breakthrough

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Medicine for the Greater Good

Medicine is a public trust

THE JOHNS HOPKINS CENTER FOR INNOVATIVE MEDICINE

breakthrough

In this Issue

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BELLS AND WHISTLES, AND HELPING PEOPLE

You may have noticed that we have a tech theme going with this issue of *Breakthrough.* It's not technology for its own sake; we're not impressed with bells and whistles just because they can do cool things. What we are interested in is helping people – our patients and the people in our community – to live better lives.

One tiny example of this may surprise you: it's not anything new or fancy, it's the humble hearing aid. Jeremy Walston, after years of studying people as they get older, has come up with some common-sense things that the healthiest and happiest have in common (see Page 12). If you need a hearing aid, get one: because if you can't hear what people are saying, you may start to withdraw and isolate yourself, and that hurts your brain. Connecting with others is good medicine.

That theme of caring and reaching out is what our Medicine for the Greater Good initiative is all about (see Page 20). For us here in Baltimore, the recent riots brought home how far we all have to go. In November, our Bayview Internal Medicine Residency Directors wrote in the *New England Journal of Medicine* that as physicians, we naturally "want to provide outstanding medical services to this vulnerable population" here in our neighborhood. But unless we also address the "intractable sense of hopelessness," we will not truly succeed.

We continue to do our best to turn out more caring physicians and to honor our finest clinicians. You can read about the "sticking power" of our Good Doctor Initiative on Page 18, and meet one of our newest inductees in the Miller-Coulson Academy of Clinical Excellence on Page 22.

And now, what about all that new technology? Well, it's pretty exciting stuff. One of our residents, Francoise Marvel, has developed an app to help our patients who have gone home after being hospitalized for a heart attack. Too many of these people – all over the country – end up coming back to the hospital within a month. Just about all of them have a cell phone, and Marvel believes this may be the key to keeping them healthier (see Page 7). Jiande Chen, a scientist in our Amos Food, Body, and Mind Center, has developed a smart watch for acupuncture (see Page 10). It delivers a safe, painless dose of electric current that penetrates as deeply and precisely as an acupuncture needle – but patients can use it in their own homes, right after every meal, to help their stomachs work better. The CIM celebrates innovative thinking, and this blend of Eastern medicine and cutting-edge science offers an exciting new approach that may help treat other problems, as well.

Finally, we come back to where we started, at the patient's bedside. Handheld ultrasound (see Page 4), a pocket-sized device, lets doctors watch the patient's heart contract, measure blood blow, check the heart valves, spot an aneurysm and even detect a gallstone. It doesn't replace the physical exam, it just helps us do it better – so that we can help people better.

I hope you have a wonderful summer,

David B. Hellmann, M.D.

WE BELIEVE

Medicine belongs to the public. Our mission is to create a different kind of academic medicine, to tear down ivory towers, share knowledge and dedicate ourselves toward one goal – making life better for patients.

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Bedside Tech and Osler's Ghost

What is it about Sir William Osler, anyway? We evoke his name around here a lot, and for good reason: he was the founding Professor of Medicine at the Johns Hopkins School of Medicine. He was also a master diagnostician whose teaching at the bedside revolutionized medical education. On the faculty today are many excellent physicians who were taught by excellent physicians whose teachers learned their craft, in turn, either from Osler or one of his residents. So, his legacy here is strong, and his ghost seems to be very much with us.

But it's been nearly 130 years since the Hospital opened, and by and large, most internists and residents are still basically approaching the patient at the bedside with "no better tools than Osler used" – mainly a stethoscope, an ophthalmoscope, for looking into the eyes, an otoscope, for checking the ears, and a percussion hammer, says Vice Dean and CIM Director David Hellmann, M.D. "And that's unfortunate, because even in Osler's hands, these tools in a number of settings weren't very good. There's no reason to think the physical exam has mystical powers when it doesn't."

In case you ever wondered exactly what a doctor is thinking when you're told to "Breathe in, breathe out" as the stethoscope moves around and the exam room is in otherwise dead silence, here's some of the inside scoop from Hellmann:

"You can tell some things about how the heart is functioning in a physical exam," he says. "You can tell if valves leak and if a person has heart failure. But the physical exam is very inaccurate in estimating ejection fraction," in other words, how much of the contents of the left ventricle are being ejected with every beat. A low ejection fraction is often silent, yet "ejection fraction is one of the most important predictors for how someone is going to do – and treating it prolongs life."

Have you ever wondered exactly what a doctor is thinking when you're told to "Breathe in, breathe out" as the stethoscope moves around and the exam room is in otherwise dead silence?

Determining if someone has a low oxygen level is "perhaps more straightforward," says Hellmann, in that "oxygen level can't be measured by physical exam at all. And yet, it is life-threatening when low."

Another part of the physical exam, where the doctor feels around your abdomen, can suggest when someone has ascites, or fluid in there. But not always. "I admitted a patient years ago," recalls Hellmann. "Four doctors swore he had ascites by physical exam. The next day the ultrasound showed he was just obese."

Hugely enlarged spleens "can be detected well on physical exam by feeling the tip of the spleen." However, most of the time, the enlargement is not huge and "you can't feel it. But you suspect it on percussion – tapping your finger over the belly – because the sounds you usually hear, which are tympanic (hollow-ish and resonant, like the sound of a drum) over the stomach turn to solid sounds when the air–filled stomach is crowded out by the log-solid, enlarged spleen." However, he adds, "eating a big Mac with fries will cause the same changes in percussion! Fingers can be fooled. But ultrasound is not fooled."

Imaging tests, of course, can show all of these things – but not immediately, right there at the bedside. The bedside physician needs to put in an order for the test, someone must wheel the patient down to Radiology, where a tech will administer the test, and then later a radiologist will read it. Sometimes this can take a day; sometimes even longer.

ULTRASOUND AT THE BEDSIDE

So, how can we improve the physical exam and ability to make a diagnosis at the bedside? WWOD? What would Osler do?

Sir William Osler might be very interested in the use of a device that fits easily into the pocket of a white coat, called handheld, or hand-carried, ultrasound.

With it, instead of just listening to your heart, doctors can actually watch it contract. Instead of simply taking your pulse, they can measure your blood flow, check your heart valves, look for narrowing or an aneurysm in major arteries – which means you're at risk of having a stroke or heart attack – and even spot a gallstone. They can do all of this in real time, right there, in the emergency room, hospital bed, or clinic, instead of either wheeling you to Radiology or worse, making you come back for an appointment to get an image.

Handheld ultrasound is not a new idea for Hellmann; it's one he has believed in for more than a decade. He worked with a company called SonoSite to get a portable ultrasound machine into the hands of residents, and in 2005, he and colleagues published a study in the *American Journal of Medicine* demonstrating that residents could indeed learn the basics of handheld ultrasound and use it successfully at the patient's bedside.

Consider, Hellmann says, the example of the defribrillator: "They used to be big and expensive, and only used in hospitals." No one imagined at first that such a powerful device could ever be used safely by non-medical people. But it has been, with great success. Now, in fact, the defribrillator is as visibly available as a fire extinguisher in many places where there are lots of people: hotel lobbies, airports, and big box stores such as Home Depot.

Hellmann doesn't advocate putting handheld ultrasound in Wal-Mart, but he would like to see it become a staple of the doctor's bag. Already, because of Hellmann, internal medicine residents at Johns Hopkins Bayview – unlike internal medicine residents anywhere else – are trained to use handheld ultrasound. Now kidney disease specialist Tariq Shafi, M.D., is leading studies to find out whether using handheld ultrasound "can make diagnosis faster, cheaper, and more convenient to patients while improving patient care." Because "imaging is not really available at the point of care," says Shafi, patients in hospital beds or the clinic must go where the big machines are – "even though the technology has improved and become miniaturized and is available in a hand-carried device." He believes the use of handheld ultrasound will "complement the physical exam, not replace it. It can actually improve our diagnostic skills, as we get more information in real time about what's happening to our patients. It can also improve our connection with the patient."

