Digital Tools to Support Contact Tracing: Tool Assessment Report

June 2020

Public Health Informatics Institute

Table of Contents

Background 2
Purpose of this Tool Assessment 3
Inclusion criteria 3
Methodology 4
Tool Assessment Report Scope 5
Tools, Platforms, and Integrators/Implementers 6
Public Health Considerations 7
Key Considerations for Public Health 7
Workgroup Recommendations for Phase II of the Tool Assessment Report 8
Digital Tools for Contact Tracing Matrix – Functions 9
Digital Tools for Contact Tracing Matrix – Inclusion Criteria 11
Tool Profiles 13
Key 13
Apple|Google Exposure Notification Framework 14
Care19 15
CommCare White Label App 16
COVID Alert / COVID Shield 17
CommonCircle (formerly known as CovidSafe) 18
Contakt 19
GovConnect 21
Healthy Together 22
HFP Technologies Emergency Preparedness and Response System 23
Maven – COVID19 Module 24
Microsoft ARIAS/Dynamics 25
REDCap 26
SaferMe 27
Salesforce 28
Sara Alert 29
TraceTogether 30
Appendix A: Informatics Technical Guidance 31
Appendix B: Digital Contact Tracing Tools Key Functions and Requirements 32

Background

At this stage (June 2020) of the U.S. COVID-19 pandemic, rapid contact tracing and notification of those exposed to infected persons is critically important to stopping further spread of the disease. Several digital tools have been developed or adapted—some by established information technology (IT) companies, others by small, entrepreneurial organizations—to support various parts of the contact tracing process. There has been no national-level opportunity for local and state health officials to collaboratively assess these tools and consider whether and how they might best support contact tracing. However, multiple public health organizations are developing or publishing a number of related efforts, such as the Association of State and Territorial Health Officials' (ASTHO) COVID-19 Technology & Digital Solutions Master Data Sheet, the Council of State and Territorial Epidemiologists' (CSTE) Digital Tools to Assist with COVID-19 Contact Tracing spotlight sessions, and the Centers for Disease Control and Prevention's (CDC) Preliminary Criteria for Digital Tools for Contact Tracing.

Rapid contact tracing is critically important to stopping further spread of the COVID-19.

Although independent efforts may shorten the time to system development, a lack of consistency and coordination will likely have advantages and disadvantages. As a result, state and local public health officials will have no clear path to deciding which system or tool is the most appropriate, secure, sustainable and cost-effective for their jurisdiction—and which system is most likely to gain the trust of the general citizenry. It is also important to note that technology must *support* the work of public health and provide functionality to help meet their objectives. Digital tools do not replace the important role that public health plays in reaching a person who has tested positive for COVID-19 (i.e., a case) and their contacts to intervene and limit its spread.

Digital tools do not replace the important role public health plays in reaching a person who has tested positive for COVID-19.

With funding from the CDC Foundation, the Public Health Informatics Institute (PHII), a program of the Task Force for Global Health (TFGH), convened local, state and federal public health officials in a national-level forum to help inform and coordinate the development of IT solutions to support contact tracing. The forum focused on two objectives:

1. Develop and provide guidance to state and local public health officials to assist their understanding of the marketplace of digital tools in support of contact tracing.
2. Provide guidance to industry partners (i.e., technology companies) to ensure technology meets the functional and privacy needs and standards state and local public health officials require for contact tracing.

Participating stakeholders sought to (1) learn what work is already underway, (2) build upon the solutions that are appropriate and (3) chart a path for new solutions as needed.

Purpose of this Tool Assessment

This report is designed to educate public health officials on the various types of digital contact tracing tools in the marketplace and on proximity notification technology. It will allow public health authorities to prioritize technical and functional capabilities of available tools and measure their efficiency.

This report is not intended to be an exhaustive inventory of available digital contact tracing products.

This report has two primary purposes:

1. To provide guidance to public health authorities to help them understand the landscape of available digital contact tracing tools.
2. To provide a set of prioritized high-level requirements to evaluate these tools and aid in decision-support for selecting the appropriate tool. *Note: public health authorities may need to contact the tool's developer for a more in-depth evaluation to understand how the tool meets their organization's specific workflow processes.*

This report is not intended to be an exhaustive inventory of available digital contact tracing products. It provides a snapshot of information on a small subset of digital contact tracing tools currently available and were discovered during our broad internet search. Key words in the search included digital tools, contact tracing, COVID, COVID-19, proximity tracing, Bluetooth, apps, case management, CRM and mobile app.

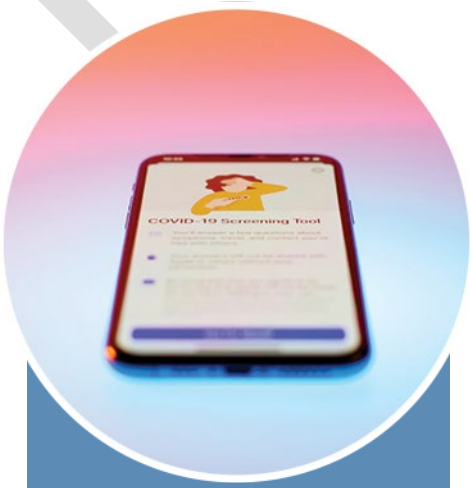
Inclusion criteria

The first set of tools were selected based on the following criteria:

- Tools in use or under consideration by state and local health departments or international governments
- Tools that meet CDC's preliminary criteria for digital tools for contact tracing
- Tools that align with traditional public health contact tracing workflows and meet at least one of the tool types outlined below (customer relationship management (CRM)/case management, proximity tracing, health education)

This report is dynamic, and amendments will be made as public health officials continue to evaluate more digital tools for contact tracing. Public health officials can find additional guidance to evaluate digital tools in Appendix B: Digital Contact Tracing Tools Key Functions and Requirements.

For vendors interested in having their products considered for future iterations of this report, please submit an inquiry to info@phii.org and complete this questionnaire. For public health agencies implementing a digital contact tracing application or technology and interested in sharing



PHII has developed technical assistance for the design, development and procurement of health information systems as a result of extensive experience partnering with ministries of health, public health organizations and federal, state, territorial, local, and tribal agencies. Leveraging that myriad of resources, PHII defined a set of key functionalities combined with core public health requirements to evaluate digital contact tracing tools.

information about the product and their experience with other public health agencies; please complete this questionnaire.

Methodology

There has been extensive research and process documentation on contact tracing for public health. In addition, workflows, surveillance system designs and requirements are widely available. PHII has developed technical assistance for the design, development and procurement of various tools and health information systems as a result of extensive experience partnering with ministries of health, public health organizations, and federal, state, territorial, local, and tribal agencies (see Appendix A). Leveraging that myriad of resources, PHII defined a set of key functionalities combined with core public health requirements to evaluate digital contact tracing tools.

