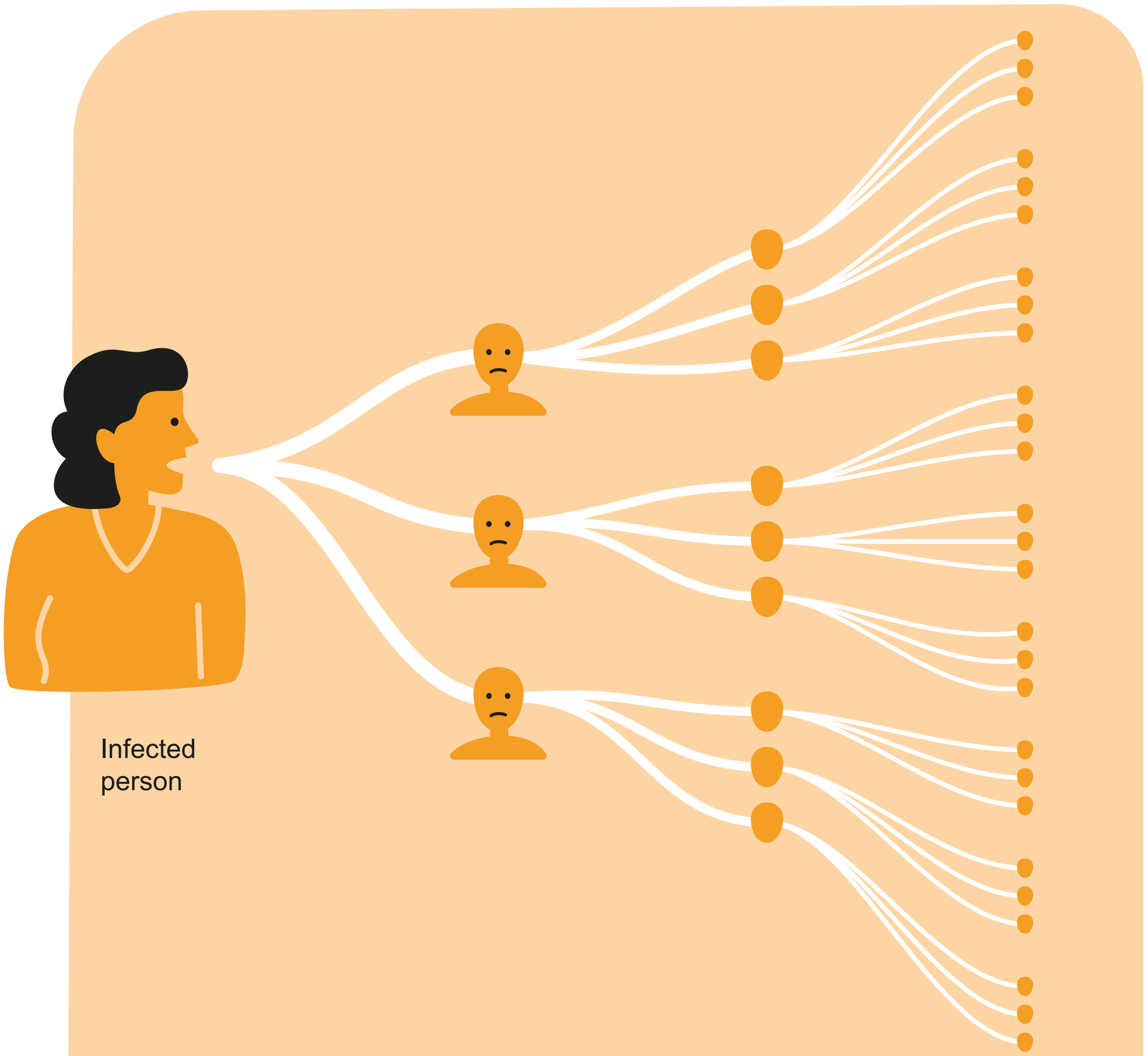
