Fall 2016

# PENN HEALTHCARE REVIEW

PRODUCED BY WHARTON UNDERGRADUATE HEALTHCARE CLUB

*WHERE BUSINESS MEETS HEALTHCARE*


## GOING BEYOND A QUALITY REPORT CARD

The Difficulties in Assessing Healthcare

## DUAL ELIGIBILITY

And State-Based Implementation of Integrated Care Models

PENN HEALTHCARE REVIEW



Special thanks to our Fall 2016 Featured Speaker: **Jeffrey Silber, MD, PhD,** Director of the Center for Outcomes Research at the Children's Hospital of Philadelphia.

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WUHC

# Where *Business* Meets *Healthcare*

Dear Readers,

America's political climate is seeping into every aspect of life. The presidential candidates, both exceptionally newsworthy, would have been unimaginable even twenty years ago. In seizing their moments of opportunity, the candidates illustrated the impact that a select few can have on an entire population. These lessons, stemming from politics, apply to the intersection of business and healthcare as well. Individuals and teams with innovative and compassionate aims can transform health care provision, as this issue shows us.

Explore the direction of the current state of healthcare and business in our feature articles, as we investigate the **effectiveness of physician quality metrics** and the **cost burden of insurance and assistance programs**. Remarkably, our writers are not simply reacting to events in the world around them—they are actively changing healthcare themselves as entrepreneurs, medical care providers, and patients. Learn about the student motivations behind **a patient-centered start-up**, reflections on the state of **hospitals abroad**, and considerations on the **risk of illness** in a college setting. Embark on discussions concerning **financial incentives** for **preventive care**, potential implications of a **genetic technique** on the **pharmaceutical industry**, **technological advances** in **women's health**, and more in the coming pages.

Sequels are often fraught with challenges. Expectations to follow in the footsteps of the original can be prohibitive to creativity, resiliency, and ambition. Yet as I introduce you to the Fall 2016 issue of Wharton Undergraduate Healthcare Club's *Penn Healthcare Review*, it is my honor to call it the second installment. Since WUHC has been named "Best Large Club" by Wharton Council following the publication of our first issue, the *PHR* team has relentlessly pursued how to further stir discourse on issues of healthcare and business. I am beyond proud of the dedication, open-mindedness, and work ethic of the Editorial Board, Design Team, Business Staff, and writers in creating another chapter of exploratory and creative work.

Sincerely,
Nirupa Galagedera
Editor-in-Chief

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# RIDE HEALTH

## Addressing the Transportation Issue

BY SUMUN KHETPAL

As ambitious eighteen year-old matriculants to Penn, we often envision having a college experience so inspiring that it would go down in the books. Our history reveres the narratives of Mark Zuckerberg and Facebook, of Elon Musk and Tesla, and of Steve Jobs and Apple. We pictured scenes of computer codes written on dorm room windows, and late night brainstorming sessions of the "next big thing." The narrative featured eager college students, bootstrapping, hackathons, and a big break. Growing up in a family of entrepreneurs and physicians, I was immersed in a clinic – which was not only rooted in science and medical treatment, but extended beyond to management and billing, and the social determinants of care. As I grew older, I became particularly eager to pose solutions towards better healthcare for patients. So, coming into Penn, an institution that prides itself on entrepreneurship to the same extent I did, I felt empowered to make a difference.

As a student in the Roy and Diana Vagelos Program in Life Sciences and Management (LSM), I engage in a dual-degree curriculum that intertwines science and business--fields that have no cursory connection, but actually thrive on the basis of their integration. While my sights are set on medical school, Penn has pushed me to evolve into a college entrepreneur – as business could serve as the matrix to tackle healthcare's inefficiencies. Upon taking a healthcare entrepreneurship class last fall, I now find myself working with four inspirational peers on Ride Health, our social venture that alleviates transportation barriers for low-resource and low-income patients.

Our story began with a late night shift in the emergency department of a North Carolina hospital. Imran Cronk C'16 had encountered an elderly man, who had just been discharged and had no ride home. After giving him a ride home that late summer night, Imran soon discovered that transportation was a problem for many patients: on average, at least 25% of no-show appointments are attributable to transportation issues. Although there are about 1 billion physician appointments per year, 24.2 million appointments never happen simply because patients can't find a ride. These missed appointments, which impede patients' ability to get care, are linked to enormous costs for providers, caregivers, and health systems, amounting over $150 billion in downstream healthcare costs.[1]

With a 3 billion dollar non-emergent medical transportation (NEMT) budget, there are efforts to tackle this issue. One governmental solution to transportation issues is Logisticare, a Medicaid contractor that operates in 40 states and provides rides for low-income patients. But the system is broken: it entails piles of paperwork and rides must be requested three days in advance – the service often misses homes pickups, and leaves patients waiting at the clinic – stranded. In Detroit, cancer patients were left waiting after their chemotherapy treatments – weak and helpless.[2] Similar complaints against Logisticare have spiked across multiple states, including Wisconsin, Maine, and Connecticut.[3,4,5]

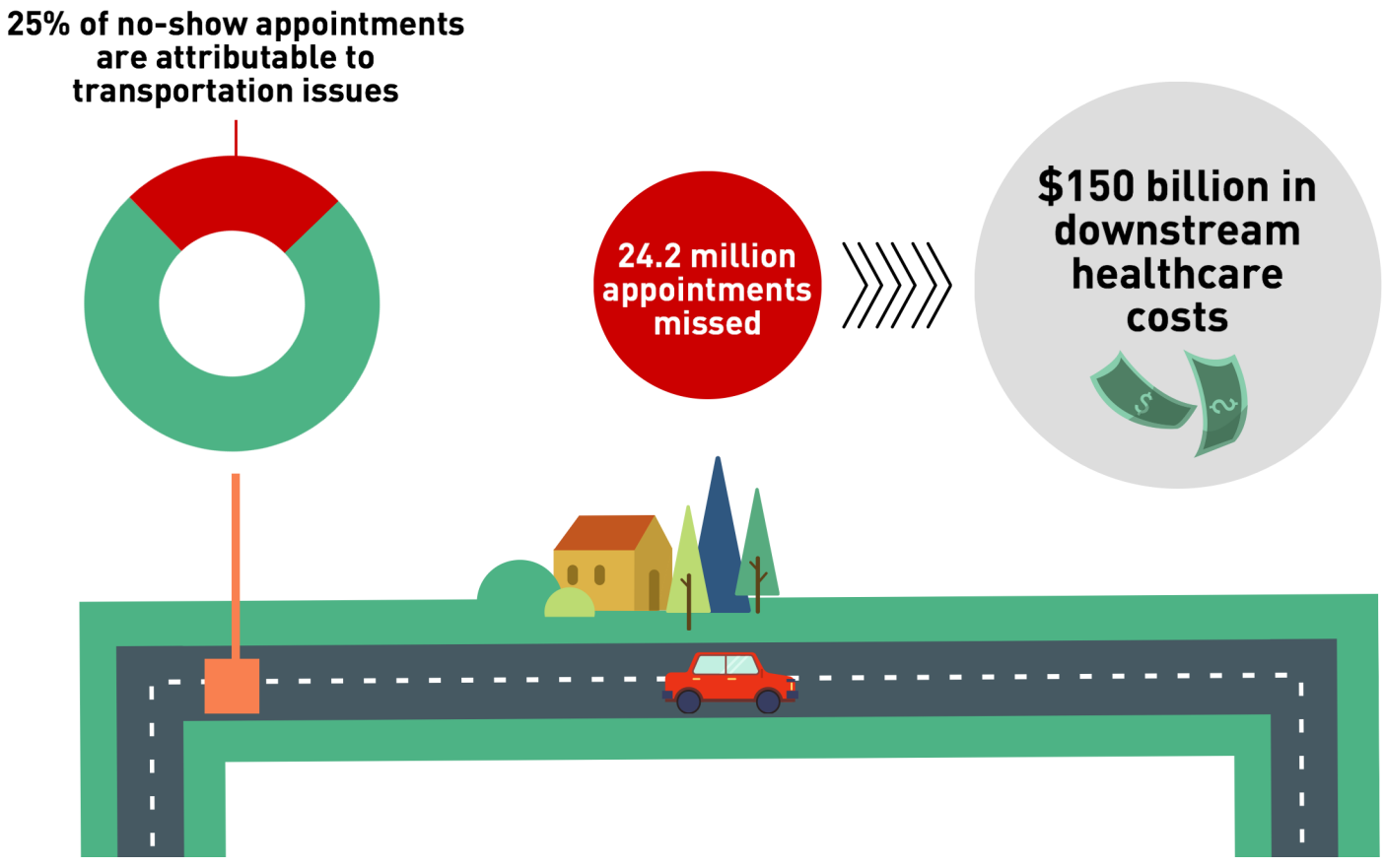
We then began to consider the applications of Uber and Lyft -- a go-to app for the youngest generation -- which spurred many conversations with Penn Medicine leaders, Wharton faculty, Pennsylvania state secretaries of health and transportation, and venture capitalists. In short, Ride Health is an EMR-integrated platform that enables clinical practices to request rides for patients, who face such transportation barriers to care. Our software leverages the application-programming interfaces of

multiple ride-sharing platforms, and aims to provide a pathway of reimbursement from insurance, specifically Medicaid and Medicare. Ride Health is envisioned to be a seamless addition to the practice workflow – specifically through its automated integration of the patient, driver, and provider, and through its account for live traffic and driving conditions. In future iterations of our product, we envision the integration of predictive analytics and machine learning to successfully target patients, who are most vulnerable to transportation risk and would ultimately benefit most from our service. As an organization, Ride Health helps all stakeholders. Patients get to the doctor and potentially avoid hospital admissions. Providers benefit from increased patient satisfaction increased revenue from what-would-have-been no shows. Insurers have a healthier pool of patients to cover. And drivers make money from the rides.

Ride Health has been the high of my undergraduate experience – encapsulating friendship, entrepreneurship, healthcare, and advocacy. From our weekly meetings and our team dinners, to our conversations with healthcare experts and public officials, our organization has broadened my perspective of medicine. Every day, I am inspired by the team's relentless dedication to revolutionizing the role of technology within the clinic – and truly starting a movement of application-based innovations to improve care coordination and the patient experience. Healthcare is a changing field and technology is at the forefront of that change.

Ride Health has pushed me to evolve into a college entrepreneur ---and to understand that being young should not be a barrier in trying to make a difference in this world. While it will take a village to solve the transportation barrier, we hope to make our efforts count and evolve into a resource that the elderly and chronically-ill can use and benefit from. I refer back to those picturesque startup scenes, and am humbled to place Ride Health among them.

1. Sviokla, John. "How Behavioral Economics Can Help Cure the Health Care Crisis." Harvard Business Review. 2014. Accessed September 20, 2016. https://hbr.org/2010/03/how-behavioral-economics-can-h.
2. Ley, Shawn. "Cancer Patient Left Stranded." Click on Detroit. January 12, 2016. Accessed September 20, 2016. http://www.clickondetroit.com/news/cancer-patient-left-stranded.
3. Laasby, Gitte. "Complaints Spike for LogistiCare Transit Service." Complaints Spike for LogistiCare Transit Service. September 12, 2013. Accessed September 20, 2016. http://archive.jsonline.com/news/wisconsin/complaints-spike-for-logisticare-transit-service-776q8qs-169700206.html.
4. Moretto, Mario. "DHHS Will Not Renew Contract with Troubled MaineCare Ride Provider When It Expires in June." Bangor Daily News RSS. January 09, 2014. Accessed September 20, 2016. http://bangordailynews.com/2014/01/09/politics/dhhs-will-not-extend-contract-with-troubled-mainecare-ride-provider-when-it-expires-in-june/.
5. Kovner, Josh. "Civil Rights Complaint Made Against Company That Provides Patients With Rides." Courant.com. March 18, 2016. Accessed September 20, 2016. http://www.courant.com/news/connecticut/hc-children-logisticare--medicaid-0319-20160318-story.html.



