

SUMMER TRAINING REPORT

BY

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UNDER THE GUIDANCE OF

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The Indian Institute of Health Management Research

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ACKNOWLEDGEMENT

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I would like to thank **IIHMR UNIVERSITY** who gave me the golden opportunity to do this project on topic **EHEALTH: MORE THAN JUST AN ELECTRONIC RECORD** which helped me in doing online course and learn new things.

I would like to thank my parents and friends for guiding me through the entire internship by providing me adequate mental and emotional support all along.

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COURSE DESCRIPTION

"eHealth: More than just an electronic record!", is multidisciplinary in nature and helps global audience like health clinicians, students, managers, administrators, and researchers to reflect on the overall impact of eHealth on the integration of care. It explores technology application, current and emerging trends, and showcases both national and international eHealth practice and research.

The entire Course consists of 5 modules and takes nearly 5 weeks to complete. Completion certificates are given on the basis of contribution in all 5 modules. Completing the health practice assignment in Module 5 enables you to advance standing in some of the eHealth courses run by the Faculty of Health Sciences, University of Sydney

ORGANIZED BY:TI SHAW

COURSE DURATION:15 hours



COURSE OBJECTIVE

- ✓ Is to learn the fundamentals of eHealth and its progress
- ✓ What sort of health data we are presently collecting and how it will change healthcare in the coming days.
- ✓ How innovative technologies are improving health consumers participate in their own healthcare.
- ✓ How eHealth can improve the coordination and effectiveness of healthcare and what the barriers might be.

