

## E-notification of vital events: innovations adaptable for business continuity of civil registration in emergency situations

### Introduction

The coronavirus disease (COVID-19) pandemic has been spreading at a fast pace around the world, compelling governments to implement strategies to flatten the disease curve, ranging from simple restrictions to contain the virus, to the isolation of cities and regions. Civil registration systems have also experienced disrupted services at all levels. These disruptions are expected to continue, affecting an estimated 40–70 per cent of the world's population. A number of actions and mitigation measures have been undertaken to ensure that service provision continues during and after emergencies. One of these has been the reduction of public interaction and promotion of the use of online systems, including for notification.

The objective of the present research brief is to show the role of systems used by some countries for the notification of vital events with the use of mobile phones, referred to as “e-notification”. Such systems facilitate the continuous and universal recording of vital events. ECA has gathered data and good practices that will play a crucial role in business continuity plans for African countries both during and after the COVID-19 crisis.

### Rationale for e-notification systems

The global proliferation of mobile phones and cellular network connectivity is increasingly being leveraged, in particular in settings where resources are limited, to drive the development and use of digital civil registration systems. With their access to mobile phones, community-based individuals, such as civil registrars, community leaders, community health workers and village elders can serve as notifiers, thereby helping to extend the coverage of civil registration systems to underserved rural and remote regions, and also in contexts where civil registration centres are not accessible. This approach may help to reduce delays in the identification and reporting of births and deaths to civil registration authorities, health systems, or both.

### Description of notification

Civil registration involves four major activities: recording, notification, registration and certification. Recording entails capturing details related to a vital event at the point of occurrence. For example, details of a birth may be recorded on a paper form at a health facility or elsewhere in the community. This is followed by notification, whereby details of the recorded event are communicated to the local civil registration office by lawful

notifiers. Upon receiving a notification, the civil registrar registers the event, by verifying event details, and recording them in a civil register or updating the details in the civil registration system. Subsequently, a legally valid certificate of registration is issued. The certificate serves as proof that the birth or death has been registered in a civil register. Registered events are aggregated by the national authorities to produce vital statistics. Since notification is the key step triggering registration, many strategies to improve the coverage and timeliness of birth or death registration are focused on reducing delays in notification, in particular by using mobile devices to notify local officials.

In some advanced systems, the Internet-based software Smart Paper Technology Engine supports the capture, uploading, recognition, automatic verification, recording, processing, storing, archiving, extracting, exporting and reporting of data. The flow of information using mobile phones from the point of notification to its arrival in the server is illustrated in figure 1 below.

### E-notification and how it works

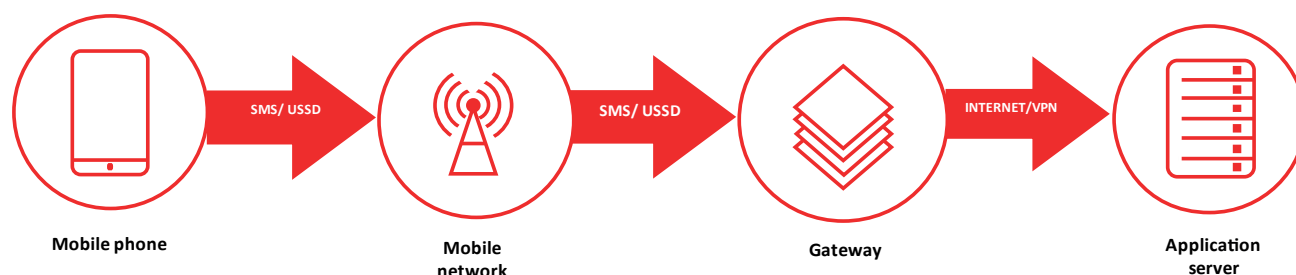
Information related to a birth or death may be transmitted online from stationary computers installed at maternity wards, via mobile phones as phone calls, submitting inputs on an interactive voice response system, or via an unstructured supplementary service data (USSD) system, as text messages sent via the short messaging service (SMS), with the use of mobile device-based applications

(apps), or with the use of publicly known short codes or access numbers.

