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Mark Masselli: This is Conversations on Healthcare, I am Mark Masselli.

Margaret Flinter: And I am Margaret Flinter.

Mark Masselli: Well Margaret, we are grappling with yet another mass shooting in this country, dozens dead in Las Vegas and hundreds more wounded in what is now being called the largest mass shooting in recent American history. We keep looking at these events unfold in a collective state of shock but still the epidemic of gun violence marches on.

Margaret Flinter: Well, our hearts go out to everybody affected by this tragedy and mark, it is an epidemic, 33,000 Americans died at the end of the gun barrel in 2014 alone, more than 300 million guns in circulation in this country and the data are clear, the more guns you have in circulation, the greater likelihood of gun violence. We want to give a shout out to the incredible trauma response teams at the hospitals and the paramedics they have prepared and planned for such tragedies but you can never really be prepared for something of this magnitude and they just did a remarkable job. So our hats off and our hearts go out to all of them.

Mark Masselli: Absolutely.

Margaret Flinter: When we think back to our own personal experience after the Sandy Hook Shootings here in Connecticut hundreds and hundreds of healthcare providers especially behavioral health providers were required to help those families and community members grappled with the aftermath of that tragedy. We know the magnitude of what lies ahead for the survivors of this latest attack the people that were affected by Sandy Hook continues to suffer.

Mark Masselli: We have had a dearth of good research data on gun violence in this country we need to support more research in that area of gun violence.

Margaret Flinter: The quest for good data overall leads us to our guest today Mark, Dr. John Brownstein is the Chief Innovation Officer at Boston Children's Hospital. He has developed a health monitoring system called computational epidemiology.

Mark Masselli: He is very interesting innovator in the health data space looking forward to that conversation, Margaret.

Margaret Flinter: And Lori Robertson will be stopping by, the Managing Editor of FactCheck.org.

Mark Masselli: But no matter what the topic, you can hear all of our shows by going to chcradio.com.

Margaret Flinter: And as always if you have comments, please email us at chcradio@chc1.com or find us on Facebook or Twitter; we love hearing from you. We will get to our interview with Dr. John Brownstein in just a moment.

Mark Masselli: But first here is our producer Marianne O'Hare with this week's headline news.

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Marianne O'Hare: I am Marianne O'Hare with these healthcare headlines. Americans are calling for discussion on gun violence in the wake of the latest deadly mass shooting on American soil. There is mounting pressure for Congress to start acknowledging gun violence as a public health crisis in this country.

A recent study showed gun violence accounts for about \$230 billion in health and medical costs as well as lost economic revenue, there have been more than 1500 mass shootings since the Sandy Hook massacre in 2012. In the wake of the Las Vegas massacre Congress did shelve a bill indefinitely that would have made it easier for gun owners to purchase silencers.

Meanwhile the Whitehouse made a stop [PH] in Puerto Rico two weeks after hurricane Maria devastated the entire island a majority of the American territory still without power or potable water or self-service, medicines and food. Relief agencies predict it could be months or possibly even years before the island will be able to fully recover from that disaster.

Congress failed to meet a September 30 deadline to continue authorization of the CHIP program at the Children's Health Insurance Program helping meet the healthcare needs of some 9 million children across the country. States like Minnesota are out of CHIP funding and have required federal assistance to continue handling the program. Utah has warned it will cancel the CHIP program at the end of the year if Congress fails to act imperiling healthcare for about 20,000 kids in that state. Congress appears ready to tackle the reauthorization in the near future.

And Price out, who is in, HHS Sec. Tom Price resigned from his post following revelations that he spent over \$1 million of taxpayer money jetting around to personal and professional business on private planes. Some names being considered to replace him Congressman Fred Upton of Michigan and TVs Dr. Mehmet Oz, but the odds on favorite at the moment is CMS administrator Seema Verma, the health consultant and

confidant of VP Pence, VA Sec. David Shulkin is also a leading contender. I am Marianne O'Hare with these healthcare headlines.

