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Letter to the Editor

Limerick: forever associated with five lines of rhyme or infamous for irrepressible carbapenemase-producing Enterobacteriaceae for all time?

Sir,

In the context of January’s edition of this journal, focused on multidrug-resistant Gram-negative bacteria (MDRGNB) to coincide with publication of new Joint Working Party Recommendations on the prevention and control of MDRGNB, we wish to report the increasing prevalence of carbapenemase-producing Enterobacteriaceae (CPE) at our 440-bed hospital in Ireland’s mid-west.\(^1,2\)

The first reported case of CPE in Ireland was in Limerick in 2009, as was the first outbreak of cfr-mediated linezolid-resistant *Staphylococcus epidermidis*.\(^3,4\) We have now identified 140 discrete isolates, each pertaining to a single patient, by retrospective audit of microbiological analyses performed at University Hospital Limerick between February 2009 and December 2015. Despite identification of operational factors associated with the incidence, and best efforts towards rectifying those, there has been an inexorable increase in CPE detection; two were identified in 2009, four in 2010, 11 in 2011, 10 in 2012, eight in 2013, 45 in 2014, and 60 in 2015. Seasonality is evident with highest numbers detected in the spring and summer months.

Of the associated carbapenemases, one was imipenem, three were oxacillin (OXA), 13 were New Delhi metallo-β-lactamase (NDM), and 123 were *Klebsiella pneumoniae* carbapenemase (KPC). During this period, two outbreaks occurred. In 2011, three out of nine patients affected by KPC-producers died, whereas in 2014 one out of 10 patients affected by NDM-producers died. Rectal swabs accounted for 74% \((N = 103)\) of our CPE-positive results over this six-year period. This is in contrast to the outcome of an Irish prevalence study performed in 2011 across 40 Irish critical care units (37 adult and three paediatric), which found no CPE carriage.\(^5\) However, as CPE was emerging as a global public health challenge at that time, those authors were prescient in recommending the importance of maintaining vigilance for CPE in Ireland.

Our current analysis has identified two fatal KPC bacteraemias, three intra-abdominal theatre-derived samples positive for CPE, with *K. pneumoniae* \((N = 80)\), *Klebsiella oxytoca* \((N = 30)\), and *Citrobacter freundii* \((N = 17)\) dominant. Indeed, our 2011 outbreak documented transmission of these strains between Irish hospitals.\(^6\) Subsequent to this outbreak, CPE screening has been performed, in accordance with national guidelines, via rectal swab or stool specimen, for all patients admitted to our intensive care unit or high dependency unit; similarly for any patient transferred from another healthcare institution, any patient who has
had an acute admission in the prior 12 months to any hospital in Ireland’s mid-west (except for paediatric, maternity or orthopaedic care), and for any patient previously hospitalized abroad. In total, 2685 screens were processed in 2011, increasing to 6128 in 2014, and exceeding 9493 in 2015.

We have benefited from considerable investment in on-site rapid molecular laboratory technology. A dedicated hygiene nurse has been appointed to monitor and audit the quality of environmental cleaning. A permanent cohort ward opened in November 2015. Local CPE guidelines have been drafted in line with international best practice along with implementation of the Public Health England carbapenem-resistant Enterobacteriaceae (CRE) toolkit. Hydrogen peroxide vapour decontamination is performed post discharge of any KPC-colonized or -infected patient. Chlorhexidine gluconate wash-cloths are used to bathe all patients in critical care areas, and a recent review of clinical staff has shown 84% hand hygiene compliance. Despite these measures, control has proved ineffective. Reliance on acute 16-bedded nightingale wards, insufficient isolation rooms, emergency department overcrowding, and lack of unique patient identifiers or of an integrated information technology system are hindering our efforts to contain CPE.

Moreover, due to observed seasonality and the prevalence of agriculture in the Limerick region, we are exploring a sectoral link to our CPE challenge. Measures have been taken in our hospital to limit prescription of carbapenems, thus reducing consumption by 21% in 2015 versus increases of 36%, 25%, and 4% in 2012, 2013, and 2014, respectively. However, in comparison to the UK, there are few published data in Ireland regarding carbapenem consumption in the veterinary industry, whereas previous reports have linked NDM-1 and OXA-48 with close proximity to animals.\(^7\)

Limerick is known as Ireland’s ‘Treaty City’ due to a Jacobite siege in 1691. We are developing a new siege mentality, and we believe that a national strategy for CPE, akin to that adopted in Israel, is urgently needed to avoid a country-wide replication of the Limerick CPE endemic.\(^8\)

**Conflict of interest statement**

None declared.

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**References**


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