



# Health-e-Child Newsletter



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[www.health-e-child.org](http://www.health-e-child.org)

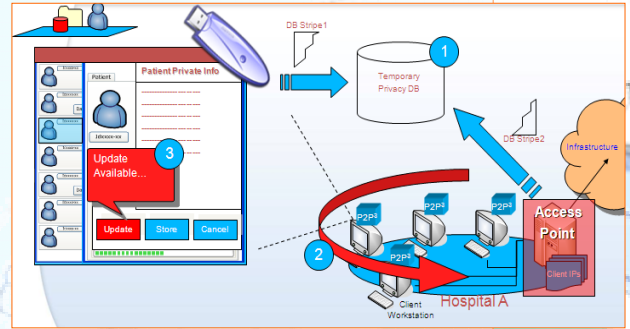




### Another Success for the Health-e-Child Development Team

The Health-e-Child development team demonstrated its latest achievements at the [Third EGEE Users Forum in Clermont-Ferrand](#) in France in February 2008, where it was the only demonstration to be awarded the "best live demo". Represented by Jerome Revillard and David Manset of HeC partner [maat gKnowledge](#), the project took home the prize for the demonstration of the HeC Gateway and Case Reasoner, a concrete implementation and use-case of a gLite-based healthgrid for European paediatrics. Specifically, the presentation simulated a clinician logging in to the platform and gLite-based grid infrastructure in order to analyse patient data.

This application is the stepping stone for the HeC decision support applications, which constituted the second stage of the demonstration, namely the CaseReasoner, together with its visualization components.



### Health-e-Child highlighted in *International Science Grid This Week*

Thanks to its best demonstration award at the recently held 3rd EGEE User Forum in Clermont-Ferrand (FR), Health-e-Child received some special coverage as "Link of the week" in the March 5th issue of *International Science Grid This Week* (ISGTW).



The ISGTW weekly newsletter - an evolution of Science Grid This Week and read by over 15,000 people - is published jointly by the EGEE and Open Science Grid projects and funded the U.S. Department of Energy's Office of Science and the National Science Foundation, and by the European Commission's Information Society and Media Directorate-General.

*"EGEE plays an active and invaluable role by supporting the HeC community in better understanding how best to use gLite, how to gridify biomedical applications and stay up to pace with ongoing developments," says demo-winner David Manset, director of biomedical applications at maat Gknowledge.*





### Rheumatology & Knowledge Discovery – A Paediatric Breakthrough

While internationally validated radiographic scoring systems are already available to measure bone erosion in children with juvenile idiopathic arthritis (JIA), standardised, validated, and feasible systems for magnetic resonance imaging (MRI) and ultrasonography are not.

A new MRI-based scoring system for rheumatology has been developed by HeC which measures the synovial membrane volume and bone erosion from MRIs. Variational methods for foreground/background separation in image processing, and segmentation were investigated using machine learning techniques. Image annotation tools were also developed and tested for establishing the ground truths for learning.

The process of validation of these semi-quantitative scoring systems is still ongoing, so far the MRI erosion scoring system has been tested on 44 patients enrolled at HeC partner Giannina Gaslini Institute. Inter-observer



reliability was assessed for all of the images by two different observers. Intra-observer reliability was based on a subset of 20 randomly selected patients, whose MRI scans were read a second time in a blinded manner by 2 observers 6 weeks after the previous review. Inter and intra-observer agreements for the MRI score were analysed by computing the intra-class correlation coefficient.

The very high inter-observer and intra-observer intra-class correlation coefficients were obtained and yielded preliminary evidence that HeC's MRI erosion score provides a reliable tool for assessing bone damage in JIA.



