

ANNEX IV: INVENTORY MOBILE SOLUTIONS AGAINST COVID-19

This annex gives an overview of digital solutions and more particular mHealth initiatives (apps) used in the EU and worldwide in the response to the COVID-19. Every day more initiatives emerge. Hence this overview is a non-exhaustive compilation.

Several EU supported projects (H2020) are currently working (daily updates) on establishing eCatalogues of technologies already available in the market and that can help to manage COVID-19 outbreak:

- European mHealth hub: <http://mhealth-hub.org/mhealth-solutions-against-covid-19>
- eHealth Hub platform: <https://platform.ehealth-hub.eu/search?clinicalarea=CORONAVIRUS&organisation=eHealthSME&page=1>
- Solutions focussing on ‘prevention of social isolation’ and ‘Feeling safe and secure at home’: <http://www.aal-europe.eu/available-aal-solutions-supporting-older-adults-to-cope-with-the-consequences-of-the-coronavirus-outbreak/>

Neither these overviews, nor the current document represent an analysis or qualitative assessment of the several initiatives. There is currently a lack of common principles and certification and there is an urgent need for a quality assessment framework to ensure health apps deliver on promises.

The CEN/ISO 82304-2³² health app quality label (under development) assesses medical safety, usability, safety of personal data and technical quality of health apps. This could be pushed forward to filter out qualitative and trustworthy health apps.

The digital health solutions are grouped in 3 categories: *government, citizen movement initiatives, and private-company initiatives*

Within each category a tag based categorisation is used to identify the services offered by the application.

- **#Symptoms:** Symptom checkers and self-diagnosis tools
- **#Tracking - #Tracing:** for tracking and tracing the spread of the coronavirus
- **#Information:** trustworthy information and guidelines to public
- **#Home:** support home bound (diagnosed) patients in their self-management
- **#MedicalStaff:** support to medical staff, mainly to follow-up on patients confined at home

³² <http://www.ehealth-standards.eu/quality-reliability-for-health-and-wellness-apps/>

WHO – #Information - #Symptoms - #Tracing

- ‘WHO – Health Alert’: <https://www.who.int/news-room/feature-stories/detail/who-health-alert-brings-covid-19-facts-to-billions-via-whatsapp>
- messaging service with partners WhatsApp and Facebook to keep people safe from coronavirus
- provides the latest news and information on coronavirus including details on symptoms and how people can protect themselves and others. It also provides the latest situation reports and numbers in real time to help government decision-makers protect the health of their populations.
- was developed in collaboration with Praekelt.Org, using Turn machine learning technology

‘WHO-myHealth App’: under development (information bot & symptom checker)

- initial objective is to help contain and mitigate COVID-19 with the longer term intent to use this for all relevant areas to help achieve the 3 billion target of the WHO Global Program of Work
- platform that provides open source tools for delivering person-centred health guidance and guidelines to individuals and health care providers at real time basis
- Main functionalities under development: Automated Bots with Information & Behaviour Change algorithms and content, Symptom Checker, Location-Based Services: used to alert individual on risks based on their location, Access to Services & essential drugs, Telehealth Services, Crowd Data Reporting.

PEPP-PT - Pan-European Privacy-Preserving Proximity Tracing – #Tracing

- Ongoing initiative: <https://www.pepp-pt.org/>; <https://github.com/DP-3T/documents/blob/master/DP3T%20White%20Paper.pdf>
- fully privacy-preserving approach to assist national initiatives by supplying ready-to-use, well-tested, and properly assessed mechanisms and standards, as well as support for interoperability, outreach, and operation when needed.
- Core features under development:
 - Well-tested and established procedures for proximity measurement on popular mobile operating systems and devices.
 - Enforcement of data protection, anonymization, GDPR compliance, and security.
 - International interoperability to support tracing local infection chains even if a chain spans multiple PEPP-PT participating countries.

