



Prof Christian Lovis, MD MPH - Dr Dirk Colaert, MD -  
Prof Henning Müller, PhD



# Detecting and Eliminating Bacteria Using Information Technology





## The Project in short

FP7 funded project (Framework Program 7)

Research initiative from the European Union

DebugIT project proposal was ranked first in its call

Start: Jan 1<sup>st</sup>, 2008

End: December 31<sup>st</sup>, 2011

11 Partners

11 Work packages

Total EU funding of the project 7M€





## The Partners

- 1 Agfa Agfa HealthCare N.V.
- 2 HUG Les Hôpitaux universitaires de Genève
- 3 UNIGE Université De Genève
- 4 LIU LINKÖPINGS UNIVERSITET
- 5 EMP Empirica
- 6 UCL University College London
- 7 INSERM Institut National de la Santé et de la Recherche Médicale
- 8 UKLFR Universitätsklinikum Freiburg
- 9 TEILAM TECHNOLOGIKO EKPEDEFTIKO IDRIMA LAMIAS
- 10 IZIP IZIP A.S.
- 11 GAMA Gama/Sofia Ltd.





## Clinical context

Antibiotic resistance is a consequence  
of evolution via natural selection

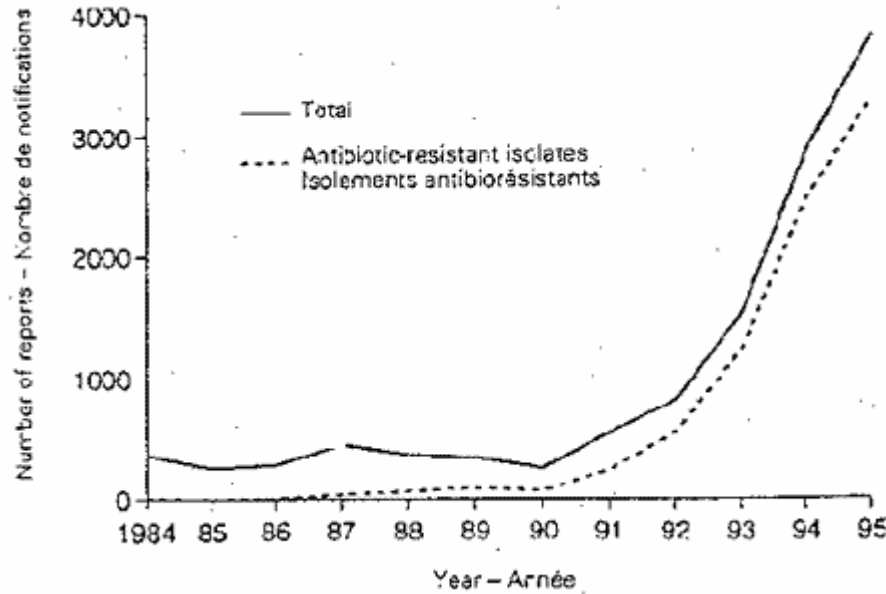
Antibiotic action is an environmental pressure

- patterns of antibiotic usage greatly affect the number of resistant organisms developing
- overuse of broad-spectrum antibiotics
- incorrect diagnosis
- unnecessary prescriptions
- improper use of antibiotics
- use of antibiotics as livestock food additives for growth promotion
- counterfeited drugs

