Health Information and Quality Authority

An tÚdarás Um Fhaisnéis agus Cáilíocht Sláinte

Advice to the National Public Health Emergency Team: What activities or settings are associated with a higher risk of SARS-CoV-2 transmission?

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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 and Youth Affairs, 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

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a highly infectious virus which has caused tens of millions of cases of COVID-19 since its emergence in 2019, with a considerable level of associated mortality. In the context of the ongoing COVID-19 pandemic, SARS-CoV-2 constitutes a significant public health concern due to its high basic reproduction rate, the uncertainty regarding cross-protection from other coronaviruses and development of long-term immunity in those infected, and the current lack of an effective vaccination or treatment approaches.

The National Public Health Emergency Team (NPHET) 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 NPHET 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 NPHET. The advice provided to NPHET 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 NPHET. 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 NPHET by HIQA, with consideration of the scientific literature and input from the COVID-19 EAG, regarding activities or settings associated with a higher risk of SARS-CoV-2 transmission.

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.

Dr Máirín Ryan

Deputy CEO & Director of Health Technology Assessment

Health Information and Quality Authority

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Particular thanks are due to the Expert Advisory Group (EAG) and the individuals within the organisations listed below who provided advice and information.

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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

None declared.

Advice to the National Public Health Emergency Team

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

> *"Emerging evidence in relation to what constitutes higher risk areas, activities or workplaces in regard to transmission of COVID-19."*

The following research question was formulated to inform this policy issue:

> *"What activities or settings are associated with a higher risk of SARS-CoV-2 transmission?"*

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

- There is consistent evidence that SARS-CoV-2 clusters predominate in household settings, and that they are associated with a higher estimated secondary attack rate (SAR) (18.1% (95% confidence interval (CI), 15.7%-20.6%)) compared with other settings (for example, estimated SAR in healthcare settings is <1%). The SAR for SARS-CoV-2 is high compared with other pandemic respiratory viruses.
- Other activities or settings where large numbers of clusters have been consistently observed include nursing homes, hospitals, meat and food processing plants, large shared accommodation, sporting activities, bars, nightclubs and restaurants, gyms, offices, shopping centres, cruise ships, weddings, shopping malls, prisons, mines and religious settings. Many of these settings and activities have been associated with superspreading events (SSEs) and have seeded large numbers of cases.
    - SSEs are defined as events that result in the transmission of infection to a larger number of individuals than is usual.
- The main factors found to contribute to transmission risk include: indoor environments, crowds, and prolonged and intense contact with others. Other important factors may include the level of ventilation, speaking volume, insufficient use of face coverings, along with the viral load of the index case. In particular, activities involving dining, drinking, exercising, singing or shouting, prolonged face-to-face conversation, especially in indoor crowded environments, were associated with an increased risk of transmission in several studies. A range of effective infection prevention and control (IPC) measures may mitigate some of the transmission risk associated with these settings and activities.
- Specifically in relation to occupational settings, additional factors found to be associated with an increased risk of transmission include: working despite

symptoms ('presenteeism'); higher proportions of individuals from lower socio-economic groups, ethnic minorities and those with migrant status; lack of access to hand-washing facilities; inadequate or inappropriate use of personal protective equipment (PPE); exposure to multiple clients; face-to-face contact; congregation; shared accommodation and transportation; and exposure to fomites (such as tools).

- While there is consistent evidence that the risk of transmission is substantially lower in outdoor settings, clusters in outdoor environments have been observed, particularly when there are large gatherings, limited social distancing, dense congregation, and mixing among groups.
- A retrospective cohort study included in this evidence summary estimated that 19% (95% confidence interval, 15-24%) of COVID-19 cases seeded 80% of all local transmission, while 69% of cases did not transmit to anyone. The transmission pattern of SARS-CoV-2 appears to be highly overdispersed, with a small proportion of cases potentially seeding the majority of local transmission.
- A number of limitations need to be considered when interpreting the findings of this evidence summary. Recall and reporting biases are particular issues in relation to the investigation and reporting of SARS-CoV-2 clusters. Hence, clusters may have been over-reported in certain settings, and under-reported in others. The findings are also time-sensitive; as time progresses, a different picture of where clusters occur may emerge, particularly given the wide scale adoption of testing and infection, prevention and control measures in settings previously identified to be high risk.
- Ongoing, robust surveillance and contact tracing (including retrospective contact tracing or source finding) across settings is critical to identify how, where, and when clusters occur and to inform the most appropriate policy measures to control the spread of SARS-CoV-2, especially in the potential presence of overdispersion as observed with this virus.

A meeting of the COVID-19 EAG was convened for clinical and technical interpretation of the research evidence on 3 November 2020. The following points were raised in respect of the review findings:

- While there will always be a risk, it is important that the public are aware that certain settings are associated with a lower level of risk and are typically safer, for example, being outdoors versus indoors. Equipping the public with knowledge on different levels of risk may help people to live better with COVID-19.
- There is a distinction between controlled and uncontrolled environments, supervised and unsupervised environments. The age groups involved are also an important factor; transmission appears to be lower in younger children. These have important implications for the risk of transmission given the substantial

difference in awareness of, adoption and adherence to effective public health measures in different settings. For example, schools are supervised, controlled environments whereas house parties are unsupervised, uncontrolled environments with the level of risk assumed to be significantly higher in the latter. When implementing factors to mitigate risk, the relative importance of the settings and activities to the individual and to society as a whole should be considered.

