Chronic medical conditions affect nearly half of the people in the United States, and the most prevalent of these conditions account for more than 60% of the national burden of medical disability. While these figures emphasize the need for high-quality care of chronic medical disorders, research has exposed numerous deficiencies in chronic illness care. Encouragingly, a variety of innovative programs have been successful in improving outcomes for people with chronic illnesses. The success of these programs led to the Improving Chronic Illness Care (ICIC) model, a paradigm for redesigning processes of care for chronic conditions. Dissemination and evaluation of the ICIC model is underway. Unfortunately, medical student education has not been a component of these efforts, even though in one study only 49% of graduating students were able to correctly identify all six of the most common chronic illnesses from a listing of acute and chronic conditions. Due to such findings, many medical educators have begun to call for increased chronic illness care education beginning at an early point in physician training.

Students appear to perceive a need for such improved training. In 2001, many medical school graduates indicated that their training in patient follow-up (46%), health care systems (39%), and the role of community health agencies (36%) had been inadequate. Many also have related negative role modeling by residents and attending physicians caring for patients with chronic illness. Partly as a result, students entering medical school have more favorable views of chronic illness care than they do following their third-year clerkships. These observations strongly suggest a need to provide training opportunities early in the predoctoral curriculum to reinforce the generally positive views of chronic care with which matriculating students arrive in medical school and to counteract negative attitudes they may later face during clinical clerkships.

We recently received a federal training grant to help us provide such training. A strong focus of the grant’s activities is to provide students with learning experiences that illustrate the central importance of two key ICIC model elements: primary care provider-patient communication and patient self-care. The vast majority of chronic illness care is delivered through self-
and bolstering self-care leads to improved outcomes in a variety of chronic conditions. Students, however, are seldom trained to effectively support patient self-care efforts.

As part of our grant-funded efforts, we implemented a Chronic Illness Care Workshop (CICW) for first-year students, designed primarily to enhance students’ self-awareness of attitudes toward patient adherence to chronic illness regimens. A secondary goal was to begin to bolster their ability to communicate effectively with patients around self-care issues. This paper describes the CICW and outcomes resulting from its implementation.

Methods

Setting

The CICW was implemented in the first week of medical school as part of a required year-long “Introduction to Patient Evaluation” (IPE) course. The main goal of the IPE course is to help students begin to build the communication skills required to competently and compassionately evaluate patient concerns.

Chronic Illness Care Workshop

The CICW was conducted in two 2-hour sessions spaced 2 weeks apart.

Session 1

Students first completed a 10-item pre-workshop quiz to assess their basic knowledge related to chronic illness care. Quiz items covered such issues as the definition of chronic illness, current care quality gaps for common chronic conditions, and evidence-based approaches to supporting patient self-care efforts. Copies of the quiz are available on request from the corresponding author.

Next, students were given a 45-minute large-group presentation, during which chronic illness was defined, current shortfalls in chronic care were reviewed, and evolving approaches to chronic illness care were introduced, with emphasis on the ICIC model.

Finally, the class was divided into three groups. Students in each group were assigned to “have” a particular chronic illness for the next 2 weeks. Each group first watched a 2-minute videotaped vignette portraying a fictional physician—Dr Swift—providing a fictional patient—Edie Wagner—with a new diagnosis of the illness appropriate for that group as well as a series of home self-care “assignments” (Table 1). Students were asked to imagine themselves as the patient. Using an intentionally exaggerated humorous tone, the video portrayed a time-pressured and paternalistic approach to the encounter on the part of Dr Swift, with the patient in turn appearing overwhelmed and afraid to ask questions. Following the video, students were given an index card listing their assigned diagnosis and home self-care tasks, as well as a pill bottle labeled with their name and instructions to take the “pills” (sugarless breath mints) three times daily. Students were instructed to bring all pill bottles and logs to turn in during Session 2. The self-care assignments were purposely vague, reflecting the manner in which such tasks are often assigned in current practice. No further clarification instructions were given.

