Early Introduction of Clinical Skills Improves Medical Student Comfort at the Start of Third-Year Clerkships
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Abstract

Background
To determine whether introducing clinical skills during the second year of medical school, via a competency-based College system approach, improves comfort level for medical students entering third-year clinical rotations.

Method
From 2003–2005, two cohorts of third-year medical students at the University of Washington were surveyed on their comfort level in the categories of history taking, physical examination, communication, and patient care.

Results
The cohort of students exposed to the College system reported a statistically significant greater comfort level in half of the measured areas, and in at least one area within each general category. No

Method
The design is a nonrandomized, prospective cohort study conducted from 2003–2005. The target population consisted of two cohorts of medical students at the UWSOM: those third year students who entered medical school in 2000 (E-00), and those third year students who entered medical school in 2001 (E-01) or 2002 (E-02). The E-00 students completed the second year of medical school and entered the third year prior to the curriculum changes that are the subject of this study. Both the E-01 and E-02 students participated in the College system and the revised ICM II course during their second year of medical school. Students were identified as being members of a certain class based upon UWSOM-compiled e-mail lists. Those members of a third year class who were not involved in third year clinical clerkships (e.g., MD/PhD students and those students who had expanded their medical school curriculum) were requested to not fill out the survey. The survey instrument was developed as an anonymous, web-based questionnaire (Table 1) with multiple-choice questions using a 5-point Likert scale and grouped in the following categories: history taking, physical examination techniques, communication skills, and patient care.
Table 1
Survey Questions with p Values for the Wilcoxon-Mann-Whitney Test Comparing the E-00 Class (Not Exposed) to the Combined E-01 and E-02 Classes (Exposed to College System)

<table>
<thead>
<tr>
<th>Survey question</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>For each question, please consider your first 12 weeks of your third year and rate how comfortable you felt:</td>
<td></td>
</tr>
<tr>
<td>1. Eliciting a thorough history of present illness (HPI), including the chief complaint</td>
<td>0.2</td>
</tr>
<tr>
<td>2. Eliciting a thorough social history, including questions about tobacco, alcohol and other/ilicit drug use</td>
<td>0.3</td>
</tr>
<tr>
<td>3. Eliciting a comprehensive review of systems (ROS)</td>
<td>0.01</td>
</tr>
<tr>
<td>4. Performing a complete, thorough physical examination (PE) on a patient in an inpatient setting</td>
<td>0.02</td>
</tr>
<tr>
<td>5. Performing the Rinne and Weber tests (tuning fork tests for hearing)</td>
<td>0.04</td>
</tr>
<tr>
<td>6. Measuring the jugular venous pressure (JVP)</td>
<td>&lt;0.01</td>
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<tr>
<td>7. Percussing the lungs</td>
<td>0.01</td>
</tr>
<tr>
<td>8. Palpating the liver edge</td>
<td>0.3</td>
</tr>
<tr>
<td>9. Testing for intact cerebellar function</td>
<td>0.1</td>
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<tr>
<td>10. Testing for the triceps reflex</td>
<td>0.1</td>
</tr>
<tr>
<td>11. Performing a female breast examination</td>
<td>0.2</td>
</tr>
<tr>
<td>12. Performing a male prostate examination</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>13. Performing oral case presentations (OCPs) on the wards</td>
<td>0.3</td>
</tr>
<tr>
<td>14. Writing a complete history and physical (H&amp;P) in a timely fashion</td>
<td>0.08</td>
</tr>
<tr>
<td>15. Constructing a differential diagnosis (Diff Dx)</td>
<td>0.3</td>
</tr>
<tr>
<td>16. Discussing patient cases with your peers</td>
<td>0.03</td>
</tr>
<tr>
<td>17. Discussing patient cases with attendings and preceptors</td>
<td>0.1</td>
</tr>
<tr>
<td>18. Interacting with patients</td>
<td>0.03</td>
</tr>
<tr>
<td>19. Using medical equipment (i.e., oto/ophthalmoscope, blood pressure cuff, etc)</td>
<td>0.03</td>
</tr>
<tr>
<td>20. Being in a patient care setting</td>
<td>0.02</td>
</tr>
</tbody>
</table>

In March 2003, an e-mail was sent to the E-00 third year class requesting completion of a brief, anonymous online survey. Two follow-up emails were sent over the next month. In March 2004 and 2005, emails were sent to the current third year class (E-01 and E-02, respectively) requesting completion of the survey. Responses were compiled and the results from each cohort were compared using the one-tailed Wilcoxon-Mann-Whitney nonparametric test for ordinal data in Matlab (Mathworks, Inc., Natick, MA).

