

EPHA Briefing on mobile Health (mHealth)

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INTRODUCTION

The use of mobile and wireless technologies to support the achievement of health objectives (mHealth) has the potential to transform the face of health service delivery (...) A powerful combination of factors is driving this change. These include rapid advances in mobile technologies and applications, a rise in new opportunities for the integration of mobile health into existing eHealth services and the continued growth in coverage of mobile cellular networks.¹

To date, no standardised definition of mHealth has been established. According to the National Institution of Health in the United States, it can be defined as ‘using mobile and wireless devices to improve health outcomes, healthcare services and health research’.² It is a subcomponent of the larger discipline of eHealth³, which in turn describes the use of Information and Communication Technologies (ICT) for health purposes. Due to its wider accessibility via mobile devices – especially smartphones and self-monitoring gadgets -, mHealth is a key emergent area in health today.⁴ It includes solutions for direct care provision in health services, real-time monitoring of patients’ conditions, the provision of healthcare information to health professionals, patients and researchers, and it can support public health, e.g. by collecting community and clinical health data,

As stressed on the European Commission’s *Digital Agenda for Europe* website, ‘mobile health doesn’t focus exclusively on the device, but on the fact that the information and data is mobile (...) The information is able to be collected wherever it is needed and transmitted wherever it needs to go’.⁵ A commercially lucrative sector with global reach, mHealth could become an important growth market under the Digital Agenda⁶, as evidenced by hundreds of smartphone ‘apps’ placed on the market every week,

But mHealth’s adaptability and faculty to provide information ‘on the go’ also poses new challenges for healthcare. The Commission’s eHealth Action Plan 2012-2020, rightly declares that ‘(...) such applications potentially offer information, diagnostic tools, possibilities to ‘self-quantify’ as well as new modalities of care. They are blurring the distinction between the traditional provision of clinical care by physicians, and the self-administration of care and wellbeing.’⁷ While the extent of its impact on health systems is difficult to predict, mHealth is set to play a role in renegotiating the relationship between health professionals and patients. In so doing it triggers ethical questions about who is steering and managing health, and what this means for society.

¹ WHO (2011), [mHealth. New horizons for health through mobile technologies](#)

² See <http://www.hrsa.gov/healthit/mhealth.html>

³ [EPHA Briefing on eHealth](#)

⁴ See <http://www.who.int/goe/en/>

⁵ European Commission, 12/2012. [The “Mobile” in “Mobile Health” Isn’t the Gadget; It’s the Data.](#)

⁶ [EPHA Briefing on the Digital Agenda for Europe](#)

⁷ COM(2012) 736 final, eHealth Action Plan 2012-2020 – Innovative healthcare for the 21st century

Crucially, while mHealth holds potential for improving access to healthcare services and mitigating health inequalities, it cannot substitute face-to-face contact. Like other eHealth solutions, it is best deployed as a complementary tool for the benefit of end users. Provided that the challenges described below can be overcome, it can help improve quality and continuity of care⁸, *inter alia* by facilitating elements of healthcare provision and remote monitoring, allowing cross-border and interregional collaboration between health institutions and professionals, and providing more user-friendly and comprehensible ways for different categories of patients to manage health, including disadvantaged groups in need of 'tailored' support.

Recent developments in healthcare

In the majority of EU Member States healthcare systems are in need of reform as a result of budget squeezes and workforce shortages, coupled with ageing populations and the simultaneous rise in chronic diseases. In the absence of political prioritisation, the public sector is forced to save healthcare costs while trying to cater to an increasingly diverse clientele demanding quality services. Hence policy makers are looking to foster innovation and efficiency in healthcare delivery.

Many patients and older people also wish to be more engaged in their own care. In order to take advantage of personalised treatment regimes they require information and state-of-the-art technology. In this regard, mHealth can offer customised 'toolkits' for predictive, participatory and preventive care.