### A New Clinical Partner for Health-e-Child

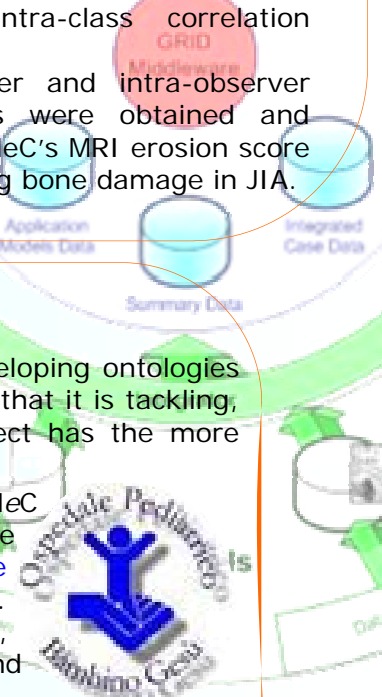
To achieve its goals of creating integrated models, of developing ontologies and of mobilising knowledge discovery in the medical conditions that it is tackling, the Health-e-Child Consortium knows the more data the project has the more accurate its models will be.

An important step will be taken in 2008 when the HeC Consortium soon welcomes (*the final agreement is ongoing*) one of the world's leading paediatric hospitals, the **Ospedale Pediatrico Bambino Gesù** (OPBG), as a new clinical partner. Located in Rome, OPBG will join HeC as an unfunded member, committing itself to providing full data sets for the cardiology and rheumatology arms of the study.

Health-e-Child started with three clinical partners (the Necker Hospital in Paris, the Great Ormond Street Hospital in London, and the Giannina Gaslini Institute, in Genoa) and has hopes of recruiting as many as 25 new clinical

partners in the future. And its ambitions are not confined to Europe: HeC's expansion plans already include the Paediatric Cardiology Department of the John's Hopkins University Hospital in Baltimore Maryland, USA.

***"This is an exciting prospect", says HeC Clinical Coordinator Giacomo Pongiglione of the Giannina Gaslini Institute, "not just for the potential addition of another world famous hospital, but also for the future of research and development in paediatric medicine."***





### Health-e-Child's 2nd Annual EC Review

Health-e-Child underwent its 2nd Annual European Commission Review this past March 13-14 c/o the Information Society and Media Directorate-General in Brussels. Chaired by the Project's Technical Officer, Mrs. Alessandra Martini, the comprehensive scientific review gave rise to constructive feedback from the independent experts, who acknowledged and emphasized the project's importance.

*"HeC has disseminated results and has raised awareness very effectively, also through important awards in public competitions with its demonstrators, giving high visibility to the project at this relatively early stage of development."*

The project was judged to have progressed according to plans, producing the announced deliverables and achieving the established major milestone of the review and refinement of the HeC prototype) by month 24.

Indeed, the delivery of the gateway software was viewed as a major advancement. While some progress, e.g., the update of the user requirements specifications, was assessed to be minor over the past 12 months, it was nonetheless seen as although meaningful for the ultimate understanding of the system by its potential users (clinicians, technicians). Finally - as was fully expected by the HeC Consortium - a red flag was raised at the evident lack of patient data to be used for the disease models, classification and prediction. Nevertheless, the reviewers appreciated and commended the Consortium's attempts to resolve the issue with the inclusion of new clinical partners.

Overall at an executive level, the reviewers found HeC to be:

- A high visibility/media attractive project,
- A project with a significant potential impact on health,
- A project with substantial breakthrough character

and, generally speaking, a project that could very well provide the IST programme with a high degree of visibility. ultimately becoming an important success story.

### Future Appointments: where to meet Health-e-Child in the coming months



Med-e-Tel - The International Educational and Networking Forum for eHealth, Telemedicine and Health ICT  
Luxembourg, April 16 - 18, 2008

ICT 2008 - Europe's biggest research event for information and communication technologies  
Lyon, November 25 - 27, 2008



HealthGrid 2008 Conference - the premier conference on the transformation of biomedical research, education and medical care through the application of Grid technologies  
Chicago, June 2 - 4, 2008

EGEE'08 Conference - the key European event dedicated to Grid technology  
Istanbul, September 22 - 26, 2008





