LO SCENARIO CHE CAMBIA

Caterina Mammina
Dipartimento di Scienze per la Promozione della Salute e Materno-Infantile «G. D’Alessandro»
UNIPA
Resistenza agli antibiotici, l'allarme dell'Oms: "Infezioni minori rischiano di tornare a uccidere"

Farmaci sempre meno efficaci. Il problema della resistenza batterica. E l'Oms parla di "era post-antibiotica"
Un triangolo epidemiologico
Outcomes of Patients with Healthcare-Associated Pneumonia: Worse Disease or Sicker Patients?

Demographic trends help hospitals plan for the future November 26, 2014

Rothberg et al. Infection Control and Hospital Epidemiology, Vol. 35, No. S3, Preventing Healthcare-Associated Infections: Results and Lessons Learned from AHRQ’s HAI Program (October 2014), pp. S107-S115

FIERCE HEALTHCARE – NJ.com
Interrelations of immunological parameters, nutrition, and healthcare-associated infections: Prospective study in elderly in-patients

Healthcare-associated infections [HAI] and malnutrition are both prevalent in elderly in-patients and are associated with increased morbidity and mortality rates and with high healthcare costs.

The U.S. health care system suffers from a chronic malady — the revolving door syndrome at its hospitals.
people aren't the only things that can be interviewed

pathogens can be interviewed too!
http://www.plosone.org/article/info:doi/10.1371/journal.pone.0059960
High Prevalence of EMRSA-15 in Portuguese Public Buses: A Worrisome Finding

Roméo Rocha Simões¹,², Marta Aires-de-Sousa³, Teresa Conceição¹, Filipa Antunes², Paulo Martins de Costa²,⁴, Hermínia de Lancastre¹,⁵,*

¹Laboratory of Molecular Genetics, Instituto de Tecnologia Química e Biológica, Oeiras, Portugal, ²Institute of Biomedical Sciences Abel Salazar, Universidade do Porto, Oporto, Portugal, ³Escola Superior da Saúde da Cruz Vermelha Portuguesa, Lisbon, Portugal, ⁴CIMAR - Centro Interdisciplinar de Investigação Marinho Ambiental do Porto, Oporto, Portugal, ⁵Laboratory of Microbiology, The Rockefeller University, New York, New York, United States of America

• handrails of 85 public urban buses
• 26% showed MRSA contamination
• ➔ 91% ST22-MRSA-IVh
• (EMRSA-15)

Public buses in Oporto seem to be an important reservoir of HA-MRSA, providing evidence that the major HA-MRSA clone in Portugal is escaping from the primary ecological niche of hospitals to the community environment.
Review

Community-associated meticillin-resistant *Staphylococcus aureus* strains as a cause of healthcare-associated infection

J.A. Otter*, G.L. French
The Drug-Resistant Staph Infection Known as MRSA... is spreading like wildfire...

Killing thousands upon thousands!

We urge the public not to panic.

MARGULIES
© 2007 jimhag@aol.com
MRSA in the revolving door

- **MRSA**
  - **HA-MRSA**
    - *nosocomial* MRSA
  - **CA-MRSA**
    - MRSA in the community
  - **LA-MRSA**
    - MRSA in livestock and pets
  - **HCA-MRSA**
    - Healthcare associated MRSA

- **HA-HO MRSA**
  - Hospital onset MRSA
  - >48 h from admission

- **HA-CO MRSA**
  - Community onset MRSA
  - <48 h from admission or outpatients

- **true CA-MRSA**
  - No risk factors

Risk factors:
- Previous hospital stay
- Previous antibiotic treatment
- Previous surgery
- Close contact with MRSA carriers
Le “nostre” revolving door
Figure 1. Prevalence of colonization by the different MRSA strains and mean weekly patient-days by quarter in the NICU under study, June 2009–June 2012, Palermo, Italy.

http://www.plosone.org/article/info:doi/10.1371/journal.pone.0087760
187 (25.9%) colonized by MRSA

