What does it take to do interdisciplinary research and why do we need it?

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Outline

- Introduction - experiences from AMR champion role
- Understanding and Translation
  - Scientists to social scientists
  - Social sciences to scientists
- Principles of collaboration
- The nature and purpose of interdisciplinarity
  - Definitions
  - Practice
  - Worked example: Antibiotic pathways in China
- Challenges to interdisciplinarity
  - Specialist expertise – funding panels
  - Publishing – outputs

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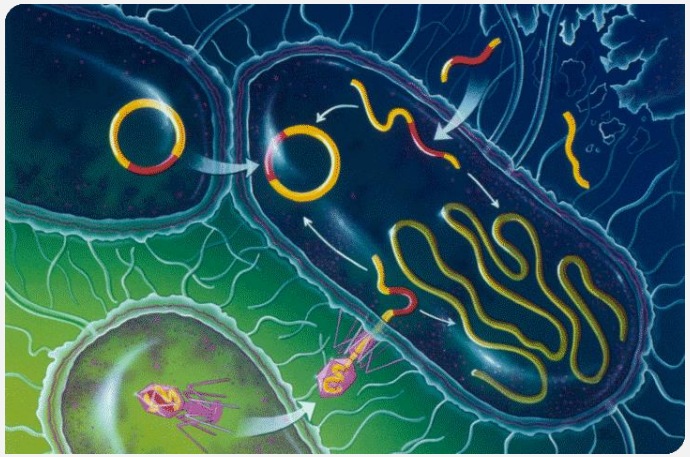
Aims:

- to highlight the importance of social science research to the challenge of AMR
- to engage social scientists from a broad range of disciplines in this issue

Challenges to engaging social scientists in AMR research

1) Multiple research literatures and fuzzy science

2) Representations of the 'problem'
as biological and the 'solution'
as technological



3) Narrow view of (relevant) social sciences
(macroeconomics or individual behaviour)

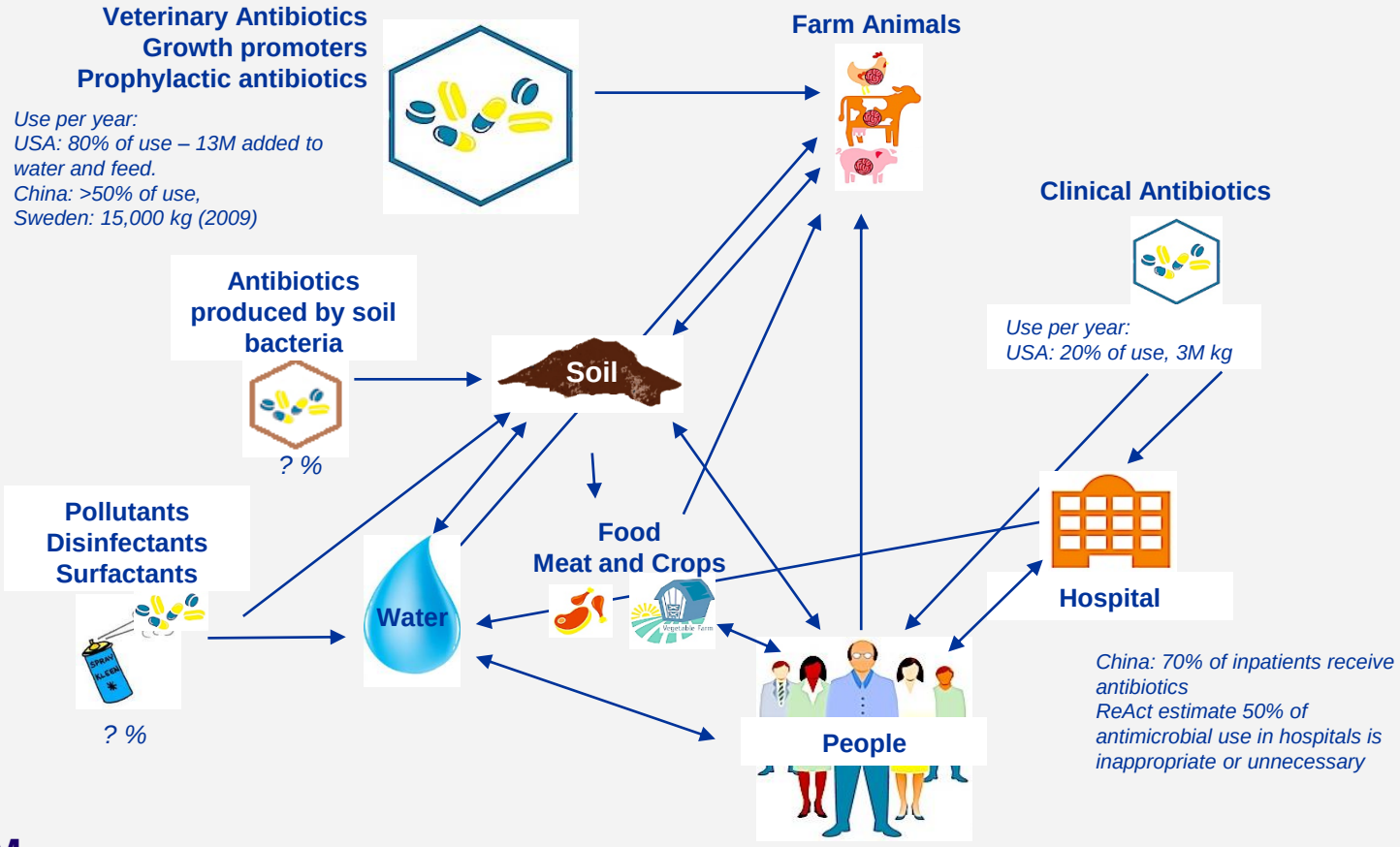
How does resistance spread?

