

DECISION SUPPORT

MEDICAL APPS ALLOW DOCTORS TO
KEEP INFORMATION IN THEIR POCKETS

Time was, lab coat pockets were stuffed with folded papers, laminated drug cards, obstetric wheels and other tools of the medical trade. Today's residents and medical students are more likely to carry mobile phones loaded with apps that assist them on their rounds.

They may not realize an Upstate connection.

Joshua Steinberg MD, an Upstate clinical professor and alumnus, collaborated with computer science students from SUNY Binghamton to create eight medical apps available for download in the iTunes store, and he's got four more in development.

The apps, designed for clinicians and students, provide "decision support," putting information at the point of care. No need for a computer.

"Doctors want quick information. They don't want to have to sit down, open a textbook and read an entire chapter. Doctors want answers within 10 seconds," Steinberg says. "This has been studied. They've had medical students follow doctors on busy days in various settings just to see how often they don't answer questions come up. Questions come up an average of 10 times per day, per doctor, and they don't seek answers. Nearly 80 percent of the time, the doctor will take an educated guess and make adjustments later, refer the patient to a specialist, or order additional tests.



"We compensate in all kinds of ways," says Steinberg.

Which is why he decided to delve into mobile information.

Steinberg says in the early 2000s, he was a "big-time user" of Palm Pilots, the hand-held personal digital assistants. By the late 2000s, he was wishing for some tools that were not available, and about the time he got comfortable with Palm Pilot software construction, the Palm Pilot went the way of the dinosaurs. So Steinberg looked into creating apps for the iPhone and discovered that "you actually have to know what you're doing as a programmer."

So he called Madhu Govindaraju PhD in the computer science department at SUNY Binghamton.

Govindaraju chooses a graduate student or senior undergraduate who has an interest in learning Apple programming and who needs an independent project. The student works together with Steinberg and Govindaraju to produce the app. "They get to be involved in a real world project," Govindaraju says.

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Joshua Steinberg MD, clinical professor of Family Medicine, discusses medical apps with Edward Grove, medical student at Upstate's Binghamton campus.

A good medical app:

1. Answers questions that arise on a regular basis.
2. Provides answers within 10 to 30 seconds.
3. Addresses something that's too complicated to memorize.
4. Solves high-stakes problems, in which getting it wrong can have big consequences.
5. Deals with material that doesn't require constant updating.

Sources: Drs. Jeremy Joslin and Joshua Steinberg

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Steinberg Medical Apps

Steinberg says, "I liken it to building a small house. I don't know how to build a house, but they do. They know how to do the foundation and the plumbing and the wiring. They frame the structure. I come in and put up the drywall and decorate.

"I have a vision for what I want the software to look like and how doctors will use it. So we have to go back and forth on design interface."

Learning how to make Apple software may take the student four or five months. "Once they build me a basic structure for an app, then I've been able to adapt it and change it into a few other apps within days or weeks," Steinberg says.

He has not produced apps for Android phones because it is difficult enough to build for a single platform.

The apps Steinberg creates are free.

"I'm an educator. I train students and residents, and I want to make tools that help them. I want to make tools that help my colleagues. So I want to share them," Steinberg says. Also, he cannot monetize someone else's property. He takes

existing information, such as guidelines from various medical societies, and makes it available at the fingertip as an app.

Joslin Chest Atlas & Other Apps

Jeremy Joslin MD, fellowship program director of emergency medicine at Upstate, has created three of his own Apple apps, including the running log, iRun, for \$3.99, and the popular Joslin Chest Atlas, for \$14.99.

"I got into the business when I was a resident, when I was poor and starving and I needed an extra \$10 any way I could get it," Joslin says. As an undergraduate human biology major, he worked in the information technology department of an insurance company and had an interest in computers.

He soon realized that Apple did not make it easy for programmers to create apps. The coding is complicated, but so are the efforts to get a completed app offered in the iTunes store. As he mastered both, Joslin formed a company that creates apps for hire and recently finished a project for the *New England Journal of Medicine*.

Joslin now plans to turn the Joslin Chest Atlas app, an interactive collection of radiographic chest

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images, into an Apple textbook. Using tools Apple makes available for free, authors can include video, audio and interactive quizzes on the pages, something Joslin believes will further revolutionize education.

