Area Rischio infettivo

Agenzia sanitaria e sociale regionale

Resistenza agli antibiotici in ambito umano e veterinario. Due facce della stessa medaglia?

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Area Rischio Infettivo

ASSR Emilia-Romagna

Ferrara 10 Novembre 2016

How does antibiotic resistance spread?

Antibiotic resistance is the ability of bacteria to combat the action of one or more antibiotics. Humans and animals do not become resistant to antibiotic treatments, but bacteria carried by humans and animals can.

ecdc
EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL

1 **Animals** may be treated with antibiotics and they can therefore carry antibiotic-resistant bacteria. **2** **Vegetables** may be contaminated with antibiotic-resistant bacteria from animal manure used as fertilizer. **3** **Antibiotic-resistant bacteria** can spread to humans through **food** and direct contact with animals.

In animal farming

4 **Humans** sometimes receive antibiotics prescribed to treat **infections**. However, bacteria develop resistance to antibiotics as a **natural, adaptive reaction**. Antibiotic-resistant bacteria can then **spread** from the treated patient to other persons.

In the community

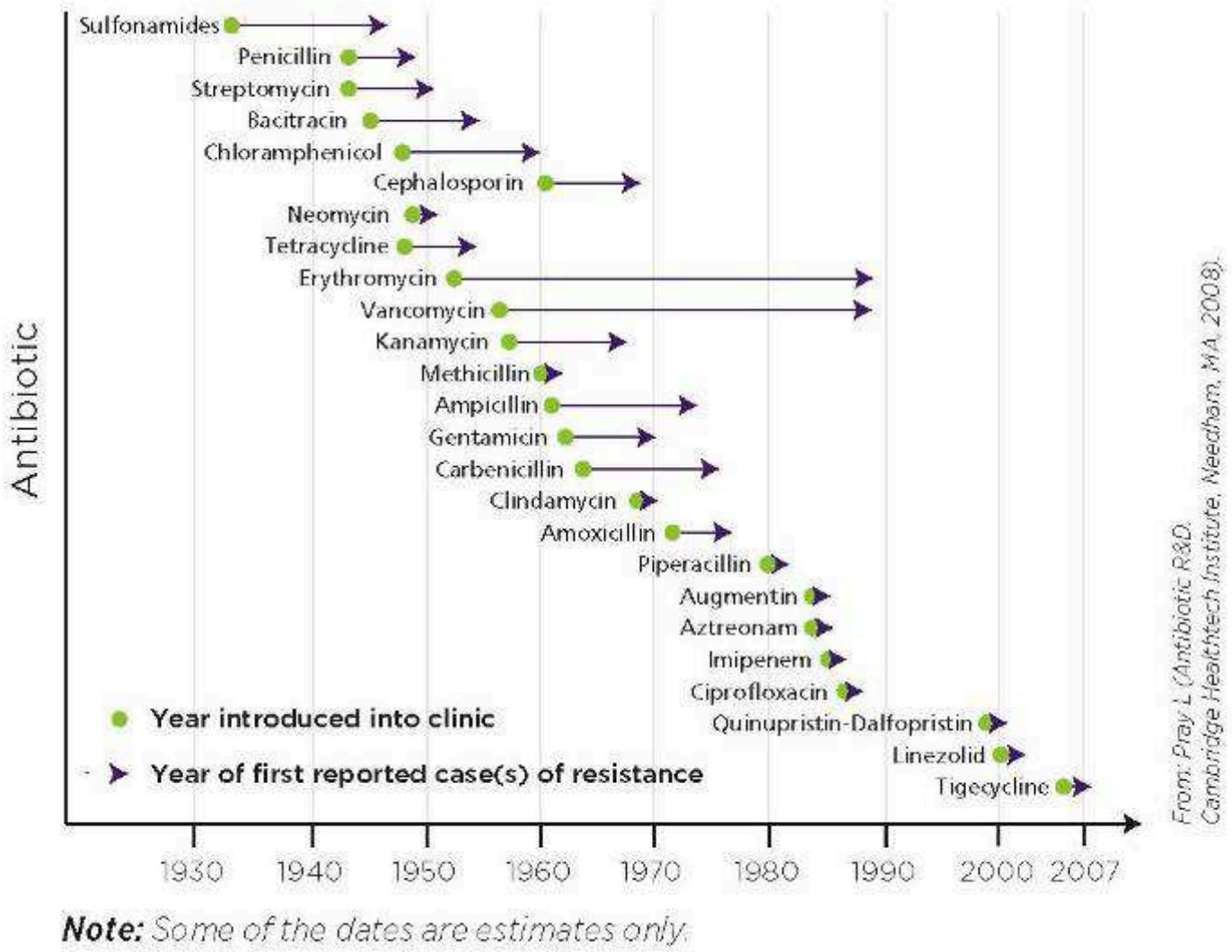
5 **Humans** may receive antibiotics in **hospitals** and then carry antibiotic-resistant bacteria. These can spread to other patients via **unclean hands** or **contaminated objects**. **6** Patients who may be carrying antibiotic-resistant bacteria will ultimately be sent **home**, and can spread these resistant bacteria to **other persons**.

