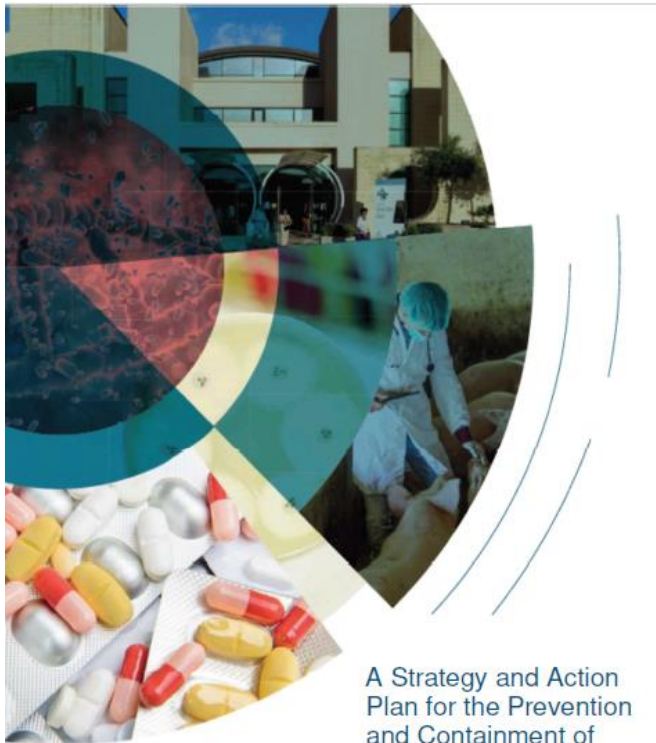


# What we need to know about antibiotics and antimicrobial resistance



A Strategy and Action  
Plan for the Prevention  
and Containment of  
Antimicrobial Resistance  
in Malta (2020 – 2028)

MINISTRY FOR HEALTH  
MINISTRY FOR AGRICULTURE, FISHERIES & ANIMAL RIGHTS

**Prof. Michael A. Borg**  
**Chair**  
**National Antibiotic Committee**  
**Malta**

## Types of Infections



Viral



Bacterial



Parasitic



Fungal



Prion Disease

# ANTIMICROBIALS



Bacterium

## ANTIBIOTICS

Against bacteria

e.g. medicines for urine infections



Virus

## ANTIVIRALS

Against viruses

e.g. medicines for herpes or HIV



Fungus

## ANTIFUNGALS

Against fungi

e.g. medicines for thrush



Parasite

## ANTIPARASITICS

Against parasites

e.g. medicines for malaria

**ANTIBIOTICS DO NOT HAVE ANY EFFECT ON VIRAL INFECTIONS**

# What is antimicrobial resistance (AMR)?

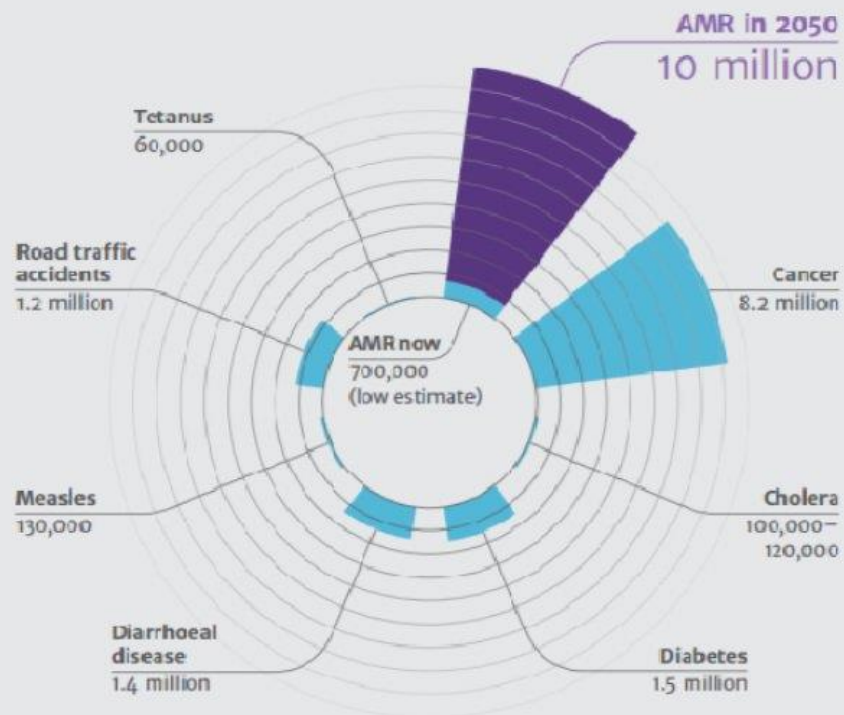
- Antimicrobial resistance (AMR) occurs when bacteria, parasites, viruses or fungi change to protect themselves from the effects of antimicrobial drugs designed to destroy them.
- This means previously effective antimicrobial drugs used to treat or prevent infections may no longer work.
  - Most critical for antibiotics
- The World Health Organization (WHO) has identified AMR as ‘one of the biggest threats to global health’.

# Why are antibiotics and antimicrobial resistance important?

- Modern hospitals depend on effective antibiotics to minimise the risk of serious bacterial infections
  - Especially surgery, intensive care and cancer treatments,
    - Currently, antibiotics reduce post-operative infection rates to below 2%
    - Without effective antibiotics, this could increase to around 40% to 50%.
      - Up to 30% of these patients could die from resistant bacterial infections
- The risk of mortality without access to effective antibiotics will make some treatments and surgical procedures too risky to continue
- Antimicrobial resistance results in substantial financial cost for patients and healthcare systems.

# Antimicrobial Resistance

Deaths attributable to AMR every year compared to other major causes of death

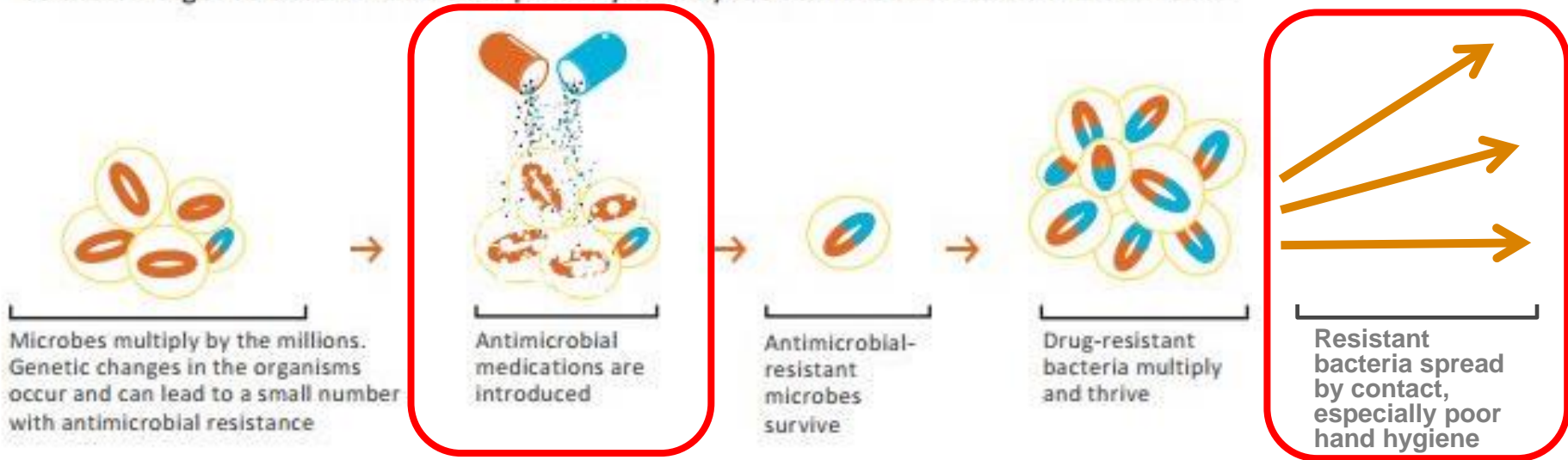


# How does antimicrobial resistance develop?

- Antimicrobial resistance is a natural phenomenon
  - Bacteria in the environment naturally produce antibiotics to “eliminate” competing bacteria
  - Exposed bacteria try to counteract that threat by developing systems to tolerate the effects of the antibiotic and therefore survive.
- The body has trillions of bacteria; outnumber human cells 10:1 ( $\approx$  3 kilos)
  - When these are exposed to antibiotics the same mechanism is triggered