This project involved five interrelated sets of activities:

1. Convened a forum with a diverse group of public health officials and technology vendors to understand public health needs and pain points and how digital tools may support various components of contact tracing.
2. Conducted a robust environmental scan of CRM/case management digital contact tracing tools:
    a. A wide internet search
    b. A literature review
    c. Technology and privacy analysis, a method for understanding IT and its applications, designs, and functions and if the technology meets the health information privacy standards (see tool profiles)
3. Reviewed and repurposed published contact tracing documents including defined outbreak management and disease surveillance processes, functional requirements and vendor analyses. Some of these sources include CDC, PHII and Resolve to Save Lives.
4. Developed a list of core functions, capabilities and requirements for digital contact tracing tools.
5. Compiled a list of tools and pertinent resources to inform the profile pages.

CDC Preliminary Evaluation Criteria

- ✓ Case/patient under investigation identification
- ✓ Case investigation
- ✓ Contact elicitation
- ✓ Contact tracing notification and follow-up
- ✓ Monitor contact

To identify salient solutions for digital contact tracing needs, evaluation criteria focused on the following core contact tracing functions as outlined by CDC in its Preliminary Criteria for the Evaluation of Digital Contact Tracing Tools for COVID-19:

a. **Case/Patient Under Investigation (PUI) Identification:** The identification or discovery of a single person with a disease; typically accompanied by laboratory tests and medical care.

b. **Case Investigation**: Case investigations are typically initiated when a health department receives a positive SARS-CoV-2 test result report from a laboratory or a report of a patient with a confirmed or probable diagnosis of COVID-19 from a health care provider. Investigations involve

several steps, including interviewing PUIs. All confirmed and probable COVID-19 cases should be investigated.

c. **Contact Elicitation**: The process of gathering comprehensive information on persons exposed to the virus through close contact to a patient diagnosed with COVID-19 to identify potential new cases. Case investigators can use information from any report received by the health department, along with the patient's symptom history gathered earlier in the case interview, to determine the contact elicitation window and begin contact tracing.

d. **Contact Tracing (Notification and Follow-Up)**: After obtaining information to identify and locate a close contact, health departments have a duty to notify contacts of exposure. CDC defines close contact as *someone who was within six feet of an infected person for at least 15 minutes starting two days before illness onset (or, for asymptomatic clients, two days prior to positive specimen collection) until the time the patient is isolated.* Persons are provided information including quarantine instructions and emergency warning signs.

e. **Monitor Contact:** All persons diagnosed with COVID-19 will be monitored using real-time communication methods (e.g., telephone call, video conferencing) to share daily reports on their temperature and COVID-19 symptoms throughout the length of their self-isolation. Persons with probable or confirmed COVID-19 are advised to self-isolate immediately. Clients are informed of COVID-19 symptoms to monitor and instructed when to seek medical attention.

Tool Assessment Report Scope

This report outlines three types of digital contact tracing tools: (1) CRM/case management tools (2) proximity tracing tools, and (3) health education tools. Most tools may fall under one or more of these categories.

1. **Customer relationship management (CRM)/case management system**: CRM is a widely-used term that covers a broad set of applications designed to help organizations manage many business processes. CRM solutions is a multifaceted platform that allows organizations to streamline administrative processes and optimize operations. In the context of this evaluation, they include tools that are able to capture data on cases and contacts and help improve the efficiency of manual contact tracing and medical monitoring. For the purpose of this report, case management systems and emergency response management (ERM) tools also fall under this category.

2. **Proximity tracing tools**: Proximity tracing tools monitor close proximity interactions (including duration) and analyze point datasets of moving individual entities, including capturing location, time and an entity identifier. However, individuals' identities are non-identifiable. Most proximity tracing tools use Bluetooth Low Energy wireless technology for proximity detection of nearby smartphones and for the data exchange mechanism.

3. **Health education**: Health education tools provide individuals with fact-based information about COVID-19 (e.g., symptoms, how to avoid exposure, where to get tested, etc.).

Tools, Platforms, and Integrators/Implementers

PHII recognizes that tool implementation involves an understanding of tools, platforms and integrators/ implementers and how they differ.

- **Tools:** The applications used to assist public health agencies with their contact tracing activities and enhance them. For example, the Maven COVID-19 module is a tool.
- **Creator(s)** – The organization(s) that built the tool. For example, Sara Alert was created by MITRE.
- **Platforms:** The underlying structure or code the tool uses to function. For example, GovConnect is built upon the Salesforce platform. Other examples of platforms include Google Cloud, Microsoft Dynamics 365, and Amazon Web Services.
- **Integrators/Implementers:** An organization that assists public health agencies with configuring and modifying the tool for the specific state/local context. An implementer/integrator can also be the tool creator. For example, Deloitte is both the creator and implementer/integrator for GovConnect. Tools can have multiple implementers/integrators; this can be a 1:many relationship.

The combinations of platforms, tools and integrators/implementers is numerous. For example, a platform company can also serve as an integrator/implementer. On the other hand, a single public health agency could be approached by five different integrators/implementers suggesting five different tools that are all built using a single platform. For the purpose of this assessment, only profiles for the tools that meet the inclusion criteria have been included. Thus, platforms and integrators/implementers do not have profiles.

In collaboration with the CDC, the CDC Foundation (CDCF), ASTHO, CSTE, the Association of Public Health Laboratories (APHL) and the National Association of County and City Health Officials (NACCHO), PHII will continue to explore and build on to this catalog.

Various contact tracing predictive modeling tools are being developed to assist public health officials estimate the need for COVID-19 contact tracing. Predictive modeling software is able to predict the number of public health workforce, such as contact tracers, that will be needed for scale-up in a region or jurisdiction based on algorithms. Some mathematical models are also being used to calculate reproductive numbers and quantify virus infection rates and transmission routes to inform contact tracing. This report did not include an evaluation of predictive or estimation tools or models.

Public Health Considerations

There is a major public health challenge in managing and harmonizing multiple stand-alone tools and information systems at the state and local levels. The public health processes for disease surveillance and contact tracing are complex, and development of effective digital tools for this purpose requires technology vendors to thoroughly understand the public health work processes for contact tracing. Organizations fully understanding their own processes is also fundamental to efficiently evaluating technology intended to support those activities. Unknown or poorly described work processes have been the root cause for many technology implementation failures. For this reason, it is imperative to define public health considerations when considering new technology. Below are key requirements identified by an assembly of public health practitioners for digital contact tracing[1].