In healthcare facilities

7 **Travellers** requiring hospital care while visiting a country with a high prevalence of antibiotic resistance may **return** with antibiotic-resistant bacteria.
8 Even if not in contact with healthcare, travellers may **carry and import** resistant bacteria acquired from food or the environment during travel.

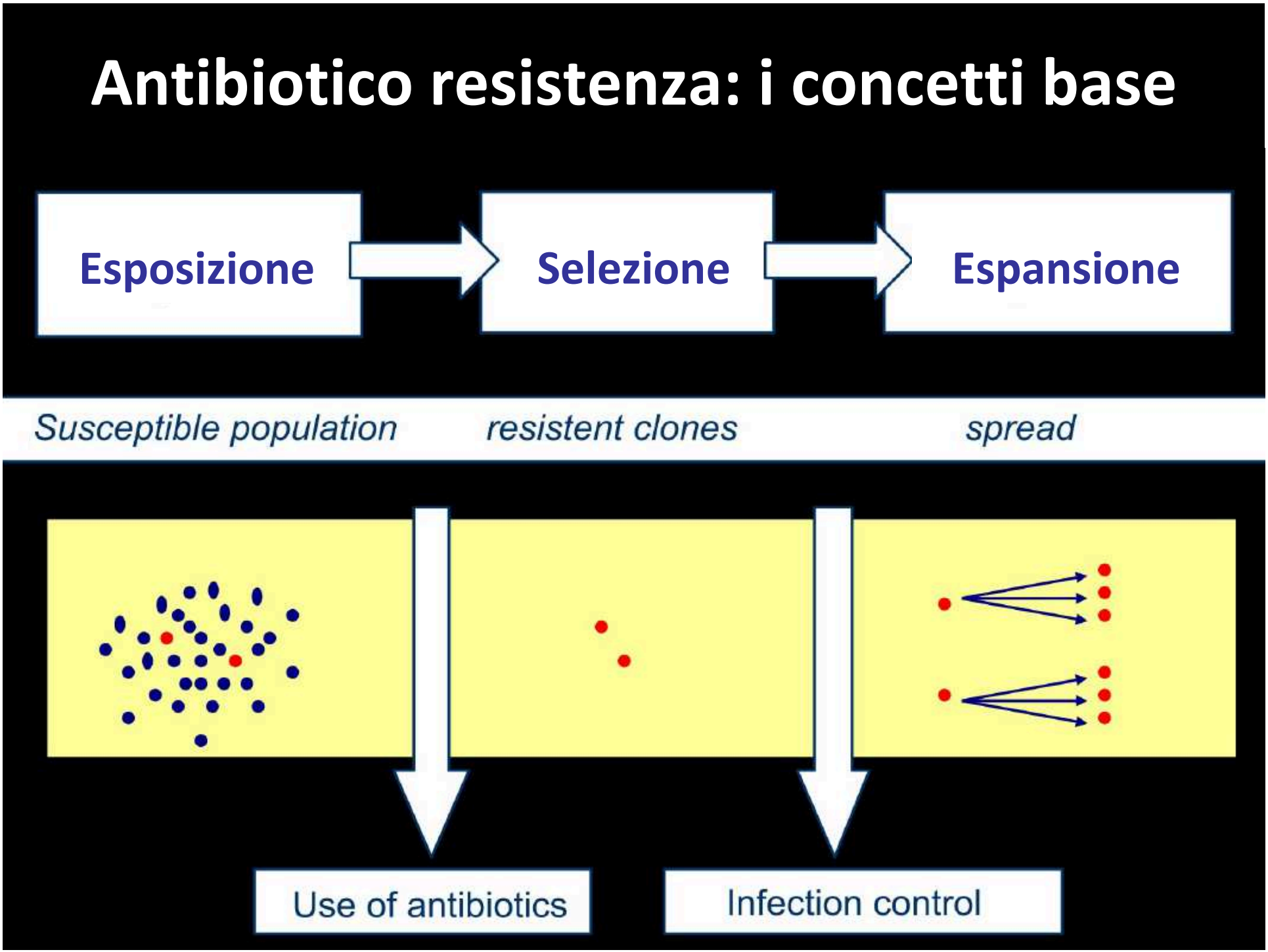
Through travel

Introduzione degli antibiotici nella pratica clinica



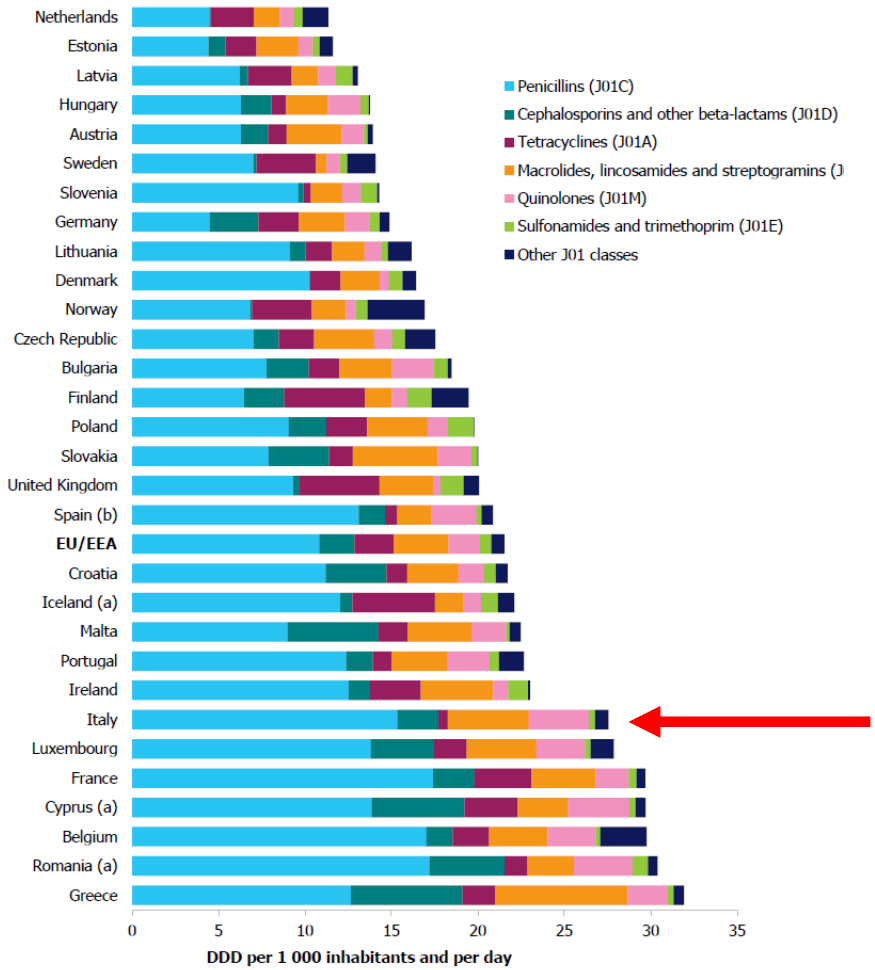
