

(1) Tell me about your background.

Well, as a child, I was an only child; never an ideal start in life. But I had quite well-educated parents: my father was an engineer, involved in water purification. And we lived most of my formative childhood in Scotland, in a small town on the west coast; very parochial, where they didn't much like the English, but it was interesting. Which led to my having part of my education at home, and then catching up rapidly at various boarding schools in Scotland and England. When did I decide to do medicine as a child? Well, I suppose when I was quite young, having decided first to be a parliament lady, and then thought that wasn't quite such a good idea as being able to get my own back on various GPs, who'd felled me into bed when I had things like migraine and measles, and I was very cross with them. And I think that's why I decided to do medicine. I think it was revenge on doctors. Don't know why I thought that would be revenge, but that was it. And then, oh, there was a lot of fun as a child, a lot of countryside. We were terribly hard up, because engineers were very badly paid, so everything one did, you certainly had to work for. And going to boarding school was a very great luxury, purely because I couldn't go to local schools; as an English person, I was most unwelcome. So, that's what happened, and I applied to medical school quite young. Very difficult for a woman, a girl - you weren't welcome in many places. And most of them wanted Latin, and I refused to learn Latin in my three years of proper schooling that I finally had, so I said "well, where can I go without Latin?" And London University wanted maths, and I was good at maths, so that was it, so it was London University. And I got in - I applied everywhere, got one offer, wasn't I lucky? That was the London Hospital Medical College, and that's where I went.

You say it was difficult for a woman. Did they actually require higher qualifications?

Oh, to get into medical school? I'm not so sure they wanted higher qualifications; they just didn't want you at all, if you were a woman. After all, it was the 1950s when I got in, and it was only 1948 that they forced every medical school in the country to take 12% of women. Mind you, they made the Royal Free take 12% of men, which must have been divine justice. And it was an interesting time to get in. Of course, I came from a co-ed progressive school, and, at interviews, I would be asked about my school. And I would tell them about this, and that killed me stone dead, in most of them. But not at The London, which was interesting. There, they asked me what my father did, and said "what branch of medicine was he in?", because he was Dr Boucher too. And I said "oh, he's not a medical doctor, he's a proper doctor. He's got a PhD, he's a water engineer". I think that was terribly cheeky, wasn't it? But they must have quite liked it, because that was the place I got. And that's where I eventually worked, and in a very splendid place to work, the East End of London; I was lucky, except that it made medical student life a bit exhausting. There were no hostel spaces for women, there were... my father couldn't afford digs, there were no, sort of, part-time jobs, in those days - certainly none I could have done. And so, I had to travel

from home, out in Surrey. And I spent over three hours a day travelling, for six years, which was interesting. And you had to be quite careful what textbooks you looked at on the trains. Quite a lot of them were not what your fellow passengers wanted to see, with anatomy and diseases, and skin diseases, and things. So, it was interesting.

(2) Tell me about your training.

Well, I did the statutory eighteen months of a second MB, having done my first MB at Queen Mary, where you did four subjects with the students doing those degrees. So, it was a very interesting year, with multi-disciplinary work. And then I went to the medical school proper - the medical college in Whitechapel - and did the basic sciences: Anatomy, Physiology, Biochemistry, Pharmacology, and so on. And then I did an intercalated BSc. My one was in anatomy, with a number of modules, which were mostly, of course, not anatomy, thank goodness. They were structure and function, which was really quite progressive, for the time. And then I went on to do clinical work, starting, I think, about 1954; three years' clinical work. And there, we had all sorts of fun, because we went through a three months' introductory period - something students don't get these days - in which we had more or less a week on every major field or topic, where we went from an introductory lecture of the sort of basic types of disease there are, and the sort of things that are common in this system. And then you went on to learn how to... what the symptomatology is, how to take histories, how to examine people, starting on each other as normals. And finding a few oddities in each other, of course, which was terrifying - quite exciting. And then, going on to see patients and think about diagnoses. And you really, by the end of those three to six months, you knew an incredible amount of medicine and surgery. There wasn't as much communication skills, but, of course, every single bit of work, you were supervised and taught by really quite experienced people, who'd come back from the war, and so on, who were dedicated to it. And you learned how to communicate. I mean, I remember, as a student, being shown someone with a murmur, and it was the first murmur I'd heard. And I stood up from listening to this, and said "gosh, that's a good one". And this man said to me "what do you mean, a good one? How would you like to have it?" And I learnt about communication skills the hard way. I was so ashamed; I wanted the floor to open. I think that lesson stayed with me all my life; terrible thing to happen, but I expect everyone's done it once. Terrible, but there you are.

And what did you learn about diabetes?

Ah, well, diabetes: you sort of had heard of it, before you got to the wards. But really, I kept coming across it. In general medical attachments, to a firm, it so happened, one of the two consultants, I was attached to, did diabetes as an extra: Dick Bomford; he was absolutely splendid. And he was marvellous with people; he was good with his patients. And what's more, he did things like fitting in with what they needed, and wasn't that an early thing to do in the fifties? He would run clinics at funny times: he did a Saturday morning; he did, I think, an evening clinic every week, as a routine. And nobody thought

anything unusual; it was just marvellous. The only person in the hospital, I think, that did. And it was interesting, because years later, when I became a physician at the same hospital, and developed an interest in diabetes, rather by accident, the first thing I wanted to do was to see the patients outside their working hours. Because they had it for life, why lose all this time off work? And I was never ever allowed to set up such a clinic; the management wouldn't have it. So, of course, now it's the great new thing, isn't it? Try and set up user-friendly diabetes care. And suddenly it's happening again. You have to laugh: fifty years after I saw it working superbly, it's come back, and just as well. But how long things take; quite shattering.

(3) And how were the patients looked after, under Dick Bomford?

Oh, my goodness. Looking back on those days, it was different. They learnt about carbohydrate exchanges, line diets - you know, so many lines and each line was ten grams of sugar or carbohydrate. Gosh, that seems amazingly complicated. How did people ever pick up what to do? And, of course, when I was first a student, it was thought that you must eat absolutely mountains of fat, so as to avoid eating too much sugar. And lots of protein and cream and butter: fill yourself up with them, it won't put your sugar up. And I'm looking back on that with total horror, because, of course, the extra risk of heart disease and lipid-related disorders. The harm that must have done was horrendous. But, of course, these are the days - insulin had come in in the twenties - people were now living. There were people who had... I saw some of the first 'fifty years on insulin' people, during my time as a student and a young consultant, and so one began to realise that the complications of diabetes were not inevitable, they were due to bad control. But it was... it took an awfully long time to see any of that happening, so patients had a terrible time. And there was all this business of you could only test the urine for sugar, you couldn't test blood. So, all the urines that you tested were looking at what had happened previously. And trying to teach patients - still one of the most difficult things there is - that the urine test doesn't tell you what to do now, it tells you what you should have done before your last meal, or treatment, or whatever it was. And having to learn what we eventually called reverse testing was a difficult concept to teach people. You had to take them through it. And I saw some horrors on the wards, because of this - even when blood testing came in - with people thinking "a high sugar now means I must give a big wallop of insulin", whereas, in fact, that was not required, because somebody wasn't going to eat a meal. And I've even seen one inpatient, at the London Hospital, die as a result of misunderstandings of that sort, when I was a consultant, so that was in the seventies onwards. Pretty horrendous; I hope it doesn't still happen. But treatment was really difficult. Insulin was a beastly business. To inject, you had to sterilise needles, re-use glass syringes, they were heavy, awkward to carry, the insulin was in heavy bottles. Everything was awkward, and the home-testing was urine. And gosh, even - now I come to think of it, in my student days, and even when I was doing resident pathology, when I first qualified after my house jobs - doing a blood sugar meant boiling things in a test-tube. And doing a urine test meant boiling the urine,

now I remember it. Good grief, no dipsticks. You had to put it in a little glass vial, and you had to have a little spirit lamp, or something, and boil it. And if you weren't very clever, two awful things happened: either the glass shattered and you'd cut yourself, or you got the top of it, it boiled over, and your fingers burned. It wasn't funny. I mean, think of patients trying to do anything useful with methodology like that. It was appalling.

(4) Can you spell out what reverse testing meant, exactly?

