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New Zealand Journal of

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New Zealand Journal of

Medical Laboratory Science

Volume 53 Number 2
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* **Illustrations** must be provided with a suitable legend typed on a separate sheet. Graphs should be 2-3 times larger than they would appear in the journal and contain a minimum of lettering. Legends for these should also be typed on a separate sheet. Photographs should be original sharp, glossy black & white prints. Authors wishing to submit colour photographs must contact the Editor in the first instance.

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Two copies of the manuscript are to be addressed to the Editor NZ J Med Lab Science, c/- Department of Medicine, Wellington School of Medicine, PO Box 7343, Wellington South, together with a letter from the corresponding author stating that the work is original, is not under consideration for publication elsewhere, and in the case of multi-authorship that all authors have contributed directly to the planning, execution, analysis or to the writing of the paper. Additionally, author(s) are to state in writing that they have checked references cited in their article against the original or appropriate databases.

Trends, Technologies and Medical Laboratory Scientist

Ross Hewett, ANZIMLS
Roche Diagnostics NZ Ltd, Auckland

NZ J Med Lab Science 1999, 53(2):39-45

The trends and technologies that have shaped both Medical Laboratory Science and Medical Laboratory Scientists are as active now as they were in the time of Dr Thomas Henry Pullar.

Madam President, Councillors of the NZ Institute of Medical Laboratory Science, Ladies & Gentlemen. Fellow Medical Laboratory Scientists, I feel somewhat humbled and honoured to be asked to present the T.H. Pullar Memorial Address. It's also a timely reminder that some of us are getting older and are not quite the young bloods we thought we were.

When we started training in the very early 1970's we were on the threshold of a technical revolution. At Palmerston North Hospital Laboratory, as with most labs at that time, manual procedures were paramount and the skills learnt made us proficient technologists. It was there that I came across the name of Dr T.H. Pullar, the Pathologist at this lab from 1937 until he moved, due to failing health, to Tauranga in 1963. During my time at Palmerston North Hospital Dr Pullar's former residence not far from the Mortuary had become the House Surgeons' quarters and was the site for Friday night drinks. I must say that over the years as a trainee, Pullar Cottage was a significant part of my social life and many a happy time was had enjoying the company of fellow technologists and hospital employees both medical and paramedical.

Dr Pullar recognised the trends and technologies that were influencing his science in the 1950's and 60's and set about educating young people who developed into what we now call Medical Laboratory Scientists. Many presenters' of this address knew Dr. Pullar and were educated and examined by him. Many of my educators and mentors at Palmerston North Hospital Laboratory worked with Thos Pullar and were a product of that process. He passed away on 29th August 1966, a few days over 38 years ago, and it's to Dr Pullar's memory and his contribution to our science, this annual address is dedicated.

I would like to talk this morning about the influences in our profession. About the trends and the technologies that are causing the changes. And finally, the outcomes, what will all this mean to our science, what we can expect, and how, as a profession, we can prepare for it.

Technology is the practical application of science in everyday life. Whilst a Medical Laboratory is not exactly everyday life, a Medical Laboratory Scientist is still a product of technology. We use technology to perform our work, they are our tools and we train ourselves to be very good at using them.

I said earlier that in the early 1970's we were on the threshold of a technical revolution. Throughout my training we saw significant changes in technology. From a double-channelled auto-analyser to a 12 channelled system From test tube "make up your own reagents" biochemistry to "its all in a kitset". We saw new generation identification systems for pathogenic bacteria, quicker ways to do cross-matches and cell counters that made counting chambers redundant.

So what were the key technologies of influence.

The science of reagents and reaction, specificity and sensitivity has progressed markedly. Whereas before we had Folin & Wu glucose's, Kjeldahl proteins, Shale's & Shale's chlorides and Clark & Collop calcium's, it all now comes in a little plastic bottle with a bar-code on it that fits into a slot on an instrument. Techniques such as Enzyme Immunoassay and radioimmunoassay revolutionised hormone analysis and gave the clinicians valuable information about their patients. It's now chemiluminesence in forms that differentiates one manufacturer from another, depending on who owns the patent.

The development of analytical systems has had a tremendous effect, especially in the last 20-30 years. The first "instruments" such as simple colourimeters, photometers and electronic counters have now developed into complex auto-analyses for Clinical Chemistry, Haematology, Immunoassay and other disciplines. These tools lead the charge to complete automation including pre-analytical processing and post-analytical archiving.

Developing in parallel with analytical systems were computers. The process of calculation and digital output has grown tremendously since the first computer. The ENIAC (Electronic Numerical Integrator and Calculator) contained 18,000 vacuum tubes, 70,000 resistors, and 10,000 capacitors; weighted 30 tons; and performed 5,000 additions per second, and by today's standards a dinosaur. The development of Integrated circuit boards and microchip processing has seen smaller, faster and easier to use systems. We cannot do anything in the lab now without one; they stalk us, talk to us and demand attention with their bleeping screens and multiple colours. They are as important as an analyser and an essential part of everyday life. They are the communication tools to and from the Doctor, the nurse, and the patient. They make bar coding possible and reduce our human errors. As I said before, their development parallels that of the analytical systems in a convergence of technology on a clinical laboratory.

Consider these series of diagrams.(Fig 1 – Fig 4) Every time a specimen is taken, transported, processed, analysed and disposed of, a data trail follows it. And it has a legacy that must be retained - the results, and even years later, they may still be needed.

The technology of analysis has grown and developed. Analysers are now systems and are more complex in the way the input, analysis and output occurs. What was a special test only a few years ago, requiring a specialist scientist, is now automated and routine. All that special training gone no longer needed. Is the result better? Probably. Can an instrument really do better? Yes. Can an instrument really do better than a highly trained scientist? I'm afraid so. It certainly leads to some interesting debates and the conflict between technology versus people brings out more often subjective thoughts than objective reasoning.

The more significant technologies that will affect our profession in the next few years are present in clinical laboratories now and are evolving rapidly.

The science of Molecular Diagnostics using techniques such as PCR, LCR and Branched Chain Analysis will be revolutionary. Already

Normal Sample Workflow

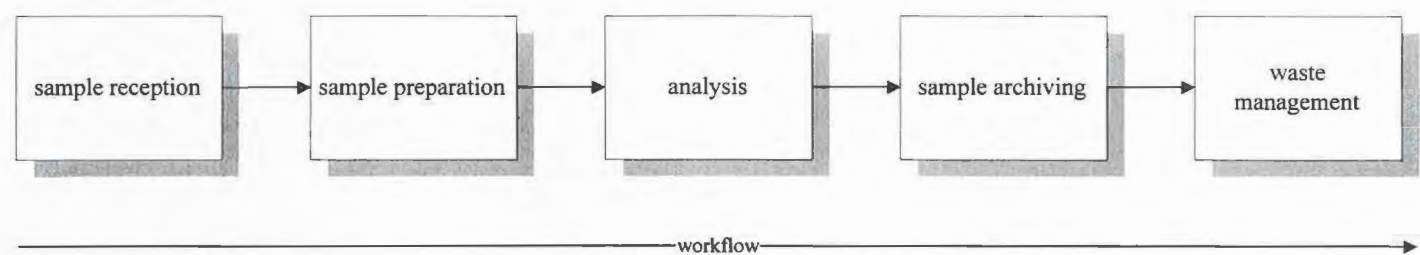

FIG 1

we can detect the DNA of a range of infectious diseases. The viral load can be measured to monitor therapy in HIV & Hepatitis and mutant gene detection for Factor V, Haemachromatosis & Cystic Fibrosis is routine. At this meeting a significant part of the program is devoted to Molecular Biology and is application to diagnosis. Complete automation of PCR and related technologies are but a few years away. The challenge for all levels of Laboratory worker from Technical assistants, to scientists, to pathologists is interpretation of results. Without standardisation, knowledge based validation or very specialist training, the results are meaningless and open to significant misinterpretation.

The development of near patient testing technologies such as Near Infrared scanning or bio-sensor technology is progressing rapidly. The need for non-invasive analysis in glucose monitoring is consumer driven and the demand from clinicians for quicker turn- around time increases. The range of products for point of care testing is exploding with even greater miniaturisation and micro-analysis. The development of in-vitro whole blood analysis is one step closer to in-vivo analysis. Significant progress is being made with reliability and ease of use of these products and the development of software to allow remote validation and monitoring of QA reduces the need for laboratory staff to perform the analysis.

The development of more complex immunoassay and the discovery and monitoring of new protein markers is an on-going process. New tests such as the Troponins, Homocysteine and the various proteins and cancer antigens are now becoming routine.

The parallel development of computers and analytical systems means that the needs of the lab can be satisfied from the massively huge to the handheld, all of which can be networked. Consolidated modular analysers performing a very broad range of tests on a single sample is creating labs without disciplinary walls.

A common anti-coagulant for Haematology and plasma analysis for biochemistry and immunoassay will facilitate this process even further.

Cell imaging and computer analysis will revolutionise haematology, cytology and other cell analysis. Initial systems are already developed and are under evaluation.

One of the unanswered questions is what comes first, the trend or the technology? Does the laboratory influence what product is developed or does the developed product influence the laboratory?

When a manufacturer decides to develop some product, it is usually based on market research, or imagination, or a gamble. There have been some spectacular failures in laboratory medicine and some real successes. I think the truth lies somewhere between, that there is very close co-operation between both supplier and user.

Sample and Data Workflow

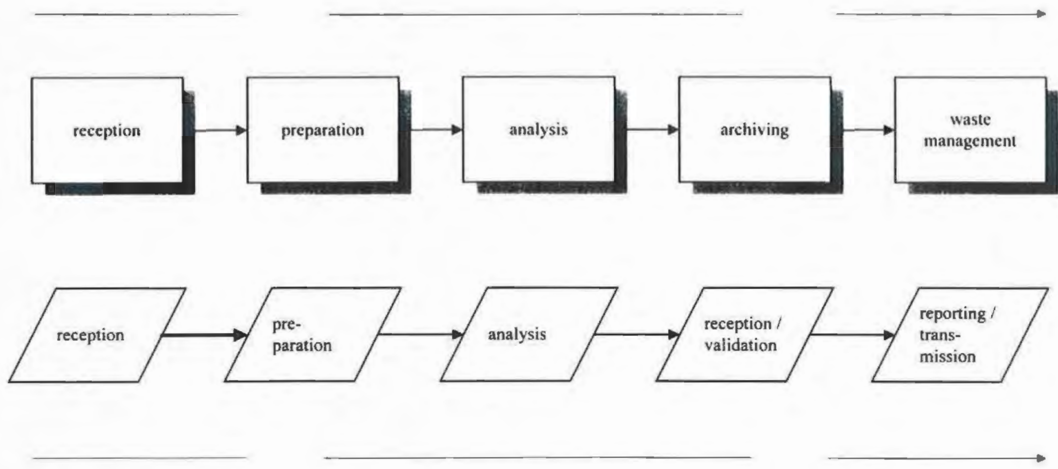

FIG 2

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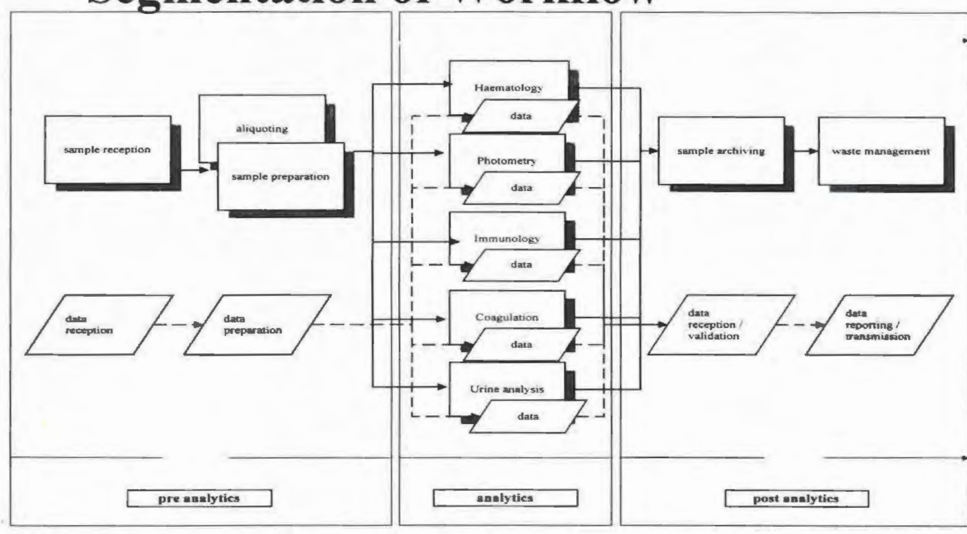


FIG 3

A trend is defined as a tendency, or direction, an inclination. What are the directions or trends of our science? The trends that have been identified in recent years have turned laboratory practice full circle since the days of Dr Pullar.

I mentioned before the laboratory without disciplinary walls. Core Lab concept is not new. Core labs existed in the 1950's and 60's and only technology created specialist areas or departments for Haematology, Clinical Chemistry, Microbiology, Blood Bank, Serology, Histology and the like. The Technology that created the departments has gone full circle. Technology is not being replaced by technology because it is newer or better. New technology should only be placed as part of the management of the workflow, so laboratory structure is no longer built around the technology but the sample. Because of this not only do Core labs exist, but Rapid Response labs, Hospital Point of Care, Physician Office Testing and Patient Self-Testing.

With smarter instruments and fiscal demands, the motivation for change has been created. Laboratory Managers wither medical, technical or otherwise have accountants and clinical support managers who are asking for efficiencies, greater productivity and rationalisation of testing procedures. Indeed the greatest influence on Laboratories in the last 5 years is fiscal management. This is a not local phenomenon, but a global reality (Fig 5).

Unfortunately the long-term benefits of better patient outcomes are currently not part of this equation, only short-term fiscal gains based on the length of the political term or the contract period of whoever the manager is this year.

The barrier to new assays such as PCR is not the technology, but often the cost or the lack of re-imbursement. The current funding strategy in New Zealand is based on cost containment and a switch to this or similar technology will reduce laboratory margins. Laboratories are already under severe pressure from GP's holding lab budgets with incentives to reduce lab tests and with non-inflation linked reimbursement levels. Funding authorities, with new or inexperienced managers, seek to rationalise the numbers of labs in New Zealand based on overseas projects and often give little or no consideration to local geography or to already low costs per capita. These and others are the trends that are having a major influence on our profession. These are the external pressures of change.

But what does this mean to the technologist, the laboratory scientist? It means a more stressful working environment and threats of redundancy. I'm sure the vision that Dr Pullar had in the 50's and 60's is not exactly what we have in the 90's. The role of the Medical Laboratory Scientist is indeed changing. The skills needed to pipette 50 or 200 ul of blood serum, use a Flame Photometer without blowing

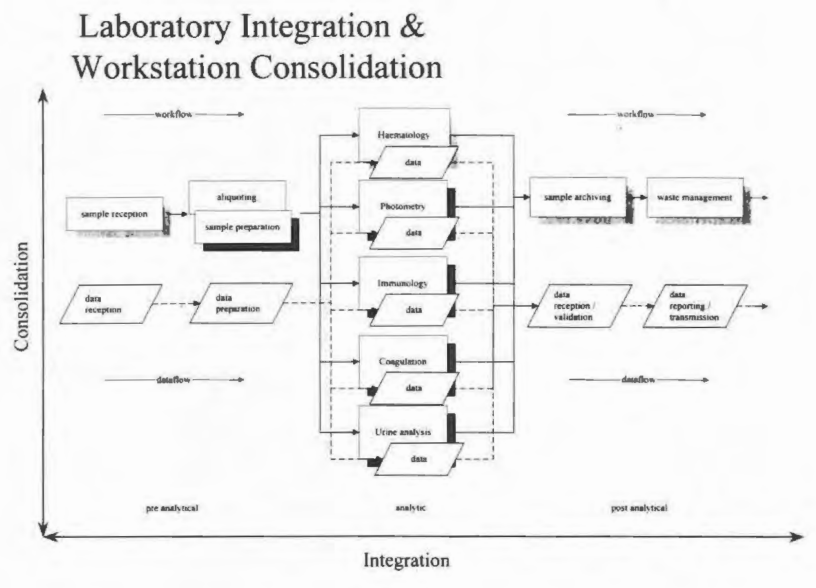


FIG 4

Economic Trends in Laboratory Medicine

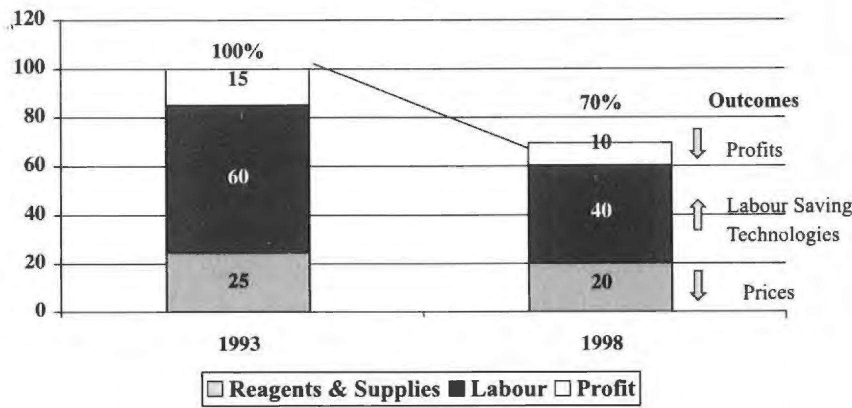


FIG 5

out the flame or to complete an Astrup blood gas are no longer essential. The management skills needed to run a lab are becoming the skills of the future, therefore ones technical skills are being replaced by ones management skills. The new Lab Scientist needs to understand workflow processing, manage the process of change and to make buying decisions based on long-term cost savings and greater productivity. The financial outcome of a particular technology will be just as important as the Technical assessment.

As yet I haven't talked about disease state management and will speak only briefly about. It is healthcare where the level of treatment a patient receives is evidence based. Early intervention of a condition may result in a better long-term outcome and significant cost savings. However the up front and often increased cost of early intervention does not currently fit the current funding strategies of short-term savings. Fortunately things may change and laboratories will benefit with increased work with more intense monitoring of conditions such as diabetes and dislipidaemias.

The industry that some of us now work for is also changing. Like laboratories the companies are consolidated as margins are reduced and the cost of R & D increases. In the last few year's significant acquisitions have occurred and that is the reality of a global market. The acquisition trail has not finished and less and less suppliers will be offering greater product ranges (Fig 6).

I would like to conclude with some key issues and actions that as a profession and in my opinion we can ensure our survival.

We must see these changes as opportunities to grow. To be flexible and embrace change. The changes will occur and what is past is past. We will be expected to be more productive, have less staff and a greater dependence on instrumentation.

Near patient testing is a reality and it will create new opportunities. Don't try and control it or it will be taken from you. Embrace it and manage it with the skills you have and new roles within our professional will open up, working along side fellow health professionals in a broader healthcare environment and outside the lab.

The trend towards Core Labs, Ready Response Labs and Professional Point of Care will happen (Fig 7 – 9). Manage and structure your labs based on sample flow. Not only the analytical part, but also pre-analysis and post analysis.

Be able to cope with continual change and to manage staff through it. Technical staff will be more multi-skilled and may rotate through a variety of lab types as described earlier with team leaders and flatter management structures.

The catch phase of the next few years will be work smarter, not harder. The management of change either for yourselves or your

Significant Acquisitions / Alliances IVD Industry.

1994	Johnson & Johnson	Kodak
1995	Behring	Syva
1996	Dade	DuPont
	Beckman	Hybritech
1997	Dade	Behring (Merger)
	Abbott	Alcyon
	Beckman	Sanofi
	Abbott	Toshiba (Alliance)
	Beckman	Coulter
	Roche	Boehringer Mannheim
	Bayer	OEM Jeol
1998	Abbott	Murex
	Roche/Boehringer	TOA / Sysmex (Alliance)
	Bayer	Chiron

FIG 6

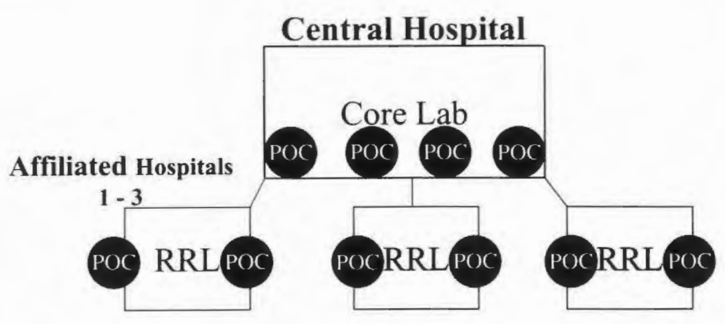
staff will be the key to your survival. There are effective ways of dealing with change.

The recognised steps are

1. Grieve for what you have lost and to recognise it.
2. Reflect on how you have dealt with change previously
3. Research all you can find about the change and how it will affect you.
4. Connect with others involved and talk about actions you can take.
5. Get involved and take on small projects.
6. Condition yourself and make continuous improvement your goal.