While arguably, Europeans are becoming more informed about health thanks to online information, individual circumstances regarding access to technology, as well as competences regarding ICT use and applying health knowledge, still differ greatly between social groups, regions and Member States. About a quarter of Europeans have never used the Internet⁹, and there are significant differences between Member States when it comes to computer access at home and on mobile devices¹⁰. Those who use eHealth regularly, confidently and efficiently can be more aware of the treatments options, medicines and medical devices¹¹ available to them. In stark contrast, most people struggle with various literacy problems, and lack of support and empowerment can lead to misunderstandings when putting online information into context, and to inaccuracies when applying it to health decision-making. For example, self-diagnosis and treatment based on data derived from mobile technologies can be harmful if findings are not discussed with qualified health professionals. The challenge is to find the right balance between conventional and ICT-enabled healthcare that can support the work of health professionals while empowering patients and expanding their (e)health literacy.

That said, the foundations for the digitalisation of healthcare are already well in place – electronic health records (EHR) and wireless communication and reporting devices are commonplace in many EU Member States. While health professionals may not always easily embrace new technology, they share the hope of many patients that it can make routine tasks easier.

⁸ [EPHA Position on the eHealth Action Plan 2012-2020](#) (May 2011)

⁹ See [Internet use in households and by individuals in 2012](#), Eurostat 50/2012

¹⁰ *Ibid.*

¹¹ For more information on the revision of the medical devices legislation, see [EPHA Briefing on Medical Devices](#)

mHealth applications

Currently mHealth can fulfil a number of different functions, many of which have been implemented in the developing world where mobile phones are fundamental due to the absence of conventional health system technologies.

Indeed the ability to perform simple tasks, such as sending reminders by text for ensuring treatment compliance (e.g., patients receiving SMS messages about the correct time and way of taking a medicine) and keeping medical appointments, is one of the strengths of mHealth. At the same time, sophisticated technologies merging the intricate features of eHealth and medical devices provide the backbone for functions involving real-time remote monitoring and transfer of patient data in outpatient settings, e.g. for managing chronic diseases. A connected function concerns supporting health information systems and providing point-of-care support. Moreover, broader aims in support of public health management, e.g. data collection and disease surveillance to control pandemics, can be achieved.

Some specific examples (including wireless health and electronic care solutions) include the following, which testify to the increased convergence of health technologies and tools¹²:

- **Medical devices acting as remote patient monitors** – used in clinical, home, mobile & other environments
- **Software applications** allowing patients to upload or download health information at any time
- **Clinical body area network sensors** for wireless capture and forwarding of physiological data for further analysis
- **Medical implants** for neuromuscular micro-stimulation techniques: used in order to restore sensation, mobility & other functions to paralysed limbs and organs
- **Medical device data systems** allowing the transfer, storage, conversion or display of medical data through wired or wireless hubs, smartphones or broadband enabled products.
- **Mobile diagnostic imaging applications** making it possible for doctors to send or review medical images from virtually any place and at any time
- **Patient care portals** which can be accessed everywhere, allowing patients to share experiences, engage in self-reporting and self-management
- Accessible **clinical decision support tools** allowing doctors to help patients in real time with diagnosis, treatment options, necessary medical calculations at the point of care
- **Broadband enabled health information technology infrastructures** for healthcare providers to share electronic health information across institutions and geography

Since smartphones and other devices enable end users to be both senders / receivers of information and active agents in data generation, mHealth is arguably more engaging and interactive than other health technologies.

¹² [mHealth Task Force: Findings & Recommendations](#) – September 24, 2012 (pre-publication public draft)

mHealth Stakeholders

Chances are that over time, mHealth will become routine as it reflects wider societal trends towards mobility and individualisation, coupled with issue-specific social networks. Especially for young people, there is no distinction anymore between on- and offline identities. This phenomenon heralds profound changes for healthcare.

Apart from the principal stakeholders mentioned below, there is a broader range of players taking part in mHealth, including other formal and informal health providers, regulators, NGOs and manufacturers of products able to converge with mHealth.

Patient-consumers

mHealth can be a potentially useful tool for patients and consumers, whether by providing more control over disease management and treatment, assisting parents in safeguarding their children's health, or by helping individuals improve their fitness and wellbeing. Convenience features such as managing hospital and health professionals' appointments, updating prescriptions, accessing personal health records and advice hotlines facilitate patients' engagement with health providers and can heighten customer satisfaction.

By being able to self-monitor vital signs (e.g. blood pressure, pulse) and condition-specific measures (e.g. glucose rate) through smartphone 'apps' and other gadgets, people are able to keep an eye on their health. They may stimulate individuals to become more 'ambitious' about their health – even competitive in a group setting – as they encourage users to practice self-control, e.g. by attaining daily or weekly exercise targets. However, caution must be taken when it comes to self-testing and diagnosing given the differences in quality, reliability and capability of mobile technologies, especially phones.

