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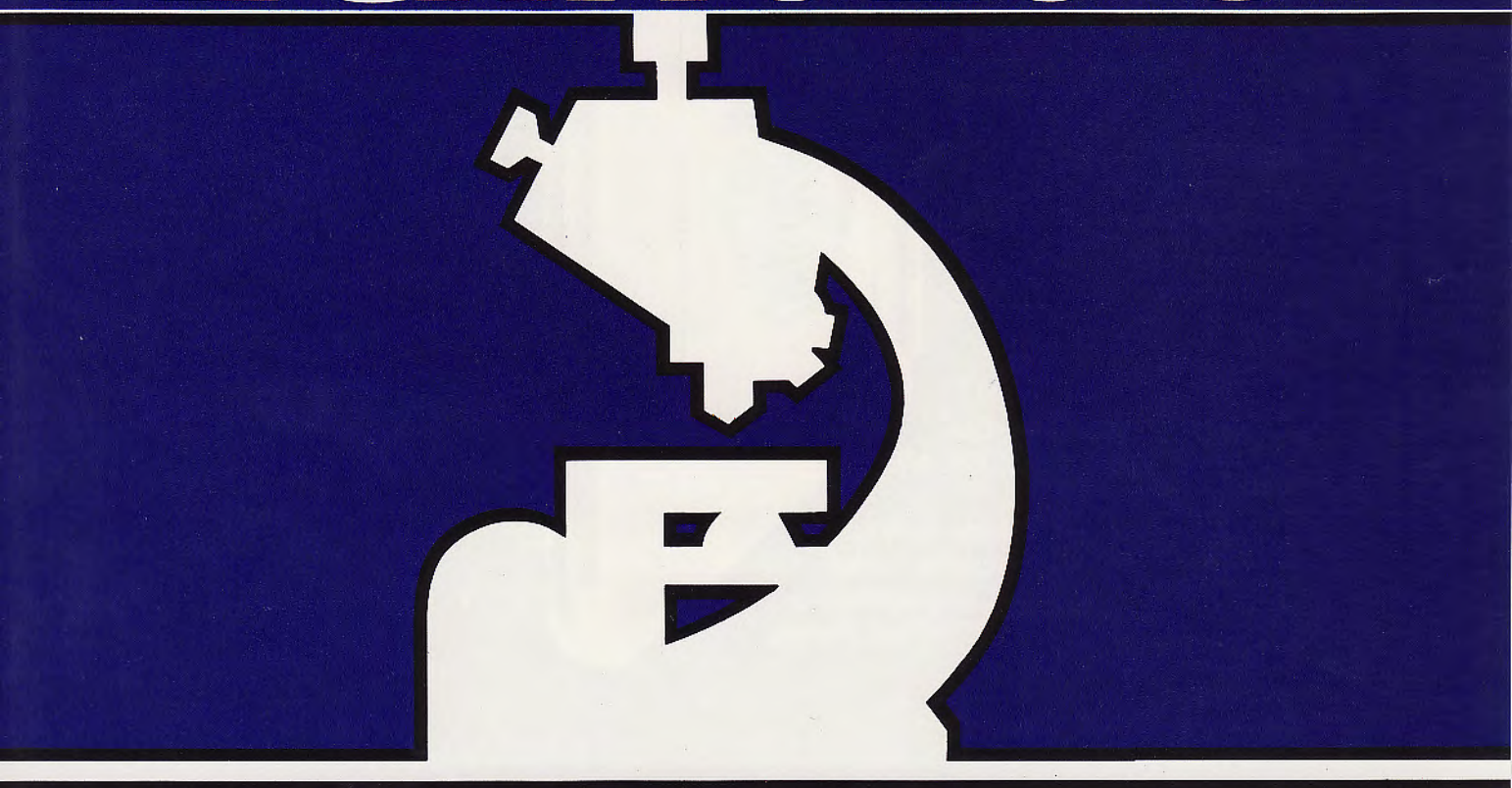

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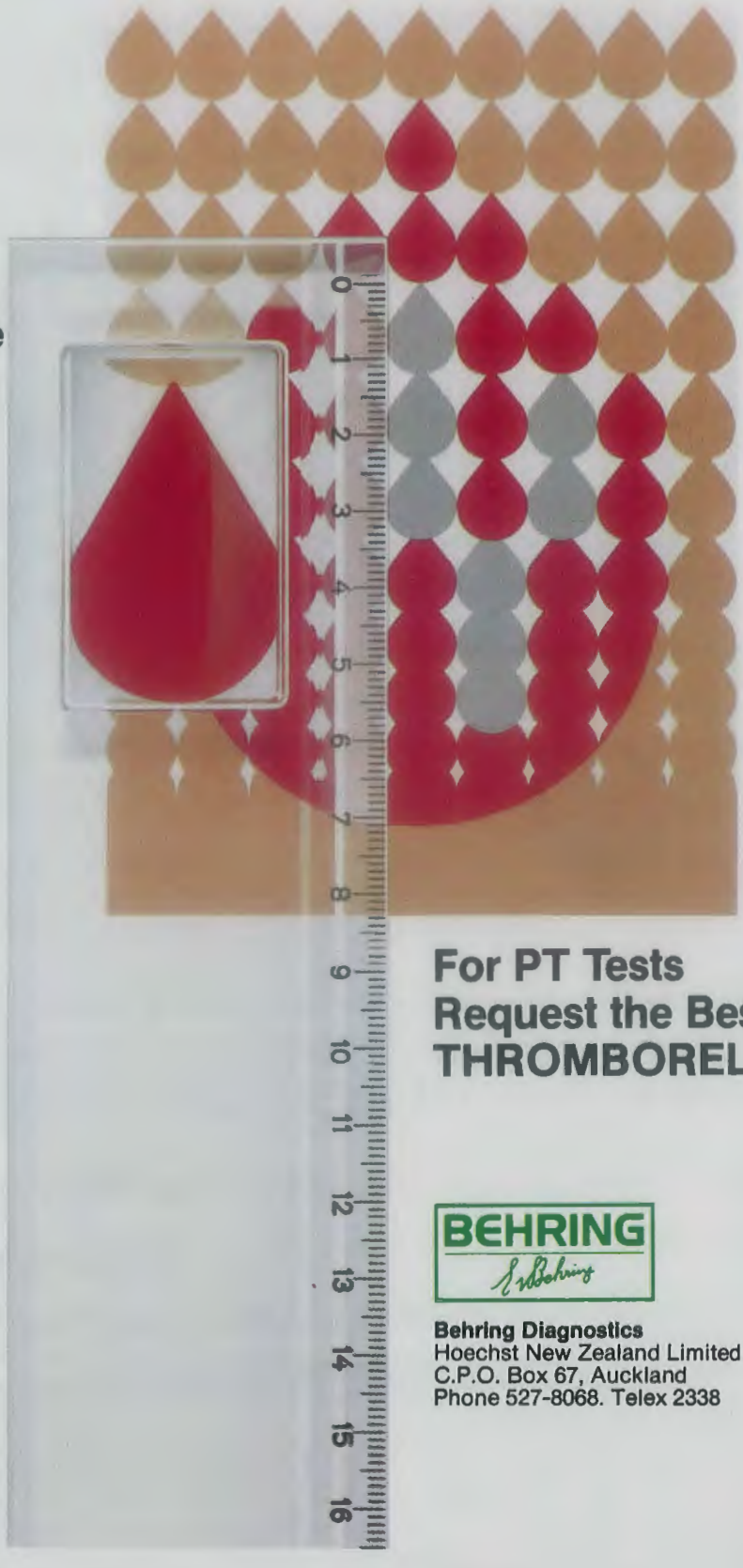

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Giardia lamblia — An Assessment from the Eastern Bay of Plenty: September 1 1986 — September 30 1989

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Abstract

During the study period, 1850 patients submitted faecal specimens for culture to the Whakatane Hospital Laboratory. The number of patients positive for *Campylobacter sp, Giardia lamblia, Salmonella sp.,* and *Shigella sp.,* were 123, 117, 60, and 5 respectively; thus confirming that *Giardia lamblia* is a major cause of infectious gastrointestinal disease in this region.

Ninety-three cases of giardiasis appear to have originated from within the Eastern Bay of Plenty. These cases occurred sporadically and 42 were domiciled in an urban area with a filtered water supply. It is therefore unlikely that water is a major source of infection. The high incidence of infection noted in infants and in adults of parenting age suggests that person to person transfer is a more significant mode of transmission.

The prevalence of giardiasis noted in this study suggests that microbiology laboratories should consider routinely examining all faecal culture speciments for *Giardia lamblia.*

Introduction

The news media have recently advised the public that giardiasis occurs in New Zealand. These media releases have stressed that this is a disease of wilderness areas.

In this study, the Eastern Bay of Plenty (EBOP) was surveyed for prevalence of giardiasis. The survey period includes two years of retrospective data analysis and thirteen months of prospective investigation. Age and sex incidence, infection in families, imported cases, and possible occupational sources have been investigated, and the geographical distribution of local cases has been logged.

The EBOP is predominantly agricultural with two urban areas, Whakatane and Kawerau, and seven public water supplies (Figure 1). The Whakatane town supply is filtered through a sand filter and is chlorinated at a level of 0.5 ppm of free available chlorine. For a time following an earthquake in March 1987, the Braemar supply serving Edgecumbe and its rural hinterland was chlorinated and a recent deterioration in the Waimana supply has necessitated chlorination. The Taneatua supply is marginally chlorinated giving trace residual chlorine. None of these supplies is chlorinated to the concentration of 3 ppm which Jarroll [1] states is necessary to kill *Giardia lamblia* cysts; however, the sand filter used in the Whakatane town supply should remove particles less than 5μm from that supply.

The urban areas have sewage treatment and disposal systems whereas the rural areas have septic tanks and a number of oxidation ponds.

Methods

The area chosen for the study was the region served by the Whakatane Hospital Laboratory. The population of this region is approximately 47,000.

All faeces specimens which were received for culture at the above laboratory between September 1, 1986 and September 30, 1989 were examined for *Salmonella sp., Shigella sp.,* and *Campylobacter sp.* and by direct wet preparation microscopy. A small amount of specimen was mixed with a drop of enrichment broth on a glass slide. The preparation was covered with a coverglass and scanned by transmitted light microscopy at 400 times magnification for approximately one minute. All specimens in which presumptive protozoa were seen on wet preparation, along with all specimens on which parasitic examination was specifically requested, were fixed in polyvinyl alcohol preservative and processed using ethyl acetate concentration and trichrome stained smear [2].

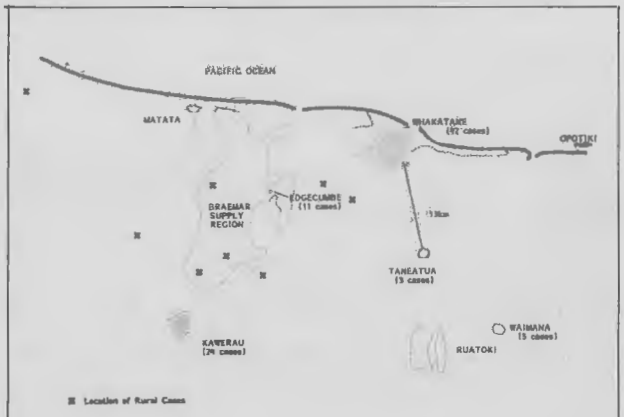

Figure 1:
Eastern Pay of Plenty (New Zealand) –water supplies and geographical distribution of local cases of giardiasis.
** = Location of rural cases.*

In the event of a physician requesting parasitic examination only, culture and direct wet preparation microscopy were not performed.

The incidence of *Giardia lamblia* in patients presenting from within the EBOP was compared to the age distribution for this region as determined by the 1986 census. The detected cases were standardised to the number of people in that age category and expressed as a rate per hundred thousand per year using three years of sample results.

To determine if there was sample bias towards certain age groups, all faecal culture requests from January 1, 1987 to October 31, 1987 were reviewed.

Results

A total of 2870 faeces specimens were processed from 1850 patients. The number of patients positive for *Campylobacter sp., Salmonella sp.* and *Shigella sp.* was 123, 60 and 5 respectively. *Giardia lamblia* cysts and/or trophozoites were identified in specimens from 117 patients, eight of whom were admitted to hospital because of the severity of their symptoms.

Medical practitioners had requested parasite examination for only 52 (44%) of the patients positive for giardiasis.

One hundred and eleven of the 117 cases were tested first by direct microscopy and 99 were found to be positive by this method.

In eight households more than one member was shown to have giardiasis.

A total of nine patients consulted their family practitioner on returning to New Zealand from the following regions: Asia, India, South Africa, South Pacific Islands.

It is possible that occupational exposure could have accounted for infection in four patients: a nurse, a dog ranger, a sewage worker and a household contact of a kindergarten teacher.

The age range for people with giardiasis was six months to 67 years; 69 of these were male.

Comparison of the age distribution for the EBOP population (Figure 2) and age specific incidence per 100,000 (Figure 3),

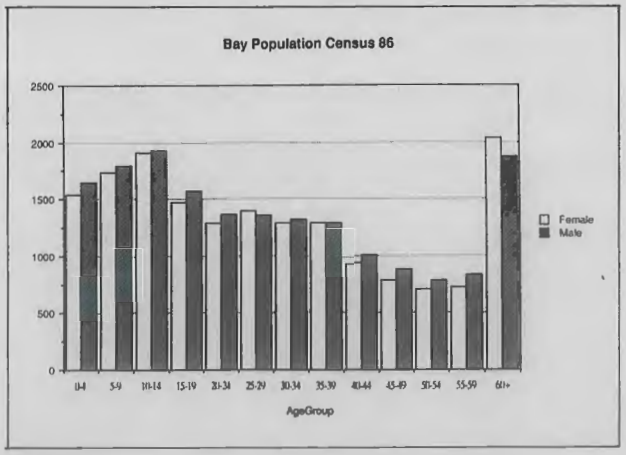

Figure 2:
Age distribution of Eastern Bay of Plenty Population (1986 Census).

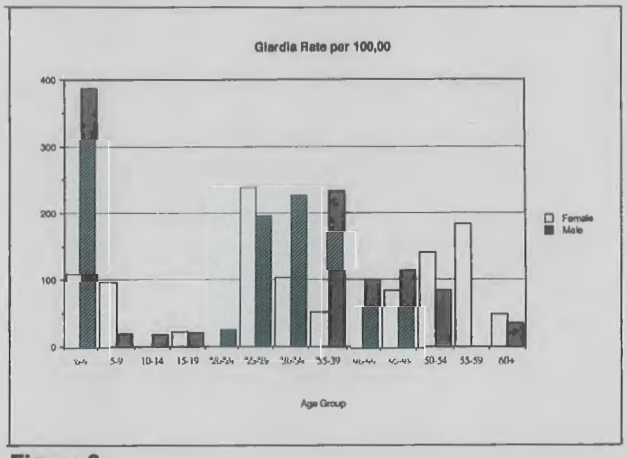

Figure 3:
Age specific incidence of giardiasis in the Eastern Bay of Plenty per 100,000.

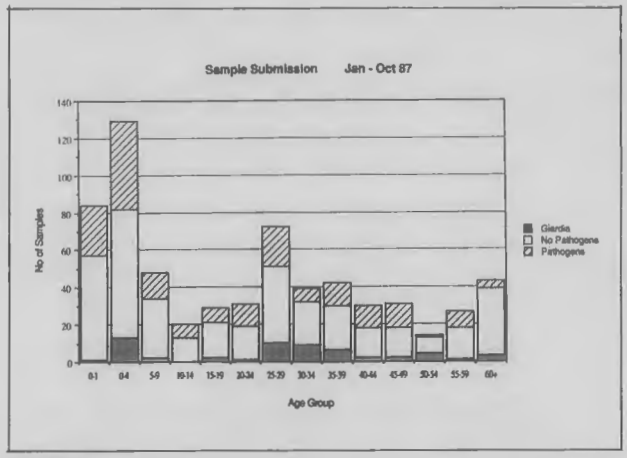

Figure 4
Age group distribution of all patients who submitted faecal culture speciments January 1, 1987 — October 31, 1987.

shows that children less than six years old and adults aged 21-40 years were at greater risk from giardiasis but all age groups were affected.

