

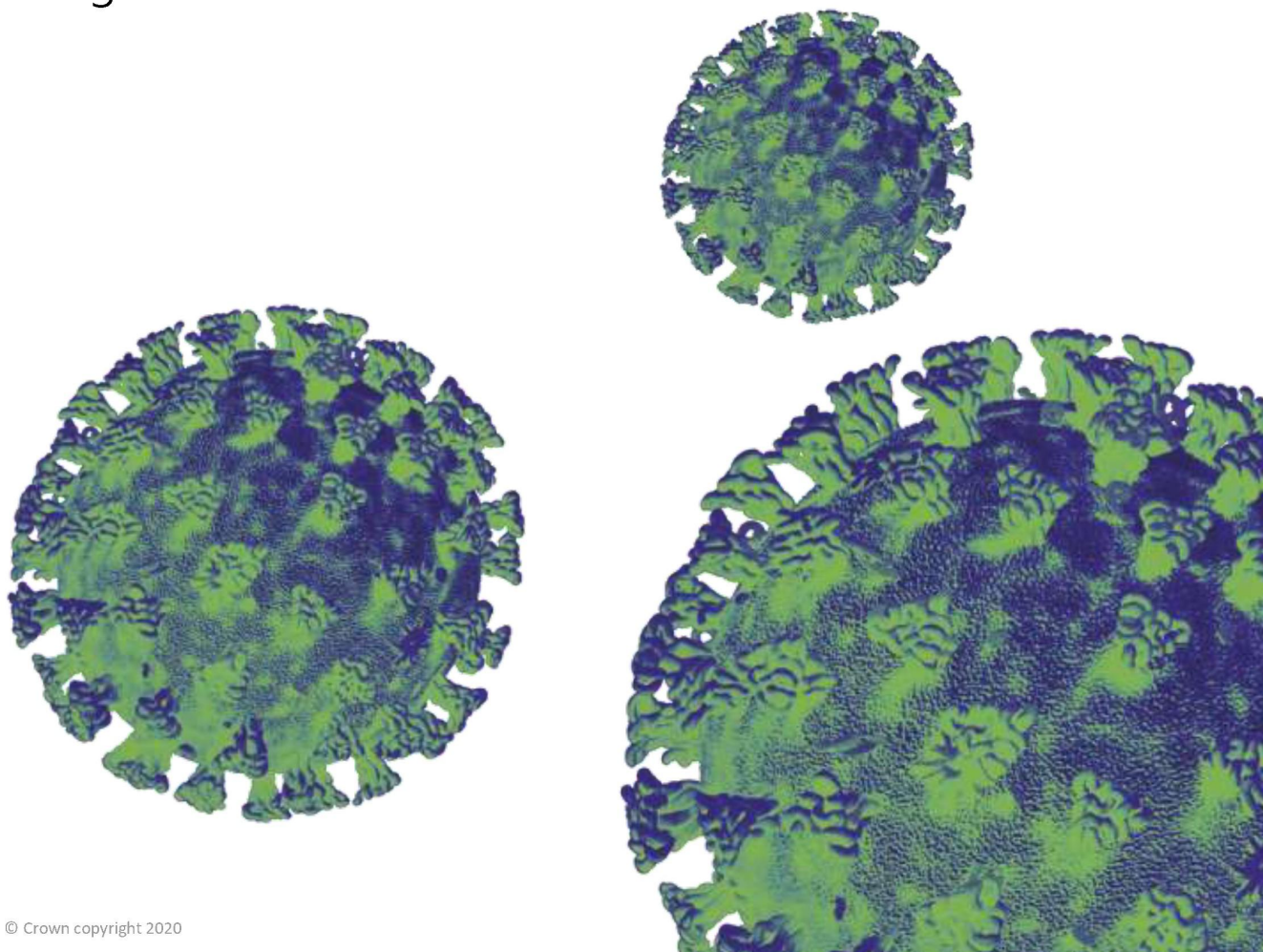


Llywodraeth Cymru
Welsh Government

Technical Advisory Group

Consensus statement on recommended
testing criteria for discharge of
asymptomatic patients to care homes

11 August 2020



Welsh Government COVID-19 Technical Advisory Group – Consensus statement on recommended testing criteria for discharge of asymptomatic patients to care homes

Situation

Currently a negative RT-PCR test for SARS-CoV-2 is required before a patient can be discharged from hospital to a care home. This paper examines, in the light of emerging knowledge of infectivity, whether an alternative testing strategy may be more appropriate.

Background

There is current Welsh Government guidance to recommend RT-PCR testing of all individuals being discharged from hospital to a step down or care home setting regardless of whether or not they were admitted to hospital with COVID-19 so that their COVID-19 status is known on discharge. As advised by Welsh Government policy people will not be admitted to a care home without a negative test.¹

Guidance also recommends that an individual is not showing any symptoms on transfer into a care home, they must continue to be cared for in isolation, with appropriate Infection Prevention and Control (IP&C) precautions in place for a period of 14 days from transfer into the care home / step down care setting. After this time they can return to normal care.

RT-PCR testing for COVID-19

COVID-19 is an acute viral infection of the respiratory tract that emerged in late 2019. The causative organism is the coronavirus SARS-CoV-2, which is an enveloped virus with an RNA based genome.

