



**Health
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An tÚdarás Um Fhaisnéis
agus Cáilíocht Sláinte

Advice to the National Public Health Emergency Team:

Rapid antigen testing for screening or surveillance of asymptomatic individuals to limit transmission of SARS-CoV-2

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About the Health Information and Quality Authority

The Health Information and Quality Authority (HIQA) is an independent statutory authority established to promote safety and quality in the provision of health and social care services for the benefit of the health and welfare of the public.

HIQA's mandate to date extends across a wide range of public, private and voluntary sector services. Reporting to the Minister for Health and engaging with the Minister for Children, Equality, Disability, Integration and Youth, HIQA has responsibility for the following:

- **Setting standards for health and social care services** — Developing person-centred standards and guidance, based on evidence and international best practice, for health and social care services in Ireland.
- **Regulating social care services** — The Chief Inspector within HIQA is responsible for registering and inspecting residential services for older people and people with a disability, and children's special care units.
- **Regulating health services** — Regulating medical exposure to ionising radiation.
- **Monitoring services** — Monitoring the safety and quality of health services and children's social services, and investigating as necessary serious concerns about the health and welfare of people who use these services.
- **Health technology assessment** — Evaluating the clinical and cost-effectiveness of health programmes, policies, medicines, medical equipment, diagnostic and surgical techniques, health promotion and protection activities, and providing advice to enable the best use of resources and the best outcomes for people who use our health service.
- **Health information** — Advising on the efficient and secure collection and sharing of health information, setting standards, evaluating information resources and publishing information on the delivery and performance of Ireland's health and social care services.
- **National Care Experience Programme** — Carrying out national service-user experience surveys across a range of health services, in conjunction with the Department of Health and the HSE.

Foreword

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a highly infectious virus which has caused hundreds of millions of cases of COVID-19 since its emergence in 2019, with a considerable level of associated mortality. Despite the high uptake rates of the COVID-19 vaccine in Ireland to-date, SARS-CoV-2 remains a significant public health concern due to its high basic reproduction rate, the limited evidence of effective treatment approaches, and emerging variants of concern.

The National Public Health Emergency Team (NPHEM) oversees and provides national direction, guidance, support and expert advice on the development and implementation of strategies to contain COVID-19 in Ireland. Since March 2020, HIQA's COVID-19 Evidence Synthesis Team has provided research evidence to support the work of NPHEM and associated groups and inform the development of national public health guidance. The COVID-19 Evidence Synthesis Team which is drawn from the Health Technology Assessment Directorate in HIQA, conducts evidence synthesis incorporating the scientific literature, international public health recommendations, and existing data sources as appropriate.

From September 2020, as part of the move towards a sustainable response to the public health emergency, HIQA provides evidence based advice in response to requests from NPHEM. The advice provided to NPHEM is informed by research evidence developed by HIQA's COVID-19 Evidence Synthesis Team and with expert input from HIQA's COVID-19 Expert Advisory Group (EAG). Topics for consideration are outlined and prioritised by NPHEM. This process helps to ensure rapid access to the best available evidence relevant to the SARS-CoV-2 outbreak to inform decision-making at each stage of the pandemic.

The purpose of this report is to outline the advice provided to NPHEM by HIQA, with consideration of the scientific literature, international public policy and input from the COVID-19 EAG regarding the policy question: "What is the emerging evidence with regard to the effectiveness of rapid antigen testing of asymptomatic populations, to limit the spread of SARS-CoV-2" The advice also reflects the findings of a discussion with the HIQA COVID-19 EAG considering key issues relating to the policy question.

HIQA would like to thank its COVID-19 Evidence Synthesis Team, the members of the COVID-19 EAG and all who contributed to the preparation of this report.

A handwritten signature in black ink, appearing to read 'M. G.', is located at the bottom left of the page.

Dr Máirín Ryan

Deputy CEO & Director of Health Technology Assessment

Health Information and Quality Authority

Acknowledgements

HIQA would like to thank all of the individuals and organisations who provided their time, advice and information in support of this health technology assessment. Particular thanks are due to the Expert Advisory Group (EAG).

Membership of the Expert Advisory Group involves review of evidence synthesis documents and contribution to a discussion which informs the advice from HIQA to NPHEt. It does not necessarily imply agreement with all aspects of the evidence synthesis or the subsequent advice.

