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1.Executive Summary

The key aims of the VPH NoE are to foster integration within and across fields of knowledge, to establish the field in the scientific community both in research and in increasing critical mass and also to create links with the later stages of the translational process by engaging industry and clinicians. This requires a concerted action across the different work packages in the network based on a careful conception and implementation of a strategic dissemination plan.

This document provides an overview on the network's dissemination efforts in its first year, the lessons we learned and how we intend to plan our dissemination effort for maximum impact considering a limited budget. Work package 5 is devoted to disseminate the VPH vision within the NoE and across the VPH Initiative projects and, through the efforts of the International Working Group, to further expand this vision in the global context.

In the first section, where the Dissemination Plan is introduced, we describe past and future efforts on conceptualisation of our concerted action, the systematic representation of events and initiatives and the analysis of our first year efforts.

This is followed by a detailed discussion on specific actions implemented and being planned in our future dissemination activities.

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2. Dissemination plan

a. Communication model

In order to provide a systematic representation of the dissemination activities, both achieved and planned, it is necessary to have a coherent set of definitions that standardise all communication events with a communication model.

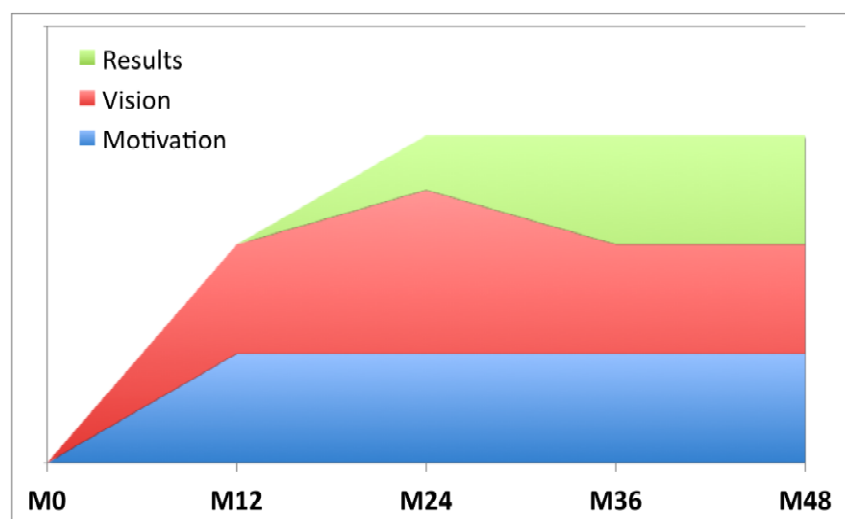
Every dissemination event is characterised by nine information keys:

1. **Date:** the date of the event
2. **Location:** the location of the event or of the communication source
3. **Source:** who starts the communication. This has several values: :
 - a. *Coordination:* Communication generated by the Coordinators or by the project management office
 - b. *Partner:* Communication generated by a member of the VPH NoE within a partner institution
 - c. *Consortium:* Communication generated by more than one member of the VPH NoE and more than one partner institution.
 - d. *VPH Community:* Communication generated by any member of the VPH Community
4. **Target:** the target of the communication with the following values:
 - a. *Internal:* Members of the VPH NoE consortium
 - b. *Clinical:* Clinical stakeholders
 - c. *Industrial:* Industrial stakeholders - corporations, SMEs, trade organisations, regional development organisations
 - d. *Research:* Research stakeholders such as researchers, research officers, research managers
 - e. *Institutional:* Communication towards institutional stakeholders such as the National, European and extra-European governmental organisations, including Health Authorities, Ministries of research, industry, and health
 - f. *Public:* Communication towards the citizens of Europe, European taxpayers, European patients
 - g. *Bulk:* Communication towards more than one of the above categories (a-f).
5. **Content:** the message of the communication with the following values:
 - a. *Motivation:* Justify the funding received in terms of returns for the European Economy and the European Society. This has to be done from day one, to explain to the taxpayers and their representatives how we use their money.
 - b. *Vision:* Disseminate research results of the entire VPH initiative in a strategic development perspective towards clinical, industrial and societal stakeholders. This has to be done as soon as the research results compose possible and plausible strategic scenarios that can be worth to be known by key stakeholders that plan future developments and investments.
 - c. *Results:* Disseminate results of the VPH NoE towards academic, industrial and clinical researchers so as to contribute to the collective knowledge development. This has to be done as soon as we have results that can be useful to the research community at large.

6. **Channel:** the media used to perform the communication with the following values:
 - a. *Journal:* Scientific publications on international peer-reviewed journals
 - b. *Presentation:* Scientific presentations at international scientific conferences/ Presentations at international networking / policy / concertation events
 - c. *Training initiative:* short and medium term workshops and personnel exchanges
 - d. *NoE audio-visual-printed dissemination material:* Dissemination material for bulk outreach communication (i.e. bulk distribution of newsletter)
 - e. *Event:* Organisation of targeted events for selected stakeholder groups
 - f. *Broadcast:* Coverage by generalist media
 - g. *Web Content:* provide content for visitors to VPH NoE website
7. **Impact:** for attended events, estimate the audience size with the following values:
 - a. 1-10 persons
 - b. 10-100 persons
 - c. 100-1000 persons
 - d. 1000-10000 persons.
8. **Outreach:** National, European, or Worldwide dimension.
9. **Citation:** description of event in standard nomenclature, e.g journal citations

b. Dissemination strategy

The content of the dissemination strategy can be summarised in the graph below.



In the first year we mainly focused on i) galvanising the NoE partners, ii) establishing the value added by the NoE to the VPH Initiative programs in FP7, iii) expanding membership and participation beyond the VPH Initiative by integrating General and Associate members. Effort on dissemination with motivational content should be kept constant in the following years, whereas the effort on dissemination of vision content should further increase in YR2, and then decrease in YR3 and YR4. This will be more than compensated by the dissemination of VPH Initiative results, which will slowly replace vision contents.

In regards to outreach, we should try to keep a reasonable balance between national, European and worldwide dissemination, typically 30% each.

In regards to the target, it is very difficult to make previsions. We should aim to reach researchers both in relation to the VPH Toolkit and in relation to training activities. We should sustain our communication with clinical and industrial stakeholders, not only via the advisory boards, but also via targeted dissemination events. And we need to keep the public at large and the institutional stakeholders informed as a duty towards the VPH community and the European Commission. At this stage we cannot identify a target more important than the others, and thus we shall work for flat distribution between targets. However, as the VPH initiative develops, strategic motivations may change this aspect of the dissemination plan.

c. Dissemination activity in YR1

We applied this communication model to all dissemination events generated by the VPH NoE during the first year of activity, please refer to Appendix #1 for the listing of dissemination events. Overall we generated 100 dissemination events, of which 53 had vision content, 38 motivational content, and 9 results content. This shows substantial dissemination effort, specially taking into account that this is the very first year of the project. The distribution in terms of content is coherent with the dissemination strategy, which for the first year suggested a communication predominantly oriented to vision and motivational content.

