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Digital Financial Services for Health

A Global Evidence Review

LOCAL HEALTH SYSTEM SUSTAINABILITY PROJECT

Local Health System Sustainability Project

The Local Health System Sustainability Project (LHSS) under the USAID Integrated Health Systems IDIQ helps low- and middle-income countries transition to sustainable, self-financed health systems as a means to support access to universal health coverage. The project works with partner countries and local stakeholders to reduce financial barriers to care and treatment, ensure equitable access to essential health services for all people, and improve the quality of health services. Led by Abt Associates, the five-year project will build local capacity to sustain strong health system performance, supporting countries on their journey to self-reliance and prosperity.

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Acronyms

CCT	Conditional cash transfer
CGAP	Consultative Group to Assist the Poor
DFS	Digital financial service(s)
EMR	Electronic medical record
HMIS	Health management information system
ILO	International Labour Organization
IRR	Inter-rater reliability
LHSS	Local Health System Sustainability Project
LMIC	Low- and middle-income countries
MNO	Mobile network operator
NHIA	National Health Insurance Authority
OOP	Out-of-pocket
RCT	Randomized controlled trial
RQ	Research question
RSSB	Rwandan Social Security Board
SaaS	Software as a service
SMS	Short messaging service
UHC	Universal health coverage
USSD	Unstructured supplementary service data



Executive Summary

Background

Universal health coverage (UHC) is the ideal that all people have access to needed health services that are of sufficient quality to be effective, without risk of financial hardship. While many countries aspire to UHC ideals, achievement remains elusive; half of the world's population cannot access needed health services, 950 million people spend at least 10 percent or more of their household budget on health care expenses each year, and 100 million people are pushed into extreme poverty each year because of health expenses. However, the rapid proliferation of mobile telephones and advances in digital financial technology have created opportunities to accelerate progress toward UHC. These developments, particularly the widespread adoption of mobile money among the unbanked, have expanded financial inclusion in low- and middle-income countries and there is great potential for applications in the health sector.

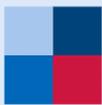
To identify these opportunities, the U.S. Agency for International Development (USAID) commissioned the Local Health System Sustainability Project to establish an evidence base on emerging models of digital financial services for health. Digital financial services consist of financial transactions, including banking (savings and loans), insurance, and payment services (remittances, transfers, user fees, and bulk payments) that can be accessed via digital channels such as mobile phones, electronic cards (credit, debit, and prepaid), vouchers, computers, and other electronic instruments. The objective of this review was to identify evidence of the impact of such services on financial protection, health service access and utilization, and health system quality, efficiency, and performance, and to identify underlying factors that contribute to their success or failure.

Methods

The review used two complementary methodologies: a systematic review of the peer-reviewed and gray literature, and interviews with expert stakeholders who work at the intersection of financial services, digital technology, and health.

To inform our research questions, we articulated a causal pathway for the impact of digital financial services on health. On the demand side, we theorized that digital financial services can increase financial resources for health and improve planning and participation in financial protection programs, such as health insurance. This would enable access to and use of health services, which in turn improves health outcomes. On the supply side, we theorized that the use of digital financial services in health facilities and across the health system creates operational efficiency and transparency. These efficiencies improve the quality and equity of care, leading to improved health outcomes. Based on this conceptual framework, we formed four research questions:

1. **Do digital financial services increase financial protection in low-resource settings?**
2. **Do digital financial services increase demand for or utilization of health services in low-resource settings?**



3. **Do digital financial services impact health system performance in low-resource settings?**
4. **What factors contribute to the success or failure of digital financial services for health?**

Results

The systematic literature review identified 34 documents from 12 sources, and we conducted interviews with 36 key informants from 26 organizations to enrich and qualify the evidence collected in the literature review. Most of the included documents focused on mobile money applications in health and were published in the last five years. Nearly half described activities in Kenya. The key findings for each research question are presented below.

Do digital financial services increase financial protection in low-resource settings?

- Mobile money accounts help people smooth health and non-health expenditures when faced with a health shock.
- Digital loans smooth health and non-health expenditures for populations who do not have access to alternative formal or informal health financing options.
- Digital platforms can facilitate participation in national health insurance.
- Digital platforms are key to scaling private health insurance, but financial protection impact is less clear.
- Digital financial services facilitate health saving for some populations.

Do digital financial services increase demand for or utilization of health services in low-resource settings?

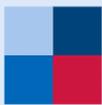
- Mobile money facilitates health care use in low-resource settings.
- Digital risk-coping strategies and health insurance are substitutes in terms of consumption smoothing but complements in terms of healthcare utilization.
- Digital conditional cash transfers facilitate health care use at scale.
- Mobile health wallets can facilitate health service use but more evidence needed.
- Pairing insurance and telemedicine increases health care engagement and value.

Do digital financial services impact health system performance in low-resource settings?

- Digitization of payments to health workers increases health system transparency, accountability, efficiency, and cost savings.
- Digitization of payments to health workers increases provider satisfaction.
- Digitization of health insurance processes results in operational and cost efficiencies.
- Digital financial services have the potential to improve service quality, equity, and coverage.
- End-to-end digitization improves facility performance and increases revenue.

What factors contribute to the success or failure of digital financial services for health?

- Clear regulations on digital banking, mobile money, and insurance protect customers and create opportunities for new product development.
- A political mandate or a national crisis can expedite a hospitable regulatory environment for digital financial services for health.



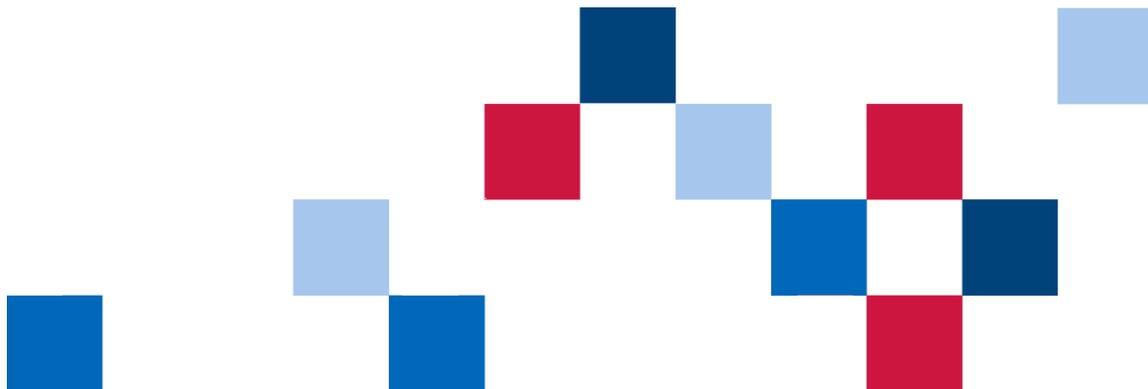
- Digital infrastructure can be a barrier to equitable uptake of digital financial services for health.
- Interoperability and digital payment ecosystems are key to expanding use of digital financial services.
- Innovations in the use of technology in health insurance may catalyze uptake.
- Digitization of parallel and upstream systems facilitate implementation of digital financial services.
- Leadership and dedicated resources are needed for the successful implementation of digital financial services in health facilities.
- Digitizing the claims process of a national health insurance program incentivizes digitization at the health facility level.

Conclusions & Recommendations

This review consolidated key evidence that indicated that while digital financial services for health are nascent, applications in health are gaining momentum and have great potential to increase financial protection and utilization of health services among beneficiaries, and improve health system efficiency and performance. The devastating global COVID-19 pandemic has further underscored the need for virtual transactions in the health sector and highlighted stark discrepancies in access to health care; it may ultimately serve as a catalyst for digital financial services for health. However, digital financial services do not yet fully bridge the digital divide, and approaches are needed to ensure that vulnerable populations who do not yet have access to or control over mobile phones or other digital mechanisms are not excluded.

Based on this evidence review, we offer the following recommendations for governments, donors, and implementing partners for investing in digital financial services for health:

- Invest in an evidence base for digital health insurance and product development.
- Build coalitions between governments, technology, health, banking/finance, and mobile industries.
- Ensure digital financial services for health are gender transformative.
- Develop a stage-based investment strategy for digital financial services for health.
- Develop integrated risk-management and hybrid engagement approaches to expand financial protection.



Introduction

Universal health coverage (UHC) is the ideal that all people have access to needed health services that are of sufficient quality to be effective, without risk of financial hardship (WHO 2019). UHC combines equity in service utilization, quality, and financial protection for individuals in need of health services. Financial protection is a foundational pillar of UHC and underscores the multidimensional financial risks and tradeoffs that individuals face in planning for and in seeking health services. However, UHC remains elusive; half of the world's population cannot access needed health services, and each year 950 million people spend at least 10 percent or more of their household budget on health care expenses and 100 million people are pushed into extreme poverty because of health expenses (WHO and The World Bank 2019). Solutions that can increase population health coverage, improve the efficiency of health services delivery, and decrease health costs are urgently needed.

Advances in digital technology and the rapid proliferation of mobile telephones and the Internet globally have created opportunities to accelerate progress toward UHC ideals. At the end of 2019, approximately 5.2 billion people (67 percent of the global population) had subscriptions to mobile services, and 3.8 billion people were users of mobile Internet (49 percent of the global population) (GSMA 2020a). By 2025, the global unique mobile subscriber penetration rate as a proportion of the population is expected to grow from 67 percent to 70 percent, representing a compound annual growth rate of 1.9 percent (GSMA 2020a). Even more impressive is the predicted 4.6 percent growth rate among mobile Internet users, who will jump from 49 percent to 61 percent of the global population. This explosion of access to and use of technology has facilitated greater inclusion in the global economy.

Mobile technology has already had an important impact on financial inclusion in low- and middle-income countries (LMIC) with the advent of mobile money in South Asia in 2001 and introduction in sub-Saharan Africa in 2007 (GSMA 2020b). Mobile money enables users to send, receive, and store money electronically using a basic mobile phone, and it is often described as the infrastructural “rails” for value-added services and more sophisticated digital financial services (DFS). DFS consist of financial transactions, including banking (savings and loans), insurance, and payment services (remittances, transfers, user fees, and bulk payments) that can be accessed via digital channels such as mobile phones, electronic cards (credit, debit, and prepaid), vouchers, computers, and other electronic instruments (Rohatgi, Galdava, and M'Bale 2018). As of 2019, there were 1 billion registered mobile money accounts in LMIC (GSMA 2020a). There is evidence that DFS have positive impacts on financial inclusion indicators including individual savings behaviors, access to financial services, ability to smooth consumption and respond to financial shocks, and ability to invest in income generating activities (Duvendack and Mader 2019; Karlan et al. 2016; Partnership for Finance in a Digital Africa 2019). As more people gain access to technology, there is growing interest in whether and how DFS can be leveraged to improve health and health systems.

DFS for health are DFS that are applied in a health context. Applications include: digital health insurance; health savings accounts; credit, transfers, remittances, and loans for health purposes; vouchers for health care; payments for health care/insurance by beneficiaries; and bulk purchases/payments across the health system, including payments to health workers.



For individual beneficiaries, DFS can facilitate savings for health events, reduce the transactional, opportunity, and out-of-pocket (OOP) costs of seeking health care, increase the accessibility, affordability, and convenience of health insurance, and improve timely access to essential health services (Meessen 2018; Haas et al. 2013; Rohatgi et al. 2018). For health facilities and systems, DFS have the potential to facilitate fast, transparent, and sustainable payments to health practitioners, including decentralized community health workers, increase administrative oversight and provider satisfaction, reduce waste and fraud in health systems, improve service quality, and generate data that can be used to inform policy, allocation of resources, and other health system decisions (Meessen 2018; Haas et al. 2013; Rohatgi et al. 2018). However, the evidence of DFS for health is fragmented, particularly in LMIC where DFS have the greatest potential for impact. The thin evidence on DFS for health reflects the fact that LMIC are still establishing enabling environments for DFS and are just beginning to explore benefits in the health sector. The next step is to expand the financial inclusion evidence base by investigating the potential impact of DFS on UHC.

Objectives

The Local Health System Sustainability Project (LHSS) was commissioned to establish an evidence base of the enabling factors and outcomes of emerging models of DFS for health and contribute guidance on why, how, and under what circumstances DFS contribute to UHC. The objectives of this review are to identify evidence of the impact of DFS on financial protection for health, health service access and utilization, and health system quality, efficiency, and performance, and to identify underlying factors that contribute to the success or failure of DFS. Using this evidence, we draw conclusions and recommendations for governments, donors, and implementing partners on whether, how, and under what conditions to invest in DFS for health.

Conceptual Framework and Research Questions

We developed a conceptual framework that articulates our theorized causal pathway for the impact of DFS on health (Figure 1). On the demand side, the utilization of DFS for health increases beneficiary financial protection and resources available for health, which enables access to and utilization of health services, which ultimately improves health outcomes. On the supply side, we theorize that the use of DFS creates operational efficiency and transparency in health facilities and health systems, which improves the quality and equity of care, which improves health outcomes. This framework motivated four research questions (RQs) around which we structured this evidence review.

