bovine Rhinotracheitis (IBR)** | Bovine Herpesvirus-1 (BoHV-1) | Cattle | 50%+ | Canada | Van Donkersgoed et al., Can Vet J, 2005 |
| **Bovine Mastitis** | Staphylococcus aureus | Dairy Cows | 30% | Netherlands | Schukken et al., J Dairy Sci, 2011 |
| **CBPP** | M.mycoides subsp. mycoides | Cattle | Reduced mass treatment | Africa | AU-IBAR, OIE Reports |
| **CCPP** | MCCP | Goats | Reduced mass treatment | East Africa | FAO, 2019; OIE Tech Card |

# The role of vaccines in Combatting AMR

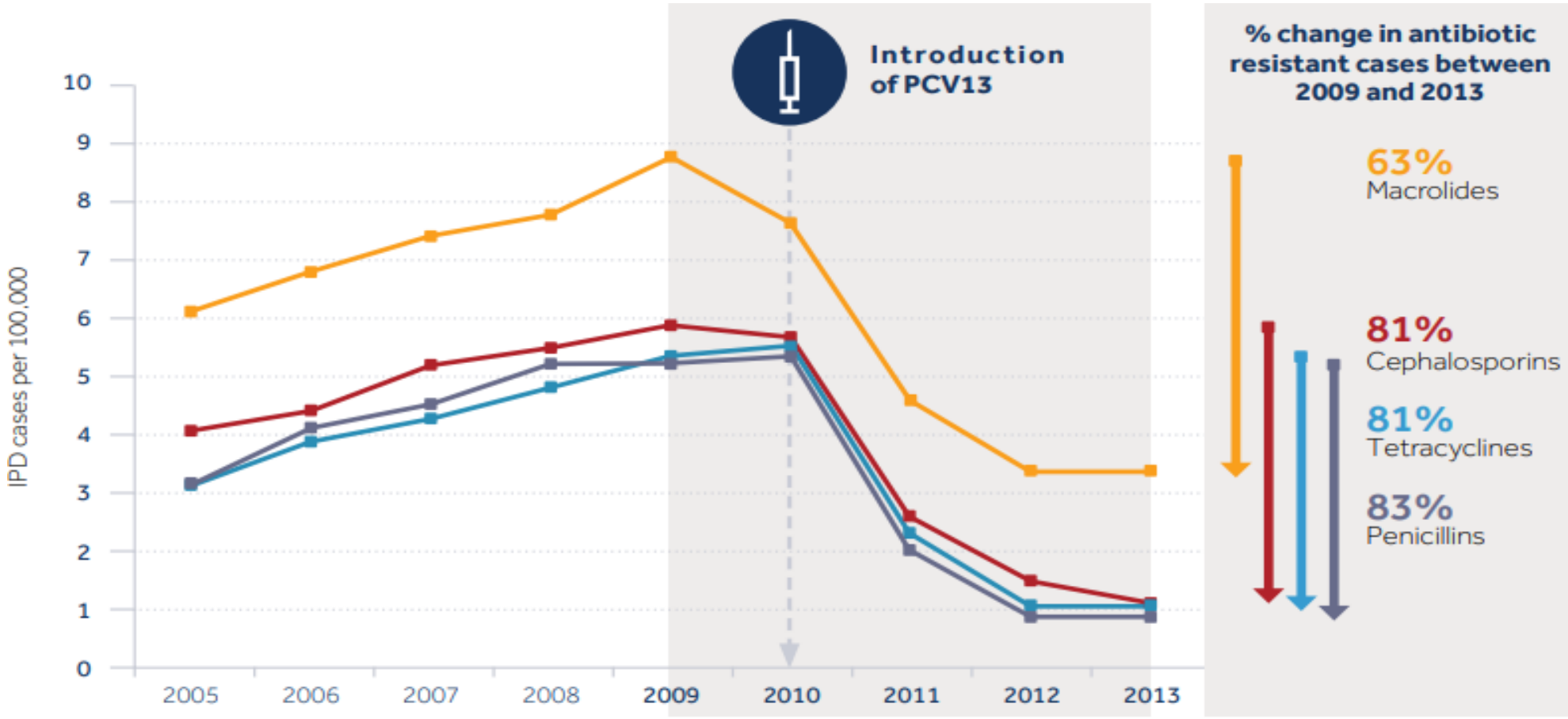
**Impact of veterinary vaccines on combatting AMR:**

**A schematic pathway**



# Impact of vaccines on AMR…

Impact of pneumococcal vaccine on rates of drug-resistant invasive pneumococcal disease (IPD) in USA




IPD: invasive pneumococcal disease; PCV: pneumococcal conjugate vaccine

Ref: Annex Immunization Agenda 2030, WHO

# Conclusions

- AMR is a growing global health concern, and the extensive use of antibiotics in animal production is a major contributing factor, needs ONE HEALTH APPROACH.
- Vaccination is not just an alternative — it is a frontline defense in addressing AMR.
  - ✓ By preventing infectious diseases in animals, vaccines drastically reduce the need for antibiotics and, in turn, limit the emergence and spread of AMR.
  - ✓ Evidence across multiple species has demonstrated that effective vaccination can lead to significant reductions in antibiotic use.
- AU-PANVAC plays a critical role in the effort to minimize antibiotic use (addressing AMR) through its rigorous quality control and certification of veterinary vaccines, ensuring their safety and effectiveness across the continent.

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# One Continent, One Market, One Standard for Registration of Vaccines & manufacturers


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