Information and Communication Technologies

EPIWORK

Developing the Framework for an Epidemic Forecast Infrastructure

http://www.epiwork.eu

Project no. 231807

D8.7 Dissemination, collaboration and exploitation report

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Project Coordinator Organization Name: ISI Foundation
Lead contractor for this deliverable: ISI Foundation

Work package participants

The following partners have taken active part in the work leading to the elaboration of this document, even if they might not have directly contributed writing parts of this document:

- ISI
- FGC-IGC
- TAU
- MPG
- AIBV
- SMI
- KULeuven
- CREATE-NET

Change log

Version	Date	Amended by	Changes
1	20/02/11		

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1 Project communication tools

One of the main goal of WP8 is to make sure that the results achieved by the project are widely disseminated and can constitute the basis of other research across the scientific and engineering communities.

Project website

The *visual identity* of the project has been defined by the choice of the Epiwork logo and the project website layout. The project web site (constituting the **deliverable D8.2**) has been setup and it is continually updated. It gives an overview about the project and compiles press material and publications.

This website is located at

>   http://www.epiwork.eu

The web site is hosted by seeweb s.r.l. (http://www.seeweb.it).

This web site is promoted by links from the partners web sites as well as from the Cordis web site (see D8.2 for technical details).

During the first two years of the project, the website has been enriched by the enormous amount of heterogeneous material produced by all the Consortium partners.

Home: http://www.epiwork.eu/ a very brief introduction to the project and a diagram highlighting the main components of the Epiwork project and their integration to reach the overall aim of the project. The home page is form of a blog, therefore, under the project introductions, it displays news and update about the project, the work packages and the partners.

Publications: http://www.epiwork.eu/publications/ List of editorial material, scientific publications and international conferences and seminars by consortium members which are linked to Epiwork. The Editorial material section contains links to dissemination movies, dedicated features in international journals etc. The Dissemination section is dedicated to those tools developed in the scope of the project to reach the general public with scientific results and outcome from the project.

H1N1: http://www.epiwork.eu/2009-h1n1-flu/ This page is dedicated to the progress made by the several teams during the H1N1 2009 pandemic.

Resources: http://www.epiwork.eu/resources/ This page contains a subset of pages illustrating demos and prototypes developed in the scope of the different Work Packages:
• **WP2**: Spatially structured models and human mobility
http://www.epiwork.eu/resources/wp2-spatially-structured-models-and-human-mobility/
• **WP3:** Epidemic Marketplace

• **WP4:** Computational Modelling Platform
• **WP5:** ICT monitoring and reporting systems
• **WP6:** Reporting systems comparative analysis and evaluation

In the press: http://www.epiwork.eu/in-the-press/ Press release, articles on
TV, radio etc.

Events: http://www.epiwork.eu/events/ This page contains announcements about international
events organized by the several partners participating to the Epiwork project.

2 Publications, conferences and seminars

The project puts great emphasis on publication in high impact scientific communication channels
such as papers and major conferences. It also envisions communicating results at top international
conferences. During the second year of life of the project the scientific outreach is simply stated by
the sheer numbers of publications (34 papers in peer reviewed journals) and presentations at
conferences (about 40 talks, lectures and seminars).

Publications

van Noort SP, Nunes MC, Weedall GD, Hviid L, Gomes MGM (2010) Immune selection and
within-host competition can structure the repertoire of variant surface antigens in Plasmodium
falciparum - A mathematical model. *PLoS One* **5**(3): e9778.

Kretzschmar M, Gomes MGM, Coutinho RA, Koopman JS (2010) Unlocking pathogen genotyping
information for public health by mathematical modelling. *Trends Ecol Evol* 18: 406-412.

Stollenwerk N, van Noort SP, Martins J, Aguiar M, Hilker FM, Pinto A, Gomes MGM (2010) A
spatially stochastic epidemic model with partial immunization shows in mean field approximation
the reinfection threshold. *Journal of Biological Dynamics* 4: 634-649.

Barnea O., Rami Y., Katriel G. & Stone L. Modelling seasonal influenza in Israel Mathematical
BioSciences and Engineering 2011.

G. Katriel, R. Yaari, A. Huppert, U. Roll and L. Stone. Modelling the initial phase of an epidemic
using incidence and infection network data: 2009 H1N1 pandemic in Israel as a case study.
Interface 2011.

Katriel G. (2011) Epidemics with partial immunity to reinfection.
Mathematical BioSciences (in press)

Sieber M, Hilker FM (2011) Prey, predators, parasites: intraguild predation or simpler community modules in disguise? Journal of Animal Ecology 80, 414-421.

Stone L, Hilker FM, Katriel G (accepted) SIR models. In Sourcebook in Theoretical Ecology (Hastings A, Gross L, eds.). University of California Press, Berkeley. 2011.

Brooks-Pollock E, Eames KTD. Pigs didn't fly, but swine flu. Mathematics Today, 2011 47(1).

Dynamic networks and directed percolation, R. Parshani, M. Dickison, R. Cohen, H. E. Stanley and S. Havlin, EPL 90(3), 38004 (2010);

Identification of influential spreaders in complex networks, M. Kitsak, L. K. Gallos, S. Havlin, F. Liljeros, L. Muchnik, H. E. Stanley and H.A. Makse, Nature Physics 6, 888 (2010)

D. Miorandi and F. De Pellegrini, "k-Shell Decomposition for Dynamic Complex Networks"), appeared in the Proc. of WiOpt (WDN Workshop), Avignon, June 2010.

M. Aguiar, S. Ballesteros and N. Stollenwerk, ``The influence of seasonality on dengue epidemiology, modelling and data analysis'', Proceedings of 10th Conference on Computational and Mathematical Methods in Science and Engineering, CMMSE 2010}, ISBN 978-84-613-5510-5, edited byJesus V.A., Almeria, 2010, pp. 25--35.

M. Aguiar, S. Ballesteros and N. Stollenwerk, ``Two strain dengue model with temporary cross immunity and seasonality'', AIP Conference Proceedings 1168 volume 2, of 8th International Conference of Numerical Analysis and Applied Mathematics,
ICNAAM 2010}, ISBN 978-0-7354-0831-9, edited by Theodore E. Simos, Greece, 2010, pp.732--735.}

M. Aguiar, S. Ballesteros and N. Stollenwerk, ``Dynamic noise and its role in understanding epidemiological processes'', AIP Conference Proceedings 1168 volume 2, of 8th International Conference of Numerical Analysis and Applied Mathematics, ICNAAM 2010}, ISBN 978-0-7354-0831-9, edited by Theodore E. Simos, Greece, 2010, pp.736--40.

Towards Design Principles for Optimal Transport Networks, G. Li, S. D. S. Reis, A. A. Moreira, S. Havlin, H. E. Stanley and J. S. Andrade, Jr., Phys. Rev. Lett. 104, 018701 (2010);

Catastrophic cascade of failures in interdependent networks, S. V. Buldyrev, R. Parshani, G. Paul, H. E. Stanley and S. Havlin, Nature **465**, 08932 (2010);

Interdependent Networks: Reducing the Coupling Strength Leads to a Change from a First to Second Order Percolation Transition, R. Parshani, S. V. Buldyrev and S. Havlin, Phys. Rev. Lett. **105(4)**, 048701 (2010);

The Structure of Borders in a Small World, C. Thiemann, F. Theis, D. Grady, R. Brune and D. Brockmann PLoS ONE 5(11): e15422.

