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Microbiologist and infectious disease specialist
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ARE YOU STILL USING AN ELECTRONIC PATIENT RECORD-KEEPING DEVICE that simply mimics pen and paper for entering patient data?

Or do you have a sophisticated digital tool that provides clinical data support, real-time performance metrics and networking capabilities, and comparative data on your patient population relative to other practice populations in your community? AND that allows you to interact electronically with your patients?

Would you be surprised to know they are probably one and the same thing?

More and more, the issue is not whether we as physicians are using electronic medical records (EMRs) in our practices but rather the degree to which we are using them effectively and productively.

With proper knowledge and connectivity, that machine you use to store your patient charts can — and should — be doing so much more.

As the recent e-Health conference in Toronto demonstrated, provincial and territorial medical associations from British Columbia to Ontario are shifting the focus of their change management programs to assist their members in better use of what, to many, have just been glorified record-keeping machines.

I believe it is along this front that the gains are truly going to be made when it comes to the adoption of health information technology by Canadian doctors.

Wonderful work is already being done in certain jurisdictions, creating dashboards that allow us to quickly and easily assess our patient populations in real time from both a clinical perspective and for practice management purposes.

Even more ambitious work on the part of the Ontario Medical Association would see physicians, rather than private corporations, reap the benefits from big data and the quantities of useful health information being gathered by collating input from physician offices around the province.

This incremental and progressive use of health IT in physician offices is what really matters for moving Canada along the international spectrum of digital health adoption, where we currently hover in the red zone.

The recent Advisory Panel on Healthcare Innovation (Naylor report) produced for Health Canada touches briefly on this aspect of health technology implementation in its extensive assessment of this area.

Most importantly, the report correctly identifies the lack of interoperability as being a major barrier to better use of electronic medical and health records in this country.

The report also importantly discusses remuneration, noting the current system provides little incentive for physicians to adopt new digital technologies — especially as it is often the patient and the system in general that benefit from these innovations.

And to return to where we started, the report stresses that in order for electronic records to truly help transform the health care system, physicians must be able to use them to their fullest extent.

To which I would reply: yep, that’s just what we’re in the process of doing.

Dr. Cindy Forbes is president of the Canadian Medical Association.
CMA paves the way for better use of health apps

Pat Rich

Canadian doctors now have guidance on how to assess mobile health applications to recommend to their patients.

The Canadian Medical Association (CMA) has become one of the first national medical associations to provide assistance in this area by releasing: Guiding Principles for Physicians Recommending Mobile Health Applications to Patients.

The high-level summary spells out how to assess a mobile health application to ensure it’s safe and effective. The principles are accompanied by handouts, to allow patients to decide for themselves whether to use a health app to aid in managing personal health.

“Mobile health is one of the fastest-growing areas in health care today,” CMA President Chris Simpson wrote in the June, 2015 issue of Future Practice in discussing the guidelines.

The document notes that by 2016, 142 million health apps will have been downloaded. According to some industry predictions, by 2018 an estimated 50% of the more than 3.4 billion smartphone and tablet users worldwide will have downloaded at least one mobile health application.

“It is important for Canadian physicians to understand when and how to use this technology to assist in providing better care. And it must be stressed that such tools should help complement the relationship between physician and patient and not replace it.”

The document defines mobile health apps functions as including:

- the ability to store and track information about an individual’s or group’s health or the social determinants thereof
- periodic educational information
- reminders or motivational guidance
- GPS location information to direct or alert patients
- standardized checklists, questionnaires.

While growth in the number of mobile health apps available to the public has been explosive in recent years, most of these are not governed by any regulations to ensure accurate information or appropriate instruction.

The CMA’s approach has been to develop general principles and seek input from various medical stakeholder groups on the validation of these principles.

The guidelines document states: “the objective of recommending a mobile health application to a patient must be to enhance the safety and/or effectiveness of patient care or otherwise for the purpose of health promotion.”

It goes on to say that no single mobile health app is appropriate for every patient and that physicians need to understand a patient’s abilities, comfort level, access to technology and the context of the application of care before recommending one.

“So should a physician recommend a mobile health application to a patient, it is the responsibility of the physician to do so in a way that adheres to legislation and regulation (if existing) and/or professional obligations.”

The document outlines the potential role of discussing the use of a mobile app and explicitly obtaining consent from the patient before using an app for the electronic management of health information.

Characteristics that should be present for a mobile app to be safe and effective include:

- endorsement by a recognized medical or professional organization
- usability
- reliability of information
- privacy and security
- avoidance of conflict of interest

Pat Rich is Editor of Future Practice.
WEARABLES: Game-changing wellness movement or just another fashion statement

Sarah Turnbull

IT’S EARLY MORNING AND ERIN MURPHY, A 29-YEAR-OLD OTTAWA accountant, taps her wrist to notify her electronic wristband that she’s awake. She then plugs her Fitbit — a popular activity tracker — into her computer to see how many hours she’s slept. Murphy has worn this device for almost two years.

