The microbial challenge – An emerging threat to human health

A proposal from Sweden and Italy for a Joint Programming Initiative focusing on

Antimicrobial Resistance

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Antimicrobial resistance: an alarming problem

Antibiotics revolutionized medicine

US 1950's The introduction of penicillin increased the chance of survival of pneumonia patients from 25% to 80%

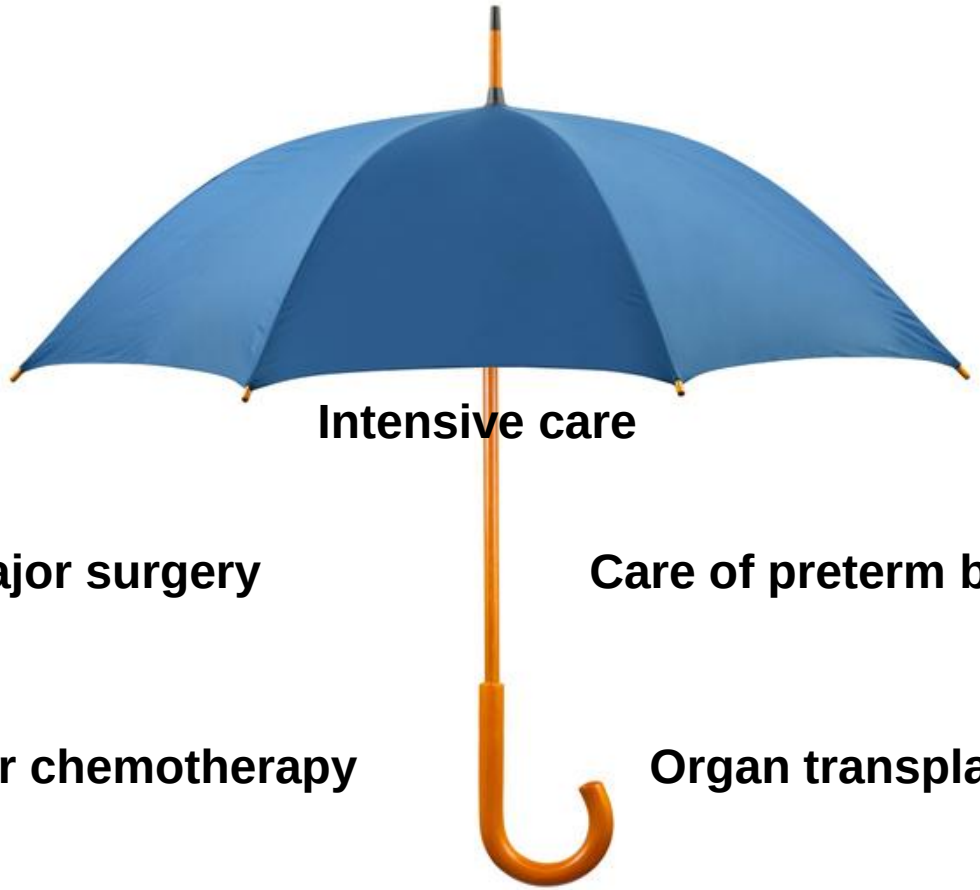
Antibiotic resistance is now turning back the clock

Tanzania 2000's Antibiotic resistance has decreased the rate of survival from neonatal gram-negative infections from 70% to 20%

