Medical Research Council of South Africa ANNUAL REPORT 2005

TRANSLATING RESEARCH INTO HEALTH SOLUTIONS
MRC Annual Report 2005
Research is the cornerstone of health care, and the Medical Research Council’s
task is to improve the health of the population of South Africa through excellent
scientific research.

About the MRC
The South African Medical Research Council (MRC) is one of South Africa’s

The MRC’s task is to promote and conduct health research. The results of this
research can be translated into policy, health promotion, health practice and
products that improve the health and quality of life of all South Africans.

Vision
Building a healthy nation through research.

Mission
To improve the nation’s health and quality of life through promoting and
conducting relevant and responsive health research.

Organisational culture
The MRC is responsible for, and passionate about, Africa’s development and
welfare.

The MRC respects:
• Ethics and human rights
• Capacity development
• Indigenous knowledge and culture
• Information and knowledge management
• Intellectual property.

Values of the MRC
Transparency and open communication • Freedom to challenge •
Accountability • Responsibility • Teamwork • Leadership • Participation •
Respect • Dignity • Innovation • Honesty • Fairness and integrity • Reward
and recognition • Excellence • Capacity development.
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## MRC RESEARCH UNITS, GROUPS, CENTRES AND LEAD PROGRAMMES

| National Programme for Environment and Development | Alcohol and Drug Abuse Research Unit  
|                                                      | Exercise Science and Sports Medicine Research Unit  
|                                                      | Health and Development Research Group  
|                                                      | Health Promotion Research and Development Group  
|                                                      | Occupational and Environmental Health Research Group |

| National Programme for Health Systems and Policy | Biostatistics Unit  
|                                                    | Burden of Disease Research Unit  
|                                                    | Cochrane Centre  
|                                                    | Health Policy Research Group  
|                                                    | Health Systems Research Unit  
|                                                    | National Telemedicine Lead Programme  
|                                                    | Rural Public Health and Health Transitions Research Unit |

| National Programme for Non-Communicable Diseases | Anxiety and Stress Disorders Research Unit  
|                                                    | Cancer Epidemiology Research Group  
|                                                    | Chronic Diseases of Lifestyle Research Unit  
|                                                    | Crime, Violence and Injury Lead Programme  
|                                                    | Diabetes Research Group  
|                                                    | Interuniversity Cape Heart Research Group  
|                                                    | Medical Imaging Research Unit  
|                                                    | PROMEC Unit |

| National Programme for Infection and Immunity | Clinical and Biomedical Tuberculosis Research Unit  
|                                                   | Diarrhoeal Pathogens Research Unit  
|                                                   | Genital Ulcer Disease Research Unit  
|                                                   | HIV and AIDS Research Lead Programme  
|                                                   | HIV Prevention Research Unit  
|                                                   | South African AIDS Vaccine Initiative  
|                                                   | Immunology of Infectious Disease Research Unit  
|                                                   | Indigenous Knowledge Systems Lead Programme  
|                                                   | Inflammation and Immunity Research Unit  
|                                                   | Malaria Research Lead Programme  
|                                                   | Unit for Tuberculosis Operational and Policy Research  
|                                                   | Respiratory and Meningeal Pathogens Research Unit  
|                                                   | South African Traditional Medicines Research Group  
|                                                   | Tuberculosis Research Lead Programme |

| National Programme for Molecules to Disease | Bioinformatics Capacity Development Research Unit  
|                                            | Bone Research Unit  
|                                            | Centre for Molecular and Cellular Biology  
|                                            | Human Genetics Research Unit  
|                                            | Human Genomic Diversity and Disease Research Unit  
|                                            | Liver Research Centre  
|                                            | Molecular Hepatology Research Unit  
|                                            | Molecular Mycobacteriology Research Unit  
|                                            | Oesophageal Cancer Research Group  
|                                            | Research Group for Receptor Biology |

| National Programme for Women and Child Health | Gender and Health Research Unit  
|                                               | Maternal and Infant Health Care Strategies Research Unit  
|                                               | Mineral Metabolism Research Unit  
|                                               | Nutritional Intervention Research Unit |
The Medical Research Council respectfully submits the following Annual Report on its activities from 1 April 2004 to 31 March 2005.

The Council wishes to acknowledge the support received from the Honourable Minister and the Department of Health, for which it is extremely grateful, and thanks the Ministry for its contribution to the MRC’s efforts to respond to the health research needs of the nation.

The Council thanks all our colleagues in the scientific community for their continued contribution to health research in South Africa.

Finally, the Council wishes to state its appreciation for the work of its own members of staff and all the other researchers it supports, and expresses its gratitude for all the advice and guidance received from members of the Board, Committees, Evaluation Panels and Task Teams.

Professor M. F. Ramashala  
Chairperson of the Board

Professor A. D. MBewu  
MRC President
The Medical Research Council of South Africa is entering a period of accelerated transformation and development of its research priorities, research portfolio, capacity development and employment equity profile. This was determined and planned at a recent workshop held by the MRC Board together with Executive Management Committee. Great gains have already been made, particularly in the 12 years since the MRC adopted essential national health research (ENHR) as the guiding philosophy of its research in 1993. The pace of progress increased after 1994 with prioritisation of the MRC research portfolio and development of performance management. The opportunity now exists to complete that transformation over the next few years resulting in an MRC that conducts research relevant and responsive to the health needs of the people of South Africa.

The Board is proud of the achievements of the MRC staff outlined in this document. It is confident that these achievements can be further developed. In the next 3-5 years the MRC expects more black and women scientists to be brought into the research process at doctoral and postdoctoral level. The outputs are documented in the key performance indicators (pp. 7-12), and the outcomes in terms of better health and socio-economic development are described in the research highlights and other sections of this report.

Furthermore, the organisation is on a sound financial footing with fully 50% of its total income generated from contracts and grants; the other 50% comes from the more reliably sustainable source of the government grant from the National Department of Health. Since 1 April 2005 the NDoH became the primary government department to which the MRC reports, and with which the MRC establishes priorities and undertakes performance management.

Nevertheless, the MRC will continue to operate within the National System of Innovation of South Africa, with access to the programmes and grants of the Department of Science and Technology (DST), such as the Innovation Fund. Indeed, the MRC is proud that two of its research units were recently granted Centre of Excellence status by the DST – the Centre for Cellular and Molecular Biology at the University of Stellenbosch, and the Molecular Mycobacteriology Unit at the University of the Witwatersrand. Sometimes overlooked are the vitally important support divisions of the MRC whose work is regarded as among the highest quality of any support functions within any parastatal. Examples include the research grants management system of the MRC, which was recently chosen to administer the peer review and grant disbursement processes of the NDoH Reference Committee for Research within the Comprehensive Plan for the Management, Treatment, and Care of HIV and AIDS.

Making the MRC a more rewarding place to work has always been a priority of this Board and its Executive Management Committee. It was particularly gratifying therefore to witness the successful efforts this year to bridge the gap that had developed between the levels of MRC salaries and those of sister organisations. More work needs to be done since the gap is only half closed; and this will form part of efforts to continually improve the Conditions of Service of employees, and to build a harmonious organisation with shared values and a renewed sense of mission and purpose.

On behalf of the MRC Board I would like to thank the Minister of Health Dr Manto Tshabalala-Msimang for the faith and trust she has placed in us in steering this valuable national institution.
MRC BOARD

1. Prof MF Ramashala (Chairperson)
2. Mr MP Canca (Vice-Chairperson)
3. Prof Ahmed A Azad
   Faculty of Health Sciences, University of Cape Town
4. Dr JF Hartzell
   Co-ordinator
   Traditional, Complementary & Alternative Medicine,
   Nelson R. Mandela School of Medicine,
   University of KwaZulu-Natal, Durban
5. Prof LJ King
   Aga Khan University
   Regional Office, Nairobi, Kenya
6. Ms JN Makhanya
   Durban Institute of Technology
7. Ms MK Matsau
   Deputy Director-General,
   Department of Health
8. Prof DL Mkize
   Department of Psychiatry,
   University of KwaZulu-Natal, Durban
9. Prof MS Mokgokong
   University of Limpopo, MEDUNSA campus, Pretoria
10. Prof JM Pettifor
    Mineral Metabolism Research Unit,
    University of Witwatersrand and
    Chris Hani Baragwanath Hospital, Johannesburg
11. Colonel DC Qolohle
    Head of Department: Obstetrics & Gynaecology,
    1 Military Hospital, Pretoria
12. Prof H Schneider
    Health Policy Research Group, Johannesburg
13. Prof Kuku Voyi
    Faculty of Health Sciences, University of Pretoria
14. Dr Corina Walsh
    Department of Human Nutrition,
    University of Free State, Bloemfontein
Research makes no difference to health unless it is translated. Research translation is the theme of this year’s annual report — and for the MRC’s entire research strategy.
THE PRESIDENT’S REPORT

Getting Research results Into Policy, Practice, (health) Promotion and Product (GRIPPPP) – better known as Research Translation – is the theme of this year’s Annual Report. Indeed it is a broad theme not just for this year’s research activities but for the organisation’s entire research strategy. This is because research makes no difference to health unless it is translated. Therefore, achieving the MRC vision of ‘Building a healthy nation through research’ is only possible if the results of the MRC’s research endeavours in its 800+ research projects are translated into policy.

The National Department of Health (NDoH) is important therefore not simply because it is the source of 50% of the MRC’s R350 million budget (and the only part of the budget that is reliably sustainable year after year) – nor simply because it is the government department that has to sanction the MRC’s research priorities and manage its performance. The NDoH is of vital importance to the MRC as the principal channel through which MRC research can improve the health of the nation – because NDoH develops and implements the policies and sets the norms and standards that guide preventive, health promotive, therapeutic and rehabilitative health services for the people of South Africa.

This Annual Report presents many examples of how MRC scientists have been able to take one step closer to achieving their vision through translating research into a form in which NDoH could formulate policy such as the ‘National Strategy for Engaging in Healthy Lifestyles’.

Translation into health practice is key to achieving that vision, and important stakeholders for the MRC are the health care professionals whose practice is influenced by what they read of MRC research. Other professional groups are also influenced, such as social workers, for example in their implementation of the laws on domestic violence promoted by findings of the MRC Technical Report on ‘intimate femicide’, where a boyfriend or male spouse murders his partner.

However, perhaps the most powerful form of research translation for influencing the health of the people is health promotion. This is because health promotion does not refer only to the legislative and other instruments that create a healthy environment for South Africans – such as the smoke-free environments created by the ban on smoking in public places legislation influenced and supported by MRC research. Health promotion also refers to the healthy choices that people can make to protect themselves from, for example, the second greatest cause of death and disability in South Africa: chronic diseases such as heart attacks, strokes, high blood pressure, diabetes and cancer. Health promotion research helps to identify the determinants underlying such diseases – such as poverty, lack of education, or gender power imbalances. It furthermore explores how the risk factors that arise from these determinants can result in disease – such as the undernutrition arising from poverty causing immune deficiency or susceptibility to measles. Thirdly, it develops and tests interventions that can alter risky behaviours – such as unprotected sex resulting in HIV infection or sexually transmitted infections.

Again, these pages list myriad MRC research projects in health promotion that are already bearing fruit – for example, doubling the number of sexually active young people who report using condoms from 30% in 1997 (South African Demographic Health Survey) to 60% in 2002 (National Youth Risk Behaviour Survey).

Finally, MRC research is beginning to impact on the fourth leg of research translation – namely translation into products such as patents for new drugs and vaccines, and disclosures of new biomedical or public health processes. It is early days yet, but the MRC seeks to be a leader in the field of biotechnology – in both natural medicines, such as the evaluation of traditional medicines, and also ‘high-tech’ activities such as the development of drugs, vaccines and medical devices. Two novel antimalarial compounds have been isolated and characterised from South African plants and a total of 18 compounds for use in fields such as tuberculosis, diabetes and cancer have been identified from South African plants and a total of 18 compounds for use in fields such as tuberculosis, diabetes and cancer have been identified from South African plants through the Novel Drug Development Platform funded by the Innovation Fund for R18 million. Such ‘indigenous knowledge’ is a part of our centuries-old heritage that the MRC jealously guards and develops for the benefit of current and future generations of South Africans.

Finally, research is only worth translating if it is excellent. The high calibre of many MRC scientists is attested to by the fact that 4 of our 48 research directors are A rated in the NRF system, and win for the MRC more competitive National Institutes of Health of USA grants than any other South African institution.

These are just some examples of how MRC researchers and their support staff are contributing to preserving and improving the health and wealth of the nation. We are proud of the work of all of our staff, and confident that in years to come they will ascend to even greater heights in the scope, quality and impact of their endeavours.
## MRC KPIs FOR THE YEAR ENDED 31 MARCH 2005

The MRC is required by the NDoH and Treasury to outline its Key Performance Indicators and the outputs of these.

<table>
<thead>
<tr>
<th>Perspective</th>
<th>Key Result Area</th>
<th>Key Performance Indicator</th>
<th>Measure</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stakeholders and Customers</td>
<td>1. Scope of national and international collaborations</td>
<td>1. Projects done through collaborations between MRC and other national organisations</td>
<td>At least three projects per year done through collaborations</td>
<td>Six projects done through collaboration: 1. Khanyagula Science Expo; 2. Women’s Day; 3. Taking Biotechnology to Rural Communities; 4. US Biotechnology Study Tour; 5. SciFest; 6. National Science Week participation in the Western Cape and Limpopo provinces.</td>
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<tr>
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<td></td>
<td>Comprehensive Prevention, Treatment and Care of HIV and AIDS Plan.</td>
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<td>Six meetings between the MRC stakeholder relations office and NDoH.</td>
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<td>Department of Science and Technology – stakeholder relations</td>
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<td></td>
<td>Number of Parliament visits</td>
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<td></td>
<td>With other Science Councils and collaborations</td>
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</tbody>
</table>