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If you have ever had medical imaging, most likely a technician performed the scan, didn't tell you anything, and you either went home or back to the hospital room and waited for a radiologist to read the test and then tell your doctor, who told you the result. With handheld ultrasound, the doctor reads the result right by your side, and tells you about it in real time.

Some educators fear that if young doctors learn to rely on technology in making their initial diagnosis, then their clinical skills will get sloppy – that they will lose the art of the physical exam. That they will rely on the technology as a crutch – the medical equivalent of people who can't get from Point A to Point B without Google maps or GPS. "But really," says Shafi, "the problem is, you don't get the all the answers you need from just a physical exam." In his field of nephrology, for instance: "People with advanced kidney disease on dialysis are often in a state of volume overload. Water can go in," but with the kidneys not working at all, that water has no way to come back out. "We can assess someone's volume status with certain physical exam skills – checking for edema in the legs, or listening for lung sounds that suggest fluid overload. These tend to become really obvious when someone has severe volume overload."

Figuring this out at the bedside is now largely subjective, Shafi says. "If we think somebody has too much fluid and the person actually is not in overload, and we remove too much fluid on dialysis, it can make the blood pressure go down," the results can be disastrous, and can include a stroke or heart attack. On the other hand, if the patient is in volume overload and the doctor doesn't realize it, that extra fluid can cause blood pressure to escalate and make the heart work too hard.

Handheld ultrasound can help make the call. If the probe is held to the heart, it can show how well the heart is squeezing blood. Held to the inferior vena cava, the large vein that runs through the abdomen and carries oxygen-depleted blood from the lower body back to the heart, it can show whether the blood flow is normal or not. "It's like looking at a river," says Shafi. "If it's big and stretched and looks like it's overflowing its banks, you know there's too much fluid." Held to the lungs, the ultrasound probe

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can show signs of vascular congestion. Because of hand-carried ultrasound, Shafi explains, "I've really changed my clinical approach."

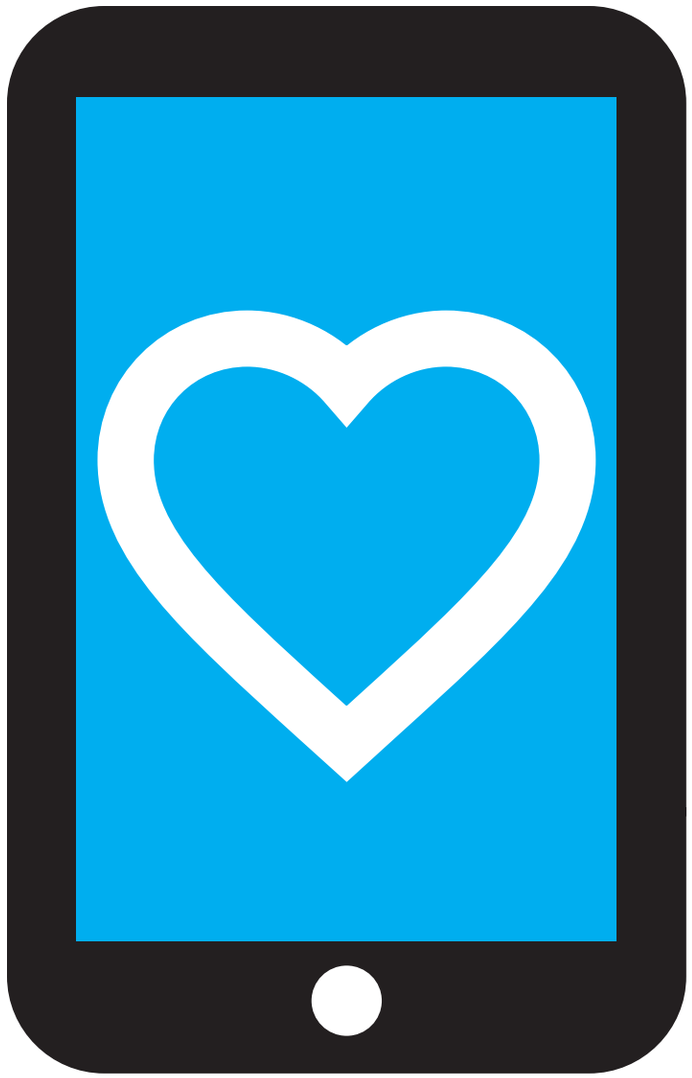
The device does require training; a doctor can't just point and shoot and have a machine come up with a diagnosis. If, say, you are a doctor and you use the device, did you read it correctly? Did you miss something? Or, at the other end of the spectrum, did you get too much information? "Do you pick up things that may not need to be found?"

These are among the questions Shafi hopes to answer in the near future. But his hypothesis, and Hellmann's, is that this technology – even in a world that's already so high-tech – can improve the way we practice medicine at the bedside.

Our doctors are not alone in worrying about a device somehow adding another layer of distance between them and their patients, and diminishing the quality of their interaction. In December 2015, two Harvard doctors wrote in the *New England Journal of Medicine:* "As we move deeper into the electronic age, we are pulled father from our patients… House officers must document everything and monitor all that is documented, spending more time face to face with a computer terminal and less with patients… remotely monitoring patients who may lie only feet from the computer." That article focused on the use of electronic stethoscopes as a way to use technology to "draw us closer to, rather than farther away from, our patients," and concluded, "Rather than letting the collation of data characterize us as clinicians, we would do better to see ourselves as 'those who visit patients in their beds.' That is the literal meaning of the Latin *clinicus,* from the Greek *klinike,* (practice) at the sickbed. Devices that bring us closer to the bed breathe new life into our roles as healers." ■

App with a Heart

Helping Patients Stay Out of the Hospital



It is a truth universally acknowledged, as Jane Austen might say, that the day of discharge from the hospital – any hospital – is like being at a bad party or uncomfortable family reunion. It's interminable. Everybody's ready for it to be over, including you; you just want to go home.

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Shortly before it's time to go, a nurse goes over your discharge instructions. Maybe you nod a lot – but maybe you also glaze over, feeling too worn out or overwhelmed to think about the big list of medications and follow-up appointments.

If this haziness about what you're supposed to do when you leave the hospital sounds familiar, that's because you're not alone. It happens to a lot of us, and this is not good; that discharge information is crucial. More than 39 million hospital discharges happen every year in the U.S., and nearly 20 percent of those people wind up back in the hospital within a month.

These are dismal statistics. Francoise Marvel, M.D., a second-year resident in internal medicine at Johns Hopkins Bayview, wants to change them – starting with helping heart attack patients who are at highest risk of being readmitted within that critical first 30 days. Her key to helping these people recover: their cell phones. Studies show that about 80 to 90 percent of Americans own a cell phone capable of receiving medical information. Rich or poor, young or old, tech-savvy or not; doesn't matter. Cell phones transcend demographics.

"Unfortunately," says Marvel, who plans to specialize in preventive cardiology, "hospital discharge is a process that is fraught with patient safety issues." The discharge instructions are often written by an intern or medical student, and frankly, the quality varies. That information is then handed off to a nurse, who conveys it to the patient. Also, the timing is bad. Patients may get the go-ahead to leave in the morning, but the actual discharge usually doesn't happen until late afternoon. The day drags on, and the last thing those people may feel like doing is sitting through a mini-seminar on medications, lifestyle and dietary changes.