The content of the birth notification may vary from country to country, as may the manner in which it is transmitted, but it usually includes the name of the child born, the name and address of the parents, the place and date of birth, details of the birth outcomes and health-related indicators. As an example of the use of mobile devices to submit a formal birth notification, we may take the case of community-based notifiers using their mobile phones to relay notifications via USSD of a home birth to a digital civil registration system. The notification is normally received and reviewed for accuracy and completeness by the local civil registration office before a birth certificate is issued. An example of the use of a mobile device to submit an informal birth notification is the case where a community notifier or village elder sends information about a birth, via SMS, to a central digital server, for the purpose of informing the civil registry of the event that has occurred in their locality; this can be used to initiate the provision of other services for the child.

Similarly, the content and mode of transmission of the death notification may vary from country to country. The content is likely to include the name of the deceased, the name and address of relatives (for example, a spouse), the place and date of death, and details of the cause of death. An example of the use of a mobile phone to transmit a formal death notification is the case where a

Figure 1: Electronic notification process overview



health provider uses an app to transmit information about a death, including the cause of death, to a digital civil registration system.

As with birth notifications, death notifications are normally received and reviewed for accuracy and completeness by the local civil registration office before a death certificate is issued. An example of the use of a mobile device for the transmission of an informal death notification is the case when a community health worker sends information about a death via SMS to a central digital server, for the purpose of disease surveillance.

### Role of e-notification systems

E-notification systems play an important role in gathering evidence for the registration of vital events, in an efficient, accurate and timely manner. They can also be used to collect important health data in some contexts. This is demonstrated by the generic e-notification workflow diagram in figure 2 below, showing the linkage of the notification system and the civil registration systems until issuance of the birth or death certificates.

The use of e-notification is important for the following purposes:

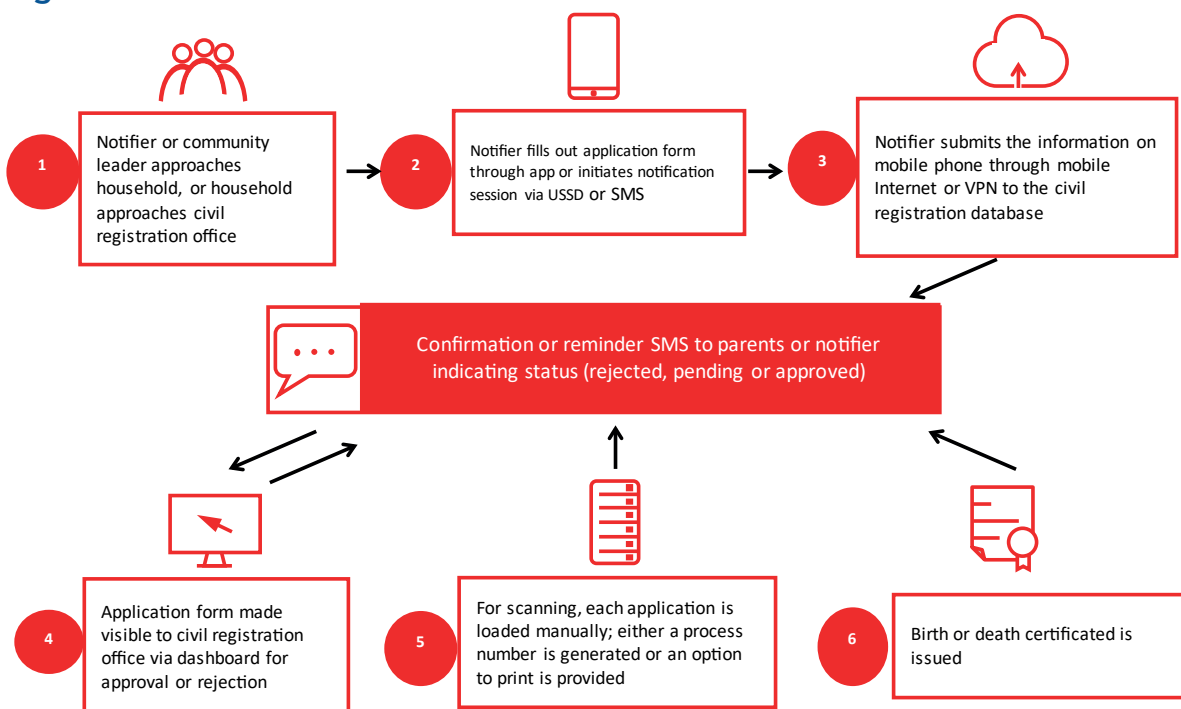
To increase the coverage of registration services, which may be limited by the lack of infrastructure at registration centres, and ensuring greater ease of usage, in particular in rural areas;