21 CA-MRSA (11.2%)

166 (88.8%) ST22-MRSA-IVa

15 (71.4%) ST1-MRSA-IVa
2 (9.1%) ST45-MRSA-IVa
1 (4.5%) ST7-MRSA-IVa
1 (4.5%) ST8-MRSA-IVa
1 (4.5%) ST20-MRSA-IVa
1 (4.5%) ST97-MRSA-IVa
A Typical Hospital-Acquired Methicillin-Resistant *Staphylococcus aureus* Clone Is Widespread in the Community in the Gaza Strip

Asaf Biber, Izeldeen Abuelaish, Galia Rahav, Meir Raz, Liran Cohen, Lea Valinsky, Dianna Taran, Anva Goral, Abedalla Elhamdany, Gili Regev-Yochay, for the PICR Study Group

Published: August 16, 2012  •  DOI: 10.1371/journal.pone.0042864
• point-prevalence study in 26 municipal day care centres in Palermo
• nasal swabs of 500 pre-school children
• 10 children (2%) positive for MRSA from 9 different day care centers
• 8 isolates ST22-MRSA-IVa (tst1 positive, spa t223) UK-EMRSA-15 “Middle Eastern variant”
Chi è?

HA-MRSA? Ma è diverso dal Barnim clone (EMRSA15, SCC_mec IVh cipR, tst1 neg)

CA-MRSA?

E’ evoluto da tst1+MSSA ST22?

oppure

E’ stato importato dal Medio Oriente?

tst1 + ST22 MRSA IVa
Acinetobacter baumannii

Ospedale C + assistenza domiciliare

Ospedali A + B + C + assistenza domiciliare

Ospedali A + B

Clin Microbiol Infect. 2011
Figure 3.9. *Klebsiella pneumoniae*. Percentage (%) of invasive isolates with resistance to carbapenems, by country, EU/EEA countries, 2013

- **Green**: < 1%
- **Light Green**: 1% to < 5%
- **Yellow**: 5% to < 10%
- **Orange**: 10% to < 25%
- **Red**: 25% to < 50%
- **Dark Red**: ≥ 50%
- **Light Grey**: No data reported or less than 10 isolates
- **White**: Not included

**Klebsiella pneumoniae**
Figure 3.15. *Pseudomonas aeruginosa*. Percentage (%) of invasive isolates with resistance to carbapenems, by country, EU/EEA countries, 2013.
Figure 3.19. *Acinetobacter* spp. Percentage (%) of invasive isolates with resistance to carbapenems, by country, EU/EEA countries, 2013

- Green: < 1%
- Light green: 1% to < 5%
- Yellow: 5% to < 10%
- Orange: 10% to < 25%
- Red: 25% to < 50%
- Dark red: ≥ 50%
- Grey: No data reported or less than 10 isolates
- White: Not included

Non-visible countries:
- Liechtenstein
- Luxembourg
- Malta
Epidemiological features of producers of Klebsiella pneumoniae carbapenemases by country of origin

The Lancet Infectious Diseases, Volume 13, Issue 9, 2013, 785 - 796
Acinetobacter baumannii sepsis is fatal in medical intensive care unit patients: six cases and review of literature

Klebsiella pneumoniae carbapenemase-producing Klebsiella pneumoniae in the intensive care unit: a real challenge to physicians, scientific community, and society

Colistin: an update on the antibiotic of the 21st century

Anaesth Intensive Care. 2014 Sep;42(5):666-8
Shock. 2013 May;39 Suppl 1:32-7
ECDC Surveillance report

- Treatment alternatives for patients infected with bacteria showing combined resistance to carbapenems and other key antimicrobials are confined to combination therapy and to older antimicrobials such as polymyxins.

- The reporting of isolates with polymyxin resistance, especially in countries with already high levels of carbapenem resistance, is an indication of the further loss of effective antimicrobial treatment options.
Outbreak of infection with \textit{Klebsiella pneumoniae} ST 258 producing KPC3 in an intensive care unit in Italy

Ongoing spread of colistin-resistant \textit{Klebsiella pneumoniae} in different wards of an acute general hospital, Italy, June to December 2011

\textbf{2008}

\textbf{2011}
Is the monoclonal spread of the ST$_{258}$, KPC-3 producing clone being replaced in southern Italy by the dissemination of multiple clones of carbapenem non susceptible, KPC-3 producing *Klebsiella pneumoniae*?*

Sequence types; numero di isolati

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*Accettato per la pubblicazione su Clinical Microbiology and Infection*
Are you ready for a world without antibiotics?

