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# Pandemic preparedness and the role of infection prevention and control – how do we learn?

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In the past year, infection prevention and control (IPC) services globally have faced unique epidemiological, operational, behavioural and policy challenges in preventing COVID-19 transmission in health and social care settings. IPC teams have been stretched beyond capacity to meet these challenges and we need to identify learning that ensures the pivotal role of IPC in pandemic planning.

In our “normal” IPC world there is a focus on improving IPC practice to prevent healthcare-associated infection (HAI) and combat antimicrobial resistance (AMR), with little focus on pandemic planning. Globally, the core components of an IPC programme are described by the World Health Organisation (WHO; 2016)

- (a) IPC programme (dedicated team to support best practice);
- (b) Evidence-based guidelines;
- (c) Education and training;
- (d) Surveillance (guiding IPC practice and detection of outbreaks);
- (e) Multimodal strategies (used to improve practice and reduce HAI and AMR);
- (f) Monitoring, audit and feedback;
- (g) Workload, staffing and bed occupancy;
- (h) Built environment, material and equipment.

Whilst pandemics of infectious disease are unusual events, the role of IPC in their management and control is critical because IPC expertise is required to advise on preventing transmission within the healthcare setting, create and revise policy and procedures to respond to the situation as it develops, deliver staff training and supporting decision making across all levels of the organisation in order to minimise the risk of infection to staff and patients (NHSE, 2017) The absence of pandemic planning within the frameworks that shape IPC services and activity jeopardises an effective response in meeting the threat posed by a novel pandemic such as COVID-19.

Pandemics are associated with uncertainty in relation to both the biology of the viral agent and its epidemiology (MacPhail, 2010). Whilst some elements of planning can

be derived from knowledge of previous pandemics, important elements are both uncertain and unpredictable, and planning needs to account for a range of outcomes (Holmberg and Lundgren, 2018). This includes identifying and protecting vulnerable groups at increased risk for medical complications or disproportionate impact (Hutchins et al, 2009). In a healthcare setting, this presents considerable challenges given that a significant proportion of patients are likely to be classified as vulnerable, but protecting them from infection needs to be balanced against the morbidity associated with their underlying disease and assuring essential services are sustained during outbreaks (Health Foundation, 2020).

High-level pandemic plans are focussed on communication and information, maintaining National Health Service (NHS) services for treatment and care of patients with influenza, maintaining “business as usual” services and protecting the health and safety of staff. Plans are highly focussed on the management of cases and formulated around five stages: detection, assessment, treatment, escalation and recovery (NHSE, 2017). Plans are based on an assumption that up to 50% of the population would be affected and 2.5% of those with symptoms would die; a combination of higher attack rate or proportion of cases with severe disease was considered unlikely (NHSE, 2017). In addition, since pandemic planning in the United Kingdom (UK) has been focussed on influenza, the ability to moderate the impact of spread through seasonal flu vaccination is a key component of pandemic preparation and management.

The law requires NHS Trusts to prepare for emergencies, including having a specific plan for pandemic influenza (Civil Contingencies Act 2004). The objectives of

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these plans are focussed on reducing morbidity and mortality from influenza; coping with large numbers of ill patients and increased demand for specialist beds; and managing the effects of staff illness on the workforce and ensuring essential services are maintained. Specific planning for the potential impact on IPC services is directed at the implementation of usual policies and procedures for transmission-based precautions. The pandemic influenza plans in place 12 months ago paid minimal attention to procedures for segregating patients suspected or known to have the infection, planning discharge of potential infectious patients to high-risk settings such as residential care, or systems for detecting and managing transmission within healthcare settings.

Whilst the routes of transmission of SARS-CoV-2 are similar to influenza, its unique features created a perfect storm of unpredicted impacts, including significant demands for creating cohorted areas to segregate patients, transmission between healthcare workers (HCW) and patients (DELVE, 2020), HCW anxiety and response to changing guidance (Houghton et al, 2020), demand for personal protective equipment (PPE) across all services, a focus on protecting HCW rather than minimising HCAI (Public Health England, 2020) and limited availability of fundamental public health interventions including testing, contact tracing and vaccination. Conventionally, pandemic plans do not consider the implications of these challenges, and the subsequent demands on IPC resource of advising the Incident Command System (ICS), managing in-hospital outbreaks of infection and responding to policy and training demands in a rapidly evolving situation.

Evaluations of the efficacy of pandemic planning have identified deficits in scalability, estates and procurement, pressure on specialist services (emergency department, intensive care), workforce fear and sickness/absence (Dewar et al, 2014; Reidy et al, 2015) These studies have not investigated the extent to which pandemic plans address managing the risks of healthcare-associated transmission or the impact on IPC resource.

The COVID-19 pandemic has exposed the lack of systems in place to enable hospitals to respond effectively and efficiently to a pandemic. Operation Cygnus, the recent pandemic response exercise conducted in 2016 to test the UK response to influenza predicted some of these systems issues (Public Health England 2017) It identified that “the UK’s preparedness and response, in terms of its plans, policies and capability, is currently not sufficient to cope with the extreme demands of a severe pandemic”. Particular concerns were raised about surge capacity and the ability of social care services to cope with movement of patients from hospitals into social care facilities, and that many organisations had missing or out-of-date plans. It highlighted the lack of staff training and the reliance on a diminishing organisational memory of the H1N1 pandemic in 2009. However, this exercise did not consider IPC in any

detail and did not identify the critical IPC challenges that emerged during the first wave of COVID-19, such as acute shortages of PPE, transmission between patients and staff in hospitals and the transfer of infection from hospital to care homes.

Healthcare-associated transmission of MERS-CoV and SARS-CoV was reported in previous epidemics of related viruses, with some reports suggesting up to 80% of patients and 40% of HCW cases were acquired in hospital (Hui et al, 2018; de Wit et al, 2016). In the context of COVID-19 in the UK, concerns about availability of protective equipment and uncertainty about virus transmission focussed concern on the risk of staff acquiring the virus. A study by the International Severe Acute Respiratory and Emerging Infection Consortium (ISARIC) Coronavirus Clinical Characterisation Consortium examined how much hospitals have contributed to spread of the disease and reported that, overall, 10.6% of cases were acquired in hospital (Read et al, 2020). The proportion of nosocomial-acquired COVID-19 infection varies widely between hospitals, and reasons for this variation require further investigation.

The European Centre for Disease Prevention and Control (ECDC) recognised the impact that COVID-19 was likely to have on acute healthcare services, and recommended early in the course of the pandemic that hospitals set up a core team, including hospital management, an infection control team member, an infectious disease expert and specialists representing the intensive care unit and accident and emergency departments (ECDC, 2020). In the UK, although Public Health England (PHE) and devolved governments published guidance on IPC in relation to COVID-19, this was not accompanied by advice or guidance on establishing robust IPC systems to manage the pandemic. The task of translating IPC guidance into a trained workforce, with appropriate PPE and robust systems for identifying and managing patients with COVID-19 infection and protecting those vulnerable to infection, is highly complex and has challenged the capability and experience of many IPC teams in the UK and globally. In order to learn critical lessons for IPC services and build more effective and resilient IPC plans for future pandemics, we need to focus on the interface between the wider healthcare system and IPC, and make IPC operationalisation a core element of pandemic planning.

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