Key Public Health Considerations

- Protection of public health information
- Diagnostic capabilities
- Epidemiological capabilities
- Rapid notification
- Rapid and easy implementation
- Integration with state and local health authority systems

Key Considerations for Public Health

1. **Protection of public health information.** Assurance of protected health information (PHI) security is a central factor in any public health system design. Confidentiality of significant volumes of client information must be maintained. The obligation to protect the confidentiality of PHI is defined by each state's law and the federal Health Insurance Portability and Accountability Act of 1996 (HIPAA) as amended under the Health Information Technology for Economic and Clinical Health Act (HITECH Act) and expanded under the HIPAA Omnibus Rule (2013). Each tool profile listed in this report highlights the type of privacy and security policy (i.e., FISMA, GDPR, HIPAA, HITECH, ONC) the tool has in place as indicated on its website.
2. **Diagnostic capabilities.** Digital tools that have the ability to integrate with diagnostic knowledge resources to accurately report the health status or increased severity of symptoms will provide timely, efficient and critical information to public health entities. There should also be interoperability of information between diagnostic lab results and information received manually by public health workers.
3. **Epidemiological capabilities.** Digital tools with proximity tracing technology capabilities can support increased understanding of broader contact exposure that is not dependent on an individual's memory or recall. In addition, digital tools will need to support future public health surveillance needs beyond COVID-19 response efforts.
4. **Rapid notification.** Digital tools must account for rapid notification required within the contact tracing workflow. To augment contact tracing manual labor-intensive processes, tools must enable automated notification to community contacts who opt in or consent (enable apps) to being notified while also preserving anonymity of patients within a 24-hour period.
5. **Rapid and easy implementation.** Digital tools must be easily and rapidly adopted by various entities within the contact tracing workflow not to overwhelm an already-stressed public health

[1]Considerations were derived from discussions in the Digital Tools for Contact Tracing Design Team meetings and subgroups held by PHII.

system and increase chances of adoption. Staff training and IT resources must be considered in the implementation process.

6. **Integration with state and local health authority systems.** Digital tools must have the ability to easily integrate with existing state and local health disease surveillance and laboratory systems. Integration allows for rapid sharing of information within and across jurisdictions. During an emergency response situation such as COVID-19, it is essential for public health officials to be able to quickly share vital information on infected persons and to track and notify contacts who have been exposed or are suspected of being infected.
    - Public health systems integration/interoperability
    - Health care systems integration/interoperability
7. **Data exchange with nearby jurisdictions' contact tracing tools.** Contact tracing crosses jurisdictional boundaries and may operate at both the state and local levels. State and local jurisdictions may each perform similar or different functions within the process and coordinate which cases or contacts they each pursue. Neighboring states or jurisdictions need to exchange information about cases and contacts who cross borders to assure appropriate follow-up. All of this underscores detailed, ongoing data exchange, to maintain coordination and speedy contact tracing.

Workgroup Recommendations for Phase II of the Tool Assessment Report

This report is intended to be an informative and useful source for public health agencies to easily evaluate available contact tracing digital tools and technology. Therefore, as tools are evolving, undergoing implementation and continuously being developed, some components of this assessment will become obsolete. A workgroup of public health stakeholders provided recommendations to ensure this report maintains relevance and is beneficial for public health practitioners to facilitate the complex software development implementation process.

The following were recommended as key next steps for future amendments of this assessment report:

1. Build on and amend the list of contact tracing digital tools in the current report as additional information becomes available. Continue to add tools that meet the criteria as described above.
2. Provide information on the compatibility of different platforms for each tool. Public health departments' IT capabilities and constraints may vary widely. Platform information may be critical in identifying compatibility of a tool to existing public health systems.
3. Conduct a more in-depth vendor analysis to accurately denote up-to-date information regarding tool implementation (e.g., is the tool in implementation? If so, where? How long has the tool been in use?).
4. Summarize survey results (e.g., this survey can include questions to assess the tool's values, contributions and outcomes) from state and local jurisdictions on their experiences with implementing contact tracing digital tools

Digital Tools for Contact Tracing Matrix – Functions

Tool	Tool Category	Case/PUI Identification	Case Investigation & Contact Elicitation	Contact Tracing (Notification & F/U)	Monitor Contact (Self-Reporting)	Bluetooth Tracking Technology	Device GPS/Wi-Fi Location Technology
CommCare White Label App	Case Management	✓	✓	✓	✓		
HFP Technologies Emergency Preparedness and Response System	Case management		✓	✓	✓		
Maven - COVID19 Module	Case management	✓	✓	✓	✓		
Microsoft ARIAS/Dynamics	Case management	✓	✓	✓	✓		
REDCap	Case management	✓	✓	✓	✓		
Sara Alert	Case management		✓	✓	✓		
Salesforce	Case management		✓	✓	✓		
GovConnect	Case management Health education		✓	✓	✓		
Healthy Together	Case management Health education	✓	✓	✓	✓		
Care19	Case management Proximity tracking	✓	✓	✓	✓	✓	✓
Contakt	Case management Proximity tracking	✓	✓	✓	✓	✓	✓
SaferMe	Case management Proximity tracking		✓	✓	✓		✓
CommonCircle	Case management Proximity tracking Health education			✓	✓	✓	

Tool	Tool Category	Case/PUI Identification	Case Investigation & Contact Elicitation	Contact Tracing (Notification & F/U)	Monitor Contact (Self-Reporting)	Bluetooth Tracking Technology	Device GPS/Wi-Fi Location Technology
Apple|Google Exposure Notification (Framework)	Proximity tracking			✓	✓	✓	
COVID Alert / COVID Shield	Proximity tracking			✓	✓	✓	
TraceTogether	Proximity tracking			✓	✓	✓	

Digital Tools for Contact Tracing Matrix – Inclusion Criteria

Tools that are greyed out meet all three inclusion criteria. An asterisk (*) denotes a tool that is implemented in an international context. Red indicates a tool that was reviewed and was not included (does not have a profile) because it does not meet the inclusion criteria.

