Health apps: where do they make sense?

White paper:

Health apps from the perspectives of patients, standards and policies

Based on a seminar held at the King’s Fund, London, 28 October 2013

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Myhealthapps.net is partnered with:

- European Health Forum Gastein
- GSK
- Janssen
- NHS England
- Novo Nordisk
- O2 Telefonica
- Vodafone Foundation

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Introduction

Health apps are projected to multiply in number in response to both the demands of patients and a growing set of healthcare challenges. If health apps are to enter mainstream healthcare, though, many questions will have to be answered, including:

• How best can the innovation that health apps represent be delivered (and offered with confidence) in a world of patient-centred care?

• How can health apps embrace the subjects of healthcare information delivery, healthcare measurement, integrated care, prevention, social networks, and wellness options across the entire range of people’s healthcare needs (incorporating such disparate individual experiences as the sports enthusiast, the worried well, the person successfully managing a long-term condition, and the very ill patient)?

• How can health apps be made appropriately safe and certified?

• How can the demands imposed by local, European and international certification be balanced to best effect?

With the EU Green Paper on Mobile Health due to be published later in 2014, Knowledge Transfer Network (KTN) and myhealthapps.net (published by PatientView) partnered to hold a seminar at the King’s Fund, London, on Monday, 28 October 2013. Entitled ‘Health apps–where do they make sense?’, the seminar examined health apps from the multiple perspectives of the patient, of standards, and of policies. Despite a weather-related incident (a ‘hurricane’) shutting down much of England’s rail network for the morning, the seminar was attended by some 60 people from various healthcare disciplines (see Appendix 1). This White Paper summarises the conclusions of the day.

For biographies of chairs and speakers, see Appendix 2.

For information on the partners of myhealthapps.net, see Appendix 3.

myhealthapps.net is brought to you by PatientView, publisher of the ‘2012 European Directory of Health Apps’, which was produced with encouragement from the European Commission. The commercial and non-commercial partners of myhealthapps.net are: European Health Forum Gastein, GSK, Janssen, NHS England, Novo Nordisk, O2 Telefonica, and the Vodafone Foundation. myhealthapps.net has also received significant encouragement and support from the European Commission.

Seminar partners:

• ICT Knowledge Transfer Network. Funded by the UK’s Technology Strategy Board (TSB), the ICT Knowledge Transfer Network supports the ICT sector in the UK by delivering events and thought leadership on areas of interest to the sector, and by working with other knowledge-transfer networks to facilitate cross-sector interaction. It seeks to help improve UK industrial performance by facilitating the development and take-up of information-and-communications technologies, encouraging their adoption as key enablers in industry.

• Minervation Ltd. An evidence-based healthcare consultancy and web design agency, Minervation has been building award-winning websites for charities, companies, and the NHS for over a decade.
The seminar: five key messages

Overhauling healthcare systems–making them patient-centric
Healthcare systems will need to be redesigned if they are to be made truly patient-centric. Such change cannot occur, however, without closer partnerships between health professionals, policymakers, all health industries, and, of course, the patient community. Funds will need to be found to escalate the process (but most likely will not come from the NHS). The great advantage of health apps is that the infrastructure of these products already exists outside the NHS. Therefore, health apps might be able to catalyse any drive to make healthcare more responsive to patients.

Engaging doctors in the prescribing of health apps
Patients and members of the public are embracing the health apps that are designed for consumers. Doctors, on the other hand, are yet to help their patients do so. If health apps are to move into mainstream healthcare, the regulatory requirements for prescribing apps will need clarification (and perhaps the creation of some sort of accreditation system). The key is trust. If doctors prescribe health apps, these apps are likely to be trusted by patients.

Overseeing quality standards for health apps
Regulators may regulate, but their regulations need to be policed. The question is: by whom? The seminar identified various candidates for the job of ‘quality arbiter’ for health apps, including: app stores (such as Google Play and iTunes); the mobile operators; and consumers (the general public). However, problems beset each possible choice. The general consensus at the seminar was that no single entity, or section of society, seems equipped to take on the role of sole arbiter of quality standards. The likelihood is that several bodies (including patients/the public) might take on joint responsibility for curating the trustworthiness of apps.

Ensuring that health apps remain of a high standard throughout their lifetime
Health apps face significant challenges if they are to maintain high quality throughout their time in the marketplace. Medical information quickly becomes superseded; the regulatory environment is reformed or adapted; changes sweep away other elements of the systems in which health apps work. Health apps need to be upgraded to reflect external change, but app developers (and their funders) find the remodelling of apps to be both time-consuming and costly. As such, one possible unfortunate consequence of implementing quality standards for health apps could be higher prices of the products for users, undermining a key virtue of health apps–their accessibility to the public.

Considerations for policymakers wishing to oversee health apps
The consensus at the seminar was that the adoption of smartphone technology will not create health inequalities, but rather can increase healthcare sustainability. The interfaces of smartphones and health apps do have to improve, though, to become more readily usable by older people and people with a disability. Regulations governing health apps are opaque and outdated. Developers are unaware of their legal responsibilities. Clarification is certainly needed about whether health apps require a CE marking (that is, are classified as a medical device). A number of issues obstruct the crafting of new regulations that can cope with rapid technological change–not least the poorly-informed nature of health professionals (who should be major advocates of mHealth). However, on the plus side, helpful advice for the developers of health apps is available from the EU and national regulatory agencies. Furthermore, the EU (and the UK, for that matter) do not want to discourage the burgeoning market for health apps by producing excessive red tape.
The importance of health apps to healthcare sustainability, self-care and consumer/patient empowerment

Chair: Karen Taylor
Director, Centre for Health Solutions, Deloitte UK

Panellists:
- **Sophie Crousse**
  Vice President European Public Affairs, Consumer Healthcare Europe, GSK
- **Monica Fletcher**
  Chief Executive, Education for Health; and Chair, European Lung Foundation
- **Oli Rayner**
  Special Adviser on Research and Patient Involvement, Cystic Fibrosis Trust

Each of the above was asked to speak for 5 minutes, after which followed an extensive discussion with the audience.

Karen Taylor
Director, Centre for Health Solutions, Deloitte UK

- During its 1997-2010 period in office, the UK’s Labour government invested heavily in the National Health Service (NHS), attempting to get healthcare spending in the UK up to that of other European countries, and increasing staff pay.
- Today’s healthcare issues are more to do with getting value for money out of the NHS, and economic sustainability into the system.
- Use of technology is paramount in order for the NHS to be able to work differently.
- Health apps are an important part of that technological drive.
- Apps can now even allow patients to look at their medical records.
- Yet internal silos, ingrained cultures and values, and vested interests all prevent the NHS from adopting health apps (and other new healthcare technologies), even though patients themselves are keen to do so.
• Self-care is important when talking about healthcare and consumer empowerment. Self-care starts with individual responsibility.

• Every consumer makes health choices every day during life—deciding, for instance, whether or not to brush their teeth twice a day, smoke, take exercise, or eat healthily. These choices comprise one aspect of self-care.

• 80% of instances of diabetes, heart disease and strokes can be prevented by better self-care.¹

• Self-care and the changing of lifestyle reduce the number of visits to the doctor—in turn, helping healthcare systems become more sustainable.²

• Self-care thus has a role to play in the prevention of disease, particularly of serious conditions (such as cancer or diabetes) related to poor or risky health behaviour.

• Health apps have the potential to facilitate consumer empowerment in healthcare, giving ordinary people access to reliable healthcare information, and helping them manage their long-term conditions, and keep track of their medication.

• Smartphones are readily available, and apps easy to use.

• Health apps can bridge the gaps in time that beset healthcare—for instance, when appointments with doctors are not that easy to obtain, and when consultations are kept short.

• A 2013 PatientView survey found that 70% of respondent patient groups believe health apps to be useful in supporting patients in maintaining their own health.³

• In conclusion: health self-care apps can help people manage their diseases, and can promote self-care—two of the foundation stones of a sustainable healthcare system.

³ http://alexxyke.wordpress.com/2013/10/14/what-do-people-want-from-their-health-apps/
The European Commission’s Directorate General for Health and Consumers (DG SANCO) was struggling to find a way of getting the message of smoking cessation out to the population.

However, in 2011-2013, DG SANCO ran a campaign aimed at young people, called ‘Ex-Smokers are Unstoppable’.1

At the heart of the campaign is an app developed by DG SANCO, the ex-smokers’ “iCoach”, a tool that aims to encourage young smokers to quit at their own pace.2 The campaign was very successful.

The key iCoach message was then also used in another smoking-cessation campaign, this time jointly initiated by the European Commission and the Catalan football club, FC Barcelona, called ‘Quit Smoking with Barça’.3

The target age profile of the iCoach app was the same as that of the football club’s campaign—25-35-year olds (particularly men) who are among the least likely to seek access to healthcare.

The Quit Smoking with Barça app motivates people to give up smoking. Regular anti-smoking messages are sent to the app from the club’s famous footballers—“personal help from FC Barcelona players”.

Within three months of the launch of the Quit Smoking with Barça app, 60,000 people had registered with the app.

Apps like iCoach and Quit Smoking with Barça represent a useful way of reaching them—demonstrating the power of apps.

ExSmokers iCoach is reviewed on myhealthapps.net

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1. http://ec.europa.eu/health/tobacco/ex_smokers_are_unstoppable
3. http://www.quitsmokingwithbarca.eu/GB#.UqYuymeGmUk

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Monica Fletcher
Chief Executive, Education for Health, and Chair, European Lung Foundation – on the potency of health apps to prevent smoking and to engage young people
Oli Rayner
Special Adviser on Research and Patient Involvement, Cystic Fibrosis Trust – on the many ways that health apps can make life easier for people with cystic fibrosis or diabetes (though doctors have yet to engage with the technology)

• Oli told the audience that he is living with both cystic fibrosis (CF) and CF-related diabetes. He has to take an average of 50 pills a day, 7 nebulisers, 3 inhalers and regular insulin injections. He also has to do self-administered chest physiotherapy twice a day and check his blood glucose levels on a regular basis. Most people living with CF cannot digest fat naturally and need to consume a huge amount of calories (4,000-5,000) a day in a high-carb/high-fat diet to sustain themselves. This can be challenging particularly when regular chest infections reduce appetite. People with CF who have the added complication of diabetes can also experience difficulties managing their blood glucose levels and gauging how much insulin to take. This adds up to a heavy burden of treatment which can take several hours per day – it is hard work and complicated.

