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European Health Futures Forum

Developing an expert consensus on barriers to co-creation in eHealth

Executive Summary

In February 2016 EHFF hosted a 24-hour long policy discussion, funded and enabled by the Robert Bosch Foundation. This was an intensive examination of the topic of early end-user involvement in eHealth product design. The invited group of roughly 30 consisted of representatives from six main stakeholder groups drawn from health, industry, government and civil society.

The group heard presentations of six varied examples of good practice in design and recognised common features such as identification of user needs as a starting point, iterative prototyping and the importance of recognising healthcare professionals as well as patient/citizens as end-users with specific needs. After discussion around aspects of design principles, a major exercise for the group was to collectively explore the opportunities, barriers and challenges associated with this approach to design. Amongst the many issues identified were excessive preoccupation with data security, the importance of digital literacy for all end-users, the handicapping effect

on potential change of ‘short-termism’ and finally ‘bolt-on’ technology versus building new systems around the new technology.

It was agreed that although the value of early involvement seemed beyond dispute, it did require a change in focus for many product designers and in terms of influencing that change, the analysis uncovered a whole range of wider issues related to end-user (both citizen/patient and healthcare professional) adoption and engagement with eHealth.

Some further relevant information collected from European sources between February and October of 2016 was described and in conclusion some proposals are made for a much larger project which would attempt to offer some possible practical solutions to the very real dilemmas (with both financial and policy implications) which currently challenge the effective uptake of eHealth solutions across Europe.

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Introduction

Policy makers increasingly look to technology to help develop new innovative care services and to transform healthcare delivery. Currently eHealth and mHealth solutions offer huge potential for innovation. However there are major development and implementation problems that are delaying impact on the system, and more importantly the patient benefits that could be realised. The absence of meaningful end user engagement and involvement, especially at the earliest stages of design and development of products has repeatedly been highlighted as a key factor contributing to 'failed' eHealth implementations[1]. This problem is widely recognised but lacks a satisfactory analysis of the blocks or potential scenarios for removing them.

Funded by Robert Bosch Stiftung Foundation (RBS) the European Health Futures Forum (EHFF) hosted a multi-stakeholder intensive exercise to explore end user involvement in the co-production of eHealth products and the effective implementation of eHealth and mHealth solutions with the aim of identifying potential solutions or recommendations.

Context

Across Europe a key trend in healthcare transformation is the development of a more patient centred approach where different aspects of health and social care are provided as an integrated service tailored to meet the individual patients' needs (demand driven) rather than the traditional supply-driven health care delivery. In this patient centred approach the patient journey is often taken as starting point for the design of integrated care services[2]. This can only be truly realised if it has the involvement of empowered patients/citizens to ensure that the newly developed service meets their needs. This principle equally applies to the development of digital healthcare services or eHealth. eHealth is a healthcare practice supported by electronic processes and communication[3]. There are a considerable number of studies on enablers to eHealth adoption that have identified a range of factors needed for successful development and implementation of

[1] Cresswell K. et al, Anything but engaged: user involvement in the context of a national electronic health record implementation. Inform Prim Care. 2011;19(4):191-206. http://www.ncbi.nlm.nih.gov/pubmed/22828574

[2] Richards, N., Coulter, A. (2007) Is the NHS Becoming More Patient-centred? Trends from the National Surveysof NHS Patients in England 2002-07. Oxford: Picker Institute Europe

[3] V. Della Mea, What is e-Health (2): The death of telemedicine?, J Med Internet Res. 3(2) (2001).

digital services and related products: e.g. stakeholder involvement[4], interoperability[5], user friendliness[6], adequate business models[7], etc.

Co-creation in is strongly dependent on user involvement[8]. Fundamental to success is meaningful and productive end-user involvement and engagement in the process of co-creation. In general terms, individual patients could, ideally supported through their representative organisations, contribute to shaping the health care and social system through involvement in health and social policy-making, organisation, design and delivery.

In current practice achieving this appears to be quite difficult, and the purpose of this project was to explore the reasons for this, as overcoming this obstacle or series of barriers potentially could save the industry huge amounts of wasted resource and increase the speed with which valuable innovations in healthcare could be adopted. Patients with chronic conditions are often referred to as the most under-used resource in the health system; co-created patient-centred care models and solutions have demonstrated better quality of care as well as potential long-term cost-efficiencies[9]. However too many patients are struggling to get the support they need to become equal partners in care.

Aims and objectives

The project had the following objectives

1. To map the current status of end-user engagement and involvement in the implementation of eHealth across Europe
2. To identify the main barriers and facilitators of end-user engagement and involvement related to eHealth implementation
3. To draft a set of guidelines involving all stakeholders that could improve the progress of eHealth implementation with end-user involvement

[4] C. Pagliari, Design and Evaluation in eHealth: Challenges and Implications for an Interdisciplinary Field, J Med Internet Res. 9-2 (2007).

[5] Benson, T. (2016). Principles of health interoperability : snomed ct, hl7 and fhir. New York, NY, Springer Berlin Heidelberg.

[6] Ross, J., et al. (2016). "Factors that influence the implementation of e-health: a systematic review of systematic reviews (an update)." Implementation Science **11**(1): 146.

[7] Broens, T.H.F, et al. Determinants of successful telemedicine implementations: a literature study, Journal of Telemedicine and Telecare, 13,6, 2007, pp303-309

[8] Jurgens-Kowal, T. (2012). "The Power of Co-Creation." Journal of Product Innovation Management 29(4): 683-683.

[9] "The costs of limited health literacy: a systematic review", Eichler K, Wieser S, Bruegger U, Int J Public Health, 2009;54(5):313-24.

The project brought together a strong group of representative stakeholders for 24 hours in an intensive workshop to maximise exchange of information and debate. Hosted by RBS at their premises in Berlin, the output of this event would be written up to promote the theme at the subsequent 2016 annual European Commission eHealth week in Amsterdam.

Description of the project

Between October and the end of 2015 desktop-research (gathering information from already published sources such as books, journals, papers, libraries, Internet etc.) complimented by stakeholder interviews was carried out to ensure that all essential topics, stakeholders and information were included in the project.

Participants/target group

In collaboration with RBS we included stakeholder representatives from both policy and front line across EU member states.: including representatives from related European programmes and initiatives. 31 experts came from eight EU states covering the following 6 broad categories:

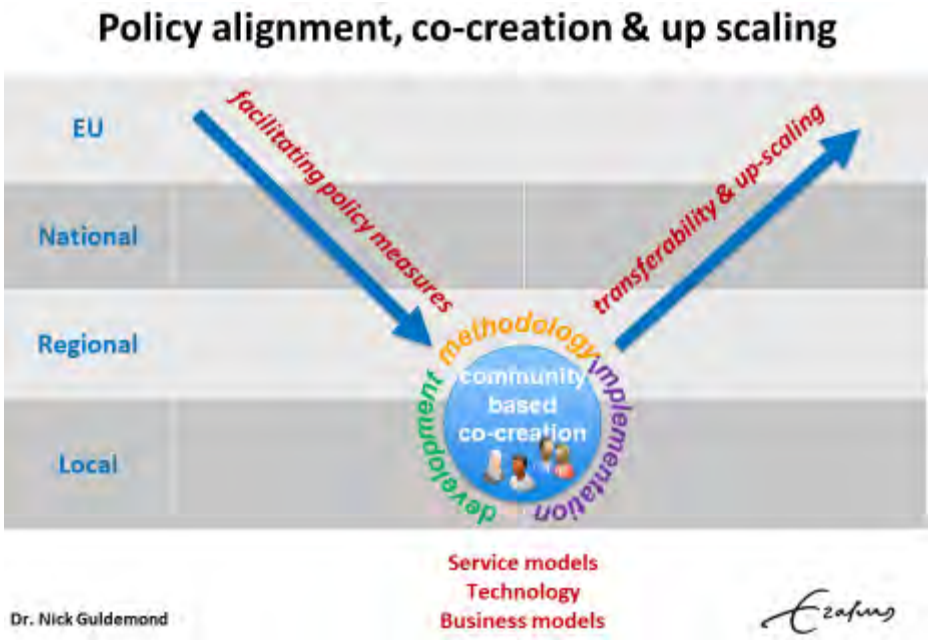
1. Primary and secondary end-users: patient and professional group representatives
2. Industry: technology (including MedTech and health IT), pharma and service providers
3. Financiers: healthcare insurers, healthcare payers, reimbursement agencies, investors
4. Policymakers: national, regional, local
5. Academics: researchers in the field of medicine, health technology assessment, service design and co-creation, eHealth and implementation strategies
6. Designers of eHealth solutions and healthcare systems

(a full list of the participants with their CVs is attached in Appendix 2).

The challenge

Our starting point was a discussion on the scope in which community-based co-creation or co-production of eHealth services takes place. We were aware that the potential complexity of the challenge risked overwhelming participants. As an introduction Nick Guldemond presented the diagram below to sketch the perspectives on the policy, co-creation and up scaling of eHealth services.

Development and implementation of solutions needs to take account of all relevant aspects of the local setting, the users acting within this context (or representatives of intended users) and with involvement of all other related stakeholders. Development is the process of design,



creation and production of a solution while implementation is more a process of adaptation and actual use of the solution in daily practice. Commonly, community based settings who co-create are referred to as living labs. (Living Labs are defined as user-centred, open innovation ecosystems based on a systematic user co-creation approach integrating research and innovation processes in real life communities and settings)[10].

In our project barriers to co-creation in eHealth with a specific focus on user engagement and involvement were a central concern. This project was designed to allow the wide range of stakeholders maximum opportunity to share information and to co-create recommendations for this report. As such formal presentations were kept to a minimum, being used to pose challenges for further discussion. The event provided a rich and wide ranging discussion and while this report attempts to covers the key points, a full and detailed description of the event and of the conversations during it is included as Appendix One, below.

Promising Practices

When we reviewed the lessons from the good practice examples presented during the exercise, drawn as they were from commercial design, academic research and also service commissioners, all providing examples of demand-side innovation.

