

The Society of Cardiopulmonary Technology (NZ) Inc.

FIFTY YEARS OF PROGRESS

1967-2017

Written to celebrate the 50th Anniversary of the founding of the Society

by

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Printed by

Warkworth Digital Design and Print

First Published 2017

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ISBN 978-0-473-41182-4

Foreword by Fiona Riddell

It is a great privilege for me, as the current Chairperson of the Society of Cardiopulmonary Technology, to write the foreword for this book commemorating our 50th Anniversary. This Society has continued to set standards of training and qualifications for those engaged in the practice of cardiopulmonary technology since it was founded in 1967.

As one would expect, there have been changes over the years. The job titles have changed; the technician group formerly called ECG Technicians are now Cardiac Physiology Technicians and the technical group formerly called Physiology Technicians, became Cardiac Technologists, and are now Cardiac Physiologists.

The qualifications have also changed. Originally, all of the Society student members sat the Associate examinations and these have been replaced by the Certificate in Physiological Measurement. The Membership and Certificate of Proficiency qualifications have been removed and the Certification of Cardiac Physiologists has been introduced.

The Society established a voluntary registration board in 1996 in order to set minimum qualifications for both technical roles. After consultation, guidelines were drafted for Cardiopulmonary Technicians and Technologists and included those working in the respiratory field.

The Society Registration Board evolved into the Clinical Physiologists Registration Board in 2005 in order to apply for registration under the Health Practitioners Competence Assurance Act. The Society continues to set the competency standards and qualification requirements for all technicians and physiologists employed within the clinical cardiac physiology field and all members must comply with the national criteria. The introduction of registration was instrumental in setting and maintaining minimum standards and competencies for the workforce.

A new national qualification for Physiologists, the Postgraduate Diploma in Medical Technology: Cardiac, was established through the University of Otago in 2006. Entry level to employment in the field is now an undergraduate degree. The Certification of Cardiac Physiologists was developed to provide the practical competency training and assessment for this group. Thus, the Society now provides separate certification pathways for the two cardiac technical groups.

After holding additional separate meetings for members over several years to discuss the many issues facing the profession, decisions about training programmes and recommendations to the registration board, the SCT Council established two sub committees in 2007:

The first, the Professional Development Group, with the aim of addressing profession specific issues and to provide a forum for networking of senior and charge technologists.

The second, the Education Committee, with the aim of reviewing the training programmes, setting exams, reviewing results and accrediting hospitals responsible for training.

Over the years, due to increasing workloads and diminishing “spare time”, the work performed on behalf of the Society Council on a voluntary basis, has reduced. The Society pays for the marking of course assignments, teaching at block weekends, development work and the treasurer role, while the SCT Council and the subcommittees continue to work in a voluntary capacity.

The Society runs an annual scientific symposium during the Cardiac Society of Australia and New Zealand (CSANZ) scientific meeting in New Zealand and this has been a successful forum in which the members and invited speakers can present advances relating to the technology in use. Distribution of annual fellowships for the annual scientific CSANZ meetings in both New Zealand and Australia provides access to scientific meetings otherwise denied to members by limited funding.

This year, the Society and CSANZ co-sponsored two national workforce surveys designed to quantify the scale of the current challenges affecting the delivery of a consistent and responsive service throughout New Zealand. Results have been distributed to all members and presented at two national meetings. Some key issues have been identified and we need to take the time to thoroughly review the results and identify possible solutions.

New designated advanced roles for Cardiac Physiologists were agreed during the 2016 contract bargaining. The two roles of Specialist Physiologist and Advanced Practice Physiologist will be established on the basis of service need and will provide a career pathway for advancing clinical practice. Other changes may include the introduction of a masters pathway, a smoother transition from the technician role to the physiologist role and changing and adapting scopes of practice for both technical roles to meet demand.

In the process of writing this, I have realized how much has evolved over the decades. It has been a reasonably complex history to cover and through the continued activities of the Council, the Education Committee and Professional Development Groups, the Society has supported a cardiac physiology workforce that has successfully adapted to changing technology and increasing patient complexity and will continue to do so in the future.

I thank all the Society members, past and present, for everything they have contributed and wish every success to those who will take the Society through the next fifty years.

Fiona Riddell

Chairperson

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Technical Staff at Green Lane Hospital 1963.



**Photograph taken in the Surgical Laboratory in about 1963
From Left: possibly Louise or Michelle Hogan, Louise Conway Beech,
Clare Biggs, Dr Jack Sinclair, Tony Mekkleholt and Sid Yarrow.**

Technical Beginnings at Green Lane Hospital

Dr James Lowe appointed Sid Yarrow in 1954 to help with technical aspects of cardiac investigations and when the surgical laboratory opened in 1956 he became involved in the animal studies. Tony Mekkleholt was employed to work with the animals in the surgical laboratory. This work preceded the first New Zealand bypass in 1958. In 1960, Dr Jack Sinclair was appointed as Head of the new Physiology Department. The first technician Jack Sinclair employed was Carol Lambert in 1961, then Clare Biggs (later Greenwood) and towards the end of the year Louise Conway Beech.

Our Beginnings

A message and some reminiscences from our Founder

Louise Conway Rahman (nee Beech)

I was delighted to be asked to contribute a few words to this publication on the 50th Anniversary of the founding of the Society.

When Carol told me of the planned celebrations I thought there must be some mistake – it couldn't be half a century ago that I returned from Oxford as a young woman in my 20s, full of enthusiasm to establish the New Zealand Society but I did the maths and its true – I am now an old woman in my 70s!

I am gratified, but not surprised, to see how far the Society has come since then – I only ever saw the Society of Cardiological Technicians as a first step towards establishing a professional qualification in our field. When I returned to England again in 1969, leaving things in the capable hands of Carol Meiklejohn (as she was then), I knew she would be the one to take it on to the next step of becoming a broader, New Zealand-based system of qualifications equivalent to that of the Pathology Laboratory Technicians.

Most of you attending this 50th Anniversary Reunion will perhaps be unaware that we have, in fact, a much older history – “Founder’s Day” which was celebrated on the 30th August 1963 in what was claimed to be the tricentennial year of the founding of the “Royal Society of Physiological Technicians”. The invitations to that occasion requested contributions towards a life size memorial statue of the putative founder, a Miss Florence Hephzibah Harmenzoon Van Rijn-Smyth. Of course, we really only hoped for enough to buy cakes for the party and were glad to get that, but then we thought well, why *not* a statue?

In a matter of days, the boys in the instrumentation workshop constructed a metal armature and “we technicians” used a direct plaster of paris technique to build up a life size representation of our Florence in defiant pose. I hope it is safe now to admit that a certain amount of plaster bandage and theatre drapery was incorporated into her being. The unveiling and celebration along with an exhibition of the evolution of techniques and equipment used in cardiac investigations over the previous 300 years was a great success and her statue stood in the corridor until at least June 1966 when Jack Sinclair referred to it in a letter to me but it had gone by the time I returned in October that year.



Florence Hephzibah Harmenzoon Van Rijn-Smyth was unveiled by Sid Yarrow in 1963.

The “Why Not?” thinking that made a reality of the crazy notion of a Founder's statue sparked the thought of Why Not a Real Society?

Martin Luther King had made his “I have a dream” speech two days before Founder’s Day, emphasising the idea that if sufficient people want something enough they can make it happen. So, why not a real society building a genuine history to be proud of? That is how this worthy Society grew out of something quite fanciful and, who knows, we may yet obtain a Royal Charter and in 250 years technicians could be celebrating the actual tercentenary. Too early to commission a statue perhaps, but if anyone is interested, my retirement activity is stone sculpture!

I began my career at Green Lane Hospital in late 1961, with a guilty secret, taking the post after completing the first year of a BA degree at Auckland University following a delightful and totally irrelevant interview gatecrashed by the Medical Superintendent, Dr Newman, in which we discussed nothing but English and French literature. I actually only intended to stay for the long summer vacation but as the time to say I was returning to university came near I was too ashamed to admit it and, besides, I was finding the involvement with the exciting new world of developing cardiac surgery and investigation fascinating. So, I carried on, benefiting from a solid apprenticeship under Sid Yarrow who insisted on the strictest of standards, but realising there was nothing more to aim for – it was either, go back to academic studies or create a worthwhile qualification in this field. Since I found there was already a recognised Society with a two-tier examination system in the UK and the latter course had the fringe benefits of leaving the parental home and overseas travel it won hands down. It was in the days when a six-week voyage to England was still marginally cheaper than air travel and included stopovers in exotic ports sailing via Panama and Suez. I looked at the map and picture books and decided that Oxford would be an interesting place to live

so wrote and asked for a job at the Radcliffe Infirmary. The offer of a post as Cardiological Technician came back straight away with a request to start as soon as possible.



Louise with her brother Peter and Sid Yarrow and Jack Sinclair at the farewell for Louise in 1964.

My Mother was a good friend of Amy and Dick Stirling – Amy was a lovely lady and my Mum was quite in awe of her. I think her full name was Amirian Minutia Stirling and that she was quite high ranking. She invited them to my leaving party and Amy brought the cloaks and a beautiful old greenstone tiki. I remember her putting a cloak and tiki on me and a little cloak on my brother Peter (only seven at the time) and giving me a blessing for my overseas travel. She then also put the cloaks on Sid and Jack as important men in the department. No one else was allowed to wear them. She impressed on us the significance of the cloaks and the honour of being allowed to wear them.

Again, no proper interview but Dr Grant Lee was expanding his department and knew his own mind. By September 1964 I was on his team. He turned out to be a charmingly eccentric, aristocratic English gentleman who could also be totally stubborn and irascible. We got on really well together and are still good friends now he is in his nineties.

I joined the Society of Cardiological Technicians as soon as possible and took the examination for Associate Membership in 1965. I managed to persuade them that international expansion to New Zealand would be to their advantage as well as ours and to allow me to take the Membership exam in 1966, instead of the prescribed two years later,

so I could return to New Zealand later that year and get on with establishing the New Zealand branch.

Sid Yarrow, Dr Sinclair and even Dr Newman wrote to me regularly during my two years away, keeping me up to date with developments at Green Lane and organised my reappointment to the department in October 1966 (real letters that had to be typed and posted). In one of these letters, Dr Sinclair (referring to current salaries for cardiological technicians moving up to £1013 per annum with progress beyond up to £1210 dependent on additional responsibilities), made the comment that, "these are reasonably good salaries for girls but less than adequate career levels particularly for married men." Further on he remarked that, "We can get reasonable applicants at most times of the year but still don't seem able to maintain enough in their third and fourth years to train the juniors." It just confirmed the need for a standardised qualification system that would not only provide a career path but also hopefully reduce gender bias.

Having passed the UK MSCT, and enjoyed the obligatory but exciting bit of the Overseas Experience: kayaking down the Danube, sleeping in the olive groves on Corfu etc. and narrowly avoiding being stranded by the British Seamen's strike, I set off on the voyage home, via a rather tense Suez and Aden, then Sri Lanka and around Australia, visiting Sid Yarrow, who had by then moved to Sydney, on the way back.

Back in New Zealand, the idea of the Society and its qualifications was taken up with a lot of enthusiasm both at Green Lane and throughout the country. Many of the technicians we contacted in other cities were working on their own or in very small groups and particularly welcomed the opportunity to be in contact with others and to be part of a shared enterprise. Because we were so few, scattered over an area the size of the UK, it was obvious from the beginning that training materials would have to be sent out by correspondence.

The fact that we managed to hold the first examinations within less than a year of the inaugural meeting in 1967, indicates the speed with which everything was put into motion. The first members had signed up to a course before it was even written! I had a lot of help from others writing specialist chapters but where I couldn't persuade anyone, or they were failing to meet deadlines, found myself writing the material as well as photocopying, collating and posting out. We had a lot of laughs in the scramble to keep the show on the road and if any of that material still exists, I would probably be appalled by its amateurism but it served its purpose and our technicians performed better than their British counterparts in the UK examinations.

The UK Society had been founded in 1949 and has held examinations since 1957 based on a syllabus compiled jointly with the British Cardiac Society. These provided a recognised standard and a very helpful shortcut to setting up our own Society by using its constitution, syllabus and examination system as a scaffolding on which to build our own New Zealand system. It too, has developed considerably since those days to keep pace with the

developing technology and has also reflected this with a change of name to The Society of Cardiological Science and Technology.

After returning to England in 1969, I worked in London at the Postgraduate School of Medicine in Hammersmith (where I met my husband) and then the National Heart Hospital for a total of three years before leaving to start a family. I later gained an honours degree in Psychology and an MA in Counselling and Psychotherapy leading to a whole new career as a counsellor at Manchester University.

I look back on those years in the sixties as a very exciting time – both for the achievements in establishing a basis for a proper career structure for technical staff and for the opportunity we had to be a part of the amazing developments in cardiac research and surgery going on in the world and Green Lane Hospital in particular.

We also had such a lot of fun thanks to the camaraderie within the team of doctors and technicians who didn't take themselves too seriously to enjoy silly things like Founder's Day, the annual "Man of the Year" award, the spoof letter from the White House (asking Richard Rowe to bring a small team of technicians with him on taking up his new post as Head of Paediatric Cardiology at the Johns Hopkins Clinic in Baltimore), and the lunchtime games of cricket in Cornwall Park.

I feel fortunate to have been a part of all that and to have kept the friendship of some of my colleagues from so many years ago.

I have great respect and admiration for those who have taken a necessarily more serious approach to the development of the Society, bringing it to the illustrious position it holds today and I wish all current members the very best for the future.

Louise Conway Rahman FSCT

Signatures to the Application for Registration as an Incorporated Society

This form was filled in on 26 February 1968 as the registrar found that the original submission did not meet the requirement for each signature to be witnessed.

L. & D. — (I.S.) 3

APPLICATION FOR INCORPORATION

We, the several persons whose names are subscribed hereto, being members of the above-mentioned society, hereby make application for the incorporation of the society under the foregoing rules, in accordance with the incorporated Societies Act, 1908.

Dated this 26 Feb day of 1968

Signature, Occupation, and Address of Applicant	Signature, Occupation, and Address of Witness
1. <u>L. Conway</u> <u>Physiology Technician</u> <u>86 Taylors Rd., Auckland 3.</u>	<u>C. Cunningham</u> <u>Registered Nurse</u> <u>22 Mission Road</u> <u>Takapuna</u>
2. <u>L. Ross</u> <u>Physiology Technician</u> <u>25 Martin Ave. Auckland 5</u>	<u>C. Cunningham</u> <u>(as above)</u>
3. <u>M. Shepherd</u> <u>Physiology Technician</u> <u>14 Haig Ave. Auckland 4.</u>	<u>C. Cunningham</u> <u>(as above)</u>
4. <u>H. Hickett</u> <u>Physiology Technician</u> <u>3/222 Green Lane Rd. Auckland 3.</u>	<u>L. P. Hutton</u> <u>Electronics Technician</u> <u>Flat 2, 14A Belmont St. Ellerslie.</u>
5. <u>D. R. Dickey</u> <u>Physiology Technician</u> <u>53 Hillsborough Rd., Mt. Roskill, Auckland.</u>	<u>L. P. Hutton</u> <u>(as above)</u>
6. <u>Frank M. Horak</u> <u>Physiology Technician</u> <u>7 Crescent Rd., Parnell.</u>	<u>L. P. Hutton</u> <u>(as above)</u>

TWO copies of this application are required. Members should sign in same place in each copy.
A witness may not be a signatory.

P.T.O.

L. & D. — (I.S.) 3

Signature, Occupation, and Address of Applicant	Signature, Occupation, and Address of Witness
7. <u>C. M. Greenwood</u> <u>115 Market Rd., Epsom</u> <u>Auckland (Physiology Technician)</u>	<u>C. Ingram</u> <u>9 TAMARIKI AVE, KELSTON, HOKIANGA</u> <u>(MEDICAL ELECTRONICS)</u>
8. <u>Mr. J. Freeman</u> <u>E.C.G. TECHNICIAN</u> <u>33 Okau Avenue Epsom, Auckland</u>	<u>C. Ingram</u> <u>9 TAMARIKI AVE, KELSTON, AUCKLAND</u> <u>(MEDICAL ELECTRONICS)</u>
9. <u>Mr. Thorne</u> <u>(Physiology Tech)</u> <u>3 Puhara Road Takapuna Auckland 9.</u>	<u>C. Ingram</u> <u>9 TAMARIKI AVE, KELSTON, AUCKLAND</u> <u>(MEDICAL ELECTRONICS)</u>
10. <u>A. C. Lofthouse</u> <u>Physiology Technician</u> <u>31 Hill Crescent New Lynn Auckland 7.</u>	<u>M. Matting</u> <u>38 Queen Mary Ave. Epsom</u> <u>(Radiographer)</u>
11. <u>O. F. Hession</u> <u>(Cardiology Technician)</u> <u>Cardiology Clinic, Napier Hospital</u>	<u>W. League</u> <u>35 Shakespeare Rd. Napier N.B. (Registered Nurse)</u>
12. <u>G. J. Ransier-Smith</u> <u>E.C.G. TECHNICIAN</u> <u>146 Maxine Rd. Napier</u>	<u>A. H. Hampton</u> <u>108 Chaucer Rd. Napier (Medical Typist)</u>
13. <u>H. Adey</u> <u>(Sister, bornology case unit Napier Hospital)</u> <u>6 Hurley Road Napier</u>	<u>R. Burrow</u> <u>73 Ebenezer Cox Green Napier. Registered Nurse.</u>
14. <u>K. C. Chalmers</u> <u>(Sister, emergency care)</u> <u>31 Wycombe St. Napier</u>	<u>M. G. Ginn</u> <u>14 Chaucer Rd. Napier (Reg Nurse)</u>
15. <u>S. Howard</u> <u>(Sister, bornology case unit)</u> <u>57 St. George St. Napier</u>	<u>W. League</u> <u>35 Shakespeare Rd. Napier N.B. (Registered Nurse)</u>

Sm. 5.66.8159, W.P.

The History of the Society

The Society of Cardiological Technicians (N.Z.) Incorporated 1967

Establishment in 1967

The founder of the Society of Cardiological Technicians (New Zealand) Incorporated was Louise Conway Beech. She had been working in Britain and was a Member (MSCT) of the British Society. After returning to New Zealand, she was keen to establish a Society here and initiated the process. Following responses to information circulated to Cardiological Technicians throughout New Zealand, a meeting was held in Auckland on 3 August 1967 (refer Appendix 5) to discuss the establishment of a New Zealand Branch of the Society of Cardiological Technicians, hereafter referred to as the "Society" or "SCT". Ten are recorded as attending the inaugural meeting. Others attended, but only the number required to establish an Incorporated Society were recorded on the original minutes. It was at this meeting that the English Society Constitution was amended to suit New Zealand. The Society was incorporated on 28 November 1967.



The founding members, who were signatories to the application for incorporation were: Louise Conway Beech, Lynleigh Ross, Margaret Shepherd, Donelle Dickey, Heather Nisbet, Frank Hanak, Clare Greenwood, Mrs J Freeman, Christine Thoreau and Carol Meiklejohn all of Auckland and Olwen Watson, Gloria Paviour-Smith, Helen Adey, L Chalmers and S. Howard of Napier. Margaret Maxwell (Auckland), Lynette Hodgson (Hamilton) and Barbara Seymour (Auckland) were also founding members.

The first Councillors were Lynleigh Ross (Chairperson), Louise Conway Beech (Secretary and Education Secretary), Heather Nisbet (Treasurer), Margaret Maxwell, Lynette Hodgson and Barbara Seymour.

At the inaugural meeting, several distinguished persons were considered for President and it was decided to ask Sir Douglas Robb, pioneer of Cardiac Surgery in New Zealand, Chancellor of the University of Auckland and former President of the British Medical Association. Sir Douglas Robb accepted and became the first President of the Society.

Louise Conway Beech organised the writing and distribution of the first correspondence course. In 1968, the first written and oral examinations were held in New Zealand, but everything was set in Britain and sent to Britain for marking. It was a slow process before email. Thirteen members passed their examinations and became Associates of the Society of Cardiologists Technicians (ASCT). The following students passed in the first ASCT examinations: Donelle Dickey, Frank Hanak, Susan Harding, Carol Meiklejohn, Lynleigh Ross, Margaret Shepherd and Chris Thoreau, all of Auckland, Lynette Hodgson (Hamilton), Olwen Watson (Napier), Cecil Hall (Christchurch), Frances Milnes (Dunedin), Barbara Ballantyne and Alison Fraser. Carol Meiklejohn and Lynette Hodgson were the first to be commended.

Cecil Hall was the first Cardiac Technician in Christchurch although there were ECG Technicians prior to that. He was the first to sit ASCT from Christchurch in 1968 followed by Marion Lovell-Smith in 1969. (List of Certificates by Year refer to Appendix 4).

Louise Conway Beech was returning to England at the end of 1969 and so arranged special permission from the British Society for Carol Meiklejohn to sit for her Membership of the Society (MSCT) in 1968 to give the Society some continuity. This required special permission because the requirement was for two years of experience after ASCT before sitting MSCT. In 1969, Carol Meiklejohn passed her MSCT, one of the three who passed from the fourteen candidates who sat the British examinations and eight passed their ASCT examination.

In October 1969, a *New Zealand Herald* article "Technicians Play Vital Part in Heart Surgery" contained the following:

"The senior technician at Green Lane, Miss Louise Beech, was mainly responsible for establishing the Society of Cardiologists Technicians two years ago and subsequently organising correspondence courses for technicians at hospitals out of Auckland. She finished her duties at Green Lane yesterday and is returning to England.

Miss Beech, who is a New Zealander, completed her examinations in England three years ago at Oxford University. For her work in establishing the course in New Zealand, she was recently made a Fellow of the Society of Cardiological Technicians - the first person in New Zealand to receive the honour. Taking Miss Beech's place as senior technician is Miss Carol Meiklejohn who completed the society's training course in June – the first person in New Zealand to do so."

By the end of 1969, the Society had 56 members; 1 Member, 16 Associates, 3 Affiliates and 36 students. There was early support for the Society from Wellington Cardiologists, Dr Peter Leslie and Dr Ron Easthope, who both encouraged technical training. The first Wellingtonian to sit the ASCT examination was Helen Anthony in 1969 followed by Margaret Kempthorne, Paula Rhodes and Beverly Underwood in 1970 and Anthea Denning-Kemp in 1971.

In 1970, Carol Burfitt (nee Sellar) and Donelle Dickey passed the Membership examination.



In 1969 the distinctive NZ badge was designed and manufactured.

By now, the Society had a substantial membership, so recognition of the Society's examinations was sought from the Health Department. Salary increments were agreed for ASCT and MSCT. Examination candidates received notification of their results from the Council. Successful candidates received a certificate and bar appropriate to their examination. From 1968-1983 outstanding candidates were commended. By 1970 membership had risen to 62. It was decided, in 1970, that the person who had the highest mark in ASCT should be acknowledged as the Top ASCT candidate and receive a prize awarded by the Society. The first to receive this was Elaine Hosken (now Rush) who was Commended and Top. In 1984, the system was revised and candidates who averaged 80% or more in the examinations received distinction. In 1970-71, the President of the Society was Dr J.B. Lowe, followed by Sir Brian Barratt-Boyes 1972-1973, Dr T.M. Agnew 1974-1975 and Dr A.H.G. Roche 1976-1977 (For a full list of Presidents refer to Appendix 1).

Physiology Department Green Lane Hospital 1968

Louise Conway Beech was employed in the Physiology Department at Green Lane Hospital (GLH). The first ASCT exams were held there in 1968 and for many years Physiology staff were the driving force behind the Society. Louise Conway Beech is in the front row, fourth from left. The founding members of the Society in this photo are Carol Breed, Heather Nisbet, Stella Yeates, Donelle Dickey, Clare Greenwood, Chris Thoreau, Louise Conway Beech, Lynleigh Ross, Margaret Shepherd and Carol Burfitt.



Back Row: Dr RML Whitlock (Toby), Carol Meiklejohn, Heather Nisbet, Sid Yarrow.

Middle row: Jim Fountain, Stella Yeates, Warwick Bowden, Barbara Mitchell, Donelle Dickey, Clare Greenwood, Lyn Hows, Sally Cowdell, Ron Bentley, Marjorie Bridle, Neil Nouse, Graham Rust, Len Priestly.

Front Row: Henry Guilleman, Allan Haycock, Chris Thoreau, Louise Conway Beech, Louise Hogan, Lynleigh Ross, Margaret Shepherd, Carol Burfitt, Tony Mekkleholt.

Absent: Marjorie Freeman, Michelle Hogan, Kathy Perkins and Barbara Thatcher.

In the 1960s and 1970s, developments in the cardiac unit were of great interest to the public and often appeared in the press. That interest extended to this new occupational group of cardiac technical people.

Dr Toby Whitlock returns to Green Lane Hospital in 1968.

EVENING POST, WGTN, 1968

Using Computers In Medical Work

ALTHOUGH symptoms would not be fed in one end and the treatment received at the other, computers could play a large part in medical treatment in the future and take over many roles at present performed by nurses and technicians, said Dr R M Whitlock who returned to New Zealand in the Northern Star yesterday after 18 months study in the United Kingdom.

Dr Whitlock, who has been away on two Bank of New Zealand research grants, has been studying medical engineering and research at the Imperial College where a \$6,000,000 computer is being used for analysis.

He also spent a month at Westminster Hospital in the department of clinical measurement.

Dr Whitlock is returning to Green Lane Hospital, Auckland where a computer is to be installed. This, he said, would be for statistical and record work, but it could be used for other purposes.

He will be working in the cardiac-surgical department and up till now has spent a lot of time studying cardiac treatment.

The heart transplants, he considered, were a "good thing."

"We wondered at first whether or not they were a little premature, but are now beginning to think that it is a valid technique," he said.

The opinion in the United Kingdom, however, towards the heart transplant operations was "very mixed."

Should any transplants occur in New Zealand in the near future, he would be very keen to be associated with them, he said. Some of the best men were already here.



Dr Whitlock

Wellington Evening Post 1968

**Newspaper Article "Technicians Play Vital Part in Heart Surgery"
Photo taken in the Cardiac Investigation Room Green Lane Hospital
October 1969**

From Left: Carol Sellar, Carol Meiklejohn, Peta Harris, Elaine Hosken, Donelle Dickey and Louise Conway Beech.



TECHNICIANS PLAY VITAL PART IN HEART SURGERY

Working as a team in the rapidly developing field of heart surgery are eight young women of the Cardiac Investigation Unit at Green Lane Hospital in Auckland.

They are the technicians responsible for investigating arm blood vessels. The cardiologist watches the path and checking before, during the tubes take on a small and after heart operations, television screen. The information they discover. They record heart sounds and record is used by the surgeons. The unit is part of the physiology department. Samples of blood are taken to send at least half a day with them measure oxygen content and patient taking measurements of blood pressure in the part chambers by inserting tubes into the heart through the heart.

They inject dyes and measure the path of the blood to check that it is following the normal route. The condition of the patient is then discussed by the surgeons on the basis of the information obtained by the technicians. During an operation a technician measures blood pressure and generally monitors the condition of the patient. ~~Some time is spent~~ ~~on the patient~~ ~~to get a more specific measurement.~~

Sometimes the technicians will examine a patient after an operation to assess the effectiveness of treatment. The technicians take a three-year training course which includes studying for the intermediate certificate in basic sciences at the Auckland Technical Institute and taking examinations of the Society of Cardiological Technicians. All the girls at Green Lane have passed university entrance: some have spent a year at university, one was a computer programmer and some have been in medical laboratories.

A technician's practical work starts with recordings in the operating theatre during an operation. This work does not encompass such a wide range of techniques as the investigation. The girls also spend some time in the bypass unit of the physiology department where equipment is cleaned and assembled. Here they gain an understanding of the equipment they work with, which is worth over \$30,000. They then begin to learn the

complex investigation work carried out in the laboratory. It takes about a year before they have mastered all the techniques involved and two more years to complete the theoretical work for the certificates. The senior technician at Green Lane, Miss Louise Beech, was mainly responsible for establishing the Society of Cardiological Technicians two years ago and subsequently organising correspondence courses for technicians at hospitals out of Auckland. She finished her duties at Green Lane yesterday and is returning to England.

Miss Beech, who is a New Zealander, completed her examinations in England three years ago at Oxford University. For her work in establishing the course in New Zealand, she was recently made a fellow of the Society of Cardiological Technicians—the first person in New Zealand to receive the honour.

Taking Miss Beech's place as senior technician is Miss Carol Meiklejohn who completed the society's training course in June — the first person in New Zealand to do so. Miss Meiklejohn spent one year at university in Dunedin before beginning work in the unit at Green Lane.

Miss Beech said the unit needed people with initiative. They were often left with many responsibilities to obtain information and often worked on their own. "The girls need to be quick and precise and have the right sort of manner with patients," Miss Beech said. "It is important that they have a reassuring manner because the masses of equipment can have a very daunting effect on a patient. "Technicians tend to go overseas once they are qualified. There are now two in London and one working in Sydney. Green Lane Hospital has a very good name internationally and its qualified people are readily accepted overseas."

Six of the eight technicians who work in the unit are (from left): Miss Carol Sellar, Miss Carol Meiklejohn, Miss Peta Harris, Miss Elaine Hosken, Miss Donelle Dickey and Miss Louise Beech.

Woman's World

Technicians in this photo were some of the earliest Society examination successes.