And yet – especially for those who have stents put in to help a clogged artery stay open – understanding and following this information truly is a matter of life and death. Another problem, says Marvel, is that the proverbial wheel is being reinvented with every patient. "The cardiology follow-up instructions are always very similar," she says. "Go to cardiac rehab, avoid salt, measure your pulse and blood pressure, avoid alcohol and stop smoking," etc. And if you have a newly placed stent, you must take aspirin and Plavix, two essential blood-thinning medications – these allow your blood vessel to knit a blanket of cells to cover the stent. "That stent is very sticky." Until the cells grow around it, without those blood thinners it's almost certain that a clot will form. But that message doesn't always come through loud and clear, and some patients don't understand the urgent need to take these pills every single day and not stop for any reason, and that "if they don't do this, they will have a massive heart attack."

Rich or poor, young or old, tech-savvy or not; doesn't matter. Cell phones transcend demographics.

This message, Marvel says, is far too important to tell people "right before they get in a wheelchair and get picked up by a family member." She cites a 2013 study published in the *Journal of the American Medical Association,* showing that 40 percent of patients over 65 "who felt that they had a good understanding of their discharge instructions" could not accurately describe the reason for their hospitalization, and 54 percent "did not accurately recall instructions about their follow-up appointment." Another study of recently discharged patients aged 64 and older found that "the majority did not understand the new dosing of medications they were taking" or the reasons for medication changes. "What we know from the research," Marvel says, "is that many patients are likely to come back to the hospital for avoidable reasons," and the discharge process is largely to blame.

She is designing the Health-e App for smart phones. It will serve as a "discharge navigator," helping patients transition from the hospital to the home after a heart attack. Designed for people who, like most of us, "don't know the first thing about cardiac rehab," the app will help patients follow up with the heart doctor and connect with a pharmacy. It also will walk them through changing their diet – cutting way back on salt, for instance – and other lifestyle changes. The app will connect patients with social services and help them apply for insurance if they don't already have it. "Last week, someone didn't know that he could get his medications for free because he's a veteran. It's really mind-blowing; the more you work with patients, the more you realize there's so much to be done to help them," not just in the hospital, but in getting back to their lives.

"It keeps you up at night when you realize we keep giving the same basic instructions that were typed out 50 years ago."

After a heart attack, most patients stay four days. Marvel plans to give the app on Day 2, "so they feel comfortable with it and have a chance to preview the app so they'll know why and how they need to take care of themselves when they get home." This user-friendly, guided, evidence-based approach, she envisions, will be much better than "the four to five pages of relatively unhelpful, EMR (electronic medical record)-automated, inconsistent instructions."

The American Heart Association estimates that one in five men, and one in four women, die within a year after having a heart attack. "Looking at the risk factors for why you would die within that window, medication and therapeutic adherence – knowing what you need to do and take, and being consistent – is the number one reason," Marvel says. "It keeps you up at night when you realize we keep giving the same basic instructions that were typed out 50 years ago. We're doing a huge disservice to our patients."

Smart phones, Marvel says, can become a tool for "wraparound care." But right now, hospitals are not routinely using them as such. "If I ask you, where are your car keys, you might have to think about it. But if I ask, where's your phone, you know where it is. You're wearing it, or it's right beside you." She calls this new communication "mobile health," and believes that using the cell phone "is going to bring us closer to our patients. In the hospital, they see us for 15 minutes, maximum, when we're on rounds; in fact, that's a long encounter. It could be as little as four or five minutes." The app will create a "suite of information," harnessing the power of a multidisciplinary team of caregivers, and "give them the game plan and the resources they need to be successful."

Marvel has won two awards for her idea; the Linda Dunbar Award for health systems transformation, and a $44,000 award for technology development through the Louis B. Thalheimer fund, which has allowed her to start developing a prototype with the help of student volunteers from the Johns Hopkins Whiting School of Engineering. She estimates that the total cost will be $150,000. "We are also building a website that will track data and allow us to analyze the information we're collecting," and maybe connect all of this information to the patient's EMR.

If you have a new stent, you need to take aspirin and Plavix every day. If you don't, you most likely will have a massive heart attack. Not all patients understand this.

Marvel's work, says Vice Dean David Hellmann, M.D., underscores the point that "all of the biomedical wizardry needed to save people's lives goes to naught if they don't take their medicine and change their behavior."

As physicians, Marvel notes, "we really want to tap into people's lives as physicians, and be a coach to them – they have to self-manage and do all the work, but they need our help and expertise" for daily vigilance. "We need to be there for our patients in advance, so we will have more impact and be of greater help to them after they leave us." ■

A "Smart Watch" for Acupuncture

The downside of taking medicine is that it wears off. If you take a pill, its benefit might last for 12 or even 24 hours, and then you have to take another one. The same holds true for acupuncture. Although administered differently – inserting very thin needles through your skin at strategic points – its effects tend to fade just as quickly. There's one big difference: Most people who get acupuncture only have it once or twice a week, at most. As CIM Director and Vice Dean David B. Hellmann, M.D., explains: "Imagine if you had an antibiotic that worked, and you only took it once a week."

Jiande Chen, Ph.D., a scientist working with the Amos Food, Body, and Mind Center, is about to change this.

Chen, Professor of Medicine and Biomedical Engineering, specializes in the pathophysiology of gastrointestinal motility, as well as diabetes and obesity. He is particularly interested in electrical therapies that stimulate the nerves involved in gut function. Jiande has developed a novel device for patients to use at home that provides "transcutaneous electrical stimulation" similar to the effect of acupuncture.

"Imagine if you had an antibiotic that worked, and you only took it once a week."

In other words, he's developed a smart watch for acupuncture. Requiring only a watch battery, it delivers a painless, noninvasive dose of electric current that penetrates as deeply and precisely as does one of those long, thin needles. But patients can administer it themselves, at home, after every meal. It's safe, DIY home acupuncture, and it might significantly change the way people with certain conditions – starting with gastroparesis – find relief.

A LITTLE BACKGROUND

In gastroparesis, the stomach is reluctant to empty. Food lingers because the muscles that should move it along to the gut – squeezing it like toothpaste through a tube – are either damaged or weak. One big cause is diabetes. The condition can be miserable and can include decreased appetite, heartburn, nausea, vomiting, bloating, anxiety, and discomfort. Symptoms are usually treated with medicine and dietary changes, but in a recent study, Hopkins scientists showed that acupuncture can also help relieve symptoms.

It's safe, DIY home acupuncture.

Now, let's switch for a moment and look at gastroparesis as an acupuncturist would. In traditional Chinese medicine, a complex system of healing more than 5,000 years old, practitioners believe our vital energy, called "qi" (pronounced "chee"), flows through the body along 12 pathways, called meridians. Each meridian involves a different organ system. When all is well, the qi flows smoothly; but when there is an imbalance somewhere, the flow is blocked or hindered, and that's how disease can begin. The needles inserted during acupuncture are designed to restore this balance. Gastroparesis might be called "food stagnation," or "liver and spleen disharmony" in Chinese medicine, but the basic problem would be the same: food not moving through the digestive tract. The liver is supposed to ensure that everything – digestion as well as emotions – flows smoothly. When this flow is blocked, it weakens the spleen, which is in charge of digestion.

Acupuncture stimulates nerves – in this case, the vagus nerve, which reaches all the way from the brain down through the esophagus, heart, and lungs, down to the abdomen, and controls many things, including digestion. It also stimulates blood flow by dilating blood vessels, and causes the body to release endorphins, natural painkillers. In someone with gastroparesis, acupuncture sends a signal to the brain via the vagus nerve, telling the stomach to work better.

Chen's device works by neuromodulation, using electrical stimulation to change how nerve cells interact. In painstaking research, he has determined the precise levels needed to produce a beneficial change in the function of the nerves – how much energy to release, the speed of the electrical signal, the width of the pulse. That precision "is one difference between our method and traditional Chinese medicine." Another is frequency: "When people go to see an acupuncturist, they can go maybe two or three times a week, and the effect of the treatment doesn't last for more than 24 hours. It would be very expensive to do traditional acupuncture two or three times a day, but with this device, you are just putting an electrode at the acupuncture points. You could do it two or even three times a day, after every meal."

