

between symptom onset in a secondary case and that of its primary case) of 2.2 to 3.5 days for influenza A and 3.4 to 4.9 days for influenza B.³⁵ The relatively short incubation period and serial interval enables the virus to spread rapidly through communities, so mitigation measures such as isolation and transmission-based precautions should be instigated as soon as a case of suspected influenza is identified to minimise the risk of transmission to contacts.

Viral shedding has generally been considered to be a proxy for influenza infectiousness,³⁶⁻³⁸ peaking 1 to 3 days after symptom onset with most healthy volunteers clearing virus by day 6 to day 7.³⁴ However, a recent study of household influenza transmission found at most only a weak association between viral load in nose and throat swabs and infectivity, possibly due to the weak correlation between virus concentration in exhaled breath and nose and throat samples, or due to the intensity of household transmission so that even those with low viral loads are still capable of infecting those around them.³⁹ Pre-symptomatic shedding may occur in up to one-third of cases,⁴⁰⁻⁴³ and prolonged viral shedding has been reported in children,^{42,44,45} in patients hospitalised with severe influenza⁴⁶ and in immunocompromised patients,⁴⁷ in whom prolonged shedding may last weeks or even months.^{48,49} The transmission dynamics of influenza infections in residents of LTCFs have not been studied; age >65 years and the presence of major comorbidities were associated with prolonged shedding of virus and higher viral load in a prospective observational study of hospitalised influenza patients⁴⁶; these findings may raise the possibility of prolonged shedding in LTCF residents.

Transmission of influenza from healthcare workers (HCWs) to hospital patients, including those in geriatric facilities, has been well documented using epidemiological linkage, nucleotide sequence analysis and contact tracking data⁵⁰⁻⁵³ and case reports of outbreaks of influenza-like illness in care facilities indicate that staff can transmit the virus to residents.^{54,55} A systematic review comparing the incidence of influenza in HCWs with other workers not working in a healthcare setting and taking vaccination status into account, found estimated incidence rates (IRs) for all influenza infections (defined as a ≥ 4 -fold increase in antibody titre over the influenza season and including asymptomatic infections) of 18.7/100 population/season (95% CI 15.8 to 22.1) for unvaccinated HCWs and 6.5/100 population/season (95% CI 4.6 to 9.0) for vaccinated HCWs, both higher than the IRs in unvaccinated and vaccinated other workers (5.4/100 population/season [95% CI 3.0 to 9.8] and 1.2 [95% CI 0.9 to 1.7] respectively).⁵⁶ However, no difference was observed between IRs for symptomatic infection confirmed serologically in HCWs compared to other workers; this overall lack of consistency in findings between overall and symptomatic infections indicates the need for cautious interpretation. The observed variability might be explained by HCWs being at higher risk of asymptomatic or subclinical infection, indicating that HCWs may act as an infective pool to transmit influenza to frail elderly people. Furthermore, a study of HCWs in an acute hospital during a mild epidemic season, found that 23% had serological evidence of new influenza infection during the season, implying a potential transmission risk to patients as between 28% and 59% of infected workers had subclinical infections and continued to work.⁵⁷ Although the role of

asymptomatic people and those with only mild symptoms in spreading influenza is uncertain, HCWs often continue to work despite having symptoms and may act as a source of infection to those in their care.⁵⁸⁻⁶⁰ Nursing home aides in particular have been shown in one Swedish study to be the occupational group at significantly greatest risk of continuing to work despite the feeling that, in the light of their perceived state of health, they should have taken sick leave.⁶¹ However, in reality the employment status of many LTCF staff is often precarious and taking unpaid sick leave may result in adverse economic consequences.

4 | ROUTINE AND PRE-OUTBREAK PREVENTION MEASURES

4.1 | Planning, training and education

LTCFs have a broad staff base and may include people with little or no formal healthcare training. Depending upon the type of facility and the nursing needs of the residents, services are provided by a range of staff including care assistants with few formal healthcare qualifications, registered nurses, domestic staff, catering and administrative staff, with additional ambulatory health services usually provided by external contractors such as general practitioners (GPs) and other healthcare professionals not directly affiliated to the facility. Managers of LTCFs have an important role in ensuring that all staff have ongoing training on the importance and practice of IPC, and that the facilities are available for IPC measures to be implemented to a satisfactory level and with standard precautions being used at all times, regardless of the detection of a suspected outbreak. Written policies should be in place in every LTCF outlining: resident and staff influenza immunisation policy; a written outbreak management plan which includes outbreak recognition (definitions, thresholds for suspicion of an outbreak), identification of communication channels, operational measures including active surveillance, staff contingency plans, visitor restriction policies, and consideration of antiviral treatment and prophylaxis strategy; a policy for ill staff to remain off work; a policy for dealing with visitors with symptoms of an acute respiratory tract infection.

During the Severe Acute Respiratory Syndrome outbreak, compliance with IPC measures was found to be associated with HCWs' perception that the facilities in which they worked had clear IPC policies and protocols, and that the management had a positive attitude towards occupational health and safety and provided training in IPC practices.⁶² Managers in LTCFs therefore have a pivotal role in creating a strong institutional climate in which staff feel valued, with continuous accessibility to the training resources, clear IPC policies and supplies and facilities required to promote compliance with IPC practices.

4.2 | Vaccination of LTCF residents

A WHO strategy and action plan for healthy ageing in Europe 2012-2020 recognised the benefit of proper vaccination strategies against infectious diseases, including influenza, both in older people and for health and social care workers in contact with them, and proposed