



**Determining the Drivers of  
Antibiotic Resistance in Poultry, India  
... and other bilateral, cross-disciplinary  
research projects  
2018-2021**



## Bringing social science into AMR research





## Socioecological System (SES) approach to AMR



# Planetary Health

*“Put simply, planetary health is the health of human civilization and the state of the natural systems on which it depends.”*

– Lancet Commission on Planetary Health  
(Whitmee et al, 2015)



# Planetary Health

*Human Health*  
+  
*Environmental Health*  
+  
*PESTLE*

*(Cole and Bickersteth, 2018)*



**SOLUTIONS**



# Antimicrobial resistance

700,000 annual deaths; 10 million by 2050

Globally, 3.8% of GDP lost annually by 2050

Global annual cost in 2050: \$100 trillion

Biggest impact in LMICs





# Antimicrobial resistance

700,000 annual deaths; 10 million by 2050

Globally, 3.8% of GDP lost annually by 2050

Global annual cost in 2050: \$100 trillion

Biggest impact in LMICs

Little (financial) incentive for pharma to act



## 4 projects under one (sandpit) call

**DARPI** (intensive, modern poultry farming)

**Chicken & Egg** (Small farms/communities)

**SMART** (policy landscape/opportunities)

**DOSA** (diagnostic tools; co-design)



*Staff crossover between projects  
(most staff on two; some on three)*





## UK – Partners – India



# Understand the Problem Space

- AMR is known to be a problem
- India has 2<sup>nd</sup> largest poultry production industry in the world
- Fastest growing agrarian industry
- 70-75% (both of layer and broiler) production in Southern States (AP, TS, KA, TN, MH).
- Comprehensive interdisciplinary perspectives of AMR.
- Methodologies to reflect community level practices and provide robust data on the scope of AMR and behavioural practices that drive it.



# Multi-discipline

## Why are antibiotics used?

Anthropology  
Human geography  
Service design  
Economics

## What do they do?

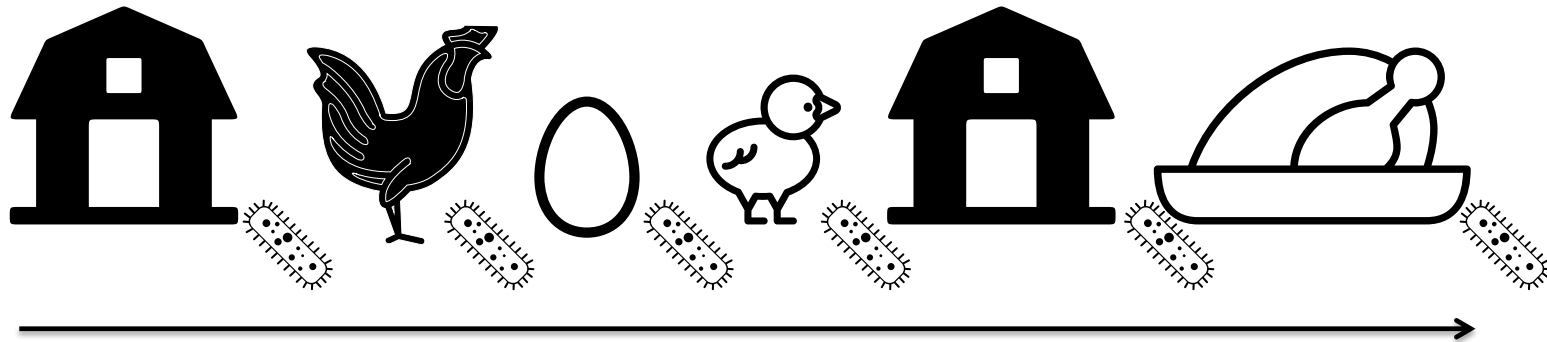
Microbiology  
Veterinary science  
Animal science  
Economics

## What would be the result of different approaches?

Microbiology  
Epidemiology  
Policy  
Economics  
Community dynamics

# Weaving in the social science

- Participatory rural action (PRA) and rapid ethnographic assessments
- Participatory design tools for co-design
- Make visible practices that contribute to AMR
- Apply and synthesize qualitative and quantitative AMR data to provide a rich narrative of the poultry journey map