FUN FACT: AMR IS TRANSMISSIBLE

Microbes are able to swap resistant genes, even with members of other species. The environment is a reservoir of resistant genes and these are swapped to human pathogens. There is a paucity of robust data on the proportion of drugs in the environment and the context in which they entered. Of the data available the majority of antibiotics are used in animals. This has reduced substantially in EU, and in the Nordic countries, particularly after their use as a growth promoter was banned and profiting prohibited.

(How) does environment-human transmission occur?

What is the community prevalence of AMR?



What are the environmental and ecological conditions conducive to transmission?

NATURE OF THE PROBLEM

Research Champion advocacy - scientists, clinicians

British Society for Antimicrobial Chemotherapy

European Society for Paediatric Infectious Diseases 2016

Medical Research Foundation workshop

MRC AMR UK-China Shanghai Workshop

Wellcome Trust AMR and Policy Summit

Global Challenges 2017 conference

European Public Health Alliance annual conference

Launch meetings of: Southampton NAMRIP network, Edinburgh Infectious Diseases AMR strategy, Cambridge Infectious Diseases AMR strategy

AMR as consequence of individual behaviour…

Lack of education/awareness leads to inappropriate patient demand for antibiotics…

e.g.‘The behaviour of members of the public contributes to AMR…there are generally low levels of awareness of antibiotic resistance amongst the general public’

…that can be rectified through public education

NIHR call 15/50 (2015) – *What are the effective interventions to communicate information on antimicrobial resistance to the public with the aim of reducing the demand for prescriptions for antibiotics?*

What drives antibiotic prescribing behaviours?

