

ECDC DIRECTOR'S PRESENTATION

The threat of antimicrobial resistance – An urgent global concern

The Graduate Institute & the Centre of Global Health Security at Chatham House
Geneva, 21 March 2014

Ladies and gentlemen, dear colleagues.

Thank you for inviting me to this panel discussion here in Geneva today, to discuss the threat that antimicrobial resistance poses on a global level.

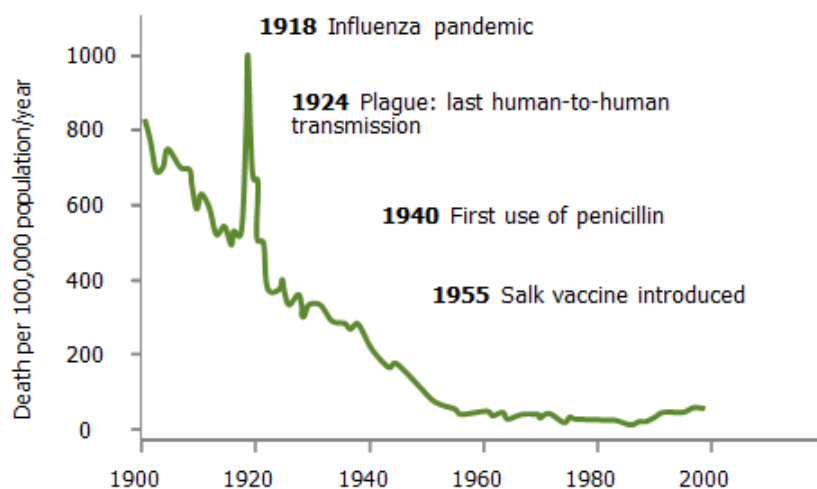
I am Marc Sprenger, and Director of ECDC, the European Centre for Disease Prevention and Control, based in Stockholm, Sweden.

In Europe, and globally, one of the major threats to public health today is indeed the increasing resistance to antimicrobials.

I will soon elaborate some more on this important issue, but first, allow me to start by going back a century in time.

During the past century, we have seen a huge decline in human mortality.

Human mortality, United States, 1900–2000



Adapted from: Aiello AE, Larson EL. *Lancet Infect Dis* 2002;2:103-10.

2

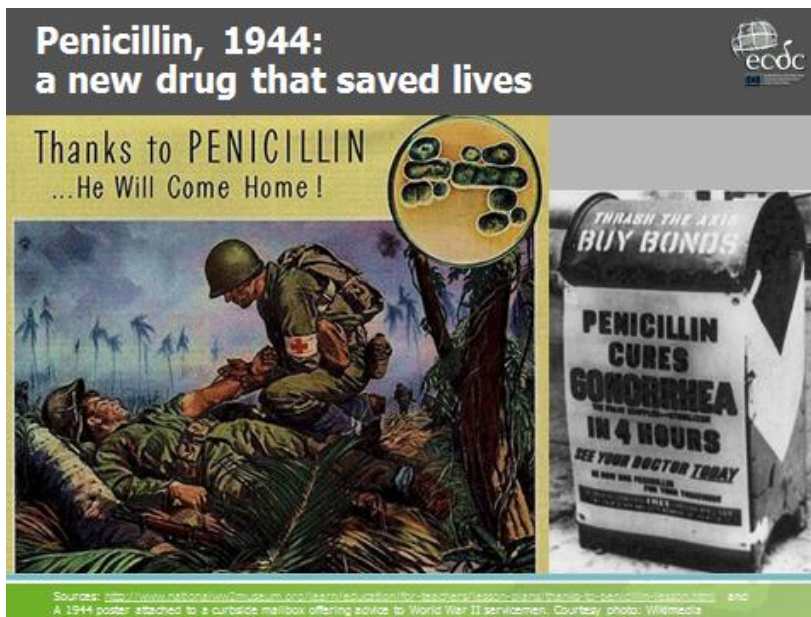
Two important discoveries in the history of medicine have contributed to this decrease:

1. The development of vaccines;
2. And the discovery of antibiotics

Diseases that were previously difficult to treat, and sometimes lethal, were now treatable or preventable.

Antibiotics have been fundamental in the treatment of human infection such as gonorrhoea, pneumonia or tuberculosis.

Lives have been saved!



A few decades ago, it was easy to use antibiotics to treat human infections.

But for the past decade, antimicrobial resistance has become a major health threat.

Failure to contain highly resistant bacteria would mean the end of modern medicine as we know it.