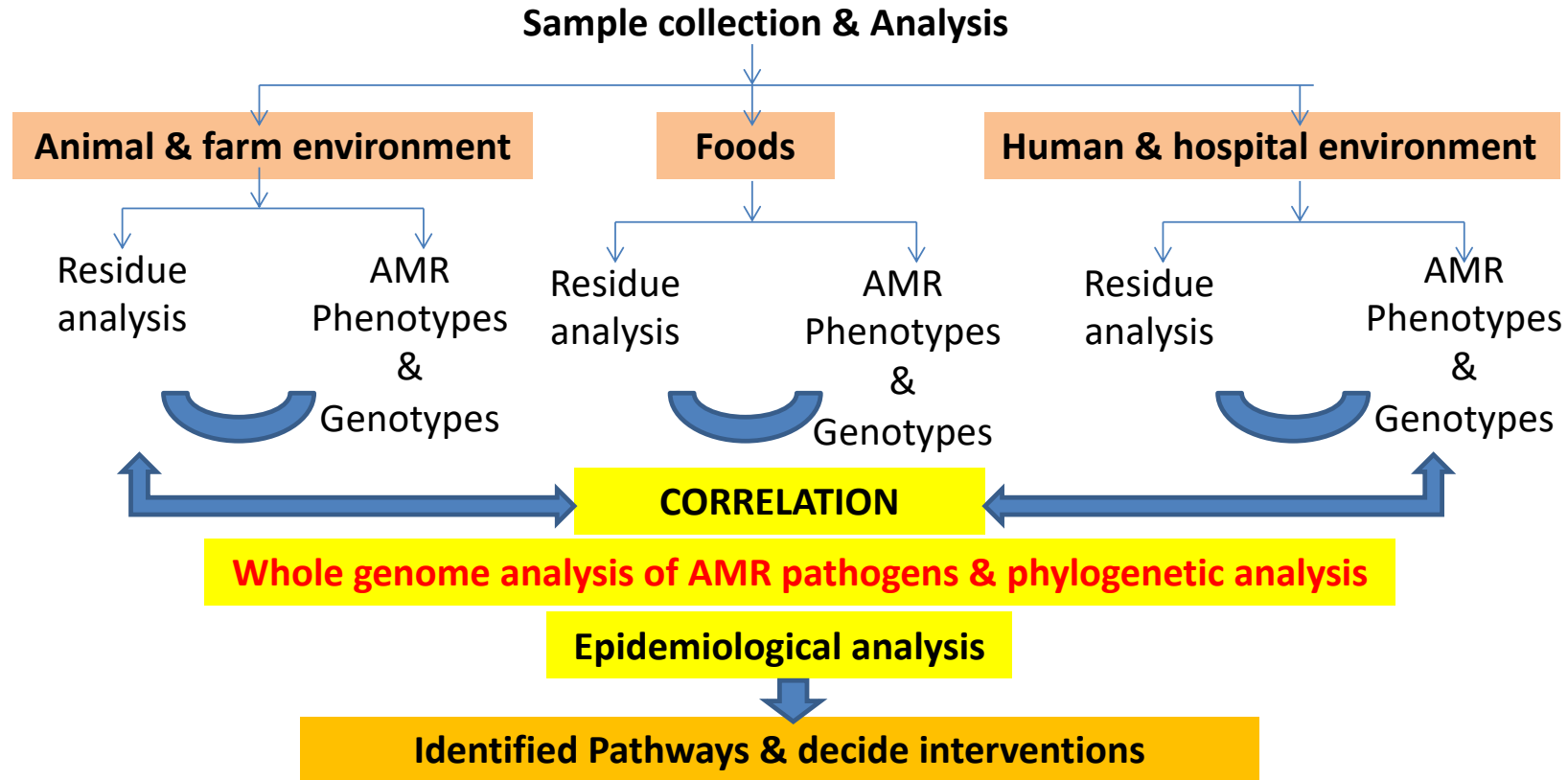
**3x locations in 15 farms involving 3x sets of monitoring of the poultry service journey; local researchers, farm workers and community members collect data**



# Animal Farms & Human Hospitals (Composite – multi species – farming system)



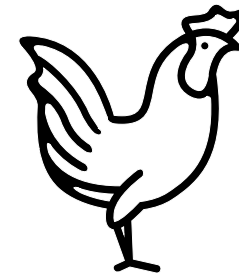
Social survey for antibiotic use: Farmers, Vets & others



