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Defining effective voucher management information systems: A blueprint for information systems to support scalable reproductive health voucher programs, based on system evaluations with programs in Bangladesh, Cambodia, Kenya, Uganda, and Tanzania

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Defining Effective Voucher Management Information Systems

*A Blueprint for Information Systems to Support Scalable Reproductive Health Voucher
Programs - Based on System Evaluations with Programs in Bangladesh, Cambodia,
Kenya, Uganda, and Tanzania*

Mahad Ibrahim, Ben Bellows & Jaspal S. Sandhu

September 2012

Vouchers are a nontraditional way of providing poor women the financial means to access reproductive health services and of establishing a stable market for private or public health providers to offer these services in underserved areas. The Population Council with the support of the Bill & Melinda Gates Foundation is evaluating the efficacy of using vouchers to improve access to quality reproductive health services for poor women.

www.rhvouchers.org

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Summary

This document defines the key elements of information systems to support the development of effective, scalable voucher information systems. It is based on an engagement between the Gobe Group and the Population Council to strengthen information systems of reproductive health voucher programs in five countries in 2011-2012. At the time of publication of this document, the Population Council is in the midst of a multiyear evaluation of five of the biggest reproductive health programs worldwide, an effort that is supported by the Bill & Melinda Gates Foundation. While the work supporting this report has been focused on reproductive health voucher programs – which provide subsidized reproductive health services to low-income women using existing providers – it is fully expected that this report will have relevance to information systems issues for other types of voucher programs as well. The report is primarily intended for two audiences: 1) anyone involved in resource allocation related to current or new voucher programs, and 2) anyone operationally involved in the design, development, or improvement of voucher programs. This report assumes a basic working background of the function and purpose of voucher programs.

For more information about reproductive health voucher programs, visit the Population Council's RH Vouchers project site at rhvouchers.org

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Those who have cooperated with the authors are not responsible for omissions or errors. The authors alone are responsible for the content in this report.

1. Introduction

Efficient and responsive information management is critical for facilitating the financing, human resources, and supplies needed to deliver high-quality reproductive health services. Reproductive health vouchers represent a new, promising approach to health care financing in resource-poor settings. The efficacy of reproductive health vouchers is predicated, to a large extent, on generating, processing, and managing information about vouchers, voucher clients, and health service providers. To date, however, little is known about the state of information management in reproductive health voucher programs.

As part of its global evaluation of reproductive health voucher programs, the Population Council supported a review and assessment of the state of information management in five reproductive health voucher programs in Bangladesh, Cambodia, Kenya, Uganda, and Tanzania.¹ The Gobe Group led this assessment.

Information management assessments were conducted from February to April 2011 in four of the five programs. The Population Council convened an interactive workshop focused on the importance of management information systems to the programmatic activities and monitoring and evaluation of vouchers programs. Representatives from four country programs attended the workshop held in Nairobi, Kenya from April 26 – 29, 2011.

In October and November 2011, follow-up assessment visits were conducted with each of the five participating RH Vouchers programs to document progress on recommendations and provide additional technical assistance. Because of the time elapsed between the in-country assessments and the publication of this report, it is possible that there are changes to the management information systems of countries that are not reflected in this report.

While the main emphasis of this engagement has been on supporting individual country programs, this report ties together the common elements of the programs in an effort to define a sensible information systems framework to support scalable voucher programs.

¹ The assessment of Tanzania occurred much later than the other programs, because the voucher management agency (National Health Insurance Fund) had not begun operations at the research start date.

2. Information Systems for Voucher Programs

2.1 Defining Information Management

There is no single agreed upon definition of information management, but it generally refers to the collection, management, processing and communication of information within and outside an organization. The practice of information management involves the sources of information (forms, transaction records, etc.), processes (human resources, business development, customer relationship management, sales, marketing), and information systems that are responsible for the collection, management, processing, and communication of information. Information management is agnostic to domain, department, or subject.

2.2 Key Common Processes

Common to all voucher programs are high-level processes for the delivery of vouchers from a central voucher management agency (VMA) through a distribution network to clients: women who meet a program-defined low-income requirement and who desire particular reproductive health services. In addition to this, voucher programs share common approaches in the redemption of vouchers for services and payment, by clients and health service providers, respectively. These processes are described in more detail in the following two figures.

Voucher Distribution Process

Figure 1: The voucher distribution process, from VMA to client.

Voucher Redemption Process

Figure 2: The voucher redemption process, beginning with client exchange for services and ending with reimbursement to the service provider by the VMA.

2.3 Impact on Program Effectiveness

The effectiveness and efficiency of voucher programs is dependent on a well-defined set of processes: disposition, contracting, printing, distribution, service delivery, reimbursement, financial reconciliation, and verification. Each process requires the timely and cost-effective transmittal and receipt of quality information.

This information, once available in an accurate, timely, and accessible format, can be used to enhance voucher programs in the following ways:

1. **Fraud detection:** Detecting fraud requires the establishment of a baseline of service data and the persistent collection of service data to detect anomalous patterns.
2. **Operational improvement:** Not just measuring performance, but also acting on it in a way that improves efficiency and/or quality of processes.
3. **Financial management:** Triggering payments and in some cases making payments.
4. **Claims processing:** Submitting automated claims for faster and cleaner data entry.
5. **Inventory management:** Tracking where and how many vouchers are available for use. Vouchers currently represent cash from the moment of printing until they are completely used or have expired.
6. **Monitoring & evaluation:** Determining the impact of programs. The key here is ensuring a consistent minimum set of available indicators across countries. This is a complement to the above items, especially the evaluation component.