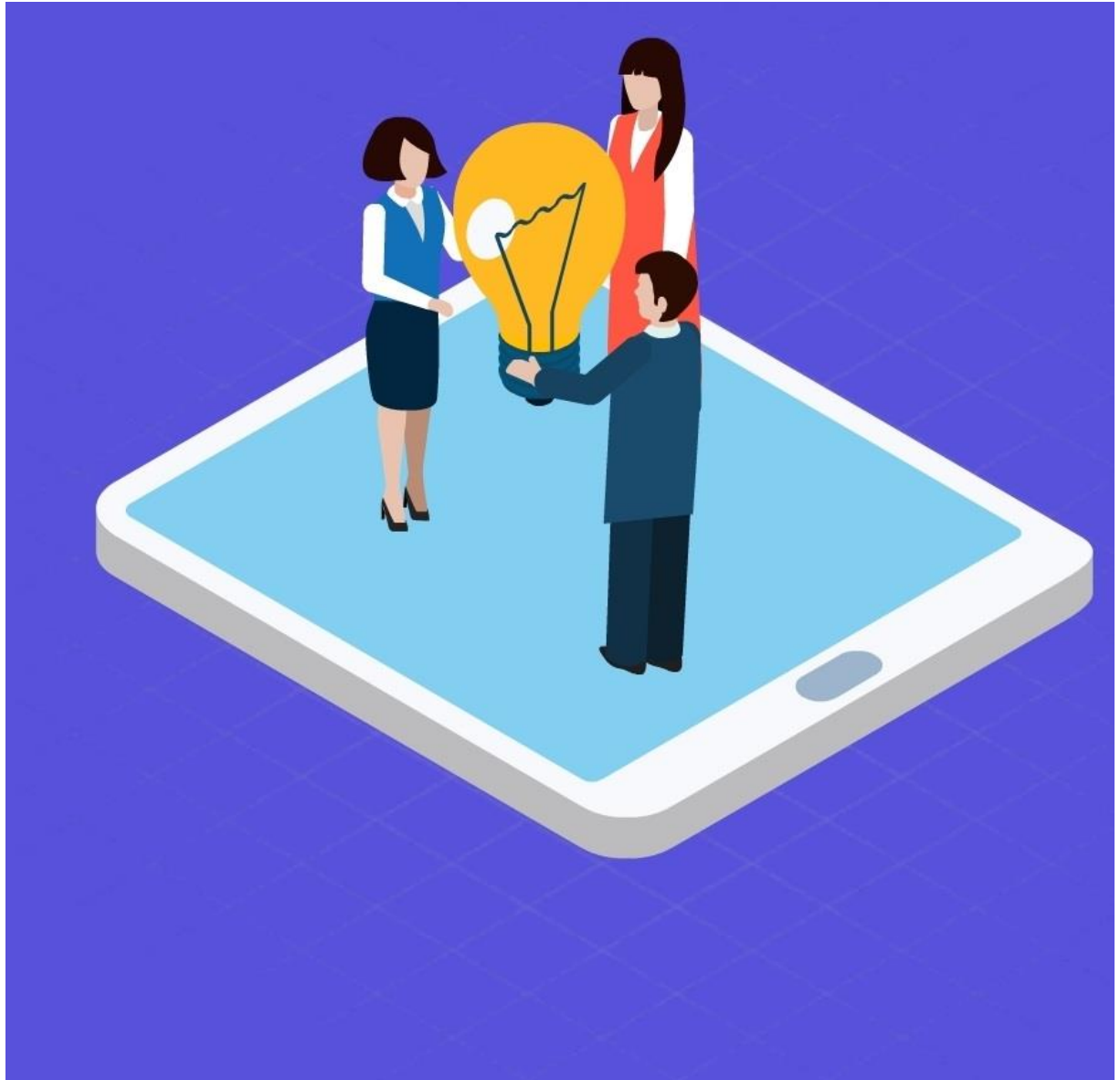


COURSE CONTENT

WEEK	MODULE	TITLE
WEEK 1	MODULE 1	WHAT IS EHEALTH
WEEK 2	MODULE 2	HEALTH IN OUR HANDS
WEEK 3	MODULE 3	DATA AND THE “QUALIFIED SELF”
WEEK 4	MODULE 4	INTERACTING WITH HEALTH PROFESSIONALS USING NEW TECHNOLOGIES
WEEK 5	MODULE 5	EHEALTH IN PROFESSIONAL PRACTICE

LEARNING METHODOLOGY:

Video lectures which included interviews with different health professionals and practice assignment.



LEARNINGS:

WEEK1-

✓ WHAT IS E-HEALTH?

- Many people have traditionally considered e-health to be electrical archives and equipment, frequently in the acute sector. Though, this definitely isn't the entire picture. Use of e-health is increasing with increased use of technology. Also, in the context of rural practice, e-health has reduced travel period for both professionals and consumers of healthcare. It is being used increasingly in a broad range of health contexts, including the use of applications, websites and wearable devices.
- Dr Teresa Anderson, Chief Executive, Sydney ,local health district says eHealth is exciting because it enables us to provide the very best care to our patients by enabling all members of the care team to have access to patient information wherever they are and at whatever time Prof. Stephen Simpson, academic director, Charles Perkins University stated eHealth is so pervasive nowadays, in health research and the implementation and practice of health, that it's almost like the oxygen, I would say, now of health. Prof. Ravel F. Cavo, professor, The University of Sydney mentions that e-health is when we bring technology to support human health in general.

- ✓ E-HEALTH MODEL-. Traditionally this has been referred to as Telehealth but is much more than simply video conferencing for rural patients. It also includes emerging areas such as health coaching and maintenance of fitness. Thirdly, **data records in the quantified self**. This includes how we store data in traditional medical records through to how we store data associated with devices and apps. This is the ring that binds them all. It's important not to draw too tight a boundary around each of them. Where e-health has perhaps the greatest impact is in the sweet spot where the three domains intersect. Ideally any program being developed should consider or combine one or more aspects of these three domains for maximum health impact.