I've spoken today about technology, trends and scientists. We are the products of technologies and they are changing more rapidly than ever and therefore we must do also. How we manage these and the trends developing around us will determine our future. Our science is in our hands. Thank you.

Laboratory Structure in Hospital Structures

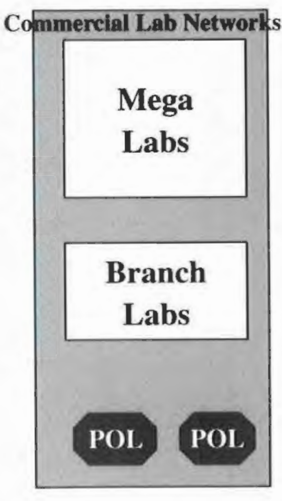


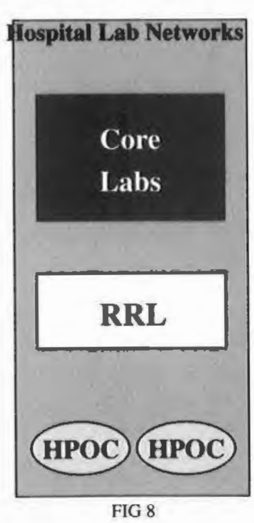
POC =Point of Care

RRL = Rapid Response Lab

FIG 7

Future Lab Structures





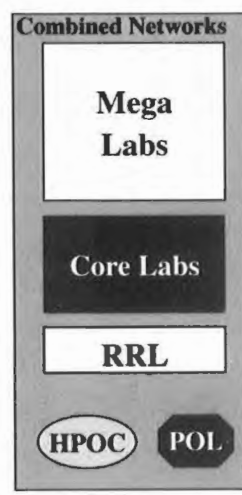


FIG 8

Future Hospital Testing Structures and Key Tasks - Not Just Complimentary But Linked and Compatible

Staffing

Medical Validation

Standardisation / Quality Assurance / Consistency of Results

Core / Reference Lab	Rapid Response Lab	POC Testing
•Broad spectrum of routine and special parameters. •New diagnostic parameters •Lab shared by several Hospitals •Response Time 1 - 24 hrs	•Basic profile / STAT (30) •For critical treatment. •RRL shared by several or all depts of a Hosp. •Response Time <60 mins	•Critical Care parameters (approx 20) •For immediate action •Dedicated to a dept or team •Response Time 1 - 10 mins

FIG 9

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Accuracy of References in the New Zealand Journal of Medical Laboratory Science

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Department of Medicine, Wellington School of Medicine, Wellington

NZ J Med Lab Science 1999, 53(2):46-48

Abstract

Objective. Previous studies have shown an alarmingly high error rate of references in articles published in biomedical journals. The objective of the study was to determine the error rate of references in articles published in the *New Zealand Journal of Medical Laboratory Science*.
Methods. The accuracy of all the references cited in published articles in the Journal for a period of one year (May 1998 to April 1999) was checked using the Medline database, and errors were recorded.
Results. Of 99 verifiable references, 43 references contained a total of 64 errors. Of these errors, 27 were found in the author's names, 12 in the article title, 11 in the journal title, 2 in the publication year, 3 in the volume number and 9 in the page numbers.
Conclusions. The error rate of references (43.4%) from the articles published during one year in the Journal is similar to other published studies, is unacceptably high, and is entirely preventable. Authors submitting articles to the Journal or other journals, should check references for accuracy using databases or ideally against the original article.

Keywords.

Accuracy, citations, Medline, references

Introduction

Most bio-medical peer-reviewed journals, including the *New Zealand Journal of Medical Laboratory Science* (the Journal), state that the accuracy of the references cited in submitted articles is the primary responsibility of the authors. Authors should verify all references against the original article that they should have read, rather than "lifting" references from other articles.

Previous studies have shown unacceptable high error rates of references in published articles in leading bio-medical journals.[1-7] These error rates ranged from 24% in medical journals[1] to as high as 67% in specialist journals.[5] Readers of published articles may want to read the articles that are referenced for many reasons, including, verification of information within the article, or furthering their knowledge by reading more about the topic. For this, accuracy of references is essential so that articles can readily and easily be retrieved through library services. The aim of this study was to determine the accuracy of references of the recently published articles in the Journal.

Methods

All the leading, review and original articles published during a 12-month period (May 1998 to April 1999) in the Journal were retrieved and studied. References to books or book chapters were excluded from the study. Each reference was carefully checked for accuracy using the Medline database. Errors were catagorised as belonging to the following six elements of a reference: (1) author(s), (2) article title, (3) journal title, (4) volume number, (5) year of publication, and (6) page numbers. If the cited reference differed from the Medline listing, the reference was then cross-checked using the CINAHL or ISI Citation Index databases, or against the original article.

Reference errors were classified as major if the following errors were detected: (1) misspelling of the author's name, (2) missing author's name, (3) wrong order of authors, (4) wrong journal title, (5) wrong publication year, (6) wrong volume number, or (7) wrong first page number. A major error is one that makes it almost impossible or difficult to retrieve the original article, or one that excludes any author of the article to be cited. Categories of minor errors were: (1) author's second initial missing, (2) incorrect abbreviation or spelling of the journal title, (3) incorrect spelling of article title, (4) part of article title missing, or (5) wrong or missing last page number.

Results

Excluding references to books, book chapters, or those references that were so old that they could not be retrieved, a total of 99 references was checked for accuracy. These originated from one leading article, two review articles, and seven original articles.

Of the 99 references, 43 references contained one or more errors for a total number of 64 errors. The error rate of references was 43.4%. Only two of the ten articles contained no errors in the cited references. Table 1 lists the error types, the number of errors in each element, while Table 2 gives an example of multiple errors in one cited reference.

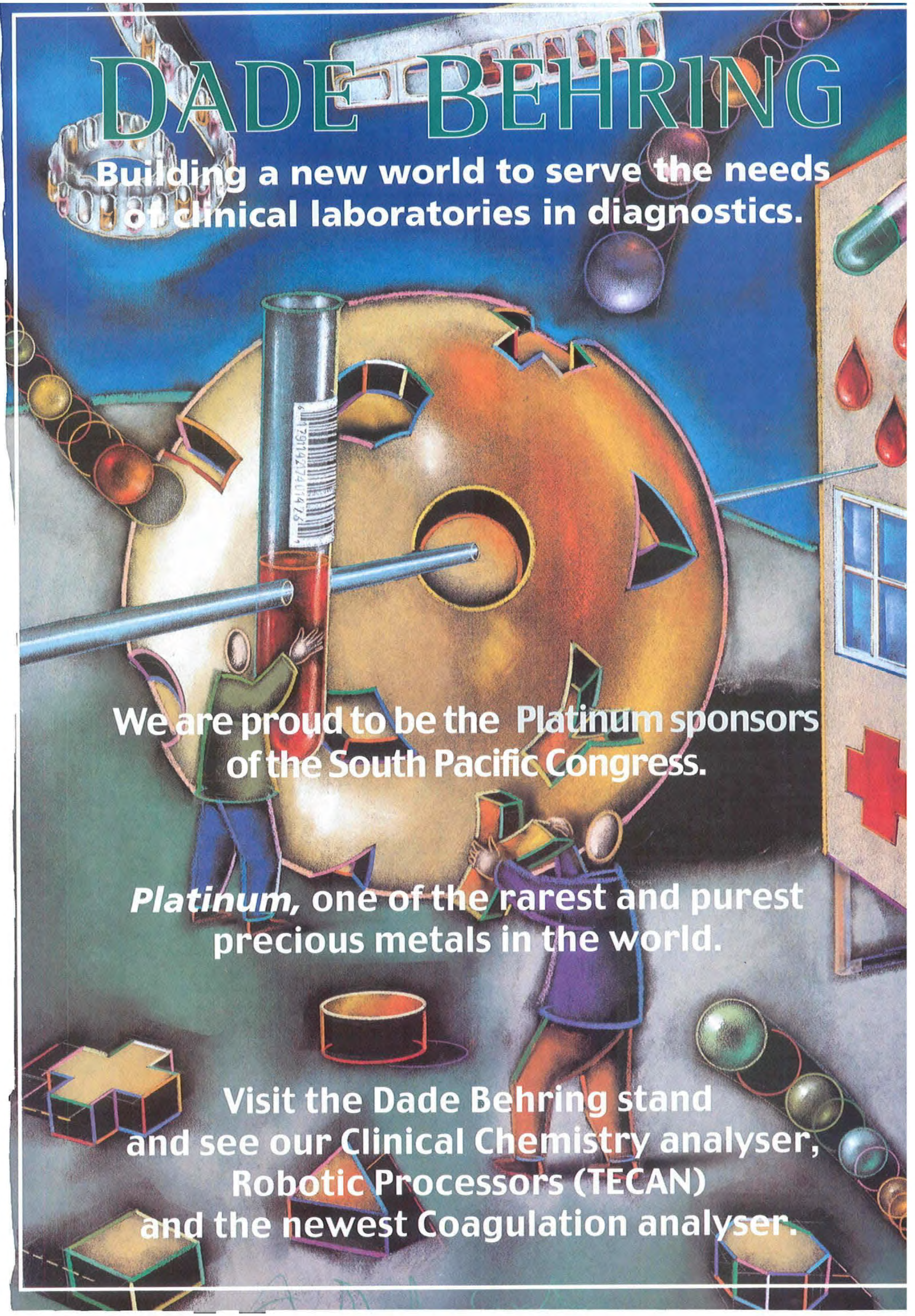
There were 27 major errors. Of these 18 were wrong spellings of or missing authors, two had totally wrong journal titles, two had the wrong publication year, and two had the wrong first page number. Of the 43 incorrect references, 27 contained one error, 11 contained two errors, 4 contained three errors, and 1 contained four errors.

Table 1. Reference errors

Reference element	Number of total errors	Number of major errors
Wrong author spelling	16	16
Missing author's name	2	2
Missing author's second initial	9	
Article title	12	
Journal title	11	2
Year of publication	2	2
Volume number	3	3
first or last page number	9	2
	64	27

Discussion

The main finding of this study was that a high rate of errors occurred in references from articles published in the Journal during a 12 month period. Of the 43 references containing errors, 27 references contained major errors. These major errors would make it quite difficult, if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not impossible, for the reader to retrieve the cited article for further reading. It also places time burdens on librarians if the reader requests a reprint through their library.

Table 2. Example of multiple errors in one reference

Quoted reference

Stephan F, Thioliere B, Verdy E, Tullies M. Role of haemophagocytic histiocytosis in the etiology of thrombocytopenia in patients with sepsis syndrome or septic shock. *Clin Infect Dis* 1997;98: 315-21.

Errors

1. Wrong volume number: should be 25, not 98.
2. Wrong page numbers: should be 1159-64, not 315-21.
3. Wrong author's spelling: should be Tulliez, not Tullies

Correct reference

Stephan F, Thioliere B, Verdy E, Tulliez M. Role of haemophagocytic histiocytosis in the etiology of thrombocytopenia in patients with sepsis syndrome or septic shock. *Clin Infect Dis* 1997; 25: 1159-64.

Authors of accepted articles normally pride themselves on the accuracy of their results and text, although a recent study has shown that even abstracts of published articles can contain significant errors.[8] Sloppiness in citing references reflects poorly on authors. When it occurs frequently in an article, as was evident in this study where 12 out of 16 references in one article contained one or more errors, one could wonder whether the article itself is creditable.

Misspelling of an author's name, or an author's name left out, is discourteous to the author of that article. It also means that the authors in question miss out on their article being cited in citation indexes, these indexes being a measure of importance of published articles by academic institutions.

Accuracy of cited references is the sole responsibility of authors. it is unrealistic to expect editors or editorial staff to check every reference for accuracy. Various suggestions have been made. They include a random selection of references to be checked by editors or referees, or including photocopies of title pages of cited references for editorial staff to verify the accuracy of the references.

What can we do to diminish, but better still, to eliminate reference errors in the Journal. As stated in the Journal, and other major biomedical journals, authors are responsible for accuracy of all references. It is this author's intention, as the editor of the Journal to request in writing a statement by authors of accepted articles that they have checked references cited in their article against the originals and/or appropriate databases, such as Medline. Hopefully, this will dramatically reduce, or preferably eliminate reference errors in the Journal. It is intended to monitor this policy and study future issues for accuracy of references.

References

1. De Lacey G, Record C, Wade J. How accurate are the quotations and references in medical journals? *Br Med J* 1985;291: 884-6.
2. Eichorn P, Yankauer A. Do authors check their references? A survey of accuracy of references in three public health journals. *Am J Public Health* 1987;77: 1011-2.
3. Goldberg R, Newton E, Cameron J, Jacobson R, Chan L, Bukata WR et al. Reference accuracy in the emergency medicine literature. *Ann Emerg Med* 1993;22: 1450-4
4. Kee WD, Roach VJ, Lau TK. How accurate are references in the Australian and New Zealand Journal of Surgery? *Aust NZ J Surg* 1997;67: 417-9.
5. Roach VJ, Lau TK, Kee WD. The quality of citations in major international obstetrics and gynecology journals. *Am J Obstet Gynecol* 1997,177: 973 -5.
6. McLellan MF, Case LD, Barnett MC. Trust, but verify. The accuracy of references in four anesthesia journals. *Anesthesiology* 1992;77: 185-8.
7. Evans JT, Nadjari HI, Burchell SA. Quotational and reference accuracy in surgical journals. A continuing peer review problem. *JAMA* 1990;263: 1353-4.
8. Pitkin RM, Branagan MA, Burmeister LF. Accuracy of data in abstracts of published research articles. *JAMA* 1999;281: 1110-1.

Author's note. All references in this article have been checked against the original articles.

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Burkholderia cepacia: A Review of an environmental Saprophyte as a Human Pathogen.

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Abstract

Burkholderia cepacia (formerly *Pseudomonas cepacia*), is a phytopathogen responsible for soft rot in onions. In 1992 the genus *Burkholderia* was proposed with *B. cepacia* as the type strain. Recent molecular investigations indicate multiple genomovars exist within the species, which will probably result in further taxonomic changes.

In the last quarter-century it has become increasingly known as an opportunistic pathogen in susceptible people, notably those with cystic fibrosis (CF) and those with chronic granulomatous disease (CGD). The organism's nutritional versatility and innate resistance to many antibiotics and disinfectants, has led to many reports of nosocomial infections and pseudo-outbreaks. Of CF patients that become colonised with *B. cepacia*, approximately 20% will develop a rapid decline in clinical status, known as '*cepacia*-syndrome', leading to septicaemia and death.

B. cepacia is a slow growing pathogen, often isolated with mucoid *Pseudomonas aeruginosa* and may escape detection unless appropriate isolation methods are followed. As the isolation of such an organism has wide ranging medical and social implications, a laboratory must be able to reliably and accurately identify and separate this organism from other similar non-fermenting gram-negative bacilli.

Key Words

Burkholderia cepacia, cystic fibrosis, identification, nosocomial, epidemiology, environment.

Introduction

"The development of multiresistance in major microbial pathogens is well recognised; in contrast, little attention has been paid to the pathogenic potential of naturally resistant environmental saprophytes."[1]

Burkholderia cepacia is an environmental gram-negative nonfermenting bacillus, which is intrinsically resistant to multiple antibiotics and has great nutritional adaptability. First described in 1950[2] as the phytopathogen responsible for soft rot in onions, it has undergone extensive nomenclature change and even now pose a challenge for taxonomists.

The organism's impressive nutritional adaptability and resistance has been one of the major reasons for its history of causing nosocomial infections. Its role as an opportunistic pathogen in cystic fibrosis (CF) patients was first noted in 1972[3], with the incidence rising dramatically by the mid-1980s[4]. In those colonised with *B. cepacia*, approximately 20% will go onto develop 'cepacia-syndrome', a rapidly fulminant fatal disease.[5,6] This serious condition has led to the implementation of stringent infection control measures, extending to the exclusion of colonised patients from CF community gatherings.

The isolation and identification of *B. cepacia* can be fraught with technical difficulties and therefore thorough laboratory procedures need to be followed. The microbiology result of a CF sputum has wide ranging medical and social implications.

Classification

Burkholderia cepacia was first described in 1950 by Burkholder[2] as the phytopathogen responsible for onion rot (Latin: *cepacia*=onion), and subsequently referred to as *Pseudomonas multivorans* (1966)[7] and *Pseudomonas kingii* (1970).[8] It was eventually designated the species *Pseudomonas* cepacia[9] in 1970 where it remained as part of the *Pseudomonas* RNA homology group II until 1992, when Yabuuchi et al[10] proposed that the seven species constituting this group be transferred to the new genus *Burkholderia* with *B. cepacia* as the type species (type strain ATCC 25416). The first two species of the genus being well recognised as human pathogens.

GENUS	SPECIES
Burkholderia	*cepacia*
	pseudomallei
	mallei
	gladioli
	carophylli
	*picketti**
	*solanacearum**

*transferred in 1995 to a new genus *Ralstonia*[11]
Later additions to the genus include *B. plantarii, B. glumae, B. vandii*[12], *B. cocovenenans*[13] and *B. vietnamiesis.*[14]

Even now, the classification of the species *B. cepacia* continues to be questioned. Organisms previously identified by conventional biochemical tests have been shown to consist of several distinct groups, or genomovars within the species by using whole cell protein profiles and DNA-DNA hybridisation assays.[15] While the majority of strains recovered from CF patients belong to genomovars II and III, most environmental isolates are genomovar I. The name *B. multivorans* has been proposed for genomovar II[15] and another group genomovar V, has been identified as *B. vietnamiensis*, a nitrogen-fixing species,[14]. Despite this, all *B. cepacia* genomovars have been identified among clinical CF isolates.[14]

This highlights the complex taxonomic heterogeneity in the identification of *B. cepacia*, and it has been suggested that the several distinct genomovars be referred to as *Burkholderia* "cepacia-complex".[16]

Clinical Features

B. cepacia has a special clinical importance in two groups of people; those who have a cystic fibrosis (CF) and those with chronic granulomatous disease (CGD). It is also a well-documented agent of nosocomial infections and pseudo-outbreaks, where the source is external contamination.

Cystic Fibrosis

CF is an autosomal recessive genetic disorder. The relatively large CF gene was identified in 1989, and codes for the cystic fibrosis transmembrane regulator (CFTR). The CFTR is involved in chloride ion secretion regulation. More than three hundred different mutations have been identified in the CF gene.[17] Generally considered a disease afflicting children, a third of CF sufferers are now adults, an increase from 8% in 1969 to 33% in 1990[18], reflecting the improvement in clinical management. The usual clinical syndrome includes chronic obstructive lung disease, characteristic microbiologic flora of sputum (i.e. *Staphylococcus aureus, Haemophilus influenzae* and mucoid *Pseudomonas aeruginosa*), and pancreatic exocrine insufficiency. The consequence of continual respiratory infections results in airway wall damage and ultimately destroyed or bronchiectatic airways. This accounts for most disease-related morbidity and mortality.[19] The goal of therapy is to reduce progressive lung damage by removing viscous/purulent airway secretions, controlling inflammatory response and by treating bacterial exacerbations with antibiotics. Recent progress in gene therapy with gene transfer of normal CFTR cDNA to airway cells offers in the future potential treatment at the molecular level. Currently, CF patients face the prospect of lung transplantation as their only means of long term survival. Single lung, double lung and heart-lung transplantations have all been used with success owing to the lungs retaining the physiological characteristics of the donor.[20]

As life expectancy has increased in CF patients due to better clinical management, *B. cepacia* has emerged as an important pathogen. In most cases it colonises patients who already have mucoid *P. aeruginosa* present. In those colonised with *B. cepacia*, approximately 20% suffer a rapid decline in pulmonary function and develop the "cepacia syndrome" _ a necrotizing fatal fulminant pneumonia or septicaemia[6], quite unlike that caused by *P. aeruginosa*.[5] The medical, social and psychological implications therefore are enormous. To prevent potential patient-to-patient spread, most CF centres segregate colonised patients and they are strongly discouraged against socialising with *cepacia*-free patients.

Chronic Granulomatous Disease

Chronic granulomatous disease (CGD) is a genetic defect in one of the several components of neutrophil oxidative killing of catalase positive organisms. This results in polymorphonuclear leucocytes failing to produce superoxide ions. Those with CGD usually die in childhood from chronic or recurrent infections.

CGD sufferers are especially susceptible to *B. cepacia* invasive infections as demonstrated in a recent study.[21] The authors also suggested that isolation of *B. cepacia* from an invasive infection in a non-CGD individual, may warrant investigation to rule out CGD as an underlying disease.

