

Special focus this month:

## INFECTIOUS DISEASES

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# SMA NEWS

## Bringing Duke Medicine to Singapore



Credit for photo of Davidson Building: Duke University Medical Center.

Come 2007, the NUS Graduate Medical School (GMS), a collaboration between the National University of Singapore (NUS) and Duke University will admit its pioneer class of 25 students. The GMS, sited at the Outram campus where the first medical school was established 100 years ago, will offer a graduate-entry four-year medical programme, leading to a Doctor of Medicine (MD) degree. Based largely on the Duke curriculum, GMS students will devote the third year of their course to research projects and have the opportunity to work with

clinician-scientists of both the GMS and Duke University. Professor Sanders Williams, who has been named Founding Dean of GMS, is concurrently Dean of Duke University's School of Medicine and Vice Chancellor for Academic Affairs at Duke University Medical Center. Prof Williams is also a renowned physician-scientist and has made major contributions to the understanding of how cardiovascular disease develops. Editor Dr Toh Han Chong spoke with Dean Sanders Williams during one of his recent trips to Singapore.

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*SMA News*: Growing up in Georgia, were there any childhood experiences that made you want to become a doctor?

It happened when I went to Princeton University. Growing up, my career goal was to be a diplomat in the foreign service. I entered college planning to study public and international affairs, which I did at the Woodrow Wilson School of Government at Princeton. I have always enjoyed the sciences. I was good in science and mathematics though I did not have a professional interest; it was more an intellectual interest. In my third year in university, after I had already chosen my major, I took a biology course and I was just enthralled. This was about 1968. It was the dawn of the molecular biology era, and the genetic code had been broken in 1966. So it was just brand new and I thought it was the most fascinating thing I had heard. I continued with my major but I took some additional courses and applied to medical school. I was accepted at several good places and I chose Duke because of the unique curriculum and the opportunity to spend a year in research, which the other medical schools did not provide.

*SMA News*: How many years has that unique curriculum been built into the Duke medical school programme?

It was fairly new at the time; I think it began in 1966. I went to Duke in 1970. The other thing that was new at Duke was the medical scientist programme, which was available to junior doctors who had completed part of their residency training but wanted to learn how to do science too. Duke allowed six medical students a year to enroll as well, and they competed to get into the programme. I won one of those positions, and had in my research time in medical school a very intensive core curriculum: cell and molecular biology in the day; a bit about laboratory techniques; and a research project which we did with a mentor. So I had an early introduction to what top quality science was about, and I wanted to do that. I carried on with my clinical training, but from the outset, I knew I wanted to do some research as well.

When I finished my residency at the Massachusetts General Hospital and came back to do my fellowship – the second advanced training – I chose to go into the laboratory first, before my advanced clinical training in cardiology. I had about a year and a half of further intensive laboratory training with minimal clinical duties

and that gave me further grounding. Then I finished my clinical training in cardiology and joined the faculty at Duke. I was a very active clinician at that time. It was very important to me to be viewed as a good doctor, even though I wanted to spend time in the laboratory as well. I was so dedicated to being a good doctor that I took on more clinical duties than was wise for someone who also wanted to be a top scientist. After doing that for four to five years, I recognised that even though I was doing pretty well, I probably was not on the path to be a top scientist as well as a good physician.

I went to my department chairman and said I needed to break out of these heavy clinical duties and I also needed more training. I had learnt a fair amount before, but I needed another year. By that time, cloning techniques of recombinant DNA had been developed which I had not learnt earlier, but they were still very new. And I said if I was going to be successful in science, I needed to know how to do these things. My chairman, who was a good and wise person, said that if I came up with the right idea, he would give me leave from my clinical duties for a year – I just had to pay for it myself. He would give me leave but not any money!

So I applied for fellowships that would allow me to go for more training. I won the Fogarty Award and went to the Biochemistry Department at Oxford University in the United Kingdom (UK) for a year. There, I learnt how to do recombinant DNA work. At that time, there were probably only three or four cardiologists on the earth who could do recombinant DNA at a high level, and I became one of those. When I returned from England, I spent only a third of my time in clinical work, where before, it had been more than half. I had some skills and ideas that were different from other cardiologists, and that allowed me to move very quickly and become successful. I had a lot of luck along the way, but I was also willing to do some unusual kinds of things.

