The End of the Welfare State

Basic Research

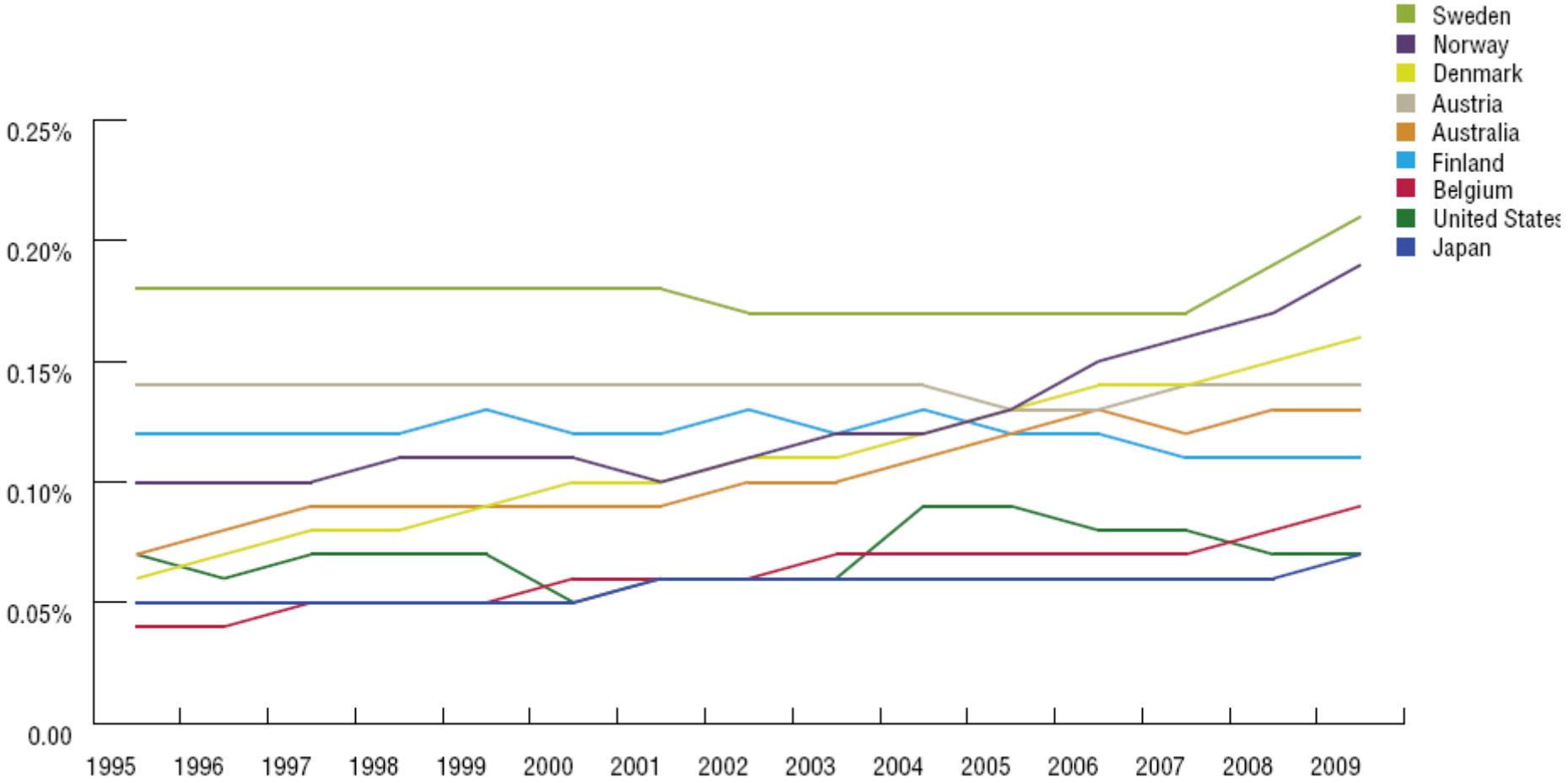
Paul Volders, MD, PhD, FESC

EUROPEAN Heart Rhythm ASSOCIATION