The membership of the EAG was as follows:

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The advice is developed by the HIQA Evidence Synthesis Team with support from the Expert Advisory Group. Not all members of the Expert Advisory Group and Evidence Synthesis Team are involved in the response to each research question. The findings set out in the advice represent the interpretation by HIQA of the available evidence and do not necessarily reflect the opinion of all members of the Expert Advisory Group.

Conflicts of Interest

Professor Mallon has stated that his institution, University College Dublin, has received funding from Abbott Diagnostics for research into COVID-19 diagnostic antibody testing. Professor Mallon is the lead author on an open-access peer-reviewed publication based on this research (published March 26th 2021; <https://doi.org/10.1093/ofid/ofab122>).

No other potential conflicts of interest were declared by members of the Expert Advisory Group.

Advice to the National Public Health Advisory Team

The purpose of this evidence synthesis is to provide advice to the National Public Health Emergency Team (NPHEM) on the following policy question:

“What is the emerging evidence with regard to the effectiveness of rapid antigen testing of asymptomatic populations, to limit the spread of SARS-CoV-2?”

The following research questions (RQs) were developed to address this policy question:

- RQ1: What are the key technical characteristics of SARS-CoV-2 rapid antigen detection tests, in relation to their use for screening or surveillance in asymptomatic populations?
- RQ2: What is the evidence that SARS-CoV-2 rapid antigen testing for screening or surveillance of asymptomatic people, reduces onward transmission?

The key points of this evidence synthesis, which informed HIQA's advice, are as follows:

Overview of rapid antigen detection tests

- Rapid antigen detection tests (RADTs) refer collectively to both:
 - near-patient (or point-of-care) antigen tests administered in healthcare or other settings by an experienced trained professional
 - self-tests administered by a lay person, typically at home.
- This evidence summary specifically considers screening or surveillance of asymptomatic populations with RADTs to identify individuals infected with SARS-CoV-2. Use of RADTs was considered as an alternative to no-testing, rather than as an alternative to a RT-PCR test.
- Screening or surveillance (with high frequency testing) using RADTs offers the potential for rapid identification of infectious cases of COVID-19 to enable prompt isolation and interruption of onward transmission.
 - Screening tests are intended to identify occurrence of SARS-CoV-2 infection at the individual level even if there is no reason to suspect infection, for example, where there is no known exposure.

- Surveillance testing is used to gain information at a population level; it usually involves testing a representative group of the population as opposed to all individuals.

Regulatory status

- An increasing number of SARS-CoV-2 RADTs have been affixed with a CE (Conformité Européenne) mark and made available on the EU market since the beginning of the pandemic. Involvement of an external Notified Body is required for self-tests, while those intended for use by professionals are CE-marked on the basis of manufacturers' self-assessment only.
- To date, almost all RADTs have been CE-marked as point-of-care tests for use in symptomatic individuals (within a certain timeframe from symptom onset) by professionals, with only a small number of tests authorised for use as self-tests. It is unclear how many self-tests, if any, are intended for use in asymptomatic individuals.

Investment

- As RADTs are portable and do not require laboratory analysis, they could facilitate decentralised testing at scale for screening or surveillance purposes. While the estimated cost of a professionally administered RADT is considerably lower than that of an RT-PCR test, successful deployment of RADTs at scale, would still incur a significant total cost.
- In the context of a professionally conducted or supervised testing programme using RADTs, guidelines highlight the following resource requirements:
 - a designated area for the provision of testing including suitable facilities for sample collection, test performance, instrument storage, safe disposal of clinical waste and appropriate storage of consumables
 - personnel to conduct/supervise sample collection, process tests and store results
 - training and certification to cover all stages of the testing pathway
 - quality assurance systems to monitor the end-to-end testing process.
- In the case of a self-testing programme using RADTs, resources required include:
 - training for lay persons to improve the quality of sample collection and interpretation of test results.

- appropriate mechanisms for reporting test results.

