Digital Solutions:
Burkina Faso

Scaling Up
NUTRITION

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BURKINA FASO

Digital Health Solutions providing support through technology towards equitable and comprehensive coverage of all communities, including hard-to-reach areas.

Despite progress made in reducing child mortality over the last two decades, preventable and treatable conditions such as diarrhoea, pneumonia, malaria and malnutrition remain the leading cause of death for children under 5 years old in low-income countries. Strategies have been developed for the Integrated Management of Childhood Illness (IMCI)[1] and Community-based Management of Acute Malnutrition

(CMAM). However, health care worker (HCW) adherence to these protocols tends to be low, and IMCI and CMAM services are not well coordinated, resulting in poor-quality treatment of sick children. Digital solutions offer the possibility to systematise approaches, improving protocol adherence significantly, as well as reducing manual errors and supporting nutrition service delivery.

Burkina Faso showcases best practice with an integrated digital health solution implemented at scale: covering 84% of the country's primary health care facilities (PHCs) and with over ten million consultations supported by a digital job aid.

The Digital Health Solution – the Integrated e-Diagnostic Approach (IeDA)

Despite Burkina Faso having adopted the IMCI strategy in 2003, the process of its implementation remained a challenge as HCWs were poorly trained and lacked supervision. This, along with low literacy rates, the high burden of paper-based reporting, and a high turnover of staff in facilities characterised as being hard to reach and under-resourced, led to poor quality diagnosis and treatment of children under five years.[2]

Against this background, the Integrated e-Diagnostic Approach (IeDA) was developed by Terre des hommes (Tdh) in 2014[3], in partnership with the Ministry of Health (MoH) (Figure 1). The aim was to strive for equitable and comprehensive coverage of all communities, including hard to reach areas, through technology. It is a four pillar approach (see Figure 2) using a digital health solution that aims to improve the quality of care at PHCs through the use of a digital job aid, quality improvement processes, e-learning and data exploitation.

The premise is that on its own, a digital health tool cannot improve health outcomes, but must be bolstered by training, support and management systems in order to improve the quality of care delivered.

The application consists of an Electronic Consultation Register (REC) and an Android diagnostic aid application, developed on the CommCare open-source platform by Dimagi and Tdh in 2010. The REC incorporates IMCI protocol digitalisation and includes patient files, a decision-making assistance algorithm, and audio, visual and text supports, all of which help HCWs make more reliable diagnoses and take better care of their patients. Initially a custom web-based app for laptops, IeDA was redesigned for tablets in 2014 to enable it to be used at the desired scale. The mobile version includes the tablet-based app and web dashboards for different users.

1   A strategy devised in 1999 by the WHO and UNICEF to diagnose childhood illnesses and improve community health practices in low-resource settings https://www.who.int/maternal_child_adolescent/child/imci/background/en/
2   https://doi.org/10.1186/s13012-016-0476-5
3   Based on a successful pilot with a smaller electronic tool in two Health Districts.

From REC to IeDA 2.0

2010
- REC pilot in 2 Health Districts (HD)
- Development financed by European Civil Protection and Humanitarian Aid Operations (ECHO) as a quality approach accompanying the exemption of user fees for under 5 and pregnant women pilot

2014
- IeDA financed by Bill and Melinda Gates Foundation
- 4 components / consortium with a research partnership, data migrated in CommCare / 2 health regions (BMH and Nord)

2017
- Geographical extension started in Sahel and East regions (2 HD in each) financed by Global Fund
- One HD of the center region decides to deploy REC on its domestic district resources

2018
- Presentation of results from London School of Hygiene and Tropical Medicine (LSHTM) and decision of handover to the MoH (3-year process) with a full scale-up plan
- Creation of the Alliance for e IMCI Diagnosis (AIeDIAI) together with World Vision and Action Against Hunger (ACF) to create nutrition continuum of care embedded in IMCI

2019
- Launch of the IeDA handover process to the MoH
- Other thematic expansions: REC maternity (Family Planning), link to civil registry and further geographical extension
- Partnership with Cloudera and The University of Geneva (UNIGE) on Artificial Intelligence (AI) and big data