From the total 100 events, 11 had a national outreach, 34 a European outreach, and 55 a worldwide outreach. With respect to target audiences, 51 events targeted the research community, 38 the public at large, 7 the clinical community, and only 3 the industrial community. The data shows a slight bias towards use of web content as a dissemination channel (31 events), which increased significantly the worldwide outreach towards the public at large. This has proven a cost effective way to create impact considering the high number of hits that the website registered – an average of 4,500 unique visitors per month. If we exclude website content, we have 24 European and 26 worldwide events, which is a reasonable geographical balance.

d. Critical revision and planning

Overall, the dissemination performed by the VPH NoE during its first year of activity is adequate and in line with the dissemination plan. According to the dissemination plan, in the second year we expect dissemination efforts to increase to around 150 events. Motivational and vision contents should remain predominant.

The second year should see a small increase in dissemination towards end users of the VPH technology, more specifically industry and clinical users. However, meaningful impact in these spheres will remain restricted until the VPH projects in general, and the NoE in particular, achieve results relevant for these end users. We aim to further focus in these fields in the short run but mostly towards the end of these projects.

Strategic priority will be given to creating a concerted dissemination action within the VPH Initiative, towards Europe and consolidating a global profile. This will be implemented with specific actions such as VPH Initiative focussed workshops, increase on General and Associated members integration and certainly with the initiation of the VPH2010 series.

3. Dissemination actions

a. Scientific communication

The VPH is largely based, at present, on the input by academic teams with ongoing research activities in this area, 'topped-up' by VPH-I projects that act as foci of integration of efforts across Europe. Consequently, a significant part of the dissemination activities are de-centralised, and the NoE needs to decide how it wishes to collate and present related information, such as scientific publication, talks, and abstracts by individual members – essentially as part of 'their own' activity.

From the point of view of NoE representation, centralised activities must complement the above, to benefit from the critical mass created, and to illustrate the role and relevance of the NoE. These centralised activities may be split into oral presentations (key representatives of the NoE who 'go out and spread the word'), and print media.

For the former, we are severely limited by the small travel budget that we allocated to the NoE at the outset, and it may be prudent to revise this in order to maximise the impact that dissemination by good communicators can have, in particular if given outside our field of bio-computational modelling.

For the latter, we have been fortunate enough to find Philosophical Transactions of the Royal Society (series A) interested in the VPH. Thus, we have completed six focussed issues, published by Phil Trans A:

- 2008: The virtual physiological human: building a framework for computational biomedicine I&II;
- 2009: Crossing boundaries: computational science, e-Science and global e-Infrastructure I & II;
- 2009: The virtual physiological human: tools and applications I & II.

A further double issue is in production for 2010 (edited by Viceconti & Kohl).

The question of whether or not Phil Trans will continue to allow us to put in a double issue per year will depend on the success of previous issues. One way used by Phil Trans to assess success is to count the number of pdf article downloads – so the better we disseminate information about these issues, the more likely it is that we will have further issues for dissemination.

We have also embarked on a relationship with Interface Focus, a new themed journal of the successful Royal Society Interface Journal (<http://rsif.royalsocietypublishing.org/>). It currently produces 6 Focus issues per annum and is ranked as 6th out of 42 in 'Multidisciplinary Sciences' publications. Effective at the beginning of 2011, Interface Focus will become a free standing Royal Society journal and has agreed to dedicate one of its first new issues to the best 20-30 papers from our VPH2010 conference.

We hope that one of the key legacies of the NoE will be the establishment of a sustainable conference series, VPH*YEAR*. VPH2010, to be held in September 2010, will be the first in the series

–. it is intended to be a high-quality scientific meeting gathering the leading stakeholders in the VPH arena. We envisage a first small inaugural meeting for 150 to 200 people that should grow considerably along the project's years; with the event growing during (and beyond) the life of the NoE project. As of December 2009, a scientific and operational team is currently being organised, and keynote speakers invited for the 2010 event. This team is expected to grow organically to ensure that the conference series is well established by the end of the project's funding. Financial sustainability will be based on charging registration fees and securing sponsorships. Publication of the best papers from the conference will further raise the event's visibility – as noted above, we have secured a publisher for the 2010 event.

In regards to VPH presence at external events, we would like to highlight organisation of VPH/Physiome sessions as at the following annual conferences:

- IUPS World Congress- usually several satellites, workshops and symposia. See, for example:

<http://www.cellml.org/community/events/IUPS2009>

http://www.vph-noe.eu/?option=com_content&id=114

<http://www.cellml.org/about/news/IUPS-workshop>

- Experimental biology FASEB meeting - a half day session.
- IEEE EMBS - a half day session
See, for example, <http://www.embc09.org/Technical%20Program.html> (called "Bioinformatics, Computational Biology & Systems Biology")
- We have set in place an annual training session on the use of VPH tools (CellML, FieldML and associated software) once every year in Auckland at the time of the CellML conference - see <http://www.cellml.org/community/events/workshop/2009>, <http://www.cellml.org/about/news/cellmlworkshop2010>. We also aim to hold this training session once per year in the Northern hemisphere.

b. Training and retraining

i. Exchange programme

The initial step towards the creation of a formalised system of VPH training and the strengthening of a like-minded training community will be achieved through a student exchange programme. Developed under the ERASMUS programme, via bilateral exchange agreements, different levels of involvement or commitment are envisaged from participating institutions, depending on, for example, the nature of the existing programmes, the attitude of institutions towards formalising the transfer of credits to students from other institutions, and the alignment of teaching periods.

These different levels of commitment can be described, going from the simplest to the most involved, and not being mutually exclusive, as follows:

Teaching staff: members of collaborating institutions can exchange staff members in the context of short (e.g. one week) teaching periods, in the context of specialised seminars or training courses, for example. This type of collaboration will provide a simple means of strengthening the community.

Project work: students could move between institutions for the purposes of focused project work.

Modules taken and credits exchanged: this level of commitment is the most desirable, as it clearly moves closer towards the desired internationalisation of a VPH system of training, and would build on the complementarity of individual programmes offered by collaborating institutions. It requires, however, the deepest level of alignment between the institutions. In common with the level of commitment described in point b) above, for project work, such exchanges would be between 3 and 12 months. Common criteria for student selection will have to be agreed between participating universities, including aspects such as language requirements, academic background and academic excellence. Special attention will be given to progress monitoring and quality assurance.

This exchange programme will be initially designed and implemented among Members of the NoE, and will later be extended to other members of the VPH community. Participating institutions will be universities with existing VPH-related master programmes from where students and staff members can be drawn.

By starting, in the first instance, with these simple exchange agreements, the NoE will, over time, gain substantial experience and insight. This will prove invaluable to the development of the more complex institutional interactions that will be essential for the development of a VPH related programme in the future.

ii. Study Groups

Study groups are week-long residential events promoting the interaction between mathematicians and academic and industrial experimentalists working within the life sciences. Researchers from experimental and industrial laboratories are invited to present technical problems for study in working sessions with leading mathematicians from the academic community. The long-term goal of these study groups is to stimulate ideas that lead to further research and fostering collaborations between the life science and physical science communities.

Looking ahead, the key issue is to ensure that such activities become self-sustaining beyond the life of the NoE. To this end, dissemination of study group activities highlighting the important role they play in both integration of disciplines and training, is absolutely crucial. Furthermore, engaging industry in particular has the potential to bring in resources for funding such activities in the future (certainly after economic recovery). The outcomes of these events are likely to lend themselves to publicity materials with immediate visual impact, which will help recruitment for the study groups in particular but also to publicise the activities of the network as a whole.

