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Table of Contents



Predicting Pandemics Page 1 - 2

"Suboptimal" U.S. Healthcare Quality Page 3

10 Technologies for Your Radar Screen Page 4



HIT Stimulus - Ready, Set, Spend? Page 5 - 6

FYA Staff

Publisher Jerry F. Pogue
Editor S. Harvey Price
Web Master Joel Schlarb
Circulation Manager Sheila Keizer

TrendLeader Connections
26 Shawnee Way, Suite C
Bozeman, MT 59715
(406) 586-6400

Predicting Pandemics

By: Phillip M. Singer

The entire world has been focused on the Influenza A (H1N1) virus over the past four weeks. This attention is deserved, due to the danger that this virus poses to humans throughout the world. The World Health Organization (WHO) has labeled this current strain of virus as international pandemic level 5, the second highest level possible for a pandemic, and connotes that the virus can be contracted through human interaction and has spread through two or more countries worldwide.

At the time of this writing, there have been 2,384 cases reported in twenty-four countries and forty-four deaths. The elevation of pandemic level for the WHO is not without merit, when the history of the H1N1 virus is considered. The Spanish Flu of 1918, which was a viral strain of our current flu, killed more than twenty million people throughout the world, although some epidemiologists put the fatality number three times as high. The question now becomes, how can we predict these pandemics before they occur?

There have been two different means developed by which researchers and public health officials can evaluate early detection of flu pandemics. The first development in pandemic prediction is being led by Dr. Nathan Wolfe of the Global Viral Forecasting Initiative (GVFI). This group of researchers has shown that the majority of major diseases which affect humanity have their roots in animals and the exposure between humans and the infected animals.

The initiative has focused its research in areas of the world where these animal-human interactions are highest, where a human population relies on hunting for its sustenance, where humans live in close proximity with their livestock and where environmental factors, such as high temperature and humidity, are more likely to increase the transfer of disease. With this focus, GVFI has developed a pilot program that monitors these hotbeds of human-animal interactions. Blood is drawn and sampled of animals and humans and tested at these viral hot-spots to determine if any diseases are present and then are sent to laboratory databases.

This data can provide valuable insight into the interaction between human and animals and the nature of disease. The impetus behind this pilot model of disease transfer is a shift from the classic 'wait and respond'

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Predicting Pandemics (Continued...)

model of pandemic control, towards a system that predicts and responds to these disease transfers when they are in their earliest stages. The classic epidemiological model of disease transfer reacts too slowly to emergent viral infections. Within a matter of days, the majority of diseases are beyond the scope of containment.

The second development that can potentially enable prediction of pandemics comes from an unlikely source, Google. In 2005, Google established a non-profit arm of its company, www.google.org, and public health became one of the staples of this newly formed non-profit arm. With access to the Google search engines, Google Flu Trends (<http://www.google.org/flutrends/>) started soon after the non-profit inception. Google collects and measures flu-related search terms and using the searching computer's Internet Protocol address, collates and organizes the number of searches performed by the state. Analysts at Google.org can then predict if an influenza rate is growing in a region merely by a sharp increase in the number of searches that are performed. Historically, influenza data collected from the Center for Disease Control and the data gathered by Google has trended quite closely.

These new medical and technological predictive models for pandemics are not without their shortcomings of course. Dr. Wolfe and GVFI both rely on the assumption that by testing a small proportion of the animal population that they will still be able to track the potentially lethal viral diseases. The search compilation that the flu tracker from Google analyzes also has a limit to its overall predictability. Analysts who are studying the search results have to be looking in specific states to understand the spread of the disease and to successfully predict an outbreak. With the

international, globalized economy and travel, diseases spread rapidly and can be transferred from distant countries with ease. Google.org currently does not have accurate, scalable real world data that can produce vibrant, significant results. In the case of Influenza A (H1N1), where the virus was first developed in the United States of America, but quickly spread throughout Mexico, data collection for Mexico really limits how accurately they could have foreseen the pandemic.