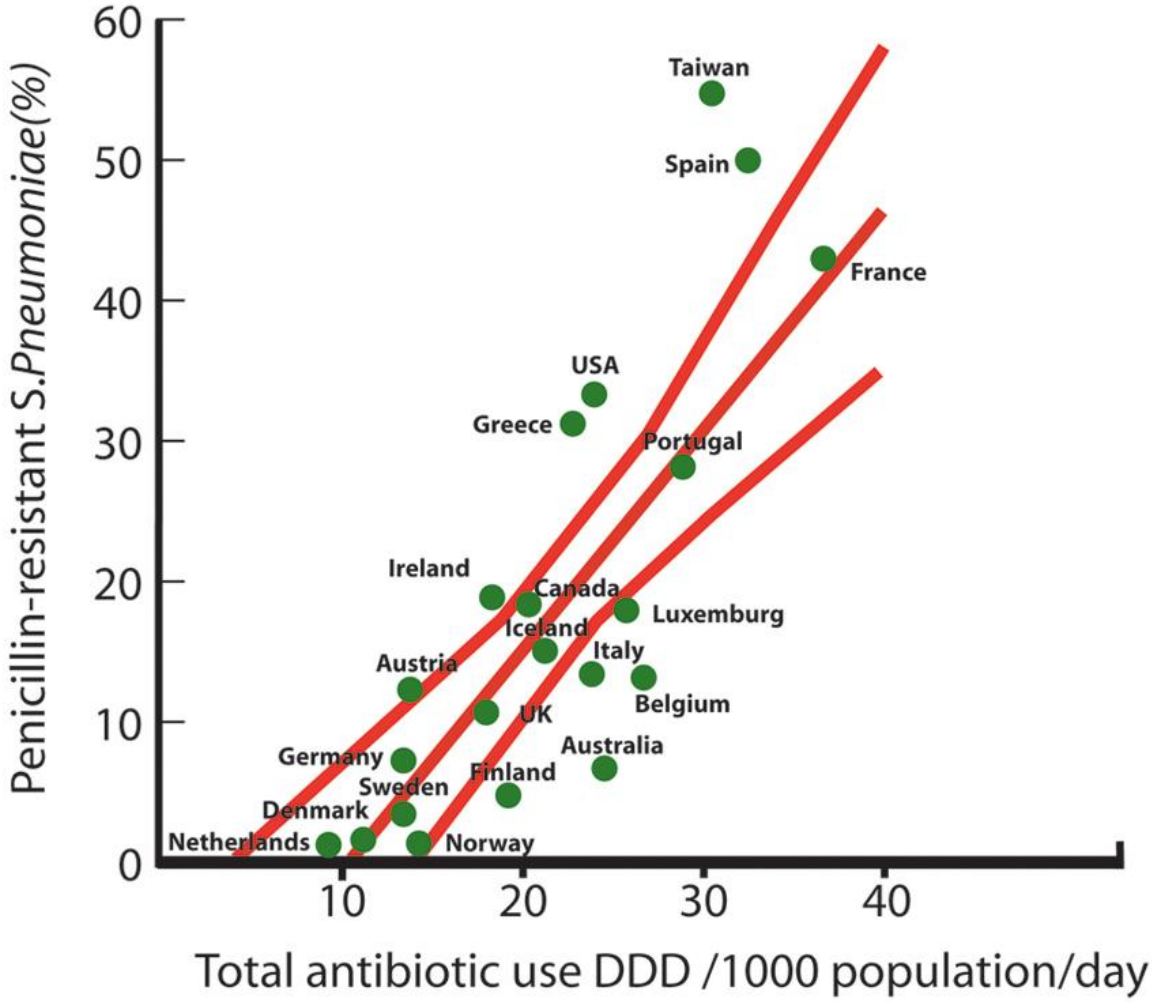
In the EU, **more than 25 000 patients** die from multidrug resistant bacteria annually (EMA/ECDC report)

Extra health-care costs and productivity losses of **at least 1,5 billion EURO per year**

