CommCare for COVID-19 Outbreak Response

For any questions about this document, please contact Dimagi’s CEO Jonathan Jackson (jjackson@dimagi.com) and/or Chief Strategy Officer Neal Lesh (nlesh@dimagi.com). Dimagi is making CommCare freely available for all COVID-19 use cases.

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Overview

During the Ebola outbreak in West Africa, there was a direct demonstration of the value of mobile applications for contact tracing, data collection, decision support, and information dissemination. However, the impact of mobile applications for preparedness and response was hindered by how long it took organizations to configure and deploy them. This was due in part to little in-country on-the-ground experience in using mobile technology to strengthen health information management in a rapid deployment model, and not leveraging existing in-country digital systems that could be adapted to the crisis.

The new coronavirus, COVID-19, is an emerging disease. While the vast majority of cases have been in China so far, it is important to prepare as quickly as possible for the growing outbreaks in other countries that are rapidly growing.

Dimagi’s team brings more than a decade of experience in rapidly deploying digital solutions to complex problems. Our deployment approach allows swift design and iteration with all stakeholders, limiting the time it takes to configure effective solutions. Using our leading open source mobile data collection and service delivery platform and Global Good, CommCare, Dimagi proposes to immediately begin working on a suite of tools that can assist in COVID-19 response, including:

- **Contact Tracing:** Dimagi will adapt its Contact Tracing 2.0 digital applications for COVID-19. The app has been shown to be effective in Ebola response and has clear applicability to COVID-19.
● **Educational Apps:** Dimagi will compile FAQs and tutorial courses to improve knowledge, awareness, myth busting, and recommendations for protective behaviors. These will be deployed through mobile apps for frontline health workers and first responders as well as direct-to-client innovations, including conversational agents that teach people what they need to know about COVID-19.

● **Data Harmonization:** The use of CommCare will help enable efficient data sharing across programs and generate a single source of data that integrates with information systems used by the Ministry of Health, such as Tableau or DHIS2.

● **Coordination:** As Dimagi works with many implementation partners around the world, Dimagi can help provide coordination across partners supporting digital solutions in a national context, and also globally.

Dimagi’s team of digital health technologists, strategists, and implementers will provide in-country and remote capacity building, as well as additional training and advisory services to government agencies and other actors to deploy the above system. We will work collaboratively with all stakeholders to ensure that the services provided are adapted to the context in which they will be deployed. Finally, Dimagi will leverage our past and current experience in outbreak response, our regional team of 50 people in Southern Asia, our team of 50 people in sub-Saharan Africa, as well as CommCare's proven, comprehensive functionalities for outbreak response.¹

Further, as CommCare is one of the most widely deployed platforms for frontline health workers globally, utilizing CommCare will leverage existing in-country capacity and also built upon reusable digital infrastructure. We're already seeing governments build CommCare applications for COVID-19, including the Ogun state government in Nigeria.

**Solutions**

If there are existing digital platforms already in place that can support the required use cases, it is highly recommended that countries leverage the existing digital platforms rather than deploy new tools. This will leverage existing knowledge and expertise, and be more readily adaptable over the progression of COVID-19 and build long term digital capacity and capability. CommCare is used in over 70 countries and is therefore often the appropriate platform to leverage, but may not be if another platform already has traction and is preferred.

**COVID-19 CommCare Applications (Contact Tracing and Educational Apps)**

Dimagi will adapt existing tools to create a COVID-19 CommCare application to be used on smartphones to carry out disease surveillance and educational activities. The disease surveillance system will include capabilities to report and track people with COVID-19 symptoms, conduct contact tracing, and educate health workers and community members. This will build on Dimagi’s Ebola contact tracing application deployed on the CommCare platform. This is a proven, sustainable solution that has been used in other humanitarian responses at scale, with extensive evidence and numerous studies showing its effectiveness.

**Contact Tracing and Case Reporting**

Dimagi proposes to accelerate and improve data collection, analysis and communication for improved response through the rapid customization for COVID-19 and deployment of the Contact Tracing 2.0 Application at hospitals and other primary care health facilities globally.

During an outbreak, contact tracing is a critical surveillance strategy that enables the rapid identification of new cases of a given disease, so that those individuals can be isolated before spreading infection. This approach has been widely used for other Coronaviruses, including MERS-CoV and is currently being used for COVID-19. Contact tracing was also used extensively during the 2014–2016 Ebola outbreak, and played a crucial role in enabling countries to halt the transmission of the disease. The approach has been successfully applied to control previous Ebola outbreaks; however, contact tracing typically relies on the use of paper-based systems which limits its power, timeliness and scalability.