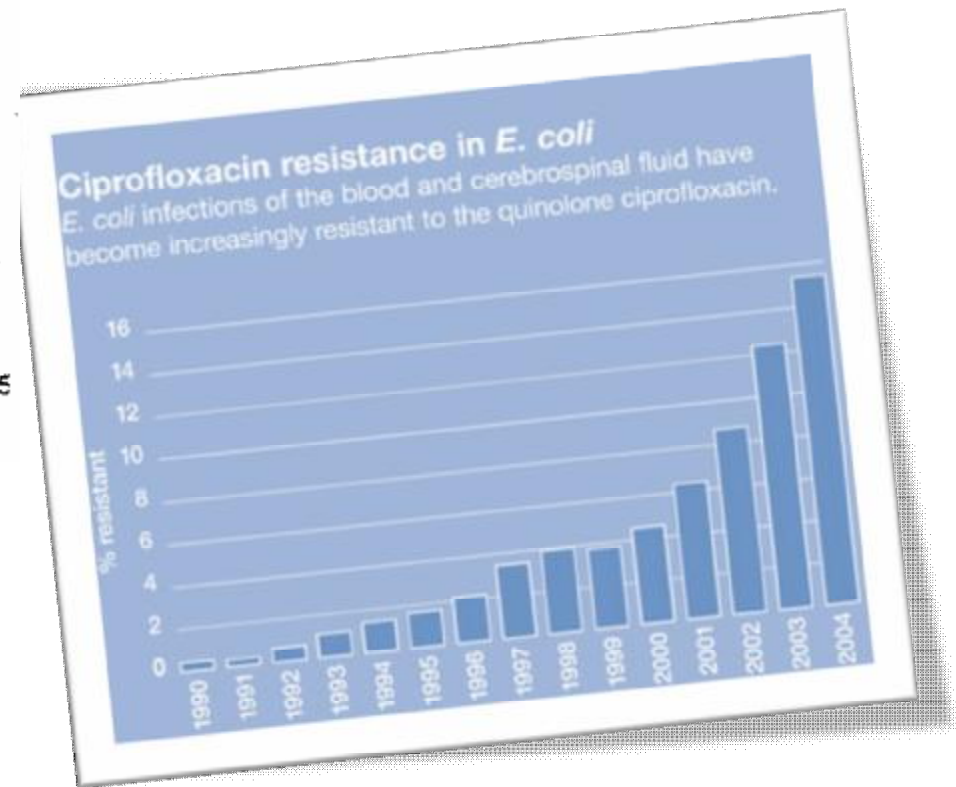


# Clinical context

*antibiotic resistance in Salmonella typhimurium DT104, England and Wales, 1984-1995*

