

THE ANTIBIOTIC RESISTANCE IN THE ENVIRONMENT

UK-India workshop on New Diagnostics and Therapeutics to
tackle antimicrobial resistance – 12-13 October 2015

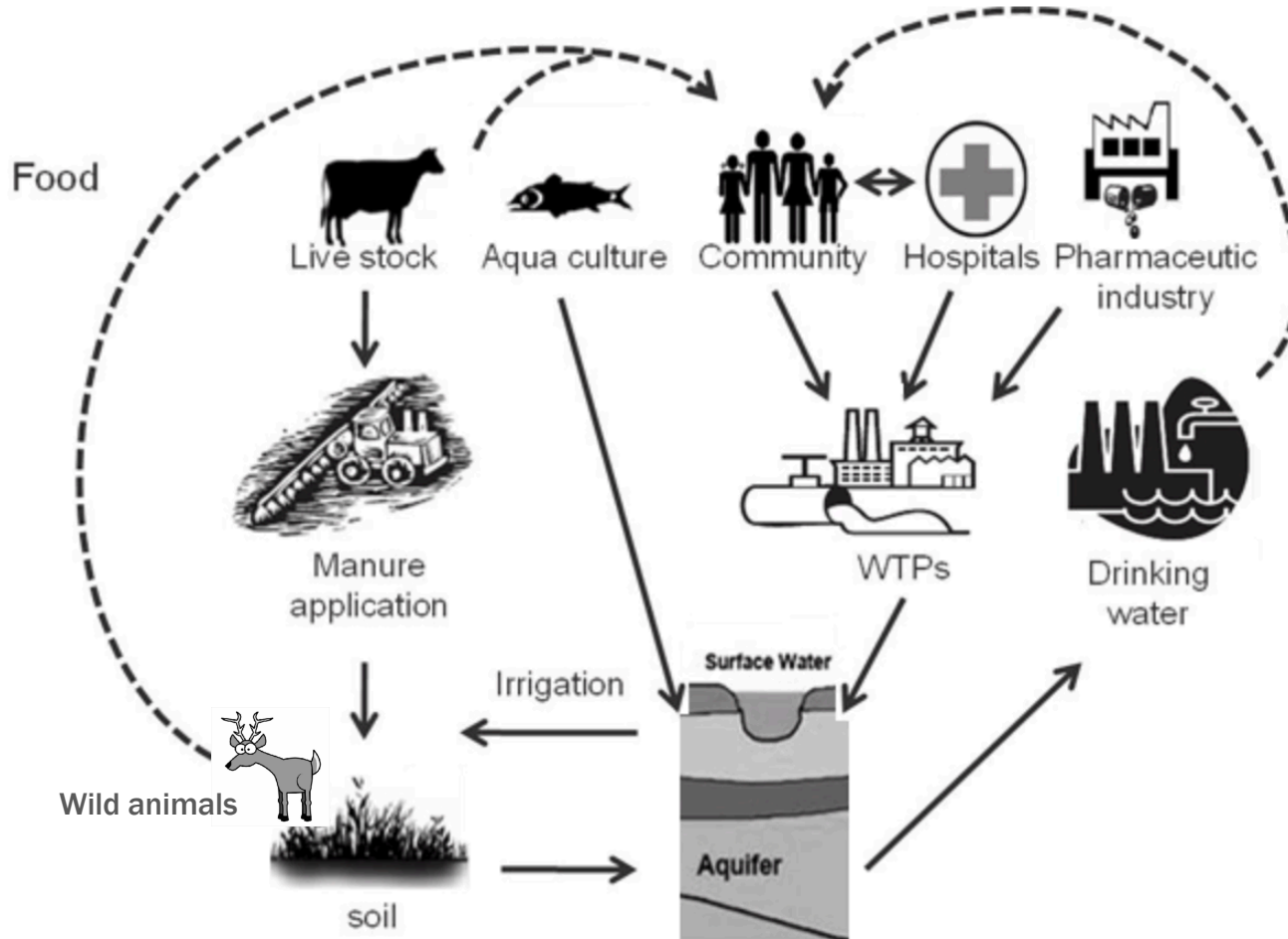
Dr Marjorie
BARDIAU



University of Brighton

Aquatic Research Centre

WHAT'S THE PROBLEM?



