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The Biomedical Research Environment in Singapore

### FOCUS ON GLOBAL MEDICINE - RESEARCH ENVIRONMENT IN SINGAPORE

Change and challenge is in the wind of 2008 comes to an end. The same is true when examining this month's ReachMD XM160 special Series Focus on Global Medicine. We take a look at both the changes and the challenges impacting global medicine.

According to economist, Tom Freedman, the globalized economic world is flat. Every one is connected to and dependent on everyone else. Is the same true in the world of medical research? Welcome to the special report on global medicine on ReachMD, the Channel for Medical Professionals. I am your host, Dr. Bruce Bloom, and joining us to discuss the globalization of medical research is Dr. Edward Holmes, Vice Chancellor and Dean Emeritus of Health Sciences at the University of California, San Diego; and Executive Deputy Chairman, Biomedical Research Council, Singapore, and Executive Chairman of the National Medical Research, Singapore.

#### DR. BRUCE BLOOM:

Dr. Holmes, welcome to ReachMD.

#### DR. EDWARD HOLMES:

Good morning.

#### DR. BRUCE BLOOM:

So, a couple of years ago you decided to split your time between Singapore and the US. How did this opportunity come about and why did you even consider it the first place?

#### DR. EDWARD HOLMES:

Well, I had previously been advising Singapore on a number of panels for a period of 6 to 7 years and over this time I came to recognize really the extraordinary commitment at all levels of Singapore to the biomedical sciences initiative and quite frankly I was so impressed with the extraordinary opportunity to be a part of what I view as a grand experiment that is going on in Singapore right now and the broad

area of biomedical sciences and translational and clinical research, in particular I could not pass up on this. I was at the right stage in my career, I was stepping down from my role as Vice Chancellor at UC San Diego and I happened to be meeting with Philip Yeo, who in many ways has been the architect of the Biomedical Sciences Initiative in Singapore and I was there on a consulting trip and just mentioned I was going to do something different and I think this is insightful for how Singapore works. Philip and I chatted, I arrived home, and Philip called me 2 days after I got back and asked if I and my wife, Dr. Judy Slain, who is also involved in this could meet him in the provost of National University of Singapore, the dean of the medical school at National University of Singapore for dinner and we said certainly, he said, good, we will see you on Saturday night in Paris, and Judy and I jumped on a plane, we went there, met with the 3 of them, and 3 days later these contracts arrived in the mail and we said anybody that can move as quickly has really got something together we want to be a part of and so the rest is history.

**DR. BRUCE BLOOM:**

And is Philip Yeo. What is his position over there and why he is so influential?

**DR. EDWARD HOLMES:**

Philip at time was the chairman of something called the Agency for Science, Technology, and Research, which is a major funder, a bit like the National Science Foundation and NIH rolled together in the United States, and in his role as the chairman of A-STAR, the agency for science, technology, and research, he had been architect along with Dr. Sidney Brenner, a Nobel Laureate, in creating something called the Biopolis, which is a 2 million square foot research complex housing 6 research institutes and was really the beginning about 7 years ago of the whole biomedical sciences initiative.

**DR. BRUCE BLOOM:**

And the size of this Biopolis for our physician and clinician scientists, how big is that and how does it compare for example to an academic medical center.

**DR. EDWARD HOLMES:**

It is about the size of an academic medical center. It is really a research community. It is designed in an extraordinarily interesting way. There are 5 or 6 buildings in this complex, very modern buildings, housing research laboratories, conference rooms, all of the typical things we think of, but in addition, it has got a whole complex of restaurants, laundries, everything you need basically to contain the community and the idea was to bring together students, post docs, research faculty all at a common site and create a critical mass on what would be essentially a city block in the United States and it has a life of its own there. It is a vibrant dynamic community and it is I think been an extraordinary success. It was started at about 2000 and as I said now it is 2 million square feet of research base. So, it is quite large. It has 6 research institutes, things like a genome institute, a basic biology institute, a bioengineering institute, a translational clinical research, a GMP facility, so it is in a way a self-contained biomedical little city if you will.

**DR. BRUCE BLOOM:**

And is this owned by the government or by private sector, or a combination. What is the ownership look like?

**DR. EDWARD HOLMES:**

The ownership is by the government, the Agency for Science, Technology, and Research is a branch of the Ministry of Trade and Industry, and so the funding is largely by the government, but housed in this complex, are not just these research institutes, but a series of private sector companies, so for example, Novartis has an Institute of Tropical Disease, is there with about 150 scientist in it. Glaxo SmithKline has a comparable size facility focused on neuroscience. Eli Lilly has a facility there, so it is a mixture of private sector research and development organizations embedded in these research institutes with the idea of fostering collaboration across these entities.

**DR. BRUCE BLOOM:**

And do the private-sector people work directly with the public sector people and do they exchange information and how is stuff supposed to get to patients, does it flow from the public to the private, then to the patient or what happens?