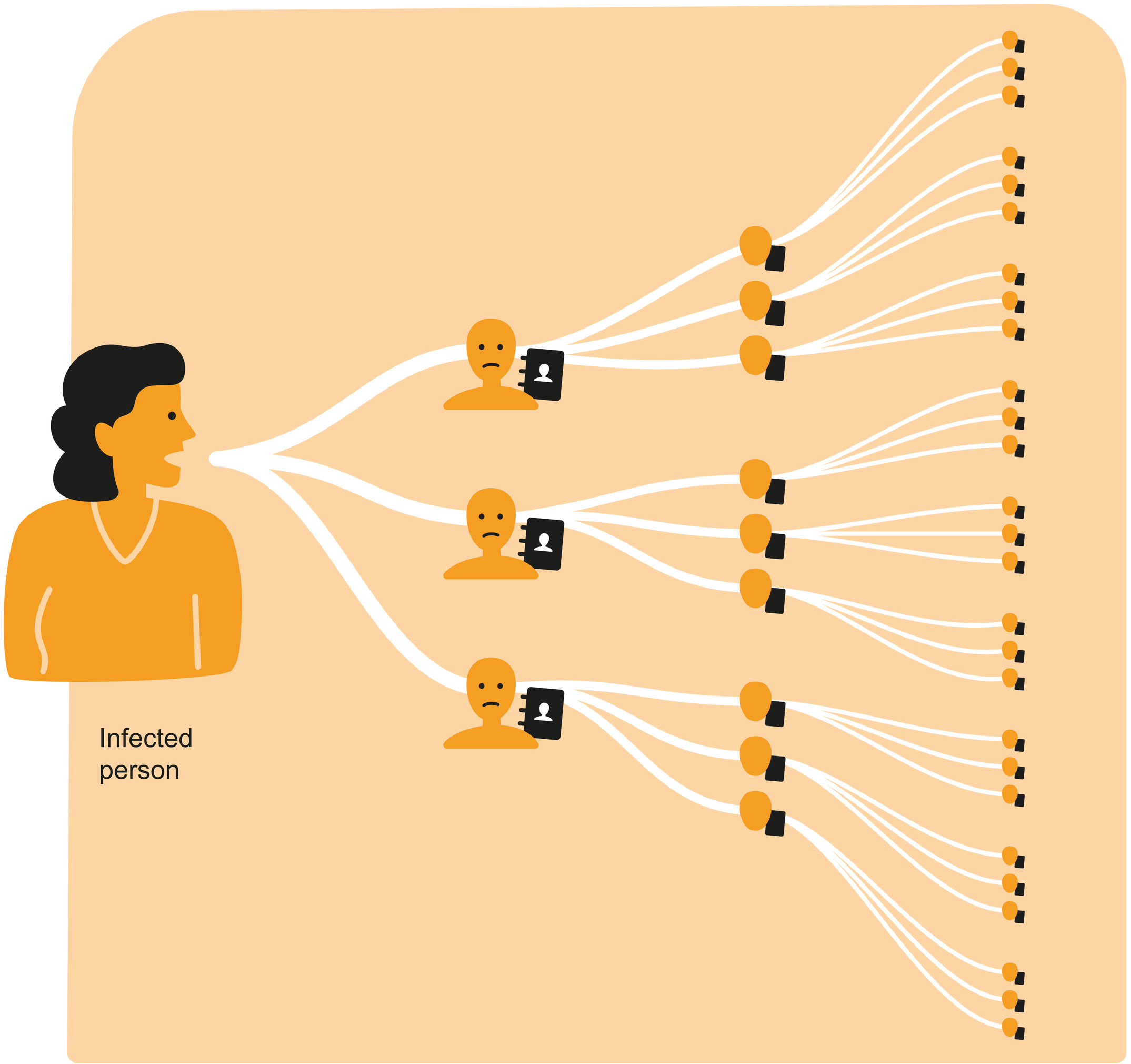
ROBERT Protocol