Meanwhile, Steinberg has heard from faculty from other institutions, who use his apps to teach certain subjects. He has tallied 90,000 downloads of his apps, worldwide, and he says many of the reviews posted on iTunes are in languages he cannot read.

His “ABG Acid-Base Eval” app has more downloads than all of his other apps combined. It helps providers analyze blood gas results, something a few other apps claim to do.

“My app is different. Mine is educational,” Steinberg says. “You type in the blood gas results, and then the app walks users through a thinking process. Look at this number. Is it normal, elevated or depressed? Second, look at whether this is a breathing problem or a metabolism problem. Each screen tells you about metabolism or the lecture you long since forgot from medical school. Then it summarizes what you, yourself, have discovered, and says to go look at these options.

“Each time you use it, you learn the material a little bit more. It shows the thinking process, and you decide whether you agree with it, whether it makes sense, whether your patient is a special case.”

Lead Screening & Other Apps

Steinberg’s newest app, created with a senior resident, will help evaluate pulmonary function tests. Other residents are working with him on a “Pap app,” which will use the latest guidelines on Pap smears and cervical cancer screening to answer every question a doctor might have about what to do for various results. He is also collaborating with the Broome County Health Department on an app for screening for lead poisoning, and he is two-thirds of the way done on an app for concussion management.

In decades past, the “best” doctor was the one who could remember the most. That’s not as true today. Steinberg tells residents and students to “study hard. Learn as much as you can, but recognize that you can’t know everything. You can still provide good care if you know how to look everything up.” ■

Joshua Steinberg’s apps

ABG Acid-Base Eval, which walks clinicians through a stepwise analysis of ABGs and electrolytes to help reach a diagnosis.

Eating Disorders, a collection of evidence-based tools for screening, a comprehensive evaluation, laboratory workup and guidance on treatment setting.

WarfarinGuide, information that includes the latest recommendations on indications and treatment duration, protocols for the initiation of Warfarin and one for dose adjustments.

PreOp Eval, which helps evaluate and prepare adults patients for non-cardiac surgery.

GBS Guide, a reference on intrapartum antibiotic prophylaxis and newborn management in order to prevent invasive Group B Strep in the newborn.

EFM Guide, a collection of electronic fetal monitoring guidelines.

Pneumonia Guide, which distills and organizes guidelines from the American Thoracic Society and Infectious Disease Society of America on management of community acquired pneumonia.

PE & DVT dx tool, an algorithm for diagnosis of deep venous thrombosis and two for diagnosis of pulmonary embolism.

Jeremy Joslin’s apps

Joslin Chest Atlas, an interactive and comprehensive collection of common and uncommon radiographic findings of the chest.

TickDoctor, a tick identification atlas of the most common ticks encountered in North America.

iRun, a running log for runners who don’t want to carry an iPhone on long runs or in the rain.

Search “Josh Steinberg MD” in iTunes for his apps. Visit AnabolicApps.com for Joslin’s apps.



BRAIN TUMOR TREATMENT

A Syracuse teen has relief from headaches after a tumor was removed from her brain in a “first” at Upstate earlier this year.

Pediatric neurosurgeon Zulma Tovar-Spinoza MD performed a magnetic resonance image-guided laser ablation of a benign tumor called a pilocytic astrocytoma in February. She said her patient, Nazirah Trice, 17, of Syracuse, is recovering well. “Her vision is improving, as well as her balance,” Tovar-Spinoza said.

Trice developed headaches over the summer. When her mother noticed changes in her eye, she took her to an eye doctor. The eye doctor dilated the girl’s pupils and looked inside. “He stood up, walked across the hall and went and called the specialists,” Isra Muhammad remembered. The next morning, her daughter went to another ophthalmologist, who sent her directly to Upstate University Hospital.

Tovar-Spinoza said Trice’s tumor was not cancerous, but it was mid-brain, in a delicate location.

It was to the left of her thalami, an area of the brain that controls movement, near fibers that play a role in eye movements.