Carol Sellar: ASCT in 1968 and MSCT (as Carol Burfitt) in 1970.

Carol Meiklejohn: ASCT in 1968 and MSCT in 1969.

Peta Harris: ASCT in 1970.

Elaine Hosken: ASCT in 1970 and MSCT in 1972.

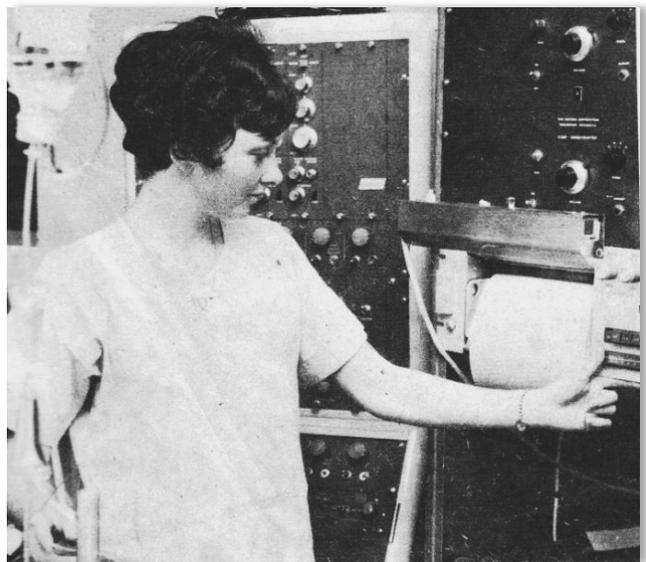
'How's Your Heart' NZ Woman's Weekly Article by Jacqueline Caron 13 October 1969

Pictures by Michael Willison



Louise Conway Beech in the cardiac investigation room (left).

Carol Meiklejohn recording in the cardiac investigation room (below).



Donelle Dickey prepares the blood to calibrate the dye-dilution curves (below).

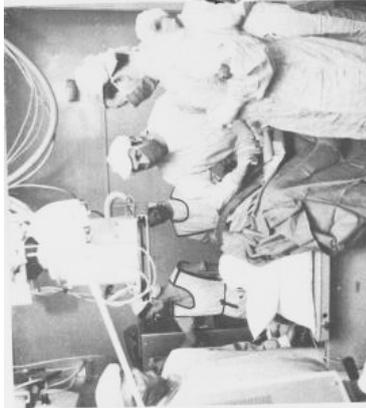


Louise Conway Beech doing oximetry with a haemoreflector (below).





Below: Secretary of the New Zealand Society of Cardiological Technicians and the first Member of the New Zealand society, Miss Carol Wicklinton prepares one of the most important and delicate tasks of a cardiologist and technician team at Auckland's Green Lane Hospital, records in graph form the pattern of blood flow.



A strict watch being kept over a monitoring TV screen as Miss Louise Beech, Secretary of the New Zealand Society of Cardiological Technicians, and Miss Carol Wicklinton, first Member of the Society, investigate a heart defect patient. The cardiologist's special information on other machines.

The personal efforts of one woman have achieved a more professional basis for cardiological technicians in this country, ensuring that staff dealing with investigations into specialized heart diseases and heart defects have qualifications recognized all over the world

BY JACQUELINE CARON

THE personal effort and enthusiasm of Auckland's Miss Louise Beech, who has been working at Rangitoto Hospital, Auckland, on a more professional basis than previously. She has been responsible for establishing the New Zealand Society of Cardiological Technicians.

At the same time, she has ensured that more girls receive lectures by doctors here, as well as taking correspondence courses that are also available at other hospitals, including Wellington, Hamilton, Dunedin and Christchurch.

She has arranged for a correspondence course for them from the NZ society, it was necessary to set the qualifying examination based on this added standard to New Zealand's already high reputation in medical work has been recognized by the New Zealand Society of Cardiological Technicians. She is the only one in the country who has completed the membership examination after two years of study and honour in any part of the world.

N.Z.W.W. OCTOBER 13, 1969



An in-the-ward check on the cardiogram machine by Miss Michelle Hogan, Mr. Huntley, who had two heart valves removed earlier this year, and Miss Carol Wicklinton, who is the first member on his health since the operation. "Great — with I had had the operation earlier."

PICTURES BY MICHAEL WILLIAMS



Preparing a mixture of dye and blood used in certain analytical tests is technician Danielle Dickey.



An important, even vital task for by-pass technician Kathleen Doyle — one of a group that operates the by-pass machine used during bypass at Green Lane.

HOW'S YOUR HEART?

recorded on a moving roll of paper as a graph by the technician for permanent record.

Some of the most important information is obtained from measurement of the pressures in the heart. Blood is pumped from the heart to the rest of the body. The high pressure — "blood pressure" — that most are familiar with.

In the tests, any defect that alters the normal flow of blood is detected after a clinical diagnosis has been made.

So thorough are they that it is possible to undertake only two or three tests to give a more detailed assessment than a clinical diagnosis has been made.

For example, if one of the valves becomes narrow so as to obstruct the flow through it, the pressure will be lower than normal. The cardiologist — just as a doctor — needs by a complex standing on a garden hose produces a build-up of pressure on the free end.

The greater the obstruction, the bigger the pressure gradient on the hose. The cardiologist on the heart connects with and more force in its attempt to overcome the obstruction.

Part of the investigation work involves the use of catheter into the patient's heart. The end of this is connected to gauges which convert various physiological data into electrical signals that are amplified and can be viewed on screens, or

Miss Beech recorded progress is spectacular. NZ membership status is and is now the society's secretary.

Others in the Green Lane hospital are Miss Michelle Hogan, Miss Carol Wicklinton, Miss Peeta Harris, Miss Cheryl Parker and Miss Elaine Hoken.

The work of the technicians is varied and demands minimum qualifications. Miss Beech has experience before starting the course, with emphasis on science subjects, particularly physics.

Miss Beech describes the work as "the responsibility of monitoring the heart's electrical activity (doctor) needs by a complex system of electronic recording gear.

Part of the investigation work involves the use of catheter into the patient's heart. The end of this is connected to gauges which convert various physiological data into electrical signals that are amplified and can be viewed on screens, or

assisted with the accurate and sensitive diagnosis that is so important for treatment.

Apart from the pre-operative work the girls also record progress during surgery, and in the post-operative period when the mobility of the heart is being monitored.

The newly qualified professional status for each work will no doubt attract more girls, young men even, to the work. The technicians' status in the future will increase as the programme planned by the National Heart Foundation develops.

But it can only develop with very necessary finance, and a year ago the National Heart Foundation was launched earlier this year.

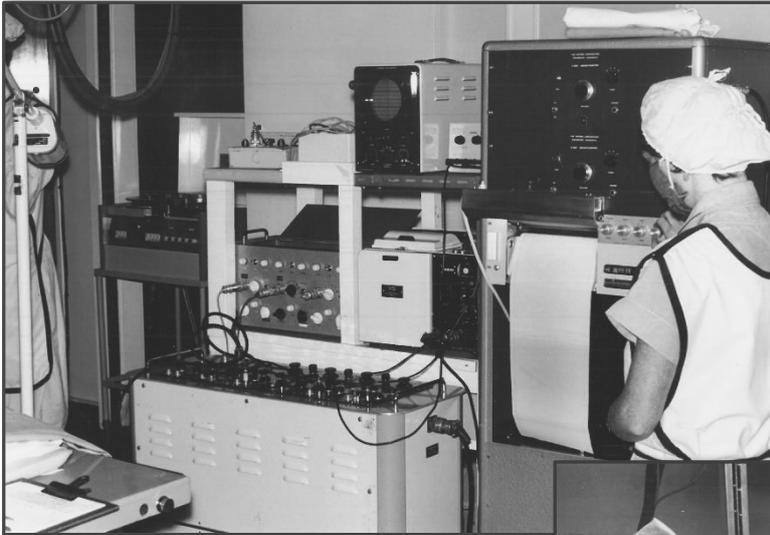
House to house collections will be made in all areas of the country. Business groups and organizations for donations and gifts.

October 18 has been named "Heart Beat Saturday." On that day the public is invited to visit the Green Lane Hospital. \$1 million will have been reached, even exceeded. *

N.Z.W.W. OCTOBER 13, 1969

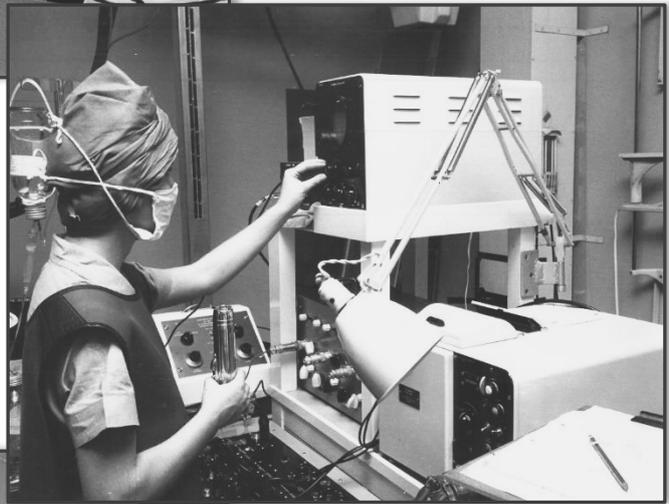
"How's Your Heart" NZ Woman's Weekly Article by Jacqueline Caron 13 October 1969

Cardiac Investigation Room 1960s



1960s Carol Meiklejohn in the cardiac investigation room (left).

Note that the technician (right) is holding a torch because it needed to be completely dark in the room so x-ray screens could be seen.



SCT Dinner (1970) held on the evening of the examination day.

Clockwise from Left of photo: Michelle Hogan, Elaine Hosken (now Rush), Richard Elliott, John Mackie, two unknown, Carol Burfitt, Margaret Vedder (nee Shepherd), Donna McGregor, two unknown at front.

Certificates from 1969 and 1972 showing the change of name of the Society (not full size).



THE SOCIETY OF
CARDIOLOGICAL TECHNICIANS
(NEW ZEALAND) INCORPORATED

THIS IS TO CERTIFY THAT

Mary Carol Weiklejohn
OF
Auckland

BY VIRTUE OF HAVING SATISFIED THE EXAMINERS
HAS BEEN ADMITTED A

MEMBER

OF THE SOCIETY OF CARDIOLOGICAL TECHNICIANS
(NEW ZEALAND) INCORPORATED ON
the 28th June 1969

A. B. Jones
PRESIDENT

L. Conway Seach
HON. SECRETARY



THE SOCIETY OF
CARDIOPULMONARY TECHNOLOGY
(NEW ZEALAND) INCORPORATED

THIS IS TO CERTIFY THAT

Susan Irene Ryan
OF

AUCKLAND

HAS BEEN ADMITTED AN

ASSOCIATE

OF THE SOCIETY OF CARDIOPULMONARY TECHNOLOGY
(NEW ZEALAND) INCORPORATED ON

7th, October 1972

PRESIDENT

P. H. Hawke
HON. ED. SECRETARY

E. C. Hooker

Commended

The Society of Cardiopulmonary Technology (N.Z.) Incorporated 1972

Independence in 1972

In 1972, the Society became independent of the British Society and changed its name to the Society of Cardiopulmonary Technology (NZ) Incorporated to include Pulmonary Technicians recognising that a broader base of technical training would improve the status of technical personnel. The Society now set its own standards in examinations.

In 1972, Elaine Hosken, Margaret Kempthorne and Brent Long all passed MSCT with Elaine Commended and Top. Among the six who passed ASCT were Elizabeth Darville (Top and Commended, Sue Ryan (now Perkins) Commended and Susan White (Commended). They would be the first to receive certificates under the new name. In 1972, Elaine Hosken was appointed as the Charge Technician in Cardiac Physiology at Green Lane and Sue Ryan became her deputy.

During the 1970s, Elaine Rush and Sue Ryan provided the leadership for the Society. Elaine served as Chairperson and Education Secretary. Sue, a Councillor from 1972 to 1981, served as Secretary and Education Secretary (For a list of SCT Councillors 1967-1990 refer Appendix 2).

Beverly Underwood from Wellington passed ASCT in 1970. In the Society records, a Margaret Kempthorne passed ASCT in 1970 and we think she was Frances Kempthorne from Wellington but have been unable to confirm this. In 1972, Ian Weaver was appointed the Charge Technician at Wellington Hospital and in that same year Helen Tucker and Joy Vertongen passed ASCT. In 1973, there was a move to a new department and in this same year Kathleen Hirtzel, Diane Lightbown and Frances Stewart all passed ASCT.



**The new Cardiology Department at Wellington Hospital 1973.
(Courtesy of Wellington Hospital Archives)**

**From left: Frances Stewart, Diane Lightbown, Margaret Simpson
and Kathy Hirtzel.**

The first Wellingtonian to pass MSCT was Margaret Kempthorne in 1972, followed by Carol McIntyre in 1974, Gwen Turner (nee Hunter) and Jan Mulder in 1983 and Helen Koschak in 1985. The Charge Technician from 1975-1977 was Frances Stewart and from 1977- 1984 Gwendoline (Gwen) Hunter.



Wellington Hospital Technical Staff February 1977. (Courtesy of Wellington Hospital Archives)

From left: Petra Peters, Val Burke, Sue Rowe, Frances Stewart, Gwen Hunter, Kath Lang, Michael Harte and Margaret Simpson.

The examinations were originally held at Green Lane Hospital and one other centre in New Zealand (depending on candidate numbers) in October of each year. The examinations consisted of written, practical and oral sections. By 1973, there were 60 members in 13 hospitals and 23 had passed Society examinations.

In 1974, Carol Breed (nee Meiklejohn) was employed as the Technical Tutor in the Physiology Department at Green Lane Hospital and organised the final year of a New Zealand Certificate in Science: Paramedical (Human Physiology) as a joint venture between Green Lane Hospital and the Auckland Technical Institute. This was set up to prepare the way for a Certificate of Proficiency (COP) in Cardiac or Pulmonary options with recognition equivalent to the five year course to COP for Laboratory Technologists.

The Certificate of Proficiency (COP) was introduced in 1974, to bring the Society's examination level to a similar standard as that in Pathology and Biomedical Laboratories. Sue Ryan was the first to pass COP in the Cardiac option, in 1974.

In 1975, Susan Davis (aka Sandy and now Long) became the second person to pass COP in the Cardiac option. By the end of 1975, the Society had 74 members: 2 COP, 5 MSCT, 5 Affiliates, 29 ASCT and 33 students and official recognition of COP was given by the Health Department.

The correspondence course was updated and published in booklet form, providing members with a useful, applicable textbook. In 1979, Jenny Fleming (nee Spackman) was the first to pass COP in the Respiratory option and Kaye Harrison passed COP in the Cardiac option.

“Life Saver at Green Lane - A Simple Plastic Box”

A NZ Herald Article by Peter Trickett, 27 December 1972.



“A physiology technician, Mrs Donna Anderson, adjusting a breathing box covering the head of a nine-month old child during a heart test at Green Lane Hospital. The equipment was developed with the aid of a heart grant from the National Heart Foundation.”

“ For two years a technician at Green Lane, Miss Heather Nisbet, has been working in close cooperation with heart specialists on the designing of an improved type of breathing box.”

“ The improvements we made were ridiculously simple but they were vital details that made all the difference to the equipment’s reliability’ says Dr Neutze.”

Life Saver At Green Lane A Simple Plastic Box

By PETER TRICKETT
Herald Medical Correspondent

A simple-looking plastic box developed at Green Lane Hospital is helping to save the lives of children suffering from congenital heart defects.

The box is a vital part of the equipment used in a series of elaborate tests to assess the condition of hole-in-the-heart children.

It is on the basis of this assessment that surgeons decide whether to perform an open heart operation.

The effect of a hole in the heart is that much of the blood that should be pumped around the body is instead pumped through the hole and into the lungs.

Overloading

The blood circulates continuously between heart and lungs, congesting the lungs and overloading the heart.

The standard tests for hole-in-the-heart children include probing the heart with a catheter and taking x-ray cine film of the interior of the heart to pinpoint defective areas.

The purpose of the plastic box is to trap the air the child breathes out so that its oxygen and carbon dioxide content can be analysed.

By comparing these figures with measurements of the oxygen in the blood being pumped through the heart, cardiologists can calculate how much blood is passing through the lungs and how much disease there is in the arteries of the lungs.

Adults undergoing assessment for heart defects breathe through a mask instead of into a box. Using a mask, however, requires active co-operation on the part of the patient and this makes the method impracticable for babies or very young children.

cases a wrong decision could be fatal.

A faulty assessment could lead surgeons to operate when in fact an operation was likely to make the patient's condition worse, or even kill him.

On the other hand, it could lead to a decision not to operate because the risk seemed too high, when in reality an operation would have been highly desirable.

In such a case a patient who might have expected a normal life expectancy had he been operated on would probably die in his 20s or 30s.

"There is a point in the life of all patients who develop disease of the arteries of the lung when the risks of an operation become too high and when, even if the patient survives, he is left worse off," Dr Neutze explains.

"This applies to only about one in every 10 children born with a hole in the heart—but it is terribly important to those who are so affected."

Improved Box

For two years a technician at Green Lane, Miss Heather Nisbett, has been working in close co-operation with heart specialists on the designing of an improved type of breathing box.

The research has been sponsored by the National Heart Foundation of New Zealand. It has now reached the point where breathing boxes can be made at Green Lane which meet the exacting standards of the cardiologists.

"The improvements we made were ridiculously simple but they were vital details that made all the difference to the equipment's reliability," says Dr Neutze.

that the Green Lane cardiology unit is now considering using plastic boxes for assessing adult heart patients as well as children.

Alternative

"The alternative to developing our own equipment in the way we have done would have been to have bought unproven commercial testing devices which would have cost more than \$5000," Dr Neutze adds.

"The equipment we have had to make specially for our tests has cost only about \$200. The Heart Foundation, in making it possible for us to develop the equipment, has saved the taxpayer a lot of money."



A physiology test during a heart

Measurement of Cardiac Output in the Cardiac Investigation Room 1970s.



Dye dilution curves in the cardiac investigation room. (above) Shelley McCleod and Louise Whiting.



Expired air collection for Fick method of calculating oxygen uptake (left).



Jagdish (Jack) Bhana doing oximetry for cardiac output calculation using the OSM2, the older haemoreflector alongside (above right).

The First 10 Years (1967-1977)

In 1977, a booklet was produced by the Society to celebrate the first ten years of SCT. It contains a summary of SCT progress and three articles: “The Changing Face of Cardiac Pacing” by S. Yarrow, MSCT, REA, Green Lane Hospital, Auckland, (reprinted in Appendix 6); “The Technique used for Calibration of the Gilford Densitometer” by Mrs E. Rush, NZCS. MSCT, Green Lane Hospital, Auckland; “The Extending Areas of Medical Technology since 1950 (as seen through the eyes of a technician)” by Olwyn Watson, MBE, NZRN, ASCT, (reprinted in Appendix 7).

Mr Sidney Yarrow, Senior Technical Officer in the Physiology Department at Green Lane Hospital, was given an Honorary MSCT in 1977 to recognise his contribution to teaching and examining.

In 1979, Elaine Rush was the first person to be awarded a Fellowship by thesis (a paper on “The Technique used for Calibration of the Gilford Densitometer”).

Ms Watson had received her MBE in 1970 for Services to Nursing. She was the Sister-in-Charge of the Cardiology Clinic at Napier and effectively the first Cardiological Technician at Napier Hospital. She retired in 1982 and her ASCT was given honorary status so she could continue to receive the newsletter.

The Society was and still is administered by a Council which communicates with its members via a newsletter containing information about the Society, articles from Society members and information about job opportunities. The Council holds regular meetings, prepares and distributes the correspondence courses and organises the examinations. Acceptance of all applications are guided by the rules of the Constitution, but the Council has discretionary powers to grant applications requiring special consideration.

The Society’s aims have always been to improve the training, education and professional status of persons engaged in the science and practice of cardiopulmonary technology. As a direct result of early negotiations by the New Zealand Society of Biomedical Technology during the drafting of the New Zealand Hospitals and Area Health Boards Professional, Technical and Related Employees Award, the COP was deemed a recognised qualification.

First 10 Years of Training (1968-1978)

Associateship Course

This was a two-year correspondence course involving theory and demonstrations. For practical work and for the expected demonstrations, the student’s own hospital, or department was expected to co-operate, as the students were required to be employed before entering the course. Where special techniques were not accessible in some centres, arrangements were made to send students to Green Lane Hospital for further experience. Students were also expected to complete 20 assignments over the two years.

The examination consisted of a 40-minute practical, including an electrocardiogram (ECG) and a spirometry manoeuvre, plus a 10-minute oral on both cardiac and respiratory work, a one-hour short answer paper and a two-hour long answer paper.

Passing these examinations plus two years relevant work experience resulted in the student becoming an Associate of the Society of Cardiopulmonary Technology (ASCT).



Elaine Rush supervising Jenny Spackman in 1977.

(John O'Connell, Electronics Technician as subject.)

Membership Course

This was an alternative advanced course to students in areas where the New Zealand Certificate in Science: Paramedical (Human Physiology option) was unavailable. It covered the technical and physiological aspects of both cardiac and respiratory techniques in as much depth as Physiology IIA (Cardiac) and IIB (Respiratory) and extended to many aspects of both Cardiac and Respiratory COP syllabi. The examination consisted of a one-hour short answer paper, a three-hour long answer paper, 30-minute oral examination and a two-hour practical examination. It was taken two years post ASCT, i.e. a minimum of four years of experience. The theory for MSCT was available by correspondence course. Passing these examinations plus the relevant work experience resulted in the Associate becoming a Member of the Society of Cardiopulmonary Technology (MSCT).

Certificate of Proficiency

The Certificate of Proficiency, established in 1974, was generally obtained after two years study beyond New Zealand Certificate in Science (NZCS) and required a minimum of five years of experience in the field. Its purpose was to produce an expert in all technical aspects of cardiac or respiratory work and to enable management of a cardiopulmonary or respiratory unit. The Cardiac option included blood gas analysis, electronic principles, cardiac catheterisation, echocardiography (Echo), etc, plus pathology of heart disease. The exam was a three-hour practical paper involving measurement or analysis of data, a three-hour written paper and a 45-minute oral.

Fellowship

Fellowship (FSCT) could be achieved by examination, by presentation of a thesis or by passing both options of COP. An Honorary Fellowship (Hon. FSCT) was sometimes granted for distinguished services to the Society of Cardiopulmonary Technology.

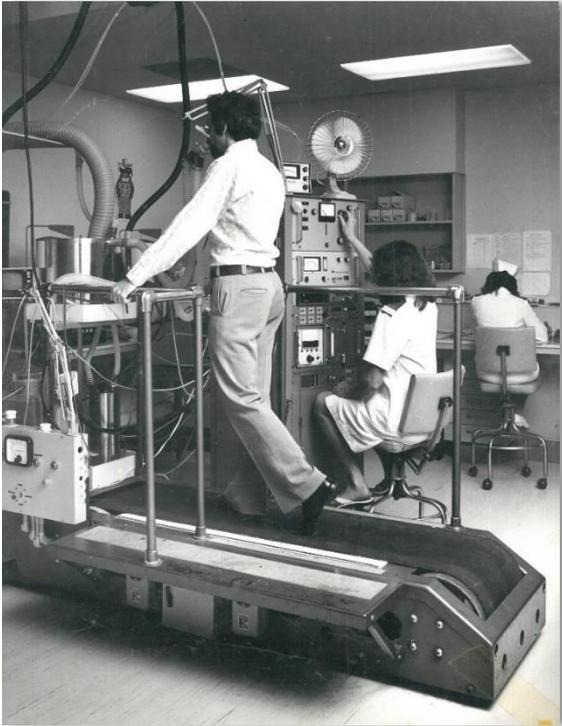


Surgical Laboratory Staff, GLH, 1977.

Left to right: Bruce Graham, Heather Nisbet, Elizabeth West, Penny Barrow, Kim Hoare, Robyn Easdale, Richard Elliott.

Heather was a founding member. Richard Elliott became an Affiliate in 1977, Bruce passed ASCT in 1977 and Robyn in 1985.

Respiratory Laboratory Green Lane Hospital



Steve Withy on the treadmill in the 1970s, a Physiology Technician recording and Nurse Yvonne Wood in background. (left).

Angela Daish recording with Graham Fuller on the treadmill in the 1980s. (right).



Sharon Pike with the body plethysmograph 1980s (left).

**Physiology Department
Green Lane Hospital
1980**

Throughout the 1980s the Physiology Department staff continued play a major role in the support of the Society.



Back row:

J. Bhana, M. Arndt, T. Willcox, T. Corin, M. Henderson, T. Haresnape, C. Nouse, N. Ashton, K. Roberts, L. Tavener, C. Gee, G. Prime, A. Wilkinson, R. Easdale, S. Long, M. Vedder, B. Graham, M. Flower.

Middle row:

W. Bird, J. Elleyett, C. Hall, S. Withy, J. Carroll, B. Milburn, B. Thatcher, Dr E. A. Harris, J. Findlay, Y. Wood, Dr R. ML. Whitlock, L. Dawson, B. Wolfkamp, G. Davie-Martin, J. Fleming, R. Dawson, K. Harrison, F. Riddell, A. Close.

Front row:

C. Grey, A. Pilkington, J. Jensen, M. Yerkovich, A. McAndrew, J. Western, R. Currie, S. Manson, J. Goudie, S. Perkins, A. Hendry, D. Anderson, Dr S. Streat, C. Breed, Dr J. Kolbe, Dr M. J. Sinclair.

Progress Through the 1980s

In 1980, Carol Breed was made an Honorary Fellow for distinguished services to the Society. She was a Councillor from 1969 -1988 and Chairman from 1977 - 1984. In 1974, she developed the pathway and ran the final year for NZCS Paramedical: Human Physiology and the plan for COP. She was an ASCT practical examiner and marked the short answer papers for ASCT and MSCT for many years. Sue Ryan, Jenny Fleming, Marie Flewellen, Alison Barber, Kirsty Troy and Sheryl Tait were Councillors and made important contributions to the Society in the 1980s.

The first Dunedin Technicians to sit ASCT were Kay Shanks in 1980 and Helen Christie in 1981. In 1981, Kaye Harrison became the Charge Technician in Cardiac Physiology at Green Lane followed by Gay Davie-Martin from 1983-1986 and in 1986 Fiona Riddell who has remained in this role and is currently Charge Cardiac Physiologist at Auckland City Hospital.

In 1982, Carol produced the Manual for Cardiopulmonary Technicians based on the original correspondence course notes. It was a 170-page book, very clearly set out to cover the requirements for ASCT and well-illustrated by Donna Anderson (nee McGregor). Back then, there were no word processors, no photocopiers and the secretary had to type the pages on A3 paper. The illustrations were hand drawn and glued on. Any alterations meant retyping the whole page or pages. The Auckland Technical Institute printed the manuals. It was reprinted in 1987.



Carol Ramage (previously Breed) was the Vice President (1985-1988) and President (1988-1990) of the New Zealand Society of Biomedical Technology and during this time was a strong advocate for the recognition of SCT qualifications and for Physiology working conditions.

During the 1980s, the Presidents of SCT were Dr John Neutze (1978-1981), Dr RML Whitlock (1981-1984), Dr Robin Norris (1984-1987) and Dr Louise Calder (1987-1990).

Dr Edward Harris was the Head of the Physiology Department from 1967 until he retired in 1988 when Toby Whitlock replaced him. They were both committed supporters of the Society and technical training and were for many years respiratory examiners.

In February 1989, Dr R.M.L. Whitlock, known as Toby, was made an Honorary Fellow. He had been an Affiliate since 1968 and had made a significant contribution to teaching and examining.

**Toby Whitlock (left)
congratulates Dr Edward Harris
on his 60th birthday in 1983.**



The Physiology Department at Green Lane Hospital employed four to six trainees each year. This provided a steady flow of local candidates for the SCT training and provided staffing for the rapidly expanding services at Green Lane and around the country.

An assessment of training was undertaken in 1985, by David Cathcart, Course Supervisor, School of Health Sciences at the Central Institute of Technology, Upper Hutt. His summary congratulated SCT on the high standard and professionalism shown of the training provided.



1984 Green Lane Physiology Trainees who all passed ASCT in 1985.

From left: Elizabeth Bell, Kirsty Clotworthy, Angela Collins, Rosemary White, Deborah Pike.

Physiologists Working in the 1980s



Electrophysiology “Time Machine” with Alison Hendry at the machine and Shona Evans in the background.



Robynne Bremner measures oxygen saturations on the OSM2 (above).



Sara Jonas monitoring with the Meddars equipment in the cardiac investigation room (left).

Physiologists Working in the 1980s cont.,



1980s Shona Evans Holter monitor scanning (above left).



Pacemaker Clinic 1980s Elizabeth Bell (left) and Nurse Nikki (above right).