“The reason I bought the Fitbit in the first place was to figure out what my sleep patterns were. If I’m feeling really unwell, I use it ... to say ‘okay, well is it because of my sleep?’”

She also uses the device to track the number of steps she’s taken in a day.

“I can see at what times of the day I’m really inactive, and I’d look at that and try and move more throughout the day.”

Everywhere you look there are thousands of people like Murphy — capturing, measuring, tracking and analyzing data collected and stored on their own personal wearables. Sensor technology is wrapped around wrists, attached to heads, imbedded in shoes or worn as clothing. Even the world’s top trendsetters have tapped into the market. Women’s clothing designer Tory Burch has created a line of electronic bracelets so women can look chic while logging their daily life events.

Activity trackers like the Nike+ FuelBand, the Fitbit and the Jawbone Up are gaining the most traction. Most can display time and track steps, distance, heart rate and calories. Advanced versions also monitor sleeping patterns.

Some argue the surge in popularity is a societal trend, stemming from a greater appreciation for health and wellness. Others suggest wearables may have a long-lasting impact in the way physicians interact with and diagnose their patients.

While the process by which we receive and collect data is new, the desire for self-awareness and a “quantified life” is not. We’ve always had a yearning for tracking and analyzing personal information. By doing so, we have a better understanding of how we learn or what makes us happy. Before electronic gadgets made their way onto the scene, we logged data with paper and pen.

Dr. Richard Goudie is a family physician in Barrie, Ont., and president of the Canadian Academy of Sport and Exercise Medicine, specializing in sports medicine. In his practice, tracking has long been a useful procedure when treating elite athletes.

“This process has existed a lot in the sports world where everything is measured,” says Goudie. “The heart rate monitor was found on pretty much every cyclist and every runner.”

The wearable technology bracket is broad, making it hard to determine the overall function, value or degree of consumer attention.

According to a 2014 MaRS Market Insights report titled Wearable Tech: Leveraging Canadian Innovation to Improve Health, consumer applications — devices that are marketed for fitness, sport, fashion, gaming and home and auto — claim 65% of the wearables market, whereas non-consumer applications — devices that fall under health care, defence and enterprise and industry — account for 35%.

Recent studies from BCC Research project the market for consumer products to grow from $6.5 billion in 2014 to $22.1 billion in 2018. The trajectory also suggests growth for non-consumer products, with the market expected to grow from $3.2 billion in 2014 to $8.1 billion in 2018.

Growth in the sale of these products has fuelled other initiatives.

Lisa Gualtieri, an assistant professor in the department of public health and community medicine at Tufts University School of Medicine, Boston, Mass., focuses on behavioural changes related to health and technology innovation as one of her areas of research.
She says activity trackers like the FuelBand and Fitbit are especially popular among young adults who have a chunk of disposable income. According to the MaRS report, research indicates that the average age of current device owners in the United States is 36. These individuals generally have higher household incomes and are considered already health-conscious.

While tracker devices may be more directly marketed to this demographic, Gualtieri believes other communities would benefit from a more “quantified life.” This is, in part, what set her on a path to her latest project.

Gualtieri created RecycleHealth, a pilot project launched in May 2015 that collects wearable technology from people who no longer use their devices. RecycleHealth then provides individuals who aren’t able to afford such devices the opportunity to track their activities and engage in fitness programs.

The initiative speaks to one concerning aspect of using wearables to track personal data such as fitness and sleep — namely, that some studies show a significant proportion of people use the devices for just a short time before relegating them to the back of a drawer.

Goudie sees wearables as a trend that could have longevity in promoting participation in activities.

Given the number of patients he cares for with osteoarthritis and other movement issues, he supports devices that encourage people to get active.

“I’m all for anything that’s going to make someone get off the couch,” he says. “If someone is going to wear a fancy little gizmo on their wrist that makes them walk, makes them walk more, makes them move, then I’m all for it.”

While increased movement can lead to a healthier overall lifestyle, Dr. Yoni Freedhoff is adamant that activity trackers will not directly impact weight loss or treat obesity, despite what the product advertisements say.

Freedhoff is an assistant professor of family medicine at the University of Ottawa and the founder and medical director of the Bariatric Medical Institute. He also contributes daily to his award-winning blog Weighty Matters. He says he often has to remind patients that exercise does not generate weight loss.

“When we explore the relationship between exercise and weight status, we get consistently disappointing results,” says Freedhoff. “The risk I see with these devices is the perpetuation of the belief that exercise will allow people to outrun their forks.”

He also takes issue with the food diary application that’s associated with many activity trackers on the market. This tool allows users to store their food intake and provides them with nutritional guidelines.

“The calories that you burn get added to your day, so it looks as if suddenly you’ve earned back an amount of energy in the form of food, and I think that gives people a false sense of security.”

However, Freedhoff acknowledges that more advanced devices, specifically those that include heart rate monitors, could be valuable for physicians when monitoring patients who have cardiac rhythm disturbances.