In researching treatment options, Tovar-Spinoza found Visualase, a Houston-based company that produces advanced laser and image-guided technologies. “What a perfect technique for this girl,” she thought, and scheduled a trip to Texas to learn more. Within a couple months, the doctor had arranged to borrow the Visualase equipment to help Trice.

Instead of a major open brain surgery, Trice underwent a minimally invasive technique that Tovar-Spinoza said is ideal for patients who have deep and treatment-resistant tumors.

Trice was at the hospital Feb. 9 for magnetic resonance imaging. The next day, her head was secured to the operating table to prevent movement, and Tovar-Spinoza made a hole in her skull about the width of a pencil. Guided by MRI images, the surgeon advanced a needle to pierce the membrane surrounding the brain, and then marked how deep the



Pediatric neurosurgeon Zulma Tovar-Spinoza MD (right) with brain tumor patient Nazirah Trice, 17

laser probe should go. “The goal is to go just inside, to the inner, deeper part of the tumor,” she said.

Once the laser was in place, Trice was moved to the MRI suite, and a new scan verified the laser’s proper position. Then Tovar-Spinoza started the ablation, sending laser energy into the tumor at 171 degrees Fahrenheit. “You move the laser in or out to make sure you are ablating the whole contour of the tumor,” she explained. The body reabsorbs the tissue that the laser destroys.

The procedure lasts 30 to 45 minutes. Afterward, a single stitch seals the hole. Trice recovered in the ICU because of the potential for swelling, but Tovar-Spinoza said this procedure eventually could be done outpatient.

This laser ablation technique was used first in patients with malignant tumors who did not respond to medications. Now it is used for brain

tumors and patients with lesions that cause epilepsy. **The operation on Trice was the first case of a cystic tumor treated using the technique,** Tovar-Spinoza said. The same technology is being used in tumors of the prostate, liver and kidneys.

The laser treats the solid part of the tumor, but in Trice’s case, a cyst containing liquid still remains. It presses on her upper brain stem, causing her vision problems. The surgeon is monitoring the cyst, which may shrink on its own. If it doesn’t, Tovar-Spinoza said she may have to place a drain.

Trice’s mother said learning of the tumor’s existence offered some relief, because they finally understood what was causing Trice’s symptoms. The prospect of brain surgery was worrisome, but she believed they were in good hands and appreciated the chance to try a new therapy. “Everybody who took care of her was great,” Muhammad said. “There was never a time when we felt like we didn’t know what was going on.” ■



Anil Ghimire MBBS Mohamed Heikal MD, FCCP Anupa Nadkarni MD Birendra Sah MD

PULMONARY & SLEEP MEDICINE: NEW STAFF & OFFICES

Upstate’s Department of Pulmonology has expanded services by adding two additional outpatient offices and four new physicians: Drs. Anil Ghimire, Mohamed Heikal, Anupa Nadkarni, and Birendra Sah.

Upstate Pulmonary and Sleep Medicine provides a variety of outpatient services, including pulmonary function testing, sleep studies and bronchoscopies, as well as consultations and on-going management and therapeutic services. The practice is available at three locations:

Upstate University Hospital, the Physicians Office Building at Upstate University Hospital at Community General and at the University Health Care Center at Harrison and Townsend streets in downtown Syracuse.

Robert Lenox MD, division chief of pulmonary/critical care, says patients previously waited about a month for appointments. Today, most can be seen the same week. For appointments, call 315-492-5804. ■

EMTs & STROKE PATIENTS

RESCUERS WHO BRING SUSPECTED STROKE PATIENTS TO UPSTATE NOW HAVE A WAY TO LEARN ABOUT THEIR PATIENTS' OUTCOMES

Upstate Stroke Coordinator Maria Lumbrazo MS, FNP-C placed a locking mailbox inside the ambulance entrance, with forms inviting paramedics and EMTs to request follow-up reports on patients they believe had strokes. Lumbrazo mails response letters to the ambulance station for each provider, explaining how his or her patient fared.

In the first five months, she received 11 requests for followup. Nine patients had strokes; two had other problems. “This raises awareness of stroke among EMTs,” Lumbrazo says. “It teaches them about outcomes and helps in their understanding of what is done at the hospital and how that relates to their evaluation from the field.”