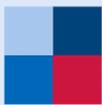
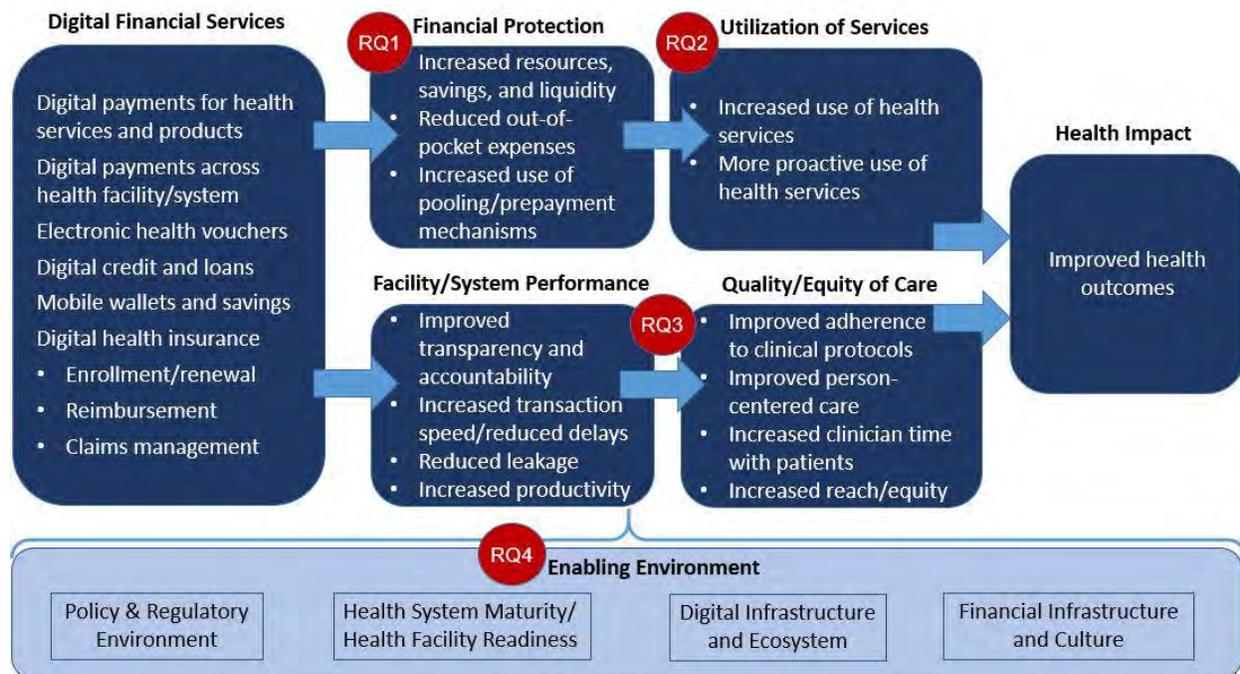


Figure 1. Conceptual Framework for DFS for Health



Research Questions

RQ1. Do digital financial services increase financial protection in low-resource settings?

RQ2. Do digital financial services increase demand for or utilization of health services in low-resource settings?

RQ3. Do digital financial services impact health system performance in low-resource settings?

RQ4. What factors contribute to the success or failure of digital financial services for health?

RQ1 seeks to understand the extent to which DFS such as digital health savings and digital health insurance increase financial protection, particularly in low-resource settings. Financial protection means that the prospect of or incurred OOP payments for health products and services, transportation costs, lost wages, and other health care-related costs should not prevent uptake of needed health services, push health care seekers into poverty or debt, force health seekers to forgo other essential goods and services such as food or education, or cause undue financial uncertainty or opportunity cost in the allocation of resources (Saksena, Hsu, and Evans 2014). RQ2 examines whether advancement of financial protection from the use of DFS also contributes to increased demand for or utilization of health services, particularly among poor and vulnerable populations. RQ3 investigates whether and how the application of DFS at the health facility or health system level improves efficiency, transparency, and accountability as well as the quality or equity of care. Finally, RQ4 explores the enabling environment and seeks to identify critical factors for the successful implementation of DFS for health. Pazarbasioglu et al. (2020) suggest that there are several areas where policymakers and other stakeholders can alleviate demand and supply side constraints to DFS. These include legal and regulatory frameworks, digital infrastructure, financial infrastructure, and ancillary government support systems, in this case health systems and associated technologies. We explore all four and expand to include social and cultural norms around finance, technology, and health.



Methodology

LHSS applied a descriptive study design to summarize global evidence around the key RQs. This evidence review included a systematic review of the literature, complemented by key informant interviews.

Systematic Review

A systematic review is a useful approach for methodically and transparently collecting and categorizing an evidence base in response to specific RQs and inclusion criteria. We conducted a systematic review to identify, synthesize, and qualify evidence in response to the RQs.

Inclusion Criteria

In order to cast a wide net for global evidence, we included documents that met the below criteria:

- Study or intervention must include at least one of the following DFS:
 - Digital payments to clinical facility, managers, staff, or beneficiaries from any source (user fees, government salaries, payer reimbursement, voucher reimbursement, donors, investors, creditors);
 - Mobile wallets and savings products for health;
 - Digital credit services for health; or
 - Digital health insurance enrollment, payments, and reimbursements.
- Study or intervention must provide evidence of one or more of the following outputs/outcomes:
 - Impact on individual or household financial resources for health;
 - Enrollment and/or retention for health applications or services;
 - Health service use or health-seeking behavior;
 - Provider, health facility, or health system performance with regard to clinical quality, responsiveness, or efficiency; or
 - Specific factors for success or failure of a DFS for health.
- Publication is a peer-reviewed article, program report, abstract, or other formal case study.
- Publication is available in English.
- Document was published between January 1, 2005 and June 30, 2020.

Documents were excluded if they met the following criteria:

- Describe a research protocol (research or intervention has not been completed);
- Only describe e-procurement systems;
- Is a blog or PowerPoint presentation; or
- Only summarize or restate the findings from another included study.

Sources and Search Strategy

Based on the subject matter of our RQs, we selected six peer-reviewed databases as the basis for our search: PubMed, EBSCO/Global Health, EBSCO/EconLit, Embase, Scopus, and Web of Science. We selected these databases for their relevance to health, social sciences, financing, and behavior. We also selected five searchable web-based evidence repositories: Consultative



Group to Assist the Poor (CGAP),¹ Better Than Cash Alliance,² the Evidence Gap Map,³ Nethope Solutions Center,⁴ and The World Bank InfoDev.⁵ We selected the web-based repositories because they included gray literature case studies on DFS for health while still offering a structured search engine. A search of Google Scholar was attempted but because of the unstructured nature of the search function and the inability to export documents, this was not feasible.

A review of the DFS Evidence Gap Map and the Alliance for Financial Inclusion basic terminology document informed our search terminology (AFI 2016; Partnership for Finance in a Digital Africa 2019). Included terms combined digital, financial, and health concepts. We tested numerous combinations of terms iteratively, including broader groupings and allowing for permutations of digital and financial terms. We initially tested some terms (such as “person-to-person” and “P2P”) that were ultimately excluded from the search because results were large and unrelated to DFS. For websites such as CGAP and the Better Than Cash Alliance, we only included the term “health” for a broad search. We conducted the searches between May and June of 2020 and exported results into Covidence systematic review software (Veritas Health Innovation n.d.).

Screening and Data Extraction

We developed the codebook and data extraction form iteratively between May and June 2020, informed by literature on DFS for health. Two reviewers conducted two rounds of inter-rater reliability (IRR) assessments during the initial title/abstract screening. In the first round, reviewers had an IRR of 86 percent and in the second round, reviewers had an IRR of 91 percent. For full text review, three reviewers participated in reviews of seven documents, with an IRR of 85 percent. IRR was lower than desired because of some disagreements around what constituted evidence versus extrapolated lessons learned. Disagreements were resolved with the use of a third reviewer at this stage.

Key Informant Interviews

To enrich and qualify evidence collected in the peer-reviewed and gray literature, we conducted interviews with key informants representing diverse perspectives, experiences, and expertise with DFS for health. Important contextual and operational lessons can be omitted in publications due to word limits, and important lessons about failures or null findings are often not published due to a bias that emphasizes positive outcomes. Purposeful selection of key informants ensures a more holistic description of the evidence, including failures and lessons learned, and broader geographical representation. We interviewed stakeholders in the fields of health insurance, financial inclusion, technical assistance, mobile technology, public health, and financial technology (fintech). A list of 36 key informants from 26 organizations is included in Annex A.

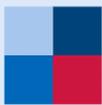
¹ <https://www.cgap.org/>

² <https://www.betterthancash.org/>

³ <https://egm.financedigitalafrica.org/>

⁴ <https://solutionscenter.nethope.org/>

⁵ <http://www.infodev.org/>

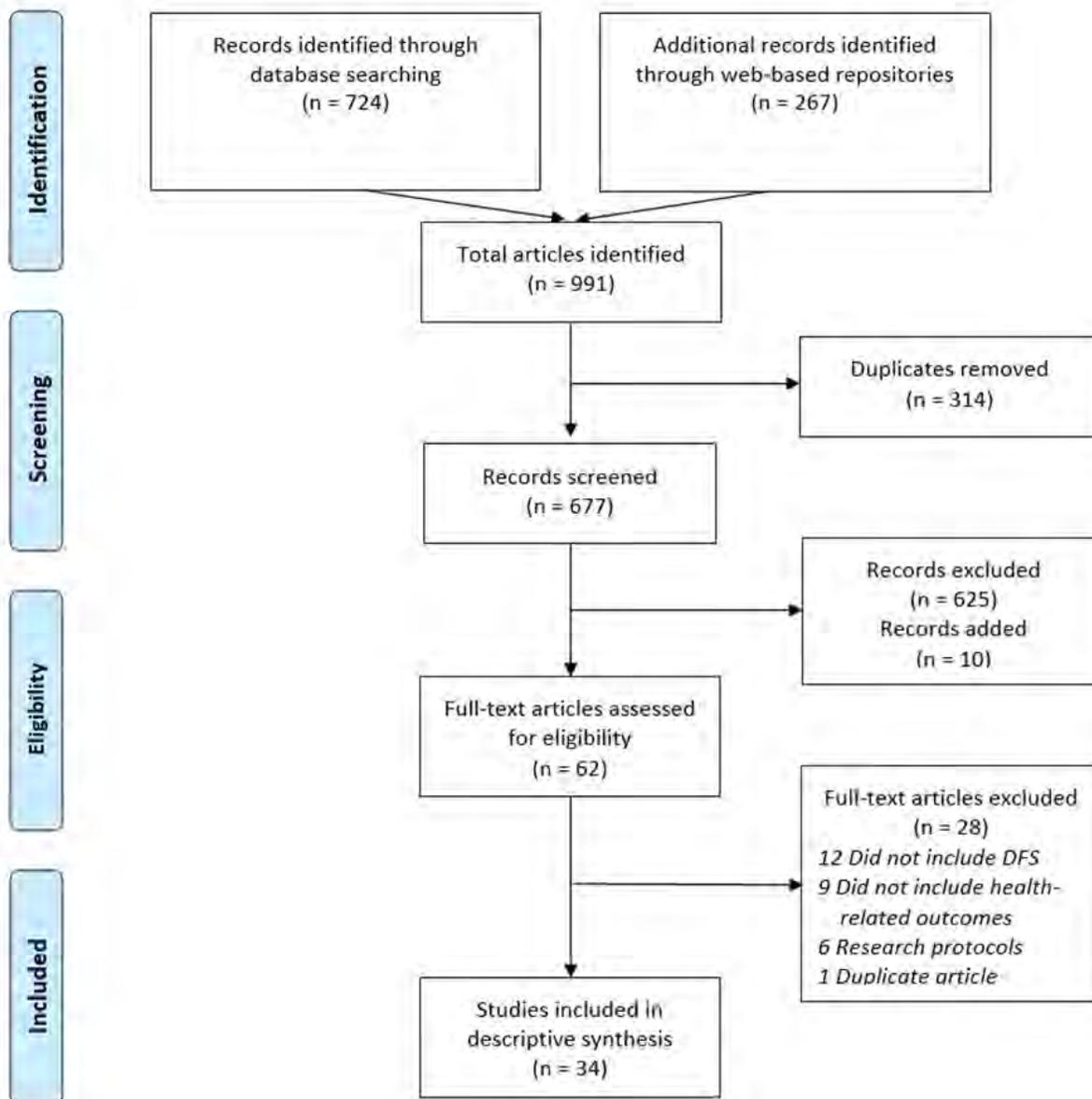


Results

Systematic Review Process

Our search returned 991 documents from 12 sources (Figure 2). After removing 314 duplicate articles, 677 articles remained, of which 625 were deemed irrelevant through a review of their abstracts and titles. We identified 10 additional articles through citation screening and key informant contacts. We screened 62 full text articles, of which we excluded 28 because they did not include a relevant DFS (12), did not include a relevant health outcome (9), were only a research protocol (6), or were a duplicate of an article that was already included (1). Ultimately, we included 34 documents for extraction.