Comparsa della Resistenza

Antibiotico resistenza: i concetti base



Uso di antibiotici in ambito territoriale - ESAC-Net 2012

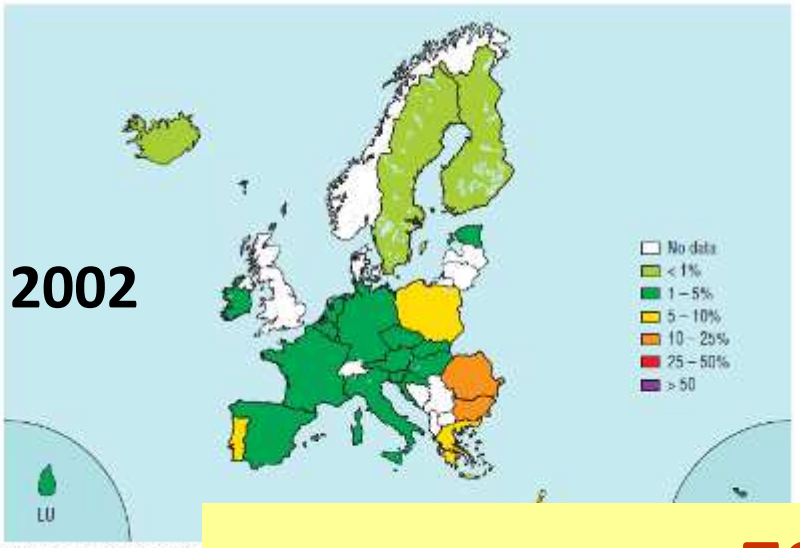
Medicina umana



ITALIA: consumi elevati e uso frequente di antibiotici ad ampio spettro (Es. chinoloni e cefalosporine)

http://ecdc.europa.eu/en/publications/_layouts/forms/Publication_DispForm.aspx?List=4f55ad51-4aed-4d32-b960-af70113dbb90&ID=1174

Escherichia coli R - Cefalosporine III gen.



