The Superbugs Are Coming!

Because the media has stolen all the catchy names—MRSA, VRSA, VRE, C Diff et al—I’d like to be the first to coin the term “PREC” (penicillin-resistant E. coli).*

The study.

This was a retrospective examination of pediatric urine culture isolates from clinical laboratories collected in a variety of inpatient and outpatient settings across the United States in 2009. The aim was to compare antibiotic resistance patterns among common uropathogens obtained for outpatients and inpatients.

The key findings.

The authors identified 5560 inpatient and 25,418 outpatient urinary isolates. Here’s their table on prevalence of common species:

<table>
<thead>
<tr>
<th></th>
<th>Escherichia coli</th>
<th>Enterobacter spp</th>
<th>Enterococcus spp</th>
<th>Klebsiella spp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male outpatient</td>
<td>50%</td>
<td>5%</td>
<td>17%</td>
<td>10%</td>
</tr>
<tr>
<td>Male inpatient</td>
<td>37%</td>
<td>10%</td>
<td>27%</td>
<td>12%</td>
</tr>
<tr>
<td>Female outpatient</td>
<td>83%</td>
<td>1%</td>
<td>5%</td>
<td>4%</td>
</tr>
<tr>
<td>Female inpatient</td>
<td>64%</td>
<td>4%</td>
<td>13%</td>
<td>10%</td>
</tr>
</tbody>
</table>

You’ll have to check the article to see all the resistance patterns that were measured, but suffice it to say that inpatient resistance rates frequently exceeded outpatient resistance rates, particularly for third-generation cephalosporins and ciprofloxacin. Most notably (in my opinion anyway) was *Escherichia coli* resistance to ampicillin in the outpatient and inpatient settings (45% vs 55%, \( P < .001 \)).

Why do we care?

This article substantiates the claim previously suggested by single-center studies that resistance patterns for uropathogens differ in the outpatient and inpatient settings. Thus, we should likely be using separate inpatient- and outpatient-based antibiograms to optimize effective empirical antibiotic use for treatment of urinary tract infection. That said, it is probably worth pointing out that there is site-to-site variability in determining who gets admitted for urinary tract infections (UTI), and this study was not designed to address this confounder or, more specifically, to account for severity of illness.

* Please cite as “Biondi E. Term coined while sitting at his desk writing his final journal club, sometime around July 2014.”

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I REFUSE TO TITLE THIS “SHOW ME THE MONEY,” BUT IT WOULD PROBABLY MAKE SENSE

There seems to be this general attitude in pediatrics that financial incentives are for “the other guys”—the investment bankers, salespeople, and the surgeons. Why is that? There’s no reason to think that we don’t care, at least a little bit, about money.

The study.

This one is really cool. In 2006, a large academic medical center designed a financial incentive program to improve certain quality metrics. This program included a $400 bonus for project goals met by residents and fellows, up to $1200 per year per trainee. Projects were placed in 3 domains: patient satisfaction, quality/safety, and operation/utilization. Residents and fellows could also submit their own projects for approval in the incentive program.

The key findings.

During the first 6 years of the incentive program (2007–2012), 5275 residents and fellows participated, including 540 residents and fellows who participated in projects submitted by trainees. On average, $724,450 were paid in bonuses each year (~$800 per trainee). The patient satisfaction project goal was met in 4 of the 6 years, the quality/safety and operation/utilization project goals were met inconsistently (although trainees were more compliant than faculty), but trainees did appear more engaged in the quality improvement process, culminating in dozens of projects being proposed, and completed successfully, by residents and fellows. In total, trainees worked on 55 projects and achieved 71% of the goals set. It is worth pointing out that because this was not originally designed as a research study, there was no control group or baseline data from which to compare the success of the program, which limits the ability to calculate a specific return on investment.

Why do we care?

This group got residents and fellows to submit dozens of quality improvement projects on their own and to accomplish the goals contained within them. Although we can’t perform a marginal cost-benefit analysis here, it does appear that using carefully thought out financial incentives to congruently align the goals of the institution and trainees may be worth at least a cursory look. And why shouldn’t they be? There may be some scientific debate regarding financial incentives, but every other business sector uses them, and trainees will likely be included in some incentive program upon beginning their first posttraining job anyway.

In the words of the expert . . .

“Pediatric hospitalists are in the ideal position to mentor the next generation of physicians in improving the quality, safety, and efficiency of clinical care, and introduce them to the increasingly prevalent pay-for-performance reimbursement model. This paper offers an innovative framework in which these goals can be accomplished to everyone’s benefit: residents, hospitalists, institutions, and most of all, patients.”

– Dr Michael S. Leonard, Chief Quality Officer and pediatric hospitalist, Golisano Children’s Hospital at UR Medicine


STRRRRREEETTTTCTCHHHHEED TOO THIN

How many patients should be on your daily census? In pediatrics, the answer eludes us. We know that we have to balance clinical outcomes and patient safety against the potentially excessive costs of limiting workload, but to what extent? An article in JAMA Internal Medicine this month may help shed some light on the issue, at least in the adult world anyway, by aiming to determine the associations among workload, efficiency, and quality of inpatient care.

The study.

This was a retrospective cohort study of 20,241 inpatient adult admissions at a large academic community hospital system from 2008 to 2011. Outcomes of interest included, among other
things, length of stay (LOS), cost, and patient satisfaction.

The key findings.
When hospital occupancy was <75%, LOS increased from 5.5 to 7.5 days across a low workload of 11 patients to a high workload of 22 patients. When the hospital was at 75% to 85% capacity, LOS held stable until the census hit 15 patients and then increased exponentially to 8.0 days. At >85% capacity, LOS decreased slightly as the census began to climb and then increased significantly. Hospital costs (converted from charges in this paper) increased by $111 per patient for each additional patient. Changes in workload were not associated with patient satisfaction.

Why do we care?
Increasing the workload of hospitalists is associated with increased LOS and cost.

In the words of the expert . . .
“What is the mechanism for the observed association between workload and length of stay/costs? This efficiency [of hospitalists] is explained partly by the ability of a hospitalist to see a patient in the morning and then drive a hospitalization forward, for example, by talking to consultants . . . . A hospitalist with a census of 20 patients, who starts rounds at 7:30 AM and spends 15 minutes with each patient, will not see patient number 20 until after noon. It is plausible that a potential discharge might be delayed or an extra test ordered simply to move things forward.”

– Dr. Robert Wachter, Chief of Hospital Medicine, Department of Medicine, University of California, San Francisco

(quotes taken directly from accompanying article commentary)