Figure 2. PRISMA Diagram for Search Results





Characteristics of Included Documents

A table of key characteristics of the 34 included documents is presented in Annex B. Although we searched for documents from as early as 2005, the oldest included document was from 2011. Most documents (n=25) were published in 2015 or later, indicating that the field is nascent but that there is increasing interest in DFS for health. Unsurprisingly, given Kenya's robust mobile economy, near-ubiquitous mobile money infrastructure, and strong development presence, nearly half (n=15) of the documents described DFS in Kenya, and most were from sub-Saharan Africa. Four documents offered evidence from Bangladesh, Indonesia, the Philippines, and Brazil. Eight documents focused on rural settings, 10 focused on urban settings, and the rest included both urban and rural, were nationally representative, or did not specify.

In terms of DFS, 28 documents focused on some aspect of mobile money, including six documents that specifically focused on mobile health wallets (named or dedicated accounts). Three documents focused on electronic cards and three focused on various or unspecified DFS. In 16 documents, the purpose of the DFS was to help beneficiaries pay for health care. In 10 documents, DFS were used to pay health workers. Five documents examined the use of mobile money to enable conditional and unconditional cash transfers. Seven documents examined DFS as a way to finance or participate in health insurance. Some documents described multiple purposes.

About half (n=16) of the included documents focused on general health, including primary care, health insurance, aging populations, and upper respiratory infections. Nine documents focused on reproductive and maternal health, five on immunization and child health, and three on infectious diseases (Ebola, brucellosis).

Study Designs and Strength of Evidence

Twelve included documents were analytical studies that quantified the relationship between two or more factors (CEBM 2014). Of these, three were the most rigorous randomized controlled trials (RCTs) (Gibson et al. 2017; Haushofer and Shapiro 2016; Jones and Gong 2019). Four studies were analytical cross-sectional, three were case/control, and two were prospective cohorts. Analytical studies were more likely to be set in Kenya (n=8), and several compared mobile money users to non-users on a number of outcomes, including health care expenditure and insurance participation. Two of the RCTs evaluated interventions that included mobile money-enabled cash transfers in Kenya, with mixed results. The five studies with the largest datasets (1,600–6,000 participants/households) compared characteristics of users and non-users of mobile money and mobile money-enabled products in Kenya (Ahmed and Cowan 2019; Bharadwaj, Jack, and Suri 2019; Geng et al. 2018; Obadha, Colbourn, and Seal 2020; Suri, Jack, and Stoker 2012). Of the 22 descriptive documents, 10 were program reviews that did not describe a methodology, four relied on qualitative interviews, four relied on quantitative surveys, and four used mixed methods.

RQ1. Do digital financial services increase financial protection in low-resource settings?

- Mobile money accounts help smooth health and non-health expenditures.
- Digital loans smooth health and non-health expenditures for populations who do not have access to alternative formal or informal health financing options.
- Digital platforms can facilitate participation in national health insurance.
- Digital platforms are key to scaling private health insurance, but financial protection impact is less clear.
- DFS facilitate health saving for key populations.

Mobile money accounts help smooth health and non-health expenditures

Several rigorous studies compared mobile money users to non-users in terms of health care saving and expenditures (Ahmed and Cowan 2019; Bharadwaj, Jack, and Suri 2019; Geng et al. 2018; Ky, Rugemintwari, and Sauviat 2018; Suri, Jack, and Stoker 2012). These studies consistently found that mobile money users were better able to smooth health care consumption in the face of a health shock than were non-users (Ahmed and Cowan 2019; Geng et al. 2018; Suri, Jack, and Stoker 2012). While Ahmed and Cowan found that there were no differences in non-health expenditures between users and non-users in the face of health shock, Suri, Jack, and Stoker found that mobile money users were able to significantly increase overall consumption expenditures by 12 percent in the face of unexpected illness, whereas non-users reduced overall consumption by 3 percent. Specifically, Suri, Jack, and Stoker found that mobile money users were able to increase spending on medical, food, and other subsistence expenditures and maintain spending on education, while non-users covered their medical expenses by reducing expenditures on education. The results from Ahmed and Cowan were consistent with these results and found that mobile money users spent 63 percent more per capita on health care than non-users during a health shock. Suri, Jack, and Stoker also found that even the mere geographic proximity of a household to a mobile money agent was significantly and positively correlated with the household's propensity to spend money on health care following an illness. A smaller, non-controlled but more recent study by Geng et al. among 184 rural dairy farmers in western Kenya found similar results to Suri, Jack, and Stoker and hypothesized that mobile money as a technology was unlikely to drive results but was instead an indicator of greater access to cash, savings, and gifts. While Suri, Jack, and Stoker hypothesized that mobile money affects user expenditure by serving as a microsavings device for remittances, these studies did not specifically examine the source of financing, instead attributing the impact of mobile money to its ability to facilitate convenient, fast, safe, and inexpensive transactions.

Digital loans smooth health and non-health expenditures for populations who do not have access to alternative formal or informal health financing options

Bharadwaj, Jack, and Suri (2019) extended this evidence by examining the potential for mobile money to facilitate access to formal digital loans to improve household resilience to negative shocks. They evaluated the M-Shwari product, a fully digitized bank account in Kenya operating on the rails of mobile money that offers approved customers access to small, short-term loans even if they do not have credit history. The study found that demand for this product was high; in the first two years, there were more than 4.5 million active users representing nearly 20 percent of the adult population. In terms of financial protection, households who were eligible for a loan were less likely to forgo expenses on medicine, food, and other subsistence items.



Bharadwaj, Jack, and Suri also found that that a large proportion of digital loans were spent on medical care and effectively smoothed expenditures on education, which would have otherwise decreased. The study examined possible negative consequences of facilitating access to loans and credit by examining the total interest paid on digital and non-digital loans and found that there was no difference in interest burden. One important conclusion was that the extension of credit to broader populations was made possible because loans accessed through mobile phones reduced the administrative costs for the lender and subsequently lowered the cost of credit to borrowers. Ultimately, the study concluded that mobile money in general and M-Shwari in particular is an important mechanism for extending access to credit to populations who do not have access to alternative formal or informal health financing options.

Digital platforms facilitate participation in national health insurance

There is evidence that digital platforms increase financial protection by facilitating participation in national health insurance schemes (Obadha, Colbourn, and Seal 2020; Dalal, Morgan, and Nanda 2019). In Ghana, the International Labour Organization (ILO) partnered with the National Health Insurance Authority (NHIA) to digitize the insurance renewal process with a dedicated unstructured supplementary service data (USSD) application that allows members to use mobile money to pay premiums and renew their membership (Dalal, Morgan, and Nanda 2019). This digital process exponentially increased the number of renewals; in the four months after the launch, 1.44 million mobile renewals were completed. In addition to renewals, the number of new member registrations also increased by 200,000 in the first quarter of 2019, compared to the same periods in 2017 and 2018. Increased renewals and new registrations were attributed to reduced wait times and transport and opportunity costs. In addition to access, the NHIA reported that on average, members saved over 11 hours and 4.2 GHS (USD \$0.75) annually when they renewed via mobile instead of in person (Dalal, Morgan, and Nanda 2019).

An analytical study using data from more than 4,000 individuals in rural Kenya found that 16 percent of mobile money users were enrolled in the National Hospital Insurance Fund compared with only 2 percent of non-users, and that the use of mobile money increased the probability of being enrolled in the Fund by 4.6 percent even after controlling for demographic factors including phone ownership, sex, age, education, wealth, bank account access, occupation, and health shocks (Obadha, Colbourn, and Seal 2020). As with Dalal et al., the authors attributed this difference to reduced travel time and lower transport costs that result from the payment of premiums through mobile money. The results of this study indicate that DFS can mitigate high transaction costs for enrollment and monthly premiums and increase enrollment even in voluntary health insurance programs, particularly in rural areas. However, the authors noted that use of mobile money itself was not equitable; mobile money users were more likely to be wealthier, more educated, and more financially informed. This barrier to financial inclusion and participation in health insurance highlights the importance of considering the “digital divide”, or who has access to or control over digital technology including mobile phones.

Public health insurance informants noted that digital platforms can help extend subsidized public health insurance programs to larger populations, conditional on mobile access (Lagos State Health Management Agency, CarePay, ILO). Providing financial protection to the poorest will inevitably require public sector and donor subsidies. The efficiencies inherent in digital technology that allow health insurance programs to reach millions of beneficiaries can reduce the cost of providing subsidies but are unlikely to entirely offset the considerable costs of financial protection schemes that include members of the poorest and most vulnerable populations. But because of its transparency, DFS could help attract donations from governments, donors, or even individuals interested in financing health care for the poor. In this regard, DFS play another key role in extending financial protection and facilitating targeted



distribution of government and donor subsidies. However, the caveat remains that if marginalized populations do not have equitable access to digital platforms, they may not benefit from these subsidies.

Digital platforms are key to scaling private health insurance, but financial protection impact is less clear

Key informants universally concurred that digital financial platforms are key to scaling up health insurance and extending financial protection programs to the underserved. Informants from MicroEnsure, AXA, Digital Healthcare Solutions, BIMA, and CarePay pointed out that digital platforms enable them to reach and serve millions of beneficiaries with financial products in a way that would not be feasible with paper-based enrollment, renewal, and claims processes. Private health insurance stakeholders noted that digital platforms create efficiencies that reduce the cost of offering insurance. This in turn can result in lower-cost private health insurance products which are more affordable to larger underserved populations.

However, some informants cautioned that scale does not always result in financial protection impact or in a financially sustainable business model (EA Consultants, MicroEnsure). One private sector model that has received a lot of attention is the “freemium” model often offered by mobile network operators (MNOs) in which an MNO customer becomes eligible for a free insurance product, often hospital cash, if the customer meets certain usage thresholds (such as maintaining a certain balance of airtime or using a certain amount of data on a monthly basis) (GSMA 2018; Rohatgi et al. 2018). MNOs offer the freemium product to differentiate themselves from competitors and insurers hope that introducing the concept of insurance to first-time buyers will create opportunities to upsell customers on additional health insurance products and services. Informants agreed that the freemium model has benefits but noted several limitations. First is that free products tend to have low impact in that either they don’t serve the needs of most of the covered population or don’t offer enough value to protect against catastrophic health costs. Second is that the conversion rates to paid products may not be as high as hoped, particularly among low-resource and underserved populations. Third is that while MNOs have demonstrated that they can enroll impressive numbers of people in these programs, many customers still do not actually understand their coverage and therefore may not benefit from financial protection.

While it seems clear that digital platforms are an operational necessity for scaling health insurance, not all studies found associations between DFS and participation in voluntary health insurance. Geng et al. (2018) compared enrollment in an unsubsidized community-based health insurance scheme between users and non-users of mobile money among 184 rural dairy farmers in western Kenya and found no difference in household health insurance enrollment (never, sometimes, always insured).

DFS facilitate health saving for key populations

A 2014 cross-sectional survey of 405 individuals in Burkina Faso found that the propensity to save for health emergencies was more than twice as high for mobile money users than for non-users, even when controlling for socioeconomic and educational factors (Ky, Rugemintwari, and Sauviat 2018). In contrast, there was no difference between mobile money users and non-users for general saving behaviors. Ky, Rugemintwari, and Sauviat also examined the propensity to save within various vulnerable populations. They found that while the use of mobile money does not affect the savings behavior for relatively advantaged groups (urban, male, highly educated), mobile money use does significantly increase the probability of saving for health emergencies among rural, female, and less-educated individuals, whose propensity to save is three, six, and four times higher, respectively, for mobile money users.

Three studies examined digital savings mechanisms for maternal health and delivery in Kenya and Madagascar, with mixed findings (Muller et al. 2019; Muller et al. 2020; Woodman et al. 2013). A process evaluation of a digital smartcard intended for maternal health and delivery savings (Changamka) in Kenya found that 89 percent of 2,909 women only used the card on the first day that it was obtained, and 40 percent reported that they did not have enough money to save (Woodman et al. 2013). In Madagascar, a mixed-methods study and a qualitative study explored facilitators and barriers to the implementation of a mobile health wallet for pregnancy-related care but did not evaluate the impact of the wallet on other outcomes of interest to this report (Muller et al. 2019; Muller et al. 2020). All three studies reported that participants expressed interest in having a digital savings tool but noted that participants who accepted the smartcard or used a mobile health wallet reported higher household and health expenditures (Kenya) or higher wealth (Madagascar), higher education levels (Kenya and Madagascar), and were more likely to have health insurance (Kenya). These data imply that digital savings mechanisms may not serve the most vulnerable or poorest populations, at least initially.

RQ2. Do digital financial services increase demand for and/or use of health care in low-resource settings?

- Mobile money facilitates health care use in low-resource settings.
- Digital risk-coping strategies and health insurance are substitutes in terms of consumption smoothing but complements in terms of health care utilization
- Digital conditional cash transfers facilitate health care use at scale.
- Mobile health wallets can facilitate health service use, but more evidence is needed.
- Pairing insurance and telemedicine increases health care engagement and value.