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Mark Masselli: We are speaking today with Dr. John Brownstein, Chief Innovation Officer and Director of Computational Epidemiology Group at Boston Children's Hospital. He is professor of pediatric epidemiology at Harvard Medical School where he also has a research focus on consumer technologies that drive health. He has also developed several disease surveillance systems including HealthMap.org he has advised Google on disease tracking systems and also he has helped the ridesharing company Uber create its health division. Dr. Brownstein has advised the Whitehouse, Homeland Security and the World Health Organization on managing real-time public health surveillance data. He has earned his PhD in epidemiology at Yale. Dr. Brownstein, welcome to Conversations on Healthcare.

Dr. John Brownstein: Great thanks so much for having me.

Mark Masselli: Yeah. You know and your expertise in this area of health data surveillance sometimes called Computational Epidemiology has earned you the title of the go-to guy when it comes to tech-based entities seeking to enter the health sector, and I wonder if you could frame up for our listeners what Computational Epidemiology is all about and why it has attracted the attention of so many tech-based organizations?

Dr. John Brownstein: Surely epidemiology is all about a study of disease and person place time and it's always leveraged data sets to understand disease, understand risk factors of disease and generally we've dealt in, probably in smaller types of data sets. And as new technologies have emerged the ability to harness much larger data sets that come into view so whether that's data that comes from clinical care and electronic medical records, data that comes from our day-to-day activities and our interactions with technology. There is a lot more data about an individual and as those large data sets become available new computational tools need to be brought into play to interpret that data and you know companies like Google and Twitter and Facebook have emerged. And there are great data sets for learning about your preferences and – but at the same time they can actually be incredibly valuable for understanding your individual health and understanding your health behaviors. And this is where -- I think there is great opportunities in population health to really understand new risk factors disease and really influence care as well.

Margaret Flinter: Well Dr. Brownstein I understand that your early interest in epidemiology took route during your academic days at Yale when you were tracking the growing incidence and threat of Lyme disease. And you also were focused on the West Nile virus in those earlier days, can you talk with a little bit about that earlier work and what you learned from those disease tracking efforts, how it informs the work that you are doing today with so many new technologies to work with.

Dr. John Brownstein: So you know some of the early work was really much more field-based to be honest so my work on Lyme disease was all about collecting ticks in the field and understanding how landscaping climates are influencing the distribution of Lyme disease and similarly for West Nile virus. It was challenging you know collecting that data in the field expense of it and we in fact actually got Lyme disease collecting ticks in the field recognized that it's probably not the best field surveillance [Inaudible 00:07:45] out there in the world. So clearly it was like, okay well maybe there's another way and be able to do model that much larger scale and this is what sort of brought me here to Boston where there was great opportunity to tap into say for instance clinical records systems which people at that time really weren't thinking about to get insights about disease population now it's lot more common. But at the same time that clinical data is heavily siloed it's not connected across large scales so I talked to myself, well what other data sets out there that we can start to tap into. I sort of realized well there is all the data on the web, you can do a Google search and someone has talked about a disease in a population there is emergent social media. All of this data, the sort of digital breadcrumbs that people leave behind can be incredibly valuable but just nobody was aggregating that information. So that's when started to leading up to thinking, okay well if we start developing machine learning tools to collect all this information now we can often get insights in real time at massive scale in ways that had never been done before.

Mark Masselli: Well let's look at one of the disease surveillance system you created HealthMap as a freely accessible automated electronic information system for monitoring global pandemics and other disease outbreaks to better observe emerging threats to global public health. And I am wondering if you could just share with us about the genesis of HealthMap.

Dr. John Brownstein: Really it's all about trying to figure out new ways to identify diseases in population as early as possible to be able to mitigate the disease risk. And if we really want the public to be really a key stakeholder and really engaged in whatever public health intervention not necessarily panic but really be informed. So HealthMap really was generated from this idea essentially it's a weather map for disease and doing that in real-time just like you can look in your phone and see a

weather forecast you should be able to see a disease forecast at a same time public health agencies could do a much better job of staying informed. And we've been doing this for now over 10 years where we're organizing all the world's data so the emergence of swine flu is an example H1N1 the first signs that didn't come out of government reporting it actually came out with news article in Mexico for instance zika where we could track across South and Central America the emergence of it and this was done through aggregation of all these sources similarly with Ebola. So many great examples where the organization of major data sets can provide a view of the world that couldn't be done with any single data set alone.