What I learnt is that for a physician to do research is a wonderfully pleasurable thing. Clinical medicine is very rewarding, but to actually discover things that no one has ever known before is thrilling.

*SMA News*: I was curious about you going to Oxford because the States would have had tremendous opportunities to do cloning and recombinant DNA. Who did you work with at Oxford?

I worked with Rodney Porter, who was the chair of the department at that time; he won the Nobel

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Prize for discovery of the chemical structure of antibodies. I also worked with a biochemist named Eric Newsholme who is a metabolism specialist, and a molecular biologist named Alan Kingsman. That combination of people helped me learn what I needed to do. And they were very gracious to me: they gave me an office. They did not have to pay for me – I paid my own salary and supplies. The other reason I went to Oxford was that the Fogarty Award required me to go abroad.

*SMA News:* Are there any differences in the way science and medicine are done across the Atlantic?

There were very few medical doctors doing basic type work in the UK; the medical doctors tended to gravitate towards more clinical research. Whereas in the United States (US), it was very much encouraged to do work that was more molecular.

The other very valuable thing I found was that the style of doing science in the UK was more thoughtful. Resources were more limited, so you were much more careful about the experiments you did and you could not afford to waste any reagents. You spent more time thinking and less time doing. In the style of American science, you just do it. And if you wasted reagents, it was not such a big thing. But I learnt from that and tried to apply the rule myself even when I was back where I had more resources. I also learnt that you cannot do research as a hobby. It has to be a real dedication and you have to be willing to make sacrifices and take the time necessary to acquire the skills.

*SMA News:* That brings us to the next topic, which I am sure you have discussed with our leadership in Singapore: the heavy clinical service commitment particularly on the Outram campus. In a review by the international committee a few years ago, they also concluded the same thing: that there is a heavy work demand on the medical doctors in Singapore's public hospitals, which would make academic pursuits harder.

It is not unlike the challenge we face at Duke. The same pressures are there, but they may be more intense for you because of the intensity of clinical expectations. I heard it estimated by one of the doctors here that one might have about 10% of one's time available for academic work, teaching and research. In US institutions, the target for an academic faculty is that almost everyone would have about 20% time for something other than seeing patients, and

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the dedicated scientists would spend about 50 to 75% of their time in research.

What needs to happen here is a larger number of people who can support their salaries from research itself, so that you can have more physicians who have 50% or 75% of their time in research. But that is going to have to be welcomed by their colleagues. It would obviously be resented if it simply results in more work for the others. So you have to have some compensatory mechanism.

A special relationship has to occur between those who are almost full-time in clinical work and those who have more time in research. There has to be a sense of mutual respect and a sense of need for the other. If the busy clinician feels that the colleague who is very active in research is simply a slacker about doing his clinical work, how is that going to work? If on the other hand, the busy clinician sees the dedicated investigator as enhancing the reputation of the department, drawing a higher quality of residents and students into the mix, and making life more interesting with discussions of scientific problems relevant to work, that discrepancy in time allocated to clinical work would not be resented. There is also the obligation of the person who is doing the research – simply because they are the ones who are writing papers in the international journals, and being invited to the great scientific meetings, they cannot suddenly think they are superior to their colleagues. If there is that kind of attitude, it would further promote resentment. In fact, they have to cherish their clinical colleagues, because it is the busy clinicians who are creating the framework on which the scientifically oriented person can develop. So there has got to be this mutual respect.

There also has to be a supporting economic system. I have talked often about this in Singapore. Your government has invited the formation of the Graduate Medical School (GMS); if the GMS fulfils all its goals, but our graduates have no career paths open to them, to be a physician-scientist, then we have not succeeded. The whole system has to evolve. I am told that at present, there are some successful physician-scientists in the SingHealth system, but the number is small. It needs to be larger; the right number is what we have to determine in the future. The goal is not to have every physician become a world-class person of international distinction; that is not feasible. The goal is to have a good number to make the environment better for all. There also needs to be broad opportunities to become such a person – and as long as you are willing to make the right investments in time and the necessary sacrifices.