Session 2

Following a brief review of the material covered in Session 1, the class was divided into four smaller groups. In each small group, a faculty facilitator interviewed one to several student volunteers regarding their adherence to assigned self-care tasks. Students were instructed to assume the patient role as realistically as possible. Faculty facilitators role modeled a nonjudgmental, equal-partner communication style, based on motivational interviewing techniques. Following the interview role modeling, interviewed students shared how they felt during the interview, and then group discussion occurred about the pros and cons of such an approach and why others, such as threatening or judgmental styles, might cause problems. Next, the students were given 20 minutes to practice the role-modeled interviewing style in pairs, taking turns assuming the patient and physician roles and receiving feedback from the facilitators.

Students were then asked to turn in their pill bottles and self-care logs, and facilitators led discussions regarding their degree of success with the assigned tasks.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Chronic Illness Care Workshop Illness and Self-care Assignments</th>
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| **Group 1** Congestive heart failure | • Take “pill” three times daily.  
• Check weight daily and record in a log.  
• Keep a complete food diary for 3 days (follow usual diet) and determine daily sodium intake. |
| **Group 2** Type 2 diabetes mellitus | • Take “pill” three times daily.  
• Walk three times per week for at least 20 minutes each session, record dates and durations in a log.  
• Keep a complete food diary for 3 days (follow usual diet) and determine daily caloric intake and percentage of calories from carbohydrate. |
| **Group 3** Hypertension | • Take “pill” three times daily.  
• Check blood pressure on 5 different days, record in a log.  
• Keep a complete food diary for 3 days (follow usual diet) and determine daily saturated fat intake. |
Facilitating discussion questions included: (1) How did the assignment feel? (2) What barriers to self-care did you experience, and how did you try to overcome them? and (3) How do think your experiences as medical students were similar to or different than the experiences of the typical patient?

Next, the large group was assembled for a closing 30-minute “debriefing” that reinforced key self-care-interviewing principles covered in the small groups. For example, a research-proven\textsuperscript{19,26} framework for collaboratively developing and longitudinally assessing and modifying a patient self-care action plan was reviewed.\textsuperscript{27}

Finally, students completed a 10-item post-workshop quiz, containing the same items as the pre-workshop quiz, and were provided with optional post-workshop readings\textsuperscript{28-34} to expand on the key principles introduced in the workshop. They also completed a written evaluation of the workshop. The evaluation included seven items asking students to assess, using a 5-point Likert scale, the effect of the workshop and its various components on their chronic illness care skills. It also included a series of open-ended questions assessing whether and how the activities had changed student awareness regarding, and perceived ability to manage, the unique issues encountered in providing care for people with chronic illnesses, how they perceived the activities to be pertinent to their growth as physicians, and whether they would like further chronic illness care training in the future.

\textbf{Analysis}

The percentage of students correctly answering each of the 10 workshop quiz questions was calculated for both the pre- and post-workshop administrations, and these percentages were compared using McNemar’s test. Mean total pre- and post-workshop quiz scores were also calculated, and the mean scores were compared using the Wilcoxon signed-rank test. Each item was worth 1 point, for a maximum score of 10 points. Students’ responses to the Likert scaled items on the workshop evaluation were tabulated, and mean scores were calculated for each. All analyses were performed with SPSS, version 10.0.5 (SPSS, Inc, Chicago). Written comments to open-ended evaluation questions were grouped into common themes.

\textbf{Results}

\textit{Pre- and Post-workshop Quiz}

Eighty-six (90\%) of the 96 first-year students attended Session 1, while 91 (95\%) attended Session 2. Pre- and post-workshop quiz results are presented in Table 2. The mean quiz score improved by more than 2 points from pre- to post-workshop administration ($P<.001$, Wilcoxon signed rank test).

\textit{Adherence to Home Self-care Assignment}

Seventy-six (79\%) of 96 students turned in pill bottles and self-care logs. Most were fairly thorough in keeping their weight, exercise, and blood pressure measurement logs. There was a much broader range of adherence to diet logs, with many turning in grossly incomplete records. Relatively few students attempted to calculate sodium intake from their diet logs, and only a few attempted to calculate saturated fat, carbohydrate, or total caloric intake. Discussion regarding the difficulties entailed in maintaining these brief self-care assignments, particularly dietary tracking, was incorporated into the small-group sessions.