• People with CF need to understand how their condition and treatments affect them and they need to be able to adjust doses and other aspects of treatment according to a number of variables on a day-to-day basis.

• Health apps may bring big health gains to people with CF by giving them the tools they need to manage their condition and treatments more effectively. Health apps can also help to empower people with CF by giving them a greater sense of control. More broadly, health apps can facilitate a more patient-centred healthcare system and a shift from rescue to prevention.

• People with CF need new tools to address issues such as:
  • Keeping track of frequently changing and complicated medications and treatment regimens.
  • Keeping track of personal health metrics.
  • Feelings of isolation and inability to problem-solve with others resulting from the fact people with CF cannot meet each other in person due to the risk of cross-infection. There is an obvious need for peer-to-peer support and meeting online is the only option. There is a vibrant CF community on Twitter and other social media but support is fragmented and ad hoc.
  • The challenges of getting all the treatments done each day while trying to build an independent life. These challenges are particularly acute for teenagers and those moving away from home.
People with CF have to collaborate with a multidisciplinary team but often information is not shared effectively within the team and the patient can be the only one who sees everything. Sometimes healthcare professionals do not have ready access to medical records or they do not have time to read them so they rely on the patient instead. Not only does this create obvious risks it also means healthcare professionals have little opportunity to see patterns and trends in the data.

Health apps may offer benefits to people with CF by addressing these issues and also by:

- Capturing health and behavioural data in a way that helps people with CF, clinicians and researchers understand more about how their condition affects them and build a more accurate picture of individual wellness. This can be empowering for the individual with CF while also making life easier for their doctors and potentially facilitating clinical trials.
- Combining with remote-monitoring and novel biosensors to provide early indicators of infections and other flare-ups to enable earlier and, therefore, more effective interventions.
- Potentially reducing the need to go to hospital thus increasing quality of life and diminishing exposure to a major source of the opportunistic infections that can be so dangerous to people with CF.
- Providing tracking and educational tools to complement the advice of their specialist dietician in order to help people with CF achieve a “CF-healthy” diet each day with sufficient carbs, fat, protein and overall calories, especially important if the person also has CF-related diabetes (e.g., the “Carbs and Cals” app).
- Allowing people with CF to meet and talk together in virtual space.

The hurdles preventing health apps from benefitting people with CF include:

- CF is a rare disease affecting 10,000 people in the UK and there is currently a lack of health apps designed in a way that meets the specific needs of people with CF. One has to be relatively well informed in order to know how to use a “generic” app in a way that is appropriate for CF (e.g., a “CF-healthy” diet is the opposite of what would be recommended for a person without CF but, with this knowledge, certain diet/nutritional apps can be helpful to people with CF when they would otherwise be harmful to non-sufferers).
- An insufficient evidence base to support the prescribing of health apps in the NHS. There is a need for robust systems to evaluate health apps in a way that provides doctors, patients and the NHS with the information they need to make informed decisions.
- A concern in the NHS about equity of access since not all patients can afford smartphones.
- Privacy and data protection regulations – while it is important for robust controls to be in place, many patients with progressive life-shortening diseases like CF feel that too much weight is given to data protection and that this hinders research that could deliver therapeutic advances. It can feel like the regulations seek to protect patients’ data more than the patients themselves.
- The doctor-patient relationship can be too paternalistic. In conditions like CF where the patient is required to take significant responsibility and there is a huge component of self-care, it may be more appropriate for the relationship to become more akin to that of a coach and athlete, with the doctor seeking to empower the patient to achieve his or her goals. Coaches are not reluctant to recommend apps to the athletes they train.
Main points emerging from the audience discussion of health apps to healthcare sustainability, self-care and consumer/patient empowerment

The need to engage doctors and to promote the prescribing of apps

Patients and the public are embracing the health apps that have been designed for consumer use. Doctors, though, have yet to help patients do so. If patient-oriented health apps are to move into mainstream healthcare, the regulatory requirements for prescribing health apps need to be clarified—and some sort of accreditation system has to appear. The key is trust. Health apps prescribed by doctors are likely to be trusted.

- Many patients were already experienced in the self-management of their own medical conditions long before health apps appeared on the scene. Health apps can therefore arguably be viewed as an adjunct to self-care, and not the complete answer to it.
- Some patients with a long-term condition may only see their GP or nurse for an hour a year to review their condition; the rest of the time, they are accessing healthcare information elsewhere. Patients are increasingly trusting healthcare information available online and from health apps. Medical professionals ignore the trend at their peril. The information gap between the two sides has to be bridged somehow—perhaps with some form of accreditation for the health apps supplied to the public.
- At present, very few GPs are comfortable with recommending health apps. Doctors are also still inexperienced about the practical issues associated with advising patients of the availability of a specific health app. One added complication if doctors prescribe health apps is that the products may then be classified as medical devices (and hence in need of regulatory compliance), whereas health apps downloaded voluntarily by the general public may not be regarded the same way.

Solutions to the above hurdles include:

- Prescriptions for health apps could be done in the form of print-offs of Quick-Response (QR) codes.
- Important healthcare stakeholders could cooperate far more in the production of health apps.
- A single repository of public-oriented information on health apps could be created (in the UK, probably outside the NHS).
Healthcare systems need to be overhauled to become patient-centric – but how?

Healthcare systems need to be re-designed to make them truly patient-centric. However, such change cannot occur without closer partnerships between health professionals, policymakers, all health industries, and, of course, the patient community. Funds will need to be found to escalate the process (in the UK, most likely, they will not come from the cash- and resource-strapped NHS). The great advantage of health apps is that the infrastructure of the products already exists outside the NHS. Health apps, therefore, may catalyse the process of making healthcare more responsive to patients.

- The healthcare provided by most healthcare systems in Europe remains dependent upon management by doctors. Moving toward a more patient-centric system will be difficult to implement in Europe unless policymakers change their mindset. Healthcare systems, however, have an opportunity to offer more holistic solutions–including health apps.

- A major challenge to any movement towards patient-centrivity is the huge fragmentation in the delivery of treatment and care found within healthcare systems–not only between stakeholders, but also within differing elements of the healthcare system (In England, for instance, between the Trusts within the NHS).

- The question is: who, as stakeholders within healthcare systems, should catalyse the transition to self-care, to patient empowerment, and towards the uptake of health apps? Pharmaceutical companies, for example, are not likely candidates for the job; they are prohibited by law from forming too close a relationship with patients. Whatever body comes forward will have to realise that any change requires a closer partnership between the healthcare system, industry and patients.

- Any patient-centric reforms will involve investment. Cost, though–especially for the NHS–remains a prohibitive force.
The need for high-quality apps – what is happening about standards?

Chair: Monica Fletcher  
Chief Executive, Education for Health; and Chair, European Lung Foundation

Panellists:

- **Eirini Zafeiratou**  
  Head of EU Affairs, and Managing Director, Vodafone Belgium

- **Piet Knaepen**  
  Senior IT Manager DIGITAL, Janssen EMEA

- **Patrick Walshe**  
  Director Data Privacy, GSM Association

- **André Tomlin**  
  Managing Director and Founder, Minervation

Each of the above was asked to speak for 5 minutes, after which followed an extensive discussion with the audience.
Smartphones and tablets are a breakthrough for users. The touchscreens of these devices have ensured greater public accessibility to information of all sorts, including healthcare information.

Mobile health (mHealth) can overcome challenges in areas such as the real-time monitoring of patients, and the collection and distribution of health-related data. Mobile technology can deliver healthcare in a new way, resulting in more freedom, self-reliance and safety for patients, as well as savings in cost and time for the healthcare system.

Importantly, though, not all of the health apps that are produced for public consumption are readily accessible, or fulfil their promises. Some are beset by inherent technical and operational feasibility problems, have not been properly tested, or are not economically viable enough to sustain themselves in the marketplace.

The Vodafone Foundation is working on overcoming these challenges. The Foundation has been running the 'Mobile for Good' programme of awards for the last three years. This initiative is designed to identify many types of useful, accessible apps that are capable of delivering social change for the good. In particular the following categories were included: independent living, well-being, mobility and social inclusion.

The Mobile for Good Europe awards involve a partnership between the Foundation and two European NGOs, AGE Platform Europe and the European Disability Forum (EDF), which judge the apps for user-friendliness.

In 2013, the most recent year of the award, health apps have proven to be the most popular for submissions, receiving 62. The Foundation looks for health apps that help patients self-care, detect symptoms, or keep fit—and are also easy to use.
The Mobile for Good Europe winners for 2013 were announced on 5 December 2013 in Brussels.

The winners of the Health category were:

**CONTIGO**
Developed by 16 women who have survived breast cancer, Contigo ("With You") is an app designed to support women from the moment they are diagnosed with breast cancer all the way through treatment. Contigo provides personal testimonies, interactive info graphics and accurate medical content about breast cancer. Content appears in 11 thematic sections: the first days, cancer, therapies, the first day of chemo, side effects, diet, sexuality, emotions, sport, recreation and the end of treatment to help women cope at all stages of treatment and recovery.

**PebbleMED**
PebbleMED is a mobile solution for people receiving treatment for high blood pressure. It helps remind the patient to take medication on time, measures blood pressure and ensures family, friends and GPs are kept up-to-date, enabling quick adjustments of medication if necessary. PebbleMED is a practical and affordable system that makes clever use of the Pebble smartwatch, a smartphone app, a mobile data subscription and a worldwide secure cloud server.

**HipTracker**
HipTracker is designed for health self-management. UMotif’s Hip-Tracker is a simple and easy app that can be used each day to help track symptoms during a patient’s recovery period after a hip injury or surgery. The app includes features that allow the tracking of mood, pain, mobility and recovery, daily reminders for medications and exercises, physiotherapy exercises, completion of standard hip-related measurements and a diary.