- Perceptions of risk - and trust
  - Research on GP-parent consultations (Cabral et al 2014, 2015) found GPs often prescribe antibiotics in the belief that patients expect them, while parents are mainly seeking reassurance and information. Both parties are trying to minimise *perceived risks of harm* associated with non-use of antibiotics.
- Notions of responsibility
  - Systematic review ('Not in my backyard') found that clinicians believe antibiotic resistance is a serious problem, but think it is caused by others (McCullough et al. 2015)

Understanding public understanding of science

- Assumption that knowledge leads to action, so education /awareness-raising is key to behavioural change
- The ‘fallacy of the empty vessel’ (Polgar 1963)
- The ‘deficit model’ (Irwin & Wynne 1996)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Natural/medical science-social science

- subordinate-service mode' of interdiscipinarity (Barry and Born 2013:11); handmaiden role
- 'qualitative methods'
- Social science as a place-marker for the social
- Public engagement, PPI, RRI

What is interdisciplinarity?

Interdisciplinary research '…is characterised by the development of a shared problem formulation and a common methodological framework for the investigation of different themes or aspects of the research problem'. (Wickson, Carew & Russell *Futures* 2006; 38:1046-59)

'We define interdisciplinary research as occurring where the contributions of the various disciplines are integrated to provide holistic or systemic outcomes.' (Tait & Lyell 2007)

CONCEPTUAL CLARIFICATION

Transdisciplinary Research	Multidisciplinary Research	Interdisciplinary Research
Collaboration in which exchanging information, altering discipline-specific approaches, sharing resources and integrating disciplines achieves a common scientific goal (Rosenfield 1992).	Researchers from a variety of disciplines work together at some point during a project, but have separate questions, separate conclusions, and disseminate in different journals.	Researchers interact with the goal of transferring knowledge from one discipline to another. Allows researchers to inform each other's work and compare individual findings.

http://www.obesity-cancer.wustl.edu/en/About/What-Is-Transdisciplinary-Research

What is it for?

National Science Foundation:

‘Interdisciplinary research is a mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge **to advance fundamental understanding** or **to solve problems whose solutions are beyond the scope of a single discipline or area of research practice**.’

(Committee on Facilitating Interdisciplinary Research, Committee on Science, Engineering, and Public Policy (2004). *Facilitating interdisciplinary research*. National Academies. Washington: National Academy Press, p.2.)

The need for an active strategy

‘Interdisciplinary research does not occur automatically by bringing together several disciplines in a research project. Extra effort is needed to promote the formation of a cohesive research team involving researchers from different disciplines, to combine expertise from several knowledge domains and to overcome communication problems among researchers from different disciplines.’