# I'm Sorry, but you have "[insert FATAL disease here]"

## THE INADEQUACIES OF MEDICAL TESTING

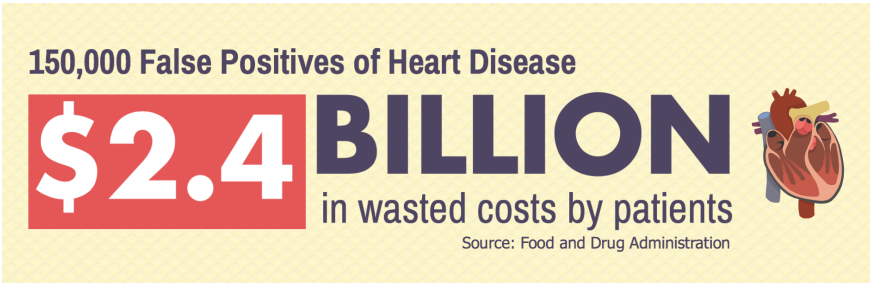
By Santosh Nori

"I'm sorry, but you've tested positive for cancer." Hearing this sentence is the worst fear of every person that undergoes medical testing for cancer, or a sentence similar to this for any dangerous disease. Regardless of whether medical tests yield relieving or concerning results, they provide a window of clarity for doctors and for patients to confirm or refute suspicions about what is going on in the patient's body. Diagnosis becomes problematic, however, when the results of such tests cannot be trusted. Unfortunately, this is the case with many LDT's, or lab-developed tests. A high incidence of false positives and false negatives is a major problem in the field of diagnostics, since inaccurate results cause physicians to unnecessarily treat patients with drugs that have adverse side effects, or let dangerous conditions go untreated: both situations can result in serious harm to a patient. The Food and Drug Administration (FDA) found that over 20 cases of LDT's that diagnose serious diseases such as ovarian cancer, whooping cough, and human papillomavirus have sub-par clinical accuracy.[1]

This accuracy issue begs the question, why don't regulatory measures exist to ensure quality and accuracy of medical tests? Although oversight of LDT development and production currently exists, the stringency of regulation varies from state to state, allowing tests with high false positives and negative measures, and dubious links to disease, to enter the market in certain parts of the country. Just last year, however, Congress and government agencies were made aware of the problem, and are now making an effort to crack down on test developers and establish measures to ensure the diagnostic quality of medical tests. The House subcommittee on Energy and Commerce has opened up discussion on whether or not the FDA has adequate authority to regulate this industry. Opponents to such consideration, primarily Republicans, have voiced the argument that stricter regulation could dampen medical innovation and set a precedent for heavier regulation of the health sector as a whole.[2]

The implications of this issue are shocking. According to one report by the FDA, a commonly used test used to evaluate the risk of the development of heart disease did not actually have a significant link to the disease. As a result, of the 150,000 patients that were diagnosed with this disease, many were mistreated with statins, which resulted in an unnecessary cost of over 2.4 billion dollars, as well as side effects such as muscle pain and liver damage.[3] False positives for another LDT determined inadequate by the FDA called OvaSure, which tests for ovarian cancer, was shown to result in an estimated cost of $12,578 per case. The numbers for false negatives do not fare any better. In the same report by the FDA, a commonly used breast cancer test was determined to result in a significant number of false negatives, resulting in a cost of $775,278 per false negative case.[4] These figures are damning to patients' finances, considering that many people who undergo these tests are of the lower or middle class.

Expanding these adverse implications to a broader scope, the lack of accuracy of LDT's also poses a significant threat to the future of medicine, especially in the United States. With the recent call from the Obama administration for the development of Precision Medicine, an approach to medicine that tailors treatments and medical care to the specific genetic makeup of a patient, it becomes more important than ever to have clinical tests of significant accuracy on the market. Without a certain level of accuracy, it would become almost impossible to develop and administer treatments based on a patient's genome, simply because of the foreseeable risk of a



false test result.[5]

The very basis of any kind of medical decision is a diagnostic test. In other words, neither physicians nor patients can make informed medical decisions until they receive information on what medical issues they are dealing with. As such, shortcomings with medical testing prevent any proper medical decision from being taken with complete certainty, a problem that threatens the stability of healthcare delivery and the healthcare industry.

The government should take multiple courses of action following a comprehensive analysis of the situation. First, the government should consider implementing stricter measures for quality assurance of LDT's and other medical tests. This is justifiable because such action would be in the best interest of patients today, and medical endeavors of the future. Furthermore, funding provided by the government in areas of research related to diagnostic testing would allow for scientists, physicians, and companies to work to improve the accuracy of LDT's. No matter how the government decides to approach this problem, one thing is for sure: this issue needs to be addressed, as inaccurate LDT's pose a threat to the entire medical decision making process.

1. "FDA Says More Regulation Needed on Lab Tests," The Wall Street Journal, accessed April 9, 2016, http://www.wsj.com/articles/fda-says-more-regulation-needed-on-lab-tests-1447720337
2. "FDA Targets Inaccurate Medical Tests Citing Dangers and Costs," The New York Times, accessed April 9, 2016, http://www.nytimes.com/2015/11/24/us/politics/fda-targets-inaccurate-medical-tests-citing-dangers-and-costs.html?_r=0
3. "FDA Targets Inaccurate Medical Tests Citing Dangers and Costs."
4. "The Public Health Evidence for FDA Oversight for Laboratory Developed Tests: 20 Case Studies," Food and Drug Administration, accessed April 9, 2016, https://s3.amazonaws.com/assets.fiercemarkets.net/public/005-LifeSciences/fdaoversighttests.pdf.
5. "The Public Health Evidence for FDA Oversight for Laboratory Developed Tests: 20 Case Studies."

# TO BEGIN TO BRING PATIENT CHOICE BACK TO HEALTHCARE

**By Dominic Gregorio**

The year is 2016, and health care is extravagantly expensive. Paying for medical upkeep is, in fact, more expensive than it has ever been, with prices growing far faster than inflation.[1] This is the case in the United States due to a number of well-intended collectivist policies, such as certain provisions of the Affordable Care Act; this causation has been recognized even in the federally-funded literature.[1] Despite the consumer-friendly intentions behind the set of policies which have caused unseemly health care price inflation, patients and caretakers alike are unfairly and unduly abused by the artificially monstrous costs of giving and receiving health care. This price squeeze contrasts with America's reputation as the most prosperous country in the world. It ought to be rectified insofar as its causes can be traced to our policy choices. Though there are many causes behind the specter of health care inflation, there exists a policy solution which is guaranteed to reduce costs without necessarily tearing down a corrupt system all at once: it's called the health care savings account.

A health savings account (HSA) is a financial construct to which a patient may contribute tax-deferred income to save for future medical expenditures.[2] An individual's employer is also free to contribute to such an account, if the employer conforms to IRS contribution rules. These contributions then accumulate interest tax-free and will not be taxed upon withdrawal as long as the funds are spent on qualified health-related purchases.

HSAs can help health care consumers of all ages and socioeconomic status save money on health care in several different ways. Firstly, of course, the consumer saves money on taxes, freeing up more disposable income to be spent specifically on health care consumption. This particular type of savings even adds a yearly return on the investment since interest accrues tax-free. Secondly, the consumer is able to purchase higher-deductible health insurance policies, the premiums for which are much lower.[2]

Perhaps it is wise that such a patient refrains from contributing to the profits of insurance companies and paying for care that he already expects to receive; instead these savvy consumers reserve their insurance budget to buying insurance for its true purpose: insuring against large, unexpected health purchases.

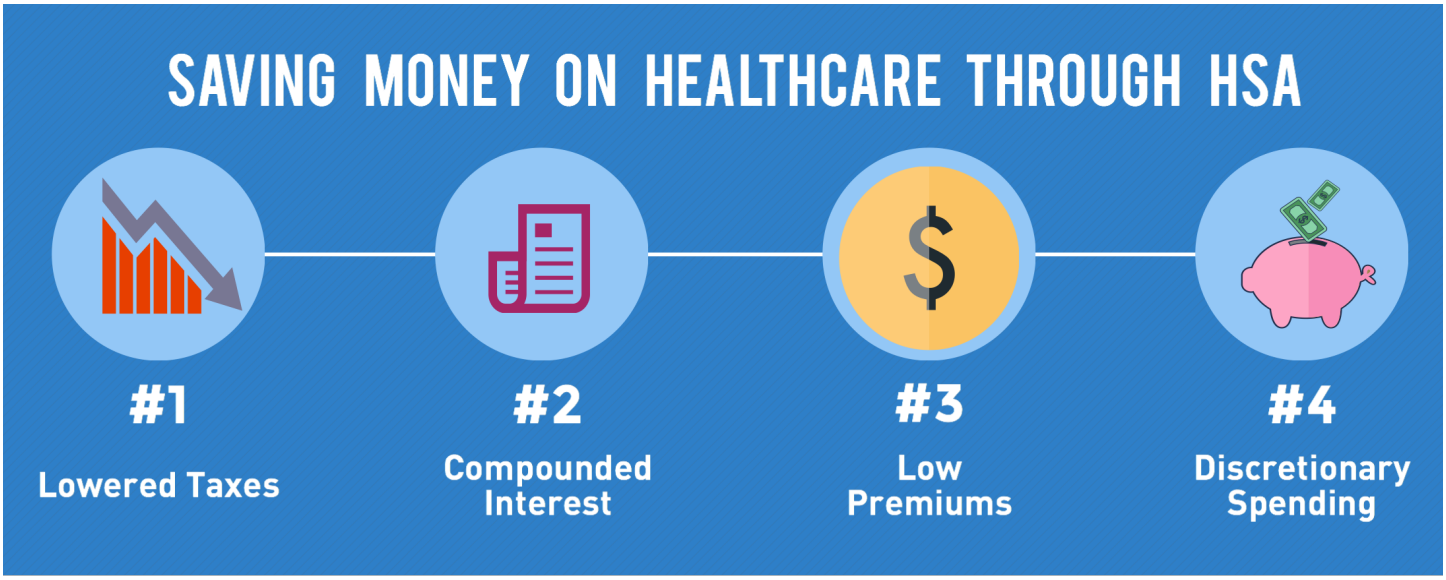
Taking their savings from tax exemptions, interest, and lowered premiums, HSA users tend to proceed to

spend less on health care due to price shopping. According to Hall and Havighurst, HSAs "are the most prominent current manifestation of the consumer-directed health care strategy for motivating patients to economize, if they wish, on their own health care."[2] Further research has inquired into the actual effects of such attempts to encourage efficiency by empowering patients to make price-based decisions in the market for health care. Empirical evidence from such investigations shows that direct patient interaction with price indeed decreases total health care spending: Even within current adverse policy frameworks, HSA enrollees spent 5 to 7 percent less on health care than non-HSA enrollees.[3] Savings due to lowered taxes, accrued, compounded interest, low premiums, and discretionary spending will represent a return to consumers of much of the power and market influence which they ought to possess surrounding personal purchases. Specifically, patients stand poised to gain the freedom to choose treatment and negotiate its price as they please. Anecdotal success stories see patients paying $700 for an injured leg that normally incurs health care costs of $1400 or paying $65 for doctor's visits for which patients are usually billed $400, all by directly negotiating prices for care.[4]

Of course, not every author who has witnessed the growing success of HSAs is satisfied that these innovative resources have a rightful place in the modern health care market. Opponents may claim that plenty of individuals, especially the destitute, are unable to manage the risk or cost of maintaining a health care savings account.[5] However, as Hall and Havighurst point out, HSAs can be easily linked to low-premium health maintenance organization plans or managed care plans if necessary for managing risk, and patients' doctors will continue to assist in making medical decisions as always.[2] Opponents of HSAs who claim to argue on behalf of the destitute also fail to observe the exceptional prospects of administering a health safety net via contributions to an individual or family's health savings account, as opposed to the system of cyclic dependency espoused by current Medicaid and Medicare policies. Furthermore, the HSA represents a prodigious route through which to administer veteran health care benefits, as opposed to the system of lethargy and incompetence espoused by current Veterans Affairs policies.

The current policy framework for personal health funding provides tax incentives for individuals to choose especially comprehensive, employer-provided plans for themselves and their families, and it further discourages the wielding of HSAs by imposing arbitrary limits on their usage.[6] Tying health care consumers' hands behind their backs while claiming to protect them is the epitome of hypocrisy. HSAs represent an enormous opportunity for individuals to efficiently save and plan for a lifetime of health care purchases without undue monetary seizures or excessive intervention by federal agents. Our federal policies should take a more neutral stance as to which methods patients prefer to use to pay for health care; after all, such a stance will return significant benefit to the consumer. Besides, the supreme law of the land never granted a constitutional prerogative to Congress to legislate and dictate intrastate health care purchases in the first place.[7]

1. Martin, A. B., M. Hartman, J. Benson, and A. Catlin. "National Health Spending In 2014: Faster Growth Driven By Coverage Expansion And Prescription Drug Spending." Health Affairs 35, no. 1 (2015): 150-60. Accessed September 12, 2016. doi:10.1377/hlthaff.2015.1194.
x2. Hall, M. A., and C. C. Havighurst. "Reviving Managed Care With Health Savings Accounts." Health Affairs 24, no. 6 (November 2005): 1490-500. doi:10.1377/hlthaff.24.6.1490.
3. Sasso, Anthony T Lo, Mona Shah, and Bianca K. Frogner. "Health Savings Accounts and Health Care Spending." Health Services Research. 2010. Accessed September 16, 2016. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2910568/.
4. Dody, Rachel. "High-Deductible Health Insurance Policies with Health Savings Accounts: A Policy Review." SPNHA Review, 5th ser., 10, no. 1 (2014): 1-12. Accessed September 16, 2016. http://scholarworks.gvsu.edu/spnhareview/vol10/iss1/5.
5. "A Brief Overview of the Major Flaws With Health Savings Accounts." Center on Budget and Policy Priorities. April 5, 2006. Accessed September 13, 2016. http://www.cbpp.org/research/a-brief-overview-of-the-major-flaws-with-health-savings-accounts.
6. Cannon, Michael. "How Would Large Health Savings Accounts Work?" Cato Institute. 2016. Accessed September 13, 2016. http://www.cato.org/multimedia/cato-daily-podcast/how-would-large-health-savings-accounts-work.
7. U.S. Constitution, art. 1, sec. 8.