Diagnostic test accuracy

- Three systematic reviews of the diagnostic test accuracy of RADTs compared with RT-PCR were identified. The reviews broadly found that test:
 - sensitivity was higher in symptomatic individuals (ranging from 64%-84%) than in asymptomatic individuals (40%-74%)
 - specificity was high in both symptomatic and asymptomatic individuals (approximately 99%)
 - sensitivity was highest (ranging from 94%-96%) for cycle threshold (C_t) values on RT-PCR ≤ 25 (which can be considered to reflect a high viral load) compared with C_t values > 25 (sensitivity 40%-50%).
- One systematic review of diagnostic test accuracy of RADTs and RT-PCR compared with viral culture (as a proxy for infectiousness) was identified. The pooled sensitivity was estimated to be 90% (95% CI 84% to 94%) for RADTs and 99% (95% CI 96% to 100%) for RT-PCR. Specificity was not estimated in this review.
- These data presented therefore suggest that RADT can reliably detect those most likely to be infectious. While C_t values provide an indication of potential infectivity, it is important to note that they only reflect viral load at the time of sampling and that there is no accepted cut-off of C_t values to eliminate transmissibility. In this context, the timing of the test is important: while a high C_t value late in the disease course may reflect detection of non-viable virus and individuals who are no longer infectious, those tested shortly after exposure are at the start of their infection and will subsequently become infectious. Identification of the latter is important to facilitate prompt isolation in order to break the chains of onward transmission.
 - From a public health perspective, identification of those that are no longer infectious is also still important as it allows contact tracing to be initiated to identify other potentially infectious individuals.
- To interpret the sensitivity and specificity of RADTs relative to RT-PCR, it is important to consider the context in which the test is being deployed, in particular the performance of the test in the target population and the prevalence of disease. For example, if an individual tests:

- *positive* for COVID-19 in a low prevalence (for example, 0.5%) setting, it is highly uncertain that an individual *is* infected (due to the low positive predictive value of the test, that is the numbers of false positives will be significantly higher than numbers of true positives); in these situations confirmatory RT-PCR testing has been recommended for positive test results to verify the presence of disease (or frequent serial testing using RADTs in certain settings)
- *negative* for COVID-19 in a high prevalence (for example, 10%) setting, it is more uncertain that an individual is *not* infected (due to the reduced negative predictive value of the test); in these situations, confirmatory RT-PCR testing has been recommended for negative test results.
- The performance of RADTs can be affected by a range of other factors, including the timing of the test; the concentration of virus in the specimen; the quality and processing of the specimen collected; the precise formulation of the reagents in the test kits; and compliance with manufacturers' instructions for use. Performance of different RADTs varies and these tests should not be regarded as interchangeable. There is also evidence of batch-to-batch variation, and additionally performance can differ by variant of concern.

International guidance

- The European Centre for Disease Prevention and Control (ECDC) advises that RADTs may be of benefit in screening asymptomatic individuals in high prevalence settings (>10%), where RT-PCR capacity is limited, to control transmission in local communities or in specific settings. In a high-risk indoor occupational setting, the ECDC advises that RADTs (including self-tests), could be used to screen employees at or before arriving to the workplace, and as part of local public health prevention and control programmes.
- The United States (US) Centers for Disease Control and Prevention (CDC) reports value in conducting screening (including serial testing) with RADTs, where turnaround time is critical in identifying people with COVID-19, for example in high-risk congregate housing settings.

Ethical considerations

- There are a number of ethical considerations in relation to the use of RADTs for screening or surveillance of asymptomatic people. These include:

- the use of less accurate tests with implications for false negative (such as providing false reassurances) and false positive test results (such as unnecessarily self-isolating)
 - the impact of existing health inequalities on uptake and participation in such testing programmes
 - whether the resources required and opportunity cost are justified
 - autonomy over healthcare decisions and reporting obligations for a notifiable disease in the case of self-testing
 - what viable alternatives to testing are available
 - the risk of severe disease in the population/setting.
- A sound ethical framework, involving stakeholder engagement, may be required to enable systematic and principled decision-making with regard to screening or surveillance of asymptomatic people for COVID-19.

Effectiveness of rapid antigen testing

- Sixteen relevant studies were identified that provided evidence regarding the effectiveness of RADTs for screening of asymptomatic individuals to limit transmission of SARS-CoV-2. Eight examined the effectiveness of RADTs for mass testing, four for pre-event screening and four for serial testing in different settings (high school students, prison inmates and staff, students and staff of a university sports programme, and staff in care homes).
- No included study examined the effectiveness of RADTs for surveillance purposes, or for screening for travel-related activities or in workplaces (with the exception of those involving staff identified above).
- All included studies evaluated the use of RADTs in the context of background public health restrictions (for example, national lockdowns) or in conjunction with other public health measures (for example, face mask use).
- Overall, there is uncertainty regarding the effectiveness of rapid antigen testing for screening of asymptomatic individuals to limit the transmission of SARS-CoV-2. This uncertainty is due to the relatively low number of studies identified, the predominantly observational and/or uncontrolled study designs used, and concerns regarding the methodological quality of these studies.