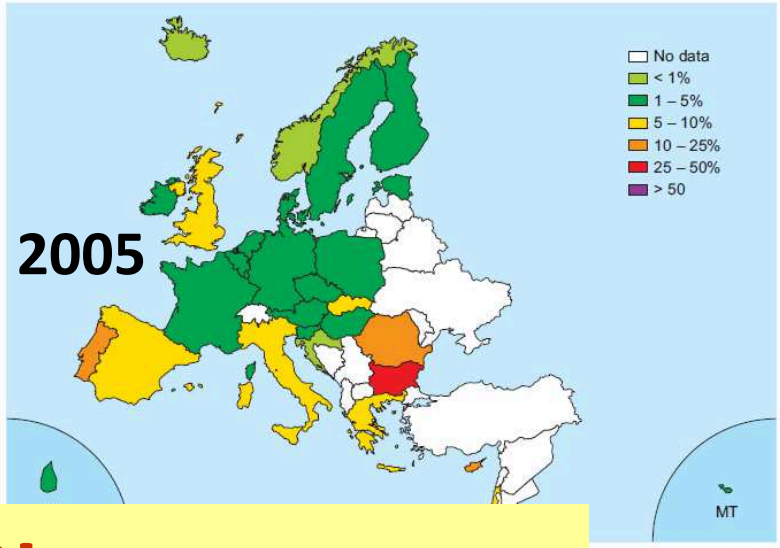


Figure 5.11. *Escherichia coli*: ...tion cephalosporins in 2005.

ESBL

...inolones, by country,

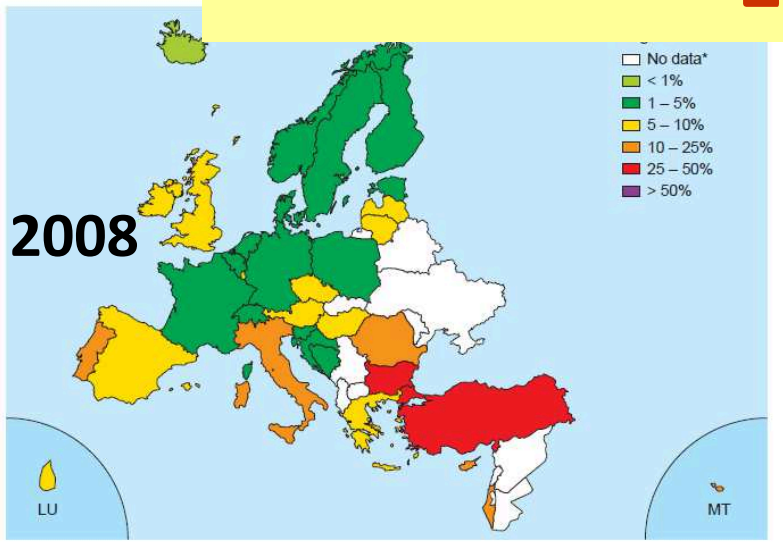


Figure 5.14. *Escherichia coli*: proportion of invasive isolates with resistance to third generation cephalosporins in 2008.
* These countries did not report any data or reported less than 10 isolates.

Fonte - **EARS-Net**

Klebsiella pneumoniae

R - CEF III Gen

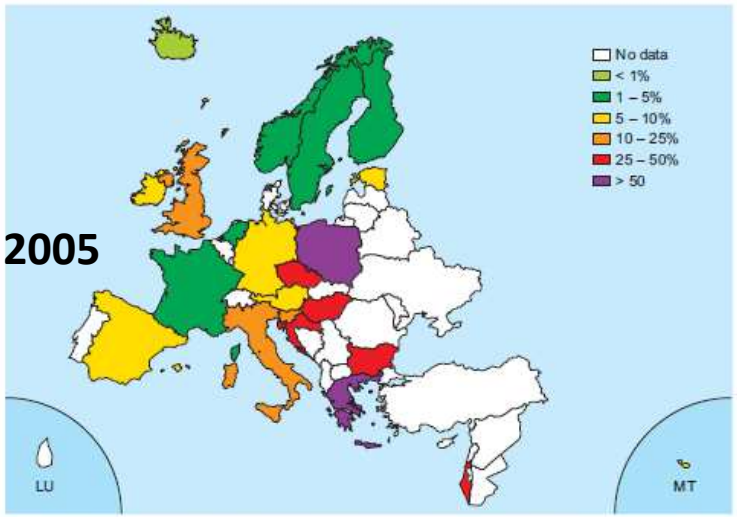


Figure 4.22. *Klebsiella pneumoniae*: proportion of invasive isolates resistant to third generation cephalosporins in 2005.