The geographical distribution of the 93 cases that appear to have originated from within the EBOP is shown in Figure 1.

Discussion

Analysis of our data has been complicated by changes in laboratory service in the EBOP during the study period. A private medical laboratory was established in the area. The hospital laboratory in Opotiki closed and its workload was transferred to the Whakatane hospital laboratory. It has not been possible to establish how many cases of giardiasis from the EBOP have been identified by the private laboratory as the disease is not notifiable. The eight cases detected since November 1988 from the Opotiki region have been excluded from Figure 3.

The number of giardiasis cases detected in this study indicates that *Giardia lamblia* is major cause of infectious gastrointestinal disease in this region. It is apparent that the screening procedure used (direct wet preparation microscopy) does not detect all cases, therefore it is probable that the actual prevalence is higher than noted in this study.

The incidence of infection in infants and in adults of an age likely to have young children suggests household transmission may be occurring. Relatively few family outbreaks were confirmed but more were noted in the latter part of the study when increased awareness by some practitioners resulted in routine screening of family contacts of a confirmed case.

It is not possible to determine if these related household cases were due to contact with a common source or person to person transmission.

Comparison of Figures 2 and 4 shows that certain age groups are under represented in the sample population. It is apparent that the number of samples submitted is not entirely disease dependant. Such factors as: a patient's willingness to seek medical advice; a practitioner's judgement as to whether a faecal culture is appropriate; and a patient's compliance with a culture request, all affect the sample population. The authors acknowledge the limitations this places on their data.

Contaminated water is a well documented source of epidemic giardiasis [3,4,5]. The data presented here does not indicate that waterborne disease is a major source of infection in the EBOP, thus suggesting that it is endemic giardiasis which has been noted in this region. Significant clustering of cases has not been demonstrated. The majority of cases occurred sporadically in the two urban areas and 42 cases were from the area served by a filtered supply which should exclude particles the size of a giardia cyst (7-14 μm). It is possible that contamination of a water supply could occur in the reservoir or the reticulation after sand filtration.

The procedure for investigating a water supply for *Giardia lamblia* requires filtration of approximately 370 litres of water [6] and the New Zealand Communicable Disease Centre is currently developing a kit for this purpose.

The data did not show significant seasonal variation; however, the number of cases per season is small.

Giardia lamblia is being imported into this region. Such cases may serve as sources of infection within the community if they are not appropriately investigated and treated.

A person infected with *Giardia lamblia* may excrete 900 x 10^6 cysts per day [7] and ingestion of only one hundred cysts is enough to ensure infection [8,9]. Direct person to person transfer is therefore a significant mechanism of infection, particularly in environments of close contact, such as : pre school centres; institutions; and in families. Education on the importance of a high standard of personal hygiene is essential to the prevention of giardiasis.

Household pets are possible sources of infection; research in New Zealand and Australia has shown that cats and dogs can harbour a *Giardia sp.* that is morphologically indistinguishable from that which infects humans [10,11].

Other known routes of transmission are anal/oral sexual activity and food-borne. The information available from the EBOP does not provide data on these routes; however, the apparent ease of transmission via contaminated food in an outbreak reported by Osterholm [12], indicates that this could be an important mode of spread.

Incidence of giardiasis within the EBOP has increased from 15 cases, in the first year of study, to 33 cases in the second year and 43 cases in the third. The investigators are satisfied that there has been no material change in the laboratory procedure during this time; however, heightened awareness amongst practitioners may have resulted in more patients being referred for laboratory investigation.

If the incidence of giardiasis is to be reduced, cases must be identified and appropriate anti-protozoal therapy instituted. The Medical Letter [13] recommends the use of Metronidazole in the following dosages: children 5mg/kg tid x 5 days; adults 250mg tid x 5 days.

The prevalence of giardiasis in the EBOP, along with the large percentage of cases detected when parasite investigation was not requested, suggests that other New Zealand medical laboratories should consider routinely screening all faecal culture samples for this organism.

Direct wet preparation microscopy is an inexpensive screening test which requires no specialised equipment and minimal technical time. Research shows that it is not as sensitive as the more time-consuming combined screen of trichrome stained smear and ethyl acetate concentration [14,15,16]. Specific immunofluorescence techniques are also available; however, the costs in materials and equipment for such a procedure may prohibit its use in some laboratories. The usefulness of enzyme immuno-assays for *Giardia lamblia* detection is being assessed overseas [17] but these techniques are not yet commercially available in this country.

Giardiasis can not be excluded on the basis of a single negative result, multiple specimens one to two days apart may be necessary to detect the organism. Some cases may be detected only by duodenal aspiration.

This pilot study has demonstrated significant incidence of giardiasis in the EBOP. The wide range of possible sources of infection suggests a broader epidemiological study of methods of transmission in New Zealand is indicated.

References

1. Jarroll E.L. Effect of Disinfectants on Giardia Cysts. *CRC Critical Reviews in Environmental Control.* 1988; **18**:1-28
2. Garcia L.S. Laboratory Methods for Diagnosis of Parasitic Infections. *Diagnostic Microbiology.* Mosby, 1985: 776-858.
3. Kent G.P. et al. Epidemic Giardiasis Caused by a Contaminated Water Supply. *Am J Public Health.* 1988;**78**(2): 139-143.
4. Craun G.F. Waterborne Giardiasis in the United States 1965-1984. *Lancet.* 1986;**2**:513-514.
5. Jephcott A.E., Baker I.A., Begg N.T. Outbreak of Giardiasis Associated with Mains Water in the United Kingdom. *Lancet.* 1986;**1**:730-732.
6. Stretzenbach L.D., et al. Monoclonal Antibody Based Immunofluorescence Assay for Giardia and Cryptosporidium Detection in Water Supplies. *Water Science Tech.* 1988;**26**:193-198.
7. Knight R. Epidemiology and Transmission of Giardiasis. *Royal Soc Trop Med Hyg.* 1980; **74**(4):433-436,
8. Turner J.A. Giardiasis and Infections with *Dientamoeba fragilis. Pediatr Clin North Am.* 1985;**32**:865-880.
9. Crawford F.G., Vermund S.H. Parasitic Infection in Daycare Centres. *Pediatr Infect Dis J* 1987;**6**:744-749.
10. Thompson A, Lymbery A. Parasites Keep the Upper Hand. *New Scientist.* 1988; Oct 29: 48-51.
11. Anonymous. New Research Direction in Microbiology. *Massey University Alumnus — Science Faculty News.* 1989; June.
12. Osterholm M.T. et al. An Outbreak of Foodborne Giardiasis. *N Engl J Med* 1981; **304**:24-28.
13. Anonymous. Drugs for Parasitic Infections. *The Medical Letter on Drugs and Therapeutics* 1988;**30**:15-24.1.
14. Watson B., Blitzer M., Rubin H., Nachamkin P. Direct Wet Mounts Versus Concentration for Routine Parasitological Examination: Are Both Necessary? *Am J Clin Pathol* 1988;**89**:389-391.
15. Shetty N. Prabhu J. Evaluation of Faecal Preservation and Staining Methods in the Diagnosis of Acute Amoebiasis and Giardiasis. *J. Clin Pathol.* 1988;**41**:694-699.
16. Gibb A.P. Identification of unsuspected cases of Giardiasis by Wet Film Microscopy. *Lancet.* 1989;**2**:216.
17. Knisley C.V., Engelkirk P.G., Pickering L.K., West M.S., Janoff E.N. Rapid Detection of Giardia Antigen in Stool with the Use of Enzyme Immunoassays. *Am J Clin Pathol* 1989;**91**: 704-708.

Acknowledgements

The authors wish to thank Mr A. Milne for his assistance in the preparation of this text.

Obituary

Peter Bernard Booth, M.A. (Cantab.), F.R.C.Path., F.A.C.M.A.

It is with sorrow that the Institute records the death of Dr. Peter Booth on 8 February 1990.

Peter started his career in blood transfusion while in the army in India at the British Base Transfusion Unit in Poona. At the end of the war he joined the staff of the North London Blood Transfusion Service as Deputy Director where he remained until the opportunity arose to take up the post as Director of the Red Cross Blood Transfusion Service in Papua New Guinea. It was in this period from 1962 to 1970 that much of his work in population genetics was stimulated. From 1970 to 1978 he became known to Institute members in his role as Director of the Canterbury Regional Blood Transfusion Service in Christchurch. The latter part of his career included senior administration positions in Nepal and Melbourne.

At an international forum in Sydney in 1986, Peter was described as "a brilliant blood banker". This accolade helps to show the esteem in which he was held by all his colleagues and it was in recognition of this that he was often an invited guest speaker at international meetings. He was not physically large but his intellect, his wit, his enthusiasm and his faultless Oxford English made him seem larger than life. He had an incredible memory and an encyclopaedic knowledge, not only of blood banking but of most things, especially his other special interests such as gardening and music. Though few ever heard him play, he was a good pianist. Besides being exciting to work with, Peter was always great fun. He had a seemingly endless supply of hilarious anecdotes and was a master raconteur.

Peter's contribution to Transfusion Medicine is huge. He published 99 papers on subjects such as population genetics, blood groups and red cell membranes, genetic factors influencing the inter-action of man and the environment and often collaborated with the John Curtin School of Medical Research in Canberra. It is sad but somehow fitting that what may become his 100th publication will be read posthumously as the inaugural Ruth Sanger Oration at the forthcoming Australasian Society of Blood Transfusion Meeting in Christchurch.

Of the society memberships which he listed, Peter was proud of his Honorary Membership of the NZIMLT. He had a high regard for technologists and his support of the profession will be missed. Those who worked with him count themselves lucky to have come under his influence.

Peter is survived by his wife, Dr. Kitty Booth and by his son, Nick and daughter, Suzie. Our sympathy is extended to the whole family.

NZJ Med Lab Technol. 1990; **44** (3): 67-70.

Current Issues In the Laboratory Diagnosis of Urinary Tract Infections

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Correspondence re manuscript to: Dr Arthur Morris

Introduction

The biggest component of the workload of microbiology laboratories is the analysis of urine specimens, particularly in relation to suspected infection. Yet the interpretation of this much requested test in an individual patient is often extraordinarily difficult. The possibility of contamination, the effects of the time which elapses between collection and analysis, the relevance of pus cells and what number of bacteria actually matter are amongst those issues which conspire to make decisions often so uncertain.

This is not an article about clinical urinary tract infections (UTI) or their treatment, although necessarily some of those issues will be alluded to in passing. Rather it is an attempt to look carefully at some components of the way in which we evaluate patients with symptoms suggestive of UTI. The data reviewed will show that the central notion instilled into most of us about the overwhelming importance of a significant urinary concentration of $\geq 10^5$ bacteria (or colony forming units, CFU) per ml (or $\geq 10^8/1$) was not and is not an immutable number for all population groups having urine tests. That idea, overstated and oversimplified for many years, has conspired to hold back thinking and development by investigators and true understanding of the problem by the rest of us..

For microbiology laboratories there are two overriding problems. First there is the need to get good information back to clinicians quickly. The second is that of maximising cost benefit so that unnecessary steps are not included in the evaluation of specimens from which there is a very low likelihood of useful information.

Quantitative Counts

Studies in women

Marple's 1940 study is commonly quoted as the first attempt at quantifying bacteria in the urinary tract[1]. It was conducted to investigate the observation that many hospitalised women without urinary tract symptoms often grew bacteria on urine culture. After careful urethral toilet, urine was obtained through glass catheters in 100 consecutive hospitalised female patients. While 69 specimens were sterile, 19 had counts of $\geq 10^4$ CFU/ml accompanied by pyuria, but only two of the 19 had symptoms: 11 patients had low bacterial counts with mild or absent pyuria. Their overall conclusion was that bacteriuria and pyuria were not rare in asymptomatic hospitalised women.

In 1948, Barr and Rantz investigated in the same way a different group of 112 younger asymptomatic ambulatory women attending the gynaecological outpatient clinic of the same hospital[2]. UTI was diagnosed if $\geq 2 \times 10^2$ CFU/ml were recovered from the catheter urine. This definition "was an arbitrary one and based on past experience". Even though they used a lower concentration to define infection, only 4.4% of this very different population was infected.

Time passed: then in 1956, 164 hospitalised patients with symptoms, 68% of them males, were evaluated [3]. Catheter urines were cultured. This time a concentration of $\geq 10^3$ CFU/ml was chosen as a reliable index of infection. This concentration was selected because the authors found a clear aggregation of counts below this number, and the isolates were not typical urinary pathogens but predominantly coagulase negative staphylococci. They were not consistently present on repeat culture. On the other hand, coliforms predominated at $\geq 10^3$ CFU/ml and at this concentration there was an association with pyuria which was not present at lower counts. They noted that 29% of symptomatic patients had counts of $<10^3$ CFU/ml. they made the clear statement that "this figure of 10^3 CFU/ml is not absolute, but rather an order of magnitude. Its use . . . will require the application of clinical judgement." In retrospect, how prophetic that was.

In 1956, Kass established an alternative quantitative basis for this problem and coined the term "significant hacteriuria" [4]. He observed that 95% of 74 patients with clinical pyelonephritis (shaking chills, fever, flank pain and dysuria) had $>10^5$ CFU/ml of urine and an additional 3% had between 10^4 and 10^5 CFU/ml. He thus chose a count of 10^5 CFU/ml as an arbitrary dividing line between "true bacilluria and contamination".

Kass then compared counts obtained by catheter with those obtained by a "clean voided" technique and also compared successive counts from the same patient [5]. He showed sterile urine was uncommon by the voiding method with many individuals having counts of between 10^2 and 10^4 CFU/ml. He estimated that finding $\geq 10^5$ CFU/ml from a single catheter specimen gave a confidence level for infection of 95% and from a single voided specimen a confidence level of 80%. Two voided specimens with similar results raised the confidence level to approximately 95%.

Hè then made a statement which has all too frequently been overlooked and has led to misapplication of his data. "It should be stressed that the consideration of bacteriuria from non-bacteriura is a statistical one in the absence of clear clinical symptomatology. There is no clear dividing line, but it is apparent from the data that for epidemiological purposes, $\geq 10^5$ CFU/ml õf urine may be taken to indicate bacteriura if two specimens agree on this range."

Around this period it was also shown that even catheterisation did not provide an absolute indication of the state of bladder urine because small numbers of bacteria could be introduced into the bladder during passage of a catheter [6]. The most reliable specimen was therefore aspirated bladder urine.

Stamey et al also examined the role of the method of specimen collection in the interpretation of urine culture [7]. A group of 54 asymptomatic women collected MSU's themselves holding their labia apart with one hand and inserting a sterile test tube into the midstream with the other. Only one of these women provided a sterile MSU, 17% had $\leq 10^2$ CFU/ml while 7% even had $>10^5$ CFU/ml. A second group of 151 asymptomatic women had their MSU collected while on a cystoscopy table in a semi-sitting position after the periurethral area had been cleaned with sterile water. While the patient voided, a nurse kept the labia separated with one hand and collected the specimen with the other. These results were better than self-collection. This time 36% of specimens were sterile and a further 39% had $<10^2$ CFU/ml. The remaining 25% had $<10^3$ CFU/ml and no count $>10^5$ CFU/ml was encountered. These results indicate clearly, and it's hardly surprising, that in women at least, the manner in which a MSU is obtained has a critical bearing on the number of organisms cultured.

It is obvious therefore, that there is a major problem excluding UTI in urine specimens collected other than in a way which is ludicrously impractical. The problem is that the laboratory is seldom in a position to evaluate this aspect of specimen collection. Because neither suprapubic aspiration nor catheterisation was or is ever likely to gain wide medical favour or patient acceptance, the MSU, despite its

shortcomings, came to be the routine specimen for microbiological testing.

