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Remote Monitoring Systems for Older Patients

ROLE OF EMERGING TECHNOLOGY IN CARING FOR THE ELDERLY

ReachMD would like to wish you a happy and healthy New Year and with each New Year comes a fresh start. As we look ahead, ReachMD is proud to present this month's special series – Focus On Future Medicine.

Welcome to The Clinician's Roundtable on ReachMD, the Channel for Medical Professionals. I am your host, Dr. Danny Petrasek. I am on faculty of Bioengineering at the California Institute of Technology and our guest today is Dr. Jeffrey Kaye who is professor of Neurology and Biomedical Engineering and the Director of Oregon Center for Aging and Technology at Oregon Health and Science University.

DR. DANNY PETRASEK:

Welcome, Dr. Kaye.

DR. JEFFREY KAYE:

Thank you.

DR. DANNY PETRASEK:

It's a pleasure to have you on and we are excited today to discuss the role of technology and perhaps telemedicine and its emerging impact on the care of the elderly. I thought we would start the discussion and may be we could just enter on the technology side a little bit. Let me just fill the topic up in the air here. We have had remote diagnosing and sensing and treatment. For a while, we have had telemetry and we have had people go up in space and be able to monitor their vital signs, medical alert badges that the elderly use. What's different now? What's happening in technology now that's changing this?

DR. JEFFREY KAYE:

I think there is a convergence of a number of factors. First of all, the technology itself continues to improve, which is always a constant

and so the ability to actually miniaturize devices to get better battery and power from the devices, the information technology that's needed to go along with the devices. All these things are actually improving and becoming more sophisticated. So, they really create new opportunities and potentially if scale can be reached, actually would drive down the cost of some of these things. I think the second area is the sort of opportunity interest, that is that there is a huge healthcare cost of the coming generation, particularly dominated by people with lots of chronic diseases and needing to figure out how it might help people stay out of high cost care institutions, ways of keeping people independent, so technology I think in these devices will play a role there and then I think there are some other sort of interesting areas again that the devices will be applied in more and more and that is the sort of space that deals with population assessment, which comes back to both the healthcare system as well as understanding how treatments and new methodologies for helping people remain healthy can be tracked and proven in the sort of real time in fact.

DR. DANNY PETRASEK:

What kind of technologies are emerging now that will extend sort of the present situation. I mean, clearly in a hospital setting or in a clinical setting, we know we use blood pressure cuffs and we take temperatures and we might be able to do a few vital signs, what's on the horizon? What's being developed now that's really digging deeper into physiology or what's going to be possible soon?

DR. JEFFREY KAYE:

We hear lot of promises that never seem to quite pan out. So, I actually think to some degree the immediate future that is in the next 5 to 10 years is more taking what we already know with some improvement in foreign factors and some of these other technical details, but being able to actually apply them more effectively and scale them out to be more vitally used. So, I think one of the major transformations that will happen is that more and more healthcare will be driven by a home-based care and what I mean by that is that there will be a convergence of people really having access to their medical record, even may be populating themselves and along with that immediately when that record and those data are in their home, all of these devices that also can be brought in the home can be linked to that system and so the hub of healthcare will be from the home out instead of the hospital, the clinic, doctor's office, these more traditional places. So, I think that actually yes we will see disposable sensors that, you know, you can pop on your chest and it will give you heart rates and blood pressures and oxygen tensions and so forth. I think the real innovation will be that these kinds of things will actually become much more widespread and integrated into, you know, the way that medical care is actually provided.

DR. DANNY PETRASEK:

Do you also see a potential for this actually transferring out of the home as well because it seems that it should be possible?

DR. JEFFREY KAYE:

What will the final form factor be, I don't know, it's hard to think. Those of us who are of a certain age didn't know what an iPod would look like until it appeared and so there are other devices perhaps that are similar that might look like that, but I think that the trend is clear that more mobility, more personal relationship to your own data and understanding what you are doing will be definitely increasing and the next group of elderly, who will inherit these chronic conditions, are the baby boomers, the penetration of baby boomers for example that are, you know, have home PCs or have broadband connections that just continues to rise, I think, somewhere in the 70% range in most metropolitan areas.

DR. DANNY PETRASEK:

If you have just joined us, you are listening to The Clinician's Roundtable on ReachMD. I am your host, Dr. Danny Petrasek. Our guest today is Dr. Jeffery Kaye, professor of Neurology and Biomedical Engineering and the Director of Oregon Center for Aging and Technology at Oregon Health and Science University, and we are continuing our discussion about the role of technology in caring for the elderly.

Dr. Kaye, where is the frontier? Where are the advancements taking place that's promoting, you know, these technologies and sort of interphase between medicine and technology? Where the big centers are? Who are the people doing it? Who should we look to?

DR. JEFFREY KAYE:

Well, aside from our own group, of course.

DR. DANNY PETRASEK:

You know, if you feel free to talk about your group, tell us about it.