**Social Science - Take it to farmers**

# Impact

- Establish **flow maps** of **AMR** through the poultry food chain, identifying key points where interventions will be most cost effective for industry, consumers and the community.
- **Inform policy makers** on best practice to rationalise AB use in the poultry food chain in order to inform government investment in interventions.
- **Co-develop effective and feasible interventions** to enable poultry to better manage AB use.
- Build **capability and capacity** with regards to **managing AMR** in the poultry food chain.
- Build **capability and capacity** in onsite sampling, **monitoring and surveillance** of **AMR**.

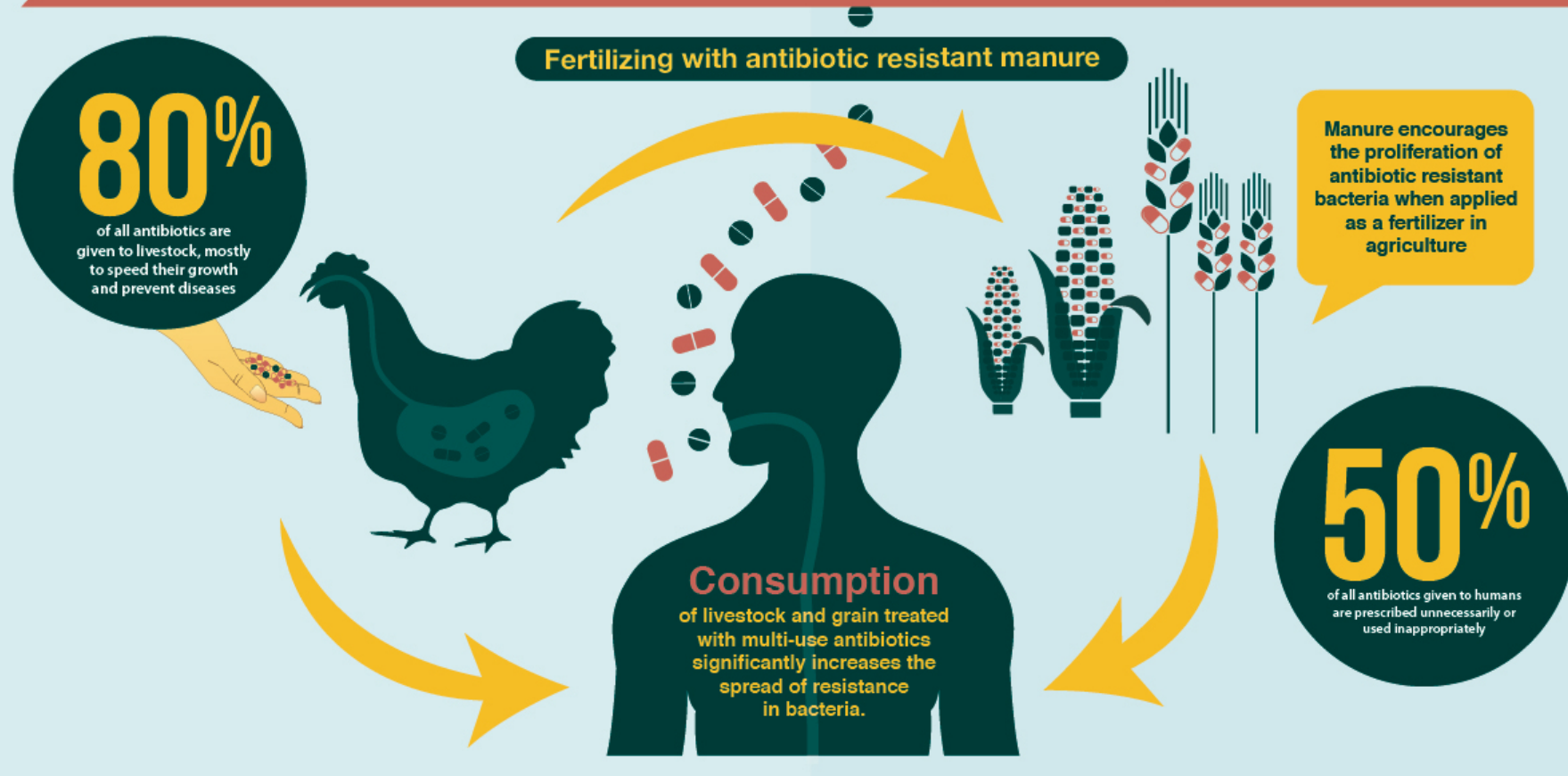




# ANTIBIOTIC RESISTANCE

*Will Kill More People Than Cancer and Diabetes Combined By 2050*

## How Resistance Develops and Spreads



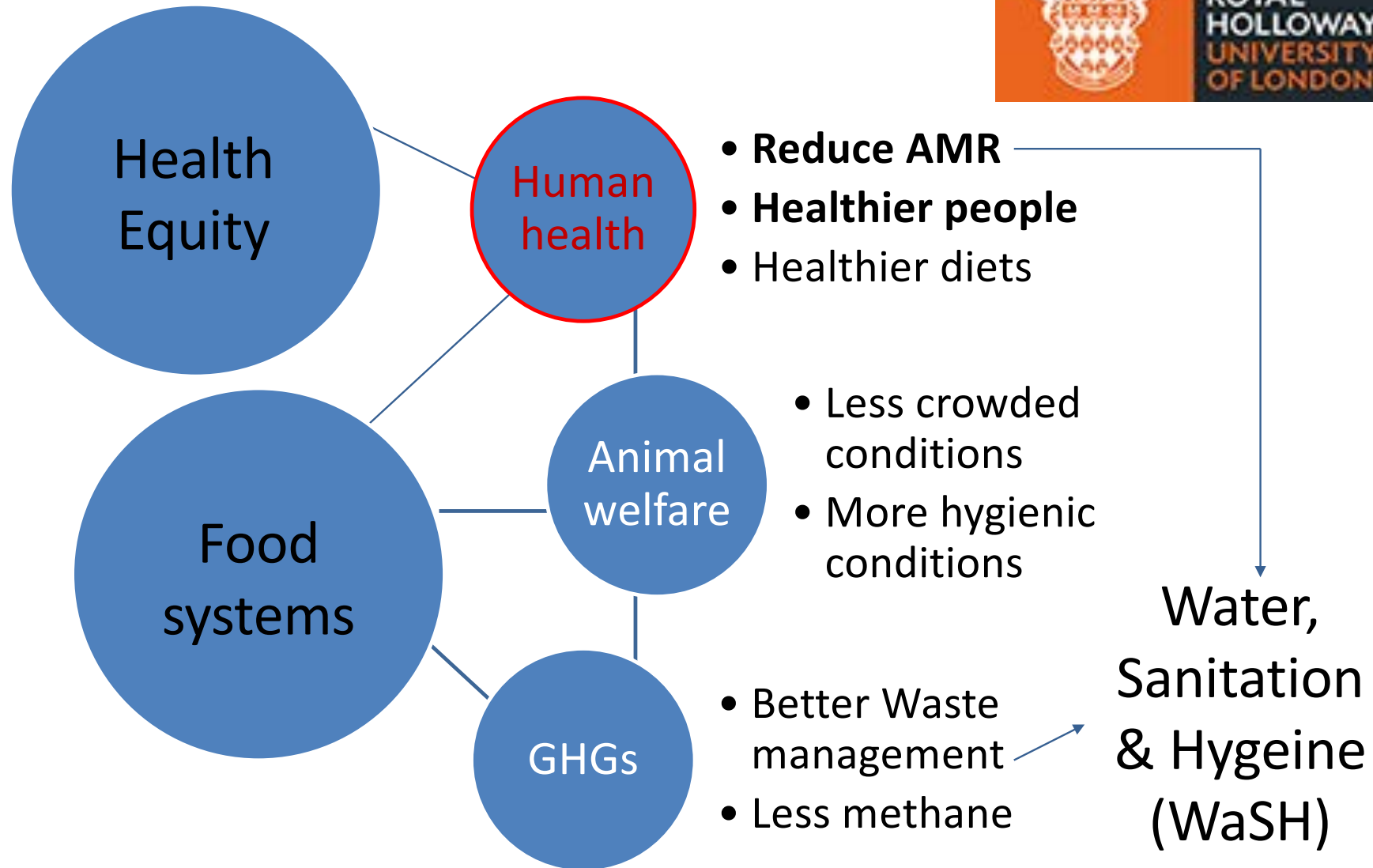