# The Need for Cost-Effective Medical Imaging in Developing Countries

By: Karthik Prabhakaran

Over the past 50 years, developing countries have been characterized by a scarcity of resources and infrastructure coupled with substandard economies. This has resulted in ineffective healthcare and consequently, lower life expectancy rates compared to developed countries. Most developing countries have begun to improve their performances in statistical indexes such as gross domestic product (GDP) and income per capita, both of which have led to improved healthcare in these countries. Despite the improvements, one of healthcare's most important components, medical imaging, is still lagging alarmingly in developing countries.

Medical imaging is the use of various imaging modalities – magnetic resonance imaging (MRI), computed tomography (CT), X-rays, etc. – to detect, diagnose, and track disease. The importance of medical imaging cannot be understated. It allows radiologists to evaluate internal structures and report on any unusual features. Radiology reports are then analyzed by pathologists in order to conduct tests and make diagnoses. Finally, pathology reports are used by an assortment of medical professionals to plan treatment.

Medical imaging in developed countries is fairly common and available for most citizens if it is deemed necessary by a physician. On the other hand, medical imaging in developing countries is not nearly as common nor available for citizens. The Organization for Economic Co-Operation and Development (OECD) charted the per capita availability of medical imaging equipment and found that no country in Africa or South America ranked in the top 30 countries for any of the following: MRI units, CT scanners, mammography machines, or radiotherapy equipment.[1] Without these critical pieces of equipment, healthcare in developing countries is severely limited.

Daniel Mollura, founder and chief executive of RAD-AID (a nonprofit organization that delivers medical imaging equipment to developing countries) states, "Imaging is a major part of almost every clinical decision we make in our health care system, yet this technology is not available to a substantial portion of the world."[2] Medical imaging is heavily relied on for clinical decisions in developed countries, so the prospect of making clinical decisions without medical imaging seems troublesome and dangerous. However, this happens every day in developing countries.

The obvious problem regarding the severe lack of medical imaging equipment in developing countries is that the equipment is incredibly expensive. For example, the price of a CT scanner ranges from $65,000 to $2.5 million.[3] The price of an MRI suite with a single machine is even more expensive, ranging from $3 million to $5 million.[4] The other problem that may go unnoticed is the cost of each scan; hospitals have to balance out the costs of buying, installing, and maintaining the machines with revenue from each scan. Given the high prices of medical imaging equipment, the income per capita in developing countries is not high enough for the average citizen to have access to medical imaging.

While it can be argued that the economies of developing countries will improve over the next few years, there are other pressing areas to spend money on such as agriculture, water purification, and education. There is no guarantee that 1) there will be enough money in the coming decades to purchase more medical imaging equipment and 2) new inflows of money will be spent on medical imaging equipment in lieu of other areas. In fact, a study reporting on national healthcare expenditures between 2013 and 2040 concluded that developing countries spent $0.03 on healthcare per capita for every $1.00 spent by developed countries from 1995 to 2013 and projected that the rate will be almost exactly the same in 2040.[5] As a result, the only viable solution to this problem is drastically reducing the costs of medical imaging equipment.

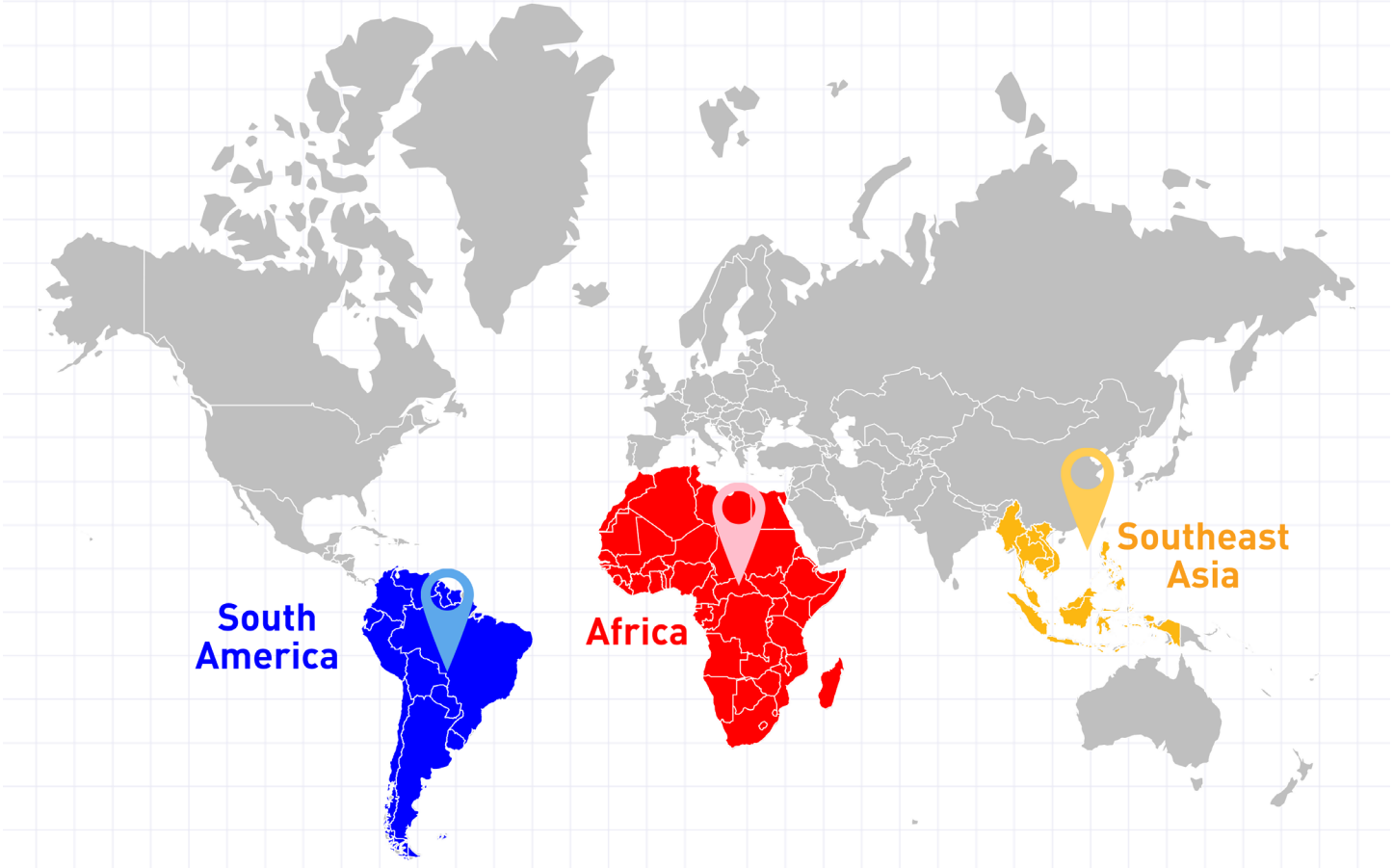
Over the past decade, scientists have been conducting research designed to reduce the cost of building and operating medical imaging equipment. In 2014, Ge Wang of Rensselaer Polytechnic Institute worked with colleagues from Chongqing University in China and Wake Forest University to create a new CT scanner that uses linear scanning instead of rotational scanning – Wang's team ran

simulations that predicted the costs of linear scanning CT scanners would be more affordable, ranging from $50,000 to $100,000.[6] Last year, a group of researchers at Harvard Medical School led by Matthew Rosen found a new way to reduce the magnetic field requirements for MRI machines and thus dramatically reduce the costs of each machine, which they predicted will be far more affordable (<$50,000).[7] Scientific and technological innovation is the brightest hope for developing countries in regards to acquiring medical imaging equipment.

While cost-effective medical imaging equipment would be beneficial for developed countries in terms of reducing patient expenditures, it is even more critical for developing countries. Instead of waiting for the economies of developing countries to boom or expecting the full monetary support of developed countries, increasing the affordability of medical imaging equipment through funding research and development is absolutely critical for the health and welfare of people in developing countries.

1."Health Equipment - Magnetic Resonance Imaging (MRI) Units - OECD Data." TheOECD. Accessed August 28, 2016. https://data.oecd.org/healtheqt/magnetic-resonance-imaging-mri-units.htm#indicator-chart.
2. Greenemeier, Larry. "PET Project: Radiologists Push Imaging Technologies in Developing Countries." Scientific American. Accessed August 28, 2016. http://www.scientificamerican.com/article/radiology-developing-countries/.
3. "Why Your MRI or CT Scan Costs An Arm and a Leg." The Fiscal Times. Accessed August 28, 2016. http://www.thefiscaltimes.com/Articles/2014/07/21/Why-Your-MRI-or-CT-Scan-Costs-Arm-and-Leg.
4. Glover, Lacie and NerdWallet. "Why Does an MRI Cost so Darn Much?" July 16, 2014. Accessed August 29, 2016. http://time.com/money/2995166/why-does-mri-cost-so-much/.
5. Dieleman, Joseph L, Tara Templin, Nafis Sadat, Patrick Reidy, Abigail Chapin, Kyle Foreman, Annie Haakenstad, et al. "National Spending on Health by Source for 184 Countries Between 2013 and 2040." The Lancet 387, no. 10037 (June 2016): 2521–35. doi:10.1016/s0140-6736(16)30167-2.
6. "Linear CT Scanning Lowers System Costs." March 30, 2015. Accessed August 29, 2016. http://medicalphysicsweb.org/cws/article/research/59198.
7. Sarracanie, Mathieu, Cristen D. LaPierre, Najat Salameh, David E. J. Waddington, Thomas Witzel, and Matthew S. Rosen. "Low-Cost High-Performance MRI." Scientific Reports 5 (October 15, 2015): 15177. doi:10.1038/srep15177.

## Lack of Cost Effective Medical Imaging in Developing Countries




No country in Africa, South America, nor Southeast Asia (except for Korea, Russia, and Chile) ranks in the top 30 countries for any of the following: MRI units, CT scanners, mammography machines, and radiotherapy equipment.

# A World Away from HUP

By Jacquelyn He

When you hear about Penn Medicine and HUP, one usually associates it with the best. It's portrayed as an institution that is top of its class. As they say, your life is worth Penn Medicine, and not the other way around. Similarly, when a hospital is denoted with the Tier 3A ranking in China, it usually signifies that it is the place to go. People expect to receive the best care from such a top-ranking institution. Since I was already in China for an internship, I decided to go see for myself.

My co-workers and I visited the Shanghai Chest Hospital, a Tier 3A hospital which is affiliated with Shanghai's Jiao Tong University. According to a medical tourism article about the hospital, it is one of Shanghai's top-ranked medical centers in China specialized in thoracic and cardiovascular diseases. But take a step inside, and one would not be so sure.

Upon entering, there is no welcoming hospital lobby or information desk, nor is there any security. In the outpatient clinic, one encounters a line of people, waiting to get a ticket number from staff members who reside behind windows that resemble those of a bank teller. After receiving a ticket, patients are left on their own to figure out where to go. Some follow the signage, but others walk around lost. White coats are like beacons in the night here. Once patients see the white coat of a doctor, they immediately flock to him and bombard him with questions about where they should go.

To get to the surgery unit, we had to take the stairs, for all the elevators were jam-packed, much like the metro during traffic hour. We went up six floors and there was not a single flight of stairs that was free of cigarette butt stains—quite ironic for a hospital that specializes in cardiovascular and respiratory care. We then met with a surgeon resident, who happened to be the only female surgical student in the entire hospital. Hearing her talk about her career path was quite interesting. Apparently, being a doctor is not as respected of an occupation as it is in the US. In fact, students are increasingly starting to steer away from the profession. Many parents also discourage their daughter s from pursuing such a labor-intensive job as a doctor. As they say, women are supposed to stay home and take care of the family.

Not one to let naysayers sway her, the female surgeon resident enthusiastically talked to us about her job and showed us around the floor. She was probably the brightest part of the whole visit, as the rest of the hospital looked rather bleak.

Hospital rooms had as many as four patients to a room. There was at most two arms-length of space between beds, with no curtains to divide them. Family members were sitting in chairs against the wall or resting their heads on the patient as they slept. The equipment behind the patients' beds was rather basic, and neither gloves nor hand sanitizer—staples in most US hospital rooms—were present. At the nurses' station, no nurse was to be found, but that made more sense once we found out that the patient to nurse ratio was eight to one. There were not any doctors out on the floor either. Instead, they were in their office, surrounded by patients who crowded around them to ask questions. The lack of patient privacy—both in patient rooms and in the doctor's office—was astounding.

Next, we visited the radiology oncology floor, where we witnessed patients simply waiting in a hallway to be examined. Radiology protective equipment—those big vests you wear when getting an X-ray—were just stored on the ground in the hallway. The doctor we were with did not seem to think that was a big problem. And perhaps it wasn't. But it begs the question that if they are storing those vests in this way, who knows what else they might be keeping on the ground? Hospital gowns? IV lines? I would rather not know.