Fabrício A.B. Silva, Mário J. Silva, Francisco Couto 2010: Epidemic Marketplace: an e-Science Platform for Epidemic Modelling and Analysis. ERCIM News 82(), 43-44. Special Theme: Computational Biology.

Fabrício A.B. Silva, Mário J. Silva, Francisco Couto 2010: Epidemic Marketplace: an e-Science Platform for Epidemic Modelling and Analysis. ERCIM News 82 - Special Theme: Computational Biology.

 Luis Filipe Lopes, Fabrício A.B. Silva, Francisco Couto, João Zamite, Hugo Ferreira, Carla Sousa, Mário J. Silva, Epidemic Marketplace: An Information Management System for Epidemiological Data. Presented at ITBAM'10 - 1st International Conference on Information Technology in Bio- and Medical Informatics - DEXA 2010 - August, 2010.

João Zamite, Fabrício A.B. Silva, Francisco Couto, Mário J. Silva, MEDCollector: Multisource Epidemic Data Collector. Presented at ITBAM'10 - 1st International Conference on Information Technology in Bio- and Medical Informatics - DEXA 2010 - August, 2010.

Mário J. Silva, Fabrício A.B. Silva, Luís Filipe Lopes, Francisco Couto, Building a Digital Library for Epidemic Modelling. Proceedings of ICDL 2010 - The International Conference on Digital Libraries 1, p. 447--459, New Delhi, India, 23--27 February, 2010. TERI Press -- New Delhi, India. Presentation of invited paper.

The GLEaMviz computational tool, a publicly available software to explore realistic epidemic spreading scenarios at the global scale
W. Van den Broeck, C. Gioannini, B. Gonçalves, M. Quaggiotto, V. Colizza, A. Vespignani
BMC Infectious Diseases 11, 37 (2011).

Human Mobility Networks, Travel Restrictions, and the Global Spread of 2009 H1N1 Pandemic
P Bajardi, C Poletto, J J Ramasco, M Tizzoni, V Colizza, A Vespignani
PLoS ONE 6(1): e16591 (2011).

Modeling the spatial spread of infectious diseases: The GLobal Epidemic and Mobility computational model
D Balcan, B Goncalves, H Hu, JJ Ramasco, V Colizza, A Vespignani.
Journal of Computational Sciences 1, 132 (2010).

Comparing large-scale computational approaches to epidemic modeling: agent-based versus structured metapopulation models
M Ajelli, B Goncalves, D Balcan, V Colizza, H Hu, JJ Ramasco, S Merler, A Vespignani.
BMC Infectious Diseases 10, 190 (2010).

P. Poletti et al. The effect of risk perception on the 2009 H1N1 pandemic influenza dynamics. PLoS ONE, 6(2): e16460, 2011.

M. Ajelli et al. Spatiotemporal dynamics of viral hepatitis A in Italy. Theoretical Population Biology, 79:1-11, 2011.

F. Iozzi et al. Little Italy: an agent-based approach to the estimation of contact patterns. Fitting predicted matrices to serological data. PLoS Computational Biology, 6(12): e1001021, 2010.

M. Ajelli et al. Comparing large-scale computational approaches to epidemic modeling: agent-based versus structured metapopulation models. BMC Infectious Diseases, 10:190, 2010.

S. Merler and M. Ajelli. Human mobility and population heterogeneity in the spread of an epidemic. Procedia Computer Science, 1(1):2231-2238, 2010.

Tilston NL, Eames KTD, Paolotti D, Ealden T, Edmunds WJ. Internet-based surveillance of Influenza-like-illness in the UK during the 2009 H1N1 influenza pandemic. BMC Public Health. 2010 Oct 27;10:650.

D. Paolotti, C. Gioannini, V. Colizza, A. Vespignani, "Internet-based monitoring system for influenza-like illness: H1N1 surveillance in Italy", proceedings of the 3rd International ICST Conference on Electronic Healthcare for the 21st century.

Bexelius C, Merk H, Sandin S, Nyrén O, Kühlmann-Berenzon S, Linde A, Litton JE. Interactive Voice Response and web-based questionnaires for population-based infectious disease reporting. Eur J Epidemiol. 2010;25:693-702.

Scientific Events

Workshop 'Frontiers in the computational modeling of disease spreading' @ ICCS2010, Amsterdam, The Netherlands, May 31-June 2, 2010
Organized by Alessandro Vespignani, Vittoria Colizza, Dirk Brockmann, Stefano Merler

ESOF 2010, the Euroscience Open Forum that was be held in Torino, Italy, July 2 – 7, 2010.
Epiwork contributed to ESOF with a session organized by Prof. Vespignani, scientific coordinator of Epiwork, and Vittoria Colizza, that has taken place on Sunday, July 4: **The dynamics of epidemics: How human mobility affects patterns**

First Workshop on "Dynamical Systems Applied to Biology and Natural Sciences", 1-3 February 2010, Lisbon, organized by Nico Stollenwerk (FFCUL-CMAF)

Second Workshop on "Dynamical Systems Applied to Biology and Natural Sciences", 2-4 February 2011, Lisbon, organized by Nico Stollenwerk (FFCUL-CMAF)

Epiwork was one of the very few projects in Europe invited to the *Influenza A(H1N1) 2009 modelling and Schools Closures working group meeting* ("Angers-II") promoted by the ECDC Stockholm 19-20 October 2010

International Conferences and seminars

FCG-IGC (WP1+WP5)
- Gabriela Gomes, Perspectives in integrative epidemiology.
Workshop on Dynamical Systems Applied to Biology and Natural Sciences, Universidade de Lisboa, Portugal.
February 2010

- Gabriela Gomes Monitoring and modeling influenza epidemics.
Seminar at Instituto de Higiene e Medicina Tropical, Lisboa, Portugal.
May 2010

- Gabriela Gomes Epidemiology and evolution of infectious diseases: The case of influenza.
III Conference on Computational and Mathematical Population Dynamics, Bordeaux 2 University, France.
June 2010

- Gabriela Gomes Ecology and evolution of infectious diseases: The case of influenza.
Seminar at Fundação Oswaldo Cruz, Rio de Janeiro, Brazil.
October 2010

- Gabriela Gomes Shifting priorities in the mathematics of infectious diseases.
Seminar at Instituto de Matemática Pura e Aplicada, Rio de Janeiro, Brazil.
October 2010

- Sander van Noort Immune Selection and Within-Host Competition Can Structure the Repertoire of Variant Surface Antigens in Plasmodium falciparum.
Workshop on Dynamical Systems Applied to Biology and Natural Sciences, Universidade de Lisboa, Portugal.
February 2010

- Sander van Noort Climate and ILI incidence.
Seminar at Centro de Geofísica, Instituto Dom Luis, Universidade de Lisboa, Portugal.
April 2010

- Sander van Noort Influenzanet: internet-based monitoring of ILI 2003-2010.
First Annual Symposium Lessons from the 2009 H1N1 Pandemic Influenza, Center for Communicable Disease Dynamics, Boston, USA.
June 2010.