Common procedures such as the ones listed here:

- Hip/knee replacement
- Organ transplant
- Cancer chemotherapy
- Intensive care

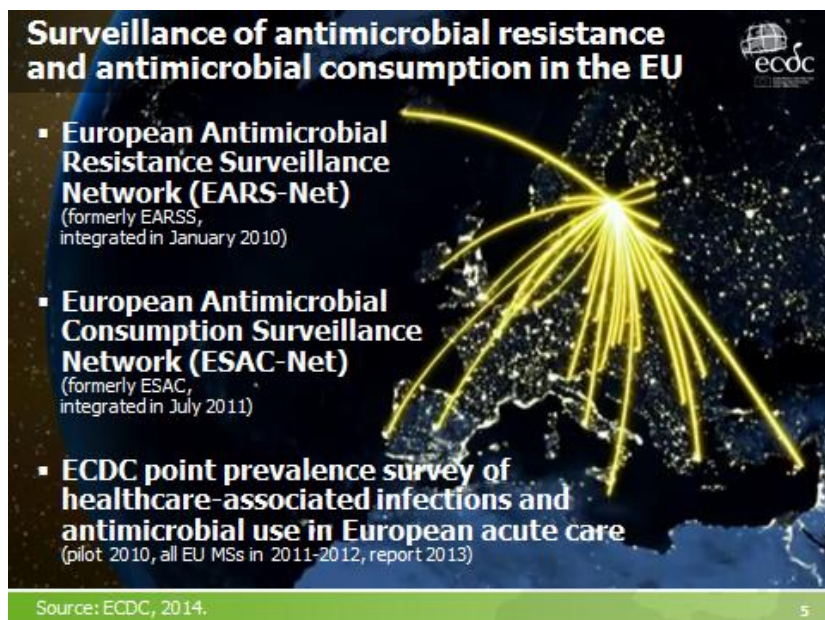
would not be possible without effective antibiotics.



If not controlled, highly resistant bacteria are indeed a threat, not only to the safety of hospital patients, but to our societies in general.

ECDC coordinates three EU networks that are relevant to today's discussion:

- EARS-Net on AMR in humans;
- ESAC-Net on human antimicrobial consumption;
- and HAI-Net that published the first European point prevalence survey on healthcare-associated infections and antimicrobial use.

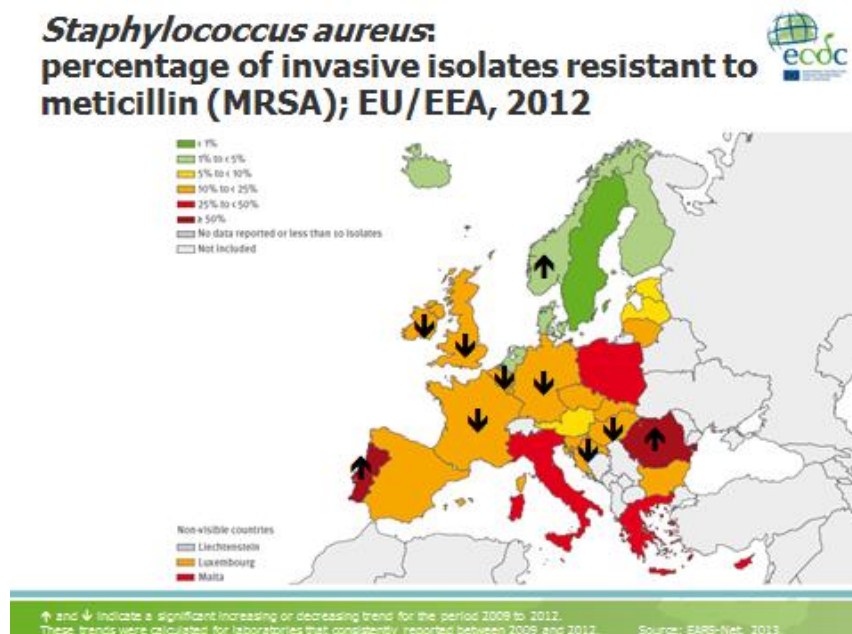


EARS-Net, previously known as EARSS, was established by my former national institute, RIVM, back in January 1999, and I am particularly proud to have been part of its launch.

In 2014, these EU networks have become models for the establishment of surveillance networks also at the global level.

So what is the current situation in Europe?

This slide presents the latest data available for the EU and EEA countries for MRSA, meticillin-resistant *Staphylococcus aureus*.



We see large variations among the countries, from less than 1% (**BRIGHT GREEN**) to more than 50% (**DARK RED**).

Now the good news is that in several European countries we see a declining trend of MRSA, if you compare data from 2009 with data from 2012.