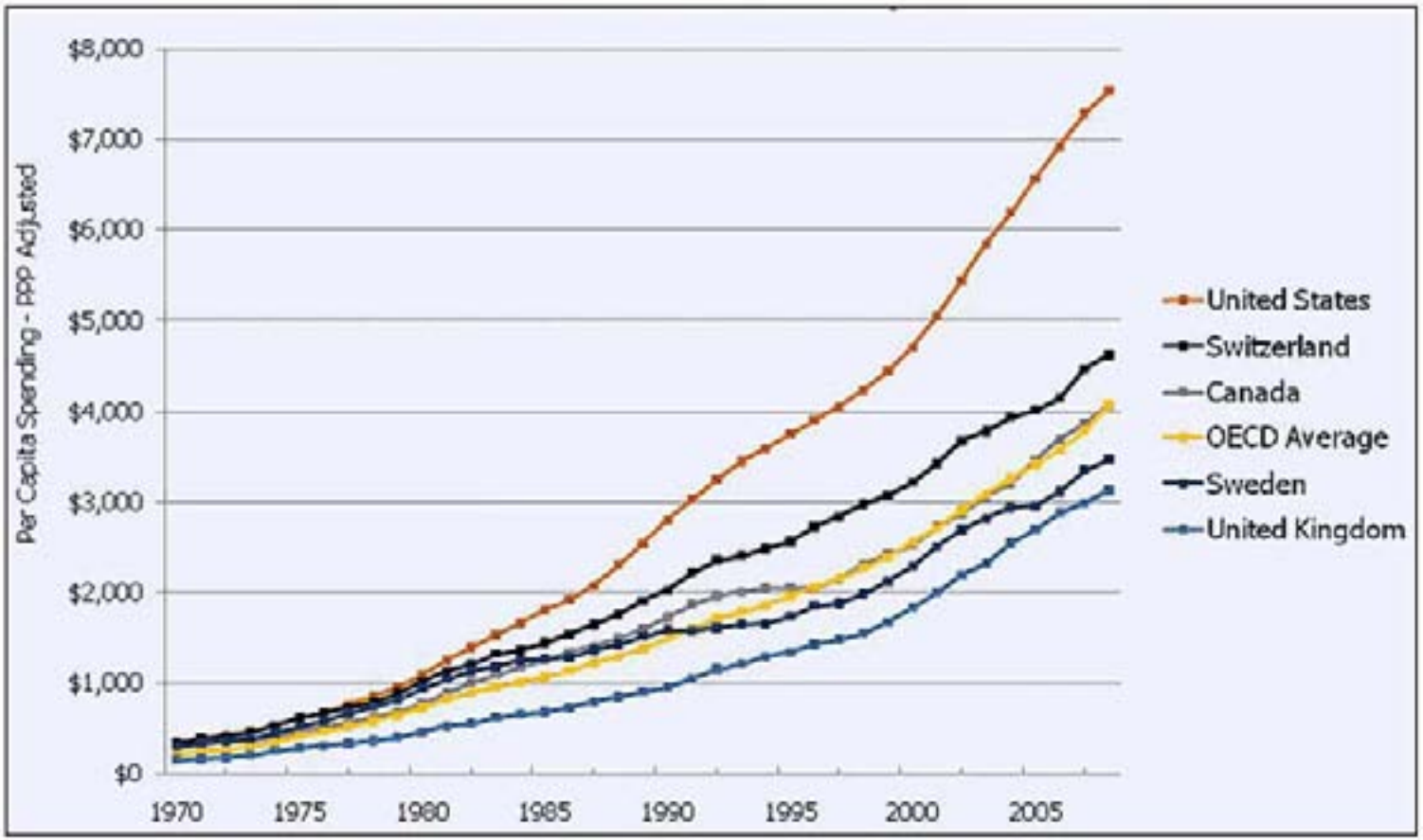
EUROPEAN SOCIETY OF CARDIOLOGY

No financial interests to disclose