Tool	Tool Category	In-Use/ Under Consideration	Meet CDC preliminary criteria for DT4CT	Align with traditional public health workflows
CommCare by Dimagi White Label App	Case Management	✓	✓	✓
Maven-COVID19 Module	Case management	✓	✓	✓
Microsoft ARIAS/Dynamics	Case management	✓	✓	✓
REDCap	Case management	✓	✓	✓
Sara Alert	Case management	✓	✓	✓
Salesforce	Case management	✓	✓	✓
GovConnect	Case management Health Education	✓	✓	✓
Healthy Together	Case Management Health Education	✓	✓	✓
Care19	Case Management Proximity tracking	✓	✓	✓
Contakt	Case Management Proximity tracking	✓	✓	✓
CommonCircle	Case Management Proximity tracking Health Education	✓	✓	✓
Apple|Google Exposure Notification Framework	Proximity tracking	✓	✓	✓
HFP Technologies Emergency Preparedness and Response System	Case management	TBD	✓	✓

Tool	Tool Category	In-Use/ Under Consideration	Meet CDC preliminary criteria for DT4CT	Align with traditional public health workflows
SaferMe*	Case Management Proximity tracking	New Zealand	✓	✓
COVID Alert / COVID Shield*	Proximity tracking	Canada	✓	✓
TraceTogether*	Proximity tracking	Singapore	✓	✓
Estimote Quarantine Monitor Module	Proximity tracking	No	Somewhat	Somewhat
TimeClock Plus	Proximity tracking	No	No	No
C19.com	Health education	No	No	No

Tool Profiles

These profiles provide more details on each of the tools listed in the report matrix. This document is the Public Health Informatics Institute's (PHII) attempt to aggregate information about the many digital tools for contact tracing available in the marketplace. PHII will continue to update this document as more information becomes available.

Key

Creator(s)	Organization(s) that built the tool
Implementer(s)	Organization(s) that assists public health agencies with configuring and modifying the tool for the specific state/local context. An implementer/integrator can also be the tool creator.
Platform	Indicates the platform the tool is built upon
Purpose and Background	A brief synopsis of the tool based on publicly provided information as well as background shared with the Public Health Informatics Institute
Tool Type	Case Management | Proximity Tracking | Health Education (Highlighted cell indicates the tool's category. A tool can have multiple categorizations)
Jurisdiction(s) Currently Using	List of jurisdictions (e.g., local/state public health agencies) that are currently using the tool or are in the process of implementation
Contact Tracing Function	Case/Patient Under Investigation (PUI) Identification | Case Investigation & Contact Elicitation | Contact Tracing (Notification & Follow Up) | Monitor Contact (Self-Reporting) | Bluetooth Tracking Technology | Device GPS/Wi-Fi Location Technology (Highlighted cell indicates the tool's category. A tool can have multiple categorizations)
Link	Main website for more information about the tool
Integration	Indicates if the tool has the ability to integrate with existing public health systems or apps. The options for this are: • Yes – *there is some ability to integrate. This ability will need to be qualified by individual public health agencies following up with the tool creator and discussing in more detail* • No – *there is no ability to integrate at this current time. However, integration capabilities might be available in the future* • TBD – *PHII was not able to evaluate if the tool has integration capabilities*
Privacy & Security	Indicates types of privacy and security policies in place as disclosed on the tool's website, specifically regarding any significant data privacy/security standards: • FISMA • GDPR • HIPAA • HITECH • ONC

Additional Information	Any additional information that might be helpful to public health agencies and practitioners (e.g., links to presentations, news articles, insights from the tool creator, etc.)

Apple|Google Exposure Notification Framework

Creator(s)	Apple, Google					
Implementer(s)	TBD					
Platform	TBD					
Purpose and Background	Two-phase exposure notification solution that uses Bluetooth technology on mobile devices to aid in contact tracing efforts. ***See the PHII white paper for more details***					
Tool Type	Case Management		Proximity Tracking		Health Education	
Jurisdiction(s) Currently Using	Germany					
Contact Tracing Function	Case/Patient Under Investigation (PUI) Identification	Case Investigation & Contact Elicitation	Contact Tracing (Notification & Follow Up)	Monitor Contact (Self-Reporting)	Bluetooth Tracking Technology	Device GPS/ Wi-Fi Location Technology
Link	https://www.google.com/covid19/exposurenotifications/					
Privacy & Security	Security is determined by the third party app that uses this framework API					
Integration	Yes – *there is some ability to integrate. This ability will need to be qualified by individual public health agencies following up with the tool creator and discussing in more detail*					
Additional Information	FAQs for Exposure Notification					

Care19

Creator(s)	ProudCrowd					
Implementer(s)	TBD					
Platform	TBD					
Purpose and Background	Location tracing application that required individuals to opt-in. The app provides the NDDoH data to understand and predict the infection rates across North Dakota. Data will be used to plan for testing and prepare health care services capacity. The initial version will collect data to assist the NDDoH in making better decisions and allow users to see at a glance the locations they've been to help identify close contacts if they contract COVID-19.					
Tool Type	Case Management		Proximity Tracking		Health Education	
Jurisdiction(s) Currently Using	North Dakota, South Dakota					
Contact Tracing Function	Case/Patient Under Investigation (PUI) Identification	Case Investigation & Contact Elicitation	Contact Tracing (Notification & Follow Up)	Monitor Contact (Self-Reporting)	Bluetooth Tracking Technology	Device GPS/ Wi-Fi Location Technology
Link	https://ndresponse.gov/covid-19-resources/care19					
Privacy & Security	Complies with the California Consumer Privacy Act					
Integration	TBD – *PHII was not able to evaluate if the tool has integration capabilities*					
Additional Information	N/A					

CommCare White Label App

Creator(s)	Dimagi					
Implementer(s)	Dimagi					
Platform	CommCare					
Purpose and Background	Dimagi's CommCare allows public health agencies to build and deploy white label mobile applications for COVID-19 response. CommCare supports screening and triage protocols; surveillance and contact tracing; information dissemination; and lab tracking and logistics.					
Tool Type	Case Management		Proximity Tracking		Health Education	
Jurisdiction(s) Currently Using	New Jersey; New York (state) – 5 counties in Hudson Valley; San Francisco, California; Sierra Leone					
Contact Tracing Function	Case/Patient Under Investigation (PUI) Identification	Case Investigation & Contact Elicitation	Contact Tracing (Notification & Follow Up)	Monitor Contact (Self-Reporting)	Bluetooth Tracking Technology	Device GPS/ Wi-Fi Location Technology
Link	https://www.dimagi.com/covid-19/					
Privacy & Security	Did not disclose					
Integration	Yes – *there is some ability to integrate. This ability will need to be qualified by individual public health agencies following up with the tool creator and discussing in more detail*					
Additional Information	Hudson Valley Contact Tracing					

COVID Alert / COVID Shield

Creator(s)	Canadian Digital Service, Shopify, Blackberry, Government of Ontario					
Implementer(s)	TBD					
Platform	TBD					
Purpose and Background	Proximity tracing app built on Apple|Google Exposure Notification Framework. Note: the app is referred to as two separate names in different articles and no website is available to clarify as of June 22, 2020.					
Tool Type	Case Management		Proximity Tracking		Health Education	
Jurisdiction(s) Currently Using	Ontario, Canada (launching July 2)					
Contact Tracing Function	Case/Patient Under Investigation (PUI) Identification	Case Investigation & Contact Elicitation	Contact Tracing (Notification & Follow Up)	Monitor Contact (Self-Reporting)	Bluetooth Tracking Technology	Device GPS/Wi-Fi Location Technology
Link	Website for the app is not available yet					
Integration	TBD – *PHII was not able to evaluate if the tool has integration capabilities*					
Privacy & Security	Did not disclose					
Additional Information	https://www.youtube.com/watch?v=SyUd0G2-PEo https://globalnews.ca/news/7080914/coronavirus-ontario-covid-19-tracing-app/					