These shortcomings aside, GVFI and Google.org both have great potential for helping our current public health models of dissecting and predicting viral pandemics and benefits the United States health system with their new developments. During a recent press conference, World Health Organization Director-General, Dr. Margaret Chan commented that there has never been a time in our world's history, when we have been more prepared for an epidemic. Our hospitals have prepared themselves with the proper training of clinicians, drugs to combat a wide variety of disease pandemics have been collected and are ready for any outbreak and now we are seeing the use of technology and medical breakthroughs to enable our health systems to be able to predict when these pandemics will occur. In the case of GVFI, it can track and find a virus before it has crossed-over to human infection and interaction. With Google.org, it gives the potential for health systems to have a three or four day advance warning of an increase in influenza spread. As more breakthroughs happen in this field we can further predict when pandemics occur and limit the infection rate.

Phillip M. Singer is a consultant at Rule 4 Consulting. He can be reached at psinger@rule4consulting.com.



"Suboptimal" U.S. Healthcare Quality

By Rick Kneipper, Chief Administrative Officer and Co-Founder of PHNS

The pressure in Congress for national healthcare reform ought to ramp up once members of Congress read the annual National Healthcare Quality Report that was just released by the Agency for Healthcare Research and Quality (AHRQ).

Our taxpayers expect to get the best healthcare that money can buy, but the report found that "healthcare quality in America is suboptimal." It also found that the receipt of needed healthcare varies widely – e.g., while patients hospitalized with a heart attack receive 95 percent of recommended services, only 15 percent of patients on dialysis are registered on a kidney transplant waiting list.

Of the core measures tracked in the report, the median level of receipt of needed care was only 59 percent – leaving a huge 41 percent who are not being cared for properly. The report concludes, as I'm sure all report readers will conclude, that "We can and should do better."

The good news in the report is that the quality of care in the U.S. continues to improve, albeit at a very slow pace, despite the increased focus on improving healthcare quality in the U.S. since the Institute of Medicine told us in 1999 that about 100,000 Americans die each year as a result of medical mistakes.

The report found that the median annual rate of change for the 39 core quality measures was a modest 1.8 percent, although 87 percent showed some improvement. The median annual rate of change for all 220 measures of effectiveness, patient safety, timeliness and patient centeredness was only 1.4 percent, with 69 percent showing some improvement. A positive note for hospitals was that the care delivered in hospitals improved at an annual rate of change of almost three percent, compared to a slightly less than one percent quality improvement in ambulatory settings.

As further stimulus for Congress to focus on quality during its healthcare reform deliberations, the report sadly found that one out of seven adult hospitalized Medicare patients experience one or more adverse events. It also found that there was a distressing decline of almost one percent in patient safety. What happened to "do no harm?"

The report issues a challenge that hopefully will be heard in the halls of Congress: "we believe that policymakers can design and target strategies and clinical interventions to ensure that patients receive the high-quality care that makes their lives better."

In addition to listening to the AHRQ, Congress should also listen to the National Research Council (NRC) and its report entitled "Computational Technology for Effective Health Care: Immediate Steps and Strategic Directions." The NRC report concludes that "current efforts aimed at the nationwide deployment of health care IT will not be sufficient to achieve the vision of 21st century health care, and may even set back the cause if these efforts continue wholly without change from their present course." This is because our current healthcare IT is "focused on individual transactions – and virtually no attention being paid to helping the clinician understand how the voluminous data collected could relate to the overall health care status of any individual patient." The NRC advocates "re-balancing the portfolio of investments in health care IT to place a greater emphasis on providing cognitive support for health care providers, patients, and family caregivers..."

Both the AHRQ and NRC urge an increased focus on the quality and safety of patient care, which is exactly what Congress said in the American Recovery and Reinvestment Act (ARRA) that provides over \$30 billion of stimulus monies to create a nationwide health IT infrastructure that "improves healthcare quality, reduces medical errors, reduces health disparities and advances the delivery of patient-centered medical care."

However, not surprisingly, the lobbying has already started to urge Congress to go slow and not make any major changes in the current direction of healthcare IT.

Healthcare in the U.S. is at a critical crossroads – it is imperative that the billions of ARRA dollars be spent for healthcare IT that improves healthcare quality and supports patient-centered medical care, as envisaged by ARRA, and not be spent merely to further the current direction of transactional healthcare IT.

I would like to hear your comments.

Send them to:

Richard.Kneipper@phns.com



10 Technologies for Your Radar Screen

The ECRI Institute, a respected nonprofit research firm based in Plymouth Meeting, PA, has released its top 10 list of health technologies for hospital c-suite executives to consider for 2009.