- ✓ Challenges-The devil is in the detail, the employment of these great ideas can get really problematic. The digital world disruption, explosive technology change, those aren't words that the health system is used to dealing with .eHealth is a potent catalyst for change in healthcare delivery. We need faster Internet, we need greater reach of the Internet through satellite and multimedia as well. Not just one service of text based technology or one service of visual technologies, but many different technologies and applications. And we need better education. We need a greater span of education on how health can be controlled by the individual, controlled by your health care provider, and controlled by Allied Health teams. And if we bring those three together we're going to see a revolution in the way healthcare is actually delivered and maintained.
- ✓ Future- as a patient or as somebody looking after your own healthcare is going to really revolutionize what healthcare means. And from the patients perspective, it will be about access; it will be about health care delivery; it will be about recording our own health information. So, many different tools that will be available to support healthcare consumers. Telemedicine, telehealth is bringing things to people in their homes. And so, it's going to require quite a change in the way in which we think about healthcare delivery and it's going to be a big paradigm shift for our healthcare services.
- ✓ The most thrilling thing is about having data-driven care. So, we talk about evidence-based medicine. But if we can have specific data that are relevant to the particular patient, then it allows for this idea of precision and personalized medicine .One of the burdens for a healthcare provider is the administrative burden. Healthcare providers spend an enormous amount of time having to gather information from a variety of sources, of having to compile and collate all of that information to improve their care. So the technology and the ability to give the information and to have that information compiled in one place or dash boarded or the relationship of databases, so that things are put together into a holistic picture free up a clinician to be able to be there with the patient to develop the treatments strategy and to improve their care. The most successful health businesses and services moving forward are the ones that really effectively harness that intersection between automation and personalization.
- ✓ eHealth has changed significantly in the last 20 years. What started as static websites, telepsychiatry has morphed into this amazing array of different

technologies. It really means as an individual, one can almost self-prescribe, choose which hospital when. And the fact that the doctors themselves, are much more guided by the information that you have and be more directed in terms of the types of drugs, the types of tests, the types of care provided.

WEEK-2

- ✓ Health in our Hands-Apps, wearable devices, on-line health info and social media are all being employed to encourage healthy behaviour and monitor existing conditions. All around us, devices are being employed by a good vary of people to trace their performance, diet, sleeping patterns, and virtually each conceivable health metric. wearable devices and associated apps will be used for a good vary of functions like capturing and displaying personal health information, plotting information to observe and track progress, delivering info during a form of formats and providing opportunities for communication with health care professionals and patients and providing links to social networks.
- ✓ Health not healthcare-People use applications that help them to monitor their own health and then keep records of their own information. They share that on social media where they get information from other people who may have experienced similar sorts of conditions or diseases. And so, in the prevention end, it's going to be about consumers owning their own health. And the devices that are available will be there to support them do that. Development of mobile technologies like Fitbits, Apple watches, the quantified self, patients or humans are telling that they love to have data about what they're doing. They love the control and track to be in their hands. Health professionals have a role more as a coach supporting them rather than a health professional dictating them what they need to do.
- ✓ Wearables: Collecting your own data-People are very excited about wearable devices they are using. For example-running app to track kilometres and speed, and then competing with friends. Fitbit to track gym sessions. Devices are available wherein a person can share this data with my family or colleagues, or other doctors or can analyse it themselves.
- ✓ Mobile apps for health-The use of apps, mobile devices, sensors etc is commonly referred to as mHealth or Mobile health. We're increasingly seeing examples of mHealth in education and awareness using it as a

helpline to provide assessment, and treatment support for remote monitoring, and data collection. It can also be used for disease and epidemic outbreak tracking. From the individual's point of view, Mobile Health is not only convenient. It puts health and healthcare into their own hands. It helps them to self-monitor and take control of their circumstances, which for people with chronic conditions, such as diabetes means that they can monitor their health in the comfort of their own home, which may reduce the need for unnecessary admissions to hospital. From the healthcare professional's perspective, it can help to make informed decisions faster in order to improve outcomes for the person by shifting some of the responsibility and control to the consumer. It may also reduce the increasing demands on resource stretch systems. About 70% of people now use mobile apps on a daily basis to track health related information. People can access it with a tap and it gives me a clear, and current overview of health whether it be measuring your heart rate, calories burned, blood sugar, cholesterol, oxygen saturation, health and fitness apps are collecting a wealth of data. In another app, you can also create an emergency card with important health information. For example, blood type, any existing allergies and emergency contact details. All of this is available from the locked screen on my smartphone. So, anyone can access this emergency data if I'm not able to communicate it with myself. Some people share their health related data across their social networks in order to connect and also give and receive encouragement from others, which can be really fantastic motivation. Tracking data using devices, sensors and apps can greatly aid people with specific conditions to be properly monitored and to promote a healthy habit of seeing a health professional when necessary. This can be both life changing and lifesaving.