There are two key placement points: One is the wrist, "which is very good for treating symptoms like nausea, vomiting, and motion sickness. That wrist acupuncture point is very close to the medial nerve." The other is about 5 centimeters below the knee, a place called "stomach point number 36" in acupuncture. "This is very close to the perineal nerve," and stimulation here "is known to enhance the autonomic nerve function, which helps empty the stomach and improves the digestive process."

Basically, Chen explains, "We combined modern neuromodulation theory with traditional Chinese acupuncture." This is just the kind of project its leaders envisioned when the Amos Food, Body, and Mind Center began a year ago: blending Eastern medicine with state-of-the-art technology in a holistic, whole-body approach to improving health.

"When people go to see an acupuncturist, they can go maybe two or three times a week, and the effect of the treatment doesn't last for more than 24 hours."

The device has not yet received FDA approval and it doesn't work for everyone, Chen notes, "but our results of early studies are very exciting." In related work, Chen plans to see whether the device can help improve symptoms in patients with scleroderma, and whether it can help reduce the appetite in people with obesity. One day, scientists at the Amos Center hope, the device's uses may be expanded even further to help people manage food intolerance. ■

How to Age Well

Quality of life is the key: our goal shouldn't be just to live to a ripe old age. No one wants to be old and decrepit (or decrepit at any age, frankly). But old and healthy – now that's an exciting goal.

Jeremy Walston, M.D., the Raymond and Anna Lublin Professor of Geriatric Medicine, has spent his career studying how we age. In addition to many studies on specific aspects of aging, he has looked at what healthy older people have in common – at what they eat and don't eat, and how they live – and has come up with some practical tips.

The secrets of healthy aging, he has found, aren't so secret after all. The best "fountain of youth" we have right now are some common-sense building blocks that can help everyone, at every age, live better.

NUTRITION: MAKE EVERY BITE COUNT

If you do it right, just about everything you eat can help your body. This doesn't mean you have to have an ascetic diet of nuts and berries, or be a food martyr who never eats birthday cake, macaroni and cheese, or a BLT with chips and a pickle. But comfort foods and flat-out junk should be the exception, not the rule, and you should make most of your dietary choices good ones.

Now, what does this mean?

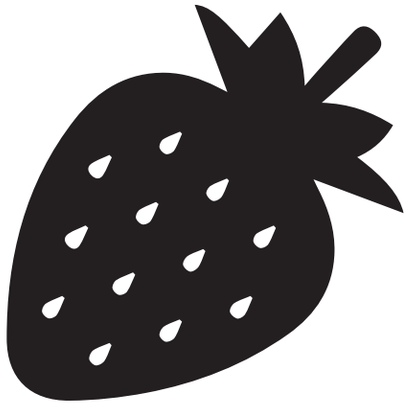
Exercise is important – not just cardio, but exercises that help with flexibility, balance, gait, and strength. And if you have an orthopedic issue, like knee or hip trouble, address it.

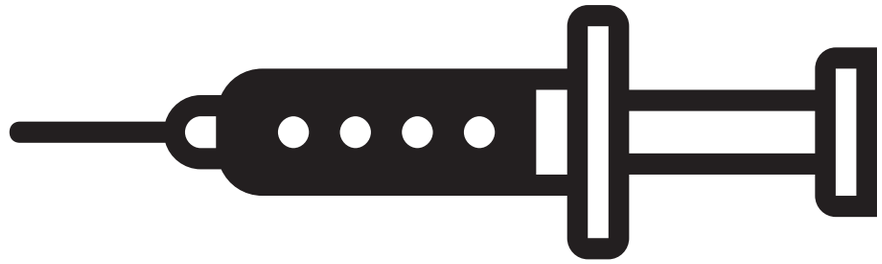
EAT FRESH FRUITS AND VEGGIES

"Fresh fruits and vegetables are very important," says Walston, "particularly ones that are rich in potassium." High-potassium fruits and veggies – including bananas, oranges, strawberries; dried fruits, like raisins, apricots, and prunes; spinach, tomatoes, avocados, beans and peas, and potatoes – are the best way for you to get potassium. Potassium is also found in dairy products, in whole grains, meat, and fish.

Here's some of what potassium-rich foods can do for you: ***Blood pressure***: When you get your blood pressure tested, you're told it's one number over another one. That number on the top is systolic blood pressure, and potassium can lower it by several points. ***Heart:*** Potassium helps your heart beat, which happens about 100,000 times a day. It can help regulate the heart rhythm, too. ***Cholesterol:*** Potassium, by itself, is not a designated cholesterol-lowering agent; however, if you are eating foods rich in potassium, this means you're not loading up on saturated fat. Just eating this good food instead of junk can lower your cholesterol.

Fresh fruits and vegetables are also are anti-inflammatory. This is very important, because inflammation has been linked to many diseases, including several forms of cancer. When you eat these healthy foods, don't blow it, Walston adds: "Don't add salt and don't overcook them."





GET MORE PROTEIN

Protein is increasingly important; we need it more now than we did when we were younger. "Protein helps muscles function better, and it is also important to help maintain muscle mass." True, you can get protein from a cheesesteak sandwich, but it's better to "choose high-quality protein that is low in fat," says Walston. Salmon, for example, is a great source of protein; so are chicken, lean beef and pork, eggs, beans, soy, and low-fat dairy products like yogurt. "We need about 30 grams of protein at a sitting to stimulate muscle growth optimally," and the best time to take in protein is after exercise; this helps the muscles recover and grow. "You can also get it from a protein shake or energy bar."

GET PLENTY OF VITAMIN D

Vitamin D helps keep your bones strong. It also helps keep your muscles, heart, brain and immune system healthy, and can help prevent cancer. Having low levels of Vitamin D is bad: A study published in the *Archives of Internal Medicine* found that people with the lowest levels of Vitamin D had more then twice the risk of dying from heart disease and other causes, compared to those with the highest levels. The researchers listed "decreased outdoor activity" as one reason that people can become deficient in Vitamin D. You can get it in milk, oily fish, mushrooms, eggs, and meat. You can also take a supplement. The National Institutes of Health recommends 600 IU (international units) of Vitamin D a day if you're under 70, and 800 IU a day if you're over 70.

And get some sun: "Your body needs direct sunlight exposure to activate the Vitamin D." A pretty amazing reaction happens when the sun hits your skin: the UV-B rays activates Vitamin D into a form that your body can use best. You don't need to bask in the sun for hours; just a few minutes – 20 or so – a couple of times a week is plenty of time to gain this benefit.

GET YOUR SHOTS

Lower your risk of getting the flu, or pneumonia, or shingles by getting a shot. Many pharmacies, grocery stores, and big-box stores like Walmart and Target offer these shots at a low cost. Take them up on it. The risks of getting one of these illnesses far outweigh the inconvenience and minor expense of a vaccine.

PARTICIPATE IN CLINICAL TRIALS

"Talk to your doctor about taking part in a clinical trial," says Walston. "There are several that aim to preserve muscle function and cognition as people get older." In addition to benefitting personally from such a study, "you would be helping other older adults learn how best to extend their health, function, and cognition, and maintain their independence."

KEEP MOVING

"Stay active as long as possible," says Walston. "Don't sit for long periods of time, especially in the late afternoon or evening. Studies show that those are low-activity times for many people, so it's good to try to boost your activity during those times." Go for a walk after dinner. Walking is good; in fact, you should walk a lot, or do some aerobic activity – there's plenty to choose from. Just a few examples include taking a Zumba or Jazzercise class, riding a bike, swimming or doing water aerobics, hiking, jogging, or dancing. In addition to getting cardiovascular exercise, "it's also important to do exercises that help you stay flexible, that help your balance and gait, and that help strengthen your muscles. Don't forget your shoulders," which are important for maintaining core body strength and higher levels of function. And if you have an "orthopedic issue," like knee or hip trouble, address it. "It is essential to maintain your mobility as long as possible."