The subject for the first study group (held at the University of Nottingham in summer 2009) was chosen to be that of regenerative medicine with a focus on epithelial cells across different organs (e.g. skin, bladder, gut, lungs, heart, breast etc). Four different problems (one from each organ) were presented on the first day and groups comprised of theoretical modellers and experimentalists spent the rest of the week tackling the particular problem. A videographer kept a record of the week's activity and a short video was produced, illustrating with great visual impact the very aims of these study groups. (see the video report here: <http://www.vph-noe.eu/news/125-1st-vph-noe-study-group-gets-under-way>). The second study group to be held in September 2010 at Universitat Pompeu Fabra, Barcelona, will be based on sound science and will be deeply problem driven. The theme for this SG will be a focus on establishing the methodologies for multiscale simulations. Thus,

a series of talks during the first day will present different schemas for multiscale simulation as well as introduce three areas in which such multiscaling is essential. Researchers from different backgrounds and origins will be invited to attend, although those involved in the VPH-i will be especially encouraged to participate. In 2011 the third and final Study Group in this series will be organised by ERCIM-FORTH. The experience of the two previous Study Groups will allow a detailed preparation to address very concrete problem oriented needs within the VPH related community, as established by the Requirements and Technology Assessment Exercises carried out by Work Packages 2 and 3 over the course of the project, while at the same time maintaining its high scientific emphasis. This objective is the one that actually differentiates these Study Groups from other more practical hands-on trainings, workshops or summer schools on VPH toolkit and software and hence were their contribution lays.

iii. Toolbox workshops

In addition to both the exchange of students between institutions as part of existing courses and the Study Groups already planned as part of NoE activities, a series of VPH Toolbox workshops are proposed. The first of which will be held at Barcelona in July 2010. These workshops will be distinct from the Study Groups whose primary aim is to answer specific scientific research questions, and will focus on the identification of 'gaps' in existing tools available to the VPH-I projects. The first workshop will bring together tool developers and researchers during the course of a week to address specific pre-defined technical issues which present barriers to VPH-I projects progress. It is proposed that the outcome of such activities would comprise:

Novel tools, or combinations of existing tools into novel workflows, to address specific technical issues, which would be disseminated through inclusion in the VPH toolbox.

Documentation of the process involved in developing such tools, to provide "How To" guides or FAQs to enable other researchers to undertake such modifications. This material would be disseminated through future training programmes and made available through the Virtual Academy. Dissemination of workshop outcomes both within the VPH-I community and to existing users of established tools.

iv. VPH NoE Endorsed satellite activities

In addition to the development of an exchange programme, the series of study groups organised to meet specific needs and the toolbox workshops, a fourth type of training activity is proposed. These will be VPH NoE- Endorsed Satellite Training Activities. In line with one of the key objectives of the NoE, the construction of a cohesive community, the organisation of training activities must not be confined to NoE Members or VPH Initiative projects. External players with specific skills or who wished to strengthen their relationship with the NoE will also be encouraged to offer targeted training events.

Endorsement of training events by the VPH NoE will be based on the topic addressed, evidence of quality, and the target audience. There will be a requirement to address a specific need of the VPH community at large, with ideas originating from research, clinical or industrial stakeholders, the approach can be theoretical or practical, and will include both events directed to new researchers or for in-career training.

In short, such external events will contribute to the fulfillment of the various VPH training and integration objectives and VPH NoE Endorsement provides recognition of this.

v. Integration with other WPs

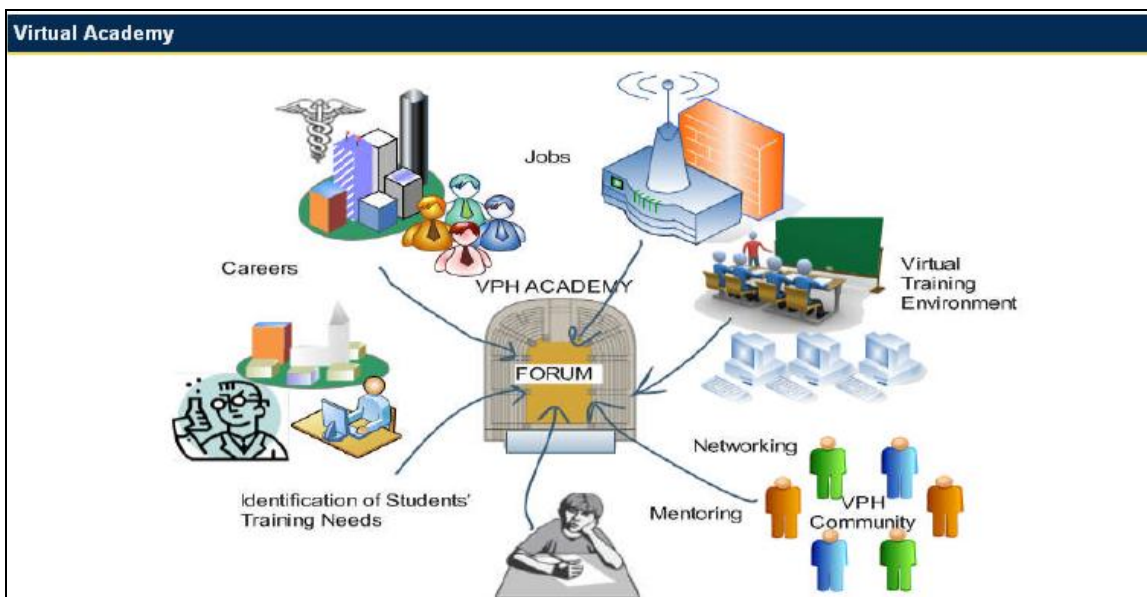
The NoE encompasses many, disparate, activities. Both for the sake of completeness and for sustainability it is essential that these form an integrated whole. No single part of the NoE can work effectively in isolation. Training has a seminal role in the integrative process and to this end, WP4 will work closely with WP2, WP3 and WP5 to maximise awareness of the emerging tools and technologies throughout the VPH community and to make them readily accessible to both new and to established VPH researchers.

Exemplar applications arising from WP2 effort provide sources of innovative tools and techniques that can demonstrate the problem-solving nature of the discipline and also the ability of developers to consider the wider picture when arriving at solutions. Dissemination of output from WP2 will be achieved through inclusion of WP2 tools in training mechanisms, such as the NoE exchange programme, study groups and dedicated hands-on workshops to demonstrate a direct translation from identification of need to documented success.

In order to encourage and maximise uptake of the Toolbox it will be necessary to ensure that researchers receive exposure to, and training in the use of, VPH technologies. Training will include both broad introduction to the Toolbox components curated within WP3 and specific models which address application areas identified through the WP2 Exemplar Projects and VPH-I projects. Although training activities are led through WP4 effort, the ability of these activities to engage the community beyond the NoE Core membership relies heavily on their subsequent effective dissemination through WP5.

vi. Virtual Academy

The proposal of a *VPH Virtual Academy* takes an important initial step in defining a mechanism to identify and meet the training needs of the VPH community. This proposal has arisen from the identification of deep-rooted challenges to bridging the educational gap, the practical strategies required to address these, as part of WP4 effort and wish to engage with, and seek feedback from both the researcher community and potential employers. At the current stage, whilst the motivation which underpins the Virtual Academy has been welcomed by core NoE members and the Advisory Boards, the vision for the role of the Academy continues to develop in response to engagement with VPH training stakeholders. Such a process is supported by the adoption of a web-based solution and web 2.0 technologies are expected to play a large role in the development of the Academy content.