Mobile money facilitates health care use in low-resource settings

Mobile money was the primary digital financial mechanism to be evaluated in the context of health care demand and utilization (Ahmed and Cowan 2019; Geng et al. 2018; Gyasi, Adam, and Phillips 2019; PharmAccess 2015). One rigorous study of 1,600 rural households in western Kenya found that mobile money users were 50 percent more likely to buy medication, were almost twice as likely to pay consultation fees, and used more formal health care facilities than non-users (Ahmed and Cowan 2019). This finding indicated that DFS can be an effective tool for facilitating health care use. The authors suggested that mobile money as an informal channel of credit could lead to timely diagnosis, prevention, and treatment of disease. Another study reiterated this finding when it reported that among rural dairy farmers in western Kenya, mobile money users were significantly more likely to have a visit to a health facility in a given week compared to non-users (Geng et al. 2018). This study went on to find that mobile money users who have insurance were significantly more likely to use health care than non-users who had insurance. A retrospective case/control study among older adults in Ghana supported the finding that mobile money account ownership was associated with increased use of health services (Gyasi, Adam, and Phillips 2019). In an interesting contrast, the study found that unlike mobile money account ownership, ownership of a bank account did not affect use of health services. In another study, while the M-Shwari digital loan product in Kenya was not specifically designed for health, households often reported spending the loan on health emergencies, and households with access to digital loans were less likely to report forgoing any health services (Bharadwaj, Jack, and Suri 2019).



Digital risk-coping strategies and health insurance are substitutes in terms of consumption smoothing but complements in terms of health care utilization

One study of 184 rural dairy farmers in western Kenya examined whether mobile money and health insurance act as complementary or substitutional health financing mechanisms (Geng et al. 2018). The study used household and week fixed effects to control for variables that do not change or only change consistently over time such as wealth and gender. The study found that enrollment in voluntary health insurance increases the probability that mobile money users will seek high-quality care at a formal health care facility, and that health insurance does not reduce income from informal insurance mechanisms, suggesting that while informal risk-coping strategies and health insurance are substitutes in terms of consumption smoothing, they are complements in terms of health care utilization. The study went on to suggest that machine learning techniques might be able to predict households' ability to cope with health shocks and the impacts of health insurance on the basis of mobile money usage patterns.

Digital conditional cash transfers facilitate health care use at scale

It is already well substantiated in the global literature that conditional cash transfers (CCT) are an effective financing mechanism for encouraging health service utilization and improving health outcomes, but there is a more limited examination of the role that digital platforms play in expanding this access (Gaarder, Glassman, and Todd 2010). The Bolsa Familia CCT program in Brazil was the largest in the world, covering nearly 47 million people when it closed in 2018 (The World Bank 2020). The program relied primarily on an electronic card through which the funds were transferred. A search of PubMed returned nearly 60 peer-reviewed articles documenting positive social welfare, financial protection, health service utilization, and health impact outcomes of this one program. Most articles did not focus on the digital nature of the CCT card. We included one analytical evaluation that found that the program significantly increased well-child visits and vaccination rates, as well as psychosocial health and that mentioned the card (Shei et al. 2014). This study serves as evidence that digital platforms can support a CCT program at scale in the South American context, including for low-resource populations.

An RCT of a Kenyan CCT program found that offering mobile money cash transfers paired with short messaging service (SMS) messages to rural Kenyan caregivers of an infant significantly improved the proportion of children who were fully vaccinated at one year compared to caregiver-infant pairs who did not receive these interventions (Gibson et al. 2017). Underscoring the importance of the mobile cash transfer to the health care utilization/coverage outcome was the finding that SMS (behavior change communication) alone did not significantly improve the proportion of children who were vaccinated. The study did not compare cash-based transfers to mobile money transfers, so it does not provide evidence as to which types of populations might be able to benefit from a digital vs. a cash-based intervention. Further complicating the interpretation was the fact that when asked what factor most influenced their decision to vaccinate their child, only 8 percent cited the mobile CCT while 47 percent cited the SMS (Wakadha et al. 2013). An unconditional cash transfer program in Kenya and Tanzania which used mobile money to support transport costs for fistula repair reported a 60 percent increase in patients over the previous year since the initiation of the M-PESA cash transfer program, but it did not specify whether other factors may have also contributed to this increase (Bangser 2011).

Mobile health wallets can facilitate health service use, but more evidence is needed

A descriptive, mixed-methods assessment evaluated a mobile health wallet (M-TIBA) in Kenya that included a KES 1,000 (USD \$10) deposit in the wallet which could be used at pre-qualified clinics (PharmAccess 2015). The assessment had mixed findings on the ability of the wallet to

facilitate health care utilization among low-resource populations. On the one hand, program data showed that 100 percent of the nearly 5,000 individuals registering for mobile health wallets were female, 54 percent had only primary education or less, and most were categorized as poor or very poor, indicating that wallets were reaching and being accepted by key demographics. Additionally, seven of 50 interviewed users reported that the wallets facilitated early health-seeking behavior. On the other hand, utilization of the wallet was low, with only 33 percent of wallets being used within two months of the cash transfer. Non-users did not use the benefits for a variety of reasons, including that their child had not been sick, they had lost their log-in information, they did not understand the transaction process, and other logistical and informational reasons.

However, in interviews with CarePay and PharmAccess, informants noted that M-TIBA has rapidly scaled since the study in 2015, and as of 2020, there were 4.7 million individuals on the platform. They went on to note that utilization increased from approximately 60,000 hospital visits in 2017 to nearly 500,000 hospital visits in 2020. Informants also noted that they would be interested in partnering with donors and implementing partners to use their data to objectively measure financial protection and service utilization impact metrics, in addition to sharing descriptive service statistics and implementation lessons.

Pairing insurance and telemedicine increases health care engagement and value. While telemedicine is not a particularly novel concept, informants were enthusiastic about bundling telemedicine and insurance as a way to increase engagement with beneficiaries and efficiently satisfy demand. Insurers like BIMA, MicroEnsure, AXA, and Digital Healthcare Solutions view telemedicine as an inexpensive way to provide immediate, tangible benefits to health insurance clients as part of a larger package of health services that can be paid for electronically. An insurance informant from AXA described their partnership with Alodokter, a mobile health company in Indonesia that offers free medical chat consultations through their mobile application. The partnership introduced and cross-promoted hospital cash insurance products to Alodokter customers and integrated an e-claims module in the app. An informant formerly from Telenor Health, now Digital Healthcare Solutions, described the synergies between telemedicine and DFS and suggested that pairing the two services had led to increased utilization and increased access to health services. Specifically, the company had recently launched a pilot for customers of a micro-lender in Bangladesh and found that 40 percent of subscribers were using the telemedicine service within the first week and the chat function was getting 250,000 contacts per day. The product also reportedly increased the amount of time that beneficiaries spent with providers from approximately 20 seconds (due to incredibly low doctor-to-patient ratio in villages) to approximately four minutes. The informant also suggested that data showing the locations from which beneficiaries are calling suggested that the bundle increased access to health care services because there are no known health care providers in many of the remote geographic areas.

RQ3. Do digital financial services impact health system performance in low-resource settings?

- Digitization of payments to health workers increases health system transparency, accountability, efficiency, and cost savings.
- Digitization of payments to health workers increases provider satisfaction.
- Digitization of health insurance processes results in operational and cost efficiencies.
- DFS have the potential to improve service quality, equity, and coverage.
- End-to-end digitization improves facility performance and increases revenue.



Digitization of payments to health workers increases health system transparency, accountability, efficiency, and cost savings

There was substantial evidence that the use of DFS to pay health workers can increase health system accountability and efficiency, while reducing costs (Assogba 2017; Bangura 2016; Haas et al. 2013; Sock, Mvondo, and Mensah 2018; Webb 2015; Burke et al. 2017; Dnet 2014). The digitization of payments to Ebola response workers by the government and other agencies in Sierra Leone is often pointed to as strong evidence that DFS support health system efficiencies (Webb 2015; Bangura 2016). The transition to digital payments reportedly shortened the delivery time of payments to response workers from one month (on average for cash payments) to one week (on average for digital payments). As a result of the more timely payments, health worker strikes were dramatically reduced from an average eight per month to zero (gain of 800 working days), which increased productivity (Bangura 2016). Digitizing payments to Ebola response workers in Sierra Leone resulted in a cost saving of US\$10.7 million between December 2014 and January 2016. This saving was achieved through a combination of increased accountability and decreased operational costs. Specifically, digitizing payments led to the identification and removal of more than 3,000 duplicate provider records and 300 fraudulent payment recipients (Webb 2015). Digitization also removed costs associated with cash payment operations and reduced travel costs for health workers (Webb 2015; Bangura 2016).

In Bangladesh, Dnet estimated that it saved between 23,000 and 38,000 taka (USD \$300–\$485) each month using mobile money instead of cash for 1,000 community health agents who identify, motivate, and register expecting and new mothers for maternal health care services in the Aponjon program (Dnet 2014). The program also noted that switching to mobile payments reduced administrative processing time from 41 days to 11 days and the program was better able to track whether beneficiaries received their payments in full or if their supervisor/organization had kept a portion of the payment. The use of mobile money to pay incentives was also reported to reduce administrative costs and improve accountability and oversight for program administration of community health extension worker referrals in Zanzibar (D-tree) and reproductive health vouchers in Madagascar (Marie Stopes Madagascar) (Haas et al. 2013; Burke et al. 2017).

Digitization of payments to health workers increases provider satisfaction

In interviews with 852 Ministry of Health field staff in Benin who were paid through mobile money, about 78 percent of participants reported being satisfied with the mobile money platform (Assogba 2017). The study found that most participants reported that payment through mobile money was easy (90 percent), fast (82 percent), and safe (89 percent). However, health providers also reported delays in receipt of per diem (31 percent) and cash unavailability or slow service in some mobile money service delivery points (59 percent). Despite the problems reported, almost all the participants (91 percent) reported that mobile money was the best way to be paid. In Madagascar, providers were reportedly satisfied with mobile money-facilitated rapid and direct claims reimbursements, which led to increased provider engagement with the program (Corby 2012). Bangura also reported that providers in Sierra Leone were very satisfied with the transition from cash to digital payments during the Ebola crisis (Bangura 2016). Finally, in Kenya, all 50 interviewed providers at facilities accepting M-TIBA payments rated their experience as positive, citing the security and speed of making claims and receiving payments, as well as the spillover benefit of attracting new customers through active marketing (PharmAccess 2015).



Digitization of health insurance processes results in operational and cost efficiencies

The NHIA in Ghana implemented a mobile insurance renewal process in 2017 and found that the digital solution increased program income, reduced administrative and transaction costs, and improved claim management (Dalal, Morgan, and Nanda 2019). The NHIA estimated that the annual savings from this initiative could reduce the National Health Insurance Scheme's annual deficit by up to 25 percent, which would be a significant contribution to securing scheme sustainability. In the MicroEnsure/Tigo model launched in Tanzania in 2012, switching from paper to mobile claims payments facilitated reduced claims processing time from 11.0 to 3.2 days (Haas et al. 2013). More speculatively, in Senegal where approximately 83 percent of transactions across all government social programs are made in cash, the digitization of Agency for Universal Health Coverage (ACMU) payments was identified as an opportunity to broaden financial inclusion among 3 million beneficiaries and save the administration up to \$129 million CFA (approximately US\$232,000) (Sock, Mvondo, and Mensah 2018).

DFS have the potential to improve service quality, equity, and coverage

One case study reported that service providers participating in a voucher program in Madagascar who were paid within a few days with mobile money, instead of weeks or months with standard cash payments, were reportedly more motivated to comply with quality checklists around family planning counseling and service provision (Haas et al. 2013). In Kenya, M-TIBA digital claims data for payments to providers facilitated the identification of over-prescription of antibiotics for acute respiratory tract infections, creating an opportunity for quality improvements (Mekuria et al. 2019).

Key informants from PharmAccess and CarePay spoke about the benefits of digital financial platforms in general, and M-TIBA specifically, for increasing health facility efficiency and reducing the cost of care. CarePay cited a reduction in the cost of care (utilization: claims ratio) of 20 percent due to increased transparency and efficiency of the M-TIBA platform and noted that claims are processed 26 times faster, which leads to faster payment and improved operations. Additionally, informants noted that M-TIBA creates real-time visibility on utilization and quality of care by tracking visits, treatments, diagnoses, costs, and referrals. PharmAccess cited an example from their Connected Diagnostics program which identified differing antimalarial prescription behavior by providers and approximately 30 percent of over-prescription by connecting digital diagnostics equipment to the payment platform. In addition to improving service quality, the M-TIBA platform engaged patients more fully in their care and financial decisions by transparently updating patients in real-time about the costs that they incur for specific procedures.

End-to-end digitization improves facility performance and increases revenue

Until 2014, Bushenge Hospital, a rural public provincial hospital in Rwanda, faced several operational challenges. One challenge was that all records were paper-based. This meant that departments could not easily share information, leading to a lack of continuity of patient care. A second challenge was that because there was no information system, claims sent to the Rwandan Social Security Board (RSSB), which covers 85 percent of the population, were often disputed and many valid charges went unpaid.

In 2014, Bushenge Hospital piloted the digitization of electronic medical records (EMR), billing, and accounting (and later added a health management information system (HMIS) and other reporting systems) as a way to improve the quality of services and increase revenue. This pilot had several important results. First, digitization increased the transparency of billing, which led to less leakage, contention between patients and the hospital, and disputes between the hospital and the RSSB. This led to a reported 100 percent increase in revenue and also sped up the processing of claims and payments. The additional revenue was used to pay for operational, maintenance, and improvement costs including performance-based financing programs to attract, retain, and incentivize staff to provide quality services. The digitized systems also reduced wait times for patients, which improved their experiences and increased demand for the services at the hospital. While the digitization improved the transparency of costs for patients, the digitization process did not reduce the prices of services at the facility (all additional revenue was reinvested in the hospital). Ultimately, the facility became a model for facility digitization in Rwanda.