- ✓ **SOCIAL MEDIA-** Social media are quite diverse and they encompass a broad range of platforms that are constantly changing and evolving. The range of social media available in online communities can be broken down into six main categories. First of all, there's blogs such as WordPress ,collaborative projects like Wikipedia, social networking sites such as Facebook and Twitter, content communities like YouTube, virtual social worlds such as Second Life and virtual game worlds like World of

Warcraft which try to replicate face to face interactions but in a virtual environment. Increasingly, social media is being used by governments to promote health information as well as to gather data. So, it can be used to provide healthy information on a range of conditions or answer medical questions. It can also assist conversations between patients, or between patients and health professionals, and it can also be used to collect data on patient experiences and opinions. It can provide public health surveillance, and it has a potential to significantly influence health policy. Nurses, healthcare professionals are using the social media space to share information.

- ✓ Health information online-As nowadays, people are more inclined towards health in their hands, health professional have become from the prescriber, to the coach, collaborator, and facilitator of the consumers own health journey ,Information is available in various forms ranging from apps to blogs to virtual games(for management of type 1 diabetes).
- ✓ Co-design of eHealth solution-The design and development of technologist to support psychological wellbeing and human flourishing is called positive computing. Positive computing builds around different factors as psychologists know support psychological wellbeing. One of them is autonomy, compassion, competence, connectedness .So let me tell you a little bit about a project we're working on with Asthma Australia. This is going to be an app to help young people transition to adulthood. And young people with asthma need to remember to take preventer inhalers that reduce the likelihood of them having an asthmatic attack. Now, we can design the apps in different ways. We can design it, for example, using GPS trackers to make sure how much activity they have done. Or in the case of the inhaler, put sensors that show that they have taken or not taken the inhaler. And if they don't, we set up a trigger, an alarm, that sends an SMS to the mother, for example, or the doctor, so in that the person has not taken the inhaler in let's say 24 hours. Play video starting at 4 minutes 22 seconds and follow transcript4:22 Now this can feel very limiting. This design does not support, in fact one could argue hinders autonomy, but we can also design it in a different way. You can design it, so it's based around things that are intrinsically important to the person. We can design the app

so for example, there's a photograph of something significant to the person, to the user. A photograph of the soccer team. So, when the person does not take the inhaler for a period of time, he or she is shown a photograph that reminds her of the link between her actions and the impact on her health and her wellbeing. And these two designs, as you can see, have a very different impact on one of these factors in particular on autonomy, sense of urgency. And therefore, it will have a different impact on personal development, and the long term wellbeing. So, this is what we call positive computing. The design and development of technologies to support well-being and human potential.

- ✓ Evaluating health apps-evolution of health apps is really crucial as there are so many apps being made each day. Existing criteria for assessment of app quality were categorized by an expert panel and they used it to develop a new mobile app rating scale. And they developed sub-scales, items, descriptive, and anchors and called it the MARS. Five broad categories and criteria were identified, including four objective quality scales. Engagement, functionality, aesthetics and information quality, and one subjective quality scale, which were refined and developed into a 23-item MARS tool. Their results show that the MARS demonstrated excellent internal consistency, which is how well items on the test measured the same constructor or idea as well as excellent inter-rater reliability. So, the degree of agreement between rate. And these results indicate that the MARS is simple, objective, and reliable and it can be used as a tool for classifying and assessing the quality of mHealth apps. It can also be used to provide a checklist for the design and development of new high quality health apps.