A number of 'apps' are designed to restore patients' personal autonomy, e.g. people with dementia and Alzheimer's, while others encourage people to control their health behaviours, for instance intake of alcohol, smoking and nutrition.

While mobile technology can benefit the immobile (e.g. remote monitoring via interactive terminals installed at home) it also holds appeal for those habitually mobile themselves: travellers can access up-to-date information about health threats, such as disease outbreaks and epidemics, and they can transmit self-generated information to health professionals at home in case of problems.

Research undertaken by the Boston Consulting Group demonstrates that patients, when assuming more self-responsibility, generally become more (pro)active in improving their health. 86% of women having adopted this approach undergo breast cancer screening (compared to an average of 57%) and 99% undergo cholesterol testing (compared to an average of 55%). Meanwhile, proactive care results in a 10 percent reduction in primary and urgent care visits.¹³

Health professionals

For health professionals, mHealth can also bring multiple benefits. In a climate of workforce shortages and scarce support, they can be empowered by accessing accurate information and evidence anywhere and anytime, while communication with colleagues becomes easier to better coordinate care.

¹³BCG Telenor Report, [The Socio-Economic impact of Mobile Health](#), April 2012

In addition, it allows for closer, more direct contact with patients. By being 'virtually available', health professionals can demonstrate their commitment, ask direct questions and provide targeted advice in an unobtrusive way, which may help them better understand patients' concerns. Communication with patients living in geographically isolated or underserved areas also becomes easier, and condition- or community-specific health information can be sent directly to particular categories of patients.

The use of tablets and health gadgets at the bedside can help illustrate conditions and reassure patients that they are being looked after by competent staff. Health professionals are also able to instantly record and share vital information during consultations (e.g. diagrams, instructions).

It has been shown that monitoring and diagnostic 'apps' are more reliable if they involve transmission of information to qualified health professionals who analyse the information remotely. Given the range of tasks smartphones can perform – from recording to planning and reporting on data – their use will likely become more common as bodily functions are monitored automatically. Another interesting use of apps supports, for instance, the identification of medicines and of counterfeit products by pharmacists.

Nevertheless mHealth will not work if it creates new professional burdens. For example, overloading health professionals with additional data input / processing and electronic communication tasks compromises rather than boosts quality of care. That is why these devices must be designed according to end users' needs. Continuous professional training in eHealth will also help build up confidence in using new technology.

Vulnerable groups

The rapid expansion of smartphones is bringing the digital world closer to those who were hitherto excluded from ICT. This is because they are portable, compact, multifunctional (including camera, texting, diary / logs, GPS, maps, entertainment, e-mail, etc.), and with easy user interfaces (e.g. touch screens). 'Apps' provide relevant information in a more condensed, practical, and intelligible fashion than traditional Internet content. Mobile content also tends to be more adapted to quick reading and sharing.

More importantly, smartphones are relatively affordable compared to other mobile technologies such as laptop computers or tablets although the cost of phones and related charges is still high enough to make them off-limits to the poor in many parts of Europe.

While the ubiquity, speed of change and complexity of new technology can be overwhelming, older people may benefit from mHealth solutions that are easy-to-use and that assist them in checking their conditions, combined with regular supervision by qualified health professionals. This can make them feel safer and more in control.

At least in theory, vulnerable groups such as migrants and other minority populations (e.g. Roma communities) can also benefit from mHealth, e.g. by accessing tailored information in their own language(s) and reporting problems. Given the plethora of difficulties (social, legal, discrimination, etc.) vulnerable individuals are subject to, health is often neglected and pain endured. There is potential for mHealth to reach out to people on the margins of society, e.g. by providing anonymous advice, meaningful and multilingual content (e.g. respecting religious and cultural peculiarities) and location tracking for people in danger.

The possibilities for customisation are extensive since mobile content does not rely on traditional literacy skills. Instead, it can integrate pictograms, voice-recognition, video content, etc. If a concerted effort is made to 'Include Everyone' as recommended in the eHealth Task Force Report¹⁴, mHealth could represent a step towards reducing health inequalities.