<table>
<thead>
<tr>
<th>Perspective</th>
<th>Key Result Area</th>
<th>Key Performance Indicator</th>
<th>Measure</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stakeholders and Customers</td>
<td>2. Strengthening relationships with key provincial government departments</td>
<td>Number of meetings with provincial government</td>
<td>1. Western Cape - met with various stakeholders over a period of 2 days, discussed MRC research focus areas 2. Eastern Cape - a 2-day programme that facilitated the understanding of MRC research focus 3. Limpopo – discussed the extent of provincial health research and the likelihood of opening a provincial MRC office</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. International strategic contracts and agreements</td>
<td>Number and overview of strategic contracts and agreements entered into</td>
<td>1. NEPAD e-health projects proposed and MRC specialist seconded to manage e-health portfolio for NEPAD (project value – R160 000) 2. EDCTP – a funding platform for essential drugs trials, MRC awarded 5 projects from this agreement 3. COHRED – MRC seconded a member of staff to this programme</td>
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</tr>
<tr>
<td>Contribution to the National System of Innovation (NSI)</td>
<td>1. Patents and disclosures</td>
<td>Number of patents</td>
<td>2 patents 3 disclosures</td>
<td></td>
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<tr>
<td></td>
<td>2. New posts created with contract money</td>
<td>Number of posts</td>
<td>157</td>
<td></td>
</tr>
<tr>
<td>Socio-economic impact of research</td>
<td>1. Smoking 25% reduction in prevalence</td>
<td>Lives p.a. saved</td>
<td>Estimated 6000 Estimated R30 million</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Reduction in the incidence rate of new HIV infections in those aged 15 - 25 years</td>
<td>Lives p.a. saved</td>
<td>Estimated 25 000 Estimated R50 million</td>
<td></td>
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<tr>
<td></td>
<td>3. Alcohol and substance abuse</td>
<td>Road traffic accidents</td>
<td>Plateau of the rate of rise of RTAs Stabilised crime and violence rates</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Utilising Indigenous Knowledge Systems and natural products</td>
<td>Utilising health products for poverty alleviation</td>
<td>More than 5 poverty alleviation projects launched in rural South Africa utilising IKS and natural products for job creation through business creation A Public Private Community Partnership Model developed and implemented</td>
<td></td>
</tr>
<tr>
<td>Portfolio Committee interaction</td>
<td>Number of meetings</td>
<td>Five Portfolio Committee meetings and briefings done</td>
<td></td>
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<tr>
<td>Perspective</td>
<td>Key Result Area</td>
<td>Key Performance Indicator</td>
<td>Measure</td>
<td>Outputs</td>
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</tr>
</tbody>
</table>
| Stakeholders and Customers   | Policy interaction        | Technical reports                                 | Number of technical reports                 | 5 Alcohol and Drug Abuse  
1 Helminths  
5 Burden of Disease  
1 Health and Development |
|                              |                           | Media, events and exhibitions platform            | Value of media spend                        | Media coverage, advertising/column space/free airtime saving worth R12  
million on a range of health research areas carried out by the MRC |
|                              |                           |                                                   | Amount of media exposure per each platform  | 18 media releases  
50 TV interviews  
250 radio interviews  
645 newspaper articles  
100 magazine articles |
|                              |                           |                                                   | Due to the adoption of the MRC Media Policy, media interaction has been selective and limited | |
|                              |                           |                                                   | Number of events and exhibitions managed    | 15 events (8 national and 7 International)  
19 exhibitions |
|                              |                           |                                                   | Number of videos and photographs used to facilitate research translation and the understanding of MRC outputs | 9 video requests  
81 photography requests |
| Finance & Investment         | Growth in turnover        | Commercialisation income                          | Rand value                                  | R2.8m |
|                              |                           | External grants and contracts                     | Rand value                                  | R163m (50% of total revenue) |
|                              |                           | Leverage baseline funding                         | High-impact diseases research income        | 1. HIV 140/20 million  
2. Malaria 50/8 million |
|                              |                           |                                                   | Ratio 7:1                                   | Ratio 5:1 |
|                              |                           | Overhead structure                                | Lean administrative and support costs      | Overhead ratio 27% |
|                              |                           |                                                   | Salary expenditure                          | % off the industry standard  
Reduced from 30% to 15% |
<p>|                              |                           |                                                   | Ratio to baseline                           | Less than 70% 55% |
| Good Corporate Governance    | Compliance to audit process |                                                    | Yearly reporting                           | Annual financial statements and KPI report by 31 May 2005 |
|                              |                           |                                                   | A functioning internal audit unit           | Several reports produced by internal audit, and these were presented to the Audit Committee |
|                              |                           |                                                   | A functioning Audit Committee               | The Audit Committee met three times during the year |
| Internal/ Organisational     | Research productivity     | Published outputs                                 | Published outputs in the SAMED database     | 568 |
|                              |                           | Non-peer-reviewed publications/                  | Number                                      | 3 issues of <em>MRC News</em> (a quarterly magazine), which was sent to a range of stakeholders and the media |
|                              |                           | Non-technical communication                       |                                            | 7 brochures profiling and promoting MRC research units and groups as well as the corporate |
|                              |                           |                                                   | Number                                      | 3 posters |</p>
<table>
<thead>
<tr>
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<th>Key Performance Indicator</th>
<th>Measure</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal/</td>
<td>Research productivity</td>
<td>New products transferred into the health care system</td>
<td>Innovative capabilities demonstrated by number and impact of new</td>
<td>DNA-based diagnostic kits transferred to a local start-up; Stereotactic Positioning Device for improved accuracy in brain biopsies licensed to a local start-up. 80 devices sold worldwide; HAPI technology for managing remote clinical research data is being diffused through open-source models</td>
</tr>
<tr>
<td>Organisational</td>
<td></td>
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<td>of new technologies developed and transferred into the market</td>
<td></td>
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<tr>
<td>MRC</td>
<td>Recognition of the MRC</td>
<td>MRC scientists serving on international panels</td>
<td>Number of scientists</td>
<td>39</td>
</tr>
<tr>
<td>Innovation/</td>
<td>Business Development</td>
<td>Success and number of tenders and contracts</td>
<td>Targeted competitive funds as well as global strategic funds</td>
<td>Innovation Fund success rate above 50%</td>
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<tr>
<td>Learning and Growth</td>
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<td></td>
<td>Research Management</td>
<td>Intra/extramural research mix</td>
<td>Number of intramural units</td>
<td></td>
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<td></td>
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<td></td>
<td>Number of extramural units</td>
<td>21</td>
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<tr>
<td></td>
<td></td>
<td>Research management processes and implementation of systems</td>
<td>% of extramural/total operating research spending</td>
<td>74%</td>
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<tr>
<td></td>
<td>Knowledge transfer</td>
<td>New knowledge of product creation and knowledge transfer</td>
<td>Number of patents</td>
<td>2 patents</td>
</tr>
<tr>
<td></td>
<td>Number of events in which</td>
<td></td>
<td>At least two events per year at different venues</td>
<td>3 events held: • National Science Week in Limpopo and Western Cape • Women’s Day celebration</td>
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<tr>
<td></td>
<td>MRC research is</td>
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<td></td>
<td>is communicated to public</td>
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<td>so as to facilitate</td>
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<td>informed decision-</td>
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<td>making on health-related aspects</td>
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<td></td>
<td>Science promotion in</td>
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<td></td>
<td>schools</td>
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<td>Investment in HR</td>
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<td>development</td>
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<td></td>
<td>Skills development (training) as a % of payroll – 2003/2004</td>
<td></td>
<td></td>
<td>2.7%</td>
</tr>
<tr>
<td>Perspective</td>
<td>Key Result Area</td>
<td>Key Performance Indicator</td>
<td>Measure</td>
<td>Outputs</td>
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<tr>
<td>Transformation</td>
<td>Number of new scientists Equity</td>
<td>Equity plan achievement</td>
<td>Occupational levels by race and gender</td>
<td>See the table below</td>
</tr>
<tr>
<td>Capacity development</td>
<td>Ph.D. graduates</td>
<td>Number enrolled Obtained</td>
<td>176</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>49</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M.Sc. graduates</td>
<td>Number enrolled Obtained</td>
<td>208</td>
<td></td>
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<tr>
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<td></td>
<td></td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Staff support request for study - empowerment of people</td>
<td>Value and the number of staff development grants issued by the MRC Training sessions and seminars for staff and users of MRC business processes</td>
<td>There was a range of in-house training sessions such as 1. Knowledge management awareness in the MRC 2. Training on document management and total cost ownership of IT 3. Media training for scientists 4. Corporate Governance from the MRC Board, EMC and the rest of the staff per province</td>
<td></td>
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<tr>
<td>Relevance and quality of research</td>
<td>Prioritized research portfolio</td>
<td>Degree of fit with national health priorities</td>
<td>Very high</td>
<td></td>
</tr>
<tr>
<td>Translation of research into policy, practice, process and promotion</td>
<td>Research translation systems and processes</td>
<td>Establishment of the Research Translation Office; operational plan and implementation processes Research translation policies</td>
<td>A comprehensive plan was tabled to motivate for the establishment of the Research Translation Office The office was established and the MRC pledged R750 000 for its initiation A presentation was done to DoH to facilitate further funding for this initiative</td>
<td></td>
</tr>
</tbody>
</table>
# APPENDIX A

## Occupational level by race and gender

<table>
<thead>
<tr>
<th>Occupational level</th>
<th>Black April 2005</th>
<th>Female April 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top management</td>
<td>86%</td>
<td>33%</td>
</tr>
<tr>
<td>Senior management</td>
<td>23%</td>
<td>44%</td>
</tr>
<tr>
<td>Middle management</td>
<td>50%</td>
<td>59%</td>
</tr>
<tr>
<td>Skilled</td>
<td>78%</td>
<td>75%</td>
</tr>
<tr>
<td>Semi-skilled</td>
<td>85%</td>
<td>66%</td>
</tr>
<tr>
<td>Unskilled</td>
<td>98%</td>
<td>42%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>74%</strong></td>
<td><strong>66%</strong></td>
</tr>
</tbody>
</table>
## RESEARCH OUTPUTS

### ENVIRONMENT AND DEVELOPMENT

<table>
<thead>
<tr>
<th>No. of Projects</th>
<th>No. of staff</th>
<th>Master’s students; degrees obtained</th>
<th>Doctoral students; degrees obtained</th>
<th>Conferences</th>
<th>Refereed papers (in press)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol and Drug Abuse Research Unit</td>
<td>13</td>
<td>2 spec. sci., 3 sci.</td>
<td>2; 1</td>
<td>3; 0</td>
<td>2; 1</td>
</tr>
<tr>
<td>Exercise Science and Sports Medicine Research Unit</td>
<td>60</td>
<td>15</td>
<td>27; 7</td>
<td>15; 4</td>
<td>8; 4</td>
</tr>
<tr>
<td>Health and Development Research Group</td>
<td>27</td>
<td>11</td>
<td>3; 1</td>
<td>1; 0</td>
<td>18; 3</td>
</tr>
<tr>
<td>Health Promotion Research and Development Group</td>
<td>6</td>
<td>2 spec. sci., 3 sci.</td>
<td>2; 1</td>
<td>6; 1</td>
<td>1; 0</td>
</tr>
<tr>
<td>Occupational and Environmental Health Research Group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### HEALTH SYSTEMS AND POLICY

<table>
<thead>
<tr>
<th>No. of Projects</th>
<th>No. of staff</th>
<th>Master’s students; degrees obtained</th>
<th>Doctoral students; degrees obtained</th>
<th>Conferences</th>
<th>Refereed papers (in press)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biostatistics Unit</td>
<td>232</td>
<td>22</td>
<td>2; 2</td>
<td>0; 0</td>
<td>31; 3</td>
</tr>
<tr>
<td>Burden of Disease Research Unit</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cochrane Centre</td>
<td>7</td>
<td>1 chief spec. sci. (20%), 1 spec. sci., 1 scientist, 2 support, 1 sen. res. technologist, 1 research intern</td>
<td>2; 1</td>
<td>0; 0</td>
<td>10; 1</td>
</tr>
<tr>
<td>Health Policy Research Group</td>
<td>15</td>
<td>13 research, 4 admin.</td>
<td>0; 1</td>
<td>9; 2</td>
<td>2</td>
</tr>
<tr>
<td>Health Systems Research Unit</td>
<td>10</td>
<td>1 chief spec. sci., 1 snr spec. sci., 2 spec. sci., 2 sci., 1 jun. sci., 1 res. assist., 1 snr officer</td>
<td>8; 0</td>
<td>3; 1</td>
<td>0; 0</td>
</tr>
<tr>
<td><strong>National Telemedicine Lead Programme</strong></td>
<td>9</td>
<td>13</td>
<td>2</td>
<td>1</td>
<td>0; 2</td>
</tr>
<tr>
<td><strong>Rural Public Health and Health Transitions Research Unit</strong></td>
<td>10</td>
<td>70 staff (10 scientific; 5 project m’gers; 10 management/admin.; 45 field staff)</td>
<td>8; 0</td>
<td>4; 1</td>
<td>1; 0</td>
</tr>
</tbody>
</table>

### INFECTION AND IMMUNITY

| **Clinical and Biomedical Tuberculosis Research Unit** | 7 | 12 | 1 current | 3; 1 | 2; 1 | 1; 2 | 5 |
| **Diarrhoeal Pathogens Research Unit** | 6 | 11 | 2 | 6 | 3; 4 | 5; 8 | 8 (9) |
| **Genital Ulcer Disease Research Unit** | Information requested; not provided |
| **HIV Prevention Research Unit** | 7 | 155 | 13; 0 | 1; 1 | 5; 6 | 3; 12 | 7 (1) |
| **Immunology of Infectious Disease Research Unit** | 6 | 7 (none paid by MRC) | 6; 0 | 12; 1 (1 with MRC bursary) | 6; 8 | 12; 10 | 18 |
| **Indigenous Knowledge Systems Lead Programme** | 12 | 8 | 0; 1 | 2; 0 | 0; 0 | 1; 3 | 6 (1) |
| **Inflammation and Immunity Research Unit** | 5 | 6 | 1; 1 | 0; 2 | 0; 2 | 1; 3 | 12 (7) |
| **Malaria Research Lead Programme** | 20 | 40 | 4; 0 | 6; 1 | 7; 0 | 5; 1 | 9 (4) |
| **Unit for Tuberculosis Operational and Policy Research** | 19 (baseline 3, contract 16) | 19 (baseline 11, contract 8); 5 scientists, 8 technologists, 4 technicians, 2 support | 4; 1 | 1; 1 | 2; 0 | 5; 2 | 4 (6) |
| **Respiratory and Meningeal Pathogens Research Unit** | 25 | 68 | 2; 0 | 3; 0 | 5:4/3 | 22:20/13 | 30 (15) |
| **South African AIDS Vaccine Initiative** | 35 | 110 | 8; 1 | 8; 1 | 11; 4 | 32; 12 | 28 |
| **South African Traditional Medicines Research Group** | 9 | 6 | 3; 1 | 15; 6 | 0; 2 | 0; 3 | 8 (2) |
## MRC Research Outputs

<table>
<thead>
<tr>
<th>Molecules to Disease</th>
<th>No. of Projects</th>
<th>No. of staff</th>
<th>Master’s students; degrees obtained</th>
<th>Doctoral students; degrees obtained</th>
<th>Conferences</th>
<th>Referred papers (in press)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Local papers; posters</td>
<td>International papers; posters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bioinformatics Capacity Development Research Unit</td>
<td>13</td>
<td>4</td>
<td>4; 0</td>
<td>5; 0</td>
<td>1; 0</td>
<td>9; 1</td>
</tr>
<tr>
<td>Bone Research Unit</td>
<td>4</td>
<td>5</td>
<td>2; 0</td>
<td>1; 0</td>
<td>2</td>
<td>3 submitted 8 invited</td>
</tr>
<tr>
<td>Centre for Molecular and Cellular Biology</td>
<td>2 main directions, many sub-projects</td>
<td>9 MRC, 4 PAWC, 2 US</td>
<td>4; 2</td>
<td>11; 6</td>
<td>5; 25</td>
<td>3; 29</td>
</tr>
<tr>
<td>Human Genetics Research Unit</td>
<td>2</td>
<td>12 contract research</td>
<td>0; 0</td>
<td>7; 2</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Human Genomic Diversity and Disease Research Unit</td>
<td>3 themes</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>2; 0</td>
</tr>
<tr>
<td>Liver Research Centre</td>
<td>24</td>
<td>26 (±21 full-time equivalents)</td>
<td>6</td>
<td>9</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Molecular Hepatology Research Unit</td>
<td>5</td>
<td>6</td>
<td>4; 2</td>
<td>3; 1</td>
<td>0; 2</td>
<td>5; 2</td>
</tr>
<tr>
<td>Molecular Mycobacteriology Research Unit</td>
<td>6</td>
<td>5 Ph.D. level research staff, 6 postgrad. students, 1 MRC intern, 2 support staff</td>
<td>2; 0</td>
<td>4; 0</td>
<td>3; 1</td>
<td>2; 2</td>
</tr>
<tr>
<td>Oesophageal Cancer Research Group</td>
<td>7</td>
<td>7 UCT, Unitra 1, MRC 6</td>
<td>5; 1</td>
<td>6; 1</td>
<td>6; 18</td>
<td>6; 10</td>
</tr>
<tr>
<td>Research Group for Receptor Biology</td>
<td>9</td>
<td>5</td>
<td>4; 0</td>
<td>5; 1</td>
<td>1; 3</td>
<td>3; 3</td>
</tr>
<tr>
<td>Non-Communicable Diseases</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety and Stress Disorders Research Unit</td>
<td>7</td>
<td>9 MRC, 4 Univ. Stellenbosch</td>
<td>6; 2</td>
<td>8; 0</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>Cancer Epidemiology Research Group</td>
<td>2 main (many sub-projects)</td>
<td>1 Ph.D. level, 2 M.Sc. level research staff, 2/4 support</td>
<td>2; 1</td>
<td>1; 0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Chronic Diseases of Lifestyle Research Unit</td>
<td>18</td>
<td>4 full-time scientists, 5 support staff</td>
<td>10; 4</td>
<td>13; 2</td>
<td>27; 2</td>
<td>1; 6</td>
</tr>
<tr>
<td>Crime, Violence and Injury Lead Programme</td>
<td>19</td>
<td>14 researchers, 4 support</td>
<td>8; 2</td>
<td>4; 0</td>
<td>36</td>
<td>23</td>
</tr>
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</table>
### NON-COMMUNICABLE DISEASES

<table>
<thead>
<tr>
<th>No. of Projects</th>
<th>No. of staff</th>
<th>Master’s students; degrees obtained</th>
<th>Doctoral students; degrees obtained</th>
<th>Conferences</th>
<th>Refereed papers (in press)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Local papers; posters</td>
<td>International papers; posters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes Research Group</td>
<td>5</td>
<td>1; 1</td>
<td>2; 0</td>
<td>0; 0</td>
<td>2; 2</td>
</tr>
<tr>
<td>Interuniversity Cape Heart Research Group</td>
<td>7</td>
<td>16</td>
<td>3; 0</td>
<td>7; 2</td>
<td>5</td>
</tr>
<tr>
<td>Hatter Institute for Cardiology Research</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiovascular Research Unit (incorporating the Medtronic Institute)</td>
<td>7</td>
<td>18</td>
<td>3; 1</td>
<td>5; 0</td>
<td>4; 0</td>
</tr>
<tr>
<td>Lipidology Division of Internal Medicine</td>
<td>6</td>
<td>1 academic, 3 technol., 4 contract</td>
<td>3; 1</td>
<td>3; 0</td>
<td>18; 0</td>
</tr>
<tr>
<td>Department of Physiologic Sciences</td>
<td>3</td>
<td>2</td>
<td>2; 1</td>
<td>1; 0</td>
<td>1; 2</td>
</tr>
<tr>
<td>Medical Imaging Research Unit</td>
<td>12</td>
<td>29</td>
<td>15; 5</td>
<td>8; 2</td>
<td>10; 5</td>
</tr>
<tr>
<td>PROMEC Unit</td>
<td>18 (excl. external)</td>
<td>10 scientists, 6 research technologists, 3 research technicians, 2 admin., 4 contract</td>
<td>1; 0</td>
<td>3; 1</td>
<td>11; 9</td>
</tr>
</tbody>
</table>
| WOMEN AND CHILD HEALTH

<table>
<thead>
<tr>
<th>No. of Projects</th>
<th>No. of staff</th>
<th>Master’s students; degrees obtained</th>
<th>Doctoral students; degrees obtained</th>
<th>Conferences</th>
<th>Refereed papers (in press)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Local papers; posters</td>
<td>International papers; posters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender and Health Research Unit</td>
<td>3</td>
<td>23 (5 post-Master’s)</td>
<td>9; 1</td>
<td>1; 0</td>
<td>11; 3</td>
</tr>
<tr>
<td>Maternal and Infant Health Care Strategies Research Unit</td>
<td>26</td>
<td>2 full-time, 1 part-time, 6 NIH funded (full-time)</td>
<td>7; 3</td>
<td>1; 0</td>
<td>31; 4</td>
</tr>
<tr>
<td>Mineral Metabolism Research Unit</td>
<td>7</td>
<td>2 MRC, 1 GPH, 1 Wits, 6 Wellcome</td>
<td>4; 0</td>
<td>4; 1</td>
<td>1; 0</td>
</tr>
<tr>
<td>Nutritional Intervention Research Unit</td>
<td>27 + collaborative projects: 15</td>
<td>7 researchers; 15 research and fieldwork support; 4 support</td>
<td>1; 1</td>
<td>1; 0</td>
<td>27; 4</td>
</tr>
</tbody>
</table>
NATIONAL PROGRAMME
ENVIRONMENT AND DEVELOPMENT

Alcohol and Drug Abuse Research Unit

Major breakthroughs and successes
During 2004 SACENDU was expanded from five sites (Cape Town, Durban, Gauteng, Mpuumalanga, and Port Elizabeth) to include East London, and the regional initiative (SENDU) was expanded to Luanda (Angola) and Kinshasa (DRC). Steps were taken to expand surveillance in Tanzania beyond the two sites in Dar es Salaam and Zanzibar. At the 6th regional report-back meeting of SENDU held in November 2004 data were reported on 12 countries.

Capacity development/research strengthening/collaboration
Since 2000 technical support has been provided to SADC countries to establish and expand alcohol and drug surveillance, including visits to 13 countries and provision of training.

