Michigan Physiological Society Introduces an Undergraduate Physiology Quiz Team Competition at Their Annual Meeting

Valerie VanRyn, Erica A. Wehrwein, and Susan M. Barman
Michigan State University, East Lansing, Michigan

Background on IMSPQ

Nearly 15 years ago while on sabbatical as a Professor of Physiology of the Faculty of Medicine at the University of Malaya in Kuala Lumpur Malaysia, Hwee-Ming Cheng pondered ways to encourage medical students to get excited about learning physiology (2, 5). The outcome of his creative reflection was the development of the first Intermedical School Physiology Quiz (IMSPQ) in 2003. He recruited teams of three to five students from eight Malaysian medical schools to compete in an oral quiz held before a live audience at the University of Malaya. Cheng served as Quizmaster and asked questions that covered nearly every organ system. The top performing team was awarded with a trophy named in honor of Prof. A. Raman, the first Malaysian Professor of Physiology at the University of Malaya, who died suddenly of cardiac arrest in 1998.

Within 5 years, the IMSPQ had grown to become an international event; IMSPQ 2008 included 39 teams, 26 coming from outside of Malaysia. By 2014, IMSPQ had grown to include teams from 90 medical schools (21 from Malaysia, 69 from elsewhere). The growth in participation led to the need to establish a two-phase competition, since including all teams would create huge time constraints, and this way teams are competing at the highest level. On day 1, there was a 100-question, true-false quiz to whittle down the number of teams that would participate in the oral competition on day 2.

In addition to several hundred medical students converging at the University of Malaya, each team brought one or more faculty mentors. To keep these mentors occupied while their students were taking the true-false quiz, Cheng invited a physiologist to lead a refresher course in their area of expertise. To date, these instructors have been from the U.S. and include Richard E. Klabunde [Professor of Physiology, Marian University College of Osteopathic Medicine, Indianapolis IN (2014)], Kim E. Barrett [Distinguished Professor of Medicine, University of California-San Diego (2015)], Susan M. Barman [Professor, Michigan State University, East Lansing, MI (2016)], and Walter F. Boron [Professor, Case Western Reserve University, Cleveland OH (2017)]. Both Barrett and Barman have reported on their positive experience with IMSPQ (1, 4).

Having been a part of IMSPQ 2016, one of us (Barman) can testify to the high energy level in the auditorium during the oral competition. The audience is packed with students and faculty cheering on their favorite team. The competitors on the stage are very intent on answering questions and will challenge the Quizmaster if they are convinced they answered a question correctly but were deemed to have provided a wrong answer. This meant a small panel of judges, including the refresher course instructor and faculty who did not have a conflict of interest, had to trust their own knowledge of physiology to make a final decision. This added to the intensity of this event. The final round of the oral quiz is a match between the top three scoring teams in the other rounds. In the end, one realizes that all the participants are winners since they have displayed an incredible level of competency in cellular and systems physiology. This should serve them well when they become physicians.

Planning for a U.S. Team to Participate in IMSPQ

In addition to the increased number of teams participating in IMSPQ, as described by Cheng (5), many of the faculty who have brought a team of medical students to participate in the IMSPQ in Malaysia have been inspired by the dynamics of the program and have developed a similar quiz in their home country. In at least some cases, winners of the regional competition have gone on to participate in the IMSPQ.

Refresher course instructors have returned to the U.S. in awe of what they have witnessed: several hundred medical students who were driven to prepare extremely well in an effort to be recognized as the team that demonstrates the greatest proficiency in physiology. In fall 2016, Barman and Barrett began a campaign to send a U.S. team to the next
IMSPQ. They came up with the plan to have the competition start at the APS Chapter level.

The majority of the teams that participate in IMSPQ are comprised of students who enter medical school straight out of high school. When Barrett and Barman were strategizing about the format for a U.S. team, Kim wisely suggested that we recruit undergraduates who are enrolled in physiology majors or specializations or even students who simply have taken and enjoyed a physiology course. After discussing this idea with the IMSPQ founder, Cheng agreed that the academic profile of this pool of students would be equivalent to that of the IMSPQ competitors. Cheng also advised that 7–10 teams would be ideal for an inaugural event.