CommonCircle (formerly known as CovidSafe)

Creator(s)	University of Washington (School of Engineering, School of Medicine), Microsoft					
Implementer(s)	TBD					
Platform	TBD					
Purpose and Background	CovidSafe changed its name to CommonCircle to avoid confusion with the Australian tool COVIDsafe AU. CommonCircle helps people learn if they've been exposed to coronavirus, connects them to the appropriate public health guidance and enables contact tracing. CommonCircle allows public health agencies and contact tracers to communicate urgent information to exposed individuals. Specifically, CommonCircle: • Notifies individuals about possible exposure. Person may be notified if someone who was near them within the last two weeks has symptoms of COVID-19. The measure of 'near' is not as precise as the medical definition (within six feet for more than ten minutes), but it is accurate up to a few meters. • Helps individuals track symptoms. These may be useful to assist public health teams with a confirmed case during a contact tracing interview. • Provides the public with information about SARS-CoV-2, its risks, and how it spreads					
Tool Type	Case Management		Proximity Tracking		Health Education	
Jurisdiction(s) Currently Using	Washington (state)					
Contact Tracing Function	Case/Patient Under Investigation (PUI) Identification	Case Investigation & Contact Elicitation	Contact Tracing (Notification & Follow Up)	Monitor Contact (Self-Reporting)	Bluetooth Tracking Technology	Device GPS/ Wi-Fi Location Technology
Link	https://commoncircle.us/ Former CovidSafe website					
Privacy & Security	Privacy-Sensitive Protocols And Mechanisms for Mobile Contact Tracing					
Integration	TBD – *PHII was not able to evaluate if the tool has integration capabilities*					
Additional Information	N/A					

CONTAKT

CONTAKT
WWW.CONTAKT.WORLD

Creator(s)	CONTAKT, Applicature, MeshTek
Implementer(s)	CONTAKT, with channel partnerships and exchanges TBD
Platform	HyperLedger (blockahin platform)
Purpose and Background	CONTAKT is a "sole-source" suite of patent-pending software and patented hardware built for public health agencies (PHAs) and/or organizations like schools, businesses, and government or non-government sites to privately identify and manage person-to-person and person-to-place transmission chains. CONTAKT customizes its solution using one or all of the following components. • CONTAKT Platform is an API for blockchain storage of anonymized events, with separate storage of PII/PHI accessible only by tracers/agencies upon permission from a user. This allows for integration of disparate data sources like multiple apps., testing results, surveillance, and hardware. • CONTAKT ProtektMe is an API for mobile devices that uses all wireless technologies (Bluetooth, WiFi, cellular, or RFID) to record close contacts to the CONTAKT Platform with apps. • CONTAKT TraceKit is an API and interface for health departments or enterprise/institutions to securely retrieve disparate sources of data, and communicate with anonymized devices and people, prioritized by known infection risk, through multiple modes (i.e. calls, texts, emails, push notifications). TraceKit is like a risk-prioritized CRM for transmission management. • CONTAKT SpotChek is a portfolio of 65 indoor & outdoor rated plug-and-play hardware devices, with 23 patents issued, to record site-based person-to-person and person-to-place interactions to the CONTAKT Platform. CONTAKT SpotChek can be used by schools, universities, restaurants, nursing homes, sports arenas, government buildings, or any other site that wants to securely register visitors, and provide PHAs with a de-identified means to manage possible transmission chains. CONTAKT is available as a full solution to PHAs or businesses, or as a partner in major exchanges, apps., and platforms built upon more limiting frameworks that are otherwise not securely interoperable. CONTAKT also has 200,000+ site-based devices are already in the field for other applications of IOT/mesh.

Tool Type	Case Management		Proximity Tracking		Health Education	
Jurisdiction(s) Currently Using	Full proposal to Harris County, TX. Under consideration in other local/state public health agencies and universities.					
Contact Tracing Function	Case/Patient Under Investigation (PUI) Identification	Case Investigation & Contact Elicitation	Contact Tracing (Notification & Follow Up)	Monitor Contact (Self-Reporting)	Bluetooth Tracking Technology	Device GPS/ Wi-Fi Location Technology
Link	https://contakt.world/					
Privacy & Security	CONTAKT anonymizes close contacts but makes devices available for tracing and PHA communication. Local oversight committees, HIPAA certification, and 3rd party security audits are part of each deployment for compliance, transparency and community alignment.					
Integration	Yes – *there is some ability to integrate. This ability will need to be qualified by individual public health agencies following up with the tool creator and discussing in more detail*					
Additional Information	CONTAKT's corporate charter restricts access or commercialization of PHI/PII. The company is working with Morehouse School of Medicine (Satcher Health Leadership Institute). www.contakt.world/examples					

GovConnect

Creator(s)	Deloitte					
Implementer(s)	Deloitte					
Platform	Salesforce					
Purpose and Background	Allows state and local governments and public health organizations to collect information on contact tracing and conduct follow-up. It also allows users to self-report positive disease conditions and receive guidance. The system utilizes the Salesforce Platform. Individuals can opt in to using the app to assist public health with contact tracing for employees, visitors and contractors. The solution also offers basic features for residents to receive treatment information and self-report.					
Tool Type	Case Management		Proximity Tracking		Health Education	
Jurisdiction(s) Currently Using	Texas					
Contact Tracing Function	Case/Patient Under Investigation (PUI) Identification	Case Investigation & Contact Elicitation	Contact Tracing (Notification & Follow Up)	Monitor Contact (Self-Reporting)	Bluetooth Tracking Technology	Device GPS/ Wi-Fi Location Technology
Link	https://www2.deloitte.com/us/en/pages/public-sector/articles/contact-tracker-tracer-covid-19-govconnect-public-health-transformation-platform.html					
Privacy & Security	Did not disclose					
Integration	Yes – *there is some ability to integrate. This ability will need to be qualified by individual public health agencies following up with the tool creator and discussing in more detail*					
Additional Information	GovConnect press release					