In judging the Mobile for Good Europe awards, the evaluation criteria that the Foundation and its two partner NGOs employ include:

- The social impact that the app could have, and its value for users.
- The technical and operational feasibility of the app.
- The level of innovation that the app represents.
- The successful testing of a prototype of the app.
- A venture-capital approach to working out the economic viability of bringing the app to market.
Janssen is interested in developing (beyond its own pharmaceutical products) tools that help patients with adherence, and which aim to improve the quality of life of patients.

For instance, an app that offers the user information about a different healthy meal a day is the sort of app that Janssen is delighted to see being produced.

All Janssen products which involve any online element have to go through company checks for (among other matters) privacy, legality, and medical accuracy.

In the area of health apps, Janssen sees two patient needs as being particularly important to meet: firstly, a patient’s need to find the right app for them; and, secondly, a patient’s need to be able to trust that app, once they have found it—which is why Janssen is partnering with myhealthapps.net.

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Example of one of Janssen’s health apps featured on myhealthapps.net

Languages: English
Countries of use: Any in which the user is familiar with English
Cost: Free
Developer: Janssen Healthcare Innovation (Janssen Research and Development, LLC), USA
http://www.janssenhealthcareinnovation.com
Funder: Janssen Healthcare Innovation (Janssen Research and Development, LLC), USA
Medical Adviser: Janssen Healthcare Innovation (Janssen Research and Development, LLC)
URL: mhm.care4today.com
Summary: A tool that reminds the user to take medications (and health supplements) on time. The ‘Care4Family’ facility allows the user to check on whether family members are taking their medication as prescribed, and to encourage them to do so. The ‘Care4Charity’ facility allows donations to be sent to selected NGOs. The app will work with any service provider or service plan, and on almost any mobile phone (including feature phones, as well as smartphones). It contains photographs of 20,000-plus medicines (including generics), to help with users’ identification of medicines. Graphs on progress at taking medication on time can be shared with healthcare providers or family and friends. An FDA-registered Class 1, 510K-exempt medical device. A European version will be made available later in 2014.

Reviewer: AIDS Institute, USA
Review: “We at the Florida Consortium for HIV/AIDS Research (FCHAR) have piqued the interest of Janssen Therapeutics in funding a Care4Today evaluation project. Care4Today Mobile Health Manager, version 2.0, is a free, secure, two-way messaging platform, mobile app and website provided by Janssen Therapeutics. Adherence reminder notices are texted to the individual. Complementary tools, including personalised follow-up by healthcare staff or case managers, are provided to help encourage taking medication on time. The study would examine the effectiveness of the Care4Today programme. The dependent variable would be viral load. If VL becomes undetectable within one year of project implementation, it will be counted as a success. Detectable VL would be counted as unsuccessful, and would be quantified according to VL level.”

Source: http://bit.ly/19O2R5m
Weblink of reviewer: http://bit.ly/19O2Ox
Pat Walshe
Director, Data Privacy, GSM Association. (The GSM Association [GSMA] is concerned with privacy in the field of mobile devices) – 

Data can be empowering. For example, enabling cancer patients to report the effects of their medication to their doctors is incredibly valuable, not only to healthcare professionals but to research and future better treatments and cures.

However, the mobile world is fragmented by differing technologies, standards and interoperability issues, as is the world of healthcare. The working environment of a doctor might contain as many as five IT legacy systems, all of which tend to be incompatible.

The management and communication of this data on and between e-devices raises significant privacy issues. These problems of privacy centre on the location and safety of patients’ private medical information, and degrees of transparency and control for patients.

The increasing mobility of patients across the EU makes the issues of data transfer more complex – rules need to consider real-time healthcare provision across borders.

Governments around the world are looking at data privacy in the mobile sphere.

Guidelines on app privacy are emerging in different countries across the world.

Regulators across the world are struggling with the same issues of privacy in the connected mobile space.

One major imperative is the need to increase user trust in mobile privacy. More user trust would generate both greater use of data, and better value for customers.
• Among the many issues that need to be addressed are:
  • Interoperability problems (which probably should be looked at first).
  • How/should the user distinguish between health apps and wellness apps?
  • How to reassure patients that apps are trustworthy?
  • How can app developers, OS vendors and others design privacy into their products (in a way that does not burden the users)?
  • The rise of appification— the process in which people find themselves sharing their personal data, via their apps, with many companies, simultaneously in real time, often across borders.
  • Accountability about who controls personal medical data.

• Possible ways forward:
  • Privacy seals.
  • Symbols of accountability (possibly including, for instance, a white coat, a stethoscope, a certificate).
  • Codes of Conduct.

• A plethora of new app standards are emerging, such as:
  • Happtique1 is one US-based organisation that certifies apps.*
  • ‘Health Level Seven International’ (HL7)2 is a set of standards for the interoperability of electronic health information.
  • myhealthapps.net assesses apps from the user perspective.

* Happtique suspended its mobile health application certification programme in December 2013 after a developer raised data security concerns about two Happtique-approved apps.

(1) http://www.happtique.com
(2) http://www.hl7.org
Minervation has developed a website and accompanying app called ‘The Mental Elf’. The app is aimed at health and social care professionals and aims to help keep people up to date with the latest reliable mental health research, guidance and policy.

For most members of the public, the results of new evidence-based research is hard to find and difficult to understand, but even doctors and nurses can find information about research inaccessible and unusable.

The information in Minervation’s Mental Elf website and app is drawn from the efforts of 70 international mental health experts, who find, appraise, and summarise the latest research on mental health from 500 sources, thereby ensuring the quality of the information is high.

The app allows the user to sift by subject, and it shows 3-minute summaries on new research papers on a wide range of subjects; everything from depression, anxiety and schizophrenia, to exercise, diet and mindfulness.

The Mental Elf method of presenting information is not just limited to mental health; it can be rolled out to include virtually every other theme in healthcare. Minervation is tackling lots of other healthcare topics in this way with other elves on commissioning, dentistry, diabetes, healthy lifestyle, learning disabilities, musculoskeletal health and stroke.

Finally, choosing the right name and visual brand for an app is important. A thoughtlessly-named app can be instantly forgettable (or difficult to find on a search engine). The Mental Elf, by contrast, is a name that is both memorable and engaging, as is the broader name for this project – the National Elf Service.
Key points emerging from the audience discussion on the need for high-quality apps – what is happening about standards?

Who should ensure that quality standards for apps are upheld?

Regulators may regulate, but their regulations need to be policed. The question is: by whom? The seminar nominated several candidates for the job of ‘arbiter of quality’ of health apps including: app stores (like Google Play and iTunes); the mobile operators; or consumers (the general public). However, problems beset each approach. The general consensus at the seminar was that no one seems equipped to take on the role of sole arbiter of quality standards, and the likelihood is that several bodies (including patients/the public) might be responsible for curating the trustworthiness of apps.

The debate on app stores as arbiters of quality

Some people consider that app stores are ideally positioned to shoulder the burden of responsibility for setting standards for health apps. After all, app stores monopolise the distribution of apps, and, to a certain extent, determine whether an app becomes publicly available. But app stores are hindered as potential arbiters of quality by their overt commitment to the profit motive. App stores wish to generate income out of the sale of the apps featured on their site (and, ultimately, to out-compete and dominate rival platforms in the marketplace). The companies behind app stores target customers for advertising purposes, and even sell data about consumer behaviour. App developers (who bear the legal responsibility, and carry all accountability, for the performance of their products) would have a particular problem if app stores were to become the gatekeepers of quality. How could app developers ever be sure that app stores—with their overriding mercantile orientation—were behaving fairly, and in a trustworthy, transparent manner, in their judgements over quality?

Self-policing

Other people suggested that both mobile operators and the developers themselves are well placed to establish professional guidelines for health apps. Although the EU is currently debating proposals to impose obligations on companies above a certain size to employ a data protection officer to generate trust, trust occurs when suppliers do what they say they are going to do, and act ethically. The market dictates reality, and, if a company has proven to be trustworthy, people will be prepared to engage with that company’s products. Unfortunately, though, the app market is fragmented and imperfect.
The debate on users as arbiters of quality

Consumers, of course, can choose to use or reject health apps, thereby signalling the presence of trustworthiness and quality in an app to their fellow consumers. However, the concept of relying on patients and the public to police health apps has at least one major obstacle to overcome. The public is, arguably, not capable of applying uniform judgement to the question of quality in apps. People understandably differ in their desire to feel protected from the signs of poor quality in apps, and in the strength of their insistence on having personal data kept private. Nearly as prejudicial to the chances of the public deciding which health apps are high quality is the hit-or-miss nature of the app-discovery process for consumers. With some 90,000 health apps now available, the mechanisms by which patients find out whether a health app is suitable for them remain arcane. One way to improve the progression from desire for a certain type of health app to finding an appropriate product is to follow a patient group’s recommendation of an app. Such a version of the user’s view as arbiter of quality—in the form of a patient group review of an app—is very different from that of technical trust, or regulatory trust. This is patient trust. Curating information on apps—such as myhealthapps.net—brings trust and value to the apps featured by the curating body.

Ensuring that health apps remain of high standard throughout their lifetime

Health apps face significant challenges if they are to remain of high quality throughout their time in the marketplace. Medical information quickly becomes superseded; the regulatory environment is reformed or adapted; changes sweep other elements of the systems in which apps work. Health apps need to be upgraded to reflect exterior change, but app developers (and their funders) find the remodelling of apps to be both time-consuming and costly. As such, one possible unfortunate consequence of implementing quality standards for health apps could be higher prices of the products for users, undermining a key virtue of health apps—their accessibility to the public.

Health apps differ from some other medical products in that their content and framework are subject to the need for occasional or regular mutation. Health apps usually have to be upgraded during their lifetimes in the marketplace—not least to follow updates to operating systems, changes in interoperability, or heightened public or regulatory expectations of privacy. The resilience and continuity of any health app, therefore, has to be regarded as an important consideration in the decision to regard it of high quality. The onus, accordingly, is on the developers of health apps (and the companies that fund them) to make sure that all is up to date in the apps they produce.

