plenary discussion in which the diagnosis is revealed and the groups justify their choices of questions. These are commented on by the moderator with reference to the general principles presented in the lecture.

**What lessons were learned?** Students experience the element of team competition as stimulating and entertaining. The lively discussions within the groups before they spend their scarce tokens are especially stimulating to learning. Moreover, the groups provide a safe environment for feedback. Students report that allowing the groups to justify their choices afterwards helps substantially in consolidating the principles of efficient disease classification. The competition has been highly rated in student evaluations for 3 years and is rivalled only by live patient demonstrations.

In our experience, groups should be no larger than five students for maximum involvement in within-group discussions. With a total class size of up to 35 students, answering the questions posed by the resulting six or seven groups can sometimes be challenging for a single teacher. We therefore recommend a total group size of 25–30 students.

REFERENCE

1 American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*, 5th edn. Washington, DC: APA 2013.

*Correspondence:* Steven Bakker, Department of Psychiatry, University Medical Centre Utrecht, Hersencentrum Rudolf Magnus, HP A01.146, Postbus 85500, Utrecht 3584 CG, the Netherlands. Tel: 00 31 8875 56370; E-mail: sbakker2@umcutrecht.nl

doi: 10.1111/medu.13426

## Interprofessional drug safety: enhancing collaborative knowledge exchange

Lindsey J Ferrie & Andrew Sturrock

**What problem was addressed?** With an ageing population, health care professionals are increasingly managing patients with multiple co-morbidities and polypharmacy considerations. To do this effectively students must be able to apply fundamental principles such as pharmacokinetics to address drug safety issues in their own clinical practice but more importantly appreciate how this may overlap in the practices of other professionals. Problem-based or case-study curricula can only provide 'siloed' approaches to this learning and lack the complexity needed to show how interprofessional learning (IPL) enhances understanding of patient safety. This project uniquely brought together pharmacists and dentists (who, despite a high level of professional interaction are often forgotten in IPL education research[1]) to explore whether knowledge exchange and collaborative decision making at a pre-clinical stage of training could enhance students' understanding of drug interaction issues.

**What was tried?** A 3-hour, team-based workshop was developed by the University of Sunderland School of Pharmacy and Newcastle University School of Dental Sciences. Following a short ice-breaker activity, students were divided into mixed professional teams. The workshop covered two distinct drug interaction scenarios: anticoagulant and antibiotic therapy. Each scenario was a series of structured, decision-making questions that required equal knowledge input from both student cohorts for completion. The workshop was delivered by an interprofessional team (pharmacist, pharmacologist and dentist) to further demonstrate the benefits of collaborative learning to students. Two hundred and twenty-seven students attended the workshop (166 pharmacy and 61 dentistry) and completed a perception survey before and after the session to rate their therapeutic knowledge and understanding of health care professional roles.

**What lessons were learned?** One of the key observations made was the high level of communication and collaboration achieved between the two cohorts. Pharmacy students provided hands-on practical prescribing advice, whereas dental students were able to enhance the pharmacists' understanding of microbiology. Indeed, 82% of students agreed they now understood how to work with other professionals. This was interesting given these students had no experience of clinical team practice. What this highlighted was that focusing students on resolving patient safety issues rather than exploring the personal attributes of professional practice (the typical focus of IPL) enabled these pre-clinical students to engage more deeply with the session because of its timely relevance to their education.

In collaborating with colleagues to make a clinical decision, students began to appreciate the differences in attitudes to knowledge content across health care professions. Students reported a 41% increase in their ability to critically appraise the

decisions of other professionals. This was a clear sign that students were being encouraged to work in a higher cognitive domain than was expected for their stage of training. Students were gaining a better understanding of what knowledge content was of importance to them, comparing this with their professional colleagues and then synthesising this into a patient management plan.

Students were clearly able to contextualise, apply and enhance their therapeutic knowledge as a result of the session. Students reported a 32% and 27% increase in their antibiotic and anticoagulant therapeutic knowledge, as well as increases in their understanding of drug interactions and adverse drug reactions (32% and 24%, respectively).

REFERENCE

1 Wilson N, Soni A. Interprofessional working: a spearhead opportunity for dentistry and pharmacy. *Br Dent J* 2016;**221** (10):607–8.

*Correspondence:* Lindsey Ferrie, School of Biomedical Sciences, Newcastle University, Framlington Place, Newcastle upon Tyne NE2 4HH, UK. Tel: 0191 2087668;
E-mail: lindsey.ferrie@ncl.ac.uk

doi: 10.1111/medu.13442

## Medical students as teachers: hands-on quality improvement education

Kevin P Shah, Jaden R Kohn, Shreya Goyal & Diana E Stewart

**What problem was addressed?** Although the Association of American Medical Colleges encourages medical schools to incorporate quality improvement and patient safety (QI/PS) into training, medical students continue to have limited QI/PS exposure. It is estimated that less than half of medical schools have a formal curriculum for teaching students about QI/PS[1]. Limited faculty expertise reduces widespread implementation of QI/PS curricula. Both self-directed learning and peer-to-peer teaching in various settings have independently been shown to improve knowledge more than traditional didactics. We combined these strategies in a pilot programme to assess the efficacy of interactive workshops developed and led by self-directed medical students in improving peers' perceived usefulness and knowledge of QI/PS principles and skills.

**What was tried?** Student leaders in a medical school chapter of the Institute for Healthcare Improvement (IHI) Open School developed and led three QI/PS workshops from October 2015 to 2016, with a total of 66 attendees. Leaders acquired knowledge through self-directed participation in IHI's online QI/PS modules and involvement in other QI/PS initiatives. Workshop topics were selected based on identified QI/PS curricular gaps, relevance to medical students, and ease of teaching a new skill within a workshop format. Topics included patient hand-overs, process mapping and root cause analysis. Each workshop used a pre-workshop survey, brief didactic case-based discussion and small-group practical activity, large-group discussion and post-workshop survey. Workshops occurred during lunchtime and participation was voluntary.

**What lessons were learned?** Our workshops allowed student leaders with a passion for QI/PS to showcase skills that are relevant to medical students at any stage of training; workshops were specifically targeted to reach students at earlier stages of medical training who did not have prior exposure to QI/PS. Sixty-six learners participated in workshops: 62 pre-clinical medical students, two clinical medical students and two physician assistant students. Data demonstrated significant improvements in students' knowledge of, perceived usefulness of and confidence in employing QI/PS skills.

Personal anecdotes, discussion of research projects completed by student leaders and interactive activities and cases allowed learners to identify opportunities to apply QI/PS skills in their future clinical experiences, including patient care and operational research. We found that learners were highly receptive to learning from other students with an interactive approach designed to teach a tangible skill, rather than learning from a purely didactic lecture. We believe that interactive activities and cases designed specifically for students, by students, heightened the perceived relevance of content for learners. In the post-workshop surveys, learners expressed a desire to teach other peers about the learned QI/PS skill in the future.

This methodology of peer-to-peer instruction has the potential to serve as an innovative model that can be widely replicated at medical schools, given the limited number of trained faculty members in academic settings. It allows students to gain early exposure to important QI/PS principles and skills, emphasises the importance of assessing processes and measuring outcomes in a value-driven health