AMR IN WASTEWATER

Environment & Public Health Research Group (EPHReG) at the University of Brighton



PLOS | NEGLECTED TROPICAL DISEASES

RESEARCH ARTICLE

Minimizing the Risk of Disease Transmission in Emergency Settings: Novel *In Situ* Physico-Chemical Disinfection of Pathogen-Laden Hospital Wastewaters

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WASH issues (Water and Sanitation)

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AMR IN WASTEWATER

European project in 1998 on VRE in WW and river/sediment

Journal of Applied Microbiology 2003, 94, 994–1002

Comparison of enterococcal populations related to urban and hospital wastewater in various climatic and geographic European regions

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Environmental Microbiology (2008) 10(4), 885–892

doi:10.1111/j.1462-2920.2007.01507.x

Presence of vancomycin and ampicillin-resistant *Enterococcus faecium* of epidemic clonal complex-17 in wastewaters from the south coast of England

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significant problem in American hospitals in the late 1980s (Uttley *et al.*, 1988; Willey *et al.*, 1992; Bonten *et al.*, 1996; Huycke *et al.*, 1998) and have been isolated with increasing frequency from wastewaters, recreational waters, healthy human communities and from a wide range of food animals and food products in the European

APPLIED AND ENVIRONMENTAL MICROBIOLOGY, Sept. 2005, p. 5383–5390
0099-2240/05/\$08.00+0 doi:10.1128/AEM.71.9.5383-5390.2005
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Vol. 71, No. 9

Occurrence and Relatedness of Vancomycin-Resistant Enterococci in Animals, Humans, and the Environment in Different European Regions

Inger Kühn,^{1*} Aina Iversen,¹ Maria Finn,² Christina Greko,² Lars G. Burman,³ Anicet R. Blanch,⁴ Xavier Vilanova,⁴ Albert Manero,⁴ Huw Taylor,⁵ Jonathan Caplin,⁵ Lucas Domínguez,⁶ Inmaculada A. Herrero,⁶ Miguel A. Moreno,⁶ and Roland Möllby¹

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Sampling just before the EU law banning the use of AB as a growth promoter