The hurdles that face attempts to maintain the standards of health apps can be significant. As the seminar heard, even pharmaceutical companies—large corporations with deep pockets—have yet to solve the problem of keeping current the health apps they fund. Developers do not always revise their products; many move on to new fields after their apps are in the public domain. Upgrading health apps is complex, costly, and time-consuming. Sometimes, an upgrade to an app can affect other applications/services on the user’s smartphone. One alternative is to shift the app to a web-based facility that is easier to maintain (a solution that rather undermines the elegance and ease of use of apps).
Legislation for app developers

Helpful links about the EU position: EU guidelines on when stand-alone software like a health app qualifies as a medical device

The notified bodies in each EU country in charge of implementing the Directive 93/42 on medical devices
http://ec.europa.eu/health/medical-devices/links/contact_points_en.htm

When is an app a medical device?
January 2012 MEDDEV 2.1/6: 1.2 (a) ‘medical device’ means any instrument, apparatus, appliance, software, material or other article, whether used alone or in combination, including the software necessary for its proper application intended by the manufacturer to be used for human beings for the purpose of:

–diagnosis, prevention, monitoring, treatment or alleviation of disease;

–diagnosis, monitoring, treatment, alleviation of or compensation for an injury or handicap;

–investigation, replacement or modification of the anatomy or of a physiological process;

–control of conception, and which does not achieve its principal intended action in or on the human body by pharmacological, immunological or metabolic means, but which may be assisted in its function by such means.
Regulatory aspects of health apps (EU)

Presentation by Céline Deswarte, Policy Officer, Unit Health and Well-being, DG CONNECT, European Commission

The European Union has produced several sets of legislation which have a bearing on app developers.

The Medical Device Directives


This Directive was designed to regulate medical devices that are involved with the prevention, diagnosis and treatment of disease. App developers have to ask themselves whether their product will be considered as relevant for regulation by this Directive. The in-vitro medical devices directive can also apply to apps. In January 2012 “MEDDEV 2.1/6: Qualification and Classification of Stand-Alone Software” was instituted, providing guidance to app developers (including a decision tree) as to whether an app constitutes a medical device. This guidance is currently being revised. The Medical Devices Directives are also being revised to become regulations, therefore they will provide for a single set of rules throughout the EU regarding medical devices, increasing legal certainty.

So, when in the EU is an app regarded as a medical device?

Useful guidance was provided by a Judgment of the European Court of Justice (Third Chamber) of November 22nd 2012, Case C-219/11, the Brain Product case, which ruled on the scope and interpretation of the concept of the phrase ‘medical device’ as applied to a piece of software that measured brain waves. The manufacturer stated the software was only for investigational use and not for diagnosis or treatment or a disease. The ECJ found that the instrument was not a medical device because the intention of the manufacturer was not to diagnose or treat.

When an app clearly serves a medical purpose, CE (Conformité Européenne) marking is required, which may necessitate clinical evaluation. CE marking indicates that the manufacturer warrants its product conforms to all relevant EC directives.

In the US the FDA (Food and Drug Administration) has also provided guidance about when mobile apps should be considered medical devices and as such require FDA approval before use. The FDA announced it will use regulatory discretion for the apps that are in a grey zone, that may be medical but because they pose very low risks to users they do not have to comply with US medical device legislation. Examples include apps that track medication and provide reminders for improved medication adherence; apps intended to log, track, evaluate or make decision or behavioural suggestions related to developing or maintaining general/fitness, health or wellness such as calorie counters that provide dietary suggestions.

(1) http://ec.europa.eu/health/medical-devices/files/meddev/2_1_6_ol_en.pdf

The Data Protection Directive

(95/46/EC on the protection of individuals with regard to the processing of personal data and on the free movement of such data).

This Directive is relevant to apps which collect personal data. The Directive, in principle, prohibits the processing of health data, except when:

- the subject provides explicit consent.
- the data are used for treatment purposes by a health professional bound by a duty of secrecy.
- the processed data are of vital interest to the subject.

Following its adoption in 1995, national legislations have transposed this Directive differently across the 28 EU States. This Directive is being revised and should also become a regulation so that a single set of rules apply throughout the EU.

Further clarification of the Data Protection Directive as applied to apps on smart devices has been provided by the Article 29 Working Party group in an opinion. The latter shows that EU legislation applies not just to developers based in the EU, but to US developers whose apps reach European audiences.

Consumer rights: obligations for app developers

EU consumer-protection legislation aims to safeguard the interests of consumers, as well as promote their rights to information and education. In this context, app developers working in the EU are legally required to publicly supply the following information:

- the characteristics of their app.
- the identity of the trader.
- the price of the app (plus any additional charges required when making full and proper use of the app).

EU legislation prohibits:

- unfair commercial practices by an app developer or trader.
- an app developer or trader using quality marks without authorisation.

A new EU Green Paper

Because of the significant business potential of health apps, the European Commission plans to issue in 2014 a Green Paper on mHealth, which will initiate a debate among stakeholders on what should be done at EU level to release the potential of mHealth in Europe. The Green Paper will be accompanied by a Staff Working Document (SWD) explaining the legal framework applicable to health and wellbeing apps.
What do people want from health apps?

A joint presentation by Dr Alex Wyke, CEO, PatientView, and Tony Newbold, consultant, PatientView

A patient who has been diagnosed with a disease might want information about many related matters, including:

• what are the potential medical options?
• how best to exercise with the condition?
• which are the healthiest foods to eat?
• what do family or friends need to learn about the condition?

The depth of information needed is beyond what can be passed over during a short consultation in a doctor's office. These facts must come from elsewhere. Health apps provide possibly one of the best technological means for consumers and patients to access such support on self-care, easily and quickly. However, the number of health apps is huge, and of widely-varying quality. Consumer confidence in mHealth is paramount for the acceptance and adoption of health apps.

Thus far, regulators such as the US Food and Drug Administration (FDA) have focused on apps for health professionals, which aim to help diagnose or treat disease.

Although 90,000 health apps have already been downloaded, the medical suppliers of health apps (known as developers) have not been required to get customer (patient) appraisal of their products. This is why PatientView set up an initiative in 2012 to look at health apps from the consumer/patient perspective. The resulting peer review should help guide the public in at least knowing which apps people like them prefer.

An online version of PatientView's guide to patient-recommended health apps, called myhealthapps.net, was launched in November 2013, and was built in partnership with the European Health Forum Gastein, GSK, Janssen, NHS England, O2 Telefonica, and the Vodafone Foundation. The site also benefited immensely from the encouragement and input of DG CONNECT.

Consumer assessment of health apps

To develop a rating system for myhealthapps.net, PatientView conducted a 2012 pilot study of 250 patient groups worldwide (80% of respondents were UK-based) to find out what people want from health apps. The patient groups identified five main requirements. People want apps that …

• make them feel more in control of their condition
• are easy to use
• can be used regularly
• permit networking with families, friends, carers and peers
• and are trustworthy.

The 2012 survey found that these needs seem uniform, no matter from which country patients come. However, differences in viewpoint about the most important of the five app characteristics do emerge among patients and public—depending upon the medical interests of the consumer. Thus, people with long-term conditions prefer apps that help them stay healthy, while people with conditions that interfere with their movement skills want apps that are easy to use. People with sexual-health problems want to be able to network with their friends and families.

The myhealthapps.net site has converted the five app characteristics into a ‘heart-rating’ system, to help patients get to the apps they need by sifting apps into particular subject areas.
Finding the right app
Patients and the public do trust information from credible patient and consumer groups. These organisations should now be seen as a powerful resource to help individuals select health apps that are popular with the groups’ constituencies.

myhealthapps.net opened with detailed reviews of 307 favourite health apps selected by health NGOs (as of January 2014, the number increased to 330, and is growing by 20-25 each month). The apps featured on site are described in detail (including information on cost, platforms, languages in which the app is available, the developer, and the sources of the funding behind each app). Every entry has a heart rating allocated by myhealthapps.net. Five hearts denotes that the app contains all the properties patients and the public are looking for in a health app.

On myhealthapps.net
A person who wants to learn more about Huntington's disease, for example, will be pointed by myhealthapps.net in the direction of Fiftyfifty, an app commissioned by the Scottish Huntington’s Association (SHA), and which uses role play to explain the condition. Search on myhealthapps.net for ‘heart’, and 18 apps are recommended, varying widely in remit and content. The site features 57 diabetes apps recommended by health NGOs. Interestingly, only two of these diabetes apps look overtly at exercise (DSharp diabetes and Diamedic). Traffic Light Food Tracker helps people shop healthily.

The challenges
But apps can be a matter of individual taste. People with a disease also need emotional reassurance throughout all stages of their condition, as well as during the related aspects of nutrition and exercise—advice that is tailored to managing their specific condition. Curating information about apps is also not just about filtering apps—it is about being trustworthy, too.
What policymakers say about health apps

Chair: Mike Short
Vice President, Telefonica Europe; and Chair, ICT KTN

Panellists:
- Charles Lowe, President, Telemedicine and eHealth Section, Royal Society of Medicine
- Per Johansson, Legal Officer, European Data Protection Supervisor
- Pēteris Zilgalvis, EU Visiting Fellow, St Antony’s College, Oxford (on sabbatical from his role as Head of Unit, Health and Well-being, DG CONNECT, European Commission)

Each of the above was asked to speak for 5 minutes, after which followed an extensive discussion with the audience.

Mike Short
Vice President, Telefonica Europe; and Chair, ICT KTN
– opened the session

- By the end of August 2013, 97,000 health apps existed on the Google and Apple app stores. This number is likely to double in two years. The app business is growing fast, with apps serving many health subject areas.
- Research2Guidance estimates that the health app market is likely to be worth $26bn by 2017.¹
- The leaders within the app market are changing frequently.
- More and more accessories that go with apps and plug into a user’s phone are also available, for instance, blood-pressure monitors and blood-glucose tests.
- 1.8bn mobile devices are sold every year. Over 7bn mobile devices will be in use by the end of 2013.² The volume of sales is unlikely to drop off.
- Mobile phones are more ubiquitous and inclusive than any other electronic device.
- People need to trust in apps and what they offer—solutions for better health (health outcomes).
- Thus, apps should also be measured by looking at the solutions—the health outcomes—as well as the trustworthiness of the app technology and content.
- Policymakers should perhaps look at the trust level of apps, as well as whether the apps act as solutions in healthcare.