End user engagement and active involvement is crucial for successful co-creation. As a principle, this requires skilled, personally engaged consumers (or users of health solutions) co-

[10] Living Labs for regional innovation ecosystems http://s3platform.jrc.ec.europa.eu/living-labs

creating value with stakeholders[11]. Proactive users engaged in the development and implementation of solutions are also known as, 'prosumers', expanding the traditional consumer role, becoming knowledgeable, active participants in value creation[12]. Again, as a principle, if healthcare is to be founded on value creation, the service provided should anticipate the needs of the user **and** should add value in the perception of the user[13]. Patient experience is increasingly recognised as an important pillar of quality in healthcare alongside clinical effectiveness and patient safety[14] Perceived value is the users' subjective, overall evaluation of perceived benefits and perceived sacrifices.[15] Seeing the service through the user's eyes improves service, products and processes. As *Mark Brown of Social Spider (a community social enterprise*) formulated it, the aim should be: 'to create services and products that people love'. The 'love' element is an important requirement for user adaptation.

Just as MedTech companies need to reconsider their design processes, in healthcare it is being increasingly recognised that external inputs from design experts can be important as a methodology in the transformation of healthcare systems[16]. This is typified by the examples of doll-based design from Sweden and from Lancaster University, UK Professor Whittle's iterative prototyping approach (see Appendix 1).

Service design needs to take into consideration all interactions and the factors that influence the context in which a service is delivered. Commonly the design process starts from observing the current situation to identify problems in the care progress, beginning with the patient journey. Patient journeys are often based on a particular patient profile or archetype that reflects the typical aetiology and course of the disease[17]. A service design approach uses process maps, flow charts and system diagrams to collect both quantitative and qualitative data to describe the patient journey and visualise *current* versus *to be* situations. Visualisation of the critical moments of interaction between the patient and carers helps to understand

[11] Ramaswamy, Venkat, and Francis J. Gouillart. "Building the Co-Creative Enterprise." Harvard Business Review no. 88 (10):100-109, 2010.

[12] Kotler, Philip. Prosumers: A New Type of Customer. Futurist September–October 1986, 24-28.

[13] Cortese, D. and R. Smoldt (2007). "A health system by design. The future of healthcare must be about competition for patients based on value." Mod Healthc 37(38): 38.

[14] Foglino S, Bravi F, Carretta E, Fantini MP, Dobrow MJ and Brown AD. The relationship between integrated care and cancer patient experience: A scoping review of the evidence. Health Policy. 2016; 120: 55-63.

[15] Holbrook, M.B. 1994. The nature of customer value. An axiology of services in the consumption experience. In: Rust, T. & Oliver, R. (eds.). Service quality: new directions in theory and practice. Thousand Oaks, Sage Publications. Pp. 21–67.

[16] Bate, P. and G. Robert (2006). "Experience-based design: from redesigning the system around the patient to co-designing services with the patient." Quality and Safety in Health Care 15(5): 307-310.

[17] Similar to classic disease descriptions or 'case' in the textbooks

how the different elements are interrelated in time. Mapping healthcare services is often an iterative process, starting with sketching the outline on a high-level and gradually elaborating on more specific aspects and details.

User involvement can take place in different phases of the innovation process with different objectives or functions for users[18]. Commonly used techniques include; brainstorming, surveys, interviewing, focus groups, diary studies, video and observation. Wally Keijzer-Broers of Delft Technical University illustrates this in her living lab approach with elderly users, where multiple techniques were trialled to maximize user-engagement.

Finally, the overarching principle which supports all of the above is patient empowerment[19], it is both a pre-requisite for and an outcome of patient-centred healthcare – a goal as well as a process[20]. It has both an individual and a collective dimension: at individual level, it is the extent to which patients and their families or caregivers participate in decisions related to their condition and contribute to co-creation of care through their specific experience as patients. At collective level, patients, through their representative organisations, contribute to shaping the health care and social system through involvement in health and social policy-making, organisation, design and delivery.

The picture emerges overall of a model of co-design /co-production that has common characteristics that are not normally present in supply-side innovation. Firstly, involvement of end-users at the discovery phase of design, a more time-consuming element (maybe adding a couple of months to the process) but essential for eliciting the end-users needs, which they may need help in articulating. Second, iterative prototyping which requires continued engagement of the end-users. While the evidence base for greater effectiveness of technology developed in this manner is still being built, there is strong anecdotal evidence.

However even leading edge practitioners primarily work with patient/citizens as end-users, infrequently recognise that health professionals are also a major end-user group. *Simon Bramwell of ADI, a design company*, offers this useful anecdote which illustrates the dangers of not considering all key user needs.

A company went to present a new technology product to a group of clinicians at a prestigious teaching hospital. After the presentation their feedback was as follows 'we think that it's an ingenious solution to the problem – however that problem is one we don't happen to have.'

[18] Nambisan, S. & Baron, R.A. 2009. Virtual Customer Environments: Testing a Model of Voluntary Participation in Value Co-creation Activities. Journal of Product Innovation Management, 26(4)

[19] http://www.eu-patient.eu/whatwedo/Policy/patient-empowerment/

[20] Empowering patients in the management of chronic diseases http://ec.europa.eu/health/patient_safety/docs/empathie_frep_en.pdf

Barriers, challenges and drivers/opportunities. The second major exercise for the group was an attempt to examine the implications of co-production. Outputs have been fitted loosely into three categories (again, for more detail of the process, see Appendix 1):

Difficult 'status quo' issues (not easy to change):

- Preoccupations with data security – common-sense or over-regulation as a defence against change? (Comment: instead of inhibiting re-use of patient health data, create a secure environment to encourage data usage cf Estonia)
- Money, money, money. Three issues: Business tends to be focussed on selling product, even if it will fail to deliver, rather than on long-term strategy, which would actually deliver better return once additional investment is made. Providers with poor implementation systems are wasting huge amounts of resource investment. Successful pilots are not infrequently prematurely terminated through short-term financial decisions based on false economy (examples can be offered for all three).

Potential levers for change:

- Early involvement of end-users in eHealth product design – bearing in mind that healthcare professionals are also end-users
- To remedy lack of communication skills of HCPs and lack of digital competencies of users (both HCPs and citizen/patients). Digital literacy should come not from academics but should be continuous, consistent and provided at any stakeholder level. Improving digital literacy in any stakeholder group is certainly not straightforward.
- There are various profiles, interests and needs among "end-users." Defining these is a step forward - instead of combining "end users" into one single group; there are categories, and even sub-divisions within groups. Having a clear picture which allows connecting the different needs and integrating them into the process is key for effective change.
- Convincing players that impact evaluation is essential

'Structural' issues:

- Do you add technology to a system (bolt-on) or do you build a new system around a new technology? If eHealth means a system, we have a changing paradigm – what does a *digital system* look like?
- Gradual shift from primarily sickness orientated delivery to genuine promotion of wellness and the means to maintain it. A major cultural shift, but eHealth tools can help.
- What would happen if there was an app that cheaply diagnosed & described treatment of common diseases faster and more effectively than doctors? Similarly, Babylon as an alternative to conventional healthcare entry. Machines will read data

more effectively than humans. Overcoming fear of AI and resistance to change from professionals is crucial.

- Cupcakes: start by building small solutions to concrete problems for real people. Bring diverse groups together such as mHealth ecosystems.

Discussion

The deliberation over the two days highlighted both the complex landscape and the fragmented nature of change management in this field. Whilst technology has a lot to offer it is important not to undervalue the importance of personal interaction; whilst AI might do some things more accurately and faster than humans (and clinicians may need help in accepting this) it cannot replace them. It is also important to remember that when in a turbulent change environment such as this, new technologies can initially make things worse not better as the system adapts to and integrates the new approaches.

The challenge faces both healthcare professional (HCPs) and patients as the two constituencies learn to engage both with new technologies and also with each other in new ways of co-production and shared decision making. Empowering patients and developing shared decision making requires change of both individuals but also organisations and systems.

This is illustrated by the enquiry into barriers to end-user involvement in design steadily expanding over the two days to encompass consideration of the overall context of determinants of uptake of eHealth tools and systems. The lessons from the promising practice examples are clearly valuable, but inevitably a description of good practice examples in itself only provides some indicators as to what is needed to allow the principles embodied by them to be scaled up, so that such principles become widely adopted. *

For health systems, transferring, embedding and sustaining good practice is an abiding problem. What transferability[21] requires is both the kind of validation

[21] Nine steps for developing a scaling-up strategy, http://www.expandnet.net/tools.htm, http://www.expandnet.net/PDFs/ExpandNet-WHO%20Nine%20Step%20Guide%20published.pdf
*(scaling up can either be thought of as propagation to larger populations of health interventions that are proven to be effective, as used in public health, e.g. by WHO or, in the context of the Commission's innovation policy, the validation of the business model for start-ups to allow the creation of interest from companies for investment and growth of adoption).

referred to in scaling –up (i.e. the evidence of impact and preferably cost-savings, which are necessary levers for the political will necessary to support the proposed change) but also significant understanding of the contexts both of the good practice and the system to which it needs to be transferred (vide Bergman's report in WP3 of the EMPATHiE tender for DG-SANCO)[22].

Simply to recommend implementation of the principles behind the good practices is therefore clearly inadequate. Even for those excellent practices, what is not immediately available is the validation data necessary to persuade sceptics to adopt a method that requires a change of procedure and possibly more initial expenditure. Secondly, there are also important contextual issues, both within and across health systems.

Publications since February 2016 which complement the Berlin exercise:

Two recent publications illustrate some aspects of the argument so far. FICHe –Future Internet Challenge eHealth[23] has put in 6.24M€ 'to boost 20 European innovative eHealth start-ups into the European market'. Unfortunately, no evidence is provided on the validation or impact assessment of these products, nor of involvement of end-users in their design.

Future Health Index 2016[24] a report written by New Narrative Ltd. with research conducted by IPSOS and Schlesinger. 'Capacity for care' speaks of 'Measuring perceptions of accessibility and integration of healthcare systems, and adoption of connected healthcare.' Although generally upbeat, the report concludes 'while technology can facilitate transformation, and even integration, it does not necessarily result in either. A government can establish networks and hand out devices *en masse* and still see few or no results if patients are reluctant to put these advances to use, or if the data outputs remain in a 'walled garden' within the healthcare system where they are rarely shared with other agencies. As the mixed results of large- scale health technology initiatives in the developed world attests, a 'big bang' approach to health system modernization may not be the most effective.' In the section 'Connected care - where the fault lines lie' (pp.24-29) a number of the barriers identified in our exercise are touched upon, based on their global consumer research.

