

This is the transcript of an interview made on 3 November 1986. Professor A.C. Kennedy had set up the original Renal Unit in Glasgow in 1959. Dr Peter Mackenzie, a retired Consultant, made it his mission to record the life and times of eminent Glasgow physicians and surgeons. The tapes are now in the Archives of the Royal College of Physicians and Surgeons Glasgow, whose permission has been given to publish this interview.

**Dr P. MacKenzie (P.McK)**

'Today I have the privilege of interviewing Professor Arthur Kennedy, who is the Muirhead Professor of Medicine at Glasgow Royal Infirmary and President of the Royal College of Physicians and Surgeons of Glasgow. I am going to ask him to begin right away to tell us how he started off in 1959 what was the Renal Dialysis Unit. Please tell us your own story from the beginning.

**Professor Kennedy (ACK)**

'Well, Peter, I had been down in Dumfries as Senior Registrar from 1953 to 1957 doing general work as a young physician learning my trade and I had been invited back to apply for a lectureship in the Department of Medicine in the Royal Infirmary by the then Professor, Leslie Davis. The vacancy actually had arisen because of the promotion within the Department of Edward McGirr who later succeeded Leslie Davis in the Chair and Edward had moved up to be a Senior Lecturer leaving a vacancy at the bottom. I was asked to apply for that post and I came back to the Department in late '57. You were talking about starting kidney diseases but looking back one intriguing thing about that was the other candidate for the post was a man called David Kerr (D.N.S. Kerr) who just after he failed to get the job (which of course I got) got a post in Newcastle and he had a very similar career to myself down in Newcastle and we were very good friends from that time.

'Anyway I came back to the Department as a lecturer in 1957 and Leslie Davis said to me very early on, 'Kennedy, what are you going to do?' And I said well, I'd work away and I talked about my interests in things.

He said, 'Well, but specifically what special interest are *you* going to develop?' He was a very shrewd man and he said, 'I think every young man now should have a special thing that is his own.' Now, prior to that I had had a pretty broad based training with, if anything, a leaning towards Haematology. I had taken my Edinburgh membership in Haematology but I did not really want to go on in Haematology particularly, partly because I had no burning ambition to do so, but also partly I suppose, I saw others in Haematology ahead of me. Stewart Douglas was there and Alec Brown; and I looked around the Royal Infirmary and I saw people in Endocrinology, in Nuclear Medicine, in Cardiology (I was in the wrong set-up for Cardiology), in Neurology, in Respiratory Medicine - they were all taken up with promising people but there was nobody doing medical renal disease. There was a lot in the literature in the Fifties on medical renal disease particularly the paper that had come out from the Hammersmith by Graham Bull and his associates on newer methods of managing acute renal failure and I said to Leslie Davis, 'I think I would be quite interested in medical kidney disease. ' I had always had a bit of an interest in metabolic changes in the body so it seemed to fit. So he said, 'That's fine. Well, beaver away!' 'So I just started looking at patients and gathering things together and so on. Then early the next year - in 1958 - Leslie Davis said to me, 'Arthur Jacobs,' (who was at that time the senior urologist in the Infirmary a very distinguished urologist), 'he is desperately keen to get an artificial kidney. In fact he is even prepared to buy it for the Infirmary; he has got some money from a patient and he wants to buy an artificial kidney. He had hoped that one of his young men would take it up and develop it but they all seem more interested in doing prostatic surgery and bladder cancers etc. and do not want to go into the kidney line in terms of dialysis and renal failure. So he asked me if I had any young man who might be interested and I have given him your name. I went and saw Arthur Jacobs who was very good, very, very helpful, very direct and he said, Kennedy, I am

going to buy this kidney machine. Will *you* run it for US? SO that was it; that was in 1958. I knew nothing about kidney machines, of course. There wasn't one in Scotland and "the Royal Infirmary arranged that I went off down to Leeds where there was a kidney unit which was linked to the Urology Department in Leeds Royal Infirmary. An old friend of Arthur Jacobs Leslie Pyrah (who was the senior urologist) had got a kidney machine in Leeds and I think that Arthur Jacobs felt very much that he wanted a kidney machine in the Royal, so there we were. I had three or four weeks training down there on the machine with Frank Parsons and came back. We placed an order for a machine and in 1959 we got it. It was a Rotating Drum kidney made by Usifroid. And we started off.'