WEEK -3

- Digitizing paper records is clearly beneficial. It enables a patient's medical history to be tracked over time. To alert patients for routine or follow up consultations, to monitor patients' vital signs. And overall, to improve the quality of care. In addition, aggregate medical records can be used to provide regular downstream information on individual team or organization performance. And to link with quality improvement programs. In spite of the obvious potential for medical records to improve care.
- Australian government has developed a tool called PCEHR, the Personally Controlled Electronic Health Record. It's now being renamed to the MyHealth Record wherein they have created standards/format how each information will be recorded(format for discharge summary, format for medications etc) and it is completely owned by the patient and the patient decides whom he wants to share it with.
- The challenge of e-health at that level is, to help us manage the relationship between our biology and our environment. We need to do that to collect new sources of data about ourselves. About what we're eating, our levels of activity, and our sleep and we need to be able to distil that down. Using sophisticated data analytic procedures to a form that's tractable for designing new interventions. For example, predicting a person's health given their biology and their lifestyle. In terms of new bio markers for example, that can help prevent health problems, or provide opportunities for early treatment of those health problems. So that, in combination, is the challenge for eHealth into the coming decades.
- Owning your own data-patients own their data. patients are the data.it helps doctor to diagnose the problem well .For example if somebody has a pathology report with himself there is no need to undergo another pathology test.it thus improves the care provided.
- Patient reported data in practice-Patient reported outcomes(example- patient is distressed or anxious)are as imp as other health data .Using e-health to collect patient related outcomes can be done in various ways like providing a patient with a tablet when sitting in waiting room in order to fill the questionnaire.

Secondly e health can be used to score the data with the help of stored algorithms in the system. Thirdly, immediate feedback can be provided to the patient after seeing his/her score, thus reducing consultation time.

- Privacy and security-The challenge with digitization in health is how to do it safely. When considering genomic data and privacy, there's a few very specific issues at hand. Partly it's just the huge volume of data that we're dealing with. Every patient may have a genome that equates to about 750 megabytes or an audio CD, but the way you actually sequence it magnifies this greatly and so we are dealing with very large volumes that are probably only matched by radiology and MRI. It's very different to keeping patient records in a database .So you have to look at sending data elsewhere. And the cloud is really something that's quite important to consider in this matter. And you can break that down into two different types of problems. You've got storage and then you have actual processing. When you're storing large amounts of data it's quite easy. It's matter of encrypt the data, send it to someone else, and just make sure you get it back at the end of the day., marked from 3 minutes 34 seconds till 3 minutes 57 seconds .So you have to look at sending data elsewhere. And the cloud is really something that's quite important to consider in this matter. And you can break that down into two different types of problems. You've got storage and then you have actual processing. When you're storing large amounts of data it's quite easy. It's matter of encrypt the data, send it to someone else, and just make sure you get it back at the end of the day. There's no trust in that third party that has to be in place. But if you're processing data elsewhere, and that's quite important in genomics, because there's a number of algorithms and software pipelines that need to be used, then there's an element of trust that has to come into this. I'm sending my data away to a third party, and I have to have the belief that they have the correct systems in place to make sure that this data is secure. There are one or two technical issues, so we think about the way, for example, that it's encrypted and the way that it's held so, we use a technique known as homomorphic encryption. Which allows calculations, for example people can send data analytics to you to try and study your data, and they actually do those calculations on data that remains encrypted. So, they never actually see the data. All they see is the results of that analytics. And that ensures that people's

data is held by themselves n so on. And indeed, could be held somewhere else in the cloud or some other appropriate vault, doesn't really matter. So, I think there are many more modern techniques now in machine learning and in data analytics that allow you to do that. I mentioned already homomorphic encryption, but there are other types of ideas as well, so called privacy preserving record linkage, that is an ability to take two databases with two lists of names. And link the data that's associated with common names, but without ever revealing who they are.

