

Country context

Like other countries in this sub-region, Burkina Faso is affected by a very high mortality rate amongst children aged under 5 years. The main causes of these deaths are malaria, acute respiratory diseases, diarrhoea and neonatal infections. In 70% of cases, the deaths occur in the community.

To reduce infant and child mortality rates in the communities, a number of strategies have been deployed, including Integrated Management of Childhood Illness - IMCI) at community level. Despite this, numerous difficulties still remain, including poor availability and quality of data on treatment of cases, frequent interruptions to medicine stocks, and insufficient supervision of community health workers (CHW) by health workers. These CHWs are of first importance, constituting the link between the health workers and the community, and have several missions at community level. Firstly, they can provide simple diagnoses¹ (e.g. diarrhoea and simple malaria), and, when there are no complications, they can also provide direct treatment using the medicines available to them. If complications occur, the CHWs are required to refer the children to the Health and Social Advancement Centre [Centre de Santé et de Promotion Sociale - CSPS]. These centres also have the task of organising awareness activities to improve indicators at community level. *"My workmate and I regularly organise awareness campaigns in the village: for example, we use flashcards, and we organise discussion groups on a wide variety of topics including hygiene and family planning", explains Catherine Kouraogo, CHW in Sao village (about 650 residents), located about 10 km from Tindila CSPS.*

Origins of project

To overcome these difficulties, the Burkina Faso public authorities have decided to resort to mobile technology for health care at community level. The Ministry of Health, with the technical support of the United Nations Children's Emergency Fund (UNICEF) and the World Health Organisation (WHO), thus implemented, during the period 2010-2013, a project to accelerate the reduction in maternal, neonatal, infant and child mortality rates in Nord and Centre-Nord Regions, with finance from the Bill and Melinda Gates foundation. The project comprised six areas of intervention, the most important of which was the community IMCI, which has allowed the CHWs to home-treat, screen or refer children aged 0-5 for the most deadly diseases, such as malaria, pneumonia, diarrhoea and malnutrition.

An evaluation of the implementation of the community IMCI and of the quality of the services provided by the CHW, conducted in 2013, revealed that most CHWs were able to diagnose and treat these infantile conditions. *"This study revealed that the CHWs were taking proper care of sick children in the Nord Region. However, it*

¹ On average, the CHW takes care of 2-3 children per day.

was very difficult to access health data at community level and find out about medicine stocks and gaps in those stocks. The CHWs were not sufficiently supervised or monitored", asserted William Ouango, programmer and analyst with the Health Computer Services Management [Direction des Services Informatiques en Santé - DSIS]. Ferdinand Kaboré, Mhealth contact with the Family and Health Directorate [Direction de la Santé et de la Famille - DSF] also mentioned that it "was necessary to review the copies to ensure comprehensiveness and timeliness of data transmission. And also to be responsive in relation to supplying the CHWs with inputs to ensure that there is no break in provision of care at community level."

At the end of this programme, and in reaction to these comments, the Burkina Faso Health Ministry, through the DSIS working together with the Family and Health Directorate, the other technical directorates and UNICEF, launched in 2016 a project aimed at introducing apps for phones (Java and smartphones) to help CHWs and health training in the Nord Region of Burkina Faso². The aim of the programme was to improve the quality, collection and centralisation of the Integrated Management of Childhood Illness data obtained at community level and the monitoring of stocks/orders for health products used by the CHWs.

Establishing relations with those involved in the project

In order to obtain a clear overview of the Mhealth project, I contacted a number of different participants involved in this initiative:

<i>Kouraogo, Catherine</i>	Community Health worker (CHW), Sao Village, Tindila CSPS, Yako Health District
<i>Ouedraogo, Sanoussa</i>	Head Nurse, Tindila CSPS, Yako Health District
<i>Bonkian, Charles</i>	Manager of the Health Information and Epidemiological Surveillance Centre [Centre d'information sanitaire et de surveillance épidémiologique - CISSE] in Yako Health District
<i>Gansore, Jean Gabriel</i>	Manager of the Health Information and Epidemiological Surveillance Centre [Centre d'information sanitaire et de surveillance épidémiologique - CISSE] in Nord Regional Health Directorate [Direction Régionale Sanitaire - DRS]
<i>Ouattara, Jean de Dieu</i>	Health Promotion Manager , Yako Health District
<i>Kaboré, Ferdinand</i>	Mhealth and leDA contact person at the Family Health Directorate
<i>Ouango, William</i>	Programmer and analyst within the DSIS
<i>Boukary, Ouedraogo</i>	Public health specialist doctor, Head of DSIS