Oh, well, reverse testing eventually became - particularly with the American diabetologists - the standard way of teaching to patients - people with diabetes - how to understand what they were doing. For example, if you were testing your urine in the morning, and there was sugar in it, and you were testing it at night and there wasn't sugar in it, then instead of saying "oh, I don't need any insulin at night, I only need it in the morning, because I've got sugar there in the morning", you have to learn it's actually the other way around. If there's sugar there in the morning, you didn't have enough insulin at night, and 'if there's no sugar there, sort of, before the evening meal, then you did all right in the day; you'd had enough insulin. So, I think it was Sutherland, in the States, who started this. And it was a very simple concept: Learn to realise, if you're doing two tests a day, morning and evening, before breakfast, before supper, the test tells you what to do for the insulin the other way round. The morning test tells you the evening dose; the evening test tells you the morning dose. I think it was the first big advance in trying to help people to get a more normal blood sugar without knocking themselves out with hypos. And it was an understandable concept. And so many concepts people tried to ram down the throats of people with diabetes were not comprehensible, but that was quite a helpful one. And if people - even if they didn't quite understand the physiology - they could understand the usefulness of it, and do it in a sensible sort of way. First time that patients could begin to be able to see how to adjust their own treatment. Of course, the next big excitement was seeing oral treatment come in: tablets. And people with, you know, the so-called Type 2 diabetes, were thought then to have mild diabetes. Great joy for them if they didn't have to a) starve, or b) have insulin injections; they thought they were home and dry. Of course, they weren't, because most tablets either don't work very well, or don't work very long in a person's lifetime. And so, I'm not sure that actually changing over to tablets, which I saw big-time, was terribly helpful to the control of diabetes. And, for an awful lot of people, it meant that for many, many years, they were poorly controlled, and they had bad complications as a result of it. And also, it led to generations of people with diabetes feeling they didn't want to have insulin, because there were tablets. And looking back at it, over fifty years of this, maybe we'd have done better for people if we hadn't had tablets. Now there's a reactionary thought.

What else did you learn from Dick Bomford, while you were a student?

Well, apart from the obvious efforts that he made to fit in with what the patients needed, which you didn't see from many other physicians, at that time, in other

disciplines. And the fact that he talked to people like a human being; that he answered their questions; he didn't stand on a pedestal; he was there for them. That was way ahead of his time, really. Although, I'm sure, there were other physicians, over the years, who had those qualities, he stood out for having them. He was accessible to them, too. I mean, they could ring up or call in, and ask things. He communicated well with GPs, and involved them in people's care, and what the plans were. I just thought he was really quite a special doctor. I mean, going round the wards, he had his glasses slipped off his nose, and he had a smile on his face, and his white coat was sort of a bit rumpled, and he would sit by the patient and talk. And again, not many people did those things; it was nice. And, of course, he later became, I think, one of the radio doctors, you know, that did this early morning "here's the radio doctor on the BBC to tell you about...", answer your health questions and things, and talk about healthy diet, and latest advances that might have been in the papers. All those things. I'm not sure what else comes to mind. It's just those qualities, somehow, as a communicator and as a physician, and putting the patients first. So, it was quite special; it was a good example. There were some physicians, as a student, that I worked with, who would have taught me to come in in my Rolls Royce and shoot my cuffs, and talk over the patient's head. And I'm glad I saw Dick Bomford, when I was a student; it was useful.

(5) And what was an outpatients' clinic like, when you were a student?

All outpatient clinics were in a huge, vast cavern of a building, a bit like an aircraft hangar, with huge rows of benches for people to wait on. And the clinics were busy. I remember that for most clinics, and probably also the diabetic clinics, there wasn't a very good appointment system - sort of first come first served, if you were lucky enough to have notes to see the patients with. And you just went on seeing patients, endlessly, until you'd finished. I know, personally, as a very young doctor, when I covered for other people, you went to do the clinic - you were always being asked to do it, because other people didn't want to, because you were there till you finished - and you might start at one thirty, and finish at eight thirty at night. And you'd seen the last patient, you'd done your best, and people didn't actually punch you in the face for keeping them waiting so long, because, at the end of the day, when they got to you, hopefully they got what they needed, or what they wanted, out of you. And a bit of a wait was, by the time they got to you, somehow or other, one made up to people for it, and certainly Bomford did. And I used to like to think that I did, although I think everyone around us went mad, because it took so long. Crazy system. And because we had no community back-up, you actually had to do it in those clinics, or it didn't happen at all. Education: teaching people what diabetes was, teaching people what they needed to know about themselves, trying to help them with every day to day problem. You know, "last week, so and so happened", and then you had to have a conversation: "Well, what were you doing, then? What had you done the night before?" you know, "What time had you had supper? What did you eat? What did they cook for you, when you went out for dinner?" All those little details, which, these days, you see specialist nurses, hopefully,

winkling out of people and helping them sort themselves out. We had to do all of it. And so, you can see why, later on, I was particularly glad that I was able to be instrumental in getting, I think, virtually the first diabetes care nurses in the country appointed in our district. We certainly needed them. Because I loved doing that, it was the best part of diabetes care. Watching Bomford do it was an eye-opener: helping people... using their lifestyle, and adjusting their treatment to their lifestyle, and teaching them what pitfalls they needed to avoid was really, really constructive. It wasn't exactly top science, but it was certainly good patient care. But, yes, it was horrendous, the time that it took, the waiting people went through, the... I mean, people were having hypos in the clinic, because they'd waited too long. That was horrendous, too. "Come and see so and so, he's having a fit" - a young man of fifteen, I remember, once. And I was saying "oh, good gracious, no he isn't, where's the sugar?" And, of course, by that time, it had to be intravenous; and that was terrible, too. We didn't have Glucostop you could pop into someone's mouth, if someone couldn't drink and couldn't eat. You actually had to inject intravenous glucose: 50% glucose in a wide-bore needle, from a glass syringe. And it would take minutes, with a row of people holding someone down, because people can be very violent when in hypos. Quite extraordinary. And that was terrifying to see that happening: because they'd been waiting in outpatients. Scandalous.

(6) What other staff were there in the clinic, apart from doctors?

Oh, equally dedicated teams of people who helped, but, of course, they also had to queue up the patients to see these people, and they were there all hours, too. Dietitians: they were actually very expert, and spent a lot of time with people, teaching them about how to adjust their diets, and finding out about their lifestyle, and... rather than ordering them to eat this, that and the other thing. And I saw the transition between two types of staff: the formal dietitian, who told them what to do - none of which they could do, because the times were wrong, their jobs were wrong, and they couldn't afford what was recommended - to those who listened to what they normally did and suggested a few tweaks. And that took time. So, yeah, I can remember several of them; lovely people.

Was that transition during the 1950s, when you were a student?

I think it probably was more sixties; fifties, sixties. But, no, there were some very good people. It's just I didn't see them at work, as much, as a student as I did later. But the chiropodists were excellent. They, too, they had come into the scene well by the time I was a student, in the fifties. And I think they were busy dealing with small lesions in the feet, and avoiding big trouble. Terribly important. When we set up shared care, we had to re-introduce all that, because it had more or less got lost. And, of course, a lot of young chiropodists coming in wanted to do the big stuff, the heroics. The older people, some of whom I remember well - people like Miss Mercer, who's no longer with us - she was a marvellous woman. I mean, she might have been quite fierce with patients, but she would deal with anything, however trivial, because she knew what it would avoid. And you would get her to see anybody whose feet you felt might

be threatened. It was interesting. They all ran in separate sections of the clinic. They weren't... it wasn't a sort of integrated throughput from one to the other - it was more of a scrum, to be honest, to get seen - but it did happen, and it was quite good care. And I think a lot of it was because Dick Bomford had made sure that these things were in place for his clinic. Of course, in those days, if the consultant said he needed something, on the whole, if you were lucky, it tended to happen. There was a luxury that's long gone, and thereby hang one or two tales from my early consultant years, of the politics of trying to get things to happen for patients; very interesting.

(7) What experience did you have of obstetrics, as a student?