However, while you're staying active:

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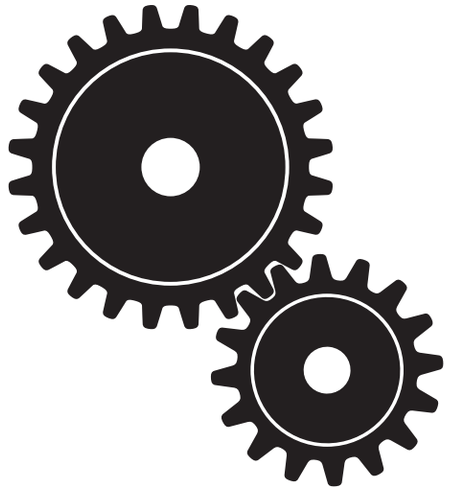
DON'T FALL

The body literally takes a hit when you fall. Many older people, who otherwise have been doing pretty well, take a turn for the worse after a fall. Just being laid up for a few days, or even longer, can be difficult for the elderly because they tend to lose strength quickly. The best way not to fall is to be aware of the risk, and do your best to prevent it, says Walston. "Things that can make you fall include not watching your medication; vision problems; weakness in the lower extremities; and balance and gait problems."

One huge risk factor is easy to fix: "low lighting and a cluttered living area." Make sure your rooms are well lit – that you not only have enough lamps or ceiling lights, but that the bulbs are high-powered enough so you can see where you're going. And go after the clutter. It doesn't take much – maybe a stack of books or magazines that slips over, or a puzzle left by a grandchild on the floor – to make a walkway treacherous. Sometimes, you're so used to looking at clutter that you don't see it. This is why Walston recommends bringing in an independent party – a friend or relative who is not used to your home, who can see potential trouble spots you haven't noticed.

Talking to people – volunteering, interacting with others in church, clubs, or other groups, being around family or friends – is good medicine.

You can lower the odds of falling, as well, by working on your balance. Tai Chi is a great way to do this, and many community centers offer classes (another bonus: taking a class helps you stay connected – see below). Weights and exercises can also help your legs get stronger.



KEEP YOUR MIND ACTIVE, TOO

"Cognitive risk factors include diabetes, elevated lipids, and high blood pressure," says Walston. Medications can keep all of these problems in check. Even if you are currently being treated for these, it's good to go the doctor for "tune-ups" every so often, to make sure you're still on the right dosage.

But other things can affect how well you're thinking and functioning, too, and they may not be what you'd expect:

Poor hearing: If you don't feel connected, you may tend to withdraw from the conversation, smiling politely, not engaging, because you don't know what people are saying. This is bad. "Get a hearing aid if you need one." It won't just help your hearing; it will help your brain.

Physical inactivity: Being active affects every part of your body. It helps your heart work better, helps your lungs get more air, strengthens your muscles, and helps your brain work better. Many studies have shown that older adults who are active are less likely to get dementia and Alzheimer's.

Depression: If you are depressed, you are going to be withdrawn, you may not eat or sleep very well, and you may not get enough exercise. All of these can affect your cognitive skills.

Addressing all of these risk factors is good "cognitive protection," says Walston. And one of the most important ways to protect your brain is to stay active is to "interact with others more frequently." ***Stay connected.*** Talking to people – volunteering, interacting with others in church, clubs, or other groups, being around family or friends – is good medicine. "Engaging in outside activities improves both physical and mental health in older adults." ■

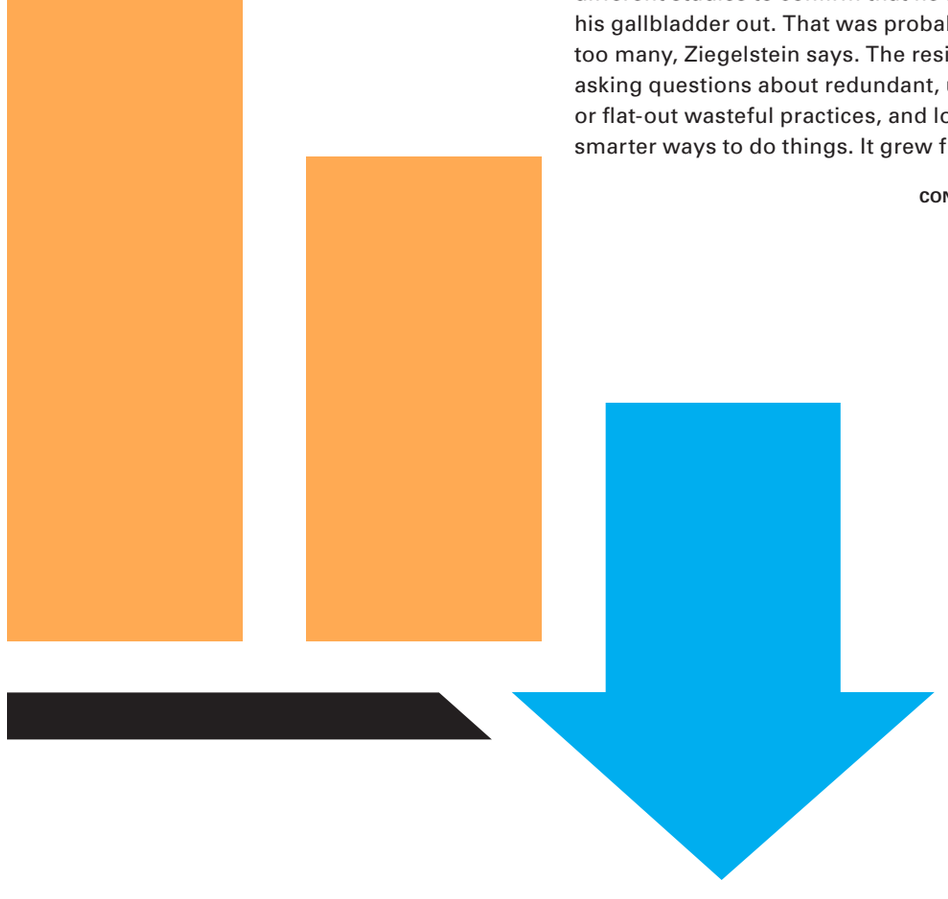
Wiser Choices

"Why do we do it this way?"

"Because it's always been done that way."

"Why is that?"

"I don't know, just to be on the safe side, I guess."



It's good to ask why. It's good to question whether what you're doing makes sense. But in medicine, says David B. Hellmann, M.D., we don't ask those simple questions nearly often enough. "We spend $3.2 trillion on health care in the U.S., and one-third of that is estimated to be wasteful, from overtesting or overtreatment," he states.

In 2009, here at Johns Hopkins Bayview we began a program called Physicians for Responsible Ordering. The kick in the pants to start it came from our residents, especially Marc Larochelle, M.D., with guidance from cardiologist Jeff Trost, M.D., Colleen Christmas, M.D., and others. Resident Linda Mobula, M.D., and cardiologist Roy Ziegelstein, M.D., the Miller Scholar, now Vice Dean for Education at the School of Medicine, were presenting a case at a Morning Report. The patient was a man who had to go through three different studies to confirm that he needed to have his gallbladder out. That was probably two studies too many, Ziegelstein says. The residents began asking questions about redundant, unnecessary, or flat-out wasteful practices, and looking for smarter ways to do things. It grew from there.