More briefly, *Diane Whitehouse from EHTEL, an NGO dedicated to promoting health telematics,* contracted by EHFF to deliver a preliminary Market Scope analysis for a current Horizon 2020 project on pre-commercial procurement of ICT to empower patients to manage their chronic health conditions comments "75% of eHealth programmes fail during the operational stage. Why do the programmes fail?" Independent of our study she identified five

[22] http://ec.europa.eu/health/patient_safety/key_documents/index_en.htm

[23] www.digitalstartup.eu

[24] www.futurehealthindex.com/report/2016/

key factors: lack of professional involvement in the design, IT vendor lock-in, only pilot funding was secured, short-termism and people didn't see the big picture.

Subsequent to the Berlin meeting, at the Health 2.0 conference in May 2016, World Mobile Capital Barcelona hosted a meeting of about 25 stakeholders to consider the current barriers to eHealth adoption. Present within the group were five of the Berlin attendees including Joan Cornet, who chaired the event. The outcome of this roundtable event was a paper from WMCB entitled 'Digital health transformation: A Call for Action!'[25] This six page paper raises many of the same points that our group did. While not providing detailed solutions or a route forward, except that WMCB have launched a project named 'Digital Health Academy', to help improve professionals' digital literacy, the report clearly identifies the challenges to be faced.

Finally, a document entitled 'European Blueprint for Digital Innovation in an ageing society'[26] has been issued for consultation in October 2016 prior to the Summit on Active and Healthy Ageing in December. Again, this looks at enablers and barriers to eHealth progress and identifies among other issues, works force training and (digital) skills development, user-generated data models, citizen digital health literacy as an essential element for successful transformation of integrated care and improved self-management but raises questions about the transitional funding necessary to allow old processes to shift to new ones.

Conclusions

A major dilemma for health policy and the delivery of healthcare in Europe is that many people agree that the current system is broken but no-one can provide a credible alternative. This results in continued attempts to 'fix' a system that is increasingly beyond repair. Like patient empowerment, adoption of eHealth, especially digital tools, has huge potential as a lever for change, but there are equivalent dilemmas. Examples are the preponderance of top-down implementation initiatives, despite the high failure rate: there are a number of effective implementation examples, sourced and delivered at a local level and even validated in terms of effectiveness, but with the bottom-up approach comes the problem of transferability or 'scaling' and other issues such as inter-operability. As already noted, there is too little evidence of the successful scaling-up of good practice examples in this area. One might conclude that a degree of 'magic-bullet' thinking and rhetoric is also prevalent, as if all health and healthcare needs in order to bring about radical transformation is that the new technology is adopted. We could add the rider, what *are* reasonable measures of effective adoption? An alternative scenario is 'slow-cooking', i.e. that given enough time the necessary ingredients will come together; although

[25] http://mobileworldcapital.com/digital-health-transformation-a-call-for-action-r3/

[26] http://ec.europa.eu/research/conferences/2016/aha-summit/index.cfm?pg=blueprint

that has a certain logic, it is not an option that anyone is visibly promoting, for practical reasons that are quite understandable.

Having explored the field through this exercise and attempted to illuminate key aspects of the problems besetting it, we felt that **to produce a set of recommendations** for stakeholders may well be valuable but that more is needed, if the object is to help promote necessary change. The Barcelona initiative (q.v. ref.25) spoke of 'a call for action' but the challenging question is, what kind of action would be most effective in the current environment?

A complementary piece of work would be to re-examine the examples of promising practice in end-user engagement in early product design (for detail see pp.15-17, Appendix 1, below) and learn with/from those players **what scientific criteria can be established to validate or demonstrate the added-value** of their methodology?

Paradoxically, a third component may be **an 'out of the box' approach** which recognises that possibly the most significant developments are happening 'below the radar' in that patient/citizens are using technology, whether web-based information, networking through social media or novel use of health apps in a way that professionals have little control over and indeed have limited means even to adequately monitor. Certainly some pharma companies are looking to mine social media as a means of assessing responses to their products rather than use more conventional means, recognising how, as use of digital sources becomes more widespread and sophisticated, this becomes relevant to the future relationship between health professionals and citizen/patients.

Taking the analogy from complexity theory one could argue that what is happening is that one system that was stable is becoming rapidly less so, whereas another system is rapidly emerging in its place, and that this is an area where gaining a better understanding of what is happening could be a powerful tool for influencing change. Given the long-lasting nature and size of conventional health systems, this scenario might not sound plausible but one has to ask, isn't failure to adapt to changing circumstances a powerful predictor of the likely collapse of large systems?

A final component of the possible 'second phase' of this exercise reverts back to the 'cup-cake' notion, referred to above on p.10 as the last of the key observations we extracted from the exercise on Day 2, but rather than attempt

to use these as examples of good practice, to **look to a different way of utilising such outcomes as building blocks for creating a radically different approach** for at least a part of the overall health and healthcare delivery system. This harks back to the idea of envisaging a digital *system* rather than digital tools being seen as a 'bolt-on' or enhancers of an existing delivery model. This is ambitious, but could be a viable approach.

We believe that the one alternative which is least acceptable, is to continue with the status quo, not only in terms of what activities are pursued but also in terms of the belief that if fixed properly, whether by more investment, cleverer technology or political will, the current approach to health and healthcare is sustainable. It isn't, and we need to progress by accepting this and all of its implications. **We propose that this small exercise has proved useful in addressing one important piece of the jigsaw and that the outcome, especially in terms of engaging an expert group of stakeholders, each with their own network of associates, merits a second phase of activity concentrating on relevant actions, which the group needs to work further to define.** There are tools available to expedite the latter process but we have already indicated several approaches, which together or separately might prove fruitful.

APPENDIX 1

DAY 1

Introductions.

Participants were invited to outline why they had attended and what they hoped for from the workshop. David Somekh (DS) and Nick Guldemond (ND) representing EHFF outlined the context, reminding people what was in their information pack. Bernadette Klapper from RBS, our funders, welcomed the group to the RBS Offices and Terje Peetso spoke briefly about the view from the Commission.

Ice-breaker exercise

'Back-casting and forecasting': participants were asked to think of something that emerged five years ago, 2010/11, which they personally felt was a really significant innovation for eHealth. Similarly for 2020/21 to predict something that would have a real impact (as wild as they liked, but it should have some plausibility).
The results are presented in Appendix 3.

Promising Practices

Examples of the following promising practices in co-production for discussion and inspiration/learning were presented in small discussion groups.

***Example 1**:*

Wally Keijzer-Broers of Delft Technical University presented her PhD research undertaken 2013-2016 and supervised by Nick Guldemond: Developing a service platform for Health and Wellbeing in a living lab setting: an Action Design where design iterations leading to eHealth solution in the field of smart living had involved end-users throughout the process: elderly people and voluntary caretakers within the Living Lab, but also established an expert group of end-users. The challenge was how to find optimal means of engaging end-users and maintaining their involvement[27].

Wally Keijzer-Broers: w.j.w.keijzer-broers@tudelft.nl

***Example 2**:*

David Somekh of EHFF presented the work of Christina Jakobsen, School of Computer Science, Aarhus University, on Doll-based design. The user involvement technique miniLAB is an innovative and resource saving technique used for uncovering end-users wishes and demands for new technology, work processes and organization and co-design of possible new futures. Using the technique end-users create miniature figures representing themselves and others,

[27] Developing a Service Platform for Health and Wellbeing in a Living Lab Setting

followed by co-operative role-play. MiniLAB was originally developed as part of a building process of a new library building in Aarhus but has since been successfully used in several cases within eHealth, e.g. working with people with blood disorders[28].

Britta Ravn, Director, Centre for telemedicine Central Denmark Region, who is currently working with Christina to pilot utilisation of these techniques in eHealth development: britta.ravn@stab.rm.dk

***Example 3**:*

David Somekh also presented the work of Simon Bramwell, Technology Project Manager at the Advanced Digital Institute (www.adi-uk.com), where designers have modified the early stages of the design process to actively engage and involve end-users.

Although UK government advice stresses the incorporation of end-user based thinking in the alpha phase the protocol in the manual doesn't actually involve end-users at early stage alpha, but only after prototyping[29]. To clarify, Alpha is the development phase that comes after discovery where you build prototypes of your service, test prototypes with users and demonstrate that the service you want to build is technically possible.

Simon Bramwell's team in the last 18 months have modified this process to involve focus groups initially to identify user needs, involvement of users in mock-up and early design models to get practical feedback and further stages of feedback prior to beta phase. Simon's final reflection, in conversation about their approach: 'co-design is also changing the user mind-set; letting them know what's possible, just as your view of what's wanted will change'

***Example 4**:*

Victoria Betton and Mark Brown presented mHabitat. The organisation mHabitat hosted by Leeds and York Partnership NHS Foundation Trust supports the public and third sectors (non-governmental organizations and other non-profit organizations) to discover, develop, deploy and evaluate digital innovation in health and care. mHabitat provides assistance to services and organisations along the digital innovation pathway from initial discovery through the embedding of digital tools to developing a digital strategy. The model combines iterative development principles with Service design thinking (see explanation below), an approach grounded in co-design with actual or potential service users. It is based on seeing the service through the user's eyes and understanding the context in which the service will be delivered by involving people who have personal experience of the issues.

References: YouTube short film on mHealth Discovery day illustrates their approach

https://www.youtube.com/watch?v=1qGjCvQuFUY

[28] Towards doll based design: framework, guidelines and research potentials http://dl.acm.org/citation.cfm?id=2399077

[29] https://www.gov.uk/service-manual

***Example 5**:*

Professor Jon Whittle, Head of the School of Computing and Communications at Lancaster University UK presented the CLASP project (Next Generation Wearables for Health and Well-Being). This is a wearable, blue-toothed device that allows monitoring and self-management of anxiety levels[30].

