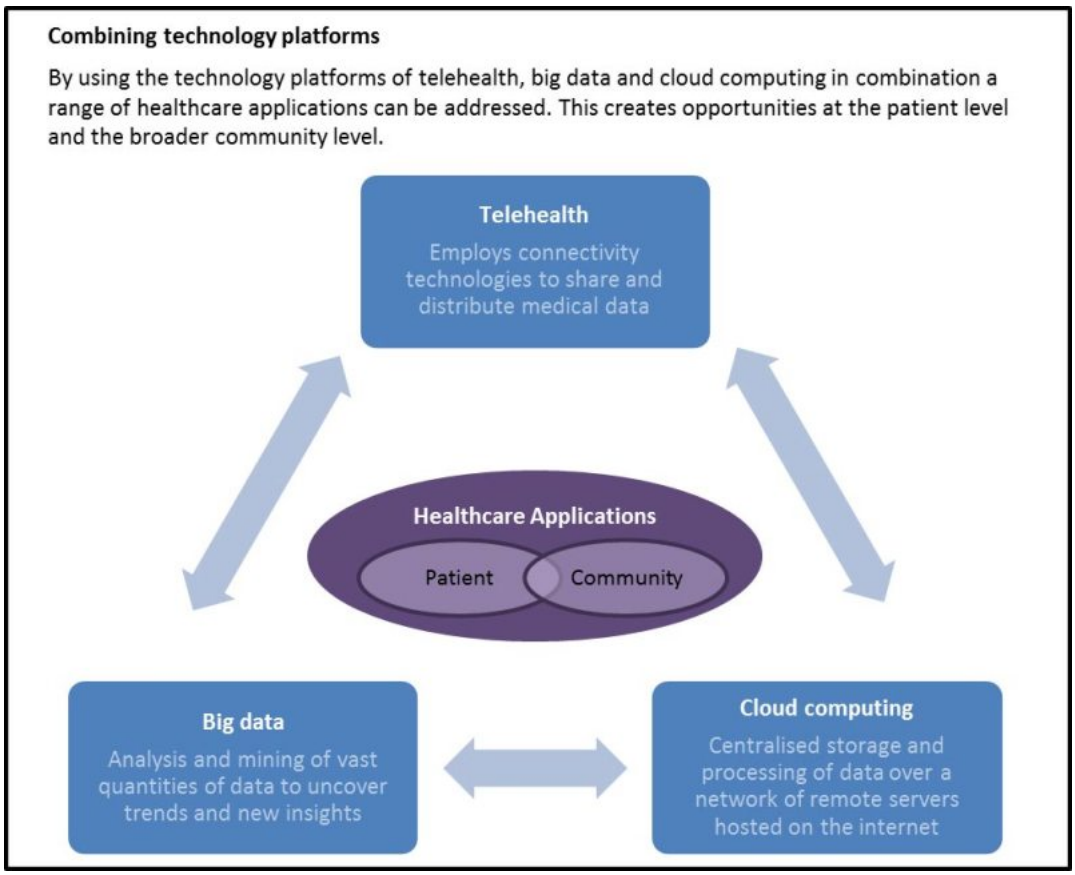
Doctor’s Office 2050: How a spoonful of ‘big data’ helps the medicine go down

Gillian Davies

Mary Poppins was wrong; it’s not a spoonful of sugar that helps the medicine go down, it’s a spoonful of “big data,” and it will make healthcare expenditure more palatable in the Doctor’s Office of 2050 [1]. As big data, telehealth, and the cloud come together, we will see healthcare reap the efficiency rewards of a decentralized approach.