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In 2012, a study led by Larochelle and Trost targeted the practice of using three tests to detect a heart attack when one is generally conclusive. They found that roughly a quarter of patients admitted for chest discomfort – none of whom had a heart attack – had more than three sets of cardiac enzymes drawn. Simply reducing this by 20 percent, they calculated, would reduce charges by $1 million a year. And it has: their results, which were featured in the *Wall Street Journal,* were so successful that the Johns Hopkins Hospital adopted the practice, and has begun reducing charges by $1.5 million to $2 million a year. Equally important, their intervention resulted in a small but significant *increase* in the diagnosis of heart attack.

"How do you successfully modify a practice when we've been doing it this way for so long?"

Two years ago, Ziegelstein and Julia McMillan, Associate Dean for Graduate Medical Education (now retired) challenged each of the residency programs at Johns Hopkins to identify at least one commonly used diagnostic test or treatment in their discipline that was "wasteful, unnecessary, and potentially even harmful," says Ziegelstein, "and to identify an intervention to reduce or eliminate it."

The response was enthusiastic: the residency programs took part in more than 40 initiatives with faculty mentorship. To highlight this work, Ziegelstein invited house staff and faculty to submit abstracts for presentation at Hopkins' first High-Value Practice Research Symposium in February. More than 50 projects were presented by residents, fellows, medical students, and even premedical students as well as faculty.

Note: The idea here is not to go cheap, not to save money just to save money. That might not be the best thing for the patient, and it wouldn't improve medical care. Instead, the goal is to **choose wisely** – an idea the American Board of Internal Medicine (ABIM) Foundation has been promoting since 2012 in a national campaign to cut down on unnecessary tests, treatments, and procedures. Daniel Wolfson, the ABIM's Executive Vice President and Chief Operating Officer, came to Hopkins to give the keynote address. Ziegelstein and Pam Johnson, M.D., Vice Chair of Education and Director of the Radiology Residency Program, plan to make it a national meeting in 2017. "I was really impressed with how engaged everyone was – the questions, the discourse, what we learned from each other. When we do this next year on the national level, we plan to expand the time for discussion, because there's so much to be learned from every project."

Back at that 2009 Morning Report at Bayview, Ziegelstein, who led it, showed the house staff an article written in 1985 that he had saved when he was a student. It was from the *New England Journal of Medicine,* and it was about routinely taken admission chest X-rays. The article said that unless someone has a respiratory or heart symptom, these scans were "virtually useless," says Ziegelstein, "but the practice didn't change. Admission chest X-rays were like a ticket to getting admitted. It was a routine practice then, and still is at many places."

The thing is, he continues, "that article didn't do anything to change behavior. Education alone is not sufficient to change the way physicians practice. You would imagine that it should be, but it's not." When he became Vice Dean, Ziegelstein wanted to make sure that "all of us as educators teach the next generation the importance of practicing cost-conscious and high-quality care," he says. "To make sure that we communicate to our trainees that high cost is not always high quality. The general ethos at many academic medical centers, and certainly Johns Hopkins, has been that thoroughness always means lots of tests. That ethos doesn't make any sense and actually is irresponsible."

Ziegelstein and Johnson were delighted that the residency program directors and their trainees not only identified things to change; they figured out interventions and implemented them. As Ziegelstein describes, "Across the board at the Symposium, that's what was featured. It wasn't, 'Hi, my name is X, I'm the residency program director for this department and here's a seminar that I gave to my house staff.' It was, 'Here are my medical students or residents, and here's what we did. Here's what happened, here are the results that we've been able to demonstrate.'"

The challenge to residency programs: Find at least one commonly used diagnostic test or treatment in your discipline that is "wasteful, unnecessary, and potentially even harmful, and identify an intervention to reduce or eliminate it."

The next steps are several: "We want to work with all of our hospitals and clinical staffs – not just the educators – to get some of these programs that we feel have the highest yield and the best evidence implemented in clinical practice across the institution," says Johnson. And thinking ahead to next year, "With Dan Wolfson from the ABIM Foundation, we are working to lead Hopkins' first national research and education symposium on this. Our goal is to engage a national discussion and learn from other institutions, and lead widespread improvements in practice."

Ziegelstein, who is also the Sarah Miller Coulson and Frank L. Coulson, Jr. Professor of Medicine, adds: "We want to move the needle in terms of health care expenditures in this country, in a way that is intentional and thoughtful. That is, we want to make sure we do it in an evidence-based way, as Johns Hopkins has always done. Not to say to doctors, 'You can't, or you shouldn't order this test or prescribe this treatment,' but rather, 'You shouldn't because we have shown it is unnecessary."

Why do doctors order unnecessary tests or treatments? Several reasons: "I just couldn't sleep at night if I didn't do it, because I want to be thorough," or "The patient expects me to do it," or "I might get sued if I didn't." Another reason: no connection to how much the hospital or patient will have to pay for it. Says Johnson: "How do you successfully modify a practice when we've been doing it this way for so long? Changing that kind of behavior is a process, but we're doing it. Given the breadth of commitment across our institution that I witnessed at the symposium, and the systematic research-based approach that we are taking, I am confident that we will be successful in helping reduce the cost of high-quality care for our patients." ■

As Needed, vs. Every Day

You're in the Intensive Care Unit and you feel awful. Hey, it's time for your daily chest X-ray!

Does everyone in the ICU need a daily chest X-ray? As you may suspect, the answer is no, and a team led by internal medicine house officer Sonali Palchaudhuri, M.D., set out to "change the culture" and improve care by helping doctors order chest X-rays only when they're warranted. With resident Stephanie Chen, M.D., Chief Resident Jonathon Thorp, M.D., and instructor Anthony Accurso, M.D., she designed a multifaceted intervention to replace the daily scans with chest x-rays as needed. The goals were to save patients the extra radiation from multiple scans plus the sheer physical hassle of having to get up to get X-rayed every day – and, in so doing, to reduce routine daily chest X-rays by 30 percent. The team noticed that clinicians were ordering more tests in the morning. Coincidentally, chest X-rays were among the items to select on the computer menu of daily morning orders. The team figured that just having "Chest X-ray" as something to click every day suggested that this was an acceptable practice; so they took it out of the routine ordering set. They also talked at Grand Rounds about unnecessary chest x-rays, made presentations to residents and attending physicians, and handed out pocket cards with guidelines for when it's appropriate to order a chest X-ray.

Does everyone in the ICU need a daily chest X-ray?

The project began in January 2015, and the team compared all the data from one year before the intervention and eight months after: morning orders for chest X-rays dropped by 28 percent. And, as they had hoped, there was no change in the ordering of urgent chest X-rays – so the people who actually needed the scans still got them. "We plan to continue to refine our interventions to make sure this project is sustainable," Palchaudhuri told the audience at the Symposium.

Sticking Power

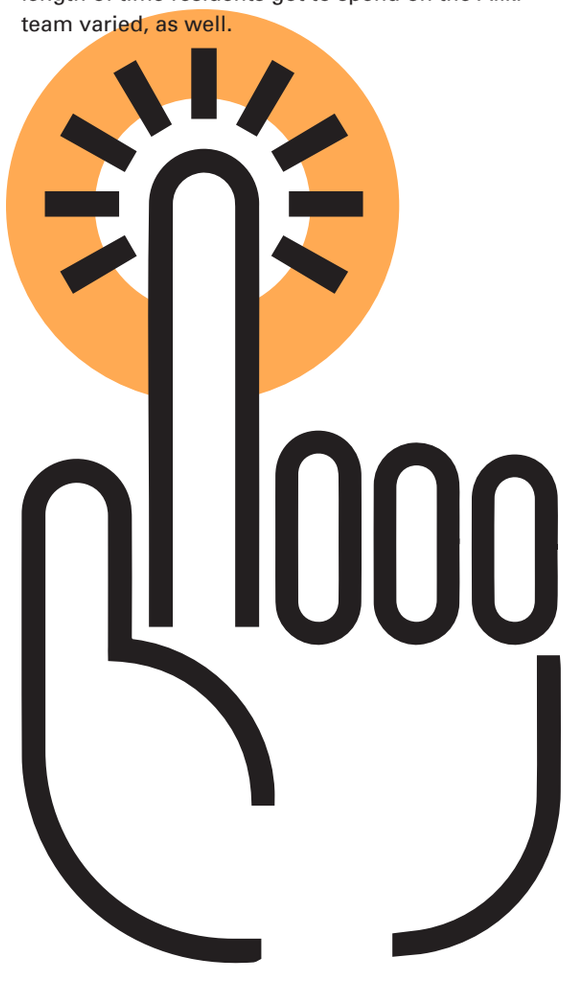
It's what we always suspected would happen – but still, it's nice to know. The vast majority of our medical residents who took part in the CIM's Good Doctor Initiative say they practice medicine differently because of it. This is the result of a recent study of graduates of the Good Doctor Initiative, formerly called the Aliki Initiative – a groundbreaking project designed to help young doctors get to know their patients as people.