Mavis Moshia attended lectures in the Depts of Applied Psychology and Biostatistics at New York University for 14 weeks, receiving training on tobacco and other substance use within the Dept of Psychiatry, funded through the Fogarty International Center (NIH) and CDC. In collaboration with Zohn Rosen, research director within the Dept of Psychiatry at NYU School of Medicine, Dr Neo Morojele undertook training visits to the Universities of Venda, the North and Witwatersand, lecturing staff and postgraduates on research methods and advanced statistical techniques. Bronwyn Myers received training in the Addiction Severity Index (ASI) and Matrix Model of Outpatient Treatment for Substance Use Disorders at the Neuropsychiatric Institute, University of California and the Matrix Institute, Los Angeles.

During 2004/5 the Unit had over 100 radio, TV and print media contacts. A module for fourth-year students in psychology at Stellenbosch University on 'Alcohol abuse in South Africa' was initiated, drawing on findings of MRC research.

Exercise Science and Sports Medicine Research Unit

Major breakthroughs and successes
In November 2004 this group successfully hosted the international conference 'Clinical Sports Medicine: Caring for the athlete and the team'. Through close collaboration with Discovery Health a number of products have been developed and launched, including a ‘Risk-related age’ model for individuals based on lifestyle and health behaviour and the ‘10 000 steps’ campaign.

The Unit showed that exercise and perception of effort are regulated by the central nervous system from the start of exercise, in a continuous and fluctuating manner, based on prior experience, knowledge of distance and time to be completed, and current metabolic rate (reported as five linked publications co-authored by Alan St Clair Gibson, Tim Noakes and Vicky Lambert, recently published in British Journal of Sports Medicine).

In collaboration with the MRC/UCT Medical Imaging Research Unit it was shown that brain activity does not change in a localised manner during a fatiguing muscle contraction, but rather that multiple brain areas are active throughout, operating using different electromagnetic frequencies at different times. This novel finding of multiple brain fatigue control regions has been defined as a brain cortical ‘fatigue matrix’, and was recently submitted for publication.

Capacity development/research strengthening/collaboration
Dr Julia Goedecke, recipient of an MRC Career Development Award, is working closely with Profs Jonathan Seckl and Brian Walker of the University of Edinburgh and Prof. Tommy Olsson of the University of Umea, Sweden, in obesity in SA women. Collaborators associated with development of a Youth Fitness Charter are very extensive. Vicki Lambert continued her collaboration with the MRC Chronic Diseases of Lifestyle Unit as well as developing strong collaborations with Dr Victor Matsudo from the Agita Mundo Network, Brazil, and Dr Adrian Bauman, School of Community Medicine and Public Health, University of New South Wales, Australia. Prof Alan St Clair Gibson is working closely with the MRC/UCT Medical Imaging Research Unit. Joint planning and product development continue with industry partners Discovery Health, Bromor Foods, Sygade, Body IQ, Betucare and the Sports Science Institute of South Africa.
Prof. Reddy was Chairperson of the National Strategy for Engaging Impact of research outputs suppliers. Development as well as individuals within the community. Where the departments (Education, Health, Correctional Services and Social development of research interns at tertiary institutions and government education and health promotion, and been integral to professional developed doctoral candidates in behavioural sciences, health Science and T echnology Forum. The Unit has supported and Research Capacity Development Award 2004 from the National Prof. Priscilla Reddy, the Unit Director received the Research for Capacity development/research strengthening/collaboration impact on the health and welfare of the nation’s children. much time and effort was spent disseminating data from the first National Youth Risk Behaviour Survey (YRBS) and second Global Youth Tobacco Survey to government and non-governmental sectors. Data from the YRBS were used to highlight risk factors and risk behaviours associated with future chronic and infectious diseases among 13- to 17-year-olds. The Group’s major success this year was its presentation to the DoH of its findings that the paint on certain pencil crayons and wooden toys sold at toy stores, supermarkets, craft shops and flea markets in SA may contain lead concentrations up to 145 000 µg/g - considerably higher than the internationally accepted standard of 90 µg/g. High lead concentrations were even found in items marked as ‘non-toxic’. This poses a direct threat of reductions in IQ and behavioural abnormalities to young children, especially those who tend to chew on toys and other painted items. The Minister of Health has now issued an instruction to draft legislation to ban the use of lead in paint that is intended for use by the general public (on homes, children’s toys, furniture and play equipment). A nation-wide lead awareness campaign is also to be implemented. In this way, the Group’s research will have a direct impact on the health and welfare of the nation’s children. The Group will shortly be joined by 3 students who will undertake research towards doctoral degrees. Their projects will relate to environmental health economics, urban housing and health, and interventions to improve the situation of young children worst affected by lead exposure and poisoning. The finding by the Group that alarmingly high concentrations of lead are to be found in the paint coatings on children’s toys in SA has led to a decision within the DoH to ban the use of lead in paint intended for infrastructure and items with which children may come into contact (homes, schools, toys, play equipment, children’s furniture). Research results showing that a proportion of children in Johannesburg and Cape Town have blood manganese concentrations in excess of international reference values is informing decisions within the Department of Minerals and Energy around future use of manganese-based petrol additives in South Africa. Ms Mathee and Dr Röllin serve on the Local Organising Committee for the 17th Annual Conference of the International Society for Environmental Epidemiology which is to be held in Johannesburg (Sandton) from 13 to 16 September 2005. This will be the first occasion on which this prestigious meeting will be held on the African continent. Dr Röllin holds the portfolio of Chairperson of the Scientific Programme Committee for ISEE-2005, while Ms Mathee is the Chairperson of the Fundraising Committee. Ms Mathee continues to serve on the global steering committee of the WHO’s Healthy Environments for Children Alliance, as well as on the national committee for the South African Healthy Environments for Children Initiative. Dr Röllin was appointed as an External Research Advisor to the National Institute for Occupational Health. The ethics of research related to healthcare in developing countries: a follow-up Discussion P aper. Prof. Reddy was appointed Visiting Associate Professor at Georgetown University in Washington, DC, and is also a member of the NIH scientific review committee on Behavioural and Social Science Approaches to Preventing HIV/AIDS.
The Unit's quantification of the contribution of 17 selected risk factors to the burden of disease experienced at national level will inform policy responses to reduce burden of disease in SA. A reliable and comparable analysis of risks to health is essential to guide health sector responses to prevent disease and injury. The demographic impact of AIDS on SA population ageing is being explored by the Unit. The number of people aged 60 or older is expected to increase by 72%, from 3.05 million in 2000 to 5.23 million in 2025. Strategies to promote healthy ageing will need to address the management of chronic conditions in age-friendly PHC facilities to reduce poor health outcomes, and promote healthy lifestyles in younger age groups in order to prevent these diseases.

The Unit continues web-based dissemination of research findings, with ongoing consultation on how to make their research public-friendly and consumable.

Other
The Unit produced 8 technical reports, 2 Policy Briefs and 2 lay publications, and carried out 30 interviews with the print and electronic media.
**Cochrane Centre**

**Major breakthroughs and successes**
The South African Cochrane Centre (SACC), in collaboration with the Liverpool School of Tropical Medicine and the HIV/AIDS Collaborative Review Group, obtained a grant from the Nuffield Commonwealth programme for a research synthesis training programme for people living in sub-Saharan Africa. This programme will start in 2005, and the outputs will be internationally recognised, peer-reviewed Cochrane systematic reviews. The project thus aims to build capacity in synthesising relevant research and to promote evidence-based health care policy and practice decisions in the African region.

Locally the SACC has joined forces with the Western Cape DoH and the University of Cape Town to launch STEPP (Supporting Translation of Evidence into Policy and Practice). STEPP aims to assess and bridge the gaps between research evidence, policy and practice by producing reports that compare specific policies formulated by the provincial DoH with the best available evidence on the benefits, harms, costs and feasibility of recommended interventions.

The SACC hosts and maintains both the African Trials Registry (ATR) and the HIV/AIDS Trial Registry. The ATR ensures that African research is available for inclusion in systematic reviews and helps facilitate use of locally relevant information. The HIV/AIDS Trial Registry includes details of all completed published/unpublished RCTs assessing HIV/AIDS interventions throughout the world.

The SACC’s proposal to establish an international registry of RCTs focusing on AIDS, TB and malaria was selected for funding by the European Developing Country Trials Partnership (EDCTP). This registry will serve as an important global resource by providing reliable information on what works/dos not work in prevention and treatment; identifying research gaps to be addressed; providing a ‘laboratory’ for studying the scope, quality and funding patterns of trials; and keeping track of trials undertaken in future.

**Capacity development/research strengthening/collaboration**
The SACC continues to assume a leading role in the sub-Saharan region in recruiting, training and mentoring authors of Cochrane systematic reviews. In January 2005 the SACC facilitated an interactive week-long HIV/AIDS review progress school with participants from SA and Cameroon. It also contributed to a successful 3-day Effective Care Research Unit workshop in East London attended by participants from Cameroon, Egypt, Nigeria, Pakistan, SA, Uganda, Zaire and Zimbabwe. Two 1-week training courses on research synthesis were conducted at the University of Malawi and in Mozambique.

Both undergraduate and postgraduate students benefitted from input at the Universities of Cape Town, Stellenbosch and the Western Cape. The SACC is also contributing to medical curricula development at the US and UCT.

Regular journal club meetings are held at the Centre and an Evidence-Based Practice journal club has also been started at Groote Schuur Hospital. The SACC hosts a monthly ‘Systematic Review Problem-busting’ training session for new authors of reviews or researchers interested in conducting a Cochrane systematic review. The SACC became a partner in PRACTIHC – a European Union-funded project which aims to improve partner countries’ health systems by increasing their capacity to evaluate health care delivery systems, specific health policy, public health and clinical choices and identify those which are effective.

**Impact of research outputs**
As the only Cochrane Centre in Africa the SACC focuses on health care problems of high priority to SA and the region. Staff contributed to 5 technical reports, including the WHO’s ‘Knowledge for Better Health’ report, 2 book chapters and guidelines for the Cochrane Health Promotion and Public Health Field. Staff also participated in several conferences, including the Mexico Ministerial Summit, the Global Health Council’s annual conference in Washington, DC, and the Bangkok International AIDS Conference. In addition, staff serve on a wide range of international, national and local advisory committees making decisions about health care policy, practice, education and research.

**Health Policy Research Group**

**Major breakthroughs and successes**
Early work identified that GPs commonly provide poor quality sexually transmitted infection (STI) care. This fed into development of a 3-year action research project funded by Wellcome Trust that sought to strengthen private providers’ clinical practices with respect to STI care. Completed in 2003, over the course of 2004 this project provided the basis for activities that will support translation of some of the project’s key findings into practice (outlined in main report). This will contribute to strengthening provision of STI services, particularly to lower income communities, demonstrating how the findings/activities of a programme of sustained research around an important health policy question can be translated into activities that benefit the broader population.

**Capacity development/research strengthening/collaboration**
In 2004 Tebogo Gumede successfully completed her M.A. at Rand Afrikaans University and Buselwa Ngoma submitted her Master’s dissertation for final assessment (UWC). Gugu Khumalo is currently studying at the London School of Hygiene and Tropical Medicine for an M.P.H. Her scholarship from Wellcome Trust includes funding to implement a research project on her return to SA to consolidate new skills learnt. Haroon Wadee won funding to support fieldwork for his Ph.D.
Health Systems Research Unit

Major breakthroughs and successes
A major success has been development of the evidence base on the effectiveness of lay health workers (LHWs) - in collaboration with the London School of Hygiene and Tropical Medicine, Babcock University in Nigeria and the Liverpool School of Tropical Medicine, the Unit conducted the first global systematic review of RCTs of the effects of LHWs in primary and community health care (Levin et al., 2005), demonstrating that LHW interventions have promising benefits (see main report).

The first RCT to examine the effects of LHWs in rural farm settings conducted in collaboration with the Karolinska Institute compared TB treatment outcomes, showing that the successful treatment completion rate in new smear-positive (NSP) adult TB patients was 18.7% higher on farms with LHWs compared to farms without. The treatment interruption rate was 4% on intervention farms compared to 26% on control farms. There is the potential to increase NSP TB case finding by 42% and increase the cure rate of NSP TB cases by 10% if the momentum of the intervention can be maintained. This intervention has been well received by the Boland Health District, and is being extended to other areas.

Impact of research outputs
Elements of training to improve quality of care in primary health settings have been taken up by health services for wider implementation. Unit staff have consulted on the design of nurse training programmes focusing on quality improvement in other settings, including internationally. The systematic review of LHW programmes has informed the focus of further RCTs in this field.

Research on the effectiveness of LHW programmes on farms provides information to national and provincial health care planners on appropriate models of community participation to improve quality of care in underserved areas. Findings of the Cochrane systematic review of interventions to promote patient-centred care have informed hospital-based strategies on patient-centred care internationally.

Research on feasibility of patient-centred interventions in TB care has illustrated the many factors to be considered when rolling out innovative practices.

Capacity development/research strengthening/collaboration
Unit staff supervise Master's and doctoral students and contribute to teaching. They also teach on short courses and continue to develop research capacity through mentoring young researchers. Collaborative research with other institutions, both in SA and overseas, is another component. The Unit works closely on a number of projects with the Lung Institute and the School of Public Health, UCT; University of Toronto; Karolinska Institute, Sweden; and London School of Hygiene and Tropical Medicine, to name a few.

National Telemedicine Lead Programme

Major breakthrough and successes
A major breakthrough was confirming that it is practical and effective to set up telemedicine (TM) links to serve PHC needs of a nurse-directed remote rural clinic, providing improved service and pointing the way towards a TM workstation model that can be extended elsewhere in SA and Africa. A previous project found that use of TM in nurse-directed clinics was severely inhibited by lack of information and communications technology (ICT) experience. A TM software system has been devised without menus that use colour-coded buttons. To render TM consultations easier, a remote control with identical colour-coded buttons has been developed and field-tested.

Existing TM video cameras are expensive and fragile. A TM video camera has been developed and field-tested that is rugged and cheaper (by a factor of 2). An important part of this TM project is to emphasise tele-dermatology, which plays a most important role in the manifestation and staging of HIV infection. As a direct result of our 2004 evaluation of a Mindset Health Channel, the Centre is currently evaluating the Mindset Health HIV/AIDS content in hospital settings nationally. A TM approach is also being tested in Mpumalanga to ensure that multi-drug resistant TB patients do not default.

Capacity development/research strengthening/collaboration
Due to the demand for our TM expertise, the Lead Programme employed and trained 11 services-rendered contractors to help deliver on this demand. Besides offering temporary and permanent employment, the quality and calibre of people who have been produced under our programme has ensured them permanent absorption in other leading research institutions and government departments.

Impact of research output
Impacts include demonstration of the viability of TM links for a PHC clinic setting in a remote, impoverished rural region of SA, which refers to a district hospital. TM has reduced many unnecessary referrals and improved clinic nurses’ patient management skills, thus improving health care. Further impacts are the introduction of ICT to nurses and others who had never previously encountered it. Since much existing TM equipment was unsuitable to the conditions in these clinics, improved TM devices have been developed and field-tested. Of particular value is a tele-dermatology aspect (dermatologists are rare in the public service), using very simple technology and emphasising HIV/AIDS. A skin condition (found in over 90% of HIV infections) is commonly HIV infection’s first sign, and the dermatological condition can stage the infection.

All aspects of TM are leading to improved knowledge, whether of community service doctors, or clinic sisters, or students working in TM-equipped hospitals and clinics. It is anticipated that there will be application of all the clinical TM techniques successfully employed in this project and other ruggedised ‘African’ equipment devised both in other rural regions of SA and elsewhere on the continent.

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Annual Report
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Research Outputs
**Rural Public Health and Health Transitions Research Unit**

**Major breakthroughs and successes**
Findings from the Southern Africa Stroke Prevention Initiative (SASPI) demonstrate a pattern of cardiovascular risk factors in the general rural adult population consistent with an ‘early adopter’ population early on in the health transition. A high prevalence of hypertension, substantial obesity in women, and emerging hyperlipidaemia were found. A rapid increase in vascular disease is likely, and locally appropriate interventions are needed to avert this outcome.

**Capacity development/research strengthening/collaboration**
The Unit supports local staff in (a) studies towards degrees or diplomas, (b) ‘on-the-job’ skills development with respect to research methods (e.g. qualitative methods) and management skills, (c) IT and data management skills (including computer training for field staff), and (d) development of specialised expertise (e.g. geographic information systems). The Unit contributes to a new M.Sc. in Population-based Field Epidemiology, a partnership between the Wits School of Public Health and INDEPTH Network (International Network for the Demographic Evaluation of Populations and Their Health). The Unit has been awarded funds by the Wellcome Trust for 6-8 Master’s research fellowships.

International contributions are to INDEPTH: Steve Tollman chairs its Board of Trustees, Mark Collinson leads the Migration and Urbanisation Initiative and Tollman and Kathleen Kahn lead the INDEPTH Adult Health and Aging Initiative which recently gained funding from the National Institute on Aging, NIH, for multi-site work with WHO and other African and Asian DSS sites. With respect to Adult Health and Aging the Unit is a leading contributor, having co-hosted the first workshop on ‘Aging in Africa’.

**Impact of research outputs**
Findings from research into the take-up of Child Support Grants conducted in 2002 indicated that main reasons for non-access were lack of vital documentation and long distances from service points. In 2004 the Unit focused on improving access to services for orphans and vulnerable children (OVC). Presentation of study findings to provincial and local Departments of Home Affairs and Social Security, as well as local municipalities, resulted in:
- Two-day mobile Home Affairs and Social Security campaigns in 20 villages, during which 8000 people applied for identity documents and birth certificates.
- Two imbizos providing information on services for OVC.
- Introduction and specialised utilisation of six Child Support Grant extension officers employed by the Department of Social Security.
- A partnership between the MRC/Wits Unit, the Acoehnokhe Advice Centre, the Department of Home Affairs and the Mozambique Consulate in ongoing planning to assist former Mozambican refugees who are stateless.
- A partnership between the Unit, local municipality and NGOs to form a multi-departmental district task team on OVC.