Nosocomial Infections

B. cepacia is a very nutritionally versatile organism, capable of degrading penicillin G as a sole source of carbon, multiplying and surviving in water and in some disinfectants including povidone-iodine, quaternary ammonium compounds and chlorhexidine.[22-25] Due to these abilities *B. cepacia* is a well-known agent of pseudo-outbreaks. Clinical infections attributed to receiving contaminated products and fluids include: pneumonia, pneumonitis, bacteraemia, urinary tract infections, conjunctivitis, septic arthritis, neonatal meningitis and endocarditis. This opportunism was demonstrated in a retrospective analysis of 70 episodes of *B. cepacia* bacteraemia in 52 patients during a 13 year period at the National Taiwan University.[26] 91% of the episodes were nosocomial and the overall case fatality rate was 11%. The common predisposing conditions were:

intravenous catheter	70%
stay in intensive care unit	61%
intubation	57%
invasive procedures, including urinary catheters	54%

In 41 episodes in which the focus of infection was identified, the respiratory tract was a common portal entry (41%), followed by intravenous catheters (27%).

Numerous other cases have been documented involving contaminated medical equipment and solutions.[27-30]

Virulence

Originally considered a pulmonary disease marker, *B. cepacia* is now recognised to be associated with a condition known as "*cepacia*-syndrome". This occurs in approximately 20% of colonised patients, including those with a previously mild disease.[5,6]

Pulmonary Colonisation

The elements that influence the colonisation by *B. cepacia* are unknown, but may involve various factors including adhesive ability and cell wall structures.[1] There has been speculation that some strains of *B. cepacia* responsible for epidemics may have an enhanced ability to colonise the lung. Adhesion to respiratory mucin is associated with fibres referred to as cable pili, with the gene responsible for cable pili designated *cbl*. this gene has been detected in the epidemic transatlantic Edinburgh/Toronto lineage strain (also known as ET12).[1] The adherence ability to mucin of this outbreak strain, has been shown to be more than six-fold greater than other strains.[31]

Once colonisation has occurred, some *B. cepacia* isolates from CF patients develop auxotrophic requirements for various amino acids which are found in the secretions of CF lungs.[32] It was demonstrated that 45% of CF isolates examined were auxotrophic, with all of the clinical non-CF and environmental isolates being prototrophic. The auxotrophic variants were genotypically related to the prototrophic strains found in the same patient. The authors suggest that the auxotrophic mutants are sub-populations selected from the prototrophic population, and are maintained by the nutritionally rich environment of the CF lung. This would indicate that *B. cepacia* has specifically adapted to the ecological niche provided by its host.

Clinical Response

The range of clinical response associated with colonisation by *B. cepacia* and the inability to predict clinical outcome for individuals are attributed to various factors. Explanations include: differences in strain virulence and transmissibility, the relatively low "strike rate" of cepacia-syndrome, the influence of co-colonisation by other pathogens and the age at which colonisation occurs, individual host immune response and the severity of underlying disease.[1]

Extensive studies have demonstrated *B. cepacia* is intrinsically resistant to the non-oxidative killing of polymorphonuclear leucocytes.[21] This would account for the incidence of *B. cepacia* in CGD patients, whose genetic inability to produce oxidative killing makes them vulnerable. Many CF patients are colonised by mucoid *Pseudomonas*, whose predominant exoproduct is alginate. Alginate has been shown to scavenge oxidative radicals *in vitro*, which might then allow subsequent infections with *B. cepacia* by cancelling the one neutrophil-mediated bactericidal mechanism (oxidative killing) to which *B. cepacia* is susceptible.[21] It was suggested that the organism is potentially more virulent than *P. aeruginosa* under the conditions where neutrophils fail to deliver reactive oxygen radicals to the infection site. Results from microbiological studies in transgenic CF mice showed that 70% of CF mice exposed to *B. cepacia* succumbed to more severe broncho-pulmonary infection than did control animals, indicating the virulence of this organism for these genetically susceptible mice.[33]

Environmental Issues

Known as a phytopathogen, its "resourcefulness" is demonstrated by the interest in *B. cepacia* as a potential agent for biological control, as it produces several antimicrobial agents that inhibit other bacterial and fungal phytopathogens.[34] It is also capable of degrading industrial wastes and herbicides, including soil decontamination by the chief ingredient in "agent orange" 2,4,5-trichlorophenoxyacetic acid (2,4,5-T), at a rate of up to 20,000 fold greater than other known degradation bacteria.[35]

Epidemiology

The increasing prevalence of *B. cepacia* infection, as well as several outbreaks has lead to on-going surveillance to identify transmission routes and risk factors. Isolate typing is an important component in verifying outbreaks and identifying sources or reservoirs. Data from the French Observatoire *B. cepacia* Study Group[36] showed that the mean age at which patients became colonised was 12 years, decreasing from 22 years for patients born before 1975 to 4 years of age for patients born after 1984. The spread of *B. cepacia* was noted with 72% of French centres being "*cepacia*-free" in 1993, decreasing to 58% in 1994. Many CF centres have introduced segregation policies and hygiene guidelines for colonised patients both within and outside the hospital environment, including exclusion from national CF conferences. Despite these measures of infection control, the prevalence of colonisation continues to increase.

Typing Methods

Typing systems need to be reliable, reproducible, demonstrate isolate relatedness and produce useful data. A direct comparison of typing methods was evaluated in 1989 to determine the ability of the typing systems to confirm isolate relatedness.[37] Ten typing methods were evaluated: chromosome analysis by restriction fragment-length polymorphis (RFLP), four serotyping systems, three different biotyping schemes, bacteriocin susceptibility and production, and antimicrobial susceptibility. Each method was challenged with 101 individual *B. cepacia* isolates, obtained from seven hospital outbreaks and unrelated diverse sources.

The most sensitive and specific typing method was chromosome analysis, either by the general categorisation of ribotype or by the more refined classification of subribotype. The only drawback to this technique is the specialised equipment and technical knowledge required. The differentiation systems of serotyping were sensitive and specific for non-CF and environmental isolates, but the typeability rates for CF isolates are significantly reduced.[38] Although serotype difference may not be as convincing evidence for strain dissimilarity than a ribotype difference, it may be of use in non-CF nosocomial investigations, and less sophisticated equipment and training are required. Two of the biotyping macromethods were less sensitive and specific, however, the test components are widely available and biotyping may be achieved in the average laboratory. The third biotyping method using profile numbers from the API Rapid NFT System was too variable to produce useful data. Bacteriocin susceptibility and production varied substantially among outbreak related strains and antimicrobial susceptibility by disk diffusion was extremely variable, and was not a suitable typing method.

Results of Epidemiological Studies

An extensive epidemiological study was carried out on 627 *B. cepacia* isolates (525 isolates from 255 CF patients, 44 isolates from 43 non-CF patients and 58 environmental isolates).[39] These were gathered from CF centres in Canada, the United States, the United Kingdom, France, and Australia, as well as many isolates from other clinical sources and from the environment. This large collection allowed a more global epidemiological viewpoint of *B. cepacia*.

A polymerase chain reaction (PCR) based randomly amplified polymorphic DNA (RAPD) method was chosen for this investigation to allow the large number of isolates to be studied. More importantly, it is reproducible and able to produce stable and discriminatory polymorphism. It was shown that RAPD group 2 was the most common CF isolate strain type (267 out of 525), and was recovered from multiple CF patients in the UK and Canada. Type 40 was an epidemic strain type, recovered from 17 CF patients in an Australian treatment centre. Non-CF and environment isolates were generally different from CF strain types with only 6, a total of 132 strain types found, recovered from more than one of these sources. This provided additional evidence that CF isolates are more commonly genetically distinct from other non-CF and environment strains, and that some CF centres may harbour one or more predominant strains of *B. cepacia*.

The Environmental Habitat

Natural Environment

There has been an increasing concern of the risk the environment poses as source of this pathogen to CF patients, as the prevalence of *B. cepacia* continues despite segregation measures. A common misconception is that *B. cepacia* is found widely in the environment, similar to the habitat of other pseudomonads. The distribution of *B. cepacia* was investigated in a large botanical complex.[40] This site provided an extensive range of soils, aquatic sites, and vegetation in a natural temperate climate, tropical, sub-tropical and arid microclimates within a greenhouse. *B. cepacia* was isolated from (21.8%) out of 55 samples and sites, the majority of these being in moist soil or soil rhizosphere. This suggests that these environments are natural habitats. When these environmental isolates were tested against a range of antibiotics, they in general showed greater sensitivity than did CF isolates. Furthermore, genomic analysis of DNA by pulsed field gel-electrophoresis (PFGE) following endonuclease digestion, demonstrated great genomic diversity with different profiles for all but one isolate, with none of them similar to clinical isolates examined.

Whether clinical and environmental organisms could represent two separate groups remains unanswered, but current evidence would indicate that the natural environment is not a major source for CF patients.[39,40]

In non-CF patients, environmental strains have been documented as the etiological agent of macerated hyperkeratotic foot lesions in troops training in swamps.[41]

The Hospital Environment and the Cystic Fibrosis Clinic

A common feature of reports of *B. cepacia* nosocomial outbreaks and pseudo-infections is the contamination of fluids, often in pharmacies, disinfectant solutions, tubing for irrigation and monitoring lines. In a survey of antiseptics and disinfectants used in a hospital for various purposes, e.g. irrigation fluid, soaked cotton balls and storage fluid, 22 out of 51 benzalkonium chloride and chlorhexidine gluconate samples showed microbial contamination.[24] The major contaminants were *B. cepacia, P. aeruginosa, Stenotrophomonas (Xanthamonas) maltophilia* and *P. fluorescens.* After improvements in the handling of the antiseptics and disinfectants, no microbiol contamination was observed.

Within the CF community there has been a concern that person-to-person transmission of *B. cepacia* could occur during clinic visits and social activities. In a recent review of the literature by Govan et al,[1] the authors presented an extensive list of evidence towards the occurrence of person-to-person transmission. this was well documented in a investigation in 1990 of three cystic fibrosis summer camps in the United States.[42] It was shown that 6.1% (11/181) of campers, had become positive for *B. cepacia* after the camps, compared to a control

group of non-campers with a 0% (0/92) incidence of sputum conversion.[42] Ribotyping of the isolates from all 11 campers with sputum conversion were identical or similar (1 to 2 band difference) to isolates of previously *B. cepacia*-infected co-campers. Similar findings have led to the cessation of such camps to prevent further cross-infections occurring.

In conclusion, the results of most epidemiological investigations support the stringent and socially unpopular segregation measures instituted by most CF centres.

Identification

General Description

The general characteristics of *B. cepacia* are : gram-negative, non-sporing bacillus; motile with multitrichous flagella; aerobic with a respiratory metabolism; grows well on nutrient agar with the optimal temperature for growth 25-35°C for 48 hours; oxidase positive, but the reaction may be weak; catalase positive; a yellow pigment enhanced on iron-containing media (e.g. TSI), and may produce various non-fluorescent pigments including an intense reddish-purple colour due to the formation of a non-diffusible phenazine; accumulates poly-β-hydroxybutyrate.[22] They are also intrinsically resistant to multiple antibiotics and resistant to the polymyxin group of antibiotics (polymyxin B and colistin).

Key characteristics[43]

- oxidase positive>90%
- lysine decarboxylase >90%
- multitrichous polar flagella
- utilisation of a wide variety of mono- and disaccharides, including lactose

Biochemical Identification

The use of a commercial kit system for the identification of *B. Cepacia* has to be viewed with caution as many systems have only evaluated a few *Burkholderia* species, and may not include "typically" environmental organisms in their databases. This results in reduced differentiation within the *Burkholderia* genus. Therefore, it is important that the laboratory is familiar with the database of the commercial kit or automated system employed, and compensates for any limitations with supplementary conventional tests.

A study was carried out on the accuracy of four commercial systems for the identification of *B. cepacia* and other gram-negative non-fermenting bacilli recovered from CF patients.[44] The systems evaluated were RapID NF Plus, API Rapid NFT, Vitek and Remel. The identifications produced by the commercial systems were compared with he results obtained by conventional biochemical reference methods. it was demonstrated that there was difficulty encountered in all systems in differentiating members of the *Burkholderia* genus, with he accuracy for identifying *B. cepacia* ranging from 43 to 86%. The authors suggest that the most accurate method for identifying members of *Burkholderia* would appear to be a range of conventional biochemical tests incubated for 7 days. It was recommended that any isolate from a CF patient identified by a commercial system as a *Burkholderia* species or an organism considered primarily environmental, should be confirmed with conventional biochemical methods.[44]

The mis-identification of other gram-negative non-fermenting bacilli can occur and has major clinical implications for the patient. The Pseudomonas Repository Laboratory (Vancouver, British Columbia, Canada) reported that of 819 isolates referred to them as as "*B. cepacia*" from CF clinics and research laboratories from five countries, 28 (3.4%) were not *B. cepacia*.[45]

This problem was well illustrated when a large experienced University Hospital Laboratory mis-identified *S. maltophilia* as *B. Cepacia*.[46] The errors were detected when 32 of their *B. cepacia* isolates were submitted for further study to the Pseudomonas Repository Laboratory. Of those 32 isolates, 3 (9%) were identified as *S. maltophilia*, and were from patients with no prior history of colonisation with *B. cepacia*. The original laboratory involved has extensive experience in identifying *B. cepacia*, and processed approximately 600 specimens from 95 adult CF patients per annum. All three *S. maltophilia* isolates grew as characteristic vivid pink colonies on *P. cepacia* agar, were polymyxin resistant and lysine decarboxylase positive. The identification errors occurred in the screening scheme the laboratory employed. The isolates were reported as oxidase positive at 3 minutes, which should have been interpreted as negative for the method used, and DNase negative at 24 hours. Retrospective testing by the laboratory showed that they were in fact DNase positive, but only after 72 hours, and complete biochemical testing confirmed the three isolates as *S. maltophilia*. The laboratory altered its testing scheme so that results of DNase were held 72 hours before interpretation, and oxidase tests were read within one minute of testing.

Burkholderia cepacia and B. gladioli

A more difficult problem that has been encountered has been the isolation of organisms possessing characteristics of both *B. cepacia* and *B. gladioli*.

Typical differentiating biochemical reactions [47]

	B. cepacia	*B. gladioli*
Oxidase	93	0
Lysine decarboxylase	92	0
lactose oxidation	99	0
Maltose oxidation	98	0
Sucrose oxidation	83	0

B. gladioli has been generally regarded as a phytopathogen, and when isolated clinically was considered a hindrance to the identification of *B. cepacia* rather than a pathogen in its own right. There has been gathering evidence to the contrary, with adverse clinical outcomes in some CF patients attributed to *B. gladioli*.[48,49] As an primarily environmental organism many identification systems do not include it in their databases.

In a outbreak in the United Kingdom during 1990-92, an epidemic multi-resistant strain was isolated which was identified at the 99.8% confidence level using the API 20NE system as *B. cepacia*.[50] This strain spread from Edinburgh to other regional CF centres through social contact, and was responsible for 6 out of 7 deaths during this period. The prevalence of this strain in Manchester rose from 36% in 1990 to 51% in 1992 amongst patients infected with *B. cepacia*. Investigations with biochemical tests and fatty acid analysis indicated that the strain possessed some characteristics atypical of *B. cepacia*, and exhibited a close resemblance to *B. gladioli*. A later study extended this investigation and included a wider range of clinical isolates.[48] Additional evidence was gathered for the presence of a highly resistant hybrid strain that possessed characteristics of both *B. cepacia* and *B. gladioli*, and it was suggested that this apparent intermediate group between the two species may form the basis of a new species.

This highlights the difficulties that can be encountered in identification, and underlines the importance of complete biochemical testing on initial isolates of *B. cepacia* with confirmation given by an experienced reference laboratory.

Molecular Identification

Identification of organisms at their molecular level is a powerful and accurate method, albeit expensive, as it avoids the problems inherent in phenotypic analysis. Gas-liquid chromatography of bacterial cellular

fatty acid methyl esters (FAME) has been widely used with results being analysed quantitatively to provide taxonomic data at the species level.[51] Not only can isolates be identified, epidemiological data which can differentiate strains can be obtained at the same time.

Another method is PCR-ribotyping, used extensively for epidemiological studies. By modifying this technique and using *B. cepacia*-specific primer, the simultaneous identification and typing can be achieved.[52] Unfortunately this technique remains in the domain of research and reference laboratories until a more commercial and economically viable method is developed.

Isolation Methods

Selective Media

The microbial flora of CF patients can have a characteristic heavy burden of bacteria, including mucoid *P. aeruginosa*. This can overwhelm some slower growing bacteria, which may be present in small numbers. Various selective and selective/differential media have been developed to increase the isolation of *B. cepacia* whilst inhibiting other flora present. Examples of such media are oxidation-fermentation polymyxin-bacitracin-lactose (OFPBL)[53], *B. cepacia* selective agar (BCSA)[45] and *P. cepacia* agar.[54] Media selective for *B. cepacia* should be incubated in ambient air at 30-35° C for up to 5 days.[55] Although these agars are highly selective, other organisms can grow and mimic colonies suggestive of *B. cepacia* so care is needed with the correct identification.[45]

Clinical Cystic Fibrosis Specimens

Sputum specimens from CF patients should be assessed for quality by gram stain (i.e. number of squamous epithelial cells), and poor quality specimens rejected.[55] Specimens are characteristically viscous and can have a high microbiological load, therefore should be liquefied and cultured both direct and diluted onto appropriate selective medium for routine pathogens and *B. cepacia*.

Environmental Specimens

A liquid enrichment medium (Malka broth) supplemented with polymyxin B (300U/mL) is recommended for environmental specimens.[40] Water samples of 100 mL can be filtered with a 0.2 μm millepore. Swabs are first inoculated directly onto selective agar, and then the filter and swabs are transferred to Malka broth and incubated in ambient air at 30°C for 5 days. The broth is then subcultured to selective media.

Molecular Diagnosis

Even with selective media to enhance the recovery of *B. cepacia*, occasionally this has failed to detect the organism during long term colonisation.[56] Therefore a more selective detection method is needed.

Researchers are investigating the area of diagnostic molecular techniques, to develop a more specific and sensitive method for the identification of *B. cepacia* in clinical specimens. A study published in 1995 supports the potential role of PCR technology in the detection of *B. cepacia* in clinical specimens.[57] using a *B. cepacia* 16 S rRNA sequence as the amplification target region with a 209-bp product, tha authors describe a sensitive and specific detection method that is fast and simple, and potentially applicable to patient samples. They demonstrated the method could detect the 209-bp amplified product in six different ribotypes of *B. cepacia*, with the minimum number of bacteria required for detection of 10^2 CFU. No detectable amplification occurred with any other bacterial species known to colonise CF patients and organisms of medical importance with DNA or rRNA homology with *B. cepacia*.

Three sputum samples from patients with chronic long-term colonisation with *B. cepacia* were tested by PCR and simultaneously cultured.[57] All three were positive by PCR, but only two cultures detected the organism. Subsequent sputum cultures from that patient were intermittently positive for *B. cepacia*. Their findings suggest that a larger study, which compares PCR with culture techniques, could elucidate the potential for applying the described PCR method for the detection of *B. cepacia* in CF sputum samples.

Antibiotics

B. cepacia is one of the most intrinsically resistant organisms encountered in the laboratory. It is typically resistant to the aminoglycosides, polymyxin, ticarcillin and imipenem with variable susceptibility to aztreonam, ciprofloxacin and tetracycline. The organism generally remains susceptible to trimethoprim-sulphamethoxazole, chloramphenicol, piperacilin, ceftazidime and meropenem.[22] Isolates from the environment and a non-CF patients tend to be more susceptible than CF isolates[40], with some CF strains being resistant to all known antimicrobial agents. This could be attributed to selective antibiotic pressure.

It has been shown that alterations in the lipopolysaccharide (LPS) of *P. aeruginosa* confers wide ranging antibiotic resistance.[58,59] It has been suggested that a similar mechanism might also enhance the resistance of *B. cepacia*.[50] In an investigation of a highly resistant epidemic strain from Edinburgh and Manchester (UK), all isolates produced rough LPS by sodium dodecyl sulphate polyacrylamide gel electrophoresis (SDS-PAGE) analysis. In contrast, the relatively sensitive reference strains possessed predominantly smooth LPS, and the more sensitive environmental isolates all possessed smooth LPS.[40,50] Additional evidence has been the demonstration that alterations in LPS and major outer membrane proteins (OMP) have been associated with resistance to chloramphenicol and trimethoprim/sulphamethoxazole.[60] Resistance to β-lactams are associated with changes in the OMP, and inducible β-lactamases are encoded by chromosomal genes.[22] Cross-resistance between antibiotics of different classes can occur with *B. cepacia*.[60]

Recent investigations into the use of non-antibiotic drugs in combination with previously ineffective antibiotics, offer potential new avenues for the treatment of *B. cepacia*.[61] It was shown that theobromine, theophylline, trifluoperazine, fluophenzine and coumarin-152 significantly reduced the MICs of gentamicin and ceftazidime, with the first two also reducing the MICs of amikacin and azithromycin.