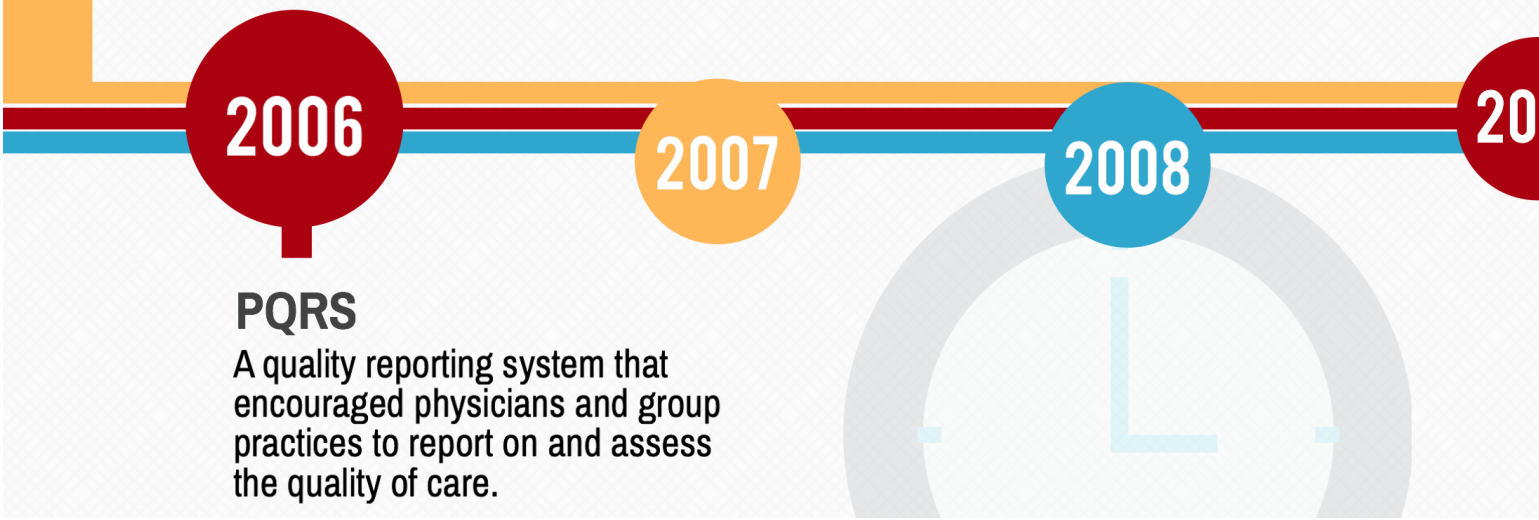
Overall, I would say my visit to the hospital was eye-opening. It boggles my mind to think that this is one of China's Tier 3A hospitals. For a hospital that is supposed to be one of the best-in-class, it seemed far from it in reality. Maybe it is because my expectation of a top-tier hospital is influenced by my experiences at HUP and CHOP—some of the top teaching hospitals in the nation—but I would have thought that the chest hospital would at least resemble a US regional or community hospital. Instead, what I saw was a hospital that really did not look all too different from perhaps Chinese hospitals ten years ago.

From what I have seen in the course of my short visit, there needs to be a greater emphasis on making hospitals more of a healing place and a patient-centered environment. A hospital is probably the last place someone wants to be, so the least hospitals can do is to make the patient's visit a bit more tolerable. Things like sanitation, patient privacy, and ease of navigation are relatively easy fixes. More systemic issues, such as lack of primary and preventative care, may take a little longer. But we have to start somewhere. Only then will the actual state of China's hospitals start to get closer to our expectations of what they should be.

# Going Beyond a Quality Report Card:

## *The Difficulties in Assessing Healthcare*

By Sapna Nath



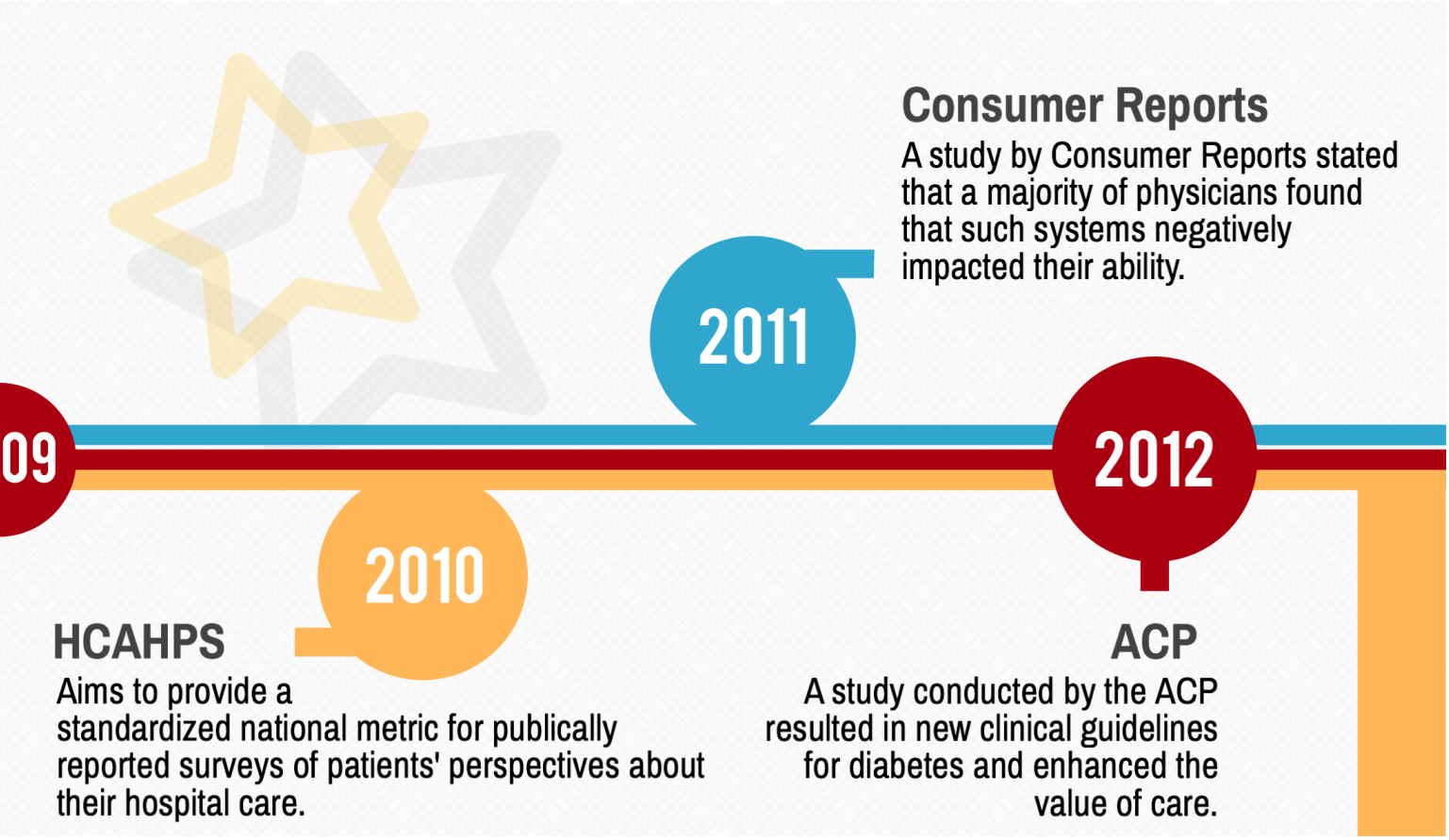

With the evolution of standardized healthcare metrics, the movement towards evidence-based medicine has gained new life from administrators and legislators. Two of the most commonly employed reporting surveys used to determine physician reimbursement are the Physician Quality Reporting System (PQRS) and Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS). These metrics, however, falsely associate that physician quality reimbursement and pricing are directly correlated with quality of care.

First implemented in 2006, PQRS is a quality reporting system that seeks to encourage individual medical professionals and group practices to report on and assess the quality of care to Medicare and patient care.[2] The program aims to quantify physician care by looking at the timeliness of care, how well providers communicate, patient's rating of provider, access to specialists, health promotion and education, health status/functional status, courteous and helpful office staff, care coordination, and stewardship of patient resources.[2] Physicians who do not use the reporting system are penalized with a substantial decrease in Medicare payment.

Made mandatory in 2010 under the Affordable Care Act in 2010, HCAHPS aims to provide a standardized national metric for publically reported surveys of patient's perspectives about their hospital care.[3] While many hospitals have used internal methods for assessing patient satisfaction, prior to the implementation of HCAHPS there was no national standard for publically reporting information regarding hospital care and providing a basis for cross-local, state, and national comparison.[3]

While the intentions behind both systems are noble, the reality is that the true heart of physician care is inaccessible to many who exist outside the realm of healthcare. Many evidence-based approaches to medicine can be ineffective at improving healthcare practices. A lot of the rhetoric used by legislative administrators to gain support for physician quality reporting systems acts as a Trojan Horse – forcing doctors to comply strict guidelines that they often do not agree with.

Instead, PQRS surveys are often administered post-discharge and as a result, require patients to remember specific aspects of their hospitalization. However, patients undergoing distress, trauma or surgery, seldom can accurately recount the quality of care they received. Even more so, an evaluation of the physician represents such a small component of question bundle of the survey, that quality of care cannot be the sole metric being quantified. What further complicates PQRS reporting in hospital-based settings is that a single physician may only be assessed even though others may have aided in treatment. The reporting metrics also fail to capture areas of improvement for those in need of system modifications. The groups that require the most resources targeted by these resources are typically underrepresented. The impracticality lies in the fact that systems, such as HCAHPS, penalize hospitals for re-admission.




While it may seem like such reducing such procedures would increase the quality of care delivered overall, the impracticality becomes apparent with groups that lack access to community healthcare. For example, people who live in nursing homes are often re-admitted to hospitals for relatively simple procedures.

A 2011 study by Consumer Reports notes that a majority of physicians found such systems to be detrimental; 42% of the physicians surveyed revealed that their ability to provide high-quality care was negatively affected as well.[5] In fact, patient and physician interaction can become even more complicated by confusion of rules with these metrics and contradicting healthcare assessments. Furthermore, a lack of influence in medical administration and the complexity of digitalized medical records adds to the frustration of physicians.[5]

Increasing physician involvement in care assessment provides one of the largest potentials to improve patient outcomes and deliver higher quality care. A 2012 study conducted by the American College of Physicians (ACP) resulted in new clinical guidelines for diabetes and enhanced the value of care.

Similarly, in the last decade, Dr. Don Berwick, under the Institute of Healthcare Improvement, lead the voluntary "Save 100,000 Lives" campaign.[5] The high participation rate in the study underscores the fact despite the lack of payment-per-performance mechanisms, the simple objective of improving patient quality motivates physicians to contribute to a cause. Ultimately, Dr. Berwick and his team of physicians identified six clinical areas, remote from finances or cost, that significantly reduced patient morbidity and mortality.

Such studies reveal the integral component that in such healthcare procedures, physician inclusion is key. Healthcare does not translate to our normal shopping experiences. Shopping for the best surgical procedure is not the same as shopping for a new kitchen appliance. Such measures and reporting systems do not empower and re-energize a skilled workforce and disconnect physicians from their patients. High-quality healthcare is not simply something we can "add to cart" after reading reviews of wait times, courteousness of office staff, or the decisions of the patient once they leave the hospital room. Patients are different and do not always fit the blanket type of care these reporting systems are tailored for. Ultimately, the only assessment that truly matters is if physicians and hospitals are keeping their patients safe and maximizing patient care.

1. American College of Physicians. "Five Things Physicians and Patients Should Question." Choose Wisely. Last modified 2016. http://www.choosingwisely.org/societies/american-college-of-physicians/.
2. Centers for Medicare & Medicaid Services. "About PQRS." Physician Quality Reporting System. Last modified December 23, 2015. Accessed April 8, 2016. https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/PQRS/.
3. Centers for Medicare & Medicaid Services, Centers for Medicaid & Medicare Services. "HCAHPS Hospital Consumer Assessment of Healthcare Providers and Systems." Last modified 2016. Accessed April 8, 2016. http://www.hcahpsonline.org/home.aspx.
4. Consumer Reports. "What Doctors Wished Their Patients Knew." Last modified 2016. Accessed April 6, 2016. http://www.consumerreports.org/cro/2012/04/what-doctors-wish-their-patients-knew/index.htm.
5. Institute for Healthcare Improvement. "Overview of the 100,000 Lives Campaign." Last modified 2016. Accessed April 9, 2016. https://www.ihi.org/Engage/Initiatives/Completed/5MillionLivesCampaign/Documents/Overview%20of%20the%20100K%20Campaign.pdf.

