pathogen and 332 patients with no identified pathogen (Table 1) and found no association. Bacterial documentation of our population was representative of pathogens isolated in patients with severe CAP. A part of unidentified pathogens might have been viral pneumonia, which is not usually searched in clinical practice. These results showing thrombocytopenia for a high percentage of common bacterial pathogens suggest that thrombocytopenia in critically ill patients with CAP is a severity criterion and not a diagnostic tool.

<table>
<thead>
<tr>
<th>Pathogens</th>
<th>Platelet Count ($\times 10^9/L$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\geq 400$</td>
</tr>
<tr>
<td><em>Streptococcus pneumoniae</em> (n = 137)</td>
<td>9 (6.6)</td>
</tr>
<tr>
<td>Other gram-positive cocci (n = 76)</td>
<td>6 (7.9)</td>
</tr>
<tr>
<td>Gram-negative bacilli (n = 131)</td>
<td>13 (9.9)</td>
</tr>
<tr>
<td>Atypical pathogens (n = 21)</td>
<td>2 (9.5)</td>
</tr>
<tr>
<td>Nonidentified (n = 332)</td>
<td>26 (7.8)</td>
</tr>
</tbody>
</table>

Data are presented as No. (%).

### Simulating Training for Recognition of Murmurs

#### Give a Kid a Hammer?

**To the Editor:**

In their recent article in *CHEST* (February 2011), Fraser et al[^1] demonstrated that students who have just listened to a mitral regurgitation on a high-cost, high-fidelity patient simulator (“Harvey”) can recognize mitral regurgitation in a real patient more accurately than can students who heard other abnormal heart sounds on Harvey during training. We wish to issue a cautionary note. The evidence presented does not constitute an endorsement of simulator training, except as compared with no training. If, as we suspect, the students had little or no exposure to murmurs prior to the study (in their 8 h with standardized [healthy] patients and 2 days on the ward), then we might expect the students who heard the simulated mitral regurgitation would diagnose mitral regurgitation the next time they heard any murmur and, consequently, do better than students in the comparison groups who heard some other abnormality. Consistent with this interpretation, students who heard aortic regurgitation did not do significantly better than students who heard no murmur. The authors also describe a pilot study in which students who had practiced on aortic stenosis did worse on a case of mitral regurgitation than students who had heard no abnormalities.

We also disagree with the authors’ claim that we are lacking well-designed studies demonstrating that simulator training can improve performance on real patients. Going back nearly four decades, Aberg et al[^2] showed comparable diagnostic skill (on real patients with mitral stenosis and aortic stenosis) following 2 h of patient-based clinical teaching vs 1 h of training with an electronic heart-sound generator. A more recent study found a marginal gain in students’ recognition of clinical findings but no difference in their diagnostic accuracy or clinical skill (as tested on real patients) using Harvey-based training in comparison with training using an audio compact disc[^3].

In summary, although this study shows that a high-fidelity simulator can enhance recognition of a murmur, it also shows that the skill apparently does not generalize. More important, it does not address whether the same learning could result from much less costly approaches.

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**REFERENCES**

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Response

To the Editor:

We would like to thank Drs Norman and Cook for their comments on our recent article in CHEST (February 2011). We agree with several of their points, including the fact that training in one clinical skill (recognition of aortic stenosis) does not generalize (to improved performance at recognizing mitral regurgitation), as we stated in the "Limitations" section of our study. This finding is another demonstration of the phenomenon of content specificity, rather than a reflection on our study. We also concur with their cautionary note that using high-fidelity simulators is not the only way to create a virtual learning experience to improve clinical skills. It was never our intention to compare interventions in this study. Typically, single studies are designed to answer one research question, and no one study can answer all questions.

We do, however, disagree with two of the views by Drs Norman and Cook. The first is that "students who heard the simulated mitral regurgitation would diagnose mitral regurgitation the next time they heard any murmur." If this were the case, then we should expect a similar finding for students trained in aortic stenosis. Yet we did not find this; in fact, most students who heard simulated aortic stenosis diagnosed (correctly) mitral regurgitation on a real patient. We also disagree with their inference that there exist well-designed studies demonstrating that simulator training can improve performance on real patients. To support their opinion, they quote two studies, which, by implication, they consider to be well designed. These studies compared two interventions (ie, phonocardiosimulator vs real patients in the study by Aberg et al1 and compact disc vs human patient simulator in the study by de Giovanni et al3). Both studies had a parallel group design that did not include a control group or a preintervention evaluation. Also, the comparison interventions in both studies were part of a curriculum that also included didactic teaching. Both groups found no difference between interventions in the postintervention performance on real patients. However, because of the study design, it is not possible to establish whether both interventions are equally effective (ie, if transfer occurred equally in both groups) or equally ineffective (if transfer did not occur in either group), and whether the learning gains, if these occurred, were due to the didactic teaching or the target interventions. Although our study has its own limitations, our design did include a control group that received the same amount of simulator training (but no exposure to a cardiac murmur), and our intervention comprised the simulator learning experience only. Thus, we were able to demonstrate that transfer of learning did occur, and that this was associated with exposure to the target murmur on a simulator (mitral regurgitation).

Currently, our understanding of how best to use simulation in medical education is inchoate, and there are many research questions still to be answered. Drs Norman and Cook have hinted at some of these, including the following: Is one type of simulation better than another? And, what is the cost effectiveness of different types of simulated learning experiences? We would add to this: What types of outcomes can be improved through simulated learning experiences? And, are combinations of simulated learning experiences better than single experiences?

To tackle these, and other important questions, we will need a variety of study designs, all of which will have their own strengths and limitations.

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