In those days, we did two or three months, I think, of obstetrics, based in the hospital. And then you went out and did two or three months in a district hospital, with some outside obstetrics in the community, which was very interesting to be able to do. Quite fearsome in Whitechapel, in people's homes, and boiling water and no space, and goodness knows what. But the thing... my abiding memory, if you're thinking about the diabetes side, was in the London Hospital, where we did a lot of deliveries, and we were there for weeks on end. And my abiding recollection of this time - apart from the first healthy baby I delivered, of course, and I still have a cutting from the Telegraph of the announcement of this birth, because it was quite a posh couple, whose first baby I had delivered, by chance - my abiding memory is of trying to be there, as a student, not allowed to tell the patients anything, and can't answer their questions, but trying to comfort them, sitting there with dead babies in their uterus, or having just delivered stillbirths. And who were these women with dead babies? They were the people with diabetes. And this was a completely horrifying eye-opener. It was the era when obstetric mortality in... neonatal mortality from diabetes was still horrendous; about 40%, which was terrible. And these were shocking things to see in young people. And, at the same time, of course, we also saw women who had the most appalling diabetic complications, because insulin-treated diabetics, they'd been kept alive on insulin, and I don't think people had realised that that wasn't enough. It was just beginning to be realised, in the fifties, that you needed a good sugar, not just not to be ketoacidotic. And these women in pregnancy, some of them went blind, because they'd got bad retinopathy. And it was later realised that retinopathy could get a lot worse in pregnancy, and nobody knew to look for that. And there was no laser treatment, such as you'd hear of now, to protect the eyes. So, we saw people go blind, we saw people go into renal failure, because of renal damage, and we saw also pregnant women come in acutely with ketoacidosis, in coma. And there was nothing like having ketoacidotic coma to kill the babies; they would die within hours. It seemed to me, of having ketoacidosis, it was an absolutely disastrous complication. And then, they would sit there with this dead baby. Delivering macerated babies was an appalling experience, when you realised that this was all - or should be - avoidable. So, I didn't think anything of it, as a student, except regard it with horror, as part of life's rich tapestry, but with horror. But, looking back on it, I often wonder if that's why I became, sort of willy-nilly, lured into doing diabetes

as a speciality. And when I did do it as a consultant, one of the first things I did, along with Wendy Savage, who's quite a well-known name in obstetrics - she and I both had beds down at the Mile End branch of The London - we actually set up one of the very first shared care things in our district. Of course, by then, King's had been leading the way on looking after pregnant women, and keeping both the mothers alive, and also the babies - reducing mortality. And there was a bit of evidence to help us do it. But I think, looking back, that must have been in my mind, when people kept pushing me into doing diabetes. And nobody ever, as young doctors, wanted to do it, because it was so time consuming, and it wasn't what you might call high-tech, it was more people skills. But I always gave a lot of time to it, in my career, and I think those memories from my student obstetrics must have had an influence on that, though I wasn't aware of it at the time. But, I suppose, distance lends insight, and perhaps it was relevant.

(8) What did you do after you qualified in 1957?

Well, I did a year of house jobs - six months medicine, six months surgery - and, of course, diabetes was pervasive in all the... both jobs that I did. You kept meeting people with problems from diabetes, but enough of that. Then I did nearly a year of resident pathology jobs: six months in a laboratory, where I did the duty technician's job. There weren't any technicians; I was the doctor on. For six months, I did alternate nights and alternate weekends, non-stop, cross-matching blood, doing blood sugars, doing blood chemistry, plating out CSF, plating out things... bugs. Absolutely horrendous job. Cross-matching blood, as an untrained person, trained in two hours; horrendous. I have recollections of that time that I wouldn't dare tell anyone: I might be sued, even after fifty years, for the standard of service that was being offered, at the time. But every hospital did the same, at the time. Anyway, I moved on and did morbid anatomy, which was tissue diagnosis and post-mortems. I did not enjoy that one; it was terribly boring. So, I went to Professor Wilson, who ran the academic medical unit, and said "I can't put up with this, I'm not happy with it. I want to do medicine as a specialty". And "how should I set about it?", because I was a woman, and there weren't too many of us. There were six out of fifty, in my year, and most of them wanted to be GPs. So, I said "I want to do medicine, how do I set about it? Is there any hope? I certainly can't do surgery, because no woman would be allowed into surgery, so how do I do medicine?" And much to my astonishment, he offered me a junior clinical lecturer job. And it was during those years that I met my husband, who was a fellow student. And interestingly, he later became the Professor of Medicine. So, that was an interesting time. And he had me there, and I worked for one of the consultants on the medical unit - one of the professors. And I was also attached to Dr Stuart Mason, a marvellous man, who did diabetes and endocrinology. And, in addition to my normal training, therefore, for the years that I had, I worked for him. Now, when Bob and I - he was a lecturer on the unit as well - became engaged, of course you couldn't stay in the same firm, so I looked for an NHS job. And I was lucky enough to get an NHS registrar job. But, to retain my attachment to Dr Stuart Mason



in diabetes and endocrinology - which is how, I suppose, I got pushed towards doing diabetes - I did my clinics with him, of course. But everyone around the hospital, who also did clinics for the other consultants, was always asking me - even when I was doing the pathology residence - would I... could I help? They had so and so to do, would I do their diabetic clinic? So, right from post house jobs, I was doing diabetes care, intermittently. And, of course, I saw a lot of diabetes with Stuart Mason; I learnt such a lot from him about diabetes. Things like the funny presentations of hypos, and things like helping the patient see that they needed to look after themselves. And that, I suppose, was the basis of one's approach in later years, which was: the patient's lifestyle comes first, and how do we help them adjust their diabetes to the lifestyle - which is now the current approach. But I think we got there a bit earlier than most, because he was, if you like, the successor to Bomford. When Bomford retired, I was with Stuart Mason, so that was very interesting. And I did some research with Stuart, which eventually led me to do some research on diabetes. And, after he retired, I did a senior registrar job, and that was still with Stuart Mason. And then he retired, and I, when I was appointed... I was appointed in 1970, as a consultant, to work in general medicine, with a special interest in radioisotopes, interestingly. But radioisotopes meant nuclear medicine for diagnosis - like X-rays for diagnosis, radioactive substances for diagnosis - and radioimmunoassay in the labs, which was measuring all the endocrine hormones, and things like insulin. So, there I was on diabetes, again, and I got involved in diabetes research.

- (9) Before we get on to you becoming a consultant in 1970, do you have any memories of diabetes care in the 1960s?

Well, it was always a big part of my job, because of working for Stuart Mason. I always did a clinic, and, of course, the other big thing - oh, there were big things - the other big thing was that the general medical firms on take took in all the emergencies, and this included huge numbers of diabetics. The common problems - and this time I was in the front line seeing them, rather than boggling at what was happening as a student, I was looking after them - the big problems were hypos; we had a lot of people in with hypos. And the trick was - of course, now, they'd be treated and sent home as soon as they were right - we used to admit them, which gave you a little chance to talk to people about why they'd had these hypos, and hopefully to help them to avoid future ones. And that was terribly valuable. This sort of developed as a skill. And the other big thing was to see the treatment of ketoacidosis change. I remember, now, that in the early years, you treated ketoacidosis: you gave insulin, a great wallop of insulin - fifty units intravenously, and fifty unit subcutaneously - and intravenous saline. And then, maybe, when you'd knocked them from one coma, from diabetes, to another hypo coma, maybe you'd put some glucose in. And towards the end of the sixties, that had been somewhat rationalised, because people were killed by this regime, there's no question. Far too much insulin. The big danger, as we saw it, was that the intravenous insulin - all right, if it worked quickly, you knew what was happening - but these patients were dry, and they didn't pick up the subcutaneous insulin until you'd re-hydrated them. So, hours after you thought

they'd recovered from the high blood sugar, and they were rather better, they would be, sort of, knocked off again, and drifting away. And this would be with a low sugar. Now, we had no bedside testing for blood sugar - you couldn't do it quickly - and if you tested the urine, it would still be full of sugar from the severe episode. So you're completely misled, and people would have severe hypos for far too long, and some got brain damaged. And the big advances were to get rid of the subcutaneous insulin, in the acute treatment, and to give small boluses regularly, and eventually to be able to give them hourly; although, at that time, that was still very difficult, when I was a student - that came in later. But at least it was appreciated that you... this wasn't a very good regime, and it got modified. And that was important.

(10) And what about the treatment of Type 2 diabetes?