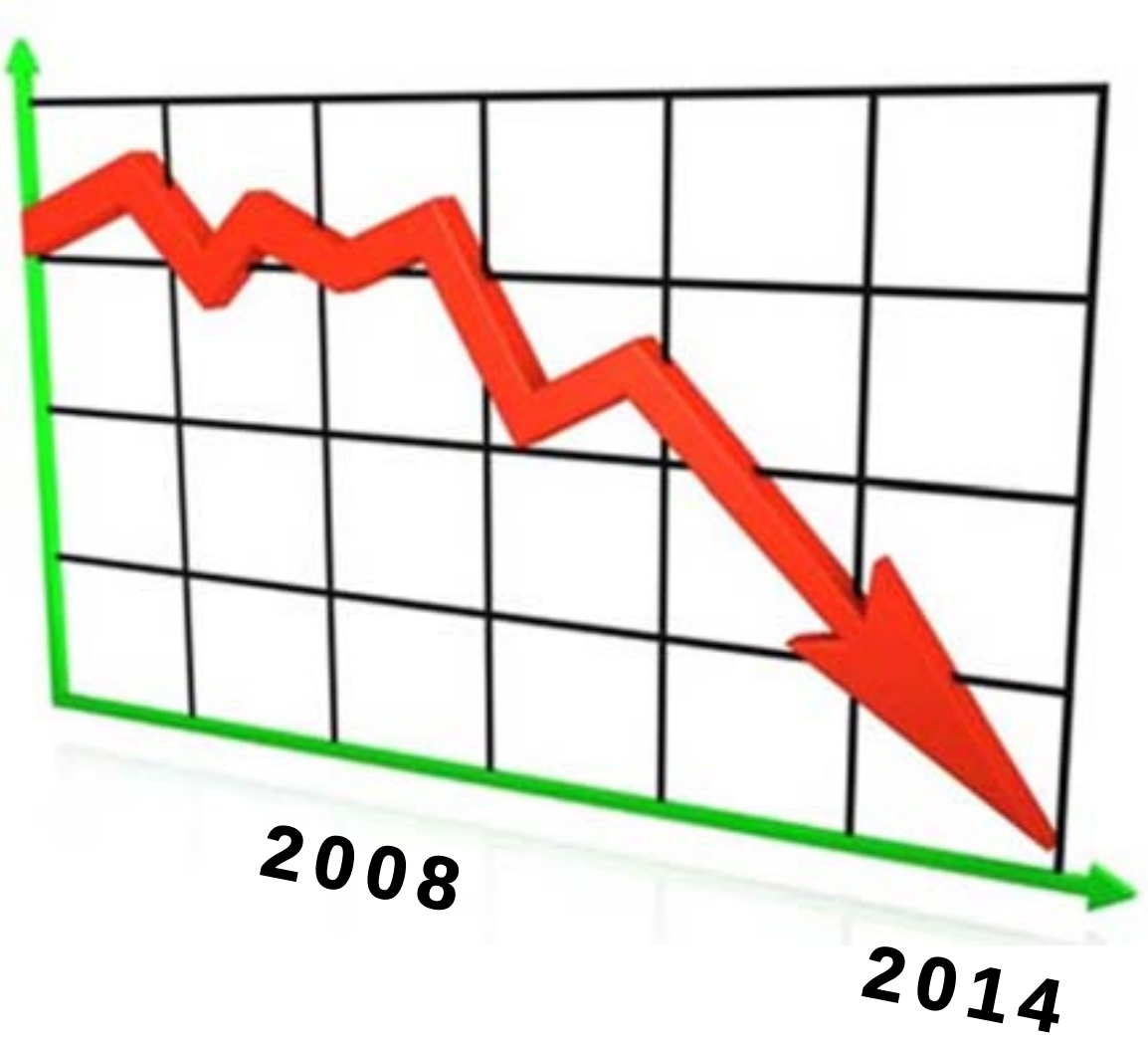
Government Funding of Medical Science Performed by the Academic and Non-Profit Sectors; Share of GDP