*SMA News:* I think we do respect these opportunities to create an academic hinterland in Singapore. How do medical leaders invest millions of dollars into research and clinician-scientists, and then measure the outcomes of such a venture? Certainly, it is easier to measure outcomes of the number of patients seen or procedures done on patients.

In the American system, the easiest thing to measure is money. We measure money on the clinical side: if you are producing a certain revenue stream relative to your expectations, you are doing well. And we measure money on the research side because it is a surrogate for peer review. We compete nationally for research grants, and the more successful you are in that, it means the greater your reputation.

There is at present, a competitive grant system in Singapore. It is small but it is my understanding that the government intends to grow that, and as that grows, the extent at which your faculty is winning awards would be a measure of success. Now, I would argue that counting the money is not the real outcome you want – it is a surrogate marker. The real outcome of research comes in four things.

1) Notable biological discovery.

I met a young man here on Outram campus – a head and neck surgeon – who is doing work that points to the possibility that stem cells embedded within head and neck cancers, which are insignificant within the population of tumour cells, are in fact the relevant cells

that you have to destroy with surgery or chemotherapy if you are going to cure the cancer. He wants to see if he can acquire data that supports the cancer stem cell hypothesis. If he can do so, that would be a notable biological discovery, and it would be published in an international journal of high competitiveness. It is not simply counting the number of papers or the impact factor of the journal – it is the impact of the discovery.

2) New technology that could be applied to patients, like a new diagnostic tool, a new device that one might use in the operating room, or progress towards new drugs.

When I evaluate our departments at Duke, one of the measures is generation of new intellectual property.

3) Clinical research that changed the way medicine is practised.

For instance, if you have led a clinical trial that suggested that chemotherapy agent X was better than conventional therapy and that changed the way people around the world practised, that is a win. And if the name of GMS was associated with that discovery, that is also a measure of research outcome.

4) People.

Let me give you an example from Duke. If I have a clinical department that has 50 faculty in it, I would expect that such a department would have approximately five individuals who would be people of international distinction. And if they have five more who are younger but on the track to do that, that would be about what I would expect. That would mean that the other 40 people are doing very good work but perhaps not quite at that level. And some number would be doing purely clinical work, because it takes a team. So I judge the department both by the success of team, in which everybody has an important role to play, and how many are emerging into the upper echelon, carrying our reputation. I think similar judgements could be made here. For instance, if you were the Division Director of Surgery, we should expect that there was some number of people emerging into international distinction.

*SMA News:* It is good that more opportunities are being created for local doctors. In Singapore, going into private practice is a very attractive direction to take.

It is the same in the US.

*SMA News:* So if a young cardiologist in Duke says that he has a good offer from a private cardiology practice, is he more likely to take up the offer, or is he more likely to stay in the institution? What is the percentage of fellows who stay in Duke as academics compared to those who go out into private practice?

As an example, we would have about 12 to 15 new cardiology fellows every year. On average, six to eight of those would enter private practice when they finish. The other half would enter academics; half of those would become people of international distinction in their research, and the other half would be members of an academic faculty who are more engaged in clinical work. That is about as good as any US place. The attractions of private practice are great and many would choose it even if they had been exposed to the highest level of research.

*SMA News:* And if you have big loans from medical school, it is even more pressing.

It is harder, and that is why we work to keep those debts down. Duke medical students graduate with half the debt, on average, of graduates of other private US medical schools. It is not because we take students whose families have money, but because they earn competitive fellowships that help pay their own tuition and living expenses, as a result of their research orientation which is the special opportunity given in our curriculum. We also have a generous financial aid policy for those who truly do not have the means.

The kind of person who aspires towards international distinction as a medical scientist would tend not to care what kind of car he drives. Everyone cares about such things, but if you want to own your own airplane, you have to go into private practice. If you want to have the most expensive car, and that is really important to you, do not even think of the academic path. On the other hand, academic doctors are still paid pretty well compared to the general population.