- Scalable backend architecture and technology that can be deployed with local IT infrastructure.
 - Certification service to test and ensure local implementations use the PEPP-PT mechanisms in a secure and interoperable manner.
 - Our reference implementation is available under the Mozilla License Agreement.
- The PEPP-PT team, which as of 31st March 2020, has more than 130 members across eight European countries, includes scientists, technologists, and experts from well-known international research institutions and companies. According to the information provided by PEPP-PT team it has the expertise in communication, psychology, epidemiology, proximity tracing, security, privacy, encryption, data protection, application development, scalable systems, supercomputing infrastructure, and artificial intelligence.

1. GOVERNMENTAL INITIATIVES

Singapore - #Tracing

- ‘Trace Together’: <https://mothership.sg/2020/03/trace-together-covid/>
- The Government Technology Agency and the Ministry of Health of Singapore have developed this certified app to identify people exposed to persons with Corona virus disease - and curb its spreading - through community-driven contact tracing.
- Singapore government made source code of the app available to help control the spreading: <https://www.tech.gov.sg/media/technews/six-things-about-opentrace>
- Trace Together requires users consent. Users have to agree to provide their mobile numbers, allow the app’s Bluetooth proximity data to be collected and stored in their phone for 21 days, be contacted by Singapore Ministry of Health (MOH) in the case of probable contact with a person with COVID-19, and send their Trace Together data to MOH to help with contact tracing. The user can withdraw their consent at any point in time.
- The app uses only Bluetooth signals to determine a user’s proximity with other app users. It does not collect any other personal data (contact list, address books) or location data (GPS, Wifi, cellular networks) - More information on personal data safeguard in the factsheet attached.

Israel - #Tracking

- ‘Hamagen’: <https://medium.com/@oleiba/hamagen-fight-coronavirus-and-preserve-privacy-b1631693bb46>
- Health Ministry launches phone app to help prevent spread of coronavirus and tracks a user’s whereabouts and then compares them to known movements of those diagnosed with COVID-19, to check if paths crossed within previous 14 days.

- users opt-in to activate their mobile GPS, and their information never leaves their device.
- Instead, the app fetches the relevant infected people's routes from the MoH servers and looks for overlaps locally. If it finds an overlap with a sick person's location in time, it notifies the user and provides him with the updated instructions.

Austria - #Tracing

- <https://participate.rotekreuz.at/stopp-corona/>
- exchange of (manual and automatic) digital handshakes via Bluetooth (BLE), uses ultrasound and WLAN only to estimate the distance between two devices. This is done using Google Nearby and P2P kit from a Swiss company.
- The warning of close contacts is triggered by the infected person (after medical confirmation of infection). Warnings are sent only to users who have been in close contact during the past 54 hours.
- The app is available only in Austrian app stores, open source code will be published soon

Bulgaria

- Real-time link between citizens and health authorities: <http://virusafe.info>
- Central site, and information for regions www.coronavirus.bg
- Dashboard: <https://coronavirus.bg/arcgis/apps/opsdashboard/index.html#/ecacd239ee7e4fba956f7948f586af93>

Iceland - #Tracing

- <https://www.covid.is/app/en>
- contract tracing app "Rakning C-19" helps to analyse individuals' travel and trace their movements against those of other people when cases of infection or suspected infection arise. Rakning C-19 is available for Android and iOS devices and is open to all.

Cyprus - #Tracing

- <http://covid-19.rise.org.cy>
- application named TRACER based on geo location (all data remain on the phone and the user decides for sharing anonymised data with government).
- application is based on safepaths (<http://safepaths.mit.edu>), developed by MIT university (USA).

Czech Republic - #Tracing

- 'Smart Quarantine memory maps' provides a set of tools helping CDC authorities in contract tracing, such as call center and memory maps. Created by the covid19cz.cz community and endorsed by Ministry of Health. Uses location data from mobile operators to construct "memory maps" (visualization of locations the person spent significant time in the last 5 days), which help CDC specialists to lead more effective and efficient contact tracing call with infected people. Memory maps are only used

with an explicit consent of the infected person, otherwise standard CDC contact tracing call is done. It is currently in pilot operation in 3 regions.