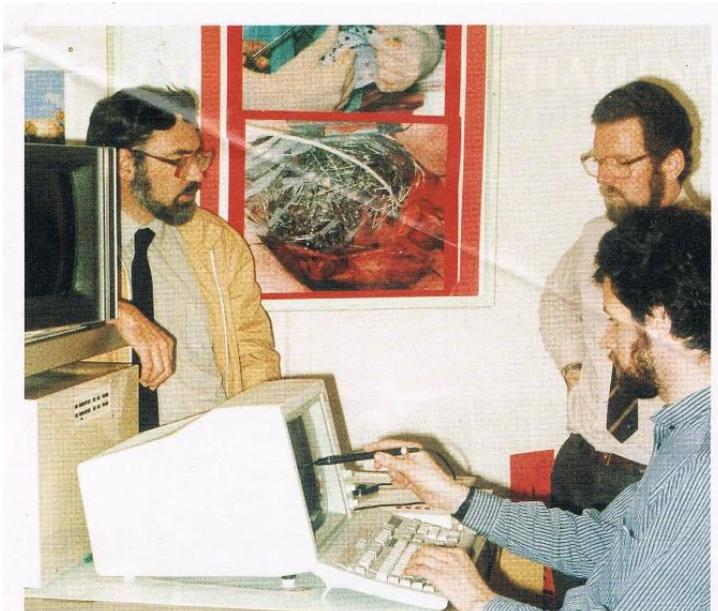


1990s Robynne Bremner and Lisa Fife Holter screening.

1989 Green Lane Physiology Trainees



Back Row: Carol Ramage (Technical Tutor), Debbie Bakker, James Hamilton, Robynne Bremner.
Front Row: Patricia Hughes, Jennifer Youard, Gillian Chase, Tanya, Kaiwai Liang.



**New Electronics October 1988
Green Lane Hospital Scientists:
Steve Withy (left), Noel Ashton
(right) and Nick Burke (seated).**

ELECTRONICS AT THE HEART. Sophisticated electronics is behind a Cardiac Electrophysiology Mapping System, developed by Green Lane Hospital research staff under scientific officer Noel Ashton (right), seen here with fellow S.O. Steve Withy and software engineer Nick Burke (seated). The system measures electrical activity on the heart via a "sock" with receptors attached — seen in the rear poster — and features in our October sector focus: Electronics in Medicine, beginning on Page 14.

Department of Clinical Physiology and Biomedical Engineering

Green Lane Hospital 1990



Back Row:

Steve Withy, Martin Little, Bruce Wilmhurst, Neil Nouse, Terry Corin, Ruth Andrews, Nick Burke, Chris Rust, Graeme Fuller, Bob Haines, Motufoua Motufoua, Mike Vear, Phil Lacey, Mark Lipski, Steve Smith, Bob McBurney.

Third Row:

Linley McKenzie, Chris Paterson, Tracy Cumming, Sheryl Tait, Margaret Wilson, Jennifer Youard, Robyn Nimmons, Sela Tu'utafalua, Jan Western, Rachel Tuerlings, Glenys Tierney, Karen Edney, Jack Bhana.

Second row:

Robin Le Grice, Rachel Miles, Vicki Richardson, Katrina Poppe, Christine Sargent, Kim Goodwin, Kirsten Knudsen, Liane Dawson, Gitti Fuller, Renelle Walker.

Front Row:

Susan Guptill, Belinda Buckley, Beryl Jackson, Lisa Fife, Kirsty Troy, Sheryl Waite, Noel Ashton, Dr E. Harris, Dr R. Whitlock, Carol Ramage, Fiona Riddell, Barbara Wolfkamp, Susan Jonkers, Patricia Hughes, Kai-Wai Liang.

Progress Through the 1990s

Kirsty Troy chaired the Council from 1990-1995 and Liane Allchorne (nee Dawson) chaired the Council from 1996 -1997 and 1998-2001. Belinda Buckley was in the chair 1997-1998. During the 1990s, Christine Sargent (1990-1992), Karen Searancke (1992-1995), Belinda Buckley, Donna Elliot, Kerry Conway and Fiona Riddell were the Secretaries. Liane Dawson was the Treasurer from 1990-1995 and Craig Smith from 1996-1999. The Education Secretaries were Sheryl Tait, Katrina Poppe, Jackie Crawford, Rose Allen, Paula Bishop, Christine Shanahan, Taryn Evans and Sonia Darlington.

During the 1990s, the Presidents of SCT were Dr Tevor Agnew (1990-1993), Dr Warren Smith (1993-1996), Dr Artur Coverdale (1996-1999) and Dr Margaret Hood (1999-2003).

Significant advances in computing enabled advances in cardiac technology. This increased the need for scientific input in the training of Cardiopulmonary Technologists. Steve Withy and Noel Ashton, Scientists at Green Lane Hospital, both made significant contributions to the Society by teaching and examining. Steve Withy joined the Society in 1974 and sat ASCT in 1975. Noel Ashton became an Affiliate in 1978. In 1993, they were both honoured for their contribution.

In 1990, Green Lane Hospital celebrated its Centenary and the Green Lane Hospital Centennial Committee published a book "*Green Lane Hospital - The First 100 Years*". Basil Hutchinson was the Editor and Toby Whitlock wrote the chapter on the history of the Department of Clinical Physiology and Biomedical Engineering, (p81-85), (Reprinted in Appendix 8).



Graham Fuller, Carol Ramage, Noel Ashton, Liane Dawson, Fiona Riddell, Sharron Stone, Toby Whitlock and Steve Withy in 1993.

By 1990, the membership stood at 120, with the majority being student members undertaking the ASCT course or Associate members studying towards MSCT or Certificate of Proficiency (COP). Occasionally students would enrol for either ASCT or MSCT from Australian Hospitals, as their Society was not active in some states. These students travelled to New Zealand to sit their examinations.

By 1993, the Society had 127 members: 2 Honorary Fellows, 1 Fellow, 1 Honorary Associate, 12 COP, 1 MSCT, 83 ASCT and 27 Student members.

In 1994, the ASCT course was run from Waikato Hospital by Council Members Jackie Crawford, Rose Allen and Paula Bishop.

Change of Certificate of Proficiency to Postgraduate Diploma

In 1996, the name of the “Certificate of Proficiency” qualification was changed to Postgraduate Diploma in Cardiac or Respiratory Technology (PGD), on the advice of the Qualifications Authority, as a “certificate” was considered a school level qualification. The last COPs were awarded to Donna Elliott and Rachel Lovatt in 1997. In 2000, the first PGD was awarded to Craig Smith.

Registration

In 1996, a survey of New Zealand Cardiologists gave clear support to registration and the SCT unanimously accepted the proposal for registration. The Cardiopulmonary Registration Board was formed, in September 1996, under the umbrella of the Society. After consultation, guidelines were drafted for Cardiopulmonary Technicians and Technologists and included those working in the respiratory field. Some Technologists (increasingly fewer now due to specialisation) were employed across both cardiac and respiratory areas. A limited grandfathering period allowed time for anyone currently employed to attain the minimum of ASCT, regardless of their role.

There were four levels of registration initially established:

- 1 Trainee (enrolled in and working towards ASCT or other approved training course)
- 2 Level 1 Technician (ASCT with two years of full-time relevant work experience)
- 3 Level 2 Technologist (ASCT and Diploma in Applied Science or North American Society of Pacing and Electrophysiology (NASPE) qualification and three years of full-time relevant work experience)
- 4 Level 3 Senior Technologist (Level 2 plus Postgraduate Diploma (SCT), Diploma of Medical Ultrasonography or NASPE qualification, and five years of full-time relevant work experience).

The objectives of the Board were:

- 1 To oversee theoretical and practical training for Cardiopulmonary Technicians/Technologists.

- 2 To ensure that such trained Technicians/Technologists receive an appropriate certificate when they have completed their training and passed their examinations.
- 3 To keep a Register of trained Technicians/Technologists and issue an Annual Practising Certificate.
- 4 To find further funding to carry out these functions.

This Board was chaired by Sheryl Tait from 1996-1999 and by Fiona Riddell from 1999-2004. Karen Searancke was on the Board and the Secretary to the Board from 1996-2004.

Other members of this board were Dr R.M.L. Whitlock (1996-2001), Dr W.M. Smith (1996-1999), Dr M. Williams (1996-2004), Dr J. Skinner (2000-2004), Dr K. White (2001-2004) Miss Fiona Riddell (1995-2004), Mrs Kirsty Troy, (1996-1999), Mr K. Gain (200-2002), Miss Katrina Poppe (2003-2004) and Miss Maureen Swanney (2003-2004).

By October 2001, 96 were registered with the Cardiopulmonary Registration Board: 29 Trainee Technicians, 13 Level 1 Technicians, 23 Technologists and 31 Senior Technologists.

By May 2003, 127 were registered with the Cardiopulmonary Registration Board: 35 Trainee Technicians, 26 Level 1 Technicians, 29 Technologists and 37 Senior Technologists.

By 2004, 115 were registered with the Cardiopulmonary Registration Board; 23 Trainees, 25 Level I Technicians, 30 Level II Technologists and 37 Level III Senior Technologists. Work performed (included a combination of work for some members): 100 Cardiac (including Echo), 25 Respiratory and 8 Sleep members.

In 2005, this Board was replaced by the Clinical Physiologists Registration Board.

Removal of MSCT

By 1997, the Membership (MSCT) had been removed from the training and examination structure. Between 1969 and 1986, this had served the Society well as an advanced qualification and 16 people had passed this exam. COP was now a more relevant and recognised qualification but some of the members in areas with less access to education would have liked the correspondence course to have been retained.

By 1 October 1998, financial membership stood at 75: 28 Students, 30 Associates, 1 Affiliate, 2 Members, 13 Postgraduate Diplomas (COP), 1 Honorary Fellow.

By September 1999, financial membership stood at 55: 22 Students, 20 Associates, 1 Affiliate, 3 Life Members, 8 Postgraduate Diploma/COPs, 1 Honorary Fellow. This drop in financial members was due to late invoicing in 1999.

The Society after 25 years (1967-1993)

From a Society Information Sheet 1992-93

“The examinations are held at Green Lane Hospital and one other centre in New Zealand (depending on candidate numbers) in October of each year. The examinations consist of written, practical and oral sections. Examination candidates receive notification of their results from the Council. Successful candidates will receive a certificate and bar appropriate to their examination. Candidates who average 80% or more in the examinations receive distinction. An annual prize is awarded by the Society to the top candidate in the ASCT examinations.

1. Student Members

Each application for student membership is considered by the Council and must satisfy the following criteria laid down in the constitution:

- (1) that he /she is a fit and proper person to be admitted to membership of the Society.
- (2) that he/she is working in a technical capacity in a cardiopulmonary department.
- (3) that he/she has attained such standard of education as the Council may from time to time prescribe. The Council ruling as of October 1988 being: “Student members of the New Zealand Society must have obtained English, Mathematics and Science (or two of the following Sciences; Computer Science, Physics, Chemistry, or Biology) to a School Certificate level of B1 minimum or any equivalent standard acceptable to the Council.”

2. Associate Members (ASCT)

The examination for Associateship may be undertaken by student members provided that they have a minimum of two full-time years' experience in a technical capacity in a cardiopulmonary department. Personnel working in part-time positions also have minimum requirements as decided by the Council at the time of application.

The course leading to this examination is suitable for Electrocardiographers, Respiratory Technicians and Trainee Cardiopulmonary Technicians. Other allied health personnel may benefit from this course and suitability should be discussed with the Council.

3. Holders of Certificates of Proficiency (COP)

The examination is undertaken two years post Bachelor/Diploma in Applied Science, NZCS or equivalent, and requires the candidate to be working in a technical capacity where they are able to gain experience in more advanced technical procedures.

4. Affiliate members

Affiliate members are members who have attained distinction in cardiopulmonary or allied technology who are unable to satisfy the requirements for Ordinary or Associate membership.

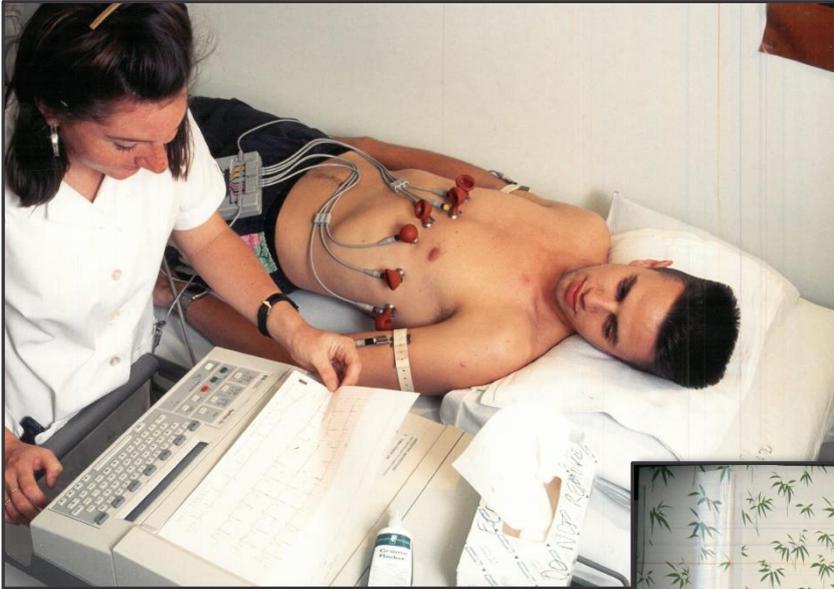
5. Fellows (FSCT)

Fellowship can be achieved by examination, by presentation of a thesis or by passing both options of COP. Honorary Fellowship may be granted for distinguished services to the Science of Cardiopulmonary Technology.

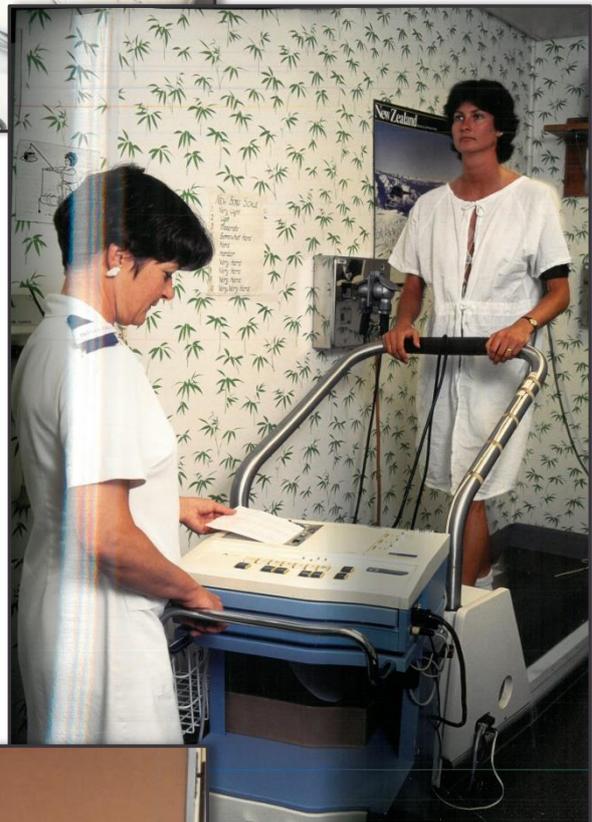
RECOGNITION: The Society has for more than twenty years promoted education and training of Cardiopulmonary Technicians. As a direct result of negotiations by the New Zealand Society of Biomedical Technology during the drafting of our New Zealand Hospitals and Area Health Boards Professional, Technical and Related Employees Award the COP is now a recognised qualification.

The qualifications of the Society are now recognised in the [employment] award and carry minimum graded steps. These qualifications are also recognised in the U.K. and in some states of Australia where members have established a precedent.”

Working in the 1990s



Sonia Darlington doing an ECG on Technician Daniel Bradley (above).

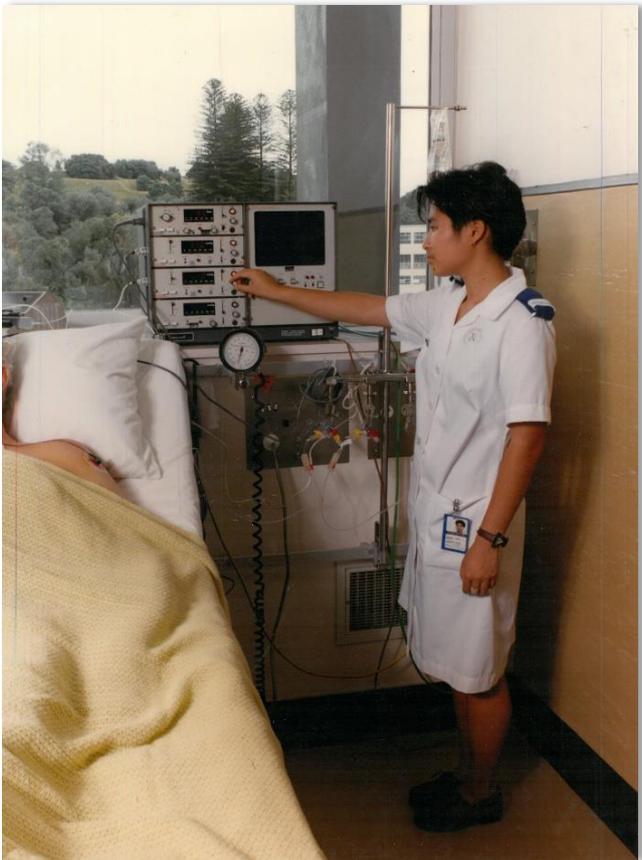


Vivienne Smalley records an ECG on Technician Sheryl Waite on the treadmill (right).

Katrina Poppe does a tilt table test on Susan Guptill (below).



Transducer set-up for monitoring in the Intensive Care Unit at Green Lane.



Kai Wai Liang monitoring in ICU (1990s).

The Millennium and Beyond

By September 2000, membership stood at 122: 31 Students, 63 Associates, 4 Affiliates, 22 Postgraduate Diploma (or COP) and 2 Honorary Fellows.



Department of Cardiac Physiology

Green Lane Hospital 2000

Back Row: Xiangyong Gu, Motufoua Motufoua, Colleen Brown, Julie Crowe, Patricia Hughes, Kara Hollands, Ljubica Milvojevic, Brian Lunt, Cheryl Byers, Rachael Parker, Debbie Dippenaar, Robynne Bremner, Liz Weatherby, Ian Tripp, Mark Harrison.

Middle row: Colin Burke, Sean O'Leary, Kevin Ellyett, Margaret Vedder, Heather Nisbet, Teena West, Christine Shanahan, Fiona Riddell, Liane Allchorne, Sharron Stone, Karen Searancke, Gloa Brinton, Abigail Butler, Kim Hetherington, Muyar So-Lwin, Halina Borthwick.

Front Row: Toby Whitlock, Jennifer Youard, Leanne Maher, Stacey Harrison, Lisa McGlaggan, Carol Ramage, Warren Smith, Noel Ashton, Stephen Withy, Nigel Wilkinson, Tanja Radovich, Kylie Todd, Liz O'Brien, Jackie Crawford, Graham Orsbourn.

In the above photograph are three of the founding members of the Society who were all employed by Dr Jack Sinclair in 1966. In 2000, Heather Nisbet and Margaret Vedder were both working in Biostatistics and Carol Ramage was the General Manager of Green Lane Hospital.

Carol retired from GLH in December 2001, Heather retired from Auckland City Hospital in 2005 although she continued to work part-time for Starship for another five years and Margaret retired from Auckland City Hospital in 2013.

Clare Greenwood (nee Biggs), employed by Dr Sinclair in 1961, was also a founding member of SCT and worked at GLH (1961 to 1963), then the Brompton (1963-1964) and back to GLH (1964-1965) and North Shore Hospital from (1974-2004).

Liane Allchorne was the Chairperson at the turn of the century and served from 1996-1997 and from 1998-2001 in that role. Karen Searancke succeeded her as Chairperson and served in that role from 2001-2005. Kerry Conway served the next five years, 2006-2012, in the Chair. Fiona Riddell served in the Chair from 2012-2017. The Society has benefitted enormously from their leadership and successive contributions. (For a list of Council Office Holders refer Appendix 3A).

The Presidents since 2000 were Dr Margaret Hood (1999-2003), Dr Jim Stewart (2003-2005), Dr Sally Greaves (2005-2006), Dr Peter Ruygrok (2006-2010), Dr Nigel Leaver (2010-2013) and Dr Ivor Gerber (2013-2015).

In 2001, Gillian Whalley applied for and was granted Fellow status based on her published echocardiography research.

New communication technology has made more effective operation possible and enabled better representation across New Zealand. In the 1960s, operating across New Zealand was difficult using mail and occasional individual phone calls. Today, the Society and the Clinical Physiologists Registration Board both have websites. Council meetings are held by teleconference. Email correspondence is simple, quick and cheap. Some examinations can be done online. Newsletters are available online.

SCT Training Courses

These are administered by the Education Committee. This is currently chaired by Christine Shanahan.

Certificate in Physiological Measurement

By 2006, ASCT examinations had ceased and the Certificate in Physiological Measurement (CPM), was in place. This is a one-year full-time equivalent (FTE) course aimed at Cardiac Physiology Technicians and in the first year 12 candidates passed CPM.

The Certificate in Physiological Measurement (CPM) has been constantly revised and updated to maintain standards and practices around New Zealand. As part of this work the examination content and its format were revised with the goal of bringing aspects of the course delivery and the exam online too.

Certification of Cardiac Physiologists

In 2006, a two-year Certification of Cardiac Physiologists (CCP), a practical competency course for Technologists, was being developed. The inaugural CCP exam was held in November 2007. "The aim of this programme is to ensure that there is an agreed standard of practical training and competency for all those practicing as a Cardiac Physiologist or training to be a Physiologist in New Zealand", (SCT website www.sct.org.nz)

The CCP training course provided the two years practical training in all the procedures required of a Physiologist in New Zealand, whereas the theoretical training was to be provided by a new course developed for cardiac physiology by the University of Otago; the Postgraduate Diploma in Medical Technology (MTEC).

With the development of the new training programmes, there was also a lot of development by education providers to bring courses online. New Zealand had a need for providing the CCP examination online to potential overseas candidates as well the New Zealand students. The exam is purely multiple choice covering all aspects of their practical work. On the 10th June 2015, online examinations for the CCP training programme were held for the first time. The exam was a success with a high pass rate and positive feedback from students.

Accreditation of Sites

The Society recognised the need to formally accredit hospitals that wished to train Physiologists using the new CCP and Otago University training programmes. They needed to provide the trainers with education on how the course ran and the departmental expectations for training. The launch of site accreditation occurred in 2006-2007.

The Education Committee ensures that all sites are maintaining appropriate training standards and practices and that the students are provided with a suitable training environment. Each department is accredited every two years with a site being visited and audited every three to four years. Site visits are undertaken by an Education Committee member from outside the region. The site visits provide a great opportunity to address any training issues or questions and provide education to the departmental trainers. The current accredited sites: Auckland, Middlemore, North Shore, Waikato, Wellington, Taranaki, Tauranga, Nelson, Christchurch, Dunedin, Southland. The Education Committee meets twice a year to review education and accreditation of sites.

Examiners.

Over the past 50 years, too many people to name have been examiners or have assisted with the running of examinations. The examiners (oral, written and practical) have come from cardiac and respiratory medical staff, scientists, electronic technicians and Society members. Most of the supervision of examinations has been done by Society members. Practical "subjects" were all volunteers from the hospital staff, families and friends. The Society offers their grateful thanks to all these people who freely gave their time and expertise.

Examination Passes

Over the last 50 years, 615 people have passed examinations. Between 1986 and 2005, 403 members passed ASCT. Between 1969 and 1986, 16 members passed MSCT and between 1974 and 2010, 47 passed COP/PGD.

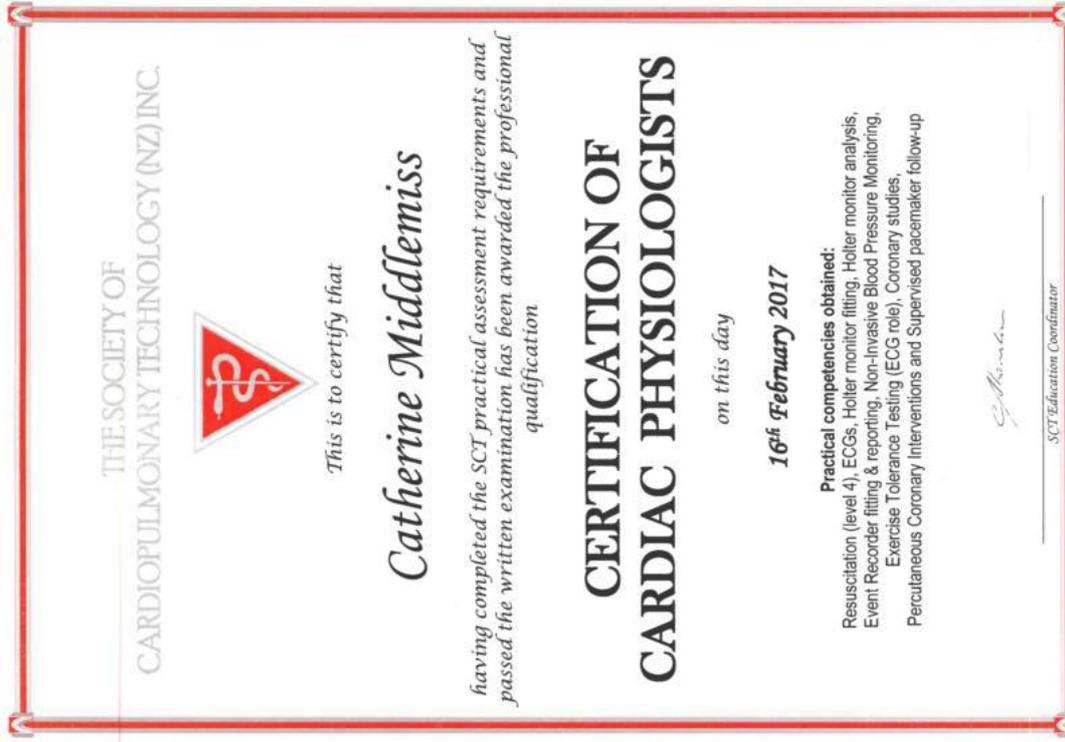
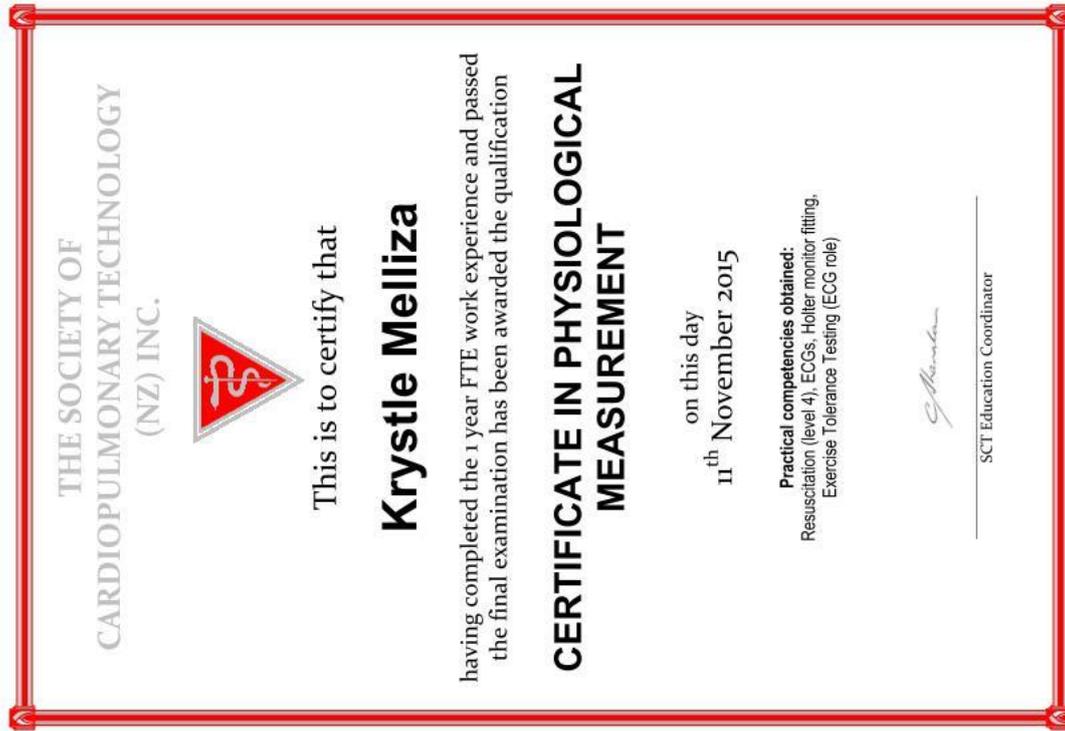
SCT Examination Passes	1968-76 9 years	1977-86 10 years	1987-96 10 years	1997-2006 10 years	2007-16 10 Years	Total
ASCT (1968-2005)	77	104	111	111	0	403
MSCT (1969-1986)	10	6	0	0	0	16
COP/PGD (1974-2010)	2	7	24	9	5	47
CPM (2006-16)	0	0	0	20	42	62
CCP (2007-16)	0	0	0	0	87	87
Total	89	117	135	140	134	615

Since CPM started in 2006 there have been 62 passes and since CCP started in 2007 there have been 87 passes.

CPM and CCP Passes by Region

	CPM (2006-16)	CCP (2007-16)
Waitemata	6	8
Auckland City Hospital	17	26
Counties Manukau DHB	7	6
Waikato	0	8
Tauranga	4	0
Whakatane	1	0
Rotorua	1	0
Wanganui	2	0
Wairarapa	1	0
Palmerston North/Manawatu	4	3
Hutt	0	1
Wellington	2	11
Wakefield	1	3
Nelson	1	2
Blenheim	4	0
Greymouth	1	0
Christchurch	6	12
Dunedin	1	2
Southland	1	5
Australia	2	0
TOTAL	62	87

Certificates from 2015 and 2017 showing the CPM and CCP qualifications (not full size).