Well, it's hard for me to sort out whether the treatment of Type 2, with the introduction of tablet therapy... I think it began in my later student days, or house years. But it certainly got going, in a big way, in the sixties, when everyone felt that these magic bullet pills were going to be the answer for Type 2. And we saw them come in: the Tolbutamide, in the early days, and then the great excitement with the long-acting sulfonylureas. And everybody thought patients will love this, it'll be marvellous for them. Chlorpropamide, once a day, instead of Tolbutamide three times a day; isn't that marvellous? Well, you might think so, for patient - how lovely to take one instead of three, but it was very long-lasting, and, particularly at night, people would have hypos. Now, we know there were some deaths from that, and we suddenly began to have a lot more admissions, because of long-acting Chlorpropamide. So, you had to start people having to eat more at night, so they began to be able to have great trouble trying to control their weight. And it wasn't all, you know, it wasn't all coming up roses, with the tablets. And the other really big problem with tablets was when the biguanides came in. Phenformin was the first, and this was quite useful, because it didn't make people put on weight, didn't increase the appetite, didn't produce severe hypos in the night. So, people were pushing the doses of this Phenformin as a twice or three times a day treatment to ameliorate high blood sugars in Type 2. And that was fine, until it was realised that we were suddenly seeing a lot of people coming in with really very severe acidosis, and not necessarily with ketones on their breath. And this was lactic acidosis. It took a while to be recognised; an absolutely horrendous problem. And it got... I think it got sorted out rather in the next decade, but it became apparent, as a problem, as we looked at patients coming through, acutely. I don't know what chaos it produced in people's homes, but it was obvious that it wasn't working as well as it should. We were seeing terrible complications, in Type 2 diabetes, increasingly filling the clinics, and filling the wards, and filling the beds: things like ulcers and renal failure, and so on. And it wasn't the answer, but, of course, the big thing was that patients thought they didn't have to have insulin, with the tablets around. And I think a lot of doctors thought they didn't. And my recollection of the late sixties, and my early years as a consultant, was that I came in to the team, officially, as it were, at the end of my trainee years, fairly

convinced by the literature from America, and from King's and places, that good control of blood sugars - blood glucose - was worth its weight in gold. Pregnant women, they stayed alive, their babies stayed alive, and were fairly healthy, and not too huge. And that complications, certainly experimentally in animals, could be reduced by good sugar. And I came in, from my late training years in the sixties, to my early consultant years, as a convert to having a good blood sugar. And I wasn't a very welcome animal around the patch. Not all patients thought this was a good message, and certainly lots of my fellow consultants thought it was nonsense. The older diabetologists had always thought that complications would happen, whatever you did with diabetes. It didn't matter what the sugar was, so long as you didn't die of ketoacidosis. And they had a fair point, having seen people die within a year, with Type 1 diabetes, when they were in training. Good gracious me, of course they did. But we knew better, by then. And so, my early years as a consultant, doing diabetes as a small part of my work, the major effort was to get that message over, and do something about it.

- (11) Before we get on to your becoming a consultant in 1970, I'd like to ask you a question which I ought also to have asked all my male interviewees, and that is, how did you cope with having a young family, in the 1960s?

Ah, that's interesting, isn't it? It was no more of a problem than coping with being a woman in medicine in general, I think. It was part of the picture, a standard problem. I had my children when I was thirty and thirty three, while I was a senior registrar. It was interesting, because I was interviewed for the senior registrar job. I was three months pregnant, then; nobody knew. I was offered the job, and I put them on the spot; I rather enjoyed this. I said to the panel "I think I would love to have the job, but I think that I should tell you that I am three months pregnant, and would need to have the standard maternity leave. And if you would rather I didn't take the job, I won't accept it". That put them on the spot, so they had to have me; they had to put up with me taking my maternity leave. And so, once we had the first child, it wasn't quite such a problem having the second one, because by then, we'd had to live in a house with an extra bedroom, to have someone living in. We had somebody living in with us for sixteen years, which was not altogether sweetness and light, but it was interesting. We met a lot of very nice people; had one or two disasters. But the real secret to being able to go on working was that neither I, nor Bob, my husband - who was, by that time, a consultant or senior lecturer on the academic medical unit, later becoming, as I said, the Professor there - we both took it absolutely for granted that I would go on working. It wasn't even a topic for discussion; it was simply a question of how do we organise things at home? And we had lovely people helping. And once the children went to school, and were enjoying it, that was fine. And the secret appeared to be that, at night, from when I got through the door, or Bob got through the door, we were it: we were looking after them and playing with them. And in the night, if they woke up, it was us, not the carer. And the carer had time off in the day, when they went to school, to do other things, and everybody seemed to be quite happy. And it's interesting: you know, you look back and think, well, was it a wicked thing to

do for the kids? A lot of people now think you shouldn't work full-time. Well, ask my children. My son takes it for granted that his wife will work, and she's a senior sister in casualty, near here, near Portsmouth. And our daughter thinks it's horrendous and doesn't work, and she's trained in medicine, as I did. So, it takes all sorts. It was right for us, our kids survived it. I think our daughter didn't approve, but I don't think she suffered for it, which is interesting. So, we managed. And there were one or two disasters: a broken arm here, where I had to rush home; an infant son, where the carer, who was acting temporarily for us, rang up and said "oh, your son, he's having a fit". So, "God, a fit, aged six months?" And I took a history over the phone, decided it wasn't a fit, but drove home like a bat out of hell. This woman was doing a temporary job. She was the vice principal of a nanny training school - I'd better not mention which one - and she was bathing a six month old baby - or even younger, if I remember correctly - in a room that was freezing cold, and the water wasn't very warm, and he was shivering with cold; bright blue, just shivering - he wasn't having a fit at all. So, I had the fit, then. But that was one of the worst episodes we had, and I suppose we were lucky we got away with that one. But it just seemed the right thing to do; I wasn't going to waste that. And what would I do when the children left home? Indeed, what would I have done when the children left home? I went on working; I was of some value to the community, I like to think. I'm still involved with quite useful research, and I would have lost all of that, and been a perfectly horrible mother. And I think I would probably have hit the children, if I'd been home with them forever, because I wouldn't have been happy. But who knows? Everyone's different. It was right for me, it worked for us; not for everybody.

(12) So, now, moving on. What was it like when you became a consultant, in 1970?

A good question. It was gratifying, after a long time training, managing to get to be a consultant. I think I was the first female physician at the London Hospital, and that was quite gratifying - I'd got there. Now, of course, your troubles begin, and there were troubles. It was interesting; that's a good word, yes. There were many senior consultants who never spoke to me, from the day I was appointed to the day they retired, because they didn't approve of women in medicine. One of my ex-bosses, who I'd trained with, told me, when he retired some eight years later, he came up to me at his retirement party, and said "you know, when you were appointed, I was horrified. I didn't think women should be made physicians". And he said to me - I so appreciated it - he said "you know, I was wrong, and I thought I should tell you so". And I thought that was the only decent thing that any senior consultant said. I can remember being called in to the manager's office, when I was appointed, and I thought "oh, he's going to say something nice about my getting the job". And he said "huh, I see you've got this job. You've been a locum at the Elizabeth Garrett Anderson. What level was it at?" So I said "consultant". And he said "right, you get three years' seniority on your salary". "Fine", said I. And he said "and by the way, the loos in the consultants' sitting room, you can't use them. They're for men;

they're not suitable". "Oh", I said, "right". And I didn't even think to ask what tools I could use. Never mind. That was a good start, wasn't it? But it was very rewarding. It was fascinating, having a team to look after the patients. It was very interesting, as I eventually - as people retired, who did diabetes, like Stuart Mason - I found myself not only running the immunoassay lab, being the medic for nuclear medicine for the next fifteen years, but also running the diabetes service. And it was developing the diabetes service that was, in the early years - apart from research - that was really, really big-time push to get things to change. Because it was attitudes, as I said earlier, to persuade people that a good sugar was worth having; it wasn't simply the big issue of not going into coma for any reason. And also, how to do it. And I found myself doing my general medical - acute medical - work for a long time, after appointment, at the Mile End branch of The London, where Wendy Savage was doing her obstetrics, at the time - of great fame, for other reasons. And we decided to set up a joint, shared care clinic, which was interesting. And, eventually, I ran one with her down at Mile End, and one with the obstetricians up at the Whitechapel end. So, I was doing it at two places, and that was very, very labour-intensive. The problem was, to help people get good blood sugars now, we had one clinic a week. So, the pregnant ladies would come up, they'd have a blood sugar done in the lab when they arrived, and then they'd have one done at the end of the morning. So, you had one sort of after breakfast, and one before lunch, which gave you a bit of an idea of how the insulin at breakfast was doing, and maybe what you should give at lunch time. But not much idea for the rest of the twenty four hours. And, of course, the poor women had to wait about for hours, often with their small children, and... waiting for the blood test results, so that at lunch time, you could have a quick word with them, outside the clinic, tell them what it looked like, what needed doing, work out what to do with them, and off they went home.

(13) How did you approach getting patients to take care of their sugar levels?