Modern medicine is built on access to effective antibiotics

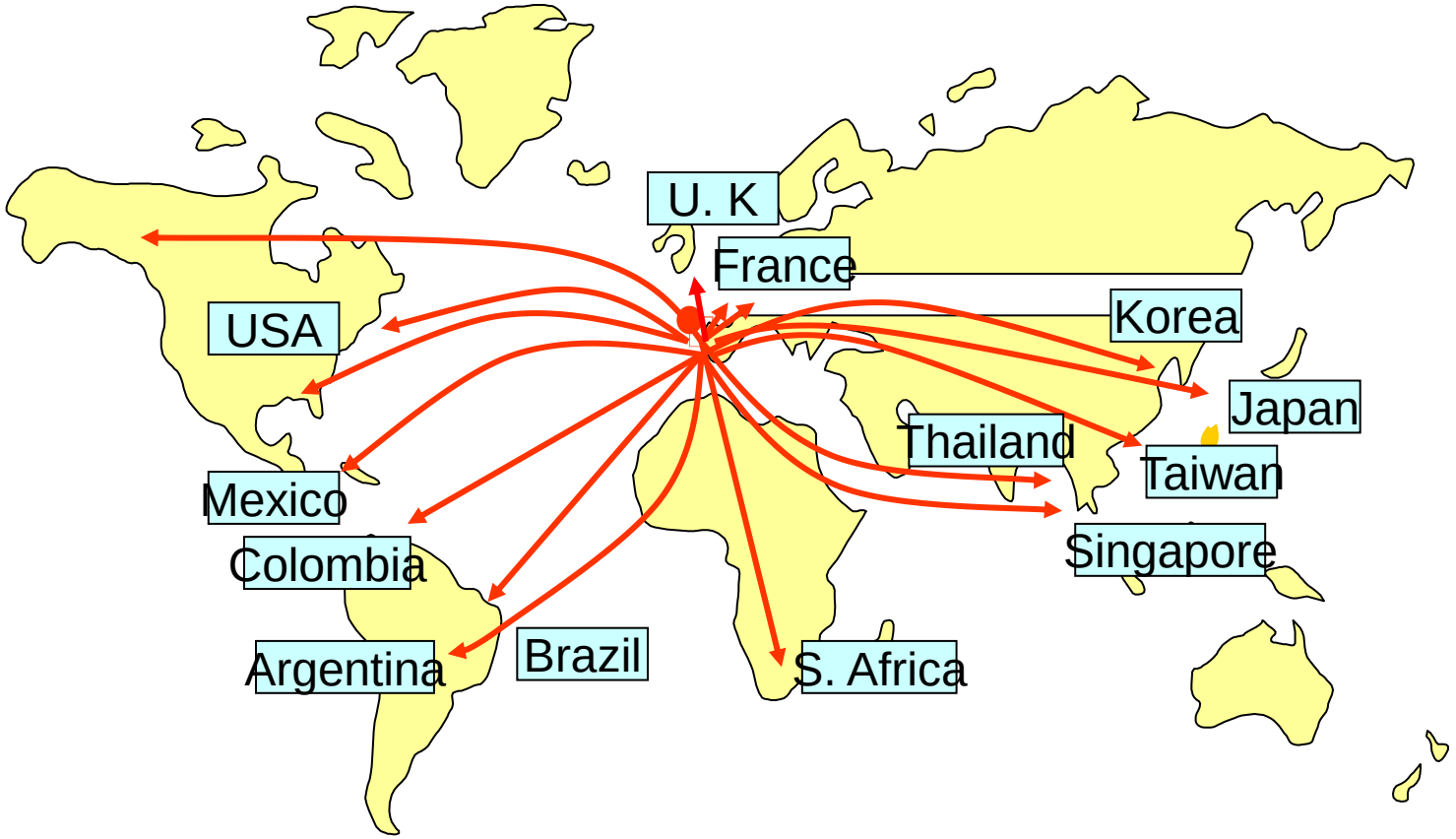


“The more we use them, the more we lose them…”



A global problem!

Worldwide spread of the 23F clone of penicillin resistant pneumococci



NDM-1 bacteria – the new superbug

”Alarm over unbeatable enzyme that could make all bacterial diseases resistant to antibiotics” Daily mail UK