- Screening programmes were found to be resource-intensive and costly. There is currently insufficient evidence as to whether the use of RADTs for screening of asymptomatic individuals represent a good use of resources and value for money.
- While mass testing using RADTs in conjunction with public health restrictions might have some short-term effect at reducing SARS-CoV-2 transmission, it is likely that re-testing at regular intervals would be necessary to achieve any potential sustained effect.
- Though still limited, research is being conducted on the potential role of RADTs for pre-event screening, in conjunction with other public health measures, such as face mask use, social distancing and optimising ventilation.

Conclusions

- RADTs may have an important supplementary role in testing symptomatic individuals, close contacts and in outbreak situations, particularly in high prevalence settings where RT-PCR testing is constrained, and rapid results are needed.
- While RADTs can reliably detect those most likely to be infectious at the time of testing, transmission can still occur in those with high C_t values (low viral load) with no accepted cut-off of C_t values at which risk of transmission is eliminated.
- Based on the current evidence, there is uncertainty regarding the effectiveness of RADTs for screening asymptomatic individuals (who have no known or suspected exposure to SARS-CoV-2) to limit the transmission of SARS-CoV-2, with no evidence found regarding their use for surveillance purposes.
- The included studies were conducted in populations with limited vaccination uptake and before the emergence of the Delta variant, thus effectiveness may differ in settings where another variant of concern is dominant or where there are very high levels of vaccine uptake.
- There is uncertainty surrounding the clinical- and cost-effectiveness of RADT screening programmes at limiting the transmission of SARS-CoV-2. Any decision to introduce such screening should consider the feasibility, potential benefits and harms, ethical and social issues, regulatory aspects, and value for money of such screening relative to other available mitigation measures.

COVID-19 Expert Advisory Group

A meeting of the COVID-19 Expert Advisory Group (EAG) was convened for clinical and technical interpretation of the research evidence and the technology description on 11 August 2021. The following points were raised in respect of the review findings:

- The three different testing scenarios outlined in the evidence summary (diagnostic,¹ screening² and surveillance)³ were discussed. It was suggested that testing of close contacts and testing in the management of outbreaks could form a separate category, distinct from diagnostic testing, given that these involve testing in asymptomatic individuals with a known or suspected exposure to SARS-CoV-2. It was felt to be important to distinguish between testing symptomatic and asymptomatic individuals, even if there is known exposure to SARS-CoV-2 and hence a higher pre-test probability.⁴
- The absence of evidence for the use of RADTs for surveillance was noted. It was agreed that there was unlikely to be a particular role for their use in this regard. It was felt that screening rather than surveillance is where the use of RADTs in asymptomatic populations could provide potential benefit.
- It was suggested that the ability of RADTs to detect those that are most infectious underpins their potential role as a screening tool. It was suggested that it is the identification of contagious individuals in society that may be important for reducing onward transmission. It was stated that case detection differs from detection of infectiousness and this is where the two tests (RT-PCR and RADT) fundamentally differ.
- It was acknowledged that this is a polarised area (lab-based RT-PCR vs. RADT). It was noted that there are new molecular technologies that can be used, such as LAMP and near patient PCR, that are providing promising results with fast turnaround.
- There was a discussion on the appropriate comparators for RADT. The possible options considered were:

¹ Diagnostic testing is intended to identify infection at an individual level and is performed when a person has signs or symptoms consistent with COVID-19, or when an individual is asymptomatic but has recent known or suspected exposure to SARS-CoV-2

² Screening tests for SARS-CoV-2 are intended to identify occurrence of infection at the individual level even if there is no reason to suspect infection, for example, where there is no known exposure.

³ Surveillance testing is used to gain information at a population level rather than an individual level - and usually involves testing a representative group of the population as opposed to all individuals.

⁴ Pretest probability is the chance that the patient has the disease, estimated before the test result is known.