- eRouska (rouska = face mask in czech) is an extension of 'CZ Smart Quarantine' concept, which provides a set of tools helping CDC authorities in contact tracing. Bluetooth proximity tracing app, created by the covid19cz.cz community and endorsed by Ministry of Health. The app uses pseudonymous IDs, data from the phone are provided to the central system only with the explicit consent. Source code on github.com/covid19cz/erouska-android and github.com/covid19cz/erouska-ios. It is a bluetooth proximity tracing app, created by the covid19cz.cz community and endorsed by Ministry of Health. The app uses pseudonymous IDs, data from the phone are provided to the central system only with the explicit consent. Source code on github.com/covid19cz/erouska-android and github.com/covid19cz/erouska-ios. Currently Android version released on Google Play 11.4.2020, Apple version in AppStore approval process

France - #Symptoms #Home

- maladiecoronavirus.fr a software that analyses the COVID-19 symptoms
- <https://www.service-public.fr/particuliers/actualites/A13927> follow-up of COVID-19 patients in their home environment. Medical survey is sent to patients every day. Hospital analyses results. Used by 2 hospital groups in Paris. Will be scaled-up.

Germany - #Information #Tracking

- COVID-19 registry:
[https://urldefense.com/v3/http://www.leoss.net;!!DOxrgLBm!TjH-ytz8kMOQhh5CDkkO6Zkg4KpXuj8H3_XIq1u_0vm3W5VKoUFnlKeoDODpJ-rGqE4bV6etmcc\\$](https://urldefense.com/v3/http://www.leoss.net;!!DOxrgLBm!TjH-ytz8kMOQhh5CDkkO6Zkg4KpXuj8H3_XIq1u_0vm3W5VKoUFnlKeoDODpJ-rGqE4bV6etmcc$)
- COVID-19 Dashboard:
<https://experience.arcgis.com/experience/478220a4c454480e823b17327b2bf1d4>
- <https://corona-datenspende.de/>

Ireland - #Information #Home

- <https://www.hsecovid19.ie/>
- Patient Management app to monitor COVID-19 health information of a patient during self-isolation. Data is sent to health care practitioners who can monitor health status of patient

Italy – #Home

- LazioDoctor <http://www.regione.lazio.it/rl/coronavirus/scarica-app/>: Information, Telehealth and Monitoring with general practitioner in Lazio Region
- Co4Covid-19 app: <https://www.dedalus.eu/dedalus-per-covid-19/> - screening, active surveillance at home, tutorial, chatbot, telehealth

- Smart Axistance Covid-19 Control – Telehealth and monitoring
- eLifeCare Covid-19 app: <https://www.exprivia.it/en/> – Monitoring and telehealth, information and clinical diary
- Ticuro Reply app: <https://www.reply.com/ticuro-reply/it/> – Clinical diary, alerting and telehealth

Netherlands - #Information

- ‘Medisch Dossier – COVID 19’ app: <https://apps.apple.com/nl/app/covid-19-medisch-dossier/id1502322865>
- Public information app with Q&A, phone numbers and map of NL locating infections