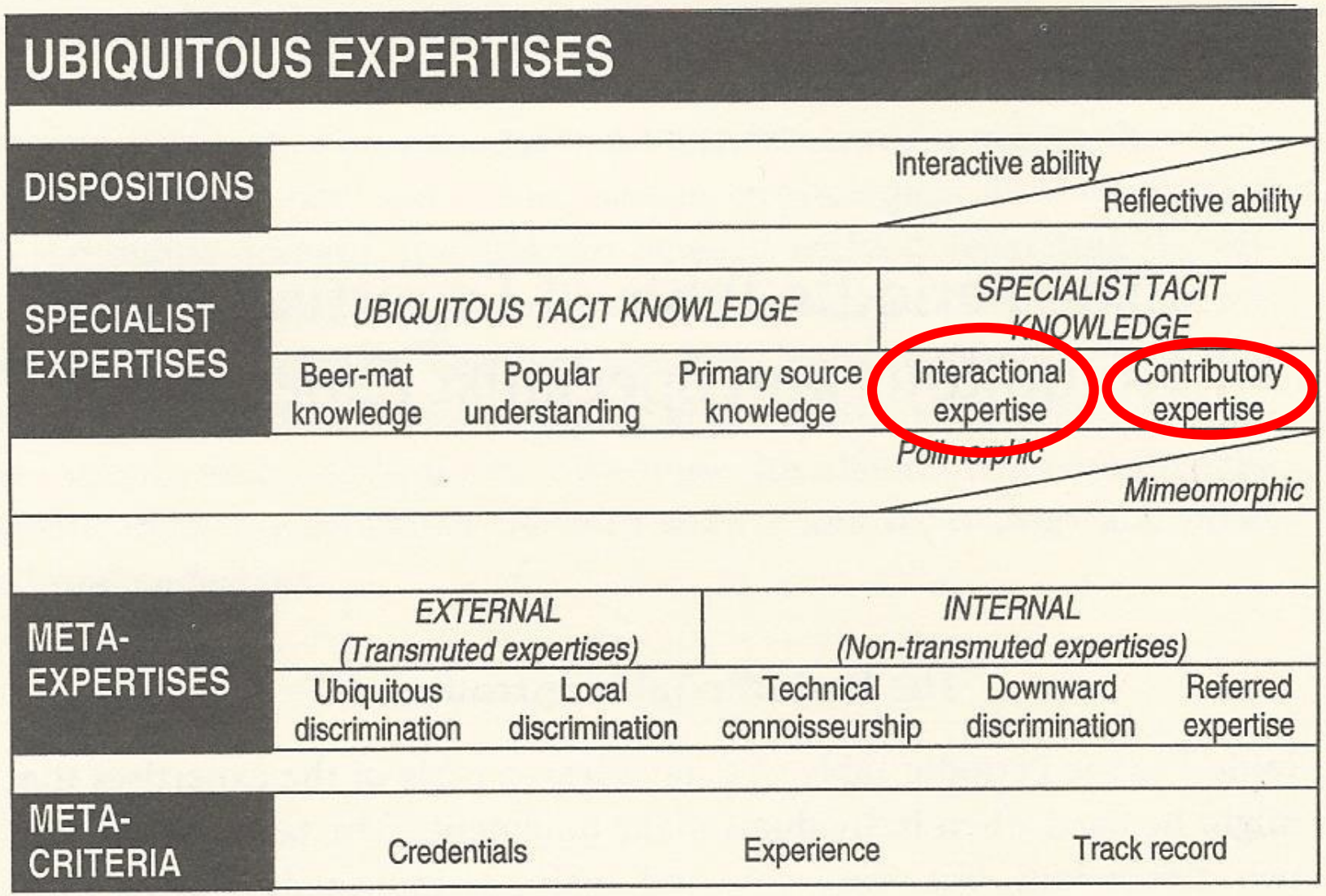
(Tait & Lyell 2007:2)

Interdisciplinarity as a form of practice

requiring:

- development of interactional expertise
- identification of implicit categories & assumptions
- attention to language and translational processes

Table 1: The periodic table of expertises



Types of deeply tacit-laden expertise

Contributory expertise: Enables those who've acquired it to contribute to the domain to which the expertise pertains (24); what you need to do an activity with competence (14).

Interactional expertise: The ability to master the language of a specialist domain in the absence of practical competence (14) or expertise in its practice (28) (e.g. science journalist, anthropologist)

Rethinking expertise (Collins & Evans 2007)

- interactional expertise ‘… is, a fortiori, the medium of interchange in properly interdisciplinary, as opposed to multidisciplinary, research’ (Collins & Evans 2007:32).

UK-China AMR Partnership Initiative

- **'Pathways to optimising antibiotic use in Anhui province: Identifying key determinants of antibiotic consumption and prescribing in community and clinical settings'**
- Newton Fund (MRC/NNSFC) 2016-2019.
- *Epidemiology, infectious disease, respiratory medicine, public health, microbiology, psychology, statistics, health services research, anthropology*
  - UoB: Helen Lambert (PI-UK), Matthew Hickman, Alastair Hay, Christie Cabral, Sue Ingle
  - NBT: Alasdair MacGowan
  - PHE: Isabel Oliver, Caroline Coope, Anthony Kessel
  - UCL: Susan Michie
  - Anhui Medical University: Debin Wang (PI-China), Jiabing Li, Xiaowen Hu, Qicheng Jiang, Lifen Hu
  - Anhui Provincial Hospital: Xiaowen Hu
  - Xi'an Jiaotong-Liverpool University: Paul Kadetz