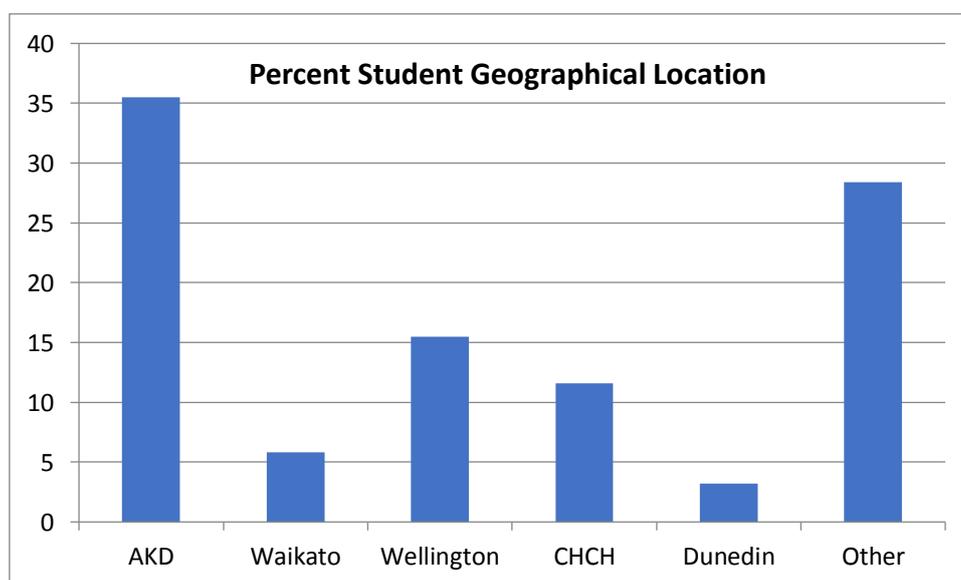


National Training Programme of the University of Otago

The Medical Technology (MTEC) programme has been running for 11 years, with its inception in 2004 and the initial course in 2006. There have been 187 students through the programme over this period. 93 students went through the MTEC 703/704 or Postgraduate Diploma Cardiology programme, 20 students went through the MTEC 705/706 or Postgraduate Diploma Sleep programme. The remainder of the students, (74) went through the 701/702 Postgraduate Certificate – general certificate programme and did not continue to the diploma papers.

Over time, the way students have entered the courses has changed. At the outset of the programme, more than half the students enrolling in 701/702 had jobs in cardiology. In the last four years this proportion has decreased to less than a quarter. It has now become the standard to employ students who have completed 701/702, so that we had an increase in the number of students taking 703/704 in their first year of work within cardiology.

These students came from all around the country; these data include all students from all papers. The numbers are not limited to cardiology. Auckland region includes: Auckland, North Shore and Middlemore. Wellington includes: Wellington Hospital, Wakefield Hospital, Lower Hutt and Wellsleep. Others include all regions outside the ones listed and all students for whom we could not get a location.



The students' progress throughout the profession was watched with interest; where they go and how they are perceived. The Cardiac Physiology profession has benefited extensively from the programme over this time and although there was consultation and discussion of course changes and content along the way, the University felt that the course structure had become outdated and in 2016 elected to overhaul the course to meet the demands and expectations of the modern student. This change involved multiple contact courses as well as a significant change in the modular structure of the course. These changes have been well received and appreciated by the students and the wider profession.

To achieve registration as a Clinical Physiologist there is a requirement to have a Postgraduate Diploma in Cardiac Technology as well as having attained the CCP practical certification.

By 2006, a proposal was put to Otago University to run a master's programme; this proposal stalled as agreement with the essential stakeholders could not be achieved.

A request to the University of Otago to develop and launch an Implantable Device Master's programme was made in 2015/16. The University surveyed its stakeholders with a very mixed response to the concept of a master's programme, with the most acceptable programme revolving around a taught master's rather than a research based master's. The University is currently working through the appropriate channels to implement the programme.

Looking forward, the University has been approached to work with the Respiratory Physiologists to develop a Postgraduate Diploma since access to all university programmes in Australia have been made unaffordable.

Graham Orsbourn and Peter Larsen set up the course and have been running it since its inception. They are both based in the Department of Anaesthesia and Surgery at the Wellington School of Medicine, University of Otago. Graham Orsbourn is a Lecturer in Medical Technology and Professor Peter Larson is the Head of the Department of Anaesthesia and Surgery.

Clinical Physiologists Registration Board (2005)

In 2004, a national meeting of Charge Cardiac, Respiratory and Sleep Technologists was held to discuss the issues around the Health Professionals Competency Assurance Act (HPCA Act) and the national training programme.

The outcome of this meeting was that the Cardiopulmonary Registration Board could move ahead with a proposal to the Ministry of Health (MOH) to represent these three professional groups under the Act.

In 2005, the Cardiopulmonary Registration Board was replaced by the Clinical Physiologists Registration Board (CPRB) and applied for registration under the Health Practitioners Competence Assurance Act. Initially three Clinical Physiology professions were covered by the Board; Cardiac, Respiratory and Sleep and this has since grown to encompass Renal and Clinical Exercise Physiologists. Registration levels were simplified, with two cardiac registration pathways; Cardiac Physiology Technician and Cardiac Physiologist (includes echocardiography).

“The Clinical Physiologists Registration Board was set up in 2005 to formally develop processes for voluntary registration for health care professionals employed in the clinical physiology fields. These processes included defining scopes of practice and requirements for competencies based on the already developed competency requirement of the appropriate professional societies in New Zealand and Australia. The CPRB went through wide ranging

consultation including discussions with the Ministry of Health (NZ) and the Health Practitioners Council (UK) in order to develop processes that fitted with the international picture for regulation of similar professionals and to the needs of the safety of the public as spelt out in the *Health Practitioners' Competence Assurance Act 2003.*" 2017 Review, CPRB website (www.cprb.org.nz 20/06/2017)

The Society remains closely aligned with the Clinical Physiologists Registration Board in New Zealand and continues to set the competency standards and qualification requirements for all Technicians and Physiologists employed within the Clinical Cardiac Physiology field and all members must comply with the national criteria. The introduction of registration was instrumental in setting and maintaining minimum standards and competencies for the workforce.

The Board promotes the development and enhancement of Clinical Physiology and Physiology Technician roles in the New Zealand healthcare system. The CPRB registers health professionals working in: Cardiac Physiology, Cardiac Sonography, Clinical Exercise Physiology, Echocardiography, Renal Dialysis, Respiratory Science and Sleep Physiology.

The Board has a Chairperson, Registrar, Secretary, Treasurer and representatives from the professions that are aligned with the Board: Cardiac, Respiratory, Sleep, Renal and Intensive Care Unit Technicians.

Fiona Riddell was the CPRB Chairperson from 2005-2013 and Angela Morgan from 2014-2015. Angela Campbell is the current Chairperson. The current Registrar is Jennifer Youard.

In 2005, 144 people were registered: 5% Sleep, 3% Respiratory, 13% Cardiac Physiologists, 80% Cardiac Technologists. By 2016, there were 235 registered Cardiac Technicians/Physiologists, 11 with conditions of Echocardiography only.

At 31 July 2017, there were 321 people registered (excluding Renal Physiologists). There are 285 Clinical Physiologists: 225 Cardiac, 2 Exercise, 34 Respiratory and 24 Sleep and 36 Physiology Technicians (Cardiac). Six Physiologists are registered in more than one category.

Annual Practicing Certificate

The Clinical Physiologists Registration Board "will issue an Annual Practicing Certificate (APC) to all registrants who on production of the required documentation demonstrate an appropriate amount of professional development related to the profession and roles in which they practice." (www.cprb.org.nz 20/06/2017).

The required outcome of an APC process is to ensure practitioners remain competent to practice. There is a points-based system of activities and the supervisor must sign the applicant as competent and fit to practice. The evidence is only submitted if requested for audit.

Professional Development Group

In 2007, the Society set up a Professional Development Group (PDG) with the aim of addressing specific professional issues and to provide a forum for networking of senior and charge technologists. Two meetings are held in Wellington each year with Team Leader representation from all tertiary centres, secondary representatives from both the North Island and South Islands and a rotating invitation to one Team Leader from another secondary centre.

This group provides an opportunity to network and exchange ideas. The group aims to be a cohesive voice that represents the perspective and direction of this profession. They meet twice a year and make recommendations to SCT Council, some of which will need to be taken to the members for debate/discussion/voting. They look at such issues as career development, workforce measurement, staffing models, merit progression, conditions of employment and have a relationship with the union that does contract negotiations (currently APEX).

The group was chaired by Fiona Riddell from 2007-2010, Stacey Neilson 2010-2011, Sharron Denekamp 2011-2014, Michelle Bayles 2014- 2016 and is currently chaired by Kellie Timmins.

Education Committee

The Education Committee is a subcommittee of the Society Council and was setup in 2007 by Christine Shanahan who is still in that role today. It was set up with the aim of reviewing the training programmes, setting exams, reviewing results and accrediting hospitals responsible for training. Membership consists of those in key training positions from most regions: Auckland, Midlands, Mid-Central, Canterbury, Southern and others, as well as Otago University.

The group meets twice a year to discuss exams, results, accreditation, course updates and new course development. Any recommendations are presented to the Council for discussion and approval.

Cardiac Society of Australia and New Zealand

The Society also has an important relationship with the Cardiac Society of Australia and New Zealand (CSANZ) and runs a scientific session at their annual conference. SCT members are encouraged to present and there is a Technical Affiliates Prize for the best presentation. Sadly, this session was cancelled this year. It is important to the profession to be undergoing scientific research to validate and guide their clinical practices and raise their profile.

Conference Funding.

Distribution of SCT fellowships for the annual scientific CSANZ meetings in both New Zealand and Australia provides access to scientific meetings otherwise denied to members by limited

funding. Members of the Society may apply to the Council in writing for funding. All applications are considered, although the final decision is at the Council's discretion.

SCT Website

In 2003, the website was being developed and became operational in 2004. It was developed, launched and maintained by Christine Shanahan. It was rebuilt in 2014 by Allan Gatland. Gay Noyer (nee Davie-Martin) is currently the Website Administrator. The Council also maintains a Dropbox that allows sharing of the Council and Annual General Meeting (AGM) minutes.

Newsletter

The Society has always produced newsletters. The originals were typed and laboriously produced with a cyclostyler. They were then hand folded, put into envelopes, labelled and posted. There was definitely no colour! By the 1980s, we had good access to photocopiers. David McKenzie was one of the editors in the 1980s.

By 1997, the Society was producing a substantial newsletter/magazine with an Editor's message, Council and Society news, interesting articles, news about members and job advertisements which was mailed to members. Belinda Buckley was the editor from 1997-1999 and Jennifer Youard from 2000 -2004.

By 2007, the newsletter was posted on the website. The modern newsletter is readily available online, attractive and interesting. James Cadogen was the editor of the online newsletter from 2005-2014 and Gary Zealand from December 2014 to the current time. It takes a great deal of individual effort and inspiration to regularly produce a newsletter.

Finances

The finances of the Society are managed by the Treasurer who is on the Council. It operates as an Incorporated Society and a Registered Charity. The accounts are reviewed annually.

In 2014, the SCT consulted the Auditors about their recommendations for putting systems in place to reduce the manual workload for the Treasurer and Secretary. "Xero" accounting software was introduced over the course of the year. Belinda Bennett was the Secretary and Treasurer during this implementation and remained Treasurer until 2017. A Constitution review was undertaken with the changes passed at the Special General Meeting in June 2016. The changes were necessary to ensure that the Constitution and current practice were aligned. Blair Sinclair is the current Treasurer.

Workforce Development

It is a major issue that there is an inadequate workforce to maintain existing services and prepare for future demands. In 2017, The Society of Cardiopulmonary Technology and The Cardiac Society of Australia and New Zealand commissioned a workforce survey. The report (July 2017), prepared by Vector Consulting, summarises the key issues identified by the respondents to the survey and outlines where further work may be beneficial. This further work includes workforce planning supported by initiatives to attract and retain staff, protected learning time with dedicated training roles, pay parity between Cardiac Physiologists and Sonographers and the review of work processes to ensure appropriate utilisation of this highly skilled workforce.

The Society 50 Years On

The Society of Cardiopulmonary Technology (NZ) Incorporated remains the professional society for Cardiopulmonary Technicians and Technologists throughout New Zealand. The aims of the Society are to improve the training, education and the professional status of persons engaged in the science and practice of cardiopulmonary technology. It has been successful in achieving those aims for 50 years. It has needed to be a progressive society continually changing to meet the ever-changing needs. This has required commitment from many members, especially from those on the Council, with new and innovative ideas arising from the changing membership.

The Council in 2017

The Council is largely run on a volunteer basis, the only paid role being the Education Coordinator/Developer and honoraria are paid to the Treasurer and assignment markers. It is increasingly difficult for Councillors, with their own increasing work/life demands, to give sufficient time to the Society and the Council needs to consider ways to ease this.

Recent changes to the Constitution have simplified the membership into three groups. There are currently 213 Society members: 24 Associates, 160 Ordinary Members and 29 Affiliates.

Fiona Riddell has made an exceptional contribution to the Society, not just in terms of her many years of service as a Councillor, but in leading the progress in the 21st century. From 1998-2004 she was Secretary to the Council. She chaired the SCT Registration Board from 1990-2004 and the CPRB from 2005-2013. In 2007, she set up the meeting which resulted in the PDG which she then chaired from 2007-2010. The Education committee also resulted from that 2007 meeting.

Christine Shanahan (nee Sargent) has also given notable service to the Society, especially as the Chairperson of the Education Committee since its inception in 2007 to the present. She had previously served as Secretary 1990-1992, Education Secretary from 1996-1998 and from 2010-2012 was both Education Committee Chairperson and Treasurer. Christine set up the website in 2004 and for a period maintained it.

Current Council Members

Chairperson	Fiona Riddell
Treasurer	Blair Sinclair
Secretary	Krystle Melliza
Website Administrator	Gay Noyer
South Island Representative	
Education Committee Representative	Christine Shanahan
Newsletter Editor	Gary Zealand
PDG Representative	Kellie Timmins
Council Member	Samantha Bowman
Incorporated Societies Contact Person	Vikki D'Ath

The Appointment of Council

The Council is elected at the Annual General Meeting (AGM).

The Council has a Chairperson, Secretary, Treasurer, Education Secretary, and Professional Development Group representative selected by the Council.

Each year a President and a Financial Reviewer are elected at the AGM.

There is also an Education Committee and Professional Development Group.

The Role of the Council

- Discussing and processing membership applications
- Discussing and processing CPM/CCP applications
- Organising CSANZ meeting in conjunction with the meeting organising committee
- Reviewing and setting policies
- Distributing Fellowships
- Monthly newsletter
- Liaising with the SCT Education Committee, the Professional Development Group and the Clinical Physiologists Registration Board

Contributions from across the country

One of the significant areas of change, over the last fifty years, has been the growth in services, and subsequently the growth in staff, across the country. The main centres were invited to tell their stories.

Cardiac Physiology North Shore and Waitakere Hospital



The Team at Waitemata DHB Cardiac Physiology Department 2017.

Back Row: Mark Lipski, Karen Searby (nee Searancke), Debbie Slipper, Liane Dawson.

Front Row: Catriona Tilsley, Robyn Meyrick, Krissie Harris, Marion Buckley, Vikkie Day, Heather Semple, Mark Antonio, Corey Leaupepe.

Absent: Robynne Breakwell, Bridget Stevenson, Ajmal Sohail, Mia Parata, Jeannette McGuinness, Kylie Todd, Rosie Yalland, Yvonne Wynne, Ifeanyi Unamadu.

North Shore Hospital (NSH) ECG Department was set up under Dr Hamish Hart in 1984. Diana Blankley from Rotorua and Clare Greenwood (nee Biggs) from GLH Cardiac Physiology were employed to perform ECGs and exercise tolerance tests (ETTs) with Registrars. In 1990, nurses were recruited to lead ETTs and Lindsay Howett came on board to start a cardiac Echo service along with Cardiologists Dr Ted Clarke, Dr Guy Armstrong and Dr Colin Edwards. The cardiac Echo service is now staffed separately but still with many staff linking back to Green Lane and Auckland Hospital's training.

In 1999, Robynne Breakwell (nee Bremner) started scanning Holters, Marion Buckley (now Charge Cardiac Technician) joined the team in 2001 and Debbie Slipper (nee Bakker) started in 2004. We now had a comprehensive non-invasive Cardiology Unit performing ECGs, Holter monitoring and scanning, echocardiography and ETTs.

During the next decade, the service grew to include Waitakere Hospital (WTH) with an Echo service staffed from NSH plus ECG and ETT services provided by Mia Parata and Vikkie Day. Cardiac catheterisation started in the vascular interventional unit at NSH. As the number of cardiologists grew more technical staff were recruited.

In 2007, Stacey Neilson started as Team Leader of 14 staff over both sites and the fledgling Cardiac Physiology service was born (not just an ECG Department anymore). She was tasked with setting up the pacemaker implant service at NSH and a follow-up service on both sites. Cardiac Physiologists were recruited and integrated into the cardiac catheterisation unit which was previously staffed with radiographers.

In 2010, the new “Lakeview Cardiology” was completed with a purpose built Coronary Care Unit (CCU), cardiology ward and two cardiac catheterisation laboratories.

In 2012, Liane Dawson started as Team Leader of Cardiac Physiology along with Dr Andy Gavin an Electrophysiologist. We were now able to start an implantable cardioverter defibrillator (ICD) service as well as pacemakers.

NSH is accredited by the Society as a training centre. A broad range of non-invasive cardiac procedures and device follow-up clinics are performed on both sites. Invasive procedures, device implants and in-patient spirometry are performed at NSH. We have 21 staff (17 FTE) over both NSH and WTH sites.

A few statistics:

Waitemata DHB population	>580,000 and growing 13% per year.
Pacemaker implants	>300 per year
ICD implants	60-80
Device follow-ups	7000
ECGs	>15,000
ETTs	>4000
Holter/event/ambulatory blood pressure (BP) monitoring	2100
Percutaneous cardiac interventions (PCIs) excluding angiograms	>2000

By Liane Dawson Team Leader - Cardiac Physiology
and
Marion Buckley Charge Physiology Technician

Department of Cardiac Physiology Auckland City Hospital, Starship Children's Hospital and Greenlane Clinical Centre

The Physiology Department was fundamental to the development and continuation of the Society of Cardiopulmonary Technology and the Society training was significantly influenced by technological development in the Department. Thus, the history of the Physiology Department has been partly covered throughout the book and in Appendices 8 and 9.

The department is split into two technical areas, Cardiac Measurement and Cardiac Ultrasound and includes a General Physiology section consisting of a Scientific Officer and Biostatisticians.

Auckland City Hospital (ACH) opened on the Grafton Road site in 2003 when the services of the Physiology Department, Green Lane Hospital had transferred into the new clinical block. The cardiac technical services of Green Lane Hospital and Auckland Hospital were amalgamated, with all Cardiac Ultrasound staff reporting under one structure and all Cardiac Physiologists and Cardiac Physiology Technicians reporting under another structure. Respiratory technical services moved to the Department of Respiratory Medicine. All inpatient services were transferred to the ACH site and all outpatient services, except Pacemaker Clinics, were transferred to the Greenlane Clinical Centre that was established on the Green Lane Hospital site. At the same time, a dedicated paediatric and adult congenital heart disease (ACHD) catheterisation laboratory (Cath Lab) was opened in the Starship Children's Hospital (SSH).

Cardiac Measurement

At the Greenlane Clinical Centre, we are based in the Cardiology Outpatient Department. We provide ECG services for all outpatient clinics held on this site, ETT services and Holter monitor fitting and analysis. The Holter monitor analysis is fully networked to allow analysis from either site. These clinics continue to grow in number as all services improve efficiencies to increase surgical volumes. The Physiology and Cardiology services have learned to live with the inefficiencies that arise from operating across multiple sites.

At ACH, our base is on the Cardiology floor where we provide the following non-invasive services: pacemaker and ICD clinics, Holter monitoring, event recording and non-invasive blood pressure fitting and analysis. ECG services are provided to all ACH and SSH wards and clinic patients including preadmission clinics, and spirometry services are provided for preoperative anaesthetic risk assessment. ETTs were originally provided in three locations; SSH, Cardiology Ward and on the Emergency Department (ED) floor. However, due to recently required expansion of the ED floor, one location has since been removed. Cardiopulmonary ETTs are provided to the Paediatric/ACHD Service.

Technical support is provided to the SSH catheter laboratory with cases scheduled two and a half days per week. Diagnoses and treatments are increasingly complex with a growing ACHD population as survival is increasing for this group. Interventional studies are now standard, with many problems treated with catheter delivered therapies and devices; these can delay the need for a surgical procedure, or eliminate the need for a further operation, resulting in fewer surgical procedures for many patients. These include closing patent ductus arteriosus (PDA), atrial septal defects (ASDs), ventricular septal defects (VSDs), pulmonary vein ablations, stenting of surgical conduits, coiling of collaterals and angioplasty of stenoses.

There are three Cath Labs on the cardiology level. The first room is used solely for adult diagnostic left heart and PCIs for coronary disease as well as an increasing number of right heart studies for the heart transplant programme. The second room has to accommodate three different types of procedures; the left heart and right heart catheterisation studies, pacemaker and ICD implants and electrophysiology (EP) studies. The third room is only used for pacemaker and ICD implants and EP studies. All three rooms have full scheduling five days per week with increasingly longer days in multiple rooms in order to accommodate the patient numbers.

A hybrid theatre has since been commissioned on the cardiovascular theatre floor. This allows work that requires the skills of the Cath Lab team combined with the cardiac surgical team for procedures such as lead extractions, transcatheter aortic valve implantations (TAVIs) and aortic stents to be safely carried out in a theatre suite that contains a high level X-ray fluoroscopy system.

There is growing demand for the provision of support and advice for patients with pacemakers and ICDs who are undergoing surgical procedures, those who require MRI and those who are undergoing radiation therapy (ACH provides radiotherapy for the entire Auckland and Northern region). Pacemaker support is also provided to the three Northland DHB Hospitals; Whangarei, Kaitaia and Bay of Islands via travelling pacemaker clinics with two staff on the road for these clinics for a total of 45 days per year.



Ready for the travelling pacemaker clinic.

In the 2017 financial year, there were 2871 cardiac catheterisations, 527 EP studies, 2044 Holter monitor scans, 632 pacemaker procedures, 191 ICD procedures, 8902 pacemaker and ICD follow-ups and 5433 non-invasive tests (ETTs, non-invasive blood pressure, event monitors, tilt table tests(TTTs) and Holter monitoring). Current ECG data is unavailable, however, there were 29,855 ECG and ETT tests performed in the 2015 financial year with significant growth experienced over the last two years.

To support this volume and complexity of work, there are 35.85 FTE on the staff; 10 FTE are Cardiac Physiology Technicians (including those in training) and 25.85 are Cardiac Physiologists (including those in training).



Catheter Room set up for an EP study.

By Fiona Riddell

Charge Cardiac Physiologist

Cardiac Ultrasound Service

Some History

The echocardiography service has come a long way since it began at Green Lane Hospital with M-mode imaging only. After M-mode came 2D imaging, in a fairly basic form. By the mid-late 1980s the Green Lane Echo department consisted of two rooms on the fifth floor of the cardiology building, with most of the scans being done in the larger of the two rooms – this had a desk in one corner, and a Hewlett Packard Sonos 500 on the other side of the room, with curtains around it for patient privacy. While one sonographer was scanning, others would be sitting at the desk, dictating Echo reports on other patients. From memory, the smaller room had an old Toshiba machine, on which you could see the individual scan lines at the wider end of the sector. We didn't yet have image-guided continuous wave (CW) Doppler – once the Nyquist limit had been exceeded, it was time to grab the Pedoff probe (or “blind probe”) and play Hunt the Jet. This certainly gave us good skills in distinguishing the differences between the various flows detected, based on shape, velocity, and timing. The

arrival of image-guided CW in the late 1980s was very welcome indeed. In 1989, we got our first colour Doppler machine; this new technology was initially viewed with a certain level of caution, and for quite some time we continued to assess regurgitant valve lesions using our old tried-and-true method of pulsed wave (PW) Doppler mapping as well as via the new colour Doppler technology, just to confirm that the two methods agreed with each other. Once the sonographers and Echo consultants were convinced that colour Doppler could indeed reliably show us the degree of valvular incompetence, we ditched the PW mapping and trusted the new technology. Transoesophageal echocardiography (TOE) came to the department while we were still on the fifth floor; we used to sterilise the TOE probe by soaking it in glutaraldehyde in a big open stainless steel soaking tray on the bench of our main room, where we would all sit and breathe in the glutaraldehyde fumes.



Rachel Miles recording an echocardiogram on the Sonos 500 in 1987.

Somewhere along the line, the Sonos 500 was replaced with a Sonos 1000, and eventually the Echo fleet grew to two Sonos 1000's and a Sonos 1500. By this time, we had moved up to the sixth floor, with part of an empty ward being remodelled to provide us with three main scanning rooms, two office areas, and another room with a Quinton and treadmill in it for stress Echo procedures – a new development in our lab. Later, another Echo room was added – a bathroom area in the old building was remodelled into a scanning room so we could have a satellite unit over in that building, in an attempt, to improve efficiency. We were also eventually provided with another small room for TOE probe storage, with our very own fume cabinet in which to soak the TOE probes after use – no more glutaraldehyde fumes for us! (Health and Safety reps can relax now.) The old Sonos 1000 and Sonos 1500 platforms were eventually replaced with Sonos 5500 machines.

Developments from 2003

In 2003, the Green Lane and Auckland Hospital departments merged, with paediatric echocardiography splitting off and becoming a specialised paediatric Echo service based at

Starship Hospital. The adult Echo service was rearranged to be provided over two sites – with outpatient transthoracic echocardiograms (TTEs) and most outpatient stress Echos being done at the Greenlane Clinical Centre and inpatient TTEs, all TOEs and some stress Echos being done at the new ACH.

By 2010, the adult service had their first Philips IE33, a huge leap forward in imaging technology, probably the single biggest technology improvement in the history of the department. Tissue Doppler was introduced, along with 3D imaging, both for TTEs and TOEs, and the ability to assess global longitudinal strain (another means of assessing ventricular function).

The Auckland DHB adult echocardiography service now consists of 9 sonographer FTEs including a Charge Sonographer, 1.2 Nursing FTEs, and a full-time scheduler. We have three Philips IE 33 machines at the Greenlane Clinical Centre, and two IE33 machines and an Epiq 7 at ACH, along with a Philips CX50 which is used for simple bedside scans and heart murmur clinic. In 2016, we did approximately 9200 Echo procedures.



Sue Perkins recording an echocardiogram on the Philips Epiq machine in 2017.

There has been a continual increase in our workload over the years. One significant source of increased referrals for us is cardiac oncology; following ventricular function in patients who are on cardiotoxic chemotherapy drugs, and assessing patients presenting with the long-term cardiac effects of radiotherapy.

Our Sonographers are now required to be registered with the Medical Radiation Technologists (MRT) Board, and must have either a Diploma of Medical Ultrasonography (DMU) or Graduate Diploma in Ultrasound from the Queensland University of Technology (QUT) to be eligible for this.

By Rachel Gatland
Cardiac Sonographer



**Green Lane Physiology Reunion in 2008.
Karen Searby, Alison Hendry, Liane Dawson,
Shona Evans, Alison Bashford and Rachel
Tuerlings.**



**Gay Noyer and Fiona Riddell at
the reunion in 2008.**



Department of Cardiac Physiology

Auckland City Hospital 2013

Back Row: Diane Owens, Catriona Pearson, Cheryl Byers, Noelle Balbas, Motufoua Jr Motufoua, Geyng Zhu, Sadiqa Khan, Sara McKenzie, Carol Cheak.

3rd Row: Jette Thomsen, Emma Hamilton, Pauline Borst, Colin Burke, Christopher Jenkins, Leighton Jones, Scott Loza, Calvin Channing.

2nd Row: Lisa Copper, Lisa Toon, Belinda Bennett, Marina Fowler, Bridget McIlraith, Emma Rawson, Keri Brown, Sue Brett, Kelly Reynish.

Front Row: Halina Hinds, Kara Edwards, Leanne Maher, Fiona Riddell, Christine Shanahan, Renelle French, John de Carteret, Jennifer Youard, Steve Withy.

Cardiac Physiologist Service Middlemore Hospital and Manukau Super Clinic

The first Charge Physiologist/Sonographer employed at Middlemore Hospital, Counties Manukau District Health Board, in the late 1980s was Alison Barber. “Alison’s Department” consisted of two Cardiac Technicians who performed ETTs and ECGs on the wards; Alison who scanned the Holters tapes and performed echocardiograms; and 1.5 FTEs of Cardiologists (Mike Caruana and Andrew Maslowski). The department was situated in an old ward and became part of the main corridor between the old wards and the geriatric wards at the back of the hospital. Privacy was a big issue – the treadmill and Echo room were on one side of the corridor and Holter room and patient waiting area were on the other side and the public were able to look into the rooms as they were walking past.