Operation of the programme

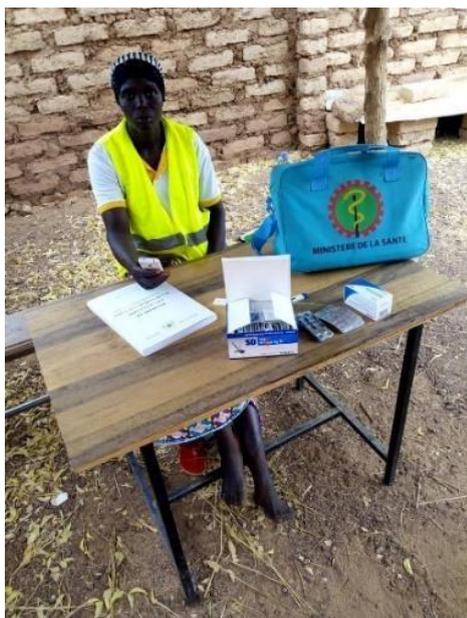
Because of the poor quality of the mobile internet in Burkina Faso, the project used text messages as the means of communicating data between actors at community level and their managers in the health centres. In this regard, a Java application for mobiles has been created for the CHWs, and an Android application ("Mhealth PCIMEC³") for smartphones/tablets has been designed for the Station Head Nurses (SHNs) responsible for supervision of the CHWs.



*Javaphone used by CHW (left),
 Smartphone used by SHN (right)*

Every Monday morning, the CHWs complete the forms installed on their mobiles (supporting Java) and send the data to an SMS exchange platform known as Rapidpro. Once on the platform, this data is automatically transferred to the SHN *via* text message. The message received by the SHN is loaded into an Android application which presents the data in comparative tables (treatment, orders and situation of inputs – see photo below). This form of presentation is designed both to ease the reading of data and certain indicators and to ease the analysis and quality control of data sent by the CHWs from their health areas.





Weekly sending of data (forms) by Catherine Kouraogo, CHW in Sao Village (attached to Tindila CSPS) (photo on the left). Catherine Kouraogo, CHW in Sao Village (attached to Tindila CSPS), in a consultation with a mother and child (photo on the right).

At the same time, the data received by the CHWs' SHN are duplicated on the National Health Data Storehouse of Burkina Faso, a platform for integrated management of health data within the Health Ministry. ENDOS-BF was launched in June 2013 and is designed to reinforce the health system and to introduce a high-quality health information system. Designed like the District Health Information System (DHIS2) platform, it allows management of routine data (whether or not aggregate), and data from the early alert system, programmes and resources (human, financial, logistical *etc*). The platform is accessible *via* the internet for actors in health districts, health regions and central directorates of the health ministry for use. The platform has a number of limitations, as William Ouango points out: *"The problem with DHIS2 is that the platform does not manage the possibility of sending data by text. It is therefore difficult to send information from the field to the central level: at CSPS level it is very difficult to get an internet connection."* For this reason, the DSIS leaned towards Rapidpro, a SMS management platform, allowing information to be managed by the CHWs and SHNs and DHIS2. However, this platform also has some functions missing. *"The difficulty with Rapidpro is that it works on a question-and-answer basis. Its only problem is that it does not contain any forms. It's not easy to use... and the questions can take two hours to actually reach the CHW because of our unreliable networks. We have also directly designed forms on Java phones, and these are really simple to use"*, said the programmer in response to our questions.

Once completed by the CHW, the Java form is automatically coded and the information is sent via Rapidpro (single number, short and free / parametrised on Rapidpro)⁴. When the platform receives this coded information, it knows automatically which CHW is sending and can thus send the information to his/her SHN. In fact, the CHWs have been pre-registered. *"Once he/she is registered on the platform, and as soon as he/she sends a message, the identity of the CHW is automatically recognised and we can see his or her full name and village"*, explains William Ouango, before adding: *"To sum up, then, it's Rapidpro that's responsible for saying: this is that CHW from that CSPS, therefore I'm sending the information to that SHN. There is also a code that allows the data to be sent to DHIS2."* This platform is also able to analyse input errors. Thus, if

the information sent via Rapidpro is wrong, the platform takes it upon itself to send the CHW a message asking him/her to correct the error. Otherwise, Rapidpro will undertake to send the data to his/her SHN and then to DHIS2.