DR. JEFFREY KAYE:

One of the themes that I keep coming back to a little bit is this question of gullibility and how will things work in the real world and so there is a long tradition of laboratories that has been called the smart home, the smart apartment where a marked apartment or even home has been created often in the Biomedical Engineering Department at the University and populated by graduate students who might live there for a day and you collect some interesting information about how the future might look, but of course, your typical graduate student is not typical of your typical patient out in the community. So, that's been around for a long time and many of the developments actually do come from those places. I think that the next frontier is really building out those smart homes into a smart community. So, being able to do clinical trials and studies of efficacy of these kinds of technology and capabilities on a scale that's typically seen for, you know, a large cardiovascular health study for example. So, instead of a dozen graduate students over a few weeks, you would have a thousand elderly living in their own homes, study for several years and I think that model is very important. So, in our own work in Oregon, at the Oregon Center for Aging and Technology, we have created what we call a living laboratory, there is many of these around the world that are version of the living laboratory, is a network of seniors who have agreed to have a platform of technology installed in their home and allow us to monitor their activities 24x7, interact with us by computer. So, we will ask them very basic health questions on a regular basis and begin to collect data that really reflects how they are doing in their home on a much more continuous basis as opposed to the typical research model where you go into a clinic, some data is collected, you wait a period of time and you go back and you recollect it and this kind of saltatory connecting the dots doesn't really tell you very much or it takes you long time to figure things out by that methodology.

DR. DANNY PETRASEK:

Most of us are familiar with the so-called medical alert badges. There are several companies that advertise them and lots of elderly are using them. Basically, it is sort of the first step in this idea. Are there other sort of success stories or pilot programs outside of academia that are implementing some of these ideas already or?

DR. JEFFREY KAYE:

Well, there is a huge industry that's developed around this. Actually, there is a lot of activity in Europe for sure. A lot of the large technology companies, Phillips, Honeywell, GE, Intel, they are really very much in this healthcare sector of patient monitoring in a number of ways. I think one of the things that's a little different from the traditional medical model is that until there is a need or a desire for payers to reimburse these kinds of, well the services that might be available through collecting this information. It's not clear how this industry will grow. It may end up being that a certain portion is actually a consumer electronics model, the people just say this is useful and helpful and I like it and I'll pay for it or health systems, health plans, the government decides this actually saves us money and makes sense and keeps people healthy and it's worth reimbursing for and so I think that that mixture of trying to understand what's going to be reimbursed or not and how that's going to work is where these companies now are working right now. There definitely are products out there on the market, turnkey systems that you can buy, put inside somebody's house, set up the sensors, and receive calls that you know there is some concern that your loved one is having some problem, but what we don't have much data unlike for many other areas of biomedicine is how many false alarms might there be or does it really work. You know, it makes sense certainly if somebody falls and they are lying on the floor and they can't talk to anybody, they are going to be in big trouble unless somebody comes and helps them, but at the same time, there is clear evidence again some anecdotal that people will get false alarms and then we charge for the EMT visit and that's not good either.

DR. DANNY PETRASEK:

Yeah. Supposedly, for example of the medical alert badges, there are sort of simple products that if you are having a problem, you have to press a button, but then those instances where someone falls down and is knocked out, it's difficult for them to press the button.

DR. JEFFREY KAYE:

And in fact even there is sort of other level of investigation that still needs to be done and that is the human factors are so. There are elderly who will tell you that they fell down, they could press the button, but they didn't want to because they perceive that it is landing them in a nursing home. They get picked up and carted off to the emergency room. Then, they are really going to be told well you really can't live alone anymore.

DR. DANNY PETRASEK:

There is always the human issue we have to deal with in people's right to have independence.

DR. JEFFREY KAYE:

Right. Now, having said what I just said about, building an evidence base for these kind of technologies, there is an area that there is good evidence for, but it depends very much on the situation and the way that it's applied and that comes from the traditional disease management world. So, there is a lot of long history of disease-focused management enabled or at least augmented by using a technology. So, probably the most widely recognized would be diabetes management using, you know, home-based glucometers and nurse callback system or some monitoring program and those are well established and in many instances have shown, I think, a lot of promise certainly in terms of potentially saving money, but surprisingly in some ways, the actual integration of the other very few patients who have just diabetes, they also have other things and so really being able to go beyond a sort of single application in disease management I think is a real new area that we will see more and more of.

DR. DANNY PETRASEK:

I want to thank our guest, Dr. Jeffrey Kaye, who is the Professor of Neurology and Biomedical Engineering at Oregon Center for Aging and Technology and he is the Director of that center and we have been discussing the role of emerging technology in caring for the elderly. Thank you so much Dr. Kaye.

DR. JEFFREY KAYE:

Thank you.

I am Dr. Danny Petrasek. You have been listening to Clinician's Roundtable on ReachMD, the Channel for Medical Professionals.

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Rapid cooling of vital organs and tissues is now possible. I am Dr. Larry Kaskel; join me this week on a special program of the future of medicine. I will be talking with Dr. Ken Kizer from the Oregon National Lab, talking about this new exciting technology.

This is Dr. Jennifer Shu. This week, we will be speaking with Dr. Peter Scheidt at the National Institute of Child Health and Human Development. We will be talking about what physicians should know about the National Children's Study.

And I am Dr. Morris Pickard. Join me this week. I will be speaking with Dr. Donald Palmisano, former President of the AMA and we will be discussing his new book - On Leadership: Essential Principles for Success.

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