The 1990s

In the early 1990s, Cardiologists Miles Williams and Albert Ko joined the department which grew to include two Physiologists (who also did echocardiography) and three Cardiac Technicians. We started doing pacemaker implants and checks. They were hectic days as everybody was multi-tasking throughout their day trying to fit in all the procedures.

Middlemore Cardiology Staff early 1990s.



Back Row: Miles Williams, Donna Erceg, Karen Hutchinson.

Front Row: Lodi (receptionist), Sela Takau, Alison Barber, Margaret Oldfield (Hine).



Middlemore Cardiology Staff early 1990s.

Back Row: Miles Williams, Harry Lowe, Lodi, Karen Hutchinson, Geoff Green.

Front Row: Sela Takau, Alison Barber, Margaret Oldfield, Albert Ko.

The 2000s to today

We finally moved out of the corridor in 2000 as we had outgrown the three clinic rooms and we had also commenced work at the Manukau Super Clinic. Since 2000, we have moved premises three times and now provide a full cardiac pacing, echocardiography, Holter monitoring, event monitoring and ETT service. We now have 10 Cardiac Sonographers (including 3 Trainees), 6 Physiologists (including 2 Trainees) and 5 Cardiac Technicians (including 1 Trainee)

By Margaret Oldfield

Section Head Echo - Cardiac Investigation Unit

Cardiac Physiology Waikato Hospital



Waikato Hospital from the air (photo credit to Waikato DHB).

All hospitals throughout the country have seen changes in technology and the work environments as hospitals have been rebuilt or redesigned. We have felt the change in the workload and the change in our professional qualifications and responsibilities.

The early days at Waikato Hospital were a relaxed affair with nonprogrammable VVI pacemakers, spirometry on the Vitalograph, a few Cath Lab cases each week, ETTs and Friday in the sluice room listening to the radio whilst cleaning and packing equipment for reuse. Then there was lunch by the hospital pool, some knitting and then social events to organise.

In 1968, the first cardiac catheterisation was performed and a year later the first pacemaker was implanted. By the mid-1980s, half-day basic EP studies were being conducted for research purposes.

1989 saw the first dual chamber rate modulated pacemaker (DDDR) implanted in New Zealand. We also started tilt table testing and reintroduced EP testing using a borrowed system from Middlemore. Also, in 1989, pacemaker travelling clinics initially to Tauranga, Whakatane and Thames were introduced. This eventually grew to include Rotorua, Taupo, New Plymouth and Gisborne. Pacemaker implants were starting to be done in a dedicated Cath Lab (previously in theatre with a five-minute warning to gather the gear and get there!).

The first ablation procedure was performed in 1993 as well as the first ICD implant. In 1994, the National Lead Extraction Service was established and in 1995 the 10,000th catheterisation case was performed. In 2002, Waikato implanted Australasia's first biventricular ICD.



**Old catheter laboratory 2004
(above left).**



**Sarah Cummins (nee Bruce)
testing at pacemaker
implantation
September 2004 (above right).**

**Anna Wilson monitoring at the
Mac-Lab in our old catheter
laboratory September 2004
(right).**



**Ana Ng testing Haley Robinson in
our old respiratory laboratory in
September 2004 (below).**



Today we have four catheterization labs. One is a dedicated EP/pacing lab and another is a biplane, hybrid, catheterization and open heart surgical theatre. We also run a 24/7 Primary Angioplasty in Myocardial Infarction (PAMI) and device issues service. Our current team consists of Cardiac Physiologists, Respiratory Physiologists, Echocardiographers, ECG Technicians and soon our first Cardiac Technician.

And time for some fun at Xmas.



Back row: Christine Whiteley, Anna Wilson, Sacha Ware, Kellie Timmins, Nathan Little.
Front row: Rebecca Schofield, Yaser Mohammad, Belinda Jolly, Rosemary Allen, Harsile Bandhara.

By Kellie Timmins

Team Leader - Clinical Physiologist

Clinical Physiology Tauranga Hospital

In 1950, Tauranga Hospital was considered a cottage hospital supporting a population of approximately 7,000. Today, Tauranga City is the fifth largest urban area in New Zealand with a population of 134,400 June 2016 (*Bay of Plenty Times*).

Clinical Physiology

In 1993, three full-time Physiologists and three part-timers worked in Clinical Physiology alongside two Cardiologists and a Respiratory Physician. They provided all non-invasive diagnostics and respiratory tests Monday to Friday and a Saturday ward ECG and ETT service. They have a shared facility in Radiology for cardiac catheterisations starting in 1998 and in that year the total number of diagnostics performed was 2670.



ETT /respiratory room year 2000.

From left to right: Sheryl Tait (nee Manson) on the bed, with Jennifer Whiting, Jensey Hooper and Nicki Carran.

The pacing/implant service got underway in 2008 and 43 devices were implanted in that year.



The team fund-raising for breast cancer in 2008.

From left to right: Susan Howard, Sheryl Tait, Cheryl Friedland, Jane Rogerson, Leigh Lamont, Tracey Cumming, Helen Hughes, Barbara Barker, Nadia Williams, Natasha Brown.

In our last financial year, a total of 12,850 non-invasive diagnostics were performed. Over 3,000 device follow-ups and more than 3,000 Echo studies were performed. The team now provides TOEs, dobutamine contrast and bubble studies.

The new facility, the Clinical Physiology Department opened in July 2016 and the Cath Lab scheduled its first patient on Monday 16 January 2017. Our team has evolved into 17 Physiologists, a Cardiac Invasive Team and seven Cardiology Consultants across two sites.

2016 Tauranga Team in their new digs.



From Back to Front: Karl Hunter, Glenn Gabrielsen, Tracey Cumming, Barbara Barker, Carolyn Gordon, Joelene Walker, Paula Jones, Sue Jones, Kate Swinson and Michelle Bayles.

And there are more exciting changes on the horizon.

By Michelle Bayles

Team Leader - Clinical Physiology and Echocardiography

Cardio-Respiratory Suite Taranaki Base Hospital



Above from left to right: Jenny Hardiman Team Lead Physiologist/Cardiac Sonographer, John Hunt Cardiac Physiologist, Crystal Goulet Clinical Respiratory Physiologist, Mike Maxim Cardiac Physiologist (absent Aimee Roberts Cardiac Sonographer).

Our team here at Taranaki Base Hospital in New Plymouth consists of five members from around the world (Canada, England, New Zealand and Ireland) made up of 2 Cardiac Sonographers, 2 Cardiac Physiologists and 1 Clinical Respiratory Physiologist. We are supported by an excellent cardiology team including 2 Cardiologists, 2 Cardiac Nurse Practitioners and the catheter room team. We have training accreditation for students and our team members hold the following qualifications: Diploma of Medical Ultrasonography (DMU), British Society of Echocardiography (BSE) and International Board of Heart Rhythm Examiners (IBHRE).

We are fortunate to be able to provide a wide range of services to our community (population in Taranaki 109,650) including echocardiography, TOEs, cardiac angiography, ETTs, pacing clinics, respiratory services (including dynamic lung volumes (spirometry with reversal), diffusing capacity of the lungs for carbon monoxide (DLCO), maximum inspiratory pressures (MIPs)/maximum expiratory pressures (MEPs), static lung volumes, and saline challenge testing) and ECGs. We have seen some exciting developments in the last year including a new Cardiac Cath Lab Suite, body plethysmograph box for pulmonary function testing, a new General Electric (GE) Echo machine with 4D technology and PaceArt Software to support our pacing service.

By Jenny Hardiman

Team Lead Physiologist/Cardiac Sonographer

Physiology Service Palmerston North Hospital



Palmerston North Hospital main entrance (Panoramio images- photo credit lumpic).

According to our sources, there was one Physiologist here at Palmerston North back in the 1980s, along with a couple of ECG Technicians. Unfortunately, we do not have much information about the service provided at that time. When this Physiologist left, they were unable to recruit another Physiologist and an Enrolled Nurse was trained in the Physiologist role. She performed ETT, Holter tape event recording, and eventually pacemaker checks right up until her retirement around 2011.

During the late 1980s-1990s, Echos were performed by one of our general sonographers. In the early 2000s, a Physiologist was recruited who could perform Echos and this service started to grow.

During the mid-2000s, the Cardiology Service was further developed with two full-time Cardiologists both starting here. With the new Cardiologists came another Physiologist followed quickly by another and the Cardiology Service including a Cardiac Catheterisation Service started to rapidly expand.

From the mid-2000s to today, the service has increased to where we now have five Cardiac Physiologists and an ECG Technician. We also now have four full-time Cardiologists.

Our Cardiology Department where we performed most of our diagnostic testing was a small partitioned area located on Ward 28/HDU. Eighteen months ago, as part of a hospital-wide ambulatory care project, we moved to a new Cardiology Department. Our new department has the existing two Echo scanning rooms, three clinic rooms, pacemaker clinic, ECG room, office and a Holter room.

In the near future, we hope to also have our own Cardiac Cath Lab/Pacemaker Laboratory (we are currently sharing one of the Radiology Laboratories).

In a given year we would fit approximately 150 event monitors, and fit and scan 1,200 Holter tapes. We would provide technical support at 65 pacemaker implantations and provide over 1000 pacemaker checks (some acute ICD checks), Reveal implants and 200 Reveal checks. We also do 800 ETTs, 4,800 ECGs, 2,500 adult Echos, around 100 paediatric Echos, 130 TOEs and a few bubble studies for good measure!

By Jenny Tang

Head Clinical Cardiac Physiologist

Clinical Measurement Unit Wellington Regional Hospital



Cardiac Physiology Team move from top floor of the Clinical Services Block to the Clinical Measurement Unit in the new Regional Hospital, January 2009.

Back row: Doris Chuma, Nita Raju, Nadine Tierney, Kanak Kishore, Kate Swinson, Paula Rhodes.

Front Row: Marion Montgomery, Angela Morgan, Lauren Bishop, Kate Garmonsway, Sue Winter.

By 1988, Wellington Hospital had an established Cardiology Department, with typical non-invasive cardiac physiology work, a Cath Lab performing angiograms and intervention and its original pioneering electrophysiology (EP) service.

In addition to Wellington Hospital, Hutt Hospital 20kms away, had its own burgeoning Cardiology Department. Initially starting as an ECG department, the service had grown to include treadmill tests and Holter monitoring. After a period of public fundraising, including sessions where they would scan all-comers in local malls for a donation, Hutt Cardiology had its own Echo machine.

During 1988, Angela Morgan, a Society member and Green Lane trained Physiologist, relocated to Wellington and joined the Hutt Cardiology team as Charge Technician, bringing much needed Echo skills. Over time, as Hutt Cardiology continued to grow, the educational support from Society training programmes contributed to ongoing training and education of staff, indirectly influencing the quality and standards of practice.

Over the last 30 years, the relationship between Hutt and Wellington Cardiology Services at Physiologist level waxed and waned as staff and services collaborated at different times. At its peak, Hutt and Wellington Cardiology Departments agreed a Memorandum of Understanding to jointly appoint two Cardiac Physiology Trainees, one based at Hutt, one at Wellington. This was in direct response to the Society requiring training centres to be accredited to deliver the Certification of Cardiac Physiologist (CCP) programme to trainees.

Hutt Cardiology provides non-invasive services so is able to train in those modules, so must collaborate with a centre that can provide training in the invasive and pacing modules that they cannot provide. At that time, Wellington agreed to offer those modules, with the trade-off that Hutt would provide training in more of the non-invasive modules. Ultimately two Trainees were employed in the region and successfully completed CCP, where only one Trainee would have been employed otherwise.

The Society has further influenced training and practice in the Wellington region by inviting the Wellington Team Leader to be involved in the Education Committee from 2006 to 2015.

Regional involvement in the Society Education Committee has had mutual benefits for the committee and the local workplaces, with improved mutual understanding and open channels of feedback regarding how the CCP and CPM programmes worked in other centres. Many issues and problems have been addressed through this direct communication, resulting in modifications and improvements to the Society Education programmes, which continue to run successfully today.

Cardiology Department on the move to the new Clinical Measurement Unit 2009.



Packing up the old workroom.

Setting up the new Echo room (right).



Setting up the new workroom with Lauren, Ricky, Kanak and Marion (below).





Stephanie Morrison setting up the new pacing clinic.



Cardiac Physiology Team.

Back Row: Kate, Lauren, Stephanie Morrison, Paula Rhodes, Ricky Djohari.

Front Row: Marion, Kate, Lisa Johnson, Sally Cadacio Tan.

By Angela Morgan

Cardiac Physiologist/Sonographer

Cardiac Physiology Wakefield Heart Centre Wellington

Wakefield Heart Centre is a private health care facility in Wellington.

Cardiac Physiology started in 1994 when Dr M. Abernethy joined Dr R. Thompson at Wakefield Hospital. Prior to that they had a nurse doing ECGs and Norah Martens was contracted to come in and do the cardiac catheter monitoring.

I joined in May 1994 and set up the cardiac physiology area, doing ECGs, exercise tests and cardiac catheterisation monitoring, we then added Holter, blood pressure and event monitors and did occasional pacemaker implants and follow-ups, also with on-call cover.

In December 1994, we took on another Technician and over the years we have increased the staffing level as needed, we currently have 5 fully qualified Cardiac Physiologists covering 4.05 FTEs and 1 Cardiac Physiology Technician (0.8 FTE).

In 2012, the Wakefield Heart Centre took over ownership of the Cardiac Physiology/Echo area still based on the Wakefield site.

We currently run clinics from 8.30 am till 8.00 pm Monday, until 6.00 pm Tuesday to Thursday and 5pm Friday. There are 12 Cardiologists, 4 Cardiac Surgeons, 1 Respiratory Physician and 1 Nephrologist/Renal Physician working out of Wakefield Heart Centre. The Department covers ECGs, exercise tests including stress echocardiograms and perfusion scans, Holter, event and blood pressure monitoring, pacemaker follow-ups and we contract to Wakefield Hospital to cover cardiac catheterisations, PCIs, valvuloplasty, and left atrial appendage closure monitoring, pacemaker implants and electrophysiology studies and ablations. Most of our equipment is GE. The hospital Cath Lab is Siemens.



**Wakefield's New cardiac
catheterisation laboratory
June 2016.**



The present Physiology staff are: Kris Shand, Sam Bowman, Jannine Pepper, Anton Heinrich, Anna Curac and Jeni Stratford.

By Kristine Shand

Charge Cardiac Physiologist

Echocardiograph Service

An Echo service was started in 1989 with an echocardiographer being contracted out of hours and 40 Echoes were performed that year. Permanent part-time Echo staff were hired in 1993. The Echo numbers have increased dramatically over the years with now over 2500 Echos being performed every year. Staff numbers have increased accordingly: We now have 5 echocardiographers doing a total of 3.5 full-time equivalent positions. The present Echo staff are: Sue Pankhurst, Carol Allan, Susan Brady, Nadine Tierney and Will Robinson.

We have two high-end plus one small portable Echo machines, along with three TOE probes. We provide TTEs, stress Echos (exercise and dobutamine), TOEs (both outpatient and intra operative). We are involved with left atrial appendage closures, patent foramen ovale (PFO)/ASD closures and the service plans to start a transcatheter aortic valve implantation (TAVI) service soon.

By Sue Pankhurst

Charge Cardiac Echocardiographer/Clinical Team Leader

Physiology Departments Nelson and Wairau Hospitals



Nelson Team:

Debbie Hampson, Tracey Lawson, Karen de Bruijn, Christine Johansen and JoBeth Lancaster.



Wairau Team:

Denise Cooper, Jan Cranston.

Nelson Hospital and Wairau Hospital in Blenheim are in the Nelson Marlborough DHB. The Nelson Physiology team consists of five Cardiac Physiologists and the Blenheim team have two Cardiac Technicians. Nelson Hospital has a separate Echo Department of three staff, which services both sites.

The late Dr Barry Jackson was instrumental in building cardiology services in Nelson, with our first CCU opening in 1970. This coincided with employment of our first Cardiac Technician, Christine Greenslade, who passed ASCT in 1974 and is still working here today as Christine Johansen. Dr Jackson's first pacemaker implant was performed in 1972, with follow-up being carried out by our Biomedical Technicians.

ECGs were performed on a single-channel valve Sanborn ECG machine which took two minutes to heat the stylus, and Vitalograph spirometry was also performed in the ECG Department.

Dr Andrew Hamer set up the angiography service here in 1996, with Dr Nick Fisher adding a PCI service in 2007. Electrophysiologist, Dr Daniel Garofalo joined us in 2015, which made ICD implantation possible.

Having grown from our roots of ECGs, lung function tests and exercise testing, we now provide a service for ECGs, Holter monitors, event monitors, BP monitors, treadmills, stress echos, dobutamine stress Echos, TTTs, pacemaker and ICD implants and follow-up. We provide technical support for interventional work which includes coronary angiography, right heart studies and PCIs.

We also provide a respiratory service and perform spirometry, diffusing capacity, lung volumes, MIPs, MEPs, sniff nasal inspiratory pressures (SNIPs), and reversibility.

Between us all we have amassed over **ONE HUNDRED and FORTY** years of experience.

By Tracey Lawson and Team

Clinical Cardiac Physiologist

Cardiology Service Christchurch Hospital

Christchurch Cardiology Services were historically sited at Princess Margaret Hospital until 1994 and there was a separate ECG Department at Christchurch Hospital.

Our firsts

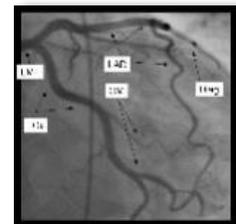
1964 first pacemaker implant (epicardial)

1970 first angiograms

1987 first electrophysiology study

1987 first direct current ablation

1991 first radiofrequency ablation



In 1991, the Cardiology Department at Princess Margaret Hospital had seven staff:

Echo: Margaret Milne and Liz Hassan

Pacing: Jude Greenslade and Rachel Fountain

Electrophysiology: Jude Greenslade

Cath Lab, Exercise Testing, ECGs: Rachel Frethey, Fay, Madeline Castle

In 2017, we have 33 staff: 7 ECG, 14 Physiology, 8 Echo and 4 support staff consisting of 2 Healthcare Assistants, 1 Physiology Team Assistant and 1 Clinical Support Facilitator.



**Judy
Greenslade
(left).**



**Rachel Frethey
(McLeod) (right).**

Procedures

The procedures provided by our service include trans aortic valve implants, percutaneous foramen ovale closures, heart pod implants, cryo-ablation as well as radiofrequency ablation procedures.

The service also carries out electrophysiology and ablation procedures for the South Island, cardiac defibrillators implanted for almost all of the South Island (some are done in Nelson), and pacemaker implants for the central South Island.

Christchurch Cardiology covers outpatient clinics in South Canterbury and West Coast DHBs.



Stephen Browitt doing an EP study.



Melissa Kong preparing the room for an exercise test.

Innovations in our service

Support Staff

Christchurch cardiac technical teams have employed four support staff to the service to assist the clinically trained staff. This enables those trained clinically to work at their maximum scope of service for more of their working day. One area which has been especially helpful is the enrolling, setting up and trouble-shooting of our remote monitored device patients. This can be time consuming.

Trainee Interns

Christchurch trialled a pilot internship in the summer of 2016-17 offering ten weeks of summer job experience to two university students. They rotated through ECG, physiology and sonography, and had some theory teaching and testing included. This was to increase the profile of the profession among physiology students, and to allow students and our department to assess students for passion and fit for the profession. One of the interns from this pilot has succeeded in gaining a position with us since then and joins us in January 2018. We are awaiting the outcome of a business case to repeat this internship over the coming summer.

Supernumerary trainees

With our retention and recruitment issues as a profession, we have been awarded four FTE supernumerary trainee roles to allow us to train above our FTE allocation.

The latest trials and innovative treatments in our service

Christchurch was the first hospital in Australasia to implant three Micra leadless pacemakers. Current trials include the APAMA trial of a multi-electrode ablation catheter and the ASD-2 Trial of subcutaneous ICDs.

By Sharron Denekamp

Charge Cardiac Physiologist

Cardiology Services Dunedin Hospital

Dunedin Hospital Cardiology Department started its days in the 1970s in the basement level of the old X-ray building at Dunedin Hospital. Professor Norma Restieaux was head of department, along with Dr Mike Ablett, Dr R Amarasingham and Dr S Woodhouse.

Among the first Physiologists were Bruce Smith, Helen Christie and Wendy Jackson. Early cardiac diagnostic testing included ECGs, Holter monitoring, exercise testing and very rudimentary M-Mode echocardiography. Coronary angiography was performed in a room in the Radiology Department. These were the days of physiological monitoring using a multi-channel Hewlett Packard physiological recorder that used photographic paper that required developer and fixer. The single-channel ECG machines used metal plates and rubber suction cups.

December 1980, saw the Cardiology Department move to the seventh floor of the new ward block, with the Cath Lab opening on the seventh floor soon after. The early 1980s saw the Physiologists' role expanding with the introduction of 2D echocardiography and the expansion of Cath Lab procedures and cardiac pacing. Dunedin Cardiology Department was the first in New Zealand to perform percutaneous coronary balloon angioplasty (1980) and in the late 1980s Dr Mike Ablett was the first in New Zealand to insert a coronary stent.

We now run our Department with 19 Cardiac Physiology staff (not all full-time) including one trainee who has nearly completed her exams and two new trainees just starting. We have 9 Cardiologists, 8 Cath Lab Nurses, 5 admin/support staff, 3 Research Nurses and one Charge Nurse Manager.

We pride ourselves on team environment – the strength is in your team!



Cath Lab team performing a time out prior to procedure.

Our Cath Lab services the entire Otago/Southland region for angiograms, PCIs, left and right heart studies, pacemaker implants and Reveal implants. In this last year, we have also been performing TAVI procedures.

The Echo Service has three rooms plus an office and they use the redeveloped treatment room on our CCU where the tests that need more equipment such as dobutamine stress Echo are performed. The Echo service is also a growing area with the introduction of two Echo Cardiologists driving this growth. Paediatric Echos are performed and four times a year a Paediatric Cardiologist from Auckland performs a two-day clinic.



Kate Wellington performing a paediatric echo.

The Pacing/ICD service is growing exponentially, especially with new implants, with at least 20% growth every year. Our pacemakers, CRT-P devices and Reveals are implanted here but all of our ICDs are implanted in Christchurch then transferred back to us for follow-up.

We also perform exercise stress tests, Holter monitoring, ambulatory blood pressure monitoring, event monitoring and ECGs.



Sarah McLennan (CP) running an exercise test with Nurse Ashleigh Wright.

We have been working hard over the last four to five years to get more trainees on board as we have found it extremely difficult to recruit trained Cardiac Physiologists. The introduction of MTEX and CCP has given our trainees a better knowledge to complement their practical skills gained training on the job but we have found it to be a very high workload for them for the two years.

Cardiology is an exciting area of expertise that is always striving to improve technology and equipment to provide a better outcome for our patients. The improvements that have already happened are a testament to this and the technology in development is exciting to look forward to.

By Maree McCormick and Vikki Milmine
Senior Cardiac Physiologists

Diagnostic Testing Department Southland Hospital

We are not sure when our department became its own identity, but we do know that in 1984 the Medical Technicians were a staff of three who performed single-channel ECGs, spirometry, echocardiography, exercise tests and Holter monitor recording and scanning.

However, these tests were certainly not done the way we would see today:

ECGs were done on a single-channel machine which recorded using a heated stylus that moved onto heat-sensitive paper. Limb leads were small metal plates that were strapped to the arms and legs, and the chest lead was recorded by moving a single suction cup with dots of conduction paste applied to the skin. The single-channel strip recording needed to be cut and mounted onto the report form.



An obsolete ECG machine which we have never used (unsure of age).

A three-channel ECG machine with a display screen was purchased in the mid-1980s and it revolutionised our lives as we could see the trace prior to recording, and also use it for ETTs!

Spirometry was performed on one of two wedge bellows units. Forced Vital Capacity, Slow Vital Capacity (SVC) and Forced Expiratory Volume in 1 second (FEV1). Measurements were charted onto graph paper by a stylus which moved as the patient blew into the unit and the numbers were manually measured from the graph. A Gould pulmonary function testing unit was purchased in 1987, and this enabled us to expand our testing to include DLCO and lung volumes.

Exercise testing was done by walking the patients up the stairs and monitoring using a Holter tape recorder which was later replayed.

Holter monitoring was carried out by recording on to cassette tape and replaying these on the telemetry screen in the CCU (they could only be reviewed when there was no patient in the CCU bed).

Echo results were stored on video tapes and images were printed as photos.

There were no computers in the department, all bookings were recorded in a diary and all test results were printed manually.

As technology advanced, and new equipment was purchased, we quickly expanded the depth and range of procedures we performed, with the addition of respiratory challenge testing, ankle brachial index (ABI) studies, pacemaker and automated implantable cardioverter defibrillator (AICD) follow up clinics, blood pressure monitoring, sleep studies, continuous positive airway pressure (CPAP) and bilevel positive airway pressure (BiPAP) treatment, and event monitoring from the early 1990s through to present day. During this time, we have applied our services in other areas; the Medical Technicians and Physiologists have also performed audiology tests and hearing aid fitting, urine flow tests, autonomic nerve function tests, TTTs, pH monitoring, manometry studies, nerve conduction studies, skin allergy tests, and Mantoux testing.

Not only has the equipment changed, but also our practices have evolved over this time as well. We used to do twice daily ward rounds for both ECG and spirometry tests, with sometimes up to 30 ECGs on the wards each morning. All myocardial infarction patients would have a daily ECG for the week they were required to be in hospital.

We also had a staff member rostered to cover cardiac and respiratory clinics in the outpatient department and this would involve sitting in an outpatient clinic room for the session to perform any tests on the patients attending the clinic. How odd to have not expected the patients to be able to walk the 100 metres to our department for their tests!

Our original main room had three beds and two spirometry units, with curtains to separate the spaces to allow patient privacy. Sometimes there could be three to four people being tested in the same room at the same time. This was the case for us until we moved to our current facility in the new hospital in October 2004. We were able to design our department to include dedicated procedure rooms for each area of our work, which has vastly improved the work flow, and the quality of service we are able to provide.

Changes to our profession over these years has included how we learn and train, and the qualifications required for us to be able to do our job. Back in 1984, trainee staff were school leavers who then trained “on the job” and completed the ASCT training programme. Those of us who are still around today, do not have the required degree which would now be an entry level basic, however, over the subsequent years we have completed the relevant post-graduate qualifications for the areas we work in. We all now complete an APC and have CME requirements to keep up to date with our learning.

Over the years, Southland Hospital has not always had resident specialist Consultants in Cardiology, Respiratory or Sleep Medicine. Many of the Consultants work in General Medicine

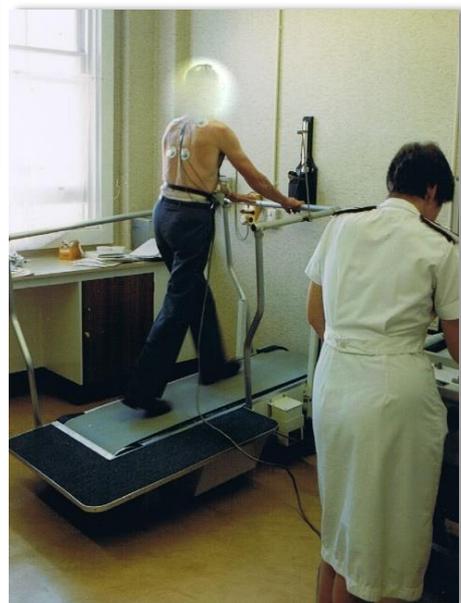
with an interest in one of these areas, or they are visiting Consultants from other hospitals who come to Southland on a regular basis. Therefore, our Physiologists are independently responsible for the reporting of many of the procedures we perform and then sending the results out to the referring doctor.

The Diagnostic Testing Department underwent a name change in the early 2000s to better reflect the type of services we provide, and we now have a total of 10 staff. Over the years since 1984, there have been more than 45 staff pass through our department, the majority of whom have been trainees.



Judith Gardner using Gould pulmonary function testing equipment with the patient.

Pam Scobie with the patient doing exercise tolerance test (right).



So, we have come a long way from where we were to where we are now. Our patient volumes continue to increase every year, the complexity of the procedures we now perform is vastly different from when we used a single-channel ECG or a wedge bellows spirometer and the results are widely available online almost before the patient has left the department in some cases. Technically, professionally and personally we have all changed significantly over the years, but our basic practice of providing the best service for the community we serve remains the same.

By Nicky McNaught

Respiratory and Sleep Physiologist

Acronyms and Abbreviations

Society of Cardiopulmonary Technology and related organisations

ASCT	Associate of the Society
APC	Annual Practicing Certificate
CCP	Certification of Cardiac Physiologists
CME	Continuing Medical Education
COP	Certificate of Proficiency
CPM	Certificate in Physiological Measurement
CPRB	Clinical Physiologists Registration Board
CSANZ	Cardiac Society of Australia and New Zealand
FSCT	Fellow of the Society
Hon. FSCT	Honorary Fellow of the Society
MSCT	Member of the Society
PGD	postgraduate diploma (formerly COP)
PDG	Professional Development Group
SCT	Society of Cardiological Technicians (N.Z.) Incorporated (1967-1972) Society of Cardiopulmonary Technology (N.Z.) Incorporated (Since 1972)

Medical

BP	blood pressure
Cath Lab	catheterisation laboratory
CCU	coronary care unit
DLCO	diffusing capacity of the lungs for carbon monoxide
ECG	electrocardiogram
Echo/s	echocardiogram/s
EP	electrophysiology
ETT	exercise tolerance test
ICD	implantable cardioverter defibrillator
MIP	maximum inspiratory pressure
MEP	maximum expiratory pressure
PCI	percutaneous coronary intervention
TOE	transoesophageal echocardiogram
TTE	transthoracic echocardiogram
TTT	tilt table test

Hospitals and District Health Boards

ACH	Auckland City Hospital
DHB	District Health Board
ED	Emergency Department
FTE	full-time equivalent
GLH	Green Lane Hospital
NSH	North Shore Hospital
SSH	Starship Hospital
WTH	Waitakere Hospital

Acknowledgements

A heart felt thank you to all the people who have helped us bring this book together.