Studies in Men

Surprisingly little attention has been paid to the diagnosis of urinary tract infections in men. There has been a general tendency to simply assume that the results obtained from women will be applicable. Lipsky et al. have recently looked at this more critically [8]. They investigated a mixed group of mostly elderly ambulatory men with various genito-urinary disorders, i.e. men from whom urine specimens are most frequently cultured. Seventy-six sets of urines were obtained. Bladder urine was obtained by suprapubic aspiration or urethral catheterisation and the colony counts compared with MSUs and with first void specimens collected without prior meatal cleansing. The count from MSUs that best separated sterile from infected bladder urine was $\geq 10^3$ CFU/ml with one predominant species, which gave both a test sensitivity and specificity of 0.97. First void as opposed to midstream specimens were as sensitive but less specific. As Stamey had previously shown, men in this study with sterile bladder urine grew $\leq 1.5 \times 10^2$ CFU/ml in midstream urines. Because neither urethral cleansing nor a MSU improve the detection of bacteriuria, irrespective of circumcision status, Lipsky has suggested that MSU's need not be routinely obtained from men and that first void specimens will normally suffice [8].

Studies in catheterised patients

Many specimens are received from patients with indwelling catheters. Even using modern closed drainage systems, virtually all patients will have bacteriuria of some degree by 14-21 days [9-11]. Again, there has been a tendency to regard $\geq 10^5$ CFU/ml as significant, but this is quite inappropriate.

Multiple studies have shown that usually any low concentration of organisms demonstrated will increase over the next few days without any particular symptomatic association [10,12]. Thus patients catheterised for weeks have a changing population of organisms, most often with multiple organisms at any one time [13]. In general, patients with bacterial counts $\geq 10^4$ CFU/ml will have pyuria (i.e. ≥ 10 cells/mm^3) while pyuria is less frequent in those with counts $< 10^3$ CFU/ml [14].

The important question is how to handle this information. Routine cultures do not predict clinical complications and eradication of bacteria in this situation is impossible other than for brief periods. Thus such tests are only likely to be of some benefit in the presence of symptoms and then any bacteria should be considered potentially relevant.

Pyuria

There is an enormous literature on pyuria and the potential relevance of pyuria has been restated during the 1980's [15-17]. Stamm in particular has reviewed this evidence and states that the most reliable counts are those performed on unspun urine in a haemocytometer in which the counts are expressed as white cells/mm^3 [15].

The consensus view is that ≥ 10 cells/mm^3 is abnormal and constitutes pyuria [15]. Using this definition, less than 1% of young asymptomatic non-bacteriuric women have pyuria. In symptomatic men or women with $\geq 10^5$ CFU/ml, then 98% and 96% respectively have pyuria. These data support the cut-off point of 10 cells/mm^3. However, a recent study in asymptomatic ambulatory elderly women [18] showed 32% of them to have pyuria with sterile urine and another 64% with pyuria had bacterial counts between 10^2 and 10^4. Pyuria in these women is thus a poor predictor of bacteriuria although its absence is a good predictor of the absence of bacteria. Similarly in elderly men with sterile bladder urine, a recent study [8] showed their bladder urine contained 23 $\pm$12 white cells/mm^3 and the accompanying MSU contained 32 $\pm$ 12 white cells/mm^3. Thus while the male urethra decreases the incidence and level of bacterial contamination of MSUs, on the other hand it is a source of a number of white blood cells which can spuriously suggest urine infection. We need more information to better define a cut-off level for pyuria in men, particularly elderly men, and also in elderly women.

Despite all these uncertainties there is a generally strong correlation between bacterial counts $\geq^5$CFU/ml and pyuria of ≥ 10 white blood cells/mm^3.

Urethral Syndrome

In 1965, Gallagher et al. coined the term "urethral syndrome" to describe symptoms of frequency and dysuria but without evidence of UTI i.e. a catheter urine containing $<10^4$ CFU/ml [19]. Subsequent studies showed that about 50% of women presenting with dysuria and frequency do not have "significant bacteriuria" (i.e. $\geq 10^5$ CFU/ml) and as many as 30% had sterile urine [20,21]. No one addressed this symptomatically important issue in women for years and general practitioners, those seeing the syndrome most often, tended to give these patients antibiotics and claim that they worked. How right they were.

The causes of the acute urethral syndrome in women were investigated by Stamm et al. in 1980 [22]. After excluding patients with other defined genito-urinary tract disease, they investigated 181 young nulliparous sexually active women presenting with dysuria and frequency of less than three weeks duration. Each patient provided an MSU specimen and also either a suprapubic aspirate or a catheter urine. It was found that women with the acute urethral syndrome (acute dysuria and frequency with $<10^5$ CFU/ml by MSU on two successive days) could be divided up into three roughly equal groups: those with low count bladder bacteriuria and pyuria, those with sterile pyuria and those with sterile cultures without pyuria. Those with low count bladder bacteriuria were infected with the usual organisms associated with UTI but simply in fewer numbers i.e. between 10^2 and 10^5 CFU/ml rather than $\geq^5$ CFU/ml. Of the women with sterile bladder urine, 10 of 16 (63%) with pyuria, but only one of 16 without pyuria, were infected with *Chlamydia trachomatis*. This work showed that 10^5 CFU/ml is an insensitive concentration to diagnose infection when applied to young women with symptoms of lower urinary tract infection and that *C. trachomatis* could be responsible for the syndrome as well as traditional urinary pathogens in low concentrations. In retrospect, how amazing that *C. trachomatis* had not been considered before this, given its long association with male urethritis. And how extraordinary that low count urinary tract infection in symptomatic women had not really been evaluated before, given that it had actually been described decades ago in 1956 [3].

In 1982 these same authors reported a similar group of symptomatic young women in whom they specifically set out to address the question of the best concentration of organisms in an MSU specimen for diagnosing urinary tract infection [23]. They confirmed that low count coliform bacteriuria was a real clinical entity and that the count which laboratories should use in these symptomatic women was 10^2 CFU/ml. At this cut-off point the test had a positive predictive value of 0.88 (i.e. 88% of patients with $\geq 10^2$ coliforms/ml did have infection) and a negative predictive value of 0.94 (i.e. 94% of patients with $<10^2$ coliforms/ml were not infected). That is a good test. However there are real problems with these sorts of low numbers in practice with contamination the most obvious one [24]. There has not been an instant rush by microbiology laboratories to adopt this approach. Nevertheless they had made some important points.

These authors point out different "significant" bacterial counts of $\geq 10^2$ and $\geq 10^5$ CFU/ml come about simply because as Baye's theorem states, the predictive value of a urine culture is proportional to the prevalence of infection in the tested population [24]. The population evaluated by Kass in 1956 was of asymptomatic women with a low prevalence of infection (6%) and $\geq 10^5$ CFU/ml was required to accurately

predict infection [4]. In contrast, in young women with symptoms and, not surprisingly, a higher prevalence of infection (52% in Stamm's study) a lower concentration ($\geq 10^2$ CFU/ml) was a very good predicter of infection. But as they state "it is not necessarily that symptomatic women have lower concentrations of coliforms in bladder urine, although it may be true, but because symptomatic women have a higher prevalence of bladder infection than asymptomatic women that the lower cut-off has greater predictive value"[23]. The inescapable implication for clinical and laboratory staff is that setting bacterial counts to diagnose infection requires data on the prevalence of infection. The count should vary according to the prevalence of infection. But laboratories generally don't have this data, although the clinician has a better chance of having some idea about it than the laboratory. A helpful start would be for all laboratory requests for MSU evaluation to at least state "UTI symptoms" or "no UTI symptoms". Laboratories might then be able to begin changing their evaluation and interpretation according to potential diagnoses.

More recently, Latham et al. have looked at the measurement of pyuria as a method of directing subsequent laboratory investigation of MSUs in a non research setting[25]. They evaluated several methods. The most cost effective method turned out to be a "pyuria-directed" culture approach. By this they meant that MSU specimens with pyuria were cultured to detect both $\geq 10^2$ and $\geq 10^5$ organisms, while specimens without pyuria had standard culture to detect $\geq 10^5$ CFU/ml. In this way they responded to the information on the potential diagnostic importance of low bacterial counts occurring with pyuria, while acknowledging the potential relevance of high bacterial counts even in the absence of pyuria. But we all need to remember the poor predictability of pyuria for UTI in the elderly of both sexes[8,18].

Thus we could summarise the issues to here by saying that counts $\geq 10^5$/ml virtually always mean a true UTI, but that the relevance of lower and lower counts depends on the known or guestimated prevalence of infection in the group the patient comes from. The presence of white cells, at least in young females, adds weight to the likelihood of true infection. Put simply, in the presence of symptoms, much lower counts are likely to be significant. In the absence of symptoms, then infection is less likely with lower counts. Perhaps that's a reasonable level of understanding to have as a baseline. In the end it all seems intuitively sensible. Despite all this, there will still be plenty of uncertain situations and empirical clinical decisions will need to be made.

Rapid Diagnostic Methods

In addition to attempts to better define bacteriuria and pyuria and their relevance, much effort has also been expended recently in evaluating rapid diagnostic methods [26]. The aim of these methods is firstly to decrease the time it takes to get accurate information to the doctor and secondly to eliminate specimens most likely to be negative so that more technician time can be spent on likely positive specimens or other laboratory tasks.

Rapid screening methods (apart from microscopic examination of uncentrifuged urine in a haemocytometer) include enzymatic, filtration and spectrophotometric procedures with varying degrees of automation. It's beyond the scope of this review to analyse all the currently available rapid methods, but these methods have been recently extensively reviewed by Pezzlo et al., 1988 [26]. As an overall statement, it can be said that most of these methods compare very favourably with a culture method when the reference point is $\geq 10^5$ CFU/ml. The problems begin anew however when lower colony counts are used.

Urinary nitrite has been used for many years as an indicator of urinary tract infection [26,27]. Gram negative bacilli reduce nitrate to nitrite using the enzyme nitrate reductase: the presence of nitrite thus indicates Gram negative bacteriuria. Although specific, the sensitivity of this test as might be expected is low at about 0.30 to 0.45[27]. It is thus simply not good enough to stand alone as a test for urinary tract infection.

The detection of pyuria by the presence of leucocyte esterase is another simple, rapid and cheap method in common use. The test is quite sensitive at detecting ≥ 10 WBC/mm^3 i.e. 0.88-0.94, but many substances in urine e.g. vitamin C or elevated urinary protein, interfere with the test [26].

There are available in New Zealand and elsewhere strips which detect both nitrites and leycocyte esterase (and sometimes blood and protein) and these have been extensively evaluated [26]. In evaluations totalling over 13,000 urine specimens, test sensitivities range from 0.79 - 1.0. Various authors have used these strips to determine subsequent culture: they have usually resulted in savings in both time and money. While they may have some false negatives, they are surely no less sensitive than the traditional use of $\geq 10^5$ CFU/ml as the sole arbiter of UTI.

A new wave of automated systems which detect bacterial growth by photometry is also approaching [26]. These systems add dilute urine to broth media, and most Gram negative urinary tract pathogens produce detectable growth within 4-6 hours. While positive results may be available within 1-2 hours, negative results cannot be reported before 5-13 hours and these systems detect only bacteriuria and not pyuria. The machinery is expensive and the running costs in disposables are high.

Conclusion

In summary, bacteriology laboratories need clinical information if they are to improve the evaluation of urine specimens. Similarly they need information on the prevalence of UTI in the populations they serve: in New Zealand however, most laboratories provide a service across the whole range of individuals who have UTI.

How to minimise time wasted on specimens which have almost no potential yield, while providing timely information for those specimens which are likely to be diagnostically helpful is the dilemma. Those who use the microbiology laboratory need to know some of this new information. Urine microbiology is at last being re-evaulated. Change is coming.

References

1. Marple C. The frequency and character of urinary tract infections in an unselected group of women. *Ann Int Med* 1940;**14**:2220-39.
2. Barr, R, Rantz L. The incidence of unsuspected urinary tract infection in a selected group of ambulatory women. *Calif Med* 1948;**68**:437-40.
3. Sanford J, Favour C, Mao F, Harrison J. Evaluation of the "positive" urine culture. *Am J Med* 1956;**20**: 88-93.
4. Kass E. Asymptomatic infections of the urinary tract. *Trans Assoc Am Physicians* 1956;**69**:56-63.
5. Kass E. The role of asymptomatic bacteriuria in the pathogenesis of pyelonephritis. In: *Biology of Pyelonephritis*. E Quinn, E Kass, Eds. Churchill, London 1960; p.399-412.
6. Guze L, Beeson P. Observations on the reliability and safety of bladder catheterization for bacteriological study of the urine. *N Engl J Med* 1956;**255**:474-5.
7. Stamey TA, Govan D, Palmer J. The localization and treatment of urinary tract infections: the role of bactericidal urine levels as opposed to serum levels. *Medicine* (Baltimore) 1965;**44**:1-36.
8. Lipsky B, Ireton R, Fihn S, Hackett R, Burger R. Diagnosis of bacteriuria in men: specimen collection and culture interpretation. *J. Infect Dis* 1987;**155**:847-54.
9. Macfarlane D. Prevention and treatment of catheter associated urinary tract infections. *J Infection* 1985;**10**:96-106.
10. Schaeffer A. Catheter-associated bacteriuria. *Urologic Clinics of North America* 1986;**13**: 735-47.

11. Garibaldi R, Burke J, Dickman M, Smith C. Factors predisposing to bacteriuria during indwelling urethral catheterisation. *N Engl J Med* 1974;**291**:215-8.
12. Stark R, Maki D. Bacteriuria in the catheterized patient. What quantitative level of bacteriuria is relevant? *N Engl J Med* 1984;**311**:560-4
13. Breitenbucher R. Bacterial changes in the urine samples of patients with long term indwelling catheters. *Arch Intern Med* 1984;**144**:1585-8.
14. Musher D, Thorsteinsson S, Airola V. Quantitative urinalysis. Diagnosing urinary tract infection in men. *JAMA* 1976;**236**:2069-72.
15. Stamm WE. Measurement of pyuria and its relationship to bacteriuria. *Am J Med* 1983;**75**(Supp.1B):53-8.
16. Komaroff A. Acute dysuria in women. *N Engl J Med* 1984;**310**:368-75.
17. Komaroff A. Urinalysis and urine culture in women with dysuria. *Arch Intern Med.* 1986;**104**:212-8.
18. Boscia J, Abrutyn E, Levison M, Pitsakis P, Kaye D. Pyuria and asymptomatic bacteriuria in elderly ambulatory women. *Ann Int Med* 1989;**110**:404-5.
19. Gallagher D, Montgomerie J, North D. Acute infections of the urinary tract and the urethral syndrome in general practice. *Br Med J* 1965;**1**:622-6.
20. Mond N, Percival A, Williams J. Brumfitt W. Presentation, diagnosis and treatment of urinary-tract infections in general practice. *Lancet* 1965;**I**:514-6.
21. Brooks D, Maudar A. Pathogenesis of the urethral syndrome in women and its diagnosis in general practice. *Lancet* 1972;**II**:893-8.
22. Stamm W, Wagner K, Amsel R, Alexander R, Turck M, Counts G, Holmes K. Causes of the acute urethral syndrome in women. *N Engl J Med* 1980;**303**:409-15.
23. Stamm WE, Counts G, Running K, Fihn S, Turck M, Holmes K. Diagnosis of coliform infection in acutely dysuric women. *N Engl J Med* 1982;**307**:463-8.
24. Smith G, Brumfitt W, Hamilton-Miller J. Diagnosis of coliform infection in acutely dysuric women. *N Engl J Med* 1983;**309**:1393.
25. Latham R, Wong E, Larson A, Coyle M, Stamm W. Laboratory diagnosis of urinary tract infection in ambulatory women. *JAMA* 1985;**254**:3333-6.
26. Pezzlo M. Detection of urinary tract infections by rapid methods. *Clinical Microbiology Reviews* 1988;**1**:268-80.
27. James G, Paul K, Fuller J. Urinary nitrite and urinary tract infection. *Am J Clin Pathol* 1978;**70**: 671-8.

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NZIMLT CONTINUING EDUCATION
SPECIALIST INTEREST GROUP UPDATE

The NZIMLT Council Continuing Education Committee has established Specialist Interest Groups with the intention of providing opportunities for further development of practical and theoretical skills. With these groups providing an education programme it is hoped to encourage greater involvement of members in planning, organising and participating in workshops, seminars, the Scientific forum of the Annual Scientific meeting, and in preparing articles for publication in our Journal.

