EU Funding for Influenza Research

Luxemburg, 25-09-2007
4th Joint EC/ECDC/WHO Workshop on Pandemic Influenza Preparedness

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(8 thematic + 7 horizontal)

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Public Health Research, Genomics & System
Biology, Health Biotechnology,
Administration & Finance

Antimicrobial drug resistance
HIV / AIDS
Malaria
TB
Emerging Epidemics
Cornelius Schmaltz
EDCTP
Neglected Infectious diseases
EU-funded influenza research:

Past
- Assets and drawbacks
- Project portfolio: Influenza funding in FP5+FP6
- Highlights/„Success stories“

Present
- FP7 – new dedicated area for Emerging Epidemics
- FP7 – results of 1st call

Future
- Research gaps - Priorities for future topics…
- …and how they are shaped and decided…
A rich legacy…:

- Projects directly and *exclusively* focusing on influenza
  - FP5 (1998-2002): 5 projects, € 6.9 million
  - FP6 (2002-2006): 29 projects, € 41.7 million
  - SANCO projects: 3 projects, € 5.3 million

- Projects addressing a broader range of (viral or other infectious) diseases but with a significant part devoted to influenza
  - FP 6: 7 projects, € 42.4 million
  - SANCO projects: many (EPIET, VENICE etc.)…!
EU-funded influenza research
The past

BUT: No dedicated program/activity

• Dispersed over a number of different programs (Biotech, antimicrobial drug resistance, fundamental genomics, specific SME programmes etc.)

• Ad-hoc call 2005 in response to H5N1
  (6 human health, 11 animal health projects, € 28 million)

• No continuous funding stream

• No unified approach/strategic planning
EU-funded influenza research
Project Portfolio
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“Preventing infection and spread among humans”
- Making flu vaccines more efficient
- Understanding the biology of the influenza virus

“Early warning and strike at the source”
- Diagnostics
- Surveillance
- Vaccination of birds
EU-funded influenza research
Project Portfolio

Human VACCINES: safe, effective, broadly protective, long lasting, easy to administer

- **MUCADJ**: Mucosal adjuvants for intranasal influenza immunization
- **FLUPAN**: H7N1 vaccine: safe and immunogenic in clinical trials
- **NOVAFLU**: Improving strain selection for epidemic and pandemic flu, novel vaccine candidates
- **SARS/FLU VACCINE**: Combined Influenza/SARS Vaccine
- **FLUVACC**: Live-attenuated Replication-Defective (DelNS1) Influenza Vaccine
- **UNIVERSAL VACCINE**: “Universal” flu vaccine based on M2 protein
EU-funded influenza research
Project Portfolio: Vaccines

Human VACCINES: safe, effective, broadly protective, long lasting, easy to administer

- **Chimeric Vaccine**: delNS1 virus as a vector for foreign antigens
- **PANFLUVAC**: ISCOM-adjuvanted, intranasal, virosomal H5N1 vaccine
- **Intranasal H5vaccine**: DelNS1 H5N1 vaccine, novel sialic acid analogue-based immune correlates
- **FluVac**: CoVaccine HT-adjuvanted, inactivated whole-virus H5N1 vaccine
EU-funded influenza research
Project Portfolio: Diagnostics and Surveillance

Robust and specific diagnosis and efficient surveillance in animals (and humans): crucial for containing epidemics

- **NEW-FLUBIRD**: contribution of migratory birds to spread of avian influenza
- **FLURESIST and RIVERS**: survival of influenza virus in animal carcasses and environment
- **FLUTEST, LAB-ON-SITE and AVIFLU**: sensitive and robust diagnostic tests
- **ESNIP and ESNIP 2**: diagnosis and surveillance of influenza in pigs
EU-funded influenza research
Project Portfolio: Biology

Biology of influenza viruses: important contributions to future applications

- **EUROFLU and FLUPATH**: virus-host interactions, transmissibility, pathogenicity, cell tropism