Norway – #Information - #Symptoms - #Tracing

- Citizens’ health portal <https://helsenorge.no/coronavirus> owned and maintained by the Norwegian Directorate of E-health.
- Norwegian Institute for Public Health the Directorate of E-health has developed a service where you register symptoms. You will not get any specific advice based on what symptoms you report, but will be given generic information about how to behave to lower the risk and when and how to contact the healthcare services.
- There are plans in place to track the location of individuals that use an app developed at the national level. This will likely be achieved using Bluetooth and/or GPS. Law will need to be developed to regulate this. <https://www.simula.no/news/eng-simula-working-norwegian-institute-public-health>
- The (Norwegian) infection tracking application has two purposes:
 - To rapidly detect and give advice to people who may be infected with the coronavirus,
 - To monitor the spread of the infection and to assess the effects of the infection control measures.
- Central storage of personal data related to infection tracking can be regarded as greater intervention than storing personal data locally on each individual mobile phone (decentralization). A choice of centralized storage must therefore be justified by the fact that one or both purposes for the application, can hardly be achieved otherwise.
- One of the reasons for the implementation of the application is to help health authorities to assess the effect of infection control measures. By following aggregated and anonymous movement patterns in the population, this can be a tool for analyzing movement patterns. In this way, it will be possible to keep track of whether the measures Norway is implementing are working, and whether the amount of close contacts to the infected will change when society opens up the very strict restrictions little by little. Such assessment requires that the information is stored centrally, so that data can be compiled.
- Another reason for central storage of location and contact information is accuracy and speed. Tests have shown that the application can provide higher tracking accuracy if information is stored and processed centrally. This is because data from both phones

that "meet" can be compared, and provide a more accurate assessment of close contact. In this way, it can prevent the application from notifying that a resident has had close contact with an infected person, when this is not a case.

- Centralized storage makes it possible to send out messages to those who have been in close contact with an infected person faster, than a decentralized application. In a decentralized application it is necessary to contact the infected person first, before that person uploads its data. Then, the close contacts can be identified and a message can be send.
- Based on this assessment it is our conclusion that in order to achieve both purposes the application shall be based on central storage. In Norway's opinion, the benefits of central storage outweighs the disadvantages.

Poland – #Home #Tracing

- COVID-19 chatbot within the Patient's Internet Account - Information regarding i.e. symptoms of infection, prevention measures, rules of quarantine, other measures imposed by the government presented as FAQs with a possibility to write down a unique question. The virtual assistant is updated daily by: the Ministry of Health, the Chief Sanitary Inspectorate and the National Health Fund. www.pacjent.gov.pl
- Symptom Checker within the Patient's Internet Account - Online tool serving informational purposes, guiding the patient how to react when disease symptoms appear: whether to report to the appropriate medical point or just follow general sanitary rules. <https://pacjent.gov.pl/koronawirus/sprawdz-objawy>
- Map of coronavirus infections SARS-CoV-2 prepared by Ministry of Health <https://www.gov.pl/web/koronawirus/wykaz-zarazen-koronawirusem-sars-cov-2>
- Contact Tracing and self-diagnostic app - in the final stages of development. Launch is to occur imminently and an information campaign is ongoing since late March. Downloaded voluntarily, the application uses Bluetooth to record contacts, informs users (and health authorities) of exposure to an infected person, and provides users with verified medical advice. The risk-assessment is supplemented with a "health diary" self-diagnostic monitoring tool as well as a dedicated helpline. Providing users with an accurate risk-assessment information. Providing the health authorities with information helpful in epidemiological analysis. Enabling the users to access verified and personalized recommendations and means to quickly contact the relevant authorities.

Portugal - #Symptoms #Home

- <https://covid19.min-saude.pt/> or <https://www.sns24.gov.pt/>
- By default NHS24 (national phonenumber for 1st triage) is the mandatory single national contact point for COVID-19 patients. Citizens will have on their disposal other digital tools, such as Symptom checker or self-monitoring functionalities in the healthcare citizens portal. The contact or referral can be done in multi-channel. NHS 24 will make a score according to their clinical severity.
- In terms of mobile approach and tracing, PT currently isn't focusing on development of tracing app but on promotion, monitoring and Self-care. Interoperability between existing system will be guarantee in the mApp, symptom checker (this functionality

will be used in the app as well), connected with “TRACE COVID-19 System” (Surveillance and Monitoring) and NHS24 referral system.