Hexoskin performs similar functions, but instead of a bracelet users slip on a running shirt with fabric-embedded sensors. The shirt tracks heart rate, breathing, steps, VO2, max, calories and more. A variety of health providers and researchers are working with Hexoskin to develop preventive techniques in areas of psychiatry, public health and neurology as well.

While intriguing, these devices come with a steep price tag. The Fitbit ranges from about $119 to $299, while Jawbone Up models are approximately $65 to $140 and the Hexoskin shirt ranges from $175 to $399 (US). Joseph Cafazzo, a biomedical engineer and director of the Centre for Global eHealth Innovation at the University of Toronto’s University Health Network, predicts technology will have a major impact on the way health care is delivered in years to come. He points to an experiment conducted at the Mayo Clinic where patients who had just undergone cardiac surgery were given the Fitbit as a way to monitor their recovery. The physicians were able to predict length of hospital stay using the data collected.

Cafazzo and his team are taking this study one step further by sending patients who have had heart failure home with wearable activity trackers. The researchers then monitor their movement levels and relate that information back to their cardiopulmonary function testing.

However, he says integrating the use of wearables in health care delivery won’t happen overnight. “Physicians tend to be pretty conservative in terms of what they integrate into clinical practice. I’m more interested in what patients can do with this.”

“If someone is going to wear a fancy little gizmo on their wrist that makes them walk, makes them walk more, makes them move, then I’m all for it.”

—— Dr. Richard Goudie

“If there’s any way for patients to be better enabled to do self-management of chronic illness, I think physicians should be supportive.”

—— Joseph Cafazzo
In terms of chronic disease management and preventive health, wearables could be valuable to patients who have the ability to monitor their own health and adjust behaviour without having to make additional (sometimes unnecessary) trips to the hospital. "If there’s any way for patients to be better enabled to do self-management of chronic illness, I think physicians should be supportive," says Cafazzo.

In a 2014 Office of the Privacy Commissioner of Canada report titled Wearable Computing — Challenges and opportunities for privacy protection, the authors reference a study conducted by PricewaterhouseCoopers stating that nearly 80% of respondents were comfortable using a virtual monitoring service for a chronic condition.

While the parameters of most activity trackers are still quite narrow, the devices could be used more extensively in a health care setting if existing brands broadened functionality and went through the mandatory regulation process.

"Many are worried about being regulated as a medical device so they have to be very careful on the intended use," says Cafazzo. "So, a lot of these companies do what I call ‘ducking;’ they’re trying to make sure that they don’t add functionality or an intended use that would help a person with a chronic illness."

Nevertheless, health care is considered the largest non-consumer segment for wearable technology. As more applications are discovered, experts are acknowledging the value of these devices in diagnosing, training, treating and monitoring their patients’ health.

Wearables with video and audio capabilities can be used to live stream medical procedures or as a way for physicians to converse with colleagues outside the operating room. In a recent experiment at Stanford University, Google Glass was used in a simulation lab by Dr. Homero Rivas to demonstrate how the Glass device superimposes step-by-step instructions and images over the skin of the model. The Google X Lab is also working on a “smart contact lens” that helps diabetics measure their blood sugar levels.

To Dr. Eric Topol, chief academic officer of Scripps Health and professor of genomics at the Scripps Research Institute, California campus, and a popular keynote speaker who delights in showing the power of remote technology, wearables are the future of medicine.

"In 20 years, humans will finally attain the status of cars for their medical care. They’ll have wearable and embeddable sensors with predictive analytics and, most importantly, autonomous driving capabilities," he told the Wall Street Journal last year.

But for most busy Canadian GPs, wearables are still just interesting toys used by their healthy patients to track fitness and diet, without any significant impact on how their health is managed.

While it seems clear wearables have a role to play in health, exactly what and how big that role will be remains to be determined.

Sarah Turnbull is a writer for Future Practice.
Maximizing the benefits of EMR use

Pat Rich

When it comes to electronic medical records (EMR), the main question for physicians in Canada is no longer "Are you using an electronic medical record?" but "How effectively are you using it, and are the data you're gathering sufficient for that purpose?"

At this summer’s e-Health conference in Toronto, a number of presentations dealt with specific projects assessing physician use of EMRs, the quality of data gathered and provincial programs to enhance that use. This comes at a time when organizations such as COACH: Canada’s Health Informatics Association and the Ontario Medical Association have validated maturity models now in place to measure effective EMR use.

Frank Vassallo, vice-president of physician IT adoption at OntarioMD, told one session that this shift reflects the development of a more sophisticated model for engaging physicians. In addition, he said, “our governments have spent hundreds of millions of dollars on EMR adoption and now we have to drive the optimization or enhanced use. We have to deliver value on the investments.”

“Turning the machines on doesn’t necessarily create benefit,” said Dr. Morgan Price, assistant professor and research lead for informatics in the family medicine department at the University of British Columbia, as he introduced a session on driving optimal EMR use in Manitoba.