It is important for the data input by the CHW to be sent to the SHN, as there is a requirement at national level for the information to be validated beforehand by the immediate superiors. This system allows the SHNs to check that they have sent the data properly or if an error has been made. If this is the case, the health worker will contact the CHW⁵ so that he/she can correct the error and send the amendments using his/her phone. *"Every Monday morning, the CHWs must send me the data. When I receive them, I check them. This must be done before 08:00. If there are problems, then I contact them"*, explains Sanoussa Ouedraogo. The station head nurses are supported by different CISSE members from the districts and regions and the different central directorates, in the same way as the DSF, who have the overall responsibility for data. *"I have access to all community-level data. We work with the SHNs in different forms of health training and contact them when we see any data that draws our attention. If necessary, we ask the CHW to make an amendment if there's been an error in the data input process,"* explains Charles Bonkian, CISSE Manager of Yako Health District.



*Sanoussa Ouedraogo, Station Head Nurse (SHN)
at Tindila CPCS*

⁴ The automatic response sent to the SHNs is free of charge. From one end to the other, the actors in the field are not charged.

⁵ The SHN can use the short number for sending messages to the CHW. The project does not provide communication credits that allow the SHNs to contact the CHW.

Thanks to the Android application designed within the framework of this project, the health workers can oversee the treatment activities carried out by the CHWs (year, week, village, name of CHW, number of children seen by CHW etc), as well as stocks and input orders. Ferdinand Kaboré, mHealth contact point in the Family Health Directorate, *points out that "before this project, it was difficult for the SHNs to find out anything about the CHWs' activities and to complete the monthly reports on the health situation in their sector. When this system was set up, they saw an opportunity to get themselves some quality data."* Access to this data has helped enrich the exchanges between the SHN and his/her CHWs⁶ at monthly meetings⁷, simplified the job of the CHWs who no longer have to leave their village to hand over medical data for their sector to the SHN, validated the work done and fully justified the monthly subsidies paid to them⁸. In addition, the app has allowed health workers to verify input stocks and send supplies to the CHWs if necessary.

After undergoing an initial training on the community IMCI, organised over a 5-day period by the SHN and the district workers, the CHWs underwent a day of training⁹ in use of the phone and the process of form sending. *"This has given us a lot of skills!"* declared Catherine Kouraogo, before adding: *"I spend about 10 minutes per week sending data! I do it every Monday morning, and it's easy, especially because of the training we've had."* This is confirmed by Ferdinand Kaboré: *"Since the training, the CHWs have had little difficulty filling out the forms"*. Sanoussa Ouedraogo, SHN at Tindila CSPS¹⁰, recognises that *"this project has galvanised the CHWs; they feel much more encouraged and now have a guarantee that their data on their work will be used, that their work is not in vain"*. Charles Bonkian, Manager of Yako CISSE, also point out that *"there is evidence that the CHWs have been reinforced. This allows them much closer contact with the patients, and the population has confidence in them. In fact, people have more confidence when tele-health tools are being used."*

⁶ There are at least 2 CHWs in each village. In exceptional cases, there may be four of them. The CHWs are recruited by the town halls, directly from within the community. They must be residents in the village and able to read and write.

⁷ Each month, the CHWs must produce a monthly activity report for their SHNs, who in turn must send the data to their health district on a monthly basis.

⁸ The CHWs are given a fixed subsidy of CFA25,000 per month. These monthly subsidies are paid *via* Orange Money (the districts in their turn must ensure that the CHWs have an orange number) by the government, supported by the World Bank. The payments made to the CHWs will eventually be transferred to this system.

⁹ Training sessions were organised in 2016 when the project started in the two districts, and in 2017 in the four other districts in Nord Region. Throughout the country, every CHW has been trained in the awareness aspect, and many have been trained in the treatment of diarrhoea and malaria. The CHWs from the 5 priority regions in Burkina Faso have been given additional training in the treatment of malaria, diarrhoea and pneumonia (with antibiotics), screening for malnutrition, checks for vaccination and vitamin A supplementation. The term *"complete package"* is used in these 5 regions.

