1 **Title page**

2 **CHALLENGES OF INFECTION PREVENTION AND CONTROL IN SCOTTISH LONG-**
3 **TERM CARE FACILITIES**

4 **Abbreviated Title:** Challenges of infection control in care homes

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18 **Body Text**

19 Residents living in long-term care facilities (LTCFs) are at high risk of contracting
20 healthcare-associated infections (HAIs). The unique operational and cultural
21 characteristics of LTCFs and the currently evolving models of healthcare delivery in
22 Scotland create great challenges for infection prevention and control (IPC). Existing
23 literature that discusses the challenges of infection control in LTCFs focuses on
24 operational factors within a facility and have not explored the challenges associated with
25 higher levels of management and the lack of evidence to support IPC practices in this
26 setting.[1-7] This work aims to provide a broader view of challenges faced by LTCFs in the
27 context of the current health and social care models in Scotland. Many of the challenges
28 are also faced in the rest of the UK and internationally.

29 The mismatch between demand and funding for health and social care provided in
30 Scottish LTCFs, which is also confronted in other parts of the UK, is likely to negatively
31 impact the priority of IPC, which is a key element for safe care (Table 1). Most LTCFs in
32 Scotland serve a mix of state-funded and self-funded residents.[8] Councils and National
33 Health Service (NHS) boards in Scotland who fund nursing and personal care services
34 provided in LTCFs for entitled residents are encountering climbing financial pressures
35 because of an aging population with increasingly complex health and social care
36 needs.[9] Currently, the shortfall in public funding (UK-wide) for LTCFs is around 5-10%,
37 equivalent to approximately £200-300 million.[8] The facilities that are most exposed to
38 local authority funded residents are most affected. As a result, they have to charge self-
39 funded residents higher fees to maintain provision of services. Additionally, the shift to
40 more sustainable models of health and social care, which reduce costs, have sufficient

41 staff with the right skills in place, and meet growing demand, is not occurring rapidly
42 enough to address this issue. The agenda of cutting health and social care budgets and
43 the difficulty in agreeing on integrated budgets between councils and NHS boards also
44 obstruct the shift of resources to non-NHS settings such as LTCFs. Furthermore, due to
45 lower thresholds in the financial assessment for eligibility to access publicly funded
46 health and social care, fewer people can benefit from nursing and care services
47 provided in LTCFs. The financial restriction to access timely and appropriate care in
48 LTCFs has led to an increase in avoidable infections and increased uses of NHS
49 services among people aged 65 and over.[10] Due to restricted financial resources, the
50 Scottish government is more likely to prioritise other health and social care needs for
51 the growing aged population than investing to implement improved models of IPC
52 practice. Service providers of LTCF, of which the majority are in the private sector, may
53 also not be keen to prioritize IPC over other nursing and care services that improve
54 resident satisfaction more directly.

55 Significant staffing shortage and high turnover of staff can reduce compliance to IPC
56 practices and make it more difficult and costly to provide IPC training, thereby promoting
57 the spread of HAIs. The 2017 survey data from Scottish Social Care Councils, Care
58 Inspectorate and Scottish Care estimated that the nurse vacancy rate for LTCFs is at
59 14-20% and two-thirds of the facilities are struggling to recruit nurses as they have to
60 compete with the NHS that offers better terms and conditions and career development
61 opportunities.[11,12] Migration policies, including the decision to retain the Minimum Salary
62 Threshold at £30,000 for applicants seeking a Tier 2 visa and the minimum salary
63 threshold requirement for permanent residence (£35,000) also prevent the recruitment

of HCWs from overseas to fill the workforce gaps in LTCFs.[11] HCWs working in this setting, even those with many years of post-qualification experiences, often earn less than £30,000. Additionally, the possibility of limited European Union migration following Brexit may exacerbate the pressure of scarce HCWs, both in general and in LTCFs, by a projected shortfall of more than 70,000 nursing and social care workers by 2025.[13] The shortage of HCWs, which causes heavier workload, increased time pressure, and stress, is associated with lower compliance to IPC interventions and standards and the resulting increased spread of HAIs.[14,15] Nurse shortage has also been considered as one of the main factors that constrain healthcare facilities' capability to handle possible future threats such as outbreaks and epidemics.[3] In addition, the insufficient number of HCWs in LTCFs hinders the implementation of many IPC procedures such as screening and surveillance. The perception of unsafe working conditions in LTCFs caused by staffing shortfalls also impedes the retention of qualified HCWs in this setting, worsening the current situation.[15] Besides the staffing shortage, high turnover rates of HCWs in LTCFs and the reliance on temporary employees can undermine efforts to implement IPC policies and provide IPC education and training to HCWs in this setting. The annual turnover rate of 33.8% for nursing and care workers in LTCFs, is substantially higher than the rate of 6.4% for NHS staff.[12,16] These high staffing turnover rates imply that LTCFs would have to bear additional costs to provide more frequent in-service training sessions on IPC practices and ensure that new staff are familiar with the facility's IPC practice protocols and annual IPC programs.