To improve the timeliness of birth and death notification via mobile device, in other words, the time elapsing between the occurrence of the vital event and notification via mobile device to the civil registration office;

To facilitate the legal registration in response to notifications, within the civil registry, of the occurrence and characteristics of vital events in accordance with the legal requirements of a country. Legal civil registration is conducted by a civil registrar. E-notification is therefore a link to civil registrars to ensure that vital events are recorded and validated by the civil registrar;

Where birth registration and the provision of other services are concerned, to increase the proportion of children receiving newborn or child health services, such as immunizations,

Figure 2: E-notification workflow



in response to birth notification via mobile device, by significantly reducing the delay between birth and the receipt of services;

With regard to death registration, to increase the proportion that were ascertained by, or reported to, a disease surveillance system.

The e-notification system also enables the civil registration office to provide quantitative measures of the acceptability of birth and death notifications and of notifiers' satisfaction with the system, ensuring improved use of human resources and time, including the additional time spent by notifiers when managing and transitioning from paper to digital reporting systems, training, supplies and equipment.

Lastly, e-notifications help to significantly reduce unintended consequences, such as the transmission of inaccurate information as a result of incorrect data entry, breach of privacy and disclosure issues, failure or delays in message delivery, workflow interruptions due to infrastructure constraints relating to the charging of batteries and network coverage, and adverse impacts on equity.

## Notification systems and their support for the registration of vital events during the COVID-19 crisis

Examples of e-notification systems that have operated successfully through the COVID-19 pandemic include the following:

**Self-notification of vital events** - In Rwanda, the Civil Registration Office has online access and, on the basis of the applications that it has received, it can update events via the country's online portal Irembo (<https://irembo.gov.rw/rolportal/web/rol>). When applying for vital events certificates, such as birth certificates, declarants upload the documents in their possession (a medical certificate for births and deaths at health facilities) and the civil registration officers can issue the vital event certificates via Irembo. This process is performed entirely online, from application

to issuance of the certificate, and does not require any physical, face-to-face interaction.

**Measures to facilitate community registration or registration in remote areas** - In Mozambique, the civil registry uses mobile phones to track births and deaths and to follow-up on events occurring in distant registration areas and also in communities.

**Registration by health facilities** - In countries where the health facilities are registration points, the notification systems act as the link between the civil registration office and health facilities.

**Communication and follow-up with registrars** - Awareness campaigns are being conducted via the e-notification system for civil registrars and secretaries on the need for continuity in civil registration services during the COVID-19 pandemic. In Burkina Faso, messages are delivered to all system users of the country's civil registration system.

**Collection of vital statistics** - In Kenya, the Civil Registration Office calls registrars on a regular basis to confirm the number of registrations, and requests them to communicate any variances in the vital statistics and to circulate information from the central office.

## Selected country experiences with existing e-notification systems for civil registration and vital statistics

### Uganda<sup>1</sup>

The National Identification and Registration Authority (NIRA) operates the country's Mobile Vital Record System (MVRS), which uses a web-based application and mobile phones (namely, a USSD system) to register births and deaths in health facilities and communities. For deliveries outside health facilities, mobile phones are used by notifiers to submit, via the USSD system, birth and death notifications from the community to a central server at

1 See [www.mobilevrs.co.ug/home.php](http://www.mobilevrs.co.ug/home.php).

NIRA. This information is accessible to the registration officers of a given registration area, who verify it for completeness and consistency, before a birth certificate is printed, signed and issued to the registered child.