# How does antimicrobial resistance develop?

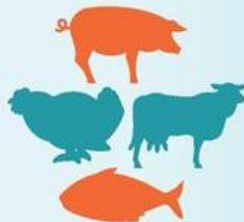
Resistance can exist naturally, happen through mutation, or happen by picking up resistant genes from other microbes. Microbes not killed by antimicrobials survive and multiply, leading to the emergence of strains that are partially or fully resistant to antimicrobial treatment.<sup>5</sup>



Over-prescribing of antibiotics



Patients not taking antibiotics as prescribed



Unnecessary antibiotics used in agriculture



Poor infection control in hospitals and clinics



Poor hygiene and sanitation practices

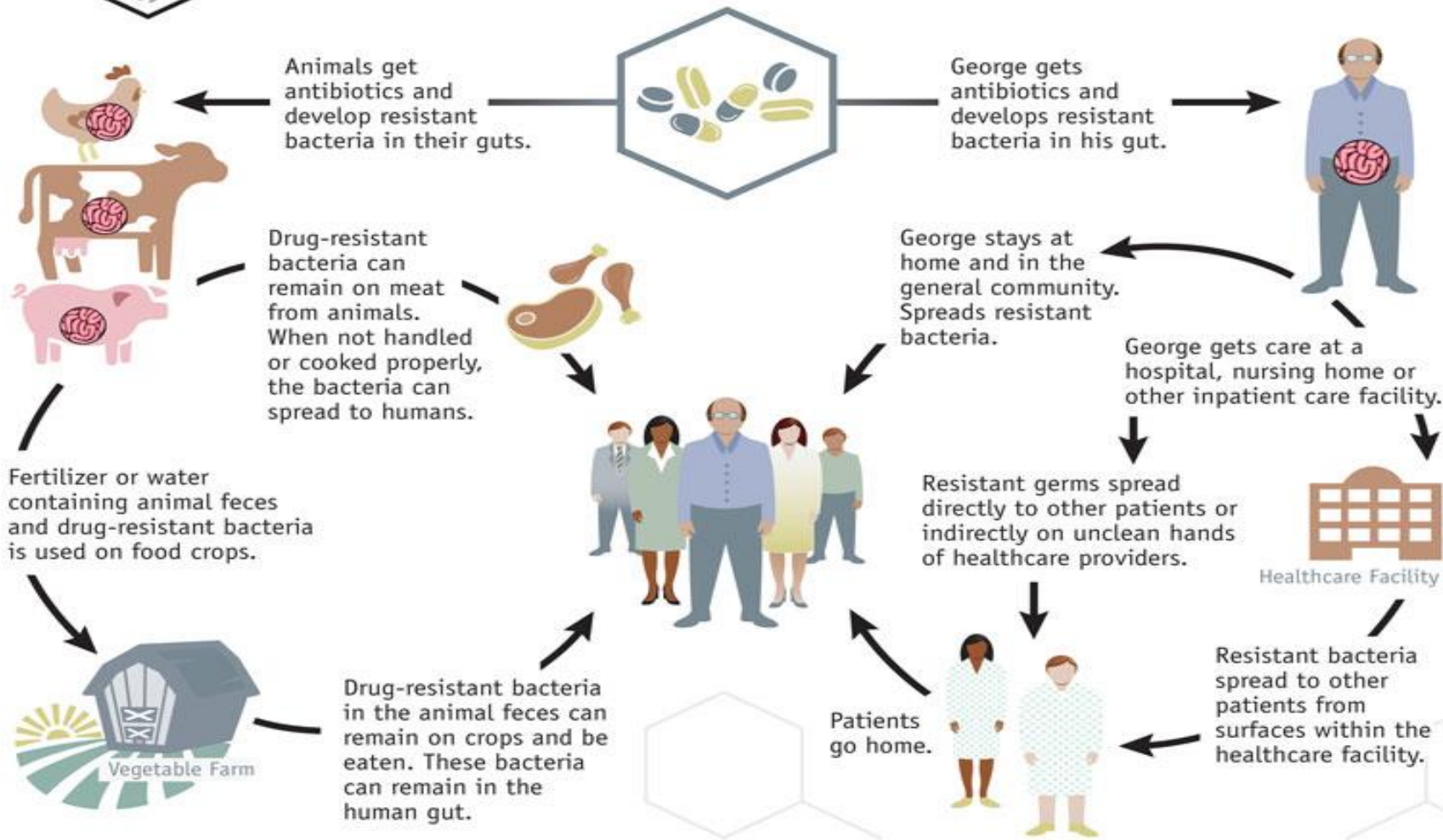


Lack of rapid laboratory tests





## Examples of How Antibiotic Resistance Spreads



Simply using antibiotics creates resistance. These drugs should only be used to treat infections.

# Broad vs Narrow Spectrum Antibiotics

- Narrow spectrum antibiotics work against a limited group of bacteria
  - Lower resistance potential
- Broad spectrum antibiotics work against a larger group of bacteria
- Overuse of unnecessarily broad spectrum antibiotics can drive antimicrobial resistance

It is preferable to narrow spectrum antibiotics wherever possible

Bacteria A	Bacteria B	Bacteria C	Bacteria D	Bacteria E	Bacteria F	Bacteria G
	Antibiotic 1					
	Antibiotic 2					
	Antibiotic 3					
	Antibiotic 4					
	Antibiotic 5					
	Antibiotic 6					
	Antibiotic 7					
	Antibiotic 8					
	Antibiotic 9					
	Antibiotic 10					

# Antibiotics are a unique medicine

- In general, the impact of medications are limited to the patient taking them
- Use of antibiotics has an impact not just for the patient using them but the global community as well