- Sander van Noort The Influenzanet self-reporting system warrants consistency in epidemic monitoring across countries and seasons.
European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE), Lisbon, Portugal.
November 2010

- Ricardo Águas Applicability of simple deterministic models in epidemiologically complex scenarios.
Workshop on Dynamical Systems Applied to Biology and Natural Sciences, Universidade de Lisboa, Portugal.
February 2010

- Ricardo Águas Applicability of simple deterministic models in epidemiologically complex scenarios.
Seminar at Oxford University.
February 2010

- Delphine Pessoa Modelling the dynamics of Streptococcus pneumoniae colonization in children.
Seminar at Universidade de Lisboa.
December 2010.

- Flávio Coelho A Bayesian Framework for Parameter Estimation in Dynamical Models.
Workshop on Dynamical Systems Applied to Biology and Natural Sciences, Universidade de Lisboa, Portugal.
February 2010

BIU (WP1 + WP2)
- APS March Meeting: March 14 - 18, 2010, Portland, USA

- 11th Experimental Chaos & Complexity Conference: June 1 - 4, 2010, Lille, France

- Black Forest Focus on Soft Matter: June 2 - 5, 2010, Breisach, Germany

- International School of Physics Enrico Fermi: June 28 – July 2010, Varenna, Italy

LSHTM (WP1 + WP5)

- HPA conference on Pandemic Influenza London, June 2010; Prof Edmunds gave an invited talk: "Web-based Surveillance During a Pandemic".

- Meeting with Health Protection Agency Syndromic Surveillance Centre, Birmingham, November 2010.

- University of Cambridge, November 2010; Ken Eames gave a research seminar: "Living in interesting times".

- Meeting with representatives of the US Centers for Disease Control and Prevention (CDC) on modelling and surveillance of influenza December 2010.

- University of Strathclyde, February 2011; Ken Eames gave a research seminar: "Modelling epidemics when things change".

FFCUL-LASIGE (WP3 + WP4 + WP5)
- Luis Filipe Lopes, Fabrício A.B. Silva, Francisco Couto, João Zamite, Hugo Ferreira, Carla Sousa, Mário J. Silva, Epidemic Marketplace: An Information Management System for Epidemiological Data. Presented at ITBAM'10 - 1st International Conference on Information Technology in Bio- and Medical Informatics - DEXA 2010 - August, 2010.

- João Zamite, Fabrício A.B. Silva, Francisco Couto, Mário J. Silva, MEDCollector: Multisource Epidemic Data Collector. Presented at ITBAM'10 - 1st International Conference on Information Technology in Bio- and Medical Informatics - DEXA 2010 - August, 2010.

- Mário J. Silva, Fabrício A.B. Silva, Luís Filipe Lopes, Francisco Couto, Building a Digital Library for Epidemic Modelling. Proceedings of ICDL 2010 - The International Conference on Digital Libraries 1, p. 447--459, New Delhi, India, 23--27 February, 2010. TERI Press -- New Delhi, India. Presentation of invited paper.

- Presentation and demo of EPIWORK to students at the University of Valencia, Spain in an invited 4hrs seminar, by Fabricio Silva, June 2010.

- Presentation of EPIWORK to students of the Master/Phd in Epidemiology at the Faculty of Medicine of the University of Lisbon, in an invited 3h seminar, by Mário J. Silva.

- Mário J. Silva, Privacy in Socially Intelligent ICT. Imperial College, London, UK. ASSYST Perada Workshop - Towards a Science of Socially Intelligent ICT. August, 2010.

FFCUL-CMAF
Maíra Aguiar, Sebastien Ballesteros and Nico Stollenwerk, ``The influence of seasonality on dengue epidemiology, modelling and data analysis'', Proceedings of 10th Conference on
Computational and Mathematical Methods in Science and Engineering, CMMSE 2010}, ISBN 978-84-613-5510-5, edited byJesus V.A., Almeria, 2010, pp. 25--35.

Maíra Aguiar, Sebastien Ballesteros and Nico Stollenwerk, ``Two strain dengue model with temporary cross immunity and seasonality'', AIP Conference Proceedings 1168 volume 2, of 8th International Conference of Numerical Analysis and Applied Mathematics,
ICNAAM 2010}, ISBN 978-0-7354-0831-9, edited by Theodore E. Simos, Greece, 2010, pp.732--735.}

Maíra Aguiar, Sebastien Ballesteros and Nico Stollenwerk, ``Dynamic noise and its role in understanding epidemiological processes'', AIP Conference Proceedings 1168 volume 2, of 8th International Conference of Numerical Analysis and Applied Mathematics, ICNAAM 2010}, ISBN 978-0-7354-0831-9, edited by Theodore E. Simos, Greece, 2010, pp.736--40.

ISI (WP4 + WP5)

APS March Meeting: March 14 - 18, 2010, Portland, USA
Human mobility in an emerging epidemic: a key aspect for response planning, a contributed talk presented by Chiara Poletto in the *Focus Session: Complex Networks I*
Human mobility and epidemic invasion, an invited talk by Vittoria Colizza in the *Focus Session: Stochastic Processes in Biology I*

NETSCI 2010
Global invasion of H1N1 influenza: could have we stopped it by grounding planes?, a contributed talk presented by Paolo Bajardi in the Epidemic Spreading session (Wednesday, May 13) [see picture on the left].

Pandemic influenza and medical response: assessing the sustainability and ecotoxicity risks **,** an invited talk by Vittoria Colizza (Wednesday, May 13).

ICCS 2010 10th edition of the International Conference on Computational Science, Amsterdam from May 31 to June 2, 2010
contributed talk by Corrado Gioannini titled "The GLEaMviz simulator. A software tool to explore realistic epidemic spreading at the global scale".
The talk was part of the workshop "Frontiers in the computational modeling of disease spreading", organized by Vittoria Colizza, Alessandro Vespignani, Dirk Brockmann and Stefano Merler.

"International Summer School on Complex Systems: Structure and Dynamics" ITAP, in Turunç, Turkey, August 23 - 27, "Workshop on Complex Systems" ITAP, on August 30 - September 1.
Series of three lectures titled "Epidemic processes on complex networks" by Vittoria Colizza.
oral presentation: Modeling the 2009 A/H1N1 pandemic: the experience after the 2009-2010 winter wave by Michele Tizzoni.

Workshop "Data driven dynamical networks", that took place at the Ecole de Physique in Les Houches, France, September 26 - October 1.
"Multiscale networks and epidemics" - a keynote talk by Vittoria Colizza.
"Longitudinal analysis of microdynamical complex networks: a case study" - a contributed talk presented by Paolo Bajardi.

D. Paolotti, 3rd International ICST Conference on Electronic Healthcare for the 21st century - 13-15 December 2010 - Casablanca, Morocco**,** "Internet-based monitoring system for influenza-like illness: H1N1 surveillance in Italy", oral contribution

A. Vespignani, First Global Symposium on Health Systems Research, Session on complex systems, Montreaux, Switzerland November 16-19, 2010.