## **Mozambique<sup>2</sup>**

The National Directorate of Registries and Notaries has developed its electronic civil registration and vital statistics system (e-RCEV) as an information management system using USSD, SMS and a web-based interface to streamline, simplify and decentralize vital registration services. The system is used to register births and deaths that occur in hospitals or communities; these events are captured by the use of the cell phone or web at the different registration posts and a notification is sent to the main database, notifying the central office of activities at the different registration posts. This information will be validated by authorized registrars, who act as the conservators of data, and a birth or death certificate is then issued as proof of registration.

## **Namibia**

The Department of Civil Registration under the Ministry of Home Affairs, Immigration, Safety and Security and the Directorate for Solutions Architecture in the Department of Public IT Service Management, under the Office of the Prime Minister, have developed the country's e-National Population Registration System (e-NPRS), based on the existing ID registration platform. The system has specific e-notification arrangements for births and deaths: thus, the e-notification system for births notifies NPRS electronically when a birth has occurred at a hospital. This secures the birth details of the child, verifies the identity of the mother, and collects accurate data about all children born in Namibia.

It is the responsibility of the nurse attending the birth to record the birth details for each

child. Only a few pieces of data about the child's health are captured; this is to minimize the administrative burden for nurses. When the birth is registered, all the data captured in the e-notification system are extracted using the reference number generated by the system or the mother's ID. Parents later submit more information to the civil registration office. This office is responsible for establishing the child's given name or names, surname, citizenship and paternity. As soon as the registrar has captured all the data, an electronic printed birth certificate is issued. The process takes less than five minutes.

The e-notification system for deaths requires all health facilities and police mortuaries to notify NPRS electronically immediately after a death has occurred. This is to verify the identity of the deceased at the time of notification and to limit the issuance of fraudulent death certificates. The data captured include cause of death, which is linked to the data about the deceased held in NPRS at the point of death registration. This makes it possible for operational statistics and comprehensive vital and mortality statistics to be produced in a timely manner.

## **South Africa**

The Department of Home Affairs is using mobile technologies such as SMS to identify marital status, with a view to identifying fraudulent marriages. Using this facility, the Department needs only to know the individual's ID number in order to check his or her marital status. Member of the population can also use the facility by sending an SMS - quoting the letter M followed by the ID number (example: M 5001010050080) - to the number 32551. A reply SMS will be sent back to the cell phone to confirm the marital status and the date of the marriage. There is a charge of R1 per SMS, levied by the network service provider. SMS is also used for registration: once the initial process of registration has been carried out in the office; the client is informed of progress via SMS and will also be informed once the registration document is available for collection.

2 See <https://civil.registros.gov.mz/crvs>.



## Burkina Faso<sup>3</sup>

The General Directorate for the Modernization of Civil Status is using the iCIVIL system, which is a technological solution based on the use of so-called “bubble bracelets” for the digital identification and authentication of newborn infants, guaranteeing the inviolability of digital identification throughout life, and an encrypted SMS to transmit information quickly, with due consideration for connectivity and mobile phone network problems.

The midwife (or other duly authorized person) scans the bracelet with the smartphone provided. A form is automatically generated for completion (including such information as the child’s gender and name and the parents’ biodata). The data are then sent by encrypted SMS to the server of the national civil registry centre, which checks that the bracelet is valid and has not been used before. This is followed by registration by a civil registrar, when the bubble bracelet is supplemented with the necessary additional information. A birth certificate can then be issued upon presentation of the bracelet on the same day, or later, in any civil registration centre in the country. All processes are monitored at the central level, at the headquarters of the General Directorate, in Ouagadougou. The system is hosted in the local server room at the General Directorate.