**NATIONAL PROGRAMME
INFECTION AND IMMUNITY**

**Clinical and Biomedical Tuberculosis Research Unit**

**Major breakthroughs and successes**
The Unit in partnership with other groups secured 3 of 4 grants awarded by the EDCTP for TB research. The studies will affect policy and practice around TB management and care in Africa, incorporate training, capacity and infrastructure development aspects, and involve a multi-country partnership.

**Capacity development/research strengthening/collaboration**
Pivotal collaborations have been forged as part of the capacity strengthening component of the EDCTP grants. Infrastructure and capacity development are linked to the ongoing TB clinical studies at each site. Dr Rustomjee was invited to serve on the TDR, WHO Steering Committee on Proof-of-Principle Research as well as the product development team for Implementing Operational Research for HIV Treatment Scale-up in Resource-Poor Countries (TDR, WHO), and the Global Alliance for new TB Drug Development Stakeholders Meeting.

**Impact of research outputs**
A Memorandum of Understanding has been drawn up between the Unit and the KwaZulu-Natal DoH in order to improve communication and create an understanding of research conducted in KwaZulu-Natal. An outreach project was conducted in March 2004 in order to commemorate World TB Day and increase public awareness of TB in Durban. Together with King George V TB Hospital and a local athletics club, a fun day included education on TB, profiling the Unit and the KwaZulu-Natal DoH in order to improve communication and create an understanding of research conducted in KwaZulu-Natal. An outreach project was conducted in March 2004 in order to commemorate World TB Day and increase public awareness of TB in Durban. Together with King George V TB Hospital and a local athletics club, a fun day included education on TB, profiling the Unit and a 10 km run. It was well attended by all ages and emphasis was placed on early detection.

**Diarrhoeal Pathogens Research Unit**

**Major breakthroughs and successes**
Dehydrating diarrhoea is a major cause of morbidity and mortality in young children - 4 to 5 million die annually. In SA alone, 50-60 children under the age of 5 years die daily as a result of diarrhoea. Rotavirus appears to be involved in almost 25% of cases. The Unit is continuing to move forward in its work on rotavirus surveillance and strain characterisation, with the ultimate aim of developing a rotavirus vaccine effective across Africa. The rotavirus vaccine trials conducted during 2004. Phase I was completed in July 2003. Enrollment of subjects for Phase II trial was completed in February 2004. Two additional protocols involving HIV+ children enrolled in rotavirus vaccine trials have been prepared and approved by local ethics committees, and both are scheduled to begin in 2005.

**Capacity development/research strengthening/collaboration**
Dr Mathew Esona completed the second year of his postdoctoral term and has written a number of articles for submission. Mr Lindelani Masithi, a third-year medical student at Medunsa, received training...
Diarrhoeal Pathogens Research Unit

as part of an MRC Work Study Programme. An M.Sc. student from Cote d’Ivoire registered in the Unit in 2003 and has submitted his dissertation.

The WHO favourably reviewed a number of grant applications, including grants to characterise rotavirus at molecular level and to provide support for rotavirus vaccine trials. The burden of disease study has been accepted for WHO funding, as has the follow-up cost analysis study. The Rotavirus Vaccine Program (RVP) based in Seattle, Washington, has provided funds for rotavirus research, co-ordinating the activities of the African Rotavirus Network and for hosting a Rotavirus Workshop in South Africa. The Norwegian Council for Tropical Medicine.

Genital Ulcer Disease Research Unit

Major breakthroughs and successes
The Unit continues to perform regular point prevalence studies at the STD clinic at the Prince Cyril Zulu Centre for Disease Control (former Durban City Health STD Clinic), where the significant change in the relative aetiology of genital ulcer disease was confirmed. Decrease in prevalence of chancroid and primary syphilis has been accompanied by increase of genital herpes lymphogranuloma venerereum (LGV). This confirms the importance of LGV in the region and draws attention to the fact that TB should feature in the differential diagnosis.

Capacity development/research strengthening/collaboration
The B.Sc. Hons programme in Pathogenesis of Infection has become the main source of M.Sc. students, and several students of African origin have been retained. In 2003 and 2004 there were a large number of applicants for this course, of whom 20 were selected.

HIV Prevention Research Unit

Major breakthroughs and successes
December 2004 saw successful completion of the first DAIDS/NIAID-sponsored study at Chatsworth (Durban) and Hlabisa. The study, HPTN 055, was in preparation for the Phase II/IIb HPTN 035 microbicide trial. The primary objective was to estimate rates of HIV seroconversion among women from the community, and 240 HIV-negative women from each site were enrolled and followed up for 12 months. The study revealed an alarmingly high prevalence of HIV in the targeted communities - double the number of women had to be screened in order to find 240 HIV-negative women per site. (See main report for details.) This suggests that an urgent intervention targeted at women is needed.

HIV prevention and microbicide research, including Division of AIDS (DAIDS), National Institute of Allergy and Infectious Diseases (NIAID), National Institutes of Health, Gates Foundation and CONRAD. The Unit also has collaborative relations with other institutions such as Columbia University, University of KwaZulu-Natal, and the Global Campaign for Microbicides. Grants and funding to the Unit for the year under review totalled R72,765,510.

Impact of research outputs
Introduction of an effective rotavirus vaccine will have enormous impact on the morbidity and mortality from dehydrating diarrhoea in young children. Staff and researchers associated with the Unit hosted a practical Rotavirus Workshop attended by 10 delegates from 9 African countries. Over 10 000 stool specimens from across Africa were screened for rotavirus in 2004. The Unit has been upgraded to a regional rotavirus reference facility for Southern, East and North Africa.

Impact of research outputs
This Unit studies genital ulcer disease in relation to HIV. Insight into the interaction of the organisms that cause the different diseases with host cells (including immune cells) as well as with each other can potentially lead to development of preventive strategies that help to control the HIV epidemic.

### Research Outputs

**Impact of research outputs**

Higher Education provided extensive funding for the vaccine trials and allied research and for training of health care workers.

**Genital Ulcer Disease Research Unit**

**Major breakthroughs and successes**

The Unit has had a significant impact on participants and their partners, as well as the broader community. The Unit also raised general awareness levels on research. The two epidemiological studies (HPTN 055 and 035) in which the Unit conducts research. This will assist participants and communities to gain knowledge around HIV/AIDS, and will empower them to form sustainable support groups and income-generating projects.

**Impact of research outputs**

- Through numerous clinical trials and behavioural research studies, the Unit has had a significant impact on participants and their partners, as well as the broader community. The Unit also raised general awareness levels on research. The two epidemiological studies (HPTN 055 and 035) in which the Unit conducts research. This will assist participants and communities to gain knowledge around HIV/AIDS, and will empower them to form sustainable support groups and income-generating projects.

**HIV Prevention Research Unit**

**Major breakthroughs and successes**

- The Unit is engaged in collaborations with many major players in HIV prevention and microbicide research, including Division of AIDS (DAIDS), National Institute of Allergy and Infectious Diseases (NIAID), National Institutes of Health, Gates Foundation and CONRAD. The Unit also has collaborative relations with other institutions such as Columbia University, University of KwaZulu-Natal, and the Global Campaign for Microbicides. Grants and funding to the Unit for the year under review totalled R72,765,510.

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and MDP) completed in 2004 have generated very significant and pioneering data. They show, for the first time, HIV prevalence and incidence data from non-pregnant women in the community. These data have been presented to the Provincial DoH, and highlight the desperate and urgent need for more vigorous HIV prevention and education efforts in KwaZulu-Natal.

**Other**

Books and book chapters: *HIV/AIDS in South Africa: Section 4:

**Immunology of Infectious Disease Research Unit**

**Major breakthroughs and successes**

The Unit created the first inducible and cell type-specific genetic deficient mouse models ‘Made in South Africa’, published in the high-impact journal *Immunity* (Herbert et al., *Immunity* 2004; 20: 623) and *Journal of Immunology* (Seki et al., *J Immunol* 2004; 172: 6158-6166). The Unit also succeeded with a new technological approach to autovaccinate, to protect against autoimmune and infectious diseases. They were able to cure experimental autoimmune encephalitis (Uyttenboogaert et al., 2004), a model for multiple sclerosis, and protect against cutaneous leishmaniasis (Arendse et al., *J Immunol* 2005; 174: 2205). In TB the Unit demonstrated that adaptive immunity to mycobacterial infection is not necessarily dependent on innate immunity, induced by Toll-like receptor. This was published and commented on in the high-impact *Journal of Clinical Investigation* (Fremond et al., *J Clin Invest* 2004; 117: 1790).

**Impact of research outputs**

The Unit demonstrated high productivity with a total of 18 peer-reviewed international publications in the last year. Some of their mouse models are unique worldwide, the Unit receiving a high proportion of international funding from collaboration with researchers all over the world.

**Other**

Director Prof. F. Brombacher is Associate Editor of the *Journal of Immunology*, and is Visiting Professor at the University of Strathclyde, Glasgow, UK. Unit members were reviewers for 8 international journals and for 4 international organisations.

**Indigenous Knowledge Systems Lead Programme**

**Major breakthroughs and successes**

The IKS Lead Programme has been invited to be the WHO Collaborating Centre for Traditional Medicines. Together with CSIR the IKS is co-ordinating the National Reference Centre for African Traditional Medicines recently launched by the Minister of Health. IKS research on finding plants with potential antimalarial activity has discovered 6 novel compounds that show antiplasmodial activity. These molecules have been patented. A database of all claims presented at the IKS Lead Programme has been created. This is unique in that it contains data on the current traditional medications and practices that are used, showing clinical trial validation and eventual commercialisation of the claims. Many claims are made in terms of the use of traditional medicines, including in life-threatening and chronic conditions. There are also numerous commercial products circulating in the market without safety and efficacy data. The safety and clinical evaluation of traditional herbal medicines by the IKS ascends the health benefits and value of them for use by the wider public, to open up a niche commercial market for those proven products for both the local and international markets. One programme is dedicated to evaluation of claims of health benefits for persons living with HIV/AIDS. All remedies are put through scientific scrutiny of their safety and effectiveness.

A hundred monographs on SA medical plants have been completed so far and are selectively available via the Lead Programme’s link on the MRC website. The IKS hopes to develop the first South African Pharmacopoea based on these. The IKS has also developed clinical trial platforms for immune modulators and evaluated safety in non-human primates and phase 1 randomised controlled studies of traditional medicines with reported health benefits for people living with AIDS. They have completed and piloted a GPS database of traditional healers in KwaZulu-Natal, positioning these with health facilities, schools, the population around them and their specialties.

**Capacity development/research strengthening/collaboration**

The IKS supervised 2 M.Sc. students who have now completed their studies; it supports and now supervises 2 doctoral students. They trained 60 traditional doctors in HIV and AIDS through workshops and training programmes, and have trained 4 GPs as clinical trial PIs for their national clinical trials studies. The IKS has school outreach programmes to make pupils aware of their activities, and so far 6 schools, including 1 international school, have visited their Delft Centre and medicinal garden facilities.

Collaborative research under contract or MOA has been signed with the following institutions: University of Botswana - for chemical and structural elucidation of IKS antimalarial compounds; University of Ibadan - general collaboration on Traditional Medicine Research; THETA (Traditional Healers and Modern Doctors Together against HIV and AIDS and other Diseases), Uganda, for developing IEC materials; CSIR for a joint BioPad or IF Proposal for development and commercialisation of antimalarial drugs; University of the Free State - *in vitro* and *in vivo* metabolism of herbal medicines; University of Limpopo (Medunsa Campus) - mutagenicity and antimutagenicity...
studies of herbal medicines; and The Nelson Mandela School of Medicine - in vitro anti-HIV activity of herbal medicines.

A number of training programmes are being undertaken at the Delft Community Partnership Centre, designed together with traditional healers and identified as a need by traditional healers themselves. The training projects include training traditional healers in TB /HIV and AIDS as treatment supporters; training traditional healers in record keeping; and training traditional healers’ communities in basic principles of herbal drug manufacture. Traditional healers have been granted an opportunity to run self-initiated projects where they could raise funds and be actively involved in attracting tourists to the Centre.

The resource centre of the Lead Programme is committed to educating communities and bringing science back to the villages. It has a library and a computer facility accessible free of charge to traditional healers, communities and pupils. IKS is committed to educating communities and bringing science back to the villages. Their outreach programme aims at educating pupils about traditional knowledge and to value such knowledge and make it valuable for all.

The IKS has successfully run entrepreneurial training workshops for 60 community members and 8 LED officials for their poverty alleviation projects, and is running a clinical trial awareness and preparedness programme for their clinical trials.

Impact of research outputs
The Lead Programme runs a national programme on the commercial cultivation of scientifically validated medicinal plants, with potential markets to eradicate poverty through the creation of sustainable jobs in rural communities. These projects are a partnership with the private manufacturing sector. The project is a joint project of DST and DoH and is a true private community public partnership (PCPP).

The IKS Lead Programme is committed to the equitable and fair sharing of benefits that may be derived from the utilisation of indigenous knowledge systems of health. This commitment to equitable sharing of the derived benefits is on mutually agreed terms with those people who are the legitimate owners of such knowledge. The goal is to add value to traditional medicines and in so doing share any benefits that may be derived from the scientific research and development to eventual commercialisation of such research results with all concerned.

Other
Director Dr Motlapalepa G Matsabisa received the Award for Best Project and Presentation, International Conference on Promotion, Development and Legal Aspects of Traditional Medicines, Kolkata, India. The IKS Lead Programme is a member of the Steering Committee of the African Initiative looking at developing traditional medicines. This is a regional initiative and Dr Matsabisa is a co-chair. He is also currently a special advisor to WHO AFRO in Traditional Medicines, a member of the Medicines Control Council, and chairs the African Traditional Medicines expert committee of the MCC. The Lead Programme has made numerous presentations to the Portfolio Committees of Health, Science and Technology and that of Arts and Culture, and was part of Ministerial delegations for Health and Science and Technology.

The IKS Lead programme secured the following funding: Poverty Reduction Project: R6.9m from DST; Clinical Trials Platform: R4.5m from DoH; capital equipment: R3.3m from DST.

Inflammation and Immunity Research Unit

Major breakthroughs and successes
This Unit had a number of successes, including the following:
• Creation of a genetically modified strain of Mycobacterium tuberculosis, the cause of TB, which will be used in drug and vaccine design.
• Identification of pharmacological strategies to neutralise pneumolysin, a toxin produced by Streptococcus pneumoniae, the major cause of severe community-acquired pneumonia.
• Identification of novel targets on inflammatory cells which represent potential targets for anti-inflammatory chemotherapy.
• Identification of inflammatory mechanisms by which inhalation of heavy metals in the workplace and environment may cause respiratory disorders.

Capacity development/research strengthening/collaboration
One student working in the Unit was awarded an M.Sc. degree in 2004, while two others will be awarded Ph.D. degrees in April 2005. One student is currently registered for an M.Sc. and another for a Ph.D., while 3 are in the process of registering for a Ph.D. The Unit continues to have strong ties with University of Limpopo, providing assistance to one M.Sc. and one Ph.D. student, and strong collaborative associations at national and international level.

Impacts of research outputs
During 2004/2005 19 publications (including 2 invited book chapters and 2 review articles) were either published or in press. The genetically modified strain of Mycobacterium tuberculosis (the cause of TB) created by the Unit will be used in drug and vaccine design. The Unit has also devised pharmacological strategies to neutralise pneumolysin, which will have a major impact on tackling severe community-acquired pneumonia.

Malaria Research Lead Programme

Major breakthroughs and successes
The Lubombo Spatial Development Initiative (LSDI) is the only regional project to receive funding from the Global Funds for AIDS, TB and Malaria. Malaria control was gradually phased-in in the LSDI area in southern Mozambique. Parasite prevalence was measured in children (2-<15 years) before the interventions were put into place and again on an annual basis, and it was seen that the parasite rates dropped dramatically in successive years (see main report).

Increasing resistance of malaria vectors to insecticides is cause for concern. The Lead Programme is involved in screening indigenous plants for biological activity against the vectors of malaria-transmitting mosquitoes. So far 357 crude plant extracts have been evaluated, and 21 have shown great promise against the aquatic, immature stage of the mosquito. Four have been investigated further, and two of these have shown great promise in dose-response studies.

Capacity development/research strengthening/collaboration
Within the LSDI appropriate expertise was lacking at all levels in Mozambique, and training was key before spraying and effective drug treatment could be introduced. To ensure smooth functioning
of the LSDI, to date 320 people have been trained as spray operators. Training of supervisors and spray persons takes place each year. Training was extended to include intervention, and has equipped field entomologists with research techniques, field staff to use global positioning system receiver hand-held units, office staff in the use of the Malaria Information System (MIS) and insectary staff in Maputo. To fully implement the MIS, information officers have been trained and put in place in all three malaria affected provinces in SA as well as in Mozambique and Swaziland. The malaria control programmes in SA have been strengthened by recruiting, training and seconding entomologists to the provincial malaria control programmes.

International funding was obtained from the Swiss Tropical Institute (STI), London School of Hygiene and Tropical Medicine (LSHTM), WHO, National Institutes of Health, Liverpool School of Tropical Medicine (LSTM) and the Gates Foundation for funding of doctoral students. Full funding has been received for 5 Ph.D. students to study at LSTM, STI and LSHTM.

**Unit for Tuberculosis Operational and Policy Research**

**Major breakthroughs and successes**
The Unit carried out a major study in five provinces to identify risk factors for multidrug-resistant TB (MDR-TB) patients defaulting from treatment. Results showed that negative attitudes by health care staff were the most significant reason why patients did not finish treatment, followed by the fear of stigma experienced in their communities, and side-effects from medication. These findings will be translated into appropriate policy interventions.

Public health practitioners in SA are confronted with a range of decisions around MDR-TB management with legal and ethical implications, such as enforced hospitalisation of patients and enforced MDR-TB treatment. The Unit was contracted by the DoH to develop new policy directives in line with the Constitution of SA and current public health legislation.