At present Haematology, Clinical Chemistry and Clinical Microbiology groups are active — with further groups yet to be confirmed.

The following is the first of bi-ennial reports from these Groups; a column intended to publicise their activities and invite your input.

FROM THE MICROBIOLOGY SPECIAL INTEREST GROUP (MSIG)

Convenor: Shirley Gainsford
Contact Address: Valley Diagnostic Laboratory, P.O. Box 30044, Lower Hutt.

Objectives of the MSIG are:
- — to organise Seminars/Workshops relevant to Microbiology within the resources of the NZIMLT.
- — to nominate examiners for Fellowship, Specialist, and QTA examinations.
- — to liaise with the Annual Scientific Meeting organising committee over the Microbiology component of workshops and forums.
- — to co-ordinate a syllabus review for the Specialist and QTA examinations.
- — to create new opportunities for learning.
- — to advise Council on matters pertaining to Microbiology.

Our job will be to instigate and co-ordinate the above. We do not see ourselves as the experts in Clinical Microbiology but rather as a small group, to get the above going — relying on input from senior Microbiology technologists.

At our first meeting in November 1989 it was decided to send a questionnaire to all Microbiology Charge Technologists to find out what seminars/workshops they would like, and asking for volunteers to act as examiners.

Report June 1990

Many thanks to those people who filled in the questionnaire on seminars/workshops. Fifty forms were sent out and twenty two replies received. Special thanks to those people who said they were willing to be examiners. We have forwarded their names to Barrie Edwards.

The most popular choice for a seminar was "Antibiotic Sensitivity Testing", "Respiratory Tract Infections", "Infection Control" and "Infections in the Immunocompromised", were almost equal as second choice.

We have decided to organise a seminar for 1991, possibly in conjunction with the Microbiology Society and this will probably be on Infection Control.

A Specialist Level Study Guide in Microbiology is underway with students doing this exam receiving plenty of reading material on a regular basis.

A Journal Club has been started in the lower half of the North Island. Subscribers will receive indexes from fourteen journals and be able to order copies of articles for which they will pay for the copying. If this is successful we hope to find someone in Auckland/Waikato and Christchurch/Dunedin to do the same for their areas.

FROM THE BIOCHEMISTRY SPECIAL INTEREST GROUP (BSIG)

Convenor: Alison Buchanan.
Contact Address: Clinical Chemistry Dept, Auckland Hospital, Park Rd, Auckland.

"A Paediatric aspect of Clinical Biochemistry"

A one day Seminar to be held on Saturday the 22nd September, Marion Davis Medical Centre, Auckland Hospital.

The final program is still being arranged but information and registration forms will be sent to Charge Technologists at the beginning of August.

This is the first of a series to be organised by the Biochemistry Special Interest Group.

We need more suggestions and any offer of help.

If you have a favourite topic and would like to share it please send a note to the Convenor.

If you have ideas for a Workshop, we hope we can find an organiser and a venue.

If you would like to organise a Seminar, please let us know.

Your help and encouragement is needed to ensure continuation of this education programme.

Remember that it was at your request that these Special Interest groups were formed.

FROM THE HAEMATOLOGY SPECIAL INTEREST GROUP (HSIG)

Convenor: Ross Anderson
Contact Address: C/- Marilyn Eales, Haematology Dept, Middlemore Hospital, Private Bag, Otahuhu.

Objectives of the HSIG are:
- — to create new opportunities for learning.
- — to be available to advise on matters pertaining to Institute examinations.
- — to be available to advise NZIMLT on matters pertaining to Haematology.
- — to organise seminars and workshops relevant to Haematology within the resources of the NZIMLT.

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Publicity, Promotions and Medical Laboratory Technology.

E. Norman, Principal Technologist, Rotorua Hospital, P. McLeod, Microbiology—Charge Technologist, Nelson Hospital, B. Tapper, Haematology—Charge Technologist, Medlab. Tauranga.

Introduction

At the 1989 Conference in New Plymouth those present demonstrated concern over some future directions for our profession by passing a remit requesting that "The N.Z.I.M.L.T. investigate the establishment of a Public Relations and Marketing Committee with a view to promoting national awareness of Medical Laboratory Technology". A committee was formed and it decided to take an initial broad view by circulating a questionnaire to all laboratories. This questionnaire sought opinions on our professional self image, our perceived image with other health professionals and of our perceived image with the public. It also covered future directions for Medical Technology and asked for views on effective publicity and promotion.

Questionnaires were sent to the Head of each laboratory with a request that they be distributed widely within laboratories. Some were also sent to individuals whose views and opinions were specifically sought. 45 replies were received with 10 representing a consensus after discussion within laboratories and the remainder being from individuals, some of whom noted that their colleagues were in accord with the views expressed. The questionnaire was general in nature and covered a wide range of topics. The replies are summarised.

Self Image:

Most Technologists consider themselves to be professionals who are part of the Health Care Team but there is some ambivalence as while they are confident of their role as providers of scientific data, the role of interpreter and communicator seems much less clearly defined. Some respondents reflected a backroom out of sight, out of mind attitude, mentioned manipulation and domination by the Medical and Nursing professions and saw themselves in the role of helpers to the Medical Staff. A significant number of replies noted what they considered to be a less than professional attitude displayed by many of their peers. This apparent lack of pride showed in sloppy appearance and often inappropriate dress. Many offered the opinion that the apathy which appears to beset our profession was a reflection of our self image.

Image with Other Health Professionals:

The majority of replies indicated that Technologists did not consider that they were held in high regard by other Health Professionals. It was noted by some that they considered that some laboratory staff members seemed to be unhelpful and negative when dealing with staff from other departments. This made their laboratory less approachable and discouraged feed-back. Most acknowledged that we often do not seek feed-back when we should, but that we expect a quick response when something goes wrong. There is no doubt that those who project a positive professional attitude are valued for their expertise. A knowledgable and helpful Technologist is likely to be consulted by Medical staff in many situations, even when Pathologists are readily available. Technologists in medium and small sized laboratories appear to be more comfortable in communicating with other Health Professionals as they can obviously correspond more on a one to one basis. Many replies suggested that the lack of communications meant that doctors and laboratory staff were often unaware of each other's needs. One method that some laboratories are now instituting to help bridge this communication gap is the production of a regular laboratory newsletter. The setting up of a Public Relations Committee by another laboratory also appears to be a positive move. Recognition of the need for improved communication with other Health Professionals seemed best summarised by the comment that "the interface creates the image".

Image with the Public:

Almost all replies indicated that this was very nearly non-existent with laboratory staff generally feeling that they were considered to be vampires or blood suckers. Many thought that we should make an effort to provide a service which is patient friendly and designed to be helpful.

Several noted that the patients are our customers and that we should aim to assure them of our role in the Health Care Team. Many also considered that we could go a long way toward bridging this communication gap by making laboratories more accessible to the public by methods such as holding open days.

Institute Title:

A large majority of respondents indicated a preference for the title Medical Scientists. Those who had doubts equated Scientists with research, but by dictionary definition a Scientist is a person with expert knowledge of a science and a person using scientific methods. For this reason such a title would not seem inappropriate.

Medical Technology and the News Media:

The vast majority of replies acknowledged that our profession receives little or no publicity in their town or city with the little bit that was received usually relating to blood donor drives. There are notable exceptions with a few laboratories having generated good relationships with reporters from local newspapers. This has resulted in well written, educational and timely articles being produced. Technologists must approach the media when they have topics of interest such as new equipment or examination results. Having a Laboratory Publicity Officer to liaise with the media is a suggestion that all laboratories could consider. This would enable each laboratory to raise the profile of Medical Technology within its own region.

National Secretariat:

There is general agreement that we currently have little access to the political arena, but some doubt as to whether a Secretariat would be effective. Cost is a major concern. The view was expressed that there would be value in having someone who could turn around the listless attitude of an ultra conservative bunch of Technologists. Those who are aware of the secretarial services available overseas, such as in Australia or Ontario, Canada, were in favour. More than one respondent mentioned the possibility of sharing secretarial services with the Medical Laboratory Technologist's Board. An alternative suggestion is a voluntary Public Relations Committee which could be set up in each region.

Wellness Testing Service

There was almost total agreement with this concept with most considering it to be the most effective potential way of providing publicity and improving our professional image. Many considered it fully compatible with the preventative mandate of Area Health Boards and Health Development Units. This service was seen as a necessary alternative to Supermarket testing and that it was "our patch if we claim it".

It is critical that full relevant accurate information and advice be made available to users. The range of tests should reflect market demand and suggestions include; Glucose,

Lipid Screen, Haemoglobin, Blood Group, Hepatitis B Serology, Pregnancy Testing, Rubella Screening, Uric Acid, Fructosamine, Vaginal Swabs (not for sexually transmitted diseases), Urine Screening, Lead and Cholinesterase. In addition to wellness testing mention was made of the future potential in screening for fitness, lifestyle in the workplace, fertility and for monitoring pharmaceutical dosages. The most pertinent comment was the one which considered Nelson Hospital Laboratory to be "an oasis in the desert" for their leadership in this area.

Present Training:

By and large this was thought to give us a suitable basic training, especially for those who had attained a Specialist qualification. Some considered that the present lack of requirement for training at Specialist level constituted a down-grading of our qualification. Areas of deficiency in the present training system included anatomy and physiology, clinical pathology and management. Several noted the need for more continuing and post-qualification education and some staff from small laboratories felt this was an area of special concern.

Degree Education:

There was almost total agreement on the move toward this upgrading of our qualifications with many considering it to be essential. Most felt that this course would be helpful in improving our image, although some thought a degree would not necessarily result in a more competent Medical Technologist.

Promotion for Recruitment:

There was almost total agreement on the need for promotion at school level with careers guidance councillors being an obvious target for information. It was suggested that an improved public image would assist recruitment as parental expectations often helped determine career choices.

There was some concern expressed that the Otago University Course may only attract those who are able to pass the Intermediate Examination, but are unable to gain admission to the Schools of Medicine and Dentistry.

Increasing Public Awareness:

It was considered relevant to offer the public a broad appreciation of our role in the Health Care Team and that this could be achieved by promotion of a wellness testing programme. In addition spokespersons should be able to provide information on specific areas of medical science as the need arises. There was some agreement on the need for a National Publicity and Promotion Campaign, the suggestions ranging from T.V. advertising, through newspapers and magazines to the local free press. A suggestion worthy of consideration is that a resource kit be put together and made available to the news media. It was suggested that we should aim to promote the achievers within our profession. A publicity and advertising campaign similar to that mounted by the public Pharmacists was considered to be expensive and inappropriate. If such a campaign were mounted several suggestions agreed that we should consider ourselves the Health Professionals who the public see least often. The consensus was that while a campaign to raise our profile may attract some criticism, this was not considered to be a problem.

Philosophy and Mission Statement:

While some considered that these were trendy, but hardly vital, were window dressing, or that they would not contribute anything to Medical Technology, the majority considered that it was essential for our Institute to adopt a philosophy and mission statement thus setting clear goals for our profession.

Quality Assurance

A number of respondents saw Quality Assurance within the narrow confines of individual test Quality Control and considered it to be primarily an in-house problem. Many others looked at the wider context of laboratory performance and considered that the Telarc requirements should be set as a yard stick. Some noted that they felt that the Institute should become more involved in encouraging laboratories to strive toward Telarc standards. The concept of overall Quality Assurance as embodied in the Hospital Accreditation prescriptions is relatively new and requires that the inter-relationship between the laboratory and other departments be examined. This concept should also encompass the relationship between laboratory and customers, both clinical and public and requires that laboratories seek the view of their customers in assessing performance. Some respondents encompassed these ideas in their suggestions that we should treat the public as we would expect any shop owner to, that we should ensure that we are customer friendly and open for public scrutiny and that we must ensure that we provide a service which gives value for money.

Conclusion

This questionnaire was rather general and somewhat narrow in the field covered but it provided some interesting and useful information. Those who replied seemed to be in agreement that for the most part we have not felt compelled to present ourselves as Health Care Professionals and that if we are to be seen as filling an essential role in Health Care we must ensure that our role is better understood. In this respect the comment that "those who act submissively are usually treated accordingly" seems appropriate. There would seem to be no doubt that there is need for a Publicity and Promotions Drive by our profession but opinion is divided on the most appropriate means. Some considered that the answer could be found mainly at a national level. Others were sure that individual laboratories should take a lead while many offered the opinion that each of us as individuals could do much to enhance our image and also the image of Medical Laboratory Technology. Clearly part of the answer lies in each of the three sectors but it is tempting to suggest that primarily each and everyone of us must accept responsibility. Perhaps this is what Virgil had in mind when he stated that "they are able because they know they are able".

Acknowledgement

The Authors thank Mrs Jeanne Boyd for her Secretarial assistance.

PUBLICITY AND PROMOTIONS COMMITTEE

Members of the Committee are Paul McLeod, Brett Tapper, Ted Norman (Convenor).

This new committee was set up in response to a clearly expressed need at the 1989 Conference.

To date the emphasis has been on establishing the views of Laboratory Technologists on the image of our profession and on the most appropriate forms of Publicity and Promotion.

This was done by circulating a questionnaire to all laboratories. Many useful and thought provoking replies were received and a summary of these has been presented to Council and will be made available for publication in the Journal.

The main future thrust for this Committee will be to ensure that Council is made aware of the Publicity and Promotion views of laboratory workers as expressed in the questionnaire replies.

The Committee expresses its gratitude to the many laboratory staff who took the trouble to make their views known.

CONTINUING EDUCATION COMMITTEE

Dennis Reilly (Convenor), Shirley Gainsford, Jim Le Grice, Anne Paterson, and Geoff Rimmer.

This year we have been concentrating on establishing 'Special Interest Groups' for each of the disciplines in Medical Laboratory Technology.

The 'Rationale' was that all technologists, trainees and Assistants need to develop their practical and theoretical skills. These developments are assisted by providing them with a consistent planned education programme.

The 'Objectives' for the special interest groups include:

1. Organise seminars and workshops relevant to that discipline.
2. Advise the organisers of the Annual Scientific Meeting on forums and workshops.
3. Nominate suitable individuals to act as examiners for Institute examinations including Fellowship, Specialist Certificate and Technical Assistant.
4. Co-ordinate Syllabi Review for these examinations.
5. Advise Council on matters pertaining to their particular discipline.

The 'Resources' required to achieve this will be budgeted for out of members subscriptions.

To date the Interest Groups are:

1. Clinical Biochemistry	Secretary	Alison Buchanan Dept of Clin Chem Auckland Hospital
2. Haematology	Secretary	Ann Cooke School of Med Lab Tech Auckland Hospital
3. Immunology	Secretary	Gillian McLeay School of Med Lab Tech Auckland Hospital
4. Microbiology	Secretary	Shirley Gainsford Valley Diagnostic Lab Lower Hutt

OVERSEAS AID COMMITTEE

Members of the Committee are Marilyn Eales, John Elliot and Ted Norman (Convenor).

The Institute maintained its links with the P.P.T.C. during the 1989-90 year and continued to support the Training Centre.

The Committee is assisting the 1991 South Pacific Congress Committee in arranging an appropriate involvement for Pacific Island Laboratory Technicians in the 1991 Congress. This involvement will take the form of two half day workshops on relevant topics and will also include significant input from Monica Cheeseborough who has indicated her willingness to attend.

The Committee was pleased to have been able to offer help to Mr Joe Davies who is now working in Papua New Guinea.

The Committee once again offers thanks to the many individual Institute members who have so willingly supported the P.P.T.C. during the year.

FELLOWSHIP COMMITTEE

Members of the Committee are: J. Le Grice (Convenor), K. McLoughlin and H. Potter.

Stephen M. Henry of the Auckland Regional Blood Centre was awarded Fellowship for his thesis entitled "The Serology and Genetics of the Le (a + b +) Phenotype in Polynesians,"

The changing educational environment for Medical Technologists is being monitored by this committee and we hope to be able to equate the Fellowship qualification to the appropriate level of a university degree.