**P.McK.**

Could I just interrupt there to say that I don't think that Arthur Jacobs' contribution to Glasgow medicine has ever been fully appreciated. And it is a great pity that his portrait is not in that book about the Royal College because he did a big transforming job when he was President of the College at that time and it was quite a watershed. He was quite a remarkable man.

**A.C.K.**

Well, it is quite interesting *you* saying that because later on when I moved around a bit and talked quite often in urological circles on renal failure, it was apparent to me how much Arthur Jacobs was thought of outside Glasgow. He was in fact one of the best known names in Glasgow medicine and surgery in the United Kingdom and elsewhere. He was very perceptive and very far-sighted. I owe a very great debt of gratitude to Arthur Jacobs because not only did he produce the money to buy the machine but he also actually produced the space in the basement of his unit - where to put it in the beginning. We soldiered away there in the basement of the Urology Block, Ward 51, for many years in premises which were quite remarkably simple and primitive. 'That was in 1959 - I think probably May 1959 might have been the first actual treatment. I remember this patient coming in. She had renal failure - we really did not quite know why - it was not very clear-cut. Looking back, I am sure she had polyarteritis nodosa secondary to sulphonamides. She had a drug induced renal failure and I am pretty sure it was sulphonamide induced renal failure - may have been polyarteritis. We dialysed her - she improved - dialysed her again - she improved for a bit but she eventually died. We were learning our trade. The machine was very large at that time - it had come from France. It was a rotating drum machine. The cellophane which was used as the dialysing membrane was wound on to a rotating drum and we did this by hand prior to each treatment and stripped it down ourselves at the end. It was quite an exercise. None of this buying it direct from the factory and throwing it away afterwards. We assembled it and used it. Each treatment took about four or four and a half hours and you had about an hour's preparation and then about an hour's work afterwards so the actual treatment for a patient took you six to eight hours and they seemed to come at the most awkward times! In these days one of the phrases we had was that renal failure always seemed to get worse on a Friday afternoon. They were from district hospitals.'

'I had a vision of physicians looking at biochemistry results on a Wednesday and saying, 'Well, we'll wait and see how it is on the Thursday.' And it came back again on the Friday and they realised they did not want to hold on to their patients over the weekend. I would shudder to think of how many weekends were ruined for my family at that time - it must have been quite a trial for them.'

**INSERT FIRST PHOTOGRAPHS & DESCRIPTION FROM Mr M.G.H. SMITH FRCS**

But there was no way out, because there I was - I was in charge of this thing; and I was always extremely fortunate in the quality of the junior and support staff that I had, but at the end of the day I was in charge. I was the only consultant and even though you could get it started and leave someone else for a time, you were still on the hook, as it were.'

**P.McK.**

'My memory is, you never seemed to be off that unit. Any time I came, you were there.'

**A.C.K.**

'Yes, it was like that because, looking back, it acted like a magnet. I wondered at first when I started doing kidney disease on my own how would people know I was doing kidney disease.; how would I ever build up a trade, as it were, but once when we started getting the odd success - and we had quite a number of successes, I suppose, looking back - it was like a magnet and patients came from all over the west of Scotland, and the north of Scotland and were flown in from here and there. So we were really dealing with acute renal failure from a large population in Scotland and we knew less then, of course, about how to handle it in its early stages, so the cases were tending to come in fairly advanced, fairly severe, requiring urgent dialysis and treatment. I got involved very much in going round talking to staff in other hospitals. I counted up once and I think I have really talked on renal failure in literally every hospital in the west and central belt of Scotland - up to Oban, up to Inverness, everywhere - one was on the trot - because they were interested in this. It was very exciting! '

**P.McK.**

'Did these cases cause you any worry?'

**A.C.K.**

'Yes, of course, worry about the acuteness of the thing. It was very dramatic medicine pregnancy disasters and complications with young women in advanced renal failure. This was in the days before legalisation of abortion and in the first two or three years I had maybe twelve or fifteen septic abortions - clostridium welchii acute renal failure, desperately ill women with septicaemia and acute renal failure and with all the tragedy behind the criminal abortions. Road traffic accidents - commonly young people; complications of elective surgery; medical ones from severe pneumonias; haematemesis and blood loss plenty of worries as to whether they would pull through. We were running a success rate in terms of survival and virtually complete recovery of just over 50%, well over 50% for the younger fitter people . **(Reference 1)**

That was encouraging, of course, because these kind of patients we were treating in that way all would have died, so saving rather more than every alternate one gave one confidence to go on.'