## United Republic of Tanzania<sup>4</sup>

Working together with the company Tigo Mobile, the Registration Insolvency and Trusteeship Agency (RITA) of the United Republic of Tanzania has developed an application designed to work on an Android smartphone. This basic application allows the registrar to input the required information by following a series of prompts. When this is complete, the application compiles the data into two SMS messages and sends it to an SMS gateway server, which, in turn, forwards the message to the central server at RITA. Once the central server decodes the message and

stores the birth record in the central database, a confirmation message is immediately sent to the mobile device to notify the registrar so that a birth certificate for the child may be issued. The entire process takes only a few seconds to complete.

Other civil registration offices in Botswana, Eswatini, Kenya, Lesotho and Zimbabwe are using SMS services to inform the populations in the respective countries on the progress of their registration process. In this way, members of the population are prompted to send SMS messages as a means of obtaining necessary civil registration services.

## Key aspects to consider with e-notification systems

- **Working in partnership:** Following a multi-sector approach to civil registration and vital statistics, it is necessary to ensure that each partner’s strategic objectives are aligned and contribute to the respective government’s national development strategies to empower and improve living standards in local communities.
- **Maximizing the impact:** The e-notification system should help in surmounting fundamental barriers to civil registration – in particular prohibitive cost and lack of awareness.
- **User-centric design:** When designing a mobile application, partners should give extensive attention to the specific human and technical limitations of the market, to ensure that new registrars have the skills and knowledge needed to carry out their roles. The application should be designed to be both easy-to-use and interoperable – this will ensure that it works across multiple platforms.
- **Linkages to other vital events:** The utility should extend to the registration of other vital statistics, such as marriage, divorce and death, and should also support the collection of data related to other health outcomes.

<sup>3</sup> See [www.icivil.bf/](http://www.icivil.bf/).

<sup>4</sup> See [www.rita.go.tz/](http://www.rita.go.tz/).

- **Review of the legal framework:** It is essential for operators and other partners to work alongside governments to embed the new, modern civil registration system into law.
- **Plan for sustainability:** It is vital that partners work together from the outset to help operators elevate these projects from the specific confines of civil registration services to the wider commercial domain.

## Conclusions

The examples presented here show the potential of mobile phones in boosting the operational efficiency of the civil registration

system in Africa. By harnessing the extensive use of mobile devices in Africa, digital technology opens up an incomparable opportunity to drive the agenda for the accelerated improvement of civil registration and vital statistics systems and to ensure a legal identity for all on the continent. Technology provides the platform for the interoperability and real-time data-sharing necessary for efficient governance and e-commerce, which brings together all development efforts through interconnected systems across public and private sectors. Inclusive and trustworthy civil registration and digital ID systems are a foundation for accelerating progress towards many of the targets set by the Sustainable Development Goals.

## Note

ECA, the secretariat of the Africa Programme on Accelerated Improvement of Civil Registration and Vital Statistics Systems and the Centre of Excellence for Civil Registration and Vital Statistics Systems are supporting the development of technical briefs on innovative approaches and good practices that have facilitated the continuous and universal registration of vital events in Africa, and consequently mitigated the impact of COVID-19 on the performance of the civil registration systems, including the generation of data for health surveillance during a health crisis. The overarching purpose of the briefs is to provide inspiration and policy guidance for the programming of civil registration and vital statistics in the African region in the midst of a global health crisis, such as the COVID-19 pandemic.

**“E-notification of vital events: innovations adaptable for business continuity of civil registration in emergency situations”** is the third in a series of briefs focusing on good and innovative country practices in

the midst of the COVID-19 pandemic. The themes of the briefs include:

- Rapid impact assessment of the COVID-19 pandemic on civil registration and vital statistics systems
- Documenting the role of civil registration systems in delivery of emergency cash grants: a good practice example from Namibia
- Documenting good practices in national and ministerial continuity plans, including civil registration and vital statistics systems
- Documenting good practices in terms of collecting data on death registration, including causes of death, for COVID-19 surveillance

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