ROBust and privacy-presERving proximity Tracing (ROBERT)



Why is COVID-19 spreading so fast? It’s because anybody can be contagious for several days without knowing and without having any symptoms. Such people can transmit the virus to the people around them.



Traditional contact tracing is based on the interviews of people diagnosed with COVID-19. This procedure involves collection and processing personal data of such people (including their geolocation) and of people they have met.

ROBERT Protocol

It is possible to keep the proximity history of people with a smartphone application in a privacy-preserving manner, simply relying on Bluetooth signals. We propose that such an application is implemented using the ROBERT Protocol.

ROBERT Protocol

Alice

Bernard

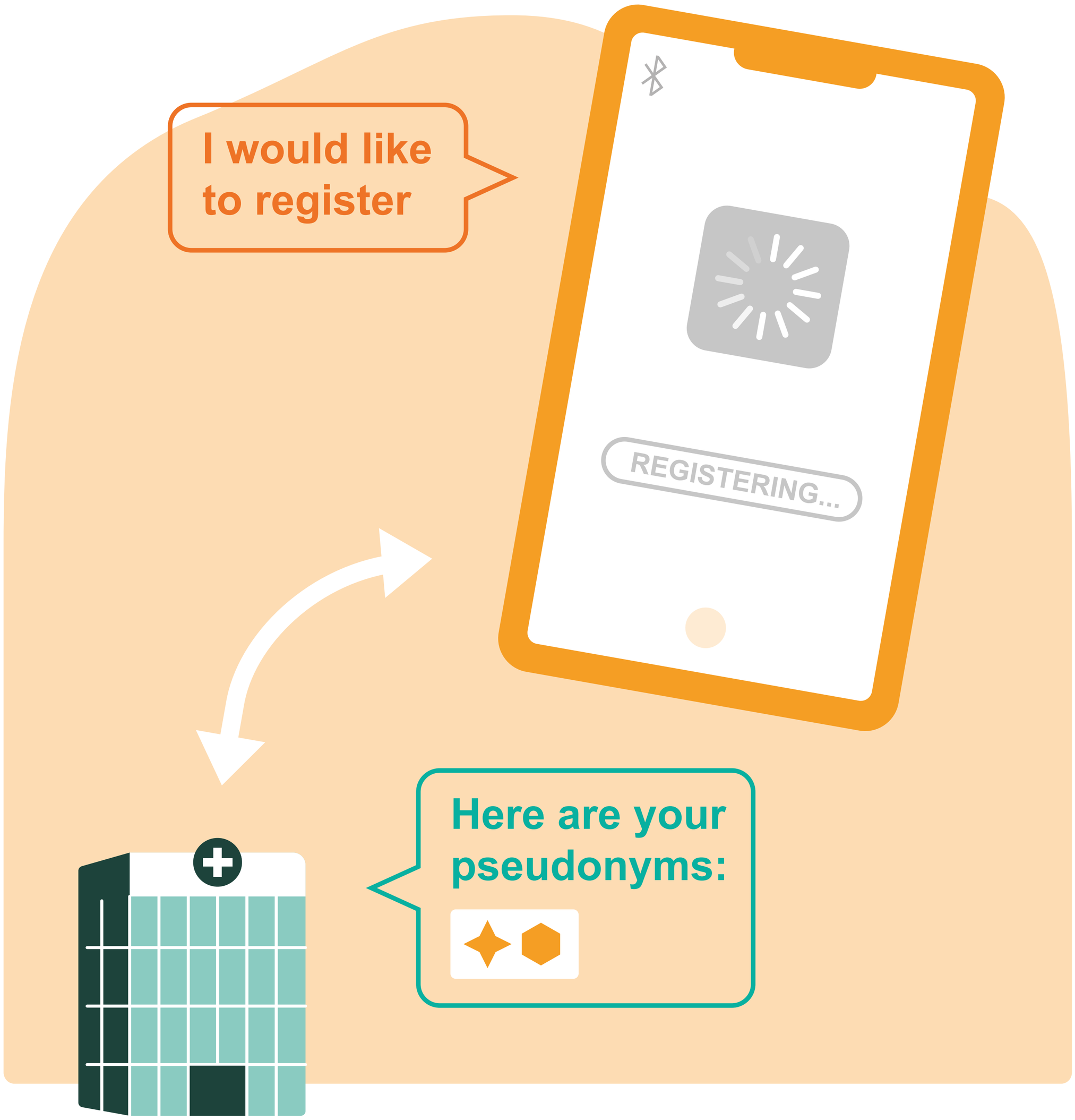
Charles

How can an application keep this proximity history and still protect the privacy of its users? Follow the story of three people, Alice, Bernard, and Charles, to see how the ROBERT Protocol works.

ROBERT Protocol

Alice decides to install an application and activates Bluetooth. This is an application that is based on the ROBERT protocol.

ROBERT Protocol



Upon installation, an application receives several pseudonyms. Those pseudonyms will be used one after the other and for a limited period to ensure that they cannot be used to track Alice.

Application of Alice distributes her pseudonyms via Bluetooth. Only applications of people around Alice, such as Bernard and Charles, are able to capture her pseudonym and store it on their phones.

