



Antimicrobial Resistance: Questions and unmet needs Prof APR Wilson



MDR Gram negatives



- Significant threat to patient treatment
- Hospital – community transfer by patients, staff and equipment
- Colonization of travellers
- Antibiotics, urinary catheters, hand wash sinks
- Pan-resistance yet few new agents
- No suppression regimens
- Infection control is best defence



Terms



- ESBL Extended spectrum β lactamase producer
- AmpC - cephalosporinase
- CRO Carbapenem resistant organisms – permeability or carbapenemase
- CRE Carbapenem resistant Enterobacteriaceae
- OXA-48 carbapenemase plasmid mediated

2008 MDR *K pneumoniae*



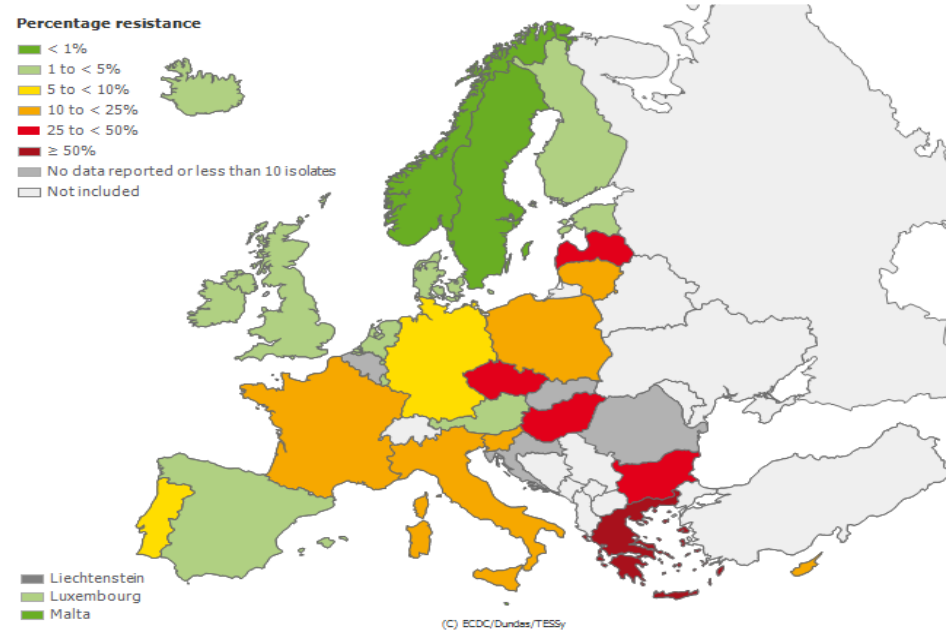
Precision AMR



Multidrug-resistant *Klebsiella pneumoniae* Isolates in Participating Countries in 2008 (Resistant to Third-generation Cephalosporins, Fluoroquinolones and Aminoglycosides)

Percentage resistance

- < 1%
- 1 to < 5%
- 5 to < 10%
- 10 to < 25%
- 25 to < 50%
- ≥ 50%
- No data reported or less than 10 isolates
- Not included



This report has been generated from data submitted to TESSy, The European Surveillance System on 2016-02-05. Page: 1 of 1. The report reflects the state of submissions in TESSy as of 2016-02-05 at 18:30