These outcomes can only be achieved if the proper resources are dedicated to designing, developing, implementing, and maintaining robust information systems for reproductive health voucher programs. A voucher program cannot function without an information system. In fact, all the participating voucher programs have some

sort of information system. All are computerized except for Bangladesh, which uses a primarily paper-based system. The problem is not the absence of an information system; the problem is the inability of the information system to provide timely, quality data in easily analyzable formats for use by program staff, governments, and donors.

The following sections describe the elements of a robust information management system for reproductive health voucher programs from various perspectives: cost-effectiveness, timeliness, accuracy, scalability, availability, and accessibility.

2.4 Cost-Effectiveness

Improved information management systems cannot be evaluated strictly on a cost basis. There will always be costs to designing, developing, and implementing improved information systems, but these costs can be offset by improved information management systems in terms of additional capabilities, regained productivity, and overcoming of information bottlenecks.

Two common principles for the design and management of dynamic, complex systems are relevant to managing cost-effectiveness. The first is the Pareto Principle, which states that 80% of the effects will come from 20% of the causes. Operationalizing this principle requires the ability to identify the causes that are responsible for the highest cost effects, but doing so will enable programs to sensibly prioritize and to achieve cost-effectiveness in their activities. The second principle suggests the application of the simplest technological approach to the problem unless something more complicated offers demonstrably better benefits.

2.5 Timeliness

The value of most information declines over time and timeliness is especially critical to two functions of voucher program administration: verification of service delivery and financial reconciliation. Both of these functions rely on the availability of detailed claims data.

Verification of service delivery is an important function in many results-based finance initiatives. Verification of service delivery with all beneficiaries is possible in small-scale, geographically-compact programs. Verification becomes more difficult as the number of beneficiaries increase and they become more geographically disperse. However, in large voucher programs, beneficiaries can be selected on a sample basis (“spot checks”) for follow-up and interview. Spot checks only work well when a randomized sample of recent² claims can be generated and verified on a regular and timely basis. Minimum data requirements include village of residence, partner’s or head-of-household’s name, and beneficiary’s other names (nicknames or name as known in village).

Regularity will need to be defined by the steering committee or design team, but it is important that any standard is linked to the day-to-day operation of the voucher program. The voucher programs that are part of this study all operate on a daily basis. Therefore, it is preferable that claims verification samples be checked at least once weekly or bi-weekly to detect potential changes in facilities’ clinical practices. Sampling should be both randomized and stratified. Stratification allows for random sampling from any group of interest, e.g. specific facilities or beneficiary age groups. More frequent checks on smaller samples will increase accuracy. This is similar to industries influenced by continuous improvement approaches, including manufacturing (for further reference, see quality control, Total Quality Management, Six Sigma).

² “Recent” can mean different things to different voucher programs, but generally the claim needs to be recent enough for the particular mother to be located following the service visit and for her to have a valid recollection of her experience with the health service provider.

These methods are only possible if the voucher program's information management systems are able to meet certain timeliness requirements. Based on the assessment visits in 2011, none of the five voucher programs meet the minimum requirements to support the described verification procedures.

Financial reconciliation, similarly, requires critical program information to be timely. Vouchers claims should be the primary source for provider payments. In other words, what a provider claims should determine what the voucher management agency pays to the provider. Because of persistent bottlenecks in the claims processing system of several voucher programs this is either not true³ or results in delays paying vendors.

In Cambodia, the voucher program has essentially been operating twin claims processing systems. One system is used to pay providers in a timely fashion based on the summary invoices submitted with providers' monthly batch of claims. The other claims processing system vets and inputs the individual claims into the information management system. Discrepancies are reconciled on a regular basis. This adds a layer of work and introduces complexity that slows the overall system and adds to program management cost.

The speed of data entry⁴ is a crucial variable in assessing the performance of voucher information management systems. The lack of timeliness is a result of inefficient procedures such as monthly batching of claims, lack of decentralization in system access, and an overemphasis on vetting claims.

2.6 Accuracy

Data captured by a voucher program's information management processes and systems should be accurate. In other words, all captured data should be true to the facts, recorded in the proper format, and inputted by authorized personnel. In an ideal world, 100% of data recorded by a voucher program's information management processes and systems should be accurate. In practice, this level of accuracy is never attained for programs of a meaningful size. Nonetheless, voucher programs should develop clear targets for the degree of data accuracy. Data quality standards should be developed and targets for minimum data quality should be assigned at each data entry point in the system. For example, a voucher distributor is required to provide data about vouchers distributed and clients. A voucher distributor should have a minimum data quality standard for accurate data submission.

2.7 Scalability

Can voucher program information management systems efficiently support greater numbers of vouchers, clients and healthcare providers as the program grows? This is the essence of scalability.

To better illustrate the concept of scalability, consider voucher claims. The key metrics for measuring the performance of the claims system are:

1. Average time from VMA receipt of the claim to the payment of that claim
2. Number of claims inputted per day per staff member
3. Number of claims vetted per day per staff member
4. Number of claims payments processed per day per staff member

Each voucher program must maintain an upper limit or maximum average time from claim receipt to claims payment in order to be in compliance with provider contracts, not to mention safeguarding provider satisfaction.