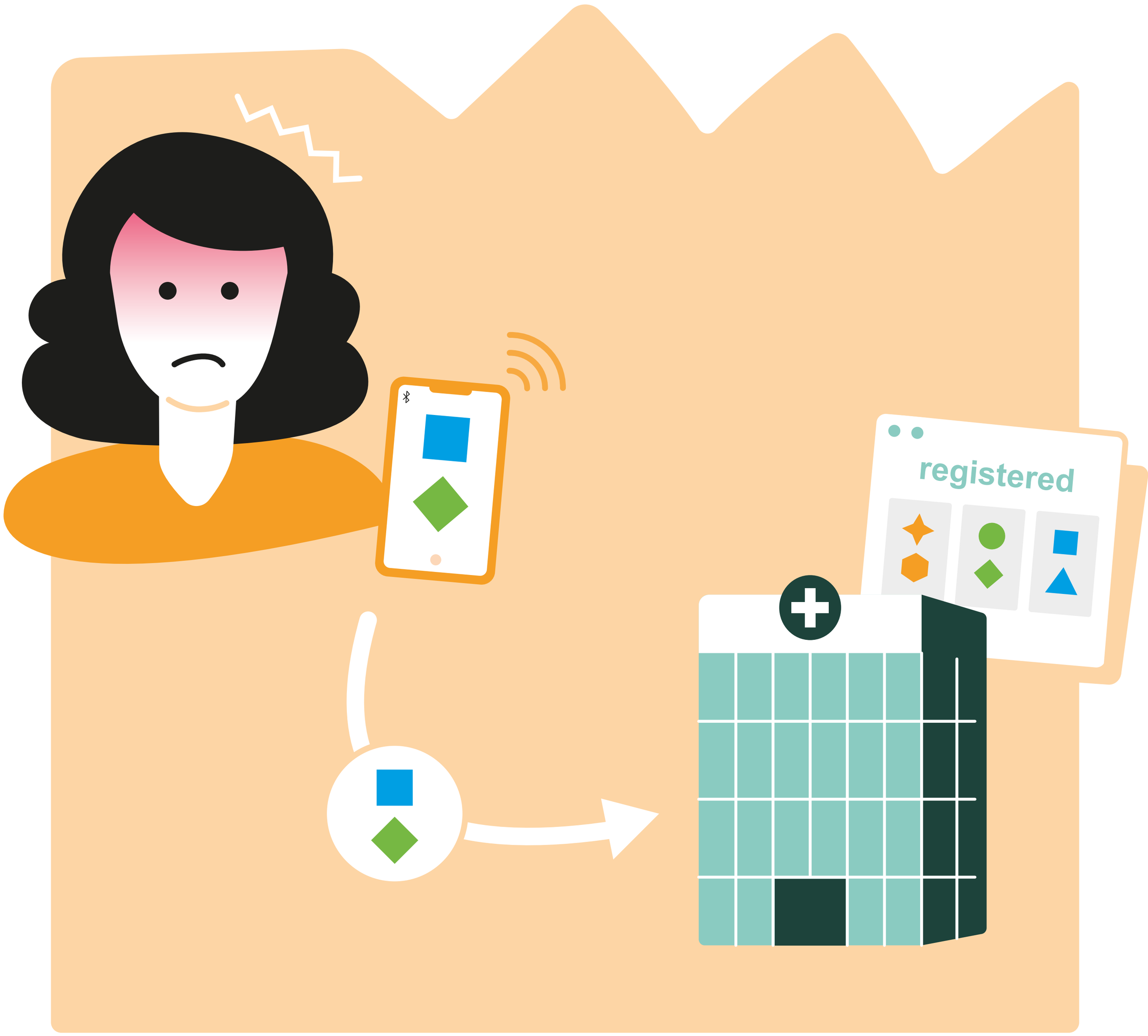
ROBERT Protocol

All the pseudonyms of users around Alice are detected without any information about geolocation. Thanks to the usage of only Bluetooth signals, no one knows where exactly Alice has been.

ROBERT Protocol