Well, it became obvious that what was needed was a lot of time and effort, with the individual person, so they became a very effective member of the team. Over my training, and sort of early years in medicine, it had become obvious that I was only a help to patients who had problems in management, because of what I'd learnt from other patients. And that's how I learnt. These things weren't in books, nobody had written them up, at that time. So, what we needed was a system whereby people could become very experienced, and pass on tips or you let patients bat their problems against somebody with experience, so that they might get the solution out of them. Now, I, and people working with me, we couldn't work seventy two hours a day with patients. That's really what it needed; it needed somebody full-time. So, it became apparent, what we really needed to do was change the way the system worked. It had to be related to... organised around the patient. And towards the end of the 1970s, not just trying to do more in the clinics, which got more and more demanding. I mean, I would be there till eight or nine at night, with a lunch time clinic, while the juniors had all gone home, because the patients had said "I want to see Dr Boucher". Now

I'm not boasting about that, it was nothing to be proud of; it was to be ashamed of. It meant that they weren't able to get what they needed out of the junior doctors, because they didn't have any experience, so they wanted to speak to someone who'd seen it all. Fair enough, but that was a lousy system, wasn't it? So, I thought, and a number of us thought - and I had a most enthusiastic junior team, people like John Yudkin, who's now professor of diabetic medicine at UCL - and we set up a shared care system. And it would never have happened without John. We surveyed a lot of patients. It was about that time we had... I'd been involved in setting up one of the first rapid methods for measuring glycosylated haemoglobin for average blood control, with Simon Welch from Biochemistry. And we published a paper in the *Lancet* on it, in the late seventies. So, we surveyed fifteen hundred clinic patients, and the level of control was abysmal. I mean, the proportion of people who had a satisfactory sugar was negligible.

- (14) And so, it became apparent that we needed to go out to the patients, and not rely on people coming to the clinic, because it was clearly inadequate care. So, we got a lot of GPs involved, and we set up a scheme where we put on a computer base all the GPs' patients - and some of them were seen by the GPs, some came to the hospital - and we appointed the first specialist nurses. Margaret Fisher, who was absolutely brilliant, joined us early on, and worked right through until, in the nineties, the management system eventually didn't work for her, and she moved into another area. But she was absolutely superb. And she trained others, and she acquired - and her team acquired - the sort of experience that I'd built up - sort of part-time diabetes, over, what was it, twenty years, nearly - she built up in a matter of three or four years. And she, and her team, were then able to offer round the clock advice, and even, on some cases of pregnant women and difficult patients, telephone advice out of hours. So that we had a system. And all the information went into a central record, so that we could see how the average haemoglobin A1c was doing, and we could show some improvement over the years. And we eventually published a paper on that in 1984. And this system was up and running as a pilot. And the annoying thing was that when we wanted to extend it across the district, at that time, there wasn't the money. And it went on running. And many years later, after Graham Hitman - now Professor Hitman, who runs diabetes and metabolic medicine at The London - came on side, and computer technology had improved, and the tide was turning for diabetes care - people were realising it was an epidemic, with enormous financial and economic and social implications - and finally some money was being put into it. So, we were offered a decent system. And luckily, before I retired, we had a proper computerised base, and a fairly district-wide service. And when I... by the time I retired, it was being extended really pretty widely, and glycosylated haemoglobin estimations were being used everywhere. So, this... it was interesting. It went from the GPs being very involved with my small study, to finding they were overwhelmed and would rather leave it to the hospital, to getting a proper system involved with incentives

for GPs, across the country, and seeing the sort of thing we were doing small-time, 1970s, '80s, rolled out across the country. Now, I don't know what it says about medicine, that you have to bribe people to tick the boxes to do these jobs. But, if that's what it takes, so that people with diabetes get the advice they need, that's fine. But there was one aspect of it, I think, that hasn't worked well, and that was the specialist nurses were then expected - and I think that's what finally broke the back of the job for Margaret Fisher - they were expected to go out and train practice nurses in an afternoon, to do what they did after years of experience. No more could I have left a medical student, after one diabetic clinic, trying to look after people with complicated diabetes. No more could she want to see her nursing colleagues go off, and try and do the same thing that she'd been doing, after one afternoon's training. I think that's what actually made her leave, between you and me, and I hope I'm not offending anyone by saying it. But it was upsetting to see. But, despite all the ups and downs, and the unpleasantnesses along the way, I think care has improved immeasurably, when I look back to how it was. And it is getting more user-friendly. There are, at last, as I mentioned earlier, beginning to be the odd evening clinic - "goodness me, we must have an evening clinic"! I mean, I laugh, but really I could cry, because I tried all my career to have evening clinics, and was barred. "We can't give you the nurses to support it". Marvellous. Oh well, then do it outside the hospital, and do it properly. Hospitals, perhaps, should be abolished, I'm not sure. Certainly for diabetes, perhaps they should.

(15) Any more memories from the 1980s?

Well, one problem that I do remember, with some glee, was trying to improve the pregnant women services. When we started, as I said, we had to have lab tests done, and then wait and wait. Or maybe, sometimes, if women had to go home, I'd ring them up after lunch, and I'd sit down with my list of numbers, and ring all these women about what the lab said their sugars were. And eventually, of course, along came the very first hand-held meters for doing a blood sugar on the spot. And I heard about these from our Professor of Surgery, who was using them for some work on dogs' livers. And I read about them, and I'd seen one at a meeting, and they looked very good. And I thought "that's what we need in the diabetic clinic for the pregnant women". So, I went to see the then management boss for the hospital at The London, who I won't name, and said "I think we desperately need a couple of these - you know, one to use and one in case it breaks down - so that we can actually give these poor women the results". And I told him the problem, and he ummed and ahhed, and said "oh, we couldn't afford it. No, couldn't possibly manage that". So, we had a discussion, and in the end I said "oh well, all right, you can't do it. That's a pity. I'll have to see if I can raise some money; go to charity for it". So, I went towards the door, put my hand on the handle, turned back to him and said "it's an awful shame you can't manage one of these for all these pregnant women, when I know the Professor of Surgery has four for his work on the dogs".

And I turned round and went out of the door, and shut it very gently behind me. And this was my first lesson in hospital politics, I think, because I got a note, two days later, saying that there was the money there for two of them. And that transformed the pregnant diabetes clinic, I can tell you, overnight, because suddenly we could discuss things with people in real time, which made an enormous difference. And, of course, as you know, now, hopefully anybody who wants to measure their sugars at home, can do so reliably themselves, which is quite a transformation. Whether people appreciate what a transformation that it - and if they want to look after themselves properly, what a big help it is, and how impossible it would have been without that - I don't know, but perhaps they should appreciate it. It was a massive, massive benefit. And that was my first really good political effort to change someone's mind. I didn't feel very nice doing it, at the time. It's not quite what I was brought up to do, if you like, but I was very pleased, afterwards, that I'd done it.

(16) And what about medication, in the 1980s?

Well, this was when various things happened. I think it was realised that once-daily long-acting insulins weren't perfect, and we began to go back to twice-daily, or even three times. But, of course, now, with pens, people use a lot of divided doses, and that was realised you could get better care that way. As far as medication goes, there weren't that many new things, on the sulfonylurea front. And although, I think, on the whole, we went over to divided doses of shorter-acting ones, to get rid of the big problems of the very long-acting ones, and that was a benefit to patients, both for control and for their safety - not having hypos. But the really rather interesting thing that happened, between the late seventies and early eighties, was the change in the biguanides used. You know, we'd had Phenformin, and we'd had this rather noticeable increase of people coming in with acidosis, that I mentioned. And it was interesting that my husband, who - Bob Cohen - who was working on the medical unit, at that time, was very interested in acid-based disorders, and was working on these cases of acidosis. And he saw a number of cases, which developed acutely, when people with renal failure were given Phenformin to try and get their sugar down, without using a lot of insulin, and saw some very nasty incidents of that. And he got interested in this, and worked on it. And he was quite instrumental in demonstrating, with his studies on the effects of Phenformin, that it was actually quite dangerous. And eventually, we had, of course, Metformin, which was shorter acting, and had about one tenth the risk of causing lactic acidosis that Phenformin had. And eventually, early in the 1980s, Phenformin was banned, and so we had Metformin. And that made a very big difference. We were much more happy about using Metformin; we felt it was safer. And people laughed, originally, when he started working on that, but not when the data was in, they didn't laugh. It got totally banned from use, across the world, which was good. And so, there we were with Metformin. And it's interesting: it's stood the test of time, it's still a good treatment. And we used it more and more, where it was safe; if it didn't give people collywobbles and gut rot, and if their kidneys were all right, so that it was safe to have. And it's interesting, it's still