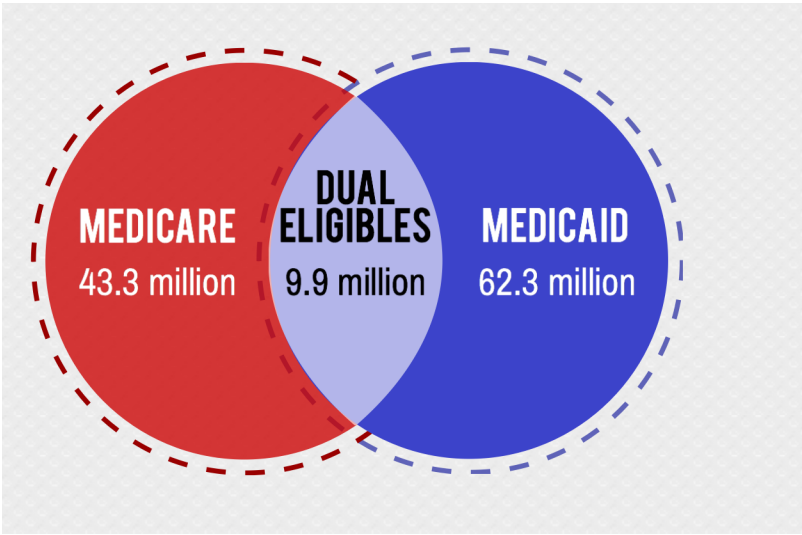
# DUAL ELIGIBILITY INTEGRATED CARE

Approximately nine million Americans qualify for coverage under both Medicare and Medicaid programs.[1] These individuals are often referred to as "dual eligibles," and are among the most disabled, most chronically ill, and most costly to support in either Medicaid or Medicare programs.[2] To alleviate both Medicaid and Medicare of the entirety of the financial burden imposed by constituents deemed eligible for both programs, the cost division was set in the following manner: Medicare covers the acute and post-acute care services of dual eligible constituents, while Medicaid covers Medicare premiums and cost sharing for these individuals. Dual eligibles who fall below certain income and asset thresholds receive coverage for long-term care and social supportive services as well.[2]

Policymakers have expressed particular interest in dual-eligible beneficiaries due to the relatively large expenditures by both Medicare and Medicaid for this relatively small group of individuals.[3] The constituents of the dual eligibles care population consume disproportionate shares of Medicaid and Medicare spending. According to a 2013 study, dual eligibles constituted 16% of Medicare beneficiaries but consumed 25% of all Medicare spending. In addition, these individuals comprised 18% of Medicaid enrollees but consumed nearly half of all Medicaid spending.[4] The immense consumption of state and federal medical finances among this relatively small yet significantly cost-consuming population has required coordination in effective financing of service coverage between Medicare and Medicaid.

The Affordable Care Act (ACA) created the Federal Coordinated Health Care Office (the Medicare-Medicaid Coordination Office). The Coordination Office works to improve coordination between the federal government and the states for dual eligible enrollees, in order to ensure constituents of their full access to covered services in both programs and high quality care.[4] To date, the Coordination Office has selected 15 states to receive contracts for up to $1 million each to design new integrated care models for dual enrollees. Among other goals, the Coordination Office "[a]nnounced a new demonstration that will focus on reducing preventable inpatient hospitalizations…by providing these individuals with the treatment they need without having to unnecessarily go to a hospital."[2]

The fifteen states, which have received such contracts, have implemented integrated care models for dual eligible individuals in a variety of different ways. Massachusetts was the first state to launch a three-year "capitated financial alignment demonstration to integrate care for beneficiaries who are dually eligible for Medicare and Medicaid—One Care—in October 2013."[5] As of February 2015, One Care has enrolled 17,763 beneficiaries (which is more than 18% of the estimated 96,449 eligible state residents) in the integrated care program.[4] One Care focuses on the following dual eligible features: "the non-elderly dual eligible population, an estimated 70% of whom have behavioral heath service needs…[and] excludes beneficiaries who participate in Medicaid home and community-based waivers,"[4] among other prominent features. Massachusetts has faced several challenges in the early implementation process of One Care. For instance, planning challenges associated with implementing systematic financial and delivery processes for individuals with complex health needs both contributed to a delayed launch date. Moreover, obtaining proper contact information for new enrollees, as well as building provider networks for plans with sufficient primary care and behavioral care coverage, among other financial and plan-implementation challenges, proved onerous.[4] Nevertheless, despite said challenges, the



# & STATE-BASED IMPLEMENTATION OF MODELS

BY ALISA FELDMAN

Massachusetts One Care demonstration also has many strengths. According to the Kaiser Family Foundation, a non-profit organization that provides analysis on national health policy issues, the "design and implementation of One Care was conducted in an open, participatory, and transparent manner."[4]

Other states have taken different routes to implement integrated care models for dual eligible Medicaid-Medicare beneficiaries. Ohio, for instance, was the third state to launch a three-year capitated financial alignment demonstration to integrate Medicaid-Medicare payments for dual eligibles, referred to as MyCare Ohio. Launched in May 2014, and as of January 2015, MyCare Ohio has enrolled 94,525 beneficiaries, which is over 82 percent of the 115,000 state residents initially estimated to qualify for financial alignment. Massachusetts and Ohio share some similarities in integrated care features, such as the emphasis of coverage for behavioral health needs. Yet, while Massachusetts focuses on the non-elderly dual eligible care beneficiaries, MyCare Ohio emphasizes coverage for "adult dually eligible beneficiaries, including seniors, people with physical disabilities, and people with behavioral health needs."[5] Despite these distinctions in implementation processes, both One Care and MyCare provide an integrated care model, in which dual eligible medical services split costs between Medicaid and Medicare.

**MEDICARE**

**A federally funded program that provides health coverage if you are 65 years or older or have a severe disability**

**DUAL ELIGIBLES**

**Individuals eligible for both Medicare and Medicaid**

**MEDICAID**

**A joint state and federal program that provides health coverage to low-income individuals**

The current financial arrangements, which coordinate the cost burden of dual eligible coverage helps "protect the dual eligible from an out-of-pocket financial burden that could impede access to needed care."[6] Yet, in addition to such assets of the dual eligible integrated care models, care coordination between the two programs remains challenging.[6] The prospect of attaining a healthcare equilibrium, in which costs are minimized and care quality is maximized, remains a prominent enigma. Issues of enrollment, and the decision of whether to permit voluntary enrollment or not, continue to impede progress in integrated care models for dual eligible beneficiaries. Currently, the main reason why states are struggling to achieve their cost-savings goals is due to voluntary participation for dual eligibles, as many beneficiaries opt-out of dual enrollment care packages.[7] As the effects of the ACA continue to play out, it is essential that states address such opt-out issues, and represent the dual eligible integrated care models in such a way that maximizes voluntary enrollment.

"The prospect of attaining a HEALTHCARE EQUILIBRIUM, in which COSTS are MINIMIZED and CARE QUALITY is MAXIMIZED remains a prominent enigma."

1. "Dual Eligible," The Henry J. Kaiser Family Foundation, accessed October 22, 2016. http://kff.org/tag/dual-eligible/
2. "Medicare-Medicaid 'Dual Eligibles,'" National Conference of State Legislatures, accessed October 22, 2016. http://www.ncsl.org/research/health/medicare-medicaid-dual-eligibles.aspx
3. "Beneficiaries Dually Eligible for Medicare and Medicaid," Medicare Payment Advisory Commission, accessed October 22, 2016. http://www.medpac.gov/docs/default-source/publications/january-2016-medpac-and-macpac-data-book-beneficiaries-dually-eligible-for-medicare-and-medicaid.pdf?sfvrsn=0
4. Colleen Barry, Lauren Riedel, Alisa Busch, and Halden Huskamp, "Early Insights From One Care: Massachusetts' Demonstration to Integrate Care and Align Financing for Dual Eligible Beneficiaries," The Henry J. Kaiser Family Foundation, May 2015, accessed October 22, 2016. http://kff.org/medicaid/issue-brief/early-insights-from-one-care-massachusetts-demonstration-to-integrate-care-and-align-financing-for-dual-eligible-beneficiaries/
5. Molly O'Malley Watts, "Early Insights From Ohio's Demonstration to Integrate Care and Align Financing for Dual Eligible Beneficiaries," May 12, 2015, accessed October 22, 2016. http://kff.org/medicaid/issue-brief/early-insights-from-ohios-demonstration-to-integrate-care-and-align-financing-for-dual-eligible-beneficiaries/
6. "Making Medicaid Work for the 21st Century," National Academy for State Health Policy, December 2004, accessed October 22, 2016. http://www.nashp.org/wpcontent/uploads/sites/default/files/mmw_dualeligibles.pdf
7. Virgil Dickson, "Future of Dual-Eligible Demonstrations Questioned Due to Low Enrollment," Modern Healthcare, April 2015, accessed October 22, 2016. http://www.modernhealthcare.com/article/20150421/NEWS/150429978

# Is Preventative Care Really Preventing Anything?

By Saur Vasil & Natalie Fahmy

"If people are constantly falling off a cliff, don't build a hospital at the base…build a fence."

The late Dr. Denis Burkitt, principal investigator in the research behind dietary fiber's impact on human physiology and discoverer of Burkitt's lymphoma, echoed this statement in an interview in 1990 at Michigan State University. His intention, according to John McDougall of Dr. McDougall's Health and Medical Center, was to inform the community that practicing medicine was more than treating the signs and symptoms of suffering patients. It also meant taking steps to educate the general public of risk factors in order to prevent chronic illness from occurring in the first place.[1]

Currently, our health-care system in the United States is primarily disease-oriented. In 2015, $3.1 trillion dollars, or $9,695 per person was spent in this nation on medical care according to the Center for Disease Control. Of this amount, 95% was spent directly for treating diseases that have already occurred, with 86% spent on chronic illness.[2]

However, the most interesting statistic is that at least 75% of these costs went into treating diseases that are easily preventable, or even reversible if caught early.[3]

## [THE CASE FOR PREVENTION]

Preventative health care saves lives.

By finding an illness or disease early on, it can more easily be treated and recovery times are bolstered. The World Research Foundation (WRF) states that if too many people wait to get treated, "the burden becomes much greater on the system overall, and the quality of everyone's health care suffers and medical expenses rise." As more people choose to wait, the demand for immediate healthcare will get higher and each individual will have less medical attention; as their diagnosis continues to worsen, this will call for more treatment, meaning more money.[4]

Chronic diseases such as heart attacks, strokes, cancer, and obesity are responsible for an astounding 7 of 10 deaths in the United States each year. The CDC suggests that there is a growing amount of chronic diseases in the United States, but this problem can be fixed.[5] Preventative measures such as screenings and healthy lifestyle choices can lower your odds of contracting a heart disease, stroke, and type-2 diabetes by 80%, and cancer by 40%.[6]

Preventative health care starts with taking your health into your own hands, but does not stop there. Not all diseases and illnesses give noticeable symptoms, which is why regular check-ups and screenings are a must to create a healthier America.

## [CURRENT PREVENTATIVE MEASURES WASTE MONEY]

With such a strong case for preventative care, it's only a reasonable assumption that providing a heavy transition into preventative care should severely cut costs.

Not exactly.

That role of preventative care on the health system is largely misunderstood. "It's simply not plausible," Austin Frakt, prominent health economist of Boston University states, "to think you can cut healthcare spending through preventative care."[7] Simply put, the methodology behind some of the best-known protocols for preventative treatment don't actually improve health.

According to a Reuters article titled "Think Preventative Medicine Will Save Money? Think Again" identifies many avenues physicians employ to discover early chronic disease that actually are unnecessary for the general population. One prominent example is the notorious avoided annual physical examinations. A 2012 cumulative analysis also cited by *Reuters* indicates that they play an insignificant and highly negligible role in reducing risk of serious illness or premature death. Yet, over one-third of adults in the United States attend their check-up annually, costing the healthcare system $8 billion per year.[8]

Also, consider the multitude of testing done in order to prevent cancers such as ovarian, prostate, and testicular. Furthermore, a majority of cancer examinations for ovarian, prostate, and testicular cancer produce "no net health benefits," according to the U.S Preventative Services Task Force. As a result, the task force reduced the necessity rating for these tests and recommended against constant checks for these illnesses.[9]

The root of this issue lies in the understanding that in order for preventative healthcare to function successfully, a much larger population needs to regularly obtain service in order to avoid illness that only a select few may contract. Consequently, preventative strategies are expansive which limits their cost-effectiveness.

"Preventative health care starts with taking your health into your own hands, but does not stop there. Not all diseases and illnesses give noticeable symptoms, which is why regular check-ups and screenings are a must to create a healthier America."

**[SOLUTIONS]**

Research published in *The New England Journal of Medicine* titled "Does Preventive Care Save Money" notes that there are indeed other opportunities to use the causes of prevention to live healthier, more preventative lives. These routes, however, depend greatly on behavioral changes amongst the American population. Healthcare oriented preventative measures, such as utilizing drugs to treat high cholesterol or blood sugar levels, not only waste billions in tax-payer health funds, but also can be treated much more effectively through modifications in user lifestyles.10 Jeffrey Levi, Ph.D. and Professor at the Milken Institute at The George Washington University states that "Some of the most common chronic, preventable diseases might be best addressed outside the clinical setting."[11] An article from *Newsweek* named "Prevention is Worth the Money" dictates that when one eats healthier, quits smoking, learns to love, exercises more, and sleeps peacefully, and eliminates stress from their life, they are naturally reducing their risk-factors for disease, and will live generally longer and happier.