The Virtual Academy will provide a focus for interaction between training providers, course developers, young researchers developing physiological modelling careers, established researchers seeking Life-Long Learning, and representatives from the major employment sectors. For sustainability, VPH training will need to respond to the changing needs of employers, and the Virtual Academy will provide an environment for two-way engagement with industry, healthcare, and professional bodies.¹ It is also anticipated that the role of the Virtual Academy *within* the NoE will actively promote interaction between workpackages, as, for example, both members of WP3 and WP4 would contribute to the development of material relating to a Toolbox workshop.

In its initial phase the Academy will be directed towards gathering information on training needs, promoting VPH-related training activities and courses, and providing a point of contact between potential employers, training providers, and newly qualified researchers.²

In the medium term the Virtual Academy will foster a training community providing the focal point for dissemination of information on current training initiatives, VPH related courses and targeted training events. As interaction with the training stakeholders increases exposure of the Virtual Academy will be extended through broader educational outreach activities such as the involvement of national disciplinary-based stakeholder groups (e.g. EPSRC, BBSRC, MRC in the UK).

vii. VPH Textbook

The VPH NoE has as a target the production of the first textbook in this new subject area by the end of the NoE. This textbook represents another important contribution from training to the overall dissemination activities and community building efforts of the NoE. For an emerging discipline it is appropriate that students should have access to teaching materials that are current, practical and comprehensive. As befits a computing-based subject, it is being planned as a multimedia system with core material in a conventional textbook produced by key authors in the relevant fields, but with comprehensive illustrative material that will be available online via controlled web links. The web-based material will be extended over time, to track changes in technology and giving currency to the content.

c. Toolkit

The VPH NoE is building a community of experts who share the common goal of enabling physiology to be explored, mapped and recreated *in silico*. Many activities are underway, across Europe and beyond, to populate this mathematical landscape with relevant data, tools and models, but the process is marred by a lack of coordination and agreement, leading to frustration for users, both from the lack of reproducibility of claimed results and the complexity, often impossibility, of interconnection between complementary components. The NoE is addressing each of these issues, but its resources are insufficient to do so simply by developing replacement versions of inadequate technology; it is forced to take a smarter approach, and the chosen route is standardisation.

The NoE is integrating a sustainable approach to the creation of a framework from which experts will feel confident that available materials will perform as expected, and into which they will be able to provide documented contributions that conform to established criteria. In this way the community will establish the foundations of its own future, by ensuring that the activities that take place are aligned towards a common platform of interoperability. An indication of the range of standards to be endorsed is given in Appendix #2.

¹ VPH NoE Vision Document Nov-2009

² VPH NoE Vision Document Nov-2009

There are many aspects to standardisation; each workpackage will be participating, as will the other NoE-associated strands of Commission-supported VPH work, in order to construct the NoE's integrated approach:

WP2, the host workpackage of exemplification, is developing tools and data that will demonstrably establish and conform to standards that are documented, proven and sustainable. The seed exemplar projects are each doing so in their own areas of specialisation, and the new ontological exemplar activity is itself operating to introduce and promote the key notion of conceptual relationship-based representation.

VPH-Initiative projects are rich sources of knowledge in this context and each will be interacting with the NoE, in particular with WP3, to contribute both developments and capabilities, and to benefit from the coordinated approach to management and curation.

WP3, where the practical framework activities take place, is developing standards for each category of community contribution, and additionally is specifying the communications system that will allow secure information interchange, and investigating the legal and ethical landscape in which such interactions must take place. This work will build into a comprehensive support mechanism for the community, and its web-based portal will be the main dissemination avenue for the community's practical achievements.

WP4 has the twin foci of community engagement and training. In the former it is directing effort to ensure that potential clinical and industrial recruits are educated in the sustainable nature of the discipline, as only such an enduring environment will offer sufficient appeal to merit their involvement. Training activities present a dynamic and practical opportunity for the wholesale dissemination of the NoE's aspirations as, through the entire set of activities - from study groups through summer schools, workshops, dedicated training sessions and the textbook - it will be possible to demonstrate a consistency of approach and a totality of coverage. Concepts originating within WP2 or the VPH-I projects, will be seen to develop into generalised, standardised, documented members of the WP3 repository, and will be employed within WP4 training activities as practical tools for routine use in the solution of novel physiological problems.

The result of this integrated, standards-based approach is that all interactions with the community, whether users, providers, advisors, or students, will be suffused with the powerful message of standardisation, and the validity of a controlled and curated repository for the community's outputs will be the central, fundamental dissemination success.

d. VPH-I community building

A key concept in the future action of the VPH NoE is that it should work more as a concentrator, re-distributor and amplifier of the work done in the other VPH projects than as a developer of VPH technology in itself. This can work only if the NoE develop a solid service program for the VPH projects, so that for them it is *convenient* to play with us. In order to implement this we developed specific printed and online (or both) material and are currently studying other possibilities as described in the following sections.

i. Dissemination material

All dissemination materials are publicly accessible (<http://www.vph-noe.eu/dissemination-material>) and the continued creation and renewal of these materials will assist with dissemination and networking. The previous year the following were produced to highlight the VPH NoE and VPH-I projects:

- VPH NoE Flyer
- VPH NoE Factsheet for the European Commission
- FP7 VPH-I PowerPoint Presentation
- VPH NoE PowerPoint Presentation
- Developing a Toolkit for the VPH Research Community
- Video of Biology and Mathematics Study Group 2009

Bi-annual issues of the Newsletter have been targeted at the scientific, medical and industrial community. Two issues of the VPH NoE newsletter have already been produced and a third newsletter is scheduled to be released in December 2009. These issues were downloaded from the website and have currently had over 2800 hits. The newsletter is also printed x1500 as a hard copy glossy format and distributed to each Core Partner (x50 perpartner), VPH-I Project Coordinators (x10 per VPH-I Project). Further copies were given to core members who distributed the newsletter at key conferences throughout the year.

The newsletter has been structured to give news of the VPH NoE project itself and to showcase different VPH projects. Each newsletter is structured in the following format:

VPH NoE section

- Editorial from Project Coordinators
- NoE News
- Upcoming Events
- Workpackage Focus
- Technical Report from Core Partner

VPH-I section

- VPH News
- VPH Project Focus
- VPH People Focus (Interviews)

As well as keeping the community informed of NoE news, each newsletter features news, updates and interviews from the broad spectrum of VPH and VPH I projects. The NoE should act as a coordination action and create opportunities for the VPH projects to integrate and network. To this end, all VPH members of the community are encouraged to participate in the newsletter creation and the newsletter has assisted in creating an integration between the VPH-I projects. One of the roles of WP5 is to assist VPH-I projects with contributions to dissemination. The first issue saw contributions from Sealife, @neurIST, MicroArt and the FP7 VPH-I Projects IMPPACT, VPHOP and ARCH. The second issue saw contributions from LHDL project, COAST as well as ACTION-Grid, euHeart RADICAL, PreDICT and PASSPORT. Where needed, Projects are given assistance in writing articles and advice on how best to disseminate their project. The newsletter format has been well received and the professional glossy looking pdf further assists in giving a professional quality and edge to further assist in promoting the VPH as a whole.