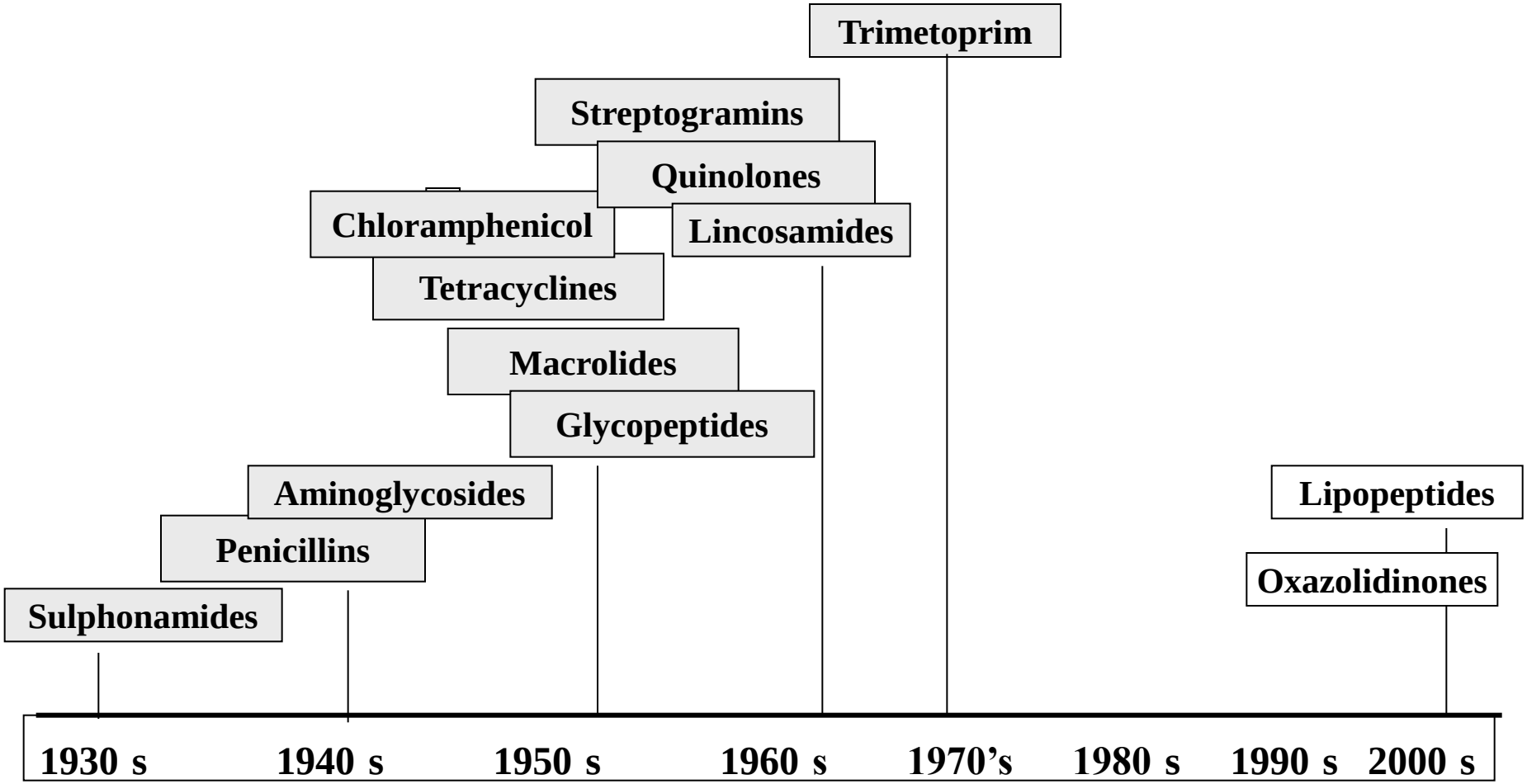
“Deadly Superbug NDM-1 bacteria gene resistant to most powerful antibiotics” USA today

The NDM-1 gene codes for a enzyme that neutralizes the effects of a family of antibiotics called **Carbapenems**

- Carbapenems commonly used in critically ill patients with severe infections where no other antibiotic help
- Originated in India and have now spread to UK, US, Canada, Australia, Sweden, Pakistan, Bangladesh, The Netherlands…..
- NDM-1 gene present on plasmids in the bacteria and can spread to other bacteria with horizontal transfer

- Nightmare scenario is the spreading of the resistance gene to bacteria that are already resistant to all other types of antibiotics
- No new drugs against Gram-negative bacteria in the pipeline!