³ Payments are sometimes made on the basis of summary reports submitted by health service providers along with their claims. In some cases, the financial personnel to pay the health service providers using these reports. The amounts are adjusted up or down once the claims are processed.

⁴ Currently, in all cases, staff members enter claims data into the MIS. There are other potential mechanisms by which claims can be entered into the information system.

Holding constant the average time from claim receipt to claims payment as the number of vouchers, clients, facilities and geographies increase will require increases in the staffing requirements of the VMA. The ability of the program to increase coverage while controlling costs speaks to the scalability of the information management processes and systems.

2.8 Availability

The sophistication of an information management system is irrelevant if the system is not regularly available for use. Time lost to maintenance, network failures, and system breakdowns can cost a voucher program in terms of productivity, service quality, and money.

2.9 Accessibility

In order for an information management system to be considered accessible, it needs to satisfy three distinct, but interrelated characteristics:

- **Decentralization:** Voucher programs operate over large coverage areas, but many of the current information management systems are accessible solely from a centralized location. This can limit performance.
- **Usability:** This refers to the ease-of-use of the information management system by a diverse set of users. It is applicable to every aspect of the information management system from form design to input mechanisms to instruction manuals.
- **Accessibility:** An information management system should be designed in such a way that there is equal opportunity to make use of its tools and capabilities, for example providing a dashboard for government and donor stakeholders to quickly and easily review program performance.

The performance of voucher MIS is defined by its capacity to achieve specific metrics based on the characteristics described above. It is important that the steering committee or design team clearly define what is expected from the MIS by translating the characteristics in specific targets and metrics for the VMA. If we use the above key metrics from the example of voucher claims, performance would refer to the variations in the underlying value of the metrics. For example, increasing the average claims per day entered by the data entry specialists is better performance than decreasing amount entered. The same can be said about decreasing the average time from claims receipt to claims payment versus increasing that time. This process will allow the VMA, donors, and governments to clearly determine a robust MIS for voucher programs.

3. Cross-Country Workshop

As a part of this overall engagement, the Reproductive Health Vouchers MIS/M&E Four Country Workshop was held in Nairobi, Kenya from 26-30 April 2011. This workshop was sponsored and organized by the Population Council; it was designed and facilitated by the Gobe Group. The workshop brought together representatives from Bangladesh, Cambodia, Kenya, and Uganda to discuss the challenges faced in scaling up reproductive health voucher programs, with a particular focus on MIS. Notably, this was the first time that these programs had ever been brought together to exchange challenges and ideas for any purpose. This workshop is described in brief here. For more detail, refer to the separate report “Final Workshop Report, Reproductive Health Vouchers MIS/M&E Four Country Workshop, Nairobi, 26-30 April 2011” (May 2011).

This multi-country workshop had been planned since the beginning of the engagement between the Population Council and Gobe, in January 2011. It was intentionally scheduled for late spring, so that Gobe could first provide field-based country support to Cambodia and Bangladesh. The request for Gobe support for the three countries in East Africa came later in 2011.

The workshop had two overall objectives, as shared with participants on the first day of the workshop:

1. To improve the management of information across reproductive health voucher programs
2. To improve program operations, monitoring, and evaluation

An internal outline of workshop goals was developed and used to plan the actual workshop activities. The outline follows (it has not been edited for this report):

Working session: The entire workshop will emphasize working. Programs will need to bring their data and where possible their systems. The emphasis will not be on PowerPoint decks from programs or lectures from consultants, but rather on “heavy” working sessions to learn-by-doing and to learn from common experiences.

Best practices: A key emphasis of the workshop will be sharing of best practices. Currently very different approaches are being taken in each country, including different partnerships for managing and reporting data. As a result there is significant value in bringing them together to demonstrate how they operate.

Barriers and challenges: At least one session will emphasize the barriers to data use and any interventions programs may have used to overcome these barriers.

Local decision-making: A major emphasis of the capacity-strengthening exercises will focus on local decision-making – using data for more than reporting to funders and government agencies. This is about thinking critically about how data should impact programmatic decisions.

Connecting with national HMIS: There is a medium-term vision of matching the data outputs with the needs of national HMIS for each country. This will be discussed in practical terms and will be integrated into work plans. The presence of some MOH officials will help move this discussion forward.

Dashboards for countries: Dashboards will be introduced that will allow data managers and others to explore data in different ways, as well as more easily and intuitively. This will be another working session, where participants

will “come with data”. The dashboards will, as appropriate, be integrated into the country work plans based on the working sessions. The purpose of dashboards, it will be stressed, is program improvement and decision-making.

Global dashboard concepts: Building off the strong interest and buy-in achieved at the June 2010 TAC meeting in Washington, DC – which in part was based on the demonstration dashboard developed by consultants from the Gobe Group in partnership with the Population Council (see section on dashboards) – some aspects of the workshop will focus on the conceptual development of global dashboards. The activities will involve country program workshop participants, as well as Population Council staff, and will include: needs assessment contextual interviews, rapid lo-fidelity prototyping, and prototype-based user interviews.

Common indicators: As a part of ongoing activities as well as the development of a global dashboard, part of the discussion will relate to developing a common set of indicators, both for internal purposes and for external groups. Some work to this effect has already been completed, but it will be necessary to revisit this work with the workshop participants to ensure that there is program-wide buy-in.

Developing the network: There are strong, non-technical motivations for this multi-country workshop. Part of it is developing a basis for facilitated discussion remotely. Another part of it is that these M&E staff – e.g., data managers – do not typically attend the international program workshops, but they need to be to understand well how other country programs have coped with similar problems.