- **FLUINNATE and INN-FLU**: focus on innate immunity

- **FLUPOL (exclusively influenza) and VIZIER (several RNA viruses)**: characterise structure of viral replication enzymes – targets for antiviral drugs

- **RespViruses**: immune response in elderly to known and new respiratory viruses
EU-funded influenza research
Project Portfolio: Networking, Training, socio-economic and legal issues

Influenza research in a wider context…

- **VIRGIL**: large network on antiviral drug resistance (flu + hep B)

- **EPIZONE**: large network for research on preparedness, prevention, detection and control of epizootics

- **FLU-LAB-NET**: networking national and community flu reference laboratories

- **HEALTHY POULTRY**: science-based decision support to policy makers with regard to epizootic poultry diseases

- **ConFluTech and FLUTRAIN**: training and technology transfer to affected regions
EU-funded influenza research
„Success stories“

NOVAFLU (Novel Vaccination Strategies and vaccine formulations for epidemic and pandemic influenza control)

- Duration: 01/10/2002 – 30/09/2005
- EC contribution € 1.7 million
- Coordinator: Erasmus Medical Center, Rotterdam/NL
- Partners from UK (U Cambridge + Retroscreen), NL (Solvay Pharmaceutical), FR (Institut Pasteur), DE (Paul-Ehrlich Institut)

- Results:
  - Computer algorithms to assess antigenic relatedness of flu viruses – now fully integrated into WHO vaccine strain selection process
  - Development of a (T7-based) reverse genetics system (patent application filed)
EU-funded influenza research
„Success stories“

FLUPAN „Preparing for an Influenza pandemic“

• Duration: 01/09/2001 – 31/05/2007

• EC contribution € 2.1 million

• Coordinator: NIBSC, Potters Bar/UK,

• Partners from France (Sanofi Pasteur), Italy (ISS), Norway (Gade Institute, Bergen), UK (HPA + U of Reading)

• Results:
  – first candidate H7N1 vaccine, safe and (midlly) immunogenic in clinical trials
  – First PER.C6 cell grown pre-pandemic vaccine
  – Enhanced surveillance of porcine and avian flu in Italy and demonstration that viruses with pandemic potential circulate in Europe
EU-funded influenza research
Overview

• EU-funded influenza research: Past
  – Assets and drawbacks
  – Project portfolio: Influenza funding in FP5+FP6
  – Highlights/“Success stories”

• EU-funded influenza research: Present
  – FP7 – new dedicated area for Emerging Epidemics
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• EU-funded influenza research: Future
  – Research gaps - Priorities for future topics…
  – …and how they are shaped and decided…
• Antimicrobial drug resistance
• HIV, Malaria and tuberculosis
• Neglected (tropical) infectious diseases
• Potentially new and (re-)emerging epidemics:

“The focus will be on confronting emerging pathogens with pandemic potential including zoonoses (e.g. SARS and highly pathogenic influenza). Where appropriate, provisions will be made for rapidly initiating collaborative research aimed at expediting development of new diagnostics, drugs and vaccines for efficient prevention, treatment, and control of infectious disease emergencies.”

Significant international collaboration dimension!

- International Collaboration Partner Countries (ICPC) – basically all developing and emerging/threshold countries, including China, India, Brasil etc.
- ICPC eligible to participate in all FP7 calls, with same conditions (reimbursement etc.) as EU and associated countries
- In addition SICA (specific international collaboration action) topics: participation of at least 2 ICPC (in addition to at least 2 European countries) required!
- Influenza:
  - Research institutions in affected regions (China, Indonesia, Vietnam, Taiwan, Thailand) involved in many existing and recently selected projects!
  - SICA topic last call: AsiaFluCap + TAMIFLU.ORG
1st call for proposals: Concerted effort on *Influenza*:

- **Broadly protective vaccine**: NASPANVAC - intranasal, split, H5N1 chitosan-adjuvanted vaccine
- **Mechanisms of protection**: IMECS – correlates of protection in AI-infected and vaccinated individuals, including elderly + infants
- **Standardisation of immunological assays/surrogate markers for vaccine trials**: No submissions! **Point-of-care diagnostic tests**: Fluarray + PORTFASTFLU – microarray-based, RANGER – real-time rtPCR
- **Additional treatment strategies**: No projects selected! – but: see “highly innovative projects” below
1st call for proposals: Influenza (cont’d):