The other kinds of advantages that come from an academic life are intangible. Very few private doctors would have friends all over the world, be involved in the thrill of discovery, the joy of intellectual challenge and competition, and the joy of taking a student under their wings and watching him or her blossom under their care. So

The Duke philosophy, which we have been asked to bring to Singapore, is that our medical graduates will become leaders and scholars. What they lead in is up to them.

the rewards are different. And in fact, even in terms of money, the very successful people end up doing pretty well. Their salaries may be lower but they earn consulting fees, or they may start a biotechnology company. Several of our Duke graduates have become very, very wealthy because of some intellectual property.

I remember when I was a young doctor, doctors at Duke were paid very poorly – and they took pride in paying us poorly! I went to my chief and said he had to pay me more because I could not afford to put new tires on my car, whereas people my age, with the same training, had gone into private practice and were already owning their own airplanes! He agreed I was paid poorly then, but he urged me to be patient and trust the system, and that as I advanced, I would do fine. As things turned out, I did just fine.

*SMA News:* There would always be skeptics who regard the relatively short clinical programme at the Duke medical school as potentially inadequate – whether there would be enough clinical exposure, and whether this shorter course could produce solidly trained doctors. Of course, Duke pre-selects its students who are highly motivated and very intelligent. Do you think that is going to be possible here?

I do. Otherwise we would not have started the GMS here. I am told that the current students work like students. But the GMS students will work like residents. Moreover, they will be more mature and self-motivated. It does require a special kind of student. As you know, you do not really learn how to be a doctor in medical school, you just prepare; you really learn to be a doctor in your residency. We urge our students to enter the most intensive residencies, and we are told they do very well. They are sought after by all of

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the major residency programmes. We do not focus on standardised tests or coach them to do well on the national boards. But we do insist that they acquire the basic competencies appropriate for a medical student.

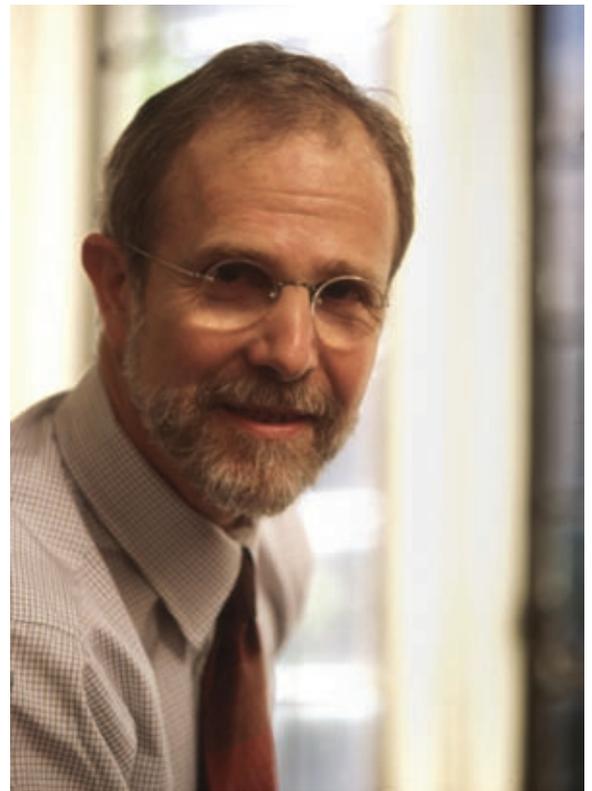
*SMA News:* If a student came to you with an undergraduate degree in political science and philosophy, and said he or she really wanted to be a medical doctor, what would you advise?

Well, that depends. The Duke philosophy, which we have been asked to bring to Singapore, is that our medical graduates will become leaders and scholars. What they lead in is up to them. We are proud that we have Duke medical graduates who are presidents of biotechnology companies or leading eye surgeons in South Florida, direct laboratories at the National Institute of Health, or become medical historians and medical ethicists. There are a whole variety of paths. So a humanities degree might be quite appropriate to add to an MD if your path is into health policy or the business side of medicine. But what we insist upon is that they show strong proficiency in the sciences. Out of 100 Duke students, we would have five or so who had majored in art history or something of that nature. And they tend to do very well.