Margaret Flinter: Well Dr. Brownstein often technologies launch a lot of anticipation for disrupting the healthcare space but – or maybe a little bit ahead of their time, but you are instrumental in helping Google launch its Flu Trends Project which I think was later shut down maybe there was some inconsistent results. What did you learn from that ground floor experience with Google and how might you approach things differently?

Dr. John Brownstein: So the Google Flue Trend the concept and the idea that you can mind what people search for online as an indicator of disease, it was incredibly novel but it's also very early days in terms of using these data it might work in one flu season but it might not work in the following flu season. And so the models have evolved pretty significantly and in fact our team here at Children's has actually taken over Google Flu Trends and it is now called HealthMap Flu Trends with revised methods.

Google data is great but when you start to match it with data from Twitter, data from electronic medical records that's when you get a much more robust picture and that's really, you know it's a good lesson. And I think, you know when we talk about the hurricanes looking for post hurricane illness whether it's foodborne related or vectorborne related kind of data sets where people are searching can be the earliest sign.

Mark Masselli: We are speaking today with Dr. John Brownstein, Chief Innovation Officer and Director of the Computational Epidemiology Group at Boston Children's Hospital where he has a research focused on consumer technologies that drive health. He is advisor to the ridesharing start up Uber and really I would like to sort of explore the collaboration that you develop with Uber, and after using the service yourself we know that millions of Americans are no-show to medical appointments often simply because they don't have an easy way to get there. And I understand you initially reached out to Uber in a pretty interesting way and I wonder if you could talk about how that collaboration came about.

Dr. John Brownstein: Yeah. You know very interested in sort of emerging technologies and how they can play role in understanding health populations but also how they can improve access, we also run another actually project that actually started at Google as well called Vaccine Finder which we took over after swine flu that's, essentially is a repository for all the locations where an individual can get a flu shot or other vaccines across the country. And despite it being, you know you can't walk a block without seeing a pharmacy that's offering a flu shot, so challenging to get someone to go and do it even if it's completely free. So we had this idea of, well if it's impossible to get someone to walk a block for vaccine, what if the vaccine like showed up at your doorstep and what if it was that easy would someone refuses at that point? So we saw the emergence of the huge logistic network that Uber has as a vehicle for healthcare delivery. And we were like okay well maybe we can convince them to do UberHEALTH and so we actually emailed a support ticket, so we actually responded to a receipt that you would use to complain about the ride instead of complaining about the ride we actually said, well you know the ride was great but maybe you should think about healthcare. And someone who actually turned out to be a close colleague saw the email and thought, wow it's great idea and we worked together to build up this concept of UberHEALTH where we inserted a vaccine – so we had a new button on the Uber app called UberHEALTH you could get a flu shot if you are stopping up to 10 people at your door, and we have done that for several years now we have done it across 40 cities –

Mark Masselli: I think there are thousand entrepreneurs out there who are just about –

Margaret Flinter: Taking notes.

Mark Masselli: Taking notes you know.

Dr. John Brownstein: I mean if you have a vision for something, I mean it doesn't always work but you can find ways in, so, and then of course that's evolved now and so we actually ended up spinning out a company at a Boston Children called Circulation which took the concept that on-demand can be a transformational health care. And now actually we are using a platform that incorporates Uber and other transportation options basically help bring patients to their appointments and bring on-demand to healthcare. And so we've now expanded across over 60 healthcare systems in 30 states and really now changing the ways that people can get to their appointments these are patients on Medicaid that have transportation benefit that experience the most difficulty of getting to their appointment.