Even hereditary disease, such as breast cancer, should be heavily targeted and screened for based on research dictating the frequency of screenings and high-risk populations, rather than having blanket statements that one must obtain these checks by a certain age.[12]

It is possible to cut healthcare costs in America while maintaining smaller fractions of the population to obtain chronic illness. Physicians and other healthcare leaders must focus their efforts to bolster education on healthy lifestyles, and voice their opinions on redundant testing. But, more importantly perhaps, rather than spending the money to build a hospital at the base of that treacherous cliff, it is up to the population themselves to break a sweat, build the fence, and lead healthier, more active lives.

1. Vickery, Donald M., Larry Matson, and Carol Vickery. Live Young, Think Young, Be Young: -- At Any Age. Boulder, CO: Bull Publishing Company, 2012.
2-3. "Chronic Disease Overview." Centers for Disease Control and Prevention. 2016. Accessed August 28, 2016. http://www.cdc.gov/chronicdisease/overview/.
4. "Preventive Health Care Helps Everyone." World Research Foundation. Accessed August 22, 2016. http://www.wrf.org/preventive-healthcare/preventive-healthcare.php.
5. "Preventive Health Care." Centers for Disease Control and Prevention. 2013. Accessed August 22, 2016. http://www.cdc.gov/healthcommunication/toolstemplates/entertainmented/tips/preventivehealth.html.
6. "The Growing Crisis of Chronic Disease in the United States." The Growing Crisis of Chronic Disease in the United States. Accessed August 26, 2016. http://www.fightchronicdisease.org/sites/default/files/docs/GrowingCrisisofChronicDiseaseintheUSfactsheet_81009.pdf.
7-8. Begley, Sharon. "Think Preventive Medicine Will save Money? Think Again." Reuters. January 29, 2013. Accessed August 28, 2016. http://www.reuters.com/article/us-preventive-economics-idUSBRE90S05M20130129.
9. "What Is Breast Cancer Screening?" Centers for Disease Control and Prevention. 2016. Accessed August 28, 2016. http://www.cdc.gov/cancer/breast/basic_info/screening.htm.
10. Cohen, Joshua T., Peter J. Neumann, and Milton C. Weinstein. "Does Preventive Care Save Money? Health Economics and the Presidential Candidates." New England Journal of Medicine N Engl J Med 358, no. 7 (2008): 661-63. doi:10.1056/nejmp0708558.
11. The Value of Prevention. PDF. Partnership to Fight Chronic Disease. http://www.prevent.org/data/files/initiatives/valueofprevention(pfpandpfcd).pdf
12. Ornish, Dean. "Health: Prevention Is Worth the Money." Newsweek. April 23, 2008. Accessed August 28, 2016. http://www.newsweek.com/health-prevention-worth-money-86075.

# THE Q&A ALTERNATIVE MEDICINE

By Christina Zhou

How is alternative medicine seen today? To find out, I interviewed Dr. Ping Zhang, an acupuncturist based in Long Island, New York. Dr. Zhang is one of the first acupuncturists to be licensed in America and is known as a pioneer in the field of Traditional Chinese Medicine. While the whole interview was rather informative, I had a personal and emotional reaction to one of her answers. Her specific phrasing, her choice of topic, I thought to be emblematic of the deepest difference between acupuncture and mainstream medicine. That difference has absolutely nothing to do with the technology of either science. It has everything to do with the way we live with health (and its obverse).

Halfway through the interview, in reply to my question about emerging trends in the past few years, she began by saying that her patients have always come to her for pain management. I know who her patients are, and in this context, their pain comes from all corners. Normally, it's chronic pain. Chronic pain can come from a surgery, from an athletic injury, from an accident, or it can be plain mental pain in such guises as depression, post-traumatic stress, and grief. It's interesting that she said their acupuncture was for pain management. This idea of pain management reappeared elsewhere in the interview. In different places, she contrasted acupuncture as a slow way, versus "the fast way to fix things," which is "the conventional way."

In America today, excising pain appears to cost us very, very little. By which I mean pain relief is marketed as costing us just once, and that cost is limited to the simplest material dimension of money exchange and chemical aftereffects. When some event leaves us with pain, if medical instruments cannot detect our problem, we are left with our pain. Then we follow the cultural norms. Being an adult in America means

that the usual response to pain is to try to take it away in one step. One swallow. One puff. One hit. Coffee, smoking, alcohol, and over the counter or other drugs - we have a bevy of ways to obtain relief. While I am focusing on substances, I would also note that it is just as common to turn to one person, a new romance, a new sexual obsession, as a way to push away the fog of pain.

The beauty of this pain relief approach is its simplicity, its borders, its start and end lines. It's that we only pay once. There's no price after we pay what's listed as the cost: the $10.99 tag, the "occasional nausea". A single transaction, after which we move on with whatever we were doing. We are left mostly unchanged except that that killing pain is gone. At least, our handy dandy pain relief toolkit is not supposed to cost us anything outside of whatever's written explicitly on these tiny font print lists. But using coffee, tobacco, alcohol, or other drugs as a response to pain costs us invisibly. It is this invisible cost that is the most precious.

Pain management, versus pain relief, is the real difference between alternative and mainstream medicine. It is what makes alternative medicine so intriguing. And it is why it is so compelling to those who have exhausted every other stratagem our mainstream culture today offers us. I hope that this interview also provokes a similar enlightenment or emotional response in you, and if not, that at least it provides some interesting tidbits to chew on.

**Can you talk about the contrast between Western and alternative medicine?**

It's a different dimension: Western medicine and then alternative medicine such as Ayuverdic or Chinese medicine. Drug companies are going a conventional way, we should see what the society needs to find out a cure or healing method from a different angle.

**How are insurance companies treating your practice?**

It's changing. It used to be that insurance companies did not take natural medicine at all. But then they saw in the long run that there should be more focus on prevention than treatment, which would save money, lots of money. Some insurance companies already cover yoga and acupuncture. And they cover certain other practices. But it's not enough. I want to go look at statistical data... Some of my patients who are big players in pharma, they see the trend on the horizon, it's there already, that so many people are going into alternative medicine, and that it should be a good indication that big companies eventually have to put their foot into the new horizon.

Patients who don't have insurance, actually write to insurance companies, so they are actually powerful, because they are the customers.

**In the past 5 years, can you describe trends in the types of conditions they asked you to treat, and trends in demographics:**

*[On trends in conditions]* Acupuncture is mainly for pain management, but people are now coming more for fertility, women's diseases, autoimmune conditions.

Like for instance... When acupuncture is the last option, or when it's idiopathic (undiagnosable). And also for emotional conditions. Ranging from anxiety attacks to using it as a conjunctive treatment for depression and mental disorders. Definitely for de-stressing.

*[On demographics]* It used to be alternative types. People who believe in whole healing, in organics. Now I see in the past 5 years, more doctors refer their patients. So it's become more mainstream.

A new trend - very interesting - people understand more that natural treatments will take time, and they're willing to spend more time to see results.

**Why do you think that is?**

I guess because when people look for a fast way to fix things (like a cortisone shot for back pain), really, after a while it comes back. For something to change, it has to change from something underlying. Really, people with migraine headaches, and with chronic conditions, they understand.

Another trend is that I really see young people, even teenagers, requesting this kind of treatment. And they really feel it helps them. And they understand the theory behind it.

Another trend: people tend to combine this with other methodologies. People getting acupuncture, they may also see a homeopathic doctor, and a Western doctor.

**A recent "miracle" success story from your work?**

There are so many…There was a patient who failed many times in IVF (for infertility). She had tried 5 or 6 times. She was so desperate. Finally she was about to give up. But then she came here saying that she wasn't looking for miracles anymore, but she wanted her body to get naturally healthy again because she had gone through many hormonal shots. She wanted to get overall balance and treatment. She was 42. So I didn't promise her anything. I told her "Your clock is ticking." And guess what? First of all, we did a de-stressing treatment, and then an overall body treatment. We used a set of points. These points were what are known in Chinese texts as earth element points, the stomach meridian and the spleen meridian. Plus, some blood moving points to rebalance the hormonal axis, and also to balance the heart channel. After 2 months of treatment, twice a week, she got pregnant naturally. So what that tells us that we have to treat the body as a whole. When multiple systems are balanced, other insufficiencies of the body will build up.

# GETTING PAID FOR MAMMOGRAMS:

## THE DILEMMA SURROUNDING INSURER FINANCIAL INCENTIVES

By Julia Palecki

Women in the US are undergoing mammograms not only to detect early breast cancer, but also because they are being paid to do so by their insurance companies. Health insurance companies are currently offering financial incentives in the form or cash or gift cards to incentivize women to have mammograms. While it is difficult to estimate how widespread this practice due to the fact that insurance companies are not required to report incentives, many plans by major insurers can be found with incentives, ranging from $10 to $250 per mammogram.[1]

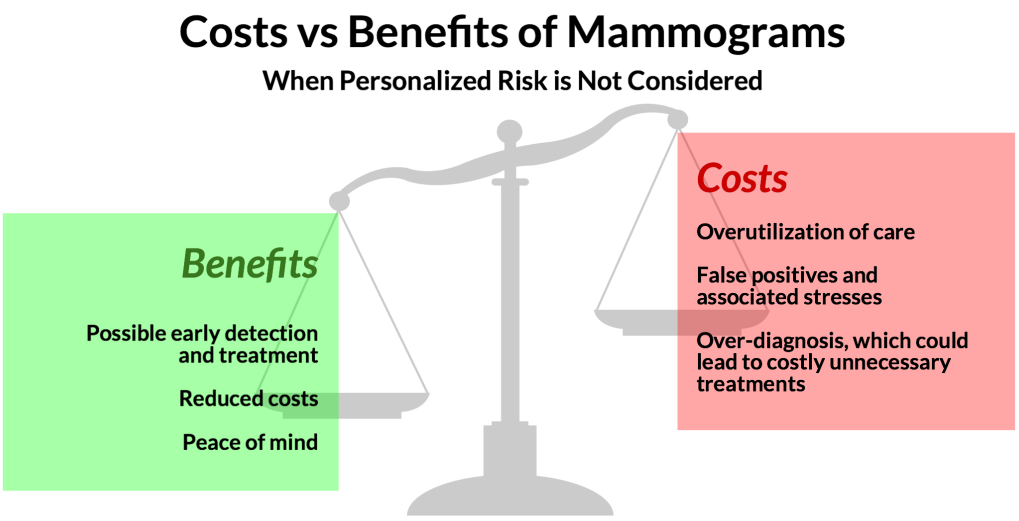
Insurance companies, which pool risks for large populations, wants their insured populations to get mammograms because they have financial stakes in maintaining a healthy population. That is, insurers would rather pay for women to undergo mammograms than to pay for expensive cancer therapies later on when the disease has progressed.

Offering a financial reward for mammograms significantly alters the cost-benefit analysis for many women and encourages them to get the preventative test done. Without any financial incentive, the cost of a mammogram includes time, travel, and maybe even copays, while the benefit is the small chance that they are diagnosed with breast cancer in early stages. However, when insurance companies offer financial incentives in the form of cash or gift cards, they shift women's cost-benefit analyses significantly. The benefit then becomes a considerable amount of money, causing the benefits to outweigh the costs, and leading many more women to have mammograms.

From a societal perspective, mammograms should be incentivized to women for whom research suggests there is a significant risk for breast cancer. The optimal amount of care occurs when the cost of a mammogram is equal to the marginal benefit of receiving a mammogram. While we want to detect as many breast cancers as early as possible, it is inefficient to encourage all women regardless of risk to get frequent mammograms. If we put too many of our resources towards mammograms, we lose the opportunity to use those resources towards other, more efficient medical care.

The cost associated with mammograms is fairly large, including the monetary cost of overutilization and the cost of over-treating breast cancers. As Schmidt explains, "a proportion of cancers identified in screenings never develop into lethal tumors. Such over diagnosis commonly leads to overtreatment since partial or full surgical breast removal and hormone therapy, radio therapy, or chemotherapy are typically initiated after any confirmed findings."[2] Additionally, there is the added psychological stress that results from false positive results. "All participants risk periods of worry due to false positives and biopsy complications. There is some disagreement about the exact magnitude of benefits and risks in these categories, but also clear consensus that multifaceted and preference sensitive trade-offs need to be made in these areas."[2]

Instead, society should want to incentivize an optimal amount of mammograms—an amount that takes into account age, past medical history, family history, scientific research, and perhaps most importantly, a conversation with their physician. Insurance company incentives should support informed decision-making, not distract or undermine it.[2]




One major problem is that there are no clear guidelines for when women should start getting mammograms, or how often they should get them. The United States Preventative

Services Task Force recommends that women at average risk begin getting regular mammograms at age 50, and then every other year until age 74. On the other hand, the American Cancer Society recommends yearly mammograms from age 45 to 54, then screenings every other year afterwards.[1] Conflicting guidelines further complicate the matter of incentivizing women to get mammograms with financial incentives. If the experts can't even agree on recommendations for screenings, how appropriate is it that insurance companies are giving such strong incentives?