Over the last five to six years his group have developed a model of design of short (9 month) projects, not all in health, which begins with a 2 months partnership between academic and stakeholder groups on understanding issues (discovery phase). These tend to be very inclusive re stakeholders and evolves from user groups of 15 to others giving distance feedback (up to 50 people). Afterwards going to wider public involvement, up to 2000 participants.

Then the design phase (2-3 months) involves co-design with focus groups and workshops with hands on design sessions to look at options plus rapid prototyping to explore (technology mediated enquiry) and probe solution space (topology workshop-hack, bring-back and then iterate).

Jon Whittle, Head of the School of Computing and Communications at Lancaster University UK: j.n.whittle@lancaster.ac.uk

Key Findings and observations from the good practice examples

The origin of the practices were drawn from commercial design, academic research and service commissioners, all providing examples of demand-driven innovation. From the overall picture emerges that the different approaches of co-creation, co-design or co-production have common characteristics that are not routinely present in eHealth development and implementation.

Another observation was that user involvement can take place in different phases of the innovation process with different objectives or functions for users[31]. A user-to-be participating in the ideation phase of new product development is seen as resource, customer participating in design and development phase is seen as an actual co-creator and customer role in testing and support is seen as end-user[32].Engagement and involvement of end-users at the of early stage of design (discovery phase) is a more time-consuming and difficult element (maybe adding a couple of months to the process) but essential for eliciting the end-users needs: articulating needs by end-users in the early stage may need help and a facilitating approach[33].

[30] http://www.catalystproject.org.uk/projects/sprints/access-asd/

[31] Nambisan, S. & Baron, R.A. 2009. Virtual Customer Environments: Testing a Model of Voluntary Participation in Value Co-creation Activities. Journal of Product Innovation Management, 26(4)

[32] Nambisan, S. 2002. Designing virtual customer environments for new product development: Toward a theory. Academy of Management Review 27(3), pp. 392–413.

[33] Kujala, Sari (2003), "User involvement: a review of the benefits and challenges," Behaviour and Information Technology, 22(1), 1-17.

Eliciting user needs is an exploratory dialogue between users and developers. In which dedicated methodologies can help to stimulate the exploration of needs and possible solutions, as what we seen in the example of minilab with the doll-based design. Other commonly used techniques are brainstorming and ethnographic methods as surveys, interviewing, focus groups, diary studies, video and observation. In the case of Wally's research, she used a mix of methods to elicit user needs during different stages of development and depending on the general objective of the co-creation exercise.

Hence, iterative development requires continued engagement of the end-users as explained by Simon, Jon and Wally. The basic idea behind to develop a solution through repeated cycles (iterative) and in smaller portions at a time (incremental), is that it allows developers to take advantage of what was learned during development of earlier parts or versions of the solution. Learning comes from both the development and use of the solution by users, where possible key steps in the process start with a simple implementation of a prototype and iteratively enhance the evolving versions until the solution is mature and ready to be implemented. At each iteration, design modifications are made and new functional capabilities are added to the prototype[34]. While the evidence base for greater effectiveness of technology developed in this manner is still being built, there is strong anecdotal evidence[35]. Along the way, it struck us that even the leading edge practitioners we show-cased primarily worked with patient/citizens as end-users and not so often with health professionals who are the other major end-user group. There is nevertheless a useful anecdote provided by one of the designers that illustrates the dangers of not considering user needs.

A company went to present a new technology product to a group of clinicians at a prestigious teaching hospital. After the presentation their feedback was as follows 'we think that it's an ingenious solution to the problem – however that problem is one we don't happen to have.'

Deliberation

Facilitated by Pascal Lardier this plenary used feedback from the breakout sessions to build a picture of key themes across the wide range of stakeholder perspectives.

[34] Larman, C. and V. R. Basili (2003). "Iterative and incremental developments. a brief history." Computer 36(6): 47-56.

[35] Esmail, L., et al. (2015). "Evaluating patient and stakeholder engagement in research: moving from theory to practice." Journal of Comparative Effectiveness Research 4(2): 133-145.

Three notable themes emerged;

1) – *isn't it obvious that end-users should be engaged*? Some thought that more attention should be given to engaging healthcare professionals (HCPs), especially doctors in primary care, because of their ability to sabotage the process, but overall it was felt that both patient/citizens and HCPs needed support and engagement but recognising their differing needs. Finally, can engagement be created like crowdsourcing[36]?

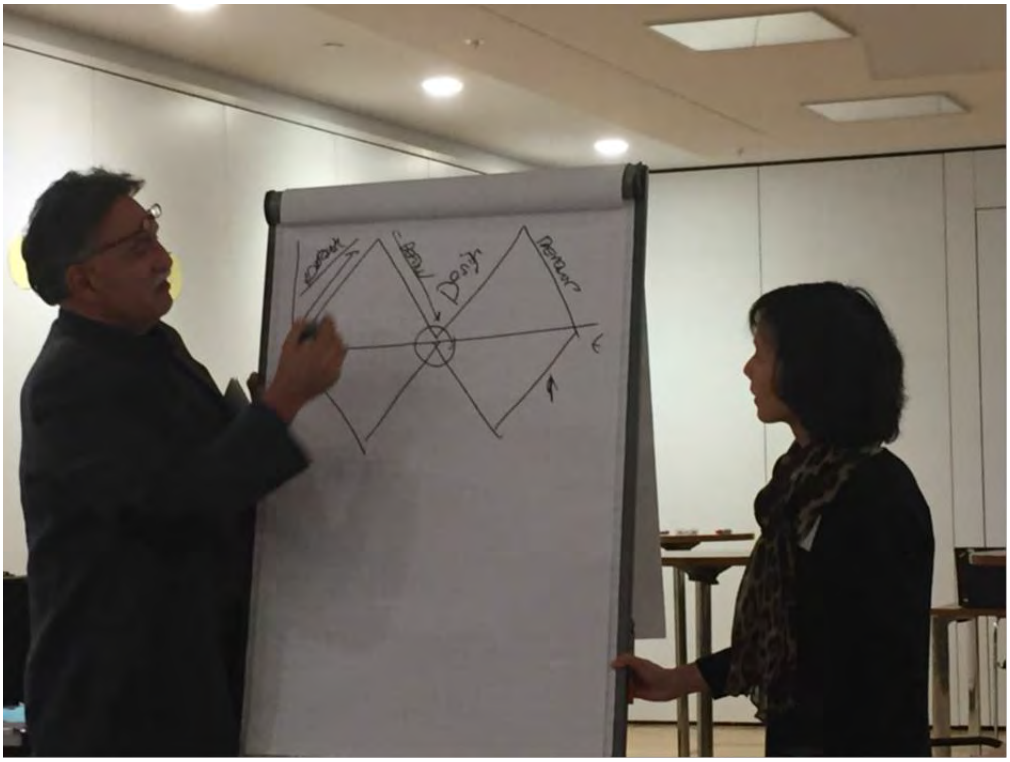
2) *a series of supply-side issues i.e. a product, service or process is implemented with real involvement of the users*. Theirs is difference between the lab setting in which the development took place and the actual use in the real world: not the same! It shows the subtle difference between complete involvement of users and just 'giving early prototypes to future users to play with'. Risk of investment fatigue (technology is just another product to be delivered). Patient engagement remains a challenge; we need to involve 'real patients', not just so called professionals from patient organisations who often have a 'political' agenda, there seems to be no single recipe for engagement.

3) *the particular nature of healthcare systems*. Healthcare is not like other businesses when it comes to the role of entrepreneurs, especially because of the issue of integration of care. Do you add technology to a system (bolt-on) or do you build a new system around a new technology?

[36] Crowdsourcing is a specific sourcing model in which organizations use contributions from Internet users to obtain needed services or ideas and been used for non-commercial work and to develop common goods.

Challenge

Prof Daniel Steenstra and Tram Nguyen Trihn led a discussion on principles of design. Do we recognise the stages of the process? Where might the optimal access points for end-user involvement be?



The 'double diamond' design process model: an explanation

The double diamond diagram was developed through in-house research at the UK Design Council in 2005[37] as a simple graphical way of describing the design/co-creation process. Divided into four distinct phases, Discover, Define, Develop and Deliver, it maps the divergent and convergent stages of the design process, showing the different modes of thinking that designers use. Discover: The first quarter of the double diamond model marks the start of the project. This begins with an initial idea or inspiration, often sourced from a discovery phase in which user needs are identified.

The second quarter of the double diamond model represents the definition stage, in which interpretation and alignment of these needs to business objectives is achieved. Develop: the third quarter marks a period of development where design-led solutions are developed, iterated and tested within the company. Deliver: The final quarter of the double diamond model represents the delivery stage, where the resulting product or service is finalised and launched in the relevant market.

[37] www.designcouncil.org.uk/sites/default/files/asset/document/ElevenLessons_Design_Council%20(2).pdf

Daniel and Tram's Double Diamond Challenges

Is user engagement interesting in stage 1? We have to distinguish between user led and user centred design. We need to be clear what the question is you want to solve (maybe you need end-users, maybe not).

In the 'discover' phase, what are the most effective methodologies? Identifying needs: observation, exploration of someone else's reality. Challenge (focus groups). If we do want end-users, how to improve end-user engagement (can't take it for granted).

Where do we place the emotional dimension (example iPad: emotion, fashion) to put things in movement? Prototyping with end-users implies that we don't use waterfall model but iterative processes.

There was then extensive discussion but people felt that they were getting more confused rather than clearer about the issues, also due to the similarities in terms and definitions used in the different design/co-creation methodologies, and it was agreed that we should all sleep on it or at least adjourn for dinner to continue discussion in a more relaxed setting!

DAY 2

What Next?

This section of the workshop was intended to start an exploration of opinions on how to take forward this work. David Somekh summarised this by saying "what we are engaged in is a process". Future possible outcomes were identified:

1) A white paper?

2) Links to other projects?

3) Creating an on-going conversation

Reflections from Day 1 (Led by Agnieszka Daval-Cichon)

The outcomes from day 1 were clustered into three main groups. The first cluster was around what might be called existential or critical issues.

- The nature of users; users as experts in their diseases, the question of taking responsibility rather than being a passive participant.
- Mind-set issues and the paradox of transformational change; the difficulty people have in recognising the difference between telematics and digital systems, the spectrum from apps for personal use to platforms that can disrupt or transform the healthcare system, if

eHealth means a system we have a changing paradigm – what does a digital system look like? The paradox of balancing breaking things up to allow new configurations and keeping things together.