The Institutional Review Board, Human Subjects Division, of the UW SOM exempted this study from further review in March 2003 (exemption reference number 03–6855-X). No funding sources were used for this study.

Results
Overall, 99 of 135 (73%) respondents from the E-00 class, 95/128 (74%) from the E-01 class and 94 of 129 (73%) from the E-02 class completed the survey. The results of the survey are shown in Table 2 along with the p values for the Wilcoxon-Mann-Whitney test comparing the E-00 cohort with the combined E-01 and E-02 cohort.

As noted in Tables 1 and 2, statistically significant improvement in students’ self-reported comfort levels were found for the following skills: obtaining a history of present illness, performing a complete physical exam, specific exam maneuvers chosen to represent the head and neck, cardiovascular, pulmonary, and abdominal exam, oral case presentations, discussing patients with attending physicians, using medical equipment and working in the patient care setting.

Discussion
Our study focuses on students’ comfort level in a variety of different areas, rather than on the competencies of third year medical students during their core clinical rotations. Additional studies addressing competencies in these skills are currently taking place at the UW SOM. However, based on our results, we feel that exposure to the College system and revised ICM II course has an overall positive impact on students’ perspectives regarding their comfort with clinical skills and may help to alleviate some of the anxiety that third year students experience when beginning clinical rotations. Those third year students involved in the College system reported a statistically significant (p < .05) greater comfort level in half of the measured areas, and in at least one area in each of the general categories (history taking, physical examination, communication, and patient care). No specific area showed a statistically significant decline.

We decided to question students regarding comfort levels with specific physical examination maneuvers rather than with a certain part of the physical exam in the abstract. Our thinking was that the student would be able to provide a more accurate self-assessment when considering a concrete maneuver, which could serve as a proxy measure. In choosing which specific “benchmark” physical examination techniques to represent a particular body or organ system, we attempted to filter out those techniques that may have been learned during the first year of medical school (e.g., auscultation of normal heart sounds), as well as those techniques that tend to be part of a more advanced physical examination (e.g., eliciting a Murphy’s sign during an abdominal examination). Those techniques that are represented in the survey were specifically chosen because they are considered to be “benchmark” requirements for successful completion of the revised ICM II course. However, considering the broad range of maneuvers that are part of a complete physical examination, it becomes recognizably difficult to choose the perfect representative maneuver for each system.

Several areas did not show an improvement between the cohorts. Certain survey questions, such as those focused on perceived comfort level in obtaining a complete social history and review of systems, are not primary focuses of the ICM II course, but rather the focus of the introduction to clinical medicine I course (ICM I) taught during...
the first year of medical school. In ad-

dition, the teaching of the female

breast exam and the male prostate exam
occurs in the ICM I course and have not
yet been the focus of change in the

revised ICM II format. However, we note
that the continued discomfort that

students’ experience with the prostate
exam highlights our need for added focus
on teaching this important clinical skill.

Other areas that failed to show

improvement include the maneuvers for

the neurological and musculoskeletal
exam, and these results will also help to
tailor future teaching efforts.

Several other questions did not show a

statistically significant improvement,
largely because students were already
relatively comfortable with these areas.

Only a few students in either cohort felt

uncomfortable discussing patients with

peers or with patient interaction.

Comfort with formulating a differential
diagnosis ($p = .081$) and comfort with

patient interaction ($p = .13$) showed

improvement but did not meet the

criteria for statistical significance. For

patient interaction, part of the lack of

statistical significance likely resulted from

the relatively high comfort level in both
groups as noted above. However, these

questions also represent two areas,

clinical reasoning and communication

skills, that lacked specific curricula
during the time studied. We have

subsequently developed and

implemented curricula for clinical

reasoning and communication and will

be interested to see if comfort levels in

these areas continue to improve.

Our study has a number of limitations.