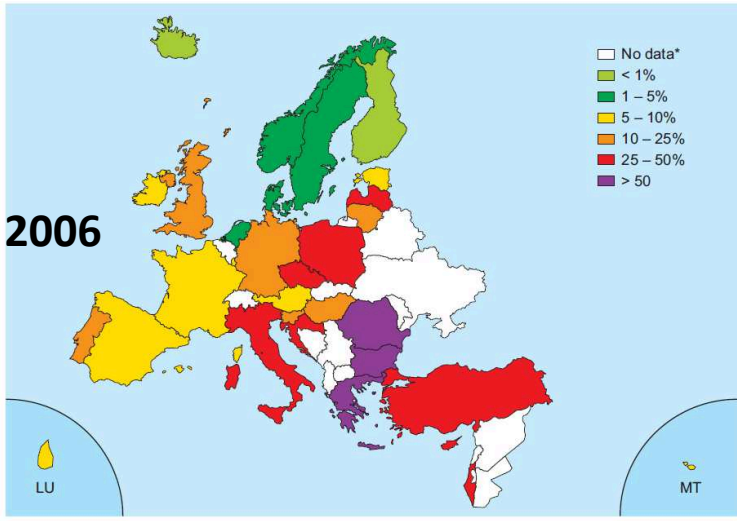
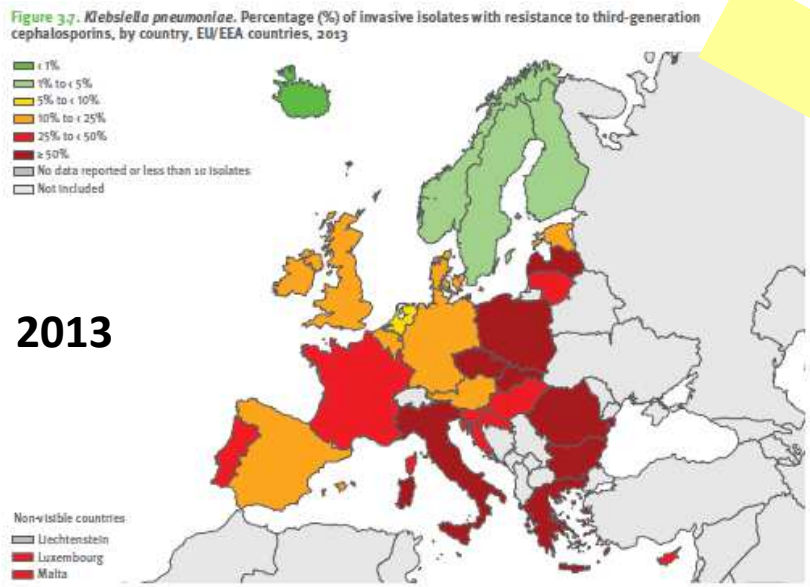


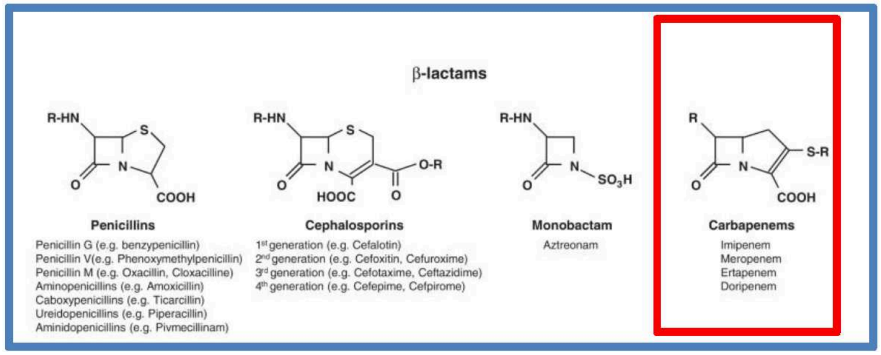
Figure 5.23. *Klebsiella pneumoniae*: proportion of invasive isolates resistant to 3rd generation cephalosporins in 2006.



