App helps combat antimicrobial resistance
By Kathryn Kaplonas

Antibiotics are a part of life-saving treatments for many infectious diseases. However, with the overuse and misuse of these important medications, the development of antimicrobial resistance is on the rise worldwide. Antimicrobial stewardship is the practice of minimizing antibiotic resistance by monitoring and limiting antimicrobial use. During their residency, Drs. Elizabeth Paffiti (Infectious Disease) and Paul Campell Critical Care Medicine) conceptualized the Spectrum MD app, designed with the busy physician in mind, the app is a point of care tool that aids in the selection of appropriate antibiotic therapy for various diseases.

Paffiti and Campbell collaborated with a software-development group as well as a multidisciplinary team from the University of Calgary. The final product, which took nearly two years from concept to implementation, allows health care professionals to enter select patient factors directly into the app and receive treatment recommendations specific to that patient. Furthermore, because guidelines and microbial resistance patterns differ among sites and provinces, the app is customizable to incorporate local sensitivities patterns.

Currently, customizable microbial profiles are available for hospitals throughout Calgary and the Foothills Health Care Group of hospitals in Vancouver. The team is also working on a children’s hospital version that will be launched later this year.

"We essentially imagined the tool we as physicians wanted to use, and created it," says Paffiti.

Resistance of antimicrobials can lead not only to drug resistance, but other health issues such as drug toxicity or complications such as Clostridium difficile colitis. Prolonged hospital stays, secondary infections and the treatment of other various adverse effects of antimicrobials also result in increased costs to the health-care system.

Paffiti says that while antimicrobial stewardship probably sounds quite boring, she and Campbell hope the app makes it more accessible, interesting and more mainstream.

As for future goals, there are many. The doctors not only hope to increase the number of medical centres that use the app, they hope to one day expand its capacity so it becomes a useful tool for outpatient care, in addition to the inpatient population it currently targets.

Augmented reality in medical education
By Julia MacGregor

This past summer, a mobile gaming app called Pokémon Go became a worldwide social phenomenon. The app encourages users to catch pocket monsters that appear in the real world through their phone screens. This new game is a simple example of augmented reality technology (AR), which uses a person’s view of their physical environment and through dynamic computer mapping, overlays visual information on top of it.
Dr. Irene Ma (PhD’15) has a different reason for All of outside gaming. She wants to take this technology into the medical school and residency training program, to train the next generation of physicians how to insert a central venous line correctly and safely.

“I know that simulation-based education improves outcomes in central venous catheterization (CVC),” says Ma, assistant professor in the Division of General Internal Medicine at the Cumming School of Medicine (CSM) and faculty member at the university’s Institute for Public Health. “As education, studies have found that we unintentionally miss teaching 10 to 20 per cent of elements to learners by accidently skipping steps and omitting explanations.”

Inserting a central venous line is a complicated and time-consuming procedure that can take four hours or more to teach. In the United States alone, physicians insert more than 5 million central lines every year to allow medication delivery, nutritional support and the measurement of blood flow within the body’s organs and tissues. They are necessary to care delivery, but there are numerous risks to patients if the procedure is performed incorrectly.

The procedure involves inserting a catheter into a patient’s internal jugular vein, which requires physicians to simultaneously operate a needle and an ultrasound machine.

Ma and the W2CC have been working with Edmonton-based company Snaps AI to build the medical education content for the CVC procedure into an augmented reality application. After donning a pair of special glasses that contain an outward-facing camera, learners can see their real-world surroundings enriched with instructional content and images. They then go step-by-step through the procedure with a task trainer mannequin.

“Rather than any one individual holding up a small group of learners to master a certain step, each learner may go at his or her own pace to practice and develop the skill,” says Ma.

W2CC researchers are currently working with Snaps AI on evaluating the different iterations of the CVC application through a variety of methods. After the application is finalized, next steps are to bring this technology into the Cumming School of Medicine’s Post Graduate Medical Education Program and evaluate its effectiveness with real medical learners.

If there is supporting evidence that augmented reality can effectively teach a complicated procedure such as CVC, this technology could then be used to teach learners a wide array of bedside procedures and aid in meeting faculty teaching demands.

“The field of augmented reality is new territory for me,” says Ma. “To work with the W2CC team and Snaps AI in translating the educational content into this application is very exciting.”