After much discussion and strategizing, a decision was made to have the Michigan Physiological Society (MPS) host a quiz. We (VanRyn, Wehrwein, and Barman) prepared a proposal that Barman submitted to APS Council for their consideration. The plan was to recruit teams of undergraduate students from various Michigan universities or colleges and to hold a competition at the MPS annual meeting. We also requested that the winning team be allowed to travel to Malaysia to compete in IMSPQ with financial support from the APS. Although the APS Council denied the request as submitted, they encouraged Barman to have MPS hold a competition at their 2017 annual meeting and to use this as a stepping stone to entice other APS Chapters to follow suit. The hope is that once more chapters include a competition in conjunction with their annual meeting, then the U.S. may set up a competition among chapter winners (perhaps held in advance of the EB Meeting) to send the overall winning team to compete in the IMSPQ later that year.

**Planning for the Inaugural U.S. Quiz Modeled after IMSPQ**

The inaugural event was named the Michigan (Mi) Physiology Quiz (MiPQ, pronounced "my physiology quiz") and was held at Alma College (Alma, MI) during the afternoon of June 7, 2017, the day before the start of the annual chapter meeting. We initially fell short of our goal of at least seven teams by just one, so we planned to run the event with six recruited teams of undergraduate students. However, one team had to bow out at the last-minute due to scheduling conflicts. The five remaining teams (Ferris State University, Michigan State University, Michigan Technological University, Oakland University, and Wayne State University) were each comprised of three to five enthusiastic students, eager to face the challenge to see which school comes out on top, and a faculty mentor who helped them prepare ahead of time and served as a coach at the event. Barman served as Quizmaster for the inaugural MiPQ.

For the inaugural event, we chose questions from a book of questions and associated ideal answers compiled by Cheng (3). All faculty mentors were provided an electronic copy of this book for them to use when prepping their team for the MiPQ. Teams were also told that the format for the quiz would be for students to provide short answers to questions. As Quizmaster, Barman selected questions covering a range of topics (cardiovascular, neural, renal, and respiratory physiology) for each round of the event. These questions were of course not shared with anyone. Moving forward, the plan is to develop a bank of questions from instructors across Michigan who teach physiology. In fact, if the quiz expands beyond Michigan as hoped, we can get a much larger bank of questions by requesting submissions from physiology instructors across the U.S.

**Format for the Oral Quiz**

The rules and format described below followed as close as possible the original oral quiz format finetuned by Cheng for IMSPQ. The total number of sessions needed to complete a round will depend on the number of teams participating. For purposes of this description, we will assume 10 teams will participate.

Round 1 of the competition will be divided into two sessions, each with representatives of five teams (three to five students/team).

In each session, any three members of a team will compete. The composition of the competing team can only be changed at the beginning of each subsequent round except in acute illness afflicting a member.

In each session, one member of each team will step forward to answer questions. If there are five teams in a session, five students will step forward.

**Question 1** will be directed to the first student (sequence of teams determined randomly). The question will be read twice. The student will be given 15 seconds to respond. A correct answer will earn 3 points. There will be no penalty for a wrong answer.

If this first response is wrong or there is no response in 15 seconds, the question is open to the other four students only after the Quizmaster has announced, "The answer is wrong." or the 15-second timer has sounded. The first student to hit a buzzer after this will be given a chance to answer. Premature use of the buzzer will be penalized. No excuse will be allowed for unintentional use of the buzzer. A correct second response will earn 2 points. An incorrect second response will be penalized 1 point.

**Question 2** will then be directed to the second of five students, and the student will be instructed to respond within 15 seconds. The procedure that follows is repeated until question 5 is directed at the fifth student.

After the first cycle of five students is completed, the next five students – one from each team – will step forward to replace their team members. The quiz will proceed as above until the 10th question has been asked in the second cycle.

The third cycle of competition between the last five students completes the session. Each session of five teams will thus have a total of 15 questions (30 questions total).

This format will be repeated for the second group of five teams to complete round 1.

The team with the most points in each session of round 1 automatically goes to the semifinal round. In addition, the four teams with the next highest scores from among the remaining eight teams will also advance to the semifinal round. Thus the semifinal round will include six teams.

For the semifinal round, there will again be two sessions, each including representatives from three teams. The format will follow that of round 1; a total of nine questions will be asked in each session within the semifinal round (18 questions total),
The team with the most points in each session of the semifinal round automatically goes to the final round. In addition, the one team with the next highest score from among the remaining four teams will also advance to the final round. Thus the final round will include three teams.

For the final round, the format will be the same as for other rounds but only one session will be needed. The final round will include a total of nine questions.

First place, second place, and third place winners will be determined based on the scores earned by each team in the final round.

