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A new RVH for a new century: maintaining clinical excellence

Annual Oration: Royal Victoria Hospital, Belfast, October 2003

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The need for a new RVH

This oration, and the record of it for publication, mainly focuses on the new Royal Victoria Hospital building opened officially on 2 September 2003, but it is interesting to compare and contrast the needs of the Royal Victoria Hospital at the ends of the 19th and 20th centuries. At both times there was increasing dissatisfaction with the hospital's accommodation while the demands on the hospital were increasing rapidly. For example, it was felt that more complicated surgery was much safer in a central facility. In 1900 this was the contrast between home and hospital surgery while towards 2000 the need for intensive facilities for complex major operations was apparent. In both eras the case for a new build was compelling but finances were a major issue. The process for the move to the RVH site and the process for the new build in 2004 had similarities. Firstly, the site of the rebuild had to be established (Figs. 1 and 2). Secondly, it was necessary to change the management of nursing. Thirdly, it was vital to involve medical staff. On both occasions members of the RVH medical staff were closely involved in decisions on the type of hospital and the facilities needed. Even 100 years later one has to acknowledge the dedication and fund raising ability of Lady Pirrie who was instrumental in raising the capital required to allow a foundation stone to be laid in 1901 and the official opening in the summer of 1903 by King Edward VII and Queen Alexandra. For a comprehensive account of these events see the official bicentennial history by Professor Richard Clarke.[1]

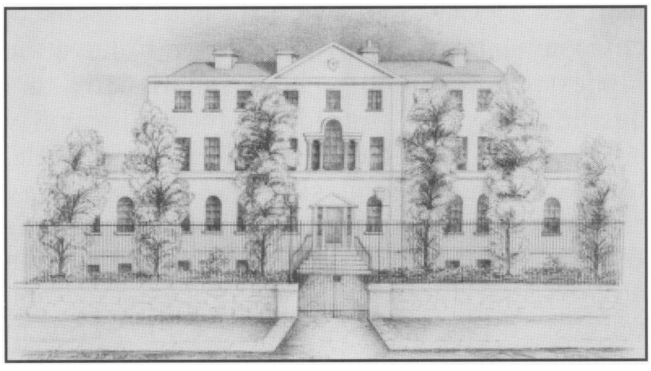

Fig 1. *The General Hospital, Frederick Street after 1847.*

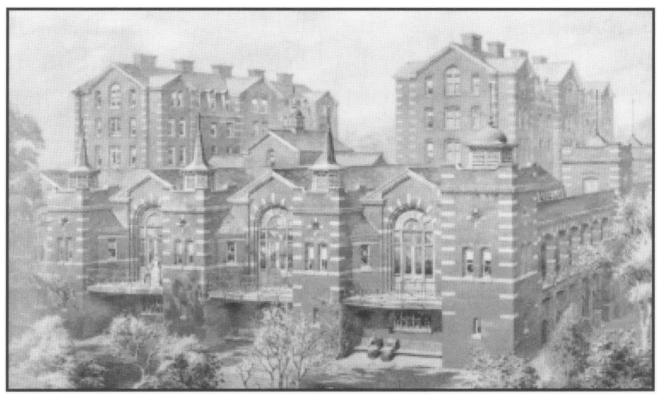

Fig 2. The Royal Victoria Hospital viewed from the South; architect's drawing, 1901.

Developments on the Royal site in the 20th century

Throughout the 20th century there were further changes to the fabric of the RVH. These can be divided into pre-NHS and post-NHS changes. After the initial beds were opened on the new Grosvenor Road site there were the additions of

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the King Edward Building in 1915, the new mortuary in 1924, the Institute of Pathology with Queen's University Belfast in 1933 and extensions to the ward units and new wards between 1925 and 1938. These changes are well reviewed in other publications.[1]

Since the institution of the NHS there have been a variety of additions to the site. The Pharmacy was opened in 1951, the Institute of Clinical Science in association with Queen's in 1954, the Metabolic Unit and Quin House in 1957, the Eye & ENT Building in 1965, the Dental Hospital with Queen's in 1965, the Outpatient Building in 1969 and A Block in 1973.