## The tragedy of the commons



### Individual benefit:

Immediate effectiveness of antibiotics against disease

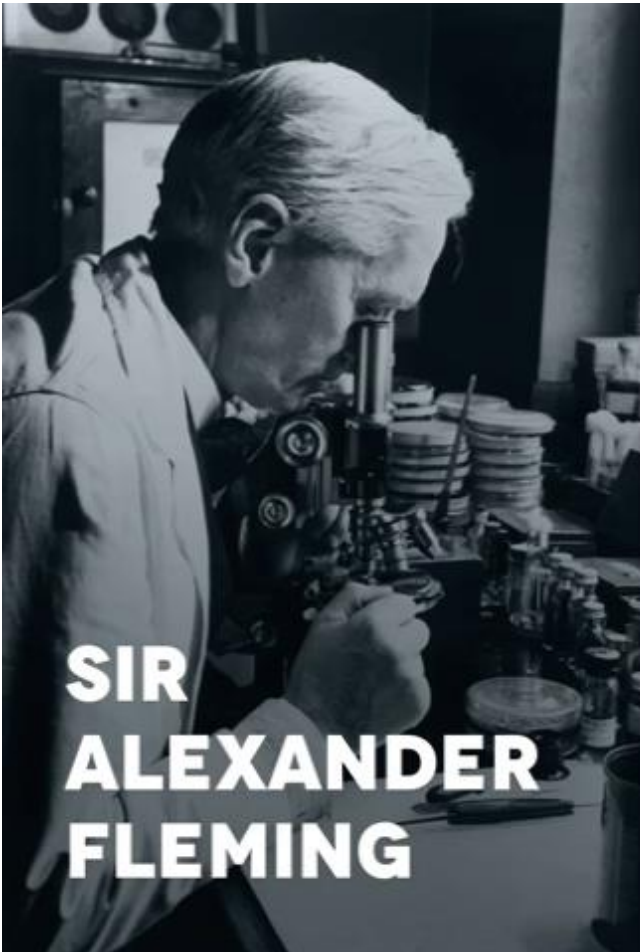


### Common externalities:

Other patients: antibiotic-resistant infections

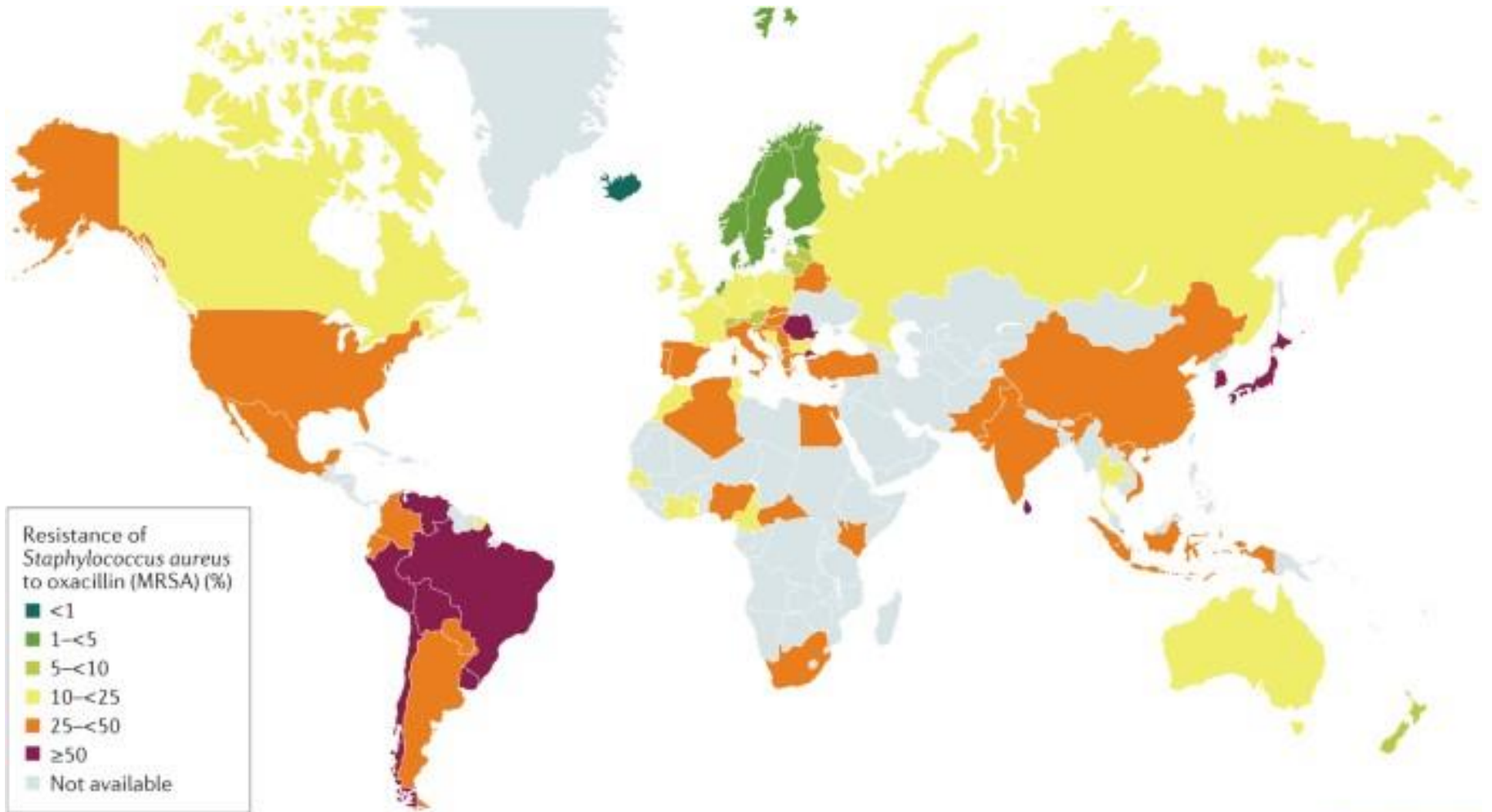
Society: reduced antibiotic effectiveness and higher healthcare costs

# Resistance is not new

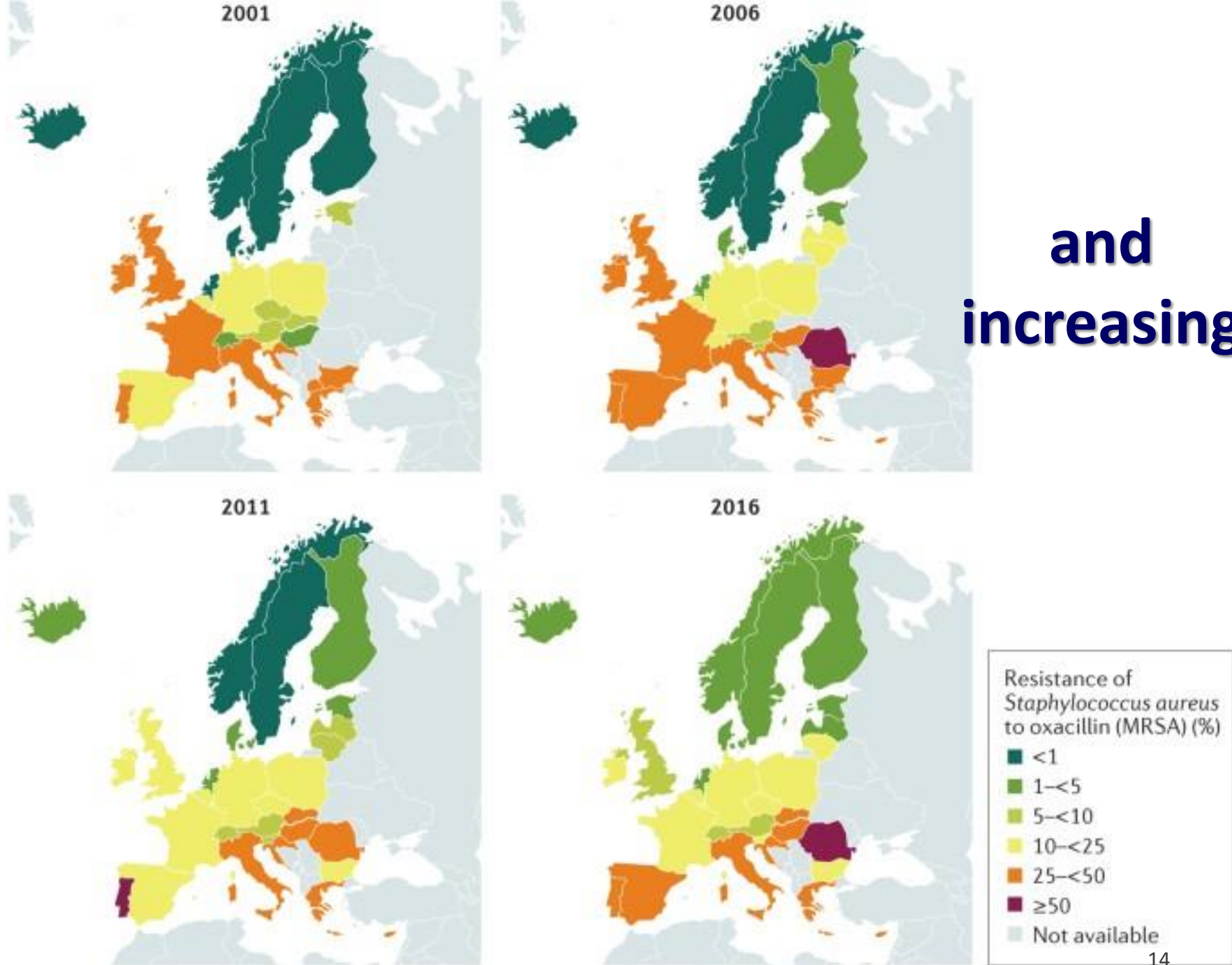


The thoughtless person playing with penicillin treatment is morally responsible for the death of the man who succumbs to infection with the penicillin-resistant organism.

# But is now widespread...



**and  
increasing**



# Local situation

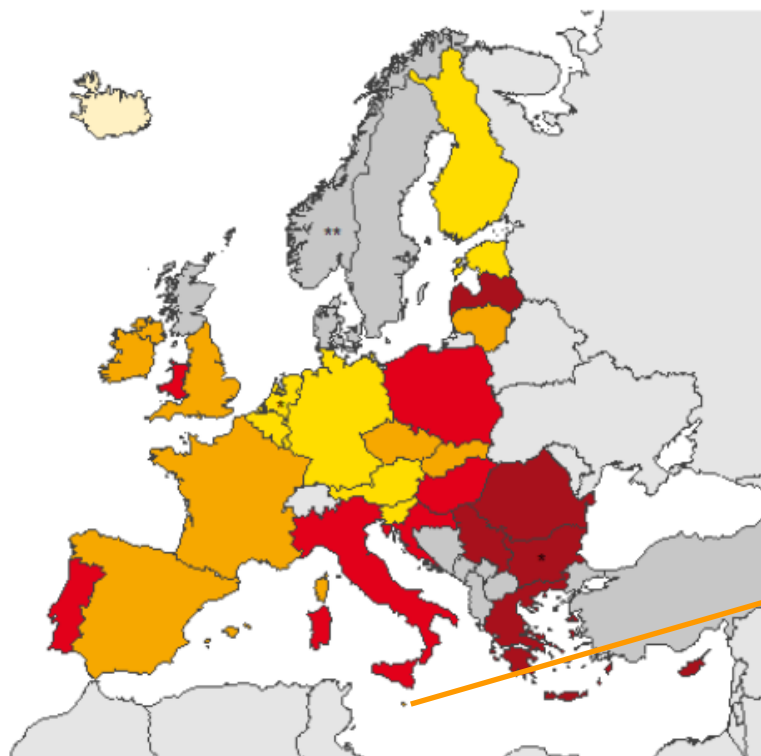
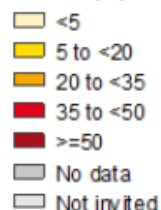


# AMR in EU/EEA



## Composite index\* of antimicrobial resistance (AMR) in healthcare-associated infections from acute care hospitals, EU/EEA countries and Serbia, 2016-2017

Resistant isolates (%)



Non-visible countries  
 - Liechtenstein  
 - Luxembourg  
 - Malta

\*Percentage of isolates resistant to first-level antimicrobial resistance markers in healthcare-associated infections, i.e.:

- *Staphylococcus aureus* resistant to meticillin (MRSA),
- *Enterococcus faecium* and *Enterococcus faecalis* resistant to vancomycin,
- Enterobacteriaceae resistant to third-generation cephalosporins,
- *Pseudomonas aeruginosa* and *Acinetobacter baumannii* resistant to carbapenems.

