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Report

(Re)Building health systems in West Africa: what role for ICT and mobile technologies?

Monday 15 – Wednesday 17 June 2015 | WP1409

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In the past 18 months the ability of West African health systems to effectively respond to a major epidemic was thrown into sharp focus as the Ebola virus spread rapidly across the region. In the most affected countries, there have been 26,628 recorded cases and 11,020 deaths, with 509 reported deaths[1] of health workers (as of July 1, 2015). [2]

The epidemic exposed weaknesses at many levels. The international response was slow. National and local governments were insufficiently prepared. Health strategy, planning, funding, and infrastructure, as well as basic training and skills development of frontline health workers were all insufficient. Information Communication Technology (ICT) and the health 'infostructure' were inadequate and as a result had to constantly evolve in real time in response to the crisis. Significant cultural barriers to effective prevention and treatment hampered the health system's ability to deal with the growing case load and to prevent new cases. Together these weaknesses caused fatalities that affected communities to their core and will have lasting effects for generations to come.

With this in mind, the aim of the (Re)Building health systems in West Africa: what role for ICT and mobile technologies? meeting at Wilton Park was to understand better the role of ICT and mobile technologies for rebuilding and creating strong health systems in West Africa. The meeting also aimed to identify lessons that could be taken beyond West Africa and used more broadly for health system strengthening in resource poor settings globally.

It built on the health information systems (HIS) strengthening meeting led by the West Africa Health Organization, which took place in May 2015 in Ghana[3]. At that meeting, 160 representatives gathered in Accra to examine Ebola response lessons, and to discuss how Health Information Systems (HIS) could be improved across the West Africa region.

The (Re)Building health systems event convened a unique mix of senior

representatives from the public and private sectors. Attendees were both experts and decision-makers in their fields. All were already involved in forming the new collaborations necessary to help prevent and respond more effectively to a similar outbreak in the future.

Key points

"Ebola shone a spotlight on the ineffectiveness of past health systems strengthening efforts; there is growing evidence that ICT and mobile are a vital part of the solution to build resilient health systems."

- This is a moment in time. The last 15 years have seen a revolution in ICT and mobile technologies. Ebola shone a spotlight on the ineffectiveness of past health systems strengthening efforts; there is growing evidence that ICT and mobile are a vital part of the solution to build resilient health systems.
- People must come first. User-centred design in programmes and technology is an essential component of sustainability, although health systems cannot be strengthened by technology alone. The Global Health 2035 Lancet Report[4] forecasts a 12 million shortfall in the number of frontline health workers (FLHWs) globally. Not only are there not enough health workers, but the current workforce lacks the training that is essential to their work. Training and technology must focus on problems FLHWs have identified in their work, not problems imagined or assumed from outside. The most successful tools people use are the ones that integrate into their everyday lives, but it is not yet clear to what extent mHealth solutions have achieved this goal.
- The private sector is an important part of a sustainable solution. Businesses typically think about sustainability from the outset of any initiative; this approach is essential for building lasting change in health systems. However the private sector is frequently under-represented in discussions about health system strengthening. This needs addressing and urgently. Involving the private sector is increasingly enabled by the shift amongst companies to become more socially responsible businesses. This is a step beyond simple Corporate Social Responsibility (CSR) activities. Being socially responsible is now seen as ultimately being good for business and is seen as more of a long-term relational (rather than transactional) investment.
- Building staff and infrastructure capacity within health, technology, and political systems has been talked about for long enough. Yet despite much effort and investment, past interventions have not yet produced desired or lasting results. There is a need to be specific about what type of capacity is needed and in particular to get deep knowledge of what governments and health workers really need. Unfortunately technologists and global health programmers do not always uncover this information. It is vital that a shift takes place to enable demand-side growth and thinking, and for the global health community to be able to respond to this effectively.
- Horizontal infrastructure investment needs prioritising over – or at least to be viewed as equally important as - vertical project or disease specific funding. There also needs to be a move from short term project funding to longer-term funding commitments. There is some concern about a post-Ebola 'financial cliff', or lack of new funding, following the current significant donor investment coming to an end in the next 12-18 months. However, as total private sector investment in development dwarfs public sector investment, it is important not to overstate the concern over diminishing donor funds in the next few years.
- The recent Consortium of Universities for Global Health (CUGH [5]) conference debated whether the Sustainable Development Goals (SDGs) should support vertical programmes or switch to health system strengthening. Vertical programme impact is more easily measured. The impact of 'horizontal programme' funding is harder to measure; but such funding has the potential to underpin successful outcomes across the breadth of the health system. There is

a need to support both horizontal and vertical approaches and ICT can play a critical role in bridging the two. In recognition of this, donors are increasingly acknowledging the need to be partners with governments, not just distributors of funds.