Antimicrobial Susceptibility Testing

Up until recently there have been no National Committee for Clinical laboratory Standards (NCCLS) interpretive criteria available for non-fastidious glucose non-fermenting gram-negative bacillli. NCCLS published in January 1998, the Performance Standards of Antimicrobial Susceptibility Testing; Eight Informational Supplement, M100-S8 Volume 18 Number 1. This document provides guidelines for susceptibility testing for such organisms. NCCLS recommends that non-Enterobacteriaceae other than *Pseudomonas* and *Acinetobacter* species should be tested by the dilution method.[67]

Testing conditions:

Medium: Broth dilution: cation-adjusted Mueller Hinton broth (CAMHB0
Agar dilution: Mueller Hinton agar (MHA)
Incubation: 35°C ambient air, 16-20 hours

The use of automated susceptibility testing systems is not recommended because the organisms slow growth may lead to major errors in false susceptibility.[55]

Interesting and unexplained variability in antibiotic susceptibility patterns has been described.[1,31,63] Pitt et al[31] reported an epidemic strain that appeared homogeneous in total genomic profile, but was markedly variable in antibiotic susceptibility. They demonstrated up to a 7-fold increase in MIC in some antibiotics for serial isolates from the same patient. This phenomenon may be associated with the observation that migration of insertion sequences within the *B. cepacia* genome, can affect the expression of genes that modulate antibiotic resistance[63], resulting in variable antibiograms.

Conclusion

As *Burkholderia cepacia* moves from being an environmental phytopathogen to a clinical isolate – whether through nosocomial opportunism or as a pathogen in susceptible patients – it will be encountered in most laboratories. This review on *B. cepacia* as a human pathogen identifies problems that may be encountered, and highlights areas that would benefit further investigation. The classification of genomovars within the species will undoubtedly require additional clarification, perhaps resulting in further taxonomic changes. A greater understanding of the organism's virulence mechanisms could lead to new therapeutic avenues in CF patients, and possibly reduce the incidence of 'cepacia-syndrome'. Until a more sensitive and specific diagnostic technique is commercially available, it is the responsibility of the Microbiology laboratory to have thorough and systematic identification procedures, with referral to an experience reference laboratory for confirmation of isolates.

References

1. Govan JRW, Hughes JE, Vandamme P. *Burkholderia cepacia*: medical, taxonomic and ecological issues. *J Med Microbiol* 1996; 45: 395-407.
2. Burkholder WH. Sour skin, a bacterial rot of onion bulbs. *Phytopathology* 1950; 40: 115-7.
3. Ederer GM, Matsen JM. Colonization and infection with *Pseudomonas cepacia*. *J Infect Dis* 1972; 125: 613-8
4. Sanford JP. Pseudomonas species (including Meliodosis and Glanders). In: Mandel GL, Bennett JE, Dolin R, Eds. Mandell, Douglas and Bennett's Principles and Practice of infectious Diseases, Vol 2, 4th ed. Edinburgh, UK: Churchill Livingstone Inc.
5. Tablan OC, Chorba TL, Schidlow DV, White JW, Hardy KA, Gilligan PH, et al. *Pseudomonas cepacia* colonization in patients with cystic fibrosis: risk factors and clinical outcome. *J Pediatr* 1985; 107: 382-7.
6. Isles A, Macluskey I, Corey M, Gold R, Prober C, Fleming P et al. *Pseudomonas cepacia* infection in cystic fibrosis: an emerging problem. *J Pediatr* 1984; 104: 206-10.
7. Stanier RY, Patteroni NJ, Doudoroff M. The aerobic pseudomonads: a taxonomic study. *J Gen Microbiol* 1966; 43: 159-271.
8. Jonsson V. Proposal for a new species *Pseudomonas kingii*. *Int J Syst Bacteriol* 1970; 20: 255-7.
9. Ballard RW, Palleroni NJ, Doudoroff M, Stanier RY, Mandel M. Taxonomy of the aerobic pseudomonads: *Pseudomonas cepacia, P. marginata, P. allicola, P. carophylli*. *J Gen Microbiol* 1970; 60: 199-214.
10. Yabuuchi E, Kosako Y, Oyaizu H et al. Proposal of *Burkholderia* gen nov. and transfer of seven species of the genus *Pseudomonas* homology group II to the new genus with the type species *Burkholderia cepacia* (Palleroni and Holmes 1981) comb. nov. *Microbiol Immunol* 1992; 36: 1251-75.
11. Yabuuchi E, Kosako Y, Yano I, Hotta H, Nishiuchi Y. Transfer of two *Burkholderia* and an *Alcaligenes* species to *Ralstonia* gen. nov.: Proposal of *Ralstonia picketti* (Ralston, Palleroni and Doudoroff 1973) comb. nov., *Ralstonia solanacearum* (Smith 1896) comb. nov. and *Ralstonia eutropha* (Davis 1969) comb. nov. *Microbiol & Immunol* 1995; 39: 897-904.
12. Urakami T, Ito-Yoshida C, Araki H, Kijima T, Suzuki K-I, Komagata K. Transfer of *Pseudomonas plantarii* and *Pseudomonas glumae* to *Burkholderia* as *Burkholderia* spp. and description of *Burkholderia vandii* sp. nov. *Int J Syst Bacteriol* 1994; 44: 235-45.
13. Zhao NX, Qu CF, Wang ET, Chen WX. Phylogenetic evidence for the transfer of *Pseudomonas cocovenenans* (vanDamme et al 1960) to the genus *Burkholderia* as *Burkholderia cocovenenans* (vanDamme et al 1960) comb. nov. *Int J Syst Bactyeriol* 1995; 45: 600-3.
14. Gillis M, Van T, Bardin R et al. Polyphasic taxonomy in the genus *Burkholderia* leading to an emended description of the genus and proposition of *Burkholderia vietnamiensis* sp. nov. for N_2-fixing isolates from rice in Vietnam. *Int J Syst Bacteriol* 1995; 45: 274-89.
15. Vandamme P, Holmes B, Vancanneyt M, Coenye T, Hosle B, Coopman R, et al. Occurrence of multiple genomovars of *Burkholderia cepacia* in cystic fibrosis and proposal of *Burkholderia multivorans* sp. nov. *Int J Syst Bacteriol* 1997; 47: 1188-200.
16. International *Burkholderia cepacia* Working Group. Victoria, BC. May 1997.
17. Collins FS. Cystic Fibrosis: Molecular biology and therapeutic implications. *Science* 1992; 256: 774-9.
18. FitzSimmons SC. The changing epidemiology of systic fibrosis. *J Pediatr* 1993; 122: 1-9.
19. Knowles MR, Gilligan PH, Boucher RC. Cystic Fibrosis. In: Mandell GL, Bennett JE, Dolin R, Eds. Mandell, Douglas and Bennett's Principles and Practice of Infectious Diseases, Vol 1, 4th ed. Edinburgh, UK: Churchill Livingstone Inc.
20. Read RC, Finch RG, Sussman M. Bacterial infections of the respiratory tract. In: Hausler W Jr, Sussman M, Vol 3 Eds, Bacterial Infections. Collier L, Balows A, Sussman M, Eds, Topley and Wilson's Microbiology and Microbial Infections, 9th ed. London: Arnold; 1998.
21. Speert DP, Bond M, Woodman RC, Curnutte JT. Infection with *Pseudomonas cepacia* in Chronic Granulomatous Disease: Role of Nonoxidative Killing Neutrophils in Host Defense. *J Infect Dis* 1994; 170: 1524-31.
22. Pitt TL. Pseudomonas, Burkholderia *and related genera*. In: Balows A and Duerden BI Vol 2 Eds, Systematic Bacteriology. Collier L, Balows A, Sussman M, Eds, Topley and Wilson's Microbiology and Microbial Infections, 9th ed. London: Arnold; 1998.
23. Pyle BH, Watters SK, McFeters GA. Physiological aspects of disinfection resistances in *Psuedomonas cepacia*. *J Appl Bacteriol* 1994; 76(2): 142-8.
24. Oie S, Kamiya A. Microbial contamination of antiseptics and disinfectants. *Am J Infect Control* 1996; 24: 389-95.
25. Beckman W, Lessie TG. Response of *Pseudomonas cepacia* to β-lactam antibiotics: utilization of penicillin G as the carbon source. *J Bacteriol* 1979; 140: 1126-8.
26. Lu DC, Chang SC, Chen YC, Luh KT, Lee CY, Hsieh WC. *Burkholderia cepacia* bacteremia: a retrospective analysis of 70 episodes. *J Formos Med Assoc* 1997; 96: 972-8.
27. Pegues DA, Carson LA, Anderson RL, Norgard MJ, Argent TA, Jarvis WR, Woernle CH. Outbreak of *Pseudomonas cepacia*

bacteremia in oncology patients. *Clin Infect Dis* 1993; 16: 407-11.

28 Keizur JJ, Lavin B, Leidich RB. Iatrogenic urinary tract infection with *Pseudomonas cepacia* after transrectal ultrasound guided needle biopsy of the prostate. *J Urol* 1993; 149: 523-6.

29. Yamagishi Y, Fujita J, Takigawa K, Negayama K, Nakazawa T, Takahana J. Clinical features of *Pseudomonas cepacia* pneumonia in an epidemic among immunocompromised patients. *Chest* 1993; 103: 1706-9.

30. Manigo E, Watanakunakorn C. *Xanthomonas maltophilia* and *Pseudomonas cepacia* in lower respiratory tracts of patients in critical care units. *J Infect* 1995; 31: 89-92.

31. Pitt TL, Kaufmann ME, Patel PS, Benge LCA, Gaskin S, Livermore DM. Type characterisation and antibiotic susceptibility of *Burkholderia (Pseudomonas) cepacia* isolates from patients with cystic fibrosis in the United Kingdom and the Republic of Ireland. *J Med Microbiol* 1996; 44: 203-10.

32. Barth AL, Pitt TL. Auxotrophy of *Burkholderia (Pseudomonas) cepacia* from Cystic Fibrosis Patients. *J Clin Microbiol* 1995; 33: 2192-4.

33 Davidson DJ, Dorin JR, McLachlan G et al. Lung disease in the cystic fibrosis mouse exposed to bacterial pathogens. *Nature Genetics* 1995; 9: 351-7.

34. Aoki M, Uehara K, Tsuji K, Ono K, Iijima M. Large-scale culture and preservation methods of *Pseudomonas cepacia* B5 for biological control against bacterial wilt disease. *Bioscience Biotech Biochem* 1993; 57: 668-9.

35. Kilbane JJ, Chatterjee DK, Karns JS, Kellog ST, Chakrabarty AM. Biodegradation of 2,4,5-trichlorophenoxyacetic acid by pure culture of Pseudomonas cepacia. *Appl Environ Microbiol* 1982; 44: 72-8.

36. Segonds C, Chabanon G, Couetdic G, Michel-Briand Y, Bingen E, and the French Observatoire *Burkholderia cepacia* Study Group. Epidemiology of Pulmonary Colonization with *Burkholderia cepacia* in Cystic Fibrosis Patients. *Eur J Clin Microbiol Infect Dis* 1996; 15: 841-2.

37. Rabkins CS, Jarvis WR, Anderson RL, Govan J, Klinger J, LiPuma J, et al. *Pseudomonas cepacia* Typing Systems: Collaborative Study to Assess Their Potential in Epidemiologic Investigations. *Rev Infect Dis* 1989; 11: 600-7.

38. Werneburg B, Monteil H. New serotypes of *Pseudomonas cepacia*. *Res Microbiol* 1989; 140: 17-20.

39. Mahenthiralingam E, Campbell ME, Henry DA, Speert DP. Epidemiology of *Burkholderia cepacia* Infection in Patients with Cystic Fibrosis: Analysis by Randomly Amplified Polymorphic DNA Fingerprinting. *J Clin Microbiol* 1996; 34: 2914-20.

40. Butler SL, Doherty JE, Hughes JE, Nelson JW, Govan JRW. *Burkholderia cepacia* and Cystic Fibrosis: Do Natural Environments Present a Potential Hazard? *J Clin Microbiol* 1995; 33: 1001-4.

41 Taplan D, Bassett DC, Mertz PM. Foot lesions associated with *Pseudomonas cepacia*. *Lancet* 1971; ii: 568-71.

42. Pegues DA, Carson LA, Tablan OC, FitzSimmons SC, Roman SB, Miller JM, Jarvis WR. Acquisition of *Pseudomonas cepacia* at summer camps for patients with cystic fibrosis. Summer Camp Study Group. *J Pediatr* 1994; 124: 694-702.

43. The Nonfermentative Gram-Negative Bacilli. In: Koneman EW, Allen SD, Janda WM, Schreckenberger PC, Winn WC Jr, Eds. Color Atlas and Textbook of Diagnostic Microbiology, 4th ed. Philadelphia: JB Lippincott Company; 1992.

44. Kiska DL, Kerr A, Jones MC, Caracciolo JA, Eskridge B, Jordan M, et al. Accuracy of Four Commercial Systems for Identification of *Burkholderia cepacia* and Other Gram-Negative Nonfermenting Bacilli Recovered from Patients with Cystic Fibrosis. *J Clin Microbiol* 1996; 34: 886-91.

45. Henry DA, Campbell ME, LiPuma JJ, Speert DP. Identification of *Burkholderia cepacia* Isolates from patients with Cystic Fibrosis and Use of a Simple New Selective Medium. *J Clin Microbiol* 1997; 35: 614-9.

46. Burdge DR, Noble MA, Campbell ME, Krell VL, Speert DP. *Xanthomonas maltophilia* Misidentified as *Pseudomonas cepacia* in Cultures of Sputum from Patients with Cystic Fibrosis: A diagnostic Pitfall with Major Clinical Implications. *Clin Infect Dis* 1995; 20: 445-8.

47. Gilligan PH. *Pseudomonas and Burkholderia*. In: Murray PR, Baron EJ, Pfaller MA, Tenover FC, Yolken RH, Eds. Manual of Clinical Microbiology, 6th ed. Washington, D.C: ASM Press; 1995.

48. Baxter IA, Lambert PA, Simpson IN. Isolation from clinical sources of *Burkholderia cepacia* possessing characteristics of *Burkholderia gladioli*. *J Antimicrob Chemother* 1997; 39: 169-75.

49. Wilsher ML, Kolbe J, Morris AJ, Welch DF. Nocosomial acquisition of *Burkholderia gladioli* in patients with cystic fibrosis. *Am J Respir Crit Care Med* 1997; 155: 1436-40.

50. Simpson IN, Finlay J, Winstanley DJ, Dewhurst N, Nelson JW, Butler SL, Govan JRW. Multi-resistance isolates possessing characteristics of both *Burkholderia (Pseudomonas) cepacia* and *Burkholderia gladioli* from patients with cystic fribrosis. *J Antimicrob Chemother* 1994; 34 353-61.

51. Mukawaya GM, Welch DF. *Subgrouping of Pseudomonas cepacia* by Cellular Fatty Acid Composition. *J Clin Microbiol* 1989; 27: 2640-6.

52. LiPuma JJ. Ribotyping of *Burkholderia cepacia*. *Pediatr Pulmonol* 1995; suppl 12: Cystic Fibrosis Conference: S17.3.

53. Welch DF, Muszynski MJ, Pai CH, Marcon MJ, Hribar MM, Gilligan PH, et al. Selective and Differential Medium for Recovery of *Pseudomonas cepacia* from the Respiratory Tracts of Patients with Systic Fibrosis. *J Clin Microbiol* 1987; 25: 1730-4.

54. Gilligan PH, Gage PA, Bradshaw LM, Schidlow DV, DeCicco BT. Isolation medium for the recovery of *Pseudomonas cepacia* from respiratory secretions of patients with cystic fibrosis. *J Clin Microbiol* 1985; 22: 5-8.

55. Gilligan P. Report on the Consensus Document for Microbiology and Infectious Diseases in Cystic Fibrosis. *Clin Microbiol Newsletter* 1996; 18: 83-7.

56. LiPuma JJ, Marks-Austin KA, Holsclaw DS Jr, Winnie GB, Gilligan PH, Stull TL. Inapparent transmission of *Pseudomonas (Burkholderia) cepacia* among patients with cystic fibrosis. *Pediatr Infect Dis J* 1994; 13: 716-9.

57. Campbell PW, Phillips JA, Heidecker GJ, Krishnamani MRS, Zahorchak R, Stull TL. Detection of *Pseudomonas (Burkholderia) cepacia* Using PCR. *Pediatr Pulmonol* 1995; 20: 44-9.

58. Bryan LE, O'Hara K, Wong SA. Lipopolysaccharide changes in impermeability-type aminoglycoside resistance in *Pseudomonas aeruginosa*. *Antimicrob Agents Chemother* 1984; 26: 250-5.

59. Leying HJ, Buscher KH, Cullman W, Then RL. Lipopolysaccharide alterations responsible for combined quinolone and β-lactam resistance in *Pseudomonas aeruginoasa*. *Chemotherapy* 1992; 38: 82-91.

60. Rajyaguru JM, Muszynski MJ. Association of resistance to trimethoprim/sulphamethoxazole, chloramphenicol and quinolones with changes in major outer membrane proteins

and lipopolysaccharide in *Burkholderia cepacia*. *J Antimicrob Chemother* 1997; 40: 803-9.
61. Rajyaguru JM, Muszynski MJ. Sensitization of *Burkholderia cepacia* to antibiotics by cationic drugs. *J Antimicrob Chemother* 1998; 41: 277-80.
62. National Committee for Clinical Laboratory Standards. Performance Standards for Antimicrobial Susceptibility Testing: Eighth Informational Supplement. NCCLS document M100-S8. NCCLS, 940 West Valley Road, Suite 1400, Wayne, Pennsylvania 19087-1898 USA, 1998.
63. Larsen GY, Stull TL, Burns JL. Marked Phenotypic Variability in *Pseudomonas cepacia* Isolated from a Patient with Cystic Fibrosis. *J Clin Microbiol* 1993; 31: 788-92.

Oooopps!!

In the last edition of the journal, Boehringer was acknowledged as the winner of the 1996 Industry Display Award.

This is incorrect. The 1996 Industry Display Award was won by SCIANZ Corporation. My apologies to SCIANZ for this error.

Fran Van Til

Obituary

Robert James Coleman

1941 — 1999

It is with deep sorrow that we note the passing of a much-loved friend and colleague.

Bob began his laboratory career as a trainee in the Wanganui Pathology Department where, in accordance with the custom of the day, he trained in all disciplines and after five years work, was awarded the Certificate of Proficiency.

Once qualified he went abroad for several years and gained valuable experience working under haematologists of international repute in England and Canada. On his return to New Zealand in 1967, he worked for fifteen years with Sir William Liley in the investigation and treatment of haemolytic disease of the newborn.

In 1982 he joined the Auckland Regional Blood centre as deputy to the Charge Technologist, Red Cell Serology Laboratories, a position he held up to the time of his death. As a technologist, Bob was without peer. He was a perfectionist in all areas of his work. He had a tremendous enthusiasm and great depth of knowledge which he shared willingly. A very gifted teacher, Bob trained literally hundreds of students in Transfusion science and there will be people all over the country who benefited from his help and remember him with gratitude and affection. he was regarded by his workmates as a true gentleman with a great loyalty to his colleagues, his employers and his profession. His special sense of humour will be remembered by all who knew him.

A devoted family man, Bob shared almost 30 years of love and companionship with his wife Margaret, and their three children were a great source of pride to him. Our hearts go out to them at this sad time. His passing is a great loss to the profession and to the New Zealand Blood Service.

New Products and Services

AUTOZYME™ ANCA

Designed with flexibility in mind, Cambridge Life Sciences is now offering either qualitative or quantitative detection of antibodies to both PR3 and MPO in human serum. The new AUTOZYME™ ANCA ELISA can be used to greatly aid the differential diagnosis of Wegener's Granulomatosis and other autoimmune vasculitides. Both kits utilise high purity native antigens with guaranteed excellent specificity. A simple method with 30 minute room temperature incubations, together with the added convenience of common reagents and methodology, ensures that the AUTOZMYE system is well adapted to automated technology.

AUTOZYME™ GBM Anti-collagen IV α3

Cambridge Life Sciences has launched AUTOZYME™ GBM, an ELISA for the measurement of anti-collagen IV α3 antibodies. Good Pasture's Syndrome (GS) is an autoantibody mediated glomerular nephritis characterised by the presence of antibodies to the α3 chain of type IV collagen which is the specific antigenic determinant for the glomerular basement membrane. Early detection is vital for the successful treatment of patients with GS. AUTOZYME™ GBM utilises ready-to-use, colour coded reagents and has dual protocol to give either qualitative or quantitative results in 90 minutes.

For more information, please contact us.
Med-Bio Enterprises Ltd
Ph: 0800 MEDBIO
Fax: 0800 101 441
email: jvincent@medbio.co.nz

New LIF Detector Extends Applications of Beckman Coulter CE Platform

Beckman Coulter Australia introduces its new high-sensitivity, two-colour Laser-Induced Fluorescence (LIF) Detection System for P/ACE Capillary Electrophoresis System. The addition of this detector to the Beckman Coulter CE Platform, which already includes UV and diode array detection and an external detector adaptor, expands the functionality and the application of the P/ACE MDQ, addressing both methods development and quality control needs with the same instrument platform.

