DIvision of Medical Microbiology

Head: Prof E Wasserman

Diagnostic Service

Both the Bacteriology and the Immunology sections were able to maintain the high standards of clinical service during the past financial year. The division was able to increase clinical involvement through the newly founded Centre for Infectious Diseases, and the staff remain motivated to offer a cost-efficient service that contributes constructively to patient management. The Head of the Division (HOD) and the consultants from the Division of Medical Microbiology conducted regular visits and talks to Clinical Divisions in Tygerberg Hospital to improve clinical interaction, facilitate channels of communication and to ensure that the Division of Medical Microbiology provides a clinically relevant service.

Incidents of note:

Staff from the Division isolated a strain of *S. aureus* from a paediatric patient with reduced susceptibility to the glycopeptides. An MRSA outbreak in the neonatal wards late 2007 is still being monitored. Other problem organisms that were isolated in 2007 include multi-resistant Pseudomonas (Burns Unit) and Acinetobacter. Thirty cases of multi drug resistant TB were diagnosed during 2007. Twenty three of these cases occurred in adults and seven in children.

The Immunology Section at NHLS Tygerberg Hospital is a referral laboratory for auto-immune markers, as well as for the evaluation of patients with primary immunodeficiencies. During 2007 the Immunology Section introduced an Anti CCP test as a more specific marker for rheumatoid arthritis. The Section investigated and initiated the introduction of semi-automation of specific antibody studies.

Future plans: Plans request for a PCR facility to aid in the early diagnosis of TB was approved. Renovations and refurbishing will hopefully begin early in 2008. This facility will significantly reduce the turn around time of our tuberculosis diagnostic service.

Research Initiatives and Projects

A further four NHLS and two NRF research grants have been secured by the division during the period under review. Research assistance and physical space dedicated to research activities and post-graduate students remain a major problem.

During 2007, a Southern African Regional branch of the FAIMER institute was successfully founded, with Prof Wasserman as a member of its board. The objective of this initiative is to enhance medical education and research in Africa.
Prof Wasserman is the co-investigator of a collaborative research project with Würzburg University in Germany, which has a focus on the exchange of knowledge and skills development regarding the laboratory characterization of staphylococci causing complicated infections.

Prof Wasserman was part of a group of researchers from Stellenbosch University and UCT that visited Vancouver, Canada, in November last year to plan a birth cohort study that will focus on infectious diseases occurring in children in the Western Cape.

This Division collaborated with UCT colleagues to publish an update on the booklet – ‘Antimicrobial Guidelines for Academic Hospitals of the Western Cape’. This booklet is distributed to doctors in all wards at TBH & GSH as well as in peripheral hospitals.

The division was involved with 6 publications in peer reviewed journals, 1 published abstract and 11 national and 3 international congress presentations.

Summary of research projects currently running in the Division:

- **Enhanced surveillance of invasive bacterial pathogens**
  We continue to be one of the ‘enhanced surveillance sites’ collaborating with the NICD to monitor invasive pathogens and their antimicrobial sensitivity profile. Dr S Martin, senior registrar from this Division is the project leader of this study which is partly funded by the NICD.

- **Gonococcal resistance and STD surveillance**
  We were a pilot site for the extended surveillance of sexually transmitted diseases during 2007 in collaboration with David Lewis of the NICD. The NICD employed a clinic sister as well as a technologist to collect the samples and do the necessary tests.

- **Non-gonorhoeal urethritis pathogens in pregnant women**
  A PhD student (Ms S Govender) is developing molecular techniques to investigate the prevalence of sexually transmitted pathogens in pregnant females in the Eastern Cape, and examining the effect of these on the outcome of pregnancy. Dr L Chalkley (previously from the MRC) is her promoter and Prof E Wasserman is her co-promoter. This project is funded by a Stellenbosch University Research Grant.

- **Vancomysin resistance in MRSA**
  An BSc Hons student, Ms Z Salaam, investigated trends in Vancomycin susceptibility of the MRSA isolates from our hospital. Dr H Orth from our Division, is her promoter. This project is continuing as a masters study.