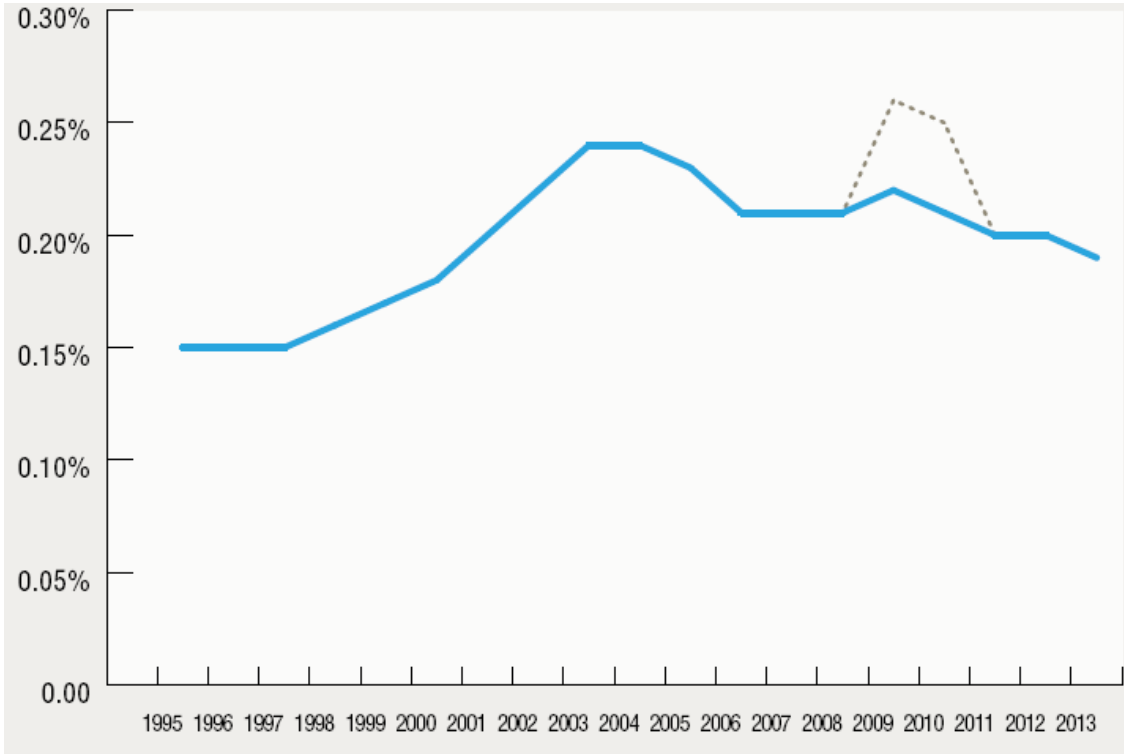
Growth in Total Health Expenditure Per Capita