Perhaps instead of incentivizing mammograms themselves, we should incentivize the use of online decision-making tools that assess women's risks. Harald Schmidt, PhD, MA writes "incentives for completion of mammograms are an ethically disconcerting distraction in the complex decision-making process. However, incentives for making an evidence-based active choice about breast cancer screening can be ethical--even if this policy may avert fewer breast cancer deaths overall." The health care system could achieve more efficiency if insurers incentivized the use of interactive decision aids, and then further incentivized mammograms for moderate and high-risk women. While this strategy would curb the over utilization of mammograms, one serious drawback is that it may prevent some seemingly low risk women from getting life saving mammograms.

Insurance companies should embrace financial incentives for potentially life-saving preventative measures, such as mammograms, because they successfully encourage women to get screened. However, insurance companies must remember that there are potential drawbacks to this strategy, which include the potential overutilization of medical services. Thus, the financial incentives for having a mammogram should be focused on pre-emptively educating women of their breast cancer risk and encouraging them to consult with their physicians about their relative risk. Insurers could restrict incentivizes to moderate to high-risk women, whom they deem to be sufficiently at-risk to receive a mammogram. This would lead to more efficient outcomes while simultaneously preventing many breast cancers through early detection.

1. Harald Schmidt, PhD, MA. Insurer Rewards Rush Women Towards Mammograms. The New York Times, 2016
2. Harald Schmidt The Ethics of Incentivizing Mammography Screening. Vol. 214. 10 vols. Journal of the American Medical Association, 2015.

# CRISPR

## Disruptive Innovations in Pharma

By Aaron Lai

While buzzwords like 'disruptor' and 'revolution' are tossed around so much that they're often reduced to platitudes, the rise of CRISPR-Cas9 – a powerful genome editing tool – heralds a genuine disruption of the pharmaceutical industry. Though designer babies and gene therapy in humans are still a long way off, CRISPR-Cas9 is poised to be the tool that turns ideas like these into reality.

### What is CRISPR-Cas9?

CRISPR-Cas9 is a precise and extremely efficient tool for genome editing. Although discovered in 2013, the CRISPR-Cas system is actually a natural defense mechanism in bacteria, consisting of repeating patterns of DNA called CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) and their associated proteins, Cas (CRISPR-associated proteins). When viruses invade bacteria, they leave behind trace amounts of DNA that are stored by any surviving bacteria in the aforementioned CRISPR regions.[1] That way, if these bacteria encounter this type of virus again, they're able to recognize the invading agent with said regions and deploy Cas proteins to cut the invading viral DNA – rendering the virus benign.

What scientists have done is alter this process with specific regard to the Cas9 protein, creating a tool. Fed with synthetic RNA strands, this tool can be encoded to identify, cut, and replace any DNA sequence in eukaryotic cells– from those of flies and nematodes to cells in angelfish and humans. The implications are huge: CRISPR-Cas9, used as a therapeutic tool, could treat diseases at the genetic level. Researchers in translational healthcare research have already demonstrated promising applications of the technology in relation to sickle cell anemia, muscular dystrophy, and HIV.

Although several genome editing techniques like zinc finger nucleases and TALENS have preceded the advent of CRISPR-Cas9, they offer neither the fidelity nor ease with which CRISPR can be deployed. While older techniques have been limited in their scope – e.g. they can only target a single DNA site– CRISPR-Cas9 is far more versatile. It has

the potential to treat multiple DNA sites simultaneously, and offers a far higher potency and specificity than similar tools.[2] Moreover, while older techniques are often cost prohibitive – zinc finger nucleases, for example cost $5,000 or more to engineer and design with extreme difficulty – CRISPR can be set up for as little as $30 with cheap made-to-order RNA molecules and off the shelf components. CRISPR's inherent advantages have left it positioned to impact healthcare and science on a level not seen since PCR was discovered in 1983. The medical applications are almost endless, with treatment of any genetically linked diseases, including cancer, made more feasible.

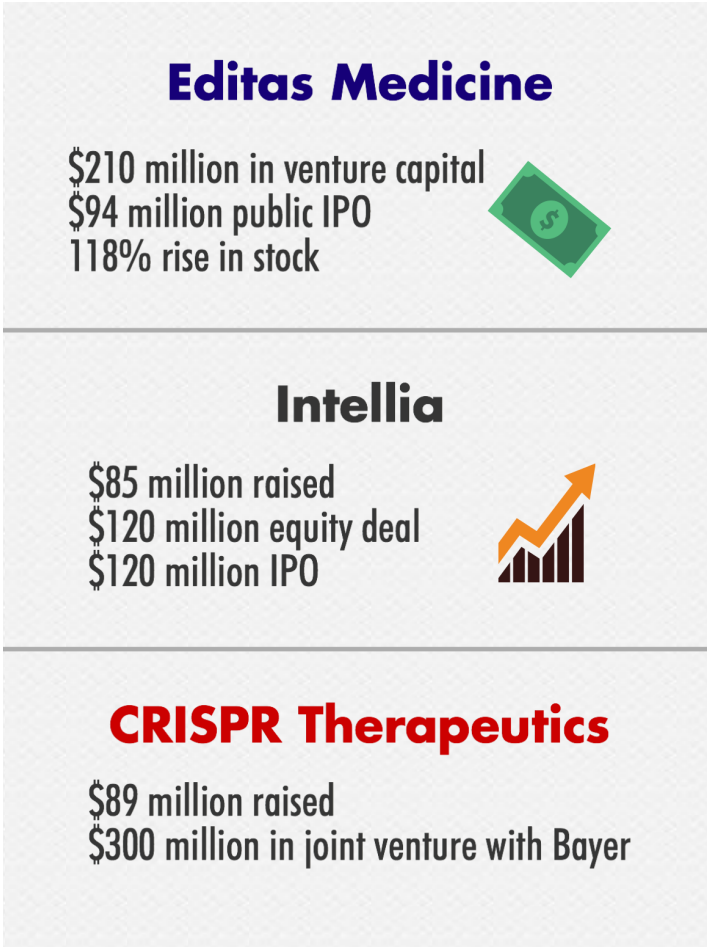
CRISPR-Cas9 and the pharmaceutical industry

Testament to CRISPR's immense potential is the sheer amount of funding it has pumped through startups and established companies alike. Three high-profile startups stand out: Editas Medicine – a startup out of The Broad Institute of MIT and Harvard – raised over $210 million in venture capital before going public with a $94 million IPO. Its stock price has risen 118% in the past three months.[3] Intellia, another biotech startup, raised $85 million in its series A and B, secured an addition $120 million through an equity deal, and just recently filed for a $120 million IPO.[4] Not to be outdone, CRISPR Therapeutics, the last of the three, has raised $89 million in funding, and recently established a joint venture with Bayer, with $300 million in funding provided by pharmaceutical giant for research and development.[5] Despite its undeniable promise, however, CRISPR-Cas9 has a tumultuous road ahead of it.

### Who owns CRISPR-Cas9?

The crux of the issue lies in a billion-dollar patent battle between the aforementioned Broad Institute and UC Berkeley over the IP rights to CRISPR-Cas9. The truth is difficult to make out. While Jennifer Doudna and Emmaneulle Charpentier, of the UC Berkeley camp, were the first to publish a paper demonstrating the use of the CRISPR-Cas system to precisely cut bacterial DNA, it was Feng Zhang of The Broad Institute who first demonstrated the use of CRISPR to cut and replace DNA in eukaryotic cells.[6] That is, while Doudna and co. are chief among those who discovered the technology, Zhang demonstrated its use for actual editing in mammalian cells. What further complicates the issue is the fact that while Doudna filed her patent several months before Zhang, Zhang's legal team submitted a fast track application, effectively a pay to expedite service, which resulted in The Broad Institute being awarded the patents first.[7]

Neither group is likely to back down. Both Zhang and The Broad Institute have stakes in Editas, whose existence hinges on the fact that it is able to license the CRISPR patent granted to the two parties. Doudna and UC Berkeley, on the other hand, have licensed their patent pending IP to Intellia. The make matters even more complicated, Charpentier sold her own patent-pending rights to CRISPR Therapeutics.[8] With hundreds of millions, and possibly even billions on the line in licensing rights, The Broad Institute and cash-strapped UC Berkeley are likely to dispute things to the bitter end.




### Is investing in CRISPR-Cas9 worth it?

Even if the patent battle goes to an investor's company of choice, it is difficult to say whether long term investment will pay off. For Editas, whose focus is in gene editing in humans, is still two years out from clinical trials. It is very possible that their research may come to nothing. Nonetheless, the promise of CRISPR-Cas9 technology is difficult to ignore. It is the first groundbreaking discovery in the biotech and pharmaceutical space in nearly three decades, and for most, the possible rewards far outweigh the risk.

1, 2. Ledford, Heidi. "CRISPR: Gene Editing Is Just the Beginning." Nature.com. Accessed April 28, 2016. http://www.nature.com/news/crispr-gene-editing-is-just-the-beginning-1.19510.
3. Zhang, John. "Editas: A Win Big, Lose Big Gene Editing Play." Seeking Alpha. 2016. Accessed April 27, 2016. http://seekingalpha.com/article/3965528-editas-win-big-lose-big-gene-editing-play.
4. "Intellia Therapeutics." Crunchbase. Accessed April 27, 2016. https://www.crunchbase.com/organization/intellia-therapeutics.
5. "CRISPR Therapeutics." Crunchbase. Accessed April 27, 2016. https://www.crunchbase.com/organization/intellia-therapeutics.
6. Press Release: Bayer and CRISPR join Forces." CRISPR Therapeutics. Accessed May 1, 2016. http://crisprtx.com/news-events/news-events-press-releases-2015-12-21.php.
7. Ledford, Heidi. "Bitter Fight over CRISPR Patent Heats up." Nature.com. Accessed May 01, 2016. http://www.nature.com/news/bitter-fight-over-crispr-patent-heats-up-1.17961.
8. Wiseman, Ben. "Crispr Gene-Editing Upstart Editas Goes Public as Patent Battle Rages." Wired.com. Accessed March 17, 2016. http://www.wired.com/2016/02/crispr-gene-editing-upstart-editas-goes-public-as-patent-battle-rages/.

# The Influence of General Electric's Maternal-Infant Care Technology

By: Sophia Busacca

The United States has one of the highest infant mortality rates among other OECD countries. General Electric Healthcare has set the foundation for many maternal-infant care products and has begun paving the way to solve the high infant mortality rate in the United States. In an interview I conducted with Rita Barksdale, the General Manager of Maternal Infant Care at GE Healthcare, Lori Dunbar, the Chief Technology Officer for Maternal Infant Care at GE Healthcare, and Britta Kons, the Communications Operations Director at GE Healthcare, I learned how they work together to provide quality products for healthcare professionals working in maternal infant care.

Rita Barksdale expressed that the mission of GE Healthcare is to provide products that save the lives of mothers and babies and maximize comfort. In order to achieve their mission they have to talk to clinicians and then make their products fit to the needs of the patient and the clinician. As Britta Kons said, "we have to think about three populations when designing our products: the patient, the clinician, and the baby." In addition, they have to think of ways to make their product easy to work with and reliable.

"Maternal infant care is critical and part of providing the best care is giving healthcare professionals access to high end products."

Lori Dunbar began by talking about GE Healthcare's premiere product the Lullaby Infant Warmer. In order to make this product successful GE Healthcare launched many pilot programs, received feedback from nurses and OB/GYNs, and adjusted the product for different patient populations. The Lullaby Infant Warmer is an infant warmer that makes safe and reliable thermoregulation accessible for primary care settings from remote and rural areas to heavily populated areas.

Not only does this product maintain the temperature of newborn infants, but it also is versatile. It can be brought from the Labor and Delivery floor straight to the Well Baby Nursery or the Neonatal Intensive Care Unit. Lori Dunbar talked about how healthcare providers needed a product like this because when the preterm baby needs to go to the NICU, it is critical to avoid negative touch. Negative touch is touching a preterm baby when it is not necessary. The Lullaby Infant Warmer makes it easy to only touch the baby when it is absolutely critical. NICU preterm babies have to be treated as if they were still in utero because their lungs and organs still need to develop. Having access to products that allow the healthcare providers to stimulate utero is vital.

Part of the innovation of the Lullaby Infant Warmer was making the product have the ability to work in various settings and environments. Each warmer has a built in battery pack so the baby can be transported and the warmer will remain on. If there is a black out in the hospital and the electricity is not working, the warmer will stay on with the built in battery pack. The product is an international innovation so in the United States they use a 120V plug, while in Europe they use a 230V plug. Although the patient needs in maternal infant care do not fluctuate much internationally, different physicians and nurses have different preferences.

The final products that Lori Dunbar spoke with me about were the different types of beds. As a nursing student, I have learned a little about different beds and their uses, but I never thought about how important it was in a maternal infant setting to have specific delivery beds and specific post-partum beds. Clinicians stress Mother-infant bonding and skin to skin contact. One of the best ways to implement a bond and skin-to-skin contact is having a bed that makes it easy to access the newborn crib on the post-partum floor.