“We wanted to explore what it was that people were doing — or not doing — with their systems and could we actually help them better adopt their EMRs,” Price said, noting there are several steps between installing an EMR in a practice and seeing benefits such as improved patient outcomes.

“Adoption isn’t easy or necessarily transparent to the user,” he said. Physician and practice variables all factor into how well the EMR is being used.

Price discussed an adoption model developed in British Columbia, similar to other Canadian models, that assesses physician EMR use in 10 categories of increasing sophistication with a six-point scale for each category. It was this model that was used to assess EMR use among primary care physicians in Manitoba.

“One of the things we recognized early on is that data quality is really an issue we need to think about, and it’s not necessarily easy to ask a physician about,” Price said.

Dr. Alex Singer, an assistant professor of family medicine at the University of Manitoba and eHealth champion for family doctors in the province, expanded on this by saying the main goal of the research was to assess the quality of data collected by family physicians who were using an EMR.

The aim, he said, was to establish: “is the data good for our purpose, which is to deliver patient care? If the goal is an interoperable system, (then) if the data quality is poor it can have severe consequences.”

“If the goal is an interoperable system, (then) if the data quality is poor it can have severe consequences.”

— Dr. Alex Singer
To establish a baseline for the quality of EMR data in primary care clinics across Manitoba, a retrospective analysis was conducted with 18 salaried and fee-for-service primary care clinics involving 96 physician practices and 76,000 active patient records.

As an example of the type of tests done to assess data quality in the EMRs, the study assessed the number of patients with a diagnosis of diabetes entered in the EMR against what Singer described as a gold standard for having diabetes — being prescribed insulin or an oral hypoglycemic medication.

In the clinics evaluated, there was a wide range of data accuracy, Singer said, from 90% of those taking diabetes medication having a diagnosis of diabetes entered to having the diagnosis accurately recorded in 65% of cases. He said this shows that in the worst case, just 35% of patients taking a medication only used to treat diabetes had diabetes entered in their EMR file as an existing medical condition.

Other conditions and associated prescribing patterns for appropriate medications also showed wide variation in correlations based on EMR data, he said.

Singer said the study found the strongest predictor of how well EMR data was recorded was the individual practitioner, rather than any variable associated with type of practice.

The study also revealed wide variations in how well basic demographic and risk factor data were entered into the EMR, with some practices recording fewer than half of the risk factors associated with cardiovascular disease.

One conclusion to be drawn from the analysis, Singer said, is the need for caution in using EMR data from primary care clinics for secondary uses because of its questionable validity.

In addition, the analysis has shown just how important the EMR can be in recording data needed to improve the quality of care. “We just didn’t have any quality data in primary care pre-EMR,” he said.

In the final part of the Manitoba presentation, Katie Dyck, peer-to-peer network leader for Manitoba eHealth, described the program that has been put in place to optimize EMR use in the province’s primary care clinics.

Dyck said the program was developed in 2012 to improve the quality of EMR data and to increase functionality of how the EMRs were being used.

As part of this process, Dyck said clinics are assessed using the adoption model described by Price and provided with comparison data on how they are doing compared with other clinics. Action plans are then created to help the clinics optimize their EMR use.

She said one key learning is that physicians and clinic staff need a degree of self-awareness about the limitations of their EMR use in order for the support offered to be useful. She noted live demonstrations with an EMR have proven particularly popular in helping to improve use.

**DATA QUALITY DASHBOARDS**

Another presentation at e-Health dealt with the use of data quality dashboards to assist physicians in British Columbia and Ontario with improving the data they gather in their EMRs. Such dashboards can provide the physician with a selection of variables on the opening screen that show how their practice is performing.

“We want to … start introducing dashboards within the EMRs, not only to help physicians in terms of managing their practices in daily life and from a clinical point of view, but also to help the system,” said Elizabeth Keller, vice-president of product management and operations for Ontario MD. This, she said, means giving physicians real-time access to the wealth of data they have in the EMR.

The tools range from daily dashboards to help physicians care for patients day-to-day, to clinical dashboards focusing on population health, to dashboards that focus on data quality.

Keller said the experience with British Columbia physicians is that while data quality dashboards are “wonderful” to help improve system efficiency, clinical dashboards need to be developed in parallel to benefit the physicians directly from a practice perspective.

“In the next 12 months we are going to move forward very quickly in developing these dashboards,” she said.

With many other stakeholders in Ontario (besides the provincial medical association) developing health care indicators in primary care for reporting and analytics, Keller stated the question is not the capacity of the systems to do this, but rather who decides which indicators are most important.
Panel ponders problems with optimizing EMR use in Canada

GIVE REPRESENTATIVES OF THE clinical, policy-making, vendor and research communities less than an hour to discuss optimizing the use of EMRs in Canada and it’s not surprising that they ran out of time.

During a panel discussion at the e-Health conference in Toronto, it was clear participants were just scratching the surface of EMR value optimization. But what was said provided valuable insights into the perspectives of both large health organizations such as the Canadian Medical Association (CMA) and important players such as the EMR vendor community.