-Dr. Zuberi Muvunyi, Director General of Clinical and Public Health Services in the Ministry of Health in Rwanda, former Director General of Bushenge Provincial Hospital

RQ4. What are the barriers and enablers for digital financial services for health?

Political and Regulatory Environments

- Clear regulations on digital banking, mobile money, and insurance protect customers and create opportunities for new product development.
- A political mandate or a national crisis can expedite a hospitable regulatory environment for DFS for health.

Clear regulations on digital banking, mobile money, and insurance protect customers and create opportunities for new product development

Many of the meaningful guidelines that are foundational to developing a hospitable regulatory environment for DFS are not specific to a health context. For example, Pazarbasioglu et al. (2020) suggested that there are four key regulatory reforms needed for DFS development and adoption:

1. Enabling non-banks (often MNOs) to offer e-money products through special licensing or partnering with a bank.
2. Enabling fair and transparent competition.
3. Ensuring consumer protection by:
 - a. creating a balance between ease of consumer access to financial products and predatory financial practices; and



- b. introducing new laws on data protection and privacy (particularly relevant for DFS for health).
4. Fostering demand for DFS and confidence among consumers through government adoption and use of DFS and simplification of registration.

Included documents also primarily referenced regulatory issues that were not unique to health, but since they were directly referenced in relation to the development and implementation of DFS for health, they are highlighted here (Bangura 2016; Haas et al. 2013; Sock, Mvondo, and Mensah 2018; Yehualashet et al. 2016; Zimmerman and Bohling 2013). Two documents focused on the institutionalization of digitized payments; these documents concluded that legal frameworks which articulate and enforce clear mobile money guidelines, avert network management issues (such as fraudulent or exorbitant agent fees), and provide effective redress mechanisms are critical enablers of DFS acceptance (Bangura 2016; Sock, Mvondo, and Mensah 2018). Sock, Mvondo, and Mensah (2018) suggested that regulation is necessary for the development and improvement of the supply of financial services. They also suggested that regulation should establish reasonable levels of transactions costs to avoid exploitation, improve access to DFS in underserved areas, and encourage development of DFS that respond to the needs of consumers.

Insurance informants from MicroEnsure, Digital Healthcare Solutions, BIMA, CarePay, and others noted that regulatory frameworks could either provide useful guidance and structure for digital health insurance products or could cause unnecessary delays and complications. An informant from PharmAccess commented that in general, insurance regulators do not have specific regulations pertaining to microinsurance products, yet the existing rules for regular health insurance products may not fit well with the needs of low-income groups (e.g., frequency of premium payments) or digital products (e.g., physical insurance policies). Another example of a way in which regulators can inhibit DFS expansion is by limiting how much can be paid through airtime, which can complicate insurance premium payments for mobile loyalty products that are not yet using mobile money platforms for transactions. This can be problematic for mobile microinsurance products because, as noted by MicroEnsure, consumers tend to be much more willing to pay for health insurance products using airtime balances than other forms of payment. It can also limit upselling of full coverage products.

In Bangladesh, mobile-enabled health insurance is regulated both by the telecommunications authorities and the Ministry of Health. However, because there are no joint regulations, both entities need to be consulted on products, causing delays and misalignment of approvals. Digital Healthcare Solutions noted that clear frameworks or guidelines would ensure consumer protection and prevent competitors from undercutting the market by offering poor-quality products and services in this space. These types of regulations would open up opportunities to scale and increase trust in the products offered.

A political mandate or a national crisis can expedite a hospitable regulatory environment for DFS for health

Included documents and key informants indicated that a political mandate or health crisis has often served as an impetus to establish key frameworks and policies governing DFS and their use in the health context (Bangura 2016; Yehualashet et al. 2016; Zimmerman and Bohling 2013; Webb 2015). For example, in the Philippines, there was a sudden, unexpected political mandate to scale up a digital cash transfer/social protection program very early on in the pilot. Although this caused inception challenges, it also led to the successful expansion from an intended 6,000 participants to 4 million participants (Zimmerman and Bohling 2013). In Sierra Leone, the Ebola crisis presented an urgent need for automated health care worker payments

and therefore the decision to digitize payments to health workers came before the establishment of a legal framework (Bangura 2016). The Bank of Sierra Leone actually issued mobile money guidelines for the first time in November 2015 after the successful implementation of hazard payments to health care workers during the Ebola crisis. Implementation of these guidelines facilitated effective redress and was necessary for boosting acceptance of digital payments among health workers (Bangura 2016). In addition to political and regulatory frameworks, partnerships (including public-private partnerships) were cited as crucial to the success of digitizing payments for health workers (Webb 2015). Bangura found that difficulties with interagency coordination, consumer protection/education, and mechanisms for payment redress were challenges, but could be addressed through multilateral stakeholder coordination (for example, a hazard committee was established to facilitate cooperation).

Several stakeholders pointed out that the global COVID-19 pandemic in 2020 created unprecedented opportunities for the development of enabling regulations on DFS. An informant from the Inter-American Development Bank noted that governments like Brazil and Colombia, which have fostered clear regulatory guidance, digital access, and digital ecosystems, are reaping the benefits of early investments and are able to use DFS for direct stimulus payments and subsidies to nearly a third of the population (Brazil). Regulators in many other countries are taking note.

Digital Infrastructure and Ecosystem

- Digital infrastructure can be a barrier to equitable uptake of DFS for health.
- Interoperability and digital payment ecosystems are key to expanding use of DFS.
- Innovations in the use of technology in health insurance may catalyze uptake.

Digital infrastructure can be a barrier to equitable uptake of DFS for health

Digital infrastructure, including mobile phone ownership, mobile money enrollment, network connectivity, and cash points, was widely acknowledged as a foundational component to the success or failure of DFS, although not specifically in the health context. In most documents, the digitizing mechanism was a mobile phone rather than a card or other digital mechanism. While the use of mobile phones has the potential to expand access to financial services for health, many articles also acknowledged that uptake of DFS for health (and in general) is also limited by mobile phone ownership and network coverage (Adaba, Ayoung, and Abbott 2019; Assogba 2017; Smith et al. 2019; Zimmerman and Bohling 2013; Burke et al. 2017). In Madagascar, a reproductive health voucher program originally intending to use SMS e-vouchers decided to add a paper component to reach younger women in rural areas (Burke et al. 2017).

Marie Stopes Madagascar initially envisioned the youth voucher exclusively as an SMS-based mobile voucher... However, the study also highlighted the need for an alternative strategy as only 20 percent of respondents under the age of 20 years possessed a mobile phone. In addition, remote parts of Madagascar have limited access to phone network coverage. To maximize the program's reach, Marie Stopes Madagascar adapted its voucher distribution system to include a paper voucher component
-Burke et al. 2017



Even in the Philippines, where there is reportedly 105 percent cell phone penetration and mobile operators claim 100 percent network coverage, the digital GCASH program found that only 20 percent of intended recipients in payout areas had a phone (Zimmerman and Bohling 2013). Issues frequently reported with mobile money included: difficulty withdrawing money due to poor network coverage; slow or unstable Internet connection; and unavailability of cash withdrawal points. Phone ownership and network coverage were not the only infrastructure challenges cited. Payee list management technology, unique digital identification for DFS enrollment, liquidity, and access to cash points and agent networks were also cited as major barriers. Some studies temporarily created access to mobile money agents, but noted that when the intervention ended, interest in using DFS diminished (Ommeh et al. 2016; Yehualashet et al. 2016). Obadha, Colbourn, and Seal (2020) found that travel time and any amount of travel costs to the nearest mobile money agent was significantly associated with a decreased probability of using mobile money. Informants from EA Consultants, the ILO, and the Grameen Foundation emphasized that digital approaches should not be exclusively used in health financing because of the potential to exclude poor, female, and vulnerable populations.

Despite this, five studies concluded that individuals can benefit from DFS for health even if they do not have a mobile money account or a mobile phone, as long as there is high enough penetration that someone in their immediate social/familial circle has an account or phone (Adaba, Ayong, and Abbott 2019; Bangser 2011; Gibson et al. 2017; Wakadha et al. 2013; Dalal, Morgan, and Nanda 2019). For example, the NHIA in Ghana based its renewal process on USSD technology, which means that beneficiaries do not need to have access to mobile Internet data services or own their own phone; they can access the platform to check membership at any time with even the most basic phone (Dalal, Morgan, and Nanda 2019).

Interoperability and digital payment ecosystems are key to expanding use of DFS

One lesson from the digital health worker payment program in Sierra Leone was the importance of establishing financially inclusive accounts and other infrastructure which enabled recipients of digital payments to use those funds to pay for food and other essential goods and services digitally (Bangura 2016). The author suggested that this infrastructure was needed to build a digital payment ecosystem; otherwise, payments would be converted to cash, limiting the larger and long-term benefits of shifting to digital payments. Fragmented, non-interoperable mobile money networks also prevent health providers from easily and cheaply transferring money from one payment platform to another (Haas et al. 2013). Informants echoed these sentiments. Digital Healthcare Solutions suggested that donors should invest in promoting interoperability as a critical precursor to the expansion of DFS for health. Specifically, the informant highlighted the importance of interoperability and open-source systems for exchanging health care data and financial information between organizations and across platforms. An informant from the Ministry of Health in Rwanda likewise noted that using open-source software programs facilitated integration across the HMIS, logistics management information system, and payment system.

In contrast, an informant from PharmAccess noted that interoperability and data exchange are best served by application programming interfaces (APIs) that allow systems to talk to each other and data standards that enable systems to speak the same language, but that are not necessarily open-source. The source code for CarePay's digital platform is proprietary and offered as "software as a service" (SaaS) which has attracted private sector investment and given them the flexibility and incentive to build an agile and responsive product. Helium Health, a digital health firm which offers SaaS EMR, HMIS, billing, and payment apps and systems across more than 400 health facilities in Nigeria also does not use open-source software, noting that it would prevent their products and services from evolving as rapidly or efficiently as desired. As with CarePay, they rely primarily on private sector (venture) funding and contracts with the government rather than on donor funding.

Related to interoperability was the lesson from CarePay on the drawbacks of over-customization of DFS for health. CarePay initially built customized platforms for specific health care payers and providers but found that this approach led to complications and misalignments between the platforms. CarePay noted that while the current M-TIBA platform still allows for customization of the design (look and feel) and enrollment processes, the backend is consistent across the countries in which CarePay operates.

Innovations in the use of technology in health insurance may catalyze uptake

There are a number of exciting new financial technologies that may decrease the cost of health insurance enrollment, increase demand, and expand uptake. One example is blockchain-enabled "smart contracts," which allow policyholder medical data to trigger automated payout of benefits. Smart contracts can bypass otherwise time-consuming claims procedures, but it can still be difficult to define the rules and triggers in a health care context. An informant from PharmAccess suggested that automated claims handling using an artificial intelligence business rules engine may be more useful in health care. An informant from LumenLab suggested that claimless insurance decimates the cost of settling a claim and that these reductions in costs can extend products to even lower socioeconomic market segments. Additional innovations being adopted by many major microinsurance organizations include the expansion and bundling of telemedicine, automated symptom assessment tools, and artificial intelligence chatbots, which increase opportunities for beneficiaries to access immediate and tangible benefits at a low cost to payers. While cases will remain that will require physical examinations and tests, these technological advancements may increase satisfaction with and uptake of health insurance, which will expand the pool of resources.

CarePay's M-TIBA platform in Kenya is arguably one of the most successful DFS platforms for health in sub-Saharan Africa. An informant from CarePay listed four key factors that encourage them to introduce the platform in a new market:

- 1) High (>85%) mobile phone penetration (high mobile money penetration is helpful but not necessary)
- 2) A large health care payer, such as a government, large private insurer, or large social donor, which is willing to use the platform and drive users to the platform
- 3) A political and regulatory environment that is willing to consider non state-owned solutions, including SaaS
- 4) A large (>10 million) population of potential users/beneficiaries of the platform

Markets that meet these criteria and present logical opportunities for expansion include Uganda, Ghana, Senegal, Côte d'Ivoire, and several Asian markets.

Health System Maturity and Facility Readiness

- Digitization of parallel and upstream systems facilitate DFS implementation.
- Leadership and dedicated resources are needed for the successful implementation of DFS in health facilities.
- Digitizing the claims process of a national health insurance program incentivizes digitization at the health facility level.

Digitization of parallel and upstream systems facilitate DFS implementation

The literature acknowledged that the success of DFS for health depends on digitizing upstream and parallel information systems and activities (Bangura 2016; Webb 2015; Corby 2012; Zimmerman and Bohling 2013; Dalal, Morgan, and Nanda 2019; Smith et al. 2019). Examples of parallel and upstream systems include identification and registration of beneficiaries; accounting; monitoring and evaluation; EMR; and information management systems to administer cash transfer. In the context of health insurance enrollment, renewal, and other transactions, one of the most critical systems that must also be digitized to reap the benefits of digitization is identity authentication. In Ghana, the NHIA successfully developed and piloted two types of digital authentication: biometric and non-biometric (USSD, mobile app, web-based portal) (Dalal, Morgan, and Nanda 2019). The authentication approaches were rolled out to 15,000 NHIA and health care provider staff at 3,500 facilities and were acknowledged to be foundational to the ensuing success of the digital renewal process.