I’m in the Doctor’s Office of 2050, my bathroom. A feeling of lethargy has permeated the past few weeks so I press my home healthcare system, also known as the bathroom mirror. My reflection is replaced by that of a digitized triage nurse, Jane. We run through medical questions, talking fluidly thanks to speech recognition and semantic search software. Jane also employs big data algorithms, some that use artificial intelligence-like learning, constantly interrogating, and mining the encrypted data in my Personal Health Record (PHR). My PHR is stored remotely in the cloud; interrogation of the data it contains seeks out patterns and red flags of illness. Thanks to the wireless connectivity of telehealth tools, my Personal Health Record is kept up to date with all my medical data. It also stores my genetic profile and a host of other relevant information. Should my triage nurse decide I need to be referred to a real life doctor, that healthcare professional can seamlessly access my consolidated records through the internet. Fortunately, on this occasion, Jane tells me it’s nothing to worry about, but notes my iron levels are a little low and suggests some large portions of spinach or steak.

Telehealth employs connectivity technologies to share and distribute medical data, cloud computing allows the centralized storage and processing of data over a network of remote servers hosted on the internet, and big data is the analysis and mining of vast quantities of data to uncover trends and new insights. The healthcare applications for these combinations of technology platforms span the individual patient and the community.



[2]The patient gains a comprehensive, centralized medical database, able to be regularly updated by a plethora of telehealth and clinical diagnostics. The cloud can manage the large data of medical images and genetic signatures as well as simpler *in vitro* diagnostic results. This medical data is seamlessly accessed by the patient’s doctor, providing a single consolidated resource available at the point of care. Often referred to as Personal Health Records (PHR), these digital records could capture disease progress, medical history, insurance claims, lab reports, and prescriptions. This platform that has the potential to improve accuracy, negates communication errors, and ultimately enhances healthcare efficiency.

The introduction of data mining tools allows us to go even further with PHR. Prevention of disease, in addition to treatment, becomes a viable option. Interrogating test results, genetic data, and health indicators could facilitate red flags of illness being raised before symptoms develop. This opens the way for the introduction of a diverse array of prevention regimes, from lifestyle changes to administering disease modifying drugs that limit the pathology of chronic diseases such as Alzheimer’s.

For the community, cloud computing provides an exciting application for big data tools. The analysis and visualization of anonymous medical data from the population would enable global tracking of disease to prevent epidemics. Mapping health trends in conjunction with interrogating anonymous physiological data from vast sample sizes (i.e., national populations) will enable researchers to better refine the causes of disease. The latter creates opportunities for precision medicine and precision tool development, ushering in the age of stratified and personalized medicine.

At a local level, we are already seeing benefits from the application of big data tools in healthcare systems. Seton Healthcare Family [3], a hospital system in Texas (U.S.) is using IBM [4] data mining tools to uncover new patient triaging methods, such as predictive visual cues of congestive heart failure. Implementation of these methods has realized real efficiencies within the hospital system.

Promise of the healthcare market emboldens new entrants like Bina Technologies [5] and Appistry [6] to vie for position with established players like IBM and Oracle [7] in big data. While Google [8] may have bowed out of the cloud healthcare market, other big players like Microsoft [9] and smaller entrants such as CareCloud [10] are happy to replace them. Dialogue with regulators of data protection, healthcare, and medicines will be critical to building appropriate security and gaining traction, but if medical technology companies and their new IT partners get this right, we will see telehealth come to maturity, and that in turn will shepherd in home healthcare and the Doctor's Office of 2050.

When your home healthcare system just won't cut it and you do visit the family doctor, what will their office look like? Indeed, will your doctor even be there? I'll be exploring this and the opportunities it presents for medical technology companies in my next post.

Gillian Davies is a senior consultant in innovation & technology management at Sagentia [11], a global product development and outsourced R&D company. Internationally providing expert leadership to front end medical and healthcare programs, recent experience includes helping pharma and medtech companies adapt their product platforms to enter new markets and exploit new market conditions. Gillian has experience spanning pharmaceutical, biotechnology, and medtech industries and has a Ph.D. in oncology.

Read the previous post of Gillian Davies in Doctor's Office 2050 series by clicking here [1].

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