¹ http://www.research2guidance.com/shop/index.php/downloadable/download/sample/sample_id/262/
Charles was commissioned by the dallas\(^1\) project, itself funded by the Technology Strategy Board, to examine how best to improve the perception by doctors and patients of the efficacy of medical apps.

The key points emerging from his study are:

- There is considerable fear, uncertainty and doubt about the process for securing certification for medical apps, with many developers and clinicians not knowing what a CE certificate is, or that it can apply to standalone software.
- Cost-effectiveness has been largely neglected so far, yet if GPs for example are to offer patients a choice of apps or drugs to treat, say, depression, they have to be assured of comparable efficacy.
- There is no clarity as to the business model for how the NHS can buy medical apps or distribute them via prescriptions.
- There is a dearth of good evidence on the efficacy of medical apps just now. However, most senior public-health people believe that apps will bring at least a small health benefit. Given that mass deployment of apps is very cheap, even a small individual health benefit will result in apps still being very beneficial.
- There are problems though - taking the example of smoking-cessation apps, in a paper submitted recently to the BMJ for publication, Prof Jeremy Wyatt has reworked some research by Abroms et al\(^2\) that shows that the most popular are the least clinically-effective; clinical rigour needs to be applied to these sort of health apps that promote behavioural change.
- In addition there are many bogus apps that either do not do what they purport, or give incorrect results (eg on opioid conversion\(^3\)) that could cause a death or serious injury.

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1. delivering assisted living lifestyles at scale: [https://connect.innovateuk.org/web/dallas/overview](https://connect.innovateuk.org/web/dallas/overview)
• Beware also that in digital health the business model may not be what you think – for example, 23andMe, the gene-mapping company, portrayed itself as simply offering a genetic service to users, whereas it was also mapping genetic elements to patient characteristics. As a consequence it has now filed two patents on genetic issues. The business model of many health app developers involves selling user data – mainly although not always anonymised – to third parties.

• A lot of pharmaceutical companies are frightened of giving patients a feedback capability in apps in view of legislation that requires such responses to be considered. However, patients can already use the ‘Yellow Card’ reporting system for pharmaceuticals – feedback does not have to be filtered through GPs.

• Getting certification under the Medical Devices Directive or In-vitro Devices Directive is only part of the problem - app developers also have to adhere to the EU’s data protection and EU consumer protection legislation.

• Other issues include inter-app interference when many apps are downloaded onto one device, and concerns about accessibility when travelling from one country/region to another.

• Apps change over their lifetime, particularly as operating systems are enhanced and so require good post-market monitoring to maintain safety and efficacy. That needs a revenue stream. No revenue stream means reduced support for post-marketing surveillance.

• Charles’s principal recommendations are:
  • Expand the remit of NICE (National Institute for Health and Care Excellence) to include medical apps.
  • Establish an organisation (see www.dhaca.org.uk) that can work with the MHRA (Medicines and Healthcare Products Regulatory Agency) and NICE to establish an agreed process for certifying, and establishing the cost-effectiveness, of medical apps.
  • Ensure good policing of medical apps to prevent bogus apps from creating a risk to life.
The European Data Protection Supervisor (EDPS) is one of the key actors in the area of EU privacy and data protection. The EDPS is not the European Commission. The Supervisor is not a law-making entity. It is:

- A supervisory body of European institutions.
- An advisor to the legislators (the European Council and the European Parliament) on data protection.
- A consultative, coordinating element on many EU-wide bodies that are concerned with data protection. The EDPS achieves its coordinating role primarily through its involvement with the European Commission’s Article 29 Working Party.

The Supervisor is in the early stages of consultation on the regulation of medical apps.

The right to the protection of data is a fundamental right stemming from the Treaty of Lisbon in 2007, and is clearly applicable to health apps.

Protection of data creates the legal certainty of a level playing field.

The rights to have access to one’s own personal data, and to be informed in a clear and transparent manner of how these data are processed through health and well-being technologies, also contribute to patient empowerment, and the respect of people’s right to self-determination.

Trust is key in the relationship between user and technology provider, just as employees need to trust that their employers will not circulate their personal information without their consent.

By having rules on consent, individuals who are less concerned with data privacy can allow wider distribution of their personal data. This is necessary, as people vary in their desire for data privacy.

The Article 29 Working Party have produced a report outlining the responsibilities of app developers in the field of data privacy.

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Any regulatory intervention needs to recognise its potential impact on innovation.

The European Risk Forum (ERF) is an expert-led, not-for-profit think tank that (1) promotes high-quality risk-assessment and risk-management decisions by the EU institutions, and (2) raises awareness of risk-management issues at EU level.1

In October 2013, 12 CEOs of companies that are major investors in innovation, accounting for a joint €21bn per year, came together under the auspices of the ERF and produced a report that proposed the application of the so-called ‘innovation principle’. The principle states that “whenever precautionary legislation is under consideration, the impact on innovation should also be taken into full account in the policy and legislative process. It seeks to balance a reliance on hazard-based regulatory approaches, geared to removing or avoiding unknown risks, with encouragement of innovation as an equally-important objective for the EU.”2

An innovation-friendly policy stance, guiding from a public policy perspective, might involve changes in tax policy, reimbursement, research funding—all intended to balance out the negative consequences to innovation that greater regulation can bring.

EU institutions do actively foster innovation (though most innovation, of course, is not within the power or scope of policymakers).

So-called ‘disruptive innovation’ (an innovation that helps to create a new market and a new value network) needs to be allowed to exist, hindered by as few necessary barriers as possible.

These two approaches can be applied to health apps—guiding, while not smothering.

Actions need to be undertaken to allow entrepreneurs to innovate.

We all have a role to play in making healthcare more sustainable. Apps can be a part of remoulding that relationship. We must allow entrepreneurs to invent health apps and to put them into the marketplace.

Trust is needed, public trust in health apps.

Developers must work with health professionals and NGOs to foster trust. Nobody wants the public to lose trust in health apps.

I commend the efforts of myhealthapps.net to help guide the consumer who is looking for a good choice of health app.

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1 http://www.riskforum.eu/
Key points emerging from the audience discussion on policymakers and health apps

What should policymakers consider in their oversight of health apps?

The consensus at the seminar was that the adoption of smartphone technology will not create health inequalities but rather can increase healthcare sustainability. The interfaces of smartphones and health apps do have to improve, though, to become more readily usable by older people and people with a disability. Regulations governing health apps are opaque and outdated. Developers are unaware of their legal responsibilities. Clarification is certainly needed about whether health apps require a CE marking (that is, are classified as a medical device). A number of issues obstruct the crafting of new regulations that can cope with rapid technological change—not least the poorly-informed nature of health professionals (who should be major advocates of mHealth). However, on the plus side, helpful advice for the developers of health apps is available from the EU and national regulatory agencies. Furthermore, the EU (and the UK, for that matter) do not want to discourage the burgeoning market of health apps by producing excessive red tape.

Could smartphone technology widen the health divide between the haves and have-nots?

• Smartphones do carry inherent costs, but are increasingly seen as essential consumer items. Smartphones today are available for as little as £10 a month. The ‘Amber Homeless Helper’ app, which supports the personal needs of homeless people, shows how ubiquitous smartphones have become.

• Healthcare systems are beginning to exploit the potential of smartphones. The Surrey Telehealth Project,¹ for example, seeks to help patients remain at home, rather than in the hospital, for as long as possible with the support of health technologies. The initiative aims to encourage greater self-care in patients by providing them with mobile phones.

• The interfaces of smartphones and health apps do have to improve, though, to become more readily usable by older people and people with a disability.

How can regulators keep up with changes in society?

• Attempts should be made to ‘future proof’ legislation during the drafting process (perhaps through consultation with relevant health stakeholders). For example, if patients and the public shift from primarily using smartphones for the management of their apps to tablets, the legislative framework should be able to cope with the change, and not be made largely obsolete by it. The forward-looking approach should not merely be limited to the drafting of legislation; it should also be employed in the writing of certification schemes, guidelines, and industry standards—all of which will become increasingly important to the world of health apps.

• One problem with trying to future proof legislation, though, is that many healthcare stakeholders (such as health professionals) are not up to the task of giving worthwhile advice. Far from being in a position to accurately predict the impact of future technologies, health professionals, for instance, are not even up to date with today’s developments in health apps. Another difficulty is that future proofing can hardly be seen as an inevitable prospect if

EU Member States do not always wish to work together in harmony on certain topics.

- App developers, too, face difficulties with the future. Not only do many developers have little idea about whether a CE marking is necessary [for an explanation of CE marking, see page 22], but by the time CE marking is attained, the app and its contents might have moved on. App developers, in short, feel that laws and guidelines governing health apps are opaque. Grey areas clearly exist between health apps that are non-CE, and those which are CE-marked (that is, medical devices).
- Advice as to which app constitutes a medical device are provided both by the EU and by national regulatory bodies (an example of the latter is the UK’s Medicines and Healthcare products Regulatory Agency, MHRA).
- However, the European Commission’s Directorate General for Communications Networks, Content and Technology (DG CONNECT) is interested in the great majority of non-CE-marked apps being regarded as trustworthy. The question is: how can that be achieved?
- The EU wants to encourage innovators, and not let regulation and red tape stifle the process of creativity.
- An innovation explosion is currently occurring within the health-app arena in Europe. But apps cannot be considered socially innovatory if they cannot be manufactured, replicated, or find a market.