Conversely, much remains to be done to improve the availability and functionality of 'apps': each technology requires its own approach regarding design and content. Many are presently either too 'cluttered' or only available in English, hence they remain inaccessible to the majority. It is also problematic that some require social media memberships as a prerequisite. Unsurprisingly, those who make the most use of 'apps' are individuals living in technologically advanced Member States¹⁵ while the poor and lesser educated have little if any exposure.

Industry

mHealth involves the IT and telecommunications sectors, the pharmaceutical industry, medical devices companies and consultancies. For all of them it represents an interesting market to tap into, especially in the current economic climate in which healthcare is difficult to deliver without private investments. At European level, the European Innovation Partnership on Active and Healthy Ageing¹⁶ stimulates multisectoral partnerships for providing eHealth and mobile health solutions, e.g. in the areas of ambient assisted living and domotics.

The market for mHealth 'apps' is still highly fragmented and immature. Many solutions are being developed without much consideration of health and social inclusion objectives. In 2012, the first European Directory of Health Apps¹⁷ was launched by the European Commission's Directorate-General for Communications Networks, Content and Technology (DG CONNECT). This repository of health and wellness apps reviewed by patient groups and consumers provides a status quo of what is available, with products ranging from the useful (e.g., toilet finder) to the quirky (e.g., yoga poses). In order to find long-term viability and focus, solutions will need to have both mass appeal and be flexible enough for tackling health inequalities.

Clearly, fostering equitable mHealth depends on the extent to which end users are able to influence the policy-making and design process. mHealth takes eHealth to another level in the sense that it moves health into a consumer realm that can be difficult to control and legislate, as the experience of unauthorised internet pharmacies and bogus health websites has shown.

Hence it will be crucial to develop ethical guidelines and sustainable business models in line with end users' needs. Partnerships must be formed to ensure that stakeholders understand the stakes and constraints (including legal, operational, security, educational and access issues), and to avoid that mHealth aggravates offline health inequalities in the face of mass unemployment and austerity measures.¹⁸

¹⁴ See lever 5 for change in the [eHealth Task Force Report 'Redesigning health in Europe for 2020'](#) (2012)

¹⁵ 'Italiani, abbiamo tanti smartphone ma ora scarichiamo poche app', *La Repubblica*, 7 Sep 2013. The article describes that 'apps' are predominantly used by citizens of technologically advanced countries like South Korea and Sweden.

¹⁶ More information is available on the [EIP on AHA website](#)

¹⁷ [European Directory of Health Apps 2012-2013](#)

¹⁸ [EPHA Position on Reforming health systems in times of austerity](#)

Governments and healthcare managers

mHealth is of importance to national and regional policy makers as it promises significant savings by providing services remotely and targeting specific population groups. In this context it will be important to recall the importance of 'Health in all Policies'. mHealth only makes sense if it is integrated into overall health system policies – it must not exacerbate workforce shortages.

Practically speaking, it can help reduce paperwork and bureaucracy in hospitals and health settings while speeding up processes, reducing human mistakes (e.g. medication errors), increasing inter-departmental communication and avoiding duplication of work. Remote access to centralised EHRs can reduce administrative burdens by 20 to 30%. More savings can be gained through better patient compliance with treatments and drug adherence, and better observance of medical appointments. Interoperability, training and task division are critical prerequisites.

POTENTIAL BENEFITS AND DISADVANTAGES

Digitalisation in healthcare: support or hazard?

Many hail mHealth as a potential panacea for the health system challenges described above. Projects worldwide have resulted in the following positive observations¹⁹:

- Increased access to healthcare and health information, e.g., for hard to reach populations
- Increased efficiency and lower cost of healthcare service delivery
- Improved ability to prevent, diagnose, treat, care and track diseases
- Timely, more actionable public health information
- Expanded access to ongoing health education and training for health professionals

However, all new technologies are disruptive by nature: it often takes several years for end users to accept them. This means that, before mHealth will become integral to health system structures, experiences are bound to be based on trial and error.

Improving access & reducing health inequalities

Eligibility rules for accessing healthcare vary greatly in the EU, depending on available resources, the overall organisation of the health system, reimbursement schemes, legal barriers, etc. These rules in combination with the social determinants of health create vast health inequalities within and between countries.