Malta

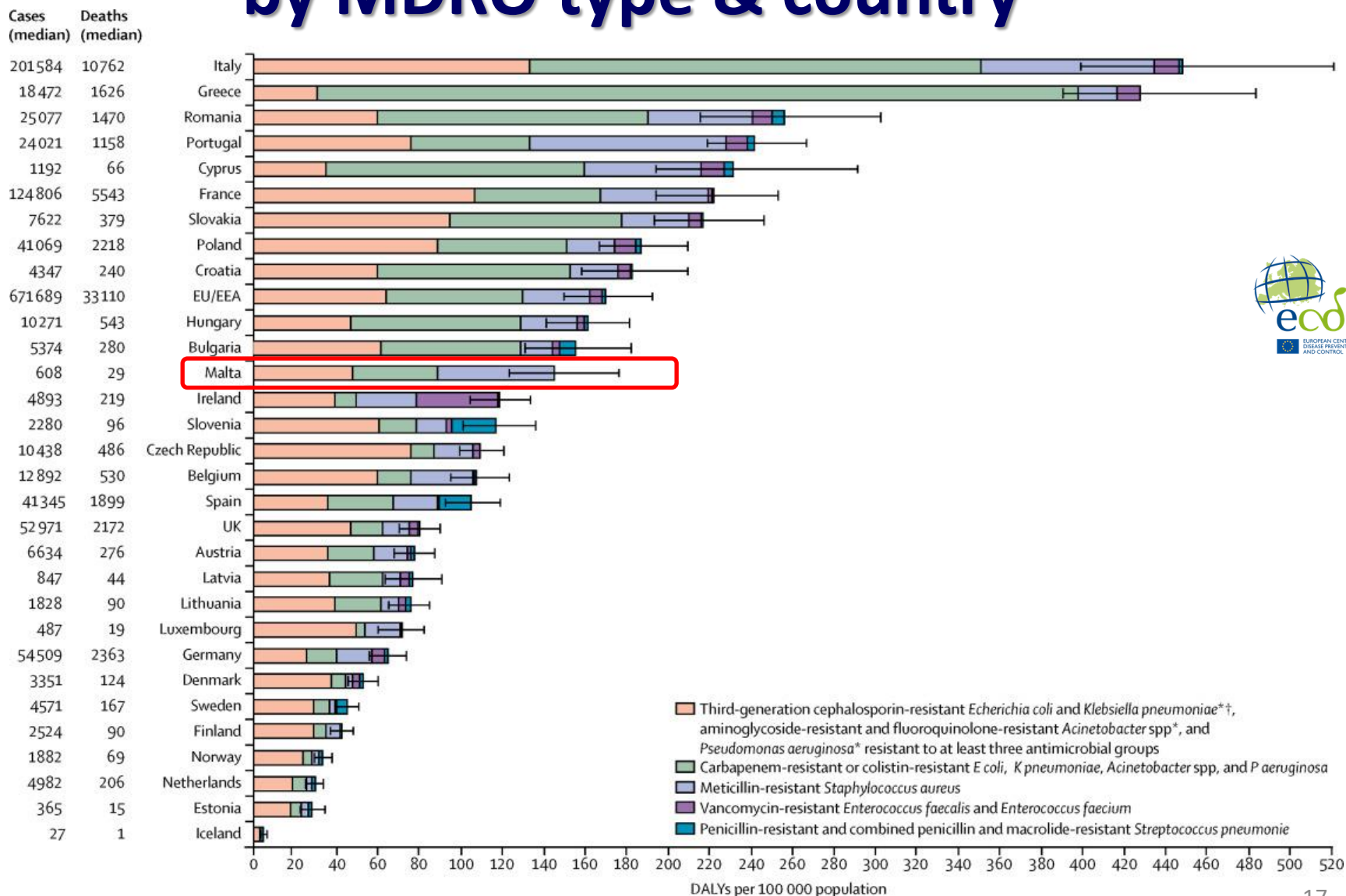
\* Bulgaria and the Netherlands: poor national representativeness of acute care hospital sample;

\*\* Norway: national protocol;

Norway and UK-Scotland did not collect microbiological data.



# Estimated annual AMR burden by MDRO type & country



# AMR burden

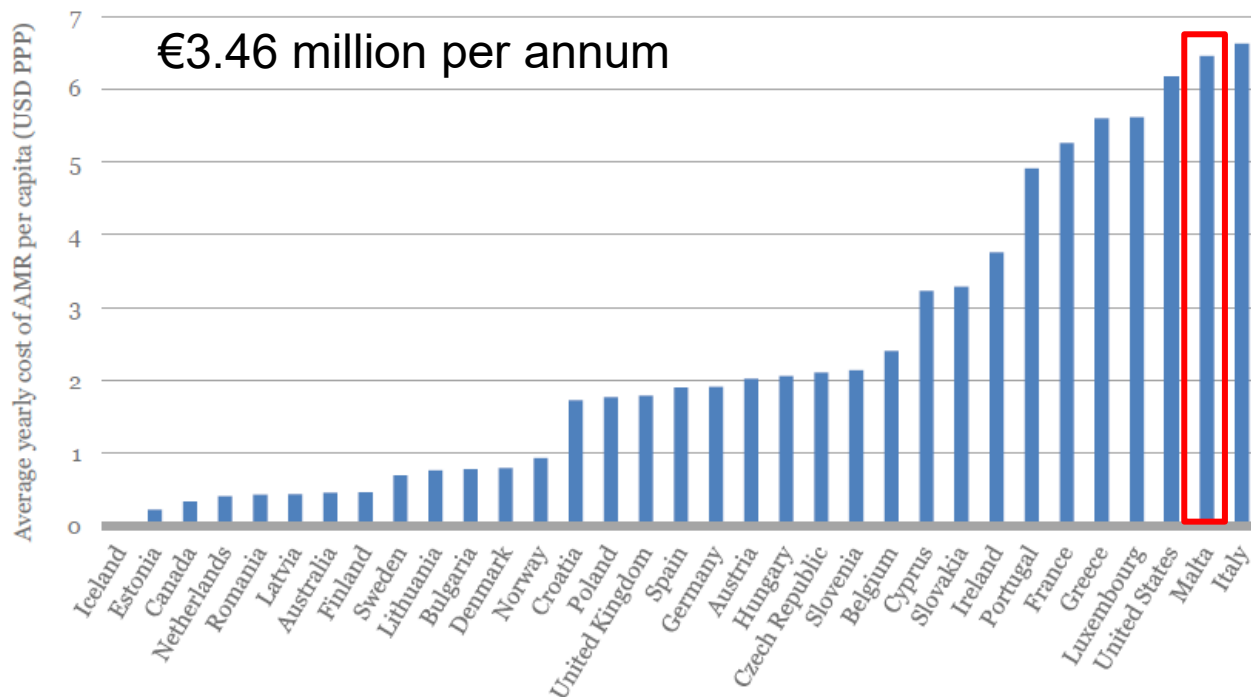
OECD Health Policy Studies

Stemming the Superbug Tide

JUST A FEW DOLLARS MORE



AMR Costs 3.5B USD PPPs per Year to the Healthcare Systems of OECD and EU Countries



Source: OECD. Stemming the Superbug Tide: just a few dollars more. 2018. [oe.cd/amr-2018](https://www.oecd.org/amr-2018)