ECRI compiled the list taking into account the convergence of critical economic, patient safety, reimbursement and regulatory pressures that hospitals face today.

"Prioritizing is a tough but essential job for executives who face a squeeze on their capital budgets, insistent demand from clinicians concerned with patient care and personal income and the well-being and strategic directions of their institutions," said Jeffrey C. Lerner, president and CEO of the ECRI Institute. "This difficult-to-compile ranking of 10 critical technologies will help them to pay close attention to technologies and issues that have a significant impact."

The top 10 technologies are:

1. Electronic Medical Records. ECRI researchers urge hospital CIOs and CEOs to figure out what they need to do to prepare for an EMR or, if they have already implemented one, how best to continue the adoption path so they will not face penalties.
2. Ultrahigh-field strength (3.0 T) and MRI and premium-slice CT. "With limited access to capital funds in 2009, we believe that most hospitals that need a new or replacement MRI system will not be able to consider 3.0 T or open HFS systems in 2009," researchers said. One alternative is to purchase a refurbished 1.5 T system. ECRI researchers also believe many hospitals will put off buying CT scanners unless absolutely necessary, and if they do, their best option would be to purchase a basic or refurbished system.
3. Physician preference items (PPI), including cardiac stents, pacemakers, orthopedic implants and orthobiologics. Researchers recommend that hospital executives be educated about pricing: "The resulting lack of transparency of pricing often leaves hospitals holding the bag for the high cost of implants, but all too often in the dark about what it should pay for the devices."
4. Robotic assisted systems for surgeries and endovascular catheterization. "Hospital leaders will need to carefully assess the high capital and consumable costs of a second or possibly third robot against the possible growth of surgical volumes, the ability to accommodate the robots in OR suites, the resultant OR scheduling issues and the market advantage of providing robot-assisted surgery," said ECRI researchers.
5. Radiation oncology (proton therapy systems). "Medicare has listed proton therapy as one of its top 10 priorities this year, an indicator that they will be taking a close look at the evidence for the burgeoning indications with an eye toward coverage policies." Given the uncertain reimbursement climate, researchers recommend monitoring this technology to support improved clinical outcomes.
6. Radio-frequency identification technology. The cost of RFID systems is high, so researchers recommend hospital executives examine the return on investment carefully. One promising application they highlight for this technology is its ability to track medical devices.
7. Alarm integration technologies. The effective management of alarms is a serious problem – according to FDA's MAUDE database, 150 deaths related to physiologic monitoring alarms occurred between 2002 and 2004. One recommendation is to implement a complex alarm integration system that can incorporate many alarms (e.g., physiologic monitors, ventilators, infusion devices and medical telemetry) and notify a clinician's wireless device. Researchers say this is a big incentive for hospital executives to consider because it can alert the clinician to alarms while the clinician is not near the patient.
8. Hybrid operating rooms. "Hybrid ORs require larger space and typically have to be dedicated to only those procedures requiring that equipment," researchers said. Whether a hospital has sufficient cardiovascular and neurosurgical procedures to justify purchase should be considered, as well as the potential to introduce "unwanted competition between clinical service lines within the hospital."
9. Therapeutic hypothermia (TH). ECRI researchers say implications for this technology are promising. They recommend having a TH protocol in place as a standard of care for out-of-hospital cardiac arrest in patients who have an initial rhythm of ventricular fibrillation, such as taking the patient to a hospital that offers therapeutic hypothermia services.
10. Rapid tests for deadly infections. "Hospitals should refer to published evidence reports on these topics and consider how to integrate rapid tests in their infection control protocols and measure outcomes regarding impact on healthcare-acquired infections (HAI) rates with the understanding that protocols may need to be adjusted in light of the evidence they collect," researchers said.

About



PHNS provides IT services for hospitals, other healthcare providers and businesses. PHNS' IT services include application hosting, co-location and managed services; electronic off-site data back-up and data vaulting; business continuity solutions; disaster recovery services; and systems integration services. PHNS also provides comprehensive business process

solutions for hospitals including admitting, HIM (including medical record management and storage, transcription, coding, release of information and electronic medical record services) and revenue cycle services. PHNS creates business-healthy hospitals by improving operations, enhancing technology and increasing cash on hand, which allows hospitals to focus on their core competency--patient care. PHNS has approximately 1,670 customers, including approximately 400 hospital IT and business process customers and approximately 1,270 IT customers. PHNS is headquartered in Dallas, Texas. See www.phns.com for additional information about PHNS.