Thanks to mHealth, a larger percentage of the population can be served, including vulnerable individuals who may be more comfortable using mobile devices as they allow them to explore and 'practise' mHealth step-by-step, in their own time, and in informal settings. Although focused on the individual, mHealth also encourages individuals to join networks.

To improve access, two courses of action could be pursued. One involves creating incentives for health professionals to become active users of mobile broadband-enabled technologies for current and preventive care. The second would be to ensure universal access to mobile broadband for households in underserved areas. However, both depend on the removal of regulatory barriers. In developing nations, mHealth is already providing access for larger segments of the population

¹⁹ Barriers and Gaps Affecting mHealth in Low and Middle Income Countries: Policy White Paper; Centre for Global Health and Economics Development Earth Institute, Columbia University, May 2010

while maximising health professionals' time²⁰ but more research and evaluation is required to determine how this can be 'translated' in Europe.

Home monitoring

A key tool for health professionals and patients alike are home monitoring services. Some of the most common conditions being monitored are chronic diseases, such as cardiac problems that reduce life expectancy and quality of life. The application of ICT in this area can lead to lower healthcare costs, more efficient care delivery and improved sustainability.

Home monitoring can also greatly improve the lives of the frail and elderly. Sensors connected to home alert systems help prevent that incidents, such as falls, turn into life-threatening events.²¹ Smart systems thus provide reassurance that help is only minutes away.

Educational and public health use

A number of educational tools strive to educate patients and caregivers about the conditions they are dealing with, and they provide relevant information and links to networks where expertise and anxieties can be shared. Other tools build up user skills for navigating common eHealth functions.

For health professionals and trainees, there are training modules for specific conditions, purposes (e.g. echocardiographies) and learning objectives (e.g. the extensive 'Anatomy on the Go' app²²), as well as for building up skills for working with vulnerable groups.

A number of mHealth solutions, in particular texting via SMS, are more generally useful raising awareness of prevention and health promotion. In the developing world, a number of public health campaigns have been successfully carried out to combat HIV/AIDS infections, outbreaks of communicable diseases and epidemics, and for family planning, allowing recipients to make informed choices and supporting disease management.

Promotion of health and well-being

Given its multifunctionality, mHealth can be a tool for promoting health and well-being. Its extensive range of gadgets is seductive for patient-consumers as it takes health out of the scientific sphere into the realm of day-to-day activities and social ties, thereby allowing individuals to explore both conventional and emerging health methods, e.g. complementary and alternative medicine (CAM). Through routine deployment, mHealth can also contribute to better prevention and healthy behaviours.

It is however imperative to recognise the limitations of technology: data can be erroneous, tools used incorrectly, and results may depend on performing tasks in the right sequence at the right time. Moreover, the negative impacts of excessive ICT use on health outcomes (both physical and psychological) must not be underestimated.

Gaming

ICT-enabled games are ubiquitous as people pass time with their mobile phones 24/7, e.g. in waiting rooms, on public transport, during lunch break, even in bed. Gamification describes the application of game elements and digital game design techniques to non-game problems such as health.

²⁰Ibid.

²¹BCG Telenor Report, [The Socio-Economic impact of Mobile Health](#), April 2012

²² For more information see www.thieme.com.

While online marketing and inappropriate information to patients (e.g., by unauthorised vendors of medicines) represent a growing concern, especially for individuals unable to distinguish between 'good' and 'bad' sources of health information, education-oriented health games are arguably a fun way for individuals to become more conscious of their health. Seen in this way, ICT has the potential to improve quality of life²³, especially since mobile games are played by people of all ages and across social groups. Examples are action games for youth with dyslexia, games offering pain relief via 'information overload' (e.g., for patients with permanent pain due to severe burns, etc.), but also Wii sports for people suffering from obesity²⁴

There are also interesting solutions for health professionals, e.g. simulations and interactive learning for physicians controlling 'virtual patients'. It has even been suggested that playing video games can help develop surgeons' manual dexterity.²⁵

Cost reduction vs. evidence

The Boston Consulting Group reported that mHealth can reduce the cost of health services (amongst the old age group) by about 25%, and of data collection by 24%.²⁶ Patient care can be improved by capturing information for providers and allowing them to rapidly analyse large amounts of information to better understand a person's health status over time²⁷.

