

Table 1: An overview of the different contact tracing tools used throughout the pandemic and scenarios in which they could be considered in future pandemics.

	Manual contact tracing	Digital contact tracing		
		Self-service survey	NZ COVID Tracer app (QR code)	NZ COVID Tracer app (Bluetooth)
Method of contact identification	Self-reported contacts and locations of an identified case	Manual entry by case of known contacts via online platform, plus Bluetooth contacts	QR code entry of place(s) visited by case when infectious	Bluetooth record of contacts in proximity of case when infectious
Contact follow-up	Contact contacted by phone or other means	Electronic notification of reported contacts plus Bluetooth contacts	Electronic notification of those matching location and time of case	
Advantages/strengths	<ul style="list-style-type: none"> - Established and legally supported response for notifiable diseases - Clinical input into contact determination and case support 	<ul style="list-style-type: none"> - Could be implemented as a simple extension of existing manual contact tracing - Potential to increase sensitivity by adding Bluetooth contacts - High speed to notify contacts from case ascertainment 	<ul style="list-style-type: none"> - Wide net of potential contacts identified - More easily scalable 	<ul style="list-style-type: none"> - Tighter contact definition than QR code approach - No active participation required - More easily scalable
Disadvantages/limitations	<ul style="list-style-type: none"> - Human (and clinical) capacity limitations - Case recall bias - Difficulty identifying unknown contacts 	<ul style="list-style-type: none"> - Requires access to internet service and digital literacy 	<ul style="list-style-type: none"> - Large numbers of false positives (low specificity) - Required active participation (high compliant adoption) - Required multiple manual steps to process data 	<ul style="list-style-type: none"> - Required manual steps to be implemented (contact tracer approvals) - Does not facilitate clinical judgement - Cannot follow-up contacts as they are anonymous

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Pandemic scenarios most suited for	<ul style="list-style-type: none"> - Transmissibility is relatively low - Controllability is high because of visibility of infection and relatively long incubation period 	<ul style="list-style-type: none"> - Transmissibility is relatively high - Controllability using conventional public health approaches is relatively low because of low visibility of infection or short incubation period - If clinical severity is high or if pursuing an elimination strategy, then it is justifiable to invest more effort in high sensitivity of contact tracing even at the expense of low specificity 		
Other relevant features influencing future use	<ul style="list-style-type: none"> - Alignment with pandemic characteristics and response strategy - Capacity of the health sector to implement - Likely to remain important for well-circumscribed outbreaks within wider pandemics 	<ul style="list-style-type: none"> - There must be sufficient social license to implement the tool - A sufficient proportion of the population needs to be digitally included with a response for those who are not - Support from public health officials is needed - Likely to become more effective as rapid point-of-care diagnostics and digital health surveillance tools improve - The self-service survey method could be introduced for selected non-pandemic infectious diseases following careful design and evaluation with patients, communities and system operators 		