- **Characterization of staphylococcal isolates causing persistent bacteraemias**
  We are embarking on a prospective characterization of staphylococcal isolates causing persistent bacteraemias in our patient population. An MSc and a BSc honours student will be taking this project further during 2008.

- **Tigecycline evaluation surveillance trial**
  We are busy with a surveillance trial that will determine the susceptibility of bacteria in this setting to Tigecycline. This study is funded by Wyeth Pharmaceuticals.

- **Antimicrobial synergy testing of Acinetobacter baumannii**
An MMed student, Dr S Martin is investigating methods of antimicrobial sensitivity testing of *Acinetobacter baumanii*. Dr H Orth from Division of Med Microbiology is his promoter. Funding from an NHLS Grant is still pending.

- **Surveillance of antimicrobial susceptibility of anaerobic organisms**
  We are conducting a surveillance study of the antimicrobial susceptibility of anaerobic organisms. This study is conducted by an MSc student Ms Y Prince in conjunction with Dr R Hoffmann from UCT and is partially funded by Davies Diagnostics.

- **A study of invasive pathogens cultured by blood cultures to detect septicaemia**
  A prospective study of invasive pathogens cultured by blood culture is underway to analyze the clinical profile of septicaemia in our patient population. This project is conducted by an MMed student, Dr Z Gqada, and Dr C Bamford is his promoter.

- **Register of invasive fungal diseases, other than candidaemia**
  We established a biobank of invasive fungal pathogens together with the MRC, which will monitor emerging and re-emerging fungal infections in our population. This study will be done by Dr H Orth and Prof E Wasserman from our Division in conjunction with the Centre for Infectious Diseases, Division of Anatomical Pathology, Dermatology and Dept of Microbiology, Stellenbosch University Main Campus. An application was made for an NHLS Grant to fund this initiative.

- **Chlorination resistant *E. coli* isolated from environmental water**
  We worked with Dr Jo Barnes of the Division of Community Health on a project that investigated the relationship between chlorination tolerant *E. coli* and antimicrobial resistance of organisms isolated from the surface water of the Western Cape. An MSc student, Ms M Krige is a co-worker on this study and funding was obtained from a NHLS Grant.

- **Laboratory diagnosis of septic arthritis**
  A study was conducted that investigated the yield of positive cultures from septic arthritis, using improved culture techniques. An MMed (Clin Path) student, Dr L Nutt is doing this project in completion of her MMed degree and funding was obtained through a NHLS Grant. Dr H Orth is her promoter.

- **Several projects are ongoing that focuses on the development of in-house molecular techniques for the diagnosis of tuberculosis. Y Prince, and MSc student, is investigating molecular methods for the diagnosis of the agents causing chronic tuberculosis. Prof E Wasserman is her promoter, and the study received an NHLS grant. Another MSc student, J Lynch, is also working on the development of a cost-effective PCR technique to diagnose tuberculosis. She applied for an NHLS grant in 2008 to support the further development of the study.**

- **Development of MALDi-TOV for diagnosis of tuberculosis**
  Flow cytometric methods and the use of the MALDi-TOV instrument are also evaluated for the diagnosis of tuberculosis. Ms E Odewole (MSc student) is doing this study in conjunction with the University of Manchester in the UK under supervision of Prof P Bouic from Synexa Group and this project is partially funded by the Waters Corporation.

- **The optimization of laboratory cultivation of childhood mycobacterial disease in S.A.**
An MTech student, Ms W Brittle, is comparing culture methods for the diagnosis of BCG disease in immune-compromised children. This study is funded by an NHLS grant. Prof E Wasserman is her co-promoter.

- **A randomized comparative study of acetic acid eardrops versus boracic acid powder in the medical management of chronic suppurative otitis media (CSOM)**
  
  We are collaborating with the Ear, nose and throat division at Tygerberg Hospital in a clinical trial that evaluates various treatment modalities for chronic otitis media. Dr Z Gqada is the collaborator on this study for his MMed degree and Dr H Orth is his promoter. This study is funded by an NHLS Grant.