- Patients are referred, according to their clinical severity, for self-care, in isolation from home and under surveillance, or for medical evaluation, in dedicated COVID-19 areas (ADC) in primary health care or emergency rooms, or to the National Institute of Medical Emergency (INEM). Accordingly, to the symptom’s physicians can electronically prescribe medical exams, such COVID-19 testing to authorized laboratories by Public Health Authority. The result shall be made available to the citizen and physicians by electronic means (majority of the cases) by directly connectivity/communication between national infrastructure, SINAVE (epidemiological system/registry) or TRACE COVID-19 System (Surveillance and Monitoring). Not all confirmed cases of COVID-19 require hospitalization, as long as they present a mild and stable clinical case, are able to stay at home and the monitoring of the health team at home is guaranteed.

Spain - #Symptoms #Home #Tracking

- Spain has launched a website [Covid19.es](https://covid19.es/) (<https://covid19.es/>) providing access to all official digital resources at the national and regional levels designed as an interactive and updated map made of the last official news.
- Spain has developed a chatbot using AI and Natural Language named Hispabot-Covid19. It is designed to provide official information via WhatsApp on a 24/7 basis. This conversational tool assistance is available in this link <https://covid19.gob.es/> and it has been envisaged as an automatic channel of consultation for citizens. For using this tool through WhatsApp people have to keep this number +34 600 802 802 in their telephones.
- There is also a web and mobile app known as “Asistencia Covid-19” that allow citizens to perform auto diagnosis and obtain key feedback and assistance based on their symptoms. This app has can be used by smartphones ([Ios](#) and [Android](#)) or though the website (<https://asistencia.covid19.gob.es/>).

UK - #Tracing #Symptoms

- NHS is working closely with the world's leading tech companies on an app that will warn users if they have recently been in close proximity to someone suspected to be infected with the coronavirus.
- people who have self-diagnosed as having coronavirus will be able to declare their status in the app.
- The software will then send the equivalent of a yellow alert to any other users who they have recently been close to for an extended period of time.
- If a medical test confirms that the original user is indeed infected, then a stronger warning - effectively a red alert - will be sent instead, signalling that the other users should go into quarantine.
- To report testing positive, the user would have to enter a verification code, which they would have received alongside their Covid-19 status.

Brazil – #Information #Symptoms

- <https://play.google.com/store/apps/details?id=br.gov.datasus.guardioes&hl=en>
- The Ministry of Health launches the Coronavirus-SUS app with the objective of making the population aware of the Corona Virus COVID-19. Map indicating nearby health units. In case of suspected infection, the citizen can check if the symptoms are compatible with Corona's, and if so, they will be instructed and sent to the nearest basic health unit. Information on various topics such as symptoms, how to prevent, what to do in case of suspicion and infection and etc.

Vietnam – #Symptoms #Information

- 'NCOVI' app. <https://www.opengovasia.com/vietnam-launches-health-app-to-manage-covid-19/>
- Citizens can update their daily health status and provide information about cases suspected of having the COVID-19 in their residential areas.
- Data collected through the app will help the nation's health sector to identify who needs medical assistance in the fastest and most effective manner.
- The app also serves as an official channel for competent authorities to disseminate the COVID-19 epidemic situation as well as health recommendations to citizens.

2. CITIZEN MOVEMENTS INITIATIVES

COVID Safe Paths - # Tracing

- <https://covidsafepaths.org/> and <https://github.com/tripleblindmarket/covid-safe-paths>
- a global, citizen-centric movement to develop free, open-source, privacy-by-design tools for citizens, public health officials, and larger communities to flatten the curve of COVID-19, reduce fear, and prevent a surveillance-state response to the pandemic.
- The technology has been developed with clinical input from Mayo Clinic and Massachusetts General Hospital and mentors from the World Health Organization, the US Department of Health and Human Services and the Graduate Institute of International and Development Studies.