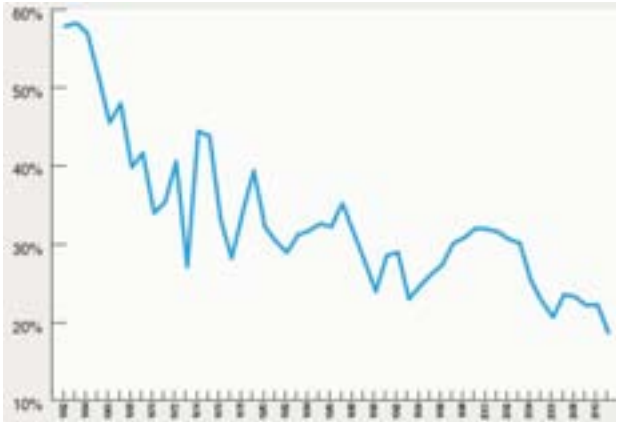


The End of the Welfare State



NIH Appropriation; Share of GDP / Grant Application Success Rates





Additional International Developments

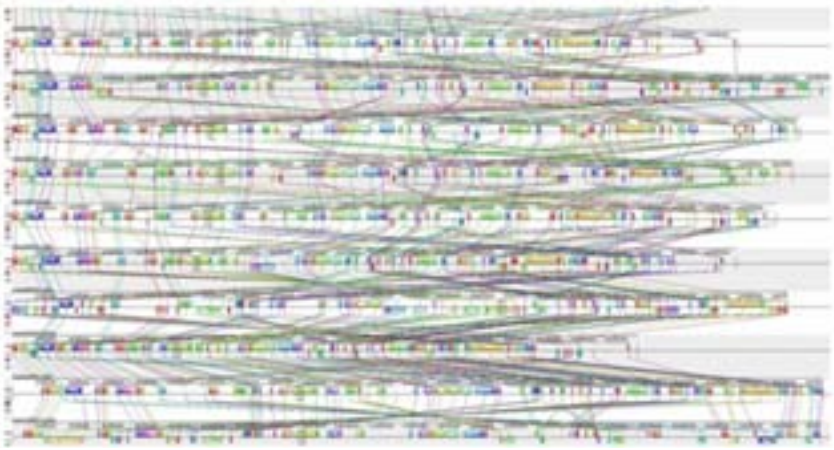
- **Intensified global competition: China, Germany, India, Singapore, Sweden, United Kingdom, and other countries have recognized that life sciences represent a high-wage, high-growth industry**

- **Some of these countries not only expended financial support for biomedical research, but also implemented tax incentives, regulatory reforms to speed drug approvals, and immigration and education policies to attract the best life-sciences talent**

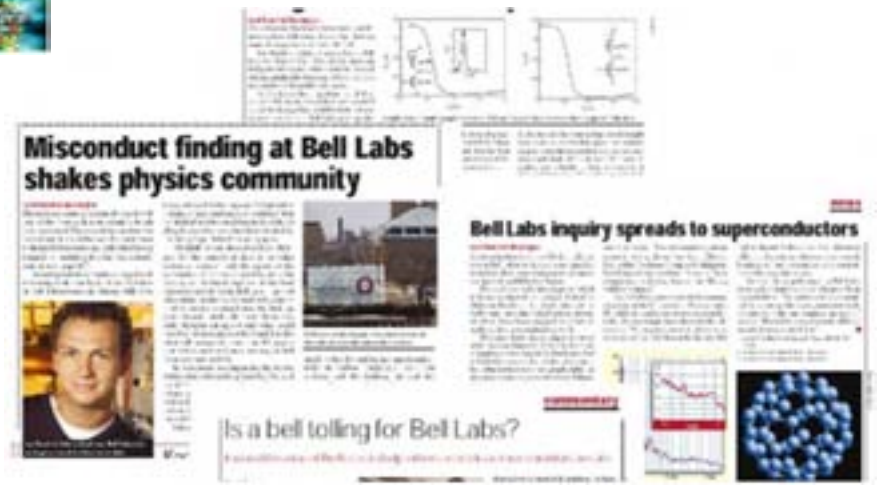
- **E.g., China has identified biotechnology as one of seven key strategic and emerging pillar industries, and has pledged to invest $308.5 billion in the period 2012-2017**

Phenomenal Challenges That Require Strong Basic-Science and Translational Research

Phenomenal Challenges That Require Strong Basic-Science and Translational Research



Additional challenges …



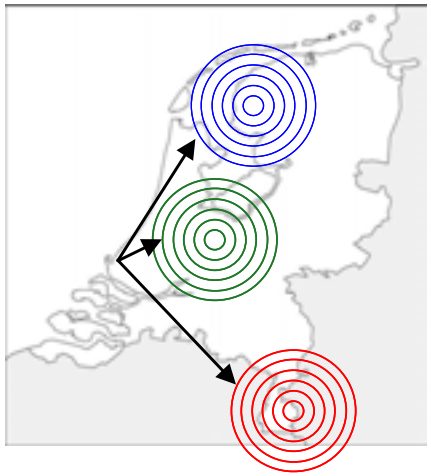
Consequent developments, examples from the UK and NL

Reneman et al. *Eur Heart J.* 2013

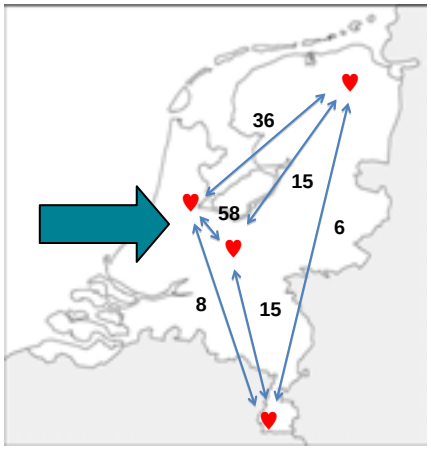
The Netherlands CardioVascular Research Initiative

Steering towards synergy and impact.