With the new LIF detection capability, Beckman Coulter has developed four new application-specific CE Systems. These include the P/ACE MDQ Glycoprotein System, Molecular Characterisation System, Carbohydrate System and DNA System. These systems are designed for automated and quantitative isoelectric focusing, oligosaccharide analysis, monosaccharide analysis, DNA-protein interaction analysis, oligonucleotide purity analysis, gene expression and viral load determinations.

"The LIF detector adds a high degree of flexibility to our CE platform," explains Jeff Chapman, Global Product Manager for Beckman Coulter. "The increased functionality makes the routine use of CE possible for a wide range of biotech and pharmaceutical labs."

Beckman Coulter, Inc. is a leading provider of instrument systems and complementary products that simplify and automate processes in life science and clinical laboratories. The company's products are used throughout the world in all phases of the battle against disease, from pioneering medical research and drug discovery to diagnostic testing that aids in patient treatment. Pro forma annual sales for the company totalled $1.8 billion in 1997, with half of this amount generated outside the United States.

For more information, contact Beckman Coulter on 1800 060 880 or Fax: 1800 060 879 or visit our Web Site for the latest technical and application information – http://www.beckmancoulter.com
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New Circulating Reservoir for the Multimek™ 96 Automated 96-Channel Pipettor

Beckman Coulter Australia introduces a new Circulating Reservoir that provides continuous supply of solvent, buffer or reagent to the Multimek 96 Automated 96-Channel Pipettor. This eliminates the time-consuming user intervention required to refill normal reservoirs. A peristaltic pump circulates liquid between the 96-well reservoir on the Multimek Labware Deck and a glass supply bottle. The front of the pump has controls for circulating speed and power on/off.

"When a Multimek is equipped with stackers, or is part of an integrated system, the automation benefits can be enhanced by the addition of refillable reservoirs," explains Susan Stone, Marketing Manager, Liquid Handlers, for Beckman Coulter, Inc.

Beckman Coulter, Inc. is a leading provider of instrument systems and complementary products that simplify and automate laboratory processes for life sciences and clinical diagnostics. From integrated laboratory automation solutions to centrifuges and blood analysers to diagnostic rapid-test kits, the company's products are used throughout the world in all phases of the battle against disease. Pro forma annual sales for the company totalled $1.8 billion in 1997, with half of this amount generated outside the United States.

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Beckman Coulter Develops Method for Fully Automated Plasmid Purification Using QIAwell* 96 Ultra Kit from QIAGEN*

Beckman Coulter Australia announces a method for the automated purification of plasmid DNA using QIAGEN'S QUAwell 96 Ultra Kit and Beckman Coulter's Biomek® 2000 Laboratory Automation Workstation. This method, which runs with no human intervention, completes the purification of 96 samples in approximately one and one half hours, a significant improvement over traditional manual purification. DNA recovery, purity and suitability for cycle sequencing are comparable to manual results.

A Biomek method has been written to automate every step of this purification process. The Gripper Tool from Beckman Coulter facilitates the operation by moving and relocating devices and labware on the Biomek worksurface. The method also takes advantage of Biomek's ability to dispense a wide volume range of buffers and solutions.

"The flexibility and power of the Biomek's open architecture make this kind of automation possible with purification kits from other vendors," commented Michael W. Clark, Ph.D., Product Manager for Genetic Analysis. "We expect that more automated protocols for DNA purification in a wide variety of applications will be developed with the Biomek 2000 as a core instrument. We are also developing ways to use the Biomek to automate other DNA analysis test such as setup of sequencing reactions and cleanup of PCR* reaction."

The automation of these methods is the most recent development in Beckman Coulter's ongoing, major effort to simplify and automate the entire genetic analysis process using the company's broad range of technologies. The company also recently introduced the

CEQ™ 2000 DNA Analysis System for fully automated DNA sequencing by capillary electrophoresis.

Beckman Coulter, Inc. is a leading provider of instrument systems and complementary products that simplify and automate processes in life science and clinical laboratories. The company's products are used throughout the world in all phases of the battle against disease, form pioneering medical research and drug discovery to diagnostic testing that aids in patient treatment. Pro forma annual sales for the company totalled $1.8 billion in 1997, with half of this amount generated outside the United States.

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**QIAGEN and QIAwell are trademarks of QIAGEN GmbH, QIAGEN, Inc. this is a method developed by Beckman Coulter, Inc. and does not represent a QIAGEN endorsement of Beckman Coulter products.*

**PCR is covered by patents owned by Hoffman-La Roche, Inc.*

Please send READER INQUIRIES from this news release directly to Trish Fenton, Alphatech Systems, PH: 0800 257 428 or (09) 377 0392 FAX: (09 309 8514.

New Optimising Scheduling Software Makes Assay Development Easy

SAGIAN™, a Beckman Coulter company, has introduced SAMI NT software for automated systems. SAMI NT is a graphical assay development tool that provides a simple, icon-driven interface for automated laboratory systems. Designed for laboratory method development, it combines an optimising scheduler with a graphical interface for ease of use.

"SAMI NT offers an easier way for scientists to develop and run their assays," explains Rob Donoho, Product Manager for SAGIAN. "We have taken the best from our first version SAMI and added many features like an optimising scheduler, to provide the absolute fastest sample throughput for automated systems; flexible/rigid and min/max timing to enable the scheduler to optimise throughput of the assay based on the method's criteria; and one look sample history, which provides a quick look at the sample path through the assay. Based on customer input, SAMI NT also now includes the ability for pooling, splitting and recombining and batch processing samples on an automated system."

SAMI NT is powered by SAIGAN's new SILAS™ software, which provides real-time communication for configuration and operation of automated stations on SAGIN Core systems. The combination of SILAS and SAMI NT offers the ability to quickly and easily add stations to an automated system, and design, schedule and run an assay.

Beckman Coulter, Inc. is a leading provider of instrument systems and complementary products that simplify and automate processes in life science and clinical laboratories. The company's products are used throughout the world in all phases of the battle against disease, from pioneering medical research and drug discovery to diagnostic testing that aids in patient treatment. Pro forma annual sales for the company totalled $1.8 billion in 1997, with half of this amount generated outside the United States.

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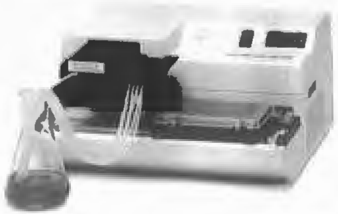

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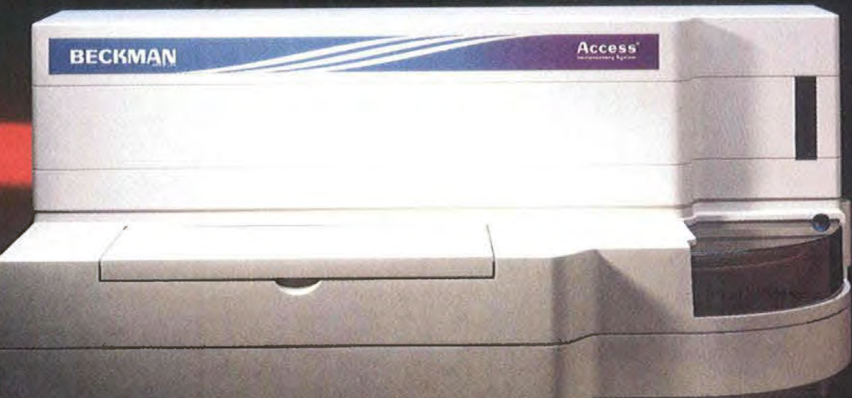

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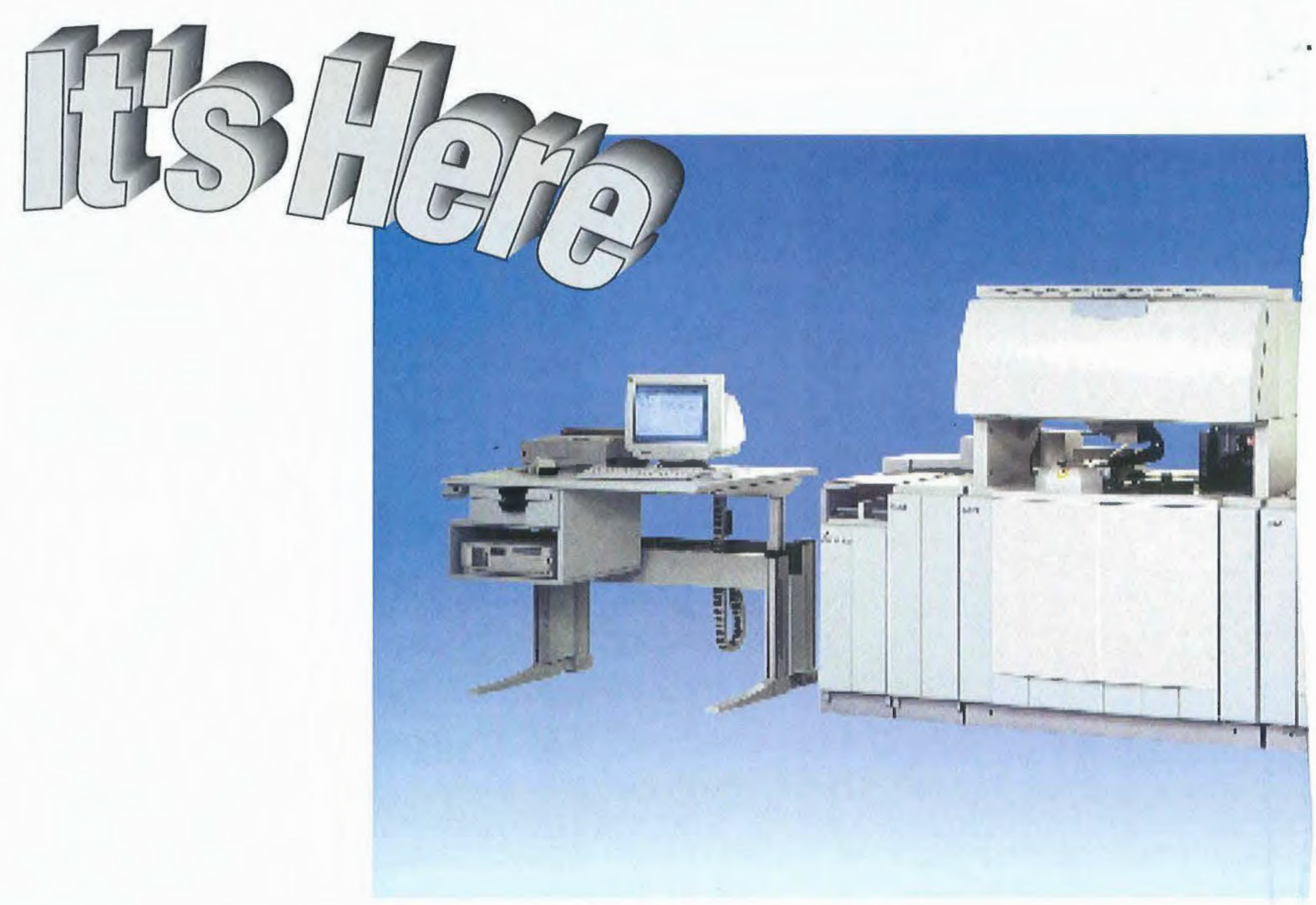
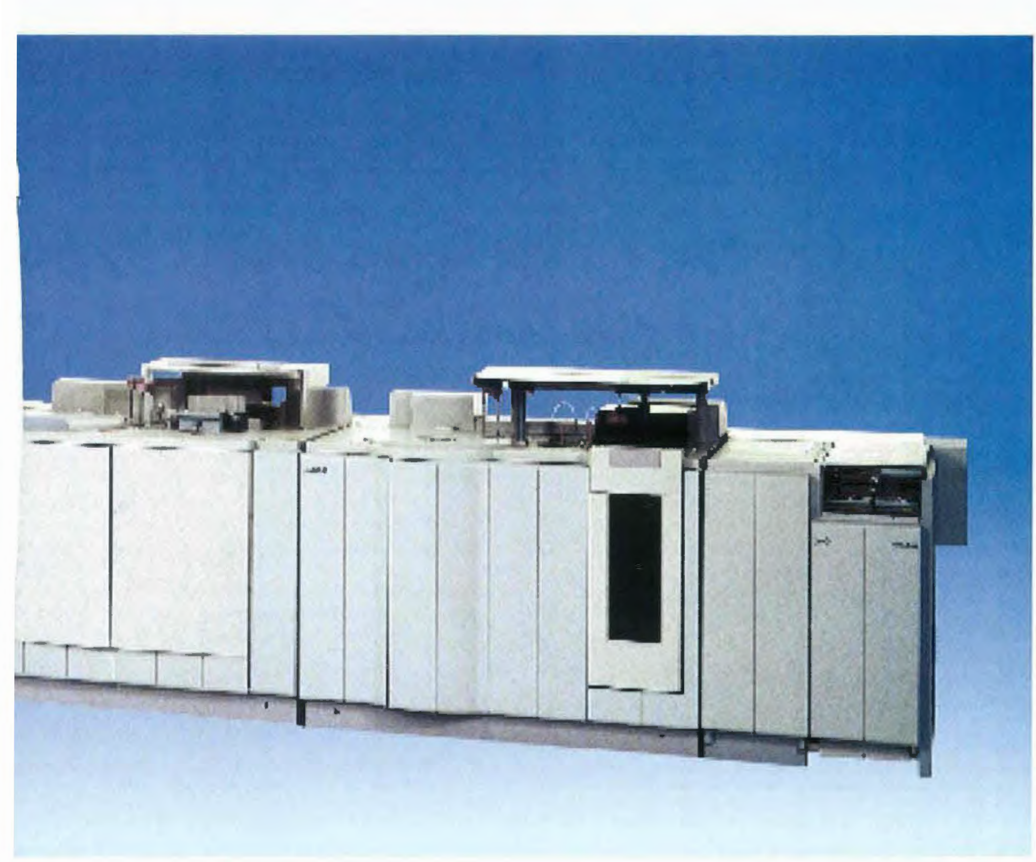


Meet Modular at the NZIMLS

ANALYTICS

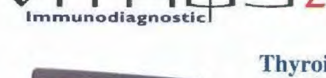
Diagnostics



South Pacific Congress 1999

A Wide Variety of Solutions

Saving Lives through better medical decisions



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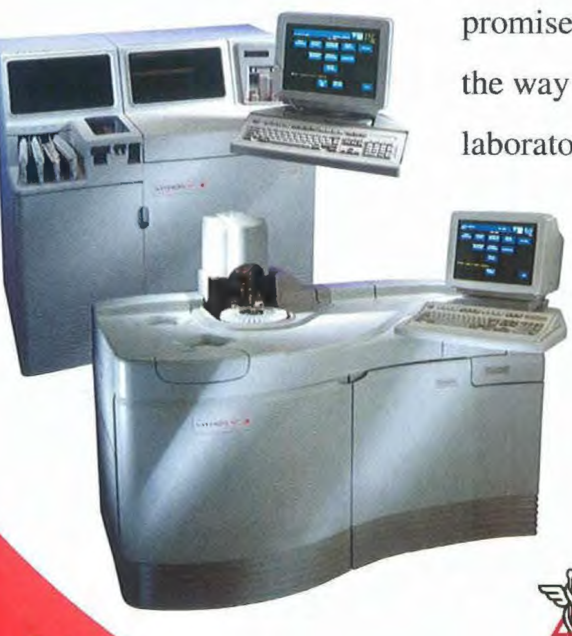

Thyroid
- TSH 3rd Generation
- Free T4
- Free T3
- Total T4
- Total T3
- T3 Uptake

Reproductive / Fertility
- Total β-hCG
- Estradiol
- Progesterone
- LH
- FSH
- Prolactin
- Testosterone
- Free βhCG

Hepatitis / HIV
- Anti HIV 1+2**
- Anti HBs
- HBsAg
- HBsAg Confirmatory
- Anti HCV**
- Anti HBe
- HBeAg
- Anti HBc IgM
- Anti HBc
- Anti HAV IgM

Metabolic
- Ferritin
- Cortisol
- B12
- Folate
- RBC Folate

Cardiac
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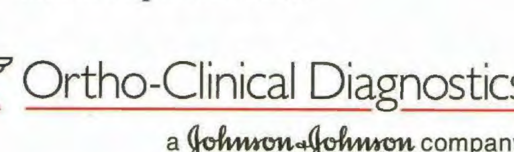

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Pacific Way by Bullumakau

South Pacific Conference

This conference was held in Port Moresby, Papua New Guinea, between 1 July and 4 July 1999. it was hosted by the PNG Red Cross and the International Federation of Red Cross and Red Crescent Societies and was supported by the International Operations Department of Australian Red Cross. The programme was structured around facilitated workshops and symposia, using internationally recognised experts as a resource. Two delegates from each South Pacific nation with a Red Cross blood service were invited.

The objectives of the conference were:

- To initiate dialogue and to develop appropriate, researched and documented policy standards for safety and sufficiency of blood for transfusion
- To identify key issues for training programmes and ways in which the programmes could be delvered.
- To explore the implementation of appropriate quality systems for blood services in the South Pacific.
- To develop a mutual understanding between volunteer and technical components to improve their structural relationships.

The international resources included,

Dr Umili Aeno, PNG Red Cross Blood Service
Dr Gordon Whyte, Australian Red Cross Consultant
Dr Roger Dodd, American Red Cross Blood Service
Prof Joseph Igo, University of Papua New Guinea
Dr Chris Hogan, New Zealand Blood Service
Dr Ron Mackenzie, Pacific Paramedical Training Centre
Mr Mike Lynch, Pacific Paramedical Training Centre
Ms Hannele Virtanen, International Federation of Red Cross and Red Crescent Societies
Mr Alan Crouch, Australian Red Cross Consultant

Participants included Red Cross personnel and laboratory technicians or physicians from Papua New Guinea, Fiji, Tonga, Samoa, Cook Islands, Soloman Islands, Vanuatu, Tuvalu, Palau, Federated States of Micronesia and Marshall Islands.

Conference symposia were grouped into (1) donor resources, recruitment and current practice, (2) crisis management and blood supply, (3) epidemiology of blood transmissible diseases and blood safety, (4) quality systems for blood in emerging countries, (5) trade-offs, costs and maintaining supply. A working party was formed from the Pacific country participants to investigate ways and means to establish a "Pacific Blood Association", to construct guidelines for donor selection and for the screening of blood for hepatitis B, HIV, syphilis and malaria in the Pacific region, how to establish an information and resource exchange for donor recruitment and to identify the key issues that need to be included in training programmes.

Bullumakau understands that the conference highlighted several problems in the Pacific region that relate to blood transfusion and these included, a shortage of voluntary non-remunerated regular donors, the high number of family donors, the high prevalence of hepatitis B in the region, the increasing prevalence of HIV infection in some countries, the lack of a reasonably priced hepatitis C test, the need for the use of blood components in place of whole blood and the need for help in establishing quality systems in blood transfusion services.

Coconut Radio

- Bullamakau hears that personnel changes are happening in the Pacific laboratories:
- Sebio Shonniber has retired from the post of Chief Technician in the Marshall Islands to show an interest in prawn farming
- Vaevae Pare has left the Rarotonga laboratory to pursue a career in politics.
- Meleone Tumi of Rarotonga is likewise seeking a seat in parliament
- Santos Borja and Johanes Techechur are shortly to retire from the laboratory in Palau
- Augustine Bani has retired from the Santo laboratory in Vanuatu
- Mike Lynch (PPTC) lost his luggage on his trip to Papua New Guinea
- Ron Mackenzie (PPTC) recently returned from a trip to India where he did not climb Everest but at least got into the foothills.
- If you want to prosper, devise a rapid simple diagnostic test for typhoid fever and sell it in Papua New Guinea
- Gilbert Rose late of Christchurch and the Pacific region is now working in Binh Dinh Province Hospital, Vietnam
- All medical laboratory training in Papua New Guinea has ceased
- The Fiji School of Medical Laboratory Technology seems to be flourishing within the Fiji School of Medicine

A window of opportunity for you ends soon! ! !

FELLOWSHIP BY EXAMINATION

Medical Laboratory Scientists who hold a NZIMLS or NZIMLT Specialist Certificate will be EXEMPT from sitting Part I Examination, IF they apply prior to:

31st MARCH 2000
This exemption will not be extended.

Successful completion of Part II - the Dissertation, will fulfil the requirements of Fellowship by this route.

Please see over for all options by which to gain Fellowship.

Fellowship of the New Zealand Institute of Medical Laboratory Science is the highest academic category of membership and carries the right to use the letters FNZIMLS.

