

How To Make Digital Proximity Tracing Work: The View from Economics¹

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Covid-19 proximity tracing apps can contribute to the fight against the pandemic. In a free society, however, their adoption is impossible to enforce by decree or material incentives. Their success therefore hinges on voluntary cooperation. We show that activating the app has considerable private benefits that many may underestimate – especially by offering information to guide their behavior towards vulnerable relatives and friends. Hence, activating the app need not primarily be seen as an act of social generosity. Alerting contacts through the app after having tested positive, however, presents a tradeoff of private costs against societal benefits. We argue that these private costs are likely to be negligible for most users, while the social benefits (saving lives) are potentially large.

Digital proximity tracing (DPT) holds great promise as a complement to traditional proximity tracing, mainly because it allows contacts in anonymous crowds to be alerted in addition to known contacts, and it can operate without capacity constraint even if manual contact tracing facilities are overwhelmed.

Yet, even the best technological solution, when it depends on widespread adoption, needs to contend with the human factor. Recent surveys in Switzerland suggest growing skepticism. The share of Swiss residents who declare willingness to install the DPT app has fallen from 65% in April to 54% in June.

Compliance can be broken down into 'passive' actions (downloading the app and carrying it around) and 'active' actions (entering an alert when tested positive). The table below presents a detailed breakdown.

We show that 'passive' adoption generates considerable private benefits in the form of information that can guide one's own behavior as well as contacts with vulnerable people. 'Active' compliance is closer to a typical social dilemma, where private costs must be weighed against societal benefits. Eliciting the necessary pro-social motivation among a majority of people will crucially determine the potency of DPT in the light against the pandemic.

Therefore, public information should be transparent about risks but also make clear that adopting the app has considerable private benefits in addition to social benefits that increase exponentially with the share of users. One informational nudge could be for governments, in their regular Covid-19 data releases, to communicate the share of new infections (i) that were detected thanks to an app signal received, and/or (ii) that led to an app signal sent by the infected person.

¹ Full article can be [downloaded here](#).

Overview of Actions and Associated Costs and Benefits from the Point of View of an Individual User of a Covid-19 App

Actions	Costs <i>to individual</i>	Benefits		
		<i>to individual</i>	<i>to family and friends</i>	<i>to society at large</i>
1. Download app	None	Better information on infection risk	Better information on infection risk	<ul style="list-style-type: none"> • Contribution to containment of pandemic • Contribution to avoidance of renewed general lockdown • Exponential social value of individual participation due to network effect
2. Carry app around	<ul style="list-style-type: none"> • Battery drain • Risks associated with use of Bluetooth • Exposure to replay attack (false positive, sent maliciously) 	⇒ <ul style="list-style-type: none"> • adapt own plans (e.g. travel) • adapt own health behavior (e.g. stress levels) 	⇒ adapt contacts with vulnerable 'loved ones'	
3. React to warning signal	<ul style="list-style-type: none"> • Material and psychological cost of distancing and self-isolation • Ex post psychological cost of overreaction in case of false alerts ('cry wolf') 	<ul style="list-style-type: none"> • Free test • Reduced risk of social stigma as a spreader 	Protect 'loved ones' by adapting contacts	
4. Enter warning signal when infected	Potential revelation of contact patterns and health status (privacy risk)	None	Alert and protect 'loved ones' quickly, easily and comprehensively (no imperfect recall problem)	