- Change in complex systems; are individual actors able to disrupt at all? No-one wants to be disruptive, rather, it's about transformation, but this brings fear of obsolescence and the fear of less human interaction. One solution won't fulfil everyone's wishes. How can disruption become constructive scaling up? How to scale? Across borders?

The second group was around defining context, defining terminology and measurable data.

- Context was felt to be crucial to sustain, justify and energise change. But by the end of the previous day people felt that the discussion had surfaced elements in the model which confused us.
- Some of us felt the need to work on definitions, on facts and figures e.g. indicators that would help track meaningful change or helping to define the scope of the issue that needed to be tackled. The right key performance indicator for cooperating with external start-ups.

The third grouping related to actions – a collection of observations related to 'what next?'

- Examples: 'we have to start somewhere: connection is difficult (integration medical – business/medical-digital)'. 'Don't rush the Discovery phase'.' 'For a solid foundation for b2c you really need to understand the customer – but if App use becomes a significant component in the health system, move to b2b (*Explanatory note: b2c is an abbreviation for 'business-to -consumer', in the context of e-commerce; b2b stands for business to business, in other words electronic exchange of products*).' 'It's going to happen anyway, but how can we nudge it?' 'We need to assist people with poor digital literacy'. Finally, 'we've formed a strand, after this workshop we need to sustain it.'

Small group Discussions

Here is a sample of the observations recorded from just one of them following the previous session, to give a flavour of the exchanges at this stage in the Workshop:

- *We need to progress change with bite size pieces.*
- *In a turbulent environment the Chinese saying applies - when the storms comes you can build a wall or a windmill: connect the 'windmill' to the system (adaption)*
- *By analogy: people are afraid of risks (like the refugee problem – how to adapt to something that in unstoppable). But can the healthcare system change in time?*
- *Start-ups as vehicles to reach users, but how to scale-up; pilots don't scale*
- *Need new protocols as GPs can't prescribe apps.*

Barriers, Challenges and Drivers/Opportunities for User Involvement

Led by Victoria Betton, Mark Brown and Veron Lai.

Using the content we had generated the previous day, we followed the Simon Sinek rationale of 'why', 'what' where 'and 'who'. We tried also to look across those columns at process', 'tools,' methods' and 'system' in different workgroups. Themes and ideas were written post-it's and put onto flipcharts.

BARRIERS

Some 30 themes/ideas where produced, which were quite difficult to sort into categories or over-arching themes. Three groups of barriers were identified, different varieties of 'deficit', barriers related to 'status quo' and 'others (miscellaneous)'.

Barriers associated with 'deficits'

Data and evaluation: a cluster of issues associated with practitioners wanting evidence to convince them to change, financial and clinical evidence as evidence from start-ups is not enough, lack of evaluation of healthcare professional (HCP) protocols, no framework for evaluation and adoption and lack of rapid methodology evaluation that can be used Europe-wide. Same applies to the lack of evaluation which would enable doctors to prescribe eHealth tools which patients might use.

- Lack of alignment (timing) between healthcare/Industry/research pace & process
- Lack of adequate AI data prevents feeding into HC processes
- Lack of communication skills of HCPs
- Lack of digital competencies of HCPs
- Lack of knowledge of IT/Digital creates fear
- Game changing alternatives to the legacy system lack the power to transform it.
- Lack of trust

Barriers related to 'status quo'

- Fear: of change, of risk, of losing status/becoming obsolete, of dehumanisation of services
- Ethical issues of involving patients in new methods
- Liability concerns
- Digital exclusion
- Legal barriers e.g. certification
- Cultural barriers to involvement and co-design
- Public tenders for infrastructure lock giants in: conversely, funding structure silos mean those who develop innovation don't always gain
- Healthcare professionals do not tend to engage with innovation because being part of the system they don't have the power to change it
- Reimbursement EU-healthcare is by and large free. EU Citizens are not therefore consumers of health as such and have different motivations

Other/miscellaneous barriers

- Healthcare doesn't always understand the opportunity
- Unequal health literacy/incl. digital health literacy. How do we support people with insufficient health literacy to engage?
- Urgency for change isn't felt within health care
- Lots of small SME's- Confusing space for healthcare
- Healthcare budgets tend to be too focused on medical professionals and products (drugs, devices) and not on behavioural expertise, lifestyle behaviours conditions

but medics are not skilled or motivated (paid) to promote prevention and digital tools are a great enabler of prevention.

CHALLENGES

The themes here bridge the area between barriers and opportunities.

Status quo:

- Preoccupations with Patient Data Security – sense or defence (against change)
- The people affected by a solution/service are not (measurable) stakeholders on the executive level
- Difficulties associated with access to end-users, the time it takes to engage and maintaining long term engagement of users
- eHealth products are often not good enough to attract users
- Healthcare financing isn't aligned with incentives to use eHealth

Methods/philosophy:

- Seek indicators for user engagement
- Prioritise user requirements versus others
- Instead of preventing patient health data from reuse of data→ create secure environment to encourage the use of data
- Understand customers
- Work on the adaptiveness of the system to prevent the KODAK moment

Actions/solutions:

- Make things people love
- What would happen if there was an app that cheaply diagnosed & described treatment of common diseases much faster than doctors?
- Babylon as alternative to conventional healthcare entry- machines will read data more effectively than humans
- Determine what the early stages of success stories were
- A change of behaviour will break the system: through patient empowerment the system will change despite itself

DRIVERS/OPPORTUNITIES

Similar categories have been used in grouping themes from the last phase of the exercise

Background processes:

- Prototype iterations

- Economic interest in Health Data
- Free flow of data
- Use of critical thinking methods

Culture/methods:

- Information integrated into daily life
- Wellbeing is key throughout the process
- Use the child's perspective: 1. don't skip the first step, 2. don't jump to conclusions and 3. don't forget the why
- See the similarities and connect the dots
- Societal changes in embracing digital plus the patient push
- The consumer market drives usable solutions. We learn not to accept bad experiences
- Focus on patient satisfaction, human centred care and other measures of end point quality

Actions/solutions

- Engage other sectors (examples of initiatives that support digital literacy of elderly or other groups)
- Let the rabbit teach the elephant to jump- bringing in knowledge from other, more agile client focused areas e.g. lean care gamification
- Prepare the next generation –knowledge as the new norm
- Academies for developing digital literacy
- Gathering innovative practices with evidence and context e.g. Cuba
- Engaged patients: there are groups of active patients i.e. online that are potential drivers
- Cupcakes: start by building small solutions to concrete problems for real people
- Use start-ups as an accelerator for collaboration and whole system change
- Bring diverse groups together (e.g. mHealth ecosystems)

Final Discussion

The final plenary discussion was led by Nick Guldemond and David Somekh

It was felt that any report should clearly make the point that we are an extremely diverse group but that we still have come up with agreed key words/phrases even though misunderstandings and challenges to different view-points were evident.

Having used a 'why, how, what' methodology and looked in depth at tools, methods and systems, it's clear that there is a complex landscape and *approaches to bringing about change are extremely fragmented at present.*

It's an emergent space/market and there *will be 'sweet spots' where money, people and systems are coming together, but it depends which locality you are talking about*. For example, Estonia has a big benefit because a) there has been investment b) it's a relatively small country but the people trust the system i.e. a secure and protective environment has been created which allows a crucial element, free flow of user data.

It is felt that *bringing multi-actors together is valuable*. It's like technology cross fertilization (for example WhatsApp - no advertisements for this and still everyone uses it) but *we mustn't undervalue the importance of personal interaction*: healthcare technology may modify the nature of this but it is still essential

Someone quoted Robert Wachter's 'the Digital Doctor'. This makes the same point but also that *we are in turbulent change process where technology is actually making things worse because we just assumed that 'adding on' would make things better: not true during transition.*

Painful things to be accepted – *AI will do better in regard to error than humans*, even if it won't replace them.

Professionals have to change, but training for HCPs (mHealth, eHealth, serious games) is not embedded in their education. *Patient engagement is already there*. 180 degrees view (just accept it) for the patient this may mean that when you see a doctor: this is your problem, this is the treatment and then you are on your own. Except that now there is more patient community/advocacy, especially for groups with chronic conditions (which may be experienced as a threat by healthcare professionals). The *need to move from healthcare to health coaching* (black and white thinking prevents it?). Uncomfortable change, for some. Metaphor: getting a bus (you want to go from a to b), but are you in the driver's seat (examples: co-pilot, rowing a boat etc.)?

All parties are challenged by the proposed shift from damage repair to prevention, we all have to change behaviour (incentive vs penalties) because *the status quo represents too much of a threat.*

Change is the common theme (transformation). How can we contribute, where are the 'jacking points' to influence what is happening? There is a spectrum here from single solutions to system solutions. How to map and promote different aspects?

The way forward?

It was agreed that two use cases from opposite ends of the spectrum as 'straw men' would be a possible means of taking the exploration of issues further. Explore the scenarios, share views, and formulate recommendations.

On the system side (common denominator) target groups, tangible examples: finance, collaborations. Cookbook - recipe (best practices)? Can we get examples to scale up? Use the

EU (where it is good), not directing health care, but seed funding in regions (but the Horizon2020 programme was seen as too fragmented). Christopher Westerteicher from Philips will consult his group about committing to lead this side of the follow-on. As an example, their collaborative project on scaling up at system level was the ACT project: Advancing Care Coordination and Telehealth Deployment Programme[38].

On the person side: use example of diabetes (Sebastian Hauk): story telling – how the Night Scout Foundation ('we are not waiting') promoting open source technology was, by sheer weight of numbers of citizens eventually contributing, able to challenge the FDA[39].

There could be cross fertilisation possibilities

The main direction was to nurture the initial ideas and take them further (for instance survey a wider group of stakeholders)

Epilogue:

Further work by the group along the lines proposed has simply not happened six months after the Berlin meeting – most people would cite pressure of work. The enthusiasm with which people enquired about progress of the project in June at the Commission eHealth week however suggests that the potential for further collaboration is high, but needs to be structured.