- RADT versus RT-PCR
 - RADT versus infectivity assays
 - RADT versus no testing
 - RADT plus public health measures versus public health measures alone
 - RADT without public health measures versus public health measures.
- While diagnostic test accuracy studies tend to use RT-PCR as the reference standard, it was argued that this may not be appropriate in the context of using RADTs to screen for infectiousness in asymptomatic populations, and that infectivity assays may be more appropriate. However, in terms of resource use, it was argued that RT-PCR may be a useful comparison as it illustrates the resources required and ethical issues relating to mass testing asymptomatic individuals, regardless of the test used. It was suggested that no-testing may be the most relevant comparator as currently in Ireland, unlike the UK for example, there are no mass screening programmes for asymptomatic populations. Another suggestion was that the comparison should be RADT in conjunction with usual public health measures versus the same public health measures without any RADT. Such comparisons could highlight the potential additional benefits from implementing RADTs on top of the usual public health measures. It was also suggested that the comparator might be screening with RADTs as an alternative to more restrictive measures, as some real world studies are trialling screening with RADTs as a way to replace other measures (for example, quarantining due to close contact in schools, face masks and physical distancing at concerts).
 - With regard to the use of RADTs to replace existing public health measures, it was felt that the current evidence summary finds no strong evidence to support this approach. Anecdotal evidence was provided of the impact of the Delta variant on viral load kinetics, with a big change in Ct values (from weakly positive to strongly positive) observed from one day to the next in some pre-symptomatic patients. It was suggested that RADTs may not have detected these individuals in time. In this context, it was felt that replacement of current public health measures with RADTs could potentially lead to a significantly increased risk of transmission at this time.
 - Poor adherence to serial testing using RADTs, as described in some of the included studies, was acknowledged as a particular issue. It was noted that there was a recent Irish publication on this topic. This questionnaire-based study by UCD Veterinary Hospital evaluated staff and students' satisfaction

with an RADT pilot programme and examined their reasons for participating, or not, in the programme.⁵ While participation was high among staff (75-90% on the two audited days), participation among students was low (average of 19%). The consequences of a positive test result (for example, inability to sit final examinations) was one of the main factors reported for the low participation rates among students.

- Some recent large superspreading events that occurred in Fieldlab pilot events in the Netherlands were discussed. These particular pilot events took place when the Delta variant was dominant. A negative antigen test was required for entry, but face mask and physical distancing measures were relaxed. In one of the festivals attended by over 20,000 individuals in Utrecht, at least 1,000 people are known to have become infected. In another event involving 650 attendees at a disco, at least 180 are known to have become infected. It was noted that the official Fieldlab reports for these events have not yet been published and so were not included in the evidence summary. In contrast, the earlier Fieldlab events, which favoured the use of pre-screening antigen tests have been published, highlighting the issues with potential publication bias where such studies are more likely to be published in the academic literature than those with negative findings.
- In light of high vaccination coverage in Ireland, it was suggested that routine testing of asymptomatic individuals should be scaled back, rather than expanded. It was argued that testing should not be viewed as a control measure of itself, but rather as part of a suite of public health measures. In the context of high vaccination coverage and continued face mask usage, it was felt that RADTs may not currently have a large role to play, but it was acknowledged that this may change if the epidemiological situation deteriorates in the future.
- While there was agreement that RT-PCR is the gold standard test for detection of SARS-CoV-2 and should not be replaced by any other test, it was suggested that use of RADTs may be better than no-testing in certain circumstances. The utility of RADT testing was agreed to be context-specific, and it was suggested that any decision to use RADTs for screening purposes should consider the following issues:
 - prevalence of SARS-CoV-2 infection in specific populations (and whether there are outbreaks involved)

⁵ [Barry, Gerald, et al. "Rapid antigen testing for SARS-CoV-2 infection in a university setting in Ireland: learning from a 6-week pilot study." medRxiv \(2021\).](#)

- proportion of the population that have adequate immunity
 - type and number of potential close contacts
 - public health measures in place
 - the potential adverse consequences (for example, the risk of severe COVID-19 in the population or setting involved)
 - ethical considerations.
- Preparedness was considered to be an important factor in terms of RADT screening programmes. While it may not currently be considered high priority to roll out a mass testing programme for asymptomatic individuals due to high vaccination coverage, it was suggested that preparing for such programmes may allow for a successful implementation later on if needed. Implementation and feasibility issues, as highlighted by the included studies, could be considered presently. The UK asymptomatic mass testing programme was cited as a good example of preparedness.
 - The regulatory status of RADTs was discussed by a representative of the Health Products Regulatory Authority (HPRA). It was stated that there is currently no control of supply for in-vitro diagnostic devices (IVDs) once they are CE-marked, though this may change under new Directives coming into force in 2022.⁶ It was clarified that there is currently no centralised database of CE-marked tests on the European market. Though there are plans for such a database (Eudamed) to be established under the new Directives, this will not be fully available for another two to three years. Although there are some lists that have attempted to collate all known RADTs on the EU market, these lists are not necessarily up-to-date or comprehensive, and information on their indications and the populations in which their use is intended (for example, symptomatic versus asymptomatic) is generally not reported. It was acknowledged that the availability of information on IVDs, including RADTs, has been less than satisfactory to-date, but this should improve under the new Directives.
 - Additional considerations were discussed including effectiveness of self-testing compared with professionally administered tests (as self-tests are generally