During the Ebola crisis, in the absence of an existing decentralized information management system that could track workers in real-time and ensure delivery of correct payment based on eligibility, roles, contract types, and other specifications, the government of Sierra Leone established a separate human resource management system, in parallel to the existing health sector payroll, to directly manage and track hazard payments to all salaried or volunteer health workers (Webb 2015). This core human resource information system was the primary system that also interconnected with an Open Data Kit smartphone application, SMS application, and a biometric identification application. The bundling of these systems led to successful deduplication, streamlining, and fraud reduction in the payment of Ebola response workers.

One study evaluated the Connected Diagnostics program by PharmAccess and CarePay (referenced earlier by informants) which combined point-of-care rapid diagnostic tests for malaria and brucellosis with a rapid diagnostic test reader that digitally interprets the results and connects to mobile payment mechanisms (Smith et al. 2019). This study found that bundling these systems was effective to diagnose, treat, and manage payments for health care even with rare diseases and among remote nomadic populations.

Most informants agreed that digitizing parallel systems amplifies impact. An informant from PharmAccess noted that integration of hospital and DFS systems will be required to prevent double data-entry and that making it easier for hospital administrative staff to transform patient records into an insurance claim will expedite uptake and acceptance of DFS for health. Another informant from MicroEnsure qualified that when faced with resource limitations, it is only critical to digitize where it is most needed. For example, claims and sales administration for health insurance require the efficiencies afforded by digital approaches for the product to be viable. End-to-end digitization, such as digitization of health records, is not required for insurance success. Although potentially more impactful, end-to-end digitization may not be a scalable model because of the resources and additional partnerships required. From another perspective, low literacy, numeracy, self-efficacy, and education were often cited as barriers to

uptake of DFS. Digitization of complementary systems such as voice-operated devices and biometric technology can potentially increase access and use of DFS for health.

Leadership and dedicated resources are needed for the successful implementation of DFS in health facilities

DFS implementers generally agreed that strong and unequivocal leadership was needed at the top of an organization for the effective implementation of DFS for health. For example, in Rwanda the digitization of health records and billing systems at Bushenge Hospital was successful because it was required and funded by the director general, who also financed adequate training and capacity-building. The director of the facility noted that many staff had no digital capacity but that making the use of the digital systems a requirement for employment was a strong enough incentive for staff to prioritize building that capacity. The fact that Bushenge digitized quickly and successfully, despite being a rural hospital where many of the providers were not technologically literate, speaks volumes about the importance of a top-down approach.

Digitizing the claims process of a national health insurance program incentivizes digitization at the facility level

Informants from Rwanda, Kenya, and Tanzania noted that when the claims process of a national health insurance program is digitized, this acts as an incentive for facilities to adopt complementary interoperable digital systems that can speed up the process of reconciling claims and receiving payments. Informants from the Ministry of Health in Rwanda noted that the digitization of Bushenge Hospital and many other Rwandan hospitals was driven by the revenue lost as a consequence of using paper-based systems to report into the digitized RSSB system which covered 85 percent of the population. Informants from CarePay noted that one of the biggest challenges that they faced in marketing their mobile wallet/digital payment platform was that when they marketed the platform to providers, the providers asked which payers/insurers were using the platform and when they went to private payers/insurers, they asked which providers were using the platform. Partnering with a state, national, or other public health insurance program can circumvent this piecemeal challenge, which is what CarePay did by partnering with the Lagos State Health Management Agency in Nigeria.

Financial Infrastructure and Culture

- Labeled accounts and transaction fees can deter social appropriation and improve self-control.
- Consumer understanding of the value of financial protection products is still low.
- New models, products, and partnerships in health insurance may increase uptake.

Labeled accounts and transaction fees can deter social appropriation and improve self-control

One social benefit of DFS for health was that the ability to label a digital account may have been as important as having the account itself. Several studies reported that a labeled or dedicated account may overcome two social constraints to saving for health, social appropriation and self-control problems (Adaba, Ayoung, and Abbott 2019; Geng et al. 2018; Jones and Gong 2019; Ky, Rugemintwari, and Sauviat 2018; Muller et al. 2019). Social appropriation is often thought of as a “social tax on saving.” It is the concept that when someone acquires resources, family and friends may lay claim to those resources and act as a social tax on savings. The labeling of a digital account or wallet for health can indicate commitment to increase savings specifically for



health and deter both discretionary and non-health essential spending, as well as familial requests for funds. Another financial benefit of using DFS for health savings was that transaction fees for withdrawals and transfers disincentivize non-essential spending and may therefore serve as a deterrent to withdrawing from mobile health wallets for non-health purposes (Ky, Rugemintwari, and Sauviat 2018; Suri, Jack, and Stoker 2012).

Consumer understanding of the value of financial protection products is still low

Informants from the ILO and the Grameen Foundation noted that consumers may question why they should pay for a product such as health insurance or a dedicated health savings account that they may not need or use, particularly when they have limited resources. DFS implementers added that often the most difficult part of their work was to cost-effectively convince potential consumers of the value of financial protection products for planning and pooling. Digital approaches to developing financial understanding are not yet as effective as in-person approaches. As an example, among the 4,678 individuals who registered for M-TIBA wallets during a 2015 pilot in Kenya, 91 percent registered through agent models which used providers, enrollment officers, and community health workers to explain the benefits of the wallets, and only 9 percent registered after receiving SMS communication (which presumably reached far more people than the agents) (PharmAccess 2015). An informant from PharmAccess confirmed that this study helped to ensure that there were agents on the ground when M-TIBA was launched to increase its accessibility and success. An informant from GSMA reaffirmed that agent-assisted registration, which uses mobile network agents or community health workers as in-person agents for digital registration, enrollment, or payment, has worked well for other digital health initiatives, and could potentially be a useful mechanism to sensitize and engage potential beneficiaries in DFS for health. An informant from the ILO added that if the goal was to reach traditionally excluded populations, a hybrid (digital/in-person) approach is needed because financial and health literacy is low. To date, DFS implementers appear to have the most success in efficiently reaching and engaging beneficiaries through the hybrid use of both digital marketing/registration approaches and complementary community-based strategies.

New models, products, and partnerships in health insurance may increase uptake

Insurers noted that they are constantly seeking to develop new products and partnerships that can stimulate and respond to consumer demand. An informant from AXA described their innovative approach to bundling health insurance with digital loan repayment terms with Carbon, a fintech in Nigeria that was originally conceived as a lending platform. Carbon customers who take digital loans are offered a “VIP” hospital cash product as an incentive to repay on time. As individuals pay back loans, they are simultaneously purchasing coverage that can help them if they fall sick and are unable to repay a loan. This product is like health insurance without paying a premium and serves to introduce individuals to the value of health insurance for financial risk protection. AXA also launched a partnership in 2020 with Uber in Mexico that enables drivers to purchase coverage for telemedicine and outpatient services through the Uber app using their income from driving. Innovative partnerships and models like these present opportunities to add value and expand access and choice for customers, as well as build revenue for companies.

The global COVID-19 pandemic has also created enormous opportunities to engage potential consumers with new health insurance products. For example, insurance broker TQM Corp partnered with Bangkok Insurance PCL to offer the first coronavirus insurance policy in Thailand in February 2020. The product, initially offered mostly as a “marketing gimmick”, sold more than 1 million policies in two months (Nguyen 2020). The launch of this product attracted a large number of new customers and has made TQM immensely profitable.



Limitations of Study Approach

In an attempt to aggregate a comprehensive body of evidence on DFS for health, our inclusion criteria were intentionally broad. However, this approach allowed for the inclusion of descriptive and secondary case studies that highlighted specific DFS programs in health, but which offered less objective assessments of DFS outcomes. Some documents and informants offered more enthusiasm for the potential of DFS than actual evidence of impact. It was therefore challenging to objectively synthesize and represent findings from highly rigorous studies, descriptive case studies, and informants. A second limitation is that of publication bias. Evidence that demonstrates positive results is more likely to be published, which can overemphasize the potential and minimize the challenges of DFS for health. A third limitation that we acknowledge is that there are many financial services in health that have digitized some aspect of the service, but which have not captured outcomes or programmatic lessons in a document or repository that would have allowed for inclusion in our report. This is a broad and ever-expanding field and there are therefore potentially many additional documents in the gray literature or internal to key organizations that address some aspect of DFS for health. Because there is not a consolidated source for these, we were unable to include them in this report.

Key Takeaways

- DFS for health are nascent but gaining momentum.
- Mobile money facilitates financial protection but is not financial protection.
- Digitization improves health system performance.
- Both governments and the private sector can drive DFS ecosystems.
- DFS do not yet fully bridge the digital divide.
- The global pandemic is an opportunity to accelerate DFS for health.

DFS for health are nascent but gaining momentum

One overarching conclusion supported by both the systematic review and stakeholder interviews was that DFS for health are nascent. Stakeholders who have worked on financial inclusion for decades noted that only recently have fintech companies begun to consider opportunities in the health sector. There was general stakeholder consensus that scaling up DFS in the health sector was still at least five years away, and evidence of impact might come even later. The systematic review reinforced this finding, with three-quarters of the documents on DFS for health published in the last five years. Additionally, most included documents were not evaluations of sophisticated DFS products in health (such as health insurance or dedicated health savings accounts), but rather initial attempts to understand whether the digital rails of financial services increase health resources, expenditures, and consumption. Finally, half of the DFS described in the literature were implemented in Kenya, where the digital ecosystem, regulatory environment, and financial infrastructure far outpace other LMIC.

Voluntary health insurance in particular, even with digital enhancements, is still a fairly small-scale enterprise in LMIC. Low uptake is due to limited ability to pay for these products and a poor understanding of the value of pooling and prepayment mechanisms. Customer acquisition costs for direct-to-consumer models are a major expense for most insurers and many rely heavily on an intensive “ground game” requiring trusted community members to lead community sensitization, awareness, and enrollment. Mobile microinsurance products offered by MNOs have a role to play in introducing consumers to the concept of insurance but these products often offer limited value in terms of financial protection and may not be operationally sustainable as standalone products. New insurance models and technologies such as blockchain-enabled smart contracts, artificial intelligence chatbots, and telemedicine may help reduce the cost of providing insurance and increase consumer perception of product value. In contrast, national health insurance programs are beginning to realize significant financial dividends by digitizing enrollment, renewal, and payment processes by partnering with fintech companies. Digital platforms which can efficiently connect insurers, health care providers, and health care consumers are also gaining momentum. The success of these programs may help build awareness of and demand for financial protection products in a given country context.

Mobile money facilitates financial protection but is not financial protection

There is no doubt that DFS will be part of any large-scale shift towards more prepayment and pooling. However electronic payment systems like mobile money will only lead to significant financial protection and progress towards UHC if they are used to shift away from OOP payments for services at the point of use to prepayment and pooling of risks across large groups of people. This review found evidence that mobile money accounts offer a secure, convenient platform through which individuals can build savings for health, aggregate financial



resources from formal and informal sources to pay for health, and purchase and enroll in health insurance programs to protect against catastrophic health expenditures. From the health system perspective, mobile money provides an efficient and scalable mechanism to expand financial protection programs to broader populations. It also facilitates the pooling and disbursement of government and donor funds across populations and health programs. However, an important distinction to make is that while mobile money extends financial protection opportunities to the informal sector and unbanked populations it does not itself afford financial protection unless it is intentionally used for pooling and prepayment. While evidence indicates that mobile money users are better able to smooth consumption and withstand shocks, it also indicates that users make more OOP payments for health than non-users. Although this presumably indicates that mobile money users consume more health products and services when they are needed than non-users, it also means that mobile money users may not be financially protected against catastrophic health care costs.

Digitization improves health system performance

There is strong evidence that digitizing financial services across the health system improves health system performance. This includes digitizing payments to health workers, including frontline and community-based health workers, digitizing financial management and accounting systems within a health facility, and digitizing enrollment, renewal, and payment of national and private sector health insurance programs. Digitizing these financial services results in improved transparency, accountability, protocol adherence, speed of transaction, efficiency/cost saving, increased demand for financial protection products and health services, and increased revenue.

One key factor in the ability of DFS to improve health system performance is the simultaneous digitization of parallel and upstream systems for identification and registration of beneficiaries, accounting, monitoring and evaluation, and EMR. Without these digital systems, there are still significant bottlenecks and inefficiencies that DFS alone cannot overcome. For digital health insurance, it is critical to have digital options for identity verification, enrollment, and renewal in addition to payment. Non-digital approaches have been a key limiting factor in the scaling of these products. For health facilities, establishing an EMR can be a forerunner to digitizing financial and accounting systems, and ultimately accepting and processing digital payments from patients and to facility staff. Across the health system, pairing DFS with communication technologies such as SMS, telemedicine, and chatbots can efficiently create awareness and enhance behavior change initiatives.