- Pandemic containment and mitigation strategies:
  FLUMODCONT – surveys and novel mathematical models to evaluate effectiveness of containment measures

- „Small innovative projects“: FluDrugStrategy – anti-capsid protein drugs, FLUINHIBIT – small molecule inhibitors of polymerase, RNAFLU – effect of natural viral RNA sequence variation on virus function/pathogenicity

- „International Collaboration projects“: AsiaFluCap – pandemic preparedness/health system analysis in Vietnam, Thailand, Indonesia, Taiwan, TAMIFLU.OR – new organocatalytic approaches to synthesis of oseltamivir and derivatives
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Focus of current workprogramme(s) on other emerging epidemics → substantial past investments into influenza, little or nothing for other potentially emerging pathogens!, but for future…:

- **„Additional treatment strategies“**: Alternatives to neuraminidase inhibitors (in view of ↑ resistance, limited efficacy): host-signalling pathway interference (NF-κB inhibitors?, statins?)…?

- **Targeted public health research(!) topics**: Influenza transmission (droplet, aerosol) and efficacy of personal protection equipment…? Comparison of immunogenicity, cross-protection, shelf-life etc. of commercially available (pre-)pandemic H5N1 vaccines…? Others?

- **Others?????**
Main policy drivers (General for collaborative research in HEALTH):

- Improving health of European citizens
- Increasing competitiveness of European health-related industries
- Addressing global health issues, including emerging epidemics

EU-funded influenza research
The Future
EU-funded influenza research
The Future: How topics are drafted...

• Annual workprogrammes with topics in this (and all other HEALTH) area(s): next update published 1st semester 2008
• Topics drafted by DG Research in response to
  – public health needs
  – new scientific/technological developments
  – existing (and to be promoted) research capacity in Europe
  – other policy needs (international collaboration, coherence with development aid, etc.)
• Input from Scientific Advisory Group, ECDC, SANCO (and other DGs), WHO, individual scientists, scientific societies etc.
• Discussed and agreed with Committee of Member States
UNITY IN DIVERSITY
THANK YOU FOR YOUR ATTENTION!
ADDITIONAL SLIDES (DISCUSSION)
Budgets of the EU Framework Programmes

€ Billion

- 1984-1987: 3.27
- 1987-1991: 5.36
- 1990-1994: 6.6
- 2002-2006: 17.5
- 2007-2013: 50.5
EU-funded influenza research
The present: FP7

Total = 50.5 billion € over 7 years (without EURATOM)

Average 40% increase of yearly budget compared to FP6, but heavily “tail-loaded”
EU-funded influenza research
The Present: FP7

The Cooperation Programme breakdown (€ million)

- Health: €6050
- Food, Agriculture, and Biotechnology: €1935
- Transport (including Aeronautics): €4180
- Socio-economic Sciences and Humanities: €610
- Space: €1430
- Security: €1350
- Energy: €2300
- Nano production: €3500
- Environment (including Climate Change): €1800
- Information and Communication Technologies: €9110
Activities within the HEALTH theme¹

- Biotechnology, generic tools and medical technologies for human health
- Translating research for human health
  - Integration of biological data and processes
  - Research on the brain and related diseases, human development and ageing
  - Translational research in infectious diseases
  - Translational research in other major diseases: Cancer, diabetes, cardiovascular, rare diseases, other chronic diseases
- Optimising the delivery of healthcare to European citizens

This paper was produced for a meeting organized by Health & Consumer Protection DG and represents the views of its author on the subject. These views have not been adopted or in any way approved by the Commission and should not be relied upon as a statement of the Commission's or Health & Consumer Protection DG’s views. The European Commission does not guarantee the accuracy of the data included in this paper, nor does it accept responsibility for any use made thereof.