Conrad Amenta, the CMA’s acting director of physician issues, said in a summary that the association sees Canada as moving from an EMR adoption agenda to one of enhanced use (see related article). Now that an estimated 80% of Canadian primary care physicians are using an EMR, he noted, the challenge is to change the professional culture to deal with the new responsibilities and competencies that accompany this reality.

Improving and expanding how physicians use EMRs will bring the value policy-makers have been anticipating in terms of addressing population health management, Amenta stated, as well as strengthening the emerging role of the physician as data steward for patient information.

As the practitioner representative on the panel, Dr. John Machado, a University of Montreal professor of medicine, said physicians want intuitive functionality in EMRs that allows rapid and reliable data entry and task management and that can accommodate individual preferences.

With the growth of collaborative care models, Machado said there is an expectation that physicians will be able to efficiently share EMR data with other team members.

“No matter what we do, we can’t stop replacing paper records with digital records,” said Norm Archer, professor emeritus at the DeGroot School of Business, providing the researcher’s perspective. In addition, he said, it is critically important that patients be able to access their own records digitally and communicate with physicians electronically.

Dr. James Kavanagh, a family physician and medical director of the Telus PS Suite EMR, said vendors would like to see every physician in Canada having an EMR they love to use — one that allows them to communicate with providers and patients electronically. “Why can’t I communicate with other physicians safely and securely?” he asked rhetorically.

Asked to address what was creating roadblocks, the panellists identified several issues including:

- excessive focus on large provincial systems, at the expense of regional solutions
- poor EMR design and workflow integration
- lack of standardization on data entry and exchange

The lack of national coordination and leadership and the need for a federal body to take responsibility for improving collaboration was raised by more than one panellist. “Nobody gets along with anybody” was how Kavanagh put it.

“With all the money spent on (Canada Health) Infoway, why are there no standards to transfer a single patient record from one office to another? That standard does not exist in this country.”

Amenta stressed that a federal vision for optimizing EMR use would not be a “one size fits all” solution but would allow for ongoing collection of high-level requirements.

“No matter what we do, we can’t stop replacing paper records with digital records.”

— Norm Archer
The multiple dimensions of mobile health

THE IMPACT OF MOBILE HEALTH (mhealth) on Canadian health care today was the focus of three very different presentations during a plenary session at a clinical day sponsored by COACH: Canada’s Health Informatics Association, held as part of the e-Health conference in Toronto.

MACRO VIEW
David Thomas, vice-president of Telus Health, called for a “reset” in how consumers are engaged with the health care system. Health care continues to be very provider-driven, he argued, with gains in empowering people to take control of their health coming more slowly than anticipated.

While there have been huge technological advances in medicine and health care, Thomas said IT is still not being used effectively to improve the system as a whole. “We have T-shirts that can measure biometrics, but our clinicians are still using file folders for data.”

Thomas argued that making health information more easily available for consumers through mobile devices “at their fingertips” is creating the shift to facilitate giving people more control over their health. “As the younger generation gets more adept at doing that, and translating and interpreting that information, they will have far more power to demand what they want in the system.”

He also argued that the ability to continuously monitor one’s own health through mobile and wearable devices will fundamentally change the way health care consumers interact with physicians and other health care providers.

Thomas said this change is not going to come from e-patients sitting on hospital boards or committees but through more people using affordable mobile devices for their own health on a daily basis.

Thomas described mhealth as a classic disruptive innovation. He noted while it is currently very expensive and used to treat the most complex patients, this technology is starting to filter down to other health care consumers. It is being used far more widely and changing how care is delivered. The growth in mobile devices in health “clearly puts the consumer at the forefront of change,” he said.

The growth in virtual medical visits “is not happening as fast as we thought it would,” but he predicts the number of such visits will grow dramatically, noting work done in British Columbia and by the Ontario Telemedicine Network (OTN). Thomas posted a 2011 quote from OTN CEO Dr. Ed Brown that virtual visits will account for 25% of health care delivery, noting there is now a feeling that this estimate may be low.

Thomas called for more collaboration between consumers, providers and industry to apply innovative solutions in health care.

MOBILE APPS
According to Duane Bender (P Eng), director of the MEDIC applied research program at Mohawk College, mhealth represents a “confluence” of health care, technology, consumer demand and health policy.

“Mobile health has promised to empower patients, personalize medicine, better equip providers, improve system capacity or at least avoid costs, and to operationalize best practices,” he said.

Bender said in terms of efficiency there is evidence that the use of mhealth approaches can significantly reduce the costs of delivering some types of care through remote monitoring. He quoted studies suggesting mhealth can cut the cost of delivering care to the elderly by 25% and reduce maternal and prenatal mortality by 30%, as well as reducing data collection costs by 24%.

From the patient perspective, those mhealth applications that can monitor or improve the health or well-being of loved ones tend to be those that have the most “stickiness” and are preferred by consumers. Weight loss, fertility monitoring and smoking cessation were all identified by Bender as examples of areas of health where there are now numerous mobile apps available.