Mike Short concluded the seminar by saying that he believed the meeting should be repeated as an annual event.
### Appendix I: Seminar attendees

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<tr>
<th>Name</th>
<th>Position/Title</th>
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<tbody>
<tr>
<td>Roy Trevelyan</td>
<td>Patient Representative (arthritis)</td>
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<td>Richard Dikstra</td>
<td>Director</td>
<td>Belle Media</td>
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<tr>
<td>Justin Holloway</td>
<td>Software Engineer</td>
<td>Biotelligent Ltd</td>
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<tr>
<td>Ben Underwood</td>
<td>Dentist and App Developer</td>
<td>BrushDJ.com</td>
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<tr>
<td>Risikatu Olaribigbe</td>
<td>Mentor</td>
<td>Built-IT</td>
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<tr>
<td>Oli Rayner</td>
<td>Special Adviser, Research and Patient Involvement</td>
<td>Cystic Fibrosis Trust</td>
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<tr>
<td>Karen Taylor</td>
<td>Director, Centre for Health Solutions</td>
<td>Deloitte UK</td>
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<tr>
<td>Céline Deswarte</td>
<td>Policy Officer, Health and Wellbeing</td>
<td>DG CONNECT</td>
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<tr>
<td>Carey Cameron</td>
<td>Executive Director</td>
<td>DigitalmC2.com</td>
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<td>Monica Fletcher</td>
<td>Chief Executive</td>
<td>Education for Health</td>
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<tr>
<td>Per Johansson</td>
<td>Legal Officer</td>
<td>European Data Protection Supervisor (EDPS)</td>
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<tr>
<td>Alessandro Spina</td>
<td>Data Protection Officer</td>
<td>European Medicines Agency</td>
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<td>Sophie Crousse</td>
<td>Vice President, European Public Affairs Consumer Healthcare</td>
<td>GSK</td>
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<tr>
<td>Pat Walshe</td>
<td>Director, Privacy and Public Policy</td>
<td>GSM Association</td>
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<tr>
<td>David Cox</td>
<td>Chief Medical Officer</td>
<td>Headspace</td>
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<tr>
<td>Elizabeth Ball</td>
<td>[No details]</td>
<td>Headspace</td>
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<tr>
<td>David Dowe</td>
<td>Delivery Manager</td>
<td>ICT Knowledge Transfer Network</td>
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<tr>
<td>Cosima Gretton</td>
<td>Strategic Partnerships Manager</td>
<td>iHelp World Ltd</td>
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<tr>
<td>Geraint Barton</td>
<td>Bioinformatics Software Developer and Data Analyst</td>
<td>Imperial College London</td>
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<tr>
<td>Judicaelle Hammond</td>
<td>MBA student</td>
<td>Imperial College London</td>
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<tr>
<td>Marco Pisano</td>
<td>Programme Manager</td>
<td>Intellect UK</td>
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<tr>
<td>David Webber</td>
<td>Director</td>
<td>International Self-Care Foundation</td>
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<tr>
<td>Giles Ellison</td>
<td>Account Manager</td>
<td>IRIS Software Group</td>
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<tr>
<td>Piet Knaepen</td>
<td>Senior IT Manager, DIGITAL</td>
<td>Janssen EMEA</td>
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<td>Nancy Nackaerts</td>
<td>Director, Communications EMEA</td>
<td>Janssen Pharmaceutica NV</td>
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<td>Graham Tyrrell</td>
<td>Head of Digital</td>
<td>Maggie’s Cancer Centres</td>
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<tr>
<td>Caroline Howes</td>
<td>CEO and Founder</td>
<td>Memory Lane Games</td>
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<tr>
<td>André Tomlin</td>
<td>Managing Director and Founder</td>
<td>Minervation Ltd</td>
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<tr>
<td>Roger Pebody</td>
<td>Editor</td>
<td>NAM/aidsmap</td>
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<tr>
<td>Liza Ball</td>
<td>Consultant</td>
<td>NHS</td>
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<td>Frederick Lee</td>
<td>Patient Representative</td>
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<td>Clive Nead</td>
<td>Editorial Director</td>
<td>PatientView/myhealthapps.net</td>
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<td>Henry Nead</td>
<td>Associate</td>
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<td>Tony Newbold</td>
<td>Consultant</td>
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<td>Dee O’Sullivan</td>
<td>EU Affairs Associate</td>
<td>PatientView/myhealthapps.net</td>
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<td>Alex Wyke</td>
<td>CEO</td>
<td>PatientView/myhealthapps.net</td>
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<td>Charles Elliot</td>
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<td>Prestige Group</td>
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<td>Charles Lowe</td>
<td>President, Telemedicine and eHealth Section</td>
<td>Royal Society of Medicine</td>
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<td>Amanda Smith</td>
<td>Managing Director</td>
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<td>Péteris Zilgalvis</td>
<td>EU Visiting Fellow</td>
<td>St Antony’s College, Oxford</td>
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<td>Julian Wakeley</td>
<td>Head of Interactive, EMEA and Asia Pacific</td>
<td>Sudler &amp; Hennessy</td>
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<td>Tom Fiddian</td>
<td>Lead Technologist</td>
<td>Technology Strategy Board</td>
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<td>Charles Henderson</td>
<td>Management Consultant, Assisted Living Innovation Platform Interop</td>
<td>Technology Strategy Board</td>
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<td>Mike Short</td>
<td>Vice President (Telefonica Europe), and Chair (ICT KTN)</td>
<td>Telefonica Europe/ICT KTN</td>
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<td>Swapnil Gadgil</td>
<td>Director</td>
<td>Therapy Box</td>
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<td>Kasia Zawadzka</td>
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<td>Eirini Zafeiratou</td>
<td>Head, EU Affairs, and Managing Director</td>
<td>Vodafone Belgium</td>
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Appendix 2: Biographies of speakers and chairs

Sophie Crousse
Sophie is GSK’s Vice President Public Affairs Consumer Healthcare Europe. She established Consumer Healthcare’s Public Affairs function in July 2006. As a member of the European Leadership team, she leads the Public Affairs Consumer Healthcare department in Brussels to deliver integrated public affairs activities. By focusing on the most important stakeholders that influence GSK consumers’ environment, she creates a positive landscape to build trust, support business objectives and growth in Europe. For six years previously, she was Associate General Counsel for GSK Legal Operations Europe.

Sophie studied in Belgium and the UK, gaining an LLM from the University of London. Prior to joining GSK as Legal Counsel in 1998, she developed her legal skills in various management positions, in Belgium and in other countries. She came to GSK from a position as Senior Associate with a Brussels-based law firm.

Céline Deswarte
Céline is Policy Officer, Health and Well-Being Unit of DG CONNECT (Communications Networks, Content and Technology), European Commission. She qualified as a lawyer in France in 2005, and holds a Master II Degree in European Institutional Law, and a Master II Degree in Public Law of the Economy from the University of Paris Panthéon Assas. She speaks French, English, Spanish and Italian.

Monica Fletcher OBE
Monica was appointed Chief Executive of Education for Health (formerly National Respiratory Training Centre) UK and US in February 2001. Among her many other professional roles, she chairs the European Lung Foundation (ELF) and has a particular interest in PPI. After training and working as a registered nurse and health visitor, Monica gained a BSc (Hons) in nursing and then went on to an MSc in Healthcare Management and Policy at Birmingham University. Prior to joining Education for Health, she was Co-Director of Primary Care, NHS Executive London from 1999-2001 and Director of Primary Care, Tower Hamlets Healthcare Trust, from 1996-1999; She was awarded an OBE in 2013 for her services to nursing and nurse education.

Per Johansson
Per is Legal Officer, Secretariat, European Data Protection Supervisor (EDPS), based in Brussels, Belgium. He holds a Master of Swedish Law from the University of Gothenburg, and a Postgraduate Diploma in European Law from the University of Saarland, Germany. He started his career in the Swedish courts as a trainee judge before arriving in Brussels for a traineeship at the European Commission. After working as an EU Consultant for five years, he rejoined the European Commission, where he spent three years, before joining the EDPS Policy and Consultations Unit in November 2011.

Piet Knaepen
Piet is an IT professional with more than 10 years of experience in digital healthcare. His career started with Merck, Sharpe & Dohme, in the team of innovators who created a successful internet portal for healthcare professionals in EMEA: univadis. Piet has been with Janssen for five years as Senior IT Manager, responsible for IT DIGITAL within Janssen EMEA. He manages a team who work with their Janssen EMEA Business Partners to consult on digital initiatives, helping to reach business objectives. Besides cooperating with the EMEA Business Partners, the team plays a Centre-of-Excellence role towards all countries across the EMEA region. The delivery and support of all Janssen DIGITAL initiatives is managed by a team of 25-plus Drupal developers. Janssen EMEA has delivered over 50 mobile apps to the market, for healthcare professionals, and for the general public alike. A rigorous process is in place to ensure quality in all of Janssen’s mobile apps.
Charles Lowe
Charles ran the London Borough of Newham's Assistive Technology programme for four years, during which time 3,000 people had telecare installed, and the borough began telehealth implementation after winning Whole System Demonstrator status. In 2008, Charles joined Telehealth Solutions Ltd as product manager, initiating new products, and assisting customers with implementing telehealth. In December 2011, he was recruited by Surrey County Council on a fixed-term contract, now ended, to manage the mainstreaming of their telecare service, and to establish a telehealth programme. Charles previously chaired the TAHI Assistive-Living Working Group, is an Expert Reviewer for the EC, a Contributing Editor to http://www.telecareaware.com, and is President of the Royal Society of Medicine's Telemedicine and eHealth Council. He also chairs Citizens Online, a charity specialising in digital inclusion.

Tony Newbold
Tony develops tools and materials to help healthcare professionals and other healthcare stakeholders work effectively with patients and their carers. He specialises in translating medical messages and science into targeted support, to drive health behavioural change in patients. He has more than 20 years of experience creating international patient-support materials for diverse medical conditions (including ADHD, end-stage renal disease, ITP, osteoporosis, and type-2 diabetes). As a non-medic, he challenges patient-support projects to push for materials that are meaningful and useful for patients, carers and other stakeholders.

Oli Rayner
Oli is the Cystic Fibrosis Trust's Special Adviser on Research and Patient Involvement, building on his own experience of living with cystic fibrosis and taking part in clinical research. He focuses on enhancing the involvement of people with the condition in research, in line with the Trust's five-year research strategy. After graduating in Law (including studies in medical ethics) from University College London, he spent 12 years working in investment banking and venture capital, advising fast-growing companies in the media, technology, life sciences and renewable-energy sectors. Oli has recently had to step back from full-time work to prioritise his personal healthcare, but is still involved in a number of initiatives, including as consumer referee for the Cochrane Cystic Fibrosis and Genetic Disorders Group, which carries out systematic reviews of the evidence available to support current treatments, and as author of a regular column on drug development and clinical research for CFUnite.org. In June 2013, Oli was selected by EURORDIS (Rare Diseases Europe) to attend their highly-regarded Summer School for Patient Advocates in Drug Development, Clinical Trials and Regulation.