# What is driving AMR in Malta?

News Local

## Malta with highest use of antibiotics in EU

By Jurgen Balzan - November 21, 2022 3:47 PM



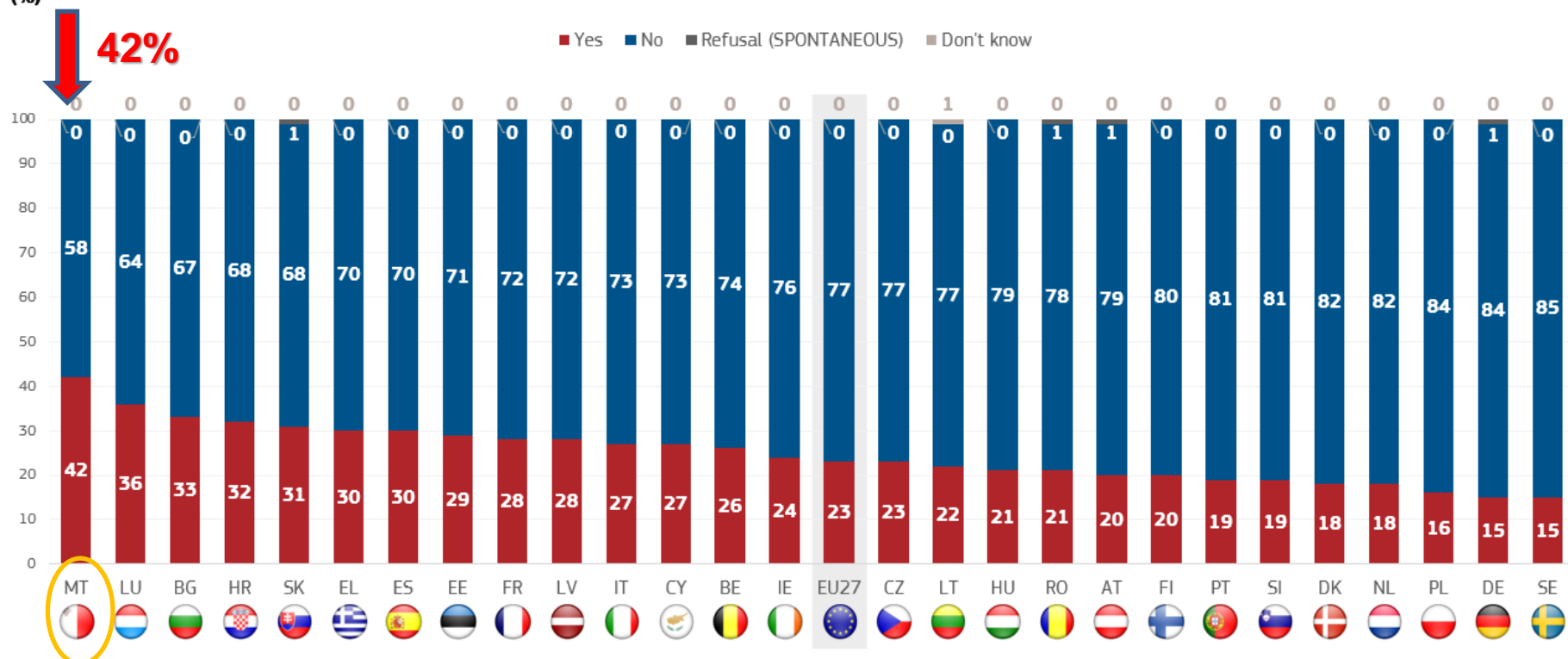
# Antimicrobial Resistance

Report

Fieldwork: February-March 2022

QC1. Have you taken any antibiotics orally such as tablets, powder or syrup in the last 12 months?

(%)



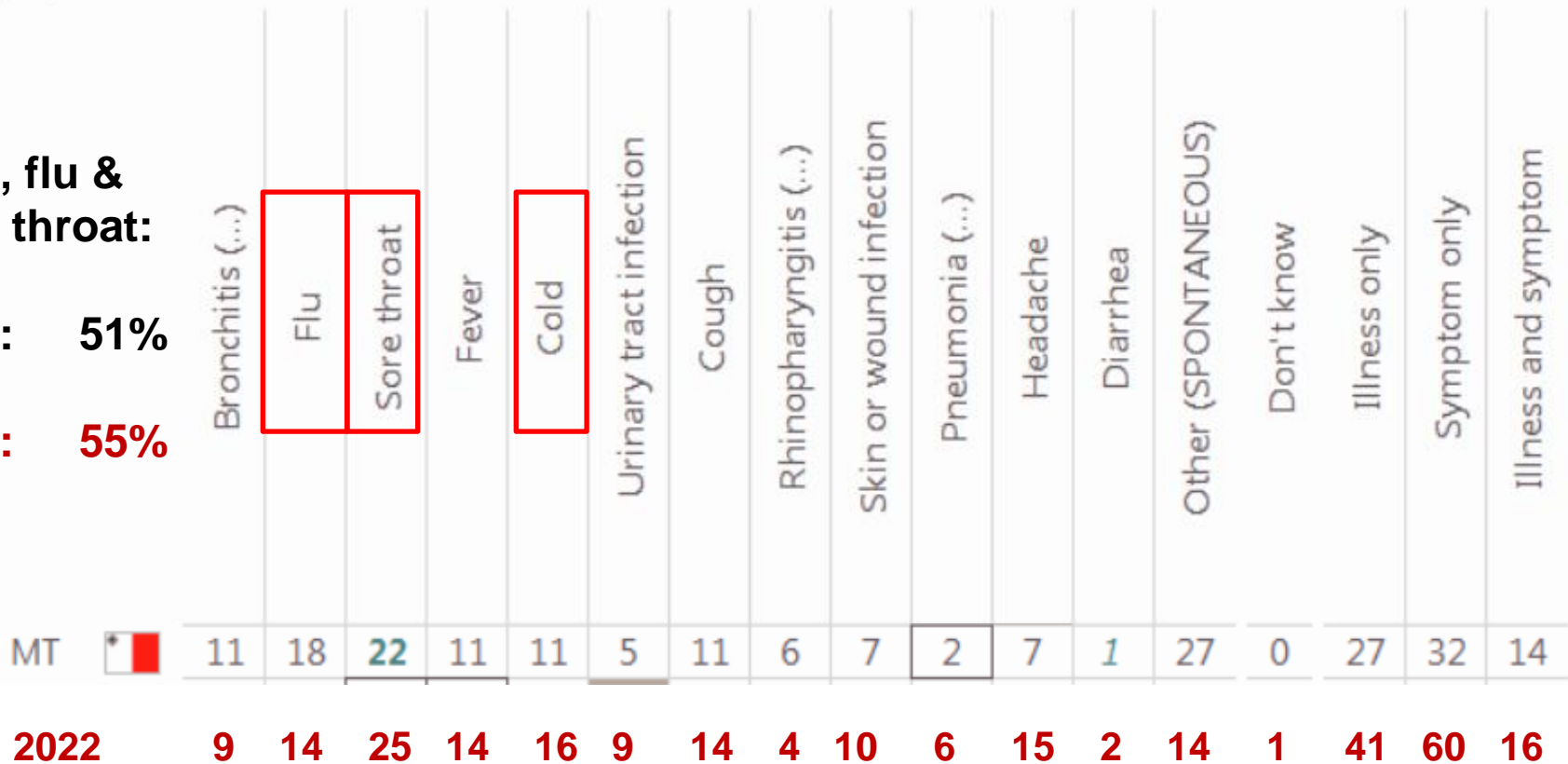
# Antimicrobial Resistance

**QB3** What was the reason for last taking the antibiotics that you used? (MULTIPLE ANSWERS POSSIBLE)  
(%)

**Cold, flu &  
Sore throat:**

**2016: 51%**

**2022: 55%**



# Most common infections are viral

**Viruses or Bacteria**  
What's got you sick?



Common Respiratory Infections	Common Cause			Are Antibiotics Needed?
	Virus	Virus or Bacteria	Bacteria	
Common cold/runny nose	✓			No
Sore throat (except strep)	✓			No
COVID-19	✓			No
Flu	✓			No
Bronchitis/chest cold (in otherwise healthy children and adults)*		✓		No*
Middle ear infection		✓		Maybe
Sinus infection		✓		Maybe
Strep throat			✓	Yes
Whooping cough			✓	Yes

\* Studies show that in otherwise healthy children and adults, antibiotics for bronchitis won't help patients feel better.

To learn more about antibiotic prescribing and use, visit [www.cdc.gov/antibiotic-use](http://www.cdc.gov/antibiotic-use).