Biolab Scientific kindly sponsors this page for insertion into your Membership Folio

FELLOWSHIP

of the New Zealand Institute of
Medical Laboratory Science

May be gained by:

Examination
Thesis
Publications

Option A: By Examination

The examination will consist of two parts:

Part I Two written papers each of three hours duration.

Part II A dissertation of 3000 - 5000 words (upon successfully attaining Part I).

Note: Clauses 3.12 & 3.13 of the Regulations:

3.12 Medical Laboratory Scientists who hold a Specialist Certificate are exempt from sitting the Part I examination. This clause will be effective for a maximum period of three years after adoption of these regulations.

3.13 The final date for applications under Clause 3.12 will be March 31st 2000.

Option B: By Thesis

This must be the original work of the candidate and not exceed 20,000 words.

Option C: By Publication

A publication summary or review of 3000 - 5000 words presenting a minimum of 5 articles published in International or Discipline acknowledged Journals. The applicant will be an author or significant contributor to these articles.

For a copy of the full Regulations and Instructions for Fellowship, please contact:

NZIMLS Executive Office
P O Box 3270, Christchurch
Tel: 03 313 4761 Fax 03 313 2098

COUNCIL NEWS

MAY 1999

NZIMLS FINANCIAL POSITION

There is a good result for the end of year with excess income over expenditure. This comes predominantly from a good 1998 conference profit.

THANK YOU Palmerston North Conference

Committee
Speakers
Delegates
Sponsors
Who made this successful conference profitable.

The Institute Journal is also on track to achieving a 'cost neutral' position.

Members Please Note:
The financial watchdog team of Shirley Gainsford (President), Trevor Rollinson (Treasurer), and Fran van Til (Executive Officer), have refined systems to closely monitor costs being incurred by the NZIMLS. Careful cashflow management is critical as the NZIMLS gains income in the first half of the year and incurs expenses in the latter half of the year. We are starting to rebuild a buffer of investments against fiscally challenging years, for example, when there is no annual scientific meeting.

If the Conference profit is removed from the equation the NZIMLS is getting close to being cost neutral to govern.

All efforts will continue to aim for this.

JOURNAL

The "Journal of New Zealand Institute of Medical Laboratory Science" has been accepted by :

"Embase, the Excerpta Medica Database" for indexing on a regular basis.

This makes our scientific papers widely available internationally through a recognised journal indexing library service on the Internet.

FELLOWSHIP

Fellowship has been awarded to **Jennifer Castle** from Microbiology, Starship Hospital, Auckland on completion of her dissertation on *'Burkholderia cepacia: A Review of an environmental saprophyte as a human pathogen'*. The treatise will be published in this Journal.

The NZIMLS warmly congratulates Jennifer on her significant achievement and gaining the Institute's highest honour ' Fellowship of the Institute of Medical Laboratory Science'.

As Jennifer is going overseas prior to her deserved fanfare at the South Pacific Congress, she will be presented with her certificate at a ceremony to be arranged in Auckland.

Meanwhile the Institute Fellowship Committee has received applications towards gaining Fellowship as follows :

Part I	(Examination)	=5
Part II	(Dissertation)	=7
Thesis		=1

Remember the window of opportunity for those who have attained Specialist level to have this qualification cross-credited to Part I. Fellowship applications close - 31st March 2000.

SOUTH PACIFIC CONGRESS 1999

AN EVENT NOT TO BE MISSED !!!!!!!

Scientific Programme & Workshops
A full programme is offered in all disciplines.

Social Programme
Unparalleled experiences.

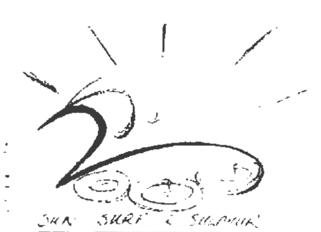
As advertised in the last journal, grants for four members to have received free registration to the South Pacific Congress. These have been awarded to:

- Jacquie Wypych
- Toni de Lautour
- Sheryl Khull
- Sue Baird

CONFERENCE : BAY OF PLENTY

15th - 20th AUGUST 2000 (Based in Rotorua)
Sun Surf Sulphur

- An outstanding destination
- Activities unlimited.
- Plan to participate now



EDUCATION

All three educational bodies, Massey University, University of Otago and Auckland Institute of Technology, have responded to our 'Needs Analysis', however, we are still waiting for all employers to respond, to produce a real and useful document.

Massey University Update

- **Massey University BMLS at Albany in 2000**

Students wishing to study toward the Bachelor of Medical Laboratory Science at Massey University will be able to enrol in the first year of the programme at Massey's Albany campus in 2000. Years two and three continue to be taught from the Palmerston North campus with the clinical training year completed in a diagnostic laboratory.

- Immunology and Clinical Biochemistry are to be amalgamated in the 4th year.

- Virology will be taught in the 3rd year and then available again as a post graduate option.

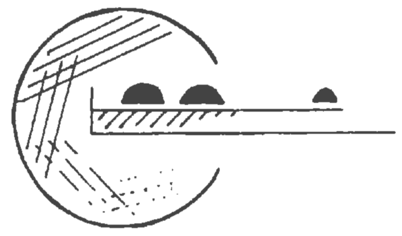
Political Science

Council has again responded to the latest H.F.A. (Health Funding Authority) document on the provision of Primary Referred Laboratory Services. A copy is available via the Executive Office.

The H.F.A. continues its drive towards the competitive model.

Microbiology

Special Interest Group



SIG Convenors: Sandie Newton/Jenny Dowling
Diagnostic Laboratory, Auckland
☎ 09 357 4107

Abstracts from MSIG 8 May 1999 Rotorua

This year another successful seminar was held with 114 registrants in Rotorua.19 papers were presented. The current format allows for a range presentations from beginners to seasoned professionals. The presentations were followed by Discussion Groups to allow people the chance to network in areas of interest

A case study of Hydatid disease

Bharati Thaker – Diagnostic Laboratory Auckland

The most recent case of Hydatid disease was presented. Ultra-sound revealed a large liver cyst. Serology was positive for Hydatid disease. The patient was treated with Albendazole for 6 weeks before and after surgery.The cyst was evacuated and examination of spun deposits of the cyst fluid showed hydatid elements-scolex and hooklets.

A national eradication campaign for Hydatids has been operating in New Zealand since 1959. MAF is hoping to declare the country provisionally free from true hydatids later this year. Chronic cases of hydatids may still be diagnosed as the hydatid cyst can persist in man for many years.

URO-QUICK trial results

Katharine Snow – Diagnostic Laboratory Auckland

The results of two trials at using the URO-QUICK system were presented.

The system uses a light scattering technique and an optimised reagent to allow an urine culture screen to be reported within 3 hours. Using a laser beam the light scattering signals are computed and displayed as growth curves.

The procedure is simple. After mixing 0.5ml of urine is inoculated into 2ml of eugonic broth and entered into the system. A computer screen continually monitors the results showing growth curves.

210 and 240 samples were run in each trial. The results were compared with the routine technique of 10 microlite inoculation onto CLED agar plate. Correlation with the CLED plate was good with <8% variation. The discrepancies were mainly mixed insignificant growths(Staphylococci,Stretococci and Corynebacteria)

The comparison of DFA & PCR for the detection of Chlamydia trachomatis at Waikato Hospital

Matthew Akehurst – Health Waikato

Waikato Hospital has been using the Amplicor Chlamydia trachomatis PCR test for just over a year. This study is a comparison for 11 months on results from specimens obtained at the Waikato Hospital Sexual Health Clinic. The reason for the use of these results from the Sexual Health Clinic was that the specimens are generally collected correctly,compared to specimens collected in wards or emergency rooms etc.

DFA results are from Jan 97 to Nov 97, and PCR results are from April 98 to Feb 99

DFA

Patients	Total number	Positive	%Positive
Males	907	90	9.9
Female	1243	93	7.5
Total	2150	183	8.5

PCR

Patients	Total number	Positive	%Positive
Males	971	143	14.7
Females	1320	146	11.1
Total	2291	289	12.6

E.coli 0157-"Our experience"

Steve Soufflot, Jan Bird, Chris Pickett – Medlab Hamilton

We present our findings for our first year's experience screening for E.coli 0157

During this period we found 18 primary cases, and 11 family contacts. Of these 29 isolates,only one required hospitalisation, and only two were related strains (apart from within families). Peak isolation times appear to be late summer and autumn, and cases were predominantly children <4 years of age. Cases were found from throughout the Waikato and were not restricted to rural or urban areas. Stool appearance was not an accurate guide to isolation as 79% were normal,and none were blood stained.

Seaside danger-Beware of rips, sunburn, heatstroke, dehydration and VIBRIOS

Michelle, Jo and Ann – Medlab Hamilton

Over the last 2 summers we have noticed an increase in the number of vibrio isolated. With the exception of one isolate in July 1998 from a case of gastroenteritis, the majority of our isolates occurred between December 1998 and the start of April 1999

From our 22 isolates, 12 were ear infections, 6 wound infections and 4 gastroenteritis.

With the salt dependent vibrios, vibrio alginolyticus and vibrio parahaemolyticus, we have found the addition of extra salt to the OF media to be useful.

We didn't get a clear cut fermentative result from the standard OF media which contains 0.5% salt. We found adding an extra 0.5% salt to the OF media the reactions were clear cut and complete.

Graphic Streps

Jane Childs – Medlab Auckland

On reviewing Group A BHS positive throat swabs in our lab for the periods January 1998 to December 1998, it was noticed that the lowest incidence occurred in children less than 2 years of age, and the highest in 7 and 8 year olds, with another peak occurring in the 30-39 year adults. Perhaps this adult peak is related to the 7 and 8 year old children's peak

Rapid Candida albicans identification using Candiselect media

Paula Shalders – Diagnostic Laboratory Auckland

Diagnostic Laboratory Auckland evaluated a chronogenic yeast media, Candiselect, to use for the identification of *C. albicans*. We compared the growth of Candida sp. on Sabouraud Dextrose Agar to the growth on Candiselect medium. Also determined was whether the Candiselect plate could be used in place of the traditional Germ Tube Test. From 760 clinical vaginal and cervical specimens, 65 patients grew a yeast. The amount of growth on the Candiselect media is the same as SAB agar. We had a 100% correlation of positives for identifying *C. albicans* from the Candiselect plate. No false positives.

C. albican grows as blue green colonies on Candiselect media. There is a wide variation in blue/green colour and care must be taken.

New CNS Protocol

Annmarie Clarkin – Health Waikato Laboratory

At HWL we have established a new protocol to deal with coagulase negative staph (CNS) isolates in blood cultures with emphasis on determining the likely clinical significance of the isolates before deciding whether to perform sensitivity testing. This is a change from the previous protocol where isolates were worked up simply because they were from blood cultures.

Criteria have been established to determine whether a CNS isolate is likely to be a contaminant, and an appropriate comment is issued. No further work is done on these isolates

A separate protocol is used for intravascular catheter CNS isolates and those from patients with implants.

This protocol has resulted in a significant decease in workload and costs, and hopefully more appropriate antibiotic use with regard to CNS isolates

Burkholderia pseudomallei

Jennifer Castle – Auckland Hospital

Burkholderia pseudomallei is the etiological agent of the tropical disease melioidosis.

It is endemic in the soil and water of South-East Asia and North Australia. The clinical presentation of melioidosis is wide ranging; from subclinical infection to fulminant septicaemia, and it can mimic other bacterial infections. Even with appropriate treatment the mortality rate from acute severe melioidosis is high and relapses are common.

Laboratory identification of this organism may be hampered by the use of commercial identification systems, as they do not all include it in their databases. Another problem is the lack of relevant clinical details, including travel history that could alert the laboratory to the possibility of an unusual organism. As the organism can spread through aerosols it should be handled in a biohazard safety cabinet.

New Zealand has had only four occasions in which B pseudomallei has been isolated in the last 25 years. The last case was at Auckland Hospital in August 1998 from an English tourist. He presented at the emergency department with a lump on the side of his neck that had appeared after travelling through South-East Asia.

Rapid Detection of Staphylococcus aureus in Blood cultures by Tube Coagulase

Mary Bilkey – Auckland Hospital

The use of the tube coagulase test (TCT) for direct identification of Staphylococcus aureus in blood culture was evaluated over a six month period.

A total of 336 blood culture bottles (BactAlert, Organon Tecknika) containing gram positive cocci suggestive of staphylococci were tested using TCT (Difco plasma).

The TCT was read at 2 hrs, 4 hrs, and after overnight incubation at room temperature.

Sensitivity and specificity values were obtained. Specificity was 100%. The sensitivity at 2 hrs, 4 hrs and overnight was 76%, 88% and 93% respectively. All Paediatric bottles containing Staphylococcus aureus were positive in 2 hours.

The method is cheap, easy to perform and reliable.

A trial comparing Difco plasma to BBL plasma is currently under test.

ooooocysts.

Shirley Gainsford, Valley Diagnostic Laboratory, Lower Hutt.

Over the summer of the last 2 years Cryptosporidium parvum has been the second most commonly isolated GI pathogen in Lower Hutt. In 1999 it has dropped to 3rd place after Salmonellae outbreaks.

In 1998 a change was made from the Meridian Direct Fluorescent Antibody Test (DFA) to the Alexon Enzyme Immunoassay (EIA), for the combined detection of Giardia lamblia and Cryptosporidium parvum.

Tests to confirm a positive EIA were examination of iodine and carbol fuchsin (cold Kinyoun) stained deposits of concentrate with examination of a trichrome stained smear for Giardia trophozoites if necessary.

However in 20% of cases of cryptosporidiosis, the oocysts were not acid fast and a single antigen EIA test or DFA was needed to confirm the combined EIA test.

Laboratories using an acid fast stain for the detection of C parvum may therefore be missing cases.

The DFA test was the simplest to perform and giardia cysts can be differentiated from cryptosporidium oocysts. However, it requires a microscope for fluorescence and does not detect giardia trophozoites. Care must be taken to prevent carry over from well to well in the slides. The IEA test detects trophozoites of giardia as well as cysts. However a second test is needed to confirm if giardia and/or cryptosporidia is present. Great care must be taken to wash wells properly and the colour developer reagent bottle is difficult to squeeze, resulting in sore hands when large numbers of specimens are tested.

V.R.E. – A case study and development of a screening method for V.R. E. and E.S.B.L.

Jane Shewan Health Waikato

On 22 July 1998 we received notification of an admission of a V.R.E. positive patient to Health Waikato Hospital. V.R.E. had been acquired by this patient during an admission to a New York hospital for necrotising pancreatitis.

After this patient was discharged the Infection Control Team decided to perform a "Point Prevalence Surveillance" to check and see if any cross infection of V.R.E. had occurred from the New York patient and also to provide baseline data on the number of patients colonised with either V.R.E. or E.S.B.S. It was decided to focus screening on patients in the high usage antibiotic areas within the hospital, as well as the wards in which the V.R.E. positive patient had been staying.

A method for the detection of both V.R.E. and E.S.B.L. was developed by the Microbiology laboratory and on the designated day 77 out of a possible 84 patients (925) consented to be tested.

After screening all patients tested were reported as being

negative for both V.R.E. and E.S.B.L.

Current TB Practice in Laboratories in New Zealand

Catherine Tocker Health Waikato

A telephone survey was conducted in July 1998 to determine current practices for TB work in NZ clinical laboratories.

46/54 possible laboratories were surveyed. 22 were culturing for TB. 8 labs culture daily during the week, the rest batch and culture 1-5 days a week. Only one half come close to meeting the acid-fast microscopy turnaround times from the NZ TB Guidelines 1996. 21/22 would provide an out-of-hours microscopy.

Two laboratories do not process specimens in a BSC.

13/22 use broth and LJs on all specimens with increased use of automation. Two make selected use of broth. Two use broth alone and five labs continue to use LJs only.

	1994	vs	1998
Labs culturing for TB	36		22
Flurochrome stain	11		12
Liquid culture media	6		17
Use of BSC	86%		91%
<10 specs/week	72%		32%

Improvement apparent in all areas.

Enterohaemorrhagic E Coli (EHEC) New Zealand Isolates 1998-1999

Enterohaemorrhagic E coli are being isolated in increasing numbers in New Zealand. It is not clear if this is due to increased testing or whether it is a true increase, however, the rate of HUS at 3.9 per 100,000 children under 5 years, is higher than for most other countries with reporting systems. The rate of HUS is a more sensitive measure of the incidence of EHEC than culture as it encompasses both O157 and non-O157 cases. The numbers of EHEC confirmed by ESR have risen from 3 per year in 1993 and 1994, to 6 per year in 1995 and 1996, to 13 in 1997. There were 54 isolates confirmed in 1998, and 30 to the end of April this year.

The majority of isolates have been from the Central North Island/Waikato regions. Molecular typing has indicated that most of the isolates are the result of sporadic infection, with identical patterns seen only in family clusters. There has been one exception to this, with two cases from different families sharing an identical pattern, but no link has been found.

Recommendation: That labs using Mac/Sorb use a positive control – non-toxigenic O157 are available from ESR for this purpose.

Exotic Beasties

Neil Wood-Medlab Auckland

Three parasites arriving in our laboratory were presented.

1) A filarial worm extracted from the eye of a ships captain prompted a review of zoonotic filariasis. Many kinds of filariae have been isolated in humans. They can be identified by their gross appearance if they are extracted intact or more commonly they are identified from a biopsy specimen. This worm was identified as *Dirofilaria repens* by its size and the external longitudinal ridges with transverse striations in the cuticle.
2) Common Bedbug (*Cimex lectularius*). These insects look like brown beetles 5x3mm in size. They are bloodsucking insects feeding at night while the host sleeps. The bites are irritating with allergic reactions and secondary infections common. The bugs hide in cracks and crevices and in bedding. Infestations are often moved between buildings in old infested furniture.
3) Cattle Tick (*Haemaphysalis longicornis*). The cattle tick is the only tick present in N.Z. infecting mammals. It is commonly found in scrub and Paspalum pastures north of L. Taupo. It is essential to ensure that ticks are *H.longicornis* and not an imported exotic species because of the risk of tick borne infections and tick paralysis. an Entomologist may be required to accurately identify an unknown tick.

Capnocytophaga meningitis

Joy Odgers – Diagnostic, Whangarei

A 63 year old lady presented with a three day history of diarrhoea and vomiting, was drowsy, confused, and dehydrated. On examination she was febrile, with a widespread, red, blanching rash.

Lumbar puncture revealed, red cells, 79 x 10^6/L, white cells 0 x 10^6/L, glucose 0.7 mmol/L, protein 1.78. mmol/L

Slender, fusiform-like, gram negative bacilli were seen on gram stain. The organism was subsequently identified as Capnocytophaga canimorsus.

A second CSF on day 13 revealed, leucocytes 28 x 10^6/L (100% lymphocytes), normal glucose, protein 0.87 mmol/l, no organisms. Cefatoxime was the therapeutic agent.

Both purulent and lymphocytic meningitis cases have been reported in infections with this organism which is a common oral commensal of animals. This patient eventually recalled having a dog bite to her wrist a few weeks prior.

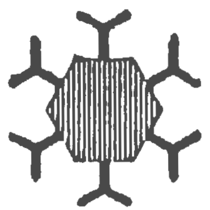
Who knows what's up your nose

Philippa Skellern – Medlab Auckland

Klebsiella ozaenae and nontoxigenic *Corynebacterium diphtheriae* were isolated from a Cambodian immigrant with primary atrophic rhinitis, also known as ozaena. This is a severe, chronic nasal disease characterised by mucosal atrophy with resorption of the underlying bone, formation of thick crusts and a distinct fetid odour. It is rare in developed countries, but well recognised in developing countries. The precise cause of the disease remains unknown and the organisms isolated are regarded as secondary invaders. Diagnosis is made clinically along with culture of *Klebsiella ozaenae* from the nasal secretions.

Immunology

Special Interest Group



SIG Convenor: Rodger Linton
Medlab South, Christchurch
☎ 03 363 0824

Immunology Special Interest Group Seminar Blenheim Country Lodge, May 29-30 1999

Our annual ISIG meeting was held on the weekend of 29-30th May at the Blenheim Country Lodge, a fine establishment. (Most befitting our group) and set in the heart of the Marlborough region. Although not able to visualise the grapes on the vines that brought success, to this region of New Zealand, we were able to taste and toast to the success of yet another very well organised Immunology Special Interest Group meeting. This was due in no small part to the grand efforts put in by the team at Canterbury Health Immunology Department, with particular thanks to Stewart Smith for his involvement. (Please note that Stewart even organised the meeting around the Super Twelve rugby final between the Crusaders and the Highlanders!!! Peter Johns from Dunedin was overheard uttering his disappointment at the end of the game — "By hook or by crook we were robbed at the Brook." Being the one-eyed Cantabrian, I don't agree!!

The meeting was yet again well attended with 30 participants from Auckland to Dunedin. In brief, we had a lot of fun, learnt a lot and fuelled ourselves for another year of stimulating and active immunology, serology and related topics. Below is a summary of the weekend presentations for those who were unable to attend. Anyone wishing to seek further information on these presentations please feel free to contact the various speakers directly or via myself.