Health care providers are also starting to recognize the value of mhealth apps and devices — especially when these tools can help avoid unnecessary patient visits or otherwise help the practice operate more efficiently. However, he noted, remuneration for these types of remote interactions continues to lag behind.

He noted there are still “huge” regulatory issues in approving medical apps and devices — especially when these tools can help avoid unnecessary patient visits or otherwise help the practice operate more efficiently. However, he noted, remuneration for these types of remote interactions continues to lag behind.

UNIVERSITY HEALTH NETWORK
Jim Forbes, chief technology officer at the University Health Network (UHN) in Toronto, discussed the practical issues involved in using mobile devices in a hospital environment in
A mobile application to help seniors was one of the big winners at the Hacking Health Design Challenge that concluded during the e-Health conference in Toronto this summer.

ArtonTheBrain is a mobile app that uses art to promote lifelong learning, brain fitness and social engagement for seniors with mild cognitive impairment and mild dementia.

In the words of team member Aviva Babins, manager of culture, arts and innovation at Baycrest Health Sciences, Toronto, the project “uses visual art as a platform to deliver an enjoyable, user-driven experience that is both mentally and socially engaging.”

She added in a blog post: “We developed this mobile health solution to address the problem of reduced access to meaningful recreation in these seniors.”

The app was developed in part through a series of focus group sessions, one-on-one interviews and trips accompanying seniors from Baycrest Residential Properties and the Freeman Family Day Centre to outings at the Art Gallery of Ontario.

The contest, which concluded at the e-Health conference, was an eight-week exercise. Teams of health care students and practitioners collaborated with technology experts and students to design innovative solutions for health care issues. This year much of the focus was on preventive care. ■

Art for the sake of well-being

Participants in the Seniors Arts Engagement Program at the Art Gallery of Ontario
Medical office of the future using the technology of today

Alexander Singer

“Merely automating the form, content and procedures of the current patient records will perpetuate their deficiencies and will be insufficient to meet emerging user needs.”

— Dick and Stein, 1991

Almost 25 years later, these words still hold true as clinicians face the challenge of trying to use electronic medical records (EMRs) efficiently while interacting with health systems functioning with outdated information technologies.

Unfortunately, in health care we continue to use technology such as fax machines and pagers that other industries have long since abandoned.

Instead of adopting innovations to meet emerging challenges, clinicians are struggling to find ways to improve the use of EMRs, which presently often function as little more than “electronic paper records.” By embracing modern information technologies — including truly computable medical records, interoperability and mobile — clinicians can begin to move forward and see increased efficiency and improved patient outcomes.

To appreciate how the medical office of the future will look, one only needs to examine the technologies of today. Our lives outside the medical office have been transformed by information technology that remains largely untapped in clinical settings.

Computer of the present in your office?
We currently use powerful computers to essentially handle a couple of thousand scanned pieces of paper and some typed notes. But think what could be done if these computers could be adapted to process and store the full genomic, proteomic and microbiomic content of a patient. Consider that today one can purchase an entire copy of his or her personal human genome in a single microchip the size of your fingertip. It’s not science fiction: this volume of information could actually be processed by a computer in a medical office.

Such applications seem far-fetched but are already being applied. For example, some insurers in the United States are refusing to cover clopidogrel for patients whose genetic profile indicates that the drug will not work for them. In future, we’ll use high-powered computers to help us determine the correct balance of treatments for patients with multiple morbidities that human heuristics could not process independently given the terabytes of information needed.

Interoperability
At present, we have only the most basic systems for communicating with one another in the health care setting for reasons that are multiple, complex and endemic to how we fund and organize health care. The reality is that the public already expects us to truly embrace interactive technology, as every other aspect of our lives from banking to travel to grocery shopping has done. As Michael Harris notes in his book The End of Absence: Reclaiming What We’ve Lost in a World of Constant Connection, citizens who are not “digital natives” (so those born after 1985) will be increasingly puzzled by medicine’s paper requisitions and appointment notifications that arrive in the mailbox rather than the virtual inbox.

From prescribing to referral and requisitions, Canada is already 10–20 years behind most European countries in terms of interoperability. And to reach the holy grail of real-time analytics, there is no way to accomplish this without real-time infrastructure — which we are only starting to invest in.

Mobile technology
Technology embedded in your mobile phone has the potential to change the way medicine is practised. From the high-resolution camera to the ability to process blood tests from a literal lab on a chip, smartphones are for more than just receiving calls. It is astonishing that we still carry around pagers that weigh the same and are similar in size to a device now on the market that can collect a full set of vital signs in 20 seconds.

Beam me up, Scotty
Pockets of innovation include the Canadian Primary Care Sentinel Surveillance Network, which has made progress in extracting and processing EMR data from 11 different vendors across the country, and the expansion of electronic health records in certain jurisdictions.

For example, eChart Manitoba connects drug dispensing, imaging, immunization, laboratory and — increasingly — hospital summaries in a single web-based source. However, much more needs to happen to push medicine beyond the premillennial technology in which many practices are mired.