*SMA News:* You have a strong humanities background, as do other medical greats like Nobel Laureate Dr Harold Varmus (President, Memorial Sloan Kettering Cancer Center), who was an English major; and the eminent man of letters and essayist, Dr Lewis Thomas (former President of Memorial Sloan Kettering Cancer Center), one of your heroes. Do you think being steeped in the humanities might make a better doctor?

I do. One of my great professors in medical school would, at the end of ward rounds, want to talk about Shakespeare or ask people what they had read. He very much encouraged medical students to develop the humanistic, as well as the technical and scientific sides of their lives. And I believe in that. Medicine is only partly technical. You have to connect with the spirit, as well as with your scientific knowledge and your proficiency.

Doctors are given a great privilege to observe the human condition. We see patients, and we are invited into the lives of people who, a moment before, were strangers. They reveal their most intimate secrets to us. We touch the most



*Prof Sanders Williams.*

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Doctors are given a great privilege to observe the human condition... Without humanistic grounding, I am not sure one can deal with that as effectively as if you had read widely and are familiar with what literature says about the human condition.

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intimate parts of their bodies. They reveal things that they probably have never said to anybody else. Without humanistic grounding, I am not sure one can deal with that as effectively as if you had read widely and are familiar with what literature says about the human condition. Plus it makes medicine more interesting to think of it in those terms.

*SMA News:* Running a big organisation is a challenge, and asking people to buy into a common mindset and vision must be a challenge. What are some of the qualities you think that medical leadership should possess?

The first attribute of a strong leader is to surround oneself with great people. In other words, build a fine team, and not try to do everything yourself. Find leaders of the units that make up your larger group who are outstanding, and let them lead while you support them, rather than try to be all things to all people. To me, great leaders build great teams.

Try to direct people to their passion. Do not take an individual and try to put a round peg in a square hole. Let them find what it is they want to do, because as soon as you try to force them into something against their own wishes, they will not perform as well. Some of my best successes as a leader have been finding people who were in the wrong jobs and bringing them to the right jobs.

Convey a vision and believe deeply in it so that others become drawn to it as well. You cannot be a leader, and look around and nobody is following! Whatever the rightness of your cause, unless people in the organisation likewise believe in it, you will not be successful.

*SMA News:* You mentioned something very provocative in your talk yesterday about having ‘mavericks with outrageous ambitions’ in any organisation, because they provide great creative value. How would you manage people like that?

With great difficulty! And there are limits. Part of what Duke has tried to do is encourage people to challenge authority and push for things that seem impossible. Some incredible successes have resulted from such things. But that does not mean that everybody gets to try out their crazy ideas all the time. For every one that becomes a grand success, 20 or 100 never happen. Be open to fresh ideas, and where you have someone with great talent or enterprise, try to create room for them to do something special.

But again, there are limits. My tolerance for mavericks does not extend to those who are dishonest or disrespect their colleagues. And I have, at times, had to get rid of a person

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who was greatly talented and who I admired, because they crossed that line.

*SMA News:* If you were sitting in your backyard in North Carolina, and had to think back about what has brought you the greatest satisfaction, or something that is really important in terms of what medicine and life is all about, what would that be? What is the driving force behind what you have done and achieved in your lifetime?

I suppose it is just the sense of being part of something noble and worthwhile. I like to get up every morning feeling like what I am doing has value to humankind, that I was part of something larger than myself, and that I was part of a great team.

When I first took leadership of the Duke programme in September, we had a retreat. We went around the group of faculty and asked everyone what it was that drove us to work so hard. Was it money? No, because we could be paid more doing something different. Was it fame? Well, some of us might become famous, but fame in medicine is pretty narrow. It is not like being a rock star. How many Nobel Prize winners could you recognise in a restaurant? I think it was two things. One was a sense of self-satisfaction that you were meeting your own standards for achievement. Second, that you had the respect, even if it was just a small number, of your colleagues whose opinions mattered to you; and that you respected someone else so much that you wanted them to think that what you were doing was of special value. Those were the two things that we decided were what drove us to such crazy work hours.

I also think about my family. Take care of your family. Even though I have always worked lots of hours, I have never thought it appropriate to neglect one's family. ■