

Smart Paper Technology Solution

Data entry

Recording personal information and medical records of a patient at the clinical point of care



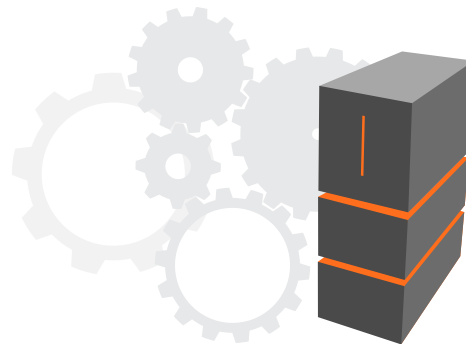
Scanning

Scanning Smart Paper Forms and automated uploading to the server for data processing



Processing

Automatically processing images of handwritten text and data into digital form



Quality assurance

Ensuring that data that is generated from the system is above 99% accurate, timely and complete



Data for action

Integration of data with DHIS2 and generating different types of reports to support closing identified gaps and continuous improvement of health service delivery in fixed and outreach clinics



Shifo Foundation developed Smart Paper Technology Solution which comprises several components that work in tandem to improve the quality of data and health outcomes.

Data entry

Recording personal information and medical records of a patient at the point of care.

Smart Paper Forms - Forms to record patient registration and personal medical history. Forms are printed and provided to health facilities by the regional health authority or medical store in sufficient quantity for one year to prevent stock-outs. No electricity, connectivity or security is required at the point of care delivery to use the Smart Paper Forms.

User of Smart Paper Forms - An authorised person (frontline health worker) who uses Smart Paper Forms during delivery of health services (in fixed and outreach clinics)

User authentication & authorisation - Name and signature

Scanning

Scanning Smart Paper Forms and automated uploading to the server for data processing.

Scanning station - The scanning station is a set of hardware and software to support scanning and data digitisation of Smart Paper Forms. The scanning station is connected to Processing System for further data processing. Scanning stations are placed in scanning centres with reliable electricity, connectivity and security.

Scanning station coordinator - An authorised person who uses the Scanning Station

User authentication & authorisation - Login and password

Processing

Automatically processing images of handwritten text and data into digital form.

Processing system - Suite of tools that facilitate data capturing, uploading, extraction, recognition, automatic verification, processing, export, archiving, and reporting, based on the cutting edge image processing, machine-learning and validation algorithms. When the system detects bad handwriting, poor marking, and/or damaged/dirty document images, these errors are flagged for data quality assurance.

Quality assurance

Ensuring that generated data from the system is above 99% consistent, timely and complete.

Quality assurance station - A set of hardware and software that support advanced control and data quality assurance functions. Additionally, there are supportive tools and processes to perform data quality assurance investigations and generating quality assurance reports that are shared with health centres and scanning centres to continuously improve work processes.

a) Data verification operator - The data verification operator is responsible for verifying unrecognised characters, handwriting or poorly marked boxes that can easily be confirmed or corrected.

b) Quality assurance officer - The data quality assurance officer performs audits on the data verification operator and system processes to ensure that high data quality is maintained.

User authentication & authorisation - Login and password

Data for action

Integration of data with district health information system (DHIS2), logistics management information system (LMIS), civil registration and vital statistics system (CRVS) and generating different types of reports to support continuous improvement of health service delivery in fixed and outreach clinics.

Data for action reporting system - A set of hardware and software connected to the Smart Paper Technology™ Engine that facilitates integration of data with other systems and export of data into monthly reports, registers and electronic dashboards.

Data inputs

Smart Paper Forms are used at the point of health service delivery to register individual clients (women, children), assign unique ID and record delivery of health services:

Shifo Women's Registration Form - used to register personal information of women receiving reproductive, antenatal, intrapartum or postpartum care. This form has pre-printed unique ID numbers.

Shifo Women's Registration Form Update - used to update personal information of a woman, such as a new phone number or address.

Shifo Antenatal Form - used to record woman's ID number and health services during antenatal service delivery.

Shifo Intrapartum Form - used to record woman's ID number and health services during intrapartum service delivery.

Shifo Postnatal Form - used to record woman's ID number and services provided during postnatal service delivery.

Shifo Family Planning Form - used to record the ID number of male or female and services provided during family planning service delivery.

Shifo Birth Records - used to register newborns and children under 5. This form has pre-printed unique ID numbers.

Shifo Birth Records Update - used to update personal information of a child, such as a new phone number or address.

Shifo Immunisation and Supplementation Form - used to record child's ID number and services provided during child health service delivery.

Shifo Monthly Return - filled in on a monthly basis, this form is used to report the vaccine stock status and actions taken based on data at the end of the month.

Data outputs

Monthly special reports, indicators, and tailored feedback reports that are the product of the export stage:

Individual electronic birth registration and health records are generated/updated by the system and can be integrated with national information systems (such as DHIS2, CRVS and other systems)

Updated electronic registries for reproductive, antenatal, intrapartum, postnatal and child health services.

Monthly integrated reports - tally sheets, daily summaries and HMIS reports.

Stock management reports - processing algorithms calculate individual daily consumption of essential medicines and supplies, wastage rate, stock balance at health facility, demand for medicines and supplies for the upcoming month for a specific health facility based on set algorithms for supply needs (consumption or target-based). The stock requisition note is automatically sent to the district store / warehouse, based on which, medicines and supplies are delivered to health centres.

Gaps report - reporting of needs/gaps which are related to resources required to provide essential services. The Gaps report is shared with district health team, iNGOs, UN agencies working in the specific district, and those with a mandate to close the gaps in health services.

Electronic Performance Dashboard - a web-based, integrated dashboard providing data on each fixed and outreach session performance that shows if the health centre is delivering services on schedule, and how many women or children visited each session.

Medical Errors and Policy Violations Report - special reports where medical errors and policy violations are highlighted. These cases are further investigated and feedback is given to the health workers.

SMS reminders - women and caregivers are asked to provide their mobile phone numbers if they have one. This information is used to generate and send out SMS reminders one day before scheduled visits.

Follow up lists - a list of defaulters is automatically generated and shared with health care workers on a monthly basis. Cross-checking child registers to find women and children who missed scheduled visits has previously been done manually, a time consuming task that was often skipped due to lack of time and resources. Smart Paper Technology Solution provides this list in a simple way so that health workers can easily track those who have missed health appointments.