The meeting began with a welcoming introduction to the ISIG programme by Stewart Smith. Our first speaker was Rob Siebers from the Wellington Asthma Research group. Rob's talk was entitled 'Non Cetaceous Transport Mechanism for House Dust Mite and Cat Allergens in Antarctica'. Rob essentially summarised the results of research that he is currently involved with in relation to the role of indoor allergies in the pathogenisis of asthma (in particular the role of the HD mite-Dermataphoides Pteronysinus). New Zealand has one of the highest levels of derP1 (HD mite allergen) in the world, the allergen being produced in the faecal pellet of the HD mite. The HD mite requires for survival a moist warm environment with a relative humidity of 70-80%, although they can survive in a relative humidity down to 45%. The allergen fel d1 (from the salivary glands of the cat) are also a potential allergy agent. This allergen has great aerodynamic properties and can float along in the air. Given the fact that the relative humidity in Antarctica never rises above 20% then the HD mite theoretically is unable to survive in Antarctica, and also given that there are no cats in Antarctica, Rob's colleagues set of to investigate. What they knew was that these allergens could be transported to the Antarctic regions on clothing etc.

Following the controlled collection of dust samples in various environments at Scott Base, Rob's team found that most areas examined had undetectable, or very low der P1 levels. Six out of 11 jerseys had however, detectable levels of der P1 but at low levels unlikely to cause problems. Fel d1 allergen from cats however, was found in more areas and particularly in 10 jerseys, (some at levels that could cause problems). Their research confirmed the passive transfer of allergens, particularly in clothing. Fel d1 appearing to accumulate even in remote areas with no cats.

The second talk of the day entitled 'Automation in Serology' was from David Haines — Medlab Auckland. Thanks to his video accompaniment, David was able to give us a guided tour of the operations of his 'TECAN' automated robotic pipettor for use in a myriad of serology/immunology techniques. David was able to demonstrate the ease with which this analyser could cope with large volume work and the scope of the machine in handling a variety of tasks. David expressed his faith in the reliability and accuracy of the machine and how its introduction has allowed better utilisation of time within the laboratory. A very informative and valued presentation.

Next up was Stewart Smith on the titled subject of 'How Are Your Arteries?' — a presentation of systemic vasculatides. He spoke about the historical aspects of the recognition of vasculitis. The term polyarteritis nodosa (PAN) was coined in 1866 by Kussmaul and Maier. Subsequentlly it was recognised that vasculitis could affect veins and arteries of all sizes and the term polyangiitis was coined. Stewart talked about the classification of the necrotising vasculatides using the Chapel-Hill consensus conference on the nomenclature of the necrotising vasculatides which basically divides the vasculatides on the basis of vessel size affected'. He finally presented a case study of a lady who presented with Wegeners Granulomatosis.

Deborah Willis from the Immunology at Canterbury Health Labs 'preached' to us from her lectern — "Give us this day our daily germs". This extremely interesting talk was a review of an article from 'Immunology Today', March 1998. The authors proposed a theory that our modern vaccination regimes and obsession with hygiene are depriving our immune systems of an essential learning process. They drew similarities between the brain and the immune system in the way in which each is educated and suggested that without the types of microbiological challenges our bodies used to be exposed to. our immune systems are not developing as they should. This fails to maintain correct cytokine balance and fine-tune T-cell regulation, and may lead to an increase incidence of allergies and autoimmune diseases. They suggested that many of the vaccines in use today induce Th2 cells which are involved in humoral immunity and IgE mediated allergy. The authors concluded with the suggestion that vaccines be constructed that both protect from disease and provide an immunological stimulus that maintains the correct cytokine balance and the correct restraints on the activity of autoreactive T cells

Next up Gordon Sutton from Medlab South gave us a special insight into the workings of a biochemist-come very capable immunologist in his talk 'Automate or Die'. Gordon summarised for us the background of heterophile antibodies and the work he has been involved with in turning a manual screen test for infectious mononucleosis into a rapid automated turbidimetric assay that is both reliable and cost effective. Although still not at completion, this project looks to be promising and may offer a solution that can be picked up by

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other laboratories in reducing time spent on tedious manual assays within the laboratory.

Nicholle Heggie from Abbott Diagnostics Division spoke to us on 'The Value of Hepatitis Assay Quantitation'. Nicholle's talk initially focused on what are our clients looking for in the way of Hepatitis markers and what do they need, then moved on to what we are currently providing our clients, outlining the variations between the qualitative serology currently provided by most and the newer quantitative sereology methods available and also discussing techniques under the banner of 'DNA Technology'. A comparison of methods outlining the various advantages and disadvantages was given. Nicholle's talk was summarised in stating that Hepatitis quantitative serology is developing quickly and is easily implementable and the move to quantitation is already happening in some areas.

After mid-afternoon refreshment break we were soon back into the swing of things, Sheryl Young from Serology at Canterbury Health gave us a most enjoyable and informative talk, one that would later earn Sheryl the Best Presentation for the seminar. Her talk was entitled 'R. G's Dilemma ' and evolved around an interesting case study.

R. G. was involved in the testing of a Somalian refugee whose diet included unpasteurised milk and cheese and whose Brucella results presented in 1998 when tested as (SAT=1280, Coombs-1280, CFT=<8). Shortly after completion of testing R.G., herself presented with fever and chills with temps of 39.9, extreme fatigue and aching muscles — but don't be fooled. Although alarm bells rang and all the suspicion centered around the connection between our patient and R. G. the outcome was not as first thought but rather one of the more frequent cases being seen now of 'Slap Cheek' virus or Parvovirus B19 infection. (The connection and timing purely coincidental). Sheryl went on to overview Parvovirus infection indicating its epidemic nature of infection generally occurring every 3-4 years. The virus replicates in mitotic cells and can cross the placenta causing foetal infections. The virus is also passed through oral and respiratory secretions. It can be transmitted by blood and products but this is rare. Incubation is generally 6-18 days but can be up to 28 days. The first 20 weeks of pregnancy is the most important risk period, outcome post 20 weeks being generally okay. Problems occurring to the foetus during the 20-week period may include foetal anaemia, hydrops foetalis, spontaneous abortion and stillbirth. Infection in compromised patients may lead on to chronic disease Serology wise, levels of Parvovirus B19 IgM generally remain up for 2-3 months following infection but may remain up to 9 months. IgG antibody remains for life.

Following Sheryl's presentation, Lisa Brennan from Immunology at Canterbury Health, reported to us on her recent trip to the AIMS workshops held recently in Surfers. Lisa spoke on Thyroid chemistry in particular the 'Sick euthyroid syndrome' and the multifactorial causes of, and also the detection of autoantibodies in autoimmune disease. Lisa also touched on a new rapid card test for Glomerular Basement antibodies involved in Pulmonary Renal disorders, and on Coeliac disease antibody markers (including tissues transglutaminase antibodies), and Coeliac Pathogenisis — The 'Hapten' model of coeliac disease combining concepts of autoimmunity and food sensitivity. Lastly Lisa gave a summary of comparative studies of Eliza methodology vs Immunofluorescence for detection of ANA's. The conclusion being that Eliza methods do not appear yet to be specific or sensitive enough.

Last talk of the day was from Ruby Yee of the Hutt Valley Hospital who spoke to us on the topic 'Meningococcal Meningitis'. Ruby first presented a case study of a 3-month old male who had contracted Neiseria Meningitidis type B and whose family history indicated another 2 previous cases of meningoccocal meningitis, one of which was fatal. Ruby went on to show some interesting statistics from recent years that showed pronounced increase in meningococcal cases in particular ethnic groups, especially the Pacific Island population. Apart from socioeconomic reasons why are these great differences apparent? Studies have shown that individuals lacking different complement components carry increased risk of contracting (and in some cases recurrent) meningococcal disease and suggested that screening for complement deficiencies in cases where recurrant meningococcal disease and multiple family member infection occurs. Complement deficiency, inheritance mode, and its role in meningococcal disease was then discussed. The complement proteins appear to be inherited in an autosomal fashion except for factor P-Properdin which is X-linked.

Meningococcal infections are virtually the only clinical manifestation of those individuals with terminal complement deficiencies (c5-c9) or properdin. A deficiency of one of the terminal complement proteins may result in meningococcal infection with a 50-60% of cases having recurrent infection

In properdin deficiency however, fulminant meningococcemia has a case fatality rate of up to 75% in some families. The role of properdin and its function in the complement pathway was then outlined and the 3 properdin deficiency phenotypes described, all being associated with meningococcal disease. Ruby concluded her extremely interesting case by indicating that complement studies should be considered in patients with a family history of fulminant meningococcal disease. In many cases meningococcal disease may be the only indication of a complement deficiency.

Saturday evening was enjoyed by all with a great chance to catch up over pre-dinner drinks and some fine dining later that evening.

Our ISIG programme continued on Sunday morning with items of a more general nature. We were privileged to have in attendance, Shirley Gainsford who spoke to us with an update on various NZIMLS affairs. Rob Siebers followed briefly with an outline of requirements for fellowship. Lisa Brennan gave us all an update on the South Pacific Congress and this was followed by a chaired session for ISIG business with a number of issues being covered. (An expanded copy of these discussion sessions will be made available to ISIG members through the next Immunology newsletter.

The final item for the day was the prize-giving and issue of certificates. Sheryl Young being voted the best speech. The meeting was formally wound up around mid-Sunday.

I would like to take this opportunity to thank once again the organisers of this well-run seminar and also thank those companies and individuals for all their generous sponsorships offered to us for the successful running of this meeting. Finally, thank you to all who attended and participated in this weekend, your support is vital.

Transfusion Science

Special Interest Group

Convenors: Geoff Herd, Northland Hospital
☎ 09 438 2079
Sue Baird, Southland Hospital
☎ 03 218 1949

Abstracts from presentations at the 10th annual N.I.C.E. Weekend, held at Wairakei on 14-16 May 1999

Rampant Apathy

Glenn Anderson, Rotorua Hospital

A report of the various recruitment programs run by the Rotorua Blood Donor Centre.

Sex– A Penetrating Question

Raewyn Cameron, Rotorua Hospital

An alternative look at the "Special Health Questions:" we ask donors and our perceptions of the risks.

Topical and Tropical

Tony Morgan, Hastings Hospital

What risk does Aedes camptorhynchus (the carrier of Ross River virus) pose to recipients of blood transfusions?

HCV positive donations in northern region in 1997 and 1998

Gek Hong, Tan, NZBS Auckland

To review the HCV positive donations in Northern region in 1997 and 1998 by age, sex and race. Both years show similar statistics. The highest incidence of HCV positive donations were in males of European ethnicity, within the age range of 40-44 years.

	1997	1998
Total donations collected	59,000	59,373
% of HCV positive donations of total donations	0.05%	0.04%
% of total new donors that are HCV positive	0.3%	0.2%

Case Study of an HTLV-1 Repeat reactive Donor

Rebecca Horder, NZBS Auckland

NZBS Northern Region's interpretation of the Minimum Standards for HTLV-1 testing was changed on July 1, 1998. What happens when a donor who was previously excluded had to be screened for HTLV-1 under the new criteria.

Safe But Not Save

Tareq Mustafa, Hastings Hospital

Is autologous blood transfusion cost effective?

Haemoglobin Therapeutics – What's the Future for Blood Banking?

Lesley Jones, Tauranga Hospital

Haemoglobin-based oxygen carriers – What are they? What are the advantages of using them? And will they take over?

A Chapter of Accidents

Heather Henshaw, Medlab Timaru

Life in the country can be hazardous! This presentation follows a chapter of accidents that happened to a patient who was admitted to our hospital recently. Her rural lifestyle resulted in a problem for us in the Blood Bank!

Criteria for acceptance of specimens and forms for pre-transfusion testing

Jude Willis and Bernice Smith, NZBS Wellington

A discussion on acceptance criteria highlighting variation in practice.

Working in a Smaller Transfusion Department

By Johanne Milbank, Wanganui Hospital

A viewpoint on the requirements needed to make a smaller department successful from the point of collection to the transfusion of the unit.

A Change to the Core

Brydon Broadley, Hutt Hospital

This presentation overviews the downsizing and continuing integration of our Blood Bank into the Core Laboratory environment – the changes made and the role of NZBS in the move.

Lessons from the Green

Sharon Sims, Palmerston North Hospital

A brief presentation of some of the characteristics that distinguish an ordinary team from a highly successful one.

Report on Health and Safety Management in the NZBS-Northern Region

Christine Fowler, NZBS Auckland

This report looked at the management of health and safety in the NZBS, Northern Region. The objective was to determine whether or not all areas of the service had complied with the Health and Safety in Employment Act, and if not to identify the problem areas and seek resolution.

Fatigue Alert

Paulette Massey, NZBS Auckland

A brief discussion on the effects of shift work – how it alters our sleep patterns and ways to help avoid sleep deprivation.

Blood Product Forecasting – How good are we?

Leonie Robinson, NZBS Auckland

In order to ensure a continuing supply of fractionated blood products for New Zealand, CSL Bioplasma are dependent on accurate forecast of anticipated demand to plan production. This presentation reviews the forecast data provided against actual demand for that forecast period.

Thorns of TRALI

Suzanne Williams, NZBS Christchurch

Investigation of plasma donors implicated in a fatal case of non-cardiac pulmonary oedema also known as Transfusion Related Acute Lung Injury (TRALI) – a rare and serious complication of transfusion caused by leucoagglutinating, lymphocytotoxic or antineutrophil antibodies in the donor units which cause white cell aggregates which are trapped in the pulmonary microcirculation.

High Titre Antenatal Anti-K

Amanda Hayward, Dunedin Hospital

91/2 weeks gestation – titre 1024.

The Kell antigen, K1, is a strong immunogen, its antibodies can cause severe haemolytic transfusion reactions and HDNB. Mrs P presented as a referral from the private laboratory: "First antenatal screen, atypical antibody detected for identification." Mrs. P was 9½ weeks pregnant. Anti-K was identified. A case study will be presented. Mrs. P's edd is 8-6-99 and it will be interesting to see "the proof of the pudding – the final piece of the puzzle – we will know when the chicken has hatched."

Haemolytic Disease of the Newborn

Diane Matheson, Rotorua Hospital

A comparison between ABO and Rh haemolytic disease and some unexpected findings are presented.

Oh G, what do I do now?

Mark Bevan, Palmerston North Hospital

A brief introduction to the G antigen, a case study of anti-G formation in a R2rG patient and a question as to the relevance of anti-G to post-partum Rh-immunoglobulin administration.

Expect the Unexpected

Helen Norton, NZBS Christchurch

A case study of a patient with recurrent haemolytic episodes. Investigation found a negative DAT and antibody screen but, unexpectedly, a positive Donath-Landsteiner test.

Acquired Immune Haemolytic Anaemia post Splenectomy for Chronic ITP

Geoff Herd, Whangarei Hospital

A case of acquired immune haemolytic anaemia post splenectomy is presented. The patient developed haemolysis (while on prednisone) two weeks after splenectomy for chronic ITP. The presentation includes clinical and laboratory findings and explores possible mechanisms.

Intragam Use in Neuropathies

Sue Baird, Invercargill Hospital

Intragam use in the deep south is high – with the majority being used on patients with neuropathies. This talk will give a brief look into the disorders that use it in their treatment protocol. Plus an attempt to explain how it might work.

The CAT that Cheated Time

MaryAnn White and Dibby Sattler, Diagnostic Auckland

How new technology (Column Agglutination Technology) improved our workflow and result reporting.

A Wild Goose Chase

B. Curtis, NZBS Auckland

The NZBS NR has recently begun work to implement a DNA phenotyping method, which they are using to test amniocentesis samples. When one of these samples showed a baby whose mother/father could have a potentially 'interesting' phenotype, a sample was requested from the mother and referred on for further investigation. We tested this sample and found that mother did indeed have an interesting phenotype (r'r").

The Highs and Lows of anti-D Plasmapheresis Quantitations

Bob Coleman, NZBS Auckland

An E.I.A. anti-D quantitation method to monitor levels of anti-D in plasmapheresis donors was introduced in 1997. Our experience using this method on a panel of anti-D donors will be discussed.

Electronic Crossmatching – the Waikato Experience

Anne Burnand, Hamilton Hospital

Waikato Hospital Blood Bank has been doing electronic crossmatching since October 1998. This is a report on the setup of the system, advantages and disadvantages we have found.

Equipment Maintenance Database

Christine van Tilburg, NZBS Auckland

In Blood Products in Auckland we have a large number of pieces of equipment requiring continuous maintenance, monitoring, repair and calibration. Until 1997 we operated a First Choice database to record these activities. The installation of a new computer network, unable to run this programme, necessitated the rapid development of a new database. We have developed an Access database to fill our needs and are proud of the final (well we're always fine tuning) product.

Bone Banking

Warwick Henry, Nelson Hospital

It is considered that with blood donors the donor interview is a crucial first step in donor accreditation. With bone donors it should be regarded equally so. As bone donations will involve staff outside the supervision of the laboratory, who do we trust to carry out the donor interview?

A Review of Bone Banking Procedures in Tauranga Hospital

Shirley Thompson, Tauranga Hospital

Abstract not available.

Twelve Weeks in the Wilderness

Owen Sargisson

My experiences as a fourth year student during clinical placement.

Highlights of My Career

Diane Farr, Middlemore Hospital

Some interesting highlights from my blood banking career:

Blood bank in 1961
The first Jk(a-b-)
The discovery of the Milne antigen.

Blood Stream Project

Stephen Silk, NZBS Wellington

A presentation outlining this work, what changes have been made as a result and any future outcomes that we hope to achieve.

Being Responsible

Ray Scott, NZBS Northern Region

The legislation establishing the New Zealand Blood Service defined the Service's responsibility for blood as being from "vein to vein". Unlike many other national Blood Services, which effectively act as wholesale suppliers, the responsibility for the management and use of blood, even when the blood is in the possession of independent health providers, remains with NZBS. The opportunity to review the practical requirements associated with ensuring NZBS responsibility is met occurred recently with the establishment of a new private hospital in the Northern Region. This presentation will describe the approach taken and the experience gained from this exercise.

BEDS, BMS "R" US

Les Milligan and Florence Mitchell, NBS Christchurch

"The new computers for NZBS will help in all sorts of ways. These are some ideas I came up with:

- the computers will have email so they can send and receive information about the blood and what they can do with it.
- the computers will have a large memory span so they can store blood tests, who gave the blood, and what will happen to the different blood.
- these are quite good ideas though I do say so myself and I think that the NZBS deserve their computers."

These ideas will be developed and presented along with other facts pertaining to the new BMS system.

Apparently Anti-D

Maria Shaw, Hamilton Hospital

Apparent anti-D production by an apparent Rh (D) Positive antenatal patient.

Curiouser and curiouser

Sheryl Khull, Palmerston North Hospital

Just like Alice, everything we tried seemed to open the door to more strangeness. This is the story of our journey through a wonderland of antibody identification and the adventures we had on the way.

High Titre Low Avidity Antibodies and Antigens – A Case Study

Adeline Tjia, Middlemore Hospital

Investigation of high titre low avidity antibodies in TD, a 62-year-old causasian male diagnosed with lymphoma. He was initially typed as a R_2R_2 due to the presence of anti-e and anti-Ce. Over a period of $2^1/_2$ years, he received 47 units of R_2R_2 red cells. In view of recent results he was found to have either anti-Rg or anti-Ch instead and he was typed as ccDEe.

An Enzyme Antibody Causing Grief

Jane Burke, Whakatane Hospital

A case study of a multi-transfused man making an antibody, or was it antibodies?

Multi-Jill

Gill Morley, Hastings Hospital

History and difficulties of a multi-transfused patient.

Out of the Ordinary

Hoss Zibaei, NZBs Auckland

Early in 1999 a previously known Cook Island male with anti-Gerbich phenotype (Gerbich type of Gerbich negative) underwent surgery for a second aortic-valve replacement. Isotope red cell survival studies were conducted prior to his operation. These studies were conducted to see whether it could be possible to use a less rare blood type safely for his transfusion.

Case Study

Terri Shaw, Waikato Blood Service

This presentation will cover a brief case study of a newly identified anti-Lu^b and an overview of rare donor banks.

Top and Bottom – Part 1

Andrew Mills, Waikato Blood Service

Waikato's experience of trialing the Opti-System to prepare buffy coat platelets from an operational point of view.

Top and Bottom – Part 2

Gerri Jones, Waikato Blood Service

Quality analysis of data obtained from the Opti-System trial.

Too Many Red Cells

Iris Lee, NZBS Wellington

Minimum Standards for quality of blood components. Are centres having trouble with compliance? Do we need to look again at the parameters for Red Cells, Resuspended and Platelets from whole blood?

Water – How Clean is Clean?

Lynette Boden, Waikato Blood Service

Water contamination and its associated problems with EIA testing.