Dr Mike Short CBE
Mike's career spans 39 years in electronics and telecommunications, covering technology, innovation and public policy—particularly in mobile communications. After running design and manufacturing for subsidiaries of Philips Industries, and then Landis and Gyr, he joined BT in 1983, and was appointed in 1989 as a Director of Cellnet (now part of Telefónica and branded O2 UK) to launch Digital 2G (or GSM) mobile networks. He later went on to run the 3G business case, and launch 3G in the UK. He has served as a member of the UK Home Office Internet Task Force, Home Access to Broadband Committee, the UK Government Trade and Investment ICT sector advisory board, and its advisory committee on London 2012. He was Chairman, global GSM Association in 1995, and then a Board member until 2002; and chaired the UK Mobile Data Association from 1998-2008. From 2007-2013, he was a board member of UK Council for Child Internet Safety, and an IET Trustee (elected IET President 2011/2012). He was also elected to the Board of ETSI for 3 years, 2011-14, and has chaired the TSB-backed ICT Knowledge Transfer Network since 2007. Mike's Telefónica focus today is on European public policy as it relates to innovation—whether research, the responsible use of mobiles, or new business development. Included is a focus on advanced mobile services and data applications, including mobile learning, smart metering, transport telematics, and connected healthcare. He chairs ICT KTN, and is a Visiting Professor at Surrey, Leeds, and Lancaster universities; a Fellow of the Royal Academy of Engineering; and a Member of the Royal Television Society. In June 2012, he was awarded a CBE for 25 years of service to the mobile industry.
Karen Taylor OBE
Karen was appointed Director of Deloitte UK’s new Centre for Health Solutions in November 2011. The Centre's objectives are to: develop ideas, innovations and insights that encourage collaboration across the health-value chain; connect the public and private sectors, health providers and purchasers; and connect consumers and suppliers. She and her small research team have published four healthcare reports: *Primary Care Today and Tomorrow; Healthcare for the Homeless; Telehealth and Telecare; and Improving Access to Early Diagnosis*. She has also published two reports on subjects relevant to the life-science industry: *Measuring the Return from Pharmaceutical Innovation*, and *The Impact of Austerity on Pharmaceutical Policy and Pricing*. Karen is currently working on reports on improving services for the frail elderly, and on end-of-life care. She is a member of the Institute of Chartered Public Finance Accountants, and was, until January 2011, the Director of Health Value-for-Money (VFM) Audit at the UK’s National Audit Office, where she spent 13 years investigating whether the Department of Health and other NHS bodies were using resources in an economic, efficient and effective manner. Karen received an OBE in 2002 for her work on Health VFM work. She is a Non-Executive Director at Dartford and Gravesham NHS Trust, where she is Chairman of the Board’s Quality and Safety Committee.

André Tomlin
André is Managing Director of Minervation, an evidence-based healthcare consultancy that he set up with business partner Douglas Badenoch in 2002. He has been designing and building health websites for patients and professionals since the late 1990s, and has established interests in blogging, EBM, information science, mobile technology, social media, usability, and web design. André launched the Mental Elf (http://www.thementalelf.net) in 2011, to help health- and social-care professionals keep up to date with the latest reliable mental health research. The immediate success of this website inspired the creation of 7 other health-oriented ‘elves’, which have been combined into the National Elf Service. The elves aim to help professionals engage with research, by bringing them nuggets of information on a daily basis. The content is evidence-based, but easy to read, and presented through memorable and approachable design.

Patrick Walshe
Pat is responsible for the work on privacy conducted in the Public Policy Department of the GSM Association (GSMA). The GSMA represents the interests of the worldwide mobile communications industry, spanning 219 countries, and uniting nearly 800 of the world’s mobile operators, as well as more than 200 companies in the broader mobile ecosystem (including entertainment organisations, equipment providers, handset makers, Internet companies, the media, and software companies). The Association’s members represent more than 4.5 billion GSM and 3GSM connections. Pat is currently cooperating with GSMA members and other key stakeholders to establish dialogue and to explore ways to shape (collaboratively and collectively) the way that privacy is advanced, managed and protected across the mobile ecosystem. He has over 15 years of experience in data privacy, interception law, and regulatory policy in the fixed, mobile and Internet sectors. He has represented industry on a number of privacy matters to various regulatory and international public-interest groups. Pat has a degree in Social Anthropology and Development, and holds privacy and information security audit qualifications. He has served on the International Standard Organisation’s Privacy Steering Committee, and is a member of the British Computer Society.
Dr Alexandra Wyke
Alex is CEO and Founder of PatientView, a UK-based research, publishing and consultancy group. PatientView has worked to build bridges worldwide with the health NGOs that comprise the patient movement, to help define and support one of the most important phenomena changing healthcare in the 21st century. The patient movement grows continually in numbers and scale of influence. PatientView has the capacity to reach out to 120,000 such health NGOs (covering over 1,000 specialties, and from most countries in the world). PatientView is the publisher and owner of myhealthapps.net. Alex’s recent publications include: The Future of Healthcare, published by the Economist Intelligence Unit (EIU) in March 2011, and sponsored by Janssen; and the first European Directory of Health Apps, published in 2012. From 1996 to 2000, Alex was responsible for creating and running the EIU's international healthcare publishing unit. She was previously business and science correspondent for The Economist. Alex continues to write for the EIU. She was elected by the BBC in 1996 to participate in a small team assessing the Corporation's radio and TV coverage on science and technology. As well as lecturing, presenting and chairing healthcare forums worldwide, Alex also sits on the advisory board of the healthcare initiative of INSEAD management school Paris, and has worked for television and radio, appearing in an expert capacity on several programmes. She has a PhD in biochemistry from St George's Medical School, London. She is married, with one son. Alex can be contacted on alexwyke@patientview.com.

Eirini Zafeiratou
Eirini is Managing Director of Vodafone Belgium, and heads the Vodafone Group's representation to the EU. Prior to joining Vodafone, Eirini held various roles in the telecoms industry, and was Director of GSM Europe Brussels, the European interest group of the GSM association, and Legal Adviser at ETNO, the fixed telecoms association. Eirini is a Greek lawyer, trained in European and telecommunications law in Athens, and in Saarbrücken University of Saarland, Germany.

Dr Pēteris Zilgalvis JD
Pēteris is EU Visiting Fellow at St Antony’s College, Oxford. He is currently on sabbatical from his role as Head of Unit, Health and Well-Being, DG Communications Networks, Content and Technology (CNECT), European Commission. Prior to that, he was Head of Unit, ICT for Health, Directorate ICT, addressing Social Challenges, Information Society and Media Directorate General (INFSO). Earlier, he was Head of Unit, Infectious Diseases and Public Health, in the Health Research Directorate. From 2005 until 2010, he was Head of the Governance and Ethics Unit, Directorate Science, Economy and Society at DG Research, European Commission. From 1997 to 2005, he was Deputy Head of the Bioethics Department of the Council of Europe, in its Directorate General of Legal Affairs. Pēteris has held various positions in the Latvian civil service (Ministry of Foreign Affairs, Environment). He was Senior Environmental Law Advisor to the World Bank/Russian Federation Environmental Management Project, and was Regional Environmental Specialist for the Baltic Countries at the World Bank. He studied political science (cum laude) at the University of California, Los Angeles. He obtained his JD (Doctor of Jurisprudence) at the Law Centre of the University of Southern California, received the Darling Foundation academic scholarship, and completed the High Potentials Leadership Program at Harvard Business School. He is a member of the California State Bar. Pēteris has published over 30 publications on bioethics, economics, European and environmental law in English, Latvian, and French.
Appendix 3: Information about the partners of myhealthapps.net

The European Health Forum Gastein (EHFG) was founded in 1998 as a European health-policy conference, with the aim of providing a platform for discussion for the various stakeholders in the field of public health and healthcare.

Since then, the EHFG has developed into a key annual event, bringing together politicians, senior decision-makers, representatives of interest groups, and experts from government and administration, business and industry, civil society, and science and academia. These four sections of healthcare stakeholders and their perspectives constitute the four pillars of the EHFG.

The EHFG further considers the vertical organisation of societies and the EU by integrating regional, national, European and international levels, and thus facilitating the exchange of views and experience among key actors and experts from the 27 EU Member States and the EEA countries, and also from the rest of the 52 countries of the WHO European region. Launched with major financial support from the European Commission, subsequent events have grown with the continued and extended co-operation of Commission services. In that regard, the Forum can be considered as a pilot project and benchmark for any Commission civil-society consultation process.

http://www.ehfg.org/home.html
GSK is a science-led global healthcare company that researches and develops a broad range of innovative medicines and brands. Its products are used by millions of people around the world, helping them to do more, feel better and live longer. GSK has three primary areas of business: consumer healthcare, pharmaceuticals, and vaccines. The company’s commercial success depends on creating innovative new products, and making them accessible to as many people who need them as possible. By achieving this, GSK can grow its business, and provide benefits to consumers, employees, patients, shareholders—and society itself.

GSK has wide geographical reach beyond its headquarters in the UK. The company has offices in more than 115 countries, major research centres in Belgium, China, Spain, the UK, and the USA, and an extensive manufacturing network of 87 sites globally.

Research is vitally important to the success of GSK’s business, and the company spent just under £4 billion in 2012 in a search to develop new medicines, vaccines, and innovative consumer products. GSK is one of the few healthcare companies researching medicines and vaccines for the World Health Organisation’s three priority diseases of HIV/AIDS, malaria, and tuberculosis.

**Consumer Healthcare**

The GSK consumer healthcare business develops and markets a range of consumer health products based on scientific innovation. The company has leading positions in four main healthcare categories: nutritional; oral care; skin health; and total wellness. Well-known GSK brands in these subject areas include Horlicks, Panadol, and Sensodyne.

**Pharmaceuticals**

The GSK pharmaceuticals business researches, develops, and makes available medicines that treat a variety of serious and chronic diseases. The company has medicines that are available (or in development) in a wide range of disease areas, including: asthma; cancer; chronic obstructive pulmonary disease (COPD); epilepsy; heart disease; HIV/AIDS; and infectious diseases.