## Health-e-Child selected as "Project of the Month" for a 2nd straight year

For a second consecutive year, Health-e-Child has been selected as the eHealth project of the month. Published on [eHealthNews.eu](http://eHealthNews.eu), the European Commission's portal dedicated to its eHealth policy, the full page overview summarised HeC's developments and progress over this past year, highlighting the imminent inclusion of the *Ospedale Pediatrico Bambino Gesù* of Rome as a new clinical partner (see [page 3](#)), the development of the MRI and US scoring system for bone erosion assessment in juvenile idiopathic arthritis ([page 3](#)), as well as ample coverage of the project's award for best demonstration at the recently held 3rd EGEE User Forum ([page 2](#)).



## 2nd Health-e-Child Training Course

Health-e-Child's Training Workpackage Leader, the [European Genetics Foundation](#) (EGF), has announced the 2nd HeC Training Course "Cardiogenesis and Congenital Cardiopathies: from Developmental Models to Clinical Applications", to be held this coming June 7 - 10, 2008 c/o the G. Levi & V.A. McKusik EuroMediterranean Center for Genetics & Medicine in Ronzano (Bologna) Italy.

Congenital heart defects (CHD) have an incidence of 1% of livebirths, and are considered one of the most important causes of paediatric morbidity and mortality. The course, funded and organised specifically within the package of HeC training events, will showcase the project and its objectives of vertical data integration, disease modelling and knowledge discovery as these are related to paediatric cardiology. Sessions will focus on the clinical, genetic and molecular aspects of CHD, thereby tackling these disorders from a translational medicine perspective.

For details and further information please visit the [EGF website](#).





## Health-e-Child Publication Update

After only 2 years of activity, the Health-e-Child consortium has already put together an impressive list of peer-reviewed publications in both the IT and clinical arenas, as well as 8 cross-institutional articles.