- New catalytic collaborations are needed. Government has a key role to play – often as the primary client - but other partners bring complementary capacities such as technical and project management knowledge and skills. New types of collaborations are needed around strategic planning and organisation; investment; economic analysis; skill building; technology; understanding needs and communication. Successful collaboration will require clear, shared goals and understanding of roles and responsibilities among all partners. It will often require sacrifice or change on the part of individual organisations to achieve the greater benefit of shared outcomes.
- Good governance is crucial. However, an agreed methodology for establishing best practice is not clear, as supporters of agile or more structured approaches vary in their perceptions of which practices are most successful.
- Technology must be interoperable and future-focused. Experience indicates that interoperability between systems is critical. Increased use of Application Program Interfaces (APIs) is needed to connect systems (it's not about seeking to create one large system at a country level); sustainable solutions are not tied to quickly obsolete technologies. For example, the technology underpinning future health systems must be able to cope with the innovation that new phones and other mobile devices enable. This approach requires thinking about the underpinning 'infostructure' where there is less emphasis on sharing specific data and more on connecting the systems that support data to be shared. Improving internet coverage, connectivity and access are essential components of this health systems approach.
- The emphasis on collection of data must shift to use of data. Historically, there has been too much focus on data collection and not enough on its use and application. Over-collection of data wastes time. A stronger approach starts from what data is useful to the frontline health worker. Information that is useful to her will add value to her work. Viewing the need for health system strengthening through a health worker prism could have a significant impact on infrastructure thinking and technology deployment.
- Training frontline health workers is essential and needs to be more user-focused. Understanding how mHealth initiatives complement face to face training is essential.

Improving local health systems

"…confidence in health systems is low and this increases barriers to introducing new initiatives."

1. For local health systems, ICT can be a catalyst in epidemic control and recovery in four phases: getting disease incidence to zero; early recovery of the health system; restoring primary care and trust in the health service; and preparing for future epidemics or disease control. The information architecture needed at each stage should build on what already exists. However, in the immediate aftermath of the latest outbreak, it needs to be acknowledged that confidence in health systems is low and this increases barriers to introducing new initiatives.
2. Best practice is changing. Information had previously been scarce, expensive, poor and hard to access. Over the last 15 years, ICT and mobile technologies have changed this to the point where there is now more information available than ever before. One of the biggest challenges for the next decade is how this mass of data can be used and shared for effective decision-making and to help increase positive health outcomes. Related to this is the difficulty for local health systems to coordinate effectively when

information is collected via a combination of ICT and paper-based processes.

3. Health Information Systems (HIS) policies can provide the framework in each country to help address these challenges; the overall policy framework for the West Africa region is already in place[6] . The principles and policies outlined in that policy document now need understanding and applying more widely.

4. There is a need for stronger and more effective governance structures. But knowing when, and how, to create and support such formalised and structured governance processes is challenging. There are two competing demands to manage: delivering tangible outcomes quickly versus creating strong upfront and transparent governance processes that require time to establish. Agile methodologies attempt to balance the two by placing user need and experience at the centre of design with appropriate governance built around this aim.

"To help save lives, it is highly likely data will need to be shared electronically even before full and agreed standards are in place."

5. A perceived 'wall' between disease surveillance and heath information systems needs breaking down, enabled by improved data sharing policies that have permissive not restrictive principles underpinning them. To help save lives, it is highly likely data will need to be shared electronically even before full and agreed standards are in place. Significant barriers to achieving this remain, especially when a military response is the first response to a major health-related crisis and its data is not shared.

6. Working together to achieve better local health systems requires using best practice principles (e.g. Principles for Digital Development[7]). Sustainability and scalability must be built into thinking from the beginning. This includes ensuring investments are realistic and long term and take into account both the hardware and the people needed to maintain the systems.