Work plans and commitments: Countries will work with consultants to revise draft work plans developed after the on-site needs assessments. A final part of this activity will be to secure commitments from individual countries.

At the end of the workshop, participants identified two main challenges to scaling up reproductive health voucher programs: 1) a need for strong incentives, and 2) information systems that better support program activities. On incentives, one Ugandan participant stated, “In Cambodia, they also have incentives - as well as Bangladesh - which are very key in really motivating the clients and beneficiaries to come on board and be able to access services.” On information systems, one Kenyan participant stated, “The key takeaway message is we need to be able to use data to make decisions that will help to improve efficiency of the program in the various units of implementation.”

Representatives from each country program listed actionable takeaways related to program management, monitoring and evaluation (M&E), and management information systems. In addition to identifying a need for more opportunities such as this workshop to allow for cross-program learning, voucher program representatives expressed concerns with the financial and human resources made available to address issues of information management and management information systems. It was not clear – and is still not clear – from the perspective of workshop participants that major donors to reproductive health voucher programs recognize the importance of information management to voucher program performance.

4. Program Comparison

Figure 3: Map locating and briefly describing the five country programs that were part of this evaluation, and the broader RH Vouchers evaluation managed and executed by the Population Council and funded by the Bill & Melinda Gates Foundation.

4.1 Common Themes

There were tens of insights related to improving voucher MIS from the evaluations of the country programs in Bangladesh, Cambodia, Kenya, Tanzania, and Uganda. The five highest priority, top-level insights that are common to the programs are:

1. Large amounts of data are collected, but little information available for analysis.
2. There is too much emphasis on vetting claims for clerical and medical errors at the expense of verifying that claims are truthful.
3. Inefficient information management procedures hinder the ability of voucher programs to scale.
4. Unclear performance criteria and lack of standards for voucher management information systems mean that programs do not easily know how well marketing initiatives, contracted facilities, or included services are routinely performing.
5. Fraud detection and problem resolution is hindered by severe time lags in information management procedures.

4.2 System Descriptions

Bangladesh: The Bangladesh Demand-side financing (DSF) program MIS is based on two reports from the Upazila Health Complex (UHC). The UHC is responsible for data entry and submission on a monthly basis (local DSF organizer, “Monthly Activities Report”) and on a biannual basis (UHFPO, “Financial Transactions Report”). Data is submitted in a Microsoft Word document template via email to the DSF cell in the capital city of Dhaka. At the DSF

cell, the aggregate activity and financial data is entered into electronic information system. This electronic information system is a customized version of the freely available software – EpiInfo.

Cambodia: The Cambodian reproductive health voucher program hired Dr. Him Phannary to build a voucher claim processing software system. The program was developed in Microsoft Visual Basic .Net framework and linked to a Microsoft SQL Server database. Participating health service providers send voucher claims each month to the Voucher Management Agency offices in Phnom Penh. A team of claims processors enters each claim into the claim processing software. Three are three workstations. One of the three workstations serves as the server for the claims processing software. Connectivity to the claim processing software is only available on the local network.

Kenya: The Kenyan Output-based aid program uses a custom-developed claim processing and reporting application built atop of the Microsoft Dynamics Enterprise Resource Planning platform. The application is hosted in two locations: PricewaterhouseCoopers ZEP-RE office and Pricewaterhouse Coopers Main Nairobi office. The application is accessible by field staff throughout Kenya via the Internet and locally installed client software. Claims are received regularly from participating health service providers.

Uganda: The Ugandan output-based aid program has developed, with the assistance of PregTech (a Ugandan ICT company) a custom claim processing software. The software is built in Visual Basic .Net framework and is linked to MySQL database backend. The software does not support remote connections at the moment and is housed in regional Mbarara office. Prior to the deployment of the claim processing software in February 2010, Microsoft Excel was used to store claims data. All claims from health service providers are received at the Mbarara office.

Tanzania: Tanzania does not have a voucher specific management information system. Voucher beneficiaries are enrolled, tracked, and managed using the existing National Health Insurance Fund (NHIF) and Community Health Fund (CHF) management information systems.

4.3 Comparison of Country Systems

Key characteristics of all five country programs, including Tanzania, are compared in the following tables, which group characteristics into three groups: MIS capabilities, MIS procedures, and system connectivity.

Table 1: MIS capabilities, compared across five country programs.

	Bangladesh	Cambodia	Kenya	Tanzania	Uganda
1. Vetting of vouchers after printing	-	No	Yes	-	Yes
2. Record of voucher distribution to CBDs	No	No	Yes	N/A	Yes
3. Record of voucher distribution/sale to client	No	No	Yes	N/A	Yes
4. Record of poverty grading results	No	No	No	No	No
5. Record of service delivery	Yes	Yes	Yes	Yes	Yes
6. Record of financial transactions	No	No	Yes	Yes	No
7. Ability to track state of voucher	No	No	No	No	No

Table 2: MIS procedures, compared across five country programs.

	Bangladesh	Cambodia	Kenya	Tanzania	Uganda
1. Remote access	No	No	Yes	Yes	Yes
2. Persistent Internet connection	No	No	Yes	Yes	No
3. Adequate information security procedures	No	No	Yes	No	No
4. Automated backup	No	No	No	No	No
5. Offsite backup	Yes	Yes	Yes	Yes	Yes
6. Number of data processing staff	1	3	-	-	12

Table 3: System connectivity, compared across five country programs.