- **Real time PCR as a diagnostic tool for detecting BTK mutations in agamma-globulinaemia**
  
  A real time PCR method is developed as a diagnostic tool for detecting BTK mutations in agamma-globulinaemia. A BSc Hons student, Ms M Leo is working on this project, Dr M Esser is her promoter and an application for an NHLS grant is pending.

- **Flow cytometric investigation of Lymphocyte Activation Markers**
  
  A flow cytometric investigation of lymphocyte activation markers is continuing. Ms M Ryan, MSc student is working on this project & Dr M Esser is her promoter. An NHLS Grant is the source of funding for this project.

- The relevance of anti CCP measurement in the HIV infected patient is investigated in collaboration with the Department of Internal Medicine.

- **In vitro evaluation of Thymus Nuclear Protein (TNP) as an apoptotic agent**
  
  An *in vitro* evaluation of Thymus Nuclear Protein as an apoptotic agent was recently completed in collaboration with Synexa laboratories. Ms A Clark was the collaborator on this study and obtained her MSc degree during March 2008. Prof P Bouic was her promoter.

- **Development of flow cytometric method for tuberculosis diagnosis**
  
  A study on the development of a flow cytometric method for tuberculosis diagnosis was completed at the end of 2007. Ms A-R Louw obtained her MSc degree. This study was funded by Synexa Laboratories and Prof P Bouic was her promoter.

- **A comparison of diagnostic modalities for desiminated TB infection in children**
  
  The above study is undertaken by Dr R Abrahams for his MMed degree. He is doing this in conjunction with the Div of Haematology in Tygerberg Hospital. Prof E Wasserman is his promoter and the NRF Thuthuka Grant is sponsoring this study.

**TEACHING AND TRAINING**

**Undergraduate**

The Division of Medical Microbiology, Tygerberg maintained its extended involvement in the MBChB curriculum and also presented modules in the BSc Dietetics programme, and lectures in the BSc biotechnology programme as well as the BCHD programme for dental students of the UWC. Prof E Wasserman continues to serve on the MB.ChB Programme Committee, the Faculty Postgraduate
Education Committee and the Selection Committee for MB.ChB. She is also involved in the process of revising the current MB.ChB curriculum.

Proff J Bezuidenhout and E Wassermant are 2 of the 11 FAIMER (Foundation for the Advancement of Medical Education and Research) fellows from South Africa that are currently actively involved in the development and establishment of the Southern African FAIMER Regional Institute (SAFRI). After the initial success of the American FAIMER Institute, it was decided to expand involvement to regional level. The SAFRI was launched in February 2008 and is the 5th such regional institute (3 in India and 1 in Brazil), where ongoing exchange among health professions educators contributes to expand improvement in local health professions education systems. SAFRI currently includes 13 fellows from five South African universities, 2 fellows from Uganda and 1 from Zambia. SAFRI is modeled on the FAIMER Institute curriculum.

Medical Technologists from this division gave lectures and practical training on a regular basis to trainee medical technologists from CPUT. Eight final year Clin Path student medical technologists rotated through the department during 2007. The first trainee technician to be trained in this department passed his exam in October. Another trainee technician was appointed in July.

**Postgraduate**

Two BSc honours students in Medical Microbiology graduated with honours at the end of 2007. Two MSc students will graduate in April this year. A further seven MSc, four MMed and two PhD candidates are continuing their postgraduate studies in this Division. The Division successfully applied to the HPCSA for a fourth registrar post.

During 2007 Dr Monika Esser, Head of the Immunology Section obtained her official registration with the HPCSA as Paediatric Rheumatologist Subspecialist, one of four Paediatricians in South Africa now registered in this field.