7. A key feature of sustainability is governments driving national plans and identifying what is needed for their countries and citizens. Governments need to be in control, leading coalitions and coordinating the different types of collaboration required to bring about sustainable change. The complexity of the environment together with limited resource and capacity contributes to the sometimes fragmented approach to strategy development and implementation.

The role of mobile technology

8. There is an undoubted – though not necessarily clearly defined - role for mobile technology in addressing health system weaknesses as demonstrated by its use before and during the Ebola outbreak. Evidence for the cost effectiveness of mHealth solutions is growing but remains insufficient to persuade governments and donors to invest heavily in its scale up. ICT infrastructure at both a country and local level is a crucial enabler of mobile service access and delivery and requires investment beyond pilots and small-scale projects.

"Mobile technology on its own is not a solution to the lack of health workers in the systems, or the often poor quality training they receive."

9. Capacity to implement and use technology at all levels of national and local government, and in the local private sector, are essential. Countries introducing new mobile training programmes often have little change management experience or training in key staff. Mobile technology on its own is not a solution to the lack of health workers in the systems, or the often poor quality training they receive. Frontline health workers will continue to require some form of in-person or classroom style training supported by mobile professional development options. The more experienced and senior the practitioner, the more this is the case.

10. Lessons need to be shared from high profile successes and failures from both developing and developed economies. The principles that underpin effective training, supervision and support for frontline health workers need to be better understood: building in a way that's open to all and governed by that community. Building for reuse and scale. Building around common architecture. Building iteratively and delivering value quickly. To do this in West Africa will require the correct skillset in-country and

these skills need to be built into the government and civil service.

11. Technical adaptability is not the only piece of the puzzle - agile development is difficult and often appears slow from a donor perspective. This will require increased flexibility on all sides and a step away from restrictive funding cycles, which are typically 3-5 years.

12. FLHWs are the first line of contact and need information that is easily accessible. But creating and deploying training content at scale is hard. There is now a blueprint on end-to-end mobile content distribution process that is available to all. Published in June, the paper sets out a process based on open architecture and open content which can be adapted for use in any country[8]. The aim of the process is to reduce duplication of effort and to support adaptation of existing tools and the context for culturally specific needs.

Digital infrastructures and use of data

13. Data is routinely collected but too often it is not used, or not used to make good decisions for improving health outcomes. This over-collection and under-use of data wastes time. Health workers often do not use the official data collection system (particularly when it is impractical in their work setting) and consequently, practices on the ground vary significantly from area to area. Finding mechanisms that help health workers explain what they need in a way that can be used to build effective digital infrastructures is a challenge. The responsibility for understanding and responding to the need of the user (in this case the health worker) lies in part with the tech community – not the health worker. Listening to health workers and reflecting their needs using their own words and not talking 'tech' is essential.

"At a country level, the capacity to own, design and implement change is an issue for all involved in health systems strengthening."

14. At a country level, the capacity to own, design and implement change is an issue for all involved in health systems strengthening. Governments are working hard, but health workers often have not had the capacity development they need and want. Each country Health Sector Strategic Plan (HSSP) needs to show how it will engage with all cadres of health workers in creating resilient health systems. A key dependency of creating the right framework is a private sector, donor and technology community working in partnership with countries so that awareness builds of 'what they don't know they don't know' in a constructive manner. This fosters ownership for the solutions at a country level. Empathy is also essential – governments are often balancing complex dependencies and interdependencies, with many potential partners, and with limited resources. This directly affects efficiency and effectiveness of a client-minded approach. At the same time and with little extra resource, governments can do more to respond to problems quickly and fill the communication gap surrounding an epidemic which can lead to unhelpful rumours that exacerbate the issue.

"It is essential that mHealth tools do not repeat the same problems of the paper or in-person solutions they were designed to replace."

15. When discussing digital infrastructure it is as important to think about 'infostructure' – what are the foundational elements and data flows of the system that need to exist to enable data sharing. Creating a public good such as an ICT infrastructure is intuitively popular but there are few good models for how to sustain these infrastructures long term (after donor funding comes to an end). At a country level, governments need partners willing to engage in rethinking and reusing technologies that already exist rather than starting afresh each time. It is essential that mHealth tools do not repeat the same problems of the paper or in-person solutions they were designed to replace. Interoperability between systems is therefore critical and whilst at one level the issue is technical, true interoperability starts with helping people understand user needs better.