Healthy Together

Creator(s)	Utah Department of Health					
Implementer(s)	TBD					
Platform	TBD					
Purpose and Background	The Healthy Together app helps users assess their symptoms, find the nearest testing center, view test results, and learn what to do after they've been tested for COVID-19. If authorized by the user, the app can also provide location data to public health workers, providing them with a faster and more accurate picture of where and how the virus is spreading in our community to focus public health efforts.					
Tool Type	Case Management		Proximity Tracking		Health Education	
Jurisdiction(s) Currently Using	Utah					
Contact Tracing Function	Case/Patient Under Investigation (PUI) Identification	Case Investigation & Contact Elicitation	Contact Tracing (Notification & Follow Up)	Monitor Contact (Self-Reporting)	Bluetooth Tracking Technology	Device GPS/ Wi-Fi Location Technology
Link	https://coronavirus.utah.gov/healthy-together-app/					
Privacy & Security	Complies with HIPAA					
Integration	Yes – *there is some ability to integrate. This ability will need to be qualified by individual public health agencies following up with the tool creator and discussing in more detail*					
Additional Information	Healthy Together 1-Pager					

HFP Technologies Emergency Preparedness and Response System

Creator(s)	HFP Technologies					
Implementer(s)	HFP Technologies					
Platform	TBD					
Purpose and Background	A cloud-based, configurable EPR System solution that was developed with input from CDC's operational plan for pandemic influenza. Built to coordinate and manage critical information collection, sharing, and analysis among all pandemic participants and can be applied to the COVID-19 pandemic immediately.					
Tool Type	Case Management		Proximity Tracking		Health Education	
Jurisdiction(s) Currently Using	TBD					
Contact Tracing Function	Case/Patient Under Investigation (PUI) Identification	Case Investigation & Contact Elicitation	Contact Tracing (Notification & Follow Up)	Monitor Contact (Self-Reporting)	Bluetooth Tracking Technology	Device GPS/ Wi-Fi Location Technology
Link	http://www.hfptechnologies.com/EPR.html					
Privacy & Security	Did not disclose					
Integration	TBD – *PHII was not able to evaluate if the tool has integration capabilities*					
Additional Information	N/A					

Maven – COVID19 Module

Creator(s)	Conduent					
Implementer(s)	TBD					
Platform	TBD					
Purpose and Background	The Maven COVID–19 module can be used by federal, state and local agencies managing COVID-19 responses. Maven tracks the spread of the disease, from health providers, to clinics, to laboratories and local public health organizations. Meanwhile, individuals who may be at risk can safely practice social distancing and self-quarantine, while updating Maven daily with their symptoms and other relevant information, through an automated portal.					
Tool Type	Case Management		Proximity Tracking		Health Education	
Jurisdiction(s) Currently Using	TBD					
Contact Tracing Function	Case/Patient Under Investigation (PUI) Identification	Case Investigation & Contact Elicitation	Contact Tracing (Notification & Follow Up)	Monitor Contact (Self-Reporting)	Bluetooth Tracking Technology	Device GPS/ Wi-Fi Location Technology
Link	https://www.conduent.com/solution/public-health-technology/maven-covid-19/					
Privacy & Security	Complies with HIPAA					
Integration	Yes, with existing Maven implementations – *there is some ability to integrate. This ability will need to be qualified by individual public health agencies following up with the tool creator and discussing in more detail*					
Additional Information	Maven COVID-19 Solution Overview					

ARIAS/Dynamics

Microsoft

Microsoft Dynamics 365

Creator(s)	Microsoft					
Implementer(s)	TBD					
Platform	Microsoft Azure					
Purpose and Background	Dynamics is an enterprise CRM solution. ARIAS a CRM solution for specifically developed for case management and contact tracing for public health. ARIAS includes other applications from Microsoft Power Platform.					
Tool Type	Case Management		Proximity Tracking		Health Education	
Jurisdiction(s) Currently Using	Connecticut, Indiana, Michigan, North Carolina, North Dakota, Oregon, South Carolina, Washington, Wisconsin					
Contact Tracing Function	Case/Patient Under Investigation (PUI) Identification	Case Investigation & Contact Elicitation	Contact Tracing (Notification & Follow Up)	Monitor Contact (Self-Reporting)	Bluetooth Tracking Technology	Device GPS/ Wi-Fi Location Technology
Link	https://dynamics.microsoft.com/en-us/crm/what-is-crm/					
Privacy & Security	TBD					
Integration	TBD					
Additional Information	Microsoft Dynamics for COVID-19 contact tracing and case management – demo from North Dakota					

REDCap

Creator(s)	Vanderbilt University					
Implementer(s)	TBD					
Platform	TBD					
Purpose and Background	Open-source, web application for building and managing online surveys and databases. While it can be used to collect virtually any type of data, it is specifically geared to support online or offline data capture for research studies and operations. Use of REDCap is free for non-profit organizations.					
Tool Type	Case Management		Proximity Tracking		Health Education	
Jurisdiction(s) Currently Using	• Vanderbilt University Medical Center VUMC Occupational Health is using REDCap surveys, delivered via email, to monitor any employees thought to have been exposed to COVID-19. The initial survey gathers general information about the employee's exposure and inquires if they are symptomatic, and twice-daily follow-up surveys screen for symptoms. • Seattle's public health authority is using REDCap surveys to support COVID-19 testing and aggregate reporting, and the Department of Health in the state of Washington is using REDCap to support community-based testing sites. • The University of Washington's Institute of Translational Health Sciences is using REDCap for community surveillance, first responder tracking, and monitoring of COVID-19 in pregnant women. • Tennessee's Department of Health is using REDCap for COVID-19 monitoring. • South Africa's National Institute for Communicable Diseases is using REDCap for COVID-19 contact tracing. • Other sites using REDCap for some part of contact tracing: AL, Chicago, DC, DE, IL, LA, MN, NE, VA, WY					
Contact Tracing Function	Case/Patient Under Investigation (PUI) Identification	Case Investigation & Contact Elicitation	Contact Tracing (Notification & Follow Up)	Monitor Contact (Self-Reporting)	Bluetooth Tracking Technology	Device GPS/ Wi-Fi Location Technology
Link	https://projectredcap.org/					
Privacy & Security	Capable of compliance with HIPAA, FISMA, etc. Each instance's compliance depends on the REDCap implementation and maintenance					
Integration	Yes, via FHIR – *there is some ability to integrate. This ability will need to be qualified by individual public health agencies following up with the tool creator and discussing in more detail*					
Additional Information	How REDCap is being used in response to COVID-19					