	Bangladesh	Cambodia	Kenya	Tanzania	Uganda
1. Web interface	No	No	No	No	No
2. SMS interface	No	No	No	No	Yes
3. Mobile banking interface/service	No	No	Yes	No	Yes
4. Electronic banking interface/service	Yes	No	Yes	No	Yes
5. Link to NHMIS	No	No	No	Yes	No

5. Country Case Studies

5.1 Bangladesh: Too much data, too little information

Bangladesh captures copious amounts of data associated with the DSF program, but these data are largely fragmented and paper-based. Where the data do exist in electronic format, they are highly aggregated and are not given in usable formats. This severely limits the ability to access or analyze these data, which in turn make programmatic activities such as fraud detection or continuous improvement nearly impossible.

Data moves directly from each Upazila Health Complex (UHC) to the DSF cell in Dhaka. The UHC is responsible for data entry and submission on a monthly basis (local DSF organizer, “Monthly Activities Report”) and on a biannual basis (UHFPO, “Financial Transactions Report”). The Monthly Activities Report is completed using a Word document template provided by the DSF cell and is submitted by email. DSF cell staff members enter the monthly data manually into their own electronic information system. The Monthly Activities Report is comprised of a summary “top sheet” (see figure) and three pages of detailed information. The digital data is aggregated into reports that are shared with the WHO and the GOB. Various physical documents are also submitted to the DSF cell by UHCs, but any physical files received by the DSF cell are simply archived.

In parallel to the reporting between each UHC and the DSF cell, information is exchanged between each UHC and a local bank branch responsible for managing DSF accounts. These data are typically only submitted twice per year, timed to the bank's receipt of DSF funds. The UHC provides a physical “top sheet” with a summary of the financial request to the bank. Attached to this top sheet are carbon copies of documentation indicating services provided and a summary of transport disbursements. While aggregated data goes to the national DSF office, the deeper claims data resides (on paper only) at the local bank and the UHC. Nothing is done with these data. It also appears that nothing is done with the data generated by transactions with the chart account data, at a local or national level.

The DHIS2 system has now rolled out nationally, to all upazilas. The system is fully connected, with all upazilas reporting data electronically. While it has some operational issues, it is not a solution for the DSF problem. It is not likely that DSF program would be integrated with DHIS2 because of relative footprint - DSF is in only 10% of upazilas - and because DHIS2 deals in aggregate data, while an effective DSF system will require support for individual services.

5.2 Cambodia: Better later than never

A voucher has a lifecycle from printing until a client uses all reimbursable services or the voucher expires. It is important that program administrators have access to the current status of a specific voucher in order to effectively resolve problems including error, lack of compliance, and even fraud.

One such situation has already occurred with safe abortion vouchers in Cambodia. This type of voucher is unique to Cambodia and is not distributed publicly because of a need to respect privacy and confidentiality of end users. 200 claims were paid without properly verified and documented voucher coupons. It took three months to discover the issue. After an investigation, only 110 out of 200 cases were verified. This does not mean these cases were fraudulent or erroneous, but it does highlight the difficulty that time lags can cause for verification procedures.

The inability to track vouchers is due to primarily to the processes used to distribute and redeem vouchers, but is also a result of human resources constraints and deficiencies in information systems.

This incident along with other identified issues has helped Cambodia recognize the importance of timely voucher tracking and take steps to improve their systems.

5.3 Kenya: Once a day makes the backlog go away

Nearly all voucher programs rely on the centralized processing of paper claims. Bottlenecks are inherent in this centralized process because high volumes of claims are received within a short, regular period of time (e.g., the first week of every month). Within this process, voucher program administrators have only two options to increase processing times: 1) add staff, or 2) increase productivity. Without fundamentally changing the nature of a claim within a voucher system, the next best option for improving performance is to decentralize the system.

Kenya, faced with a rapidly scaling voucher program, has initiated two reforms to their system that begins to alter the equation of voucher claims processing. Field managers are provided laptop computers with remote access to the program's management information system. This allows the Field Manager to regularly enter each voucher sold. Distributors are required to return their voucher distribution lists after they have sold 20 vouchers. This typically happens within two weeks. Batching sales data and claims is a practical and sensible process, especially considering the vast distances in which voucher programs operate. Batching, however, does create delays in the processing of sales data and claims. Kenya has moved to an information system that allows service providers to submit claims at any point. The next step would be to electronically accept sales data and claims.

5.4 Uganda: The challenge of going from 100,000 to 1 million

In Uganda, the reproductive health voucher program sold more than 100,000 Safe Motherhood vouchers in the recently completed two and half year project period. About 40% of safe delivery vouchers go unused for delivery after purchase. These unused vouchers represent women who took unnecessary risks by not delivering in a facility; they also represent unspent donor assistance and unused vouchers are a lost opportunity to provide a new mother her choice of postnatal contraception and proper care for the newborn.

The Ugandan program, like many of its peers, faces severe bottlenecks in its claims management system. It takes between 25 – 35 days to process a claim. The VMA has been forced to quadruple its data processing staff from 3 to 12 to adequately handle the volume. Despite the increased staffing, critical program data remain inaccessible to the program administrators hampering decision-making and performance monitoring. The size of the staff needed to process and vet claims crowds out the monies needed to make staff available for the arguably more crucial task of service verification. These information management challenges are shared in varying degrees by all five voucher programs being evaluated by the Population Council.