Margaret Flinter: Well Dr. Brownstein I would like to talk with you really about your role at the Center of Pediatric Genealogy, we see challenges to the health of children certainly in United States we have seen an uptake in the incidents of preventable childhood diseases globally with see outbreaks of cholera Yemen and Haiti. Can you talk about advances in epidemiology that you think might help us really grapple with these threats that impact children? You also are challenged with the chronic illnesses; diabetes and asthma that affect children, so talk with us about that.

Dr. John Brownstein: Yeah. You know one of the interesting factors that you know we have incredible assets [PH] already in the form of vaccines, vaccines are you know [Inaudible 00:15:18] public health and yet we still have major challenges in getting uptake. And so oftentimes it's not as much about identifying the intervention it's education and trying to deal with some of the rumors [PH] that emerge around vaccines you know we have built some products funded by Gates [PH] around trying to understand rumors how they evolve, how they spread because there's -- oftentimes some of these diseases are – many of them it's not, you know the major ones are vaccine preventable. There is also the challenge of logistics in getting these vaccines from the hands of the right people at the right time but there is also just an uptake in an adherence.

So there is a public health infrastructure in the world that it's not uniform and there is challenges, many parts, many blind spots around the world where people are not looking from the infectious disease realm and even less about technology it's more about education and similarly for – on the chronic disease side. At Boston Children's we're thinking about all sorts of technologies that can impact the patient journey for instance patients that are on diagnostic oddities how to shorten the time from them having an undiagnosed diseases to them having a diagnosis and then a treatment for globally we have a technology called the OPENPediatrics that's trying to train pediatrics specialists around the world with best in class knowledge coming from here from Boston Children's.

We're trying to think about new ways to augment physicians with you know artificial intelligence machine learning so you can start to build that into technologies to then provide that sort of knowhow to a broader set of people of course doing more with the data that we have and then collect the more data through technologies like wearables. And so when you think about the chronic disease and diabetes like continues glucose monitor that can provide data in real time towards clinical decision support, but there are many other ways in which we're doing a better job interacting with patients in a more continuous way.

Mark Masselli: Well let's take a look at what appeared to be a dramatic uptake in health application, last year we had the Apple COO Jeff Williams on talking us about Apple ResearchKit you're one of the first developers to create an application for Apple's CareKit you also are seeking innovation ways to better understand Amazon's Alexa in its voice recognition technology. I am wondering if you could talk about some of these projects, so in the backdrop that was, we really, haven't really solved the problem of the connecting electronic health records together and so you've got all the excitement that's going on in individual health apps, but the fundamentals of exchanging data across many platforms so maybe you could put, pair those together.

Dr. John Brownstein: The challenge of data silos is a real one and it's a real one, the patients experience and being able to transfer their health information from institution to institution you know that's kind of caused lot of issues we have different types of EMR platforms that don't talk to each other. We're spending a lot of time trying to integrate these data sets together through new data standards and some of the work actually had been done at Boston Children's really focused on this concept of the app for the electronic medical record which are essentially substitutable and can work on top of multiple EMRs allow for sort of better data fluidity. We're thinking about of course how to improve that physician experiences in terms of their workflows and to also provide a better sort of more continued interaction between a patient and a physician. So voice is, this one area that we've really been excited about, our team developed the first healthcare skill for Amazon Alexa called KidsMD which is really a consumer skill that allows parents to ask about common conditions that kids face and enable parents to get more education through just pure voice. But then voice could be an incredible tool in healthcare for instance a physician who wants to get access to dosing instructions or wants to pull up a radiology image in the hands-free environment or wants to have dictation while they are talking to patient. There's so many different examples where voice assistant can be an incredible augmentation to a physician, and I think there's big opportunities to sort of really transform the physician experience and thereby the patient experience as well.

Margaret Flinter: We have been speaking today with Dr. John Brownstein, Chief Innovation Officer and Director of the Computational Epidemiology Group at Boston Children's Hospital. He is also professor of Pediatric Epidemiology at Harvard Medical School and advisor to UberHEALTH, you can learn more about his work by going to childrenshospital.org/researchers/john-brownstein or you can follow him on Twitter @johnbrownstein. John, thank you so much for your innovative work and for joining us on Conversations on Healthcare today.