- Using data to improve performance-In most of the facilities I work in, there's a strong negative attitude towards medical records. This is due to a perception that the data contained within the record is not useful to conditions beyond direct patient care. A patient in our health system is surrounded by three domains of data. First, you have currently available data, which is largely restricted to pathological data, imaging, history, and some information on how patients are responding to treatment. You then have emerging data. It includes genomic data and items like patient reported outcome measures. Lastly, you have so called new data. In this, I include the massive link data that surrounds us all such as data that can be collected from fitness centre or diet apps as well as information on what we purchase, where we travel, and almost every other aspect of our lives. If you combine the data from all the patients a team treats, you can see that we will shortly have a comprehensive picture of the care a team delivers. We're looking now at how this global information can then be used to impact on clinical decision making, professional development and quality improvement.

WEEK 4

- Health providers should think of ways to automate and make more their services efficient while still providing a really personalized and tailored service to the patient . In the early day , ehealth was just about static websites and information but today it ranges from assistive technologies, from biometric devices, apps to gaming.
- One of the biggest benefits is sort of the ability to access a broader patient group than we would otherwise be able to access in our traditional face to face clinics. The second thing is all the advance treatments can be started early. Also, health professionals can now have the flexibility to work from a cafe or on a tropical holiday and still be able to continue their caseload.
- In online consultations, they're finding that actually patients self-treat themselves more often in the online space, because they're given the tools to use themselves. They've got the exercises and the retest mechanisms to gauge how they're going themselves, and finally outcomes are shown to be the same if not better than a face to face consultation.
- At earlier times ,laptops were used to carry patients medical records, but laptops are heavy .thus are used now .The patients can give all the information and their GP can access it. Teleconference with all the team members can be done swiftly.
- Use of online communication via social media can provide opportunities to communicate in ways that face-to-face conversations can't. It gives the user time to think, gives them time to compose their responses, and they can do so in a manner that suits them. Also ,social media is part of everyday interaction for so many people these days, it's more than likely that young people use social media before they needed to see the doctor so life after an injury should also be the same. So, it makes sense that using social media may be part of their goals for communication and regaining

independence and function in everyday life. Also, social media provides a platform to interact with other health professionals,

- Benefits of apps when the patients go see the doctor they can actually see the whole history in a digital, not just in numbers but in charts and in trends. And not just in the last few months but their whole entire history. Another advantage of an app is that as you put in your data it can do error checking for you and it would also send alerts if something is not right. And as soon as the patient inserts data, it is pushed to a secure cloud server which can be then accessed by care staff.
- Ehealth can also help in professional development in the following ways-
- Professional learning-when a radiologist looks at a mammogram, it's actually an exceedingly difficult task. It's a black and white image and the cancer is not highly visible. Plus, you add to that the fact that only 1 in 200 images will actually have the cancer. Getting an accurate diagnosis is crucial to the woman, but the radiologist who looks at that image needs ongoing training and continual professional development. there's a lot of technology involved in this strategy. First of all, when radiologists look at mammograms they need specific high end monitors, five megapixels to 5 million pixels, and high end workstations to be able to show those large images. Also, on the collection of the data from the radiologist we use a web platform. This web platform was developed in house and has been spun out into a company that works internationally called Ziltron. So, it captures the decisions of the radiologists and at the end it gives them highly visual feedback, showing them where they clicked, what they decided, and demonstrating to them what the actual truth of the case was. It gives them an overall dashboard of their own performance. At the back end, it allows the purchaser of the system, for example the Royal Australian New Zealand College of Radiologists, to see their performance, the individual performance, in relation to everybody else.
- Can help in improving communication skills-Certain software give the practitioner the benefit of learning communication skills.

- the most crucial point in eHealth right now is bringing the health communities together, to understand that this is a unified vision, and that there's a benefit to every single discipline in health. And that the collaboration has to be done with not just health, but technologists, engineers, scientists but in all those discussions, we need to engage the community more. We teach young people about the basics of literacy and writing, but we should also be teaching them about more to do about with how to control their health. And their rights and responsibilities to have a happy, healthy life. And if they can do that early on through simple health education programs, they're going to inform the scientists, inform the practitioners of what they need and want, which better focuses our development of that technology in the future.