2020
- Geographical extension continues to reach 86% of all PCHs by the end of the year
- Connected device and Rapid Diagnostic Tests (RDTs): pulse-oxymeter, dengue
- New developments: Electronic Medical Record (EMR), PHC stock management, TB, Malaria study, full REC maternity
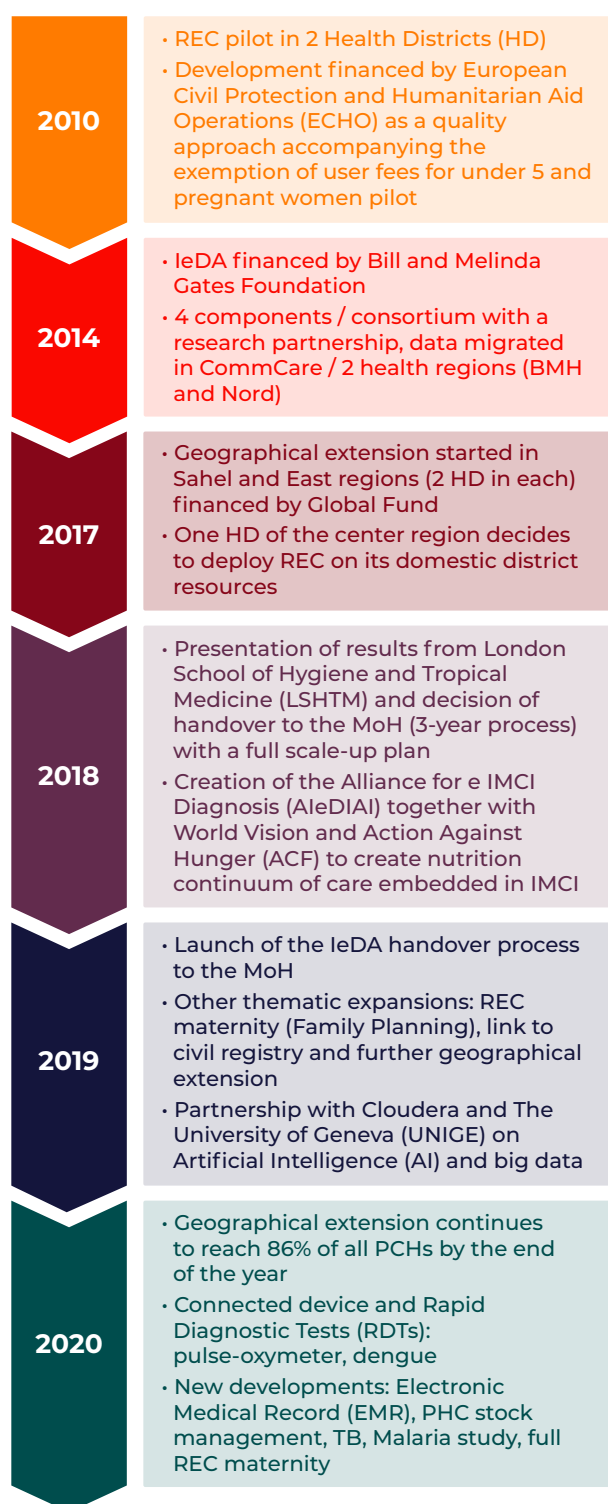
Figure 1: 10 Years of Digitalisation in Burkina Faso

Key features and how it works:

- The app's offline functionality enables it to be used in all districts, including those with poor connectivity.

- The app is designed to be user-friendly and guides HCWs through decisions step-by-step to ensure that IMCI protocol is strictly followed.

- Once the requested information has been entered by the HCW, an automated diagnosis is produced, as well as guidance for proper treatment, including prescription.

- Instructional videos, audio files and limited text fields make it easy to use, regardless of digital literacy.

- E-learning modules provide easy-to-access training for HCWs to maintain and improve their knowledge and skills.

- A support system is also in place to respond to breakdowns and questions on the software and the tablet.

Since 2018, new modules have been integrated for maternal care, nutrition counselling for infants and young children, tuberculosis, stock management, family planning, epidemiological surveillance and other emerging health priorities.[4] Additionally, artificial intelligence (AI) features and machine learning have been integrated as a pilot[5] to allow for more efficient data processing, provision of real-time recommendations to health workers, and generation of smart dashboards and predictive models for epidemiological surveillance.

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4   Point of care testing is also being trialled (haemoglobin and medical devices such as a pulse-oximeter)
5   In partnership with the Ecole Polytechnique Fédéral de Lausanne, Switzerland and Cloudera Foundation

Further, as recommended by the latest report from <u>USAID</u>[6] on digital tools for better service delivery for nutrition, this digital tool for nutrition service delivery is incorporated into a comprehensive digital service delivery platform and fully integrated into Burkina Faso's health infrastructure (Figure 3). IeDA is considered a priority within the national digital health strategy, and data on key indicators are sent automatically to the government's health information system for national-level monitoring.