16. Thinking and working in a way which is collaborative underscores for all stakeholders the fact that no single entity can pay for sustainable infrastructure. In addition, shared investment goes hand in hand with sharing the system and in turn this helps data to be shared more easily. Together, working practices based on genuine partnership could help deliver quality universal health coverage within a country. Creating a culture that

works and thinks like this requires partners to collaborate differently - including having social time together so contributors know and understand better the people with whom they collaborate.

17. The importance of country ownership in development of technical infrastructures and systems has been clearly demonstrated. For example the creation of an Open Health Information Exchange (HIE)[9] has led to a community of practice with peer to peer engagement with the issues. This group convenes to improve e-health architectures and influence the wider tech community on the potential of the HIE to undertake technical activities. These include creating architectural conventions; creation of standard iconography; and describing ways these processes link together. This work is supported with examples of reference technologies; a self-certification process and technical assistance. It includes document implementation experiences as they happen, peer support mechanisms and community development.

18. Another challenge to rebuilding health systems is 'information liquidity'. That is, creating an infrastructure that allows information to be shared easily, with data moving seamlessly between systems. However, clearly capturing and articulating the demand for data is a bigger problem. There is a real need for more people from within the health system to talk more about what their requirements are so that solutions can be designed to respond to those needs.

"The private sector is increasingly focused on how it can use its experience addressing first world health care problems and applying this knowledge in resource poor settings."

19. Translating plans into action is not a trivial issue. Operationalising good intentions is a difficult skill to acquire.

20. The private sector is increasingly focused on how it can use its experience addressing first world health care problems and applying this knowledge in resource poor settings. This will include sharing how the sector thinks about information architecture, infrastructure and sustainability from the outset.

Frontline Health Worker training

21. Who a FLHW is matters (for example in relation to 'counting them' within the formal health system and whether and what kind of training, support and supervision they receive) but this term does not have a universally recognised definition. This makes it hard to compare FLHW programmes within and across countries to identify evidence of good practices that could be replicated and/or scaled up.

22. Mobile technology is already enabling new ways of training and developing FLWHs - and is setting the stage for this to happen at scale. There is a trend toward open-source content published under Creative Commons license available online (for example the mPowering Frontline Health Workers content platform, ORB: http://health-orb.org) but also available for download and use offline. The intuitive benefits are clear: more people who need information that could save lives can have access to high quality information they need, when they need it.

23. Through access to, or ownership, of mobile devices FLHWs, who often work alone or in remote locations, can now reach their supervisor, as well as speak with their peers. Practically, data collection functionality on a mobile device means the amount of paperwork FLHWs need to carry is reduced. Data collected via mobile reduces the administrative burden associated with paper based systems of monitoring and evaluation and enables remote diagnostics of logistics and performance information.

24. There are significant challenges to delivering successful mobile training however. There is a high turnover rate of trained staff (for example rural health workers who may move to urban settings or government paid health workers secure better paid jobs in the private sector), reducing return on investment (ROI) of training in general. Cost benefit and the financial sustainability of mobile training initiatives are widely questioned and the evidence base of the effectiveness of mHealth is not yet substantive enough to secure long term investment. In addition, countries often have

limited mobile infrastructure and coverage. Where some infrastructure is established (e.g. using a very small aperture terminal [VSAT]), installation and maintenance costs are high and therefore not necessarily sustainable. Funding for training is often limited and in turn this limits the scope of training possible. Health care workers have been subject to many new initiatives over the past 10 years sometimes leading to worker fatigue caused by the number of interventions. Even mobile training proponents acknowledge that mobile training is not the answer to all training needs.

25. Complementarity between mobile and classroom training has not yet been developed in an integrated way at scale. There is a need for research on the effectiveness blended models of face to face plus mobile learning which could assist national governments in their planning of workforce development.

26. Physically getting people to attend classroom training usually requires per diem incentives (and it is not always clear that the people who most need the training are actually represented in the classroom). Face to face training often takes health workers away from their health facilities for extended periods of time, thereby reducing health services to the community. However there is little research on how incentives can be integrated in mHealth training programmes to militate against 'lost earnings' through the per diem system.