# Reduce antibiotics in livestock

**Public health: reduce AMR**

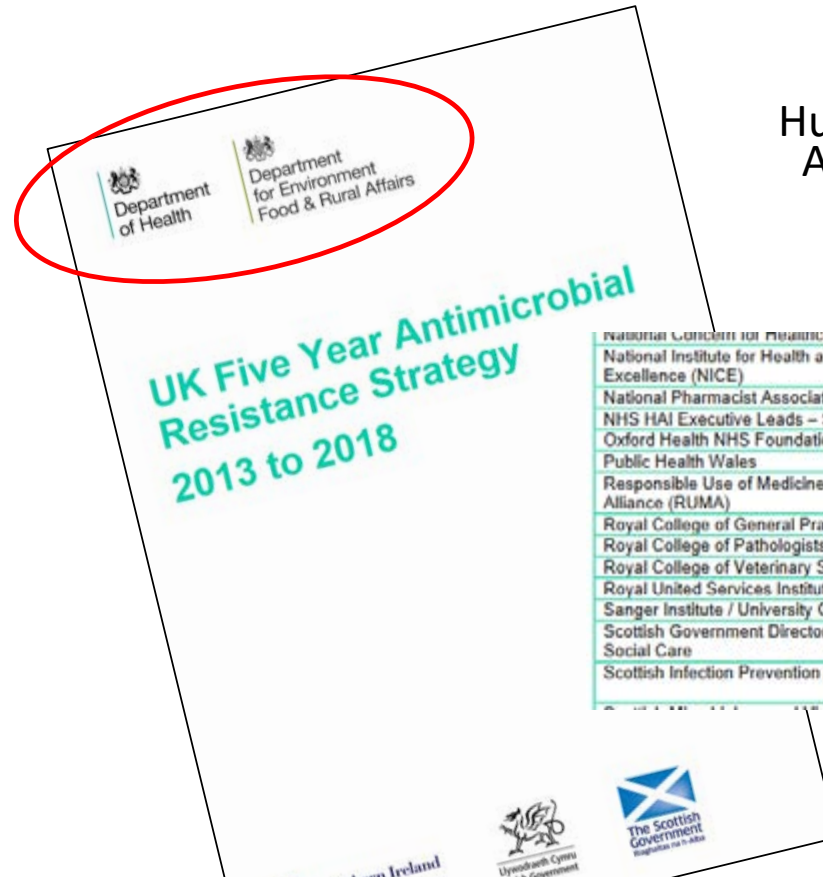
Cobenefit: Healthier diets

Environment: reduce GHGs, prevent eutrophication, improve soil quality





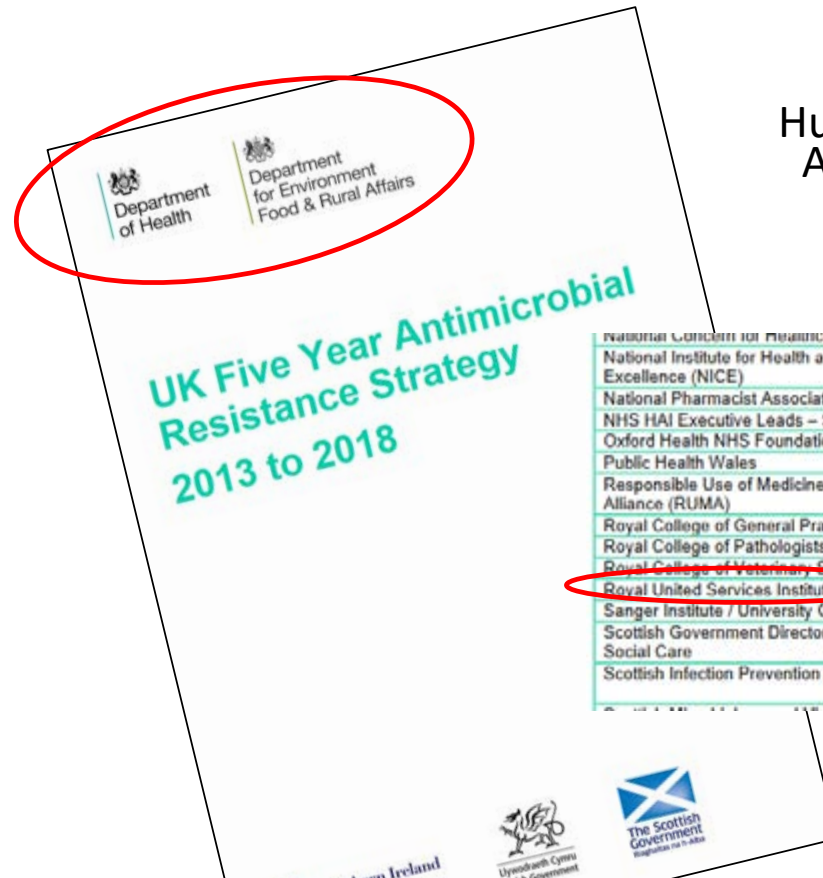
# UK Five Year AMR Strategy



Human health/Pharmaceutical industry  
 Animal health/Farming industry/Vets  
 Food Systems/Agriculture  
 Environmental protection  
 Academia

National Centre for Antimicrobial Infections	National Office of Animal Health (NOAH)
National Institute for Health and Care Excellence (NICE)	National Voices
National Pharmacist Association	Norgine Pharmaceuticals Ltd
NHS HAI Executive Leads – Scotland	Patients Association
Oxford Health NHS Foundation Trust	RAND Europe
Public Health Wales	Roslin Institute
Responsible Use of Medicines in Agriculture Alliance (RUMA)	Royal College of Nursing (RCN)
Royal College of General Practitioners (RCGP)	Royal College of Physicians (RCP)