Several faculty or staff were recruited in advance of the event to help with the logistics of the quiz. In addition to the Quizmaster, three judges, who did not have a conflict of interest since they were not affiliated with a participating institution, were selected. When called on by the Quizmaster, the judges were used to decide whether an answer was correct in the event that it differed from the ideal answer. For this, they were provided with a number of physiology textbooks, as well as the question and answer key. Additionally, two time-keepers were selected and placed at a table with scoring equipment and timers. The time keepers were responsible for enforcing the time restraints on the question answers and determining which team buzzed in first. Last, two individuals served as score keepers, who kept an ongoing written tally of scores, mutually agreed on these scores, and then projected the scores on a large display screen of a PowerPoint slide (with the layout of a scoreboard that included all school mascots and scores), updated in real time for the audience to see.

Alma College hosted the event in a large auditorium; the seats of the auditorium welcomed peers, instructors, friends of the participants, as well as several early arriving MPS conference attendees. Three members of each team were seated at five individual tables in a half-moon formation on the stage; the Quizmaster was at a podium to their left near the front of the stage, and three judges were at a table to the left of the Quizmaster. We were fortunate to be able to borrow ADInstruments teaching hardware (PowerLab, push-button switches) and software (LabChart version 8.1.5), courtesy of Michigan State University Department of Physiology, to create a multi-input buzzer system that was connected to a monitor. Two time-keepers who handled the PowerLab equipment were at a table directly in front of the competitors. Two score keepers were in the upper audio-video room at the rear of the auditorium. Between the individual team tables and the scoring equipment, five microphones were set up, one for each team. These were placed in close proximity of the scoring equipment so that the microphones and the buzzers could both be easily accessible to the respondent. Each team had one representative at their designated microphone at any given time while the other team members remained at the table. In the instance that the student who was assigned the question either did not answer or answered incorrectly, the Quizmaster and/or judges verbally deemed the answer "incorrect," and the question was opened to the other teams. The buzzer system allowed two time-keepers to immediately determine which person was the first to respond, with the accuracy of a millisecond.

Rewarding the Participants

In keeping with naming the IMSPQ winning team members for a distinguished Malaysian physiologist, members of the first place MiPQ team were honored as the Warren Plimpton Lombard Award recipients. Lombard was one of the first professors of physiology in the state of Michigan (University of Michigan, 1892–1923) and the eighth APS President (http://www.the-aps.org/fm/About/presidents/introwpl.html).

All participants of MiPQ were treated to a pizza party, which also served as an awards ceremony. Members of the first-, second-, and third-place teams for MiPQ (Wayne State University, Michigan State University, and Oakland University, respectively; received certificates recognizing their accomplishments. Thanks to the generous contributions of some Michigan Physiological Society members, they also received a monetary award. Members of the first-, second-, and third-place teams each received $75, $50, and $25, respectively. All students participating in the MiPQ received a copy of the 25th edition of Ganong's Review of Medical Physiology, compliments of McGraw-Hill.
Future Plans

As mentioned above, teams were comprised of undergraduate students from Michigan universities and colleges for the inaugural MiPQ. We allowed students to participate as long as they were undergraduate students in the spring of 2017 and had taken a physiology course at some point in their college career, even if they graduated by the time the MiPQ event was held in June. For the first time at an IMSPQ, in 2017, Cheng allowed students enrolled in a masters degree program to participate. This will be discussed as an option for future MiPQ events.

Are You Interested in Starting a Physiology Quiz at Your Next Chapter Meeting?

If you are thinking about including this engaging event at your annual meeting, it is advisable to form a subcommittee of faculty and staff who can help with the logistics, including helping to recruit teams, soliciting questions from participating institutions (and others if possible), identifying time keepers, score keepers, and judges, and soliciting donations. Barman reached out to individuals in Michigan who have had leadership roles in APS or the Chapter for soliciting donations. In addition, someone needs to assume the role of Quizmaster, who will need to identify the questions that will be included in the various rounds of the oral quiz.

Teams that participate should work with their faculty mentors to prepare for the competition, perhaps even meeting weekly to practice answering questions.

If you are interested in starting a quiz for your APS Chapter, you are welcome to attend the MiPQ event to be held at Michigan Tech in conjunction with the fifth annual MPS meeting (June 14—15, 2018). Contact us for more information. Also, we welcome more in-state and even out-of-state teams and their faculty mentor/coach to participate in the second annual MiPQ. Contact Sue Barman if you have any questions (barman@msu.edu).

References