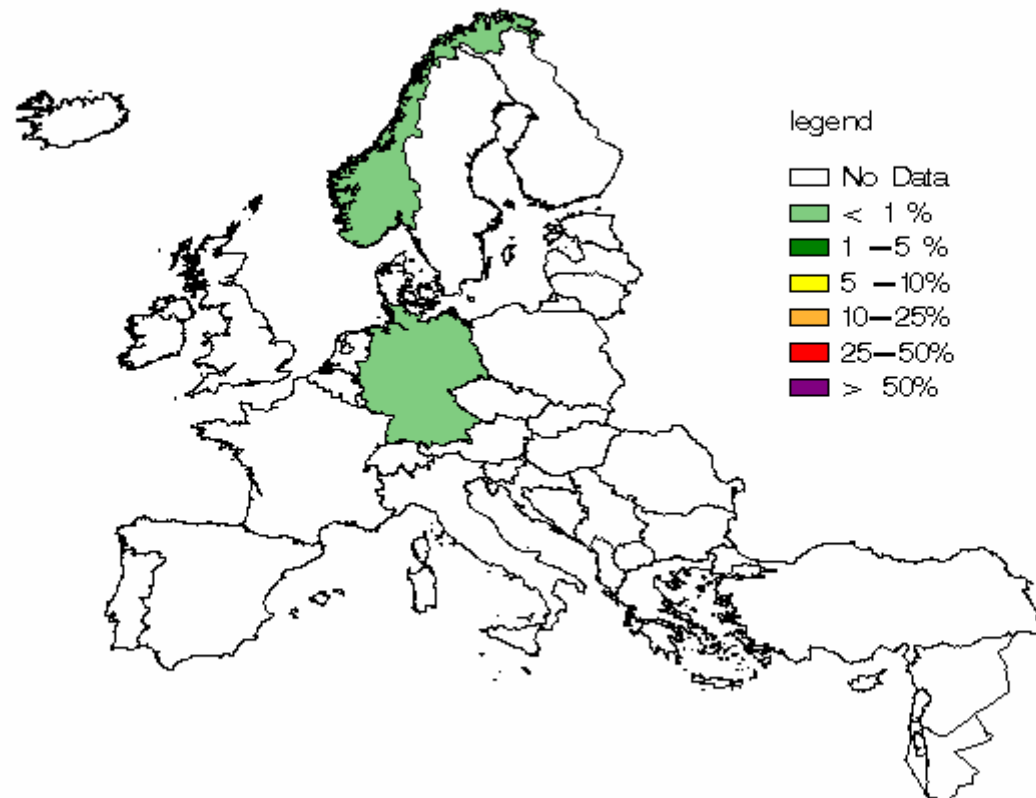


*WHO Weekly Epidemiological Record,  
Vol 71, No 18, 1996*



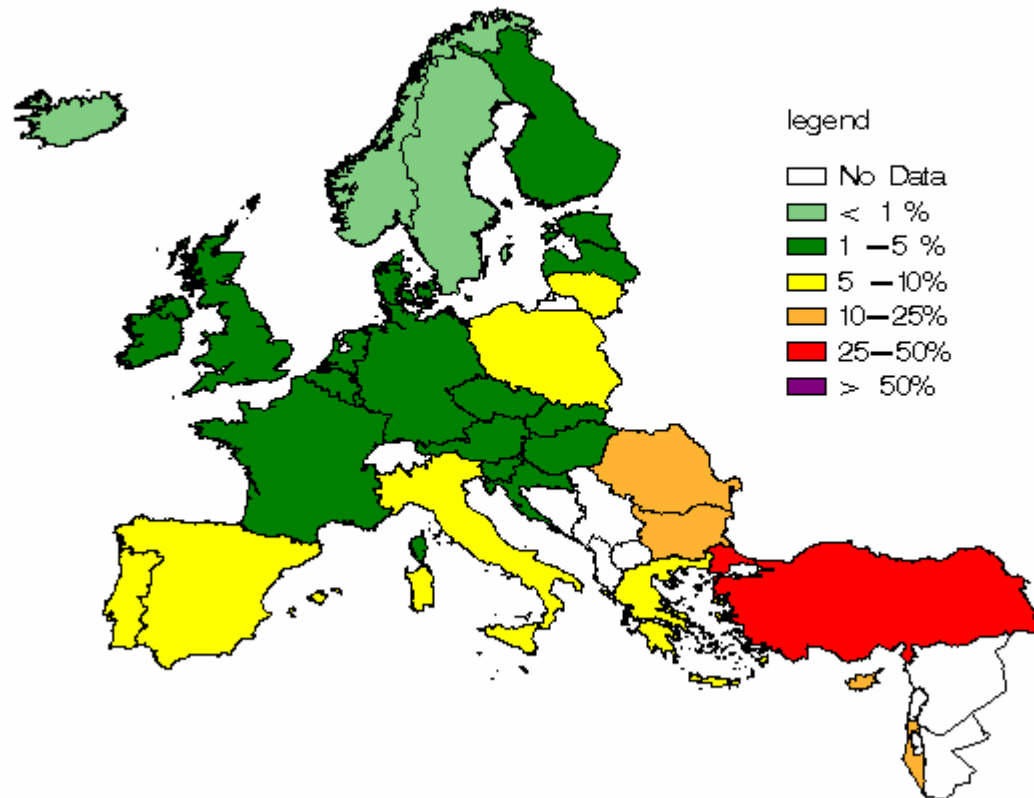
# Clinical context

Proportion of 3rd gen. oeph. resistant E. coli isolates in participating countries in 1999  
 (c) EARSS



# Clinical context

Proportion of 3rd gen. cephalosporin resistant *E. coli* isolates in participating countries in 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007  
(c) EARSS