AMR IN WASTEWATER

European project in 1998 on VRE in WW and river/sediment

1) VRE persistence

Sampling at the same place
(river/sediment) 15 years later

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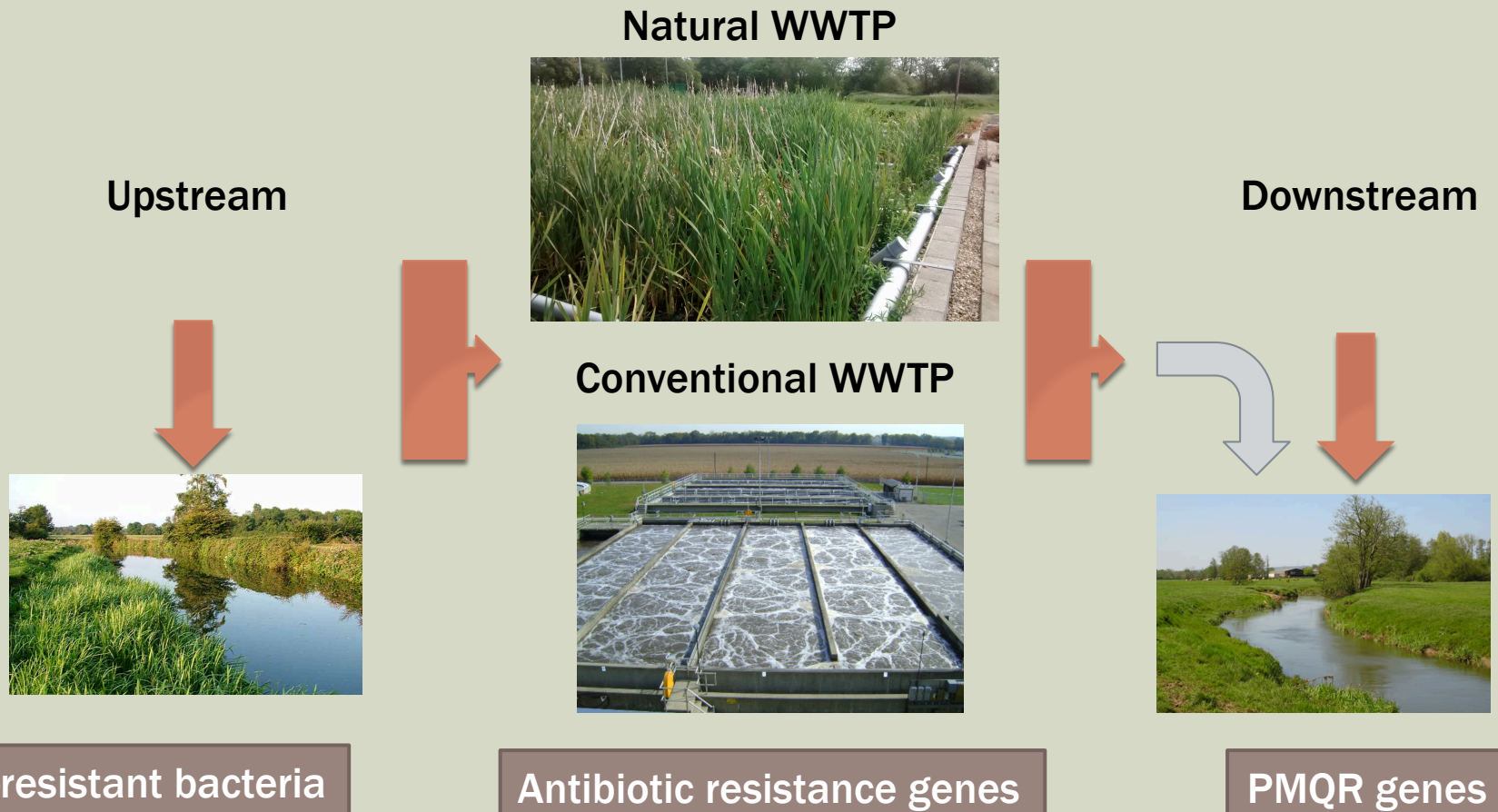
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Very low persistence of hospital-associated VRE after 15 years

AMR IN WASTEWATER

2) Efficacy of wastewater treatment plant (WWTP) for the removal of AMR



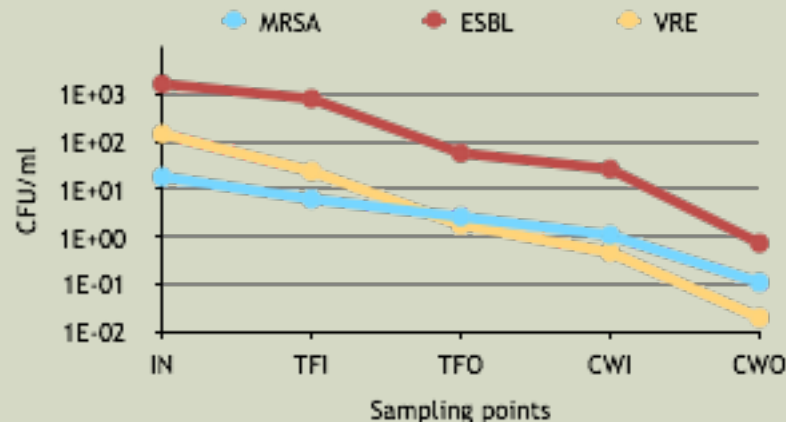
AMR IN WASTEWATER

2) Efficacy of wastewater treatment plant (WWTP) for the removal of AMR

Difference in the efficacy: natural systems have a better removal

The river receiving the treated WW is impacted but the impact depends on the size of the river