Declining drug development



By courtesy of Dr. Liselotte Diaz Högberg

Recent initiatives in the AMR field

International conference during the Swedish EU presidency 2009:

”Innovative incentives for effective antibacterials”

Vinnova Report: Bad Bugs - Future Drugs?
Mossialos Report: Policies and incentives for promoting innovation in antibiotic research
ECDC/EMEA, Joint Technical Report: The bacterial challenge

Council conclusions on innovative incentives for effective antibiotics:
”Calls upon the Member States and the Commission to support the sharing of research infrastructure, recruitment of researchers, stimulation and support of global research cooperation, increasing spread of research results and knowlegde through exchange structures and considering existing and new financial instruments”

Trans Atlantic Task Force on Antimicrobial Resistance – TATFAR

Recent initiatives in the AMR field

Follow-up conference sept 2010 organised by ReAct:

"The global need for effective antibiotics – moving towards concerted action"

190 delegates from 45 different countries

- ***Joint actions is crucial in order to ensure effective treatment of infections for future generations***

- ***AMR is by nature a universal, global problem, that, just like global warming, requires global action***

- ***Concerted action is needed now!***

2011 World health day devoted to Antimicrobial resistance

WHO | WHO urges countries to take measures to combat antimicrobial resistance

World Health Organization

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News release

WHO urges countries to take measures to combat antimicrobial resistance

Be alert to antimicrobial resistance

20 AUGUST 2010 | GENEVA -- Antimicrobial resistance (AMR) - the ability of micro-organisms to find ways to evade the action of the drugs used to cure the infections they cause - is increasingly recognised as a global public health issue which could hamper the control of many infectious diseases. Some bacteria have developed mechanisms which render them resistant to many of the antibiotics normally used for their treatment (multi-drug resistant bacteria), so pose particular difficulties, as there may be few or no alternative options for therapy. They constitute a growing and global public health problem. WHO suggests that countries should be prepared to implement hospital infection control measures to limit the spread of multi-drug resistant strains and to reinforce national policy on prudent use of antibiotics, reducing the generation of antibiotic resistant bacteria.

An article published in *The Lancet Infectious Diseases* on 11 August 2010 identified a new gene that enables some types of bacteria to be highly resistant to almost all antibiotics. The article has drawn attention to the issue of AMR, and, in particular, has raised awareness of infections caused by multi-drug resistant bacteria.

Related links

More information on antimicrobial resistance

Facts:

- Antibiotics used excessively
- Increasing number of resistant strains
- Great societal costs
- Less drugs being produced
- Global problem

Joint Programming Initiative!

“Road map”

Meeting in Stockholm on 9 February 2010
(43 participants from 15 nations and the European Commission)

Work Group formed at the Stockholm meeting
(12 individuals from 9 nations actively providing input and feedback)

Draft presented at the GPC meeting on 19 March 2010

Work Group Meeting in Brussels on 6 April 2010

Proposal submitted by Sweden and Italy on 21 April 2010

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A Joint Programming Initiative on Antimicrobial Resistance

The Lancet 2005:
About 70% of the bacteria causing serious blood infections in newborn babies in the developing world cannot be treated with the antibiotics recommended by the WHO.

Will this be true also in Europe?