**A.C.K.**

'Well, one angle to it that gave me worry in a medical sense was I had acquired a very powerful machine this rotating drum machine. It had a big surface area on it and we could lower the blood urea level and other disturbed biochemistry (that is we could correct it) pretty rapidly. We used to measure blood urea then in mgms. per 100 ml. - and we would have patients who would come in with blood ureas of 450 and 500 - grossly acidotic and perhaps hyperkalaemic - and you could virtually sort out to not quite normality but well on the way to normality all of this biochemistry in about four hours or four and a half hours and, for a time, we were almost competing with others as to how efficient we could be at it. I began to get a bit worried because a small number of my patients during dialysis were getting headaches, the odd one lost consciousness temporarily. One woman, I remember very well, became very very confused. This lady - who was a very respectable member of the community, well-spoken - you could never imagine any improper word could cross her lips

As we were dialysing, she suddenly became a little confused, a little aggressive and by the end of the dialysis she was seeing 'Papes', as she called them, hanging from the lamp posts and was being very offensive about it and I realised that we were doing something a little bit strange with this, so I started thinking about it. There had been some writing in the neurosurgical literature about brain swelling, and reversing brain swelling by intravenous injections of urea that the neurosurgeons were doing to patients with road traffic injuries, and I thought that maybe what I was doing was taking urea out of the vascular compartment more rapidly than out of the brain compartment.'

**P.McK.**

'She wasn't an alcoholic, that lady?'

**A.C.K.**

'No, I am absolutely sure she wasn't she was a pillar of respectability! I formed the view that maybe we were shifting the urea out before it could move across the blood-brain barrier; and I mentioned that as a theory once at an international meeting and I remember John Merrill who was a very famous American nephrologist snapping his fingers like that, shaking his head and saying, 'No, no, interesting but couldn't work. Urea just went across membranes just like that!' And I remember being slightly irritated because I was sure I was right. Anyway I went back, and I did some lumbar punctures in patients before and after dialysis and I showed I was right actually - urea was not moving across the blood-brain barrier and there was quite a gradient and we described this thing called cerebral disequilibrium. That led to smoother and rather slower dialysis so that was one of the outcomes from that. **(Reference 2)**

'The old Board of Management of the Royal Infirmary, I think, was a very far-sighted body and one of the things they did was they had a travelling fellowship or scholarship - I can't even remember what it was called - and, once a year, after a bit of competition somebody was selected and they could go off and travel. I went off to the States in late 1962 and I had a trip probably round all the major renal units in the States. I had my slides in my pocket of course, and I would give talks on how I was handling acute renal failure and cerebral disequilibrium. It was all very interesting and I saw what was happening. Perhaps the one thing that struck me most out there was my trip to Seattle to see Scribner's unit in Seattle because he had just started - he was about a year into it - on handling patients with end stage renal failure. Before that, the thought was that artificial kidneys were going to be used as a temporary thing to tide over patients who had acute renal failure. They would either get better or they'd die and that would be that, but here he was. He had formed the view that if you could do that for acute renal failure there was no reason why you couldn't do it for end stage renal failure. It was just a question of altering the technology and getting permanent access to the vascular bed and I saw this. He had four patients on treatment at that time and he had some enormous budget from N. I H., something like \$600,000 a year for four patients, and I remember thinking - 'This is very interesting - it's very worrying - we'll never be able to afford it. But we are probably going to have to face it sometime!' I remember when I came back it was not all that long before questions were being asked in Parliament - why was it that the Americans were doing this? We weren't doing it here, and in '63 or '64 we started at Glasgow Royal Infirmary in a very tentative way down in the basement of the old ward 51 treating patients with chronic renal failure with Twin coil dialysers.-I had many misgivings - but we had no alternative but to go on with it.

'I think it was in 1965 after many questions in Parliament the Chief Medical Officer at that time, Godber, got together a meeting of so-called experts in the field - there were about 10 of us in the U.K. We got together under the chairmanship of Godber and Max Rosenheim (Lord Rosenheim) and after a lot of discussion, it was agreed that this regular dialysis was no longer in the research

and development phase and it would be funded on a national basis. One of us asked Rosenheim who was going to do this treatment and he said, 'Well you're all here. That's why you were asked. And you will all go back and the Government will produce money for regular dialysis in addition to that for acute renal failure.'

