Note

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Different Epidemiology of Hospital-Acquired Bloodstream Infections Between Small Community Hospitals and Large Community Hospitals

To the Editor—In 2012, small community hospitals (SCHs) represented 72.4% of all US hospitals [1]. Switzerland's healthcare system has a similar structure with an 81% share of community hospitals [2, 3].

The recently published article by Stenehjem et al demonstrated that SCHs exhibit similar antibiotic prescribing rates and patterns when compared to large community hospitals (LCHs), despite being less complex in terms of patient population, and the majority not having the support of antibiotic stewardship programs (ASPs) [4]. Here, we highlight that differences in the microbial spectrum of hospital-acquired bloodstream infections (HA-BSIs) seen in small vs large community hospitals need to be taken into account when interpreting antibiotic consumption patterns. Important differences in the epidemiology of bloodstream infections are described between community hospitals and university hospitals [5]. Using the national bloodstream infection database Swiss Centre for Antibiotic Resistance (ANRESIS) [6], we analyzed patterns of HA-BSI episodes for SCHs and LCHs in Switzerland between 2008 and 2014.

Data from 23 community hospitals across Switzerland were collected (7 LCHs with > 200 beds and 16 SCHs with <200 beds). Positive blood cultures were grouped as a BSI episode if they occurred within a 7-day window in the same patient. BSIs for which the hospitalization date was available (16 969 of 20 478 of all episodes [82%]) were defined as hospital-acquired if the positive blood culture was drawn >2 days after admission. A BSI was defined as polymicrobial if different microbial species were isolated from ≥1 culture during the same episode. Contaminant episodes (for definition see [5]) were excluded.

We identified 4712 episodes of HA-BSI. In LCHs, 23.7% (vs 10.4% in SCHs, $P < .001$) were observed in the intensive care unit departments, whereas in SCHs 75.3% of BSIs (vs 70.4% in LCHs, $P = .05$) were diagnosed in medical/surgical departments. *Escherichia coli* predominated in SCHs, whereas coagulase-negative staphylococci (CoNS), polymicrobial infections, and fungi were more prevalent in LCHs (Table 1).

Antibiotic consumption is, among other factors, influenced by the spectrum of causative microorganisms; accordingly, the impact of antibiotic prescribing interventions may vary across different types of institutions [7]. In SCH, more than one-quarter of HA-BSIs were caused by (relatively easy-to-treat) *E. coli*, probably reflecting a high prevalence of nosocomial urinary tract or gastrointestinal infections [8]. Due to the low resistance levels of *E. coli* (the extended-spectrum β-lactamase rate in invasive *E. coli* isolates is <10% in Switzerland [6]), reducing broad-spectrum antibiotic use should be a realistic target in SCHs. In contrast, we found that other HA-BSIs (eg, due to polymicrobial BSIs or CoNS) requiring broad-spectrum antibiotics were seen in LCHs with more complex patient populations.

As reported by Stenehjem et al, these 2 types of hospitals are characterized by similar levels of antimicrobial use. We are convinced that SCHs have not yet fully

Table 1. Proportion of Microorganisms Among Hospital-Acquired Bloodstream Infections in Small Community Hospitals and Large Community Hospitals

Microorganism	LCH, No.	(%)	SCH, No.	(%)	*P* Value
Anaerobes	59	(1.6)	2	(0.2)	<.001
Escherichia coli	693	(18.3)	253	(27.4)	<.001
Non–*E. coli* Enterobacteriaceae	671	(17.7)	186	(20.2)	.13
Gram-negative nonfermenters	205	(5.4)	55	(6.0)	1
Staphylococcus aureus	658	(17.4)	167	(18.1)	1
CoNS	400	(10.6)	48	(5.2)	<.001
Enterococcus species	364	(9.6)	79	(8.6)	1
Polymicrobial	452	(11.9)	77	(8.4)	<.001
Fungi	106	(2.8)	2	(0.2)	<.001
Other	182	(4.7)	53	(5.7)	.72
Total	3790		922		

Group comparisons were performed using the χ^2/proportion test; the Bonferroni correction was used to correct for multiple comparisons on a family-wise basis, where appropriate.

Abbreviations: CoNS, coagulase-negative staphylococci; LCH, large community hospital; SCH, small community hospital.

benefited from the advent of ASPs despite the fact that changing antibiotic prescribing may be easier there than in LCHs. Indeed, most epidemiological studies have disregarded the SCH subset in the past. Stenehjem and colleagues should be commended for opening up a path to antibiotic stewardship in this setting.

Notes

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APPENDIX

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Reply to Buetti et al

To the Editor—We thank Dr Buetti [1] and colleagues for their interest in our publication [2]. Dr Buetti has recently published data from Switzerland's national bloodstream infection (BSI) surveillance database detailing the microbiologic differences of BSIs among patients at university hospitals compared to community hospitals and hospital-acquired (HA) infections compared to community-onset infections [3]. Their report highlighted distinct microbiologic patterns in community and university hospitals that should be taken into consideration when developing empiric antibiotic treatment guidelines. Here, they expand on their previous report and share data on HA-BSIs among patients in small community hospitals (SCHs, <200 beds) compared to large community hospitals (LCH, ≥200 beds) in Switzerland. Dr Buetti and colleagues found that when compared to SCHs, LCH HA-BSIs were less likely due to *Escherichia coli* and more likely due to coagulase-negative *Staphylococci*, polymicrobial infections, and fungi.

These data on microbiologic patterns suggest there should be important antibiotic prescribing differences between SCH and LCH (and academic medical centers) if antibiotics are used wisely. Similar to the findings described by Dr Buetti, in our system, infections with vancomycin-resistant enterococci,