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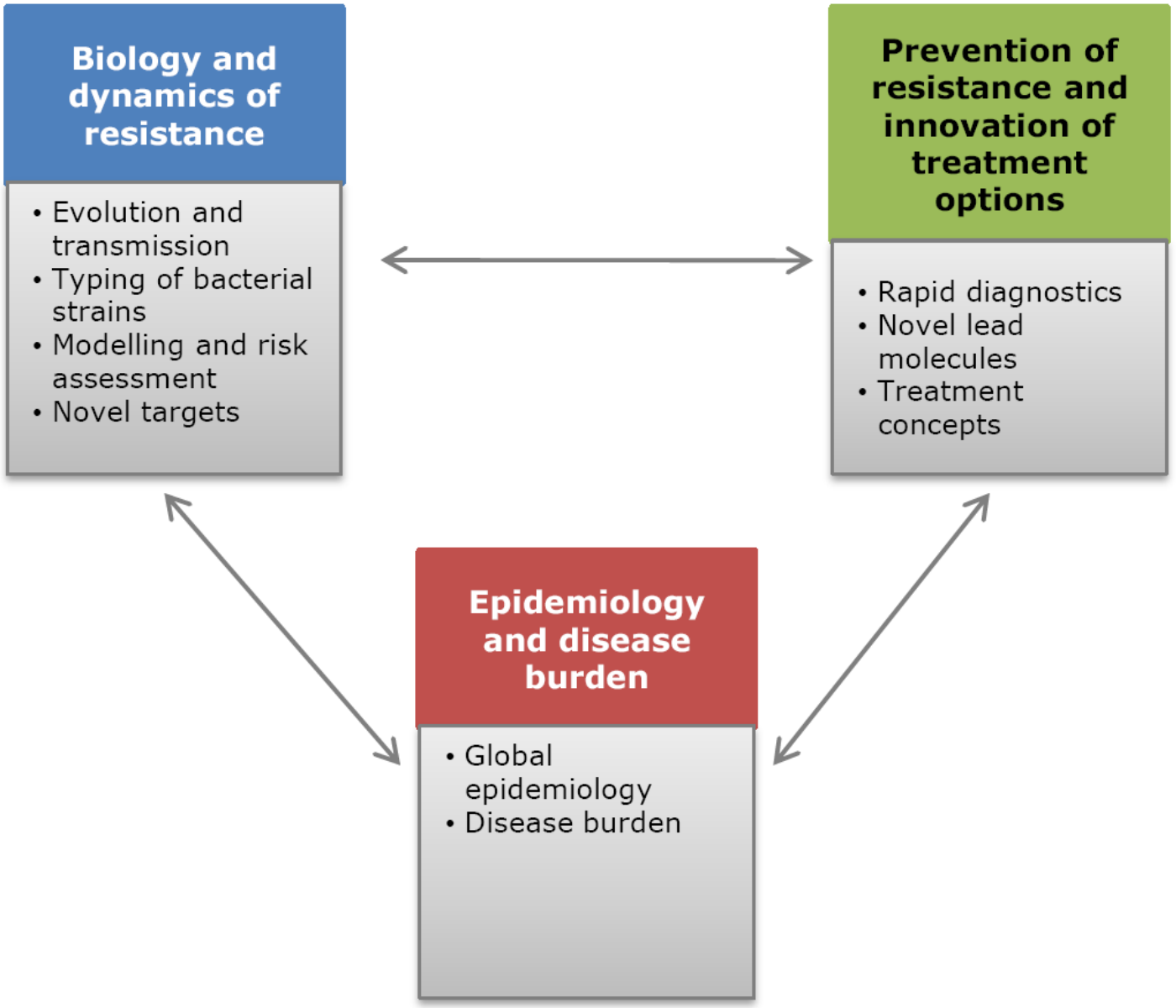
A Joint Programming Initiative
proposed by
Sweden and Italy

Proposal based on the active contribution by individuals and organisations representing: Belgium, France, Ireland, Italy, the Netherlands, Poland, Romania, Spain, Sweden, Turkey, and the United Kingdom


Biology and dynamics of resistance
• Evolution and transmission
• Typing of bacterial strains
• Modelling and risk assessment
• Novel targets
Prevention of resistance and innovation of treatment options
• Rapid diagnostics
• Novel lead molecules
• Treatment concepts
Epidemiology and disease burden
• Global epidemiology
• Disease burden

Biology and dynamics of resistance

- Evolution and transmission
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Biology and dynamics of resistance