- Since the start of the pandemic, there has been widespread adoption of new controls by health and social care services and other supports to minimise the risk of transmission. There is concern that some very vulnerable populations have cut themselves off from services that are essential to their health and wellbeing, as they are not confident that they can safely use these services, and are fearful that they may become infected if they do. It is important to provide reassurance to these individuals that where appropriate controls are in place, these services are safe to use.
- Evidence of reduced transmission in outdoor and better ventilated settings highlights the importance of adequate ventilation as a means to mitigate risk in settings where higher densities and longer duration of contact cannot reasonably be avoided. Greater emphasis on the importance of ventilation, as part of a comprehensive range of measures may help to reduce the level of risk in different settings.
- It was noted that both in Ireland and internationally, the majority of clusters are reported in household settings, emphasising the high risk of transmission once infection gets into the home. There is some uncertainty as to where the index case is acquiring the infection, but it is noted that this may be impacted by the level of community transmission and the range of restrictive public health measures that are in place at the time. Understanding where people are acquiring the infection may help to prevent people bringing the infection into the household setting in the first place.
- Although schools, may potentially be viewed as high risk settings (due to high density, close proximity for prolonged durations, indoor setting etc.), it was noted that this is not reflected in the Irish data with relatively few clusters (2% of all reported clusters), consistently low test positivity rates and limited evidence of transmission occurring in the school setting. This highlights that transmission risks within school populations can be effectively mitigated with the implementation of proper protective measures.
- Households plays an important role in the transmission of SARS-CoV-2. Based on international literature, the estimated SAR in household settings is 18% (95% confidence interval (CI), 15.7%-20.6%). This compares with a SAR in healthcare settings of <1%. This highlights the need for a public health campaign to

educate people on the importance of self-isolation and infection prevention control measures in the home when cases occur. There may be important differences between households in terms of size, number of dependent individuals, and ability to separate within the home.

- Household settings tend to have smaller cluster sizes (often limited to immediate family) and may be largely non-modifiable. In many cases, transmission may have occurred pre-symptomatically before symptoms are recognised in the index case, and as such, interventions in these settings may have a limited effect.
- Effectively self-isolating (and restricting movements for household members) may be more challenging now compared to earlier in the pandemic, as support from volunteer organisations that was widely available during the initial lockdown (for shopping and medications) may not be as accessible now. The supports that are available to help individuals and households need to be clearly communicated.
- Of particular concern are household members who are in the extremely medically vulnerable group. These individuals are at a significantly higher risk of poorer outcomes should they become infected with SARS-CoV-2. These individuals need to be protected and any supports, such as alternative accommodation for the positive case, should be considered. Mandatory hospitalisation or segregation of COVID-19 cases was noted to have been used in some Asian countries to control spread.
- The timing of clusters reported in this evidence summary is important as they are likely strongly influenced by the level of community transmission and the range of public health measures (including compulsory closure orders) in place. As time progresses a different picture of where clusters occur may emerge, particularly given the wide scale adoption of testing and IPC measures in certain settings previously identified to be at higher risk.
- The relatively low certainty of the included data and the potentially limited relevance to the Irish setting were noted as limitations. The context is important for the interpretation of these data, in that the activities that occur in a specific setting in one country may be different to activities that occur in the same setting in Ireland.
- Information on superspreading events in the Irish context is currently lacking. Understanding of where index cases in household settings acquired the infection is also limited. Better Irish data on the source of infection and risk of transmission associated with different settings and activities would support public health education and awareness campaigns and further aid policy decisions.

Advice

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

- The transmission pattern of SARS-CoV-2 appears to be highly overdispersed with a small proportion of cases potentially seeding the majority of local transmission. Indoor, high occupancy, poorly ventilated environments, where there is shouting and singing, insufficient use of face coverings, and prolonged contact present the highest risk of SARS-CoV-2 transmission.
- To mitigate the additional risk of transmission, the required range and or intensity of public health measures may need to differ for activities and settings conducive to superspreading. These settings include, but are not limited to, health and social care settings, meat and food processing plants, cruise ships, prisons, shopping malls, religious settings, bars, nightclubs and restaurants, gyms, offices, weddings and large shared accommodation.
- Data regarding the types of settings where clusters have occurred are time-sensitive and potentially subject to under or over-reporting. As time progresses, a different picture may emerge of where clusters occur, particularly given the wide scale adoption of public health measures (testing and infection prevention and control (IPC) measures) in settings previously identified to be at high risk.
- Irish data regarding settings and activities associated with increased risk of SARS-CoV-2 transmission are required to better understand national risk and mitigation factors. Consideration should be given to undertaking retrospective (or backward) contact tracing, and well-designed case-control studies.
- As there is a higher relative risk of onward transmission in household settings, there is a clear rationale for the application of self-isolation guidelines within households. To facilitate better compliance, consideration should be given to the types of supports required for those unable to safely self-isolate at home. Specific supports to enable compliance with self-isolation and restriction of movement guidelines may also be required for those sharing households with individuals categorised as extremely medically vulnerable.
- When implementing public health measures to mitigate risk, the relative importance of the settings and activities to the individual and to society as a whole should be considered.

- Communication campaigns should focus on the:
  - characteristics of the settings and activities conducive to transmission
  - concept that there are different levels of risk
  - potential to mitigate risk using a range of effective infection prevention and control (IPC) measures
  - importance of adherence to guidelines for self-isolation and restriction of movements
  - availability of supports to enable people to adhere to self-isolation guidance.

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