The changes to the site, and the development of the specialist services for Northern Ireland on it, in the first 25 years of the NHS, was of immense benefit to the people of Northern Ireland. Sadly, there was then a planning blight on site for many years while the existing fabric deteriorated to an unacceptable level. It became increasingly necessary to arrest this insidious decline and a series of important decisions were made in the late 1980s and early 1990s. In 1988 William McKee was appointed as Acting Group Administrator. He is of course now the Chief Executive. In 1989 John Cole, now Chief Executive Officer of the Estates Department, DHSSPS, established close links with the site. In 1991 the new government Trust status was applied for and after a year as a Shadow Trust in 1993 the Royal Group of Hospitals and Dental Hospital Health & Social Services Trust was established with Sir George Quigley as the first Chairman. The Royal Hospitals Community is greatly indebted to the three men mentioned above (Fig. 3) for their vision in beginning the process of making the hospital fit to serve the needs of both the local area and of the entire population of Northern Ireland.

In 1990 the hospital provided 32 specialties and had approximately 1,000 beds, but much of the estate dated from the early part of the century and had major problems. A Ceri Davis report suggested major health and safety issues, poor condition of buildings, many of which needed to be demolished, a large backlog in terms of maintenance, poorly located entrances and inadequate facilities for patients, staff and visitors. Despite this poor quality environment the hospital could still be proud of its work and ethos but the need for better accommodation was paramount.

Fig 3. From left: William McKee, Sir George Quigley and John Cole (2003).

Between 1992 and 1997 new facilities were provided for cardiac recovery, neonatology, laboratories and the School of Dentistry and Phase I of the Children's Hospital development was completed. The old Kelvin School building was upgraded to modern laboratory facilities and a new mortuary was built. New car parking was also provided. It was then essential to set out to develop a new RVH and this account describes the process for Phase I of it.

Phase I of the new RVH

A steering group was set up to develop a preliminary brief after widespread consultation within and outside the hospital. It also established membership of a project board which would have medical staff representation. Management Consultants were appointed to develop the brief and there was a wide discussion between them and users with RVH medical staff committee representatives, myself and Mr Roy Maxwell, attending these meetings as observers. This brief then had to be approved by the Area Boards and the Department of Health in terms of both functional content and funding. Quality objectives were set. The new build was to be patient focused, environmentally sensitive, and was to have the highest design quality, both functionally and aesthetically. It should be technologically advanced, should include art, should be accessible, have an integrated design and offer energy efficiency and low maintenance solutions. It was felt that the best way to progress this was with an architectural competition,[2] this process providing fairness and the best opportunity for the Trust to achieve its aims. A competition also had the great merit of avoiding the cheapest option concept.

A fixed capital sum and a fixed architect fee were set. The distinguished English architect, Sir Philip Powell, was the senior assessor with representatives from the Department of Health, senior medical, nursing and management representatives from the Royal site as well as representatives from the RIBA and RSUA. Mr Jim Grant from the Department was the competition manager. Sir Philip Powell's conclusions are important. He thanked the competition manager for his work in having skilfully compiled with the RIBA/RSUA the conditions and brief and thanked and praised the promoter "Royal Trust", and in particular John Cole of the Estates Department of the ESD, for having the good sense and imaginative wisdom to have this competition. Percy Thomas Partnerships/Ferguson & McIlveen were announced as winners, with some of the comments made regarding their scheme being that there was a strong sense of organisation, that there was potential for further development after the start of client consultation, and that the layout was immediately understandable with two distinct sides to the activity within the hospital, these being facilities for the acutely ill and for the more planned specialist medical and surgical services. The winning architectural partnership was later joined by Graham/Martin as the chief contractors and they had the distinction of delivering the building ahead of time.

However, after the competition, the Hospital Trust had still to await a financial decision from government and on 5 June 1995 the then Health Minister, Mr Malcolm Moss, announced a 64.5 million pound redevelopment package stating that the investment was evidence of the government's commitment to the health of the population, and also was recognition of the RVH's role as the keystone of the pattern of acute hospital service for Northern Ireland. However the Minister, as many others had in the light of a poor report from Professor Bernard Tomlinson on the bed numbers in London, seriously under-estimated the bed numbers required in Northern Ireland, expressing the concept that 277 beds in the new building might prove to be too many. This has already been shown to be grossly inaccurate.