# Suffering from a sore throat ?

Answer these 4 questions & count the number of scores marked  in bold that best describe your condition:

## Do you have:

1. Fever of at least 38°C (or 100°F)? Yes **No**
2. Painful glands in the neck? Yes **No**
3. Cough and/or running nose? Yes  No
4. Are you more than 15 years old? Yes  No

If all answers were marked , the sore throat is likely to be caused by a virus and therefore **would not require antibiotics**. If you have fever of at least 38°C and/or painful neck glands, or if your symptoms persist/get worse, or if in any doubt, consult your doctor.

In adults, colds, flu and sore throat - especially when accompanied by cough, sneezing and running nose - are mainly caused by viruses. **Antibiotics do not work on viruses** and will not cure these types of infection. Drinking warm liquids and simple treatments like cough syrup, paracetamol and decongestants are sufficient.

Do not take any antibiotic tablets, syrup or creams on your own initiative. Pharmacists cannot give you antibiotics without a doctor's prescription.

# Qed tbati minn uġigh fil-grizmejn?

Irrispondi dawn il-mistoqsijiet u għodd in-numru ta' twegibiet **Immarkati**  li l-aħjar jiddiskrivu l-kundizzjoni tiegħek:

## Għandek:

1. Deni ta' mill-inqas 38°C (jew 100°F)? Iva **Le**
2. Uġigh fil-glandoli tal-għonq? Iva **Le**
3. Sogħla u/jew tnixxija fl-immieher? Iva  Le
4. Għandek iktar minn 15-il sena? Iva  Le

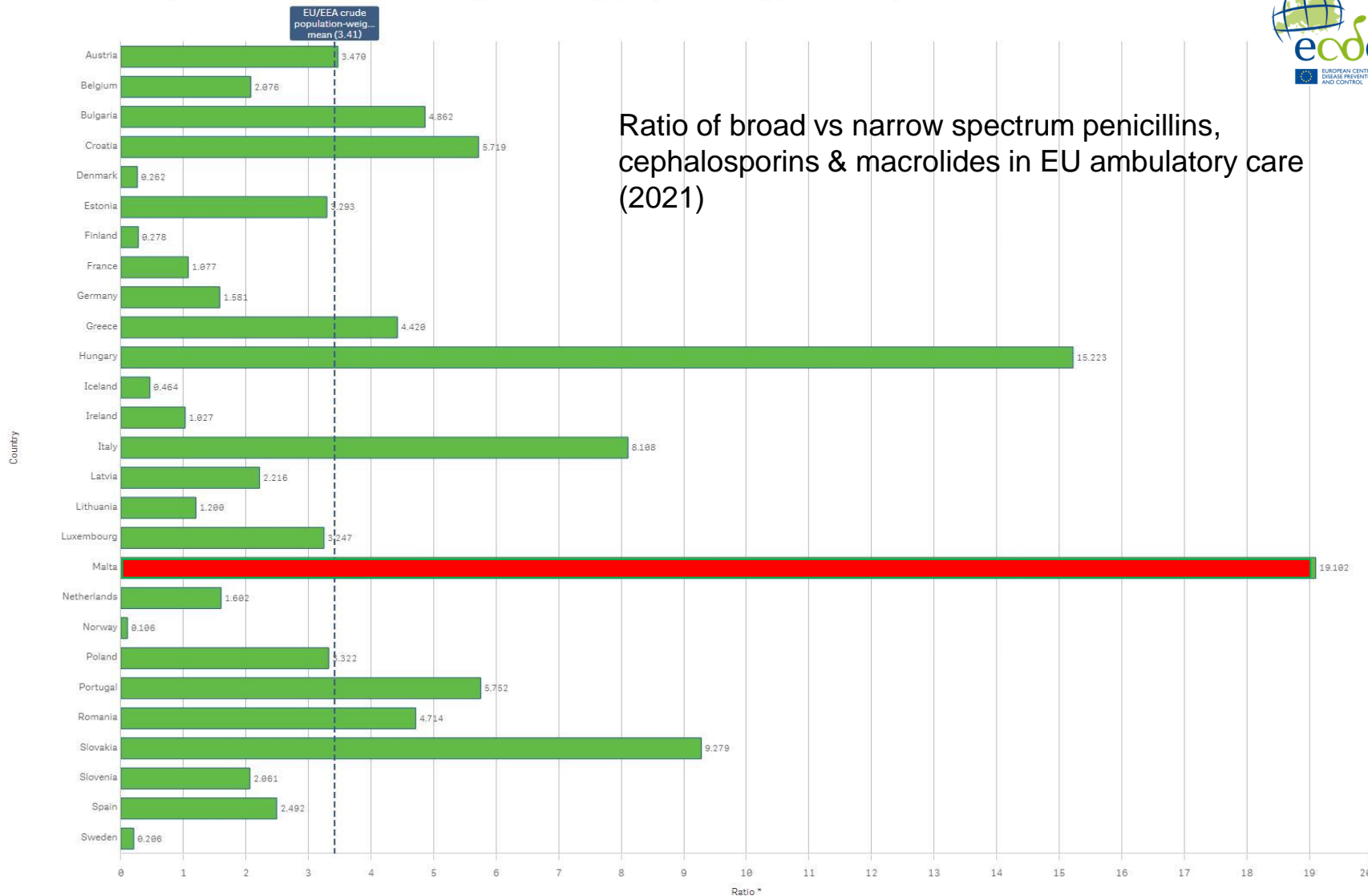
**Jekk it-twegibiet kienu kollha markati** , l-uġigh fil-grizmejn aktarx huwa kkawżat minn *virus* u għaldaqstant **ma jkunx hemm bżonn ta' antibijotiċi**. Jekk għandek deni ta' mill-inqas 38°C u/jew uġigh fil-glandoli tal-għonq, jekk is-sintomi jipper-sistu/imorru għall-agħar jew jekk għandek xi dubji, kellek li-tabib tiegħek.

Fl-adulti, rjiehat, influwenza u wġigh fil-grizmejn - speċjalment meta jkun hemm ukoll sogħla, għatis u tnixxija fl-immieher - huma ġeneralment kkawżati minn *virus*. **L-antibijotiċi ma jahdmux fuq il-virus** u ma jfejqux dawn it-tip ta' infezzjonijiet. Huwa biżżejjed li tiegħu likwidi sħan u trattamenti semplici bħal mistura tas-sogħla, *paracetamol* u *decongestants*.

Tiegħux antibijotiċi (kemm pilloli, mistura jew ingwent) min jeddek. Spizjar ma jistax jagħtik antibijotiċi mingħajr ir-riċetta tat-tabib.

# Broad spectrum antibiotic use (community)

ECDC/EFDA/EMA secondary indicator for consumption of antibacterials for systemic use (ATC group J01) in the community \*, EU/EEA countries, 2020



(\*) The ratio of consumption of broad-spectrum antibiotics (J01[CR+DC+DD]+[F-FA01]+[MA]) to the consumption of narrow-spectrum antibiotics (J01[CA+CE+CF+DB+FA01])