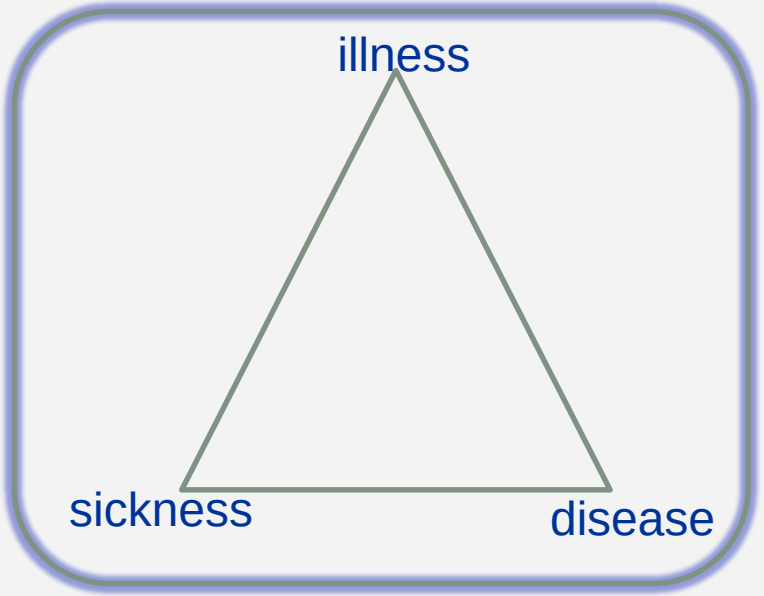
Antibiotic use in China

- Equitable access vs essential use
- Informal markets and easy access to antibiotics
- Surveillance is limited and hospital-based
- AMR transmission and prevalence in general population is largely unknown
- Extent of antibiotic use and consumption patterns outside hospital settings is largely undocumented

From Project Proposal

‘Our study will document patterns of treatment-seeking in the community for selected common infections from all forms and sources of health care (including informal, Traditional Chinese Medicine (TCM), folk, home-based, private and govenment biomedical care). We will gather information on testing, clinical diagnosis and antibiotic treatment procedures at lower levels of the health system and on over-the-counter purchasing of antibiotics from pharmacies and medicine shops. We will also ***ascertain the feasibility of assessing relationships between presenting symptoms, clinical diagnosis and microbiological diagnosis and of establishing the burden of antibiotic resistance in non-hospitalised patients***, and investigate possible population biases in existing laboratory data through microbiological sampling.’

Triangulation



Patient (reported) experience

clinical encounter

severity?

Clinical (symptom-based) diagnosis

Microbiological testing

non-causative pathogens

Patient recruitment

Sociologically meaningful study requires learning about the use of antibiotics, hence:

- Recruitment based on current practice (presenting symptoms + clinical judgement)
- Patients prescribed/not prescribed antibiotics with/out clinical indication

Microbiologically meaningful study requires isolating pathogens in sufficient numbers, hence:

- Recruitment based on narrow case definitions
- Patients prescribed antibiotics with clinical indication

Compromise

Initial study: Proposed patients with ‘common RTIs’

Microbiologists: Proposed eCOPD & UTI

Antibiotic prescribing mandated for eCOPD & UTI

Epidemiologists/HSRs: Proposed cough, sore throat, patients not prescribed antibiotics

Agreed: UTI, RTI w/productive cough, sore throat

Initial fieldwork suggests UTI patients don’t present at general (biomedical) OP clinics…

How do ‘do’ interdisciplinarity

- Ask stupid questions
- Take time to talk
- Respect diverse needs for academic output
- Be prepared to ‘back translate’
- Beware of funding panels – articulate embedded assumptions

In this workshop

- Case studies of interdisciplinary research projects
- Opportunities to find collaborators, discuss approaches to achieving interdisciplinary, and work on proposal development
- Sign-up sheets for Day 2 workshops