ESBL

Fonte - **EARS-Net**

CARBAPENEMI



	Streptococcus & MSSA	Entero-bacteriaeae	Gram (-) non fermentanti	Anaerobi
Imipenem	+	+	+	+
Meropenem	+	+	+	+
Ertapenem	+	+	Attività limitata	+
Doripenem	+	+	+	+

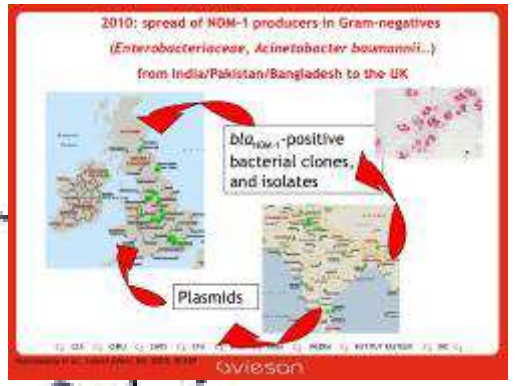
- Antibiotici **β-lattamici** ad **ampio spettro** efficaci nei confronti di un'ampia varietà di famiglie di microrganismi

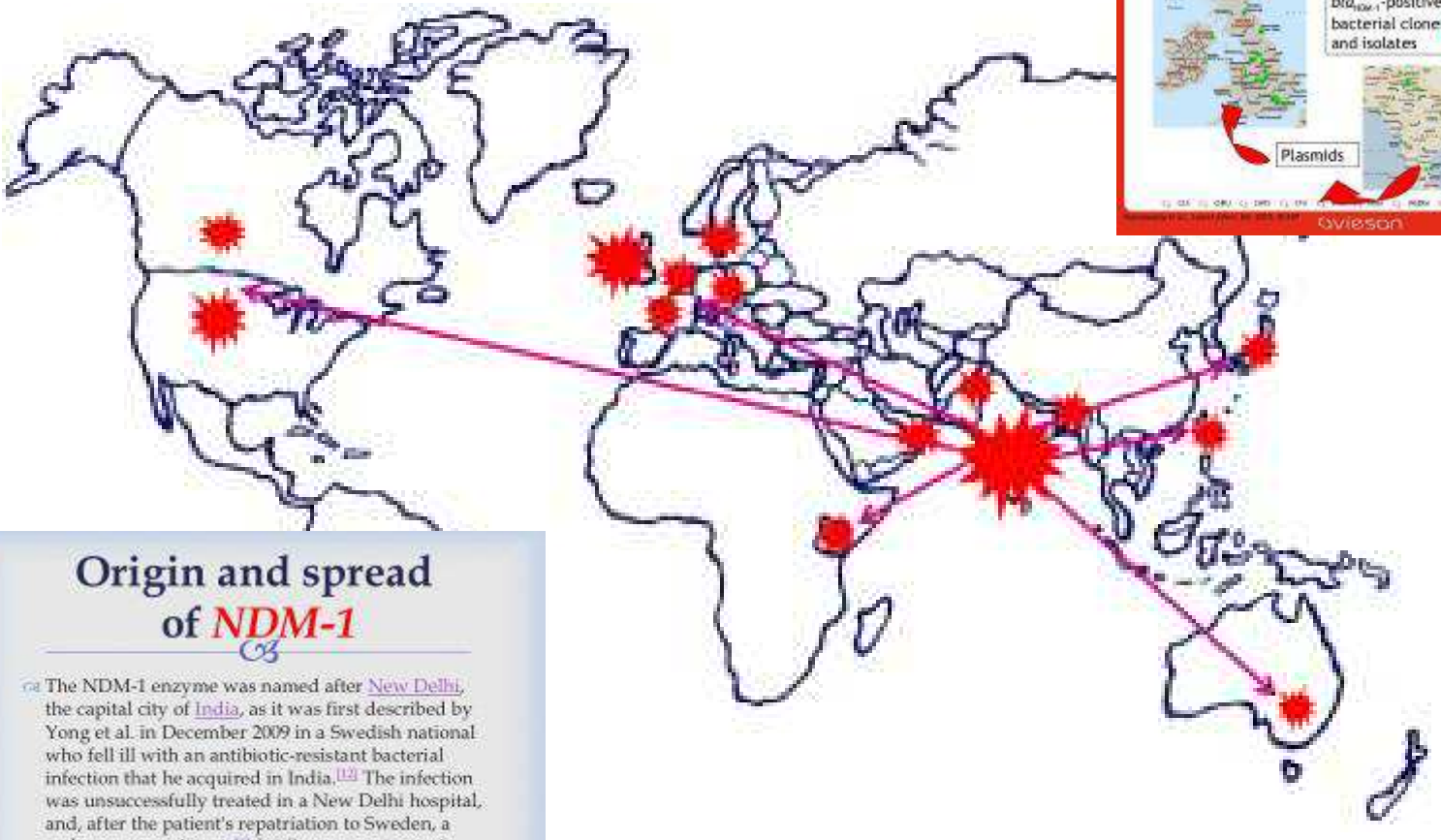
- **Nella pratica clinica i carbapenemici sono considerati* gli antibiotici «risolutivi»** per il trattamento di infezioni gravi, tipicamente nel paziente ospedalizzato