Dr. John Brownstein: Absolutely. Thanks so much for having me.

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Mark Masselli: At Conversations on Healthcare, we want our audience to be truly in the know when it comes to the facts about healthcare reform and policy. Lori Robertson is an award-winning journalist and managing editor of FactCheck.org, a nonpartisan, nonprofit consumer advocate for voters that aim to reduce the level of deception in US politics. Lori what have you got for us this week?

Lori Robertson: We recently published our final report on Obama's number a look at statistical indicators of now former president Obama's eight years in office. Nearly all of the final stats are now in, on health insurance millions Americans gain coverage as a result of the Affordable Care Act or Obamacare. The percentage of all US residents who lack coverage dropped sharply from 14.7% the year before Obama entered the Whitehouse to 9% in his final year, the lowest on record. Nevertheless the game fell far short of Obama's 2007 campaign promise to "Cover every American" these numbers come from the National Health Interview Survey conducted by the Centers for Disease Control and Prevention.

According to NHIS figures 43.8 million Americans of all ages lacked health insurance in 2008 but in 2016 that number was down to 28.6 million a drop of 15.2 million people. The number of uninsured actually rose during the first two years of Obama's tenure due to the great recession and then drifted down as the economy recovered. The uninsured dropped sharply beginning in 2014 the first year that the ACA's main insurance provision took effect.

Obama also failed to deliver on his campaign promise to "Lower your premiums by up to \$2,500 per family per year" for the typical worker premiums continue to rise faster than wages or inflation though more slowly than before. Employer-sponsored health insurance covers nearly 56% of the population according to Census figures, premiums to those policies rose 43% under the Obama for family policies and 37% for policies covering a single person, that's according to annual surveys by the Kaiser Family Foundation and the Health Research and Education Trust. But premiums rose twice as fast before Obama took office, family rates rose 97% and single coverage rate rose 90% during George W. Bush's eight years in office. And that's my fact check for this week, I am Lori Robertson Managing Editor of FactCheck.org.

Margaret Flinter: FactCheck.org is committed to factual accuracy from the country's major political players and is a project of the Annenberg Public Policy Center at the University of Pennsylvania. If you have a fact, that you would like checked, email us at

www.chcradio.com. We will have FactCheck.org's Lori Robertson check it out for you here on Conversations on Healthcare.

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Mark Masselli: Each week Conversations highlights a bright idea about how to make wellness a part of our communities and everyday lives. In the emergency room or the ICU, clinicians are confronted with a myriad of unpredictable medical crisis that sometimes can be challenging to diagnose. Most of these clinicians are now communicating with colleagues via their Smartphones often sending images of the patient's unique symptoms or chest x-rays to one another for shared diagnosis. ICU physician Dr. Josh Landy was noticing a growing trend of image sharing via Smartphones to crowdsource second opinions from friends and colleagues across the country. But he also was concerned about the potential violation of HIPAA regulations so he developed an app for that, he created Figure 1, a sort of Instagram for doctors in which images can be de-identified but shared across a dedicated social media platform that would allow input from clinicians within their network.

Doctors are using the app to communicate not only with colleagues within their hospital settings but around the world where someone might have superior expertise with a certain condition. Dr. Landy says the apps get about half 1 million image views a day with about 80 million total view so far he sees the potential for this platform only growing as more young digital natives enter the medical workforce. Figure 1, a free downloadable app, offering secure HIPAA complaint image sharing among clinicians around the world to reduce the time it takes to zero in on the diagnose by tapping the collective expert instantly, now that's a bright idea.

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Margaret Flinter: This is Conversations on Healthcare, I am Margaret Flinter.

Mark Masselli: And I am Mark Masselli, peace and health.

Conversations on Healthcare, broadcast from the campus of WESU at Wesleyan University, streaming live at www.wesufm.org and brought to you by the Community Health Center.