After the announcement of the results of the architectural competition and the financing of it, there was then an intense period of consultation work with the design consortium and the various

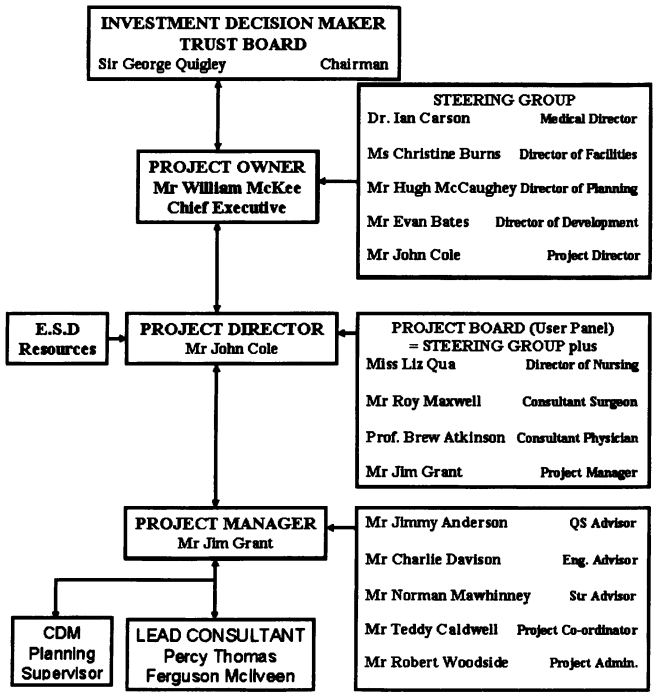

Table 1. Boards used for the development of the new phase I RVH.

Fig 4. Perspectives of the new Phase I, RVH (2003) – the building from the Kelvin site and the new intensive care unit facility.

project boards within the hospital resulting in a variety of design modifications and adjustments (Table 1). Work then began on site and things kept strictly to time with first commissioning and use of the new build in autumn 2001 for some outpatient use, first bed occupancy in 2002 and an official opening by HRH, the Prince of Wales in 2003 (Fig 4).

One added floor, designated as a rattle-space floor design for future needs, allowed expansion before opening to 400 beds. The foresight to negotiate and include this flexible space has proved vital already in the work of the hospital. Four new theatres and a new recovery unit were built as part of a 10 theatre suite. Three theatres were provided for day procedures and a three room endoscopy unit was also incorporated. In addition there is a 20-bed intensive care unit, a fractures clinic, a central investigations unit, one 9-consulting room outpatient department suite and a new endocrinology and diabetes outpatient centre. The building also contains the pharmacy, restaurants and a new and appropriate main entrance to the hospital.

The process was not without difficulties. Bed numbers were a major issue as was the acute hospitals' reorganisation process which had made it very difficult to assess which specialties would be sited at the RVH. There was also at this time no definite blueprint for future hospital services in Northern Ireland. Careful consideration had to be given to the possible hub and spoke arrangements for specialties and their impact on the RVH. Despite these difficulties the project moved ahead with close consultation but tight closing of that process at correct deadlines. It was also possible to complete the financial negotiations for the project without having to go to a public finance initiative. Today I think it entirely appropriate that we indulge in some self-congratulation as a hospital community on having achieved such a state of the art new hospital. It has happened because of a lot of planning, hard work, negotiation and cooperation by very many people in the RVH and in the wider community.

Future Site Plans

The completion of Phase I begins but does not complete a new era for the Royal Hospitals Group. Site plans have been agreed for the next 10 years and include work on a new maternity hospital, a hotel and education centre, completion of development of the Children's hospital, expanded parking developments and a new open square at the front of Phase I. These will all follow on from Phase II, for which plans had already been made and which are currently being developed. On site, in late 2003/early 2004 are the first signs of the first podium in Phase II, with it new imaging centre, being prepared.

The Importance of Clinical Excellence

Clinical excellence is a vastly important topic in today's NHS. This new building alone cannot bring it about but it is essential that a hospital such as the RVH aims for it for every aspect of a patient's care. Suggested solutions have included appraisal, revalidation, clinical governance, audit, charter marking, CHI and the extensive use of guidelines and protocols. All of these are important and many of them in time should lead to all-round improvements in the care of patients. However, this oration will focus on the important role to be played in maintaining clinical excellence by two other aspects of medicine, clinical investigative research and the development of specialist teamwork.