** forse "erano"…*

Enterobacteriacee produttori di carbapenemasi

NDM-1





Origin and spread of *NDM-1*

The NDM-1 enzyme was named after New Delhi, the capital city of India, as it was first described by Yong et al. in December 2009 in a Swedish national who fell ill with an antibiotic-resistant bacterial infection that he acquired in India.[12] The infection was unsuccessfully treated in a New Delhi hospital, and, after the patient's repatriation to Sweden, a carbapenem-resistant *Klebsiella pneumoniae* strain bearing the novel gene was identified

Turismo per Chirurgia estetica low cost

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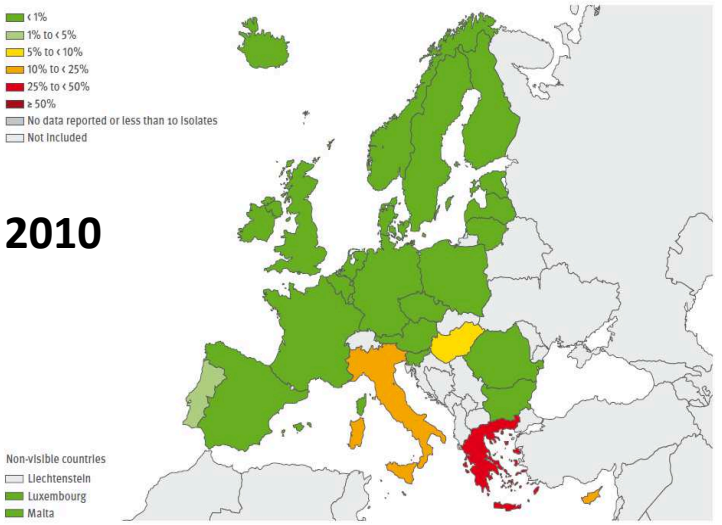
Klebsiella pneumoniae

Resistenza ai CARBAPENEMI

Figure 5.25: *Klebsiella pneumoniae*: proportion of invasive isolates resistant to carbapenems in 2009

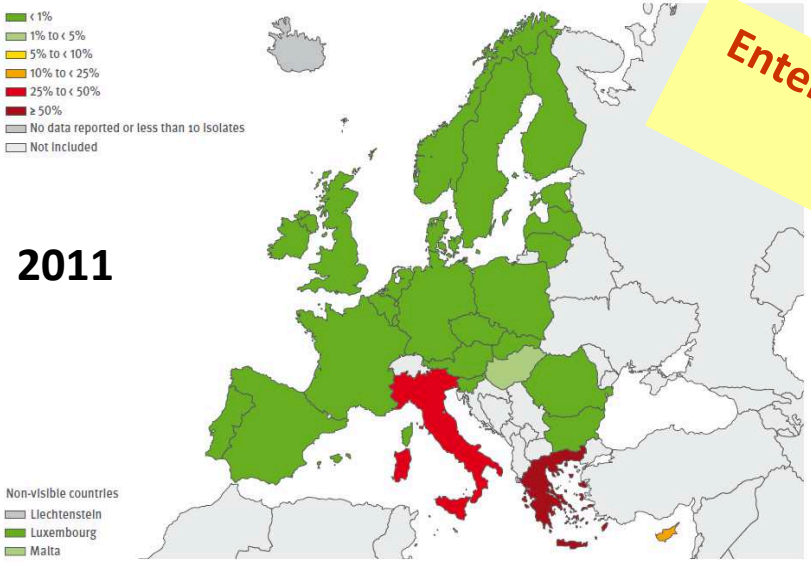
2009

Figure 5.25: *Klebsiella pneumoniae*: proportion of invasive isolates resistant to carbapenems in 2010



2010

Figure 4.12: *Klebsiella pneumoniae*: percentage (%) of invasive isolates with resistance to carbapenems, by country, EU/EEA countries, 2011



2011

Enterobatteri produttori di CARBAPENEMASI

CPE

Fonte - **EARS-Net**

Come trattare le infezioni da CPE?

- Efficacia dei trattamenti con
  MEROPENEM + TIGECICLINA + COLISTINA

OPPURE

- **Ceftazidime** (**Cefalosporina III gen.**)

  +

  Avybactam (inibitore di **eSBL** e *alcune* **Carbapenemasi** es. **KPC**)

È la strada giusta?