A. Vespignani, Connecting the Dots Symposium, Harvard University, Cambridge, MA, October 22, 2010 (keynote speaker).

A. Vespignani, Influenza H1N1 modeling working group meeting, European Center for Disease Control ECDC, Stockholm, 19 October 2010.

A. Vespignani, ESF-Cost Conference on Future Internet and Society: A Complex Systems Perspective, Acquafredda di Maratea, Italy, October 4-9, 2010 (keynote speaker).

A. Vespignani, WIN 2010 Workshop on Information in Networks, New York University, New York, September 25-26, 2010

A. Vespignani, Socially Coupled Systems & Informatics-Science, Computing and Decision Making in a Complex Interdependent World 2010 Conference, Old Town Alexandria, VA, July 12-14, 2010

A. Vespignani, Workshop on Cascading Events in Complex Financial Networks, The Fidelity Center for Applied Complexity May 11, 2010, Boston, MA (keynote speaker).

A. Vespignani, Symposium "The Physics of Global Catastrophes and Countermeasures", American Physical Society (APS) March Meeting, Portland, OR, March 14-17, 2010

A. Vespignani, Symposium "Human Mobility: the Statistical Physics of When, Where, and How" American Physical Society (APS) March Meeting, Portland, OR, March 14-17, 2010.

A. Vespignani, International Workshop on Nonlinear Dynamics of Networks, Center for Scientific Computation & Mathematical Modeling (CSCAMM),

University of Maryland, College Park, April 7, 2010,

A. Vespignani, International Conference: Networks, a framework for cross disciplinary applications, Zaragoza, Spain, February 3-6, 2010 (keynote speaker).

CREATE-NET (WP5)
Daniele Miorandi attended EGAIS 2010 and presented some of the EPIWORK results and activities.

3 Outreach to the public and popularization

The project has been very active in organizing outreach activities targeting the large public and aimed at popularizing the project and its results to the non-experts.

Press releases, media coverage

FCG-IGC (WP1+WP5)

- The contents area of the "Gripenet" (Portuguese IMS) website was completely updated (organization and page browsing more intuitive).
- The e-newsletter of the project was redesigned, keeping the functionality of the direct link to the user area.
- The social networks (Facebook and Twitter) were used, creating profile/fan pages which gave rise to the participants' community in monitoring, and helped to promote surveys about related subjects - eg, risk perception, attitudes and social anxiety in face of a flu pandemic.
- A school video contest about Influenza, named ""Gripe, câmara, acção!", was launched with electronic submission of 1 minute videos; the public voted through the main video-sharing website in the country (sapo.pt) and the best videos were exhibited through the main Portuguese TV channel.
- Two advertising campaigns of the project were launched: one in the most influent national radio station (TSF Rádio-Notícias) and other in the rail network in the two largest Portuguese metropolitan areas (Lisbon and Porto).
- A multimedia support directed to first grade students (4-10 years old), was (is being) created; playful and with informative content, it has associated data-bases for collecting simple information and will work in off-line and on-line modes. Still in development.
- It was launched the first version of IMS for dengue, a partnership between the IGC-FGC and Universidade Federal da Bahia, in Brazil, (IMS extension for surveillance of contagious diseases other than influenza). Available in http://www.denguenaweb.ufba.br/beta/index.php
- Two interviews about the project were transmitted in national TV channels, including cable TV (RTP and SIC).

LSHTM (WP1 + WP5)

Outreach activities
- Edinburgh Science Festival, April 2010. Prof Edmunds gave an invited talk: "New methods for flu surveillance".
- Meet the Scientist Day at Think-Tank (Birmingham Science Museum) October 2010 (http://flusurvey.org.uk/games/thinktank/); the UK flusurvey team displayed the platform alongside epidemic games and other hands-on activities.

Press releases and media coverage
- Press releases were produced for the launch of the UK flusurvey at the start of December 2010, and during the middle of the month, when snow-related disruption in contact patterns was postulated to delay the start of the seasonal flu outbreak.
- Ken Eames was featured talking about the UK flusurvey and other novel surveillance tools on the technology show "Click On" on BBC Radio 4, November 2010 (http://www.bbc.co.uk/programmes/b00vrt0t)

- Ellen Brooks-Pollock and Ken Eames discussed the flusurvey in a podcast produced by the LSHTM, December 2010 (http://www.lshtm.ac.uk/news/audio/2010/0212/021210lshtmaudionews.mp3)

AIBV (Grote Griepmeting)

- See http://www.degrotegriepmeting.nl/?thissection_id=82 (GGM) for press coverage in Dutch and Belgian media.
- So far in the 8th season of the GGM, there have been 52 references on the GroteGriepmeting.nl or Great Influenza Survey on radio, TV and the internet and in articles in newspapers and magazines. About 7 of them referred to the international cooperation within the FP 7 Epiwork project. This is more than in the 2009-2010 season, when the media made 35 references to the Grote Griepmeting or GGM.
- There were a total number of 14 interviews, including eight interviews on the Dutch radio and three presentations at national and international .
- Prof. Marc Van Ranst from partner KU Leuven, Belgium managed to get a lot of attention for the GGM in Flanders, by numerous interviews and articles for newspapers, magazines and for radio and TV.
- The renewed educational material content is a huge success on Dutch schools. As an example, school teachers and publishers are using our free material for education on modelling at the A levels for modelling in mathematics classes. Also flu web quests are very popular among the younger kids (14-15 years). As a tradition since 2003, the GGM was present at the annual conference of biology teachers in the Netherlands, presenting GGM and Influenzanet to the 500 participants, including the provision of workshops.
- The GGM on You Tube: http://www.youtube.com/watch?v=rST_HP5j6To&feature=player_embedded and http://www.youtube.com/watch?v=vvR4kOgqtAE&feature=player_embedded

ISI

- Daniela Paolotti discussed about Influweb at the radio program "Radio3 Scienza" on December 2010
- Epiwork coordination team has contributed to ESOF 2010, the Euroscience Open Forum that will be held in Torino, Italy, July 2 – 7, 2010. Epiwork contributed to ESOF with a session organized by Prof. Vespignani, scientific coordinator of Epiwork, and Vittoria Colizza, that will take place on Sunday, July 4: **The dynamics of epidemics: How human mobility affects patterns**

FFCUL-CMAF

Organization of two Workshops:

- First Workshop on "Dynamical Systems Applied to Biology and Natural Sciences", 1-3 February 2010, Lisbon, organized by Nico Stollenwerk (FFCUL-CMAF)
- Second Workshop on "Dynamical Systems Applied to Biology and Natural Sciences", 2-4 February 2011, Lisbon, organized by Nico Stollenwerk (FFCUL-CMAF)

Exhibitions, interactive and non-interactive media

The project has been very active in organizing outreach activities targeting the large public and aimed at popularizing the project and its results to the non-experts. Among the major successes in this area we list:

o **a visualization application dedicated to the dissemination to a non academic audience of the WP4 reasearch activity**.
The application, which is called *The Epidemic Planet*, displays the evolution of the 2009 H1N1 influenza pandemic and enables its users to interactively compare and learn about the effect of various intervention scenarios.