If we turn to clinical investigation and research, much can be learnt from the study of how some key advances were made and since my own specialty is that of endocrinology I have chosen some illustrative aspects of it. A medical student or practising doctor would do well to read a wonderful description of clinical research on bone disease as detailed by Dr Fuller Albright in his text "Uncharted Seas".[3] Albright was perhaps the greatest endocrinologist of the 20th century. He worked for most of his life in the Massachusetts General Hospital, having previously studied with Erdheim in Vienna, a pathologist whom he described as quite simply the man who knew more about human disease than any other living person. Albright in a relatively short career described the renal effects of parathormone, post-menopausal osteoporosis and the benefits of oestrogen, vitamin D related rickets, Klinefelter's syndrome, and therapy for hypoparathyroidism. Among a variety of hypotheses he suggested that oestrogen plus progesterone would act as a contraceptive and also discussed the concept of end-organ resistance to hormones, nowadays a most important and well validated concept in endocrine disease.

To emphasise the importance of clinical investigation Albright described the case of Captain Charles Martell born around 1900.

Between 1918 and 1932 he developed back pain, leg pain, loss of height, gravel in his urine and fractures of his legs and arms. His X-rays showed transparent bones and he was eventually referred to a Dr Eugene Du Bois in New York. Albright comments that every hospital ward, and this continues to be the case in 2004, has its quota of patients suffering from conditions which are understood either imperfectly or not at all. He stated that "hope depends on careful investigation. All sorts of orifices must be explored by various specialists. Body fluids must be withdrawn and chemical estimations made. Animals should receive injections with these fluids and changes noted. Every lead must be run down and any unusual findings must be compared across the world. Importantly, the doctors must have the investigative point of view and must become familiar with the techniques of scientific and experimental study." After seeing many other doctors Martell eventually met Du Bois who was aware that this was an unusual and previously undescribed case. At this stage the association of bone disease with parathyroid tumour was unknown. However, Du Bois was widely read and knew of Collip's work on parathyroid extracts and their importance in the transport of calcium between the stores in the bone and between blood and urine. He measured calcium in the Captain's blood and it was high. Other metabolic measurements showed that more calcium was going out than in. He then deduced that the results paralleled the findings in dogs which had received Collip's bottled parathyroid products. Although bone disease was not his field he made a tentative diagnosis of overproduction of parathyroid products. He then transferred the patient to the Massachusetts General Hospital Research Investigative Ward where it was proven across six months that the results were the same as in normal subjects being given parathyroid extracts. Eventually an operation was recommended but there was no happy ending as no tumour was found at neck exploration. Despite this, other patients were found with similar conditions and did have successful operations, and eventually after many operations, a tumour was found in Captain Martell but this did not prevent an early death from the renal failure which had developed as a result of the longstanding hypercalcaemia.

What application does such a story have for the modern teaching hospital? It is essential that as we move into the new century, the Royal Group of Hospitals give an appropriate priority for research. They must employ clinical investigators and must provide appropriate facilities. They must ensure that the research pathway which has become increasingly complex nationally and internationally is made as smooth and facilitating as possible by the hospital. There must be recognition that adequate time is required by those involved in clinical research and adequate funding should be made possible. This is, of course, key to the Royal Group's Mission Statement which states that it is our fundamental purpose to provide highest quality cost-effective health care as an outstanding acute general hospital and tertiary referral centre through exceptional service to our patients, staff and community in an environment of education, teaching and research. We must never forget that one of our duties is to forward research for the betterment of our patients. Albright stated that the investigating doctor should be trying constantly to push forward the frontier of medical knowledge. "The large majority of them of course make no world startling shove but a surprising number nevertheless contribute a slight push in some direction. The important effect of this arrangement is that those would be Pasteur's, working on their problems, know their frontiers and keep the whole community of doctors with whom they are in contact current and up to date. James Packer, a well known theologian, writing in a different context, states that by standing on the shoulders of giants, little people like ourselves may hope to see more than we would if we stayed on the ground.