In the next section we describe some of the currently being considered.

ii. Planned actions

Coordinated web presence

The NoE has registered vph-xxxx.eu domains, but only a few projects have taken up these domains. We should ask the EC to support us in this nomenclature, as part of coordinated dissemination effort.

We should maintain a global mailing list, possibly around the VPH NoE Newsletter, that includes Full Name, Email, Institution, Nation, Department/Unit, Institutional Role, Address, City, Zip, Phone, Fax, of ALL researchers involved with any VPH project. VPH projects coordinators should give us support in this operation, in exchange for a global dissemination target for our own community so as to make easier the advertisement of events, tools, and resources of general interest.

We should use the VPH Square in Biomed Town as a channel of news items. This can be done by having dissemination managers of each VPH project post their news directly on Biomed Town, and then republish them on their project web site via the RSS feed, or by posting them on their own web site and export them to Biomed Town via an RSS feed, or a combination of both. This should be flexible enough to fit with any communication model. A course should be organised where we teach consortia how to best use these shared dissemination resources. Once all VPH news are concentrated in one place, we can i) automatically generate weekly digests sent by email to anyone is interested, ii) link to News services that can repost our feed, and in some cases pick a story for greater coverage.

Furthermore, we must transform the VPH ToolKit into both a resource and a service for the VPH-I community. For example, we should periodically check that the VPH-I page on the VPH NoE web site is up to date, and develop a strategy to make sure it gets ranked high in Google.

Global fora and repositories

We need to create some global resources that everyone in the VPH community is welcome to use, possibly hosted by the VPH Square in Biomed Town. This should include a Wiki of terms and definition, a general VPH forum for posting jobs, news, release of resources, events, etc., and possibly a resources repository where for storing public resources of truly general interest.

We need to open up the VPH Toolbox page so that all VPH-I members can use it to advertise their tools to the VPH community.

Best of VPH-I

We should start competitions across all VPH projects for:

The best image /video illustrating key concepts of the VPH vision

The best scientific paper that demonstrates the research impact of VPH

The best scientific paper that demonstrates the clinical impact of VPH

The best logo for the whole VPH: this will run every year for the entire duration of the VPH NoE, and only at the end of the project the NoE logo will be replaced by this as the general VPH logo. For the first round we shall take the NoE logo as current best, and have all others compete with it, in a public voting round.

All the competing resources should have to be made available under the same creative common license, in a predefined format, and made available to the community for reuse.

4. Grand messages and international working group

These initiatives are intended to have a wider global reach and are to be implemented through the VPH International Working Group. Grand messages are very general position statements that should be pushed on as many channels as possible, so as to ensure that they reach the broadest audience, with sufficient penetration to become “collective truths”. The VPH NoE should each year elaborate a single grand message, and spend the next year pushing it into the communication channels, while a new one is being elaborated.

In the first year two candidate grand messages emerged from our collective work: the statement of the reproducibility of simulation studies, and the need for data sharing with research and clinical institutions. However, the second aspect whilst important, has already been extensively covered in a recent issue of Nature, with a perspective broad enough to encompass the VPH approach, thus we should focus our energies into pushing the reproducibility statement approved in Brussels in September during the VPH-I meeting.

The statement of the reproducibility of simulation studies was first developed with the support of the VPH global community in the IUPS satellite event organised by the NoE http://www.vph-noe.eu/?option=com_content&id=114. It has since been circulated, improved and approved by the VPH NoE Governing Body. We are currently collecting signatures and support for the statement. Please find a copy of the statement in Appendix #2.

We propose the following steps to widen the scope of the statement:

- Post the statement on public web site and make possible for visitors to sign it (electronically).
- Advertise the statement and make sure that as many key players as well as sheer critical mass sign it.
- Ask relevant journals to publish it as a free advertisement (less difficult than one may think if we are prepared to be flexible with the issue, as some issues have spare single pages).
- Have the consortium compiling a list of Journals, and the NoE coordinator to write a personal letter to the Editors of journals suggested by consortium members, asking that the statement be adopted in the editorial rules of the journal.
- Make sure all VPH / Physiome *evangelists* cite the statement in every public presentation and follow best practice in all NoE papers and presentations.

We are currently considering a few preliminary ideas for future grand messages. One possible avenue is to evaluate the VPH position in regards to the systems biology field. Should we position VPH as the technology pillar of SB, or should we make a frontal attack on the contradiction between the declared scope and actual development of SB, and state that current SB is simple biology, and true SB is physiome? This could be placed as a provocative letter to Nature.

i. A Vision and Strategy for the VPH

The International Workgroup is also the channel responsible for producing a document entitled 'A Vision and Strategy for the VPH in 2010 and beyond' aimed at gauging the state of play, needs and strategies for the VPH field. The VPH NoE has entered into a substantial consultation process initially within the VPH Initiative to produce a living, evolving document. The next stage is to expand the consultations to widen the relevance of the document.

In this context we collected key information from every VPH Initiative project that should further inform our dissemination and integration efforts within the initiative. Furthermore, we believe that their challenges and needs might be representative of the VPH community at large. We collected information on:

- Primary IT/infrastructural challenge
- Primary basic research challenge
- Primary clinical challenge
- Primary output
- Translational status

ii. The VPH Institute

The recent draft of the Vision document describes in detail why we should work toward the creation of a European VPH Institute. This suggestion has been adopted, and the statutory process is being started. While it will take at least one year, for the Institute to find its feet, it could play a key role in the dissemination strategy of the NoE in the project's last two years. The institute is expected to, and will play a key role in the sustainability of the NoE legacy.

5. Relationship with the media

a. Targets

We need to work on two parallel levels: we need to aim large via news agencies, and we need to aim precisely, by contacting single journalists associated with specific media.

The ICT for Health Unit has just signed a deal with the HealthTech Wire news agency, which will provide free broadcasting of our news. Reciprocally, the VPH-NoE website will re-publish the HealthTech Wire RSS feed .

The NoE is currently considering subscribing to AlphaGalileo for a fee of ~€1650 per year for the premium service. The NoE could pass on the benefits of subscription to the whole VPH community using RSS feed from the concentrator facility on Biomed Town VPH square.

The dissemination manager should establish a direct relationship with the managers of these news agencies and negotiate the best way to forward news items, from RSS feed aggregators to targeted dissemination schemes. In the latter case we recommend that at least one news item is selected and posted to news agencies every month.

The dissemination manager will also start a systematic process to foster press coverage of the VPH agenda. The first step is the collation of key press contacts within the NoE and across the VPH Initiative projects to be targeted with relevant press releases.

Ideally, the NoE should aim to have regular news posted to news agencies, and an on-line up-to-date media folder with everything any journalist might need to prepare a piece on the VPH (images, videos, definitions, references, link to other coverage, etc., photos of key figures in the VPH, photo of large meetings, etc.)

One major press release per year should be translated into all major EU languages (with translations done on a voluntary basis by consortium members and the VPH-I community), and also formatted so that each institution can re-draft it as a local press release. The NoE should also liaise with the PR offices of all VPH-I partner institutions to push this annual press release into the local media of their country.