**Vaccines**

The GSK vaccine business is one of the largest in the world, with nearly 900 million doses distributed to 170 countries in 2012. The company produces paediatric and adult vaccines to prevent a range of infectious diseases, including: hepatitis A and B; bacterial meningitis; diphtheria; influenza; measles, mumps and rubella; polio; tetanus; typhoid; and whooping cough.

http://www.gsk.com
Janssen

In healthcare, there is no time to waste. Diseases wait to be treated, medicines to be developed, and lives to be enhanced and transformed. At the Janssen Pharmaceutical Companies of Johnson & Johnson, we focus on some of the most devastating diseases, and the most complex medical challenges of our time, across the following five therapeutic areas:

- cardiovascular and metabolism;
- immunology;
- infectious diseases and vaccines;
- neuroscience;
- oncology.

Janssen companies employ nearly 40,000 people in more than 150 countries around the world. We work within and beyond our communities, globally, to bring innovative treatments for serious unmet medical needs. We make extraordinary efforts to help people enjoy ordinary moments.

Today’s medical challenges are more complex than ever before. That is why we never limit the search for new medicines to our own four walls. We look at the world as our lab, seeking innovative ideas wherever they occur. We believe in connecting our own expertise and capabilities with those of others, seeking the most creative minds in every field. Together, we can solve problems, and find transformational solutions. At Janssen, we collaborate with the world for the health of everyone in it.

Yet it is not just about finding new treatments. We look at medical challenges in a broader context. We go beyond the medicine, ensuring that people have the education, information, and support to access the treatments they need, and to use them correctly, for the best-possible results. Helping people live full and happy lives inspires us. And promising new science and technology spur us on.

It all comes back to our commitment to collaboration, in research and education, and all the way to patient access. We will not stop until new ideas turn into medical solutions for patients in need.

http://www.janssen-emea.com
The main aim of NHS England is to improve the health outcomes for people in England. We believe the new approach we are taking will make a difference, and deliver the improved health outcomes we all want to see. Central to our ambition is to place the patients and the public at the heart of everything we do. We are what we want the NHS to be—evidence-based, inclusive, open, and transparent about the decisions we make, the way we operate, and the impact we have.

We encourage patient and public participation in the NHS, treat them respectfully, and put their interests first. This allows us to develop the insight to help us improve outcomes, guaranteeing that no community is left behind or is disadvantaged.

We empower and support clinical leaders at every level of the NHS, through clinical-commissioning groups (CCGs), networks and senates, in NHS England itself, and in providers, helping them to make genuinely informed decisions, spend the taxpayers’ money wisely, and provide high-quality services.

Engaging with our staff is equally important to us, too. Our staff are what makes NHS England an excellent organisation: an exemplar in creativity, customer focus, professionalism, and rigour. Grounded by the values and principles of the NHS Constitution, we are an organisation that shares ideas and knowledge, successes and failures, and listens to each other carefully and thoughtfully.

**Health Apps Library**

The first iteration of the Health Apps Library was launched in March 2013. It aims to simplify the way people find safe and trusted apps to manage their health. All apps in the library have been reviewed by the NHS, to ensure that they are clinically safe and relevant to people living in England.

Since the launch, the apps library has doubled in size, and will be part of the wider Health and Social Care Digital Service.

[http://www.england.nhs.uk](http://www.england.nhs.uk)
Novo Nordisk, headquartered in Denmark, is a global healthcare company with 90 years of innovation and leadership in diabetes care. The company also has leading positions within haemophilia care, growth hormone therapy and hormone replacement therapy. Novo Nordisk strives to conduct its activities in a financially, environmentally and socially responsible way. The strategic commitment to corporate sustainability has brought the company onto centre stage as a leading player in today’s business environment, recognised for its integrated reporting, stakeholder engagement and consistently high sustainability performance.

At Novo Nordisk, we are changing diabetes by promoting a better informed, more supporting environment for people with diabetes. We act on the need for care beyond treatment based on the attitudes, wishes and needs of people living with diabetes. By engaging a broad range of stakeholders in improving person-centred education and support, we empower people with diabetes to overcome the barriers to effective self-management.

http://www.novonordisk.com
Telefónica is one of the largest telecommunications companies in the world in terms of market capitalisation and number of customers. From this outstanding position in the industry, and with its mobile, fixed and broadband businesses as the key drivers of its growth, Telefónica has focused its strategy on becoming a leading company in the digital world. Telefonica has a significant presence in 24 countries, and a customer base that amounts to close to 316 million accesses around the world. Telefónica has a strong presence in Spain, Europe and Latin America, where the company focuses an important part of its growth strategy.

Telefonica Digital’s mission is to seize the opportunities within the digital world and deliver new growth for Telefónica through digital services, global partnerships, research and development, and venture capital—such as cloud computing, eHealth, mobile advertising, and ‘machine to machine’ (M2M). It is also driving innovation in over-the-top communications under a new umbrella brand called TU, and in big data through Telefónica Dynamic Insights. Telefónica Digital will deliver these new products and services to Telefónica’s global customers, as well as entering new markets. It is headquartered in London, with regional centres in Silicon Valley, Sao Paulo, Spain and Tel Aviv. Axxismed, Eleven Paths, giffgaff, Jajah, Media Networks Latin America, and Terra are all managed under the Telefónica Digital umbrella.

O2 is the commercial brand of Telefónica UK Limited, and is a leading communications company with over 23 million customers. O2 runs 2G and 3G networks, and was the first to pilot 4G/LTE, reaching speeds of over 100Mbps, as well as owning half of Tesco Mobile. It also operates O2 Wifi, O2 Health, O2 Unify, O2 Media, and has recently launched the O2 Wallet. O2 employs over 11,000 people in the UK, has 450 retail stores, and sponsors The O2, O2 Academy venues, and the England rugby team.

Telefónica UK Limited is part of Telefónica Europe plc, which uses O2 as its commercial brand in the Czech Republic, Germany, Ireland, Slovakia, and the UK, and is a business division of Telefónica SA.

http://www.telefonica.com
Vodafone is one of the world’s largest mobile communications companies, with over 409 million customers across more than 30 countries, five continents, and more than 50 partner networks worldwide. In the European Union, Vodafone has operations in 12 countries, and partnerships in the rest. We have around 150 million customers across the EU. We are one of the biggest investors in many of the countries in which we operate. We are a major provider of employment worldwide, and we are a global innovator, developing the infrastructure and technologies that shape how millions of people manage their daily lives.

Our strategy is driven by a focus on four key growth areas: emerging markets; enterprise; mobile data; and new services.

Emerging markets
Mobile changes lives. It also transforms societies and economies: a 10% increase in mobile penetration equates to a 1.2% increase in GDP. Our networks provide coverage to more than 80% of the Indian population, 99% of the Egyptian population, and 99% of the South African population—more than 1.1 billion people in those three countries alone. Vodafone has invested more than £8 billion in deploying networks in emerging markets in the last four years. For millions of people in those countries, a mobile phone is a passport out of poverty. It is many things, including: a bank account; the front door to a micro-business; a farmer’s gateway to higher market prices for crops; and a lifeline for an isolated woman in a distant village. For example, in 2007, we invented the M-Pesa money transfer service, and launched it in Kenya. Five years later, Kenyans now transfer around $25m each day via M-Pesa, between people who were previously financially excluded from conventional banking, and vulnerable to corrupt middlemen.

Enterprise
We are living through an economic, generational, and technological transformation in the way people work. By 2015, it is estimated that more than one third of the global workforce (1.3 billion people) will work remotely. The productivity gains and cost-efficiencies are significant: mobile working is estimated to reduce companies’ travel and property costs by up to 40%. The environmental benefits of remote working are also substantial. To give an example from our own business, Vodafone Netherlands’ mobile working policy has led to a 25% reduction in emissions from employee commuting—a carbon-saving equivalent to a return flight from Amsterdam to Milan for every employee.

New services
We are also a global pioneer in the development of new types of mobile service, such as ‘machine to machine’ (M2M) technology (the ‘Internet of things’), which connects and controls a wide range of devices and equipment through intelligent networks without human intervention. For example, the use of simple M2M-enabled remote patient-monitoring devices allow people to stay at home, rather than in hospital. M2M is predicted to grow exponentially; total market value could reach an estimated $700 billion by 2020.

Mobile data
The world is going wireless. In 2011, sales of smartphones and tablets overtook personal computers, with global sales of 1.6 billion and 66.9 million respectively. For millions of people, the mobile Internet is the Internet. Every year, Vodafone invests around £6 billion in the networks which deliver a high-quality mobile data experience for our customers around the world.

The Vodafone Foundation
Vodafone also recognises our broader responsibility to society as a whole through our work with the Vodafone Foundation, which has disbursed more than a third of a billion pounds to partner charities over the past 20 years. One particular highlight of this initiative is the Moyo project in Tanzania, which cures women of a debilitating postnatal condition, obstetric fistula. Moyo was launched through charitable giving by Vodafone employees, and is on course to treat all affected Tanzanian women by 2015, with funding for prevention in future.

http://www.vodafone.com/eu
**Seminar partners**

**Minervation Ltd** is an evidence-based healthcare consultancy and web design agency that has been building award-winning websites for charities, companies, and the NHS for over a decade.

Founders André Tomlin and Douglas Badenoch share interests in blogging, evidence-based healthcare, high-quality health information, mobile development, patient-and-public involvement, social media, usability, and web design.

Their belief is that information about healthcare must be:

- accessible—easily, where and when it is required;
- reliable—based on the best-quality evidence; and
- usable—relevant to the needs of the user.

Minervation recently launched the National Elf Service (http://www.nationalelfservice.net), a set of evidence-based websites aimed at health- and social-care professionals.

André Tomlin manages the Mental Elf site, which has spawned a successful mobile app: http://www.thementalelf.net/app.

http://www.minervation.com

**ICT Knowledge Transfer Network.** Funded by the UK’s Technology Strategy Board (TSB), the ICT Knowledge Transfer Network supports the ICT sector in the UK by delivering events and thought leadership on areas of interest to the sector, and by working with other knowledge-transfer networks to facilitate cross-sector interaction. It seeks to help improve UK industrial performance by facilitating the development and take-up of information-and-communications technologies, encouraging their adoption as key enablers in industry.

https://www.innovateuk.org/-/knowledge-transfer-networks