From



to



Reneman et al. *Eur Heart J.* 2013

The Netherlands CardioVascular Research Initiative

Steering towards synergy and impact.

Successful when:

- The best basic and clinical cardiovascular scientists in a country collaborate in integrated research consortia, elucidating mechanisms underlying CV diseases and solving problems in patient care
- The PIs in these consortia have succeeded in establishing integrated research programs that are more than the management of individual projects

Reneman et al. *Eur Heart J.* 2013

The Netherlands CardioVascular Research Initiative

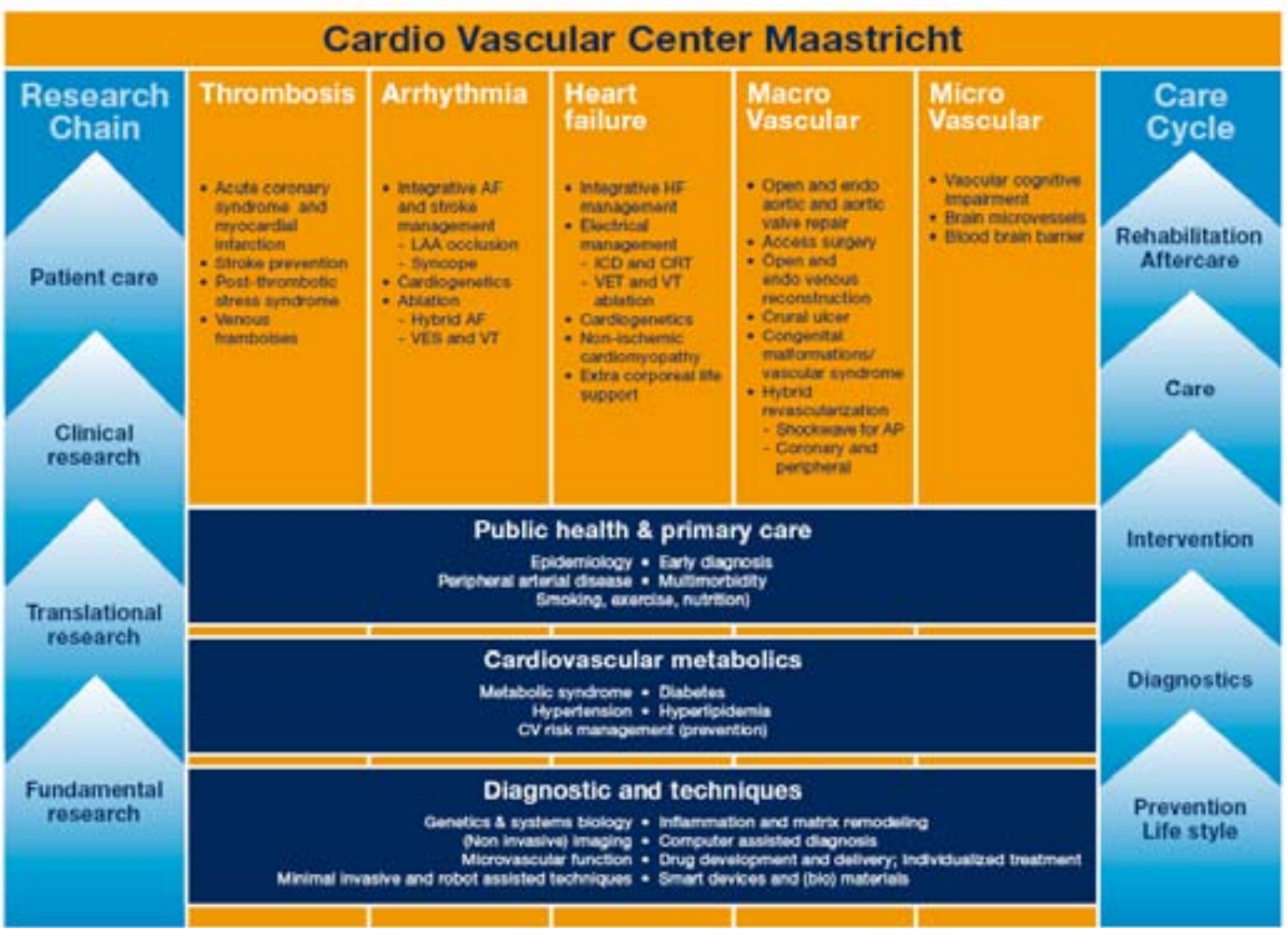
Steering towards synergy and impact.