We should furthermore undertake one “vertical” action each year to push the grand message, for example, getting a letter into a high-profile journal like Nature. This would directly raise the profile of our project in the scientific community, and would also facilitate pushing the message into coverage by generalist media.

Appendix #1

#	Date	Source	Target	Channel	Impact (pp)	Outreach	Citation
1	23/06/2008	Consortium	Public	web content	10000-100000	Worldwide	The NoE Roadmap is available - and updated
2	24/06/2008	Consortium	Public	web content	100-1000	Worldwide	VPH NoE kick-off meeting
3	24/06/2008	Partner	Public	web content	1000-10000	Worldwide	VPH at ICT-BIO 2008
4	26/06/2008	Consortium	Internal	Event	10-100	European	VPH NoE Kick off meeting
5	03/07/2008	Consortium	Research	Event	100-1000	Worldwide	Measurements for Life Science meeting, Physikalisch-Technische Bundesanstalt Berlin
6	17/07/2008	Partner	Public	web content	1000-10000	Worldwide	Update on the VPH Concertation Meeting
7	21/07/2008	Coordination	Research	Presentation	10-100	Worldwide	P. Kohl: Invited Lecturer at Russian Academy of Sciences, Ekaterinburg
8	01/08/2008	Consortium	Research	Journal	1000-10000	Worldwide	Sadiq SK, Mazzeo MD, Zasada SJ, Manos S, Stoica I, Gale CV, Watson SJ, Kellam P, Brew S, Coveney PV. Patient-specific simulation as a basis for clinical decision-making. <i>Phil. Transact. A Math. Phys. Eng. Sci.</i> 2008 Sep 13; 366(1878):3199-219.
9	11/08/2008	Consortium	Public	NoE Audio-visual-printed dissemination material	100-1000	European	VPH concertation day fact sheet
10	01/09/2008	Partner	Public	Broadcast	1000-10000	European	The Parliament Magazine Research Review: 'Virtual Reality'
11	01/09/2008	Coordination	Research	Journal	1000-10000	Worldwide	Stoica I, Sadiq SK, Gale CV, Coveney PV. Virtual Physiological Human research initiative: the future for rational HIV treatment design? <i>Future HIV Therapy</i> , Sept. 08, Vol. 2 (5): 419-425.
12	01/09/2008	Partner	Research	Journal	1000-10000	Worldwide	Viceconti, M, Clapworthy, G, Van Sint Jan, S. The Virtual Physiological Human - A European Initiative for <i>In Silico</i> Human Modelling. <i>The Journal of Physiological Sciences</i> (Vol. 58 (2008) , No. 7 441-446)
13	01/09/2008	Coordination	Research	Journal	1000-10000	Worldwide	The Virtual Physiological Human: building a framework for computational biomedicine I , Eds: Viceconti M, Clapworthy G, Coveney P & Kohl P. <i>Philosophical Transactions of the Royal Society A</i> 2008/366:issue 1878
14	01/09/2008	Consortium	Research	Journal	1000-10000	Worldwide	Fenner J, Brook B, Clapworthy GJ, Coveney PV, Feipel V, Gregerson H, Hose DR, Kohl P, Lawford P, McCormack K, Pinney D, Thomas SR, Van Sint Jan S, Waters S & Viceconti M. EuroPhysiome, STEP and a roadmap for the Virtual Physiological Human. <i>Phil Trans Roy Soc A</i> 2008/366, 2979-2999.

#	Date	Source	Target	Channel	Impact (pp)	Outreach	Citation
15	01/09/2008	Consortium	Public	NoE Audio-visual-printed dissemination material	100-1000	Worldwide	Generic basic and extended slide set for general VPH NoE use
16	06/09/2008	Coordination	Research	Presentation	10-100	Worldwide	P. Kohl: Invited lecture at University of Calgary
17	01/10/2008	Coordination	Public	Broadcast	1000-10000	European	New Scientist: 'Virtual Bodies, Real Treatments'
18	08/10/2008	Coordination	Public	web content	1000-10000	Worldwide	VPH in New Scientist: Virtual bodies, real treatments
19	13/10/2008	Partner	Research	Presentation	10-100	Worldwide	S. Manos: Conference presentation at Oak Ridge National Laboratory Young Investigators Symposium in Knoxville, Tennessee
20	14/10/2008	Consortium	Public	NoE Audio-visual-printed dissemination material	100-1000	European	Leaflet on VPH NoE
21	05/11/2008	Partner	Public	web content	1000-10000	Worldwide	IUPS nominates its next President
22	06/11/2008	Coordination	Public	web content	1000-10000	Worldwide	ACGT Report on the First Transatlantic Workshop on Multiscale Cancer Modelling (ICTBIO 2008)
23	18/11/2008	Coordination	Public	NoE Audio-visual-printed dissemination material	1000-10000	European	Report on VPH Concertation Day and resulting joint VPH-I activities is now available!
24	19/11/2008	Coordination	Public	web content	1000-10000	European	ICT call 4 is now open!
25	01/12/2008	Partner	Research	Presentation	10-100	Worldwide	S. V. Sint Jan: 'EU FP7 Virtual Physiological Human Network of Excellence' Meeting presentation at 2nd EU - Korea Cooperation Forum on ICT research
26	12/01/2009	Consortium	Research	NoE Audio-visual-printed dissemination material	1000-10000	Worldwide	Leaflet on Physiome Toolkit
27	12/01/2009	Coordination	Public	Broadcast	1000-10000	European	BBC News: 'Operating on the virtual human' featuring Peter Kohl
28	12/01/2009	Consortium	Research	NoE Audio-visual-printed dissemination material	1000-10000	Worldwide	VPH NoE newsletter issue 1
29	12/01/2009	Coordination	Public	web content	100-1000	Worldwide	Operating on the virtual human - BBC news feature on VPH
30	12/01/2009	Consortium	Research	NoE Audio-visual-printed dissemination material	100-1000	European	VPH - WP2 EPSD/WP3 RTAE document
31	14/01/2009	Coordination	Public	web content	1000-10000	Worldwide	EU sets e-health map for 2009 - Ilias Iakovidis on Telemedicine and VPH priorities
32	21/01/2009	Partner	Public	web content	100-1000	Worldwide	Democrats in USA unveil draft \$20 billion health IT plan
33	26/01/2009	Partner	Research	Broadcast	1000-10000	Worldwide	Scientific American: Interview with Dennis Noble from Oxford University, setting out a vision for the VPH Community

