Covid-19 contact tracing apps: ethical issues and implications for informed consent
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In any pandemic context, isolating infected subjects and avoiding the spread of the contagion are two main priorities in terms of public health, when there is no validated vaccine against the virus that triggered the pandemic. In this perspective, contact tracing is crucial.

The primary indicator of the effectiveness of **contact tracing (CT)** is the number of secondary cases identified and isolated, i.e, the number of persons infected by a first confirmed positive case. Traditional CT has been widely practiced so far by the Prevention Departments and consists in interviewing cases and contacts (by telephone or with home visits) and using other methods to identify all contacts, performing laboratory tests, monitoring contacts for symptoms and making sure that they are following quarantine/isolation and other preventive measures.

Digital CT makes full use of technological solutions based on digital health and, in particular, of two components: electronic health (e-health) and mobile health (m-health), drastically limiting personal contacts between public health operators and citizens and using technologies for accessing telematic databases and proximity tracing with Bluetooth or GPS.

In addition, the so-called "symptom tracking" can take place in a complex way:

a) through wearable tools that can detect symptoms (temperature, etc.);

b) through drones that can be used either to control individuals or to check if there are gatherings;

c) through digital implementation, and this is precisely the case with apps.

Through digital implementation, contact tracing takes place through computer applications on mobile media, for a specific function.

From the point of view of public health, the apps have been introduced just as another way of applying the procedures of traditional contact tracing. From an ethical and bioethical point of view, it should be emphasized that technology is not a neutral tool.

To discuss ethical issues and implications for informed consent, Prof. Morresi highlighted two levels of analysis:

1. The relational nature of traditional contact tracing is crucial in order to fully grasp the ethical issues related to CT apps (and perhaps also to explain why the use of large-scale applications in Italy has not been understood):

- The heart of contact tracing is the dialogue between the tracker and the index person; subsequently, interviews with his contacts. Main purpose of this dialogue is to identify the subject's contacts;
- Risk assessment can take place fully if all aspects relating to the contact with the positive person are asked/shared (At what distance did you meet this person? How long have you been with him/her?); the interview turns out to be all the more effective the greater the trust is between the tracker and the interviewed person;
- the tracker has also to deal with the problems of the person interviewed; he must ensure that the person's living conditions allow for isolation, if needed; he must identify whether the person to be

isolated or quarantined needs to take care of other people; ultimately the tracker has to take charge of the positive / possible positive;

Definitely, the tracker undertakes a relationship of care that has to take into account thoroughly the needs of the interviewed subject. To protect community health, operators must take care of the individual.

2. Ethical evaluation regarding the application implemented in the Italian context ("Immuni").

The application was designed with the aim of alerting people who have a risk of contagion through proximity tracking via Bluetooth technology. Prof.ssa Morresi underlined that Bluetooth is a technology suitable for applications but not created for tracking: for example, it is not a technology implemented for the purpose of calculating distances (therefore it has a bias in this sense).

The application was indeed designed to protect the privacy of the subject (in fact it uses a "decentralized" data collection, i.e. the data does not leave the single mobile device). In sum, in the Italian context, the application did not work it was supposed to replace fully traditional contact tracing.

Unfortunately, a prior assessment in this sense was not implemented considering that the relational nature of contact tracing cannot be replaced by technology. For example, risk is automatically assessed by the application and data used for this aim are perceived as revealing an intrusive approach.

Prof.ssa Morresi highlighted further ethical implications:

- cybersecurity issues, relating to data protection;
- high amount of personal and health data entered; new and large datasets created by the app; collection of data not only on health but also e.g. on mobility;
- non-identifiability of the tracker

Prof. Morresi discussed the implications for **informed consent** which **should include an in-person explanation to accompany the use of the digital application**. Each subject must be able to give consent to the use of the Apps, even after downloading them to their smartphone (or mobile support), and also differentiated with respect to the different modules that make them up. It must be ensured that consent is given in full awareness: the information to users must be clear and understandable, taking into account that an important segment of the population, especially the elderly, is not yet familiar with computer media. It would be advisable especially for these groups of users to provide explanations in the presence of the operators in the App start-up phase, or at least make videos or tutorials available. Furthermore, at the time of installation, the possibility of uninstalling must be clearly communicated, and the procedure for carrying out it must be simple and unhindered.