The Epidemic Planet setup consists of two screens:
  i)   a touch screen used to choose the starting conditions, and
  ii)   a visualization screen used to display the output of computer simulations performed using the GLEaM model.
Two different simulations are shown simultaneously.

For each simulation users can select the following options:

- the geographic origin for the disease, between La Gloria, Mexico, where the pandemic actually originated, and a major European city like Barcelona, Spain;
- the contagiousness of the disease, mild or severe (which corresponds to different values of the reproductive number);
- whether to apply travel restrictions or not, reducing the global airline transportation by a 75% factor;
- whether to suppose a worldwide vaccination campaign or not and, if yes, whether to start it in August or in November.

The dynamical maps show the time evolution of the epidemic for the selected scenarios allowing the users to qualitatively compare them. Visualization maps are provided both for the whole planet and for each continent.

The Epidemic Planet application has been shown in various events:

- at the "INFECTIOUS" Science exhibition in the Science Gallery, Dublin, Ireland, running from April 17 to July 17, 2009

- EPIWORK project presented at "Science beyond fiction" FET exhibition organized by the FET Units in the European Parliament in Strasbourg on 20-21st April 2010

- Epidemic Planet @ 22nd edition of the Edinburgh International Science Festival, running from April 3 to 17, 2010, features a special event, Meet the Medics and Vets, with the contribution of **Epidemic Planet** – *explore how H1N1 influenza travels around the world and how intervention measures may help*

- Epidemic Planet in the Exhibition hall of the International Conference for High Performance Computing, Networking, Storage and Analysis (SC10), held in New Orleans, Louisiana, from November 13th to 19th 2010

- o **The production of a series of instructive video clips that convey ideas, methods and results targeted by the project to the general public (WP4 research activity)**:
    - Clip 1: Follow the money by C. Thiemann & D. Grady
    - Clip 2: Tour de Sys, by C. Thiemann & D. Grady
    - Clip 3: Introducing GLEaM, by Van Den Broeck et al.
    - Clip 4: GLEaMviz Simulator Overview , by Van Den Broeck et al.
    - Clip 5: GLEaMviz Simulator tutorial , by Quaggiotto et al.
    - Clip 6: GLEaMviz 2.6 Teaser 1, by Quaggiotto et al.
    - Clip 7: GLEaMviz 2.6 Teaser 2, by Quaggiotto et al.

    These clips are available on the Epiwork website.

- o **The WP3 team has publicly released the Epidemic Marketplace (see Deliverable 3.3)**. The portal can be found at the address: http://www.epimarketplace.net/.
    At the end of Month 20th, The Epidemic Marketplace has been released to the scientific community at large. By means of features on the home page (figure below) of the portal, users have access to:
    - registration: visitors to the website are provided a description of the EM and can request an account;
    - upon registration, users have access to the main components of the EM, namely: Data Sets (connects to the Repository), Forum, Web Services (Mediator services) and Data Collection (MedCollector);
    - announcements, information on how to contact the EM developers and about the EM describing its main functions and goals.
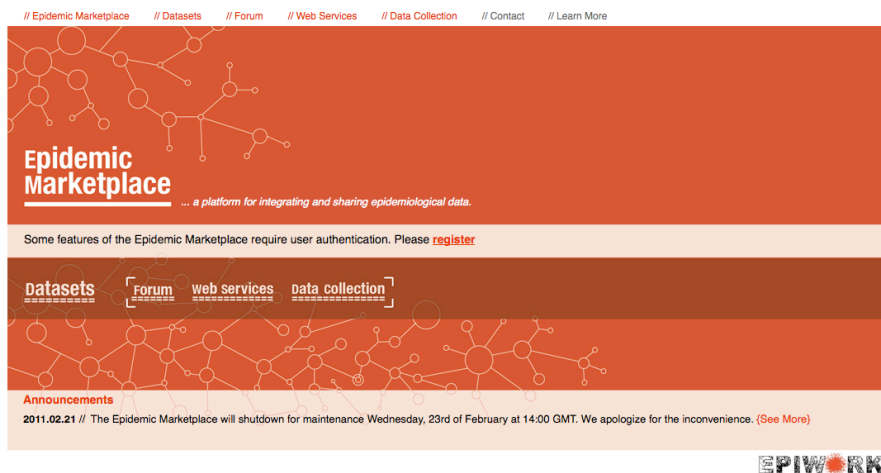
In the following we show the interface users are presented once they have registered and logged in into the platform. For all the details see Deliverable 3.3
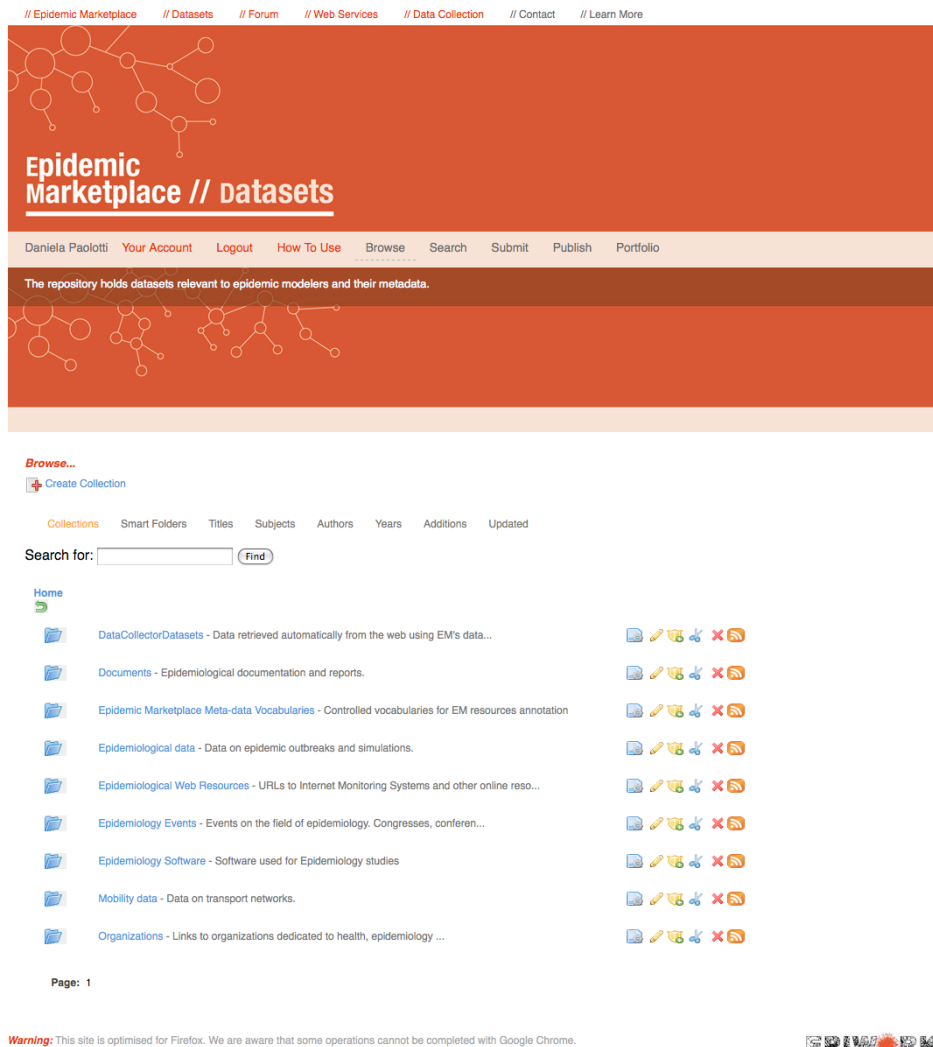
o **The project Consortium has produced a four-pages leaflet to disseminate the project main research activity areas.**
The leaflet is usually circulated during international conferences and meetings attended by the Epiwork partners. In the following, the preview of the four pages.