'80 I went back to Glasgow and in due course the Home and Health Department produced money to build what was to have been a temporary unit and they built it in the grounds of the old Out Patients' quadrangle in the Royal Infirmary - a pre-fabricated building. ( Fig ) I was told I could have anything more or less I wanted provided it was (and they drew a rectangle) in a certain space. Again the Royal Infirmary Board of Management was very thoughtful and far-sighted because they built a two-storied building and the regular dialysis was down on the ground floor and up above was the blood transfusion service for the Royal so they got two things for the price of one. From the moment of starting planning it (I really planned this building myself) to being in and functioning was six months, and the whole thing, I remember the kidney unit and the blood transfusion unit - cost £30,000! Incredible! And it was only relatively recently that we, in fact, moved out of it into other premises'.

**P.McK**

Now, could I just interrupt to say that I had one of these travelling scholarships in 1957? That was the time when it was fashionable to get the I.H.B.T.A – I have been to America! But it was a great 'shot in the arm'. I was one of the most wonderful experiences I ever had.

**A.C.K.**

'Yes, they were very far-sighted. Edward McGirr had one of them too. He went on one - I can't recollect which exact year he went away. '

**P.McK.**

'A marvellous experience. I felt the old Royal Infirmary Board, as far as I was concerned, were very far-seeing and they did very well. '

**A.C.K.**

'Yes, well I think looking back, they 'managed'. It was not consensus but it was a Board of Management and they had senior people on it from the hospital and University but they were supplemented by very enlightened experienced business men or senior trade unionists and I suppose it was a body that could look at an issue and the broad picture and make decisions.'

**P.McK.**

'And wise chairmen! I thought they were extremely fair.'

**A.C.K.**

'Looking back at the Royal Infirmary in the late fifties and sixties in which I grew up a part of, one of the great strengths in the Royal Infirmary then was the ability to identify new things, pick them out, get somebody on to it, support him and build it often from the most modest premises - limited premises and working on a shoe-string but they actually supported it. When we came into the seventies and now the eighties in the Royal Infirmary really all the sub-disciplines of Medicine are represented there and that arises from that earlier policy of the Board of Management.'

**P.McK.**

'We started out with straight dialysis further developments of investigation would tell me something probably investigations developed up from simply and now we are going on to and research. Maybe you outline how the various doing dialysis.'

**A.C.K.**

'Yes. Well, in a sense acute renal failure dialysis was what put us on the map I suppose, in the West of Scotland and maybe a little further, and we published quite a bit on that but once you started having patients referred to you with acute renal failure you got other patients with all kinds of renal disease and in particular, of course, medical things - glomerular nephritis - and I had to teach myself how to do renal biopsies and looking back it is really quite intriguing. There were no specialist advisory committees to train people - you just taught yourself. And in terms of biopsies I remember reading up about it and going down to the autopsy room and practising. Later on, with Bill Stirling (who at that time was, as we termed it, sub-chief in urology) I worked out a method of doing the biopsy initially with a little guidance from him. I used to do them in the X-ray department of Urology and he would visualise the kidneys for me by I.V.P. and later we got more confident and we just did them in the ward. Nobody ever taught me to do a biopsy. I would have done probably the first 150 or so renal biopsies myself before I started letting the others do them the juniors in the unit - Bob Lindsay, Robin Luke, Marjorie Allison and others. They came in doing it.'

**P.McK.**

'In fact you have actually founded the Renal Unit. Your people have gone all over the world.. You are the 'father figure'.'

**A.C.K.**

'Yes, I suppose that's right, Peter. I think I counted up something like ten renal units across the world headed by people who directly came from the Royal Infirmary - trained by myself - including the Western Infirmary and Douglas Briggs!'

**A.C. K.**

'Yes, and as I think I said earlier, I was always tremendously fortunate in the quality of the people who came to work.'

**P.McK.**

'But you chose them, you see. That is the very important thing. They were attracted to you because they knew it was worth while because you are an excellent teacher. You could get to the core of things. You could separate the dross and get right to the centre and do it so expertly.'