Successful when:

- The projects are innovative and internationally competitive
- The principle investigators foster new developments and young talent
- The consortia are successful in acquiring leadership in European programs

Reneman et al. *Eur Heart J.* 2013

Consequent developments, other example



Thank you!

Paul Volders, MD, PhD, FESC

p.volders@maastrichtuniversity.nl

EUROPEAN Heart Rhythm ASSOCIATION

EUROPEAN SOCIETY OF CARDIOLOGY®

Slide title here
with space for two lines of text

Conclusion: There are good reasons to pursue academic research. However, academic research is more of a gift economy than an economic growth policy, at least for rich countries. Richer countries can afford to do more academic research, but academic research is not what makes you rich (I should know!).
government R&D alone can often reach 1% of the GDP.
The problem is that it is private R&D that contributes to economic growth, not government R&D:

Demographic alterations

- Europe is losing 700,000 people each year, and will lose 3 million more each year by 2050
- Older citizens are making up a larger and larger share of the declining population
- E.g., there were nearly 500 million people around the globe aged ≥65 years in 2012. By 2030, this number is expected to double to 1 billion, or 1 in 8 people
- Ratio of European working-age : elderly citizens expected to be down to 2 : 1 by 2050

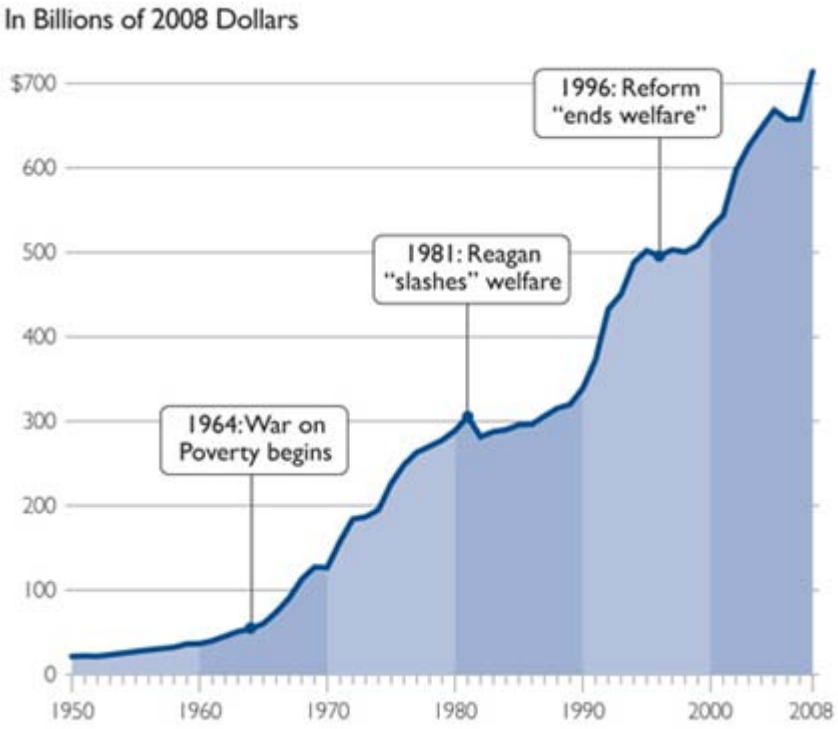
Genetic era

- 60% of all people will, at some time in their life, be affected by the consequences of a gene mutation
- 71% of admissions to a major U.S. pediatric hospital have an underlying genetic basis
- Only 1% of genetic disorders are diagnosed at birth
- This enables early detection of disease susceptibility by genomic sequencing