CoEpi - #Tracing

- <https://www.coepi.org/> and <https://github.com/Co-Epi>
- CoEpi is a privacy-first system for anonymous Bluetooth-based contact tracing / exposure matching based on voluntary symptom sharing and/or confirmed COVID-19 test results. Communities of close contacts can begin protecting themselves with CoEpi immediately; there is no scale required to achieve benefit to closed user groups.

- CoEpi is an open source project that is actively collaborating with others on a shared backend and Bluetooth protocol so these apps can ‘see’ each other as devices, expanding the impact of CoEpi.

Several countries - #Information

- <https://ciudadano19.com/#/>, dashboard based on citizen-reported data

Spain – #Information

- <https://es.mapa.frenalacurva.net/views/map>, mutual support, dashboard

3. PRIVATE COMPANY INITIATIVES

Coronavirus Outbreak Control - #Tracing

- Mobile app for contact tracing, shielding of high risk categories and quarantine enforcement
- Open-Source framework exploiting solely the anonymous data exchanged by the Bluetooth LE handshaking protocol of the smartphones
- quarantine enforcement is addressed with biometric identification performed locally on a handset, requiring only a front facing camera and no personal information transmitted to the servers
- https://coronavirus-outbreak-control.github.io/web/index_en.html

Vidicom/SmartAR³³ - #Tracing - #Information

- contact tracing and could additionally offer information about COVID-19.
- use of GPS data of persons using the App on the smartphone, it is able to trace and inform other persons/users who have been in close proximity of the COVID-19 case in the last 14 days.
- when a person is tested positive then the person is required to enter a code in the App, and this code is to be provided by the testing authorities.

Covid19Alert! - #Tracing

- <http://www.covid19-alert.eu/> app to trace and alert all people at risk COVID-19.
- Works with Bluetooth data. Registers in case your mobile phone has been near a mobile phone of an infected person who is using the app. Privacy is guaranteed. The use of the app is completely anonymous and it is impossible to trace you or your GSM.

Andaman - #Symptoms - #Information

³³ ECDC assesses the app proposed by the Vidicom/SmartAR as unfeasible

- <https://www.andaman7.com/en/covid-19>
- Developed a free in-app Pandemic Module that can help with:
 - Informing patients with trusted sources,
 - Triage to reduce load on medical staff and call centers,
 - Self-test to reduce the burden on the medical infrastructure,
 - Data collection for medical and crisis management purposes,
 - Medical research with urgent clinical trials, PRO, RWE, QoL studies.

Bingli - #Symptoms

- Covid19 triage module to define if you need to be seen by a medical doctor: <https://www.mybingli.com/covid19/>

My Patient Data - #Symptoms

- Direct link to app: for **for Apple iOS for Apple iOShere for Google Android.** and **here for Google Android.** Hippokrates IT GmbH
- The aim of the app "My Patient Data" is to reduce waiting times for corona testing and to improve the documentation of the course of the disease, especially for patients at risk, by means of documentation on the patient's smartphone.

Move-Up - #MedicalStaff

- An app to perform follow-up of COVID-19 diagnosed patients at home. Clinical dashboard.
- <https://www.numerikare.be/fr/actualites/une-application-belge-pour-suivre-a-domicile-le-patient-suspecte-ou-diagnostique-covid-19.html>

HumanXD - #Symptoms

- A comprehensive assessment tool for the general public for COVID-19 information around risk and testing. <https://www.humandx.org/covid-19/assessment>
- Supported by CDC (Centers for disease control and prevention), WHO, NHS, UCSF Health (university of California), UW Medicine, Mayo Clinic

Mapy.cz - #Tracing

- Independent contact tracing and hotspot identification, based fully on voluntary participation, independent on government. Created by Czech "Internet portal" company Seznam independently on government activities as an extension of their popular map application Mapy.cz. Uses GPS location tracking to record user movements and notifies the user about contacts with infected people or presence in known hotspots. Participation is fully voluntary, reporting from infected people also

fully voluntary. Running (both Android and Apple versions), about 900.000 people registered, 200+ infected people self-reported.