

Prof. Peter Yu: opportunities and challenges in big data era



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Dr. Peter Yu is a Hematologist and Medical Oncologist at the Hematology-Oncology Department of the Palo Alto Medical Foundation in Northern California and Director of Cancer Research.

Graduated from Brown University, Rhode Island, in 1980, Dr. Yu served his internship in St. Luke's Roosevelt Hospital Center, NY and subsequently become Chief Resident there. He attained his Medical Oncology Fellowship at Mount Sinai Medical Center, New York and his Hematology Fellowship at Memorial Sloan Kettering Cancer Center, New York where he was a Research Associate at the Kettering Institute, NY. Dr. Yu will become the President of American Society of Clinical Oncology 2014-2015 at the ASCO 2014 annual meeting.

During the CSCO 2013 annual meeting in Xiamen, China, Dr. Yu elaborated on the challenges, opportunities and accelerators for Oncology. As we are now increasingly in the big data era, Dr. Yu discussed his concerns and expectations in the management of medical data in this following personal interview (Figure 1).



Figure 1 Prof. Peter Yu.

CCO: *What is your first impression of this meeting?*

Prof. Yu: This is my first CSCO, so I cannot compare it with the previous CSCO meetings but I can compare to the experience of Dr. Sandra Swain, ASCO Immediate-Past President, who attended CSCO last year and had shown me her slides and strongly encouraged that I come. She found it to be a remarkable meeting of high quality and she felt much closer to the Chinese after the meeting. I read her slides and it presented well what ASCO is all about, so it is needless to repeat that this year. Instead, I shall focus on what the future of ASCO should be and what the development of cancer will be like including what challenges confront us and what we need to do to face those challenges and succeed. That was why I designed my talk as Challenges and Opportunities for Oncology.

CCO: *You have talked about the future cooperation between CSCO and ASCO. As the president of ASCO, what are you expecting the cooperation between ASCO and CSCO to be?*

Prof. Yu: ASCO has become an international society even

though we call ourselves the American Society and our Annual Meeting is always in America. Our members are international, and our meeting is attended by experts across the world. Therefore the challenge for ASCO is to decide whether we accept that responsibility to be an international organization and what does that mean in term of what we try to accomplish and who to engage. My answer is yes, we need to accept that challenge. We need to begin by reaching out and be prepared to adapt ourselves for what the international community needs. We can work together to take advantage of all the work ASCO has achieved in promoting research, education and clinical care and bring that to the world.

CCO: *Looking through the topics this year, which one impresses you most in CSCO?*

Prof. Yu: I think that the translation of science is very sophisticated. That laboratory questions have been asked and with high quality lab work shows deep understanding of the translation of science. I was impressed by that. I was also impressed there is a session on Palliative care which in United States is still a very new concept. Only recently did ASCO

decide to look at that and it was very impressive that CSCO has already identified that as an area to focus upon. Clearly CSCO is looking around and seeing what else is happening.

CCO: *As the principal investigator of Palo Alto Medical Foundation (PAMF), which brings doctors, patients, the data, the achievement strategy all together, what in your perspective would be the spotlight of such a system and what can be expected?*

Prof. Yu: PAMF has been in existence roughly 80 years and as an integrated health care delivery system. The doctors who founded PAMF thought that patients would get better care if there was a high degree of care coordination among doctors. Today there are a thousand doctors in PAMF. We cover a large part of the San Francisco area with many decentralized offices sites which increases patient access. We take care of patients from pediatrics to brain surgery, neurosurgery, oncology and pathology, so almost the entirety of medical disciplines. A patient and patient's family can literally spend their entire life in the health care system seeing their doctors, which gives us an invaluable insight into the health, the disease process, the support network and provides a rich research environment for our researchers that study health care delivery systems to help us understand the best ways to care for patients. The health care delivery system is led by a health care economist and includes epidemiology, statisticians, medical ethnology, and psychology. For 13 years we have been working on computerized medical records, becoming one of the first countries to do that. We understand the value of data collection, making sure the data is accurate and accessible to our researchers, and to other scientists who want to study that data.

CCO: *PAMF as a national work implementation for the electronic health records (EHR), how does it realize data collecting and sharing?*

Prof. Yu: Certain data is easy to collect because it is heavily computerized. So simple laboratory tests we do every day come in digital form from laboratory systems. What is more challenging is what we called free text or narrative text. This is the dictated operative note or pathology note which has a lot of free text. The system can be designed to capture a lot of information and which can be used over again. Once things like allergies, medication lists, prior operations, data, surgery, enter into computer, they can be ported into any analysis. The more we can put it in as structured data, the easier you can pull the data for analysis and save people from repetitive

work. Our drive is to enter more data into the system in a structured fashion, though it is not an easy task. It is more complex because how information identified in the computer requires standardization. This gets into the engineering world and as an example of the need for engineering standards, we talk about the early days in United States where railroad were built with varying track widths. Until everyone agrees to a standard, you could only travel so far before you had to change to a different train. So in the medical world, how do you, when you see someone who is reported as HER-2 positive, know whether that was done by FISH or by PCR analysis? What methodology did you use? We have to have that level detail in the computer system to know what it means. When you said the patient was HER-2 positive, was it on initial biopsy? Or was that two years later when the patient had relapsed? The data has to go in the context of what was happening to the patient at that time. That's the complexity of the data analysis.