In addition, mHealth can reduce the number of hospital nights for rehabilitating patients, home monitoring can decrease care costs and improve quality of life for the elderly, and EHRs can cut administrative burden and encourage patients to take more responsibility.²⁸

While mHealth can create efficiencies, it must be underlined that health decision-making requires more than raw data, including information obtained from face-to-face contact that can put the data into context, which is unique for each individual.²⁹

What is more, the evidence base for mHealth needs to be further developed. As noted in a study by the European Connected Health Alliance (ECH Alliance), more data is needed to demonstrate that mHealth scenarios do, in fact, lead to improved health system performance, improved health status and health-related quality of life for older people.³⁰ In this context health technology and impact assessments will be important to determine whether investments in mHealth technologies are worthwhile in the long term.

As any area in healthcare, mHealth is also open to abuse. For example, under the banner of 'wellness apps' are products promising better health outcomes (e.g. weight loss, smoking cessation, stress reduction), which is not backed up by evidence.

²³ See EPHA article '[Policy dialogue on Active and Healthy ageing – with Information and Communication Technologies \(ICT\)?](#)'

²⁴ For more information see www.gamesforhealth.org

²⁵ James Rosser et al. 'The impact of video games on training surgeons in the 21st century'. *Archives of Surgery*, 2007;142(2), pp. 181-186

²⁶ See <http://www.who.int/goe/en/>

²⁷ [mHealth Task Force: Findings & Recommendations](#) – September 24, 2012 (pre-publication public draft)

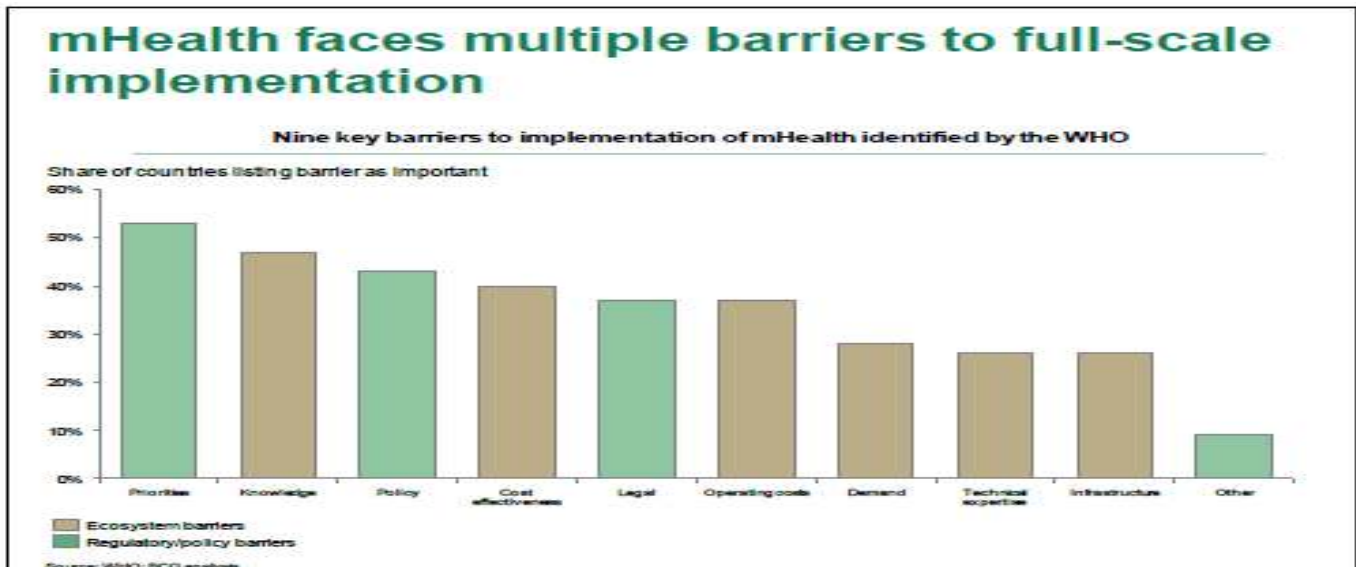
²⁸ From eHealth to mHealth – C. Peter Waegemann, see above

²⁹ Ibid.