First Immunopaedia Workshop (Novel Immunology teaching method) was held at the Medical School, Tygerberg Academic Health Care Complex on Friday 27th July 2007. The convener, Dr Monika Esser, Head of the Immunology Section, in collaboration with Proff Clive Gray – NICD and Patrick Bouic from Synexa hosted a morning workshop with an interactive Immunology Teaching Method aimed at Registrars in Pathology and Medical Speciality Training. Twenty one participants were evaluated with questionnaires pre and post workshop as to knowledge uptake and attitudes to the subject of Immunology. Judging by the enthusiastic comments of the participants there is a need for offering further such workshops. The Immunopaedia concept is funded by the Elizabeth Glaser Foundation and conceived by Prof Clive Gray of the NICD, aimed at updating Immunology concepts and knowledge in a more interactive form by means of case study constructs available on the web [www.immunopaedia.org.za](http://www.immunopaedia.org.za), or via workshops. Key concepts include those relating to HIV Immunology, other immunodeficiencies and dysregulations.

Dr Monika Esser convened the Paediatric Session at the SARAA Congress on 6 – 9 September 2007, chaired a session and also presented a paper.

Dr Monika Esser convened a Paediatric Rheumatology Workshop with Prof Ross Petty from the Paediatrics Dept, University of British Columbia, as Keynote Speaker on 3 – 6 September 2007.

Dr M Esser together with the Flow Cytometry Division organized two 1-Day Flow Cytometry Introductory Courses for pathologists, registrars and technologists during August and September 2007.
Dr M Esser was invited to become the SA Representative of the Medical Advisory Panel of IPOPI (International Patient Organization for Primary Immunodeficiency).

Prof Wasserman acted as external examiner for the Nelson Mandela University in Umtata during Nov 2007.

Prof Wasserman was a member of the HPCSA accreditation panel for the MBChB curriculum at UCT during October 2007.

In November, Prof Wasserman attended the ‘Towards Unity for Health’ conference in Kampala, Uganda and participated in negotiations to found East- and Western Africa Regional Institutes to improve medical education and research.

Dr Monika Esser & Ms Jenade Lynch (Intern Scientist) attended a workshop on ‘General Research Orientation for recently appointed academic staff’ presented by Stellenbosch University’s Division of Research Development on 20 June 2007.

Dr Colleen Bamford, Monika Esser, Ms Jenade Lynch attended the 14 X 3-hour sessions Short Course on Clinical Research Methods during September/October 2007.

COMMUNITY SERVICE AND INTERACTION

Members of the Division visited regional hospitals and laboratories to inform and update clinicians and laboratory staff on various aspects of Medical Microbiology.

CONFERENCE PRESENTATIONS

International Congresses:

Lewis DA, Scott L, Slabbert MM, Mkhonto S, Van Zijl A, Ntuli D, Du Plessis N, Wasserman E, Radebe F. Escalation in the prevalence of ciprofloxacin resistant gonorrhoea in men presenting with urethritis to public health facilities in two South African cities.\textit{17}^{\text{th}} \text{ISSTDR Meeting/10}^{\text{th}} \text{IUSTI World Congress, Seattle, WA. 29 July – 1 August 2007.}


National Congresses:
Bamford CM, Shankland M, Whitelaw A. Reduced susceptibility to amikacin in ESBL-producing Enterobacteriaceae at Groote Schuur Hospital. FIDSSA 2nd Joint Congress, Spier Hotel & Conference Centre, Stellenbosch, South Africa. 28 – 31 October 2007.


Clark A, Bouic PJD. The effects of different bacterial vaccine preparations on in vitro dendritic cell activation and maturation. FIDSSA 2nd Joint Congress, Spier Hotel & Conference Centre, Stellenbosch, South Africa. 28 – 31 October 2007.


Krige M. Chlorination and antimicrobial resistance of E. coli strains isolated from surface water in the Western Cape. FIDSSA 2nd Joint Congress, Spier Hotel & Conference Centre, Stellenbosch, South Africa. 28 – 31 October 2007.


PUBLICATIONS


