Mortality after surgery in Ireland

The European Surgical Outcomes Study (EuSOS)¹ shows mortality rate in Ireland of 6.4% (95% CI 4.8–8.1%) for all elective and non-elective inpatient surgery, excluding planned day-case surgery, cardiac surgery, neurosurgery, radiological surgery, and obstetric surgery, during a week in April, 2011. This rate was significantly higher than that of 3.6% (95% CI: 3.2–3.9%) for the UK, which was the reference country. If true, these data have serious implications for the Irish health-care system.

There were repeated unsuccessful requests to the EuSOS authors by the Royal College of Surgeons in Ireland (RCSI) and the College of Anaesthetists of Ireland to get access to the EuSOS data. In view of the inability to validate the Irish EuSOS data and the importance of the findings, a direct replication—the Irish Surgical Outcomes Study (ISOS)—was done (appendix). This study involved all 17 Irish hospitals that participated in EuSOS, and we applied the same methods (details were available from the EuSOS website) and covered the same period in April, 2011. The ISOS findings showed substantial differences from the EuSOS data for the same period. An additional 215 eligible patients were identified, but fewer deaths (table).

These substantial differences raise serious concerns regarding the quality and completeness of EuSOS. Ireland is not the only country to dispute EuSOS findings;²–⁴ at least three countries (of 28) have publicly challenged the integrity of EuSOS data. These concerns call into question the propriety of retaining the original paper in the literature and plans for the original team to continue to produce a series of further papers from this dataset.

We declare that we have no conflicts of interest.

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Authors’ reply

Sally Doherty and colleagues report the findings of a retrospective study of surgical mortality in Ireland during the same period studied in our prospective European study (EuSOS).¹ Using a different method, the authors collected data describing a larger cohort of patients and identified fewer deaths, resulting in a different mortality estimate. While the authors use the original EuSOS data as a reference for their findings, they also suggest these data are inaccurate. The overall mortality for any large population of surgical patients is crucially dependent on the representation of high-risk surgical patients within it. The lower numbers of critical-care admissions and deaths suggest the high-risk group was not so strongly represented in this repeat study population. This difference might also represent a stronger tendency for investigators to include patients undergoing complex surgery in the prospective study. Nonetheless, the hospital mortality of 2.5% is higher than previous estimates, which range from 1 to 2%,²–⁴ and remains a cause for concern.

The authors sought our assistance with their study and we encouraged them to make full use of our original protocol and case record form. We also confirmed which Irish hospitals took part in our original study. The authors did request the EuSOS data for Ireland but, despite our repeated requests, were unable to provide a prospective statistical analysis plan. We remain prepared to share the data provided this basic methodological standard is met. Since publication of the report, we have worked with various groups to further analyse the EuSOS data and better understand our findings. Prospectively defined analyses of the relation between mortality and haemoglobin, serum sodium, surgery at night-time, and use of the WHO checklist have all generated important findings and confirmed the validity of our data. Notably, prospective linkage with Swedish registry data has confirmed the accuracy of the stated hospital mortality and shows a four-fold increase in mortality within 1 year of surgery. Therefore, surgical patients could remain at risk even in nations with low early postoperative mortality rates.

We previously acknowledged⁵ the pragmatic nature of the EuSOS study. We have repeatedly indicated that our study does not provide a definitive mortality estimate, particularly in countries that contributed few patients, but that it demonstrates the need for further research and audit of

<table>
<thead>
<tr>
<th>EuSOS</th>
<th>ISOS</th>
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<tbody>
<tr>
<td>Patients identified</td>
<td>856</td>
</tr>
<tr>
<td>Median hospital stay</td>
<td>3 (1–6)</td>
</tr>
<tr>
<td>Admitted to critical care</td>
<td>66</td>
</tr>
<tr>
<td>Percentage admitted to critical care</td>
<td>7.7% (5.9–9.9)</td>
</tr>
<tr>
<td>Number died in hospital</td>
<td>55</td>
</tr>
<tr>
<td>Percentage died in hospital</td>
<td>6.4% (4.8–8.1)</td>
</tr>
<tr>
<td>Unadjusted odds ratio*</td>
<td>1.86 (1.39–2.49)</td>
</tr>
</tbody>
</table>

Data are n, median (IQR), or % (95% CI), unless otherwise stated. For the details of the ISOS study, see appendix. ISOS—Irish Surgical Outcomes Study. EuSOS=European Surgical Outcomes Study. *UK as reference.

Table: The ISOS data compared with the EuSOS findings
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outcomes for this population. In view of the very large size of the surgical population, such measures might lead to a substantial reduction in the number of deaths.

We declare that we have no conflicts of interest.

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E anophelis outbreak in an intensive-care unit

We read with interest Jeanette Teo and colleagues’ report (Sept 7, p 855)1 of the first outbreak of Elizabethkingia anophelis identified by 16S rRNA sequencing and whole-genome analysis. The subgroup of isolates had been previously identified as Elizabethkingia meningoseptica on the basis of matrix-assisted laser desorption-ionisation time-of-flight (MALDITOF) mass spectrometry analysis.

The history of this microorganism starts with its description as a cause of infant meningitis by Elizabeth O King at the US Centers for Disease Control and Prevention (CDC). She first isolated an organism referred to as CDC group IIa in 1959 and named it Flavobacterium meningosepticum. It was subsequently renamed Chryseobacterium meningosepticum, and classified in the new genus Elizabethkingia, in 2005.2

We believe that modern techniques (such as MALDITOF and sequencing) might generate more and more pseudo first outbreaks. Outbreaks of F meningosepticum, C meningosepticum, and E meningoseptica have been described in several patient settings, including intensive-care units.3,4 Thus, what is new here, except the name? To be considered as new outbreaks, future reports should describe a new source or pathway of transmission and not merely one that appears new because of the diagnostic methods presently used.

We declare that we have no conflicts of interest.

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Authors’ reply

Andreas Voss and colleagues have alluded to the fact that 16S rRNA sequencing in the early 2000s allowed Elizabethkingia to be placed separately from the genus of Chryseobacterium. Next-generation sequencing has facilitated a higher level of differentiation between two very distinct species of Elizabethkingia, namely Elizabethkingia meningoseptica and Elizabethkingia anophelis.2,3 Our analyses identifying the intensive-care unit outbreak strain as E anophelis is not just a reclassification of an old species as Voss and colleagues suggest. E anophelis is an entirely separate species with infection potential. E anophelis is presently understudied but should not be considered irrelevant in the clinical setting. Our sequencing data suggest the presence of a substantial number of virulence determinants, and studies to assess E anophelis’ virulence potential in animal models are in progress.

Investigation of novel outbreaks when paired with comparative genome sequencing data provides important information to understand transmission of a pathogen, and especially so for rare organisms. Comparative genomics is a crucial approach in the discovery of virulence determinants and genetic markers of uncharacterised bacterial species. Genome-based approaches can be associated with other omics-based approaches (eg, transcriptomics and proteomics)4 to analyse bacterial physiology and pathogenesis mechanisms.

An intriguing and important issue is the transmission pathway of E anophelis. We speculate that malaria carriage in patients might be at the origin of E anophelis transmission in the hospital setting, which we are investigating.

We declare that we have no conflicts of interest.

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