Slide title here
with space for two lines of text

Epidemic of heart failure and related arrhythmic problems

Wearable and implantable devices; telemetric medicine



Phenomenal Challenges That Require Strong Basic-Science and Translational Research

Adult stem-cell therapy, pluripotency

Complex genomics; fast, low-cost human genomes are transforming our lives; at least 80% of the so-called junk DNA functions to turn off and on specific genes, in specific cells, at specifici times, in order to accomplish specific tasks.

Paradox: globalization has steadily increased the vulnerability of the world's population to pandemics, airborne pathog. and viruses

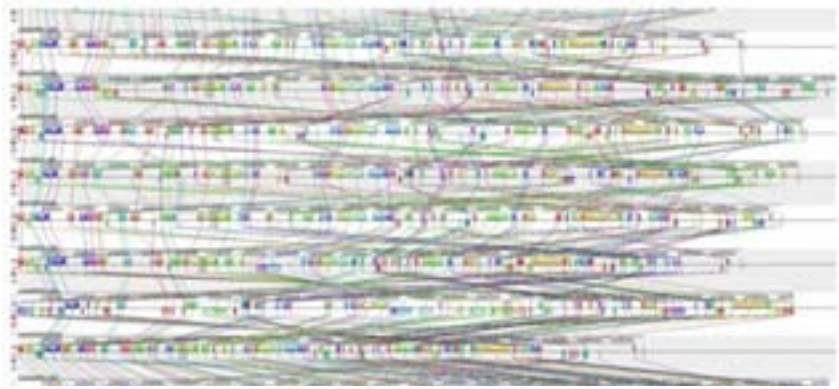
Over-prescription of ABs, resistance of many so-called "superbugs"to existing drugs; need to evelop new, more powerful ABs

Demand for customized and treatment therapies rises rapidly as personalized medicine trend accelerates

However, nmber of drug registrations steadily declining

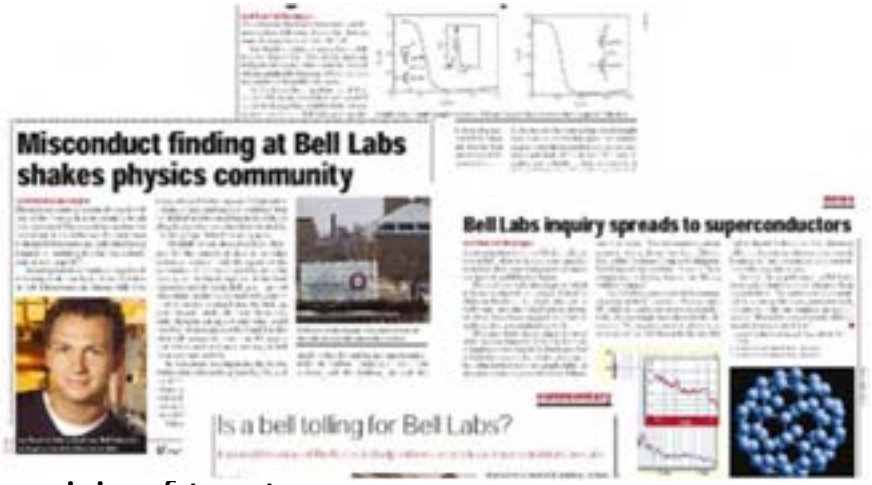
Volders

Slide title here
with space for two lines of text



Personalized medicine: practice of medicine based on the indvidual patient, rather than a statistical sample. Devising customized therapies that take advanatge of inidiviual pat's genetic makeup and unique pathology

Slide title here
with space for two lines of text



Science faces crisis of trust

Harnessing the big data opportunity

Slide title here
with space for two lines of text

Epidemic of heart failure and related arrhythmic problems

Wearable and implantable devices; telemetric medicine