Both governments and the private sector can drive DFS ecosystems

Evidence from the Philippines, Senegal, Sierra Leone, India, Ghana, and elsewhere reinforces the idea that country governments have important roles to play in driving a DFS ecosystem. One role is to establish clear regulatory frameworks that articulate allowable products, limits on allowable mobile transfers and purchases, interoperability requirements, consumer privacy, data security, and financial protection mechanisms. The regulatory environment must strike a balance between fostering innovation, collaboration, competition, encouraging private sector investment and new product development, and ensuring that products and companies meet standards such that they are not exploitative and do not pose undue financial risk to consumers. Another role of the government is to legislate or structurally incentivize digitization. In the Philippines and in India, national mandates that required digitization of health care payments prompted growing pains in the short term while programs struggled to expand services and update technologies, but ultimately led to the rapid and successful implementation and scale-up of cashless payments, particularly for health workers. In the case of Ghana, digitizing the national health insurance renewal process was a top-down decision that resulted in substantial efficiencies. In Rwanda, public health facilities found that digitizing their own systems facilitated



faster and more accurate reimbursement for covered services and products and had strong political momentum to do so.

Private sector actors are also key to the development of innovative products and technologies to boost the usability and scale of DFS for health. MNOs, fintech companies, and private health providers and insurers are looking for ways to provide value to clients, build market share and revenue, and reduce operational costs, and will invest substantial resources if there is an apparent return on investment. Innovators like CarePay and Digital Healthcare Solutions, while not yet operationally sustainable, have attracted investors—not just donors—who are banking on the eventual scale and profitability of DFS for health. Partnerships between public, private, and donor stakeholders have potential to rapidly expand and shape the digital ecosystem, including for those at lowest socioeconomic levels.

DFS do not yet fully bridge the digital divide

While there is evidence that DFS can reach and serve a proportion of vulnerable populations (women, rural, adolescent, low-income), it is clear from the literature and from informants that an exclusive focus on digitizing consumer-facing financial services for health risks excluding some of the most vulnerable potential beneficiaries. Even in the most advanced DFS ecosystems, there are still disparities in who has access to and control over mobile accounts and technology. While digital approaches excel at creating operational efficiencies, they are not yet able to equitably reach potential beneficiaries, and their ability to convey information about complex financial and health concepts remains unclear, particularly in contexts where prepayment and pooling health financing mechanisms are still unfamiliar.

Along these same lines of equity, while many of the products highlighted in this report focus on maternal care, these are often donor-driven initiatives. Mainstream DFS often do not cover family planning, antenatal, postnatal, or reproductive health care, focusing instead on hospitalization coverage and primary care. Excluding these important preventive services from coverage misses an opportunity to encourage healthy behaviors that have a significant impact on women's health and empowerment, and the health and well-being of their families.

The global pandemic is an opportunity to accelerate DFS for health

The global COVID-19 pandemic and the resulting lockdowns and social-distancing policies have resulted in an enormous global reprioritization of DFS in the health sector. Governments are focused on how to manage all health system transactions virtually, including how to transmit financial subsidies for health. Fintech companies are now hyperaware of how public health impacts global markets and are looking for new business opportunities. Insurers have noted significant increases in demand for business-to-business and business-to-consumer products. In Pakistan, MicroEnsure noted that financial institutions and other large organizations are actively seeking them out to provide health insurance products at the organizational level, reflecting pressure from consumers who are realizing the value of health insurance in a time of great risk and uncertainty. Likewise, there have been a spate of coronavirus insurance products globally (many hospital cash based) that are in high demand, creating opportunities to engage first-time insurance customers and introduce additional products and services. Key informants were optimistic that the new global focus on the pandemic paired with a sudden need for digital approaches for every aspect of health care would be a catalyst for advancing DFS for health.

Recommendations

- Invest in an evidence base for digital health insurance and product development.
- Build coalitions between governments and fintech, health, banking, and mobile industries.
- Develop a stage-based investment strategy for DFS for health.
- Develop integrated risk-management and hybrid engagement approaches to expand financial protection.
- Ensure DFS for health are gender transformative.

Invest in an evidence base for digital health insurance and product development

There is need to demonstrate the value proposition of digital health insurance and the ability of digital health insurance to accelerate progress toward UHC, particularly for potential financial and technology partners who lack experience in the health sector. This global evidence review identified significant evidence gaps around digital health insurance and highlighted the fact that evidence that does exist is fragmented and hard to access. In line with the USAID Digital Strategy for Development, there is a need to fund rigorous studies that assess how digital health insurance models can sustainably contribute to UHC (USAID 2020). These studies can help guide future DFS investments. Insurance providers have substantial data they are willing to share to advance understanding of financial protection measures in health. Donors and governments can partner with commercial stakeholders to better understand the value proposition of DFS in the health sector and to identify where additional investments will support improvements in health system access and performance. Below are four specific RQs that can advance stakeholder understanding of how and where to invest:

- Which market segments are most likely to enroll in voluntary digital health insurance and what product characteristics and financing mechanisms are the most desired?
- Do existing digital health insurance products protect against catastrophic expenditures (measured using a poverty line indicator) in practice? Which products are most effective in reducing impoverishment resulting from health care expenditures and how are they financed?
- Do individuals who are enrolled in digital health insurance products seek health services more proactively than those who are enrolled in paper-based insurance or no insurance? Is there a “spillover effect” of seeking additional uncovered health services?
- What is the potential for DFS to increase prepayment and pooling as part of sustainable health financing schemes that include the poor and support national strategies for accelerating progress toward UHC?

Build coalitions between governments and fintech, insurance, banking, and mobile industries

The COVID-19 global pandemic has created a unique opportunity to convene regulators from health and finance ministries as well as fintech, health, insurance, banking, and mobile industries. Donors and other aid organizations should support the establishment of coalitions in each country and regionally that can address blockages in the enabling environment and foster DFS innovation and implementation that extends to the health sector. These coalitions can serve as internal innovation hubs to build partnerships across health and financial sectors in a given country as well as cross-border learning fora where countries with more advanced DFS ecosystems, such as India, Kenya, and Nigeria, can share best practices on establishing



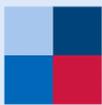
vigorous markets for DFS for health. Cross-border discussions can also address regional blockages such as a lack of interoperable DFS across country lines. Donors and aid agencies, in partnership with country governments, can encourage commercial stakeholders to take operational risks in new product development by providing start-up financing to promising DFS for health as well as technical assistance through implementing partners. Governments should create space for the development and piloting of new DFS for health by establishing a regulatory sandbox in which MNOs, health, banking, and fintech stakeholders can rapidly test the commercial viability of new products, technologies, and services. Regulators should also champion interoperability and encourage stakeholders to act collaboratively.

Develop a stage-based investment strategy for DFS for health

Much of the work that has been done in the field of financial inclusion can be leveraged to inform investments in DFS for health. Pazarbasioglu et al. (2020) suggested that countries pass through three development stages of DFS when moving from a predominantly cash-based society to a fully digital society. In Stage 1, which includes countries like Bangladesh, Ghana and Tanzania (and most LMIC), there is basic access to transaction accounts. In this stage, donor investment strategies should focus on developing basic enabling financial, digital, and regulatory infrastructure including network connectivity, and allowing non-bank issuance of e-money. Specific to the health sector, donors can begin to lay groundwork for consumer and organizational demand for DFS for health. This could include supporting digitization of parallel health facility/national health insurance systems that will build demand for DFS. In Stage 2, which includes countries like Brazil, India, and Thailand, there is more intensive usage of transaction accounts for digital payments. In this stage, donor investment strategies should focus on bolstering transactions in the health sector by investing in interoperability of payments and more comprehensively sensitizing stakeholders in health and fintech to partnership opportunities. Also, in this stage donors could encourage the digitization of health worker payments. In Stage 3, which includes countries like Kenya, countries are moving beyond payments to other DFS products including credit and insurance. In this stage, donors should invest in consumer-facing DFS by supporting digitization of health insurance enrollment, payment, reimbursements and developing more sophisticated digital financial protection products and programs. Developing a stage-based framework for investment can prevent waste and increase the probability of success by identifying the readiness of a market to use and benefit from specific DFS for health.

Develop integrated risk-management and hybrid engagement approaches to expand financial protection

Financial protection products, even those that are mobile-enabled, may not yet fully reach or serve the needs of low-income or vulnerable populations. One financial inclusion informant from the Grameen Foundation described existing health insurance schemes as “problematic,” explaining that low-income people are being asked to pay for something that may never benefit them. The LumenLab insurance innovation center by MetLife Foundation went even further to describe current health insurance models as “broken,” because products are too complex and there are too many costs and barriers to entry involved in enrollment and retention. Informants noted that insurers still need to develop products that appeal to consumers and use innovative approaches so that the products are financially viable and beneficial for all parties. Informants from the ILO and the Grameen Foundation suggested that integrated and hybrid risk-management approaches are needed to expand financial protection. The integrated approach acknowledges that individuals may benefit from access to diverse products and programs including microinsurance (“inclusive insurance”), national health insurance programs, health savings, loans, credit, and hospital cash. The hybrid approach acknowledges that even though

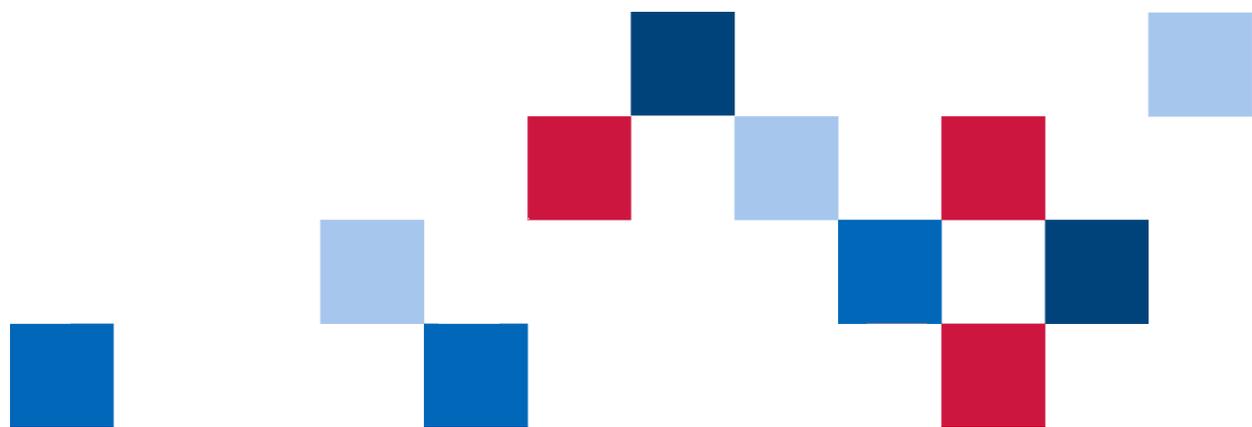


digital technologies can add value at every point in the insurance value chain, current digital approaches to marketing and distribution of financial protection products may not equitably reach or engage intended beneficiaries and may need complementary in-person support. With this in mind, governments, donors, and private sector stakeholders should consider developing an integrated bundle of financial services for health that leverage both digital distribution and marketing channels as well as community-based engagement mechanisms which can foster positive behavior and social norms, increase trust and consumer confidence, and ultimately advance financial protection.

Ensure DFS for health are gender transformative

In addition to improving equitable access to financial protection through the hybrid digital approach noted above, it is also important to ensure that women and girls have social support to use the products and that the products themselves serve the health needs of women and girls. DFS for health often do not extend coverage to essential services such as prenatal, maternal, family planning, and reproductive health services. Without these and other essential preventive health services, the cycle of poverty cannot be broken. Donors and governments should require or incentivize the inclusion of these essential preventive services in basic digital health insurance packages.

Even when products do include these services, in many contexts women have to negotiate with their husbands or partners when they want to save or spend money on health. Stakeholders should focus on increasing women's access to DFS for health and developing their skills to use those services. In parallel, stakeholders should engage with male partners and other gatekeepers to address misconceptions that financial expenditures on prenatal, maternal, and reproductive health care services and products are "women's issues." These services should be reframed as essential to families, communities, and the economy. Engaging both men and women will help ensure women are not the sole advocate for these DFS and anticipated health benefits.