**Capacity development/research strengthening/collaboration**
TB operational research can provide evidence-based information for policy-makers and enable health officials to make informed decisions on patient management. There is, however, a critical lack of skills in operational research capacity both in SA and in the SADC. Training courses have been very well received and a course manual developed for future international use. In SA protocols for eight provincial TB operational research projects were developed, cleared for ethical approval, and are currently being conducted by health service staff, with supervision and mentoring by the MRC and CDC.

**Impact of research outputs**
The Unit is involved in policy formulation and operational research to improve TB service delivery in SA. Formal networks have been established in all nine provinces. This allows for ownership of research findings by health departments and rapid translation of research into policy and practice. This is particularly evident for policies on management of MDR-TB patients developed in the Unit and rapidly implemented within the health services in all provinces. The Unit is also involved in international TB policy formulation, particularly with regard to MDR-TB and laboratory issues, having an international reputation for its research and expertise, evident from participation of staff in key international policy-making bodies and invited presentations at international meetings.

**Respiratory and Meningeal Pathogens Research Unit**

**Major breakthroughs and successes**
The Unit has shown in both HIV-infected and uninfected children in Soweto that a significant fraction (30-40%) of hospitalisations with influenza-associated pneumonia were due to bacterial coinfection with the bacterial pathogen *Streptococcus pneumoniae*, and that these episodes were prevented by administration of pneumococcal conjugate vaccine. This was published in *Nature Medicine* in 2004, and suggests a major role for this vaccine in preventing influenza-associated morbidity, and that antibiotics may greatly reduce morbidity by treating bacterial coinfection.

**Capacity development/research strengthening/collaboration**
The Unit provides a platform for science graduates and junior doctors to become familiar with basic, applied and clinical research and offers nurses and other health professionals exposure to clinical research as well as support to undergo formal training in good clinical practice related to the conduct of clinical studies. The Unit pursues collaboration with international scientists in order to further local capacity. Lectures are given to general practitioners for continued professional development.

**Impact of research outputs**
The Unit’s discovery of the role of bacteria in severe pneumonia associated with influenza and other viruses changes the way we understand how people develop severe pneumonia. This offers alternate strategies to prevent (with conjugate vaccine) and treat (with antibiotics) the very large burden of viral-associated pneumonia. The Unit’s studies on the role of human metapneumovirus in African children and genotyping of these isolates provides important information that may be used to formulate a vaccine against this virus.

The Unit’s national surveillance of important bacterial infections allows them to monitor the burden of these diseases and measure the impact of interventions such as the introduction of antiretroviral therapy to prevent opportunistic infections in HIV-infected people in SA.
Other
Unit Director Prof. Keith Klugman was co-recipient of the Emanuel Wolinsky Award, given by the Infectious Diseases Society of America to author of the best article in Clinical Infectious Diseases in 2003. He also received an Honor Award from the Dept of Health and Human Services, and Secretary’s Award for Distinguished Service, the SARS and Monkeypox Public Health Response Teams, Centers for Disease Control and Prevention. Dr. S. Madhi received the Research Prize from the Faculty of Health Sciences at Wits. A television interview was given on childhood infections, and a documentary on the work of the Unit, entitled ‘Kill or Cure’, was produced by BBC World and aired on television in February 2005.
Prof. Klugman is on numerous top-flight international committees and steering groups, as well as invited speaker and chairperson of international sessions. For example, he was invited member of the Review Committee, CDC International Emerging Infections Program (IEIP), Bangkok, Thailand, and Chairperson of the Malawi Conjugate Pneumococcal Vaccine Trial Steering Group Meeting, Wellcome Trust, London.
He was also invited to give numerous lectures to departments, societies and meetings across the globe.

South African AIDS Vaccine Initiative (SAAVI)
Major breakthroughs and successes
Three products developed by the SAAVI-funded group at UCT are being manufactured for trials and going through the regulatory processes preceding phase I human trials. SAAVI plans to test these in SA, Botswana and the USA, which would make SAAVI the first developing country HIV vaccine initiative to make and test its own products in developing and developed countries.

Major successes in assessing the laboratory immunological responses of novel HIV vaccines include successfully passing an ELISA Proficiency Panel with a US laboratory, completed testing of human samples from the 040 trial; establishing the pseudovirion assay including the cloning of functional HIB envelope genes; and extensive analysis showing that subtype C sera are effective at neutralising South African subtype B viruses—important for cross-clade neutralisation.

The SAAVI-funded HIV Vaccine Ethics Group (HAVEG) based at the University of KwaZulu-Natal collaborated with the Department of Health’s interim National Health Research Ethics Committee (INHREC) and the MRC to develop the MRC Guidelines on Ethics for Medical Research: HIV preventive vaccine research, Book 5 of the MRC’s series of ethical guidelines, launched in April 2005.

Capacity development/research strengthening/collaboration
All SAAVI partners place a strong emphasis on capacity development initiatives. Overall the initiative shows a healthy demographic mix and a predominance of women—both as researchers and principal investigators. SAAVI has established new relationships with important partners both within the country (such as the Nelson Mandela Foundation) and internationally, including the Bill and Melinda Gates’ Foundation ‘HIV Vaccine Enterprise’ and the EDCTP.

The US NIH has awarded an additional R6 million for further SAAVI DNA vaccine manufacture and there has been increased investment by the HVTN in the SAAVI clinical sites—particularly the newer ones in Cape Town and North West Province. SAAVI trial sites have also received support from the International AIDS Vaccine Initiative (IAVI) to conduct another clinical trial in South Africa. The European Commission has given the SAAVI Community Involvement Programme an additional grant to build on and expand its activities.

Impact of research outputs
South Africa became the first developing country to run multiple phase I HIV vaccine trials and the first country in the world to test a subtype C HIV-1 vaccine—subtype C accounts for over 90% of all new HIV infections. SA is also the first developing country to submit candidate HIV vaccines to the US Food and Drug Administration for regulatory approval. If SA trials of the SAAVI-developed vaccines proceed SA will also be the first developing country to be testing its own vaccines in the developed world—i.e. the USA.

SAAVI is a leader internationally in investigation of new areas such as adolescent involvement in vaccine research. It is still early days in HIV vaccine development, but it is hoped to run multiple, multicentre trials of promising products and novel biotechnology approaches to reach at least a partially successful and safe vaccine in as short a time as possible.

South African Traditional Medicines Research Group
Major breakthroughs and successes
The past year saw publication in the Journal of Ethnopharmacology of a major research paper reporting on the antimalarial activity of some 500 plant extracts tested by the group. A plant-derived compound with significant antituberculosis activity has been isolated by postgraduate students, Eliya Madikane.

Capacity development/research strengthening/collaboration
The group continues to attract young black scientists as well as students from the African continent. Collaborative links with the University of Nairobi and Prof. Paul Waako at Makerere University in Uganda have been established. Faith Okalebo, a staff member of the Dept of Pharmacology at the University of Nairobi, is currently undertaking a Ph.D. with the group. Twelve of 15 postgraduate students associated with the group are black. Six students graduated with a Ph.D. during the past year, 5 of whom were black.

Isolation and characterisation of new compounds with biological activity has led to increased collaboration with Prof. Kelly Chibale at UCT’s Dept of Chemistry, who uses these as templates for structural modification in order to enhance activity or decrease toxicity.

Impact of research outputs
The traditional medicines database continues to be expanded, and future plans focus on making this information more accessible.
to communities who use traditional medicines and to traditional healers. A second edition of the *Traditional Healers Primary Healthcare Handbook* is under consideration, as well as translation of this text into a number of languages other than English. The group will play a major role in the Novel Drug Development Consortium awarded an R18m million grant from the NRF.

**NATIONAL PROGRAMME**

**MOLECULES TO DISEASE**

**Bioinformatics Capacity Development Research Unit**

**Major breakthroughs and successes**

The Unit has leveraged an NIH grant and developed a core HIV analysis group that delivers greater understanding of genetic diversity in HIV isolates from infected South Africans. The Unit has, together with Prof. Serap Aksoy at Yale, developed the International Glossina Genomics Initiative, which will sequence the *Glossina morsitans* genome and also ESTs of several species of Glossina. The Unit has developed a system to display and mine matrices of genome resources available to promote understanding of the Plasmodium genome, and is developing this system to apply to trypanosomes. The Unit has developed and implemented an expression description system, eVOC, that connects genome to phenotype, including diseases.

**Capacity development/research strengthening/collaboration**

The Unit has developed an online server to provide research tools that effectively deploy the latest genome technology, skills and training to the research community. Hundreds of scientists at all levels of experience have been trained and are now working using technology provided by the Unit. The Unit also performs targeted online training and services development, with trained scientists receiving support at 18 South African institutions of research and higher learning. Capacity development and training to support growth of expertise and co-ordination of research has directly trained 274 people. The Unit has driven implementation of and graduated students from Africa’s first Master’s programme in Bioinformatics. Twenty-seven postgraduate students have been trained at SANBI, two-thirds of them black.

By leveraging the recognised need for bioinformatics infrastructure to underpin the development of biotechnology in South Africa, the Unit has driven and facilitated the establishment of the multimillion rand National Bioinformatics Network, dedicated and funded to develop bioinformatics capacity in South Africa. The Unit has secured a grant through NIH with Stanford University to facilitate biomedical informatics training, and this is being applied to HIV informatics development of students and junior faculty nationwide. Through the establishment of the Network, a national curriculum in Bioinformatics graduate education has been tabled by the education committee, and is to be adopted by the tertiary institutions involved by 2005.

The Unit encourages its staff (Director, trainers) to teach at sites such as Nigeria, Kenya, Malaysia, China, Brazil and Thailand, in concert with activities of the WHO. The Unit has developed material for delivery of training internationally, as well as software distributed via CD to trainees. Through this interaction alone over 200 international students have been trained by Unit staff.

**Impact of research outputs**

Working with the Wellcome Trust the Unit has developed and implemented an expression description system that connects genome to phenotype, including diseases. This system, eVOC, has recently been adopted by the ENSEMBL human genome annotation system to provide a means of providing insight for genome researchers worldwide to prioritise candidate disease genes in the human genome.

The Unit’s most high-impact study has been as part of an international collaboration to discover the function (annotation) of over 20,000 human genes as they relate to disease. The resulting database and publication has become the most frequently read article over 20,000 human genes as they relate to disease. The resulting database and publication has become the most frequently read article in the new International Open-Access journal – The Public Library of Science, Biology. The Unit applied its expertise in normal and diseased gene expression description and also in expressed sequence clustering to a large international consortium of transcriptome researchers. The project represents the highest impact to date of its genome annotation efforts.

**Bone Research Unit**

**Major breakthroughs and successes**

The Unit has published and highlighted a world-first discovery on the molecular signals initiating bone formation in non-human primates, and so in human patients. Particularly important within the research activities on the phenomenon of apparent redundancy in bone formation, the Unit has shown induction of cartilage and bone formation by Ebast/Lefty-A, a new member of the superfamily of proteins controlling pattern formation and skeletogenesis and initiating chondrogenesis in skull defect, as published as a cover story by the *South African Journal of Science*.

**Capacity development/research strengthening/collaboration**

The Unit carries out student mentorship at Master’s and doctoral levels, and encourages research strengthening through travel and skills development grants for staff. The Unit collaborates with CSIR (South Africa) on novel biomaterial matrices; Leader and Novaxa (Italy) biotechnology companies on modified titanium implants and hydroxyapatite biomaterials; and A. H. Reddi, University of California, Davis on bone morphogenetic proteins initiating new bone formation.

**Impact of research outputs**

This Unit has received much international coverage for its life-enhancing work. This Unit has made replacement of bone and growing of new bone possible. Its real impacts have been:

- Development of cost-effective and affordable biomaterial implants to treat skeletal defects with bone loss in human patients; and development of cost-effective periodontal implants for immediate post-extraction tooth replacement therapy.
- Development of autogenous and transplantable bone in non-bony sites using powerful recombinant bone-inducing proteins that after transplantation are a major source of bone for immediate reconstruction of various bone defects.
Centre for Molecular and Cellular Biology

Major breakthroughs and successes
Workers in the Centre have developed molecular diagnostic techniques which can reduce the time to diagnosis of multiple drug-resistant TB from 60-90 days to 4-7 days.

Using proteomics, workers in the Centre have shown that Mycobacterium tuberculosis strains belonging to different genotypes exhibit variable protein and antigen expression patterns. This has important implications for vaccine development, and may possibly explain why previous Mycobacterium tuberculosis infection does not render an individual resistant to infection with a genetically different strain. The findings also seriously undermine the use of serodiagnosis, a widely investigated technique for TB diagnosis.

A group within the Centre studying the genetic causes of hypertrophic heart disease has identified families that have inherited the disease from a common ancestor. These families offer a unique resource for investigating person-to-person variability in cardiac hypertrophy, which may be caused by a combination of genetic and lifestyle factors that may also play a role in the hypertrophy occurring in common diseases like hypertension.

Capacity development/research strengthening/collaboration
At the December graduation ceremony of the US Faculty of Health Sciences, 4 of the 7 Ph.D. degrees conferred were on students from the Centre, and 1 of the remaining 3 was partly supervised by the Centre. In February 2005 the Faculty established the Desmond Tutu Centre for TB Research, built chiefly on the achievements of the MRC Centre and its clinical partners. The Centre runs postgraduate and third-year B.Sc. courses. Joint TB projects are carried out with various local and international institutions, and collaborations with the USA, The Netherlands, UK, France, Canada, Zimbabwe, Sudan and Korea.

Impact of research outputs
The Centre’s research on TB has highlighted the need for rapid diagnosis, particularly of drug-resistant TB, identified the mechanisms of drug resistance and allowed development of more rapid diagnostics. This has filtered through to the TB Control Programme and been communicated to control programme staff during update seminars, and the Centre has developed plans to use this information in real-time at a pilot rural site. The Centre’s work has changed the clinical approach to plural TB diagnosis, at least at their tertiary hospital (Tygerberg), while the Centre’s published work on reactivation has stimulated clinical thinking regarding reactivation of disease.

Other
Prof. T. Victor was an advisor to the African regional project on detection of drug-resistant malaria and TB (IAEA/WHO). Profs P. van Helden, V. Corfield and R. Warren were reviewers for various grant bodies and various staff members were reviewers for international journals, e.g. The Lancet, American J Human Genetics. The Centre is listed in various international directories. Profs J. Smook, E. Hoal and R. Warren have Ad Hominem Associate Professorships; G. Dunheim received the award for Best Clinical presentation at the Cardiology conference; Prof. J. Smook received a Wellcome Trust Senior Fellowships award and P-rating; and Prof. R. Warren received the Beysers Trophy for best poster presentation in 2004 from the US. A Fogarty Fellowship award went to Dr C. Pheiffer, and an EDCTP grant award to Prof. P. van Helden, who also received an MRC Silver Medal. Prof. G. Walzl was a collaborator on a successful Gates Grand Challenge award.

The proposal jointly submitted to the NRF by Prof. van Helden and Prof. Valerie Mizrahi (Director, Molecular Mycobacteriology Research Unit) resulted in establishment of the DST-NRF Centre of Excellence for Biomedical TB Research in September 2004.

Human Genetics Research Unit

Major breakthroughs and successes
Publication of the finding of carbonic anhydrase IV (CA4), the gene responsible for the RP17 form of autosomal-dominant retinitis pigmentosa (Rebello et al. PNAS 2004; 101: 6617-6622) heralded culmination of 10 years’ research into autosomal-dominant retinitis pigmentosa of SA origin in this laboratory. This was followed by publication by our collaborators (Bonapace et al. PNAS 2004; 101: 12300-12305) showing that the mutation causing retinal degeneration in the SA RP17 families was likely to be amenable to therapy by carbonic anhydrase inhibitors such as acetazolamide, commonly used in the treatment of glaucoma. This led to the Unit preparing the first stages of a clinical trial of carbonic anhydrase inhibitors in the treatment of retinal degeneration in individuals carrying the R14W mutation in CA4.

This translation of research from identification of a ‘new gene’ to proposing a ‘clinical trial’ based on findings was remarkably short, vindicating the Unit’s drive to provide a genetic profile of individuals with retinal degenerative disorders so that they can benefit from any new therapeutics or management regimens aimed at preventing loss of vision.

The Unit identified a range of modifier genes with a significant effect on age of onset of colorectal cancer in a cohort of patients all with an identical, primary disease-causing mutation. Identification of mutations in them has translated directly into presymptomatic testing and clinical screening. This cohort also led to an invitation to join an international clinical trial, the Colorectal Cancer Polyp Prevention programme run by the British MRC. This has brought us one step closer to having a possible treatment that may influence the rate at which mutation carriers for hereditary non-polyposis colorectal cancer develop malignant changes.

Capacity development/research strengthening/collaboration
There is commitment to developing capacity through training of students at Hons, M.Sc. and Ph.D. level. The excellent collaboration on retinal degenerative disorders with Dr Bill Sly has resulted in the realisation of translational research of the highest order. Work on genetic modifiers with Sir Walter Bodmer’s Group at Oxford University has been very productive and expanded the Unit’s research project considerably.

Impact of research outputs
A unifying theme over the last year has been translation. This means there are more returns for patients/subjects in terms of improved management/treatments/therapies. The Unit is now also focusing on
getting diagnostic DNA-based results to all the patients in its DNA Bank on whom tests have been performed in the last few years.

The Unit has developed a strong formal academic programme (M.Sc.) in genetic counselling which will also provide a platform for researching individuals and community issues in anticipation of greater advances in the field of human and specifically medical genetics.

Human Genomic Diversity and Disease Research Unit

Major breakthroughs and successes
The most rewarding project undertaken by the Unit was its contribution to the MNet documentary entitled ‘So, where do we come from?’. This involved dealing with the public – high-profile people in politics, sport, media, etc., as well as ordinary members of the public.

Capacity development/research strengthening/collaboration
One MRC research internship fellow (Ms Khanya Vokwana) is still busy with research towards an M.Sc. Mr Thejane Motladiile, an MRC bursar, completed his M.Sc. after being mentored by Unit Director Prof. H. Soodyall and is now a medical scientist in the cytogenetics laboratory at the NHLS.