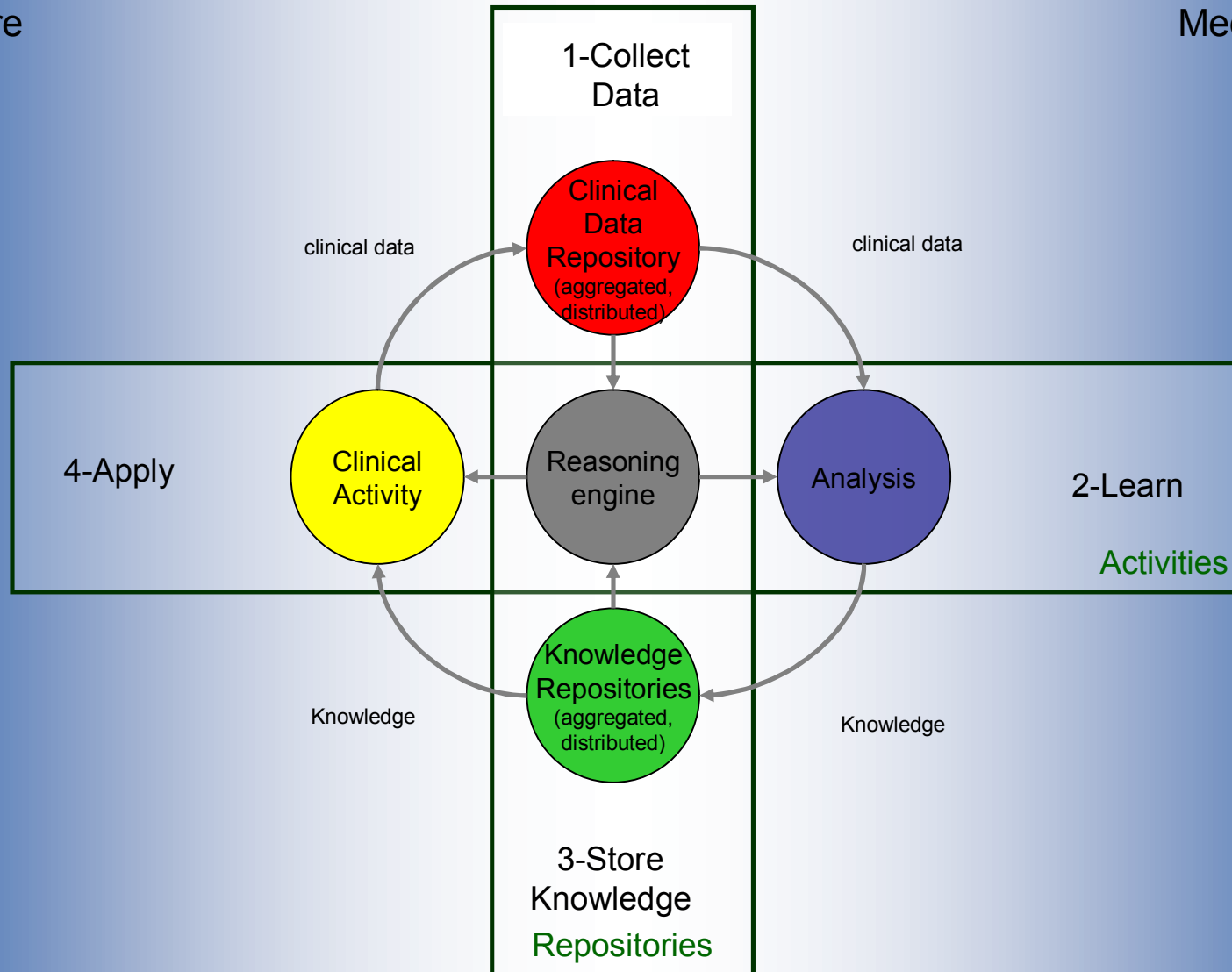




# The DebugIT project

Clinical Care

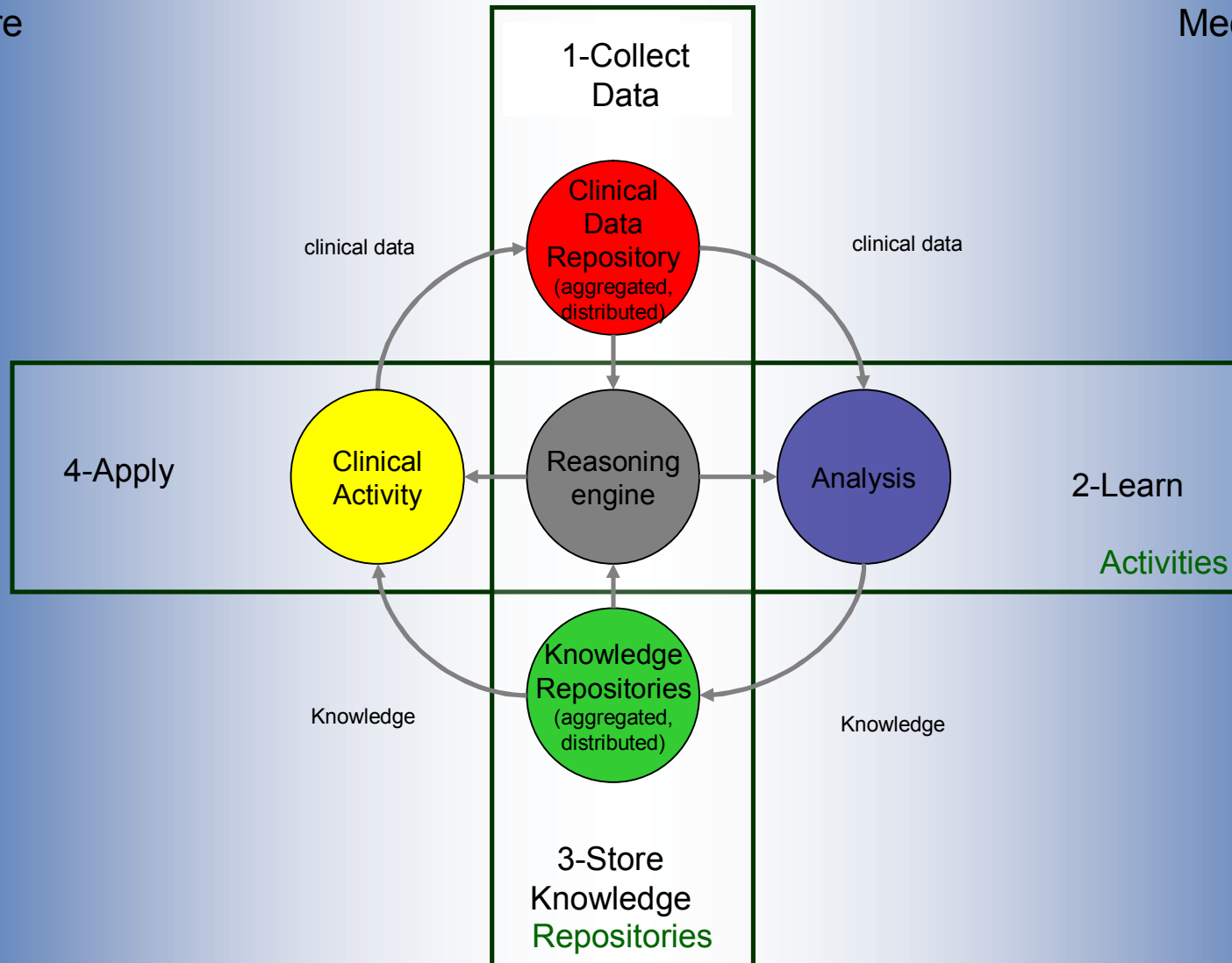
Medical research



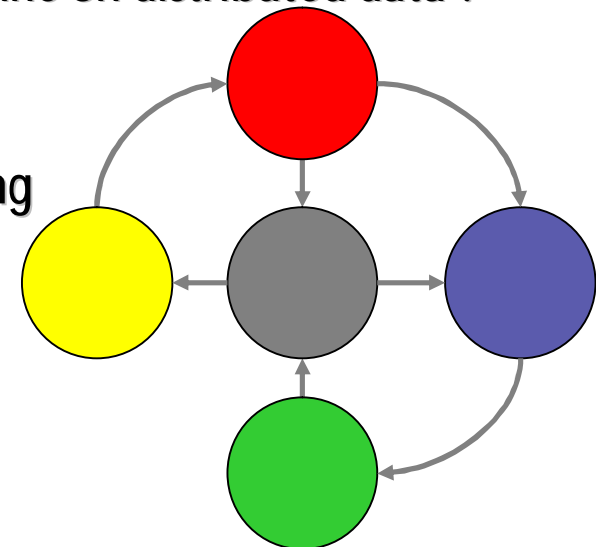
# The Translational Framework

Clinical Care

Medical research



- **Technological**
  - Interoperability
  - Clinical Data Repository Formalism
  - Federated Data Mining
    - Collect everything and mine afterwards or mine on distributed data ?
  - Multimodal Data Mining
    - Structured, unstructured, images, ...
  - Data Mining steered by knowledge/reasoning
  - Federated Knowledge Repository
    - Multi format, multi source
  - Reasoning
    - Statistical + logical
    - Performance
    - Formalism and decidability



- **Functional**
  - Representation of Knowledge
  - Integration in Clinical Systems
  - Usability
- **Medical Research**
  - Strict clinical trials versus 'real data' mining
    - a "nice picture of a dirty world"
    - applicability and usefulness of results
    - the "context" problem