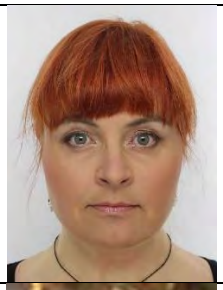
A second phase of the project is needed, which can capitalise on the rich vein of expert observations and ideas generated and the potential ongoing workgroup, but which would aim to produce more concrete outputs which would be of interest to the major stakeholders in the marketplace and help bring about change.

[38] www.act-programme.eu

[39] http://www.nytimes.com/2016/02/23/health/a-do-it-yourself-revolution-in-diabetes-care.html?mwrsm=Email

Appendix 2

CVs of attendees at Bosch meeting in Berlin

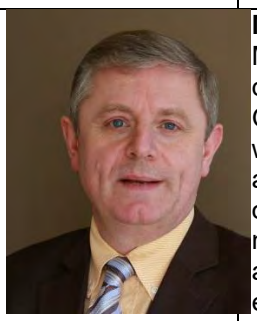
1.		**Ain Aaviksoo,** MD MPH is currently Deputy Secretary General for E-services and Innovation at the Ministry of Social Affairs in Estonia overseeing the digital transformation and innovation of social security area in Estonia, including health, labour and social matters. Mr Aaviksoo recently chaired two task forces, which prepared National E-Health Strategy and National Personalized Medicine Programme respectively – both approved by the Government. He is lecturing at Tallinn University of Technology and Medical Faculty of University of Tartu. Dr Aaviksoo obtained MD from University of Tartu and MPH from Harvard University. He has earlier work experience as a physician, senior level civil servant, international level consultant on large system transformation and technology adoption in healthcare, health policy researcher and CEO of public policy think-tank Praxis, and health-tech entrepreneur. Dr Aaviksoo has published over 20 peer-reviewed articles and contributed into several book chapters on health policy and e-health, he is also regularly presenting as invited keynote speaker on e-services and e-society at international health care or public policy events.
2.		**Piret Hirv**, MA is currently Advisor for E-services and Innovation at the Ministry of Social Affairs in Estonia supporting the digital transformation and innovation of social security area in Estonia, including health, labour and social matters. She is also a student at Tallinn University of Technology specializing on healthcare technology. Ms Hirv has earlier work experience in pharmaceutical industry, marketing entrepreneur, and long term experience as CEO of lobby and advocacy organization.
3.		**David Somekh** is a forensic psychiatrist, psychoanalyst and experienced clinician in management who retired from the UK NHS twelve years ago to devote himself to a "portfolio" existence as a management consultant, expert witness and quality advisor. He has been involved in healthcare quality since 1988. Dr. Somekh served as an NGO representative on the Advisory Committee of ISQuA (International Society for Quality Assurance) from 1995-1997, and on the Advisory Committee of the UK NICE (National Institute for Clinical Excellence) from 1999-2004. He has been a member of the Executive of the European Society for Quality in Healthcare since it was founded in 1998, was President 2005-7 and Vice-President 2007-9. He is a member of an EC working group on Patient Safety and Health Quality. In 2009 he decided to start a new career as a futurist and has attended courses and meetings at Said School of Business in Oxford on scenario planning and is a regular member of the Foresight Analysts Network in the UK and Health 2.0 and is a member of the WFS. He has been an active member of the European Summercamp group since 2003. David is the EHFF Network Director.
4.		**Pascal Lardier** is Principal at Decision Sante and senior in-house consultant for Health 2.0 Ltd., acting as the company's Executive Director for all international activities – conferences and consulting. He is in charge of promoting health innovation ecosystems around the world and connecting key stakeholders including startups, payers, providers, health authorities and VCs. He is the curator of the Health 2.0 Europe conference, and oversees the programmes for other conferences like Health 2.0 India, Health 2.0 Middle East, Health 2.0 Latin America, Health 2.0 Asia, and more - which gives him a broad and unique perspective on health entrepreneurship around the world. As such, he reviews and advises several hundred eHealth companies every year, with a special focus on European SMEs and liaises with 85+ Health 2.0 Chapters in the world, including 24 in Europe. He managed the GET Funded service of the EU-sponsored project 'GET', designed to provide EU health SMEs looking for Series A funding with training, resources and networking opportunities with investors at

		the European level. In this role, he works with a pool of 50+ European investors with a strong interest in digital health, and advises health SMEs on how to align with their investment criteria.
5.		**Matthijs Zwier** is a Senior Advisor at Raedelijn (The Netherlands), he is a former senior nurse and has a master's degree in nursing science. He has worked 10 years in the University Medical Center of Utrecht as a Senior Nurse and transition coordinator. Working as an advisor for the former CBO, he was involved in the National Action Programme Self-management and numerous innovation and implementation projects. The National Action Programme Self-management was a four-year program on the implementation of self-management in healthcare (in the Netherlands). Matthijs has rich knowledge on self-management, patient participation, self-efficacy, health literacy, transitional and integrated care. As a Senior Advisor he now focusses on self-management, empowerment and the concept of health in primary care, related to local government and secondary healthcare. Matthijs is the lead for the EVY network. At the Board, meeting on March 2014 it was agreed to invite Matthijs to become an Associate Director of EHFF and he has accepted the invitation.
6.		**Agnieszka Daval-Cichon** spent last 7 years working as a policy officer in the European Commission Directorate General Health and Food Safety (DG SANTE) where she was in charge of developing EU public health policies, in particular on patient safety, patients' rights in cross-border healthcare and health workforce. Before entering the public administration universe, she has been managing international projects mainly in the field of public health education, health systems reforms, health inequalities and integrated approach to care. She was also editing a magazine, coordinating work between hospital and community care, co-designing a new urban district and ensuring smooth transfers of her family between different countries. She cooks well, drives carefully and speaks good Polish, working English and romantic French. Despite several explanatory sessions provided by her children, she still doesn't understand what Twitter is.
7.		**Dr. Nick Guldemond** was trained in Engineering (electric engineering) and medicine (clinical physiology & neurosciences). He obtained his PhD with a focus on complications due to diabetes. He worked at various universities and hospitals as researcher, coordinator and principal investigator in projects regarding healthcare innovation, medical technology and eHealth. As founder and CEO of the first (2004) hospital based open innovation living lab (Medical Field Lab), he received great international acknowledgement for creating business through public private partnerships. Dr. Guldemond is currently Associate Professor Integrated Care & Technology and coordinator of various European programs and projects such as the EIP on Active and Healthy Ageing and the European Brain Council 'Value Of Treatment' project, Horizon2020, etc. Healthcare transformation has his special interest in neurologic disorders (psychiatry, brain cancer, stroke and traumatic brain injury), diabetes, falls prevention and palliative care. He is policy advisor for the Dutch Health Ministry and the House of Representatives. On behalf of the Dutch government and the Netherlands Federation University Medical Centres he wrote the national eHealth strategy agenda.
9.		**Veron WK Lai** has 10 years' experience in the Digital Industry, focusing on Service and User Experience Design. She studied Art Direction during her BA in Advertising (Melbourne, Australia) and Service Design during her MA (London, United Kingdom). With a hybrid interest in both design and science, Veron has established herself as an experienced UX consultant in the healthcare digital industry. Throughout her years as a strategic partner for several leading global pharmaceutical companies, Veron has produced digital and service design solutions for mobile apps, websites, Intranets and conference experiences. Before moving to London, Veron was working in a digital consultancy in Hong Kong for four years where she led the team of web developers. Her projects spanned both the public and private sectors, from transportation, banking and corporate communication to tourism and hospitality, marketing and entertainment. Her team achieved more than 10 international web awards. Outside of work, Veron has a

		strong passion for digital-related conferences and community events, and is an active organiser and speaker at events with Webvisions, Global Service Jam, World IA Day and GeoVation.
9.		**Charles Lowe** After a degree in Natural Sciences at Cambridge and an MSc at the London Business School, Charles began an early financial career with Exxon and then BT. Increasingly attracted to IT, in 1995 he led the creation of their intranet as an enabler of BT's efficiency improvement, and subsequently the establishment & initial sales of a wide range of BT internet technology-based products. In 2001 he moved to LB Newham where he established a telecare programme that was at one time the largest in the UK, and won Dept. of Health Whole System Demonstrator (WSD) funding to extend to telehealth. Unhappy with the WSD evaluation methodology proposed, in 2008 he joined Telehealth Solutions (now Medvivo) where he drove the development & sale of patient-friendly remote patient monitoring services. In 2011, the lure of a fixed term contract in Surrey to establish both a telecare & a telehealth programme was irresistible, leading to one of the largest successful telehealth deployments in the UK. Charles is Managing Director of the Digital Health & Care Alliance (DHACA), an Expert Reviewer for the EC, a Contributing Editor to www.telecareaware.com, organiser of the London Health Technology Forum, and President of the Royal Society of Medicine's Telemedicine and eHealth Section. He chairs Citizens Online, the digital inclusion charity, too.
10.		**Tram Nguyen Trinh** is CEO & Founder of VITAnLINK, based in France. She creates highways for Small Medium Businesses and Tech Transfer Offices in eHealth and MedTech solutions to move efficiently from proof of concept to pre-commercialization in Europe. She is a fan of the EHFF's journey, the living architecture geared to place individuals at the center the health value chain, as both healthcare co-designers and beneficiaries. With 20-year international corporate experience in North America, Europe and Asia, Tram is passionate about market creation. Prior to VITAnLINK, she was instrumental in shaping new services within the MedTech & Diagnostics industry. At Johnson&Johnson OCD, she took the responsibility of Project Leader France for the CEO office, then moved to Market Development Director France and to Europe Middle East and Africa Head Marketing Services with 2 J&J Standards of leadership Awards. In 1999, she was Welch Allyn General Manager looking after the French speaking countries to create, expand, structure markets & teams including launching the company's first connected vital signs devices in Europe. Prior to her healthcare journey, she co-structured in 1994 Ernst&Young Audit's first business in Vietnam & Cambodia. She had been a long time member of the CJD network of French Entrepreneurs and teaching moderator at the CNAM Art et Métiers Innovation Management Program. Tram is one of the founding executive members at Avenir Femmes Santé, a French not-for-profit Association for women's health. She is also a Mentor and Advisory Board Member at several European and North American health Start-up Accelerators. She holds an MBA from McGill University Canada and an American CPA license from New Hampshire Board of Accounting, US.
11.		**Professor Daniel Steenstra** is the first professor in Medical Innovation in the UK appointed by the prestigious Royal Academy of Engineering at Cranfield University. He is an entrepreneur with a unique expertise in healthcare innovation. He has a degree in Medicine and a background in design and innovation in industry across a range of sectors. His brief is to link academia. Industry and the NHS to develop medical and healthcare innovation. Professor Steenstra is also a founder member of Innovations Factory Ltd, a private sector R&D organisation uniquely positioned at the Heart of England NHS Trust in Birmingham.