\textit{Student Evaluation}

Fifty-three students (55\%) returned a post-workshop evaluation; results are summarized in Table 3. The majority believed that the workshop would have a positive influence on their chronic illness care skills in the future, including the self-care home assignment. Specific comments included, “(It) gave me an understanding of what it’s like to have a chronic illness,” and “It was good to get a chance to realize how difficult it can be to remember to take meds every day.” Several students noted that they had gained valuable ideas about how to engage patients in their own care. One student with prior training in public health commented, “I hope I can retain all the info we learned . . . I like that this [topic] is stressed early in our medical education.”

Several students noted having been previously unaware of the high prevalence of chronic illness in the general population. Another felt they had gained understanding that “the current health care system isn’t well equipped to deal with chronic care.” Many others noted that they enjoyed the small-group role-playing session, and a few indicated that they would have preferred that more time had been devoted to role-plays. A handful of students seemed wholly unimpressed by the workshop. One noted, “Good workshop but not crucial to my education. A 1-hour session teaching me about chronic illness and problems they present and what I need to be aware of would have sufficed.” Another noted that the self-care homework was “a great idea in theory but hard to take seriously beyond a day or two.”

In response to the question “Did these activities change your awareness regarding the unique issues involved in providing care for people with chronic illness?” several noted that they had never thought about using a patient-directed, incremental approach to health behavior change but could now see the value in such an approach. One stated that they had learned how to begin to make “feasible action plans,” while another observed patient adherence to a therapeutic plan “depended a lot more on support network and attitude than I expected.” Several felt the workshop had helped them
become more empathetictoward people struggling with chronic illnesses, eg, “I can see what they are up against.” Responding to the question “Have these activities impacted on your ability to approach a person with chronic illness?” one student replied, “I realized what a pain it is to try and track your diet...I will have to be very specific about how to go about doing...diet [tracking] when advising patients on those issues.”

In response to the question “Would you like to have further discussions around chronic illness care in the future?” many students felt additional training would be valuable. However, several students believed it would be more effective if delivered later in medical school, after they had gained some clinical experience. Several also felt that future training should include case studies, disease-specific material, and discussion of more patient self-care resources.

Discussion
To our knowledge, this is the first report detailing the introduction of teaching concerning current chronic illness care shortfalls and proposed improvement approaches and models during the preclinical years of medical school. The teaching approaches used in the workshop have been used to varying degrees for other applications. For example, student role-plays have been used successfully to help teach a variety of clinical interviewing skills, including “difficult” skills such as

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Results of Pre- and Post-workshop Quiz</th>
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<tbody>
<tr>
<td>Question</td>
<td>Pre-workshop Quiz (n=86)</td>
</tr>
<tr>
<td>Definition of CI</td>
<td>Mean (SD) # (%) Correct</td>
</tr>
<tr>
<td>Types of CI</td>
<td>38 (44)</td>
</tr>
<tr>
<td>Proportion with CI</td>
<td>26 (30)</td>
</tr>
<tr>
<td>Proportion with controlled hypertension</td>
<td>37 (43)</td>
</tr>
<tr>
<td>Components of ICIC</td>
<td>64 (74)</td>
</tr>
<tr>
<td>ICIC self-care model</td>
<td>72 (84)</td>
</tr>
<tr>
<td>ICIC four-step counseling model</td>
<td>79 (92)</td>
</tr>
<tr>
<td>BATHE model</td>
<td>27 (31)</td>
</tr>
<tr>
<td>Self-care tasks</td>
<td>72 (84)</td>
</tr>
<tr>
<td>Action plan</td>
<td>67 (78)</td>
</tr>
<tr>
<td>TOTAL*</td>
<td>6.4 (1.5)</td>
</tr>
</tbody>
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* McNemar test
** Difference between means, Wilcoxon signed rank test