"One of the big questions in medical education research that we quite commonly fail to ask is whether something we did has a sticking power," says Colleen Christmas, M.D., Director of the Primary Care Leadership Track, Associate Director of the Internal Medicine Residency Program, and one of the Aliki Initiative's founding leaders. "Did it influence someone's career in a lasting way?"

Did the Aliki Initiative have a lasting effect? "Would it wear off at some point?"

Usually, if such questions get asked, the time period is fairly brief. Residents who went through the Aliki Initiative were all asked soon afterward whether the program had influenced them, and the answer was "a resounding yes."

But what about now, a few years after the fact? "We have nearly a decade under our belt," says Christmas. For this study, Christmas looked at former residents who had gone through the Aliki Initiative between 2007, when it started, and 2014. "One hundred and fifty residents passed through our doors during that time. We had e-mail contacts for 110 of them, and 94 responded to the survey." About three-fourths of those who responded were working full-time, out in practice, and 22 percent were still in their fellowship training. Not everyone was able to participate in the Aliki initiative, and the length of time residents got to spend on the Aliki team varied, as well.



"We asked them, 'If you participated in the Aliki Initiative, how important was this to your training as a physician?'" Christmas reports, "and 77 percent said 'a great deal.' No one responded 'not at all;' the overwhelming majority thought it was really valuable to their training. Then we asked, 'Do you feel your current practice is influenced by your participation in the Aliki Initiative?"

Again, the responses were strong: "The majority (63 percent) felt like it had a great influence on their current practice as a physician." This is especially striking, she notes, "because most people had only a two-week experience in the program. Some people had four weeks, and very few had six weeks over their three years of training. That is a very small percent of their time. To have a great deal of influence from a two- or four-week experience is pretty exciting."

The comments in the survey were "very heartwarming and beautiful," Christmas adds. "They fell along a few themes: the Aliki Initiative enhanced their ability to understand social determinants of health; it made their communications skills better – taught them to pause more, listen more, and explicitly ask patients about non-medical aspects of their life; it helped build relationships with their patients, and helped them tailor treatments to individual patients."

The survey was anonymous, so we don't know who it was who wrote, "the Aliki experience will go with me in all walks of my professional life," but overall, says Christmas, "it's just really very positive, the responses from these people who are now faculty and doctors in practice, reflecting on the value of their Aliki experience."

Next, Christmas would like to "figure out if there's a way we can measure that more objectively. Not just the doctors reporting, 'Yes, it still influences me today,' but if we can find a way to compare these people to those who didn't have this kind of training."

In 2007, "when we first started the Initiative, our goal was to do something really different and revolutionary. We thought it might – might – help residents think about patients in a different way."

In 2007, "when we first started the Initiative, our goal was to do something really different and revolutionary," Christmas continues. "We thought it might – might – help residents approach patients in a different way, might help them think about them in a different way. We hoped it would bleed over into other aspects of their training – the way that they would approach primary care patients or people in the ICU. We did see those things, and we saw that it certainly influenced the culture in our residency program very broadly. But we weren't sure what they would say later. Would it wear off at some point? Would it get washed out by current clinical practices? Evidently not, so that's great!"

It was fun to see the results coming in, she adds. "People could say that everything's different in the real world, that none of that applies. That easily could have happened. I was so thrilled when it seemed like people still remembered and treasured their Aliki experience, when they gave examples of things that they did in their current practice that were drawn directly from the Aliki curriculum. It worked, and they're still doing it." ■

Greater Good

Patients come to Johns Hopkins Bayview from all over the world. That's an impressive fact. But those patients come to our doors. Should we go to theirs, too?

Yes, says Panagis Galiatsatos, M.D. He believes that although Johns Hopkins Bayview is an internationally recognized institution, it is also a local hospital, and "it is up to us to go out into the community we serve." In 2011, when he was a resident, Galiatsatos began going out into the community to talk to people about ways to improve their health. He met them in their own neighborhoods – at senior centers, churches, and synagogues. "In medical school training, there has not been much emphasis on making sure the patient understands what to do to become healthy and to stay out of the hospital," he says. "For many of the people I saw who kept coming back to the hospital, it was not a failure of the disease, but a failure of communication – because they didn't really know how to take their medicine properly, or keep their blood pressure down, or what foods to eat or not to eat."

"It started off with a very simple concept, to get people out into the community. But it's so much bigger now. I love what we're doing."

Now as a fellow in pulmonary and critical care medicine, he is co-director of a program called Medicine for the Greater Good, with Colleen Christmas, M.D. Johns Hopkins Bayview feels so strongly about the importance of reaching out to our neighbors that "we built in a required Medicine for the Greater Good service activity for our internal medicine residents," Galiatsastos says. The idea was not to add to the burden of already busy residents, but to have them do one activity, big or small, "of their choosing, some time during their three years of training." The projects were as different as the residents themselves, ranging from medical journalism to working with a church that had been partially burned during the downtown riots in 2015, to reaching out to elementary schools to promote health for students and teachers.

There have been close to 300 projects – including weight loss campaigns, partnerships with the Maryland Food Bank, an asthma initiative in the public schools, and programs to help caregivers. Medicine for the Greater Good has reached out to churches and synagogues, to community homes and centers, and has included premed students at the Johns Hopkins University, students at the School of Nursing, and the School of Business – all of whom simply want to help their community. Galiatsatos has enlisted local bands, classical musicians at the Peabody Conservatory, Baltimore chefs, and neighborhood leaders to help promote health and create partnerships between Johns Hopkins Bayview and Baltimore. He has put hundreds of miles on his car (on his own dime) driving all over town to meet with groups interested in this outreach program – and to establish trust with them. Baltimore City has 32 zip codes; so far, MGG has had projects in 17.

In November, the Bayview Internal Medicine Residency directors published a perspective article in the *New England Journal of Medicine,* called "Graduate Medical Education in the Freddie Gray Era."

The authors, Sammy Zakaria, M.D., M.P.H., Erica Johnson, M.D., Jennifer Hayashi, M.D., and Christmas, addressed the "structural racism" in Baltimore's history: "Until the 1950s, laws and property-development regulations hindered development in black-majority neighborhoods and prevented migration of blacks into more affluent white-majority areas… As late as 1959, some physicians refused to treat black patients, 10 of Baltimore's 17 hospitals declined to provide childbirth accommodations for black women, and many of the remaining hospitals segregated blacks into separate wards. During the civil rights era, business practices remained unfavorable for blacks in these areas; many banks…refused to give black applicants mortgages or charged them onerous interest rates. Real estate agents and developers encouraged "white flight," weakening and depopulating already fragile neighborhoods. Eventually, distressed areas became nonviable and were subjected to well-meaning but unsuccessful redevelopment schemes, including placement of large highways and construction of forbidding public housing projects.