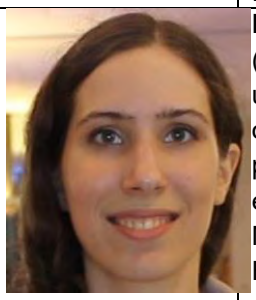
12.		**Corine van Lingen** has a background in international relations. During her 8 years of experience in national administration she worked as an adviser on global and EU health affairs in the Ministry of Health in the Netherlands and as an attaché for health, food stuffs and pharmaceuticals in the Permanent Representation of the Netherlands to the EU in Brussels. As an attaché she participated in Council negotiations on a variety of topics (including organ donation, food labelling, health in all policies, pharmacovigilance, medical devices, alcohol, drugs and tobacco and healthy ageing), giving her a valuable insight into the workings of the Council and the Member States, as well as the Commission and the Parliament. She speaks Dutch as a mother tongue, English with a near-native accent (according to her British husband), can manage most conversations in French and gets by in German. Her three small children take up most of her spare time but, when she does find time, she likes to read, give advice on personal styling and play the piano.
13.		**Victoria Betton** With Masters Degrees in Women's Studies and Social Work, Victoria is currently undertaking PhD research in the field of online social networks and mental health at the University of Leeds. She is founder and director of mHabitat, an NHS initiative which supports digital innovation in health and care. Victoria co-founded the People Driven Digital #PDDAwards and authored a related white paper entitled People Driven Digital Health and Wellbeing (June 2015). She is a member of the Y&H Digital Health & Wellbeing Board and is an Improvement Fellow at the Y&H Improvement Academy. Her writing includes various published journal articles, an e-book Social Media in Mental Health Practice and her blog which you can find at www.codesigndigitalhealth.co.uk and on Twitter @VictoriaBetton
14.		**Joan Cornet** was born in Manresa in 1950.Technical Engineer, and graduate in Psychology. After working as a Clinical Psychologist in a General Hospital in 1979, he was elected mayor of Manresa. In 1988 he began to work as civil servant in the European Commission in Brussels, where among other projects he lead EURES employment network. Later he was appointed Secretary General of the Socialist Group in the European Parliament in 1994. In June of 2004 he was named General Secretary of the Department of Health of the Government of Catalonia. In September 2005 the Government entrusted him to start up the "Bioregion of Catalonia" (Biotechnology) and since January 2007 to May 2013 has been CEO of TicSalut Foundation (ICT Health). Reminding board member of TicSalut Foundation related to international affairs and mHealth Strategies, nowadays he is Director of "mHealth Competence Center" at Mobile World Capital Barcelona. He is also a Professor/ consultor of the UOC (Catalonia Open University) and IL3 (International Long-Learning -University of Barcelona).
15.		**Tobias Gantner** , MD, MBA, LL. M. studied medicine, philosophy, economics and law in Germany, Switzerland, the PR of China and the USA. After his residency in transplant surgery, he worked with Siemens on international consulting mandates. His next positions included Novartis pharma strategy and head of health economics and outcomes research. At Bayer Healthcare, he built the department of Market Access from scratch. He is founder and CEO of the "HealthCare Futurists GmbH", an international network and think tank from experts of diverse disciplines with a focus on medicine, health-care and life sciences. His interest goes out to disruptive innovations in the health-care system in systemic, political and technologic aspects and the change of business models rooted in it. He leads "In-Algorithmo- Diagnostics GmbH", that is dealing with topics in predictive health-care and the inherent change of business models in the pharmaceutical industry and the approach towards patients and clients. Tobias Gantner holds a number of teaching appointments in the fields of health-care management, market access and Innovation in health-care. He is speaker in topics related to the future in health-care, medicine and life sciences.

16.		**Lars Kalfhaus** is General Manager of Roche Diabetes Care Spain S.L. and Head of the Management Cluster Iberia. With its Accu-Chek portfolio of medical device products, Roche Diabetes Care is a pioneer and global leader in blood glucose monitoring, insulin delivery and diabetes management systems. Additionally, Lars is President and General Manager of Madrid based Emminens HealthcareServices S.L., a Roche company focused on the design, development and international commercialization of digital health solutions for integrated care delivery, enabling personalized chronic disease management and aiming to support healthcare systems to transform their care delivery. Lars joined Roche Diagnostics in 2002 and since then has held various positions with increasing responsibility on local and regional levels. Having also been a founder and entrepreneur himself, Lars draws from more than 15 years of international experience in entre- and intrapreneurship and the healthcare sector.
17.		**Christoph Westerteicher** is the International Director for Philips Hospital to Home business, responsible for developing and managing Remote Patient Management services in Europe, Asia Pacific and other geographies besides the US. He has more than 30 years of experience in the field of medical electronics working for Hewlett-Packard, Agilent and Philips. Specific functions have included managing the development of patient monitoring and anesthesia solutions, as well as market development of Remote Patient Management concepts. For the past 15 years Mr. Westerteicher has focused on developing and implementing novel Care Coordination and TeleHealth solutions and services to help manage patients with Long Term Conditions in Out-of-Hospital settings. This has included leading and participating in landmark studies, such as TEN-HMS, CARME, and the Whole System Demonstrator project in England. He is member of the COCIR Organisation in Brussels, and has chaired the Telemedicine Focus Group since 2012. In 1980 Christoph Westerteicher graduated from the University of Stuttgart (Germany) with a Dipl. Ing. degree in Electronic Engineering.
18.		**Dee O'Sullivan** Since 2013, Dee has been director of myhealthapps.net: a web portal of health apps reviewed and tested by patient and health consumer organisations worldwide. The site is published and maintained by PatientView, a UK-based data, research and publishing consultancy that canvasses and analyses patient perspectives on healthcare. It now has the capacity to reach out to 120,000 patient groups across the globe. In addition, she works with PatientView on related mobile health research projects and liaises on its behalf on relevant European public health policy initiatives. Dee has more than 20 years' experience of the political and policy-making arenas at both national (UK) and EU levels, encompassing a wide range of roles from editorial to advocacy, pan-European stakeholder engagement and strategic communications, primarily in the field of public health. After 16 years based in Brussels Dee returned to the UK at the end of 2015.
19.		**Linnea Fogelmark** is active in the field of user-centered design. She holds a M.Sc. in Industrial Design Engineering with studies at Chalmers University of Technology, Sweden, and Delft University of Technology, the Netherlands, where she followed the specialization track Medisign - design for healthcare. In her graduation project she performed a study resulting in a communication tool for nurses that would allow them more time with their patients. The concept, as well as the user-centered approach for innovation, was adopted by Ascom Wireless Solutions, and Fogelmark, with a team of designers, extended the research to a multinational study of the everyday life of nurses, ultimately resulting in the release of Ascom Myco. She has been working with user experience design for medical technology on a practical and strategical level and her current challenge is to incorporate a user-centered design approach in large scale ICT projects in healthcare.

20.		**Dr Kathrin Happe** is Scientific Officer and Deputy Head of the Department Science – Policy – Society at Germany's National Academy of Sciences Leopoldina in Halle (Saale) since 2010. She has several years experiences in science-based policy advice and science management, and has been coordinating and supporting the academy's standing committee on health as well as the academy's activities on antimicrobial resistance and new antimicrobials, public health and global health, vaccination, individualised medicine, palliative care, predictive genetic diagnosis, predictive genetic testing. Previous to working for Leopoldina, since 1997 she has been doing research in agricultural economics, first at the University of Hohenheim in Stuttgart, since 2003 as a senior scientist, research group leader and deputy head of department at the Leibniz Institute for Transformation Economies, and with the German Bioeconomy Council since 2009.
21.		**Wally Keijzer-Broers** MBA, PhD researcher at Delft University of Technology, faculty of Technology, Policy and Management, section ICT (2013 - present). Phd Research topic: "Developing a service platform for Health and Wellbeing in a living lab setting: an action Design Research approach". Initiator of Foundation Zo-Dichtbij to support people age-in-place. Zo-Dichtbij is granted with a VIMP (implementation subsidy) from ZonMW (Organization for Health Research and Development in the Netherlands). Part of several European research projects such as Care@Home and Horizon2020 project: ENviSION (Empowering European SME Business Model Innovation). More than 20 year of experience in media (editor-in-chief and publisher technical magazines, online and tv). Specialized in managing difficult (cross media) projects and combining knowledge from different disciplines (internet, media, technology, healthcare and research).
22.		**Marc Lange** has a Master degree in Law, option business and European Law. Marc Lange is observing the progress of eHealth in Europe since 2003, from discovery to adoption and now to deployment. Thanks to his position as Secretary General of EHTEL, he is facilitating and contributing to exchange of good practice workshops and conferences involving eHealth experts from everywhere in Europe and beyond. He is also participating in EU-funded or co-funded projects at the occasion of which he contributes to collect, organise, synthesise and disseminates new knowledge and lessons learned on various topics related to eHealth, mHealth and telehealth, ranging from interoperable infrastructure to service redesign enabled by the technology. His today priority is about method and tools that enable assessing the impact of eHealth services and help to successfully deploy them in routine care. As Secretary General of EHTEL since 2005, Marc Lange is in charge of managing the daily operations of the association (including in their legal, financial and staffing aspects) and developing new business opportunities to reinforce the sustainability of the association. He reports directly to the Board of Director. This position also includes the analysis of strategic opportunities for the association, their discussion with the Board and the execution of Board decisions. He is furthermore contributing as experts in various European Projects the association is engaged in.