Exactly where basic research will lead is often unclear and we must not be narrow enough to think that so-called blue skies research is inappropriate for our NHS and for our Research and Development Office in Northern Ireland. A good example of this is found in the renin-angiotensin system. This was discovered when crude extracts of rabbit kidneys were injected into other rabbits in 1898 and the blood pressure was shown to rise. Then in 1938 Goldblatt clipped renal arteries and again showed that the blood pressure rose. A renal pressor extract was standardised and named renin and eventually the hormonal cascade of the renin, angiotensin I, angiotensin II and aldosterone system was identified. For many years it was thought that this was of interest but not of great importance, and the implication for research funders might have

been that this was pretty far from the real killer disease of hypertension and probably irrelevant to less specific forms of hypertension than renal artery disease. It could also be dismissed as pretty much animal research work or as blue sky research with little application to the Department of Health or to a University. However, ongoing work in which I was privileged to play a small part has led to the development of angiotensin converting enzyme (ace) inhibitors, angiotensin receptor blockers, aldosterone antagonists and combination of these drugs with other drugs such as diuretics has been shown to have an important effect in reducing morbidity and mortality in hypertension, cardiac failure, myocardial infarction, incipient and established diabetic kidney disease (Fig 5). Severe cases of refractory hypertension can be controlled with a combination of ace inhibitor and high dose loop diuretic,[4] while in the Hypertension in Diabetes Study of the United Kingdom Prospective Diabetes Study (UKPDS), the tight blood pressure control groups, one of which was based on therapy based on the use of ace inhibitors, reduced risk for any diabetes related end-point by 24%, with a 32% reduction in diabetes related deaths, 44% in stroke, 37% in macrovascular disease, 56% in heart failure and 34% in retinopathy progression over an eight year period.[5]

Another implication for this UKPDS study is that multicentre drug studies such as this are often not just simply drug studies but answer vital and fundamental pathophysiological questions which one centre cannot. The RVH has to facilitate and encourage those who wish to join such studies. The increasingly difficult national and international research process must not be allowed to interfere. The new Royal Research Office has made a most promising beginning and for the future has a pivotal role to play together with all of our new divisions in fostering and encouraging the role of research. Newly appointed NHS and University Staff should be encouraged to actively pursue research in their chosen disciplines.

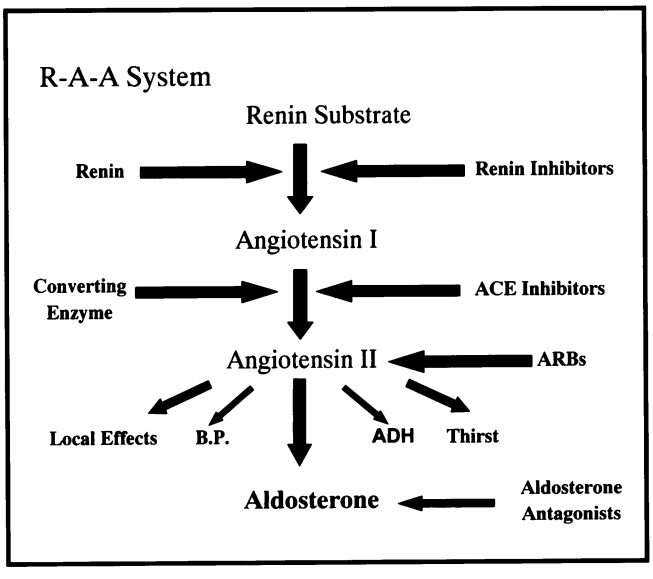

Fig 5. The renin – angiotensin – aldosterone system and its inhibitors and antagonists.

One recent development in endocrinology has been the increased understanding of the role of genetics. Over the coming decades the linkages between genetics and endocrine disease will become increasingly important. In Cambridge a Dublin graduate, Professor Steve O'Rahilly, has begun to make great advances in the study of the major health problem of obesity by looking at rare families of Pakistani origin in whom he has demonstrated major hormonal defects in production of the regulating hormone leptin.[6] This work has been recognised by the award to him of an FRS at a very early age. Other developments with this work and with other work in London point the way forward in that genetic studies plus hormone studies on the integrated relationship between hormones of hunger and satiety (including leptin, agouti-related protein, NPY, ghrelin, and neuropeptide Y) offer many exciting insights into the general problem of obesity.

Of what relevance are these particular studies to us? I would like to point out that we must nurture special talent such as that of Professor O'Rahilly. This is increasingly being done in some centres. We must ask ourselves whether or not our hospital and our university would recognise such a talent and develop it. This is essential. Interestingly also, many of these studies have also prospered because of national disease registers to which various hospitals including our own contribute. We should increasingly become part of these and should be encouraged to do so. At the same time specialists must be given the opportunity to meet and interact with cutting edge science. Proscriptive study leave formats will kill the teaching hospital ethos of being at the forefront of medical advance. Until now the Royal Group has had an enlightened attitude towards this and this must be maintained for the future.