"As a result, the populations of many of Baltimore's dilapidated neighborhoods are disproportionately black. Inhabitants of these neighborhoods must contend with poverty, drug use, unemployment, crime, and hopelessness. Children who grow up in these environments have little chance of succeeding in life. Freddie Gray grew up in one of the worst areas of Baltimore, the child of an illiterate heroin addict, in a house with high lead levels, minimal food, and intermittent electricity. His blood lead level, tested over several years in his childhood, was consistently elevated… severely affecting his neurologic development. It's not surprising that he failed in school, couldn't hold down a job, and had multiple encounters with the police."

By itself, outstanding medical care likely won't help our most vulnerable neighbors, "unless the intractable sense of hopelessness …is also addressed."

Such environments, the authors continued, are synonymous with high rates of illness and premature death. "People living in poor areas of Baltimore have a life expectancy 20 years shorter than that of residents of wealthy neighborhoods. As physicians trained to diagnose and treat disease, we naturally want to …provide outstanding medical services to this vulnerable population." However, these efforts most likely won't have much of an effect "unless the intractable sense of hopelessness affecting residents of poor areas is also addressed."

The authors went on to talk about a bright spot in this bleak picture: Medicine for the Greater Good. In less than a month, according to the *NEJM*'s database, that article had been viewed online more than 24,000 times by people from more than 23 different countries. An article about MGG in the *Baltimore Sun* prompted U.S. Congressman Elijah Cummings to write to Ron Peterson, President of the Johns Hopkins Hospital and Health System: "Such programs will help address the significant unmet needs of the Baltimore community while also helping doctors to gain a greater understanding of the complex issues many patients face, and of what they can do in their practices to help their patients lead better lives. I hope the Medicine for the Greater Good program can eventually include all of the Hopkins Health System."

The possibilities are "endless," says Galiatsatos, who hopes to secure grant funding to take the program to new levels. "It started off with a very simple concept, to get people out into the community. But it's so much bigger now. I love what we're doing." ■

Honoring Our Finest

What do great doctors do that other doctors don't? This issue is at the heart of our mission at the Center for Innovative Medicine; in fact, it's what got us started. We talk a lot about the Miller and Coulson families here, but if you're new to the CIM you may not realize that it was a patient, Mrs. Anne Miller, who asked David Hellmann more than a decade ago, "Why aren't there more doctors like Phil Tumulty?" Philip Tumulty was a legendary clinician at Johns Hopkins, an astute diagnostician who was not only excellent at what he did, but whose compassion and empathy for his patients created deep bonds that have continued to this day.

Hellmann, a master clinician himself, took this question very seriously; in fact, he had already been thinking for a long time about how to help doctors become better clinicians, and to care more. He began our Good Doctor Initiative with the idea that helping young physicians at a very hectic period in their lives – when they have less time than ever to spend with their patients, and when technology can seem to intrude more than to bring doctors and patients closer together – to get to know the patient as a person would make them better doctors. With support from the Miller and Coulson families, the CIM began the Miller-Coulson Academy as the first of its kind – an objective and rigorously peer-reviewed way to honor and reward doctors who are excellent clinicians and teachers. This has been particularly meaningful to us because academic medicine tends to reward people who publish scientific papers and bring in grant money, and this way of thinking does not similarly reward doctors who are "just" excellent clinicians. In an increasing way, the formation of the Academy has been "the shot heard round the world" in academic medicine, leading an international conversation about recognizing, promoting, encouraging, and rewarding the Phil Tumultys of our world.

Three years ago, the Academy expanded to Johns Hopkins Hospital, and added the annual Frank L. Coulson Award for Clinical Excellence to outstanding doctors-in-training in all 20 Hopkins residency programs. It began a coaching program, named in honor of the late G. Thomas Miller, with master clinicians mentoring new faculty. And last year, the first time, the Academy recognized clinically excellent Nurse Practitioners and Physician Assistants. "The Academy keeps growing in important and exciting ways," says its director, Scott Wright, M.D. Dean Paul Rothman has asked Wright and the Academy to work with the Promotions Committee to help the institution recognize clinical excellence in its promotions criteria.

The Miller-Coulson Academy: This Year's Inductees

Ivor Berkowitz, M.B.B.Ch., M.D.
Anesthesiology and Critical Care Medicine and Pediatrics

Patrick Joseph Byrne, M.D.
Otolaryngology-Head and Neck Surgery and Dermatology

Michael A. Carducci, M.D., FACP
Urology and Oncology

Steven M. Frank, M.D.
Anesthesiology and Critical Care Medicine

Nancy Hutton, M.D.
Pediatrics

Michele Ann Manahan, M.D.
Plastic and Reconstructive Surgery

Scott Douglas Newsome, D.O.
Neurology

Timothy Michael Pawlik, M.D., M.P.H., Ph.D.
Surgical Oncology

Matthew Stewart, M.D., Ph.D.
Otolaryngology-Head and Neck Surgery

Luca A. Vricella, M.D.
Surgery and Pediatrics

"We start talking about the ways we can come out on the other side – being whole, and healthy and happy."

This year, as we honor the Inductees into the Academy and the award winners, we thought you might like to hear what one of them has to say about being a good doctor. You will get to know more Miller-Coulson Academy members on these pages in future issues, as well. They are amazing people.

ON REBUILDING AND HEALING

One of our newest inductees, Michele Manahan, M.D., is a plastic surgeon. Although her practice includes "performing aesthetic and reconstructive surgery on all parts of the body to restore form and function," her focus is on breast reconstruction in women who have had breast tumors.

Rebuilding part or all of a breast takes longer than you might think. It can require multiple operations spaced out over many months, and often involves use of implants or the patient's own body tissue – from places where there might be some to spare, like the lower abdomen, buttocks, thighs, or back – in meticulous work to create more natural-looking breasts. "Implants do not require surgery in other parts of the body beyond the affected breast, but they may need maintenance in years to come," she explains. "Using the patient's own tissue takes longer to heal and is more complex," but it can last a lifetime.

The physical rebuilding is just one part of her job. "Nobody wants to see us at all for breast reconstruction," she says. "It would be much better if we never had to face that problem." But the women do, and Manahan and her team are right there with them, caring, listening, doing their best to give hope and reassurance. "We really get to know our patients well," often soon after cancer is diagnosed. "We start talking about the ways we can come out on the other side – being whole, and healthy and happy, and we continue with them long-term."

Many women come to Manahan feeling overwhelmed, scared, trying to process what's happening to them, and dealing with a lot of information, "from us, surgical oncology, medical oncology, and radiation oncology. It can be a flood." Manahan works to provide a framework, with the details of each step laid out. "Yes, there are a lot of steps, but if we put one foot in front of the other, pretty soon we find that we're on the other end of the whole process." She and the team find themselves missing their patients "when they don't need to see us so frequently any more, because we grow so close to them."

Manahan has seen women in their teens, women in their nineties, and all ages in between. "It's really a range," she says. "If one in eight women has breast cancer – if it's not going to be ourselves, it will be one of our close friends or family members. We're all in the same boat."

Sometimes, one of her former patients will come back to the clinic accompanying a newly diagnosed friend or relative. "It's wonderful. Now she's stepping outside her own illness to help support someone else," Manahan says, "to share early on that there is hope." ■

Medicine is a public trust

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**The first question which the priest and the Levite asked was:
"If I stop to help this man, what will happen to me?"
But... the good Samaritan reversed the question:
"If I do not stop to help this man, what will happen to him?"**

Martin Luther King, Jr.

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Mr. & Mrs.* George Aidinis°
Mr. Aristidis Alafouzos
American Legacy Foundation
Mr. Daniel P. Amos,
Daniel P. Amos Family Foundation
Mrs. Courtney & Mr. Paul Amos°,
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