This will undoubtedly require continued and ongoing investment, but without these changes we will be locked into far more costly and inefficient delivery models that will not be able to handle the public’s expectation of medicine.

(A version of this article was presented during the e-Health conference in Toronto)

Dr. Alex Singer is assistant professor, department of family medicine, University of Manitoba, the Manitoba eHealth family physician champion and network director, Manitoba Primary Care Research Network.
TELEHEALTH IS CONTINUING TO GROW AT A RAPID RATE IN CANADA AND globally. This growth has been documented in both a national survey update scheduled to be released in September and at an international conference on the topic held in Toronto in May.

The 4th International Conference on tele-health (Global Telehealth 2015) hosted by COACH: Canada’s Health Informatics Association featured presentations and papers from 25 countries.

The conference was where Carol McFarlane, chair of the COACH CTF national telehealth report committee, and Grant Gillis, COACH executive director of forums and practices, presented a preliminary assessment of findings from the 2015 Canadian Telehealth Report (4th ed.).

Based on survey responses from jurisdictions across Canada, their presentation noted that the number of clinical telehealth sessions has increased 68% since 2012, with 473,629 sessions logged in 2014. While mental health remains the most commonly delivered clinical service utilizing telehealth, the report notes that 90 different services are now offered virtually. These include cardiology, diabetes, genetics, oncology and pediatric services, all widely available.

In addition, use of telehealth for educational purposes has risen by 78% since the 2012 report — with sessions being most widely available in Quebec and Ontario.

The report looks specifically at remote patient monitoring. While McFarlane and Gillis said the number of patients registered in such monitoring programs is “minute,” considering the eligible population at 3,802 patients, they noted this is almost double the 2013 reported total.

They speculated the number of patients availing themselves of remote monitoring services is likely to increase; more than 20% of hospitals surveyed in 2013 said they had offered such services in the previous 12 months.

In the soon-to-be published 2015 report, jurisdictions were invited to identify new and emerging trends. McFarlane and Gillis said respondents cited:

- integration with other digital health solutions such as EMRs
- extending traditional practices through use of mobile solutions and social media
- greater user access to personal health information
- greater use of low-cost video and home-based virtual systems

In their introduction to an electronic compilation of papers presented at the international conference — published by IOS Press — COACH executives Don Newsham and Grant Gillis, along with Anthony Maeder from the University of Western Sydney, Australia, noted the “growth in adoption, diversification in service delivery and a broadening of access” through telehealth.

“Technologies for delivery of telehealth are increasingly well established and diverse, whether in the form of instantaneous interpersonal communications, or as captured information transmitted for later attention. Workflows and models of care incorporating telehealth are widely developed and successfully demonstrated in numerous rural, remote and urban health care settings around the world.”

The authors identified new factors such as the growth of mobile health (mhealth) that are further enhancing the ability for telehealth to take a greater role within the health care system.

“Closely related is the explosion in the personal and home health monitoring market, enabling the monitoring and tracking of individuals to achieve a ‘quantified self,’ providing value added and enriched datastreams for preventive health and chronic disease management.”

From a global perspective, the authors wrote that they hope telehealth will continue to enhance the provision of health care services to the underserved and help to integrate technology and information for better care.

A number of research presentations at Global Telehealth 2015 demonstrated the benefits of telehealth in a variety of clinical and geographic settings.

CARDIAC REHABILITATION

A small randomized trial of virtual cardiac rehabilitation offered over a four-month period showed this approach was as safe
and effective as traditional face-to-face cardiac rehab.

In the study conducted by researchers from the University of British Columbia, University of Northern British Columbia and Providence Health Care, Vancouver, 71 inpatients with acute coronary syndrome or post-revascularization were randomly assigned to traditional cardiac rehab with face-to-face visits and directly monitored exercise or to virtual care. The virtual care program included heart rate monitoring, education sessions and chat sessions with providers.

After adjusting for demographic variables, at 16 months follow up the virtual approach resulted in greater improvement in the primary outcome — maximal time on the treadmill stress test — than seen with the control group ($p=0.040$). Those in the virtual care group also reported the approach to be accessible, convenient and effective. A similar number of patients in both groups experienced cardiovascular-related events during the 12-month follow-up period.

VIRTUAL CARE FOR MENTAL HEALTH EMERGENCIES
An evaluation of virtual care for mental health emergencies by emergency department (ED) staff in Southwestern Ontario evoked mixed opinions.

While most respondents from the 17 participating EDs felt virtual care expedites direct assessment and treatment for patients with mental health emergencies, they also expressed concerns about the increased pressure that virtual care use placed on ED resources — especially on the nursing staff.

Improving the ease of use for virtual care equipment and access to off-site psychiatrists may increase ED staff uptake of the technology in mental health emergencies, the researchers concluded.

The study was conducted by researchers from the Schulich School of Medicine and Dentistry, London, Ont., and Queen’s University, Kingston, Ont.