**DR. EDWARD HOLMES:**

Well, the private companies that are there of course they have their own research that they conduct, but the situation is such that they can share the facilities like animal facilities, microscopy, etc. with the government-funded investigators. In some cases, they actually collaborate, but I think it is the scientific community that makes it attractive for companies to be there that the seminars that are taking place, the chance to bump into people at the restaurants that are there, they even have a couple of little bars at night, so that the students and the faculty can sit around and talk about science in a relaxed way at the end of the day. Something that may be of interest to the listeners is that when Singapore decided to jump into all of this that, it is very new for Singapore. It all began about 2000 and as typical of Singapore, it was a commitment made from the highest levels of the government to make biomedical sciences one of the pillars of the economy, and so the construction of the Biopolis and the recruitment of the scientists who are based there was phase 1 of the Biomedical Sciences Initiative. Included in this is a plan to train 1000 Ph.D. Singaporeans, kids are allowed to go any place in the world they want with their undergraduate education and graduate education paid for on the condition they come back to Singapore for a few years after they complete their education and as these young people are beginning to come back into this Biopolis complex, Singapore has also recruited aggressively at the international level and brought in outstanding scientists from around the world from the US, UK, Australia, China, and India. So it is a true global international community that is located there. The success of this first 5 years, I think, emboldened the government to move in phase 2 into a translational and clinical research agenda that as we jokingly like to say curing cancer in the mouse is not going to be enough in the long run and the government to realize its full objectives of improving the health of Singapore and people around the world as well as building up its biotechnology and pharmaceutical industry, realized it needed to have a translational and clinical research agenda, and so that is what Dr. Judy Slain and I were invited to come over and help with, is to put together phase 2 of this initiative, which was done in, I would say, typical Singapore fashion that a decision was made that a series of human capital initiative, that is the training and recruitment of physician scientists and Ph.D. scientists working at a translational level was needed, a set of infrastructure was needed to accomplish this including things like clinical research centers and building of 2 academic medical centers, hospitals, and medical schools were needed to pull this off and we are just beginning, we are 2 years into this. So I don't know if it is going to be as successful as the basic science, but it is a really exciting experiment to watch unfold.

**DR. BRUCE BLOOM:**

What are your responsibilities then over in Singapore? Are you guiding the development of these clinical facilities and hospitals? Are you doing recruitment? Are you doing research what is going on?

**DR. EDWARD HOLMES:**

Well, I do not do hands on research any longer Bruce. My responsibility was the government of Singapore appropriated 1.5 billion Singapore dollars for 4 years to launch this translational clinical research initiative and the way that money is being utilized is through the Biomedical Research Counsel, the BMRC, and the National Medical Research Counsel, and I think what they had in mind in inviting someone like myself to hold a leadership position in both of these entities was to try to coordinate the funding streams, the granting mechanisms to achieve this objective of moving basic science out of the laboratories into the clinic. So what I have been asked to do is to help to develop a series of strategies for developing the human capital, the training programs for the physicians, and the physician scientists who will lead this effort as well as funding schemes to recruit nationally and internationally and there has been a reasonable amount of success in a short period of time in bringing outstanding physician scientists to Singapore just as there was in phase 1 of bringing basic scientists to the Biopolis. A second component of this has been to develop an infrastructure that enables translational clinical research. So, one of the important objectives was to create 2, what we would call, academic medical centers in the United States that is bringing together a medical school and a hospital. In Singapore, the hospitals are largely public hospitals owned by the government and they are under the Ministry of Health. The medical schools, National University of Medical School is under the Ministry of Education, and so recommendation was made by a group of us to put these 2 together, the hospital and National University Hospital and National University Medical School in a single entity, and in what I would say is record time compared to the US and probably the UK all the way from our ground level up through the cabinet to the prime minister and back down again in 6 months, the decision was made to create a whole new governance body that brought together National University Hospital in the Ministry of Health and National University Medical School from the Ministry of Education and I think it is a sort of typical of what makes Singapore interesting and exciting right now is the speed with which things can be done and how effectively and efficient the government works to see these things being done. In parallel, interestingly Duke University has just recently opened a Medical School in Singapore in conjunction with National University of Singapore and that medical school in conjunction with Singapore General Hospital is now forming a second academic medical center. So, my role, I would say is then to advice the government on its granting mechanisms and also to help with the development of this infrastructure and creation of academe medical centers to foster translational clinical research.

**DR. BRUCE BLOOM:**

And what will be your next step be over there, when you finish this, will you be done or will they find a new job for you or will you stay on to manage whatever gets created?

**DR. EDWARD HOLMES:**

May be, we will have to have a second interview to answer that. I am 2 years into a 3-year contract as is Judy in this and we will find out whether they want us to stay and help with something else after this and whether that is the right thing for us to do, but I must say it has been very, very exciting to see a country like Singapore bring together from the highest levels of the government through the various ministries, through the universities, through the agency of science, technology, and research all of the various parties to effect what is really been a rather dramatic change in a short period of time. I think 1 of the objectives of Singapore would be to develop its biotechnology cluster along the lines of what has happened in San Diego in the bay area in Boston and its early days yet, it is only 7 years into the process, but I think the signs look very promising for a successful outcome.

**DR. BRUCE BLOOM:**

I would like to thank our guest, Dr. Edward Holmes, Vice Chancellor and Dean Emeritus of Health Sciences Center at the University of California, San Diego; and currently Executive Deputy Chairman of the Biomedical Research Council in Singapore, and Executive Chairman of the National Medical Research counsel also in Singapore for joining us to discuss the globalization of medical research. I am your host Dr. Bruce Bloom and you have been listening to a special report on global medicine on ReachMD, the Channel for Medical Professionals. Please visit our web site at [ReachMD.com](http://ReachMD.com) which features our entire library through on-demand podcasts or call us toll-free with your comments and suggestions at 888-639-6157 and thank you for listening.

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