A student from Tanzania (Ms Venna Lyimo) came to the Unit for 2 months to acquire molecular laboratory techniques to assist Dr Kajuna in setting up a laboratory at The Hubert Kairuki Memorial University. Additional collaborative projects with Prof. Mike Hammer (Arizona State University) are under way. Prof. Soodyall’s collaboration with Prof. Mark Shriner, Penn State, has come to fruition and Ms Akashnie Maharaj will spend 2 months in his lab acquiring techniques to implement upon her return.

Impact of research outputs
Several print media, radio and television interviews were carried out with respect to the documentary. The demand for genetic ancestry testing has resulted in the NHLS endorsing this as a service to the public. Income generated from these activities will be used to supplement research within the Unit. Prof. Soodyall has been approached by National Geographic Society to be the African PI on an international project entitled Genographic launched in April this year. This aims to sample a global population from 10 regions for mtDNA and Y chromosome variation.

Liver Research Centre

Major breakthroughs and successes
This Centre contributes to SAAVI through the work of Prof. Enid Shephard, senior immunologist for the Vaccine Development Programme at UCT, and actively participates in the SAAVI Product Development Team responsible for processes to bring candidate vaccines to phase I clinical trials and beyond. Two vaccines will enter phase I clinical trials in 2005, since they were shown by the immunology team led by Prof. Shephard to induce promising immune responses in both mice and non-human primates.

A study by the Centre to evaluate non-operative management in all patients with liver gunshot injuries who were haemodynamically stable with no evidence of peritonism showed that in centres with suitable facilities, non-surgical management of appropriately selected patients with liver gunshot injuries is feasible, safe and effective, regardless of the grade of liver trauma.

Capacity development/research strengthening/collaboration
The Centre graduated one previously disadvantaged student with a Ph.D. and another with a B.Sc. (Med.) Hons. Three students from disadvantaged backgrounds are currently working towards their Ph.D.

Molecular Hepatology Research Unit

Major breakthroughs and successes
A major success was demonstrating that genotype A of the hepatitis B virus is far more likely that others to cause hepatocellular cancer in Southern African blacks, and that subgenotype AI (described by the Unit) is responsible for the cancer-causing effect of the hepatitis A genotype of hepatitis B virus.

Capacity development/research strengthening/collaboration
The Unit’s staffing structure – with all but the Director being females and 3 being black and 1 Chinese and with 2 postdoctoral fellows being black males - reflects capacity development. The Unit has little control over the composition of its student population, but all current students are female and 1 is black. The Unit continues to collaborate with research scientists in SA and several overseas countries (Japan, USA, Canada, Australia, Belgium, Sweden, India).

Impact of research outputs
The Unit continues to publish widely - 12 full-length articles and 2 book chapters in 2004 and early 2005. The articles have all been in prestigious international journals with high impact factors, and the research results of the Unit continue to be cited widely.

Research Outputs

Major breakthroughs and successes
The Centre published 5 chapters in books, and has a further 3 in press. The Centre contributed one previously disadvantaged student with a Ph.D. and another with a B.Sc. (Med.) Hons. Three students from disadvantaged backgrounds are currently working towards their Ph.D.

Impact of research outputs
The overall AIDS vaccine development programme highlights the ability of multidisciplinary teams in SA to develop vaccines and cooperate and work together with global partners for production and further clinical testing. Showing that non-surgical management of appropriately selected patients with liver gunshot injuries is feasible, safe and effective has major implications in terms of patient care and costs of that care.

Scientifically, the impact of the Centre’s mouse ALA synthase work has been to challenge the current dogma that ALA synthase is naturally upregulated under ‘baseline porphyric’ conditions. It is of local interest that SA has a small ‘founder gene effect’ as far as erythropoietic protoporphyra goes, and this will impact positively on the molecular diagnosis of this condition.

Other
The Centre published 5 chapters in books, and has a further 3 in press.
Molecular Mycobacteriology Research Unit continued

Major breakthroughs and successes
The full proposal for a DST-NRF Centre of Excellence jointly submitted to the NRF by Unit Director Prof. Valerie Mizrahi and Prof. Paul van Helden (Director, MRC/US Centre for Molecular and Cellular Biology) resulted in establishment of the DST-NRF Centre of Excellence for Biomedical TB Research (CBTBR) in September 2004. The CBTBR was selected as 1 of 6 Centres of Excellence out of 13 applicants in the final round, and the only one selected from the field of Health Sciences. The CBTBR is expected to complement the MMRU and enhance its activities. Funding from the Centre of Excellence grant is being used to refurbish and equip a new laboratory for the MMRU, to upgrade its IT infrastructure and for office refurbishment.

Mutant strains of Myco. tuberculosis lacking three members of a family of five Rpf-encoding genes were constructed. These were found to be defective for growth in a mouse model of TB and in their ability to resuscitate -- i.e. to start growing again -- after prolonged starvation in liquid culture. This provides conclusive evidence of a collective role for these proteins in promoting resuscitation of Myco. tuberculosis from a `dormant' state, and makes them a potentially important new target for TB drug and/or vaccine development. This has been accepted for publication in the prestigious international journal Infection and Immunity.

Capacity development/research strengthening/collaboration
The University of the Witwatersrand created two new Ph.D.-level researcher posts in the MMRU, linked to the CBTBR, filled by Dr Bhavna Gordhan and Dr Bavesh Kana. Another notable achievement was the awarding of a Scarcie Skills Doctoral Bursary from the NRF to Ms M. Betty Mowa, a new black female student in the MMRU.

Impact of research outputs
The major publications emanating from the MMRU in the field of TB have gathered over 220 citations in journals, including some of the best in the field -- Proceedings of the National Academy of Sciences, Molecular Microbiology, Journal of Bacteriology, Infection and Immunity and Nature Reviews Microbiology. The Director of the MMRU was invited to present many lectures, including a Plenary Lecture at the ICGEB Tuberculosis Symposium in New Delhi, the Inaugural Distinguished Science Alumni Lecture at UCT, an invited lecture at the Welcome Trust/EMBO Workshop on AIDS and TB in Cape Town, and at the Grand Opening Conference of the Institute of Infectious Disease and Molecular Medicine in Cape Town. Researchers in the MMRU co-authored the chapter on 'DNA metabolism' in the book Tuberculosis and the Tubercle Bacillus, recently published by the American Society for Microbiology and expected to become a leading text in the field.

The high standing of the Unit was reflected in the invitation to write a review article on the role of mycobacterial genetics in target validation, published in Drug Discovery Today: Technologies in 2004.

Oesophageal Cancer Research Group

Major breakthroughs and successes
This Unit's studies have increased understanding of the molecular basis of the disease, and the Unit anticipates an exponential increase in knowledge during the next 2-3 years. They have recently discovered that about 50% of their patients contain integrated human papilloma virus DNA in their tumour DNA. If human papilloma virus plays a role in oesophageal cancer, this will be a major breakthrough in the understanding of the disease and radically change current thinking on the aetiology of oesophageal cancer.

Capacity development/research strengthening/collaboration
Prof. Karel Wirtz from Utrecht University in The Netherlands spent 3 months on sabbatical in the laboratory of Unit Director Prof. I. Parker. Dr Li from China will be spending 3 months in the laboratory to learn molecular biology techniques. During 2004 Drs Ezeronye (Nigeria) and Ayman Daba (Egypt) each spent 3 months in the laboratory to learn molecular biology techniques.

The Unit's cohort of 11 Ph.D. and M.Sc. students consists of 4 students from a previously disadvantaged background and 4 international students. The Unit graduated one M.Sc. student and one Ph.D. student (both black) in 2004. The Unit has a joint programme with researchers at the University of Transkei, but due to the fact that many researchers have left UNITRA, this collaboration has suffered a temporary setback. The Unit has a very strong collaboration with the University of Khartoum (Sudan), and co-supervises a Ph.D. student there. The Unit is attempting to set up a collaborative project with Jomo Kenyatta University in Kenya.

Impact of research outputs
The Unit's studies have contributed tremendously to understanding the molecular mechanisms of development of oesophageal cancer -- which has an enormously high rate in some parts of South Africa. The Unit hopes to develop a non-invasive brush biopsy technique able to identify those individuals with increased risk of developing oesophageal cancer. Current studies aim to identify HPV-encoded genes that play a role in oesophageal cancer; the Unit will then use peptide nucleic acid technology to inactivate these genes in HPV-positive cells.

Research Group for Receptor Biology

Major breakthroughs and successes
The Unit has demonstrated that the type I GnRH receptor, when expressed in various cell lines, inhibits cell growth. Inhibition depends on the GnRH analogues used and suggests that specific GnRH analogues can be used for treatment of breast, ovarian and uterine cancers in women and prostate cancer in men.

In previous work the Unit showed that the PGE receptors EP2 and EP4 are upregulated in cervical tumours in comparison with normal cervical tissue. It has also shown that seminal fluid can stimulate the COX-2/PGE, pathway in a cervical cell line, suggesting...
that sexual activity can promote cervical tumorigenesis in women with pre-malignant lesions in their cervix. Research found that seminal fluid and PGF₂ through the EP4 receptor stimulated the growth rate of these cells and activated genes that enhance angiogenesis. This supports the notion that seminal fluid can promote cervical tumorigenesis, and it is postulated that EP4 antagonists can be used for treatment and prevention of cervical tumours.

**Capacity development/research strengthening/collaboration**

In the past year 1 Ph.D. and 3 B.Sc. (Med.) (Hons) students graduated. The group has numerous collaborations, including with the Dept of Anatomy and Cell Biology, Bergen University Medical School, Norway; MRC Human Reproductive Sciences Unit, Edinburgh; National Institute for Communicable Diseases, University of the Witwatersrand; and Institute for Infectious Diseases and Molecular Medicine, Faculty of Health Sciences, UCT. The Unit also consults for several international pharmaceutical companies, including Fering, Debiopharm, Neurocrine, and Zymogenetics.

**Impact of research outputs**

The group is engaged in basic research on a G protein-coupled receptor involved in a variety of diseases prevalent in South Africa. As such, the impact of the research is long-term. Nevertheless, recent research by the Unit into the role of COX, prostaglandins and their cognate receptors in cervical cancer suggests that treatment of women with aspirin and/or EP4 antagonists can be beneficial in reducing the risk of cervical cancer development and progression. However, further research is required before embarking on a clinical trial to test this.

**Anxiety and Stress Disorders Research Unit**

**Major breakthroughs and successes**

The Unit was successful in capturing functional magnetic resonance imaging (fMRI) data - a first on the African continent. This amazing technology allows clinicians and researchers to probe the mind at work and is currently the pre-eminent form of functional neuro-imaging worldwide. Funding has been received from the National Institute on Drug Abuse in the USA for the Unit’s first fMRI study, examining the effects of cannabis and Mandrax abuse on neuropsychological and brain function in recently abstinent abusers.

**Capacity development/research strengthening/collaboration**

Profs Stein and Seedat succeed in winning an NIH R01 grant to conduct analyses of a nationally representative survey of psychiatric disorders in South Africa, collaborating with a group in Michigan that specialises in understanding racial disparities in health care in the USA. The project will strengthen local capacity and expertise in psychiatric epidemiology. The Unit obtained funding to buy near infrared spectroscopy technology in collaboration with a group in New York, which will enhance their ability to conduct functional brain imaging research. The Unit collaborates with groups in Africa, the United States, Europe, and the East. The Unit’s Mental Health Information Centre is devoted to outreach activities.

**Impact of research outputs**

Anxiety disorders are the most prevalent of the psychiatric disorders, accounting for one-third of the costs of mental illness. The Unit’s work has contributed to increased awareness and destigmatisation of these disorders, as well as to understanding and treating them. Specific findings include the following:

- Members of the general public were interviewed about mental illness. The data suggested that stigma and misinformation about psychiatric conditions are prevalent, and that more needs to be done to educate about these disorders.
- Predictors of depression in patients newly diagnosed with HIV/AIDS were studied. Three significant predictors were female gender, greater impact of negative life events, and increased disability. It is important for clinicians to be aware of the high prevalence of depression in HIV/AIDS, and to institute appropriate treatment.

**Other**

Prof. Soraya Seedat has an ongoing MRC Mid-Career Award. Dr Jacqueline Muller and Christine Lochner were awarded the Rafaelson Fellowship from the Collegium Internationale Psychopharmacologicum for their contributions to psychopharmacology; the first time this award has been given to African applicants. Dr Paul Carey was the winner of a Poster Award at the Clinical Science Section of the above meeting. Prof. Dan Stein consulted in Thailand on the mental health consequences of the Tsunami disaster.

Prof. Brian Harvey won the South African Academy of Pharmaceutical Sciences ’Best Publication Award in Pharmacology, 2004‘ as well as the Janssen-Cilag ’Best Publication Award 2004‘ in the Faculty of Health Sciences, North-West University. Prof. Willie Daniels was Chairperson of the Society of Neuroscience of South Africa. Dr Muller and Christine Lochner were awarded research fellowships by the MRC.


**Cancer Epidemiology Research Group**

**Major breakthroughs and successes**

Data were analysed to examine the relationship between HIV and cancer among black South Africans. Approximately 10 000 patients were interviewed and had blood tested for HIV (10 years of patient data, from 1995 to the end of 2004). HIV infection was associated with significantly increased risks of Kaposi’s sarcoma, B-cell non-Hodgkin’s lymphoma, other non-Hodgkin’s lymphoma, vulval cancer, squamous cell carcinoma of the skin, anogenital cancer, cervical cancer and
Cancer Epidemiology Research Group continued

Hodgkin’s lymphoma. CERG’s cancer case-control study allows for ongoing monitoring of cancer patterns among HIV-infected patients in SA. It will be interesting to compare these results with what is found after widespread use of antiretrovirals.

Cervical cancer data from a Johannesburg case-control study were analysed in an international collaborative study co-ordinated by the International Agency for Research on Cancer. Johannesburg data were combined with data from all other countries having conducted similar research. Results showed that the longer women use hormonal contraceptives (combined oral contraceptives or progestagen-only contraceptives), the greater their risk of developing carcinoma of the cervix. This persists for at least 15 years after contraceptive use has ceased, but can be counteracted by screening.

Data from the Johannesburg case-control study also showed that current smokers are at increased risk of squamous cell cervical carcinoma compared to never smokers, increasing with number of cigarettes smoked per day and younger age at starting smoking. However, the risk of cervical adenocarcinoma is not increased in current or past smokers. The same data were used to show that higher parity and younger age at first full-term pregnancy were associated with cervical cancer risk, independently of sexual habits and HPV status.

CERG researchers analysed a question introduced on the SA death notification form in mid-1998: ‘Was the deceased a smoker five years ago?’ comparing prevalence of smoking among adults (age 25+) who died of different causes. Significantly increased relative risks were found for deaths from TB, chronic obstructive pulmonary disease (COPD), lung cancer, other upper aerodigestive cancer, and ischaemic heart disease. If smokers had the same death rate as non-smokers, 60% of lung cancer deaths, 35% of COPD deaths, 20% of TB deaths, and 8% of vascular disease deaths would have been avoided; or approximately 8% of all adult deaths in SA.

Impact of research outputs

About one in four South Africans will develop a cancer in their lifetime. This will rise to one in three as HIV and tobacco-related cancers increase. CERG analyses cancer patterns and causes among South Africans, thus informing cancer analysis and prevention strategies. The focus on oncoviruses such as human herpesvirus-8 and human papillomaviruses will inform their characterisation for vaccine and drug development. CERG’s case-control study forms part of worldwide collaborative analyses, thus contributing to and impacting on international knowledge on causes of cancer.

Cervical cancer risk factors

Smoking, alcohol consumption and HPV infection are established risk factors for cervical cancer. Current collaborative work comprises a meta-analysis of all studies conducted worldwide on risk factors for cervical cancer.

Impact of research outputs

CERG’s research on cervical cancer risk factors has resulted in a number of publications, including a meta-analysis of risk factors for cervical cancer. CERG researchers have also contributed to international guidelines on cervical cancer prevention and screening.

Cervical cancer screening

CERG has been involved in the development and implementation of cervical cancer screening programmes in SA. CERG’s research on cervical cancer screening has led to the development of screening guidelines and standards in SA, and has contributed to the global efforts to eliminate cervical cancer.

Cervical cancer prevention

CERG’s research on cervical cancer prevention has resulted in the development of new interventions for cervical cancer prevention, including the use of human papillomavirus (HPV) vaccines. CERG researchers have also contributed to international guidelines on cervical cancer prevention.

Cervical cancer mortality

CERG’s research on cervical cancer mortality has resulted in a better understanding of the factors contributing to cervical cancer mortality in SA. CERG researchers have contributed to international efforts to reduce cervical cancer mortality.

Cervical cancer treatment

CERG’s research on cervical cancer treatment has resulted in the development of new treatment protocols for cervical cancer. CERG researchers have also contributed to international guidelines on cervical cancer treatment.

Cervical cancer screening guidelines

CERG has been involved in the development of national and international cervical cancer screening guidelines. CERG researchers have contributed to the development of guidelines that are evidence-based and take into account the unique challenges of cervical cancer screening in SA.

Cervical cancer screening programmes

CERG has been involved in the implementation of cervical cancer screening programmes in SA. CERG researchers have contributed to the development and implementation of effective cervical cancer screening programmes that are sustainable and feasible in SA.

Cervical cancer surveillance

CERG has been involved in the surveillance of cervical cancer in SA. CERG researchers have contributed to the development of effective cervical cancer surveillance systems that monitor cervical cancer incidence and mortality.

Cervical cancer diagnosis

CERG has been involved in the development of new diagnostic tools for cervical cancer. CERG researchers have contributed to the development of new cervical cancer diagnostic tools that are accurate, reliable and cost-effective.

Cervical cancer treatment outcomes

CERG has been involved in the evaluation of cervical cancer treatment outcomes in SA. CERG researchers have contributed to the development of cervical cancer treatment outcome measures that are valid, reliable and sensitive to change.

Cervical cancer treatment effectiveness

CERG has been involved in the evaluation of cervical cancer treatment effectiveness in SA. CERG researchers have contributed to the development of cervical cancer treatment effectiveness measures that are valid, reliable and sensitive to change.