Voucher programs worldwide will struggle to scale without improving the distribution and uptake of vouchers. In Uganda, increasing the scale of the voucher program by a factor of 10 would mean an additional 1,820 deaths and 2,400 still births averted annually (internal analysis).

6. Measurement to Improve Performance

6.1 Tracking Distribution

The voucher program managers should be able to track voucher distribution at any time. Distributors need to ensure that sufficient quantities of vouchers are distributed to the appropriate type of women. Furthermore, the distributor must conduct his/her activities with a high-level of professional ethics, in other words, without committing fraud.

Measuring distribution performance requires timely and accurate data on: when, where, to whom, and by whom a voucher is sold; knowing the appropriateness of the client; and the ongoing analysis of this data to detect anomalies.

Four out of five of the voucher programs record distribution (or sales) data in their MIS. The problem arises with the time it takes to record the information, which is a function of processes that require the centralized input of distribution data.

In the early days of the Uganda program, problems were caused because voucher claims were submitted for vouchers that had yet to be recorded as sold. The process in Uganda requires that the distribution teams return their issuance books⁵ to the district office for processing. At the time, it was common for a distribution team to be in the field for weeks at a time. The process has now been changed to require the distribution teams to return issuance books to the regional office on a weekly basis.

In Cambodia, distribution sheets are returned to the main office in Phnom Penh on a monthly basis by the Provincial Coordinators.

The Kenyan program requires distributors to return sales logs after 20 vouchers (one book) have been completely sold. The average distributor takes about 2 weeks to sell 20 vouchers.

With the exception of Kenya, all programs require the central processing of this data once its received adding further time delays. In Kenya, field managers or their staff members are responsible for entering the distribution data.

6.2 Effective Targeting

Are vouchers able to target the neediest beneficiaries? This is an important question for donors, evaluators, and managers of voucher programs because it gets to the core of the potential benefit of vouchers over other approaches. However, the current state of information management in voucher programs does not allow us to answer this question. Why?

- Poverty assessments are conducted in all the voucher programs with the exception of Cambodia, which relies primarily on the Ministry of Planning IDPoor system. In cases where poverty assessments are conducted, they are recorded and stored on paper.
- Poverty assessment scores for those not accepted to receive a voucher are not retained. Who are rejected is as important as who are accepted.

⁵ An issuance book is the tool used by the community-based distributor to record the relevant data for each distributed voucher. This terminology relates only to the Uganda program, but similar tools are used in each voucher program.

- The simple binary question, “Have you ever delivered in a health facility?” is not systematically asked in the five participating voucher programs. It needs to be asked and tracked in order to properly assess the effectiveness of targeting.

In Cambodia, the Ministry of Planning does poverty assessment at a national level. Households designated as poor are assigned an “IDPoor” number and card. IDPoor households are recorded in a national registry. The Cambodian voucher program largely assesses poverty using this registry. The only problem with system is that it relies on the Ministry for a comprehensive, up-to-date registry. Initial evidence from the field indicates that there may be sizable populations of mothers that meet programmatic eligibility criteria but are not registered in the IDPoor database. There is also one operational district in the voucher program not yet covered by the Ministry.

6.3 Systematic Fraud Detection

It is not easy to detect and measure fraud in any of the participating voucher programs. This is not to say that there is fraud. It is not possible to state with certainty whether or not there is fraud other than anecdotally.

What is missing? All voucher programs emphasize fraud deterrence using voucher design, claims vetting, and spot checks. Staff in all participating voucher programs report detecting fraud. In all cases this fraud was identified through individual ad hoc analysis rather than the use of systematic procedures or automated analytics of voucher program data.

Voucher information systems that capably track vouchers, clients, distributors, and health service providers should be able to use low-cost automated analytics to identify anomalous trends for follow-up by program staff. Two simple analyses that could be conducted in such a case:

1. Detecting deviations in the amounts claimed by health service providers
2. Clustering of voucher use by distributor. If vouchers distributed by a specific distributor are clustered in fewer facilities than is normal among her/his peers, this might be a sign of collusion.

6.4 Claims Processing

Vetting claims is not the same thing as verifying claims. The latter is more important in voucher programs. The two most important processes within the claims processing system are vetting and verification. Both processes are dependent on a claims processing system linked directly to a financial management system.

Typical health insurers emphasize auditing of claims because it is a critical cost control mechanism. Voucher programs have adopted this practice. But, as more voucher programs move towards standardized contracts for a fixed bundle of reproductive health services, vetting claims is less important than verifying claims.

In all the reviewed voucher programs, multiple staff members complete audits of incoming claims. The number of cycles varies with each program, but at least two cycles are completed in all reviewed programs.

This is a problem for several reasons:

- This requires a large team of people to process, audit, and vet claims
- Each review adds additional time to the overall process
- This process is necessarily linear, meaning that program adds the same proportion of cost as the program grows which would limit the ability to increase efficiency
- It is not linked to the fundamental question of whether the service was delivered

One exception is claims for deliveries with complications. Though complications represent between 5 – 15% of claims they still require strict auditing to curb abuse and over-treatment. This is an issue because of the relatively high value of the payment associated with a complicated delivery as compared to a normal delivery.

Spot checks are the only mechanism to verify whether a service has been delivered. Most voucher programs incorporate spot checks into their program design. In practice, spot checks are not a regular feature of program administration. The reason is simple. Regularly spot-checking of clients and service providers is an intensive undertaking from the perspective of human resources and transportation costs. Nonetheless, it remains the most appropriate auditing and verification mechanism for vouchers.