around. So, that was an interesting change. But really, over all those years, there were decades when not a lot changed, in terms of what was available for treatment. But things did change with diet. All the insistence about ten line diet, or whatever it was, or the ten gram diet, all changed. And the high fat diets, they all vanished. People realised this was bad news. What you needed was less fat, because of the heart disease we were seeing. And I actually lived through seeing people prescribed these high fat line diets, to seeing diets more or less abolished, as a prescription. And what you needed was to discuss what people normally had to eat and drink, and suggest to them how they might - where this was perhaps terribly high in available sugars, and maybe they would like to try and replace it with insoluble sugars, or have a lot of fibre to slow down the absorption - and help people to see that they needed to change their diet. And because, to feel you were being prescribed a diet, it was quite obvious that people, if they were prescribed a diet that they simply couldn't cope with, or wasn't their lifestyle, or they couldn't afford it, and didn't have time to cook, they wouldn't do any of it. Whereas, if you could help people understand what the principles were, and where they could make changes, and get them to make suggestions for changes, then you maybe had an educated lifestyle change, rather than a prescribed treatment, which is down the drain like so many other doctors' treatments, which is quite interesting. But again, enormous increase in the time needed to do this, and that's where self-help groups began to emerge. Our shared care system began to evolve into, with the specialist nurses, setting up, by the end of the eighties, self-help groups, where people in different - you know, children, or adolescents, or young mothers, or whatever - would meet together, on our premises, connected with the outpatients and specialist nurses' offices, in our new unit that we built at the end of that time. They would come together to discuss how to help themselves, with a facilitator there, just to make sure they didn't come up with anything that was quite batty, by accident. But that was very impressive. People can do it, if you just enable them.

(17) Can you tell me a bit more about the kinds of patients you were seeing, their backgrounds?

Ah, that is interesting. Over the years, it really has been a change. As a student, what were we seeing? Local, sort of, East Enders, with cockney accents, in those days; now long gone. Well, who else were we seeing? Oh, an awful lot of Jewish immigrants, people who'd escaped from Eastern Europe and the Nazis, and all sorts of other oppressive regimes. Enormous number of people who, obviously, who spoke Yiddish, and their English was quite lacking. If I'd needed a second language, as a student, I'd have had to learn Yiddish, which I didn't; I didn't know. But I suspect my husband, who knew a little bit of Hebrew, may have found that useful; I've never actually asked him. But, as the years went by, we had the next wave of immigrants, and the next wave of immigrants. And the big wave of immigrants, of course, was people from Bangladesh, initially, who have done an unusual thing, as an immigrant group: they've stayed in the East End. And they have become quite prosperous; they are an enormous community. I mean, by the time we had out shared care diabetes

system going at Whitechapel, as well as at Mile End, 50% of the deliveries were from British Bangladeshi women. And I would say three quarters of the people with gestational diabetes - you know, diabetes in pregnancy - were actually Bangladeshi women. So, we had to evolve and structure the system to provide everything in shared languages: English and Bengali, which wasn't an awful lot of use to our Bangladeshi immigrants, because they came from Sylhet, and Sylhet is not a written language. So, we had to appoint advocates who spoke both languages. And we, for a long time, we used Lord Young's magnificent Language Line. He came to see us, and we did the pilot study on the Language Line. And we used it, initially, for people with diabetes, and also in all the general medical clinics, and also on the wards, when we had people in that we couldn't talk to, in most languages. He had people at home who would take the phone call and act as interpreters. Absolutely brilliant, three-way phones. Bit time consuming, but it was marvellous. Now, of course, there are young Bangladeshi doctors, and even a few paramedics and nurses - although they don't much like the women nursing - coming through, and working in the same hospital, because this community has stayed put; really unusual. So, I saw the patients change, and it was interesting. We also had a lot of students, and some of my most interesting patients were students. Some became medics: some worked with me, some went on to work in other disciplines in medicine, and did very well. It was interesting to see it happen, but who they were never seemed, somehow, to matter to me. The thing was, you got on with the job, and the need was to be able to learn, or find out, somehow - the hard way, sometimes - how to communicate with the new lot of people, that each person was different. And if they didn't speak your language, it was an extra challenge. The number of clinics in which I've had a lady in front of me, who was a British Bangladeshi, with her husband, and she wouldn't say a word. And the husband didn't know the answer to half the questions I needed to ask. So, I would start clowning a little bit, you know, pidgin English, to see if that would help, and a bit of acting. And suddenly, these ladies, many of them, out would come what they wanted to tell me, because they could speak some English. And if I simplified what I was doing, and looked a bit stupid, they would help me, and come out with lots of things. They could speak; they were understanding me. And particularly, if I could get them in the examination room to examine them - perhaps me being a woman I, you know, I didn't have to be chaperoned, the husband would sometimes wait outside - and the woman would talk a bit more then. It was enormously helpful. It was a great challenge, but it never seemed to make me cross. Some people got cross. I found it an interesting challenge, and quite satisfying if you overcame it. But yes, it certainly added to the time you took in clinic. And if you wondered why the diabetic clinics always took a long time - or I did, to the day I retired - that was one of the reasons.

(18) And you mentioned computerisation in the 1980s. Can you talk more about how your records were kept?

Yes, in the early days, with our shared care system, it wasn't really in real time. You had to enter things and batch process them. And, at that time, I think most

of the letters went out to GPs after all the clinics. But it was interesting, because - not only in the diabetic clinic, but in general clinics - it became apparent to me that the person who needed the reminder about what had been said, on the follow-up - particularly with diabetes, which is life-long - was not the GPs, so much, as the poor patient. So, increasingly, over the years, I'd taken to writing follow-up letters - obviously not the initial first attendance letter - but follow-up letters about details and nitty-gritty of what to do, to the patient, and a copy of it to the GP, which was quite interesting. And not many people did that, although there've been recent articles in the journals, in the last year or two, talking about the benefit of copying the letter to the doctor, to the patient. It made me laugh my head off, because I'd been doing it for years. And certainly, I would do it the other way round, as well, unless there was something very confidential I'd put on a PS or speculative; I didn't want to frighten someone. But the thing about the computerisation, when Graham Hitman was able to get the technology going in the nineties, was that here was the opportunity to write the letter with the patient sitting next to you. You made your entries of your discussion and your examination, and the letter churned out at the end. You could write some notes on the bottom, and you could give the diabetic the letter in their hand before they left. Now, there was a snag with this type of computerisation. The snags that I found, in the clinic, were that, in order to do it, you had to look at this computer while you were talking to people. And that's awful. You know, one's occasionally been to the GP, or to the bank, or something, haven't you, and you're talking about something. You want them to talk to you, and they're looking at the blasted computer. And I know that the people you were seeing in the clinic didn't awfully like that you were sitting, looking at the computer. If you broke off to look properly at the patient, and talk to them, so that you could communicate, then you took more time to fill in the computerised bits. And this was a problem, but the great benefit was having printed letters, which you handed one to the patient. And then, if you needed to add a PS with something or other, "I'm a bit worried they might not be quite clear as to so and so", or you may find you need to reduce the dose of something - it was probably already in the letter - but if it was something a bit more tricky, then I could add it on before it was posted to the GP. And the letters would all be in the envelope for the GP at the end of the clinic: marvellous. I think for the new doctors coming in, who hadn't grown up communicating hard on to the patients, I think they became very computer-orientated. I would watch them, seeing the patients and writing the notes. They were dealing with the computer, not with the patient, and that is a problem. I don't know how that's... I know how it could be overcome, and I asked for it many times, but the technology wasn't up to it, by the time I retired. Maybe one day soon it will be. What you need is voice-sensitive recording, so that you simply hold a microphone up while you're talking, and say what you want to say while you're saying it to the patient, into a microphone, and it's getting typed. Now, when you can do that, on the computer system, the benefits of it, I think, will be doubled.

(19) Can we now move on to the 1990s, and what would you say were the main

changes during the 1990s?