EDUCATION COMMITTEE

Jan Parker (Convener), Anne Paterson, Shirley Gainsford

The qualification level for registration by the M.L.T.B. is now one Certificate level.

This is the first year the N.Z.I.M.L.T. will be responsible for conducting the Specialist level examinations. The number of candidates enrolled to undertake these examinations is pleasing — 38 candidates over seven subjects.

There are students progressing through the new Diploma courses offered by the Auckland Institute of Technology and Central Institute of Technology.

The **Bachelor of Medical Laboratory Science (B.M.L.Sc.)** — Otago University is on target for it's first intake of students at year two level in 1991. Although the proposal has still not completed it's final steps of approval for Academic Standard and Government funding, the University of Otago is proceeding confidently. The course has been included, in the Handbook for Intending Students. A common application form has been drawn up for all the Medical Sciences to be offered by U.O. in 1991 — Medicine; Dentistry; Pharmacy; and Medical Laboratory Science. Trainees and Laboratory Assistants should note that their applications will be favourably received.

Council has examined the Proposal and endorsed that it meets the requirements of the profession. The Proposal has been referred to the M.L.T.B. as the official Registration body.

We look forward to the creation of degree status, as our professional qualification.

EXAMINATIONS COMMITTEE

Members of the Committee are B.T. Edwards (Convenor), K. McLoughlin, G. Paltridge, J. LeGrice and T. Rollinson.

The 1989 examinations for the Certificate of Qualified Technical Assistant were held on 9 and 10 May. There were 83 candidates for the examination with 75 gaining the Certificate. The pass rate was 90% compared with 94% the previous year.

Breakdown of figures are:

	1990		1989	
	Sat	Passed	Sat	Passed
Clinical Biochemistry	11	9	13	13
General Certificate	5	4	8	7
Haematology	12	12	20	17
Histological Technique	4	4	9	9
Medical Cytology	7	5	4	3
Medical Microbiology	23	21	19	19
Mortuary Hygiene & Technique	2	2	2	2
Radioisotope & Radioassay Technique	4	4	1	1
Immunohaematology	5	5	13	13
Immunology (Microbiology)	5	5	4	4
Special Certificates	5	4	5	4
	83	75	98	92

MEMBERSHIP COMMITTEE

Members of the Committee are G. Rimmer (Convenor), D. Dixon-McIver and D. Reilly.

It is pleasing to note the continued support for the Institute. Total Membership of the Institute has fallen by 394. The largest group of 330 were deleted for non-payment of subscriptions. This purge of membership has not been done for at least 2 years.

In early 1990 we purchased our own computer and software and transferred all our files. This will result in considerable savings in running costs and because of direct involvement a more accurate and up-to-date system.

	1989/90	88/89	87/88	86/87	85/86
Membership from previous year	1709	1465	1536	1792	1352
Less deletions	547	87	340	454	58
	1162	1378	1196	1338	1294
Plus application	153	331	269	198	498
Membership as at 31st March	1315	1709	1465	1536	1792
Membership Composition:					
Life Members	17	17	16	14	15
Fellows	23	29	30	39	42
Associates	688	781	752	785	732
Members	503	741	579	625	956
Complimentary Members	-	43	123	168	235
Non-practising Members	53	68	58	55	32
Honorary Members	31	30	30	18	15

AWARDS COMMITTEE

Anne Paterson (Convener)

This year the N.Z. Bood Foundation generously offered to increase the value of the Q.T.A. awards in Haematology and Immunohaematology to $100 each. Council voted to match this for the remaining Q.T.A. awards sponsored by the N.Z.I.M.L.T. Consequently, the sponsors of the Certificate and Specialist Awards were approached, to review the value of these awards. These have now been set at $100 and $200 respectively. Our thanks go to the following companies for their generous support of our profession.

M.T.B. Examination Award Donors — Certificate Level

Amersham Australia Pty Ltd.
Biotek Supplies
Hoechst N.Z. Ltd
Intermed Scientific Ltd.
Labsupply Pierce
Life Technologies Ltd.
Roche Products N.Z. Ltd.
Sci Med (N.Z.) Ltd.

N.Z.I.M.L.T. Examination Award Donors

Amersham Australia Pty Ltd.
Biotek Supplies
Life Technologies Ltd.
Wilton Instruments
Medic DDS Ltd.
Sci Med (N.Z.) Ltd.
Watson Victor Ltd.
Organon Technica /General Diagnostics

Q.T.A. Examination Award Donor

N.Z. Blood Foundation

Journal Awards

Pacific Diagnostics
Roche Diagnostic Products

Our thanks also to the membership of the N.Z.I.M.L.T. whose contributions make possible the following awards.

Journal Prize
Journal Student Award
Q.T.A. Examinations Awards

PUBLICATIONS COMMITTEE

Members of the Committee are D. Dixon-McIver (Convenor), D. Reilly, W. Wilson and P. Reilly (Advertising Manager).

There were 9 papers proffered for publication in 1989 (5 Auckland, 1 joint Auckland/Whangarei, 1 Dunedin, and 2 Wellington) of which 6 have been accepted for publication and published. This compares with 17 in 1988, 14 in 1987, 13 in 1986 and 28 in 1985.

The slight upturn in proffered material in 1988 has not been sustained with there being a dramatic fall off in support; perhaps a reason for the decline is the turmoil that the Health service finds itself in and the uncertain future. However, whatever the reasons for the decline if support is not increased then the viability of the Journal must be brought into question.

There has been a change in Editor taking effect from 1 Jan 1990. The new Editor is Maree Gillies from Princess Mary Laboratory, Auckland. Please give her the support that is required to make a successful publication.

The convenor wishes to record his thanks to Trish Reilly, Maurice Sheppard and the Royal NZ Foundation for the Blind for their continued assistance and invaluable support.

TREASURERS REPORT

The Institute's financial year has ended with a surplus of $49,065. This surplus is achieved by an overall decrease on expenditure and a conference surplus of $14,045.

Our expenses have decreased as formerly the Institute was responsible for both industrial and professional aspects of medical technology. Now of course we are involved in the professional side only. At our last AGM subscriptions were reduced by approximately 15% which will mean our income for the 90/91 year will be reduced by a similar amount. Council believes that we need a healthy reserve to act as a buffer as more professional activities are pursued. At present we are advertising for an Executive Assistant to attend to the day-to-day administration of the Institute. It is envisaged this person would be located in Christchurch and be under the direction of the Secretary.

The Continuing Education Special Interest Groups have now been set up and will require adequate funding to be effective.

The Journal cost is similar to last year, although the advertising income is under pressure as the Industry supply companies struggle with the current economic conditions. Still it is pleasing to have their support.

Fixed assets include a purchase of a Toshiba lap-top computer of $8,657. We no longer use a Bureau for our membership files, so significant savings in our computer costs will eventuate.

Once again the Medical Science Trust has benefited from a donation of $14,000 from the Institute.

My overall impression is that the Institute is in good shape, it is very pleasing to note that subscription income has stayed steady during a period of change. This will enable council to manage all the professional requirements as they occur.

D.M. Reilly
HONORARY TREASURER

NEW ZEALAND INSTITUTE OF MEDICAL LABORATORY TECHNOLOGY INC. CONFERENCE ACCOUNT FOR THE YEAR ENDED 31 MARCH 1990

	1990 $	1989 $
INCOME FOR THE YEAR WAS DERIVED FROM:		
Registration	14,437	16,245
Trade rentals, advertising and donations	23,962	19,424
Social functions and lunches	13,583	16,424
Bank interest and other income	-	481
Other income	1,145	1,234
	53,127	53,808
FROM THIS INCOME THE FOLLOWING EXPENDITURE WAS MET:		
Travel, accommodation and meals	23,383	32,967
Social function costs	3,467	3,261
Rentals	2,320	1,160
Postage, stationery and administration	4,623	3,876
Other expenditure	5,289	2,396
TOTAL EXPENDITURE	39,082	43,660
NZACB Share of Profit	-	1,188
Which leaves an excess of income over expenditure transferred to the Statement of Income and Expenditure	$14,045	$8,960

The attached notes form part of this Statement.

NEW ZEALAND INSTITUTE OF MEDICAL LABORATORY TECHNOLOGY INC. STATEMENT OF INCOME AND EXPENDITURE FOR THE YEAR ENDED 31 MARCH 1990

	1990 $	1989 $
INCOME FOR THE YEAR WAS DERIVED FROM:		
Conference surplus (as per statement)	14,045	8,960
Examination Surplus	6,578	1,481
Interest received	3,482	3,359
Miscellaneous income	3,916	5,965
Subscriptions and Levy	85,809	90,085
Refunds	8,834	2,400
Donations	1,300	1,200
TOTAL INCOME	123,964	113,450
FROM THIS INCOME THE FOLLOWING EXPENDITURE WAS MET:		
Accommodation, etc	6,855	10,414
Accountancy and audit fee	3,000	1,524
Computer services	7,206	9,176
Fees — C.S.U., IAMLT and NCCLS	2,787	2,455
Honoraria, gratuities and prizes	1,800	2,050
Journal cost (as per statement)	10,497	10,277
Legal Expenses	-	14,336
Post Graduate Education and Pacific Training	1,050	1,058
Postage and tolls	2,801	4,877
Printing, stationery and typing	2,565	2,203
Sundry expenses	9,216	1,049
Travelling expenses	12,540	19,328
	60,317	78,747
Consultancy Fees — Medical Laboratory Trust	-	(131)
Depreciation	1,151	877
TOTAL EXPENDITURE FOR YEAR	61,468	79,493
Excess of Income over Expenditure	62,496	33,957
Gift to NZ Medical Laboratory Trust (Note 5)	13,431	8,000
Surplus for the year	$49,065	$25,957

The attached notes form part of this statement.

NEW ZEALAND INSTITUTE OF MEDICAL LABORATORY TECHNOLOGY INC. STATEMENT OF FINANCIAL POSITION AS AT 31 MARCH 1990

	1990 $	1989 $
ACCUMULATED FUNDS		
Balance 1 April 1989	36,495	10,538
Surplus for the year	49,065	25,957
Balance at 31 March 1990	85,560	36,495
TOTAL FUNDS AS AT 31 MARCH 1990	$85,560	$36,495
Represented by:		
CURRENT ASSETS		
Cash at bank	92,486	20,268
Stock on hand (Note 3)	-	856
Sundry debtors	9,637	16,142
GST	-	3,408
TOTAL CURRENT ASSETS	102,123	40,674
LESS CURRENT LIABILITIES		
Sundry Creditors	23,125	20,994
Subscriptions in Advance	20,196	-
Examination Fees in Advance	1,403	3,841
TOTAL CURRENT LIABILITIES	44,724	24,835
NET CURRENT ASSETS (LIABILITIES)	57,399	15,839
INVESTMENTS (Note 2)	20,000	20,000
FIXED ASSETS (note 4)	8,161	656
Treasurer — D.M. Reilly President — W. Wilson	$85,560	$36,495

The attached notes form part of this statement.

NEW ZEALAND INSTITUTE OF MEDICAL LABORATORY TECHNOLOGY INC. JOURNAL ACCOUNT FOR THE YEAR ENDED 31 MARCH 1990

	1990 $	1989 $
INCOME FOR THE YEAR WAS DERIVED FROM:		
Advertising revenue	28,989	38,429
Subscriptions	1,762	1,041
TOTAL INCOME	30,751	39,470
FROM THIS INCOME THE FOLLOWING EXPENDITURE WAS MET:		
Printing — journal and newsletter	32,493	39,370
Postage and stationery	5,046	4,619
Sundry expenses	3,709	5,758
TOTAL EXPENDITURE	41,248	49,747
Which leaves an excess of expenditure over income transferred to the Statement of Income and Expenditure	$10,497	$10,277

NEW ZEALAND INSTITUTE OF MEDICAL LABORATORY TECHNOLOGY INC. NOTES TO THE 1990 FINANCIAL STATEMENTS

1. STATEMENT OF ACCOUNTING POLICIES

The historical cost basis of accounting has been used in the preparation of the financial statements. Reliance is placed on the fact that the Institute is a going concern. Accrual accounting is used to match expenses and revenues.

Particular accounting policies:

(a) Fixed assets and depreciation
Depreciation is calculated on a straight line basis to write off typewriters and computer over their estimated useful lives of 5 years.

(b) Stock is valued at actual cost.

There have been no changes in accounting policies. All policies have been applied on bases consistent with those used in previous years.

2. INVESTMENTS

Debenture Stock
General Finance ltd $20,000 @ 15.5% mature on 21/8/90.

3. STOCK

	1990 $	1989 $
Ties/badges etc		856

4. FIXED ASSETS

	Cost	Accumulated Depreciation	Net Book Value
Typewriters	4,385	4,385	
Computer Equipment	8,657	496	8,161
31 March 1990	$13,042	$4,881	$8,161
31 March 1989	$4,385	$3,729	$ 656

5. NZ MEDICAL LABORATORY SCIENCE TRUST

The Council of the NZ Institute of Medical Laboratory Technology Inc approved a donation of $13,431 from general funds.

AUDITORS' REPORT TO THE MEMBERS OF THE NEW ZEALAND INSTITUTE OF MEDICAL LABORATORY TECHNOLOGY INC.

We have audited the financial statements on pages 1 to 5 in accordance with accepted auditing standards and have carried out such procedures as we considered necessary.

In common with other organisations of a similar nature, control over income prior to its being recorded is limited, and there are no practical audit procedures to determine the effect of this limited control.

The institute has not provided a Statement of Cash Flows in accordance with Statement of Standard Accounting Practice No. 10 issued by New Zealand Society of Accountants.

Except for the ommission of a Statement of Cash Flows and the possible effect of the limited control over income referred to in the preceding paragraphs, in our opinion the financial statements give, using the historical cost method, a true and fair view of the financial position of the Institute as at 31 March 1990 and the results of its activities for the year ended on that date.

Deloitte Ross Tohmatsu
CHARTERED ACCOUNTANTS

MANUKAU CITY, NZ

A Seminar on

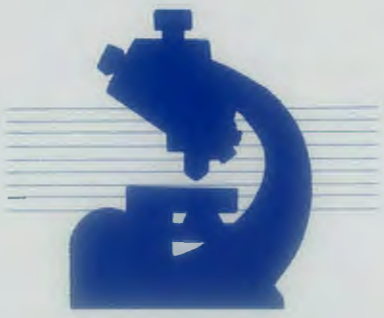
PAEDIATRIC ASPECTS OF CLINICAL BIOCHEMISTRY

Auckland Hospital

22nd Sept 1990

Organised by the

Biochemistry Special Interest Group



For the

New Zealand Institute of Medical Laboratory Technology (Inc.)

For Program Details
and Registration Forms
See Your
Charge Technologist

Ernest and Marion Davis
Post Graduate Medical Centre
Auckland Hospital

3RD SOUTH PACIFIC CONGRESS ON MEDICAL LABORATORY SCIENCE

Aotea Centre,
Auckland, New Zealand

AUGUST 26 - 30 1991, AUCKLAND, NEW ZEALAND

- Concurrent Fora
  - — Microbiology
  - — Biochemistry
  - — Haematology
  - — Immunohaematology
  - — Virology
  - — Histology
- Workshops
- General Forum
- Social Events

Speakers include Dr T. Gillis, (Microbiology), Dr G. Cooper (Biochemistry), Professor J. Stockigt (Endocrinology), Dr K. Bradstock (Haematology), Dr L. Petz (Immunohaematology), Professor R. Penny (Immunology), Professor D. Sutherland (Immunology), P. Bruhn (Education), Monica Cheeseborough.

If you attend only one Conference in 1991 this should be it.

Please place me on the mailing list

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Return to: **South Pacific Congress 1991.**
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AUCKLAND

Auckland, the largest city in New Zealand is unique despite being one of the most expansive metropolises in the world. Covering an area of around 500 square kilometres, it offers its residents an outdoor lifestyle that can only be envied. With its mild climate, a superb harbour dotted with many islands and comprised of secluded bays, and endowed with parks and reserves, the choice of recreational activities is limited only by the imagination.

With one coast bordering on the Pacific and the other on the Tasman Sea, it is no wonder Aucklanders are drawn to the outdoor life. Not only do they live on the edge of one of the most beautiful harbours in the world, but the city's suburban spread blends harmoniously into patchwork of rich, green fields and surrounding bush.