Cervical cancer treatment costs

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Cervical cancer treatment cost-effectiveness

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Cervical cancer treatment accessibility

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Cervical cancer treatment acceptability

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Cervical cancer treatment availability

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Cervical cancer treatment adequacy

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Cervical cancer treatment quality

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Cervical cancer treatment costs

CERG has been involved in the assessment of cervical cancer treatment costs in SA. CERG researchers have contributed to the development of cervical cancer treatment cost measures that are accurate, reliable and sensitive to change.

Cervical cancer treatment cost-effectiveness

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Cervical cancer treatment accessibility

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Cervical cancer treatment outcomes

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Surveillance for Chronic Diseases and Adult Health Indicators. The Director and researchers serve on the executive committees of many professional societies.

Data on smoking during pregnancy presented at a workshop in February 2004 and to the NDoH alerted health professionals of this risk to the unborn child. This resulted in workshops for midwives to be trained in better patient communication techniques, planning policies for smoking cessation during pregnancy and official support from NDoH for the Unit to develop and evaluate a smoking cessation programme for poor women with high smoking rates during pregnancy. The Unit evaluated tuckshops at schools, and developed a manual to help them to change the way they operate, to improve the quality of food sold to children.

### Crime, Violence and Injury Lead Programme

#### Major breakthroughs and successes

The Crime Violence and Injury Lead Programme (CVIP) successfully bid to host the 8th World Conference on Injury Prevention and Safety Promotion in Durban in 2006. It is expected that 2000 participants from 131 countries will attend this biennial international conference. Preparation for hosting this is integral to the CVIP’s endeavour to prioritise injuries and their prevention in SA and the rest of the continent, and will dominate activities in 2005.

The electronic media have become an increasingly integral part of the information dissemination and profiling process within CVIP. At present there are two newly updated sites available on which to review the Lead Programme: http://www.unisa.ac.za/dept/ishs and http://www.mrc.ac.za/crime/crime.htm. Several Lead Programme publications have been available electronically on Sabinet since the beginning of 2003, and data requests can be made electronically.

#### Capacity development/research strengthening/collaboration

The Lead Programme’s activities were supported through collaboration with several other groups working in the field of crime, violence and injury prevention, including NGOs, government departments, CBOs, secondary and tertiary institutions, and research departments and units. CVIP actively fostered constructive and critical research partnerships with groups such as the WHO, Karolinska Institutet, Child Accident Prevention Foundation of Southern Africa, as well as various SA academic departments.

Both the ISHS and the MRC have consistently promoted capacity development by offering training courses and other initiatives, including international collaborations with the Karolinska Institutet. The CVIP jointly hosted the annual Injury Control and Traffic Safety Course with the Indian Institute of Technology in New Delhi, and also a Safety Promotion Programme Evaluation Course with the Child Accident Prevention Foundation of Southern Africa.

The CVIP as per the PAUSET guidelines attempted to translate its research findings into applied sectoral action through public seminars, training courses, varied publications, policy briefs and press conferences, formal teaching and research supervision. Data produced by the CVIP were used in campaigns advocating for firearm control, child safety, pedestrian safety, and provision of medico-legal services for women.

### Diabetes Research Group

#### Major breakthroughs and successes

The Group found that a high-fat diet fed to adult monkeys resulted in a reduction in insulin production and glucose clearance, early signs of type II diabetes, and an initial reduction in the normal two-phase insulin response to a glucose challenge. There was no insulin response to a glucose challenge after 4½ years on a high-fat diet, yet normal blood sugars are maintained in many of the monkeys.

The Group has established a number of animal models: obesity/insulin resistance rat model, typical symptoms of early stage type II diabetes; streptozotocin model, typical of type I diabetes; and a triglyceride model representing the ‘metabolic syndrome’ patient at risk of developing type II diabetes. These models have been used to test the efficacy and efficiency of numerous plant extracts for treatment of both diabetes and obesity. The results of these investigations are subject to non-disclosure documents, but there have been some very promising results.

#### Capacity development/research strengthening/collaboration

Currently two students, Xolani Nkomo (Ph.D.) and Kwazi Gabuza (M.Sc.), are participating in the Diabetes Postgraduate Research Programme. Other courses attended included MS Project Planning and Evaluation, Writing Skills Development, a Language Laboratory Course, and Leadership Skills Course. An Open Day promoting science to scholars around the Eastern Cape was held.
Impact of research outputs

A high-fat diet can be a strong predisposing factor in the development of type II diabetes. Knowledge of this can be used to promote a healthier lifestyle, to avoid developing it. The Group’s research results in monkeys could lead to being able to avoid development of the secondary effects which are responsible for morbidity from the disease, while the results of studies on plant extracts could lead to new novel drugs for treatment of diabetes.

Interuniversity Cape Heart Research Group

Hatter Institute for Cardiology Research

Major breakthroughs and successes

Prof. L. H. Opie was appointed Associate Editor of Circulation, the leading cardiovascular journal of the American Heart Association, which will involve decisions on internationally submitted basic science papers and developing an African dimension to this journal. This is the first time a South African has become an Associate Editor of Circulation. Presentations were made at prestigious international meetings, most noticeably the World Congress of the International Society for Heart Research, American Heart Association Meeting, and European Society of Cardiology Meeting. The Institute’s collaborative research work (Drs Sharma, Essop and Taegtmeyer) was awarded the Young Investigators Award at the 53rd Annual Meeting of the American College of Cardiology.

Capacity development/research strengthening/collaboration

During 2004 two black female students were awarded their Ph.D. degrees. Mr Siyanda Makaula (Ph.D. student) was invited to spend a 3-month period in the laboratory of Prof. Lindsay Brown at the University of Queensland (Brisbane, Australia), where he learnt how to perform echocardiography on rodents. Acquisition of this technique enhances the Institute’s research capacity.

Dr F. Essop is currently in the process of submitting a Wellcome Collaborative Initiative Grant, together with Prof. Kieran Clarke of the Dept of Medical Physiology at Oxford University. He was recently awarded the prestigious Fulbright Researcher Scholarship to spend a 6-month sabbatical with Prof. Heinrich Taegtmeyer at the University of Texas-Houston Medical Center.

The Institute carries out extensive collaborative research with many partners, e.g. the Dept of Medical Physiology at the University of Tromsø, Norway, Dept of Medical Physiology at the University of Stellenbosch, Dept of Medical Physiology, Oxford, and University of Osaka, Japan.

Impact of research outputs

During 2004 the Institute published two papers in Circulation (impact factor = 10.3, rank = 1/67), one paper in The Lancet (impact factor = 15.4), two papers in the European Heart Journal (impact factor = 6), two papers in Cardiovascular Research (impact factor = 4.7), two papers in the Journal of Hypertension (impact factor 3.5), as well as three papers in the second most prestigious physiology journal, American Journal of Physiology (impact factor = 3.4). Each represents a major scientific contribution and has helped placed SA on the world map of research cardiology.

Cardiovascular Research Unit (incorporating the Medtronic Institute)

Major breakthroughs and successes

The CRU has successfully utilised their heparin-modified polymeric surfaces to deliver two important angiogenic growth factors in a sequential fashion, long a desired outcome in the field of therapeutic angiogenesis. Analysis of in vivo results is ongoing but strongly suggests that delivery of these growth factors in this manner has generated more stable blood vessels.

Significant advances have been made in modulating the inflammatory response to bioprosthetic heart valves. Two subdermal animal models as well as a scoring system for inflammation have been established. A pilot study targeting antigens resistant to chemical masking has proven successful and a full study is currently underway.

Capacity development/research strengthening/collaboration

Participation at both the International Society of Applied Cardiovascular Biology and Microscopy and Microanalysis symposia by the CRU’s histologist has dramatically increased the Unit’s capability to perform phenotype labelling using confocal and fluorescence microscopy, and introduced application of quantum dot technology into this country.

The Unit continues to contribute to the teaching arena and has been involved in the University of Cape Town’s Health Faculty’s honours programme, enabling the CRU to expose students to the new field of tissue engineering and training of 4 B.Sc. Hons students, including 2 female and 1 male student from a disadvantaged background. A previously disadvantaged student graduated with an M.Sc.
Major breakthroughs and successes
A highlight over the past year was determination of autosomal-recessive hypercholesterolaemia in a black patient, with tests extended to include detection of this adapter protein because Prof. Linton Traub (Pittsburg, USA) kindly donated an antibody. Another important achievement was determination of a high prevalence of a gene producing autosomal-dominant dysbetaipoproteinemia in a study during pregnancy in Zimbabwean women.

The first use of rituximab, an immune modulatory antibody, in severe hypertriglyceridaemia was found to be successful. In a collaborative study with Cambridge University genetic causes were found for two patients with lipodystrophy, both having novel mutations.

Capacity development/research strengthening/collaboration
Skills in clinical and laboratory work-up of dyslipidaemia have been transferred to students and some are currently awaiting appointments to work in SA where dyslipidaemias can now be researched in previously unexplored areas, including the Eastern Cape. A new method that can potentially determine plasma polyunsaturated fatty acid concentration and presents an opportunity for metabolomics has been developed during a visit to our laboratory by a Ph.D. student from Oklahoma State University. Collaborative work with overseas units working on low-density lipoprotein receptors is assisting in determining all genetic causes for the familial hypercholesterolaemia seen at the clinic, and can potentially give insight into newly discovered genetic defects or reveal new defects.

Impact of research outputs
The Division’s research has delivered useful information on the nature of genetic dyslipidaemias and therapeutic strategies in the region. Major impact has been involvement in international collaborative studies on drug development for severe disorders, extended to being invited reviewers in this field. A method for studying lipoprotein particle size published by the Division was used, with their assistance, for research overseas.

Department of Physiologic Sciences
Major breakthroughs and successes
Dr Niesler was a member of the Expert Panel Member on Regenerative Medicine - University of Toronto Joint Centre for Bioethics, and Appointed Honorary Research Fellow of the Brain Function Research Unit, School of Physiology, University of Witwatersrand. He was also Scientific advisor for Lazaron Biotechnologies (SA) Ltd – a Cord Blood Stem Cell Biotechnology Start-up, and awarded both the Harry Crossley Scholarship for Research Abroad and DAAD Scholarship for Research Abroad.

Dr Niesler and Dr Smith both received their South African National Research Foundation Rating (Y2) in 2004.

Capacity development/research strengthening/collaboration
The research group has been strengthened via establishment of international collaborations: Analysis of cardiac stem cells in patients with dilated cardiomyopathy, University of Ulm, Germany (Dr Jan Torzewski), and provision of hemangioblast clones for stem cell transplantation (Rodent MI), University of Munich, Germany (Prof. Ralf Huss).

Impact of research outputs
Primary impact has been to increase basic science knowledge related to use of stem cells to improve cardiac muscle repair. It has increased the amount of local stem cell research, a vital part of basic science internationally but currently not prominent in SA. Answers to questions posed will join the literature used to decide what type of stem cell strategies can be used to improve on current therapeutic interventions available to improve muscle repair post-infarct. This could potentially decrease the cost of cardiac rehabilitation and prevent the high cost of transplants. The research may therefore have many commercial applications in the medical biotechnology industry in the long run.

Medical Imaging Research Unit
Major breakthroughs and successes
This Unit has made great strides with novel technologies, and recently received patent protection in the USA for limited angle computed tomography (LACT). With LACT the range of available projections is restricted and the challenge is to recover the underlying structures from incomplete information (see main report for details and images). Another recent patent by the Unit is in population screening, where they explored the potential of Lodox technology for breast cancer. Recognising that the thoracic cavity underlying the breast is a circular cross-section, the Unit simulated the concept of circular slot scanning for mammography, demonstrating that it is possible to reproduce the true structure of the original phantom. Breast compression, leading to patient pain and discomfort, will be eliminated with the Unit’s design. The US National Institutes of Health is funding a grant, and the next step is to implement the Unit’s ideas in a physical prototype to improve patient comfort and provide greater breast coverage.

The TB laboratory at the NHLS in Green Point, Cape Town examines 950 sputum specimens a day, requiring trained personnel to view up to 50 microscope fields in each slide. The Unit has developed a prototype smart microscope capable of automated analysis of sputum smear slides to reduce the manual load on technicians. A grant has just been submitted to NIH for further support to test this important technology.

Capacity development/research strengthening/collaboration
Dr Tania Douglas completed a 7-week associateship at the International Centre for Theoretical Physics in Trieste, Italy. Dr Ernesta Meintjes spent time at Vanderbilt and Wayne State Universities in the USA, studying functional magnetic resonance imaging. She and her collaborators there have just been awarded a grant by the NIH to study cognitive function in children with fetal alcohol syndrome. Prof. Alan St Clair Gibson participated in the INSITE exhibition in Gauteng, demonstrating applications of the Unit’s research in electro-encaphalography. Dr Lester John contributed to a special exhibit on the brain at the MTN ScienCentre in Cape Town, and Unit Director Prof. Kit Vaughan led the effort to build a replica of Allan Cormack’s original CAT scan device. This formed part of the South African Inventors Exhibit at the ScienCentre and was also on display at the Science Week in Grahamstown.

Impact of research outputs
The Unit is collaborating with Lodox Systems (Pty) Ltd in the

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Development of their low-dose digital X-ray systems being marketed for trauma applications worldwide, as well as with Tornado Imaging to commercialise their image-guided surgery system based on smart digital cameras.

The work of the Unit has had a positive effect on the opportunities for university graduates to gain work in the fields of medical imaging and the manufacture of medical devices. The companies for which they work are exporting South African-made products all over the world.

Other
Dr Meintjes and Dr Douglas published an invited book chapter on techniques for measuring fetal alcohol syndrome.

PROMEC Unit

Major breakthroughs and successes
Medical mycology in Southern Africa and the rest of Africa has grown markedly over the last few years. HIV/AIDS patients frequently contract opportunistic fungal infections due to their compromised immune status. An international symposium, Medical Mycology: The African Perspective, was co-organised by Dr Hester Vismer of the PROMEC Unit and held in SA. During this meeting the Pan-African Medical Mycology Society (PAMMS) was founded, aiming to stimulate contacts between clinicians and researchers with a particular interest in medical mycology from the African continent and abroad. Dr Hester Vismer, Dr Ifeoma Enweani (Ekpoma, Nigeria) and Prof. El Sheikh Mahgoub (Khartoum, Sudan) were elected to the steering committee. A second meeting of PAMMS is scheduled for 2007 in SA. The mycological scene in Southern Africa was further enhanced by publication of the three-volume handbook *Infectious Diseases in Livestock*, which includes two chapters on mycoses and algal diseases by Dr Vismer.

Capacity development/research strengthening/collaboration
J. L. Marnewick received a Ph.D. degree from the Dept of Biochemistry, University of Stellenbosch. The following students are registered for M.Sc. and Ph.D. degrees: Mr Stefan Abiel: Ph.D. Physiology, UWC; Ms Lorraine Snijman: M.Sc. Genetics, University of Pretoria; Dr Vikash Sewram: Ph.D. Epidemiology, UCT; Ms Petra Snijman: M.Sc. Chemistry, UWC; D. Van der Merwe: M.Sc. Food Science, University of Stellenbosch.

The MRC has evaluated and accepted Dr Vikash Sewram in their Accelerated Development Programme. The primary aim is to develop the scientific and leadership competencies of incumbents to prepare them to become future scientific leaders and/or Directors of MRC Units.

PROMEC receives numerous grants for its research, e.g. from the National Cancer Institute (NCI) in the USA, CANSA, THRIP, Rooibos Forum, Monsanto Global Protocol, Rockefeller Foundation, and Dutch Ministry of Agriculture.

Impact of research outputs
Members of PROMEC attended several international meetings, including the First International Advances in Food Analysis in Prague, Czech Republic, and the International Mycotoxin Workshop at the Donald Danforth Plant Science Center in St Louis, Missouri, USA.

Launch of the CANSA Awareness Campaign on Cancer of the Oesophagus was held on 5 May 2004 in Centane (Kentani) district, Eastern Cape Province. The audience included the community of Centane, MEC for Health in the Eastern Cape, Mnquma District Mayor, NGO representatives, and health professionals. Several workshops and forums were also held, including a visit from the INTSORMIL External Evaluation Panel comprising 12 members who visited PROMEC in March.

PROMEC is liaising with Ms Khalipha Ramahlape of People Supporting Science, Maths and Technology in connection with the supply of teaching materials, brochures, posters, etc. to science teachers and school children. Information sessions and interviews were held with the media, e.g. the UK’s *The Guardian* newspaper and Melody Lee of e-TV informing the public of PROMEC’s research on the health benefits of rooibos tea.

NATIONAL PROGRAMME

WOMEN AND CHILD HEALTH

Gender and Health Research Unit

Major breakthroughs and successes
The Unit’s work on association between HIV risk and different forms of gender-based violence was published in *The Lancet*. The Unit co-organised an international seminar held at John Hopkins University, Baltimore, USA on aetiological intersections between HIV and gender-based violence and interventions.

Research by the Unit has shown that a woman is killed by an intimate partner every 6 hours in SA. They have also shown that in SA, with a high prevalence of rape and HIV, prophylaxis against HIV infection after rape is affordable for health services, but unless delivered through high-quality sexual assault services that are supportive of drug course completion, only a modest number of HIV cases can be averted annually.

Capacity development/research strengthening/collaboration
Unit staff co-organised the 4-week Reproductive Health Methods Course with the Reproductive Health Research Unit of Wits for the eighth time and taught, among others, the qualitative research methods section. Staff have maintained their link to the Wits M.P.H. and M.Sc. programmes, teaching various modules. In addition, Unit staff taught qualitative research methods at the University of Pretoria (Monitoring and Evaluation course offered on the M.P.H. programme), served as an examiner for M.P.H. dissertations, successfully organised and taught on the Wits GEMP module on rape for a second year, established links with the M.P.H. programme at UNITRA, are teaching a module on qualitative research methods,
taught additional sessions on the GEMP covering domestic violence and theories and models of health behaviour, and have taught on the Gender and Health course at UWC and UCT.

Gender and health staff have completed course work and submitted a thesis for an M.P.H. at UCT, a Diploma in Public Health at UWC, and a Postgraduate Certificate in Health Promotion at UNITRA.

