



# Covid-19: breaking the chain of household transmission

## We urgently need new measures to protect household contacts

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The UK is one of the countries most severely affected by covid-19. Recent outbreaks in English towns such as Oldham, probably involving transmission within large multigenerational households, show the importance of getting the right public health measures in place now to prevent more widespread surges in infections.<sup>1</sup>

Current test and trace policies have mainly focused on preventing spread in care homes, hospitals, and in the community.<sup>2</sup> However, contact within households is thought to be responsible for roughly 70% of SARS-CoV-2 transmission when widespread community control measures are in place.<sup>3</sup> In Wuhan, the reproduction number (R) dropped from 3.54 to 1.18 after lockdown and cordon sanitaire. But the epidemic was only brought under complete control when Fangcang (field) hospitals were introduced to isolate cases outside the home, with R dropping to 0.51 after two weeks.<sup>4</sup>

Current UK guidance advises household contacts to isolate within the same home as the index case for 14 days.<sup>5</sup> They make up the majority of contacts for infected individuals and are likely to remain exposed to the infected household member during this period of isolation.<sup>6</sup> Despite guidance advising household members to socially distance, contacts are likely to interact repeatedly—during mealtimes, for example—and to share facilities such as bathrooms.

We know that transmission is more likely to occur indoors than outdoors.<sup>7</sup> The cumulative risk to household contacts from an infected person is likely to be substantial during peak viral shedding. In one study in New York State, 38% of household contacts tested positive for SARS-Cov-2, and similar secondary infection rates have been reported in China.<sup>8,9</sup> Transmission may be even higher among household contacts of essential workers, who are at greater risk of being infected than the general population.<sup>10</sup>

Household members who are older, have underlying medical conditions, or share a bed or vehicle with the index case are the most susceptible.<sup>9,11,12</sup> Children seem to be at lower risk of being infected.<sup>13</sup> However, their stool samples and nasopharyngeal swabs can remain positive for SARS-CoV-2 for more than two weeks after symptom resolution,<sup>14</sup> although their role in transmission remains to be established.

Governments should consider new public health measures to prevent household transmission as we prepare for a potential second wave. Household quarantine is likely to remain an important pandemic control measure, and government support for people quarantined at home is conspicuously absent in the UK: this position has been challenged by independent experts.<sup>15</sup>

## Effective isolation

Effective isolation of index cases from household members could reduce secondary infections.<sup>12</sup> Wearing masks within quarantined households may help, particularly if used by the index case as soon as infection is suspected.<sup>16</sup> The World Health Organization recommends that infected people and unavoidable close contacts, particularly those in vulnerable groups, should wear medical masks, but Public Health England does not currently recommend this. Other measures that should be considered (and evaluated) include clear advice on enhanced personal hygiene; cleaning and disinfecting shared toilets and other common spaces, door handles, and touch points; and staggering mealtimes.

People who are unable to self-isolate safely at home could be accommodated in special isolation facilities such as hotels and hostels, an approach adopted by some other countries, including Italy, Finland, and Lithuania.<sup>17</sup> In China, field hospitals were created to manage and strictly isolate patients with mild-to-moderate covid-19.<sup>18</sup> Nightingale hospitals in the UK could be similarly repurposed to support isolation of infected people with mild-to-moderate disease. As medical and nursing care needs are mostly modest, the cost would be relatively low. However, such a system depends on access to rapid testing for anyone with symptoms or possible exposure so that infection can be confirmed and isolation started before transmission occurs. It would also require public trust that isolation in these facilities would be voluntary, safe, and supportive.

Important questions about household transmission remain. Research should be done to identify the determinants of household transmission and the optimal strategies for isolating cases and protecting household contacts. These strategies will be particularly important for those at higher risk of adverse outcomes, including ethnic minority communities, people in low income households, and those living in urban areas with overcrowded housing.

Until an effective vaccine is widely available, strategies to prevent household transmission and to support those in quarantine will be vital and should be a core part of any government's strategy. It is high time that the UK government amend its mantra of "test and trace" to "test, trace, isolate, and support."

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