There is clear evidence that suggests that COVID-19 spreads from person-to-person, which means that tracing the contacts of people who have potentially been exposed to the virus, either through direct or indirect means, is essential. Given that the average person is currently estimated to infect two others\(^2\), and the limited understanding of how the disease is transmitted, the surveillance and control of COVID-19 is of vital importance.

Significant challenges have been identified with the paper-based contact tracing approach including time delays, incomplete identification of contacts, missing contact lists, inadequate data collection, and transcription errors. Such challenges pose inherent issues for the timely monitoring of individuals who have been in contact with symptomatic or asymptomatic individuals.

Dimagi has developed a Contact Tracing 2.0 Application to address challenges with paper-based contact tracing and enable real-time data collection and retrieval. This application includes a registration and tracking of patients and follow-up with the households and contacts that are being monitored daily for symptoms for a period of required days. The application triggers alerts if an individual becomes a suspected case, making it widely deployable to investigation teams who need to quickly identify and follow up with contacts.

**Integration with Lab Systems**

The Contact Tracing application for COVID-19 can be integrated with labs to ensure rapid sharing of test results between hospitals and labs. This application will utilize case sharing features supported in the CommCare platform. CommCare has been leveraged to deploy lab specimen tracking as a dedicated use case, and also in the context of other health service delivery applications.

**Educational Apps**

Dimagi will develop additional, educational modules in CommCare to help educate frontline health workers and first responders and empower them to educate others. These modules can be used to supplement contact tracing apps, or can be used in their own standalone educational app. The modules will include multimedia, quizzes, and other ways to engage the user. The system will also be able to track which educational modules are used by which users.

The educational modules will be designed and tested to ensure they are accessible and easy to understand. All content will be in local languages. They will cover key public health principles for mitigating COVID-19.

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such as the need for handwashing. It will be designed to help address common and myths and rumors about COVID-19 that can be harmful to containing it. The system will also include a FAQ section.

**COVID-19 Direct-to-Client Apps (Chatbots)**

Dimagi also proposes to adapt the educational content developed above for delivery directly to users via conversational agents (also called “chatbots”). The chatbot will be used both to convey information as well as gather information about public perception of COVID-19.

For example, we can advertise over Facebook and other social media with offers to answer questions about COVID-19. We can also experiment with other techniques to attract users such as quizzes that test your knowledge on COVID-19.

Our FAQ-bot will allow users to ask a question in natural language. We will use simple machine learning methods to match the question to the closest match questions in our FAQ, and then offer the user the closest matches to choose from. The user can also indicate that none of the Q’s in the FAQ match their question. After the initial question is asked, the chatbot can then engage the user in further education, such as promoting hand washing.

We can report on what questions in the FAQ are most often asked, as well as identify the need for new content to be added to the FAQ. The natural language questions asked by the users will also be an important source of information about public perception.

**Data Sharing and Dashboards**

Digital development has made great progress in digitizing health systems in low and lower-middle income countries. Most successful digital development products have created value through improving service delivery or collecting data for research analysis. Through these systems, the digital health community has access to more data than ever before and it is key that stakeholders cultivate a culture of data use so that data is effectively and efficiently leveraged to improve programs and, ultimately, health outcomes.

Dimagi’s team has significant experience evaluating data use, data handling, and data decision-making across entire health systems - from the community to the office of the Minister of Health. Dimagi can support rigorous mapping and evaluation of current practices, resulting in a comprehensive set of recommendations to optimize data access, sharing, and use.

Dimagi offers a variety of tools and integrations for data sharing and analytics, beginning with a series of ready-to-use reports that enable programs to monitor mobile app use, as well as more program specific reports that can be customized and visualized to your specific needs. All raw data collected via the CommCare mobile application as part of this solution will be housed on CommCareHQ and can be directly integrated with other systems. CommCare applications can be integrated with Ministry of Health’s preferred data visualization systems (Tableau, DHIS2, PowerBI, other) to create dashboards that are aligned to the needs of decision makers to help address critical issues in the local surveillance and control strategies as well as to support the WHO Global Strategic Response Plan (GSRP). Having these integrated dashboards helps unlock the following areas for outbreak response:

- Improving communication, information sharing and decision making between the sub-coordination groups and the strategic coordination commissions through situational analysis dashboards
● Enabling improved identification initial identification of contacts, tracking follow-up of contacts, and monitoring the performance of contact tracers through the CommCare Contact Tracing Application and decision-making dashboards that provide timely information

● Reducing fragmentation of data and databases, reducing data silos, and providing complete information to decision makers by combining data from multiple sources, analyzing the data, and presenting the information in easy-to-understand visual dashboards

Coordination

Dimagi has supported coordination across many implementation partners and contexts in both emergency and non-emergency contexts. Dimagi will attempt to support coordination with COVID-19 as well. Rapidly sharing approaches and digital templates across partners who are supporting applications for COVID-19. CommCare’s global community of users can also support rapid dissemination of best practices, sharing of applications for countries utilizing digital solutions, and providing implementation support.