It has been wonderful to have the involvement of our Founder, Louise Conway Rahman. Louise has provided a written contribution and photographs, designed the centre-piece for the book cover and will be here in November when we celebrate "*Fifty Years of Progress*". We appreciate the input of Nadia Higham, Louise's daughter, who incorporated the drawing into a modern cover page and thank graphic designer, Lyn Berquist, for taking their cover concept to the final production stage.

Many of the pre-1990 records are no longer available so thank you to everyone who has provided information to fill those gaps.

Thank you to Fiona Riddell, Graham Orsbourn, Christine Shanahan and Jennifer Youard for their contributions to the section 'The Millenium and Beyond'.

It was a pleasure to read the items from around the country and we thank the contributors who have been individually acknowledged within the book.

The photographs have come from SCT and Physiology Department archives and from contributing members. The Physiology Department photographs were taken by the Photographic Department at Green Lane Hospital and the 2013 Cardiac Physiology photograph was taken by the Photographic Department at Auckland City Hospital. The photograph of Waikato Hospital has been credited to the Waikato District Health Board. The photograph of Palmerston North Hospital has been credited to lumpic.

Thank you to Dr Ron Easthope for permission to use photographs from the Wellington Medical History Society, Cardiology of Wellington Hospital website, which he maintains.

We feel privileged to be able to print the articles in the appendices and the authors are acknowledged beside their papers.

Thank you to James Ramage for his willing help, in particular, his proofreading and the debates on English grammar. Thank you to Andrea Collen for her excellent proofreading.

Most of the dates in the record book are for the year of examination but some certificates are not dated until work experience is completed so there may be variations in individual cases. Some of the early examination records have no place of residence on them and it is possible that another person has been credited with being the first to sit from that area.

Our apologies for any errors and omissions.

Carol Ramage and Gay Noyer

References

SCT Assessment of Training 1985 by David Cathcart B.SC., M.A.A.C.B., R. Med. Tech.

SCT documents and archived newspaper clippings and photographs

The Society of Cardiopulmonary Technology (NZ) Inc. 10th Anniversary Commemorative Booklet (1967-1977)

And information from the following websites

CPRB website www.cprb.org.nz

CSANZ website www.csanz.edu.au

SCT website www.sct.org.nz

Wellington Medical History Society website - Cardiology of Wellington Hospital

www.wmhs.org.nz/cardhist

APPENDIX 1

Presidents of the Society of Cardiopulmonary Technology

The President may be elected by the Society from among distinguished persons in any field of science or technology and upon whom the Society wishes to confer this exceptional honour.

Many of the Presidents contributed to the discussions on the strategic direction of the Society and to the written and oral examinations

1967-1969	Sir Douglas Robb
1969-1971	Dr James Lowe
1971-1973	Sir Brian Barratt-Boyes
1973-1975	Dr Trevor Agnew
1975-1978	Dr Antony Roche
1978-1981	Dr John Neutze
1981-1984	Dr RML Whitlock
1984-1987	Dr Robin Norris
1987-1990	Dr Louise Calder
1990-1993	Dr Trevor Agnew
1993-1996	Dr Warren Smith
1996-1999	Dr Arthur Coverdale
1999-2003	Dr Margaret Hood
2003-2005	Dr Jim Stewart
2005-2006	Dr Sally Greaves
2006-2010	Dr Peter Ruygrok
2010-2013	Dr Nigel Lever
2013-2015	Dr Ivor Gerber

APPENDIX 2

SCT Councillors 1967-1990

Most of the Council records for this period are missing. Thank you to the members who have helped fill this in from their certificates and CVs.

Year	Chair	Secretary	Treasurer	Education Secretary	Council Members
1967-68	Lynleigh Ross	Louise Conway Beech	Heather Nisbet	Louise Conway Beech	Lynleigh Ross, L. Conway Beech, H. Nisbet, Margaret Maxwell, Lynette Hodgson, B Seymour
1968-69	Lynleigh Ross	Louise Conway Beech	Heather Nisbet	Louise Conway Beech	Lynleigh Ross, Louise Conway Beech, Heather Nisbet, Carol Meiklejohn
1969-70				Donelle Dickey	Carol Breed, Donelle Dickey, Olwen Watson (Napier)
1970-71			Elaine Rush	Carol Breed	Carol Breed, Elaine Rush
1971-72	Elaine Rush	John Mackie	Brent Long	Carol Breed/Elaine Rush	Elaine Rush, John Mackie, Brent Long, Carol Breed
1972-73	Elaine Rush		Brent Long	Elaine Rush	Elaine Rush, Brent Long, Sue Ryan
1973-74	Elaine Rush			Elaine Rush	Elaine Rush, Sue Ryan
1974-75	Elaine Rush		K Symons	Sue Ryan	Elaine Rush, Sue Ryan, Carol Breed, K Symons
1975-76	Elaine Rush	Sue Ryan		Sue Ryan	Elaine Rush, Carol Breed, Sue Ryan
1976-77	Carol Breed			Sue Ryan	Carol Breed, Elaine Rush, Sue Ryan
1977-78	Carol Breed			Sue Ryan	Carol Breed, Sue Ryan
1978-79	Carol Breed			Sue Perkins	Carol Breed, Sue Perkins
1979-80	Carol Breed			Kaye Harrison	Carol Breed, Jenny Fleming
1980-81	Carol Breed			Fiona Riddell	Carol Breed, Alan Wilkinson, Sue Perkins, Fiona Riddell, Jenny Fleming
1981-82	Carol Breed	Alan Wilkinson		Sheryl Manson	Carol Breed, Alan Wilkinson, Sheryl Manson, Jenny Fleming
1982-83	Carol Breed		Jenny Fleming	Jenny Fleming	Carol Breed, Jenny Fleming
1983-84	Carol Breed			Christine Grey	Carol Breed, Christine Grey
1984-85	Marie Flewellen			Shona Evans	Marie Flewellen, Carol Breed, Shona Evans
1985-86	Sheryl Tait			Alison Barber	Sheryl Tait, Carol Ramage, Alison Barber
1986-87	Sheryl Tait			Kirsty Clotworthy	Sheryl Tait, Carol Ramage, Kirsty Clotworthy, David Mckenzie
1987-88				Kirsty Troy	Carol Ramage, Kirsty Troy, Christine
1988-89		Linda de Bray		Sheryl Tait	Sheryl Tait
1989-90				Sheryl Tait	Sheryl Tait

APPENDIX 3A

SCT Council Office Holders 1990-2017

Year	Chair	Secretary	Treasurer	Education Secretary (Chair from 2008)	PDG Chair
1990-91	Kirsty Troy	Christine Sargent	Liane Dawson	Sheryl Tait	
1991-92	Kirsty Troy	Christine Sargent	Liane Dawson	Katrina Poppe	
1992-93	Kirsty Troy	Karen Searancke	Liane Allchorne	Katrina Poppe	
1993-94	Kirsty Troy	Karen Searancke	Liane Allchorne	Jackie Crawford/Rose Allen/Paula Bishop	
1994-95	Kirsty Troy	Karen Searancke/Belinda Buckley	Liane Allchorne	Jackie Crawford/Rose Allen/Paula Bishop	
1995-96					
1996-97	Liane Allchorne	Donna Elliott	Craig Smith	Christine Shanahan	
1997-98	Belinda Buckley	Kerry Conway	Craig Smith	Christine Shanahan	
1998-99	Liane Allchorne	Fiona Riddell	Craig Smith	Taryn Evans	
1999-00	Liane Allchorne	Fiona Riddell	Ian Tripp	Sonia Darlington/Taryn Evans	
2000-01	Liane Allchorne	Fiona Riddell	Ian Tripp	Sonia Darlington/Shawn O'Leary	
2001-02	Karen Searancke	Fiona Riddell	Ian Tripp	Shawn O'Leary	
2002-03	Karen Searancke	Fiona Riddell	Ian Tripp	Rachel Palmer	
2003-04	Karen Searancke	Fiona Riddell/Liz	Marina Fowler	Rachel Palmer	
2004-05	Karen Searby	Jennifer Youard	Marina Fowler	Rachel Palmer	
2005-06	Kerry Conway	Karen Searby	Jennifer Youard	Rachel Palmer	
2006-07	Kerry Conway	Pauline Borst	Jennifer Youard	Christine Shanahan	
2007-08	Kerry Conway	Lisa Wilson/Karen Harvey	Jennifer Youard	Christine Shanahan	Fiona Riddell
2008-09	Kerry Conway		Rachel Palmer	Christine Shanahan	Fiona Riddell
2009-10	Kerry Conway	Sonia Darlington	Rachel Palmer	Christine Shanahan	Fiona Riddell
2010-11	Kerry Conway	Sonia Darlington	Christine Shanahan	Christine Shanahan	Stacey Neilson
2011-12	Kerry Conway	Christine Shanahan	Christine Shanahan	Christine Shanahan	Sharron Denekamp
2012-13	Fiona Riddell		Renelle French	Christine Shanahan	Sharron Denekamp
2013-14	Fiona Riddell	Catriona Pearson	Renelle French	Christine Shanahan	Sharron Denekamp
2014-15	Fiona Riddell	Catriona Pearson	Belinda Bennett	Christine Shanahan	Michelle Bayles
2015-16	Fiona Riddell	Belinda Bennett	Belinda Bennett	Christine Shanahan	Michelle Bayles
2016-17	Fiona Riddell	Krystle Melliza	Belinda Bennett	Christine Shanahan	Kellie Timmins

APPENDIX 3B

SCT Councillors 1990-2017

- 1990-1991**
Kirsty Troy, Liane Dawson, Christine Sargent, Katrina Poppe, Sheryl Tait, Robyn Nimmons, Angela Morgan, Rosalind Hall-Jones, Yvonne Schaar
- 1991-1992**
Kirsty Troy, Liane Dawson, Christine Sargent, Katrina Poppe, Sheryl Tait, Robyn Nimmons, Yvonne Schaar
- 1992-1993**
Kirsty Troy, Karen Searancke, Katrina Pope, Sheryl Tait, Liane Allchorne, Craig McDougal, Angela Morgan, Rosalind Hall-Jones, Yvonne Schaar
- 1993-1994**
Kirsty Troy, Karen Searancke, Jackie Crawford, Rose Allen, Paula Bishop, Sheryl Tait, Liane Allchorne, Craig McDougal, Angela Morgan, Rosalind Hall-Jones, Yvonne Schaar
- 1994-1995**
Kirsty Troy, Liane Allchorne, Karen Searancke, Craig McDougal, Belinda Buckley, Sheryl Tait, Jackie Crawford, Rose Allen, Paula Bishop, Rosalind Hall-Jones
- 1995-1996**
Kirsty Troy, Liane Allchorne, Karen Searancke, Craig McDougal, Sheryl Tait, Paula Bishop, Jackie Crawford
- 1996-1997**
Kirsty Troy, Karen Searancke, Donna Elliott, Craig McDougal/Craig Smith, Christine Shanahan, Susan Sinclair, Belinda Buckley, Liane Allchorne
- 1997-1998**
Donna Elliott, Kirsty Troy, Craig Smith, Belinda Buckley, Kerry Conway, Christine Shanahan, Liane Allchorne
- 1998-1999**
Liane Allchorne (GLH), Belinda Buckley (Auck), Taryn Evans (GLH), Fiona Riddell (GLH), Karen Searancke (GLH), Craig Smith (GLH), Susan Sinclair (Dunedin)
- 1999-2000**
Liane Allchorne, Jennifer Youard (GLH), Karen Searancke (GLH), Susan Sinclair (Dunedin), Sonia Darlington (GLH), Taryn Evans (GLH), Fiona Riddell (GLH), Ian Tripp (GLH)
- 2000-2001**
Jennifer Youard (GLH), Karen Searancke (GLH), Susan Sinclair (Dunedin), Fiona Riddell (GLH), Ian Tripp (GLH), Jackie Crawford (GLH), Elizabeth O'Brien (GLH), Shawn O'Leary (GLH)
- 2001-2002**
Jennifer Youard (GLH), Karen Searancke (GLH), Susan Sinclair (Dunedin), Fiona Riddell (GLH), Ian Tripp (GLH), Jackie Crawford (GLH), Elizabeth O'Brien (GLH), Shawn O'Leary (GLH)
- 2002-2003**
Jennifer Youard (GLH), Elizabeth O'Brien (GLH), Karen Searancke (GLH), Fiona Riddell (GLH), Jackie Crawford (GLH), Ian Tripp (GLH), Susan Sinclair (Dunedin), Rachel Palmer (GLH)
- 2003-2004**
Jennifer Youard (ACH), Karen Searancke (ACH), Fiona Riddell (ACH), Jackie Crawford (ACH), Ian Tripp (GLH), Lisa Wilson (Invercargill), Rachel Palmer (ACH)
- 2004-2005**
Paula Bishop, Kevin Eilyett, Graham Orsbourm, Rachael Palmer, David Roboiny-Rogers, Karen Searby, Lisa Wilson, Jennifer Youard, Marina Fowler

2005-2006

Karen Searby, Christine Shanahan, Rachel Palmer, Lisa Wilson, Jennifer Youard, Kevin Ellyett, Graham Orsbourn, David Roboiny-Rogers, Kerry Conway, Paula Bishop

2006-2007

Kerry Conway (ACH), Christine Shanahan (ACH), Karen Harvey (CHCH), Pauline Borst (ACH), Lisa Wilson (ACH), Jennifer Youard (ACH), Fiona Riddell (ACH), Rachael Palmer, Amanda Elliott

2007-2008

Kerry Conway, Fiona Riddell, Pauline Borst, Karen Harvey, Rachael Palmer, Jennifer Youard, Christine Shanahan, Lisa Wilson, Amanda Elliot

2008-2009

Christine Shanahan, Rachael Palmer, Shawn O'Leary, Fiona Riddell, Kerry Conway, Miriama Gideon, Karen Harvey, Lisa Wilson, (Keri Brown)

2009-2010

Jude Greenslade (CHCH), Kerry Conway (ACH), Miriama Gideon (MMH), Christine Shanahan (ACH), Sonia Darlington (ACH), Rachael Palmer (ACH), Fiona Riddell (ACH), Lisa Wilson (Southland), Karen Harvey (CHCH)

2010-2011

Jude Greenslade (CHCH), Kerry Conway (ACH), Miriama Gideon (MMH), Christine Shanahan (ACH), Sonia Darlington (ACH), Rachael Palmer (ACH), Fiona Riddell (ACH), Lisa Wilson (Southland), Karen Harvey (CHCH)

2011-2012

Jude Greenslade (CHCH), Kerry Conway (ACH), Miriama Gideon (MMH), Christine Shanahan (ACH), Paula Jones (Waikato), Fiona Riddell (ACH), James Cadogan (Southland), Karen Harvey (CHCH)

2012-2013

Miriama Gideon (MMH), Fiona Riddell (ACH), James Cadogan (ACH), Renelle French (ACH), Karen Harvey (CHCH), Lincoln Simms (Waikato), Emma Rawson (ACH), Catriona Peaseon (ACH), Kara Edwards (ACH)

2013-2014

Miriama Gideon (MMH), Fiona Riddell (ACH), James Cadogan (ACH), Renelle French (ACH), Karen Harvey (CHCH), Catriona Peaseon (ACH), Kara Edwards (ACH), Vikki D'Arth (Well), Gary Zealand (Hawkes Bay)

2014-2015

Miriama Gideon (MMH), Fiona Riddell (ACH), Belinda Bennett (ACH), Renelle French (ACH), Karen Harvey (CHCH), Catriona Peaseon (ACH), Vikki D'Arth (Well), Gary Zealand (Hawkes Bay), Megan Tomlins (Southland)

2015-2016

Fiona Riddell (ACH), Renelle French (ACH), Belinda Bennett (ACH), Gay Noyer (ACH), Miriama Gideon (MMH), Gary Zealand (Hawkes Bay), Vikki D'Arth (Hutt Valley), Karen Harvey (CHCH), Megan Tomlins (Southland)

2016-2017

Fiona Riddell (ACH), Gay Noyer (ACH), Karen Harvey (CHCH), Gary Zealand (Hawkes Bay), Vikki D'Arth (Well), Krystle Melliza (ACH), Samantha Bowman (Wakefield)

APPENDIX 4

Certificates by Year

Name	Place	Type of Cert		
1968			1970	
BALLANTYNE Barbara		ASCT	BURFITT Carol	Auckland
DICKEY Donelle	Auckland	ASCT	DICKEY Donelle	Auckland
FRASER Alison		ASCT	EASTERBROOKE Margaret	Auckland
HALL Cecil	Christchurch	ASCT	HARRIS Peta	Auckland
HANAK Frank	Auckland	ASCT	HAY Carol Althea	Auckland
HARDING Susan	Auckland	ASCT	HOSKEN Elaine	Auckland
HODGSON Lynette	Hamilton	ASCT (Commended)	HOW Ursula	ASCT (Top Commended)
MEIKLEJOHN Carol	Auckland	ASCT (Commended)	KEMPTHORNE Margaret	ASCT
MILNES Frances	Dunedin	ASCT	LONG Brent	Wellington
ROSS Lynleigh	Auckland	ASCT	McGREGOR Donna	Auckland
SHEPHERD Margaret	Auckland	ASCT	PARKER Cheryl	Auckland
THOREAU Chris	Auckland	ASCT	PASTERBROOKE Margaret	Auckland
WATSON Olwen	Napier	ASCT	RHODES Paula	ASCT
			RUFFELL Ian	Wellington
1969			UNDERWOOD Beverly	Waipukurau
ADEY Helen	Napier	ASCT		Wellington
ANTHONY Helen	Wellington	ASCT		
BERIN Patricia Margaret		ASCT		
BOWMAR Dorothy Anne	Napier	ASCT		
CONWAY BEECH Louise	Auckland	Hon. FSCT		
HOGAN Michelle	Auckland	ASCT		
LOVELL-SMITH Marion	Christchurch	ASCT		
MEIKLEJOHN Carol	Auckland	MSCT		
SELLAR Carol Ann	Auckland	ASCT		
YEATES Stella	Auckland	ASCT (Commended)		

1971

DENNING-KEMP Anthea Wellington ASCT
 KELLER Judith Lorraine Christchurch ASCT
 MACKIE John Charles Auckland ASCT
 O'CONNOR Justine Mary Auckland ASCT
 THOMAS Robyn Fay Auckland ASCT (Top Commended)
 THORBURN Pamela May Auckland ASCT

1974

BARLOW Sue Wellington ASCT (Top Commended)
 GREENSLADE Christine Nelson ASCT
 LEITH Carol Auckland MSCT
 MCGREGOR G Auckland ASCT
 McINTYRE Carol Wellington ASCT
 RYAN Sue Auckland COP Cardiac

1972

DARVIL Elizabeth Auckland ASCT (Top Commended)
 HOSKEN Elaine Auckland MSCT (Commended)
 KEMPTHORNE Margaret Wellington MSCT
 LEITH Carol Auckland ASCT
 LONG Brent Auckland MSCT
 RYAN Sue Auckland ASCT (Commended)
 TUCKER Helen Wellington ASCT
 VERTONGEN Joy Wellington ASCT
 WHITE Susan Auckland ASCT (Commended)

1975

CALLINAR Margaret Auckland ASCT
 DAVIS Susan Auckland COP
 HARRISON Kaye Auckland ASCT
 MATHIESON I Auckland ASCT
 ROUNDTREE Judith Auckland ASCT
 RUYGROK Peter Auckland ASCT
 SIMPSON Margaret Wellington ASCT
 SYMONDS K Auckland ASCT
 VINCENT Lynn Auckland ASCT
 WELLS J Auckland ASCT
 WHITING L Auckland ASCT
 WITTHY Stephen Auckland ASCT (Top Distinction)
 WOODWARD Shelley Wellington ASCT

1973

BRIGHT Lorraine Auckland ASCT
 DAVIS Susan Auckland ASCT
 HIRTZEL Kathleen Wellington ASCT
 LIGHTBOWN D Wellington ASCT
 MACKIE John Charles Auckland MSCT
 MELVILLE J Auckland ASCT
 STEWART Frances Wellington ASCT
 THOMAS Robyn Auckland MSCT
 WESTERN Jan Auckland ASCT (Top)

1976				WILSON Christine	Christchurch	ASCT (Commended)
BROOME Anne	Auckland	ASCT				
HARSENT Pamela	Auckland	ASCT				
HUNTER Gwendoline	Wellington	ASCT		BIRT Catherine	Wellington	ASCT
KIRK Lydia	Auckland	ASCT (Top)		BROWN Paul	Auckland	ASCT
LORIMER Anne	Auckland	ASCT		COWIE Teresa	Christchurch	ASCT (Commended)
McINTYRE Carol	Wellington	MSCT		FLEMING Jenny	Auckland	COP Respiratory
McLEOD Shelley	Auckland	ASCT		GAYWOOD Kim	Wellington	ASCT
TEMPLETON Pamela	Auckland	ASCT		GRAVES Maureen	Christchurch	ASCT
WONG Lorraine	Auckland	ASCT		GREY Christine	Auckland	ASCT
				HARRISON Kaye	Auckland	COP Cardiac
1977				MAHONEY Colleen		ASCT
BOLAM Trisha	Auckland	ASCT		RIDDELL Fiona	Auckland	ASCT
GRAHAM Bruce	Auckland	ASCT				
HUMPHRIES Lisa	Auckland	ASCT (Commended)		1980		
PETERS Petra	Wellington	ASCT		AUSTIN Bob	Auckland	ASCT
RUSH Elaine	Auckland	FSCT		BREED Carol	Auckland	Hon. FSCT
SLOAN Carmel	Auckland	ASCT		CLARK Judith	Auckland	ASCT
SPACKMAN Jenny	Auckland	ASCT		DAWSON Liane	Auckland	ASCT (Commended)
				DAWSON Robyn	Wellington	ASCT (Commended)
1978				FA'ASALELE Arieta	Auckland	ASCT (Commended)
BENNETT Sinclair	Christchurch	ASCT		HICKIN Sandra	Christchurch	ASCT
BHANA Jagdish	Auckland	ASCT		JENSEN Julie	Auckland	ASCT
DAVIE-MARTIN Gay	Auckland	ASCT (Top Commended)		KEENAN J	Wellington	ASCT
EDEN Sharon	Hamilton	ASCT		MANSON Sheryl	Auckland	ASCT (Top Commended)
FLEWELLEN Marie	Christchurch	ASCT		PANCHAL Pushpa	Christchurch	ASCT
JONES Judy	Wellington	ASCT		PERRY Stephanie	Wellington	ASCT
LANG Kathleen	Wellington	ASCT		SHANKS Kay	Dunedin	ASCT
LARKIN Janine	Christchurch	ASCT (Commended)		WIGGINS Jennifer	Wellington	ASCT
TIMMONS Dennis	Auckland	ASCT		WOLFKAMP Barbara	Auckland	ASCT (Commended)
WILKINSON Alan	Auckland	ASCT				

1981

BATTY Michelle	Auckland	ASCT	NEWPORT Lynette	Nelson	ASCT
CHRISTIE Helen	Dunedin	ASCT	RIDDELL Fiona	Auckland	COP Cardiac
CLOSE Andrea	Auckland	ASCT	TURNER Gwendoline	Wellington	MSCT
D'ARTH Vicki	Wellington	ASCT	WALSH Sharon	Auckland	ASCT (Commended)
FERGUSON Rosalind	Invercargill	ASCT (Top equal)	WHALLEY Gillian	Auckland	ASCT (Top Commended)
FLEWELLEN Marie	Christchurch	MSCT	WHITING Phillip	Auckland	ASCT
GOUDIE Jane	Auckland	ASCT			
HENDRY Alison	Auckland	ASCT (Top equal)	1984		
TAVERNER Lyall	Auckland	ASCT	COOK Heather	Auckland	ASCT
VLAHOVIC Maria	Wellington	ASCT	DE BRUIJN Karen	Christchurch	ASCT
WILSON Christine	Christchurch	MSCT (Commended)	EVANS Shona	Auckland	ASCT
			GARLICK Sally	Christchurch	ASCT (Distinction)
			GOGGIN Catherine	Wellington	ASCT

1982

DE BRAY Linda	Auckland	ASCT	HENDRY Alison	Auckland	COP
HENDERSON Mike	Auckland	ASCT	JOHNSTONE Juanita	Auckland	ASCT
HURLEY Andrew	Auckland	ASCT	JUDKINS Carol	Auckland	ASCT
PARR Jacalin	Christchurch	ASCT	KELLY Patricia	Dunedin	ASCT
SHAND Kristine Patricia	Wellington	ASCT	KRAMER Anna	Christchurch	ASCT (Distinction)
SWIFT Lynn	Auckland	ASCT	LANGSTON Suzette	Auckland	ASCT
			McKENZIE David	Auckland	ASCT (Top Distinction)
			ROBERTSON Blair	Auckland	ASCT (Distinction)
			RUST Chris	Auckland	ASCT (Distinction)

1983

DAVIE-MARTIN Gay	Auckland	COP Cardiac			
FLETCHER Jeannie	Auckland	ASCT			
FRAPWELL Tania	Christchurch	ASCT			
GOLDING Kathy	Auckland	ASCT			
GREY Christine	Auckland	COP Cardiac			
HINE Margaret	Auckland	ASCT			
KOSCHAK Helen	Wellington	ASCT			
MARTENS Norah	Wellington	ASCT			
MULDER Jan	Wellington	MSCT			

1985

ALLEN Rosemary	Hamilton	ASCT	
BELL Elizabeth	Auckland	ASCT (Commended)	
CLOTWORTHY Kirsty	Auckland	ASCT	
COLLINS Angela	Auckland	ASCT (Commended)	
COMPTON Raewyn	Southland	ASCT	
DEVLIN Juliet	Timaru	ASCT (Distinction)	
EASDALE Robin	Auckland	ASCT (Commended)	
KERR Nicola	Southland	ASCT	
KOSCHAK Helen	Wellington	MSCT	
MARTIN Frances	Christchurch	ASCT	
MURRAY Sandra	Wellington	ASCT	
PIKE Deborah	Auckland	ASCT	
SIMMS Lincoln	Auckland	ASCT (Top Distinction)	
SUTHERLAND Ruth	Auckland	ASCT	
WHITE Rosemary	Auckland	ASCT	
1986			
BAINIE Julie	Wellington	ASCT	
BISHOP Donna	Wellington	ASCT	
CIOBO Colleen	Auckland	ASCT	
DAVY-SNOW Suzanne	Auckland	ASCT (Commended)	
EDEN Sharon	Hamilton	MSCT	
FORDE Susan	Auckland	ASCT	
JACKSON Wendy	Dunedin	ASCT	
JOPSON Allison	Auckland	ASCT (Top Distinction)	
MILES Rachel	Auckland	ASCT (Commended)	
NIMMONS Robyn	Auckland	ASCT	
PALMER Leslie	Hamilton	ASCT (Distinction)	
PARKINSON Christine	Dunedin	ASCT (Commended)	
PIKE Sharon	Auckland	COP Respiratory	

SEARANCKE Karen	Auckland	ASCT (Distinction)	
TUERLINGS Rachel	Auckland	ASCT	
1987			
DAISH Angela	Auckland	ASCT	
FRENCH Renelle	Auckland	ASCT (Commended)	
JONAS Sara	Auckland	ASCT (Commended)	
KLENNER Michelle	Invercargill	ASCT (Distinction)	
SCOBIE Pamela	Invercargill	ASCT	
1988			
ASADYARI Gitti	Auckland	ASCT	
DEWHIRST Angela	Dunedin	ASCT	
GARDINER Judith	Invercargill	ASCT	
GOODWIN Kim	Auckland	ASCT (Top Distinction)	
HOLBROOK Nicollette		ASCT	
HOLLEY Stephanie		ASCT	
JOHNSTONE Catherine	Wellington	ASCT	
JONKERS Susan	Auckland	ASCT (Commended)	
LEAN Fiona	Auckland	ASCT	
LIPSKI Mark	Auckland	ASCT (Commended)	
LOUGHNAN Anne Marie		ASCT	
ROSS Mary-Anne	Auckland	ASCT	
SCHAAR Yvonne	Christchurch	ASCT	
SHIRLAN Teresa	Christchurch	ASCT	
SMITH Steve	Auckland	ASCT	
SMITHIES Alison	Timaru	ASCT	
SULLIVAN Alison		ASCT	
WEBB Susan		ASCT	