23.		**Sabine Wildevuur** combines the fields of health care, design, art, technology and science to work on wicked problems in healthcare. She was trained in medicine and communication science at the University of Amsterdam and has worked for -- amongst others - the United Nations Environment Programme, the Royal Dutch Medical Association and the Royal Netherlands Academy of Arts and Sciences. She is interested how to design eHealth applications with the users (both patients and healthcare professionals and other stakeholders), which could support both patients and healthcare professionals in self-management of chronic diseases. Wildevuur is head of the Creative Care Lab of Waag Society, Institute for Art, Science and Technology based in Amsterdam and she is conducting research on the barriers of implementing eHealth applications at the VU University Amsterdam (NL). She co-authored Connect: Design for an Empathic Society (2013) on designing for an ageing society, and wrote Invisible Vision: Could Science Learn from the Arts? (2009). She curated Designing Health (2014) that showed how technology, innovation and design have influenced health care throughout history and what they are capable of contributing to it now and in the future.
24.		**Christian Suelmann** is a management consultant at the Centre for Telematics and Telemedicine (ZTG GmbH) in Bochum, Germany. He studied medical informatics and economics in Germany and Sweden and joined the Centre in 2008. Suelmann's main work areas lie in telemedicine and human–computer interactions. Since January 2009, he heads the project "cross-institutional electronic patient records - EPA.nrw." As part of the eGesundheit.nrw initiative chaired by the Ministry of Health of North Rhine – Westphalia, EPA.nrw defines interoperability requirements for electronic health record systems in consideration of existing national and international standards. Suelmann coordinates experts from industry, science and self-government within healthcare in Germany's largest federal state.
25.		**Prof. Jon Whittle** is Head of the School of Computing and Communications at Lancaster University. He has a PhD from the University of Edinburgh in Artificial Intelligence and an MA from Oxford University in Mathematics. He worked for six years for NASA at its Ames Research Center, working on innovative technical solutions for NASA software. He is a highly interdisciplinary thinker, used to working with healthcare professionals, social scientists, engineers and community organisations. His current interests are in how innovative digital technologies can promote social change; in particular, he has an interest in the Health Internet of Things, used connected objects to support health and well-being. As an example, he led a project on a digital anxiety management tool for autistic adults. Most recently, he has been working with 'digital tattoos', or super-thin, flexible epidermal electronics which can be used to sense aspects of the human body. He is also working with experts on bipolar disorder with a view to developing intelligent sensing and analytics tools to support self-management of bipolar disorder.
26.		**Bastian Hauck.** Bastian is a professional sailor, author, entrepreneur – and type 1 diabetic. He is member of the Board of the German Diabetes Association diabetesDE, Founder of the #dedoc° Diabetes Online Community and CEO of dedoc labs. #dedoc° translates the idea of traditional peer-to-peer support in chronic diseases such as diabetes to the online world, using social media and blogs to create strong, authentic and self-sustaining patient communities. As public speaker and diabetes advocate, Bastian promotes taking the patient voice serious. He also works as a consultant on patient centred communication, blogger relations and mhealth solutions. At diabetesDE, Bastian focuses on awareness campaigns and patient engagement.

27.		**Dr Terje Peetso** joined the Unit Health and Wellbeing in DG Communications Networks, Content and Technology in 2011. Her main responsibilities are related to the coordination of the implementation of the eHealth Action Plan 2012 -2020 as well as the overall coordination of the policy group in the Unit. In 2014 she was the EU Fellow in the University of Southern California, USA, where her research focus was on the obstacles which hinder the introduction eHealth in healthcare systems. Dr Peetso has been working in the European Commission since 2003 starting as a Scientific Secretary in the Risk Assessment Unit in DG Health and Consumers. In 2006 she became a policy officer in the area of tobacco control in the same DG. Dr Peetso holds a diploma in medicine from the University of Tartu, Estonia.
28.		Since 2012 **Martina Kaplanek** is program officer in the health division of the Robert Bosch Foundation. She manages programs, which focus on healthy ageing, healthcare and healthcare structure. Previously, she supervised projects in education and training for healthcare providers.
29.		**Mark Brown**: May 2006 – Present Development Director Social Spider CIC Oversee project development, fundraising and lead on mental health for small social enterprise Social Spider CIC. Duties: Business development including building partnership relationships, developing projects from idea to implementation, representing Social Spider CIC and One in Four, maintaining contacts base, preparing funding strategy and developing applications, bids and tenders, developing strategy ● Editor and originator of One in Four magazine, the lifestyle magazine for people with mental health difficulties (http://www.oneinfourmag.org) 2007-2014. Developed project from idea through to launch and beyond ● Regular mental health / innovation blog http://thenewmentalhealth.org/ Nursing Times and Health Service Journal Social Media Pioneer as selected by panel and nomination 2014 ● Listed in Independent on Sunday Happy List 2014 as one of the the hundred people in UK who make others lives better ● Shortlisted Mind mental health Champion of the Year 2010
30.		**Min-Sung Sean Kim** is Partner at XLHEALTH, a Berlin-based venture capital fund specializing in Digital Health Series A investments. He believes that healthcare startups with innovative solutions have the potential to create impactful social change. In leading the analyst team at XLHEALTH, Min-Sung has seen more than 2300 digital health startups in Europe and invested in companies including mySugr, Meedoc, NeuroNation and Harimata. Additionally, he offers insights, research and opinions on the European digital health startup ecosystem at www.DigitalHealthVC.com

31.		**Dr. Toni Dedeu** has more than 15 years' experience in management in the health sector. He worked extensively on the design and implementation of primary healthcare reform in various European countries and also contributed to the design and implementation of the eHealth strategy in Catalonia. For twelve years he also participated in the implementation of primary care and health technology agencies in various countries in the former Soviet Union and the Indian subcontinent. He is the former International Officer of the Spanish Family and Community Medicine Society (semFYC) and member of the Wonca World and Wonca Europe Council, (Wonca: World Association of Family Doctors). He has held various management posts in the health care system in Catalonia. Currently, he is one of the co-ordinators of the Action Area of Organisational Models of the European Commission initiative 'European Innovation Partnership in Active and Healthy Ageing in Integrated Care'. Dr. Dedeu is a visiting lecturer in various universities in Europe and has participated in various European Commission research projects as principal investigator. His main research interests are health systems, integrated care, chronic care, community care, public health, eHealth and health and social care innovation. For 4 years he was the Senior Officer and Director of International Affairs of the Ministry of Health of Catalonia, Spain, and responsible for the international affairs for the regional Ministry of Health of Catalonia. He was then appointed Director of Research and Knowledge Exchange of the Digital Health Institute in Scotland, UK, before returning very recently to the Ministry in Catalonia. He is also the Chair of EUREGHA (European Association for Regional and Local Health Authorities).
32.		**Laurène Souchet** is currently Policy Adviser at the European Patients' forum (EPF), which she joined in January 2011. EPF is a not-for-profit, independent umbrella organisation of patients' organisations in the EU, with 65 member organisations. Its mission is to to ensure that the patients' community drives policies and programmes that affect patients' lives, to bring changes empowering them to be equal citizens in the EU. Laurène Souchet, holds a Master's Degree in European Affairs from the Institute of Political Studies of Lille. Her current areas of work include: • Equal treatment and policies to tackle discrimination encountered by patients in healthcare, education, and employment • Equity of access to healthcare • Medical devices and eHealth • The revision of the Data Protection legislation

APPENDIX 3

The Post-its exercise: eHealth 2010 vs 2020

2010

- Medical apps were nowhere
- EU directive EU cross border healthcare was adopted 2011. It offered multiple legal possibilities for eHealth solution development
- Using IT to help empower patients manage their disease more effectively.
- Zombies Run (www.zombiesrungame.com)
- Pen and paper (5 and 50 years ago and still going strong). Remember simplicity!
- Increasing market for mobile health solutions
- Use of apps in health and wellbeing

- Innovations health apps
- Internet (101) of things
- Rise of sensor tech- big data sources diversified (and include patients)
- Innovation more awareness of the need to involve users
- IST European Research centered care (Technology cannot replace human involvement
- Vital Health (Netherlands) Modular Self-management etc.
- My first real time CGM
- My primary care physician went paperless. In consultations we now look at the PC together
- My doctor bought a PC and set up electronic health records of his patients
- Cheap mobile devices at stable platforms
- Ambient Assisted living
- Professional nurses use of vital/transmission remotely

2020

- In 2020 mobiles will monitor all vital signs and anticipate health issues (Charles)
- CGM insulin pump integration (active) (AP)
- Changes in care delivery structures and financing
- Adequate/assisted healthcare in rural/remote areas
- More applications that assist old people in maintaining their independence without sacrificing their data for commercial purposes
- Medical certification of electronic bio specimen collection (invasive/non-invasive).
- A generation for which internet is a usual tool and not a big invention will be a mayor part of population- potentially useful for eHealth use.
- Personal A.I.
- VR based co-design (Walk the talk)

- Nation-wide digital prescription
- People understand uses and consequences of appliances
- Transparency with regard to commercial use of individual data
- Big data driven healthcare
- What interfaces with what
- Data backlash (protect privacy)
- Big data allows me to have a risk profile which I share with my primary care team and take on my mobile so if there's an emergency the hospital has it.
- Truly integrated digital health tools that are safe, reliable, effective and accepted by patients, healthcare professionals and healthcare systems but controlled/directed by the patient.
- Combination of eHealth and envelope platforms (age in place)
- Broadband routers at home with T/E/M-Health connection
- Full integration of eHealth services into routine clinical practice
- Nationwide electronic health-records/systems (based on international standards)
- Appointment with health professionals by citizens via web/mobile platform Some checkups done home and sent by patients to GP's
- Worldwide roll-out of people-centered care by WHO and artificial pancreas is on the market and bought by ¼ of diabetics
- Electronic patient file (patient-oriented)
- Access to EHR (+ PHR) for health care professionals and citizens (also across borders)
- Every patient has access to an integrated electronic health record
- Patient/citizen controlled personalized health care with continuous feedback/monitoring
- eHealth part of university/medical school curriculum (+HAS)
- I as a patient will be the center of my care despite where it is provided and with an overview of my journey.
- Mobile social digital tech