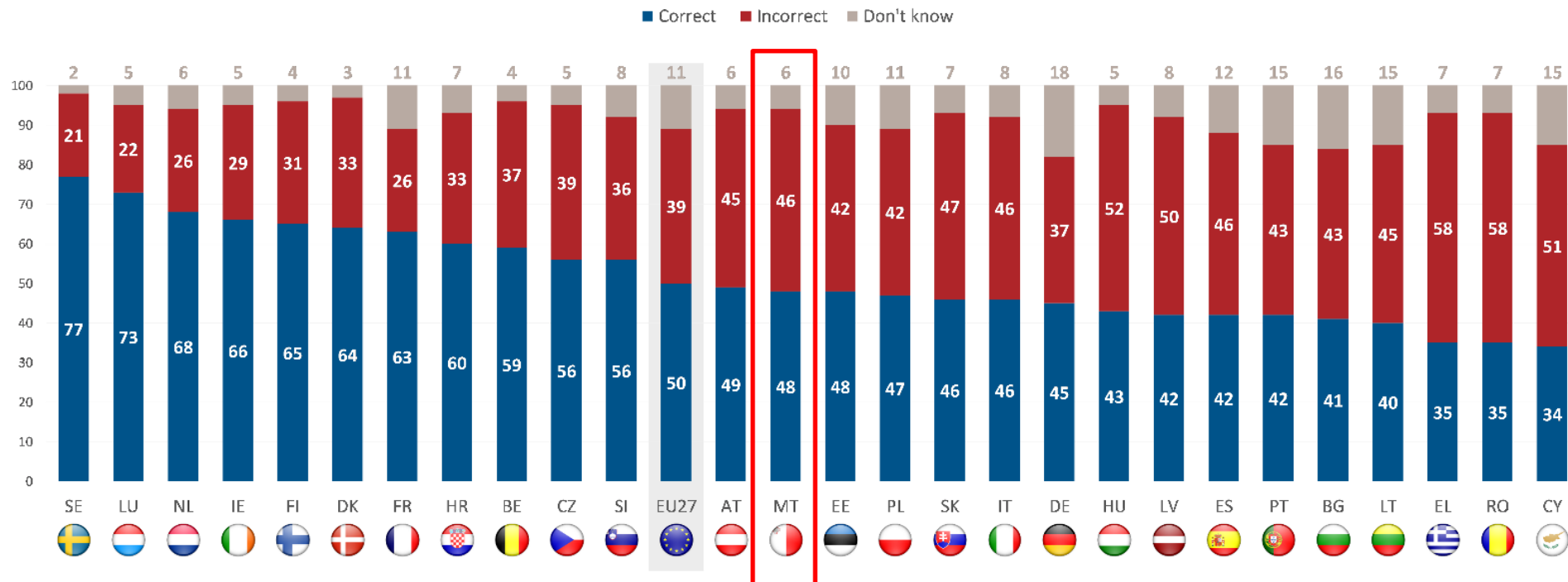


# What can you do?

- Get better informed and pass the message

# Antimicrobial Resistance

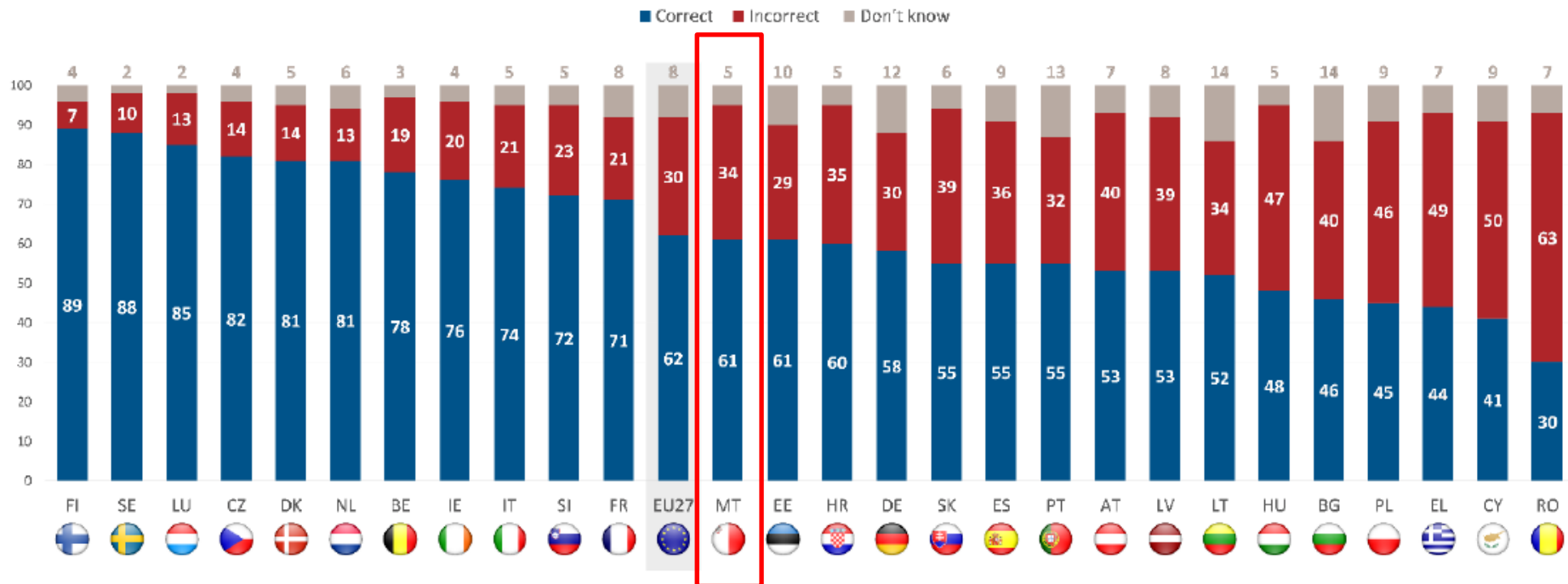
QC5.1 For each of the following statements, please tell whether you think it is true or false.  
 (% - Antibiotics kill viruses)



48% of Maltese think antibiotics kill viruses

# Antimicrobial Resistance

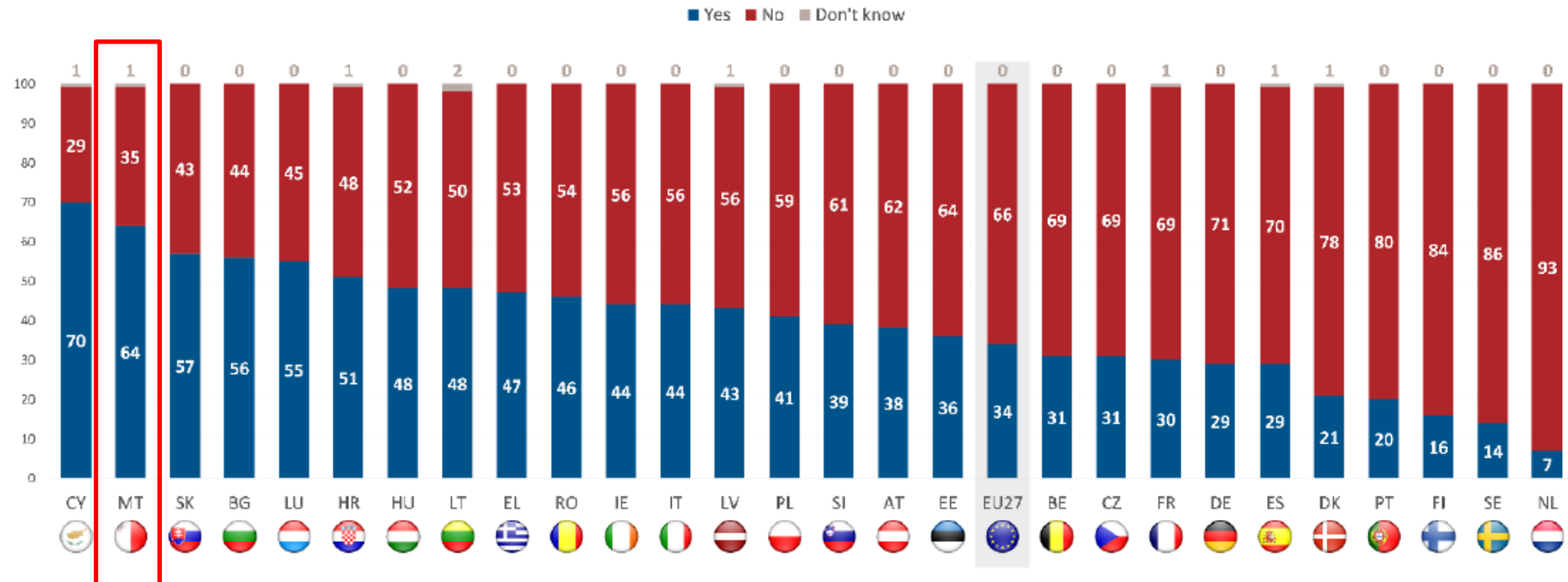
Q5.2 For each of the following statements, please tell whether you think it is true or false.  
(% - Antibiotics are effective against colds)



61% of Maltese think antibiotics cure colds

# Antimicrobial Resistance

QC9 Did the information that you received change your views on using antibiotics?  
(%)