1989

BISHOP Paula	Hamilton	ASCT (Commended)	SHERIFF Penny	Invercargill	ASCT
BREMNER Robynne	Auckland	ASCT	SINCLAIR Susan	Auckland	COP Cardiac
DAWSON Liane	Auckland	COP Cardiac	YOUARD Jennifer	Auckland	ASCT
GLASSON Kerren	Invercargill	ASCT			
GORDIN Judith	Wellington	ASCT	1991		
LUCAS Marilyn	Dunedin	ASCT	ANDERSON Karen	Auckland	ASCT
NICHOLS Kim	Christchurch	ASCT	BUCKLEY Belinda	Auckland	ASCT (Commended)
TAIT Sheryl	Auckland	COP Cardiac (Commended)	CRAWFORD Jackie	Hamilton	ASCT (Commended)
TROY Kirsty	Auckland	COP Respiratory	CUMMING Tracy	Auckland	ASCT
WHITLOCK RML	Auckland	Hon. FSCT	ELLIOTT Moana	Wellington	ASCT
WOLFKAMP Barbara	Auckland	COP Cardiac	HUTCHINSON Karen	Auckland	ASCT
YATES Denise	Dunedin	ASCT	JACKSON Beryl	Auckland	ASCT
			JONES Leanne	Australia	ASCT
			KNUDSEN Kirsten	Auckland	ASCT
1990			LOCKWOOD Colleen	Palmerston North	ASCT
ALLEY Tracey	Nelson	ASCT	O'BRIEN Karen	Wellington	ASCT
BAKKER Deborah	Auckland	ASCT	ROLLESTON Lissa	Tauranga	ASCT
BRADY Susan	Wellington	ASCT	RUFFELL Claire	Waipawa	ASCT
CHASE Gillian	Auckland	ASCT (Commended)	SARGENT Christine	Auckland	ASCT (Commended)
FIFE Lisa	Auckland	ASCT	SCARROTT Helen	Hamilton	ASCT
GUPTILL Susan	Auckland	ASCT (Commended)	STOKES Judith	Hamilton	ASCT
HAMPSON Debra	Nelson	ASCT	WALKER Renelle	Auckland	COP Cardiac
HARVEY Karen	Christchurch	ASCT	WILCOCK Helen	Timaru	ASCT
HODGES Theresa	Wellington	ASCT	WOOD Melissa	Auckland	ASCT (Top Distinction)
HUGHES Patricia	Auckland	ASCT (Commended)			
INGLIS John A	Christchurch	ASCT			
LAWSON Lynette	Dunedin	ASCT			
LIANG Kai Wai	Auckland	ASCT			
McCONE Fay	Christchurch	ASCT			
MILES Rachel	Auckland	COP Cardiac (Commended)			
MILLIKEN Hazel	Wellington	ASCT			

1992

BRUCE Fiona Dunedin ASCT
DONALD Margaret Waitakare ASCT
EREG DONNA Middlemore ASCT
GOODWIN Kim Auckland COP Cardiac
HAY Scott Wellington ASCT
HEARN Lisa Wellington ASCT
POPPE Katrina Auckland ASCT (Distinction)
RICHARDSON Vicky-Lee Auckland ASCT (Commended)
TAKAU Sela Auckland ASCT
WAITE Sheryl Auckland ASCT (Commended)
WILSON Lisa-Marie Invercargill ASCT

1993

BRADLEY Daniel Auckland ASCT
BREMNER Robynne Auckland COP Cardiac
BROWN Colleen Australia ASCT
BUNTING Melissa Auckland COP Cardiac
LOWE Andrea Auckland ASCT
MAHER Leanne Auckland ASCT (Commended)
McFADYEN Dee Hastings ASCT
MOTUFOUA Motufoua Auckland ASCT
PAMPALONE Fiona Wellington ASCT
PASHBY Sonya Auckland ASCT (Commended)
SEARANCKE Karen Auckland COP Cardiac
SIMONS Gillian Auckland ASCT (Commended)
SMALLEY Vivienne Auckland ASCT
TRASK Nicola Wellington ASCT
TUTT Kaaran Wellington ASCT
YOUARD Jennifer Auckland COP Cardiac

1994

BIDDLE Angela Auckland ASCT
CARRAN Nikki Tauranga ASCT
DAVENPORT Doreen Auckland ASCT
ELLIOTT Donna Auckland COP Cardiac
HUGHES Patricia Auckland ASCT
HUTCHINSON Sonia Auckland ASCT
JACOBSEN Kirsten Auckland COP Cardiac
KIRK Amanda Invercargill ASCT (Commended)
LOVATT Rachel Auckland ASCT
McDOUGAL Craig Auckland ASCT (Top Distinction)
McKENZIE Sara Auckland COP Cardiac
MOOTEN Michael Auckland ASCT
SANDFORD Rosemary Masterton ASCT

1995

BROWNE Jackie Hamilton ASCT
BRYCE Nicola Auckland ASCT
BUCKLEY Belinda Auckland COP Cardiac
FIFE Lisa Auckland COP Cardiac
FINCH Rayshelle Australia ASCT
LINDSAY Stuart Hamilton ASCT
POPPE Katrina Auckland COP Cardiac
RICHARDSON Julie Hamilton COP Cardiac
RICHARDSON Vicky Auckland COP Cardiac
WILSON Nicola Auckland ASCT

1996

AXEFELDT Anna-Lena	Tauranga	ASCT	
BERTHOLET Wendy	Hamilton	ASCT	
BRADLEY Daniel	Auckland	COP Cardiac	
BROWNE Karen	Wellington	ASCT	
BUCKINGHAM Kelly	Auckland	ASCT (Commended)	
CONWAY Kerry	Auckland	COP Cardiac	
ELDER Leanne	Auckland	ASCT (Commended)	
GRIME Talia	Wellington	ASCT (Commended)	
KERR Liz	Auckland	ASCT	
MAHER Leanne	Auckland	COP Cardiac	
MCDONALD Dale	Invercargill	ASCT	
RENNER Natalie	Auckland	ASCT (Commended)	
SHANAHAN Christine	Auckland	COP Cardiac	
WINTER Sue	Wellington	ASCT (Distinction)	

1998

BURROWS Megan	Auckland		ASCT (Top Distinction)
FARRAR Kuljeet	Auckland		ASCT
JACKSON Marie	Invercargill		ASCT
MARTIN Angela	Wellington		ASCT
MASON Patricia	Dunedin		ASCT
MORRISON Stephanie	Wellington		ASCT
ORSBOURN Graham	Auckland		ASCT (Commended)
PARKER Rachel	Auckland		ASCT
ROBERTSON Diedre	Rotorua		ASCT (Commended)
SO-LWIN Muyor	Auckland		ASCT (Commended)
STEVENSON Rachel	Dunedin		ASCT (Commended)
WANG David	Auckland		ASCT
XU Geying	Auckland		ASCT
ZAZULAK Carla	Auckland		ASCT (Commended)
ZHU Judith	Auckland		ASCT (Commended)

1997

BUSBY Kerri	Whakatane	ASCT	
CARTER Leanne	Auckland	ASCT	
DRURY Karen	Australia	ASCT	
ELLIOTT Donna	Auckland	COP (Commended)	
LOVATT Rachel	Auckland	COP (Commended)	
MILLER Jennifer	Auckland	ASCT (Commended)	
MORRIS Vikki	Dunedin	ASCT	
SMITH Craig	Auckland	ASCT	
WHITING Jennifer	Tauranga	ASCT (Commended)	
ZHANG Shirley	Auckland	ASCT (Commended)	

1999

CRETNEY Sharon	Lower Hutt		ASCT
CROWE Julie	Auckland		ASCT
EVANS Taryn	Auckland		ASCT (Distinction)
FONG Denise	Auckland		ASCT (Distinction)
GASH Melanie	Invercargill		ASCT
HOLLANDS Kara	Auckland		ASCT (Top Distinction)
LANGFORD Kirsty	Australia		ASCT
REYNOLDS Michelle	Christchurch		ASCT (Commended)
SHAW Carla	Invercargill		ASCT
TIMMINS Kellie	Hamilton		ASCT
UNDRILL Simon	Wellington		ASCT

2000

ADAMS Natalie	Auckland	ASCT
AYRES Robert	Wellington	ASCT
BORTHWICK Halina	Auckland	ASCT (Top= Distinction)
IBBOTT Nathan	Auckland	ASCT
JONES Paula	Wellington	ASCT
O'LEARY Shawn	Auckland	ASCT (Top= Distinction)
SMITH Craig	Auckland	PGD
WILSON Anna	Hamilton	ASCT

2001

BAINBRIDGE Sarah	Wellington	ASCT (Distinction)
BRUCE Sarah	Hamilton	ASCT

CHITTOCK Emma	Dunedin	ASCT
DASS Aika	Auckland	ASCT
DEVLET Rosanna	Christchurch	ASCT (Commended)
ENGLISH Sandra	Christchurch	ASCT
FILSILL Susan	Dunedin	ASCT (Distinction)
FOUNTAIN Rachel	Christchurch	ASCT (Commended)
GREENSLADE Judith	Christchurch	ASCT (Commended)
GU Xiangyong (Michael)	Auckland	ASCT (Commended)

HARRISON Stacey	Auckland	ASCT (Commended)
JAYANANDAN Ratna	Christchurch	ASCT
MARIU Leanne	Christchurch	ASCT
MATTEWSON Sharon	Christchurch	ASCT
McLACHLAN Christene	Dunedin	ASCT
O'BRIEN Liz	Auckland	ASCT (Top= Distinction)
ORSBOURN Graham	Auckland	PGD
RADJKOVICH Tanja	Auckland	ASCT (Top= Distinction)
SCALLY Janene	Dunedin	ASCT
SIDES Jane	Timaru	ASCT

TREW Heather	Christchurch	ASCT
TRIPP Ian	Auckland	ASCT (Commended)
WHALLEY Gillian	Auckland	FSCT
WHITE Jenny	Hamilton	ASCT

2002

BURKE Colin	Auckland	ASCT (Commended)
FAULKNER Barbara	Tauranga	ASCT
HOLLANDS Kara	Auckland	PGD (Commended)
JAMES Debbie	Christchurch	ASCT
McLAGGAN Lisa	Auckland	ASCT (Commended)
TODD Kylie	Auckland	ASCT (Top Distinction)

2003

CHATALINE Alla	Auckland	ASCT
DEW Georgina	Auckland	ASCT
DOULL Fiona	Wellington	ASCT (Commended)
DYER Anna	Auckland	ASCT
EAGLE Karen	Wellington	ASCT (Commended)
EASTWOOD Raewyn	Whakatane	ASCT
GRANT Gavin	Auckland	ASCT (Distinction)
HART Aaron	Wellington	ASCT
HINDS Halina	Auckland	PGD
MIJATOVIC Ana	Hamilton	ASCT
PLACE Katherine	Auckland	ASCT (Commended)
STATHAM Erin	Auckland	ASCT (Top Distinction)
TAYLOR Lynelle	Auckland	ASCT (Distinction)
VAN RHEEDE Tabita	Masterton	ASCT
YEATES Melanie	New Plymouth	ASCT

2004

BUCKLEY Megan	Tauranga	ASCT	THOMPSON Nicola	Auckland	ASCT (Distinction)
FOWLER Marina	Auckland	ASCT (Distinction)	WHITEHOUSE Sarah	Auckland	ASCT
HANNAH-BRENNAN Jessica	Christchurch	ASCT (Commended)	2006		
HARRISON Stacey	Auckland	PGD (Commended)	BUCKLEY Marion	Auckland	CPM Cardiac
LANKOW Nicola	Christchurch	ASCT	JONES Catherine	Auckland	CPM (Top)
LIVINGSTONE Morag	Auckland	ASCT (Commended)	LEONG Wei Li	Auckland	ASCT (Distinction)
McCLYMONT Fiona	Auckland	ASCT (Commended)	MCKAY Mabel	Whakatane	CPM Cardiac
McFARLANE Kristine	Auckland	ASCT (Commended)	MILLHAM Stephen	Auckland	CPM Cardiac
MOK Anderson	Hamilton	ASCT	PERRY Lynda	Wellington	CPM Cardiac
MOREL Lisa	Christchurch	ASCT	REDULLA Kareen	Auckland	CPM Sleep
PEETERS Sue	Auckland	ASCT (Distinction)	SAUNDERS Bridget	Palmerston North	CPM Cardiac
ROBINSON Hayley	Hamilton	ASCT (Distinction)	SLAG-GILBERS Gerry	Waitakere	CPM Cardiac
STEVELY Katherine	Christchurch	ASCT	SPIROIU Oana	Christchurch	CPM Cardiac
STROUD Christine	Christchurch	ASCT	WALKER Joelene	Tauranga	CPM Cardiac
TRIPP Ian	Auckland	PGD	WHALLEY Jacqueline	Rotorua	CPM
			YOUNG Shannon	Auckland	CPM Sleep

2005

BELSTEN Mia	Auckland	ASCT`			
BENNET Cindy	Dunedin	ASCT			
BLAIR Anna	Invercargill	ASCT			
BURTON Jane	Tauranga	ASCT			
DAY Victoria	Auckland	ASCT			
ELLIOTT Amanda	Auckland	ASCT (Distinction)			
GIDEON Miriama	Auckland	ASCT			
MILLER Prudence	Auckland	ASCT			
NORRIS Shane	Auckland	ASCT			
RAJU Nita	Wellington	ASCT			
REES Holly	Christchurch	ASCT (Commended)			
REYNISH Kelly	Auckland	ASCT (Top Distinction)			

2007

ARMIE Dorina Christchurch CCP
 BOLLEN Jill Tauranga CPM Cardiac Distinction
 BORST Pauline Auckland CCP
 BRACKENBURY-TWAITES Fleur Palmerston North CPM Cardiac
 CHANDRA Amit Middlemore CPM Cardiac
 CONNER Ellen Wellington CCP
 COOPER Denise Blenheim CPM Cardiac
 CRANSTON Jan-Marie Blenheim CPM Cardiac
 ELLIOTT Amanda Auckland PGD
 FOWLER Marina Auckland PGD
 INGLIS Jennifer Christchurch CCP
 KHAN Sadiqa Auckland CCP
 LITTLEFAIR Emma Auckland CCP
 MCLAGGAN Lisa Auckland PCG
 MOULIN Shamara Southland CCP
 PENCHEV Dimitar Auckland CCP
 REYNISH Kelly Auckland PGD
 SINGH Payal Middlemore CPM Cardiac
 STEFKOVA Frosina North Shore CPM Cardiac
 THOMPSON Nicola Auckland PGD
 WALKER Julianne Southland CPM Cardiac

2008

BELLAMY Laura Christchurch CCP
 IRVINE Susan Auckland CPM
 JACKLIN DE CARTERET John Auckland CPM
 KIRK Joanne Wanganui CPM Cardiac
 KNIGHT Kim Christchurch CCP
 McGUINNESS Jeanette Middlemore CPM Cardiac
 WARE Sacha Waikato CCP
 WEST Vanessa Australia CPM Cardiac

2009

BOWMAN Samantha Wakefield CCP
 CADACIO Rosalia Wellington CCP
 CHEAK Carol Auckland CPM Cardiac
 HART Ian Palmerston North CPM Cardiac
 JABUR Ghaz Auckland CCP
 KISHORE Kanak Wellington CCP
 LAWSON Tracey Nelson CCP
 LIPSKI Mark North Shore CCP
 LITTLE Nathan Waikato CCP
 MARSHALL Amy Southland CCP
 McCULLY Hannah North Shore CPM Cardiac Aeg.
 PEPPER Janine Wellington CCP
 ROBERTS Aimee Taranaki CCP
 RYAN Carlos Auckland CPM Cardiac
 WALSH Daniel Christchurch CPM Cardiac
 WILLIAMS Nadia Tauranga CPM Cardiac
 ZABIDIN Yasmin Auckland CPM

2010

BISHOP Lauren	Wellington	CCP	AL-JANABI Mustafa	Middlemore	CPM
BROWN Keri	Auckland	CCP	ARMSTRONG Julie	Auckland	CCP
DJOHARI Ricky	Wellington	CCP	ARTHUR Melanie	Wakefield	CCP
DREDGE Kelly	Christchurch	CCP	BANDHARA Harsile	Waikato	CCP
DURBIN Lynette	Tauranga	CPM Cardiac	BENADE Kieran	Auckland	CPM
EAGLEN Anthony	Auckland	CCP	BROWN Talia	Middlemore	CCP
FABIC Joy	Christchurch	CPM Cardiac	CHANG Celestina	Middlemore	CCP
GUNDESEN Abbey	Auckland	CCP	ELLIOTT Chris	Manawatu	CPM
HEINRICH Anton	Wellington	CCP	HALL Robert	Auckland	CPM
KHAN Sadiqa	Auckland	PGD Cardiac	HARVEY Melissa	Australia	CPM
LAMBERT Matthew	Blenheim	CPM Cardiac	JENKINS Christopher	Auckland	CCP
MILLOW Hannah	Waikato	CCP	LOZA Scott	Auckland	CPM Cardiac
PRIEST Joanne	Wanganui	CPM Cardiac	PHAM Nghia	Christchurch	CCP
PROTHEROE Anna	Christchurch	CCP	STRATFORD Jeni	Wakefield	CPM
SOHAIL Ajmal	North Shore	CCP	TAYLOR Charlotte	Auckland	CCP
WILLIAMSON Avis	Dunedin	CPM Cardiac	YIN Saroeun	Blenheim	CPM

2012

AL-JANABI Mustafa	Middlemore	CPM
ARMSTRONG Julie	Auckland	CCP
ARTHUR Melanie	Wakefield	CCP
BANDHARA Harsile	Waikato	CCP
BENADE Kieran	Auckland	CPM
BROWN Talia	Middlemore	CCP
CHANG Celestina	Middlemore	CCP
ELLIOTT Chris	Manawatu	CPM
HALL Robert	Auckland	CPM
HARVEY Melissa	Australia	CPM
JENKINS Christopher	Auckland	CCP
LOZA Scott	Auckland	CPM Cardiac
PHAM Nghia	Christchurch	CCP
STRATFORD Jeni	Wakefield	CPM
TAYLOR Charlotte	Auckland	CCP
YIN Saroeun	Blenheim	CPM

2011

CHARLETON Erin	Auckland	CCP
JONES Leighton	Middlemore	CCP
LAYBOURN Micaela	Waikato	CCP
LEE Shivane	Christchurch	CPM Cardiac
McGUINNESS Jeanette	Middlemore	CCP
PEARSON Catriona	Auckland	CCP
RAWSON Emma	Auckland	CCP
SAUNDERS Bridget	North Shore	CCP
SEMPLE Heather	North Shore	CPM Cardiac
SINGH Kumal	Wellington	CCP
STARNES Hannah	Wellington	CCP
VAN ECK Annabel	Manawatu	CCP

2013

BENNETT Belinda	Auckland	CPM
BRACKENBURY-TWAIITES Fleur	Palmerston North	CCP
JOLLY Belinda	Waikato	CCP
KERKULIET Deborah	Wellington	CPM Cardiac
LAMBERT Matthew	Nelson	CCP
LOZA Scott	Auckland	CCP
MOODY Callan	Christchurch	CCP
NOYER Gay	Auckland	CCP
RONKE Rebekah	Waikato	CCP
STUIT Vanessa	Wakefield	CCP

2014

DAY Vikkie	North Shore	CCP
HAMILTON Emma	Auckland	CCP
HART Ian	Palmerston North	CCP
HEENEY Mary	Wellington	CCP
HELEM Trudy	Greymouth	CPM
HEMSLEY Tessa	Wellington	CCP
HESS Karen	Wairarapa	CPM
LANCASTER Jo Beth	Nelson	CPM
McLRAITH Bridget	Auckland	CCP
MCLENNON Sarah	Dunedin	CCP
OWENS Diane	Auckland	CPM
PARANTHAMAN		
Ramanahan	Auckland	CPM
ROSS Polina	Christchurch	CPM
SEMPLE Heather	North Shore	CCP
THACKER Olivia	Christchurch	CCP
TODD Kylie	North Shore	CCP
TOMLINS Megan	Southland	CCP
TURTON Stephanie	Christchurch	CPM
WEBBY Sarah	Christchurch	CCP
WILLIAMS Christopher	Middlemore	CCP (Top)

2015

AL-JANABI Mustafa	Middlemore	CCP
CALIAN Delia	Christchurch	CCP
HAMMINGTON Nick	Hutt Valley	CCP
HUSSEIN Alaa	Dunedin	CCP
LEUNG Wynn	Auckland	CCP
MUMMERY Simon	Auckland	CCP
PADDISON Justine	North Shore	CCP

PUDUMAI Noah	Auckland	CCP
TOPP Lindsey Rose	Auckland	CCP
2016		
ANTONIO Mark	Middlemore	CPM
BARRELL Natalie	Christchurch	CCP
COLEY Karl	Waikato	CCP
HOYLE Rachel	Auckland	CCP
KENNARD Ashleigh	Auckland	CCP
LAL Sonam	Middlemore	CPM
LEUPEPE Corey	North Shore	CPM
LOGAN Helen	Auckland	CCP
MELLIZA Krystle	Auckland	CPM
MIDDLEMISS Catherine	Auckland	CCP
STANNAGE Sophie	Middlemore	CPM
WYNN Yvonne	North Shore	CCP
YALLAND Rosemarie	North Shore	CPM
YEOMAN Libby	Southland	CCP

APPENDIX 5

Minutes of the Inaugural Meeting of the Society of Cardiological Technicians

3rd August 1967 at Green Lane Hospital, Auckland

A meeting to discuss the establishment of a New Zealand Branch of the Society of Cardiological Technicians, held at Green Lane Hospital, Auckland, on Thursday, 3rd August, 1967, at 4.00 p.m.

In the chair, L. Conway Feech.

Others present: Miss D. Dickey, Mrs. Frew, Miss M. Maxwell, Miss H. Nisbett, Miss L. Ross, Mrs. Schmidt, Miss B. Seymour, Miss M. Shepherd; all cardiological technicians of Auckland, and Miss L. Hodgson, Cardiological Technician of Hamilton.

Correspondence: Thirty replies were received to a circular sent to cardiological technicians throughout N.Z. advising them of the proposed branch of the Society. This response indicates that approx. 60% of technicians in N.Z. are interested in membership of the Society. A letter of good wishes was received from Margaret Clarke, technician, on behalf of herself and Dr. Watters, cardiologist, of Wairau.

A majority of those present were in favour of the N.Z. Branch having its own council with the power to accept applications for membership from other technicians in N.Z., and to make regulations as to the conduct of the Society's affairs in N.Z., providing that such regulations shall not be inconsistent with, or repugnant to, anything contained in the Memorandum or Articles of Association of the Society, and shall not come into operation unless **and** until the same shall have been approved by the Council in Britain. It was therefore decided to elect, **by ballot,** a temporary council consisting of Chairman, Treasurer, Secretary and three (3) others from amongst those present to hold office until election of a Council according to the Rules of the Society in 1968.

Those elected were :-

Chairman: Miss L. Ross
Treasurer: " H. Nisbett
Secretary: " L.T. Conway Feech

Council Members - M. Maxwell, L. Hodgson and B. Seymour.

It was agreed that the Council members would send their applications to the British Council of the

(2)

Society for approval of their own Membership of the Society and of it's N.Z. Council.

Several distinguished persons were considered for Presidency of the Society and it was decided by show of hands to ask Sir Douglas Robb (pioneer of Cardiac Surgery in N.Z., Chancellor of Auckland University, and former President of the B.M.A.), to accept the Office.

The Memorandum and Articles of Association of the Society of Cardiological Technicians Ltd. were discussed in relationship to the matters that must be provided for in the Rules of a society applying for incorporation in N.Z. Various deletions, alterations and additions to make these rules more suited to the comparatively small and scattered membership in N.Z. were proposed and accepted by general consent of those present. These amendments, as set out hereunder, are to be submitted to the British Council of the Society for approval, before being sent with the application for incorporation to the N.Z. Registrar of Societies :

Memorandum of Association -

- p.1. 1) Name of Society: Society of Cardiological Technicians Ltd. altered to Society of Cardiological Technicians (N.Z.) Incorp.
- 2) "Registered Office shall be situate in England," altered to: "that town wherein resides for the time being the Hon. Sec. of the Society."
- P.2. 3) Clauses F.G. & O. providing for pensions, indemnity insurance and superan.funds etc omitted from the ^{Memorandum of Association} Society (as all these things are adequately provided by N.Z.'s Welfare State and the Hospital Boards.

Articles of Association -

- P.6 4) 2 (b) -requiring applicants for student membership to be proposed by two persons altered to - one person.

4 provide ~~ing~~ for members of the unincorporated

(3)

Articles of Assn. contd:

4 society to be registered with the S.C.T. Ltd.
omitted as not being applicable in N.Z.
contd.

Addition: Names of those elected to student membership by the Council in N.Z. shall be sent to the British Council for registration as N.Z. members of the Society.

5 1) Minimum age of 19 years for Associate Members altered to 18 years since technicians leaving school with School Certificate, will have been employed for at least 2 years by this age, and those with University Entrance for at least one year.

P.7 5.(2): & 6 (2) omitted as inapplicable as in 4 (4).

7. (2)b: Affiliate Members to be proposed by two persons, altered to 1 person

P.8 Addition: Any member of S.C.T. in Gt. Britain shall be automatically accepted as a member of equal status in the S.C.T.(N.Z.) Incorp. upon taking up residence and commencing employment as a Cardiological technician in N.Z.

" 3) Omitted as inapplicable as in 4.(4).

" 9) (2) Providing that affiliate and student members shall not be entitled to vote, nor be eligible for Council Membership, altered: allowing such members full rights and privileges until such time as the Council shall decide, but not before at least 50% of the membership has qualified as Fellow, Ordinary or Associate Members.

P.9 14)(3) providing for part-payment of fees, altered to: persons elected on, or after 1st July shall pay $\frac{1}{2}$ the annual subscription.

P.10 20).1. Number of Council Members reduced from twelve to six.

" 3. Pending a pointment of the Council in accordance with the Articles, the temporary Council altered from "the subscribers to the Memorandum of the Association of the Society" to -

(4)

Articles of Association, contd.

"six of those present at the meeting to establish the N.Z.Branch."

P.10 21) ~~Four~~ members of the Council to retire annually altered to : "Members of the Council shall hold office for one year, but may be nominated for re-election the following year."

P.11 Addition: At least 1 but not more than 3 members resident in the South Island shall be elected to the Council each year provided a suitable candidate be nominated. In the event of 6 North Is. candidates receiving more votes than any South Is. candidate, the 5 North Is. candidates having the most votes shall be elected and the 6th Council member shall be that South Is. candidate having more votes than any other South Is. candidate. This is to ensure South Is. representation in spite of a predominant North Is. membership.

P.12 ~~25~~ (3) Addition to "4 members shall constitute a quorum" - "but where members residences are widely scattered throughout N.Z. all business of the Council may be carried out by correspondence if each piece of correspondence is signed by each member on receipt and perusal, and where a resolution is required to be passed a majority vote of 2 of the Council, voting by correspondence shall be deemed to be the resolution of the Council as if they had voted at a duly constituted meeting."

P.13 31) Addition: A copy of the minutes of every meeting shall be sent to the Council of the Society in Britain .

32) "The rules and regulations defining curricula, prescribed courses of study, conditions of admission to exams. and the subjects thereof" omitted from this article, as they are fixed by the British Council of the Society. so that the article reads : the Council shall decide the dates when and the places where exams. shall be held etc.

34) Addition: "and that such union, alliance, or incorporation also be approved by the British Council of the Society."

P.14 42) The quorum for an A.G.M. reduced from 10 to 6 members.

(5)

Articles of Assoc. contd.

- P.17 54) Addition: Copies of the balance sheet and statement of accounts shall be forwarded to the Registrar of Societies immediately after its adoption and approval by the A.G.M. together with the fee of registration. (This is required by the Incorp. Societies Act)
- 56) Altered to : the Hon. Auditor shall be elected at each A.G.M. and shall be a Member of the N.Z. Society of Accountants.
- Addition: Cheques shall be signed by the Treasurer or Secretary.

Dissolution: The Society shall be wound up if at a General Meeting of which due notice is given a majority of those voting by ballot pass a resolution to this effect.

If upon the winding-up or dissolution of the Society whether voluntarily or by the Registrar of Societies or otherwise, there remains after satisfaction of all its debts and liabilities any property whatsoever it shall be given or transferred to some other Society within N.Z. having objects substantially similar to those of the Society, at, or prior to, the time of dissolution and in default thereof by the Supreme Court of N.Z.

There being no other business the meeting concluded

APPENDIX 6

The Changing Face of Cardiac Pacing

by S. Yarrow, MSCT, REA, Green Lane Hospital, Auckland.

Written for the 10th Anniversary SCT Booklet in 1977

I have been asked, on the occasion of the 10th anniversary of the formation of our Society, to write a few words on cardiac pacemakers, a subject which holds a particular interest for me. It gives me great pleasure to do this, but first I would like to congratulate the Society on its growth and progress made over the past decade. I have watched this progress with much satisfaction and I wish it every continuation.

The first recorded attempt to stimulate the heart by electric current was made in the early 19th Century, and was based on Galvani's previous classic experiment in 1791, demonstrating that frogs' legs could be stimulated electrically. However, it was not until 1956 that Zoll (in Harvard, USA) successfully paced a human heart by applying a heavy (and very painful!) current from a stimulator across the closed chest.