Thousands of Aucklanders own yachts or launches for cruising and racing on the calm, blue Waitemata Harbour. Only a day's sailing away are the quiet retreats offered by the bays and islands bordering on the Hauraki Gulf. With the many cruisers mingling among the weekend and weekday racers, it is easy to see why Auckland is called the 'City of Sails'.

The many lovely parks in and around Auckland add to the recreational opportunities of this city. Close to the commercial heart of the city is the Auckland Domain, a haven for nature lovers and office workers alike. Joggers, bush walkers, cricketers and strollers mix with visitors to the museum, which stands as a grand monument on a grassy knoll in the domain.

There is much to keep the visitor entertained after business has been completed. Theatres, music, art, history, are all there to be enjoyed. Other than cultural centres, general sightseeing will uncover many delights — the beautiful architecture of the old city buildings, the character and charm of the Parnell Village, the scenic beauty of the waterfront Tamaki Drive.

Across the harbour from the city centre lies another attraction not to be missed. Devonport looks out onto the harbour and the city. Charming and with a feeling of a holiday resort, Devonport is at the same time only a short ferry ride away from the commercial centre. Many Devonport residents who work in the city start and end each working day with a pleasurable ride on the ferry.

The excellent range of meeting venues available in Auckland will cater for any type and size of convention. Amidst the excellent shopping and colonial architecture of the central city are hotels of international repute and modern, well appointed offices. Smaller secluded lodges and resorts outside the city centre offer a more intimate alternative to the facilities available in large hotels.

After business has been completed there are a myriad of excellent restaurants offering gastronomical delights, both in the city's hotels and in many central and suburban locations. Auckland also has many types of bars and night clubs, with the old restored pubs in the inner city area offering a particular charming atmosphere in which to relax.

Aucklanders clearly enjoy an enviable lifestyle, with the latest in everything from shopping to services to facilities blending with endless sporting and recreational possibilities. The visitor to this cosmopolitan city can easily take advantage of what is on offer, no matter what one's taste.

THE AOTEA CENTRE AND AUCKLAND

Gareth Powell in the Travel and Leisure section of the **Sydney Morning Herald** says of the Aotea Centre.

''On the outside it is, in truth, not a thing of beauty and a joy forever. Inside it is undoubtedly one of the best conference centres in the world. I spend much time at conferences around the world. The Aotea Centre is as good as the RAI in Amsterdam which is the standard by which I have previously judged all others.''

and about Auckland

''One thing that has not changed is the friendliness of the people. You can most see this in the staff of the hotels and restaurants. I have not seen such warmth and eagerness to please in a very long time.''

''If you have not been to Auckland for a while you should revisit and experience the difference. If you have not been there you should plan on going. It is a most delightful, welcoming town. Friendly, intelligent, beautiful and welcoming.''

NZJ Med Lab Technol. 1990; **44** (3): 85-86.

Evaluation of the Ionetics Electrolyte Analyzer for Plasma Potassium Measurement in Whole Blood

Robert W L Siebers, FNZIMLT, MIBiol; Peter Bremner, MB ChB; Kate Woodman, BA; Carl D Burgess, MD, MRCP, FRACP; Richard Beasley, FRACP; Julian Crane, FRACP.

Department of Medicine, Wellington School of Medicine

Address for Correspondence: P.O. Box 7343 Wellington South, Wellington.

Abstract

Plasma potassium was compared by flame photometry analysis of plasma and by ion selective electrode on whole blood using the Ionetics™ electrolyte analyzer in a study of the effects of beta 2 adrenergic agonists in asthma patients. Correlation (r) for K^+ between flame photometry and Ion specific electrode was 0.959, y = 0.32 + **0.929 x** over a concentration range of 2.3 mmol/L to 4.6 mmol/L. Within-batch and between-batch precision was <3%. The Ionetics electrolyte analyzer produces rapid and accurate plasma K^+ results in whole blood without the need for sample preparation.

Introduction

Disturbance in potassium homeostasis can be life-threatening and therefore there is a need for rapid and accurate plasma potassium (K^+) determinations. Instruments have been developed which directly measure plasma K^+ in undiluted whole blood with the use of ion specific electrodes (ISE). ISE measure activities of free hydrated ions in plasma while flame photometry measures total ion concentration in diluted plasma. As K^+ can bind to protein and bicarbonate in plasma, differences in K^+ concentrations between ISE and flame photometry techniques could arise. In this study we report on the comparison of plasma K^+ concentration between flame photometry and ISE using a new low-cost ISE instrument (Ionetics 310 electrolyte analyzer) in a group of asthmatic patients in whom the effects of different bronchodilators on plasma K^+ were studied.

Keywords: Potassium, plasma, flame photometry, ion specific electrodes.

Methods

Subjects selected were 9 asthmatic (6F, 3M) who were given 0.5mg Ipratropium, 5mg Fenoterol or 5mg Salbutamol by nebuliser in a double-blind randomised cross-over study. An indwelling catheter was inserted in an anticubital vein and blood sampled for plasma K^+ at 15 min, 30 min and 60 min after nebulisation. The blood samples were split into two heparanised Vacutainer tubes of which one was immediately centrifuged at 3000 rpm and plasma separated for plasma K^+ analysis on a Radiometer FML3 flame photometer. The other heparanised blood sample was placed in a beaker of water for 3 min to allow the sample to reach room temperature. The whole blood sample was then analysed for plasma K^+ by placing the K^+ ISE of the Ionetics Electrolyte Analyzer in the sample and the K^+ read out from the display after 15 sec. The Ionetics electrolyte analyzer was standardised using the manufacturer's recommended procedure. Quality control sera with low and high K^+ concentrations were similarly analysed on a daily basis for between-batch precision analysis, and also on one day for within-batch precision. Statistical analysis was by analysis of variance (ANOVA) for group comparison and by least-square linear regression for correlation of results.

Results

Table 1 lists the within-batch and between-batch precision expressed as coefficient of variation (CV) obtained with the low K^+ and high K^+ quality control sera. The results obtained fall within the guidelines for desirable CV for plasma K^+ of 2.2% [1]. Table 2 lists the mean values obtained for plasma K^+ by flame photometry and ISE. The results by ISE were on average 0.1 mmol/L higher than by flame photometry, but the imprecision of one method over the other was not significantly different by the F statistic. Analysis of K^+ result differences between the two instruments demonstrated that 40 samples showed no difference, 64 samples showed a difference of ± 0.1 mmol/L, 36 samples of ± 0.2mmol/L and 10 samples of ± 0.3 mmol/L. Linear regression analysis, as shown graphically in Figure 1, returned a correlation coefficient (r) of 0.96, y = 0.3 + 0.93 x, n = 150, Syx = 0.125 indicating a minor negative proportional error and a minor positive constant error.

Table 1: *Within and between batch precision for plasma K^+*

	Within batch n = 20		Between Batch n = 20	
	Low	High	Low	High
$\bar{X}$ mmol/L	2.20	6.93	2.18	6.90
S.D. mmol/L	0.046	0.066	0.052	0.083
C.V. %	2.1	1.0	2.2	1.2

Table 2: *Plasma K^+ results (n =150)*

	Flame Photometry Radiometer	ISE Ionetics	Difference
$\bar{X}$	3.50	3.57	0.07
S.D.	0.45	0.44	0.13
Range of	2.3-4.4	2.5-4-5	-0.3-0.2

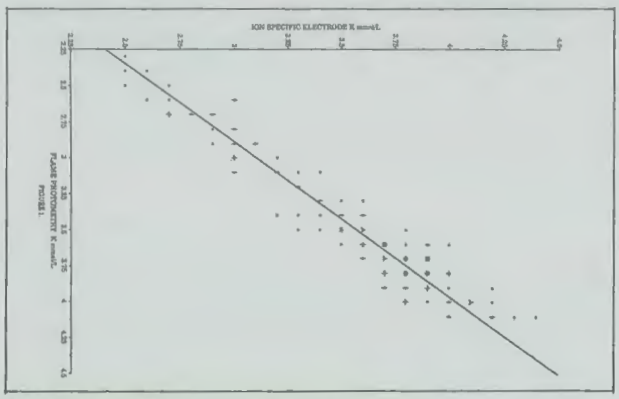

Figure 1: *Linear regression analysis*

Discussion

The Ionetics Electrolyte Analyzer was purchased in order to obtain rapid plasma K^+ results with minimal sample preparation and operator involvement. The instrument in our unit is primarily used for research into the effects of various beta 2 adrenergic agonists on plasma K^+ in asthma. We have previously demonstrated that there is a rapid and variable fall in plasma K^+ when using these agents [2], therefore it was

desirable to obtain rapid plasma K^+ results when studying asthmatic patients rather than the delay inherent with flame photometry analysis.

Ion specific electrodes measure free hydrated ions as compared to total ion concentrations by flame photometry. Various studies have demonstrated differences in results between the two techniques due to factors such as protein and lipid interference [3,4]. Our study has shown that reasonable comparable results are obtainable between ISE and flame photometry, but no samples were analysed which had abnormal protein or lipid concentrations.

By analysing whole blood, haemolysis, which increases plasma K^+, may not be apparent, unlike flame photometry analysis whereby the plasma is separated from the blood cells. In this study it occurred only once, but operators will have to be made aware of this potential problem when analysing whole blood for plasma K^+ by ISE.

Although K^+ differences ranged from -0.3mmol/L to +0.2mmol/L in our study, which is greater than previously reported [3], there are some fundamental differences in the manner in which our study was conducted. The plasma K^+ measurements by ISE in this study were performed by two of the investigators who have no training in medical laboratory techniques, while the flame photometry measurements were done by a medical laboratory technologist. No investigator was aware of the other's results until completion of the study.

This introduces the concept of double-blind comparison which minimises observer bias but may increase differences between the results, as demonstrated in this study. We would recommend the use of double-blind comparison in method and instrument comparison studies.

There has been concern lately about the proliferation of extra laboratory testing [5]. In our research unit the quality control, maintenance and training of the instrument is under the control of a medical laboratory technologist. The ISE analyzer is used predominantly for research in asthmatic subjects and not in patients who may have disturbances in plasma protein or lipids. The Ionetics Electrolyte Analyzer is a low-cost instrument which is very easy to use by non-laboratory personnel and gives rapid results which are comparable to flame photometry analysis.

Acknowledgements

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References

1. Fraser CG. Desirable performance characteristics for clinical chemistry tests. *Adv Clin Chem* 1983; **23**: 299-333.
2. Burgess CD, Flatt A, Siebers R, Crane J, Beasley R, Purdie G. A comparison of the extent and duration of hypokalaemia following three nebulised beta 2 adrenoceptor agonists. *Eur J Clin Pharmacol* 1989;**36**:415-48.
3. Burnett D, Ayers GJ, Rumjen SC, Woods TF. Sodium measurements in the presence of paraproteins by four direct ISE methods and flame photometry compared. *Ann Clin Biochm* 1988; **25**: 102-109.
4. Maas AHJ, Siggaard-Anderson O, Wellsberg HF, Zijlstra WG. Ion-selective electrodes for sodium and potassium: A new problem of what is measured and what should be reported. *Clin Chem* 1985; **31**: 482-485.
5. Farr AD. Laboratory tests: where should they be performed? *Med Lab Sci* 1984; **41**: 97-98.

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N.Z. Survey of Coagulation Assay Performance (SCAP)

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Abstract

The Auckland Regional Blood Centre Quality Assurance Department in conjunction with TELARC New Zealand has developed a regular quality control survey of coagulation assay performance (SCAP) to New Zealand laboratories. This paper reviews the results of 13 surveys carried out between November 1985 to March 1989. In general, the coagulation screening tests (PT and APTT) have demonstrated good correlation with results from the different Surveys in this review. While Factor I assays have been consistent, Factor VIII and Factor IX assays have higher Standard Deviations and % Coefficient Variations (CVs). Persistent poor performance has been demonstrated by some laboratories. Von Willebrand Factor Antigen assay similarly showed a high % CV and in general most laboratories were found to have high CV with abnormal plasmas.

Introduction

In September 1982, the Auckland Regional Blood Centre (ARBC) despatched the first regional coagulation quality control specimens under the abbreviated name of SCAP (Survey of Coagulation Assay Performance). In 1985, under the direction of the Testing Laboratory of the Registration Council of N.Z. (TELARC) the programme was expanded to a national Quality Control programme. This report reviews further experience with the SCAP programme, since the last review in 1985 [6].

Materials and Methods

Plasma Sample source for Surveys.

Plasma samples utilized were obtained from random volunteer blood donors, patients with congenital coagulation deficiencies or on anticoagulant therapy and from cryoprecipitate plasma supernatant.

Each unit of blood was collected with efficient mixing into a Tuta pack (No 20311-01) containing buffered Hepes citrate (pH7.1), (anticoagulant volume to blood, 1:9). The blood was double centrifuged at 4°C and the plasma separated. The plasma was then lyophilised in 1ml volumes and stored at -70°C. Cryoprecipitate plasma supernatant was specially treated in vitro to alter levels of Coagulation factors and then similarly prepared.

Plasma Sample Distribution

Participating laboratories each received four lyophilised normal or abnormal plasmas at approximately 3 monthly intervals. Each sample was required to be tested by the coagulation tests currently used at that laboratory. Duplicate samples were occasionally included to enable the repeatability of testing procedures to be reviewed. All of the 13 surveys circulated since November 1985, included one or more repeat specimens from a previous survey (Table 1). One normal plasma had been included in five different surveys; this plasma was a primary reference plasma.

Plasma Quality Control

The Quality Assurance Department at the ARBC quality controls the preparation of the samples, which are assayed against standards obtained from the World Health Organisation (WHO). The Laboratory also participates in International Quality Control Surveys issued by the United Kingdom Reference Laboratory for Anticoagulants and Controls (WHO Collaborating Centre) and in the Royal College of Pathologists of Australasia Haematology Quality Assurance programme (RCPA).

Table 1:

A Summary of Data and Number of Laboratories Participating in the SCAP Surveys.

SCAP NO.	DATE	NO. OF LABS	RETURNS	NORMAL	ABNORMAL
10	NOV 85	44	41		4
11	MAR 86	43	42	2	
12	JUN 86	45	41	1	
13	SEP 86	45	43	2	2
14	DEC 86	45	43	1	3
15	MAR 87	44	42	2	
16	JUN 87	44	44	1	4,1
17	SEP 87	41	41		
18	DEC 87	40	40		
19	MAR 88	40	37	2	
20	JUL 88	38	37		2
21	OCT 88	38	35	2	1
22	MAR 89	37	37		3

Methods utilised by participating laboratories

The following reagents were used by participants in the survey test procedures:

1 Prothrombin Time (PT)

- ARBC 1985-87 NZ Human Brain Standardised Thromboplastin
- ARBC NZ Rabbit Brain Standardised Thromboplastin
- ICP (Med Bio Enterprises) "Coagulon"
- Ortho (Johnson & Johnson) Brain Thromboplastin
- Behring (Hoechst) "Thromborel" Human Placental Thromboplastin.

2 Activiated Partial Thromboplastin Time (APTT)

Dade (Pacific Diagnostics) "Actin", "Actin FS" and "Actin FSL"

Ortho (Johnson & Johnson) "Thrombosil": & "Thrombofax"

General Diagnostics (Pharmaco) Auto, "Platelin" x 2

Behring (Hoechst) "Pathromtin" & "Neothromtin"

3 Factor I Assay

The majority of laboratories used the method of Van Clauss [1] or Ellis and Stransky [2].

4 Factor VIII Assay (VIII:C)

A variety of activators (Kaolin, Ellagic Acid and Activated Silica) and substrates (artificially depleted plasma, commercial haemophilic plasma and immuno-adsorbed plasma) were used.

5 Factor IX Assay

The activators Kaolin, Ellagic Acid and Activated silica were used with either the haemophilic (commercial or local) plasma or commercial immuno-adsorbed plasma.