HIT Stimulus - Ready, Set, Spend?

By Randy L. Thomas, FHIMSS

The American Recovery and Reinvestment Act (ARRA) allocates nineteen billion dollars to health information technology (HIT). This underscores the belief of the Obama administration and Congress that HIT is a crucial component in the transformation of America's healthcare system. At this point, much has been written to explain about how the \$19 billion will be applied and the various mechanisms that are being put in place to oversee policy creation, standards definitions, implementation and the creation of the criteria for "meaningful use" of an electronic health record (EHR). One question that remains, however, is what should you do now?

Organizations who have already implemented an EHR don't know what, if any, changes will be required to how they have implemented their EHR. Other organizations just starting implementation wonder if they should continue, unsure if they will only have to re-do work just completed. And those organizations ready to purchase an EHR or even just evaluating EHR options don't want to make a decision or continue their evaluation for fear the system they choose may not be certified.

Once the regulations are known, organizations can anticipate a full-court press by HIT vendors and consultants to purchase their systems and services to fast track EHR adoption to meet the timelines for "meaningful use" as laid out in ARRA. You can also anticipate that the queue of organizations requesting services or EHR software upgrades will get rather long and that those at the end may not get what is needed to effect compliance within the specified time. So despite the fact there are a number of unknowns,

now is the time to act on what you do know and to prepare your organization to be able to rapidly implement any required changes. It all starts with planning – your IT strategy.

We all know why ARRA includes money for HIT – evidence suggests that broad adoption of interoperable EHRs are a fundamental element in improving quality while safely reducing costs. It has been well documented that the American healthcare system is considered inefficient with uneven access to care. HIT is, again, considered one of the tools we need to increase efficiency, thereby enabling broader access to care for the same or lower costs.

Compare this assessment with the mission, goals and objectives of your organization. You will likely find a close match. You are committed to providing high quality, safe care at the best price possible. You are also an active member in your community, committed to improving the health of its citizens. Your IT strategy was created to support the goals of your organization. So, if the intent of the HIT provisions in ARRA is aligned with your organization's mission and your IT strategy is aligned with that mission, your IT strategy is aligned with ARRA. Your approach to HIT adoption should be woven into the fabric of your culture and goals and not simply a response to regulation. Don't let ARRA hijack your HIT strategy.

The currently undefined concept of "meaningful use" may not be as daunting as you think. First, to state the obvious, it is about **use**, not technology. If your organization continues to

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HIT Stimulus - Ready, Set, Spend? (Continued...)

focus the **use** of your EHR on improving care you are almost certainly on the right track to be aligned with the criteria once released. If you are in the midst or have not yet started the rollout of computerized physician/provider order entry (CPOE) you may want to evaluate the ability of your organization to accelerate adoption now, as this is widely considered to be a significant driver of quality improvement.

Metrics to measure improvement are almost certain to be a component of "meaningful use." If you are using the current Quality Measures reported to the Centers of Medicare and Medicaid (CMS) and made public on the Hospital Compare web site to measure your improvement over time you are likely on the right track.

In general, if you are doing the things that make sense in your organization and support the broad goals of safely delivering high quality, cost effective care you are on the right trajectory to benefit from ARRA. At the College of Healthcare Information Management Executives (CHIME) Spring CIO Forum on April 4, 2006, in Chicago,

a panel of HIT experts agreed that the bar for compliance will be set neither too high nor too low and will certainly be derived from all the work done to date. With tight time frames to comply with the criteria, the incoming Secretary of HHS will not start with a blank slate, but will likely incorporate proven approaches into the regulations.

So, in the immortal advice from "*The Hitchhiker's Guide to the Galaxy*" – Don't Panic! Stay true to your overall IT strategy. Focus on driving improvement. Measure your success. The next 18 to 24 months will certainly be busy, but if the focus of your EHR deployment has been improved quality and efficiency, you should be well positioned to demonstrate "meaningful use" of your EHR and capture your fair share of the HIT stimulus dollars.

Randy L. Thomas, FHIMSS, is a vice president with the Premier healthcare alliance, Charlotte, NC Randy can be reached at randy_thomas@premierinc.com.



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