CI—chronic illness
ICIC—Improving Chronic Illness Care
BATHE—Background, Affect, Trouble, Handling, Empathy

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<tr>
<th>Table 3</th>
<th>Respondents’ Perceived Impact of Workshop Elements on Future Chronic Illness Care Practices</th>
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<tbody>
<tr>
<td>LIKERT SCALE RATING</td>
<td>Substantial Negative</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Workshop as a whole</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Home self-care assignment</td>
<td>4.0 (0.7)</td>
</tr>
<tr>
<td>Session 1</td>
<td>4.0 (0.6)</td>
</tr>
<tr>
<td>Session 2: small group</td>
<td>4.1 (0.5)</td>
</tr>
<tr>
<td>Session 2: large group</td>
<td>3.7 (0.6)</td>
</tr>
</tbody>
</table>
conflict management and persuasion\textsuperscript{36} and sexual history taking.\textsuperscript{37} However, the “student as patient” experience appears to have been more novel; we found only one prior publication describing this type of approach being used, in a non-chronic illness context.\textsuperscript{38}

The results of our pre-workshop quiz showed substantial gaps in the knowledge base of students about chronic illness, consistent with prior research:\textsuperscript{10,17,18} 62\% of matriculating students were unable to distinguish between an acute and chronic illness on the pre-workshop quiz. Encouragingly, our brief, introductory CICW led to measurable, significant improvements in fundamental chronic care knowledge. A limitation of our intervention was that time and feasibility constraints precluded assessment of long-term changes in students’ chronic illness patient care behaviors resulting from the training. However, once our grant-funded longitudinal chronic care curriculum is fully implemented, we will incorporate direct observation of actual and simulated chronic care patient encounters to assess clinical behaviors.

Given our target audience—first-year students, most with little or no prior clinical experience—we were concerned that many could perceive the workshop as irrelevant. Fortunately, and again consistent with prior studies,\textsuperscript{10,17,18} only a few respondents seemed to feel this way, and their comments reflected a poor understanding of the complexity of chronic care and the amount of training and experience required to deeply assimilate the material. Thus, a small number of preclinical students may lack the clinical perspective necessary to incorporate early teaching in chronic illness care concepts. The experiential aspects of the training—the patient-centered interviewing role-plays and especially the novel self-care home assignment, a powerful “walk a mile in my shoes” experience—were generally well received. Some students’ attitudes toward chronic illness care appeared to improve as a result of the workshop, partially as a result of experiencing the difficulties entailed in adhering to a self-care regimen assigned noncollaboratively by a physician.

Many students felt that additional chronic care training would be desirable, particularly if presented during the clinical years. We view this as encouraging, since the CICW was intended to serve only as an introductory intervention. A variety of additional activities are being implemented under our grant, including advanced case-based training in ICIC concepts during our third-year primary care clerkship and a longitudinal chronic care home visit program. These and other activities will collectively span the predoctoral curriculum and provide students with repeated exposure to key chronic care concepts at various points in their clinical development.

Conclusions

In its accreditation standards for medical schools, the Liaison Committee on Medical Education (LCME) gives little guidance regarding education in chronic illness care, stating only that “Clinical instruction must cover all organ systems and include the important aspects of preventive, acute, chronic, continuing, rehabilitative, and end-of-life care.”\textsuperscript{39} Yet, there is now a substantial body of evidence suggesting that ICIC-based approaches to chronic care can lead to improvements in important patient outcomes.\textsuperscript{1} In the context of such evidence and our findings, we believe that providing students with longitudinal training opportunities in chronic illness care concepts and methods must become a high priority at all medical schools. The time seems right for stronger accreditation requirements for predoctoral chronic illness care training.

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Corresponding Author: Address correspondence to Dr Jerant, University of California, Davis, Department of Family and Community Medicine, 4860 Y Street, Suite 2300, Sacramento, CA 95817. 916-734-7081. Fax: 916-734-5641. afjerant@ucdavis.edu.

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