¹⁰ Tindila CSPS covers 9 villages and 13,500 residences, including about 3,000 children. He has 18 CHWs under his supervision. He has worked in this CSPS since November 2017. This CSPS welcomes an average of 30-40 children per day and 25 adults per day. Four persons work in this CSPS: a midwife and two AIS.



Training of CHWs

Several members of the DSIS have the responsibility of checking the operations of the various apps, which are interlinked, on a regular basis. For example, William Ouango carries out tests each week *"to check that all is going well, that the text messages are sent, whether Rapidpro is sending the data properly, that there are no problems with data management. There is also a person responsible for coordination, who receives the error messages from the CHWs."*



Charles Bonkian, CISSE manager for Yako District, connecting to ENDOS

Finance and economic model

The total invested for the acquisition of production resources, in order to allow the initiative to operate, is \$300,000. The annual operational cost of the initiative is \$25,000. UNICEF has supported the equipping and launch of the activities. The State is responsible for paying the CHWs' subsidies.

At central level, the mHealth project relies on volunteers: 27 volunteers are working on this initiative.

Monitoring and evaluation / effects on the beneficiaries

At present, about 4,500 CHWs are involved in the project. Following the introduction of the project in Yako and Gourcy districts in 2016, the project was widened to include all six districts in the Nord Region of Burkina Faso: Gourcy, Ouahigouya, Séguénéga, Thiou, Titao and Yako. In 2018, funds were mobilised to start work to extend the project to two other regions, Boucle du Mouhoun and Est, with extension to the Sahel and Centre Nord regions in 2019¹¹. The extension of the programme to these four regions required more time than anticipated: it should happen some time during 2019.

Despite the many positive effects mentioned above, this initiative has its limitations. Jean de Dieu Ouattara, Health Promotion Manager for Yako District, points out in fact that *"it's a very good project, but there are shortcomings. What's happened is that certain SHNs don't manage to display certain data sent by certain CHWs. This could be to do with the CHW. Perhaps he or she doesn't check that the form has been sent properly, or doesn't read the error message sent by the system, or the platform has a bug... there's room for improvement."*

Some CHWs are accidentally deleting the app. The problem of CHWs' and SHNs' phones being lost or damaged is a big one, as the project does not have a budget for replacing this equipment. The poor quality of the mobile network further complicates the sending of forms by the CHWs, the synchronisation of data in the Android application used by the SHNs and access to the DHIS2 by the CISSE offices and those working at central level. *"Without mincing words, I would say that the network we have to work with isn't very good,"* declares Charles Bonkian. On top of that, the SHNs do not have call credits to call on CHWs with regard to data sent by CHWs.

Partners

This programme is the fruit of a partnership between the Ministry of Health and UNICEF, the United Nations Children's Emergency Fund. The Global Fund has also been financing this project since 2018, within the framework of the extension of mHealth into the priority regions.

¹¹ 5 priority regions in Burkina Faso: Sahel, Centre Nord, Est, Nord and Boucle du Mouhoun.

Areas of potential and need

One current area of potential is operating the project fully in the five priority regions of Burkina Faso (2019) before extending it to other sectors. There are also plans for future development of a strategy to replace the phones that become worn out or lost by the SHNs and CHWs, in order to keep the project going.

One of the project's particular current needs is for supervision of SHNs and CHWs. The executive teams in the health districts should increase their support for the SHNs: this could mean giving them call credits to bring them close to their CHWs or increase the level of coaching at CSPS and community level. The Nord Regional Health Directorate could also increase levels of monitoring of the project's implementation in the districts, provide better maintenance of CHWs' and SHNs' phones, and increase their support for the districts in coaching of CHWs.

Much thought is being channelled into finding solutions to the problems encountered in data synchronisation and supplies of inputs for providing treatment at community level.

Conclusion

The system being implemented within the mHealth project is bringing deep and positive changes and many opportunities for community health in the rural areas of Burkina Faso. This initiative has a real added value in bringing about an increase in CHWs' productivity and a significant reduction in infant mortality on one hand, and in sending high-quality treatment data, facilitating continued supplies of medicines, equipping CHWs and SHNs with mobile phones and designing apps on the other hand.