³⁰ GSMA, AARP, WE , 02.2011. [Mobile Health for Independent Living](#).

IMPLEMENTATION CHALLENGES

The World Health Organization (WHO) has identified nine key barriers to the implementation of mHealth. They are divided into two groups – ecosystem and regulatory/policy barriers. As shown in the graph below, competing priorities and lack of knowledge are the top challenges for mHealth diffusion. Due to the lack of a strong evidence base to back up its impact on health outcomes, about half of the responding WHO Member States reported competing priorities as their main obstacle. mHealth programmes require evaluation so that policy-makers, administrators and other actors can base investment decisions on facts³¹.



Source: WHO, BCG Report 2012

Policy issues

Effective and coherent policy-making will become important as mHealth matures. As mentioned before, a key obstacle is lack of access to fixed and mobile broadband coverage for health providers and individuals, particularly in rural and peripheral areas.

Reimbursement policies will also require adjusting given that remote care and treatment.³² will become more relevant with the transposition of the Cross-border Patients' Rights Directive.

Furthermore, technology changes faster than the legal regulatory framework it is situated in. mHealth is situated in a complex policy and legal environment; the boundary between eHealth and medical devices needs to be clearly defined given that the latter are increasingly digital and integrated into eHealth. One potential way forward would be to maintain a clear focus on technical and data interoperability and to ensure that the eHealth Task Force recommendations³³ are implemented, e.g. by developing policies that are aligned with the technological demands of mHealth.³⁴

³¹ WHO: mHealth. New horizons for health through mobile technologies, Global Observatory for eHealth series, Vol. 3

³² Ibid.

³³ eHealth Task Force Report, 'Redesigning Health in Europe for 2020' (May 2012)

³⁴ BCG Telenor-Mobile-Health-Report (May 2012)

Data protection and patient safety are particularly important in healthcare. The security of personal information entered, transferred and processed via mHealth tools has legitimately been indicated as a crucial point of concern³⁵. Transparency about privacy and confidentiality rules is clearly critical for building public trust, while interoperability is essential for scaling up projects.

A particular barrier to using mobile technologies for data collection and disease surveillance is the implementation of multiple health-related data collection systems, flows and platforms within the health system that can track information directly as health services are delivered. Currently there is no standard practice for this and incoherence reigns at system and at policy level, e.g. regarding data collected at community level, within public and private health facilities, within national and district health reporting information systems, and within systems specifically designated for surveillance³⁶. There are many mHealth application systems and platforms (both open source and proprietary) but there is still no common 'architecture'. A key challenge is that there is almost never a single owner of all the information to ensure interoperability.

SOLUTIONS

Research undertaken by PWC (2012)³⁷ has shown that mHealth is beginning to embrace the following principles:

- **Interoperability** – interoperable with sensors and other mobile/non-mobile devices to share vast amounts of data with other applications, such as electronic health records and existing healthcare plans;
- **Integration** – integrated into existing activities and workflows of providers and patients to provide the support needed for new behaviours;
- **Intelligence** – offering problem-solving ability to provide real – time qualitative solutions based in existing data in order to realize productivity gains;
- **Socialization** – act as a hub by sharing information across a broad community to provide support, coaching, recommendations and other forms of assistance;
- **Outcomes** – provide a return investment in terms of cost, access and quality of care based on healthcare objectives; and
- **Engagement** – enabling patient's involvement and the provision of ubiquitous and instant feedback in order to realize new behaviours and/or sustain desired performance.

Standards for improved access and interoperability

In a resource-constrained environment, one way of overcoming system challenges is to move towards clearly defined and harmonised data standards at EU level for mobile and computer-based platforms to achieve interoperability and transparency. .

Legal clarity and operational harmonisation would also facilitate deployment of mobile technology for public health purposes such as real-time data collection in the community and reporting within health institutions, which could then be linked to larger health information systems for aggregation, provided that secure access is established at regional and national level (the level of access being dependent on the function of the individual within the health system).³⁸

³⁵ See [EPHA Briefing on Cyber Security](#)

³⁶ Barriers and Gaps Affecting mHealth in Low and Middle Income Countries: Policy White Paper; Center for Global Health and Economics Development Earth Institute, Columbia University, May 2010

³⁷ PwC Report, [Emerging mHealth: Paths for growth](#), June 2012

³⁸ Barriers and Gaps Affecting mHealth in Low and Middle Income Countries: Policy White Paper; Center for Global Health and Economics Development Earth Institute, Columbia University, May 2010

Moreover, the development of standards can help foster the inclusion of vulnerable user groups. A comprehensive 'quality management system', including impact assessments on various end users, should be part and parcel of mHealth's development. Regarding 'apps', users require guidance for selecting the most appropriate products.