Validation of chillybins for transport of blood for transfusion

By Erolia Eteuati, Hamilton Hospital

There were concerns that multiple units of blood being issued out from Blood Bank in chillybins may not have been maintaining an adequate temperature over the four hour time limit set for transport and storage. This study looks at the type of chillybins used, the number and types of icepacks and the number of blood units being transported and stored.

POSTER – New Zealand – A Land of Serological Plenty: Rare and Unusual Phenotypes

By B. Curtis, NZBS Northern Region

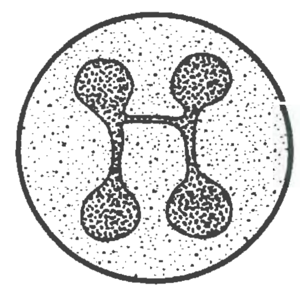
POSTER – A Light-hearted View of the History of Blood Transfusion

By Elizabeth Le Page, Hastings.

Haematology

Special Interest Group

SIG Convenor: Ross Anderson
Diagnostic Laboratory, Auckland
☎ 09 379 5225



Journal Based Questionnaire

Blood Vol 80, No. 7, Oct.1, 1992
Progress in Understanding the Pathogenesis of the Anaemia of Chronic Disease (ACD).

1. ACD is defined as the anaemia occurring in chronic infections, inflammatory disorders or neoplastic disorders (where there is not replacement of marrow by tumour cells) True False
2. It is characterised by an increased serum iron and total iron binding capacity with normal or increased iron stores True False
3. ACD does not include the anaemias caused by endocrine, renal or hepatic insufficiency. True False
4. Iron deficiency may be only second to ACD as the most common cause of anaemia True False
5. There are three pathological processes involved in ACD
   a) Shortened red cell survival
   b) failure of marrow to increase red cell production
   c) impaired release of iron from the reticuloedothelial system True False
6. There is an increased response of erythropoietin (EPO) in ACD but this is less than would be expected for the degree of anaemia True False
7. The failure of the bone marrow to respond to these increases in EPO is the primary cause of anaemia in ACD True False
8. Tissue necrosis factor (TNF) plays a significant role in inflammation and the immune response True False
9. Tissue necrosis factor (TNF) has been found to be decreased in those conditions causing ACD True False
10. TNF appears to inhibit erythroid precursor response but does not affect platelet or granulocytic procursors. True False
11. β interferon (βIFN) inhibits the action of TNF True False
12. IL-1 has a wide variety of actions in inflamation and immunity and shares many of the properties of TNF True False
13. IL-1 is elevated in ACD and correlates with the anaemia True False
14. Recombinant human IL-1 (α and β) inhibit erythroid precursors from normal marrow invitro True False
15. The inhibitory effect of IL-1α is mediated by TNFα True False
16. ϒ interferon (ϒIFN) is produced by B lymphocytes True False
17. ϒ IFN is involved in the modulation of immune and inflammatory responses as well as the host defence against microbial challenge True False
18. ϒ interferon inhibits erythroid progenitors and reticuloendethelial iron release True False
19. The distinctive feature of ACD is a low serum iron in the presence of adequate reticuloendothelial stores True False
20. The block in iron reutilisation or mobilisation is the cause of the hypoferremia True False
21. Impairment of erythropoiesis is the most important contributor to the anaemia of ACD True False
22. EPO treatment has been found to increase the haematocrit of patients with ACD True False
23. Cytokines inhibit erythroid progenitors, EPO production and impairment of iron release True False

Answers to the Journal Article

Laboratory Assays for von Willebrand Factor: Relative Contribution to the Diagnosis of von Willebrand's Disease. EJ Favaloro and J Koutts *Pathology* 1997; 29:385-391

1. F the vWF:Ag assay is quantitative only
2. T
3. T
4. F Treatment may vary depending on type
5. F 2M variants have decreased platelet dependent function
6. T
7. T
8. F The vWF RiCof has high inter assay and inter laboratory variability
9. T
10. F 2N variants have normal vWF:Ag to vWF:CBA ratio
11. T
12. T
13. F 2A variants will not induce RIPA with low dose Ristocetin
14. F Filtered plasma is unsuitable
15. T
16. T
17. T
18. T
19. F Pseudo vWD lack large multimers
20. T

Please note: These are the answers to last year's Journal based questionnaire on von Willebrands. If anyone has lost their copy of the article or the questions please contact:
Lee Glogoski
e-mail: l.gloski@middlemore.co.nz

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Report on the Workshop: Introduction to Immunophenotyping and Molecular Haematology

Held at the Department of Molecular Medicine, School of Medicine, Auckland Medical School.
On the 19-20th February 1999.

Being a "long-in-the-tooth" variety of Medical Laboratory Scientist, I thought that attending the above workshop would give me an insight into the kind of activities that the more "exotic" areas of Haematology undertake during the working week, compared to the more commonplace routine Haematology performed in my own community laboratory. I was not disappointed with what was served up. This workshop had the impact of stimulating me to the point of rejuvenation.

Various areas of the topic in question were touched on at individual sessions conducted by Jan Nelson, Neil Van De Water, Cathy Simpson and Dr Peter Browett from the Molecular Haematology Laboratory of Auckland Healthcare.

The first session on the Friday discussed immunological methodology for the analysis of acute leukaemia's and chronic lymphoproliferative disorders. Cathy Simpson outlined how immunophenotyping or cell marker analysis is now one of the routine procedures used in the diagnosis and classification of leukaemia's and lymphomas. Mention was made of the type of specimens that such procedures can be done on and include not only peripheral blood and bone marrow but fine needle aspirates, certain body fluids and even solid tissue and cell suspensions. Numerous monoclonal antibodies are now produced commercially and are available in both conjugated and unconjugated forms. Further changes have led to development of the Cluster of Differentiation or CD system. Immunoenzyme techniques are frequently used, alkaline phosphatase-antialkaline phosphtase (APAAP) being preferred for haematological disorders, and provided a permanent record. Immunofluorescence studies, particularly involving the use of flow cytometric analysis, allows for simultaneous multiparameter assessment of single cells. The cell interacts with a focussed laser beam and data indicating size, internal complexity and fluorochrome emission wavelength and intensity, is digitised for further analysis. The advancements made in molecular studies and complementary slide tests have combined to make flow cytometry a powerful diagnostic tool.

Immunophenotyping and its use in diagnosing types of acute leukaemia were discussed by Jan Nelson. This has been an essential tool for more than 10 years now and flow cytometry is indispensable for the immunological characterisation of leukaemic cells. Multiparameter analysis has improved due to the availability of new fluorochromes enabling 3 and 4 colour analysis and the introduction of CD45 gating to define the blast cell population. The importance of the use of morphology (thank goodness!) cytochemistry, immunophenotyping and cytogenetics in combination were outlined together with examples showing the use of classification charts. Special mention was made of biphenotypic acute leukaemia where both lymphoid and myeloid markers are expressed.

A particularly interesting part of the programme was the discussion of immunophenotyping in the diagnosis and classification of lyphoproliferative disorders. Cathy Simpson outlined the approved NCCLS guideline in the use of flow cytometry for immunophenotyping leukaemic cells in chronic lyphoproliferative disorders (LPD's). Peripheral blood and bone marrow are routinely tested for detecting LPDs. A lymphocytosis has to be differentiated as being reactive or of neoplastic expansion. The use of appropriate monoclonal antibodies in different panels was described and some interesting example cases were offered for us "novices" to attempt classification of.

Tools of genetic assays were outlined by Neil Van De Water. He discussed the development of DNA technology. Recombinant DNA technology has gained momentum with each new discovery, from the isolation of enzymes which allow manipulation of genes, such as restriction enzymes (cutting), ligase enzymes (joining), and polymerases (replication), to cloning techniques and DNA sequencing. Basic tools for molecular analysis in haematology have become routine. Techniques such as Southern Blotting, Northern Blotting, PCR and mutational analysis have become useful tools in the diagnosis and monitoring of many diseases.

The application of specific assays in Haematology were then described. Genetic disorders can be classified into 4 main categories: (1) Single gene disorders such as haemophillia and alpha thalassaemia, (2) Multifactorial disorders such as coronary heart disease and cancer, (3) Chromosomal abnormalities such as Down's Syndrome, and (4) Somatic cell disorders such as the various forms of leukaemia. For many haematological disorders DNA analysis is the method of choice to determine carrier status and for prenatal and presymptomatic diagnosis. Linkage analysis is used indirectly and problems can arise which include the need for family studies, non-paternity and recombination between the defect locus and the marker. These problems can be overcome by direct analysis of the defect and with the rapidly expanding knowledge of genetic mutation, this is becoming a reality. Analysis of leukaemia by molecular techniques provides a useful diagnostic tool and is invaluable in monitoring disease during treatment. There are, of course, potential ethical and social implications with the results of such testing. Specific mention was made during a discussion session of Factor V Mutation, haemochromatosis gene, Prothrombin variant and Haemophilia A and B.

Dr Peter Browett gave very interesting clinician's perspectives in regard to the use of immunophenotyping and molecular assays in a haematological setting.

The following morning (Saturday), we were treated to some more practical aspects as part of a tour through the actual laboratory. Many of the afore-mentioned processes were shown to us in the various side rooms of the laboratory. Techniques were demonstrated along with the instruments used to perform many of them.

As mentioned before, I found this workshop to be very stimulating and would recommend anyone involved in routine Haematology testing to attend such a programme if offered again.

David Pees
Assistant manager
Haematology Department
Medlab Limited
Auckland

Book Review

Abbot Diagnostics New Zealand have previously advertised, directly to Haematology Laboratories, the availability of a limited fund for educational material. Applications should be made to Abbott Diagnostics. To support this offer, from time to time, book reviews will be published by HSIG.

Haematology Laboratory Management and Practice
Edited by: SM Lewis and John A Koepke
Published: 1995 Butterworth Heinemann; ISBN 0-7506-0965-8
232 pages, hardcover
Price: Approx $235 + GST

This book discusses contemporary issues of service quality and delivery in Haematology Laboratories. It is presented in 4 parts: 1) Role of the Physician in Haematology Laboratory Practice, 2) Laboratory Management – Principles and Practice, 3) Analytic Methods and Systems, 4) Quality Assurance. Some of the topics covered include appropriate use of the laboratory, test selection and reporting of results; laboratory economics, turnaround times, workload and performance indicators; instrument/kit evaluation, development of reference ranges; regulatory and professional standards.

The text has been compiled by two internationally recognised haematologists under the auspices of the International Council for Standardisation in Haematology (ISCH). There are 26 contributors, slightly more than half from the USA, most of the rest from the UK, and a small number of other Europeans.

Traditionally haematology laboratory texts have focussed on technical proficiency. This book adds an appraisal of issues pertaining to organisation and management in laboratories. The content will be of interest to all staff involved in technical, clinical and administrative aspects of haematology laboratory service delivery. Specific chapters are dedicated to coagulation and transfusion medicine. Subject material is presented in numbered format for headings and subheadings. There are many useful tables, and references to ICSH and NCCLS documents.

I recommend this text to all haematology laboratories as a valuable reference for managers, and a comprehensive overview of organisational principles for all staff.

Janene Madgwick
HSIG

Direct Evolution of a Full Professor

Author unknown, but is rumoured to be seriously considering a career outside academia

Objectives

Success in academia is hypothesised to require specific phenotypes. In order to understand how such unusual traits arise, we used human clones to identify the molecular events that occur during the transition from a graduate student to a full professor.

Methods

A pool of graduate student clones was subjected to several rounds of random mutagenesis followed by selection on Minimal Money media in the absence of medical insurance. Students surviving this selection were further screened for the ability to work long hours with vending machine snacks as a sole carbon source. Clones satisfying these requirements were dubbed "post-docs." In order to identify lecturers from among post-docs, this pool was further mutagenised, and screened for the ability to turn isoteric results into a 50-minute seminar. Finally, these lecturers were evaluated for their potential to become full professors. They were screened for over-production and surface display of stress proteins such as Hsp70. Lecturers that displayed such proteins (so-called "stress-out" mutants) were then fused to the M13 coat protein, displayed on phages and passed over a friend and family members column, to identify those that were incapable of functional interactions. These were called full professors.

Results

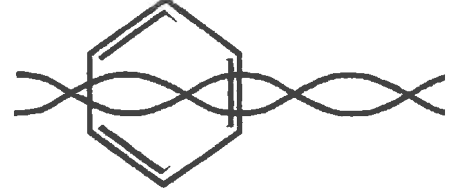
Although these mutants arose independently, they shared striking phenotypes. These included the propensity to talk incessantly about their own research, the inability to accurately judge the time required to complete bench work, and the belief that all their ideas constituted good thesis projects.

Conclusions

The linkage of all these traits suggests that these phenotypes are coordinately regulated. Preliminary experiments have identified a putative global regulator. Studies are currently being conducted to determine if over-expression of this gene product in post-docs and great students can speed up the graduate student-full professor evolutionary process.

Biochemistry

Special Interest Group



Convenor: Trevor Walmsley
Canterbury Health Laboratories, Christchurch
☎ 03 364 0300

Biochemistry Special Interest Group Seminar

This was held at Rotorua Hospital on Saturday 24 April, the meeting was well attended with 59 participants from laboratories and vendors. Shirley Gainsford opened the meeting with an "Update on the NZIMLS" and gave a big thank you for the reinstatement of the Biochemistry Special Interest Group Meeting into the NZIMLS calendar. Tony Mace (Pathlab Waikato) spoke on "Glucose Tolerance Testing" with a plea for standardisation of testing and interpretation of results. James Hurst (Pacific Health) discussed "QC Barcodes on the Hitachi 912" and detailed his method for routine QC on this analyser. Jane Kerridge and Julie Kearse (Wanganui Base Hospital) presented a Trap For Young Players and highlighted problems with analysis of samples with extremely abnormal analyte levels. This paper emphasises that the scientific companies are not the experts and they need to work with laboratories to develop methods that work in the real world. Trevor Walmsley (Canterbury Health Laboratories) described "Pseudo-hyper-tryglyceridedemia" in a patient with glycol-kinase deficiency. Rob Siebers (Wellington School of Medicine) used "How not to get your paper published" to illustrate what you should and shouldn't do when writing a paper and he encouraged everyone present to publish their work in the NZIMLS Journal. Jeremy Whimster (Medlab BOP) described his "Weekend Blues" as he recalled the events that occurred during one weekend involving a patient with bizarre results from a glycol poisoning and Kathy King described a similar occurrence when her dog was poisoned two weeks later after drinking antifreeze from a bucket. Both poisonings were fatal and Kathy illustrated how attractive these glycol products are packaged and how easy it would be for unsuspecting parents to expose their children to this risk. Jo Burnett (Diagnostic Laboratory) gave details on "GGT Interference" and Martin Black (Nelson Diagnostic Laboratory) explained "Haemochromatosis - in a Family Study". Chris Budgen (Auckland Hospital) explained "Co-oximetry measurement - why we use it". Elizabeth Bonagura (Bio-Rad Laboratories) discussed "QC Measurement" and gave an insight into QC materials from a manufacturers point of view. Dennis Reilly (Diagnostic Laboratory) discussed why "Potassium Daily Means" had changed over a 12-month period and he also discussed "Specimen Flow through the Automated Area" right from the point of collection through storage and the precautions taken to eliminate carryover in hepatitis testing. John Sheard (Coast Health Care) gave details "B12 and Folate on Elecsys 2010" and cleverly illustrated his talk with some interesting cartoons. Daphne Fairfoot (Medlab Auckland) talked about her "Experience with the Vitros 950" and her reasons for selecting the dry chemistry analyser. Linda Henderson (Medlab Auckland) discussed her experience with "HbA1c on the Primus" and gave details of the precision levels she can achieve. John Shuker (Medlab Taranaki) researched the details to answer the question we all dread — "There is Something Wrong with Your Ananlyser" and traced the varying ALT levels to homoeopathic treatment by the patient. A general discussion followed and covered tropnins and sample stability, glucose loading etc. The final event of the day was a meal at the skyline Gondola restaurant and some braved the cold and rode the luge.

I would like to say a special thank you to Nicki Thomas for her help in organising the meeting.

I would like to thank Abbott Diagnostics, Bio-Rad Laboratories and Radiometer Pacific who kindly helped out with sponsorship for the meeting. Apologies to our other vendors — a blanket policy prevents SIGs directly asking the vendors for sponsorship, so please don't feel left out and if you want to help next time please contact the organisers — your help will be appreciated. Types of sponsorship that are not essential but appreciated are: notepads/pens, transport for an invited speaker, prize for best paper etc.

New Year's Biochemistry SIG Meeting at Nelson in April 2000 — any feedback/constructive criticism about our last meeting that would be useful to organisers or offers of sponsorship please contact Trevor Walmsley (chhlth@chhlth.govt.nz)

Thank you to all participants.

Trevor Walmsley (Convenor)

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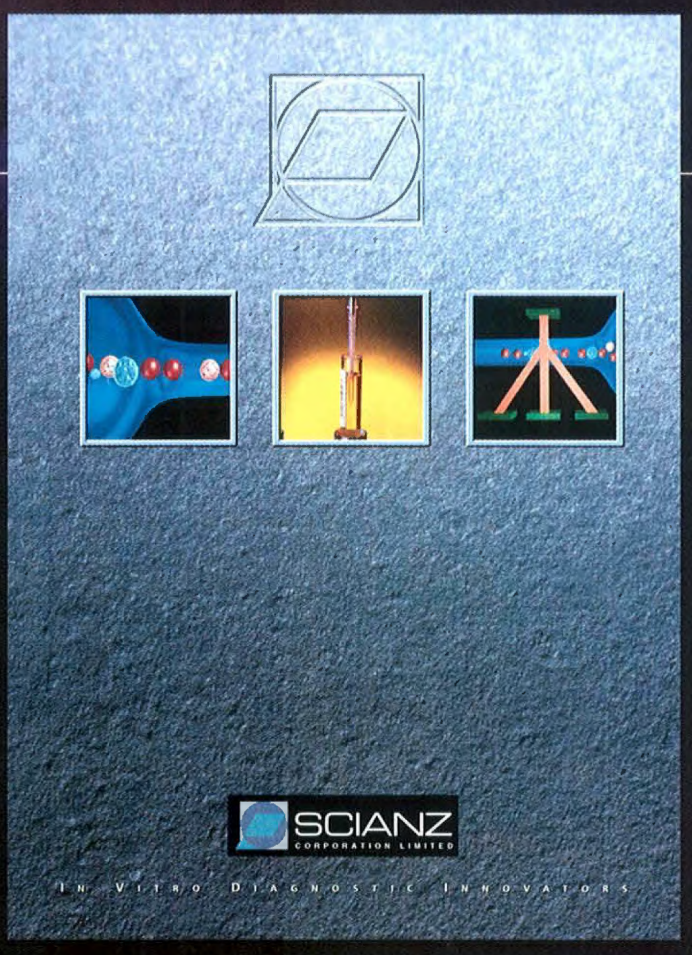

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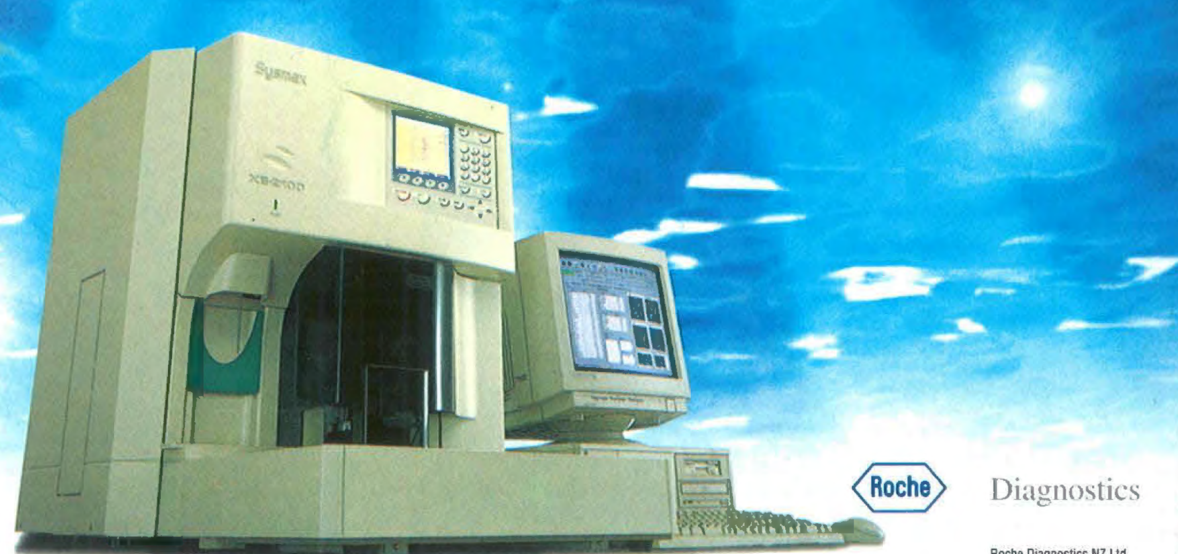

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