We recommend that voucher programs shift resources from the claims auditing staff to spot-checking. Program administrators can increase the efficiency of spot-checking through implementing the following approaches:

1. *Decentralize the administration of spot-checking.* For example, in Cambodia conduct spot checks at the Operational District level rather than the Province level.
2. *Make it routine.* Spot checks should happen every week in smaller numbers.
3. *Employ stratified randomized sampling.*
4. *Reduce the sample size.*
5. *Adapt database design.* Incorporate spot check results per claim, client, and service provider.
6. *Limit the scope of inquiry.* Ask only essential questions to reduce the burden of each visit.

In a centralized claims processing system, the flow of claims into the central office is a key factor in processing throughput. All the reviewed voucher programs use centralized claims processing systems.

The key is to smooth the flow of claims from service providers to the claims processors. Batching⁶ makes sense from a logistical point of view, but it does not make sense from an information management perspective. Specific recommendations to improve the flow of claims:

- Allow claims to be submitted at-will from service providers.
- Place a time limit from service delivery to claim submission, for example, that the claim must be submitted 30 days after service has been rendered.
- Decouple claims submission from the submission of the claims form. For example, accept electronic claims via the Internet or SMS in parallel to paper submissions.

6.5 Routine Analysis vs. One-Time Reports

All the reviewed voucher programs offered access to specific reports on various aspects of voucher program administrative activities. These reports are not always up-to-date. They are not flexible, so administrators, donors, and researchers cannot ask other questions. They are not broadly accessible to key stakeholders.

It is important that voucher programs rethink the way information is collected, stored, and presented.

Voucher programs collect reams of data concerning the day-to-day administration of vouchers. The challenge has been turning this data into meaningful information and actionable knowledge for use by the three pillars of the organization (management, providers, and beneficiaries). The cost of these information bottlenecks is difficult to ascertain, but it is clear that a better approach could yield administrative, strategic management, and marketing benefits.

⁶ Batching is the practice of storing claims until a certain numeric and time-based threshold is met.

A digital data dashboard is a custom designed, web-based tool to allow users to interact with and present information. Unlike reports, dashboards put information in the hands of users. Users are able to browse, filter, compare, calculate, and perform other data-centric activities without the need to rely on highly technical staff. Dashboards can help management conduct routine analyses on the state of the voucher program and, if well designed, help detect anomalous patterns.

The following entities should be set up to be queried in a program-focused data dashboard:

- Voucher distributor:
 - Number of vouchers distributed by date
 - Amount earned by date
 - Profile of clients by date
 - Frequency of health service provider's rendering services
- Health service provider
 - Number of services rendered by date
 - Amount paid by date
 - Number of claims rejected by date
 - Profile of voucher clients serviced
- Clients
 - Number of services utilized per voucher
 - Health service provider visited
 - Number and type of vouchers received
- Voucher program
 - Total spend by date
 - Profile of services delivered by date
 - Profile of clients served by date
 - Profile of voucher distributors
 - Profile of health service providers
 - Cost per voucher distributed
 - Cost per voucher redeemed
 - Number of unused vouchers

7. The Need for Identifiers

7.1 Unique Identifiers

Modern supply chain systems are predicated on the instantaneous knowledge that something has been bought or sold. In the world of goods, this is achieved through the use of: stock-keeping unit (SKU) codes, bar codes, bar code scanners, and, in the most advanced cases, RFID tags. Within voucher programs, there is a similar need to track vouchers throughout their lifecycle. But, this must be done in a context of limited financial and human resources. Identifiers are a critical step towards achieving this goal.

Voucher and client tracking are facilitated by the use of robust unique identifiers in the database coupled with a strong database design. The use of an existing identification scheme, such as the IDPoor number in Cambodia, as a primary identifier can place serious constraints on voucher programs. It could limit the target group; it could limit the number of beneficiaries; and it be difficult for claims processors to enter.

The use of a primary identifier based on the technical merits combined with a secondary identifier can be used to mitigate the problems caused by mandated existing identifications schemes.

7.2 Voucher Identifiers

Each voucher should be uniquely identifiable. This is critical to any potential voucher tracking system. Many types of identification schemes could be used, but they must adhere to these characteristics:

- Must be unique
- Must identify voucher type
- Must have a length large enough to accommodate a system with tens or hundreds of thousands of users per year and potential repeat users over time (may be numeric or alphanumeric)
- Must be able to be encoded into a barcode or other printable information storage format
- Must be human-readable
- Must be as simple as possible

There should be no case where vouchers are easily reproducible or where the voucher identifier can alone be used to generate payment or services; however, if this is the case, there is an additional requirement for a number space sufficiently large to prevent third party generation of valid identification numbers.

7.3 Client Identifiers

Not many countries have comprehensive national identity schemes. Such a national identifier would be the most preferable method of identifying clients, especially from the point of view of linking to national databases. However, in the absence of such a national identification scheme it is important to develop a system of uniquely identifying voucher clients.

In Cambodia, for example, the Ministry of Planning created a national database of poor families (IDPoor). The database is updated regularly and is in operation in eight out of nine districts targeted by the voucher program. The problem occurs when a client is unable to produce their ID card or number to the clinic. Based on anecdotal evidence from the field, this occurs at least 40% of the time. The Cambodian voucher program also offers safe

abortion vouchers that are not limited to poor clients within the national poverty registry. These clients must be handled separately adding complexity and time to the claims process.