This is a single institutional study limited
to the Colleges curriculum at the

UWSOM. Moreover, since we

investigated a curriculum-wide change,

the subjects were not randomized and

therefore a historical cohort was used as a

control population. Due to the time

required for study design and human

subjects approval, our survey was

administered approximately eight

months after the initiation of third year

clinical rotations. This required medical

students to reflect back on perceptions

they had during their first two rotations of

third year, approximately 5–8 months

prior to survey administration. However,

even with the timing delay, we believe

that our study was worth pursuing, given

the opportunity to take advantage of a

transition in the medical school

curriculum. We made efforts to avoid

recall bias by retaining the same timing of

survey administration for all three
groups. Our initial concern was that the

delay would tend to underestimate

differences between the cohorts. As time

elapsed between the different second year

exposures, any differences may become

increasingly mitigated by the common

third year experience. If such a

‘regression towards the mean’ did occur,
it would tend to reduce rather than

amplify any differences between cohorts,
in which case our observed findings

would be overly conservative.

Despite some of the limitations noted

above, our results are encouraging that a

College-based approach and expanded

clinical experience during the second year

of medical school help to increase

students’ comfort level at the beginning of

their third year.

References
Stress, coping, and well-being among third-

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\begin{array}{|c|c|c|c|c|c|}
\hline
\text{Survey question} & \text{Extremely comfortable} & \text{Comfortable} & \text{Neutral} & \text{Uncomfortable} & \text{Extremely uncomfortable} \\
\hline
Q1: History of present illness & 18\% & 28\% & 58\% & 56\% & 12\% & 9\% & 11\% & 7\% & 1\% & 1\% \\
Q2: Social history & 29\% & 31\% & 52\% & 55\% & 13\% & 9\% & 6\% & 5\% & 0\% & 0\% \\
Q3: Review of symptoms & 13\% & 15\% & 38\% & 41\% & 28\% & 25\% & 19\% & 16\% & 1\% & 3\% \\
Q4: Physical examination & 6\% & 5\% & 34\% & 47\% & 26\% & 29\% & 29\% & 16\% & 5\% & 3\% \\
Q5: Tuning forks & 4\% & 7\% & 19\% & 21\% & 20\% & 28\% & 38\% & 33\% & 20\% & 12\% \\
Q6: Jugular venous pressure & 2\% & 5\% & 16\% & 17\% & 21\% & 27\% & 43\% & 42\% & 18\% & 9\% \\
Q7: Percussion & 13\% & 18\% & 39\% & 50\% & 22\% & 20\% & 23\% & 11\% & 3\% & 2\% \\
Q8: Liver edge & 6\% & 13\% & 33\% & 37\% & 28\% & 28\% & 28\% & 20\% & 6\% & 3\% \\
Q9: Cerebellar & 13\% & 11\% & 39\% & 42\% & 15\% & 25\% & 24\% & 14\% & 9\% & 8\% \\
Q10: Triceps & 19\% & 11\% & 37\% & 43\% & 28\% & 26\% & 11\% & 16\% & 5\% & 4\% \\
Q11: Breast & 15\% & 17\% & 46\% & 51\% & 23\% & 19\% & 15\% & 12\% & 1\% & 2\% \\
Q12: Prostate & 9\% & 4\% & 29\% & 28\% & 23\% & 30\% & 34\% & 31\% & 6\% & 7\% \\
Q13: Oral case presentation & 6\% & 21\% & 34\% & 16\% & 19\% & 16\% & 44\% & 13\% & 5\% & 5\% \\
Q14: History and physical & 9\% & 14\% & 34\% & 32\% & 28\% & 29\% & 24\% & 21\% & 4\% & 5\% \\
Q15: Differential diagnosis & 4\% & 5\% & 27\% & 32\% & 33\% & 34\% & 33\% & 28\% & 4\% & 2\% \\
Q16: Peers & 30\% & 32\% & 53\% & 53\% & 12\% & 10\% & 4\% & 4\% & 1\% & 1\% \\
Q17: Attending & 8\% & 13\% & 42\% & 41\% & 18\% & 29\% & 29\% & 15\% & 3\% & 2\% \\
Q18: Patient interaction & 35\% & 44\% & 60\% & 48\% & 5\% & 6\% & 0\% & 1\% & 0\% & 1\% \\
Q19: Equipment & 18\% & 29\% & 55\% & 49\% & 17\% & 18\% & 10\% & 4\% & 0\% & 1\% \\
Q20: Patient care & 26\% & 37\% & 57\% & 50\% & 12\% & 10\% & 5\% & 3\% & 0\% & 1\% \\
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\end{array}
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