Maternal infant care is critical and part of providing the best care is giving healthcare professionals access to high end products. This past semester I spent my Saturdays interning at Lankenau Hospital on the Antepartum, Postpartum, Labor and Delivery, Well Baby Nursery, and NICU floors. Without innovative and patient catered products, many of these patients and clinicians would be at a loss. GE Healthcare is saving the lives of mothers and babies in various settings.

# Diseased Dorms

**By Ishir Seth**

The transmission of illness, particularly upper respiratory infections (URI), has plagued college students and university health services for decades. Although avoiding sickness at university is a daunting challenge, certain behavioral changes and policy measures can drastically limit the burden of sickness. It is critical to understand the modes of transmission in the college setting in order to avoid sickness and combat the loss in productivity that inevitably follows.

College students typically experience a recurring set of ailments that includes mononucleosis, gastroenteritis, conjunctivitis, influenza, meningitis, and upper respiratory infections.[1] Of these, the two most prevalent and well-researched in the college environment are influenza and upper respiratory infections. An upper respiratory tract infection is an acute infection that targets the nose, sinuses, pharynx, trachea and bronchi.[2] Within this class of infections, the most familiar is the common cold which is a viral infectious disease of the upper respiratory tract. In contrast to the localized symptoms of most URI, influenza is a more systemic illness that targets a greater portion of the upper respiratory tract and is highly contagious.[3] Nationally, the combined effect of these two ailments is severe; 25 million people seek health care during an influenza epidemic, and the economic impact of non-influenza-related URIs is $40 billion annually.[4]

In a university setting, the impact of these diseases manifests itself in the form of declining productivity and falling grades and an increased burden on student health services. A comprehensive cohort study in 2002 of 3300 students found that respiratory infections caused 27.8% of students to perform poorly on a test and 46.3% of students to perform poorly on a class assignment.[5] Furthermore, the study concluded that 40.5% of the sample missed at least a day of class during their sickness and that, collectively, the cohort missed 17,000 hours of extracurricular activities.[6] It is clear that there is both an academic and administrative imperative to investigate and assess the prevention programs instituted at universities. Yet, despite the indications of the data, there has been little effort to further explore or research the spread of infections in college dormitories.

Admittedly, a proper investigation into infectious diseases in the college setting is daunting because transmission is influenced by social behaviors, the unprecedented proximity of dorms, and the change in dietary regimens that college students experience. College students are exceedingly social which leads to sharing of both food and drinks, frequent attendance at social events and parties, and the excessively frequent of handshakes that virtually defines the Wharton experience. In fact, a study by Moravian College determined that students that were prone to using handshakes as a means of introduction were sicker for longer (1.23 days vs .56 days).[7] Furthermore, amongst the 64% of students that admitted to sharing food, those who fell ill experienced greater intestinal discomfort and fatigue.[8]

It is intriguing, but not surprising, to note that living in a single bedroom greatly increases rate of recovery and overall well-being. In fact, students living in singles experienced a significantly lower average amount of sick days (.42 days vs 1.23 days.)[9] Intuitively, having a single allows one to maximize their sleep, isolate himself from sickness, and maintain his environment to his own personal hygiene standards. Surprisingly, the same study also concluded that students living off-campus experienced significantly higher rates of sore throats and fatigue.

Other factors that are less quantifiable in nature contribute to transmission of URIs as well. These include the urge to disregard sickness and attend class at all costs, the willingness to sacrifice sleep in order to attend social events, and the physiological effects of stress related to examinations that undermine the immune response.

One intriguing study explored a correlation between

## Effects of Illness on Student Life

27.8% performed poorly on a test

46.3% performed poorly on class assignments

40.5% missed at least a day of class

Facebook activity and the incidence of upper respiratory infections. In linking the friends on Facebook to the rate of infections, the researchers noted that those with larger social networks had a greater incidence rate of URI. Interestingly, 85.7% of respondents experienced a degree of Facebook-induced stress and the impact of stress increased with the size of the social network.[10] Analyses such as this study are indicative of the nuanced factors that escape initial assumptions but undoubtedly influence sickness and stress levels in the dynamic life of a college student.

Most students won't stop shaking hands, using Facebook, attending class, or ditching their roommates to live a life of solitude. In fact, studies are quick to conclude that most precautionary measures for college students are ineffective, undermine happiness, and contradict the traditional behavioral patterns that define the traditional college experience. But, solutions do exist. First and foremost, the most clichéd response is the most powerful; an increase in frequency of handwashing will prevent sickness. Students that washed their hands regularly missed 43% fewer school days and experienced a 39.9% reduction in duration of sickness in 2003 at the UC Boulder campus, as reported in the American Journal of Infection Control.[11] Other policy measures include installing automated gel sanitizes in dormitories, creating opportunities to rent cleaning materials for dorms, and distributing tissues and antibacterial wipes. University administrations can also work to reduce stress, define clearer policies related to absenteeism, increase resources for student health services, and expand their influenza vaccination programs.

Sickness is inevitable—one study argues that occasional sickness is actually beneficial—but it is not invincible. Small changes like using hand sanitizer, washing hands, and cleaning dorms can make all the difference. Scientific research actually suggests using fist bumps instead of handshakes to limit transmission. So the next time you hang with your friends, go for the fist bump—it's the doctor's orders.

1. "Common College Ailments and Illness." Ecampustours.com, 4 Dec. 2005. Web. 1 Oct. 2016
2,3,4 .Mossad, Sherif B. "Upper Respiratory Tract Infections." Cleveland Clinic Medical Publications, Aug. 2013. Web. 1 Oct. 2016.
5,6. Nichol, KL. "Colds and Influenza-Like Illness in University Students: Impact on Health, Academic and work performance, and health care use." Clinical Infection Dis. May 2005. Web. 1 Oct. 2016.
7,8,9. Adams, Virginia. "The Healthy College Student: The Impact of Daily Routines on Illness Burden." SAGE Open Publications. Web. 2 Oct. 2016.
10. Campisi J, et Al. "Facebook, Stress, and Incidence of Upper Respiratory Infection in Undergraduate College Students." Cyberpsychology Behavioral Social Networks, 2012. Web. 2 Oct. 2016
11. White, C. "The Effect of Hand Hygiene on Illness Rate Among Students in University Residence Halls." American Journal of Infection Control, Oct. 2003. Web. 2 Oct. 2016.

# SICKLE CELL ANEMIA:

## When the 'Race to a Cure' Never Picks Up Speed

**By: Wandia Mureithi**

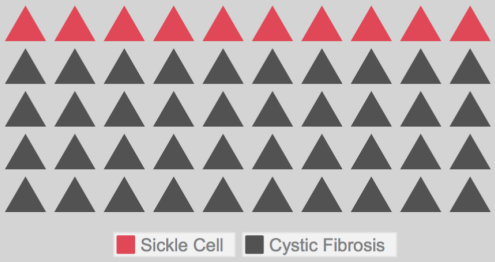
In the summer of 2015 at the University of Illinois Hospital, Iesha Thomas became the first adult to be cured of sickle cell anemia through the use of chemotherapy-free treatment.[1] It is slightly over a year later, and a breakthrough has very recently increased the feasibility of gene therapy clinical trials to cure patients of sickle cell disease. The therapy would use precise gene editing techniques to replace the genetic material of mutated genes within red blood cells with healthy DNA. This new research is groundbreaking. Sickle cell is associated with severe and life-shortening symptoms that affect the quality of life of about 100,000 Americans. However, a cure is now on the horizon. In light of new treatments with increasingly high success rates, the capital, research, and advocacy efforts for sickle cell have still seen virtually no increase in decades.[2] In many ways, sickle cell disease lacks the 'race to a cure' that is often associated with increasing public awareness and advocacy for diseases. The impact of health disparities that affect sickle cell disease shed some light on the lack of mobilization.

Sickle cell disease stems from a mutation that alters the shape of hemoglobin - it bends red blood cells and reduces the amount of oxygen each blood cell can carry. People with sickle cell anemia have two copies of the mutated S hemoglobin gene. They face a lifetime of painful crises as well as an increased risk of bacterial infection, stroke, and many other chronic symptoms. Life expectancy is drastically reduced to around 50 years of age.[1]

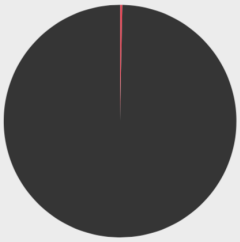
Despite identification of the causes of sickle cell, the funding for labs devoted to the disease has not improved. A lab conducted by Dr. David Williams took two years to find a way to safely insert genetic material into cells using a harmless virus. Dr. Williams only had one post-doctoral student working on the project. "With more people", he says, the process "would have taken much less time."[1] Essentially, it was simply a lack of manpower, not a lack in the knowledge or methodology, which led to a delay in the execution of ground-breaking sickle cell research in Dr. William's lab.

Much of the campaign in the search for a cure comes from public concern because this can lead to increased funds from both the federal government and private sector. Earning mass appeal is increasingly difficult for diseases that do not personally affect the vast majority

## Sickle Cell Funding vs. Cystic Fibrosis Funding




In 2004, the per capita funding of cystic fibrosis is 4 times that of sickle cell.




The Sickle Cell Disease Association of America's total revenue in 2003: $498,577

The Cystic Fibrosis Foundation's revenue: $152 million

of Americans. While virtually all Americans can name someone they know who has cancer, it is more difficult to put a name and a face to sickle cell disease. However, many rare diseases that affect relatively few people in numbers still find sufficient support among the public.

A striking example arises in a comparison of the disparities between funding for sickle cell and cystic fibrosis, a genetic disorder that affects about 30,000 Americans. In 2004 the National Institute of Health reported spending $90 million on sickle cell related research across all departments. The same year the NIH spent a total of $128 million on cystic fibrosis related research.[3] This translates to per capita funding of cystic fibrosis that is 4 times the funding of sickle cell.

In addition, sickle cell does not receive much private funding. The Sickle Cell Disease Association of America's total revenue in the fiscal year of 2003 was $498,577. The same year, the Cystic Fibrosis Foundation was able to incur a revenue of $152 million, which had a significant impact on research and clinical trial initiatives. Data suggests that sickle cell is nationally underfunded, but the reasons behind the lack of funding are hardly a topic of discussion. Many other genetic disorders such as cystic fibrosis and muscular dystrophy have secured more attention and in turn, have also secured funding to push research forward. These conditions also dodge much of the social stigma often associated with sickle cell. Due to the advantageous nature of the sickle cell trait in malaria-affected regions of the world, sickle cell disease is more prevalent in individuals of African, Middle Eastern, and South Asian heritage. In the United States, the disease impacts African Americans more than any other ethnic group at a rate of 1 in 400 and trait carrier rate of 1 in 12.[3] The media and educational settings have deemed sickle cell to be a "black disease." In the realm of healthcare, where the appeal of a disease's cure affects its public support and resulting legislation and funding, this racial stigma cannot be discounted.

In the ever-increasing overlap of genomic information and disease research, the racialized nature of sickle cell seems to be inevitable. There is a history behind racial disparities in treatment for the disease. Many patients are accused of exaggerating their pain as a result of sickle cell disease, in order to receive opiates, although there is no evidence to suggest that sickle cell patients are any more likely to be addicted to opiates than other patients.[3] In fact, across the board, black men, women, and children are less likely to receive pain medication during hospital care, and there is evidence that racial bias is to blame. In a University of Virginia study of 222 medical students and residents, about 50% incorrectly answered at least one question about patient pain tolerance, leaning toward the belief that black patients needed less medication and had higher innate pain tolerances.[4] These perceptions undoubtedly affect how sickle cell is perceived, discussed, and treated in the healthcare realm. It does not matter whether or not these disparities in treatment are intentional. The fact that they exist should raise concerns about how we view sickle cell disease as a society, and how our opinions can snowball into effects that can influence funding for potential cures.

Research is on the brink of a major breakthrough as tested procedures prepare to move from the lab to clinical trials. But this is only half the battle in the efforts to eliminate an illness that, until very recently, had no cure to completely eliminate symptoms from those afflicted. There are still concerns about what will put these treatments, once tried, tested, and true, on the market. How, for instance, do we get healthcare influencers to take interest in funding research and make treatments easy and affordable? The solution cannot be discussed until there is an open acknowledgement in the under-recognition of sickle cell treatment efforts that is matched by significant national effort to do something about it.

1. Sharon Parmet, "Adults with sickle cell disease cured with stem cell transplants", UIC News Center, September 22, 2015. https://news.uic.edu/cureforsicklecell .
2. Sharon Begley, "We've known what causes sickle cell disease for 50 years. Where is the cure?", Stat News, May 19, 2016. https://www.statnews.com/2016/05/19/sicklecelldiseasecure/ .
3. Smith, Oyeku, Homer, and Zuckerman. "Sickle Cell Disease: A Question of Equity and Quality". Pediatrics 117 (2006): 17631770.
4. Samarrai, "Study links disparities in pain management to racial bias." UVAToday. https://news.virginia.edu/content/study-links-disparities-pain-management-racial-bias

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# PENN HEALTHCARE REVIEW

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