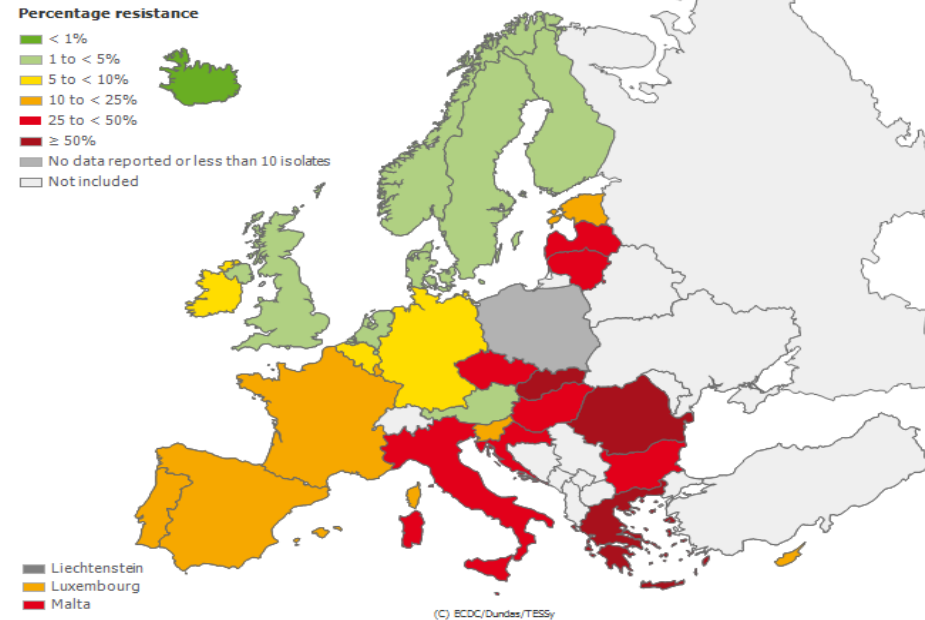
2014 MDR *K pneumoniae*



Precision AMR



Multidrug-resistant *Klebsiella pneumoniae* Isolates in Participating Countries in 2014 (Resistant to Third-generation Cephalosporins, Fluoroquinolones and Aminoglycosides)