Zoll's stimulator was marketed commercially but was very expensive (about 300 pounds, I recall, far too expensive for Green Lane Hospital in those days). My first meeting with a cardiac pacemaker was early in 1958 when Mr B. G. Barratt-Boyes (as he was then) told me I was expected to build one, capable of both external and internal use, to be ready by the date of the first by-pass operation to be performed in this country.

Using a published circuit, with considerable modification, I duly built the pacemaker. It was mains operated, but with standby batteries for transport with a patient or in case of a power failure. It was also very large and heavy. I recall it was about 18" wide, in a massive metal cabinet which required its own mobile trolley. Nevertheless, it worked reliably and was our mainstay for many years.

It is a far cry from those clumsy early machines to the modern implantable demand units, on which literally hundreds of thousands of people throughout the world rely for their continued well-being, or even existence.

Cardiac pacing is an extremely rewarding field, transforming patients as it does from a nightmare of sudden Stokes-Adams attacks to a life of freedom from such potentially disastrous onsets. The patient feels he has a new lease on life, with a lifting of a burden of fear. Pacing is a field where the Technician may really come into his or her own, providing the expertise needed to assist the doctor, and I therefore commend the subject to members of the society.

At Green Lane Hospital we implanted our first pacemaker into a patient in 1961. It was a fixed rate unit, very large and heavy, powered by five mercury cells. It was connected to the heart

by myocardial leads, necessitating a thoracotomy for their placement. We continued to use this system on an increasing number of patients until a few years later the transvenous electrode and the demand pacemaker made their appearance and were adopted by us.

The procedures in those days were certainly eventful, and were filled with catastrophes. Lead breakages were common, as were pacemaker electronic failure. Both resulted all too often in cardiac standstill and I have vivid memories of electrode placement being undertaken under cardiac massage! We did not possess a portable x-ray screening unit suitable for use in the operating theatre, so the transvenous electrode was positioned in the X-Ray department, sited some distance from the theatre. The end of the lead was wrapped in sterile towels and the patient transported to the theatre, where after a re-draping to maintain lead sterility (?) the pacemaker was implanted. I will never forget one night when one particular patient (correctly described by one of us as indestructible – he survived to die of old age in Cornwall Hospital) made 4 trips between theatre and X-Ray on an operating table, in the rain, unconscious with an anaesthetist in attendance, past gaping onlookers because each time he was prepared for pacemaker implantation in theatre it was found that the electrode had become dislodged.

Nowadays of course, pacemakers are small, extremely reliable units powered by batteries which we confidently expect will last for up to 10 years. The electrodes are reliable and the placement a routine unexciting procedure. This is as it should be, for the sake of the patient, but we owe it all to the early traumatic beginnings. I would not have missed the early days for anything, but I am glad they are history!

S. Yarrow

Written by the late Mr Sid Yarrow who was the Principal Technical Officer of the Department of Clinical Physiology at Green Lane Hospital. He was recruited to Green Lane Hospital, by Dr James Lowe in 1954. He retired in 1988 and died on 23 May 2011.

APPENDIX 7

The Extending Areas of Medical Technology since 1950

(As seen through the eyes of a technician)

by Olwen Watson, MBE, NZRN, ASCT.

Written for the 10th Anniversary SCT Booklet in 1977

When I joined the staff of Napier Hospital as a medical ward sister in 1949 there were very few technical adjuncts available to aid medical diagnosis. This was the era of blanket bed and aspirin for rheumatic fever patients, sanatoria for pulmonary tuberculosis abounded, and the treatment for myocardial infarction was anticoagulants and a two to three month stay in hospital – including bed rest for 4 weeks, the patient being fed by nurses for the first two weeks. An E.C.G. was done occasionally by the House-Surgeon, who was also responsible for taking all blood pressure readings. One private practitioner would bring his own battery powered E.C.G. machine to the ward about 6 p.m. to take tracings on his own patients. Unfortunately, he would turn off the ward power supply to reduce interference.

Due to the shortage of House-Surgeons in 1950, the one remaining showed me how to use the E.C.G. machine and thereafter I did all the ward E.C.G.s looking up in the literature to find out how to mount them and, very basically, how to read them.

A little later, in 1951, I transferred from the nursing staff to the Hearing Aid Clinic. With the advent of transistors, the hearing aids were now reduced in size in comparison to the earlier models which sported separate battery attachments and were very cumbersome. I combined this work with the taking of E.C.G.s throughout the hospital and also did the occasional B.M.R. This was a test for thyroid function, and necessitated the admission of the patient for one night. The B.M.R. machine was an antique of the 1930s, consisted of a bell filled with oxygen floating in a moat of water, and by a closed circuit method the patient breathed oxygen for 6 minutes. The machine estimated the amount of oxygen consumed per minute, a pen attachment transcribing the slope of oxygen consumed on a graph to give the basal metabolic rate. This test gave a broad definition of hypo- and hyperthyroidism. This machine was later superseded in 1961 by radio-active iodine thyroid uptake tests, the tracer of radioactivity being picked up by a scintillation probe positioned over the thyroid gland. This was the forerunner of the present Nuclear Medicine Department where a barrage of hormonal tests are now done to elucidate thyroid dysfunction, and where a Picker scanner is used to study specific organs, using radioactive technetium.

In 1954 effective hypotensive drugs were being marketed and Dr Turner established the Hypertension Clinic at Napier. The only other clinic in N.Z. had been initiated by Professor Smirk in Dunedin and I visited his department during our first year of operation. We commenced in a

small way, in one room, with a sphygmomanometer, a stethoscope, two cane chairs and two patients. It was later necessary to move to a larger area, as the unit developed. At that time, patients were admitted for one night for basal blood pressure readings, 14 being taken under basal conditions. The usual E.C.G., chest x-ray, blood and urine tests were done, although they were not as sophisticated as they are today. The drugs then available certainly reduced the blood pressure, but they had the most unpleasant side effects – dry mouth, nausea, diarrhoea and constipation. Due to chemical research, hypertensive drugs now have a smoother control and are more effective at less frequent dosage with very few side effects. We have done many clinical trials on these drugs.

Exercise E.C.G.s were done by the Master's Steps method to diagnose coronary artery disease. We always had a doctor present, but no defibrillator. The hospital electrician manufactured a defibrillator in the late 1950s which was stationed in Casualty Department to resuscitate cases of sudden death, but I don't think it was very successful. It was not until the Coronary Care Unit was established in 1966 that the hospital purchased a defibrillator.

In 1958, we obtained a small bell spirometer and commenced pulmonary function tests, combined with arterial blood gases, the oxygen saturation being measured by the Van Slyke method. In later years, it was measured by haemoreflector. In recent years, we measured oxygen tension with a PO₂ electrode. The spirometer was a large, cumbersome contrivance and in 1963 was replaced with the Vitalograph apparatus and the tests became much less time consuming.

During 1960 to 1964 we measured cardiac outputs with Evans blue dye and ear oximeter attached to a chart recorder on patients with hypertension and thyroid disorders. In 1968 the cardiac outputs were measured using Cardiogreen dye in arterial blood, and we also recorded venous and arterial pressures on the Offner recorder.

In 1967 the hospital obtained the services of an electronics technician and this was a real breakthrough because until then, if the hospital electrician was unable to maintain the electronic equipment, it had to be returned to the manufacturer for repair.

In 1972 cardiac catheterizations were commenced and were conducted in the X-ray Department for diagnosis of coronary artery disease, and this field became an enlarged sphere of the Cardiology Department, many patients being referred on for coronary by-pass surgery.

In 1973 the Master's steps were discarded and Exercise E.C.G.s were done on a treadmill in conjunction with an E.C.G. data computer. This new system is vastly superior, giving instantaneous write-out during exercise, the bar graph taking some of the guess work out of translating the S-T segment and slope. All the necessary resuscitative equipment is now readily available if required.

The latest addition to the Department is the Holter monitoring system (1976) which gives a 24-hour electrocardiographic recording and promises to be useful in the area of arrhythmias.

I had no formal technical training and in the early years gleaned what I could from textbooks, medical staff and occasional visits to Dunedin, Wellington and Green Lane Hospitals.

In 1967, Louise Conway Beech of Green Lane Hospital inaugurated the Cardiological Technicians Society with a correspondence course designed to cover a cardiopulmonary technical syllabus, about ten of us took the first Associate examination. This was the first course of its kind in N.Z., and has been of inestimable help to all technicians throughout N.Z., particularly in the smaller hospitals. Our grateful thanks go to those at Green Lane who have continued her work.

Written by the late Olwen Frances Watson, MBE of Napier

25 July 1922 – 27 March 2002

APPENDIX 8

Department of Clinical Physiology and Biomedical Engineering

Toby Whitlock

from "Green Lane Hospital the First Hundred Years" (p81-85), 1990,

edited by B.R. Hutchinson

THE FIFTIES

The Physiology Department as a concept was discussed at a meeting of the Auckland Hospital Board in June 1950 and approval in principle was given to the appointment of a clinical physiologist and a technician. Though it seems that the proposal may have foundered because it was subject to the approval of the Minister of Health, in theory the department can be considered as being "forty years on..."

In the early fifties, technical support for cardiac investigation was given by the Department of Scientific and Industrial Research with Alf Melville (later their Director) being prominent. As the work increased, it became clear that, as originally envisaged, permanent technical assistance was required on site and Sid Yarrow was appointed in 1954. He became involved not only in technical aspects of the catheter studies but also in the early animal studies leading to the first bypass in 1958. Originally the animal studies were done at Ruakura but in 1956 a Surgical Laboratory was established at Green Lane and some of the elements of the department as it is now, were put in place.

THE SIXTIES

The full recognition of the department could be considered with the appointment in 1960, ten years after it was mooted, of the first clinical physiologist as head of the department. The position was filled by Dr Jack Sinclair who had been at Green Lane as a research fellow, some ten years earlier. He was a physician with a background in cardiac and respiratory research in both the U.K. and the U.S.A.

This firmly established the close relationship between the fields of respiratory medicine and cardiology which began with contributions in both areas by such eminent people as Sir Douglas Robb, Dr James Lowe and Dr Chisholm Mc Dowell. By the time Jack Sinclair left at the end of 1966 to take up an appointment as medical director of the Medical Research Council, another physician, Dr Edward Harris, was available to fill the vacancy. He also had an excellent research background in both cardiac and respiratory fields and saw the development of the department from a staff of 25 to its present size of nearly 70 when he retired in 1988.

The early sixties saw the appointment of two important technicians. Ron Bentley who headed the bypass unit was appointed in 1965 and contributed much to perfusion until he moved on to the Anatomy Department of the Medical School in 1970. Graham Rust was in charge of

the Electronics Laboratory from 1964 until he left for the U.K. During that time he was responsible for design and constructed much of the equipment and installation in the new building in 1970.

Three of the staff who commenced work in 1966 were well chosen by Jack Sinclair as they are still in the department. Carol Meiklejohn (now Ramage) started as a cardiac technician, was later head of the cardiac measurement group, then technical tutor and is now Principal Technical Officer in charge of all the clinical sections. Heather Nisbet also started in cardiac investigations and, after a period of research working with Bramah Singh and a spell in the commercial world, returned ten years ago to a role in biostatistics. Last but not least of that year's appointees was Margaret Shepherd (now Vedder). She started as a trainee in the Respiratory Laboratory and was in charge of that section when the department's first clinical computer was purchased in 1974 being initially responsible for much of the programming. She now has a senior role in the department's biostatistics unit.

The year of 1967 saw the start of training towards qualifications in the technical field. A New Zealand Branch of the English Society of Cardiological Technicians was formed with Louise Conway Beech, then in charge of the cardiac technicians, being the driving force. Within four years it became clear that our standards were significantly higher than the parent group in the U.K. and the New Zealand branch, which was now nationwide, conducted its own examinations and broadened its base to become the Society of Cardiopulmonary Technology. The Society has held examinations annually since then, initiated a correspondence course and introduced a five-year training course leading to a Certificate of Proficiency which is now recognised by the Health Department.

Neil Nouse also started during this year as charge instrument technician. From a small two-man unit he has built the instrument workshop into the best fine instrument workshop in New Zealand hospitals.

In 1968, a second physician, Dr Toby Whitlock was appointed. He took over from Edward Harris as head of department in 1988. Whilst not having the qualifications or research background of Sinclair and Harris, he had a postgraduate qualification in engineering, especially electronics, computing and statistics which complemented the areas of expertise of Edward Harris.

THE SEVENTIES

The first major event of the seventies was the shift in August 1970, to the new cardiac block. This brought together under one roof, all parts of the department, with the exception of the Surgical Laboratory. Unfortunately, the twelve-year lag between design and completion had made no allowance for the growth of the department and the instrument workshop soon had to be relocated to the old kitchen in the engineering block. The early seventies saw the arrival of several, now senior, staff members. Two of these, Jan Western in 1971 and Tim Willcox in

1972, have alternated in the charge position of clinical perfusion for the past one and a half decades.

In 1974 Steve Withy began as a cardiac measurement trainee but soon moved into scientific work. He has been the master-mind behind most hospital computer projects and a major contributor to method development in the field of respiratory investigations. A year later Noel Ashton, who is an ordained minister as well as a scientist, started in medical electronics. His expertise in instrumentation and micro-computer development, has had considerable effect in many fields in the hospital, enabling the introduction of new services and the upgrading of old. Noel is now senior scientist in charge of the “engineering” side of the department. He is supported by another seventies person, Terry Corin, who, is in charge of the Green Lane medical electronics workshop.

Another find of the seventies was Fiona Riddell who came in 1978 and now heads the cardiac measurement group with a special interest in pacemakers. One significant feature of this decade was the placing of more and more responsibility on the technicians and scientists who took over roles previously in the realm of the medical profession. Two examples of this were Holter monitoring (the recording and analysis of electrocardiograms in ambulatory patients) and echocardiography (the use of ultrasound to diagnose cardiac abnormalities). Both of these procedures are now in use as diagnostic aids for many hundreds of patients annually, but had been, in the early seventies, fairly uncommon.

The seventies also saw the establishment of a registrar position in the Respiratory Laboratory. More than a dozen registrars have passed through the department (many staying up to two years as research fellows) and have extended their talents learned in Physiology to fulfil a variety of specialist roles both inside and outside the Auckland Area Health Board. Notable amongst these were Harry Rae (Manager and Chairman of Respiratory Medicine), Alan Liang (Paediatrician), Russell Comber (Intensive Care and Anaesthesia Middlemore Hospital), Stephen Streat (Department of Critical Care Auckland Hospital), John Kolbe (Senior Lecturer in Medicine), Andy MacFie (Neurologist Kew Hospital) and Margaret Wilsher, Andy Veale and David Ford who are now all employed as respiratory medicine specialists.

No mention of this decade could ignore the beginning of the medical illustration service. Donna Anderson started as a respiratory measurement trainee in 1969 but in the seventies turned her artistic talents to the provision of a medical illustration service. Her efforts over nearly twenty years have led to the present medical illustration section which, along with medical photography, is part of the department.

Another “identity” of that era was Richard Elliott who came from Hammersmith to head the Surgical Laboratory. He brought to the laboratory high professional standards and a burning desire to pass on his knowledge which resulted in the development of a full two-year training course for animal technicians with technical institute backing and government recognition. He left after a decade to carry on his teaching at Carrington Technical Institute and his good work is carried on by Robin Easdale one of his early trainees. He has since been joined at

Carrington by Elaine Rush who was for several years in charge of the cardiac technicians and who is now taking a break from teaching to complete an MSc in Jack Sinclair's department. (He became the Foundation Professor of Physiology in the Auckland Medical School)

This seventies time, also saw the creation of "the hole", the aborted Stage III building meant to house many departments including the Surgical Laboratory at present in sub-standard accommodation. The project was abandoned and has left a rather unsightly and expensive car park with the Surgical Laboratory poised on its brim.

Our major educational development took place in this decade. Along with the development of the New Zealand Certificate in Science (Human Physiology Option), which has now been going for nearly twenty years, and is compulsory for all trainees, staff have been encouraged to study for University degrees either part-time or by leaving the department to become full-time students. As well as a Bachelor and two Master of Science degrees, three Doctor of Medicine degrees and a Master of Engineering, we have had twelve technicians enter the medical course (of whom eight have already completed their degrees). Others have entered such diverse fields as architecture, corporate banking and the ministry. One of our research fellows, (Simon Tavener) has completed a DPhil (Oxon) and Blair Robertson, a former technician, is following in his footsteps at Oxford. This all goes to show that a background in physiology stands one in good stead for any career. The success of the training schemes and educational encouragement had depended largely on the contributions of Carol Ramage and Edward Harris. Carol became the first "tutor" in the department and it is gratifying to see one of her trainees, Sheryl Tait, succeed her. Sheryl had the distinction of being the top technical graduate for the whole of New Zealand in all Science options when she completed NZCS in 1981.

THE EIGHTIES

The eighties have seen continuous growth in the number and complexity of cardiac procedures and investigations. Angioplasties (the unblocking of coronary arteries by use of balloon catheters) has grown over six years to numbers approaching 400 per year. Use of balloon pumps and ventricular assist devices has increased the workload of responsibilities of perfusionists but has resulted in many patients surviving the complications of cardiac surgery. These techniques emphasise the "team" approach to patient care, especially important in the cardiac area, where technicians fill an essential role.

An area which has involved a large input by both the scientists and technicians of the department, working in conjunction with the cardiologists and cardiac surgeons, has been the development of Electrophysiology services at Green Lane. All the instrumentation and analysis systems for this highly technological service have been developed in the department under the leadership of Noel Ashton, and have contributed to the establishment of a specialist national centre for electrophysiology surgery.

Another significant growth area of this decade has seen the dramatic increase in the use of computers for clinical investigations and the improvement of medical information services. All these projects in the field of cardiovascular and respiratory investigation have been developed by the Physiology Department and all our technicians use computers as well and as easily as other types of instrumentation. Of special note was the development of the Biostatistics Unit, set up to fulfil the needs of medical audit and research, especially in the cardiac surgical field. All the equipment and much of the staffing was funded by research grants and a comprehensive data base covering nearly three decades of cardiac surgery has been established.

The end of the decade saw the establishment of a cardiac transplant unit at Green Lane. Physiology has played a large part in this new venture with initial results as good as anywhere else in the world.

THE NINETIES

The department (now called the Department of Clinical Physiology and Biomedical Engineering to more accurately describe the role) provides the technical and scientific expertise in many areas of medical measurement and investigation. It has developed a progressive attitude and recognises the need to promote and support the ongoing technological developments in patient diagnosis and care. It will thus continue to make the significant contribution to the success and international recognition of Green Lane Hospital that it has for the past four decades.

This history would not be complete without mention of the contribution of this department to the community life of the hospital. Apart from professional activities, the department is noted for its major contributions to such diverse activities as the canteen, the creche, hospital shows, interdepartmental sports, open days, fund raising and organisation of social activities.

Toby Whitlock

Written by the late Dr RML Whitlock, known as Toby, who was a Physician in the Department of Clinical Physiology and Biomedical Engineering at Green Lane Hospital and, from 1988, Head of the Department. He retired in 2000 and died on 5 October 2011.

Reproduced with the permission of his wife, Valerie Whitlock, and Basil Hutchinson (Editor).

APPENDIX 9

Green Lane After Dinner Thank You Speeches

Green Lane Research and Educational Fund

2014 Green Lane Dinner

19 September 2014

Honouring the following staff of the Physiology Department: Carol Ramage, Donna Anderson, Elaine Rush, Heather Nisbet, Margaret Vedder, Noel Ashton, Sandy Long and Steve Withy

Delivered by Carol Ramage, Noel Ashton and Steve Withy on behalf of those honoured

Carol Ramage

Warren, on behalf of those honoured here to-night I thank you for your wonderful tribute. We also thank the Green Lane Research and Educational Fund for their recognition.

1960s

I will speak a little about the 60s and early 70s and then hand over to Noel.

We all feel privileged to have worked in the incredible environment of the Green Lane 60s and 70s and gained enormous satisfaction from our contribution.

We worked through a time of rapidly changing electronic instrumentation and cardiac medical advances and we worked alongside many of the great people of Green Lane Hospital. One of the good things about this job was that we worked all over the hospital and alongside the best of medical, nursing and allied health staff and the teamwork at Green Lane was exceptional.

In 1966, Heather, Margaret and I were employed by Prof. Sinclair. Louise Conway Beech was the Charge Cardiac Technician, Graham Rust was in Charge of Electronics and Ron Bentley was in Charge of Perfusion. At the end of that year Edward Harris became the HOD. In 1967 Louise founded The Society of Cardiological Technicians (NZ) Inc and started the training course for the Associate and Membership examinations. Neil Nouse joined in 1967 as the Charge Instrument Technician (later Precision Engineering). In 1968 Sidney Yarrow returned, Toby and Elaine Hosken joined and in 1969 Donna Mc Gregor started and I became the Charge Cardiac Technician.

Those of us who started in the 60s started in the old green huts. Lung Function, Electronics and the instrument workshop were in the Physiology Hut and the Cardiac Technicians and CIR were in the end of the X-ray Hut. The Surgical Laboratory, in another green hut, was a very busy place in those days and the pioneering work done there by Green Lane and National Women's was enormously interesting.

We provided monitoring and measurement wherever it was needed. Equipment was much more temperamental and less user friendly than it is today. Technicians carried screwdrivers, earth wires, spare bulbs, fuse, forceps, scissors and spare sterile stock in their pockets. Modules of equipment were connected by cables and each piece had a mind of its own. The Electronics and Precision Engineering sections were vital to keeping us functioning. It was always relief to see the glow of valves when a machine was turned on. All of our recordings were on photographic paper which we hand developed in large tanks. In our workroom we had a heavy load as every tap was cleaned, metal parts dried with ether, reassembled and packed after every use. All of our connecting lines were made by us from tubing and metal connectors. Cardiac outputs and valve area were hand calculated. In the Respiratory Laboratory the tests took a couple of hours and the calculations the rest of the day. This was aided by a Facit calculating machine which original worked by turning a handle, later driven by electricity.

We are all lucky to be alive as along with the usual hospital hazards we were repeatedly exposed to: gluteraldehyde, ether, fixer, developer, blood, saliva and mercury. Furthermore, we were exposed to radiation, ethylene oxide, and anaesthetic gases in unknown quantities. No fume cupboards, no safety pipettes, no anaesthetic scavenging in CIR or the surgical lab, no radiation monitoring for cardiac technicians. The Hospital Board decided that our request for gloves for technicians was unjustified. They did actually send us a single glove of the sort vets use with cows.

The dedication of the staff to their work and the patients was inspiring. The surgeons and cardiologists worked tirelessly, procedures were often very long and we worked as long as we were needed. The first medical staff I got to know were Marie Simpson and Eve Seelye and it seemed like they never went home but they regularly ducked outside for a cigarette. They were great role models (apart from the smoking) and became my friends. James Lowe was the Cardiology HOD and he was a perfect gentleman and a great teacher. He taught us the clinical skills for phonocardiography which was one of our services. No ultrasound in those days!

We were often called backed for emergencies. John Neutze always seemed to find baby cases at night. Sue Roche was a radiographer and we worked many nights together sharing our busy roles. John was extremely patient and never criticized. He would sometimes put his hand on his chin, and say "perhaps there was a better way to do that".

In the early days, the bypass machine required a complete overall once a year and so there were no procedures over the Christmas New Year period. Once everything was done; picnics,

cricket and Christmas parties kept us occupied and the Physiology Christmas Party became a major annual event. Large Christmas puddings were made in the CIR steriliser.

1970s

The 1970s were a time of great expansion at Green Lane. We moved into the new building more than doubling the capacity. We used the existing eight channel DR8 in one theatre and three more arrived for the second cardiac theatre and the two cardiac catheterisation laboratories. By then we had a machine to develop the photographic recordings. Over the 70s the number of measurement staff rapidly increased and the training scheme produced well qualified technical staff who were able to move into specialist roles at Green Lane and beyond.

In 1972, Donna moved from Respiratory to Cardiac Measurement and that year Sandy started. Steve joined us in 1974 and Noel in 1976. All of us except for Noel started in Cardiac or Respiratory Measurement and found our special niches later in our careers.

Others from the early 70s are still working: Sue Perkins (nee Ryan), Jan Ruygrok (nee Western), Peter Ruygrok, Tim Willcox, and Fiona Riddell to name but a few. Whatever our field of work our capability and success depended on those around us. We all have a great deal of admiration and affection for our Physiology colleagues. We all took pride in providing an excellent service and helping anywhere we could. We have always seen ourselves as a physiology family. It was certainly my second family.

Later, Steve will speak more about our colleagues but I would like to acknowledge Edward Harris, Toby Whitlock and John Neutze who were all special influences on my career and personal life, Toby and Valerie among my closest friends. Noel and Steve were a loyal support as friends and colleagues throughout my technical and management years, as was Donna who remains my closest friend.

Over the 70s and 80s there were huge advances in pacing, echocardiography and electrophysiology, enabled by developing electronic and computer technology. It was an exciting job in a great environment. I will now hand over to Noel Ashton to expand on this era.

Noel Ashton

Thank you Carol for giving us a bit of history and thank you Warren for your acknowledgement of the contribution that the Physiology Department made to the clinical services at Green Lane Hospital.

I'm sure I speak for a lot of the Physiology people when I say that we all appreciate having been given the opportunity of being involved in the developmental work and the introduction of new clinical procedures that were being done at Green Lane. So, it is many thanks to all those clinicians who challenged us to provide the resources and to design new equipment and computing systems in the pursuit of clinical advancements.

While from a technology point of view the 60s, 70s, and 80s were very exciting years, as there were considerable advances made both in medical equipment and computing technology during this time, I believe that much would not have happened if the personnel and structure of the Physiology Department had been different. We have to thank those people who had the wisdom to set up such a broad based technical department.

It was unusual throughout the world to have a single technical department that encompassed such a wide range of clinical technical services, a biostatistics unit, an electronics workshop, an engineering workshop, and a research animal laboratory. It all worked well due to having department heads, Ed Harris and Toby Whitlock, who encouraged people to be progressive, having an inclusive attitude whereby anyone from the whole Green Lane/National Women's site could approach the department for assistance or services, and having a "can do" attitude rather than a "can't do" attitude.

Having a research animal laboratory within the department meant that there was an expectation to support the wide range of research projects being carried out. I quickly learnt that there was a high expectation that the department could, and would, provide all the technical innovations that were required to support the many research projects and the developing clinical services.

Also, many thanks need to be given to all those technicians who worked in the electronic and engineering workshops who, in addition to keeping all the hospital's routine equipment functioning, produced the custom designed mechanical and electronic objects that research projects required. It is often such background people who keep the services going.

For me personally these opportunities at Green Lane for innovation were the making of my working life. Teaming up with a fellow workmate, Steve Withy, enabled us to embark on many a project that in hindsight I wonder how we had the courage to undertake.

We were fortunate that there was a major technology advancement in the 70s with the development of the microprocessor device. This allowed us to circumvent the Health Department's non-purchase of computers policy by giving us access to electronic components so that we could use to design and build our own personal computer, which we named the Axiom. Eventually about 24 of these computers were built which were used as equipment interfaces, clinical data analysis systems, biostatistics, and general secretarial work. Also, this digital technology allowed us to embed into instrumentation a high degree of complexity and analytical processes.

Eventually the Physiology Department became the default IT department as there was no formal IT support at that time.

Once personal computers became the norm considerable work was also done in the provision of customized database programmes for the recording of patient data, clinical outcomes, booking schedules, and analysis reporting. Specific programmes were written for many cardiac services.

However, it was Warren Smith who gave us the biggest challenges, and the biggest rewards, in the designing and building of equipment for the EP services. It was a progressive affair throughout the 80s. It was a matter of starting small with simple instruments through to very ambitious, very complex, measurement, display, pacing, and analysis systems.

What more can be said. These were exciting times and we were fortunate to be in a position whereby we could give the level of technical support to the developing services at the hospital.

Once again thank you to all those clinicians who gave us the challenges – it has given us great memories.

Steve Withy

As Carol and Noel have said, we worked at Green Lane Hospital in a time of tremendous technological change. It was challenging, exciting and fun.

I won't try to name all the players except for a few. Tony Roche, because Sandy wants me to acknowledge his influence, because he was a great guy, and because we lost him way too early through a sad accident.

And the two medical men who allowed a lot of it to happen:

Dr Edward Harris, an English gentleman who was obsessed with respiratory physiology, its clinical practice and research. He was also a superb diagnostician, and smart enough to hire RML Whitlock, known by all as Toby, or Uncle Toby to many of the younger set. Toby left general practice to become a respiratory physiologist, took a break at Imperial College, London to become a computer engineer, took over the role of pacing expert, embraced biostatistics, and last and not necessarily least, the final GLH Medical Superintendent. Toby's lovely wife Valerie and their boys and daughter had to share Toby with the larger family at GLH Physiology.

Because these guys were far thinking the Physiology Department grew to embrace cardiac physiology, respiratory physiology, echocardiography, clinical perfusion, the surgical laboratory, an electronics laboratory and the precision engineering workshop. If anyone at GLH or NWH wanted to tackle a technical problem they would likely come to Ed or Toby, and if we had the means to help, we did. Along the way we worked with great clinical teams, along with a stream of registrars and research fellows, many of whom lead the charge today.

I think that those days proved that the Green Lane whole was greater than the sum of its parts and we were truly fortunate to be some of those parts.

Much of what took place was made possible with grants from the Green Lane Research and Education Fund. So, thank you to the committee for those many projects, and thank you for bringing us here tonight to share some great memories.

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