Royal College of Pathologists (RCPath)	Royal Pharmaceutical Society (RPS)
Royal College of Veterinary Surgeons (RCVS)	Royal Veterinary College
Royal United Services Institute (RUSI)	Science and Technology Facilities Council
Sanger Institute / University College London	Scottish Antimicrobial Prescribing Group
Scottish Government Directorate for Health and Social Care	Scottish Infection Research Network (SIRN)
Scottish Infection Prevention Network	Scottish Government Directorate for Agriculture, Food and Rural Communities

# UK Five Year AMR Strategy



Human health/Pharmaceutical industry  
 Animal health/Farming industry/Vets  
 Food Systems/Agriculture  
 Environmental protection  
 Academia

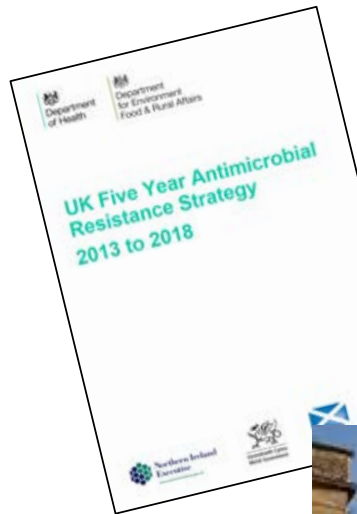
National Centre for Antimicrobial Infections	National Office of Animal Health (NOAH)
National Institute for Health and Care Excellence (NICE)	National Voices
National Pharmacist Association	Norgine Pharmaceuticals Ltd
NHS HAI Executive Leads – Scotland	Patients Association
Oxford Health NHS Foundation Trust	RAND Europe
Public Health Wales	Roslin Institute
Responsible Use of Medicines in Agriculture Alliance (RUMA)	Royal College of Nursing (RCN)
Royal College of General Practitioners (RCGP)	Royal College of Physicians (RCP)
Royal College of Pathologists (RCPath)	Royal Pharmaceutical Society (RPS)
Royal College of Veterinary Surgeons (RCVS)	Royal Veterinary College
<u>Royal United Services Institute (RUSI)</u>	Science and Technology
Sanger Institute / University College London	Scottish Antimicrobial
Scottish Government Directorate for Health and Social Care	Scottish Infection Res
Scottish Infection Prevention Network	Scottish Government
	Food and Rural Com







# UN IACG AMR







## Contact details

***Jennifer Cole, PhD***

*Jennifer.Cole@rhul.ac.uk*

*Jennifer.Cole@oxfordmartin.ox.ac.uk*



[www.planetaryhealthalliance.org](http://www.planetaryhealthalliance.org)