Well, I hope there were changes for the better. I'm sure there were some for the worse, like less time - having to shut the clinics down at five o'clock, because there was no support, and less time to see patients. But let's put that behind us. What good changes were there? I think that increasingly, throughout the nineties, there were various realisations. The value of diabetic control - definitely confirmed in massive studies, you know, in America for Type 1 diabetes, and then for Type 2 diabetes with the UKPDS - the massive benefits of improved control of glycaemia. But the real eye-opener was the massive benefit of the improved control of blood pressure, having just as much benefit for reducing complications as improving glucose. I don't think anyone was expecting that, and it was really very exciting. And it was a great battle for the UKPDS to complete the study. It ran out of money, and it had, I believe, a rather indeterminate outcome. And there was a need to do some extra work, during the nineties, to complete that trial, and see if it was genuinely going to give an answer. And I saw some of that battle first-hand, because my husband was quite involved with assessing grants for the MRC - you know, as a Professor of Medicine, one did that sort of thing. And he eventually landed up chairing one of the committees that was overseeing the effort to complete the trial. I can't even remember what it was called now. But they managed to get the money - don't let's think about how - and complete the trial. And here was this absolutely major finding, that was of importance for anybody with diabetes, and to anywhere in the world that looks after people with diabetes, and is quoted all the time, still. And here was this shocker: it was blood pressure. And that, certainly, was an eye-opener to me, and I'm sure to everybody, and, perhaps, for patients, of course - what a marvellous relief. Here was something that you could do something about, with, sort of, straight forward medication, that, all right, you had to take some blood pressures, and we had lots of machines we lent people to take home, by that time, so that they could self monitor. Now people buy them over the counter; even better. But the big thing was, it was something that was simpler to treat, and you could get benefit from it. Now, I would say to patients, who were battling with their weight, or battling with their sugar - and really trying, quite upset they couldn't do it - and yet their blood pressure was good. I would say "well, look, this study shows you've done half the job. You've made, you know, a worthwhile improvement". That was so nice to know this, and to be able to do something about it.

- (20) The other big improvement, I think, was the appreciation that came - literally, towards the end of my career, during the nineties - was how important the lipid control was for people with diabetes, and not just for people without diabetes, in terms of reduction of risk of cardiovascular diseases, like heart attacks and stroke. That was quite exciting, too. I lived through the time of being a - God, ageing consultants! - being a little bit dubious, towards the end of my career, about the value of controlling lipids. But the evidence came in pretty quickly, and I mended my ways, before I retired. At least, I like to think I did, though perhaps not as intensively as

I should have done, when you look back with hindsight. But I certainly did do it, and we started monitoring it on everybody. As soon as we realised it mattered, it went onto the annual review protocol. And, if it wasn't done, you got on... you found out on audit it hadn't been being done, you certainly had major trouble; rapped on the knuckles. And we were all auditing ourselves, during the nineties, and particularly in diabetes. And we reported audits, in our district, and they were pretty shocking, in the early days. But they did get better, and I'm sure they're much better now than they were then. Now that everybody's on the computerised system, the audits must be very good. So, it was encouraging to see things beginning to improve. But the most disheartening thing was that, right up to the wire, the day I left, for somebody with diabetes to do the job really well, they had to make an enormous effort, and it was a non-stop, 'twenty four seven' thing to work on. And that wasn't easy for people to do. And I'm still waiting for the breakthrough that says, I can control my blood glucose by doing so and so, and I can go off and do something else. We thought we had it with continuous subcutaneous insulin infusion - insulin pumps - but they had so many problems that it doesn't seem to have been the answer. Let alone, they were too expensive for, I don't know, two and a half million Britons to have, or whatever it is with diabetes. But something has to come - that's the breakthrough we're all waiting for. And it might turn out to be islet transplants. Who knows? But we need to clone the islet cells so that we can bung them in, you know, like porridge, into everybody when they need them. It's got to be that cheap, and that hasn't happened yet. So, I'm still watching this space, and if it happens before I die, I shall be very happy. But it's maddening, isn't it? Such a simple thing: replace the islets, and we haven't managed it. Man on the moon - no islets. Very sad.

(21) And what about the use of HbA1c?

Well, it's been interesting to watch that become more user-friendly. You know, when the method was discovered, by accident, and then introduced, the columns of gel that you had to use to separate a small blood sample, so as to see if this glycosylated haemoglobin was increased or not, had to be about thirty feet long. And they used to hang them up on the outside of the buildings, where Cerami and people were working, in the States. Absolutely horrendous. Our paper in 1979, or so, we had a little method you could do in a one mL insulin syringe. But even in the early years, the eighties, the methods needed a bit of blood, they needed time, so as you had to do them in batches, and a lot of quality control, and so on. So, you had to wait for a lab result - always nasty if you're the patient. More recently, I know that it's evolved into a chair-side test, so you can do it and share the result with the patient on the spot. And I think, terrifying as it is for people to wait for the results, if you know you're going to have it and discuss it on the spot, it must be somewhat less gruesome, than having to wait for a result to be sent to you, or phoned up to you later. I don't know; it must be. And that's helpful, but not everybody's doing it. And the other interesting

things about glycosylated haemoglobin, HbA1c: when I first had this method going, and we used it, I was asked to talk at a workshop at the British Diabetic Association, somewhere in the north of England. And I was expecting a small workshop of about twenty people. And I prepared a presentation showing what we'd done, our survey on the first fifteen hundred patients, and just how awful their control was. And then I prepared a sort of thought - a wish list - of how it might be used in the future. What I remember vividly is that one of them was that, in the future, I thought this test would be useful for screening for chronic diabetes. Why wouldn't it be useful for screening? All right, people with pernicious anaemia or haemolytic anaemia, it might miss them, but at least it would pick up some of the 50% of undiagnosed people. And I was torn to shreds at this workshop. There were three hundred people there, not thirty. I'd had to re-write my overheads to make them bigger, because it was a huge lecture hall. And I can remember various quite eminent diabetologists ripping into me: never heard anything so unscientific, how dared I suggest something like that. Well, I dared, because I could see it would be useful. And there are now papers appearing about the value of HbA1c: could we really use it for screening for diabetes? Well, if you're serious about helping people with diabetes, it matters for reducing illness, for reducing healthcare costs, if you're running the health service. Nothing could be more important. This is a massive charge on the health service, particularly undiagnosed, because it doesn't appear until you've had your coronary, or your gangrene, or your amputation, or your renal failure and your transplant. Think what they cost. Then, of course, we should be screening earlier, if we think we can help people. If you can't help them, it's not worth it, but if you can, do it. And it's now beginning to be used. So, I'm sitting here - that would be the early 19... that was about 1981 - so, I'm sitting here twenty five years later, I'm laughing that suddenly, people have woken up to it, and it looks as though it's going to be used for that. Why ever not? It's a cheap and cheerful test. You could do it in the GP surgery, in your annual screening of older people. Just do it - why not? I'm waiting to see it happen. It's just so maddening when you come up with something useful, and it doesn't take on.

(22) And what do you think have been some of the most helpful things for patients?

Over the years, what's been most helpful? Well, I suppose, from a medical point of view, the fact that medics have been forced to realise that helping someone with diabetes to have a better blood sugar and better blood pressure actually matter. That's been helpful to patients. But, I guess if you really want to know what the patient's view of that is, you have to ask the patient. So, my guess would be things like being able to use a clean syringe, and not having to boil it. And things like having a sharp needle every time you inject, not having a needle that's blunt because you've used it twenty times, and had to boil it every time, and it's got hard water deposits on it. Not having to cart syringes round in vials of alcohol, to keep them clean, and then fiddling about with it, and it leaks all over the place, and people wonder what's wrong with you. So, disposable syringes and needles have really... very... I would have hoped they've been

helpful to patients. If not, if they don't like them, then they've been a rip off, because they've made a lot of money for the manufacturers. I would like to think they have been. I think, hopefully, improved patient education has made it a bit easier for patients to adjust their treatment to their lifestyle. Things like wanting, themselves, to get it better, like wanting to divide their insulin injections, so that they don't have hypos at awkward times, or so that they can eat late, because they've got a business meeting all morning, and they can't have lunch till two-thirty, or something. I think that makes a difference to people's lives. They can get on with their lives, without wrecking themselves. I'd like to think that being able to measure a sugar, being able to give a short-acting treatment with your food - surely all of that must have helped. But, maybe I'm guessing. I would like to think so. Knowing whether you're achieving a good result, for some people, is terribly important, so an HbA1c, for some people, is a magnificent reward, and a reinforcement. For some people, it's a threat and a bully, because they feel frightened by it, and they don't think they can... "oh, I give up, I can't improve it". And for them, it's a threat, not a help. So, I suspect different people, different things have been important. But, having specialist nurses that you can get hold of round the clock, if they're really, really experienced, and not, sort of, trained on the cheap, and without experience, and simply doing it from a list - you know, that's no good. You would like to think that the increased surveillance in general practice has been good. But, on the other hand, if it's just box-ticking, saying "I've done this person's blood sugar, so I get my extra six hundred a year", or whatever it is, or six thousand a year, for ticking various boxes, then that is no help at all. Because, identifying the diabetes and saying "you've got it, you'd better do so and so", is no help. You actually have to put the effort in to go with it, so that the person learns how to deal with it. So, I don't know; that needs audit, to assess whether some of those things have been worthwhile for patients, or not. But, for many people with diabetes, I think it's the day to day things matter almost more than anything. Can I get on with my life? It should be a bit easier now, than it was. Am I doing all right? Well, if I am, then I'm glad to know. And being a bit more relaxed, if you are doing well, brings your blood sugar down - less stress, less cortisol, less adrenaline. Whereas, for those people who are frightened, because they aren't doing well, of course, it makes it worse. It may be we're not doing as well as we think we are, but our hearts are in the right place. And if we could get the islet transplants, then everybody would be happy, and nobody more so than Government. They should be throwing an army of people and money into it, because it would reduce healthcare costs in this country, to the NHS, at a stroke. You would get rid of, over the next ten or twenty years - it takes ten years to get complications with poor control, roughly speaking - and ten years of the 50% undiagnosed are developing complications before they present with them, they could be prevented. Think of the costs that you could save. Government, go for it! Put money into it, and get those islet transplants, or the equivalent - something we haven't thought of yet. Get it going, because you will save the money, and the country will be very... and people will be delighted not to get diabetes. Wouldn't it be marvellous?