Implementation Approach

Example Rapid Deployment Plan for Contact Tracing

Scoping

In order to understand the current surveillance and contact tracing process, a digital expert will conduct an initial, in-country scoping exercise with the government and implementation partners. This process is crucial for the design, build, and launch of the mobile application. As part of this scoping visit, the digital expert will join the implementing partner for visits to the Ministry of Health, including associated Ministry departments involved in surveillance and contact tracing activities. We then recommend that this be followed by visits to hospitals and health clinics, as well as meeting with local contact tracing personnel to better understand the bottlenecks and challenges they face in their current data collection and service delivery practices.

Application Development

From the project onset, we will work in conjunction with stakeholders who will ultimately be accountable for the system, ensuring that they have an active role in the design, build, and launch of CommCare applications. As part of this process, the designated teams to map out the existing workflows of the current outbreak response system. That design will then be quickly converted into a CommCare application. After launch, we will continue to iterate on the content, and then quickly launch the application to other uses - including other areas of outbreak response.

During this process, participants will become competent in CommCare application management, data management, and training. They will have a firm understanding of Dimagi support channels should any technical issues need to be escalated. This will build the necessary skills in the local team to maintain, adapt, and add new outbreak response content to the mobile application, as well as health system strengthening content for after the outbreak.

Training
Dimagi’s approach to training is rooted in the goal of empowering our partners and governments rather than having them be dependent on 3rd parties to manage and support their systems. In the midst of an outbreak, we also recognize that there may be some significant time, resource, security, and accessibility constraints in running the perfect training, which is why it’s important to maintain a flexible training model.

Dimagi’s implementing staff - our skilled, often locally-based field managers - are conversant in more than 30 languages and lead all initial training with stakeholders at all levels- from Ministers of Health through community health workers. We believe in the value of involving authorities who are familiar with pre-existing systems - not only to ensure an effective training, but to reinforce long-term supervision processes long after Dimagi’s role is complete. In this spirit, we typically adopt a training-of-trainers (TOT) model when rolling out technology. If this isn’t possible due to constraints related to the outbreak, we have conceived extensive training designs to flexibly support all types of systems and deployment settings, including supporting multi-level trainings, remote trainings, and pre-recorded trainings, if security reasons require this. As part of this process, we work closely with partners to develop the appropriate support and training materials in local languages. Depending on the context, we can bolster initial trainings through a variety of follow-up activities - including sharing online and physical resources, creating WhatsApp and online groups for troubleshooting, sharing reports related to user activities, and incorporating refresher training materials directly in applications.

About Dimagi & CommCare

Dimagi is one of the world’s largest providers of mobile technology in support of frontline health workers. Dimagi’s cloud server currently supports 2,000 active projects deployed across 80 countries, including the largest scaling digital health projects worldwide. Dimagi is also the lead technical partner in developing frontline health worker and logistics mobile applications for many large-scale, prominent development projects. Dimagi has one of the most mature software development teams in the digital development industry, as well as a professional services team with extensive experience in designing and deploying leading solutions for LMICS, many at national scale.

Dimagi’s flagship technology platform, CommCare, is an award-winning, open source mobile case management platform that supports frontline health workers in tracking their clients through a continuum of service delivery. CommCare is used by 680,000 frontline workers around the world, who are cumulatively tracking tens of millions of people and submitting 5 million forms a day via the system. By running as an application on a mobile phone, CommCare is built on a decision and logic-processing platform that can support partners in delivering a wide range of services. It provides critical data-quality checks and calculations at each point of service. The tool aims to help partners to track and support client registration and follow-up alongside the CommCare web platform that includes workforce performance monitoring dashboards designed to assist project managers in better supporting frontline workers as they deliver critical program interventions in the field.