The main laboratory tools for the diagnosis of acute infection are molecular based technologies that target and amplify conserved genes in the viral genome, the most commonly used method is the reverse-transcription polymerase chain reaction (RT-PCR). This method is usually performed in a real-time manner, that is the reaction occurs in such a way that the product of the reaction can be monitored and detected as the test happens. This is normally seen as an amplification 'S shaped' curve that crosses a defined threshold to signal the result as positive. The point the curve crosses the threshold is commonly referred to as the Ct value (Cycle Threshold) and is expressed as a number relating to the cycle time of the reaction. Generally speaking, the lower the Ct number the higher the amount of target (viral RNA) in the original sample (viral load).

The RT-PCR is exquisitely sensitive, and is optimised to detect trace amounts of RNA, however the lower level of this 'analytical sensitivity' can be impacted by a number factors related to the biological dynamics of viral shedding in the host over time from infection, site of sample and sample quality.

In the context of identifying infectious virus, the RT-PCR cannot discriminate between RNA from non-viable virus and RNA from viable virus. The assays used in Wales are not quantitative and the report is binary (RNA 'Detected' or 'Not detected'). The Ct value as previously referred to, can give some indication of the viral load present in the sample. A rough guide would be a Ct value of 20 equates to a high viral load (larger amount of viral RNA) and a higher Ct value, such as 35, equates to low viral load.

In order to determine infectivity other more complex detection systems are required. Viral culture identifies viable virus and is the best correlate to infectivity; it too comes with limitations, not least of which is the requirement for permissive cells lines, the inoculation of viable virus (fresh samples) and the requirement for containment level 3 laboratory processing. On average the time for a positive viral culture in a permissive cell line is greater than 4 days.

Evidence for duration of infectivity

There is increasing evidence that supports the fact that viral shedding peaks in the first week of infection and then starts to rapidly decline.²³⁴ There does not appear to be a significant difference between viral shedding in different groups, i.e. asymptomatic, mildly symptomatic and severe infection, or in different ages or gender.⁵

There are two reports that have identified infectious virus 18-20 days after onset of symptoms,⁵⁶ but the median time for shedding of infectious virus is 8 days.

Much of the data available focuses on the relationship of the viral load and the correlation with infectivity. High viral load consistently correlates with the presence of infectious virus. The Ct values tend to rise more quickly in milder cases, suggesting more rapid falling of viral load.

The most comprehensive data comes from the 'Dynamics of Infectivity' presented to the Virology cell on 4th of June 16:00 – 17:30, which provides a comprehensive summary of data available at that time² and the Erasmus paper – 'Shedding of infectious virus in hospitalised patients with coronavirus disease -2019 (Covid 19): duration and key determinants.'⁵

There is a strong relationship between Ct values and the ability to recover infectious virus (narrow confidence intervals). Viable virus was recovered more frequently from samples with low Ct value (<35) and in the first week after onset of symptoms. The presence of neutralising antibody also correlated with increasing Ct values (lower viral load). Infectious virus shedding drops to undetectable levels when viral RNA load is low and serum neutralising antibodies are present.

Assessment

There remains uncertainty around the period of infectivity for individuals infected with SARS-CoV-2. However, we have high confidence that in people who have been infected with SARS-CoV2, infectivity can be judged to be very low, if the Ct value is

high (>35), there is symptomatic improvement, antibodies are detected and the individual is greater than 14 days post symptom onset.

The risk of onward transmission should be accessed in the context of the additional risk of remaining in a 'high risk' setting, such as a hospital and an early discharge to a lower risk setting such as a nursing home.

Recommendations

The risk of onward transmission should be assessed in the context of the additional risk of remaining in a 'high risk' setting, such as a hospital and an early discharge to a lower risk setting such as a nursing home

Asymptomatic patients being discharged from hospital to a care home or other step down care can be assumed to be non-infectious if they have had COVID-19 during admission if:

- An RT-PCR test is negative or 'low positive' with a Ct value >35; **and**
- An antibody test taken >14 days after symptom onset is positive; **and**
- It is >14 days from COVID-19 symptom onset.

References

- ¹ Public Health Wales "Guidance to Prevent COVID-19 Among Care Home Residents and Manage Cases & Outbreaks in Residential Care Settings in Wales." Accessed at: <https://phw.nhs.wales/topics/latest-information-on-novel-coronavirus-covid-19/information-for-healthcare-workers-in-wales/prevention-and-management-of-infection-and-outbreaks-of-covid-19-in-residential-settings-in-wales-version-3-2/>
- ² Dynamics of Viral Infectivity. Prepared by Dr Cariad Evans and Professor Maria Zambon , Professor Wendt Barclay and Professor Julian Hiscox. National COVID19 Virology teleconference 4th June 2020.
- ³ A Rapid review of the Aymptomatc Proportion of PCR confirmed SARS – CoV -2 Infections in Community Settings. Sara Beale Andrew Hayward Laura Shallcross Robert W Aldridge Ellen Fragaszy. Discussed at NERVTAG FC – 23 -05
- ⁴ Virological assessment of Hospitalised patient with COVID 2019. Roman Wolfel et al. <https://doi.org/10.1038/s41586-020-2196-x> Published 01.04.2020
- ⁵ Jeroen J.A. van Kampen et al. Shedding of infectious virus in hospitalized patients with coronavirus disease-2019 (COVID-19): duration and key determinants. medRxiv preprint doi: <https://doi.org/10.1101/2020.06.08.20125310>
- ⁶ NERVTAG paper: J Lu et al Clinical, immunological and virological characterization of COVID-19 patients that 1 test re-positive for SARS-CoV-2 by RT-PCR. NERVTAG FC-27-Inf-01. Meeting date: 17th July 2020.