Guidelines

Successful implementation of mHealth services is pursued through the establishment of mechanisms generating a stronger link between evidence and public policy outcomes. Evidence based guidelines can help further implementation of these services through sharing best practice, consolidating and making the evidence base available, including indicators for evaluation and implementation, developing consistent guidance, analysing requirements for new skills and offering direction for the necessary structural changes that will achieve the successful implementation of eHealth services globally and mHealth devices in particular.

Develop digital and health literacy

To achieve economic, health and social objectives, and mitigate the causes for health inequalities, eHealth literacy must be enhanced in the wider framework of health literacy, so that users are well informed not only about mHealth but are able to make *meaningful* use of it.

Flexible dialogue with end users about mHealth and its exigencies should be the first step. All users must be clear about potential advantages and pitfalls, and the skills required to reap its benefits.

CONCLUSIONS & RECOMMENDATIONS

The eHealth Action Plan 2012-2020 recognises the current lack of legal clarity for mHealth:

Given the complexity created by 'mHealth' and 'health and wellbeing applications' in particular, further clarification is needed on the legal framework applicable to these specific areas. The rapid developments in this sector raise questions about the applicability of the current frameworks, the use of the data collected through these applications by individuals and medical professionals, and whether or not and how they will be integrated in healthcare systems. Clarity of information and 'user-friendliness' are also important to consider.³⁹

Given mHealth's innovation and employment potential, the Commission is increasingly exploring it as part of eHealth policies in order to attain the targets of the Digital Agenda and Europe 2020, It will publish a Green Paper in the second half of 2013.

As online transactions and communication are commonplace in sectors such as travel and banking, it will be interesting to follow whether mHealth can bring health closer to people by encouraging routine use in a safe, equitable and meaningful way. As demand is rising, it is vital that mHealth products provide tangible benefits. Hence they should be made available and tested by healthcare stakeholders to avoid abuse.⁴⁰

From a policy perspective, it is important to take into account existing and evolving pieces of European and national legislation in areas impacting on mHealth, and to systematically monitor the

³⁹EC COM(2012) 736 final on "eHealth Action Plan 2012-2020 - Innovative healthcare for the 21st century"

⁴⁰ Ashley Bolser, 'Why healthcare professionals can't afford to ignore the potential of apps'. Guardian Professional, 9 May 2013

quality of information and tools provided to end users. The following points should be considered as the discussion continues to unfold:

- Develop policies that support integrated patient-centred chronic disease care
- Foster patient empowerment: in the process of self-management: patients need to be able to take control of their condition and be reassured that feedback and necessary adjustments from a healthcare professional are available when necessary
- Ensure processes that facilitate meaningful end-user involvement
- Improve mHealth literacy: A perceived lack of knowledge and skills needed to be able to use mobile health services is one of the most common barriers to user acceptance of mHealth. In line with the European Commission's eHealth Action Plan 2012-2020, initiatives aimed at developing mHealth training and education programmes should be developed, e.g. through relevant EU programmes and/or policy initiatives.
- Clarify data protection regulation as it applies to mHealth, ensuring end-user trust and ease of use, while recognising the 'power' of data in disease management, diagnosis and prevention.
- Encourage and facilitate mHealth stakeholder engagement: Given the potential of mHealth in offering innovative and sustainable solutions for the prevention, treatment, care diagnosis and management of chronic diseases, an mHealth stakeholder working group should be created where opportunities and challenges could be discussed and the exchange of information and good practice could be stimulated.

The core question is whether mHealth can contribute to better public health or whether it will aggravate health inequalities. In order to harvest its potential for providing equitable healthcare, mHealth needs to be incorporated into health policies so that it becomes a standard element of health systems rather than a market-driven consumer alternative for the well-to-do and educated. This will require dialogue between public, private and civil society actors and a policy and business environment that encourages innovation for health equity purposes.