CommCare is a cloud-based, HIPPA-compliant, GDPR-compliant, open source mobile platform and Global Good that supports data collection, decision-support, client tracking, SMS-interaction, and map-based visualizations. CommCare is uniquely suited as the platform for mobile applications for outbreak response. It is the only mobile platform that integrates support for frontline workers, supply chain, and messaging needed for outbreak response. The CommCare form builder enables non-engineers, such as program managers, to build and adapt applications themselves. Finally, Dimagi maintains a repository of frontline
worker applications that have been published by our partner organizations. The accumulation of
standardized CommCare applications represents an increasingly important resource to assist in the rapid
deployment of new mobile applications.

Outbreak Response Evidence

CommCare is one of the most researched frontline technology platforms, and has an evidence base of over
65 peer-reviewed studies including eight randomized controlled trials. Together, these studies have
demonstrated CommCare’s positive impact on strengthening healthcare systems, frontline worker
capabilities, and client results.

A subset of these have studies have focused on CommCare’s impact on outbreak response. In October
2018, a study was published that reviewed 58 specific mobile health tools used during the 2014 - 2015
Ebola Virus Disease (EVD) outbreak in West Africa. The study found that 2 of the 58 tools, including
CommCare, supported all 7 technical characteristics and 4 key functionalities relevant to EVD outbreak
response, including surveillance, case management, contact tracing, and laboratory data management. A
2016 study in Nigeria found that frontline workers who used CommCare to combat the Ebola Virus Disease
improved their knowledge of the disease, with statistically significant improvements (p<.05) on questions
about human transmission of the virus, common symptoms, and whether Ebola fever is preventable. The
study noted reinforcement against risky behaviors such as contact with Ebola patients, eating bush meat,
and risky burial practices. Another study evaluated a CommCare application that was used to support
Ebola response efforts in Guinea in 2014. The study found that the application demonstrated the potential
to “improve access to surveillance data for informing response strategy” and that there is “opportunity to
extend this type of methodology to other pillars of the Ebola response.”

Dimagi’s Experience with Outbreak Response in Africa

Below are past and current outbreak response efforts that Dimagi has supported.

2015: West Africa Ebola Response

In 2015, led by the Earth Institute, CommCare was deployed by UNFPA in Guinea to support over 300
contact tracers (CTs) to conduct sensitization and contact tracing, supported by a real-time information
system. The data was monitored in real-time to follow up with CTs for immediate supportive supervision.
Dimagi was one of two organizations awarded for USAID’s Fighting Ebola Grand Challenge for
Development award in the ICT Solutions category. This award allowed Dimagi to further develop its suite of
mobile applications for outbreak response in order for organizations to rapidly deploy data collection
applications for their response efforts. In addition to contact tracing and lab results dissemination, we
developed mobile applications for adherence to screening and triage protocols, sensitization and
information dissemination, stock tracking, and patient self-reporting that can be used in a future crisis.

2018: DRC Ebola Response - Contact Tracing

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5 CommCare Evidence Base: https://bit.ly/2uyTwRQ
In December 2018, Dimagi provided remote support to UNFPA and the MoH in DRC to launch an adapted version of our Ebola Contact Tracing 2.0 application to 40 frontline health workers in North Kivu to respond to the Ebola outbreak in the DRC. The application deployment took a matter of weeks because we leveraged an established suite of Ebola starter applications built by Dimagi during the West Africa crisis.

In the February 2019 Strategic Response Plan (SRP) for the Ebola crisis in DRC, CommCare was highlighted for the MoH and its partner's intent to use CommCare for case detection and contact tracing. On page 13, the SRP states needing support for “Training strategic coordination team members on the use of CommCare software and providing cell phones/tablets and phone credits for monitoring community workers involved in contact tracing”. The plan aimed to engage 17 case investigation teams, 8 teams who follow up on missing contacts, 75 supervisors and 1,500 contact tracing agents, all of whom would be the main actors who would use the applications.

**Present: DRC Ebola Response - Mercy Corps Knowledge and Community Sensitization**

Mercy Corps is coordinating the coordination of a consortium made of three international NGOs (Oxfam, International Alert and CARE International) and a national NGO CORACON that are responding to the urgent Ebola response in DRC. The objective of the consortium is to deploy mobile technology solutions to work with communities and populations in non-hot spots areas for the epidemic to improve preparedness in the case the Ebola epidemic spreads in those areas.

Dimagi is supporting the consortium to digitize and deliver the following services using CommCare:

- Community sensitization and knowledge dissemination to educate communities, dispel myths, and prepare them for a potential outbreak
- Assessment of existing practices, counselling on behavior change to prevent Ebola transmission
- Capturing information about attitudes regarding Ebola to better inform emergency preparedness
- Capturing a KAP survey for a WASH program

The consortium intends to target several thousands of community volunteers in targeted regions of the DRC. These are field level workers, community workers or data collection staff such as, Care groups, Volunteers, CAGs, and WASH committees. The consortium intends to harmonize efforts across other CommCare interventions active in the country for Ebola response, where possible and effective.