Ongoing project



Removal of multi-resistant bacteria in natural WWTP

AMR IN WILDLIFE

3) AMR in wildlife

Sampled swans (n=26) and badgers (n=17) feces in Southern England

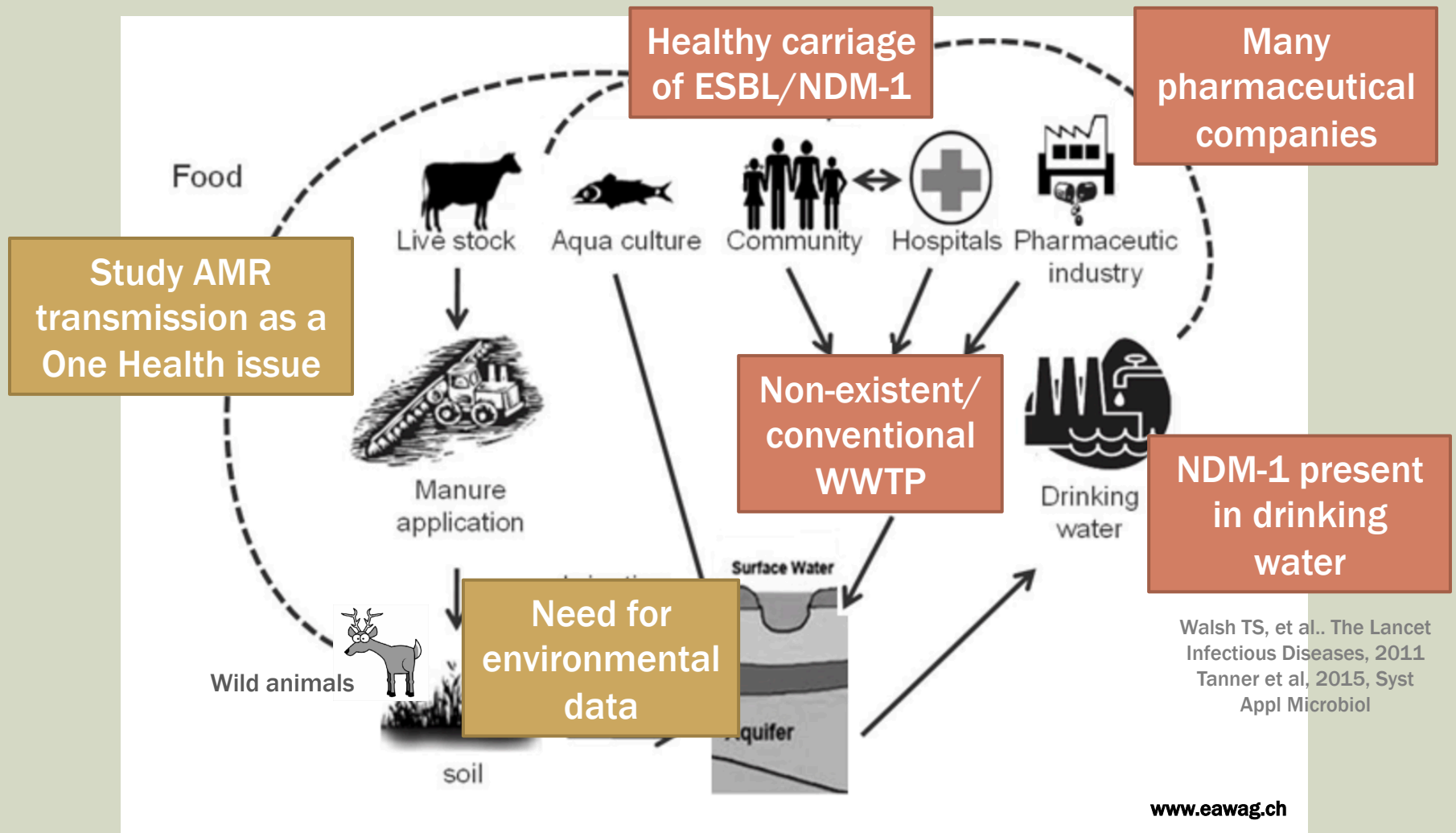


Found ESBL (n=2) and VRE (n=4)



WHAT ABOUT INDIA?

Dureja et al, PLOS One, 2011



What's happening in the environment

- has an impact on human
- Is not well understood
- Is not fully studied


Need for more environmental surveillance (WHO)

One Health perspective

Conclusion



Environment & Public Health
Research Group (EPHReG)

 UK Science & Innovation Network



University of Brighton

Aquatic Research Centre



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Thank you