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Annex A: Key Informants

Organization	Key Informant Name and Title
Access Health	Sejal Mistry, Singapore Country Director Adrienne Mendenhall, Director of Business Development Chang Liu, Regional Director
AXA	Peter Gross, Senior Advisor, Emerging Customers
BIMA	Gustaf Agartson, Founder and CEO Michael Acolatse, Consumer Business Director
CarePay	Maarten Ras, Group Commercial Director Ope Olaniran, Director of Operations, Nigeria
Catalyst Fund/ Bankable Frontiers	Thea Sokolowski, Head of Marketing & Communications
Common Health	Matthew Guilford, Co-Founder and CEO
D-tree International	Rachel Lieber Hofmann, Regional Program Director
Digital Healthcare Solutions	Sajid Rahman, Co-Founder and CEO <i>Former Founder and CEO of Telenor Health</i>
EA Consultants	Barbara Magnoni, Founder and CEO <i>Former Managing Partner of Banyan Global</i>
Grameen Foundation	Lauren Hendricks, Executive Vice President Bobbi Gray, Research Director
GSMA	Sam Ajadi, Insights Manager
Helium Health	Ifeoluwa Olokode, Head of Partnership
Inter-American Development Bank	Luis Tejerina, Lead Social Protection Specialist
International Labour Organization	Lisa Morgan, Technical Officer and Health Actuary
Lagos State Health Management Agency	Dr. Femi Serrano, Head of Operations
Living Goods	Vanessa Mwangale, Project Manager, Innovation Jennifer Hyman, Director of Communication
LumenLab/MetLife	Zia Zaman, CEO
MetLife Foundation	Evelyn Stark, Financial Health Lead Krishna Thacker, Director of Asia Region
MicroEnsure	Richard Leftley, Founder and CEO Zohair Ali, Director of Key Accounts and Operations, Pakistan
Ministry of Health, Republic of Rwanda	Dr. Zuberi Muvunyi, Director General of Public Health Services

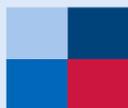


Organization	Key Informant Name and Title
Orange Labs	Ralph Ankri, Sr. Project Manager, Business Development, Middle East and Africa Region Eric Nguenti, Business Development Manager, Orange Cameroun
PharmAccess Foundation	Sicco van Gelder, Director of Health Insurance
PWC India/HSBC	Shekhar Lele, Business Innovation Lead
Strategic Impact Advisors	Wisdom Alorwuse, Africa Lead Shelley Spencer, Financial Inclusion Entrepreneur
Teasy International	Musa Ali Baba, CEO
Vital Wave	Brendan Smith, Vice President of Professional Services



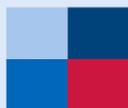
Annex B. Characteristics of Included Documents

Author, Year	Article Title	Objective	Health Area	Country	DFS	DFS Purpose
Adaba, Ayoung, and Abbott, 2019	Exploring the contribution of mobile money to well-being from a capability perspective	This study draws on qualitative data collected from Ghana to explore how the use of mobile money has contributed to well-being outcomes.	General health	Ghana	Mobile money	Payments for health care
Ahmed and Cowan, 2019	Mobile money and health care use: evidence from East Africa	This study tests whether consumption and health care use differ between users and non-users of mobile money during health shocks.	General health	Kenya	Mobile money	Payments for health care
Assogba, 2017	Investigating the satisfaction of Republic of Benin Ministry of Health field staff paid through the mobile money platform	This study explores whether mobile money is a viable and satisfactory method of payment for Ministry of Health field staff.	General health	Benin	Mobile money	Payments to health workers
Bangser, 2011	Making mobile phones work for women with fistula: the M-PESA experience in Kenya and Tanzania	This report describes how mobile banking was used in a program for fistula repair.	Maternal health	Kenya and Tanzania	Mobile money	Incentive/cash transfer
Bangura, 2016	Saving money, saving lives: a case study on the benefits of digitizing payments to Ebola response workers in Sierra Leone	This report shares key lessons from Sierra Leone's experience using digital payments to pay health workers during the Ebola outbreak.	Infectious disease; Ebola	Sierra Leone	Mobile money	Payments to health workers



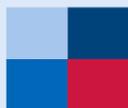
DIGITAL FINANCIAL SERVICES FOR HEALTH: A GLOBAL EVIDENCE REVIEW

Author, Year	Article Title	Objective	Health Area	Country	DFS	DFS Purpose
Bharadwaj, Jack, and Suri, 2019	Fintech and household resilience to shocks: evidence from digital loans in Kenya	This study examines the effects of digital loans on household resiliency and medical expenses.	General health	Kenya	Mobile money/ digital loans	Payments for health care
Burke et al., 2017	Youth Voucher Program in Madagascar Increases Access to Voluntary Family Planning and STI Services for Young People	This descriptive program evaluation examines draws lessons from service data on demand for family planning and STI services by young people in Madagascar.	Family planning / Sexual health	Madagascar	Mobile money / vouchers	Payments to health workers / e-vouchers
Chukwu, Garg, and Eze, 2016	Mobile health insurance system and associated costs: a cross-sectional survey of primary health centers in Abuja, Nigeria	This study documents the costs associated with a mobile technology-supported community-based health insurance scheme.	General health	Nigeria	Digital insurance platform	Health system management
Corby, 2012	Using mobile finance to reimburse sexual and reproductive health vouchers in Madagascar	This case study presents programmatic lessons for using mobile money to reimburse providers for subsidized vouchers in Madagascar.	Reproductive health	Madagascar	Mobile money	Payments to health workers
Dalal, Morgan, and Nanda, 2019	Case Brief: NHIA, Ghana	This case study presents programmatic evidence of the impact of the digitization of renewal payments for health insurance in Ghana.	General health	Ghana	Mobile money; USSD	Insurance renewal
Dnet 2014	Mobile Money Case Study: A comparison between cash and mobile payments in Dnet's Aponjon Program (MAMA Bangladesh)	This case study compared the time and cost of paying community health agents via mobile money or cash for their work in a maternal health program in Bangladesh (MAMA).	Maternal health	Bangladesh	Mobile money	Payments to health workers



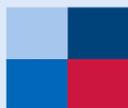
DIGITAL FINANCIAL SERVICES FOR HEALTH: A GLOBAL EVIDENCE REVIEW

Author, Year	Article Title	Objective	Health Area	Country	DFS	DFS Purpose
Geng et al., 2018	Health insurance, a friend in need? Impacts of formal insurance and crowding out of informal insurance	This study tests whether the impact of formal health insurance differs by mobile money use.	General health	Kenya	Mobile money	Payments for health care (proxy for insurance)
Gibson et al., 2017	Mobile phone-delivered reminders and incentives to improve childhood immunization coverage and timeliness in Kenya (M-SIMU): a cluster randomized controlled trial	This RCT assesses whether SMS reminders, either with or without mobile money incentives, improves the proportion of children fully immunized by their first birthday in Kenya.	Immunization	Kenya	Mobile money	Incentives/cash transfer
Gyasi, Adam, and Phillips, 2019	Financial inclusion, health-seeking behavior, and health outcomes among older adults in Ghana	This study examines associations between financial inclusion, health-seeking behavior, and health-related outcomes in older persons in Ghana.	General health	Ghana	Mobile money	Payments for health care
Haas et al., 2013	Mobile money for health	This report summarizes programmatic lessons for mobile money use in three programs: Tigo insurance in Tanzania; D-tree CHEW payments for referrals in Zanzibar; and Marie Stopes International provider payments in Madagascar.	General health	Tanzania, Zanzibar, and Madagascar	Mobile money	Pay for insurance; Payments to health workers
Haushofer and Shapiro, 2016	The short-term impact of unconditional cash transfers to the poor: experimental evidence from Kenya	This RCT examines the response of households to wealth changes from mobile money-enabled unconditional cash transfers with regard to income, assets, health, education, and well-being.	General health	Kenya	Mobile money	Incentive/cash transfer



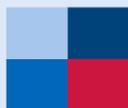
DIGITAL FINANCIAL SERVICES FOR HEALTH: A GLOBAL EVIDENCE REVIEW

Author, Year	Article Title	Objective	Health Area	Country	DFS	DFS Purpose
Jones and Gong, 2019	Precautionary savings and shock-coping behaviors: the effects of promoting mobile bank savings on transactional sex in Kenya	This RCT examines whether receipt of a new, labeled/dedicated M-PESA account for savings for emergencies reduces transactional sex and self-reported sexually transmitted infection incidence among vulnerable women in Kenya.	Reproductive health	Kenya	Mobile wallet	Payments for health care
Ky, Rugemintwari, and Sauviat, 2018	Does mobile money affect saving behavior? Evidence from a developing country	This study examines whether mobile money users are more likely to save for health emergencies than mobile money non-users.	General health	Burkina Faso	Mobile money	Payments for health care
Mekuria et al., 2019	Analyzing data from the digital health care exchange platform for surveillance of antibiotic prescriptions in primary care in urban Kenya: a mixed-methods study	This study describes how digital insurance claims data identified over-prescription of antibiotics for respiratory infections.	Primary care/ Respiratory infection	Kenya	Mobile wallet	Payments for health care; data use for processing claims
PharmAccess, 2015	How mobile health technology is transforming access to and utilization of quality healthcare in Kenya	This case report describes M-TIBA user, non-user, and provider experiences in the context of saving for health.	General health	Kenya	Mobile wallet	Payments for health care
Muller et al., 2019	A mobile health wallet for pregnancy-related health care in Madagascar: mixed-methods study on opportunities and challenges	This study explores the structural, contextual, and experiential characteristics of a mobile health wallet for skilled health care during pregnancy among women in Madagascar.	Maternal health	Madagascar	Mobile wallet	Payments for health care



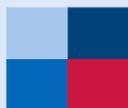
DIGITAL FINANCIAL SERVICES FOR HEALTH: A GLOBAL EVIDENCE REVIEW

Author, Year	Article Title	Objective	Health Area	Country	DFS	DFS Purpose
Muller et al. 2020	Facilitators and barriers to the implementation of a mobile health wallet for pregnancy-related health care: a qualitative study of stakeholders' perceptions in Madagascar	This study explores the perceptions, experiences, and recommendations of key stakeholders in relation to a mobile health wallet during a pilot study.	Maternal health	Madagascar	Mobile wallet	Payments for health care
Obadha, Colbourn, and Seal, 2020	Mobile money use and social health insurance enrollment among rural dwellers outside the formal employment sector: evidence from Kenya	The study examines whether mobile money use (mobile phone-based financial services) increases the probability of rural dwellers outside the formal employment sector of being enrolled in Kenya's National Hospital Insurance Fund.	General health	Kenya	Mobile money	Payments for health care
Ommeh et al., 2016	The cashless clinic: acceptability and benefits of mobile money in Kenya's health sector	This study investigates the acceptability of mobile payments in the health sector.	General health	Kenya	Mobile money	Payments to health workers
Shei et al., 2014	The impact of Brazil's Bolsa Família conditional cash transfer program on children's health care utilization and health outcomes	This study assesses health care utilization outcomes of a conditional cash transfer program that uses an electronic chip card in urban slums of Brazil.	Child health	Brazil	Electronic card	Payments for health care
Smith et al., 2019	Connected diagnostics: linking digital rapid diagnostic tests and mobile health wallets to diagnose and treat brucellosis in Samburu, Kenya	The study assesses acceptability, usability, and clinical outcomes of a mobile phone-based intervention linking on-site rapid diagnostic test for brucellosis and malaria through dedicated readers with digital financing and health care provision measures.	Infectious disease; brucellosis	Kenya	Mobile wallet	Payments for health care



DIGITAL FINANCIAL SERVICES FOR HEALTH: A GLOBAL EVIDENCE REVIEW

Author, Year	Article Title	Objective	Health Area	Country	DFS	DFS Purpose
Sock, Mvondo, and Mensah, 2018	Digitization of payments: a source of growth and inclusive development	This report quantifies and describes the efficiencies and benefits that could be reaped by the Government of Senegal if they digitized payments in health and other sectors.	General health	Senegal	Digital payments	Payments to health workers
Suri, Jack, and Stoker, 2012	Documenting the birth of a financial economy	The study examines the responses to illness-driven shocks for households with and without access to M-PESA, in terms of the level and composition of their expenditures.	General health	Kenya	Mobile money	Payments for health care
Wakadha et al., 2013	The feasibility of using mobile phone-based SMS reminders and CCTs to improve timely immunization in rural Kenya	The study examines the feasibility of using SMS reminders and mobile phone-based CCTs to reach parents in rural western Kenya.	Immunization	Kenya	Mobile money	Incentives/ cash transfer
Wang, Alatas, and Wiraniagara, 2019	Factors affecting acceptance of mobile health insurance in Indonesia: TAM applicability	This study analyzes factors that affect user acceptance of a health insurance mobile application.	General health	Indonesia	Mobile health insurance	Insurance
Webb, 2015	Payments Programme for Ebola Response Workers: Cash at the front lines of a health crisis	This case report provides information on the implementation and impact of the digitization of payments for health workers in West Africa during the Ebola crisis.	Infectious disease; Ebola	Sierra Leone, Liberia, Guinea	Mobile money and HMIS systems	Payments to health workers
Woodman et al., 2013	Saving money, saving lives: an inquiry into a micro-savings maternity product in Kenya	This report determines whether the Changamka maternal health saving card is a promising approach to reducing financial barriers to facility-based maternity care among low-income families in Nairobi.	Maternal health	Kenya	Electronic card	Payments for health care



DIGITAL FINANCIAL SERVICES FOR HEALTH: A GLOBAL EVIDENCE REVIEW

Author, Year	Article Title	Objective	Health Area	Country	DFS	DFS Purpose
Yehualashet et al., 2016	World Health Organization's innovative direct disbursement mechanism for payment of grassroots immunization personnel and operations in Nigeria: 2004-2015	This report describes the process and activities involved in management of the direct disbursement mechanism for direct payment of activities and vaccination personnel at the grassroots level.	Immunization	Nigeria	Mobile money	Payments to health workers
Zimmerman and Bohling, 2013	Case study: striving for e-payments at scale in the Philippines	This report describes the factors enabling the scale of the Philippine conditional cash transfer program (called 4Ps) that uses electronic transfers (cash cards) for 40 percent of the population, as well as some mobile money.	Maternal health	Philippines	Electronic card	Incentives/ cash transfer