**Dimagi’s Experience in South Asia & Southeast Asia**

Dimagi has extensive experience working on projects in nearly half of all countries in Southeast Asia and mainland South Asia. Since 2011, Dimagi has operated a South Asian regional hub in New Delhi, India. Our regional team of 50 technology, service delivery, and operations professionals are supporting several digital health projects in the region, including the largest community digital health project in the world.

**Ministry of Women & Child Development, India:** Through a project that is run with the Government of India’s Ministry of Women and Child Development, CommCare is being used by over 600,000 frontline workers in India to strengthen their delivery of high-impact nutrition interventions to mothers, newborns, and children. The Integrated Child Development Services-Common Application Software (ICDS-CAS) is by far the largest digital community health intervention in existence, with over 400 million people registered in the system. The integrated system is comprised of five connected mobile health applications that are supported by SMS capabilities and custom dashboards. In December of 2017, the Government of India
announced a total investment of $100 million in technology to roll out the solution across all 1.4 million Aanganwadi workers in India.

**USAID Suaahara II “Good Nutrition” Program, Nepal**: In Nepal, Dimagi is supporting a five-year integrated nutrition and family planning project to improve the health of women and children in 40 districts of Nepal. The developed CommCare application is helping users identify target populations, conduct basic population mapping, track required home visits, and deliver the required messaging through the help of automated prompts and scripts, all offline. To date, approximately 9.86 million household members have been registered with CommCare.

**INDDEX, Vietnam**: As part of a three-year, multi-country project with Tufts University, Dimagi has developed a CommCare application that enables researchers to run food recall surveys, and convert collected dietary information into total nutrients consumed in an area. This information is then used by nutritionists to determine needed interventions. Since each country has different foods available, Dimagi worked with Caktus to build a web UI that allows users to maintain those databases through a user-friendly interface customized by country, and automatically port that information to CommCare.

In addition to the projects listed above, Dimagi has supported other CommCare projects in other South Asian countries, including Afghanistan, Bangladesh, and Pakistan, as well as other Southeast Asian countries, including Myanmar, Thailand, Cambodia, and the Philippines. In addition to projects that Dimagi staff have supported, numerous organizations in these and additional South Asia and Southeast Asia countries are building, deploying, and running their own CommCare programs without Dimagi’s support.

**Technology Demonstration**

Through support from the “Fighting Ebola: A Grand Challenge for Development” award from USAID in 2015, Dimagi took the lessons learned in Guinea, Sierra Leone, and Liberia and leveraged our best application design knowledge based on programmatic realities shared by our partners to develop a series of Ebola starter applications for partners to quickly deploy during a future crisis. Dimagi developed the following applications:

- Contact Tracing 2.0 Application
- Infection, Prevention & Control (IPC) Application
- Ebola Education, Training, and Stigma Reduction
- The Ebola Treatment Unit (ETU) Decommissioning
- Supply Chain Management for IPC

These applications with the exception of the Supply Chain Management application are available to anyone for use. Since it was published, the Contact Tracing 2.0 application was downloaded 40 times.
Figure 1: Screenshot of the DRC Ebola Contact Tracing Application developed by UNFPA (left). Screenshot of form submissions from 1 user in January of 97 contacts registered in a community in DRC (right).

Figure 2: This Tableau dashboard shows contact tracing data from a CommCare application used during the 2015 Ebola crisis in Guinea. The dashboard shows the total number of contacts to be traced, the number of contacts actually visited, how many contacts were reticent to provide information, and breaks down contact information by day, location, and symptoms reported. These dashboards were updated in less than an hour from when contact tracing data were submitted.
Figure 3: The performance of community health workers doing contact tracing can be monitored. High performers can be identified and move into supervisory roles. Low performers can be identified and be given additional training and support.

Figure 4: Dimagi’s direct-to-client solution, CommCare Coach, allows organizations to extend health systems with conversational agents to reinforce behavior change messaging through proactive prompts and question answering, as well as supporting referrals, scheduling, etc. In India, Dimagi deployed a CommCare Coach named “Poshan Didi” (meaning “Nutrition Sister”) to engage parents with nutrition counseling for their children. Based on positive results from India, CommCare Coach is being adapted for women’s empowerment in Rwanda and substance abuse in the United States.