- E. Konukoglu, O. Clatz, P.-Y. Bondiau, M. Sermesant, H. Delingette, and N. Ayache. Towards an Identification of Tumor Growth Parameters from Time Series of Images. In Proc. of MICCAI'07, LNCS 4791, Brisbane, Australia, p. 549-556, Oct. 2007. Springer.
- E. Konukoglu, M. Sermesant, O. Clatz, J.-M. Peyrat, H. Delingette, and N. Ayache. A Recursive Anisotropic Fast Marching Approach to Reaction Diffusion Equation: Application to Tumor Growth Modelling. In Proceedings of the 20th International Conference on Information Processing in Medical Imaging (IPMI'07), volume 4584 of LNCS, pages 686-699, 2-6 July 2007.
- E. Konukoglu, O. Clatz, P.Y. Bondiau, H. Delingette and N. Ayache, "Extrapolating glioma invasion margin in brain magnetic resonance images: suggesting new irradiation margins", Submitted to Journal of Theoretical Biology, 2007.
- E. Konukoglu, X. Pennec, O. Clatz, N. Ayache. Tumor growth modeling in oncological image analysis. Chapter to appear in Handbook of Medical Image Analysis, I. Bankman ed., new edition 2008.
- Stanley Durrleman, Xavier Pennec, Alain Trounev, and Nicholas Ayache. Measuring Brain Variability via Sulcal Lines Registration: a Diffeomorphic Approach. In Nicholas Ayache, Sébastien Ourselin, and Anthony Maeder, editors, Proc. Medical Image Computing and Computer Assisted Intervention (MICCAI), volume 4791 of LNCS, Brisbane, Australia, pages 675-682, October 2007. Springer.
- S. Durrleman et al. Sparse approximations of Currents for Statistics on Curves and Surfaces, CVPR 2008, submitted.
- X. Pennec & S. Durrleman. Oral and Poster Presentations at SAMSI workshop on geometry and statistics of shape spaces, July 2007
- T. Mansi, M. Sermesant, X. Pennec, M. Lynch, M. Huber, A. Taylor, P. Lurz, G. Pongiglione, B. Stos, Y. Boudjemline. Image processing and disease modelling for decision support system and patient management in Tetralogy of Fallot. Joint 43rd Annual Meeting of the Association for European Paediatric Cardiology and the 18th Spring Meeting of the European Congenital Heart Surgeons Association, Venice (EAPC 2008).
- T. Mansi, M. Sermesant, X. Pennec, M. Lynch, M. Huber, A. Taylor, P. Lurz, G. Pongiglione, B. Stos, Y. Boudjemline. Modélisation électromécanique du cœur et analyse d'images: premières applications chez les tétralogies de Fallot. Société Française de Pédiatrie, meeting in Nantes (SFP 2008)
- A. Tsymbal, M. Huber, S. Zillner: Feature Ontology for Improved Learning from Large-Dimensional Disease-Specific Heterogeneous Data. CBMS 2007, Twentieth IEEE International Symposium on Volume, Issue, 20-22 June 2007 Page(s): 595 - 600 A
- A. Tsymbal, M. Huber, S. Zillner: Ontology - Supported Machine Learning and Decision Support in Biomedicine. DILS 2007, LNCS 4544, June 2007. Springer
- A. Tsymbal, M. Huber, S. Zillner, T. Hauer: Visualizing Patient Similarity in Clinical Decision Support. LWA 2007, ISBN 978-3-86010-907-6
- M. Wels, G. Staatz, A. Rossi, M. Huber, J. Hornegger: Anisotropic hidden Markov random field modelling for unsupervised MRI brain tissue segmentation and brain tumor detection. CARS 2007
- M. Wels, M. Huber, and J. Hornegger: Fully Automated Knowledge-Based Segmentation of the Caudate Nuclei in 3-D MRI. MICCAI Workshop 2007
- M. Wels, M. Huber, and J. Hornegger: Fully Automated Segmentation of Multiple Sclerosis Lesions in Multi-spectral MRI, 7th Open German/Russian Workshop on Pattern Recognition and Image Understanding, 2007
- S. Zillner, T. Hauer, D. Rogulin, A. Tsymbal, M. Huber and T. Solomonides: Semantic Visualization of Patient Information. Accepted for CBMS 2008
- R. Berlanga, E. Jimenez-Ruiz, V. Nebot, D. Manset, A. Branson, T. Hauer, R. McClatchey, D. Rogulin, J. Shamdasani, S. Zillner and J. Freund. "Medical Data Integration and the Semantic Annotation of Medical Protocols". Accepted for publication in the 21th IEEE International Symposium on Computer-Based Medical Systems (CBMS 2008), Jyväskylä, Finland, 2008.
- K. Skaburskas, F. Estrella, J. Shade, D. Manset, J. Revillard, A. Rios, A. Anjum, A. Branson, P. Bloodsworth, T. Hauer, R. McClatchey, D. Rogulin: Health-e-Child: A Grid Platform for European Paediatrics. In CHEP'07, International Journal of Physics, January 2008
- E. Jimenez-Ruiz, R. Berlanga, I. Sanz, R. McClatchey, R. Danger, D. Manset, J. Paire, A. Rios: The Management and Integration of Biomedical Knowledge: Application in the Health-e-Child Project (Position Paper). In OnToContent'06, 1st International Workshop on Ontology content and evaluation in Enterprise. LNCS Num. 4278. pp. 1062-1067. October 2006.
- Ernesto Jiménez, Rafael Berlanga, Ismael Sanz, and Roxana Danger: A Methodology for Vertical Integration over Biomedical Knowledge. In JIDBD'06, XI Spanish Conference on Software Engineering and Databases, October 2006.
- A. Anjum, P. Bloodsworth, A. Branson, T. Hauer, R. McClatchey, K. Munir, D. Rogulin, J. Shamdasani: The Requirements for Ontologies in Medical Data Integration: A Case Study. Proceedings of the 11th International Database Engineering & Applications Symposium (Ideas2007). IEEE Press ISBN 0-7695-2947-X, ISSN 1098-8068 pp 308-314. Banff, Canada September
- K. Munir, M. Odeh, P. Bloodsworth, R. McClatchey: Using Assertion Capabilities of an OWL-Based Ontology for Query Formulation. Accepted by the 3rd Int Conf on Information and Communication Technologies: From Theory to Applications (ICTTA). April 7-11, 2008. Damascus, Syria.
- J. Shamdasani, P. Bloodsworth & R. McClatchey: Semantic Matching for the Medical Domain. Accepted by the 25th British National Conference of Databases (BNCOD08). Cardiff, Wales 7th-10th July 2008.
- J. Freund, D. Comaniciu, Y. Ioannis, P. Liu, R. McClatchey, E. Morley-Fletcher, X. Pennec, G. Pongiglione & X. Zhou. Health-e-Child: An Integrated Biomedical Platform for Grid-Based Paediatrics. Studies in Health Technology & Informatics Vol 120, pp 259-270 ISBN 1-58603-617-3, ISSN 0926-9630 IOS Press. (Proceedings the 4th HealthGrid Int. Conference (HG'06). Valencia, Spain. June 2006).
- S. Mosci, L. Rosasco and A. Verri. "Dimensionality reduction and generalization", Proceedings of the 24th International Conference on Machine Learning, 2007 (Corvallis OR, USA)
- A. Destrero, S. Mosci, C. De Mol, A. Verri, F. Odone. "Feature selection for high dimensional data". Computational Management Science, 2008 (in press)
- Barla, A., Mosci, S., Rosasco, L. and Verri, A. "A method for robust variable selection with significance assessments", 11th European Symposium on Artificial Neural Networks, 2008 (in press)
- Lo Gerfo L., Rosasco L., Odone F., De Vito E. and Verri, A. "Spectral Algorithms for Supervised Learning", Neural Computation, 2008 (in press)