DEVELOPING A FRAMEWORK FOR AN EPIDEMIC FORECAST INFRASTRUCTURE

EPIWORK is a project sponsored by the Future and Emerging Technologies program of the European Community proposing a multidisciplinary research effort aimed at developing the appropriate framework of tools and knowledge needed for the design of epidemic forecast infrastructures.

The huge flow of quantitative social, demographic and behavioral data becoming available nowadays and improved ICT techniques and methodologies, supporting inter-linkage and integration of datasets can change the way epidemic processes are modeled. For the first time, ICT and computation enable the study of epidemic in a comprehensive fashion addressing the complexity inherent to the biological, social and behavioral aspects of health related problems. In this context, the EPIWORK project proposes a visionary research aimed at giving scientific foundations to the development of the needed modeling, computational and ICT tools such as mathematical and computational methods to predict the disease spreading in complex social systems, the development of large scale, data-driven computational models with a high level of realism, the design and implementation of original data-collection schemes through innovative Web and ICT applications, the setting up of a computational platform for epidemic research and data sharing to generate fruitful synergies between research communities and countries.

Project objectives:

The identification of general principles and laws that characterize complexity and capture the essence of complex epidemiological systems.

The development of an open, data driven, computational modeling platform to be used in epidemic research as well as in policy making for the analysis of global epidemics, integrating and leveraging on transnational data.

The development, deployment and validation of an Internet-based Monitoring System (IMS) producing real time data on disease incidence and epidemic spreading.

The development of a collaborative information platform enabling the production of knowledge, understanding and models from the novel abundance of digital data in epidemic research.

1

Spatially structured models and human mobility

The mathematical epidemiologists and modelers in the consortium intend to lay the foundation of new models stylized enough as to remain analytically tractable, yet nevertheless accurate to simulate realistic heterogeneous epidemic processes. The project envisions overcoming two of the most challenging aspects of complexity, namely the structure of interacting populations on many magnitude and spatial scales beyond and within international, interregional, intercultural and linguistic boundaries, and their effective interaction by means of multi-length scale transportation and mobility network. The Project research is providing a first principles construction of the meta-population description that goes beyond the usual identifiable structured contexts such as cities, town and villages, or – on a smaller case – schools, workplaces, homes. The complexity of the techno-social systems makes these intuitive modules opaque and arbitrary and the project is working on defining novel community structure identification algorithms to identify the effective community structure in multi-scale mobility networks.
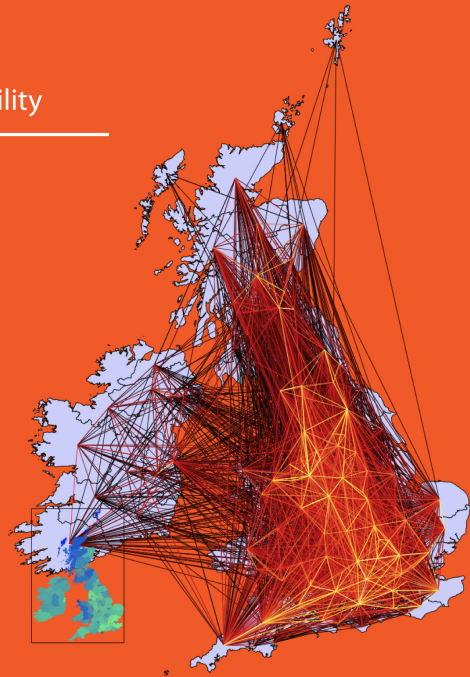
Computational Modeling Platform

The computational approach to the realistic modeling of infectious diseases is a research area that requires a multidisciplinary effort aimed at capturing the complexity underlying the interaction between biology, individuals, society and environment. The project is developing and implementing a modeling platform that integrates models, real data and visualization techniques to perform simulations and provide access to state-of-the art computational modeling to a wide audience of both experts and non-experts. In particular, transportation data on the mobility of individuals need to be integrated in epidemic models, as the human mobility is the key factor in inter-population disease spreading. The platform already includes data of the commuting of individuals and long range travelling fluxes (airliners, railways) in order to define coupling fluxes among subpopulations in different geographical areas. These fluxes can determine the number of disease-carrying individuals that will spread the disease both in agent based models and stochastic meta-populations models. The final aim is to provide a flexible and user-friendly tool for the simulation of a case study, test and validation of specific assumption on the spread of a disease, understanding of observed epidemic patterns, study of effective-

ness and results of different intervention strategies, analysis of risk through model scenarios, forecast of newly emerging infectious diseases. The platform is being informed and tested by the consortium epidemiologists and public health professionals and is also envisioned as scenario and training tool for public health workers and policy makers, fostering the use of computational modeling of infectious diseases.
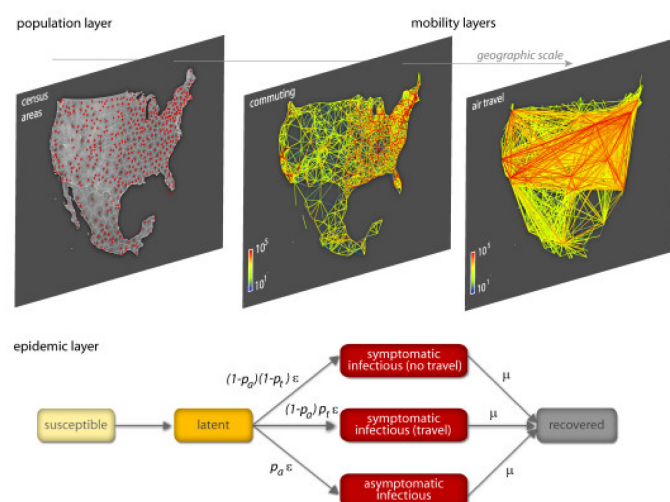
Real time Monitoring Infrastructure based on Social Web and Web 2.0 techniques