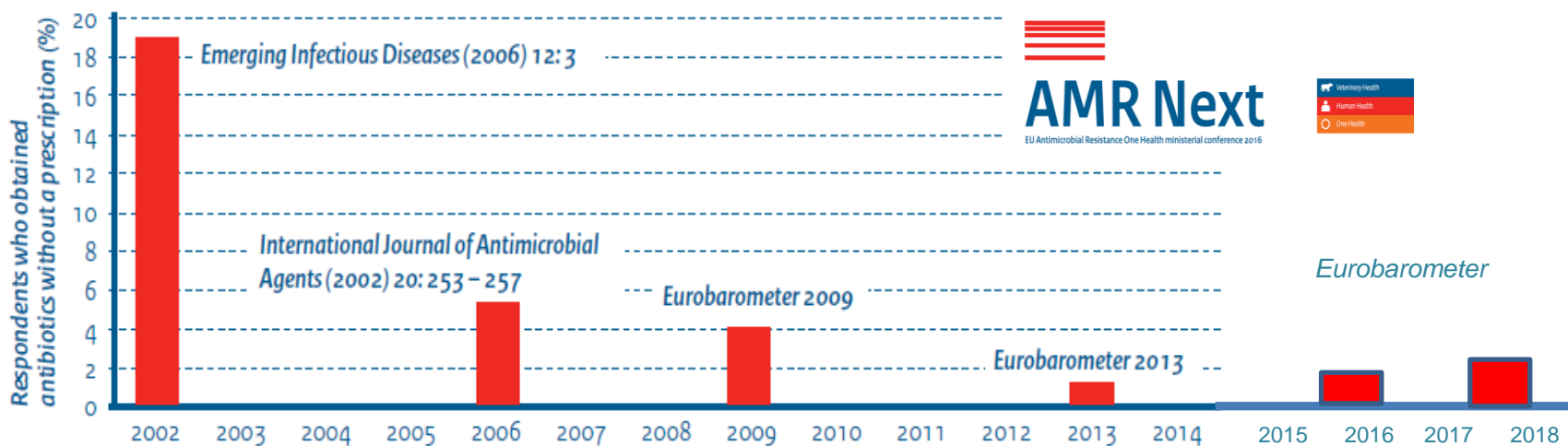


64% of Maltese changed their views on antibiotics

# What can you do?

- Get better informed and pass the message
- Do not use antibiotics without a doctor's prescription
  - Do not use left over antibiotics
  - Do not give antibiotics to friends/relatives

# Non-prescribed use: success story



Proportion of Maltese respondents who stated that they had obtained antibiotics from a pharmacy or other sources without a doctor's prescription.

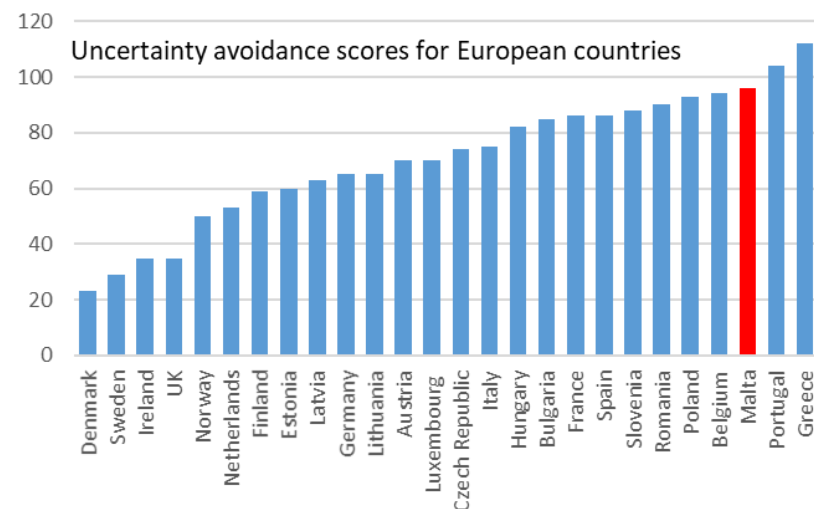
# Uncertainty Avoidance



*Societies differ in their ability to handle daily uncertainties of life and adapt to ambiguous situations*

In high uncertainty avoidance countries, antibiotic prescribing is often used to reduce ambiguity for clinician & patient:

- Given even in dubious clinical presentations
  - “started antibiotics... just in case”
- Excessive use of wide spectrum formulations
  - “need the widest possible cover.... to be safe”
- Unnecessarily long treatment duration
  - “need to ensure treatment has been sufficient”







**BE  
ANTIBIOTICS  
AWARE**

SMART USE, BEST CARE

**Talk to your doctor to  
understand when  
antibiotics are the right  
tool for your illness.**



# What can you do?

- Get better informed and pass the message
- Do not use antibiotics without a doctor's prescription
  - Do not use left over antibiotics
  - Do not give antibiotics to friends/relatives
- Do not pressure doctors to prescribe antibiotics
- Ask your doctor why you need an antibiotic and if a delayed prescription can be used
  - Query if the antibiotic is broad spectrum and why?

# Infection control



 **SPTAR  
MATER DEI**



**AS EASY  
AS ABC**

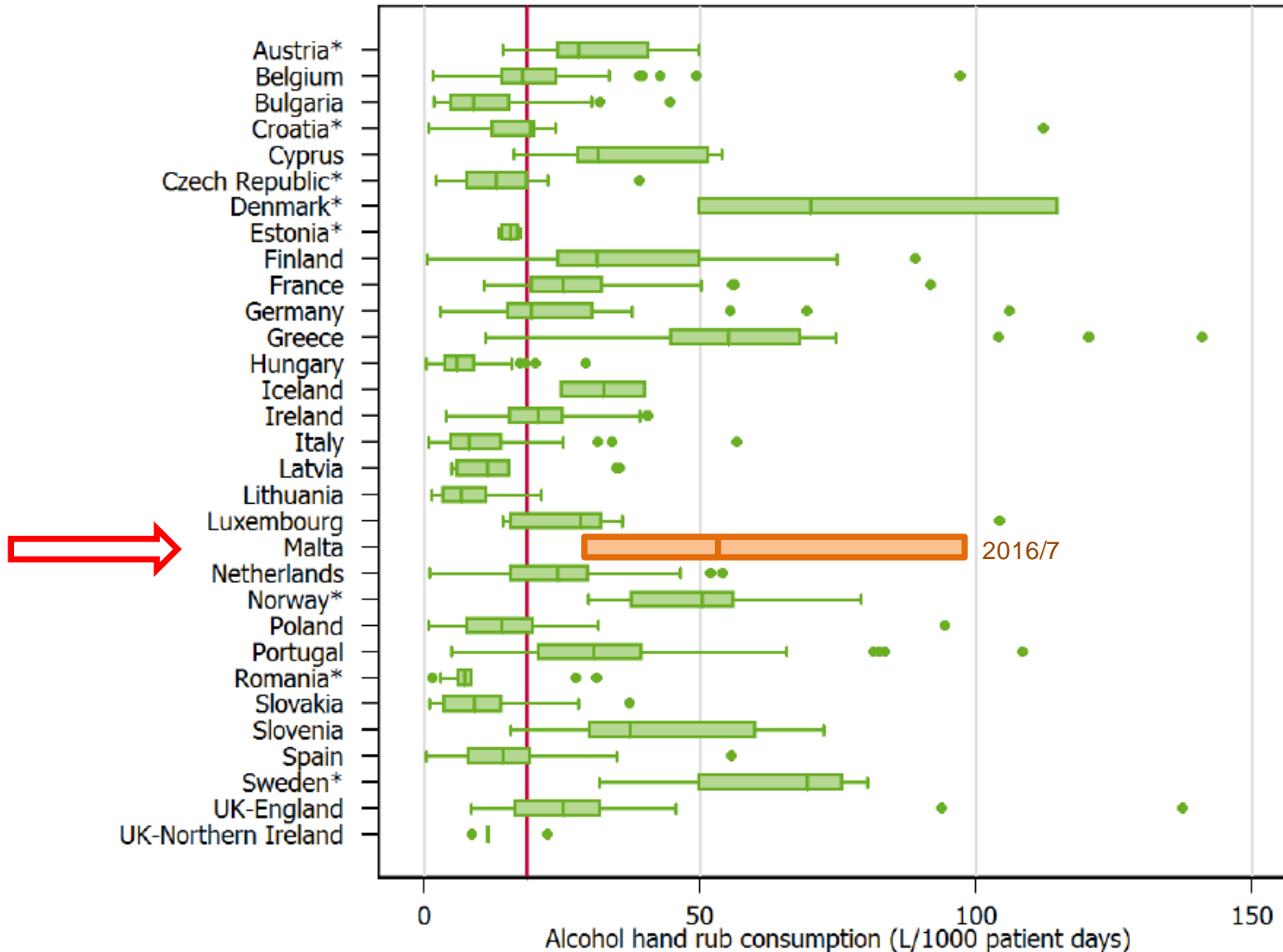
**A**PPLY HANDRUB  
**B**EFORE EVERY  
PATIENT **C**ONTACT

IT'S OUR DUTY OF CARE



# Hand hygiene

**Figure 16.** Distribution of the consumption of alcohol hand rub (litres per 1000 patient-days) by country, ECDC PPS 2011–2012



# Hand hygiene



# Finally



My actions protect antibiotics

**BECOME AN  
ANTIBIOTIC GUARDIAN**

Join me at [antibioticguardian.com](http://antibioticguardian.com)

Keep  Working