27. Measuring the effectiveness of mHealth programmes is difficult with variable practices from project to project. With a few notable examples, very few mhealth programmes have gone to scale.

"Training programmes must address need first and then select the appropriate technology second."

28. There is a growing body of learning about how to address the barriers to introducing successful mHealth training. Training programmes must address need first and then select the appropriate technology second. Donors need to align funding with country priorities, but countries must be confident to say no if the funding on offer does not align to their assessment of their need. The inherent difficulty of this tension should not be understated.

"Donors need to align funding with country priorities, but countries must be confident to say no if the funding on offer does not align to their assessment of their need."

29. Making progress in the use of mHealth to support training and supervision of health workers requires liberating the expertise from both private and public partners and pooling this to develop solutions collaboratively. Infrastructure development must integrate mobile solutions with the existing system rather than creating new systems. Integrating solutions into everyday lives requires 'bring your own device' (BOYD) approaches where appropriate. Preferential mobile use rates are a useful incentive and could encourage uptake and ongoing use of devices for job support and training.

30. There are significant opportunities for improving health worker training. Strong programmes start by designing with the user. Programmes need to build in real-time feedback and decision support for the health workers to create two-way communication loops. Content can be generated in a variety of formats including text, animations, video, and Interactive Voice Response (IVR) depending on user need and local conditions. Governments and partners can set a strategic approach to training embedded within the Ministry of Health (MOH), produce a cost benefit analysis including Total Cost of Ownership (TCO) for the country, and look at use of the current budgets that could be used to strengthen programmes and sustain them long term. Project leaders can think more broadly about how to integrate mobile and classroom training. Mobile device platforms should be device agnostic so that different types of devices can work from the same infrastructure. Until now, mobile tech too often has focused on top-down interventions with limited exploration of the power of peer-to-peer networks. This is a relatively untapped opportunity requiring further research.

31. The private sector is a crucial partner for expertise, technology and funding.

The reality of collaboration

32. There are potential opportunities where better collaboration could help transform

effective health system strengthening, including:

a. Better understanding the needs of health workers (linked to designing programmes for training and for data collection, reporting and decision-making).

b. Skills-building including in technology literacy for both governments and FLHWs.

c. Economic analysis, especially for cost-benefit analysis of projects and programmes. This in turn would help build the evidence base for effective ICT and mHealth investments.

d. Strategic planning and organisation including governance and leadership at government level.

e. Investor roles and investment modalities across government, donors, and private sector.

f. Technology systems, including existing system mapping, interoperability and data.

g. Overall communication of collaborative efforts and outcomes.

33. Action can be taken immediately at a technical level by applying existing digital principles[10] more consistently; using existing case studies to inform the development of programmes; encouraging adaptions of existing tools and re-use, sharing and adaptation of content; having a focal point in government so that duplication of effort and work does not happen; being more transparent about stakeholders' skills and assets; being clear about the role of the different stakeholders; focusing on regional organisations as enablers of change; and using technology as a tool to improve human connection.

34. Effective collaboration requires strong skills - starting with the government. Building strong skills does not happen by accident. It requires governments to invest in internal research teams so that countries own the evidence of what they are asking for – whether technical expertise, in-kind or funding support. The private sector can play an important role in helping build government skills in this area. Enabling collaboration requires defining parameters early so that partners know what role they will play.

35. Key challenges and issues include how to bring beneficiaries and users into the design process more; how to create enough time and space to work more collaboratively with governments – having appropriate upfront time allocated to plan effectively is absolutely critical to the long term success of technology (and other) solutions for health systems strengthening; and how to better collaborate with the media so that health messages and communications are provided in a timely and integrated way.

"There must be a new form of collaboration – one that reengineers how the ICT sector, national institutions and health workers combine their skills and expertise."

36. The benefits of collaboration are vast. More effective collaboration will reduce costs currently wasted through inefficient process and duplications of efforts and activity. There must be a new form of collaboration – one that reengineers how the ICT sector, national institutions and health workers combine their skills and expertise. Donors must work together. NGOs need to put egos aside. The private sector needs to look at how it uses its profits margins for good. Academics must look at implementation challenges too. Solution providers need to create things that meet a real need. Governments need to lead on all work.