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THE LANCET Infectious Diseases

Emergence of plasmid-mediated colistin resistance mechanism MCR-1 in animals and human beings in China: a microbiological and molecular biological study

Yi-Yun Liu, Yang Wang*, Timothy R Walsh, Ling-Xian Yi, Rong Zhang, James Spencer, Yohei Doi, Guobao Tian, Baolei Dong, Xianhui Huang, Lin-Feng Yu, Danxia Gu, Hongwei Ren, Xiaojie Chen, Luchao Lv, Dandan He, Hongwei Zhou, Zisen Liang, Jian-Hua Liu, Jianzhong Shen*

Gene della Resistenza a Colistina mediata da Plasmide in Escherichia coli e Klebsiella pneumoniae

http://www.thelancet.com/pdfs/journals/laninf/PIIS1473-3099(15)00424-7.pdf

la Repubblica.it
Il mondo in diretta
24 ore su 24

27 Maggio 2016

Allarme negli Usa, donna colpita da batterio resistente a tutti gli antibiotici

Per la prima volta, alcuni ricercatori hanno trovato una persona portatrice di un batterio con un gene che lo rende resistente persino ai trattamenti più potenti

http://www.repubblica.it/salute/medicina/2016/05/27/news/allarme_negli_usa_donna_colpita_da_batterio_resistente_a_tutti_gli_antibiotici_antibioticoresistenza-140706164/?ref=HRLV-26

Area Rischio infettivo

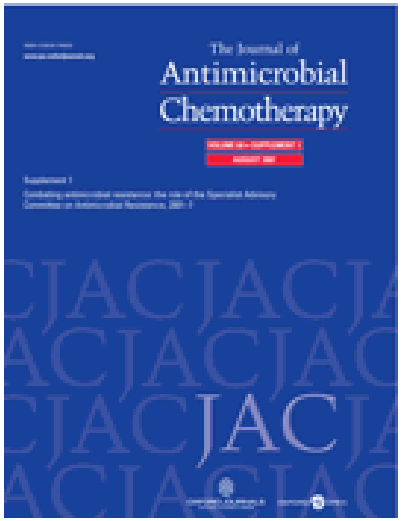
Agenzia sanitaria e sociale regionale

J Antimicrob Chemother 2016
doi:10.1093/jac/dkw195
Advance Access publication 3 June 2016

Emergence of the colistin resistance *mcr-1* determinant in commensal *Escherichia coli* from residents of long-term-care facilities in Italy

Maria Giufrè, Monica Monaco, Marisa Accogli, Annalisa Pantosti and Marina Cerquetti* on behalf of the PAMURSA Study Group†

Department of Infectious, Parasitic and Immune-Mediated Diseases, Istituto Superiore di Sanità, Rome, Italy



Ospiti di Strutture residenziali per anziani colonizzati da Escherichia coli eSBL e MCR-1

http://jac.oxfordjournals.org/content/71/8/2329.full.pdf+html

1. **Increase early science funding to tackle AMR:** established funders must address this but in addition an 'AMR innovation fund' would act as an early research grant maker for blue sky science, and as a non-profit incubator for ideas that are more mature. Too many good ideas are not being pursued for lack of funding.
2. **Make existing drugs go further:** a systematic programme of re-examining existing antibiotics could test whether changing the dosing or combining them with other agents or other antimicrobials could slow down the spread of drug resistance and treat 'resistant infections' more effectively.
3. **Support the development and use of relevant diagnostic technologies**: if we had the right diagnostics, more patients would receive the right antibiotic to treat their infection, but fewer antibiotics would be prescribed unnecessarily. 1. Antimicrobial Resistance: Tackling a crisis for the health and wealth of nations. http://amr-review.org/ publications 3 The Review on Antimicrobial Resistance, Chaired by Jim O'Neill
4. **Invest in the people who will solve the problem:** many companies have retreated from antibiotic discovery in recent decades. It is crucial to train the next generation of doctors, scientists, microbiologists, pharmacologists, medicinal chemists and biochemists, as well as economists, social scientists and vets, among others. They will need to find novel approaches and therapies for microbial diseases, whilst maintaining a connected and global outlook.
5. **Modernise the way surveillance of drug resistance is done and used globally:** a more joined up and digital global approach is needed, using the latest advances in molecular testing and informatics, to improve access to real time global-scale surveillance information.

https://amr-review.org/sites/default/files/Report-52.15.pdf

Quale futuro?

Escherichia coli – EARS-Net 2013
R - Carbapenemi

Quale futuro?

18 Novembre

EUROPEAN ANTIBIOTIC AWARENESS DAY

A European Health Initiative

http://ecdc.europa.eu/it/eaad/Pages/Home.aspx

#EAAD