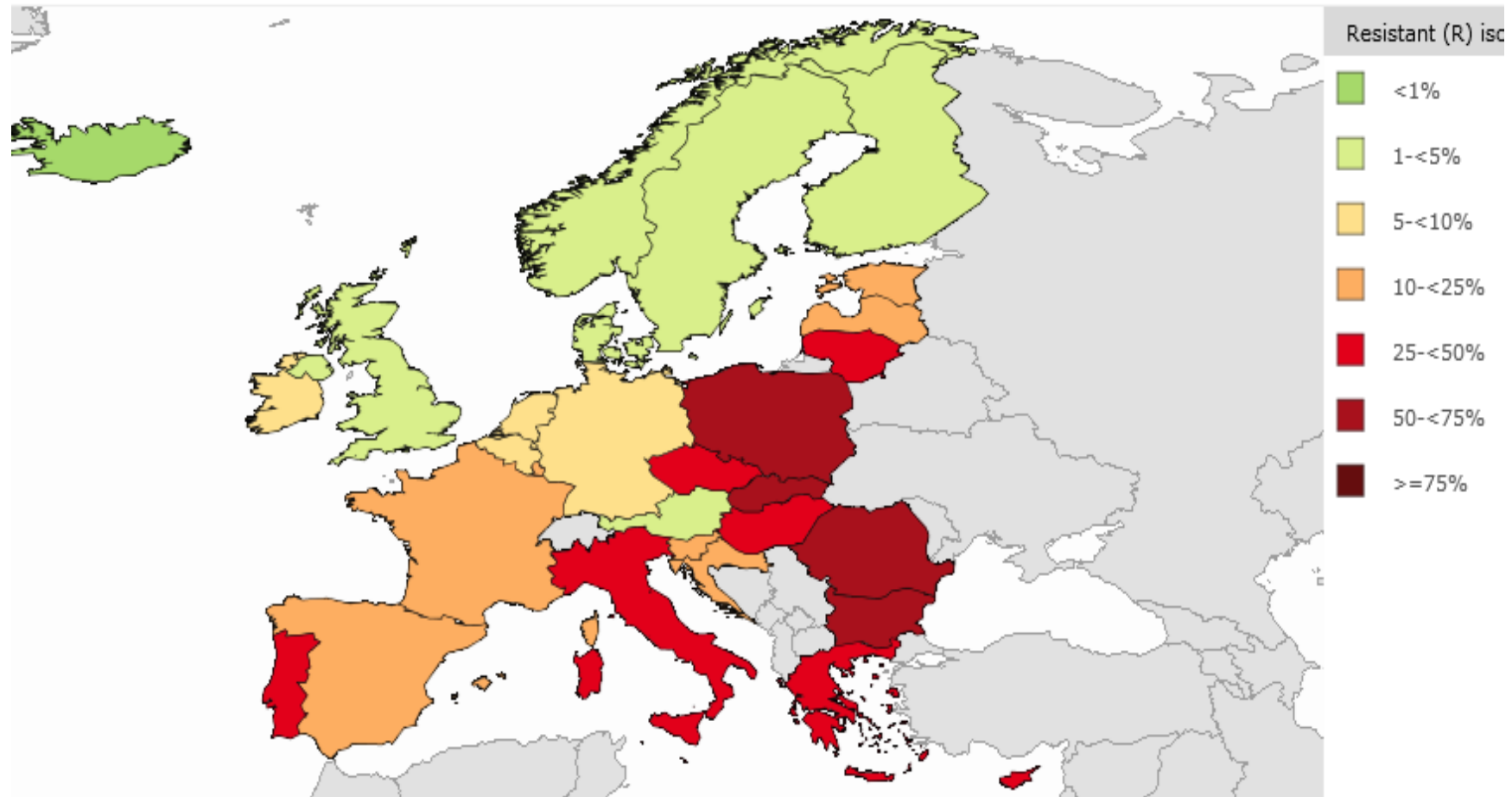


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2017 MDR *K pneumoniae*



Precision AMR





Hospital vs. Long term care facility



- Patients move between healthcare facilities
- Stays shorter – general practice
- Staff vectors, equipment
- *Acinetobacter/ K pneumoniae* survive drying
- Plasmid outbreaks
- LTCF reservoir of resistance – oro faecal, dementia, incontinence, urinary infection



Surveillance



- Gut colonisation – travel history
- Plasmid transfer
- Food animals
- Antibiotic use, urinary catheters, sinks
- Meropenem sensitivity must be tested



Can screening be rapid and cost effective?



- Rectal carriage
- Multiple potential targets and species
- Screening identifies those to isolate quickly
- Resources, outbreak progression, patients
- Not cost effective for ESBL
- No indication for staff but encourage hand hygiene



How long does carriage last and can it be eradicated?



- Selective decontamination: non-absorbable antibiotics +/- iv agents
- Labour intensive, induces resistance
- Transient reduction in CRO at 2 weeks
- Chlorhexidine wash ineffective
- Carriage detected up to 18 months in a few cases



Isolation – how does transmission occur?



- Standard Infection Control Precautions
- Single rooms reduce transmission 3/62 vs 7/39 CCM 2011 15 R211
- What are the common vectors for *E coli* and *Klebsiella*? Gut or hand?
- Pseudomonas -sinks, showers, drains. Are these the source of infection of patients getting bacteremia?



Can environmental contamination be detected quickly enough to direct cleaning?



- Failure to clean associated with transmission
- Hydrogen peroxide vapour adjunct to terminal clean
- Human operator – product, dilution, distribution and contact time may be wrong
- Endoscope reprocessing – transmission if poor compliance

Three UV systems



Precision AMR





Does antimicrobial diversity prevent emergence of resistance?



- Program in all hospitals – audit feedback
- Bacteremia outcomes collected and publically available
- Restrictive policies for outbreak control
- Horizon scanning for new agents – possible fund for development
- Diversity of prescription may slow resistance
- Source previous admission/community or current admission?



Conclusion



- Rising antimicrobial resistance is threatening life expectancy over next 5-10 years
- Control programs not effective as yet
- Accurate, inexpensive and rapid detection
- Interrupting modes of transmission
- Avoiding conditions under which resistance emerges