Summary

37. The event brought together leading West African and non-African health experts and opinion leaders to work together on how to strengthen health systems in the region, focusing on the role of ICT and mobile technologies. The meeting generated discussions that were informed, candid, emotive and practical.

38. In September 2015 the global community will meet to ratify the Sustainable Development Goals (SDGs) at the United Nations General Assembly. Many of the Wilton Park participants, and from the conference in Accra, now have the opportunity to

use the lessons taken from these meetings, to translate ideas into practice quickly within this supportive framework.

39. To achieve this, detailed and fundamental specifics still need agreeing. For example, international definitions of FLHWs and CHWs need to be developed and used to enable shared understanding. Without this in place, many interventions will run the risk of being too generalised (i.e. not responding to specific country needs) and fail the user-led test.

40. Similarly, there is a need to be clear about the type of capacity needed at national and local government levels to use ICT and mobile technologies to build and support resilient health systems. Failure in the past to build capacity in the integration of ICT and mobile has not been caused by lack of funds or will, but has often been underscored by a lack of understanding of need, as well as fragmented, uncoordinated and short term approaches to meet the immediate demands of a specific intervention or (as experienced with the Ebola response) to react to a crisis. Targeted interventions lasting several years, led by governments, delivered through collaborative efforts, and involving the private sector are needed to rebuild and sustain strong health systems.

41. As well as getting specific on core principles, agreements on common approaches to technology development that have buy-in from governments, health ministries, private sector, donors and health workers are vital. Without this, 'reinventing the wheel' by developing ICT and mobile solutions that are not integrated but created project by project, and country by country will continue (and fail to prepare countries for the next global health crisis).

42. A new and genuinely collaborative approach will help unlock new and different investments focused on maximum use and maximum, sustainable impact (not maximum project outputs). Collaborative approaches that target infrastructure are needed as much as project-based or disease-specific solutions. These approaches will include the private sector – its investment of funding, expertise and business acumen.

43. Through discussions during the event it was clear that we know and agree upon some of the new rules already:

    - user-centred thinking and design;
    - demand side approaches;
    - joint objectives with clear goals;
    - strong but inclusive leadership at government level (working with other stakeholders);
    - the private sector as a core part of the solution, using undoubted skills and approaches for maximum benefit;
    - quality training for FLHWs, based on their needs;
    - moving beyond informing each other of what we are doing, to working collaboratively;
    - finding aligned incentives to build common plans;
    - using the Principles of Digital Development with scale and sustainability underpinning our work;
    - understanding that health systems won't be strengthened by tech alone – the people in them are essential and we need to invest in them too;
    - "We can and will make mistakes, but let's make new ones, not the ones we have made before …"

44. New and transformative collaborations are clearly needed to create new ways of working that are government-led, user-focused, ICT-enabled, and private sector

"New and transformative collaborations are clearly needed to create new ways of working that are government-led, user-focused, ICT-enabled, and private sector integrated."

integrated. Doing things differently will involve sacrifices: we need to stop thinking about who receives the credit; we need to let go of the seductive simplicity of only funding vertical programmes and we need to give up working within the comfort of existing silos. We are talking about a new type of collaboration – and although we do not know yet quite what that looks like, the upsides of changing how we work could be transformative.

Vincent Smith
Wilton Park | July 2015

Further References/Reading

2012 Health Information Policy and Strategies in the ECOWAS Region

https://drive.google.com/file/d/0Bx_rVtaLF0HoeTlEZlBpc1UyZVk/view?usp=sharing

The Principles of Digital Development Website (Case Studies and Resources)

http://digitalprinciples.org/

Training Health Workers for Ebola webinars- Series One: https://www.techchange.org/live-events/training-health-workers-for-ebola/

Training Health Workers for Ebola webinars- Series Two: https://www.techchange.org/live-events/training-health-workers-for-ebola-series-two/

World Health Organization Ebola Situation Reports: http://apps.who.int/ebola/ebola-situation-reports

A Wake-up Call: Lessons from Ebola for the world's health systems. Save the Children UK: http://www.savethechildren.org.uk/resources/online-library/wake-call-0

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