As of June 2021, the app is in use in 84% (1,755) of PHCs in Burkina Faso. More than 90% of IMCI consultations are conducted using the app (approx. 250,000 per month), and over 10 million consultations have been conducted using IeDA. IeDA is also in use in Mali (two districts, since 2016), Niger (two PHCs within the ITU multisectoral digital initiative, since 2019) and India (Jharkand, since 2020).
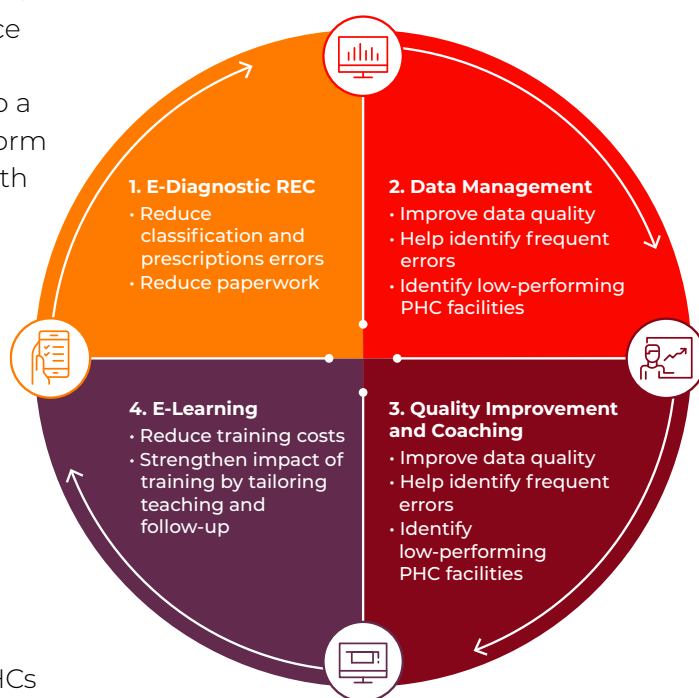

1. E-Diagnostic REC
· Reduce classification and prescriptions errors
· Reduce paperwork

2. Data Management
· Improve data quality
· Help identify frequent errors
· Identify low-performing PHC facilities

4. E-Learning
· Reduce training costs
· Strengthen impact of training by tailoring teaching and follow-up

3. Quality Improvement and Coaching
· Improve data quality
· Help identify frequent errors
· Identify low-performing PHC facilities

Figure 2: Virtuous Cycle of the 4-pillar IeDA Approach

Benefits of using IeDA

Research undertaken by the London School of Hygiene and Tropical Medicine (<u>LSHTM</u>)[7] confirms that use of the IeDA app in Burkina Faso has resulted in significant benefits (see box), and, when operated at scale, generates savings for the MoH (see Costs and Savings).

Main findings of the LSHTM evaluations of IeDA:

- Improved health care worker satisfaction.

- Indirect benefits for the community: communities appreciate the supply of electricity resulting from the solar kit provided to PHC facilities to ensure energy supply for tablets.

- In PHC facilities covered by IeDA, 97% of consultations for under fives were conducted using the digital tool, leading to a 50% improvement in the adherence to the IMCI protocol.

- Diagnostic and treatment accuracy:

  - 80% accuracy overall

  - Increase of up to 20% in diagnostic accuracy for malnutrition

  - 75% correct SAM identification rate in the sites using IeDA compared to 55% in control sites

- Reduction in antibiotic over-prescription of between 6%–15%.

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6   USAID Advancing Nutrition. 2020. Using Digital Tools to Strengthen Nutrition Service Delivery: An Overview. Arlington, VA: USAID Advancing Nutrition.

7   <u>Stepped-wedge cluster randomised trial</u>, <u>economic impact study</u> and <u>realist evaluation.</u>

Further Developments and Extensions

Taking advantage of IeDA's highly configurable format, a number of new components have been added over time. These include, but are not limited to: an e-registry for maternity; costs for the national insurance scheme and the health system; electronic medical record for use with universal health care; a stock management component; integration of AI and big data. Community-based Management of Acute Malnutrition (CMAM) Surge is also ongoing in certain regions, financed by ECHO.[8] This tracks the caseload of acute malnutrition and available human resources to determine when the maximum capacity of the PHC to manage cases and ICMI needs has been reached, in order to top them up as needed.