6 von Willebrand Factor Antigen Assay (vWF:Ag)

Three methods were reported:

- Laurell Rocket Immunoelectrophoresis [3],
- Elisa,
- Radial immunodiffusion (RID), ("Partigen", Behring)

Data collection and Processing

The results received from the participating laboratories were collected and processed using custom designed in-house software from TELARC. Results were reported in the following format:

1 Laboratory result
2 Mean result
3 Standard Deviation (SD)
4 % Coefficient Variation (% CV)
5 Number of Standard Deviations from the mean
6 Histogram
7 Youden Diagram (omitted after SCAP 17)

Results

The results on the repeat specimens form the basis of this review. The small size of the test groups has made it necessary to group some tests which involve different reagents and/or techniques.

PT Standardised Thromboplastin

In 1987 Human Brain Thromboplastin ceased to be produced in NZ and was replaced by Rabbit Thromboplastin. (Figure 1).

Recent reports [4] have suggested that a rabbit brain reagent with a low International sensitivity index (ISI) gives an equal or greater assay precision than a human brain reagent. In the SCAP survey the mean Prothromin Ratio and/or INR using different thromboplastins on the normal plasmas had a mean %CV, usually less than 20% (Table 2).

The results on the abnormal plasmas (Table 2) showed higher %CV, generally less than 20% for Standardised Thromboplastin and slightly higher for other thromboplastins.

APTT

Various commercial reagents were being used for the APTT (Figure 2). The mean %CV of the results with normal plasmas usually were in the region of (or below) 10% (Tables 4-6). In general most laboratories reported a higher %CV with abnormal plasmas (Table 3), but the %CVs were below 20%.

Factor I Assay

60% of the participating laboratories performed Factor I assays. The %CV was below 20% with most plasmas. The results for the Factor I assays have been grouped for all test methods (Table 4).

Factor VIII Assay

Factor VIII assays were performed by about 40% of participating laboratories. Table 5 outlines the grouped results for all activators and substrates for the assay on two normal and one abnormal plasma samples. There was a wide variation in the results obtained in this assay with a high coefficient variation ranging up to 35%. However, after analysing all the data, 85% of the participating laboratories interpreted their results correctly.

Factor IX Assay

About 35% of the participating laboratories perform Factor IX assays. The % CV in the grouped Factor IX assays was generally high i.e. in the region of 20% (Table 6). As with the Factor VIII assay the interpretation of the results was good, with 88% of laboratories demonstrating a correct result.

von Willebrand Factor Assay

This assay is performed by only a limited number of laboratories (18%). The grouped data showed a somewhat

Table 2:
Prothrombin Time Using different Thromboplastin (TP) Expressed as Prothrombin Ratio (PR) or International Ratio (INR)

Survey & Sample Type	Mean	SD	%CV	Labs	Type and Brand of TP
Normal 1	PR				
12	1.13	0.08	7%	38	Standardised Human NZST
	1.04	0.04	4%	6	Other TP (Ortho, Dade, Behring)
14	1.15	0.07	6%	31	Standardised Human NZST
	1.03	0.07	7%	4	Other TP (Ortho, Dade, Behring)
	INR				
16	1.09	0.05	5%	16	Standardised Human NZST
	1.07	0.08	7%	8	Other TP (Ortho, Dade, Behring)
Normal 2	PR				
11	1.07	0.06	6%	37	Standardised Human NZST
	1.05	0.10	10%	6	Other TP (Ortho, Dade, Behring)
13	1.12	0.08	7%	38	Standardised Human NZST
	1.03	0.05	5%	5	Other TP (Ortho, Dade, Behring)
	INR				
15	1.12	0.08	7%	21	Standardised Human NZST
	1.08	0.08	7%	15	Standardised Rabbit NZST
	1.04	0.15	14%	5	Other TP (Ortho, Dade, Behring)
19	1.07	0.07	7%	16	Standardised Rabbit NZST
	1.11	0.07	6%	13	Standardised Rabbit Coagulon
	1.05	0.08	7%	5	Other TP (Ortho, Dade, Behring)
21	1.09	0.05	5%	18	Standardised Rabbit NZST
	1.10	0.04	4%	8	Standardised Rabbit Coagulon
	1.11	0.05	5%	6	Other TP (Ortho, Dade, Behring)
Abnormal 4	PR				
10	6.40	1.20	19%	35	Standardised Human NZST
10	2.90	0.60	21%	6	Other TP (Ortho, Dade, Behring)
16	3.20	1.00	31%	8	Other TP (Ortho, Dade, Behring)
	INR				
16	6.70	1.20	18%	16	Standardised Human NZST
	6.60	1.20	18%	21	Standardised Rabbit NZST
	5.70	1.40	25%	4	Other TP (Ortho, Dade, Behring)

P.T. Thromboplastin
Figure 1

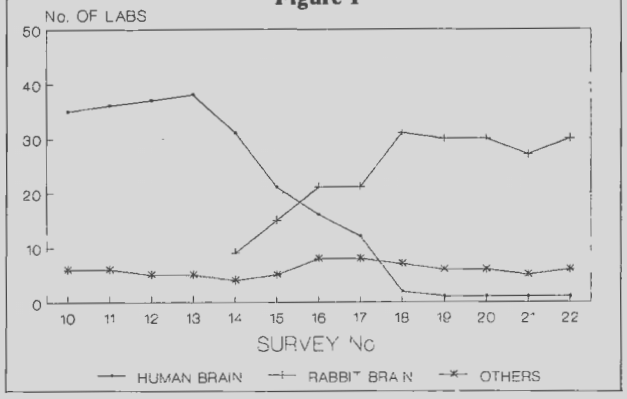

Table 3:
Partial Thromboplastin Time using different Reagents. Expressed as Ratio

Sample Type & Survey No.	Mean Ratio:	SD	%CV	No.of Labs:	Type of Reagent
Normal 1	1.07	0.02	2.0	8	Dade
12	1.12	0.06	4.9	19	Auto GD
	1.17	0.11	9.4	8	Behring
14	1.10	0.07	6.5	10	Dade
	1.10	0.07	6.7	21	Auto GD
	1.20	0.13	10.8	7	Behring
16	1.11	0.12	10.6	10	Dade
	1.08	0.12	11.1	21	Auto GD
	1.13	0.18	15.9	6	Behring
Normal 2					
11	1.14	0.09	8.2	13	Dade
	1.04	0.09	8.9	17	Auto GD
	1.12	0.17	15	6	Behring
13	1.10	0.06	5.5	10	Dade
	1.10	0.11	10.3	22	Auto GD
	1.20	0.14	11.6	6	Behring
15	1.05	0.05	4.3	8	Dade
	1.05	0.08	7.9	22	Auto GD
	1.20	0.14	12.1	5	Behring
19	1.10	0.11	10.5	9	Dade
	1.07	0.10	9.0	23	Auto GD
21	1.09	0.15	14.0	8	Dade
	1.02	0.05	5.0	20	Auto GD
Abnormal 1					
16	2.02	0.36	17.8	9	Dade
	2.45	0.34	13.8	22	Auto GD
21	2.05	0.21	10	8	Dade
	2.43	0.32	13	20	Auto GD

high %CV, ranging up to 30% on normal plasma (Table 7). The relatively low levels of von Willebrand's Factor in the abnormal plasma lead to a high %CV in comparison to normal plasma.

Discussion

It is widely recognised that biological assays such as coagulation tests have an error component in the region of ± 20%. It would seem that the PT, APTT and FI assay conform to this (i.e. ±2SD 20%) whereas the other factor assays are considerably higher than this (i.e. ±30 - 40%).

SCAP was established to provide a New Zealand-wide quality control programme for coagulation laboratories. The aim is to make available an external assessment of performance which should lead to an improvement in the overall standard of coagulation laboratory results. Cooper [5]

A.P.T.T. Reagent
Figure 2

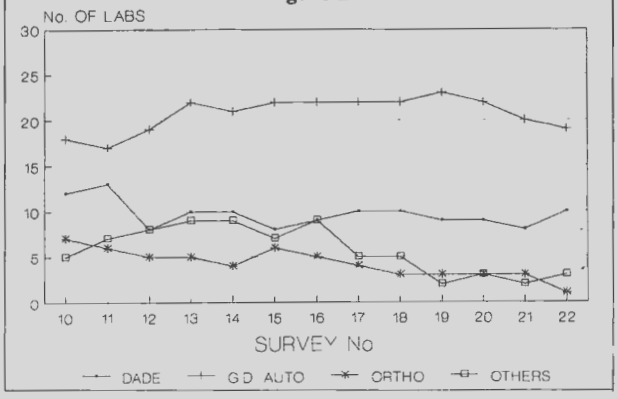

Table 4: *Factor I Assay*

SURVEY No.	MEAN	SD	%CV	No. OF LABS
Normal 1				
12	2.59	0.22	8.5	26
14	2.63	0.31	11.7	26
16	2.56	0.28	10.9	26
Normal 2				
11	2.46	0.38	15.4	23
13	2.53	0.32	12.6	26
15	2.46	0.36	14.5	27
19	2.46	0.37	12.5	27
21	2.44	0.30	12.0	23
Abnormal 1				
16	1.29	0.18	14.3	26
21	1.23	0.17	14.0	23

Table 5: *Factor VIII Assay*

SURVEY No.	MEAN U/L	SD	%CV	No. OF LABS
Normal 1				
12	857	182.9	21.3	18
14	840	185.1	22.0	15
16	840	215.1	25.6	19
Normal 2				
11	734	157.3	21.4	17
13	872	164.7	18.9	16
15	785	251	32	18
19	907	247.7	28	17
21	843	230	27	16
Abnormal 1				
13	75	12.1	16.1	16
20	99	27	27	14

has stated in regard to TELARC; "It is unlikely anyone would deny the benefits of participation in an appropriate and relevant interlaboratory comparison programme". Laboratories who do not participate can become technically isolated although such surveys can only be regarded as part of a total laboratory quality control programme that involves both internal as well as external checks.

Table 6:
Factor IX Assay

SURVEY No.	MEAN U/L	SD	%CV	No. OF LABS
Normal 1				
12	990	214.2	21.6	17
14	956	187.6	19.6	11
16	958	83.5	8.7	15
Normal 2				
11	914	178.6	19.5	13
13	1032	275	26.7	14
15	916	187.5	20.5	16
19	944	147	16	12
21	977	188	19	15
Abnormal 1				
16	63	18.8	30	15
21	88	61	69	15

Table 7:
Von Willebrand Factor Assay

SURVEY No.	MEAN U/L	SD	%CV	No. OF LABS
Normal 1				
12	1274	218.4	17.1	9
14	1102	203.1	18.4	7
16	1130	97	8.6	7
Normal 2				
11	1259	293.5	23	7
13	1272	161.1	12.7	7
15	1381	137	9	7
19	1092	360	33	7
21	1122	287	26	6
Abnormal 1				
14	166	75	45	6
22	221	125	57	5

The United Kingdom Reference Laboratory for Anticoagulant Reagents and Controls (World Health Organisation collaborating centre for quality assessment in blood coagulation testing) in Manchester acts as an external quality assurance laboratory for our department. By taking part in International surveys, acceptable levels of performance are maintained, essential for a laboratory carrying out National quality control programmes. In addition as there is close liaison with the National Institute for Biological Standards and Controls (NIBSC) in the United Kingdom, our laboratory contributes data to establish reference values for new World Health Organisation Standards. We also participate in the Australian College of Pathologists surveys.

Not all New Zealand laboratories take part in SCAP. Indeed the number of participating laboratories has decreased from 44 to 37 (Table 1) since the last review [6]. This may be partly because of the cost involved; this type of quality control survey is expensive, particularly if the survey is to be self-financing. It is only by extending the survey to more laboratories that the costs to each laboratory can be minimised. As participation is still at present voluntary, it is encouraging to see the number of laboratories involved, as this indicates a desire to maintain high standards.

The format of the analysis of data obtained in the survey has been altered on several occasions, in an attempt to more graphically and succinctly display relevant information. In general the analysis has followed the pattern of International surveys and although there are sometimes comments made on the complexity of the data, the information is as completely recorded as possible to enable those interested to obtain all relevant facts. It is important that laboratories not only read the summary but examine closely their own comparative results and then take action when anomalies are revealed. It is only in this way that the SCAP will be of practical use for coagulation laboratories.

Many laboratories have acknowledged that they have made improvements to their laboratory performance as a result of SCAP participation, particularly when controls or reagents have not met the specified recommendations.

This review has seen a number of procedural changes in techniques i.e. more laboratories are using semi-automated or automated techniques, also the range of thromboplastins and reagents used has narrowed. Also with the increasing awareness of laboratory workers towards the transmission of HIV there has been a definite trend to use artificial substrates for coagulation factor assays instead of haemophiliac substrate. What of the future? More suggestions and ideas of what participants require would be helpful.

Although the present format has met a need, it may be that a simpler type survey is required for some laboratories, and perhaps different types of specimens, or a review of presentation procedures. All proposals would be welcomed, as the object is to make SCAP a survey that is useful and practical and thus achieve our common aim of a high standard of quality assurance in coagulation laboratories.

Quality control is essential to all New Zealand laboratories and active participation in surveys can be both rewarding and reassuring. SCAP is still evolving in its role in monitoring coagulation performance but it does provide at present a comprehensive bench mark that should be enough to facilitate the detection of adverse trends in performance. Further development of SCAP will depend on both overseas trends as well as customer requirements.

Acknowledgements

Mr D. Tebbutt, TELARC
Mr G. Benny, Scientific Officer, and Dr D.G. Woodfield, Medical Director, Auckland Regional Blood Centre, for support and guidance.

The organisers would like to record their appreciation to all participants for their continued support, criticisms and feedback.

References

1. Clauss A, Gerinnungs physiologische Schnellmethode zun Bestimmung des Fibrinogens. *Acta Haemat* 1957;**17**: 237-246.
2. Ellis BC, Stransky A, A quick and accurate method for the Determination of Fibrinogen in Plasma. *J Lab Clin Med* 1961;**58**: 477-488.
3. Laurell CB, Quantitative Estimation of Proteins by Electrophoresis in Agarose Gel containing Antibodies. *Annal Biochem* 1966;**15**: 45-52.
4. Taberner DA, Poller L, Thomson JM, Darby KV. Effect of international sensitivity index (ISI) of thromboplastins on precision of international normalised ratios (INR). *J. Clin Pathol* 1989;**42**: 92-96.
5. Cooper KF, A report on the TELARC survey of QC Programme for Medical Laboratories.*NZJ Med Lab Technol.* 1987;**41**: No.3, 78-83.
6. Smith KF, SCAP — A Survey of coagulation Assay Performance.*NZJ Med Lab Technol.* 1985;**39** No.4, 152-154.

The Pacific Way

News from Fiji

Fiji Medical Laboratory Technologists Association

The 6th Annual Convention of the Fiji Medical Laboratory Technologists Association (F.M.L.T.A.) was held at Hoodless House, Fiji School of Medicine, Suva on 19th and 20th January 1990.

Mrs Salanieta Elborne, Chairperson of the Organising Committee welcomed the participants to the Convention which had as its theme "Laboratory Aspects of AIDS and Hepatitis". Mr Rajendra Singh said in the Presidential address, that the aim of the Association was to look after the interests of members but as F.M.L.T.A. was a small organisation with limited resources all members must sacrifice some of their own resources and time to keep the Association on its wheels. He thanked all members and office bearers of the Association for their support during the year and noted that this Convention was the only aspect of in-service training for members within Fiji.

List of Topics and Speakers

"National Initiative in AIDS Prevention and Control and AIDS Epidemiology" - Dr Salik Govind, Ministry of Health, Suva.

"Western Blot Techniques for Confirmation of AIDS"
Professor Fagbami, Senior Tutor, Fiji School of Medicine, Suva.

"Laboratory Aids in AIDS and Hepatitis"
Mr Alan Cocks, Boehringer Mannheim New Zealand Ltd, New Zealand

"Tests for Non-A Non-B Hepatitis"
Mr Glenn Chabot, Abbott Diagnostics, Australia.

"Blood and Blood Products in Relation to AIDS Transmission"
Mr Uraia Rabukatoka, Blood Bank, and Mr Rajendra Singh, Fiji School of Medicine, Suva.