But what is less good news is that due to the increased use of antibiotics and varying hospital infection control practices, *Klebsiella pneumoniae* - a bacterium commonly found in hospital infections – is increasingly becoming resistant to multiple antibiotics.

And what is even worse is that this bacterium is now starting to show resistance to the main last-line class of antibiotics, known as carbapenems.

This slide presents the latest data available for Europe regarding the situation of carbapenem-resistant *Klebsiella pneumoniae* bloodstream infections.

And the data we have is only the tip of the iceberg, i.e. only concerns bloodstream infections.

Options for treating patients infected with highly resistant bacteria are limited to antibiotics that are old, with limitations and toxic side-effects.

Klebsiella pneumoniae: percentage of invasive isolates resistant to carbapenems; EU/EEA, 2012



Source: EARS-Net, 2013. The symbols ↑ and ↓ indicate a significant increasing or decreasing trend for the period 2009-2012, respectively. These trends were calculated on laboratories that consistently reported during 2009-2012.

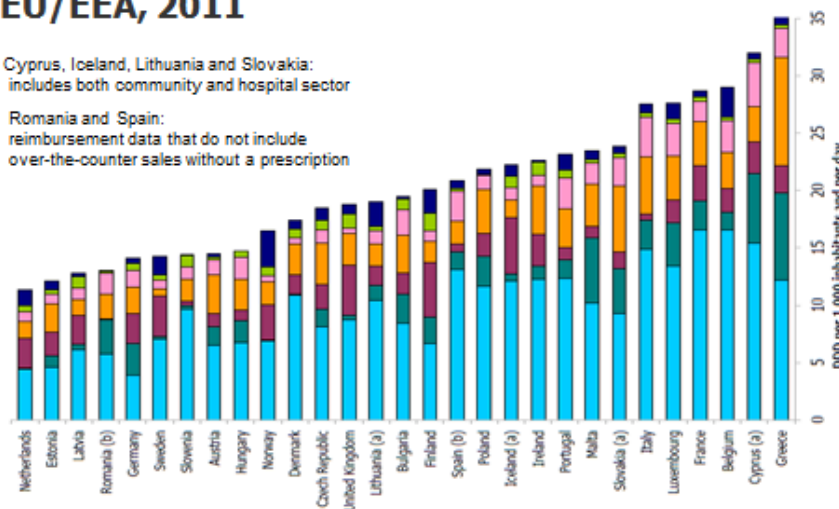
If we look at the consumption of antibiotics in the community, i.e. outside of hospitals, the latest data from ESAC-Net confirm that, in 2011, there was a 3-fold difference,

- between the country that reported the lowest consumption (The Netherlands)
- and the country that reported the highest consumption (Greece).

Consumption of antibiotics for systemic use (ATC group J01) in the community*; EU/EEA, 2011



Cyprus, Iceland, Lithuania and Slovakia: includes both community and hospital sector
 Romania and Spain: reimbursement data that do not include over-the-counter sales without a prescription



Source: ESAC-Net, 2014

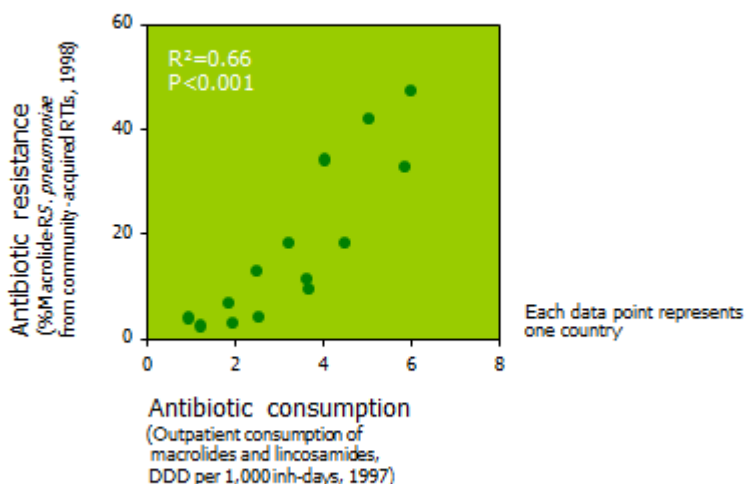
8

Not surprisingly, there is a relationship between the level of antibiotic consumption and the level of resistance.

The more a country uses antibiotics, the more bacteria responsible for infections in patients in this country are resistant.

The slide on the next page shows data for the community (i.e. outside hospitals) in the EU and for macrolides - a class of antibiotics often used to treat respiratory tract infections.