- (23) So, coming on now to your retirement, in 1999. Would you like to reflect on what happened between your time as a medical student in the 1950s and 1999?

In regards to diabetes, you mean? Yes. Well, not as much happened as it should have happened, really. We didn't find a cure, we didn't find an easy method of controlling it, but we did try quite hard. We learnt to do better, because we learnt that it mattered, as a profession. We've learnt... I don't know that we're any better at listening to the patient than we were, and talking to the patient, but I hope we are. We try quite hard to organise things around the individual patient and their needs, but... And we've got some new treatments, but nothing like as much as what one would have expected in fifty years. I like to think that what I did made a small difference to improving and moving things forward, but maybe it didn't. But at least, on the individual basis, some patients learnt how to cope better, perhaps, or felt better for sharing their troubles with me, and people like me. But, did we make an enormous difference? Have we moved it forward? Well, I think there is one difference: we've got diabetes on the agenda, now, whereas perhaps it wasn't, before. It was just a lost cause, at the time I came in as a student; it was a lost cause. God help you, you've got it, and that was it. And if you died, you died. And now, it's a problem that needs, warrants and deserves, and is going to be treated, it's just that we haven't quite got to the adequate treatment and possible cure yet. And that's what one's still looking for, as I said earlier. So, I wouldn't pick anything out in detail. There were things that were depressing, and things that were very exciting, and things that one thought were going to be instantly rewarding. I mean, even I sat there picking islets, in the hope that we could do some transplant work, back in the late sixties. And still we're trying to find a way of getting islet cells into people. Pretty heartbreaking, really. Never mind. Next fifty years on, perhaps people will say "diabetes, what's that?" And that would be marvellous.

- (24) And what have you done since you retired?

Well, I did a bit of clinical work, for a while, covering for somebody who'd had an accident at work, so I went on doing some clinics. So, I've had some experience of what happened after I retired. But mainly it's been research. During the latter years, over the last decade as a consultant, I got involved in work, which I'm still doing. First of all, I was interested in the British Bangladeshis living in our area, because they had a lot of vitamin D deficiency. And I knew from years ago, from work I'd been involved with, that lack of vitamin D interferes with insulin secretion, and puts your blood sugar up. So, I got really quite interested in that one, in the last years at work, and I followed that up since. We've shown that the lower your vitamin D state, the higher your glucose, and the lower the insulin you produce on a glucose challenge test. And that you can restore insulin secretion by giving vitamin D, but you can't correct diabetes once it's developed. So, therefore, the interest obviously developed in whether lack of vitamin D put you at risk of getting diabetes. And I've published a big review on that, about the time I retired, and there's been a lot of work come out of



that. Lots of people are working on it, now. And the associations are there: you can predict, not only, from a low vitamin D, a high blood sugar and a low insulin response, you can show that, in non-diabetic people with normal sugar tolerance, that if their D is low, they have a higher blood pressure, they have a higher bad lipid and lower good lipid, they have higher blood pressure, and they're fatter. And that means all the risk factors for heart disease are worse, if you're low in vitamin D. Now, I've pursued that, and got involved in more detailed work on that, with people like Elina Hyppönen, who's done a study on the British birth cohort from 1958, showing a huge prevalence of D deficiency across Britain - now, as we speak. If you're indoors and you work indoors, you're probably D deficient, unless you've been out in the sun, and what sun have you had this year? So, many of us - really, very many of us - are vitamin D deficient, and it may be a factor in contributing towards the epidemic of Type 2 diabetes. It's also a risk factor for Type 1, particularly in pregnancy, which is quite worrying, because we've done a study, which we're writing up at the moment, in pregnancy in Southampton. And you can't get nearer the sun than Southampton, in Britain, can you? And there's a lot of D deficiency in pregnant women there, too; as there is, indeed, in India, in another study that we've just submitted for publication. And that's quite worrying.

- (25) So, the other thing that I got involved with, with the Bangladeshi community that I was seeing in the diabetic clinic, was betel chewing. I was looking up something for a talk for the dietitians, and I bumped into some information about betel chewing. I knew it caused cancer, but I bumped into why it caused cancer. It's some compounds called nitrosamines, that cause cancer. Now, many nitrosamines also cause diabetes, so I had the wild idea, in the nineties, that maybe all this betel chewing might account for why Asians, in Britain, have four times as much Type 2 diabetes as white people. So, I fed betel nut to mice, before I retired; did a project. And I found that a large proportion - particularly of the descendants, who'd never eaten betel - a large proportion of them were getting fat, twice the normal body weight for a mouse, and diabetes, and that their pancreases looked just like people with diabetes. So, I've been pursuing that. And, with a colleague in Taiwan, we have a study on about seventy thousand people, in which we've shown - because they've only chewed betel since the Japs left Taiwan, in the late 1940s - we've shown that betel chewing is a risk factor for Type 2 diabetes. But not only that: for increases in blood pressure, adverse changes in lipids; all the factors that increase the risks of heart disease. And last week, we re-submitted a paper, after revision, which we think will now get accepted, which shows that betel chewing is a risk factor for heart disease, which is pretty horrendous, too. But we think that may be due to programming of your genes, in some way, that would therefore be reversible. And we've also shown, if you stop betel chewing, the risk begins to fall. And the longer it is since you stopped betel chewing, the lower the risk. So, we've very excited about that, and we have various projects going on. But the big thing I would most like to

see is - for the vitamin D - I want to see a large, randomised controlled trial in the population, for the prevention of Type 2 diabetes, and all the risks that go with it, like heart disease. That trial has not been done world-wide. The Americans are after it, the Canadians are after it, there's one trial in pregnancy being done. It needs a big trial. If this country has refused money for many trials of that sort, to my knowledge, on vitamin D supplementation, I cannot understand it. It will be done elsewhere. I think in Canada, because Canada has just introduced some new rules that pregnant women must have certain supplements. In this country, pregnant women are meant to take four hundred units of vitamin D a day, and they've only just made a suitable supplement available. The last time I asked, it hadn't yet reached the clinics. But we're trying, but why no trial? I made many efforts to get money for trials, before I retired, and I'm still waiting. But it's going to happen, and I'm still involved with the groups trying to raise the money for these trials. It will happen, and that might be another way of reducing the size of the diabetes epidemic. However small a contribution it might make, it could only be worth having. Although, it would need to be a careful trial, and make sure there are no adverse effects. Think of other trials, with things like vitamin A and beta-carotene, and everybody thought "marvellous, it'll reduce heart disease and lung cancer". It didn't, it increased it. So, it needs careful studies, and not just a random approach with stoss therapy, and flinging things at people. Never sensible. So, I'm still waiting to see things happening. I'm doing my little bit, on the research front, to keep them moving, and that's certainly interesting. And I think it's come out of the work I did on diabetes, over these years, and my dissatisfaction with the state of care at the end of it. We aren't doing enough to prevent it. Lifestyle changes will help prevent it: exercise, keeping a decent low weight, which, incidentally, improves your vitamin D status. All those things are worth going for big-time, and they're much less expensive than medicines for diabetes, and treatments. Also, where's the legislation for the food industry to get rid of the empty calories, that make everybody fat, in junk food? Where is that legislation? People don't seem to learn from the past. Everybody knows this is a problem, and it's a big cause of diabetes and heart disease. Where's the legislation? Perhaps I should have done politics. You know, I said earlier - maybe I didn't say, but I remember thinking - as a child, when I wanted to do medicine, the other thing I chose between was being a parliament lady. And I don't know why I gave up on that one. It's possible I made the wrong choice, and I should have done that.