A few days later, Alice has COVID-19 symptoms and gets tested. Turns out, Alice has been infected for quite some time now.

ROBERT Protocol



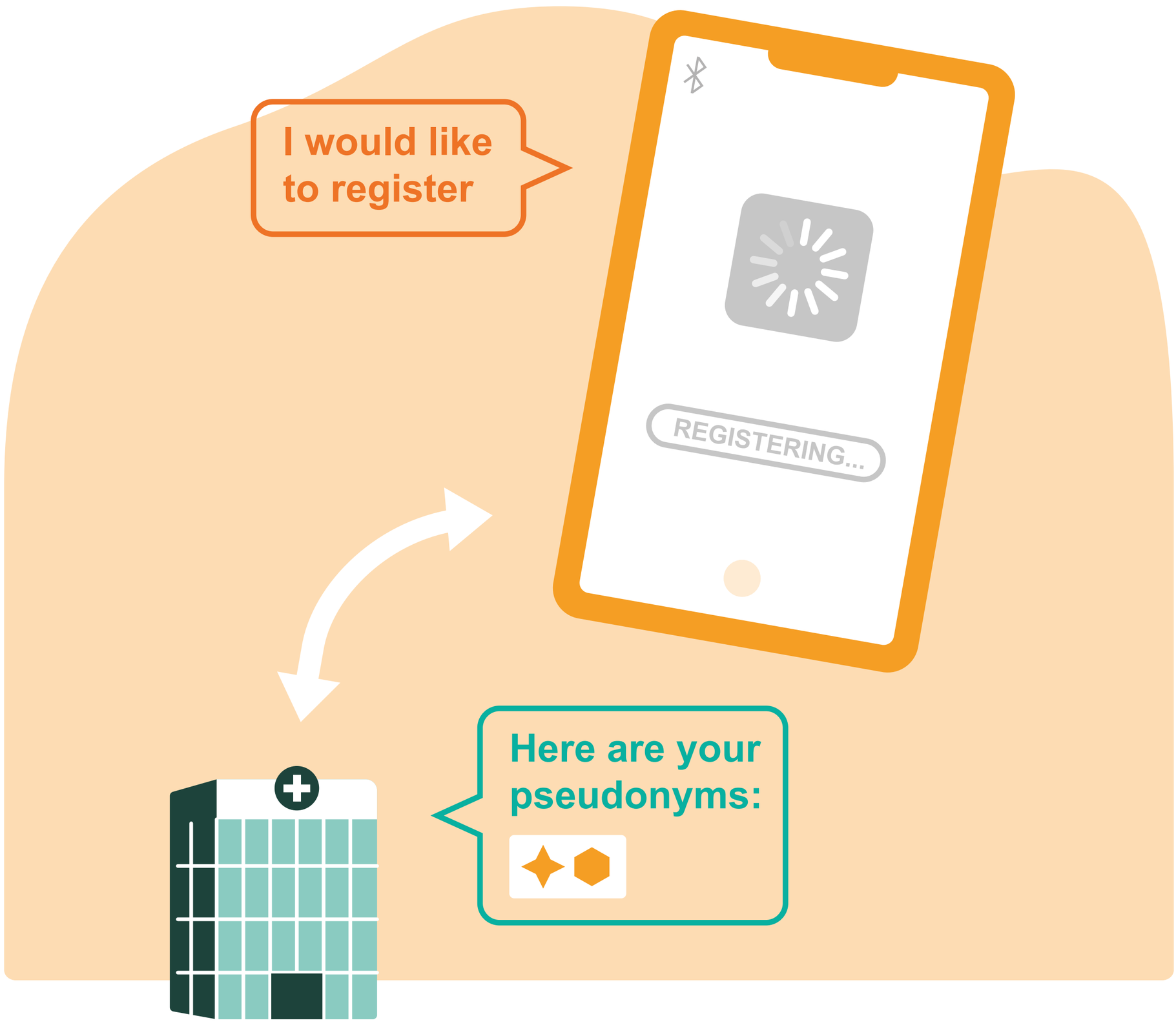
To help people who have been around Alice in the last 2 weeks, she agrees to share their pseudonyms with the central database.