Relationship between antibiotic use and resistance in the community



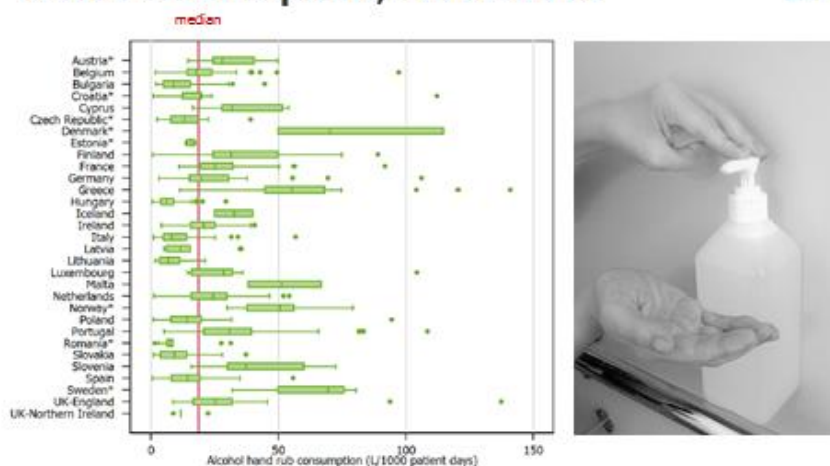
Source: Alexander Project; FINRES; STRAMA; DANMAP; Cars et al., 2001.

9

Many similar relationships can be demonstrated for other types of infection, other bacteria and other antibiotics.

Last year, ECDC published a report on a point prevalence survey in European acute care hospitals.

ECDC point prevalence survey in European acute care hospitals, 2011-2012



*PPS data representativeness was poor in Austria, Croatia, Czech Republic, Estonia, Norway and Romania and very poor in Denmark and Sweden. Red vertical line=median (18.7 litres/1000 patient-days).

Source: ECDC surveillance report (PPS), July 2013.

10

This survey showed large variations between countries in infection control structures and process indicators.

As you see from the slide on the previous page, there were also large variations among the hospitals within a country regarding the use of alcohol hand rub for hand hygiene.

Alcohol hand rub is one of the simplest and most efficient measures to prevent transmission of microorganisms.

Finally, antibiotics are frequently used inappropriately, or when they are not needed, not only in humans, but also in animals.

What we see here is the proportion of sales of antibiotics for use in human and in veterinary medicine in 10 European countries.

**Comparative sales of antibiotics (in tonnes)
for use in human and veterinary medicine,
10 European countries, 2007***



*Czech Republic, Denmark, Finland, France, Germany, the Netherlands, Norway, Sweden & United Kingdom; 2007 (or closest available year)

Source: ECDC, EFSA, EMA & SCENIHR, Joint Opinion on antimicrobial resistance (AMR) focused on zoonotic infections. EFSA Journal 2009; 7(11):1372. <http://www.efsa.europa.eu/en/efsajournal/pub/1372.htm>

I think the pie chart talks for itself.

To tackle the threat of antimicrobial resistance, the European Commission advocates for the 'One health' aspect, taking into account both human and animal health.

The European Commission launched an 'Action Plan against the rising threats from Antimicrobial Resistance' back in 2011 that embraces this holistic approach.

We need healthy animals in order to have healthy humans.

But equally important, prudent use of antibiotics is crucial, not only in humans but also in animals!



So what are the actions needed in order to prevent and control antimicrobial resistance?

In the longer term, there is a need to develop new antibiotics. This is something the European Commission is investing in.

But resistance to antibiotics will not be brought under control without paying attention to infection control practices, and especially to hand hygiene, and to the isolation of patients with resistant bacteria, in healthcare settings.

And finally, we need to pay attention to the prudent use of antibiotics.

Take antibiotics only when needed and only with the correct dose, dose intervals and duration.

- And only upon prescription.

Main actions to prevent and control antimicrobial resistance (AMR)



New antimicrobial agents
(with a novel mechanism of action,
research, development)



Infection prevention and control
(hand hygiene, screening, isolation)



Prudent use of antimicrobial agents
(only when needed, correct dose,
correct dose intervals, correct duration)

Cooperating together, globally, to tackle the threat of AMR is essential.

To promote the idea of prudent use of antibiotics, the European Antibiotic Awareness Day was established in 2008.

During the week around 18 November every year, activities promoting prudent use of antibiotics are organised in more than 40 countries across Europe, including all EU member states.

ECDC is also cooperating with its partners in other regions of the world, including the US, Canada and Australia.

And we must not forget that we are all responsible; patients, parents, doctors, all healthcare personnel, veterinarians, farmers, policy makers... you and me!

Thank you!