Finally today, I want to point out the importance of research and teamwork in our own Regional

- Diagnosis
  - intravenous dexamethasone
  - low dose dexamethasone
  - cyclical Cushing's diagnosis
- Pathophysiology
  - cortisol feedback studies/insulin resistance studies
  - insulin hypoglycaemia and GH status,hypertension
- Differential diagnosis
  - petrosal sinus sampling, CRH and high dose dexamethasone
- Acute therapy outcomes
  - bilateral adrenalectomy and pituitary surgery
  - ketoconazole , rosiglitazone protocols
- Long-term outcomes after treatment
  - mortality rates and incidence of Nelson's syndrome

Table 2. RVH Endocrinology Unit Research Studies in Cushing's Syndrome.

Endocrinology and Diabetes Centre where I am privileged to work. The Centre has had an active interest in Cushing's syndrome, the clinical manifestations of excess production of cortisol, for approximately 50 years. This work was pioneered by the late Professor Desmond Montgomery soon after cortisone acetate had been isolated from adrenal extracts.[7] Years later there are still major problems in Cushing's syndrome – these involving the diagnosis of the condition, the differential diagnosis, the interpretation of imaging studies, the limitations of current therapy, and the adequacy of studies on the long term outcome of the disease. Some of our research studies in Cushing's are shown in Table 2. Studies involve the cooperation between the unit's specialist medical and nursing staff, the Regional Endocrine Laboratory and the expertise in our department of radiology. Particular points of interest in the various studies have been the ability to recruit suitable control subjects and to study patients with possible and probable hypercortisolism with prolonged follow-up and hence correctly categorise them for diagnostic test protocols. A very careful investigational nursing procedure is essential but I believe impossible except in specialist wards such as our own 7D (or the old Metabolic Unit – ward 25) with nurses trained in careful investigative nursing procedures (see also comments from Albright also regarding this in his publication). Other outcomes of the research have been developments with Mr Brian Sheridan and the Regional Endocrine Laboratory of the use of early morning urinary cortisol to creatinine ratios to allow study of cortisol excretion as outpatients over an extended period of time. This allowed demonstrations of the fluctuations in cortisol from day to day and helped us establish cyclical Cushing's syndrome as a much more common disease entity than had previously been recognised.[8] This has then been shown to have important ramifications for the diagnosis, differential diagnosis and assessment of outcome of the disease.

We have also been very fortunate in our collaboration over the years with the radiology department with first Dr Teddy McIlrath and more recently Dr Peter Ellis. Their expertise and innovation have allowed us to look carefully at new pituitary imaging techniques and also to use the technique of bilateral inferior petrosal sinus sampling to establish the site of production of excess ACTH.

All of these research studies in Cushing's Syndrome show a wide team involvement with specialist laboratory expertise, specialist investigative nursing staff, radiological innovation and expertise. In addition there is a fundamental role for the specialist pituitary neurosurgeon, the specialist endocrine surgeon, the expert radiotherapist and the educational and investigational role of the endocrine specialist nurse. Over the years we have also been fortunate to have high quality junior medical staff and research fellows, many of whom have gone on to distinguished careers in endocrinology.

In many other departments of the Royal Group of Hospitals such specialist teamwork allows tertiary referral work to proceed and new investigations and management to be implemented rapidly. It is essential to the work of the RVH, not just for investigational research, but to ensure continuing high quality outcomes for each patient. I also strongly believe that an active research philosophy spills over into the care of all patients whether involved in a specific research project or not. It is already well documented that patients taking part in research projects have a higher standard of care than those not offered such an opportunity.

In conclusion our new hospital and our plans for future development of its fabric provide a wonderful opportunity for us all to learn and to develop our teaching, our research and our patient care. I encourage our medical students and indeed all of us to develop a thirst for knowledge and for new information and I wish our new students well in their clinical studies. I believe that a correct

emphasis on investigative medicine and on the appropriate funding and facilities for this is essential to the future of the Royal Group of Hospitals. This together with adequately staffed specialist teams throughout the hospital will enhance our care of patients and allow us to be a teaching hospital fit for the new century.

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