⁶ Health Products Regulatory Authority. Key aspects specific to the in-vitro Diagnostics Regulation (IVDR) Dublin, Ireland: HPRA
[http://www.hpra.ie/homepage/medical-devices/regulatory-information/new-eu-device-regulations/key-aspects-specific-of-\(in-vitro-diagnostics-regulation\)-ivdr](http://www.hpra.ie/homepage/medical-devices/regulatory-information/new-eu-device-regulations/key-aspects-specific-of-(in-vitro-diagnostics-regulation)-ivdr)

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found to have lower sensitivity than those that are professionally administered) and the opportunity costs (that is the diverting of staff and or resources) associated with RADT screening, which were viewed to be substantial. There was a call for economic evaluations to be conducted alongside mass testing programmes, given the uncertainty regarding the cost-effectiveness of such resource-intensive programmes.

Advice

Arising from the findings above, HIQA's advice to the National Public Health Emergency Team is as follows:

- Based on the current evidence, there is uncertainty regarding the effectiveness of RADTs for screening in asymptomatic individuals (who have no known or suspected exposure to SARS-CoV-2) to limit the transmission of SARS-CoV-2. This uncertainty is due to the relatively low number of studies identified, the predominantly observational and or uncontrolled study designs used, and concerns regarding the methodological quality of these studies. There are also significant resource, implementation, regulatory, ethical and social issues associated with using RADTs at scale in asymptomatic populations. No evidence was found regarding the use of RADTs for surveillance of asymptomatic individuals.
- Where RADTs are being considered for screening asymptomatic populations, these should be considered as an *additional* public health measure, rather than a *replacement* for known mitigation measures (such as face masks, vaccination and physical distancing). Given the low sensitivity of RADTs in asymptomatic populations coupled with the increased transmissibility of the Delta variant, a negative antigen test result in this population should not be viewed as a 'green light' to engage in activities that would otherwise be considered as high risk for transmission.
- In light of high vaccination coverage in Ireland, and the continued use of other public health measures, routine testing of asymptomatic individuals is unlikely to be beneficial at this time. Consideration could be given to the development of operational plans for routine RADT-based screening programmes to facilitate their rapid deployment should the epidemiological situation deteriorate to the extent that RADT-based screening may be beneficial. Strategic and operational planning for measures that could strengthen existing systems would be consistent with the pandemic preparedness planning cycle.
- Screening asymptomatic populations using RADTs could potentially be useful in limiting transmission in certain circumstances. Any such decision to use RADTs should consider the following factors:
 - Prevalence of SARS-CoV-2 infection in specific populations (for example, RADTs have a higher positive predictive value in high prevalence settings).

- Proportion of the population that have adequate immunity (for example, screening in populations that have high vaccination uptake or high rates of previous infection may be less beneficial).
 - Type and number of close contacts (for example, identifying infectious individuals may be beneficial in situations where people cannot avoid close contact with each other).
 - Public health measures in place (for example, RADTs may be useful in situations where other public health measures may be insufficient to limit the transmission of SARS-CoV-2).
 - The vulnerability of the population involved (for example, the consequences of missing infectious cases may differ substantially depending on the risk of severe COVID-19 in the population or setting involved).
 - The modality of test delivery (for example, test sensitivity is typically lower in self-testing scenarios).
 - Resource implications (for example, if adoption of screening will divert resources from other services).
 - Ethical considerations (for example, the implications for false negative and false positive test results).
- Given uncertainty surrounding the clinical- and cost-effectiveness of RADT-based screening programmes in asymptomatic individuals to limit the transmission of SARS-CoV-2, more real-world research evidence including economic evaluation is required to inform public policy on the widespread use of RADTs in asymptomatic individuals.

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