**A.C.K.**

'Well, that is nice to hear. One of the other things we had people come in from other disciplines anaesthetics and other disciplines - and they have the same kind of approach. They have a basic scientific knowledge and a disturbed patho-physiology and are interested in sorting it out. We also had a lot of people from overseas which was very good. So the initial magnet was a kidney

machine dialysis and then other kinds of renal disease came, particularly glomerular nephritis but also pyelonephritis a whole spectrum - and one built up a clinic. We used to start doing it just in the ward side room but it got too big. Eventually we found space and we got interested in hypertension in the kidney, glomerular nephritis, pyelonephritis, amyloid disease and there are papers we published in all three seams.'

**P.McK.**

'You have over a hundred publications - a tremendous record. I have been impressed looking at your C.V. the breadth of it - so many interests quite apart from the renal thing. Of course, there is a breadth of interest in renal disease which has never before been explored

**A.C.K.**

We had a conference; in the Royal College of Physicians and Surgeons we had a symposium on Renal Disease in either '61 or '62 and Archie Goodall (the late Archie Goodall) was very keen to have this symposium and I was really the person who picked the people and chose the themes. A lot of people came and one of the things we talked about at that was the management of the nephrotic syndrome and papers came up on that and it became quite apparent that there was really no agreement as to how you should use steroids in the nephrotic syndrome. There were papers which showed that a significant proportion of patients improved and equally there were papers which showed a rather poor proportion. And at that conference - it was actually at the dinner in the hall of the College after the conference - a number of us said that there should obviously be a controlled trial.'

**P.McK.**

'Is that in effect 'the large white kidney'?'

**A.C.K.**

'That's right. We did not really know the proper indications for steroid treatment in this condition. Arising out of that the M.R.C. sponsored a meeting and I was at that meeting in their offices near Regent's Park. It was fascinating. There was one man Clifford Wolfson, who was Professor of Medicine at the London Hospital - who said that he was a bit dubious about giving steroids because of the side effects of steroids. He truly had had very indifferent results with this and he wouldn't like to go into a controlled trial because it meant that half of his patients would get steroids and he didn't fancy that. There was another speaker from Birmingham who said that he did not want to go into a controlled trial because it meant half of his patients wouldn't get steroids. There was laughter at that quite properly and it became absolutely apparent that we had to have a controlled trial.

'Max Rosenheim was the Chairman and the M.R.C. set up a working party on glomerular nephritis - particularly on management. Max Rosenheim was the first Chairman and Douglas Black was the Secretary of the group and I was one of the probably twelve people in it. We set up a protocol. We biopsied all our patients. We did not have a decision - the decision as to whether they got steroids or not was on a random basis allocated from the centre. It was the first controlled trial on glomerular nephritis and when we published our results it became quite clear that certain types of nephrotic syndrome benefited from steroids, the others didn't, really depending on histological appearances, so you had to have a biopsy. So we got it onto a scientific basis and the minimal change glomerular nephritis benefited and the others didn't. Then Max retired from that and Douglas Black became Chairman and when Douglas Black retired I became Chairman and it is still on the 'go'. We are still doing controlled trials on

glomerular nephritis, on different forms of therapy and these trials I may say are recognised the world over as being absolutely objective and not biased in any way and they are a yard stick.

Also we have got a national register of biopsy material in glomerulo- nephritis. We have about 5,000 patients on it, all with their case histories, all with their biopsy data, all of it analysed by independent pathologists and we are laying the basis for a very comprehensive study of the natural history of glomerulo-nephritis which will be coming out fairly soon.'

**P.McK.**

'Now another side aspect is, I suppose, the immunology of this this is very important. Can you tell us something about that?'

**A.C.K.**

'Yes. Well, I have never been an immunologist. I did not have the basic training in it. I have had to learn the language as it were. In fact that is one of the things that bothers me just marginally about diversifying. I think we have become too rigid in our training of young people. They become senior registrars and as soon as they become senior registrars in effect you are saying they are going to be consultants. They are consultants in a given subject let us say at the age of 33 or 34, and there is very little chance of somebody who was say a haematologist at the age of 33 as I was in a sense - then becoming a nephrologist and yet I can't see why you cannot learn new things when you are in your thirties.'

**P.McK.**

'Well I did bacteriology intensively and then did haematology and then changed again.'