Real time surveillance data are crucial to rapidly identify public health emergencies, understand global trends and driving factors, feed realistic data-driven models to assess the impact on the population, optimize the allocation of resources and devise mitigation and containment measures to reduce economic, communication, transportation and – more in general – social disruption. The project intends to overcome the limitation of the state of the art surveillance systems by proposing an innovative ICT approach based on Web 2.0 tools. Starting from the successful experiences of internet-based monitoring systems (IMS) in the Netherlands and in Portugal, that displayed high values in surveillance, epidemiological analysis and participant recruitment, the project plans to deploy an innovative real-time surveillance system across European countries. The system, based on the Portuguese team platform, has already been deployed in Italy at the beginning of the winter season 2008-2009 and has been exported to the United Kingdom during the early phase of the new influenza A(H1N1) outbreak. The IMS is based on the participation of the population to collect real-time information on the distribution of diseases by means of Web services. The collaborative participation of users is achieved through targeted communication and recruitment. Graphic representation, processing and analysis of data on the progression of the disease, is provided in
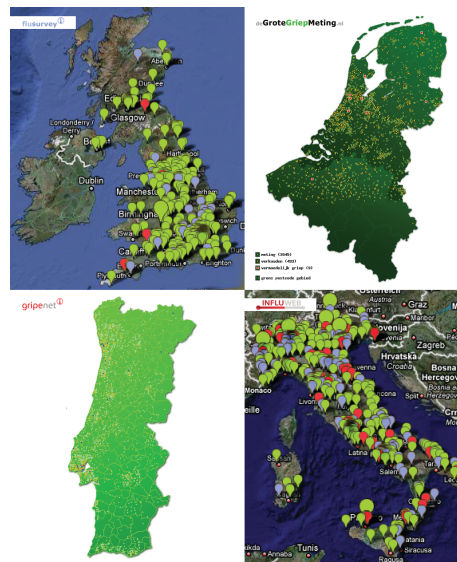
real time. Database contents of the local IMS are being designed to be consistent and have information with a standard nomenclature. Surveillance data gathered locally in each participating country is collected in a centralized database that will provide and easy-to-access, reliable and extensive source of epidemiological data.

Epiwork Epidemic Marketplace
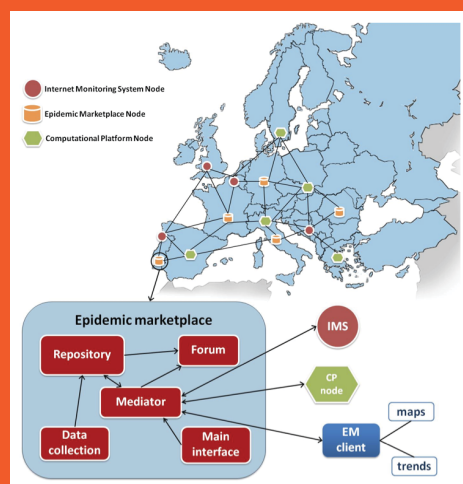
The project envisions a unified and integrated approach for management of ever increasing wealth of datasets needed to support the modeling approach, with the design and implementation of an Epidemic Marketplace Platform, publically available on the web. This information platform will provide the community with an unprecedented tool in the epidemic research field. It will be used as an on-line social networking site that will serve researchers, practitioners and educators all over the world to foster a virtual community for epidemic research. It will support the exchange of resources as well user interactions. Based on some of the Web 2.0 characteristics, users will become active participants, generating information and providing data for sharing and collaborating on-line.

3

The consortium

The project gathers a wide variety of skills competencies, ranging from complex systems theory and computational modeling to computer science, statis

- ISI – Institute for Scientific Interchange Foundation (Italy),
- FGC-IGC – Fundaçao Calouste Gulbenkian - Instituto Gulbenkian de Ciência, (Portugal),
- TAU – Tel Aviv University (Israel),
- MPG – Max Planck Institute for Dynamics and Self-Organization (Germany),
- AIBV – Acquisto Inter BV (The Netherlands),
- London School of Hygiene and Tropical Medicine (UK),
- SMI – The Swedish Institute for Infectious Disease Control (Sweden),
- KULeuven – Katholieke Universiteit Leuven (Belgium),
- BIU – Bar Llan University (Israel),
- FBK – Fondazione Bruno Kessler (Italy),
- CREATE-NET – Center for Research and Telecommunication Experimentation for NETworked communities,(Italy)
- FFCUL – Faculty of Sciences University of Lisbon (Portugal)
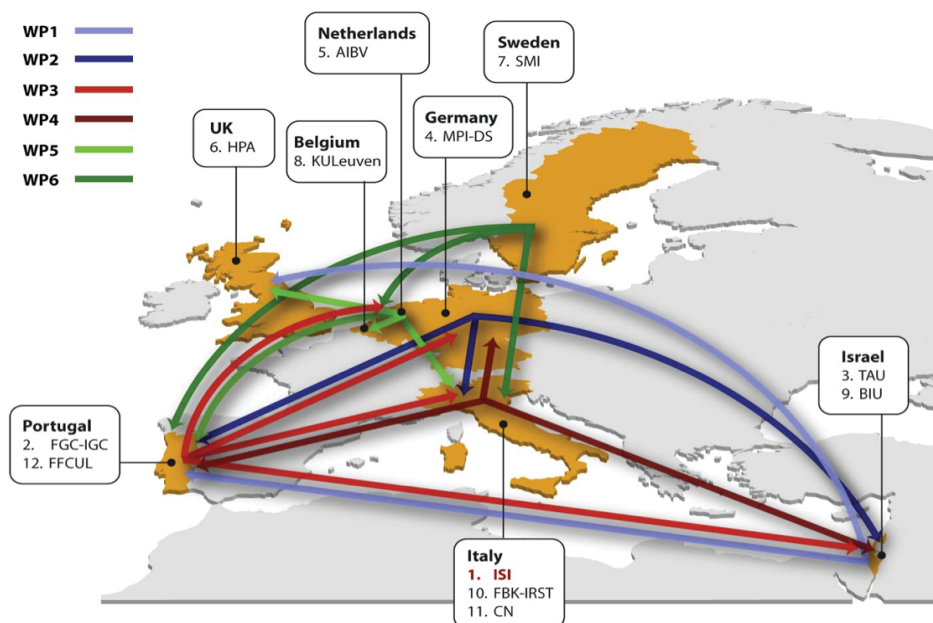
More information:

Project Coordinator: Prof. Alessandro Vespignani
More information can be found at: www.epiwork.eu
Project duration: 2009-2013.

4 Effort to engage with policymakers and government agencies

All teams of the consortium have been actively involved in the data gathering, computational analysis and monitoring in close contact with national and International agencies. We have achieved good successes with the ECDC and the JRC. The ECDC has put Epiwork on the map of project to follow and has invited Epiwork for the Influenza A(H1N1) 2009 modelling and Schools Closures working group meeting ("Angers-II") promoted by the ECDC Stockholm 19-20 October 2010.   We are also partnering with the JOINT RESEARCH CENTER (JRC) of the European Commission at Ispra, Italy. The Joint Research Centre is a research based policy support organisation and an integral part of the European Commission. The mission of the JRC is to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of EU policies. As a service of the European Commission, the JRC functions as a reference centre of science and technology for the Union. The objective of the collaboration is to share tools, including the GLEaM paltform to improve models for crisis management and decision making of emerging public health threats. We are proud to announce that the first version of the GLEaMviz Simulator has been released to JRC where usability tests have been started. The coordinator of the project has been in contact with the WHO and invited to present at the conference First Global Symposium on Health Systems Research, Session on complex systems, Montreaux, Switzerland November 16-19, 2010. Epiwork in Europe has also direct contacts through teams leaders with several National Health Institutes:

o   Belgian Pandemic crisis team, Belgium
o   Health Protection Agency, UK
o   National Institute of health, Italy
o   RIVM, the Netherlands

5 Coordination and integration with proactive FET initiatives and projects on science of complex systems for socially intelligent ICT.