A simple solution to this problem would be to create a project-wide client identifier with the inclusion of one or more secondary identifiers to link to other identification schemes. This approach decouples the voucher clients and allows the flexibility to support different types of clients as the need arises. The approach also maintains a linkage to national databases.

8. Minimum Dataset

Given the growth in voucher programs over the past decade,⁷ there is sufficient rationale for a single voucher management information system globally to be locally customized for individual voucher programs. Such a global system would reduce barriers to entry for new programs, reduce global expenditures on the administration of voucher programs, and strengthen programs that might otherwise have suffered the programmatic consequences of weak information systems. To this end, a specific focus of this engagement was to develop a minimum dataset that would define the essential data elements needed for a robust voucher MIS.

Whether or not such a global system will be realized, there is still value in producing a minimum dataset, to allow programs to identify gaps and address those gaps locally. The minimum dataset is described below.

Voucher: Each voucher should be its own entity that is attached to a client upon activation.

Example: voucher_id, print_date, distribution_date, client_id, batch_id, voucher_type

Client: It is important that clients are tracked separately from vouchers. More than one identifier should be available to track clients. This will help linking with other systems.

Example: client_id, id_poor, full_name, village, commune, district, province, dob, phone_no, occupation, family_status, poverty_status, education_level

Voucher Type: Most voucher programs offer different types of vouchers. Using a voucher type entity provides flexibility to add and alter voucher types.

Example: voucher_type_id, voucher_type_name

Health Service Provider: Monitoring the performance of health service providers is critical to the performance of voucher systems.

Example: health_facility_id, name, location

Health Services: Moving to standardize the suite of services provided by the voucher program makes it easier to process claims and track program finances. This entity would serve as a master list of the health services offered with the associated costs.

Example: service_id, service_label, service_description, amount

Transaction: Each transaction involving the voucher should be recorded, categorized, and linked to the appropriate entities involved (e.g. distributor, client, and health service provider)

Example: transaction_id, voucher_id, transaction_label, transaction_description, date, amount, client_id, cbd_id, service_provider_id

Province: self-explanatory

⁷ See Okal, J, "Fivefold Increase in Number of RH Voucher Programs Since 2002," rhvouchers.org; and Gorter A, Grainger C, Okal J, Bellows B, "Systematic Review of Structural and Implementation Issues of Voucher Programs, Analysis of 40 Voucher Programs In-depth Analysis of 20 Programs," Draft February 2012, Population Council.

Operational District: self-explanatory

Commune: self-explanatory

Village: self-explanatory

Community-based distributor: Monitoring the performance of community-based distributors is important to the performance of voucher systems.

Example: cbd_id, name, province, od, supervisor_id

Batch: Vouchers have cash value on printing, so it is important to track printing batches as they move through the system.

Example: batch_id, print_date, start_num, end_num, province, od, distribute_date

9. An Appropriate Role for Mobile

Mobile phones have widely been recognized as ubiquitous, powerful tools for finding, exchanging, and transmitting information and fostering communication. Despite this ubiquity, it is unwise to assume that everyone uses their phone with the same frequency and function, or even that they own a phone. Vouchers in most cases target the poorest quintile of the population. Mobile phone ownership and use among this segment of society has not reached the levels needed to support an electronic voucher.

Other issues such as phone sharing, multiple phone ownership, use of multiple SIM cards, lack of network access among rural populations, battery charging, and data loss makes an electronic voucher for this population infeasible. Any mobile (mHealth) solution that assumes beneficiaries/clients will use phones will alienate a significant portion of the population. This runs counter to the aims of voucher programs as they are intended to bring poor women and families that have traditionally been excluded from health systems into those very health systems.

Where mobile phones can help improve the administration of voucher programs is enabling real-time voucher distribution and claims. Achieving the benefit of real-time voucher program data requires a change in the underlying process of distributing vouchers and processing service claims. One systemic approach that achieves the necessary changes is called Mobile Lotteries and has been developed based on insights from this MIS engagement.

Mobile Lotteries decouples the value of the voucher from its physical form until activated at voucher distribution. Similarly, service providers initiate claims via a simple text message transaction that is used to verify the client. These two simple changes allow for real-time knowledge of distribution and claims. The physical vouchers and claims still circulate throughout the system to a central point, but they are now a parallel source of information on the underlying interactions.

Such real-time information, which cannot be realized with existing systems, is essential to cost-effectively scaling large voucher programs to 5x or 10x the current size.

10. Looking Forward

Maternal and reproductive health voucher programs have been successful in reducing maternal and infant mortality among the poor through the innovative demand financing of reproductive health services.⁸ However, these programs face challenges scaling nationally because of high administrative overhead, suboptimal information management processes, and weak or missing demand-side incentives for voucher utilization.

Information management is not seen as core to the goal for providing vouchers to poor mothers; however, delays and difficulties obtaining, processing, and understanding information lead to increased costs, reduced efficiency, and missed opportunities to improve service delivery. The governments and donors that fund voucher programs need to allocate more financial and human capital to the issue of management information systems in voucher programs. Better information management is a necessary – but of course not sufficient – condition for achieving scale for reproductive health vouchers.

⁸ Bellows, N. M., Bellows, B. W., & Warren, C. (2011). The use of vouchers for reproductive health services in developing countries: systematic review. *Tropical Medicine & International Health*, 16(1), 84-96. doi:10.1111/j.1365-3156.2010.02667.x