WEEK 5 -CASE STUDIES

My physio app-

- ✓ John is a 45 year old male. He presented to the clinic with a history of low back pain, which has been gradually worsening for the last eight weeks. He presented with back pain on the right side which travelled down into his right leg. And this was following changing a car tyre at work. When examined ,he was unable to bend forward without feeling sharp pain down his right leg. And he was quite concerned that this was going to limit his ability to return to work as he was a full time car mechanic. He had come to his hometown for holiday when he came to the clinic and would be going back for work from which he will return after 2 months.
- ✓ He was demonstrated my physio app. told how to use. Simple exercises with the number of times to be done, video demonstrations also available on the app. Also, a reminder everyday 6 pm was put so that the patient doesn't forget it.
- ✓ Hence, the patient improved and was happy with the results.

Electronic records supporting remote care-

- ✓ Patient living in small country town. She lives with a husband and they have a district hospital run by a general practitioner who also works in the hospital. She's brought into that hospital by her husband, incredibly short of breath. She is clammy, and really struggling, and she can't even get out of the car. So, the hospital team get her out of the car. Bring her into the hospital, do some basic observations. Her blood pressure is within normal ranges, her heart rate is very high. So, the first challenge facing the team out there is that the patient can't speak. So, she's too busy breathing, so the husband can provide some husband level information. But this time the husband was so concerned about his loved one that he didn't even bother to pick up the bag of medications. And her wallet's at home as well, so he doesn't have the list of medications.

- ✓ So, the GP, who is a locum, who turned up a week ago, doesn't know anything about this lady's history. Doesn't know what meds she's on. What's previously been done to her. Anything. So, the value of the electronic health record or electronic medical record is that they can go to one of the nearby computers and find out all the care that has been given to that patient in that facility and possibly beyond. This lady was sick and they're worried about her. And they really don't know the best way forward. So, they ring for help at their nearby tertiary referral centre. And they get an intensivist on the phone who is able to look at the electronic record of this patient, so they might see the results of all the previous reports and then offered the treatment. They then conclude to offer comfort care because curative care is unlikely to offer any benefit, this is not a curable disease. And they conducted that conversation with the family and the lady died peacefully.

PHYSIOS ONLINE

- ✓ a Dutch man who was working in Nigeria with an oil company. He had an office-based role there. He was 42 years old and was having some problem around his hip area, an increasing pain that wasn't settling down. His main issues were when he was running and playing soccer, so kicking a ball around. He had tried a number of treatments on himself like stretching and massage, but it look just wasn't getting any better. So ,he simply Googled, was trying to find information online and found our service. So, to start that consultation process, this man went to our website and filled out a subjective assessment form, relevant to the body part that he had injury on. He completed out tick box questions, along answers to really describe his injury to us. Once he's completed that form, he sends it through, and I receive that as his physiotherapist. I'm able to quickly read through that form and work out what further questions I have to work at his diagnoses. And that's exactly what I did. So, in his location he didn't have the bandwidth available to him to do a video consult. So, we ascertained his whole injury history through web forms, email and digital imaging. Then he was

referred for investigations which revealed tear in cartilage. So he went for surety and later completed his rehab physio via myphysioapp.

RECOMMENDATION

I really enjoyed this online course. I thought it was well planned and laid out. I got enough time to finish everything with enough time, learn about the topics and did not feel overloaded and rushed.

I really like this class because of all lectures assignments and interviews. I never expected to learn so much from online course.

I could retain most of the information possible. Even the assignments were very helpful and gained knowledge. I would recommend this course to any health professional and even common people who are curious about knowing how Ehealth really work.

REFERENCE

- ✓ <https://www.coursera.org/learn/ehealth?authMode=login&authType=facebook&errorCode=unknownStatus>
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