**A.C.K.**

'Yes I think our training programmes, while we say they must be flexible, they are not terribly flexible and once somebody becomes a consultant - I think that is one of the deficiencies of the National Health Service - when somebody becomes a consultant at the age of 33 or 34 it is in fact now-a-days very difficult for them to change into a different style of life. If they become a physician gastro-enterologist and they wish to go off on another angle because something has excited them - and that is what should take people off on different angles - it would be difficult to do that because of the Service requirement. I don't know if any big organisations Marks and Spencer's, I.C.I., the Banks, the Services, academic life - would see that you got everybody in their right slot at the age of 33 or 34. There is not sufficient room for a bit of lateral movement, I think in that. Anyway you were talking about Immunology. I mugged it up. To do this I need to know the language and in glomerulo-nephritis, of course, the great thing - coming back to a very simple precept which we all got hammered into us when we were doing Pathology when we were juniors - is the soil and the seed. What happens is we are all exposed to infection, for example, and one of the things which I say to the undergraduate class when we are talking about glomerulo-nephritis, the classical model is post-haemolytic streptococcal glomerulo-nephritis, I say, 'Everyone of you sitting here,' (and there are probably 100 people sitting there), 'have had a haemolytic strep. infection but almost none of you were at any risk of getting glomerulo-nephritis, and none of your family were, so why is it the odd person gets it? It is due to the immunological reaction in a given individual.'

**P.McK,**



It was only certain types, type 5 and type 6?

**A.C.K.**

'Yes, normally certain types but clearly you could get a range of people getting a haemolytic strep. with the same type but not all of them would then get this disease - would get this abnormal immunological response - it has always intrigued me as to why this is and it all comes down, I am sure, to H. L . A. typing and subtyping of H.L.A. Now in the glomerulo-nephritis study that the M.R.C.is doing, we are doing H.L.A.typing just to see and I am sure there are people who have *e* propensity to certain types of glomerulo-nephritis because of their H.L.A. structure.'

**P.McK.**

'Of course you harnessed very efficient immunologists to work with you. '

**A.C.K.**

'That's right. I have always been very keen on collaborative work with other disciplines in Biochemistry, Immunology, Histopathology. I think there is a limit as to how much you can pretend to do this yourself. You can learn the jargon. You can get the feel of what it is, but you are really not an expert. If you really want to make any advances you have got to harness yourself to somebody else who is expert.'

**P.McK.**

'Who have been your immunological supports among the people?

**A.C.K.**

'Well, in Glasgow, particularly it has been Heather Dick who was a bacteriologist by training and then became an immunologist and who, funnily enough, then went back to holding a Chair of Bacteriology and not doing so much Immunology, I imagine, now. She was very good - a really imaginative mind and very helpful to us.'

**P.McK.**

'Who is doing your Immunology now?'

**A.C.K.**

'Well, we have had a gap. Because of the financial constraints, our post was not filled for quite a time and only just a week or two ago has the post been filled and the person is not yet even there. We have been ticking over in the Immunology. The other aspect of Immunology of glomerulo-nephritis is the tissue typing for kidney transplantation - that is another whole segment of work. '

**P.McK.**

'Does one person not suffice for the Glasgow area or do you want one person for your own unit?'

**A.C.K.**

'No, I think we should have one good laboratory which could basically serve us in Glasgow. Some of the purely routine lab. tests can be done almost anywhere - it is at laboratory technician level - but in terms of research, one set-up for Glasgow for renal disease would be quite ample.'

**P.McK.**

'And what developments do you see in the future for this unit?'

**A.C.K.**

'Well, what I have come increasingly to realise, Peter, is the importance of understanding more about the basic nature of kidney disease. I started off at the very sharp end of acute renal failure. I think we have covered acute renal failure. That was exciting and very worthwhile and still in a sense almost remains my first love. We have talked about regular dialysis and I have indicated I was full of anxieties about that - where was this going to end? We have talked about glomerulo-nephritis and research and I have come back I haven't talked much about transplants but we will deal with that later - well, I have become more and more aware of the futility - maybe that is too strong a word - but the illogicality of end stage renal failure. The fact is there are hundreds of patients around the country who have a renal lesion - a renal lesion we don't understand and can't really treat. We nurse them along; they get end stage renal failure; then we keep them alive on regular dialysis for years five, ten, fifteen years - all is now possible, and we may not have the opportunity to carry out a kidney transplantation and in a sense it is bolting the old stable door when the horse is out. Costs are enormous and we will really have to face this. It might be able to dispense with them because we knew about and could prevent or treat the diseases that lead to end stage renal failure. '