The heterogeneity of LTCFs and their resident populations makes it difficult and complicated to establish regional or national guidelines for IPC approaches in this

87 setting. The heterogeneity in ownership across Scottish LTCFs[17] creates variations in
88 services provided, operational structures, business plans, and budgets which affect the
89 development of annual IPC programs in LTCFs. Although some NHS Boards across
90 Scotland had set IPC guidelines and policies prior to the introduction of the Final
91 Standards for infection control in LTCFs in 2005, they were not consistent and
92 regulatory substances were not established.[17] The Standards focus on addressing the
93 operational structures and processes in LTCFs with the provision of audit tools for self-
94 auditing in order to support effective IPC, rather than providing direct guidance on the
95 best IPC practices in this setting.[18] Nonetheless, a period of almost 15 years of
96 implementation has not guaranteed consistency in compliance with the Final Standards.
97 In fact, compliance rates to the Standards remain low. For example, Standard 2
98 requires that LTCFs have an Infection Control Group that endorses all IPC
99 policies/guidelines/procedures and provides advice and support for implementing and
100 monitoring the progress of annual IPC programs. However, a low compliance rate to
101 Standard 2 was evident as internal or external infection control committees were
102 available in less than a third of LTCFs (27.5%).[17] Clearly, there is no easy solution for
103 IPC in this setting and the establishment of the Finals Standards is just a starting point

104 Most evidence that guides IPC practice and decisions implemented in LTCFs is adapted
105 from IPC validated in hospitals, despite evidence in one setting not directly translating to
106 the other. For example, the National Infection Prevention and Control Manual (NIPCM)
107 is a practice guide mandatory for Scottish NHS employees to follow in order to reduce
108 the risk of HAIs.[19] Although it is considered as the best IPC practice in LTCFs, the
109 suitability and practicality of this manual and the extent to which staff in this setting

110 comply have neither been examined nor reported. Additionally, this manual only covers
111 basic IPC practices such as hand hygiene, safe management of equipment and
112 environment, and the use of personal protective equipment but other IPC measures
113 such as surveillance, screening, and decolonization are not included. Effectiveness of
114 IPC interventions, programs, and program components have not been rigorously
115 evaluated in LTCFs[20,21] due to challenges of conducting research in this setting.[22] IPC
116 strategies and policies used in hospitals may not be appropriate or effective to address
117 the distinct problems of HAIs in an LTCF environment which serves as both a
118 healthcare setting and a residential home because of the difference in infrastructure,
119 management and culture between LTCFs and acute care settings. For example,
120 isolation and contact precautions are considered effective and commonly used IPC
121 interventions in hospitals, however, they may not be preferable measures in LTCFs
122 where social interaction is important for resident welfare.[23,24] Additionally, residents in
123 LTCFs are not only at as high a risk of contracting HAIs from HCWs as patients in acute
124 care settings but also via frequent contacts in communal areas with other residents and
125 visitors. As a consequence, interventions such as hand hygiene that target HCWs alone
126 may not be sufficiently effective to control the spread of HAIs but require the active
127 participation of residents and visitors.

128 Prevention and control of HAIs in LTCFs is complicated and faces several challenges.
129 Although they have been discussed in the context of the Scottish health and social care
130 system, the rest of the UK and other countries across the globe are facing similar
131 challenges. Apart from the barriers caused by unique operational and cultural
132 characteristics of LTCFs, other issues that challenge IPC in this setting originate from

133 gaps in knowledge and resources which the entire Scottish health and social care
134 system confronts and cannot be addressed by individual facilities. Therefore, a broad
135 picture of challenges in IPC in this setting is useful to find effective solutions that can
136 both improve IPC practices and uphold the comfort and quality of life for LTCF
137 residents.
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212 **Table**

213 Table 1: Summary of the challenges of infection prevention and control, the causes and

214 impacts of these challenges in Scottish long-term care facilities

Challenges	Causes	Impacts
Mismatch between demand and funding for health and social care.	• Aging population with increasingly complex health and social care needs • Delay in shifting to more sustainable models of health and social care • Reduced health and social care budgets • Difficulty in shifting resources from the NHS to non-NHS settings	• Low priority for improving infection prevention and control (IPC) practices over other nursing and care services • Restricted access to publicly funded health and social care, leading to increases in avoidable infections
Staffing shortage	• Competition with the NHS for staff • Migration policies for healthcare workers • Brexit	• Heavier workload, increased time pressure, leading to low compliance to IPC standards and measures • Reduced capability to handle threats such as outbreaks or epidemics

High turnover of staff	• Less attractive working terms and conditions and career development opportunities compared with the NHS's offers • Perceived unsafe working conditions due to staffing shortage	• Less familiar with the facilities' IPC protocols and programs, resulting in lower compliance • Requiring more frequent IPC education and training, associated with increasing costs
Difficulty in establishing regional or national guidelines for IPC	• Heterogeneity of long-term care facilities (LTCFs) and their resident populations • Lack of evidence for effective IPC practice in LTCFs • Guidance on IPC practices in hospitals are not transferrable to LTCFs	• Inconsistency in IPC practices across LTCFs

215 LTCF: Long-term care facility
216 IPC: Infection Prevention and Control