# Health-e-Child FactSheet

## Health-e-Child in figures

Project Identifier	IST-2004-027749
Timeframe	January 1, 2006 to December 31, 2009
Total cost	16.7 million €
European Union funding	12.2 million €
Number of partners	14
Number of Workpackages	16
Number of Deliverables	91
Total estimated efforts (in man/months)	2363



## Who's Who in Health-e-Child

Coordinator and Executive Board Chairman	Jörg Freund - Siemens Medical Solutions
Governing Board Chairman	Alok Gupta - Siemens Medical Solutions
Project Management Team Leader	Edwin Morley-Fletcher - Lynkeus, S.r.l.
Scientific Committee Chairman	Dorin Comanicu - Siemens Corporate Research
Technical Coordinator	Martin Huber - Siemens Corporate Technology
Clinical Coordinator	Giacomo Pongiglione - Istituto Giannina Gaslini
Ethical and Legal Issues Committee Chairman	Alberto Martini - Istituto Giannina Gaslini
Intellectual Property Rights Committee Co-Chairmen	Yannis Ioannidis - University of Athens Alessandro Verri - University of Genoa

## Health-e-Child Workpackages and Workpackage Leaders

WP1	Project Management	Siemens Medical Solutions
WP2	User requirements specifications	University of the West of England
WP3	Legal, Ethical and regulatory issues	Istituto Giannina Gaslini
WP4	Privacy and security	Siemens Medical Solutions
WP5	Grid platform	maat GKnowledge
WP6	Medical knowledge representation—ontologies	University of the West of England
WP7	Data management layer and data integration mechanisms	maat GKnowledge
WP8	Medical query processing algorithms	University of Athens
WP9	Data collection	Istituto Giannina Gaslini
WP10	Ground truth and clinical knowledge gathering	Istituto Giannina Gaslini
WP11	Integrated disease modelling	INRIA, Sophie Antipolis
WP12	Decision support systems	Siemens Medical Solutions
WP13	Biomedical knowledge discovery	University of Athens
WP14	Deployment of data management system and grid gateway	maat GKnowledge
WP15	Training	European Genetics Foundation
WP16	Dissemination	Lynkeus, S.r.l.

## Health-e-Child Project Support

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