#	Date	Source	Target	Channel	Impact (pp)	Outreach	Citation
34	26/01/2009	Consortium	Public	web content	100-1000	Worldwide	VPH NoE Newsletter Version I - January 2009
35	27/01/2009	Partner	Public	web content	1000-10000	Worldwide	Interview with Dennis Noble in Russian Journal 'Scientific American'
36	28/01/2009	VPH Community	Public	web content	100-1000	Worldwide	preDICT newsletter now available
37	28/01/2009	Partner	Public	web content	100-1000	Worldwide	VPH News Toolkit RTAE/EPSP
38	29/01/2009	VPH Community	Public	web content	100-1000	Worldwide	LHDL metadata ontology is now public
39	16/02/2009	Coordination	Public	web content	100-1000	Worldwide	Peter Coveney nominated in top 25 most influential figures in engineering and technology
40	20/02/2009	VPH Community	Public	web content	100-1000	Worldwide	ACTION-Grid Survey on grid technology and biomedical informatics
41		Coordination	Public	web content	100-1000	Worldwide	The INFINITY Initiative
42	02/03/2009	Partner	Public	web content	1000-10000	Worldwide	VPH NoE Study Group : REGISTRATION DEADLINE extended until the 17th of May
43	02/03/2009	Partner	Research	Presentation	10-100	Worldwide	Peter Hunter: 'The VPH/Physiome project' at 11th Tamagawa Dynamic Brain Forum
44	03/03/2009	Partner	Industry	web content	100-1000	Worldwide	Report on EBI VPH-Industry Meeting now available
45	03/03/2009	Consortium	Industry	NoE Audio-visual-printed dissemination material	100-1000	European	Report on EBI VPH-Industry Meeting now available
46	20/03/2009	Consortium	Public	Broadcast	100-1000	Worldwide	VPH NoE and Virtual Physiological Human webpages in Wikipedia
47	20/03/2009	Coordination	Research	Presentation	10-100	Worldwide	P. Kohl: Invited speaker at ASCPT Annual Meeting, Systems Biology Symposium, Washington DC
48	26/03/2009	Coordination	Public	web content	100-1000	Worldwide	VPH NoE Position Regarding Proposals submitted to ICT 2009.5.4: International Cooperation on VPH
49	05/04/2009	Partner	Research	Presentation	10-100	Worldwide	J. Cooper: Conference presentation at CellML et al. Workshop 2009
50	05/04/2009	Partner	Research	Presentation	10-100	Worldwide	B. de Bono: 'Chaste: a general purpose simulation package aimed at multi-scale, computationally demanding models' at CellML et al. Workshop 2009
51	15/04/2009	Partner	Public	web content	100-1000	Worldwide	University of Auckland home to World Class New Zealander
52	18/04/2009	Partner	Research	Presentation	10-100	Worldwide	Peter Hunter: 'The VPH/Physiome project' at Experimental Biology
53	20/04/2009	Coordination	Public	web content	100-1000	Worldwide	VPH NoE in the May issue of Philosophical Transactions of the Royal Society
54	21/04/2009	Partner	Research	Presentation	10-100	Worldwide	Peter Hunter: 'The VPH/Physiome project' at Virtual Tissue Workshop at Environmental Protection Agency
55	22/04/2009	VPH Community	Public	web content	100-1000	Worldwide	Call for Papers: The Open Biomedical Engineering Journal - Special Issue on VPH related research

#	Date	Source	Target	Channel	Impact (pp)	Outreach	Citation
56	27/04/2009	Coordination	Public	web content	100-1000	Worldwide	VPH News - Application Hosting Environment V2.0 released
57	01/05/2009	Coordination	Research	Journal	1000-10000	Worldwide	Gavaghan D, Coveney PV, and Kohl P. 2009. The virtual physiological human: tools and applications I. Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences. 2009. 367:1817-1821.
58	06/05/2009	Coordination	Public	web content	100-1000	Worldwide	VPH NoE in the June issue of Philosophical Transactions of the Royal Society
59	08/05/2009	Partner	Public	web content	100-1000	Worldwide	4th edition of the World of IT Conference and Exhibition announced for March 2010
60	11/05/2009	Coordination	Research	Presentation	10-100	Worldwide	P. Coveney: 'Virtual Physiological Human: Network of Excellence' at DEISA-PRACE Symposium (Amsterdam)
61	14/05/2009	Partner	Public	web content	100-1000	Worldwide	MMBNOTT/MRM Summer workshop in mathematical medicine and biology to be held 15-17 July 2009
62	19/05/2009	Coordination	Public	web content	100-1000	Worldwide	New publication on Selected papers from the UK e-Science All Hands Meeting 2008
63	19/05/2009	Consortium	Public	NoE Audio-visual-printed dissemination material	100-1000	Worldwide	Updated basic and extended slide set for general use
64	25/05/2009	Coordination	Research	Presentation	100-1000	Worldwide	P. Coveney: Keynote lecture on 'Virtual Physiological Human Network of Excellence' at ICCS 2009
65	28/05/2009	Coordination	Research	Journal	1000-10000	Worldwide	The Virtual Physiological Human: building a framework for computational biomedicine II, Eds: Viceconti M, Clapworthy G, Coveney P & Kohl P. Philosophical Transactions of the Royal Society A 2008/366:issue 1879
66	02/06/2008	Partner	Research	Presentation	10-100	National	J. Cooper: Teaching presentation at Oxford University Software Engineering Programme, XML module
67	12/06/2008	Coordination	Clinical	Presentation	10-100	National	C. Gale: 'Investigation of the human body as a single, integrated, complex system (EU FP7 VPH initiative): application to integrative cardiovascular medicine' at UCL Cardiovascular Science & Medicine Day
68	01/07/2008	Consortium	Research	Broadcast	1000-10000	National	ERCIM News No 74: 'Supercomputing in Clinical Practice' by Stefan Zasada, C.V. Gale, Steven Manos and Peter Coveney
69	29/07/2008	Partner	Research	Presentation	10-100	National	J. Cooper: Student workshop presentation at LSI DTC Final Year Student Workshop

#	Date	Source	Target	Channel	Impact (pp)	Outreach	Citation
70	08/09/2008	Coordination	Research	Presentation	10-100	National	P. Kohl: Plenary session on VPH at UK e-Science annual meeting
71	06/10/2008	Coordination	Clinical	Presentation	10-100	National	P. Coveney: 'The Virtual Physiological Human & Translational Medical Research' to UCL Health Sciences Research Deanery
72	09/10/2008	Coordination	Clinical	Presentation	10-100	National	P. Coveney: The Virtual Physiological Human & Translational Medical Research' to CNRS delegation visiting UCL
73	27/10/2008	Partner	Research	Presentation	10-100	National	J. Cooper: Teaching presentation at Oxford University Software Engineering Programme, XML module
74	04/11/2008	Coordination	Research	Presentation	10-100	National	P. Kohl: Invited Departmental seminar speaker Physiology Department at University of Bristol
75	19/11/2008	Partner	Research	Broadcast	1000-10000	National	ULB intra lettre: Physiologie humaine virtuelle
76	01/01/2009	Consortium	Research	Broadcast	1000-10000	National	ERCIM Newsletter: Network of Excellence in 'Virtual Physiological Human' Research
77	03/07/2008	Coordination	Research	Presentation	10-100	European	P. Kohl: Invited Lecturer Physikalisch-Technische Bundesanstalt, Berlin
78	08/09/2008	Consortium	Research	Presentation	10-100	European	P. Coveney (conference director): Conference presentation(s) of plenary lecture with P. Coveney and P.Kohl and theme UK e-Science All Hands Meeting
79	16/09/2008	Coordination	Research	Presentation	10-100	European	P. Kohl: Invited Lecturer at Oxford Imaging Festival
80	18/09/2008	Partner	Research	Presentation	10-100	European	S. Manos: 'Virtual Physiological Human Network of Excellence' at @neurIST project open symposium
81	26/09/2008	Coordination	Research	Presentation	10-100	European	P. Coveney: 'The Role of Grid Computing in Support of Patient Specific Medical Decision Making' at EGEE 08
82	06/10/2008	Partner	Clinical	Presentation	10-100	European	S. V. Sint Jan: Conference presentation at Technologies de la sante de l'idee a l'innovation
83	06/10/2008	Partner	Research	Presentation	10-100	European	D. Friboulet: Conference presentation at MICCAI-Grid Workshop
84	06/10/2008	Coordination	Research	Presentation	10-100	European	P. Coveney: 'European Grids and National Grid Service' presentation at EGI
85	21/10/2008	Partner	Research	Presentation	10-100	European	P. Lawford: 'Face to face with the Virtual Physiological Human' Round table discussion at MediTech Medical Innovation Forum
86	22/10/2008	Consortium	Research	Event	10-100	European	VPH NoE concertation day
87	23/10/2008	Consortium	Research	Event	100-1000	European	P. Kohl/P. Coveney/A. Frangi: Conference presentations/chair of session/attendance at ICT BIO 2008

