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Evidence based healthcare is the need of the hour

06 June 2017 | Interviews

Technology is only a means to an end. It doesnâ??t solve all problems. Although it touches every aspect of healthcare, it is only the vehicle through which information and knowledge is delivered, not itself the primary source of that information and knowledge. Dr Ujjwal Rao, Senior Clinical Specialist, Elsevier shares his views on how technology can make or break the healthcare system



What are the challenges faced by healthcare sector?

Worldwide, the biggest challenge that healthcare is facing is the burden of medical errors. By some estimates, out of every 100 hospitalisations, approximately 14 adverse events occur, translating to roughly 43 million avoidable patient injuries worldwide each year. In United States, there are studies which estimate that the number of deaths due to medical errors is between 200,000 and 400,000. In India we actually don't have accurate estimates, but some studies suggest that the number of medical errors we have is almost equal to 5 million. With this, one could extrapolate the number of deaths due to medical errors.

Take for example a patient who comes into the emergency room with chest pain. The first thing that comes to our mind is that he or she may be having a heart attack. However, that is not always the case. The patient could have a clot in a vessel of the lungs (Pulmonary Embolism), causing him or her to experience severe chest pain. That's something a relatively inexperienced physician can completely miss out sometimes, which can lead to catastrophic outcomes.

Medical errors broadly occur as a result of two kinds of failures: knowledge-based and systems-based errors. Knowledge-based errors, more often than not, can directly be attributed to the "Knowledge Dilemma," in which all medical knowledge will soon double every 73 days, yet it takes an average of 17 years for only 14% of new scientific discoveries to "diffuse" into daily clinical practice. This leads to a high degree of knowledge variability that directly impacts the quality and safety of patient care.

To sum it in one word, 'Variability' is the biggest challenge for the healthcare sector.

How can technology help the various healthcare stakeholders deliver high quality, evidence based care?

Technology is only a means to an end. It doesn't solve all problems. Although it touches every aspect of healthcare, it is only the vehicle through which information and knowledge is delivered, not itself the primary source of that information and knowledge. Technology needs to be evidence-adaptive i.e., to have a knowledge-base that continually reflects current evidence so that it can bring the right information to clinicians at the right time at the point-of-care. Electronic health records (EHR) is an evolving technology that is increasingly being adopted by healthcare facilities to maximize efficiency and

streamline functioning, but to use EHRs effectively, clinicians need to integrate knowledge within the clinical workflows of their EHR systems.

Can EHRs alone provide new information and knowledge specific to the patient's clinical history and current clinical status directly to the physician at the point of care? No, they cannot. That's where technology falls short in fulfilling its promise of 'transforming healthcare. What is actually required is current, credible, evidence-based information solutions that drive consistent, high quality and cost-efficient healthcare. And for that, technology needs to be enhanced with knowledge-based solutions.

You mentioned in your whitepaper (https://www.elsevier.com/__data/assets/pdf_file/0014/264101/Order-Sets-Poka-Yoke-White-Paper-NO-BLEED4.pdf) that Clinical Decision Support Systems (CDSS) systems are being hailed as the front runners in delivering evidence-based medicine to improve clinical outcomes, and transform healthcare safety and quality. How is this so, can you elaborate further?

As clinicians, we are always making decisions – what symptoms does the patient present with his or her vitals, examining and investigating further, diagnosing the patient's condition and then providing the right treatment. Thus, each time we need to make a decision on care, we need to ensure that we have all the clinical information and knowledge required to make the right decision.

Generally, we prefer to visit a physician who is more experienced rather than a junior. But think about a scenario where both junior and experienced physicians rely on the same platform to provide similar care. In order to provide the same quality of care, they need current, credible, evidence-based information. When evidence-based medicine (EBM) is incorporated into powerful Clinical Decision Support Systems (CDSS), it has the potential to transform healthcare safety and quality.

CDSS is thought of as technology, but it can exist without technology as well. In the absence of technology (in fact, long prior to the development of computers and the internet), current, credible, evidence-based information allowed the world's leading healthcare providers to deliver high quality, cost-efficient care. Long before the development of computers and the internet, doctors would have a manual checklist to assess and treat patients. Today's technology represents a great leap forward in accessing high value care information and guidance at patient care points, with the knowledge provided by EBM integrated into EHRs, all as part of CDSS. The provision of evidence-based knowledge and guidance is the cornerstone in reducing (and eventually eliminating) preventable medical errors and in consistently improving clinical outcomes.

Could you highlight some of the benefits of using data science in healthcare?

Data is growing exponentially. Specifically in healthcare industry, the volume of worldwide healthcare data is estimated to grow to 25,000 petabytes by 2020. However, one must realise that data by itself is meaningless. You need knowledge and evidence-based solutions to make sense of the data. We can think of CDS as the arrows which target this data and help us move from data to information, from information to knowledge, and eventually, from knowledge to wisdom!

The entire field of data science is becoming more mature with all of the advances in technology, statistics and probability theories. The more and more we dwell into the science of it all, the better we will get at it. Data science needs to be validated clinically to deliver current, credible, evidence-based information. Today, much evidence adaption is performed manually, with professionals (using computer systems) to rapidly review new EBM in order to update CDS. In the near future, evidence-adaptive CDS will be empowered through advancements in machine learning and artificial intelligence. While artificial intelligence (AI) holds great promise in fields like autonomous cars and robotics, it is unlikely that AI will ever completely replace physicians and other providers. What is relevant in healthcare today is intelligence augmentation (IA), where technology amplifies the decision-making capabilities of human providers. CDS solutions such as order sets (that push current, credible, evidence-based information specific to the patient's clinical history and current clinical status directly to the physician at the point of care) can dramatically simplify, amplify, and clarify the process of clinical decision making. Similarly, care plans, clinical practice guidelines, and clinical pathways that are evidence-adaptive and workflow-integrated, provide current, credible information at the point-of-care, augmenting human intelligence and transforming the quality and safety of healthcare. Thus, when it comes to healthcare, IA prevails over AI.