International Travel and Acquisition of Multidrug Resistant Organisms

The Guardian, Thursday 12 August 2010

Acquisition of carbapenemase-producing Enterobacteriaceae by healthy travellers to India, France, February 2012 to March 2013. Euro Surveill. 2014;19 [14]
Antibiotic resistance: The last resort
Are you ready for a world without antibiotics?

Carbapenemase-producing *Enterobacteriaceae* and non-*Enterobacteriaceae* strains, plasmids and genes from animals and the environment: an emerging public health risk of our own making?

FROM THE FARM AND BACK AGAIN

The liberal use of antibiotics on pig farms has been implicated in the transmission of methicillin-resistant Staphylococcus aureus (MRSA), but tracing the origin of an infection is tricky.

Pigs fed antibiotics are known to spread MRSA to farmworkers, and MRSA strains show up in meat products, but it is unclear whether this is a significant source of human infection.

MRSA strains historically associated with hospital and community infections have also turned up on farms.

With so much movement, the distinctions between MRSA strains from hospitals, communities and livestock are breaking down.

MRSA infections in humans have been acquired mainly in hospitals or in community settings.

MRSA: Farming up trouble
Nature 2013
Methicillin-Resistant *Staphylococcus aureus*: A Food-Borne Pathogen?

- **The Netherlands:**
  - Pork: CC398, CC8, CC45
  - Beef/veal: CC398, ST1, CC80, CC5, CC45
  - Milk: CC398
  - Poultry meat: CC398, CC9
  - Lamb/fowl/mutton: CC398
  - Game birds: non-CC398

- **Canada:**
  - Pork: C5, CC8, CC398
  - Beef/veal: C5
  - Poultry meat: C5

- **United States:**
  - Pork: CC398, ST2007, CC8, CC5
  - Beef/veal: C5, CC8
  - Milk: C5, CC8
  - Poultry meat: CC8

- **South Korea:**
  - Pork: ST72
  - Beef/veal: ST72, ST1
  - Milk: ST5, ST72, ST1
  - Poultry meat: ST692, CC5
  - Fish: ST72, ST1

- **Spain:**
  - Pork: CC398
  - Beef/veal: C5, CC398
  - Poultry meat: ST125
  - Rabbit meat: ST125
  - Wild boar: ST217

- **Thailand:**
  - Pork: CC9

- **Denmark:**
  - Pork: CC398
  - Beef/veal: CC398
  - Poultry meat: CC398, CC9, CC5, CC45

- **Germany:**
  - Pork: CC398
  - Beef/veal: CC398
  - Milk: CC398
  - Poultry meat: CC398, CC9, CC5, ST1791

- **Turkey:**
  - Milk: ST239, CC8

- **Japan:**
  - Milk: CC5, CC398
  - Fish: CC8

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Human and Avian Extraintestinal Pathogenic *Escherichia coli*: Infections, Zoonotic Risks, and Antibiotic Resistance Trends

Extra-intestinal Pathogenic *E. coli*

- **Human infections**
- **Zoonotic risks**
- **Avian infections**

Humans
- UPEC
- NMEC
- SEPEC

Transfer of virulence and ATB-resistance genes

Poultry meat

Birds
- APEC

UTI
- Sepsis
- Meningitis

Human ExPEC-like

- Airsacculitis
- Salpingitis
- Cellulitis
- Sepsis
2013 - 2014

163 campioni di carne o di prodotti a base di carne di pollo in vendita al dettaglio a Palermo

134 (82,2%) positivi per isolati resistenti ad aminoglicosidi, fluorochinoloni e 3GC (MDR)

22 isolati MDR positivi per status ExPEC
The “One Health” approach

The One Health concept recognizes the interrelationship between animal, human and environmental health.
Ringraziamenti

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