Further developments include:

The Alliance for e-IMCI Diagnosis (AIeDIA): In 2018, Tdh, World Vision (WV) and ACF created AIeDIA, which aims to incorporate an existing WV CMAM application into IeDA, thereby taking the digital tool package to a new level for greater nutrition impact. AIeDIA digitalises and incorporates the whole CMAM protocol into IeDA, to facilitate continuum of care by ensuring that follow-up, referral and counter-referral are properly carried out through the use of a unique identifier. Additionally, AIeDIA encompasses a holistic approach within health services to manage all children under five who need treatment for common infections or acute malnutrition. If the pilot phase due to be undertaken in Mali in 2022 is successful,[9] AIeDIA has the potential to benefit other countries where IeDA is implemented: Burkina Faso, Niger and India.

eIYCF: an e-IYCF (infant and young child feeding) module was developed in 2019[10] to be used for consultations with children under five.

This addition was successfully piloted in one health district before being scaled up to a whole region (Boucle du Mouhoun) in May 2019. An external capitalisation study[11] indicates that 83% of PHCs use the app for IYCF advice on a regular basis; 93% of HCWs state a preference for using the digital version over the paper-based version; and 95% of caregivers expressed satisfaction with an e-IYCF consultation. The integration of e-IYCF has the potential to contribute significantly to the improvement of IYCF indicators in Burkina Faso.

Adaptations for COVID-19:

As the application already benefitted from widespread use prior to the onset of the pandemic, it was straightforward to incorporate adaptations for the COVID-19 situation. These were designed, developed and rolled out to 1,200 PHC facilities in 37 districts (May 2020) within three weeks, highlighting the ease with which additional content can be deployed once digital solutions are running at scale and HCWs are familiar with the tool.

> ### 🔅 COVID-19 adaptations for IeDA
>
> - **Screening and triage:** guides health workers through an algorithm to assess symptoms, map suspected cases, and trigger SMS alerts to health authorities for testing and follow up.
>
> - **Counselling and Community Sensitisation:** prompts HCWs to share information, raise awareness, and coach caregivers on protective measures during IMCI consultations.
>
> - **E-learning for Health Workers:** equips HCWs with up-to-date information, guidance and answers to frequently asked questions about COVID-19 in their communities.

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8   https://www.ennonline.net/fex/64/cmamsurgehealthsurge

9   AIeDIA pilot implemented by Tdh, WVI and ACF. Covering 1 district (10 health care facilities) over 15 months, at a cost of US$250,000

10 Developed by Alive and Thrive through funding from the Bill and Melinda Gates Foundation

11 Capitalisation report, e-IYCF Project, Boucle de Mouhoun. Bureau Research Innovation and Development for Health (RID4H).

Costs and Savings

The combined initial investment from Tdh and MoH required to set up this technology was approximately US$6.6 million (2014-2017).[12] This translates to an average IeDA set-up cost of US$2,617 per health centre, and average recurrent annual expenditures of US$3,717 per year (US$309 per month) per health centre.[13] However, when the project reaches scale up, recurrent expenditure drops substantially to between US$118 per year (includes cost of purchasing and distributing tablets only) and US$519 per year (includes cost of purchasing and distributing tablets as well as quality improvement costs).

Additionally, scaling up IeDA leads to a number of savings for the MoH: an economic impact study conducted by LSHTM projected yearly savings from IeDA of between US$830,000 and US$1.7 million, due to both reduced training times for health workers (from 11 days to 6 days) and reduced paper consumption at PHC facilities. The cost study [14] shows potential savings of between US$33 and US$66 per health facility per month for the scale-up phase when comparing IeDA to paper-based IMCI, amounting to a potential saving of US$5.8 million in the period 2021-2025. Savings associated with reduced ICMI training times are projected to be US$246,000 between 2021 and 2025. Additionally, better diagnosis may lead to a reduction in the over-prescription of essential medicines, especially antibiotics.[15] Further, as the REC is a dynamic tool, it can support the dissemination of new policies (e.g. revisions of the protocol) at reduced cost, as only a software revision and an upload are required to roll out revisions.

Challenges

- **Connectivity:** While the app can be used offline, submitting reports and sharing data requires an internet connection. Where connection remains limited, users note the slow speed of tablets. Data synchronisation can be delayed, however HCWs face difficulties when there are a large number of patients and REC data needs to be synchronised, as the tablets cannot be used during this process.

- **Equipment maintenance:** Solar kits require maintenance and tablets must be replaced, although tablets have a lifespan of approximately ten years.

- **Funding:** Long-term donor engagement is a prerequisite, and this will continue to be required even after full transition to the MoH.