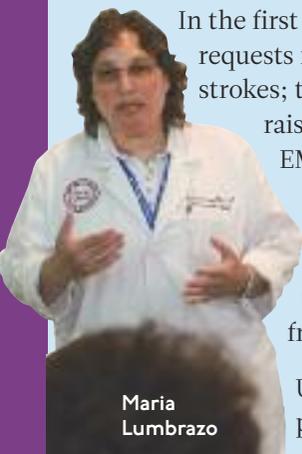
Upstate is the best choice for stroke patients throughout Central New

York because it has on duty 24/7 board-certified doctors in emergency medicine, neurology, neurosurgery and radiology and is the region’s only hospital with specialized neuroscience and rehabilitation floors.

Upstate is New York’s first designated NYS-DOH stroke center. In addition, Upstate is a DNV Primary Stroke Center, has obtained “Gold Plus” recognition from the American Heart Association and American Stroke Association, and is the only center to receive a five-star rating from HealthGrades.

Time Is Brain

Speed is crucial in taking care of people who have had strokes. That prompt response begins with an accurate diagnosis made by a paramedic or EMT. Lumbrazo gives a pewter pin shaped like a brain to any rescuer who accurately diagnoses a stroke in a patient. ■



Maria Lumbrazo

UPSTATE ACQUIRES RivA: NEW IV ROBOTIC TECHNOLOGY

A new robot ensures accurate preparation and tracking of intravenous solutions for pediatric and adult patients at Upstate. Upstate is one of the first hospitals in New York state to install RivA, robotic IV automation technology.

“This technology enables Upstate to provide safe, efficient, effective care to all of our patients,” said John McCabe MD, chief executive officer of Upstate University Hospital.

Through RivA, medications are prepared by a robot in a sealed, sanitized, air-controlled “clean room” in the hospital’s pharmacy, which meets government standards for preparing sterile solutions. RivA has the ability to operate 24 hours a day.

Steven Ciullo, Upstate’s Pharmacy Services director, said that RivA allows for a level of accuracy and consistency that goes beyond what can be accomplished manually when it comes to preparing sterile IV medications that are dispensed in syringes or IV bags.

“This is especially important when preparing pediatric IV medications that contain very small doses of potent drugs,” said Ciullo. “RivA greatly reduces the risk of medication error in that it gives us the ability to validate that the correct drug and concentration is being used based on geometric analysis of the drug containers, bar-code validation and specific gravity measurements.”

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PEDS URGENT CARE CENTER

UPSTATE GOLISANO AFTER HOURS CARE IS NOW OPEN

Central New York's first pediatric urgent-care center opened at the end of February at Upstate University Hospital at Community General. The center, called Upstate Golisano After Hours Care, is dedicated to caring for children – from newborns to those 21 years of age – with minor injuries or illnesses that do not require a visit to a hospital emergency room.

The center is open 4 to 11 p.m. weekdays and noon to 11 p.m. weekends. Patients park in the hospital garage for free and follow signs to After Hours Care, on the first floor of the hospital at 4900 Broad Road, Syracuse. Children are treated regardless of insurance status.

The four-room center offers services such as x-rays, IV rehydration, laceration repair, pharmacy and laboratory.

“Our team of Upstate emergency medicine and pediatric specialists are caring for patients in an



Alison McCrone MD is medical director of the Upstate Golisano After Hours Care center, located at Upstate University Hospital at Community General.

environment that reflects the Upstate Golisano standard for excellence,” said Medical Director Alison McCrone MD.

For more information, visit www.upstate.edu/gch/services/afterhours/ or call 315-492-KIDS (5437). ■

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In addition to improved patient safety, the hospital will also realize a savings of up to \$500,000 a year. “Before RivA, we needed to outsource the compounding of certain IV solutions,” said Ciullo. “We are now able to perform this function at Upstate.”

RivA is a product of Intelligent Hospital Systems of Winnipeg, Manitoba, Canada. Currently, Upstate is using RivA to prepare non-chemotherapeutic solutions. Ciullo says that Upstate pharmacy has plans to install a second RivA system that will prepare IV chemotherapy medication for cancer patients in the new Upstate Cancer Center, scheduled to open in 2013. ■



RivA prepares IV medications with precision