The consortium is actively participating to the life of the ASSYST coordination action and it has been present at the major initiatives in Complexity such as the ECCS09. The coordination action ASSYST is funded from the FET Proactive initiative Science of Complex Systems for Socially Intelligent ICT (COSI-ICT) and has several goals: promote CS & COSI-ICT

research, organize many scientific meetings in Europe, in the new member states, in the candidate states, with the USA and South America, with Japan, China and India, and with Africa, make better connections between complex systems scientists and potential business users of complex systems, support the European Conference on Complex Systems.

Epiwork coordinating team has participated to the COSI-ICT Workshop: Towards a Science of Socially Intelligent ICT hosted at Imperial College, London, on August 3rd 2010.

This Workshop is the first in a series intended to formulate a systematic theory of 'social intelligence' and engineering principles for applications.

Epiwork coordinating team has also been present at the ECCS2010 satellite meeting "Policy Making in Complex Adaptive Systems" organized by ASSYST.

6 IMS and Modeling Platform as exploitation and dissemination tools

The project WP5 is taking particular care in exploiting the potentiality of the IMS recruiting to use the web tool as a podium for advertisement and dissemination of the project results. At the same time the web tool is being exploited to amplify the public perception on the issue of communicable diseases and as a new media for information and risk awareness campaign.

The success of WP5 campaign to collect epidemic data on flu and cold by means of the Internet monitoring platforms is based on the participation of as many volunteers as possible, in order to collect reliable data with high accuracy both in time and in space. To rely on public participation and convince volunteers to contribute with their time and data to the project, the Internet Monitoring platform teams are responsible for communicating the importance of the population contribution to the influenza surveillance. This goal is achieved by means of:

- A professional marketing strategy, including an active press approach via press messages and networking among journalists, and a range of services for schools and interested laymen;

- The provision of 'reader ready' information and educational material or for the lay audience and the school children and their teachers.

- An up to date website, with a country map showing the 'flu-state-of-affairs' and providing news and accessible information on flu and cold, vaccination, health care and scientific research;

The IMS teams in the several countries have envisioned strategies and campaign to "advertise" the local platform with the national public (see the detailed press releases above). In each country, i.e. The Netherlands, Belgium, Portugal, Italy and UK, all the national media have been exploited to make raise the population awareness of the existence of the project. Each platform has devised its own campaign, during this first year of Epiwork project, and at the end of the pandemic period all the teams have gathered the material produced by each platform and stored it in a centralized repository accessible to all the WP5 partners.

The activity of Work Package 5 at large are communicated and disseminated to the general public by means of the international Influenzanet.com website with a focus on the European activities, including a map of Europe and with special attention to the epidemic and modelling research within the Epiwork project. It is predominantly meant for the interested lay audience. On http://beta.influenzanet.com/, an analysis of the collected Influenzanet data so far is presented, with as main and public elements:
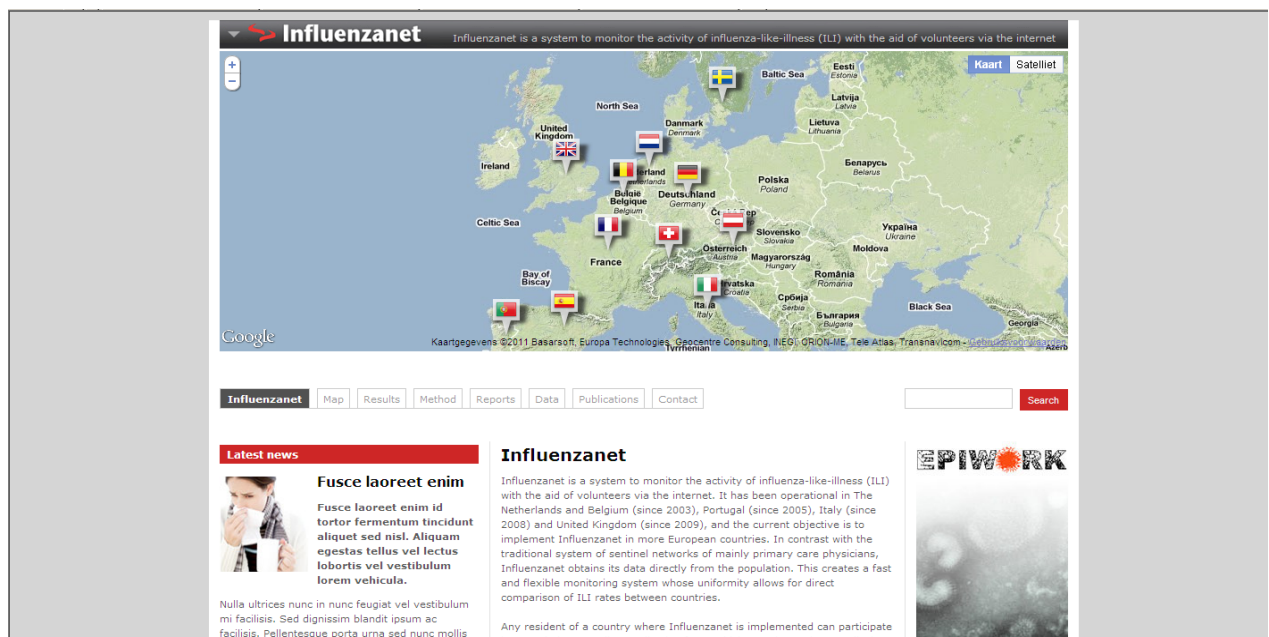
- Graphs and data on flu and cold from the Netherlands, Belgium, Portugal, Italy and the UK;
- Daily updates from all graphs and data, with the exception of the UK for this moment;
- ILI curves, as compared to Google Flu, EISN, Temperature (also interactive);
- Curves of other syndromes and ILI curves within various subgroups;
- Participation data: participants, completed surveys, histograms;
- Week and incidence data, also as CSV files;
- All published articles on IMS and Influenzanet to date;

It further contains certain elements, which are protected by a log in and a password:
- Influenza Analysis Program as the main "engine" behind the site, creating all sorts of graphs;
- Source code;
- Full datasets in uniform format as CSV files and including intake and survey questionnaires, for every country/season;

- All privacy sensitive information such as email and username are not present on the web server.

In the first three months of 2011, this website will be transformed into Influenzanet.org. Influenzanet.org will present the project an its results in a reader-friendly way, in order to promote the concept of Internet-based Monitoring Systems in other countries, to expand scientific cooperation with colleagues all over the world and, last but not least, to show interested visitors what flu, vaccination and epidemiology is.

A preview can been seen on http://www.prime-creation.com/clients/epiwork/influenzanet/.