#	Date	Source	Target	Channel	Impact (pp)	Outreach	Citation
88	28/10/2008	Partner	Research	Presentation	100-1000	European	S. V. Sint Jan/ T. Chapman: 'Virtual Physiological Human Network of Excellence' Conference presentation/Booth at 3D MA 10th International Symposium 3D analysis of human movement.
89	05/11/2008	Coordination	Research	Presentation	10-100	European	P. Coveney: Conference presentation/attendance at ICT BIO 2008
90	25/11/2008	Consortium	Research	Presentation	10-100	European	R. Ronchard/C.Gale/others: Conference presentation/booth/attendance at ICT 2008
91	02/02/2009	Consortium	Industry	Event	10-100	European	VPH-Industry workshop. EBI event targeted to industrial stakeholders. Presentation by consortium and Board of NoE including P. Hunter, S.Lloyd and P.Coveney
92	10/02/2009	Coordination	Research	Presentation	10-100	European	P. Kohl: Invited Departmental seminar speaker at Würzburg University
93	16/02/2009	Consortium	Research	Training initiative	10-100	European	1 st Barcelona School on Biomedical Informatics, BSBMI'09
94	30/03/2009	Partner	Research	Presentation	10-100	European	R. Thomas: 'The VPH Toolkit for collaborative multi-scale modelling of multi-organ systems for the Physiome' at Modelling School 'Modelling complex biological systems in the context of genomics' at La Colle sur Loup, Nice
95	02/04/2009	Consortium	Research	Event	10-100	European	Sophia Antipolis, ERCIM, V. Diaz: 'Introduction to the VPH Network of Excellence' S. Manos: 'The VPH Standardisation Effort'. K. McCormack: 'Specific VPH Standards Issues'.
96	24/05/2009	Partner	Research	Presentation	10-100	European	F. Sanz: 'Integrative approaches in pharmcoinformatics' at 7th European Workshop in Drug Design
97	16/03/2009	Partner	Clinical	Presentation	10-100	European	F. Sanz: 'European Projects Towards the Virtual Physiological human: Modelling and Simulation' at BioinforSalud 2009
98	24/05/2009	Partner	Research	Presentation	10-100	European	F. Sanz: 'Integrative approaches in pharmcoinformatics' at 7th European Workshop in Drug Design
99	19/09/2008	Partner	Clinical	Presentation	10-100	European	F. Sanz: 'Looking for new approaches in drug discovery: potential impact in Nanomedicine' at Nanomedicine 2008
100	16/02/2009	Partner	Clinical	Presentation	10-100	European	F. Sanz: 'Pharmcoinformatics' at Barcelona School on Biomedical Informatics

Appendix # 2

Statement in Support of Joint Action on 'Model Reproducibility for Physiome Research'

The undersigned agree that concrete, coordinated action is vital to ensure accessibility, reproducibility, and reliability of the computational framework for understanding human and other eukaryotic physiology (the Physiome). Specifically, we regard the following points as Priority Items for the implementation of aims set out in the World Integrative Research Initiative agreement of 2007 (http://www.biomedtown.org/biomed_town/VPH/wiri/).*

- 1) All publications, including modelling work, shall contain the necessary information required to reproduce published results.
- 2) Whenever possible, the relevant information should be offered via electronic supplement to journal publications and/or uploading to established international depositories.
- 3) The development of syntactic standards (such as suitable markup languages) and semantic standards (such as ontologies) shall be supported and their adoption/application will be encouraged where possible.

*) This statement is accompanied by an Appendix with a developing list of specific action items and examples.

Appendix

This appendix contains a developing list of concrete action items for the implementation of the Statement on Model Reproducibility for Physiome Research (MRPR).

Examples of information that may be relevant for model reproduction includes, but are not limited to:

- a) links to the data used to develop the model (e.g. published paper, raw data);
- b) information on / links to the modelling tools used in the study (both executable and source code, together with instructions on re-building the executable from the source code) or, where that is not possible (due, for example, to commercial / intellectual property rights limitations), the name of the software, its version and web link (if available);
- c) the input files, where input files are used, and instructions on their use with the modelling tools for re-creating the published figures; and
- d) simulation results (when the size of such data is deemed reasonable).

Proposed implementation strategy

To achieve model reproducibility, three levels of information are required for models, data and simulation experiments: (i) a minimum information standard, (ii) syntax in the form of markup languages (MLs), and (iii) semantics in the form of ontologies accessed through metadata. All of these are under development, for example by the VPH/EBI/Physiome Project, and we encourage the community to use and contribute to the following developments:

1. **Minimum information standards:**

MIRIAM for the models www.ebi.ac.uk/miriam/main/mdb?section=standard
MIASE for the simulations www.ebi.ac.uk/compneur-srv/miase

2. **Markup languages** for models, data and simulation experiments:

SBML	www.sbml.org	for non-spatial	biochemical	models
CellML	www.cellml.org	for non-spatial	biophysical	models
FieldML	www.fieldml.org	for spatial models		
InSilicoML	www.physiome.jp	for non-spatial	and spatial	models
DICOM	for	image		data
BioSignalML	for	time dependent	signal	data
SED-ML	www.ebi.ac.uk/compneur-srv/sed-ml	for simulation experiments		

3. **Models and data repositories** that are based on the above markup languages:

SBML	www.biomodels.org
CellML	www.models.cellml.org
FieldML	www.fieldml.org/models (available shortly)
InSilicoML	www.physiome.jp/modeldb

4. **Metadata standards** for annotating the models and facilitating webservice based interrogation of models. A number of these are under active development.

e.g. Graphing metadata www.cellml.org/specifications/metadata/graphs

5. **Ontology** standards for referencing data and models, as well as for ontology development, to follow the principles and best practices established by the OBO Foundry community www.obofoundry.org

6. **Tools and services** for authoring models, running simulations, visualising models and data: toolkit.vph-noe.eu.

Encourage development of business friendly, open source software.

7. **Mechanisms for handling the reference description of a model** (as required for MIRIAM compliance). Still under development.

Journal policy

We proposed to ask journal editors to flag articles that adhere to a Physiome Model Reference Description (PMRD) standard. We will then monitor the citation rates for modelling papers to see whether those with the PMRD flag get cited more. If they do then we can use this to encourage the journals to try to attract more papers that adhere to the standards, and encourage authors who will benefit from the increased citation rates and easier acceptance by the journals.

In addition, whenever acting as reviewers, we will seek to encourage authors and editors to provide access to the information required to achieve the aims of the MRPR statement.