CCO: *What is still needed to be done to further improve the system?*

Prof. Yu: You know it is a moving target. You learn every year, you get better every year, but no one has a perfect system, even the CancerLinQ system that ASCO is now going to build, has to overcome the problems we have seen. The problem is that there are very highly integrated healthcare delivery systems where sophisticated management and IT infrastructure exist. Today, most patients get through care in many different offices, which do not share computer systems or the same physical spaces. There are a lot of duplications because one doctor did not know the other doctor did the same test before.

ASCO is trying to unlock all the data that is now being collected in all the hospitals and offices, but are not linked together. We believe once we have done that, we can then begin to ask questions that can't be answered based on individual patients, but if you have one hundred thousand patients and you see the same things over and over again, the same situation over and over again, then you can learn something; that it's not just by chance, there is something happening here, and that is kind of the information unlocked from the computer reference.

CCO: *Though we are blessed to witness the advance of the information world, there is concern of ethics of health information technology. What would be your opinion in this?*

Prof. Yu: The health information technology is not about the computer. The computer is only a tool that is

used by health care technology. It is what we call a social technological system which means there are people who are using the system, accessing the data, analyzing it, or use it for purposes and that is what ethics is about. Ethics is not about machines but about whether you use computer for the good of man or country. The data we are collecting is potentially available for use, but who use it and for what purpose will be an ethical issue. There are also medical ethical concerns to always protect the patient. Do not harm the patient. If the patient's information, health status is disclosed to the outside of the world, employers may use it as an excuse of not hiring a person who is diagnosed of a certain disease, which is harmful to the patient. So who gets to see the information and for what purpose they are using it is a major ethical issue. If they are attaining the information to create what we call generalized knowledge, to the benefit of all the patients, that is good. If the use of data is only to make money or something like that without any benefit elsewhere, it is not ethical. So the key is what the balance is and who make that determination. For ASCO, there are couple things we have as principles. One is we will not release identifiable patient information to someone other than the patient and the doctor. We will remove patient identifiers and so the data can not be associated to anyone individual, and we will aggregate the data. You will never know which the individual patient is but you will have the entire dataset so that will protect patient privacy. Also there is a data oversight committee looking at when some asks to use the data, what is the research, what is involved, and whether it is ethical. We will use the existing ethical standard as codified in existing laws in the United States. Fundamentally the system will be based on the trust of people who give the data to ASCO; that ASCO is using it for a good purpose. If there is any unethical behavior, then the trust is gone. So we have to maintain the trust all times.

CCO: *What will you envision as future management of medical data?*

Prof. Yu: I think we have one world as I said to cure, which means that we are all together. We can not find the cure if there are no pharmaceutical companies to make any drugs. We can not find the cure if there is no insurance system to pay for the drug. So we can not make progress if we exclude whole classes of stakeholders and say never can we work with this person. You will never get anywhere. So ethics fundamentally is what about society thinks is good and valuable and if the society feels that cure in cancer is good and invaluable, the society should make decisions proper to that. Different

societies, different values make different decisions. But everybody won't decide on his own; ethics is for everybody.

CCO: *In the cancer research, what are your advices for young doctors and physicians?*

Prof. Yu: I think translational research is still the future and we are beginning to understand the models of how it works. That will make it easier for the young investigators because they will be able to see the paths that others set down. The data aggregation model helps to fix direction, so I think the translational research is still very promising and exciting. I think that health care delivery is going to become a rapidly growing field. I know see many oncologists who have master degrees in Public Health and who have gone additional two years' education to learn about health care system design as it become more and more obvious that we need to think about our systems more carefully. The health care delivery system is becoming important. There is so much work to be done in developing very comprehensive and expensive computing systems. Therefore we need doctors who understand health care, work with engineers to design systems that are useful for patients, and improve care and reduce risks.

Another concept we can get from the research world, is that the team model makes more sense with the oncologist as the team leader. Repetitive, routine work which really does not require advanced degree to do should be done as little as possible by a doctor. A doctor should assign that to somebody else who just trained to that skill. The doctors need to be more of a leader, acquire new skills, because now we ask doctors not to go to school now just to recognize a disease, order a test, prescribe medicine, know how to remove appendix, but to have administrate skills to manage people, to supervise people, to know when to step in. This is going to be another great challenge.

CCO: *Thank you very much!*

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