"Hepatitis B Testing"
Mrs Sushil Shandil, Wellcome Virus Laboratory, Tamavua.

"Counselling for AIDS. The Role of Laboratory Technologists"
Mr M. Sainath, STD Clinic, Suva.

"Self Deferal for Donors"
Ms Jane Taylor, Secretary, Blood Bank, Suva.

"Why Test Urine"
Mr George Bongiovanni, Miles Laboratory, New Zealand.

"The Role of Technologists in HIV Prevention and Control. Laboratory Safety for AIDS and Hepatitis"
Mr Michael Lynch, W.H.O., Regional Office, Manila.

"The AIDS Patient and the Health Care Worker: A Delicate Relationship"
Dr M.A. Teresa K. Dololo, Clinicial Microbiologist, C.W.M. Hospital, Suva.

A panel discussion on laboratory aspects of aids was held at the end of this seminar.

List of Office Bearers 1989/90

President:	Rajendra Singh
Vice-Presidents:	Naibuka Nakabuniceva Vimal Chand Girdhari
Secretary:	Salanieta Elborne
Treasurer:	Parmod Kumar
Committee Members:	Vinod Lal Miliakere Nawaikula Sushil Nand Neel Kasyap Manorma Sash

Fiji Laboratory Workers want a Director

The Fiji Times of the 22nd January 1990 reported that Mr Rajendra Singh the President of the Fiji Medical Laboratory Technologists Association had stated that the Medical Laboratories urgently needed a Director of Laboratory Services, and that the whole system of medical laboratory education needs careful consideration. Experienced technicians had been filling vacant positions but had not been properly compensated or appreciated. Post-graduate training at the Fiji School of Medicine would soon be provided. He urged the Ministry of Health to improve working conditions of the medical laboratory technologists in Fiji. He stated that the continuing education provided by their two day Convention would help strengthen the function of the laboratory.

Address by Dr Govind

The co-ordinator of the National Advisory Committee on AIDS, Dr Salik Ram Govind stated that about 15,000 people have been tested for HIV since 1987. Most of the tests were carried out on blood donors who were generally healthy. Sexually Transmitted Disease (STD) patients were now being tested. Fiji has one full blown AIDS case and 4 HIV cases. The first case was reported to the World Health Organisation (WHO) in April 1989. At November 30th 1989, WHO figures showed that the Oceania Region which includes Australia, New Zealand and other South Pacific Island countries had more than 1,700 AIDS and HIV cases. At that date there were no AIDS victims in Vanuata, Tuvalu, the Solomon Islands, Samoa, the Mariana Islands, Kiribati and the Cook Islands.

Delegates at the 6th Annual Convention of the Fiji Medical Laboratory Technologists Association.

Three Million Dollar Programme to Fight Aids

The Fiji Times reported on 22nd January that a three million dollar, three year programme is being set up to fight AIDS in Fiji. Called the Medium Term Plan, it is financed by the World Health Organisation. Two AIDS experts from WHO Western Pacific Regional Office in Manila were in Suva to set up the provisional budget for the Programme.

Dr Govind said the Plan would include greater public education, rigorous on-going training for medical personnel aimed at preventing further spead of the disease as well as better care for the existing cases.

The four major objectives of the plan are:-

1. To prevent the further spread of HIV transmission.
2. To reduce the morbidity and mortality associated with HIV.
3. To reduce social and economic impact.
4. To stimulate research on social, epidemiological and clinical aspect of the disease.

When the Medium Term Plan is completed the National Advisory Committee on AIDS will be in a better position to know how many people are really affected with AIDS in Fiji.

NEW PRODUCTS AND SERVICES

HIAC/ROYCO INTRODUCES DYNACOUNT SENSOR SERIES FOR LIQUID BOURNE PARTICLE COUNTING

Hiac/Royco, Division of Pacific Scientific Company, has announced the release of the DynaCount Series of extinction sensors. From the leader in particle analysis, DynaCount Sensors incorporate laser diode technology and precision optics to provide 200:1 dynamic size range. The DynaCount Series includes the HRLD-400 and the HRLD-150 Sensors. The HRLD-400 size range is 2-400 μm with a concentration limit of 8,999/mL. Flow rates of 10-200 mL/min allow the user to adapt the sensor to a variety of applications. The HRLD-150 size range is 1-150 μm accompanied by a concentration limit of 12,000/mL and a flow rate range from 10 to 75 mL/min. DynaCount Sensors meet or exceed the USP788 and the NFPA resolution specifications. These sensors can be calibrated in accordance with ASTM F658 or the newly adopted NFPA T2.6R1 method. ACFTD suspended in MIL-5606 hydraulic oil is also available.

For further information contact: Wilton Instruments Division, P.O. Box 31-044, Lower Hutt, Phone (04) 697-099, Fax (04) 697-240.

NEW PLASTIC SACK TIPPED TO DISPOSE OF COMPETITION

The days of the paper trash bag are numbered. In the same way as plastics revolutionised the grocery Check-Out bag market in recent years, thin-walled plastic sacks look set to clean up the garbage disposal business.

And the same company that pioneered and still dominates the grocery bag market has just invested over two million dollars to manufacturer new products including a low-cost handle sack which will appeal to budget-conscious institutions and commercial users.

Auckland based Chequer Systems Ltd is NZ's largest extruder of high density polyethelene film (HDPE). It's new co-extrusion process enables the company to manufacture a tough, light weight plastic film using recycled raw materials. By running different types of resin, Chequer Systems have perfected a thin wall film with superior puncture resistence which is ideally suited for rubbish bags. Marketed simply as "The Sack", this new product has considerable advantage over traditional multi-layer paper rubbish bags, especially when in contact with water.

Used in conjunction with it's purpose-built holder, "The Sack" is claimed to have a 25% greater capacity than other refuse bags. It's built in handles enable the sack to be conveniently tied off and carried away for safe, hygienic disposal.

For further information contact: Paul Halford, Chequer Systems Ltd, P.O. Box 58-195, East Tamaki, Auckland. (09) 274-8079.

SYNCHRON EL-ISE™ OFFERS STAT INTERRUPT AND MENU EXPANDABILITY

Features of the SYNCHRON EL-ISE™ Electrolyte Analyzer from Beckman Instruments, Inc. make it suitable for almost any laboratory setting. As the primary electrolyte analyzer, the throughput at 100 samples per hour ensures rapid completion of the laboratory workload. In the pediatric hospital, the manual mode is a necessity when it is difficult to obtain sufficient sample volume. As a back-up instrument, the SYNCHRON EL-ISE can be thought of as a dedicated electrolyte analyzer with lithium and total calcium testing capabilities.

Specimens are placed in either 2mL or 0.5mL sample cups for automated high-volume testing on the 40-sample turntable; samples may also be analyzed singly using the instrument's manual mode. All sample types require a 50μL sample volume and throughput is optimized at 100 samples per hour. To improve laboratory safety by reducing sample handling, a primary sample tube (PST) accessory will be available next year.

The new 3-channel (Na, K, and Cl) and 4-channel (Na, K, Cl and Co_2) SYNCHRON EL-ISE is a stand-alone, primary routine electrolyte system or complement to a random access profiler. It analyzes a full array of laboratory samples including serum, plasma, urine, and cerebrospinal fluid. The Beckman electrolyte analyzer uses the indirect ion-selective electrodes for sodium, potassium, chloride, and CO_2 measurements and , next year, for total calcium and lithium measurements.

Labor-saving software with every SYNCHRON EL-ISE provides a patient sample identification number for each specimen; up to six operator-defined sample comments such as "lipemic" or "possible hepatitis"; storage and calculation of QC statistics for up to nine controls; preprogramming for up to six panels; a selection of two Anion Gap formulas; memory for storage and recall of up to 200 samples from 5 trays; LCD display; and an INTERLINK™ interface to other SYNCHRON clinical systems.

BECKMAN INTRODUCES NEW DIODE ARRAY SPECTROPHOTOMETER

Beckman Instruments introduced the new programmable DU® 7500 Diode Array Spectrophotometer at ANALYTICA 90. The instrument, which is one of two in the new DU® Series 7000, is designed for life science laboratories — research labs in universities, medical schools and pharmaceutical companies where scientists work with microvolume and ultramicrovolume samples as small as 5μL. Typical applications include the identification, quantification and characterization of enzymes, proteins and nucleic acids.

The DU 7000 Series features patented FSQ™ Full Spectrum Quantitation, which allows researchers to determine in concentration units the individual components in complex mixtures. Significant improvements in accuracy are achieved by using information from the entire spectrum.

With Full Spectrum Quantitation, the data are calculated using advanced Vector Quant mathematics, i.e. Fourier transforms in combination with p-matrix mathematics.

Two other features, the RediRead™ and RediScan™ modes, permit the researcher to take readings or wavelength scans in seconds even if another project is in progress at the time. Measurements in progress are held, the new readings or scan is set up automatically and, following a one-button prompt, the interrupted research is resumed.

Nucleic acid concentration reporting uses coefficients determined by Warburg and Christian, the ratio of reading at 260 and 280nm as well as other wavelengths of interest with background correction are requested. A general method is also included.

Protein analysis is simplified with preselected parameters for Bradford at 595nm, Lowry (high sensitivity at 750nm or low sensitivity at 500nm), Biuret at 540nm, and a Direct UV Method at 280nm.

Enzyme activity is determined by automatically calculating the rate in delta A per minute, and multiplying by any user selectable factor.

Kinetics analyses are run at single or multiple wavelengths. The results are displayed in Michaelis-Menten, Lineweaver-Burk, Eadie-Hofstee, Hanes-Woolf or Hill Plot formats, with determinations of Km, Vmax, kcat and the Hill Coefficient.

BECKMAN EXHIBITS AUTOSAMPLER FOR SYSTEM GOLD

Beckman Instruments introduces Model 507 of the new series of Beckman HPLC autosamplers for laboratories analysing large sample volumes on a daily basis. The autosamplers operate on-line as part of the company's System Gold™ Series of liquid chromatographs, or stand-alone as part of another chromatography system. The autosamplers permit precise yet versatile injection protocols, and significantly enhance HPLC automation.

When used on the System Gold network, the Beckman autosampler takes full advantage of such features as single-point control, distributed intelligence, and digital bidirectional communications. Sampling conditions can be programmed as part of the complete analytical method and stored on disk for recall as required. When analytical results are out of the expected range, the sample can be automatically reinjected and reanalysed.

Operating features include a four-quadrant, refrigerated sample holder with 96-vial capacity, and a separate vial for rinse liquid. Vial access is direct so that calibration vials need not be in sequence. Column temperature control is also available. Reproducibility is $< 0.5\%$ Relative Standard Deviation (RSD) in fixed loop, or $< 1.0\%$ RSD in partial loop injection.

Additionally, the 507 Autosampler module offers variable injection volumes from 1-999μL; pre-column reagent addition, mixing, and reaction; and column switching. The Model 507 allows a wide variety of separation method parameters to be tested and evaluated automatically; it is particularly well suited to method development applications.

For more routine HPLC needs, another autosampler module Model 502 features fixed-loop injection and optional column temperature control. Both models are offered for stand-alone operation. This configuration features an integral keypad control panel and can be used with other popular liquid chromatographs.

IRON TECHNOLOGY

Endless modifications and improvements in iron methadology have been made during the past half century. Sigma have selected the best analytic features and designed the Ferrozime Iron and Iron binding capacity test.

The Ferrozime technique uses small samples, has all popular analyser application and is time saving.

At Acid pH, ferrozime reacts with iron, forming a water soluble magenta complex. Colour is directly proportional to serum total iron concentration. Serum unsaturated iron binding capacity is determined at Alkaline pH, by adding iron and measuring the excess not taken up by transferrin. Marketed by Biolab Scientific, Private Bag, Northcote, Auckland.

A SHIELD AGAINST EXPOSURE

Becton Dickinson introduces their new range of "Vacutainers with "Hemogard". Designed to eliminate contact with blood on stopper the new Hemogard closure is a design breakthrough that protects laboratory staff. The rubber stopper seals the tube and is covered by a plastic shield that protects staff from contact with blood on the stopper or around the outer rim of the tube, as well.

Because the stopper is recessed and protected by a plastic shield, any drops of blood left by a blood collection needle remain far away from potential contact.

All standard Vacutainers are in the Hemogard range. Protection for New Zealand Laboratory Staff, Biolab Scientific, Private Bag, Northcote, Auckland.

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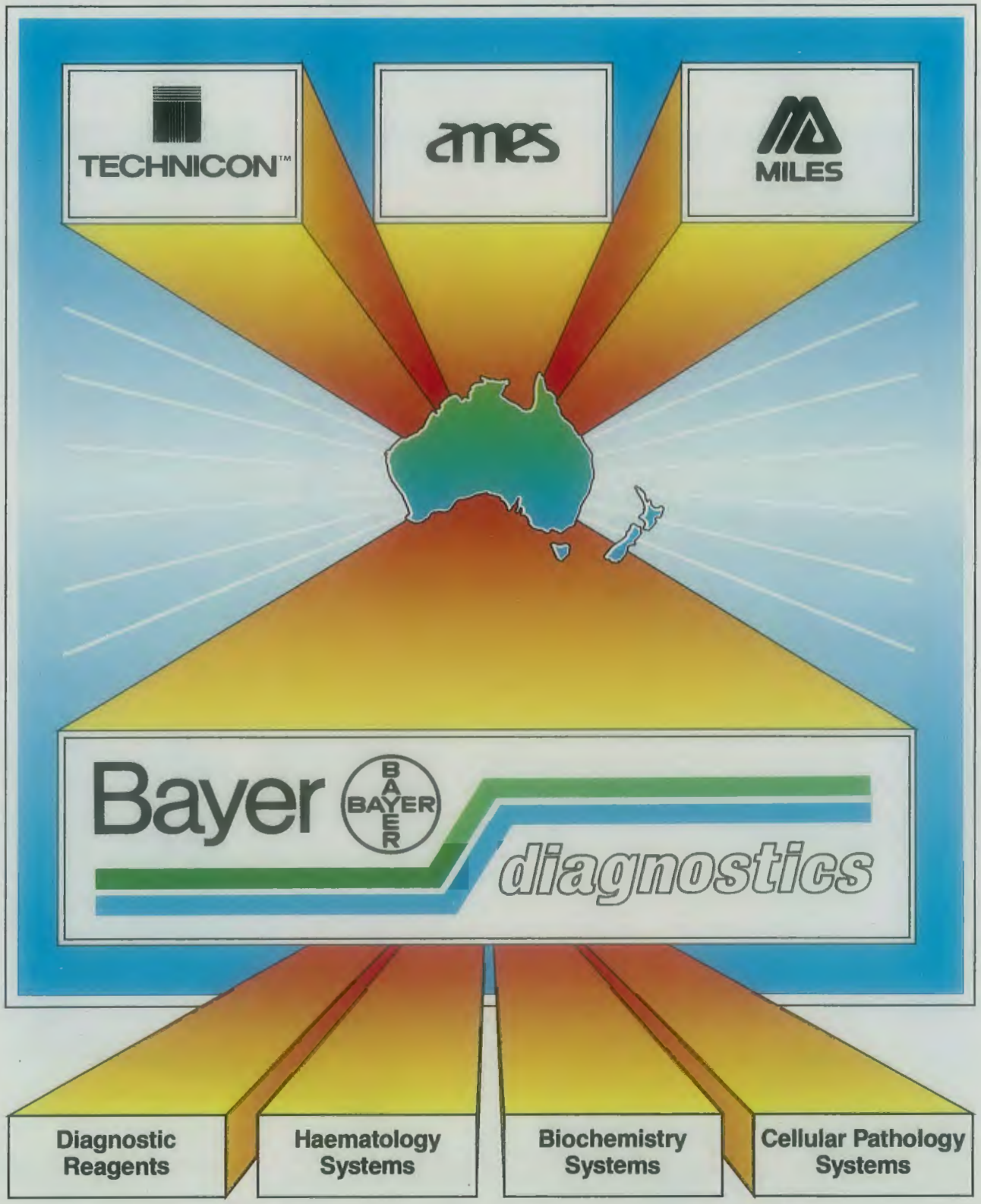

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