SaferMe

SaferMe

Creator(s)	SaferMe					
Implementer(s)	TBD					
Platform	TBD					
Purpose and Background	SaferMe's contact tracing solution focuses on three key elements: • Daily wellbeing check-in with workers - provides a daily prompt to workers for them to fill a short two-question survey that helps you identify anyone who is not fit for work - or has a close contact infected with COVID-19, immediately. • Manual contact tracing information collection - enables workers to quickly and easily file notes about contact with workers outside your organization who may not have the SaferMe app. • Automated contact tracing - mobile location technology enables the background collection of data on worker locations. This data is stored on ISO-certified secure servers and is only accessed in the case where a positive COVID-19 case occurs.					
Tool Type	Case Management		Proximity Tracking		Health Education	
Jurisdiction(s) Currently Using	New Zealand					
Contact Tracing Function	Case/Patient Under Investigation (PUI) Identification	Case Investigation & Contact Elicitation	Contact Tracing (Notification & Follow Up)	Monitor Contact (Self-Reporting)	Bluetooth Tracking Technology	Device GPS/ Wi-Fi Location Technology
Link	https://www.safer.me/					
Privacy & Security	Complies with GDPR					
Integration	TBD – *PHII was not able to evaluate if the tool has integration capabilities*					
Additional Information	N/A					

Salesforce

Creator(s)	Salesforce					
Implementer(s)	Accenture, Deloitte, MTX					
Platform	Amazon Web Services (AWS), Google Cloud					
Purpose and Background	Salesforce is an enterprise CRM solution. States can work with an implementer to customize the tool to conduct traditional public health case management to assist public health agencies and their contact tracing teams. Salesforce also employs data visualization to help PHAs analyze trends in contact tracing activities.					
Tool Type	Case Management		Proximity Tracking		Health Education	
Jurisdiction(s) Currently Using	California, District of Columbia (Washington DC), Kentucky , Louisiana, Maryland, Massachusetts, Nevada, New Hampshire, New Mexico, New York City, Rhode Island, South Dakota, Texas					
Contact Tracing Function	Case/Patient Under Investigation (PUI) Identification	Case Investigation & Contact Elicitation	Contact Tracing (Notification & Follow Up)	Monitor Contact (Self-Reporting)	Bluetooth Tracking Technology	Device GPS/ Wi-Fi Location Technology
Link	https://www.salesforce.com/solutions/industries/government/capabilities/case-management/					
Privacy & Security	TBD					
Integration	TBD					
Additional Information	N/A					

Sara Alert

Creator(s)	MITRE					
Implementer(s)	TBD					
Platform	TBD					
Purpose and Background	Open-source, web-based application designed for public health officials to monitor exposed individuals at risk of developing a disease of interest, as well as to monitor cases to determine when it is safe to discontinue isolation. Its currently configured to support monitoring individuals exposed to or sick with novel coronavirus 2019 disease (COVID-19). The Association of Public Health Laboratories (APHL) on the AIMS platform. The tool enables public health officials to enroll individuals at risk of developing COVID-19, for example, individuals from affected areas or contacts of known cases. Once enrolled, individuals enter their (and other members of their household) symptoms daily through their preferred platform (i.e., web browser via mobile or desktop, text-based, voice. The information is stored in a secure database and displayed on monitoring line lists so public health officials can identify individuals requiring care coordination, follow up for non-response, and individuals who may discontinue isolation.					
Tool Type	Case Management		Proximity Tracking		Health Education	
Jurisdiction(s) Currently Using	Arkansas, Arizona, Maine, Northern Mariana Islands, Pennsylvania, Vermont, Virginia, Washington (state)					
Contact Tracing Function	Case/Patient Under Investigation (PUI) Identification	Case Investigation & Contact Elicitation	Contact Tracing (Notification & Follow Up)	Monitor Contact (Self-Reporting)	Bluetooth Tracking Technology	Device GPS/ Wi-Fi Location Technology
Main Link	https://saraalert.org/					
Privacy & Security	Complies with FISMA					
Integration	TBD – *PHII was not able to evaluate if the tool has integration capabilities*					
Additional Information	Sara Alert recorded presentation					

TraceTogether

Creator(s)	Singapore Ministry of Health and Government Technology Agency (GovTech)
Implementer(s)	TBD
Platform	TBD
Purpose and Background	TraceTogether is a mobile application developed to support existing nationwide efforts to combat the spread of COVID-19 by enabling community-driven contact tracing. When phones with TraceTogether installed are nearby one another, they exchange anonymized proximity information using Bluetooth. This information is stored securely on the phone and only shared with the Ministry of Health (MOH) if a user tests positive for COVID-19. Also, the Bluetooth information stored on the phones after 25 days is automatically deleted. The app will cease functionality at the end of the outbreak. TraceTogether allows the identification of people who were in close proximity to an infected person more efficiently using the proximity data collected.
Tool Type	Case Management | **Proximity Tracking** | Health Education
Jurisdiction(s) Currently Using	Singapore
Contact Tracing Function	Case/Patient Under Investigation (PUI) Identification | Case Investigation & Contact Elicitation | **Contact Tracing (Notification & Follow Up)** | Monitor Contact (Self-Reporting) | **Bluetooth Tracking Technology** | Device GPS/ Wi-Fi Location Technology
Link	https://support.tracetogether.gov.sg/hc/en-sg/categories/360003161013-General
Privacy & Security	Utilizes anonymized and encrypted data but does not specify if it complies with any privacy/security standards
Integration	TBD – *PHII was not able to evaluate if the tool has integration capabilities*
Additional Information	N/A

Appendix A: Informatics Technical Guidance

Name	Description	Creator
Common Ground: Public Health Preparedness Toolkit	Designed to assist chronic disease and preparedness departments in public health agencies by documenting and defining business processes common to each of them and identifying the requirements for information systems that would support these processes	Public Health Informatics Institute
Covid-19 Contact Tracing Training Guidance And Resources	Sample training plan including training topics that may be helpful for state and local public health jurisdictions to consider when designing their own training plan for COVID-19 contact tracers	CDC
Preliminary Criteria for the Evaluation of Digital Contact Tracing Tools for COVID-19	Minimum and preferred characteristics of digital contact tracing tools to help local and state health departments overcome one or more obstacles in the COVID-19 contact tracing workflow.	CDC
Redesigning Public Health Surveillance in an eHealth World	Roadmap and a tool for moving public health toward acquiring information systems that will support its work effectively and efficiently, by leveraging standards-based information flows from electronic laboratory reporting (ELR) and electronic health record (EHR) systems.	Public Health Informatics Institute

Appendix B: Digital Contact Tracing Tools Key Functions and Requirements

The table below set of requirements can be used by state and local public health departments to evaluate contact tracing digital tools. It lists key functions and capabilities required to support public health professionals with contact tracing. A full evaluation of all the requirements listed may require contacting the solution developer for additional information.