- **Engaging stakeholders:** The multisectoral nature of digital health means that a wide range of users and functions are required. Stakeholder analysis is therefore key, and the resulting stakeholder engagement strategy must be constantly adapted to take into account varying and evolving local needs, donors' agendas and other interests.

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12 32% of total Tdh expenditures for this period were set-up expenditures, i.e. expenditures required before the REC is operational in consultations. 68% of total Tdh expenditures were recurrent expenditures, i.e. expenditures associated with the running of IeDA once the REC consultations start.

13 Includes: software and connectivity; table purchase and distribution; healthcare provision by MoH; quality improvement; external communications; programme management.

14 https://www.tdh.ch/sites/default/files/ieda_expenditures_report_eng.pdf

15 LSHTM report found a reduction in antibiotic over-prescription of between 6% to 15%.

Lessons Learned about Achieving Scale in Burkina Faso

Key factors in the success of implementing IeDA in Burkina Faso:

- **A whole change management approach** is required.[16] The support of numerous stakeholders[17] determined the positive outcome in Burkina Faso. This was facilitated through the development of a tailored stakeholder strategy that addressed the sometimes diverging needs and requirements of the stakeholders, and made it possible to avoid potential blockages from these multiple actors and gain their engagement.

- **Strong partnerships between the government and numerous partners**[18] in operations, research and funding.

- **Buy-in at operational level** – the engagement of Heads of Districts (HoDs) was generated from seeing value in the tool and that its adaptations suited their needs. This resulted in a feeling of ownership at this level, with some HoDs becoming ambassadors for IeDA.

- **MoH support** was essential for the integration of the solution into national health systems, as well as to secure necessary funding. Involving the MoH from the very conception stage was crucial to securing their buy in, and key champions within the MoH have contributed to the success of IeDA. (Note: Since 2018, Tdh and the MoH have worked on a roadmap to officially transfer ownership of the app to the government of Burkina Faso. This process (financed by GIZ and the Global Fund) entered its final phase in April 2021, and is scheduled for completion by the end of 2021.)

- **Demonstration of the health impact and affordability of the initiative.** Evidence was provided through three evaluations conducted by LSHTM (2014-17) to analyse impact, financial costs and acceptability.

- **Long-term funding** is a prerequisite. MoH and Tdh have successfully leveraged a range of partnerships, including for the financing of the LSHTM studies. These, along with the willingness of MoH to expand the approach, led the Global Fund to provide essential resources to support geographical expansion after the successful pilot phase, without which IeDA may not have moved beyond the pilot phase.

- **Development of a robust technical support system** to address bugs and broken equipment – particularly important for sustainability.

- **Incorporating the digital tool into a comprehensive digital service delivery platform** ensured the tool's usefulness for users, while also enabling scale up and local ownership.

- **Capacity building** has been fundamental to sustaining the IeDA approach. Dimagi, Tdh and the MoH worked closely together in the transfer of app-building knowledge on the CommCare platform (2014-18). This ensured that the app could be independently managed, maintained and modified.

- **Regular coaching visits** as well as the e-learning modules have allowed for sustained use of the app despite the high level of HCW turnover.

- **Strong functionality of IeDA as a job aid** ensures that HCWs use the app daily, as they find it makes their daily tasks easier.

16 Lampariello R, Ancellin-Panzani S. Mastering stakeholders' engagement to reach national scale, sustainability and wide adoption of digital health initiatives: lessons learnt from Burkina Faso. Family Medicine and Community Health 2021;9:e000959. doi: 10.1136/fmch-2021-000959

17 Ministry in charge of Digital Solutions, Ministry of Civil Servants (National Insurance Scheme), Family Health Directorate, Directorate of Health Information System, Directorate of Statistics, Universal Health Coverage Technical Secretariat, National Programme Directorates, Health District Managers, Healthcare Workers, child caregivers.

18 LSHTM, Dimagi, Tdh, University of Geneva, EPFL, Cloudera Foundation, Find, John Hopkins University

Conclusion

Burkina Faso's ten-year journey with IeDA provides a rare and inspiring example of a digital health tool brought to scale. This experience offers valuable lessons on the scale up and sustainment of digital health interventions for other countries considering digital solutions, as well as for countries in the process of scaling up such solutions.

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FOR MORE INFORMATION, CONTACT:

Riccardo Lampariello, Head of Health Program, Terre des hommes-Lausanne:
riccardo.lampariello@tdh.ch

Dr Valérie Zombre, Director of Family Health, Ministry of Health, Burkina Faso:
marcellasanon@yahoo.fr

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