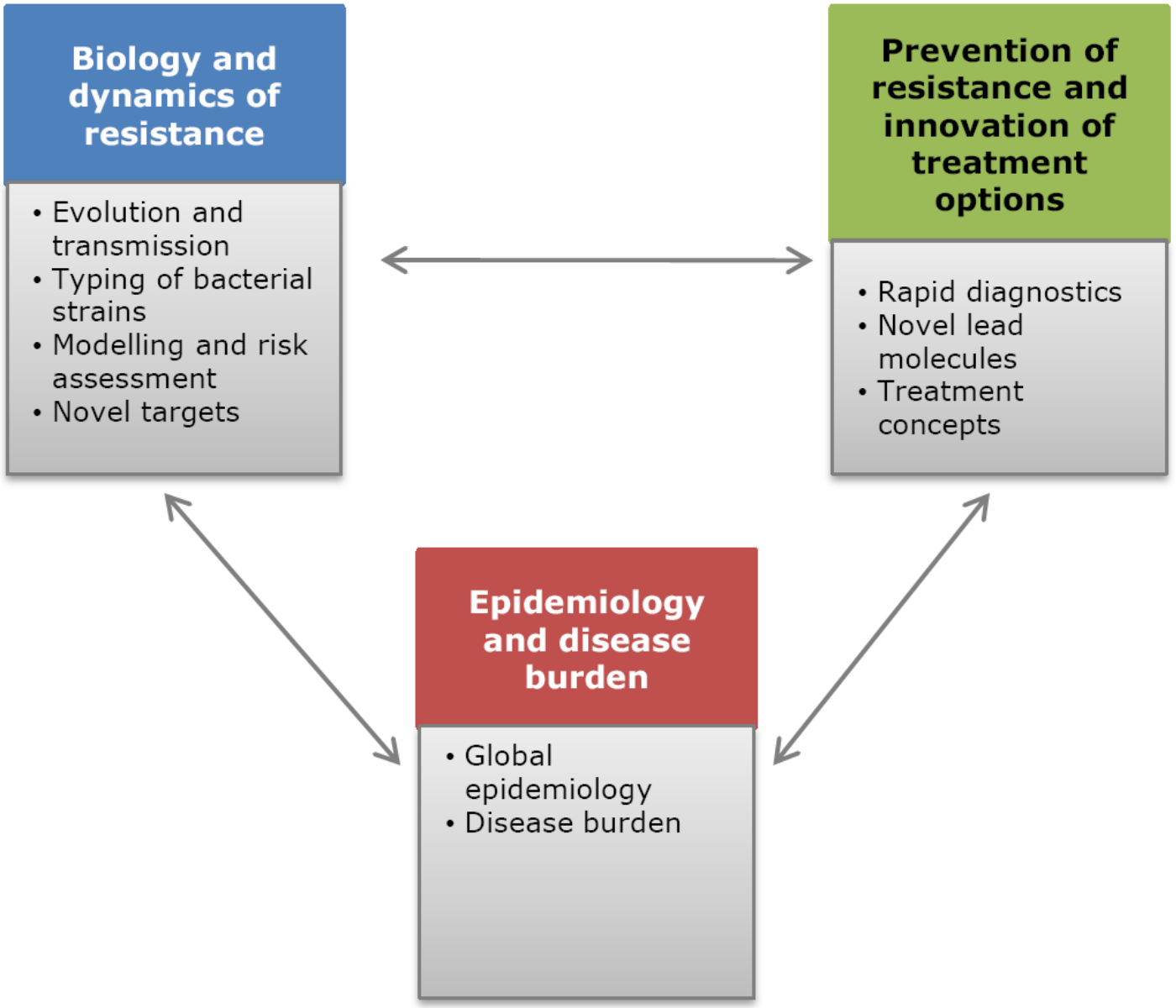
The aim is to understand the underlying biology of those factors most important in influencing the emergence and spread of resistant infectious micro-organisms within and between humans as well as from animals and the environment.

Prevention of resistance and innovation of treatment options

The primary aim is to reduce the need for antibiotics through disease prevention, refined treatments, alternative treatments, and rapid diagnostics of pathogens and resistance patterns.

Epidemiology and disease burden

The aim is to increase knowledge of the global prevalence and spread of different infectious microorganisms and to estimate the financial and societal burden of disease.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Governance structure

a. Management Board
b. Executive Board
c. Scientific Advisory Board
d. Secretariat

Implementation

Implementation

Pre-implementation phase (Sept – prel. December 2010)

Objectives:

- to establish a temporary secretariat to support the implementation activities
- to establish a temporary Implementation Group
- to identify Member States interested in participating in the JPI
- to identify stakeholders
- to identify key individuals as candidates for the Scientific Advisory Board and as JPI Director
- organize a first meeting with stakeholders and interested Members States in the end of October

Implementation

Implementation phase (prel. January – June 2011)

Objectives:

• to establish the full governance structure – 2nd meeting in beginning of January

• to provide a draft of a Strategic Research Agenda (including work packages, deliverables and milestones) based on the proposed Research Questions

• to begin financial considerations

• to link to other initiatives with common interests

Thank you for your attention!