ROBERT Protocol

Charles’s application sends his pseudonym to the central database several times per day. Charles receives an alert on his smartphone: in the last 2 weeks he has been close to someone infected with COVID-19! Bernard receives the same alert on his smartphone.

ROBERT Protocol

CAN ANYBODY SPY ON ME BECAUSE I INSTALLED THE APPLICATION BASED ON THE ROBERT PROTOCOL?



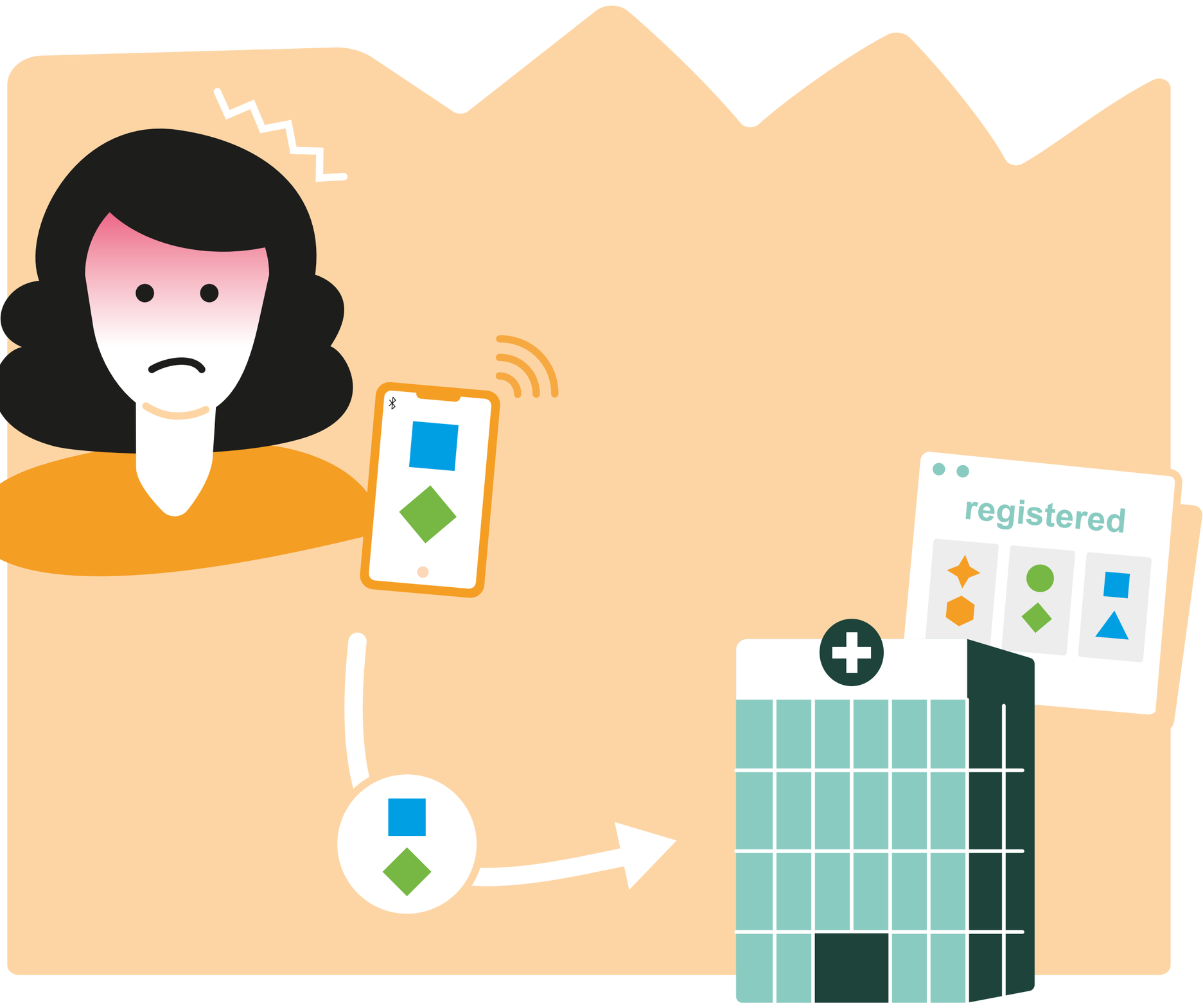
No. Let’s take Alice for example: upon installation of an application, the central database sends several pseudonyms that get associated with Alice’s application. But the central database does not know that it’s Alice — it doesn’t have any access to her real name, phone number or her location.

FAQs

THAT'S VERY NICE BUT... CAN CHARLES KNOW THAT IT WAS ALICE WHO COULD HAVE PASSED THE VIRUS TO HIM?

No, Charles cannot learn with certainty that it was Alice who is diagnosed with COVID-19. Charles has met many people in the couple of weeks (contagious period) and can not tell who could have infected him.

CAN ANYBODY ELSE THAN ALICE'S DOCTOR LEARN THAT ALICE GOT INFECTED?



No. The ROBERT Protocol ensures that nobody except for the doctor has access to this information. Even the central database does not get any information on who has been diagnosed with COVID-19. The central database only receives temporary pseudonyms of all people who have been close to someone infected. In our example, the central database only receives pseudonyms of Bernard and Charles, but has no information about Alice.

ROBERT Protocol

WHAT ABOUT ELISA, ALICE'S DAUGHTER, WHO DOES NOT HAVE A SMARTPHONE?

Indeed, children and other people who do not have smartphones cannot benefit from such an application. Researchers today are working to ensure that the ROBERT Protocol can operate on a different device that provides the same service to people like Elisa.

IS “ROBERT” A SMARTPHONE APPLICATION?

No, ROBERT is not an application. It's a communication protocol — in informatics this means a "procedure" that describes how an application should work. It's proposed by scientists, who have been working on security and privacy of communication protocols for more than 20 years. Any application can use the ROBERT Protocol. ROBERT is a proposal for a Pan European Privacy-Preserving Proximity Tracing (PEPP-PT) initiative, which main goal is to respect the European standards in data protection, privacy and security.

This document is aligned with ROBERT Protocol technical specification version 1.0:
https://github.com/ROBERT-proximity-tracing

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1. Collaborative Inria work led by the PRIVATICS team.

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