In addition to these and other studies from Canada, the conference also saw presentations from China, Afghanistan, Cape Verde, Germany and other countries assessing the theoretical and practical benefits of telehealth approaches.

PHONE OR FAX NO MORE:
The move to electronic referrals and consultations

But Dr. Clare Liddy, associate professor and director of research in the department of family medicine at the University of Ottawa and the Bruyère Research Institute, feels the situation is changing. Canada is on track to join other nations where the entire process of referring patients from primary care to specialists is automated.

“I’m very optimistic, as long as the technology solutions are solutions to a common problem such as wait times to access a specialist,” she said in a recent interview. However, once again the issue of the interoperability of electronic medical record (EMR) systems in Canada has been identified as a major challenge.

LEAVING PHONE, FAX BEHIND
Liddy has been involved in the development of one of the few systems in Canada — the Champlain BASE (Building Access to Specialist Care through e-Consultation) system — that allows family physicians in the Ottawa region to consult electronically with specialists without having to rely on faxes or telephone scheduling.

At the recent Global Telehealth 2015 conference, Liddy and colleagues presented information showing the cost-effectiveness of the Champlain BASE system and its acceptance among area specialists, as well
as the first national environmental scan of electronic consultation and referral systems.

The embryonic state of such eConsult and eReferral services was starkly demonstrated by the fact that Liddy and colleagues had initially planned a systematic literature review of published studies on these services. They settled instead on an environmental scan including interviews with key informants because of the lack of published Canadian data.

Some may want to challenge this negative perspective with data from the 2014 National Physician Survey indicating that 43.1% of all Canadian physicians using electronic medical records (56.7% of family physicians, 29.9% of other specialists) say they conduct referrals electronically.

But as Liddy pointed out in the interview, in most cases this means that the physicians are entering the referral letter into the EMR. The next step, as she describes the process from her own practice, is as follows: “I use my electronic medical record to generate the referral letter and then you print it and it gets faxed. The electronic transmission is only within our own office. That’s definitely what I have found... is happening across Canada.”

Liddy said this reliance on fax machines is out of line with many other countries she has evaluated. Even where there are nationwide electronic referral systems, she said, there are electronic linkages within communities of primary care and specialists.

**SYSTEMS TACKLING ACCESS ISSUES**

In the scan conducted by Liddy and colleagues, only three asynchronous electronic systems presently in place to facilitate consultations and/or referrals were identified:

- **Champlain BASE system** — where primary care providers can submit patient-specific clinical questions to a specialist electronically; it’s estimated 65% of primary care physicians in the Champlain region now have access to the system, thus reducing the need for a face-to-face referral in 43% of cases according to one analysis

- **Bridging General and Specialist Care eReferral system**, based in Manitoba, streamlines the consultation and referral process by ensuring referrals are properly directed, creating an auditable electronic trail

- **eReferral ambulatory referral management system (ARMs)** — initially deployed at The Hospital for Sick Children, Toronto, but integrated into the provincial Electronic Child Health Network (eCHN) in 2012, now involving 5000 primary care providers and 54 specialty clinics dealing with 67,000 referrals

Liddy said the BASE system is now fully funded in the Ottawa area through the health region and the provincial health ministry, having undergone a risk assessment and capacity review. She attributed the success of the program to its ability to address lengthy wait times to see specialists.

“It’s about improving access for our patients,” she said. “The amount and breadth of service we provide now is completely at the request of the primary care community, so where they have identified a gap in service we have been able to create availability of a specialist.”

The scan also identified programs in other provinces, such as Alberta, Saskatchewan and New Brunswick, where the referral process is being improved with the intent of implementing a full electronic referral process.

In British Columbia, Saskatchewan and Newfoundland, central intake systems have been developed in some specialties to coordinate the process and allow patients to be referred to an available specialist, rather than facing excessively long wait times for certain individuals.

**FIX THE WORKFLOW FIRST**

In the key informant interviews, Liddy and colleagues noted that many participants stressed the importance of making the existing referral process better before implementing an electronic system.

“Recognizing and improving upon the workflow challenges was considered a crucial first step prior to automation,” the online version of the published study noted.

An oft-repeated observation was that automation of a system that was already dysfunctional would not lead to any improvements and would likely complicate the referral process even more.

The researchers said those interviewed also saw physician engagement in designing and implementing the new system as being an important factor. For example, Liddy noted the Champlain system was developed directly by two clinicians on the basis of issues that had arisen in their practice.

Taking the necessary data from the EMR was identified as a major impediment for designing eReferral or pooled referral systems.

The ability for a physician to submit a referral request directly from an EMR system was seen as being important in the system design, but the researchers noted “in reality, designing a system able to draw information from multiple different EMR systems was a significant challenge.”

The study concluded by stating that despite the current lack of eConsultation and eReferral systems in Canada “several provinces are in various stages” of implementing such systems. As a result, the researchers stated “improving interoperability of EMR systems is becoming a bigger priority.”

They urged that lessons learned from various jurisdictions be shared widely in order to reduce duplication of efforts and benefit from mistakes made.