Contact Tracing Category	Requirements
Case Identification	Ability to receive initial notification of confirmed or presumptive case (including eCR)
	Capture patient contact information
	Ability to obtain user's/patient's consent
	Flag records to indicate when laboratory report results has been received
	Support multiple lab formats for specimen type; test performed; quantity of specimen available; specimen quality (e.g., how stored, how long stored)
	Allow user to edit filter settings (i.e. based on jurisdictional rules)
	Support specific laboratory testing requirements for each condition
	Send communication to sender to notify of the receipt of conditions report (Communications functionality - automation of notification)
	Promote case routing to respective program areas within the system
	Ability to update as new data is received
	Have the ability to match and update any new data obtained
	Have ability to appropriately route referrals for additional investigation within agency/programs
	Ability to receive laboratory messages in a standard format; with the ability to adjust format
	Have the ability to match case to existing data/records
	Have the ability to view and query updates
	Support the use of algorithms to identify a case
	Have the ability to log the event if additional investigation is not warranted

Contact Tracing Category	Requirements
	Have the ability to recognize trends/clusters
	Have ability to re-categorize or regroup data based on the introduction of new data
Case Investigation	Patients interview information
	Notify patient of exposure
	Ability to contact patient via SMS notification
	Ability to assign case to an investigator, capturing the date of assignment
	Ability to generate a new case from a contact record
	Ability to accept/reject case based upon signoff definition (PHA)
	Allow user to attach documents and images related to a specific case
	Facilitate the recording of standard demographic information (race, ethnicity, etc.) as well as be extensible in nature to allow for multiple of these instances to be captured within the same area
	Provide the capability to track multiple laboratory reports for an individual case; designating the source of the report whether it be manual or ELR
	Provide the functionality to track multiple results for a sign or symptom
	Ability to track date of exposure/ establish infectious period
	Ability to track source of exposure
	Allow user to assign a status to the case
	Allow user to save all case information
	Record user ID of person closing case, and time/date of closing (audit log)
	Have the ability to upload, send and receive needed forms from care providers
	Support configurable auto-classification based on user-defined criteria (i.e. disease/condition and jurisdiction specific)
	Allow for multiple methods of data entry (manual, scanning, optical character reader)
	Allow user to design and save form templates

Contact Tracing Category	Requirements
	Support an algorithm to perform risk evaluation prioritization of the case
	Display data element involved in the environmental investigation (audit trail)
	Automatically prompt user for an outbreak investigation
	Allow user to create and save questionnaire
	Support tracking of case definition changes
	Identify source of information
	Ability to evaluate criteria to determine like-kind demographic linkages (boyfriend/girlfriend residing at the same address, home phone, etc.)
	Ability to track multiple instances of like locators (geographic, telephonic, or electronic locator)
	Assign case definition at time of incidence or report
	Have ability to prompt user when contact tracing is necessary based on reported condition
	Ability to track multiple instances of like identifiers assigned by external systems (driver's license, patient id, health card id, etc.)
	Ability to define legal responsibility (parent, representative, legal guardian), and attach the appropriate documentation to the functional area
	Support versioning of data with retrieval capabilities
	Automatically suggest and update classification, based on all information gathered at any point in case investigation
Contact Tracing	Ability to link to other uniquely defined persons in the database
	Ability to generate a new case from a contact record
	Allows for real-time synchronization with self-reporting data
	Allow user to capture contact information (address, phone number, email address, photos, etc.) and risk factor data
	Allow user to upload list of contacts from spreadsheets
	Allow user to associate contact with index case
	Allow user to type information/notes in free-form text box

Contact Tracing Category	Requirements
	Ability to record multiple encounters for each case including the mood code (information denoting procedural context/intended use)
	Allow user to categorize contacts per user defined characteristics
	Allow user to sort contact list by user defined characteristics
	Provide ability to prioritize contact follow-up
	Ability to visually represent contact linkage via the contact web (Pin map)
	Support ability to provide analytical reports based on reporting contact data
	Support ability to sort/filter contacts (i.e., group by symptomatic, asymptomatic, non-reporting, etc.)
	Support ability to track/note any instructional communications sent. Record case related workflow activities (i.e., phone call, SMS, email, alert notification, etc.)
	Support contact information for an aggregate investigation or an individual case (Obtain contact info for facility rather than individual)
	Provide ability to support algorithms to determine priority
	Allow user to send communications to care providers to identify contacts (interface with EHR systems)
Monitor Patients/ Case Intervention	Ability to monitor patient for 14 days after exposure
	Allows for real-time synchronization with self-reporting data
	Ability to electronically receive reports of patients symptoms and temperature
	Ability to link a case to an index case
	Ability to generate progress notes and other documentation
	Have the ability to alert user if anyone identified as a contact subsequently becomes a case
	Allow users to retrieve information from case management system
	Allow user to send/receive alert from case management system
	Support interoperability with case management system

Contact Tracing Category	Requirements
	Have the ability to receive test reports and attach to case/contact
	Allow user to document patient/contact treatment details and diagnostics
	Allow user to create and save a customized intervention plan
	Allow user to select a recommended treatment plan
	Allow user to document and save treatment and outcome information
	Allow user to transmit recommendations to care provider/case management systems
	Have the ability to alert user of follow-up test and other diagnostic results
	Allow user to add the intervention plan to an existing case record
	Have the ability to send order sets to care provider/case management systems
	Have the ability to alert user of missed events
	Have the ability to interact with other systems to determine status of intervention
	Ability to transmit order sets and clinical pathways to provider/case manager
	Allow user to modify predefined intervention plans to include updated guidelines/metadata from CDC and other supporting information
	Identify when appropriate time periods have lapsed to close case
	Allow user to manually assign closure justification to a case
	Allow for parameters to be established for distinct conditions
	Have the ability to automatically suggest an intervention plan, based on the disease or condition
	Have ability to populate forms using information from an external system
	Allow user to select a predefined intervention plan
	Alert user that case is moving out of infectious time period or incubation time period after infections
	Display predefined intervention plans

Contact Tracing Category	Requirements
	Have ability to auto-suggest to close case based on defined criteria
	Have the ability to connect with pharmacy data to track filling of prescriptions
	Allow user to configure an algorithm to have system automatically assign closure justification to case
	Technical Requirements
Platform	Customizable and configurable by user administrators Cloud computing software
	Compatible with mobile devices
	Ability to use on various operating systems
	Ability to use web browser on mobile environment
	Provides cross-platform functionality (Android, and iOS, with reasonable backwards compatibility for older Android and iOS versions
	Ability to use within web browser on desktop environment
	Supports offline data entry and caching
	Require user consent to the terms and conditions before the program is active
	User (at-risk individual) enrolled by Public Health officials
Interoperability	Application Programming Interfaces (API) to easily interoperate with other PHAs information systems (e.g., FHIR) Supports manual data import from PHA information systems
	Supports manual data export in common formats
	Allows for real-time synchronization with self-reporting data
	Ability to access mobile device's Bluetooth technology for proximity tracing
	Ability to access device's GPS location (geolocation data) services