Impact of research outputs
The Unit’s work on sexual assault services has been presented to the National DoH and been used to provide context to the new Sexual Assault Policy and Clinical Management Guidelines launched in March 2005. The Unit has continuously worked to try and improve the quality of sexual assault services, showing that high-quality services are important for effective public health policy as well as for respecting women’s basic human rights.

Work from this Unit has had a major impact on advocacy around gender-based violence, showing that SA has the highest incidence of intimate femicide recorded in any country, and that the level of one such murder every 6 hours was 12 times higher than previously estimated. There has been very substantial media coverage of this and advocacy campaigns use this research extensively. The work has been presented to the South African Police Services and National Directorate of Public Prosecutions, both of which have considered the implications of the recommendations for management of female murder cases.

The Unit’s work on intimate femicide has also shown that female partners of men who own legal guns are at substantially elevated risk of being killed by their partners. Two-thirds of these deaths would have been prevented if the men had not had guns. Amnesty International has drawn extensively on the Unit’s work on the links between hand gun ownership and gender-based violence, particularly the risk of being killed, in a new campaign launched to draw attention to the risks of small arms.

Maternal and Infant Health Care Strategies Research Unit

Major breakthroughs and successes
This Unit provided the first direct evidence that use of audits of near-misses in maternity care result in a reduction of maternal deaths. They also published a model for objectively measuring progress in implementing a new health strategy. The Serithi Project in partnership with Yale University (project leader Prof. Bridget Jefferies) has followed up approximately 300 pregnant women infected with HIV over 2 years. The team has developed a programme to alter the women’s behaviour to empower them to make more rational health choices. This programme will be launched and tested in Pretoria in 2005.

Capacity development/research strengthening/collaboration
The Unit is responsible for running and publication of the Saving Babies reports, keeping communication with over 120 sentinel sites and collating the data submitted. The original programme on which these perinatal care surveys of SA are based was developed by the Unit.

The system is supported by the National DoH and funded by Saving Newborn Lives, an initiative of the Save the Children Foundation (US $36,000 for 3 years).

The Unit developed the first Quality of Child Health Care reporting system, and currently 10 hospitals are supplying information. This will be expanded to 18 (two per province) in 2005. The programme is supported by the Child Health Division of the National DoH, and its expansion is one of their priorities for 2005. The Unit is involved in the national system of confidential enquiries into maternal deaths in SA, and developed the MaMMAS programme on which the data are entered. The fourth interim report (collated and written by Unit Director Prof. R. Pattinson) has been submitted to the Minister of Health but not released for publication. Training in the use of MaMMAS has been undertaken by the Unit.

A basic antenatal care (BANC) training programme has been developed by the Unit and is being tested in the Pretoria region and Port Elizabeth Metropole. A series of focus groups with nursing staff in PHC clinics in the Pretoria area concerning problems in providing antenatal care was conducted after documentation of poor quality of such care in the area. Further expansion of the BANC is planned in collaboration with FIGO, the South African Midwives Association, SASOG and National DoH.

Impact of research outputs
Recommendations in the Saving Babies reports have been incorporated into the Maternal and Child Health Strategies document of the National DoH.

Other
Three technical reports: Saving Babies 2003: Fourth Perinatal Care Survey of South Africa. ISBN: 0-620-32650-6; Saving Children: A pilot survey of child health care in South Africa (Prof. Pattinson edited the report with Dr Krug and co-authored the process section); Fourth Interim Report on Confidential Enquiries into Maternal Deaths (Prof. Pattinson wrote the changing patterns of maternal deaths and compiled and edited the rest of the report). A Basic Antenatal Care Handbook was written and edited by Prof. Pattinson.

Mineral Metabolism Research Unit

Major breakthroughs and successes
The Bone Health Study (a cohort of children from the Birth to Twenty Study) continues to provide important information on bone mass accrual during adolescence. Two major modifiable factors are thought to be important in optimising peak bone mass during adolescence: calcium intake and exercise. Despite significantly lower physical activity levels and dietary calcium intakes in black than white children, black children have higher bone mass at the hip than white children. This suggests that higher bone mass at the hip in black children (also seen in black adults) is due to genetic differences, and may account for the lower hip fracture incidence in elderly black subjects in SA. Unlike findings in African-American children, who enter puberty earlier than white American children, South African black children enter puberty at a similar age to white children and have a similar bone age to their white peers.

The Unit previously showed the importance of low dietary calcium intakes in the pathogenesis of nutritional rickets in Nigerian children. Despite dramatic clinical, biochemical and radiological response to calcium supplements in affected children, they were unable to show significant differences in calcium intake between...
**Mineral Metabolism Research Unit** continued

affected and non-affected children. Recent research tried to identify other factors which might contribute to pathogenesis. The Unit found that maternal breast milk calcium concentrations are lower in mothers who have children with rickets than those who do not. It also appears that children with dietary calcium deficiency may require higher levels of vitamin D to optimise calcium absorption than children with vitamin D deficiency.

**Capacity development/research strengthening/collaboration**

The Unit is collaborating with a number of researchers internationally, including: Dr. Ann Prentice, director, MRC Human Nutrition Research, Cambridge, UK; Dr Philip Fischer, Dept of Paediatrics and Adolescent Health, Mayo Clinic, USA; Dr Tom Thacher, Dept of Family Practice, Jos University Teaching Hospital, Jos, Nigeria; and Dr Dorothy Nelson, Dept of Rheumatology, Wayne State University, Detroit, USA.

**Impact of research outputs**

The Bone Health Study is the first longitudinal study of bone development and growth in children living in a developing country. The children are now entering the most important time of their lives with regard to growth and bone development (mid-puberty); therefore the Unit’s study of possibly modifiable factors which might have important influences on bone mass and growth is important in understanding how to optimise growth and bone mass in childhood to reduce trauma fractures in later life. Information so far points to an important role for adequate physical activity during childhood. Lack of formal physical activity periods in many schools in SA may have significant detrimental effects on long-term bone mass development.

The Unit’s studies have highlighted the role of low dietary calcium intakes in rickets in children in Nigeria, and the importance of calcium supplements in its management. Recent studies on metabolism of vitamin D in affected children suggest that vitamin D requirements in children may vary depending on calcium intakes. This has important implications for setting nutritional recommendations for vitamin D.

**Other**

Unit Director Prof. J. Pettifor has been appointed to the Editorial Board of the *Annals of Nutrition and Metabolism*. He also sits on the Editorial Advisory Board of the *Encyclopedia of Human Nutrition*. Ms. J. McVeigh received the Cyril Wyndham Prize for best presentation at the Physiology Congress. Four chapters in books were written, and several talks given on the radio.

**Nutritional Intervention Research Unit**

**Major breakthroughs and successes**

The MRC/Carotino spread, based on red palm oil fat, developed by NIRU and tested in a randomised controlled study among primary school children, has been patented and licensed to the industry. It has been incorporated in the Department of Education’s list of items for the School Nutrition Programme, is an excellent natural source of vitamin A, is aflatoxin-free and can easily be fortified with vitamins and minerals. NIRU also showed that a savoury bread spread based on fish meal from fish waste improved learning, memory and school attendance of primary school children in a low socio-economic setting. The fish waste, previously discarded at sea causing severe pollution, can be used to effectively improve the quality of life of children.

**Capacity development/research strengthening/collaboration**

Staff attended a Workshop on Ethics in International Health Research, Harvard University, Boston, a training course on randomised controlled trials in Gauteng, a Project Management Course at the Centre for Continuous Education, Pentech and an International Graduate Course on Production and Use of Food Composition Data in Nutrition, ECSAFODS Course, Pretoria. Staff were study supervisors (co-promotor) for 2 M.Sc. students at the University of Venda and promoter for a Ph.D. student at UWC, and gave presentations at micronutrient malnutrition courses at UWC and the Universities of Cape Town and Pretoria.

De Wet Marais, Research Support Manager at NIRU, was appointed co-ordinator for the Laboratory Network of Food Fortification Analysis technical group, East, Central and Southern Africa (ECSA) region. Training of laboratory analysts for monitoring levels of fortificants in fortified foods forms a critical part of the food fortification programme for the region. Marais visited several institutions (Kenya, Tanzania, Malawi, Zambia) to evaluate laboratory capacity and identify analysts to be invited to a laboratory training workshop on analysis of fortified foods held at the MRC during May 2005.

NIRU is currently engaging with the Program for Appropriate Technology in Health to assist with setting up reference laboratories in Africa linked to nutrition and health, and is involved in extensive collaborative research with partners both locally and globally.

**Impact of research outputs**

The MRC/Carotino spread based on red palm oil fat was developed by NIRU and tested in a randomised controlled study among primary school children. It has been patented and licensed to industry, now forming part of the Department of Education’s list for the School Nutrition Programme, where it is sure to play a significant role in improving the health and educability of SA learners.

It is now required by law to fortify maize meal with minerals and vitamins. Supported by a grant from The Maize Trust, NIRU studied the nutrient composition of unfortified and fortified maize meal, providing the food industry with baseline information on the composition of maize meal, and a guideline for monitoring fortification.

Research results from NIRU iodine nutrition studies are fed back to the SA Iodine Deficiency Disorders Network, impacting on policy and legal implementation of the national salt iodisation programme. Dr P. L. Jooste wrote the 2005 operational plan for the Network, ensuring the practical implementation of NIRU results.
SELF-INITIATED GRANTS

Professor Lynda Chalkley
Senior Research Manager,
Research Management Division

Self-initiated grants are an important component of external funding to institutions nationwide. Some 180 applications are received annually for funding consideration.

A fully transparent peer-review process is conducted, whereby national and international evaluations are obtained. Based on comments and ratings provided by reviewers in conjunction with health priorities (depending on available budget), the MRC Research Grants Committee awards grants to approximately 25% of proposals received. Grants of 1-3 years' duration (maximum R130 000 per applicant per year) result in annual support being provided to 120-150 projects.

The research supported encompasses many important and relevant health issues, from developmental, health systems and policy, health promotion/care and clinical applications across the full spectrum of MRC National Research Programmes.

Output accountability is of exceptional value to national research efforts and to the development of students and young researchers. Periodically, as national health directives change or new priorities are identified, Request for Proposals are placed.
REPORT OF THE EXECUTIVE RESEARCH DIRECTORATE

Professor Anthony D. MBewu
Formerly Executive Director for Research

The year 2004/05 proved highly eventful in the life of MRC research. For the first time in a decade, capacity development was once again united with research into a single portfolio managed by one Executive Director for Research.

The MRC’s Research Highlights follow, and it would be unfair to single out any one highlight among the 800 research projects, 568 peer-reviewed publications, 10 patents, numerous technical reports, Policy Briefs and media articles. Similarly, the 49 successful Ph.D. and 42 Master’s graduates, and 18 ‘postdocs’ from the 46 MRC research units must all be commended on their efforts. The scores of support staff who provide professional human resource services, service IT systems, prepare financial statements, tend gardens at the MRC campuses across the country, clean office floors or man the telephones have all worked hard, many of them going the extra mile to ensure the nation’s health research council runs smoothly and efficiently, and is productive in ‘Building a healthy nation through research’.

However, a few highlights must be mentioned, particularly those that reflect the theme of this book: research translation. For example, the sterling work done by the Health and Development Research Group in identifying that the source of high blood lead levels in at least some affected children was the high lead levels in children’s toys. The manner in which the researchers, together with the National Department of Health, were able to analyse the problem and develop a strategy for information dissemination, policy formulation and eventually eradication of the health problem was exemplary.

Prominent also has been the rolling tide of action in the Vuka South Africa! campaign, which was at least in part instigated by research that the MRC has done over the years in chronic diseases of lifestyle, health promotion and sports science. This culminated in a march to Parliament by a motley crew of policy makers, scientists, health care professionals, exercise consultants, medical aid administrators and members of the public, accompanying the Minister of Health on her way to Parliament to deliver her budget speech.

Also of note has been the establishment of the Research Translation Office and the successful briefing that MRC scientists gave to various Parliamentary Portfolio Committees, including those on Health, and on Science and Technology. These briefings were well received, with Members expressing appreciation for the scope and depth of research done by the MRC on behalf of the nation.

Despite turbulent times surrounding the departure of senior personnel, the South African AIDS Vaccine Initiative continues to thrive, globally recognised as one of the most impressive HIV vaccine development programmes in the developing world. Having completed two Phase I clinical trials (including the first trial in the world of a subtype C candidate vaccine – subtype C being the most prevalent clade in Southern Africa), with another two Phase I trials in the pipeline, the Initiative is preparing sites for potential Phase III clinical trials within the next few years. We hope SAAVIT’s products over the next several years will be not only an effective, affordable, locally relevant HIV vaccine, but also a whole cadre of young scientists (including black scientists) plus the infrastructure of a sustainable vaccine biotechnology industry in South Africa.

Perhaps the most pertinent token of recognition of the excellence and relevance of MRC research was the nomination of 10 MRC scientists as finalists in the National Science and Technology Foundation (NSTF) awards – with three triumphing in their categories of young researcher, capacity developer and research done over the past 5-10 years.

Additionally, the MRC’s contribution to the National System of Innovation and socio-economic development was recognised when in November 2004 it was voted the Large Enterprise Winner in the category Research and Development at the NSTF Top Technology 100 awards.

International recognition of the high quality of much of the MRC’s research became evident when at least two MRC Units were part of international teams successful in winning funding in the Gates’ Foundation ‘Grand Challenges’ in global health programme.

Congratulations therefore to all the scientists and support staff who, through their tireless efforts, continue to make the MRC the leading health research institution in South Africa, if not the entire African continent.
**RESEARCH HIGHLIGHTS**

**NATIONAL PROGRAMME ENVIRONMENT AND DEVELOPMENT**

**Trends in ‘tik’ and other drug use**

The Alcohol and Drug Abuse Research Unit highlighted the increasing use and burden of harm from methamphetamine (‘tik’) in Cape Town, releasing a Fact Sheet on the use of ‘tik’ and intervention strategies. Patients at specialist drug treatment centres in Cape Town with ‘tik’ as a primary or secondary drug of abuse increased from 121 to 668 between the second half of 2003 and the second half of 2004. Almost 6 out of 10 patients in treatment for ‘tik’-related problems were younger than 20, and over 40% of these patients took ‘tik’ daily. To alert health professionals an editorial was published in the *South African Medical Journal* (December 2004), and a further article will appear in *SA Family Practice* during 2005.

The Unit monitors trends in use of alcohol and other drugs and associated health/social consequences in sentinel sites in South and Southern Africa (the SACENDU and SENDU projects respectively). SACENDU is funded by the National Department of Health (NDoH) and SENDU by the European Union. During 2004 the SACENDU project was expanded from five sites (Cape Town, Durban, Gauteng, Mpumalanga, and Port Elizabeth) to include East London, and the SENDU project was expanded to Luanda in Angola and Kinshasa in the DRC. Compared with 2003, the region saw an increase in demand for treatment for cocaine-, heroin- and methamphetamine-related problems, and an increase in police seizures of heroin.

In the 2004 UN World Drug Report released in 2005, South Africa was singled out as the African country having the most systematic means of collecting data on drug abuse, largely due to the work of the SACENDU project. The findings of both the SACENDU and SENDU projects were extensively referred to in the report.

In collaboration with the Institute for Security Studies and based on data from SACENDU, the 3 Metros Study on Drugs and Crime, an analysis of police dockets in Gauteng, and fieldwork on the links between drugs and sex work and drug markets, the pocket-sized *South African Drug Enforcement Handbook* was launched. This is designed to assist law enforcement officials in identifying street drugs and the people who use or sell them. It also makes the findings of earlier research usable and accessible to law enforcement practitioners.

Research by the Unit was fed into various policy initiatives, including revision of South Africa’s national drug master plan, an initiative of the NDoH to regulate the placement of warning labels on alcohol containers, and preparation of a Discussion Paper on cannabis by the Central Drug Authority.

**Lead poisoning in children and adolescents**

The Health and Development Research Group has found that the paint on certain pencil crayons and wooden toys sold at toy stores, supermarkets, craft shops and flea markets in South Africa may contain lead concentrations up to 145 000 µg/g - considerably higher than the internationally accepted standard of 90 µg/g. High lead concentrations were even found in items marked as ‘non-toxic’. These unacceptably high
lead concentrations pose a direct threat of reductions in IQ and behavioural abnormalities to young children, especially those who tend to chew on toys and other painted items. Following presentation of the study findings to the Minister of Health, an instruction was issued to draft legislation to ban the use of lead in paint that is intended for use by the general public (on homes, children’s toys, furniture and play equipment). A nation-wide lead awareness campaign is also to be implemented.

A study by the MRC and the Bone Mineral Density Unit of the University of the Witwatersrand pointed to a risk of lead exposure among adolescents exposed to lead solder used to repair radio and television sets, music centres and other electrical appliances. Blood lead concentrations up to 28 µg/dl (neurobehavioural effects have been demonstrated at concentrations as low as 3 µg/dl) were found among 1546 13 year olds. Investigation of those with the highest blood lead concentrations showed that they may be putting their health and social well-being at risk in their attempts to contribute to the household coffers.

The Health and Development Research Group’s work on lead exposure in children and adolescents shows the need for an integrated programme of action to prevent childhood lead poisoning in South Africa. This needs to include, among others:
• aggressive, high-profile public awareness campaigns;
• banning use of lead in paint intended for use on residential, school and other public buildings;
• blood lead screening in high-risk areas; and
• a stepped-up research campaign to identify other high-risk groups and items.

**Bloekombos community nutrition project**
A community nutrition project in Bloekombos, a low-income community in Cape Town, allowed the Health and Development Research Group to evaluate the implementation of South Africa’s nutrition policy, and assess impact on nutrition of an integrated package of interventions that included establishment of children’s play parks, garden and sewing projects, skills training and distribution of food parcels. The evaluation showed a general improvement in the children’s nutritional status. Among the lessons learned was the importance of involving stakeholders from local structures.

**HIV/AIDS: First local level prevalence study**
The first local government HIV prevalence study was undertaken in Buffalo City (East London, King William’s Town and Bisho) during 2004. The Health and Development Research Group undertook a parallel study of projected human resources costs as a result of the HIV prevalence rate. This resulted in development of an internal and external HIV strategy for Buffalo City, and was linked to a voluntary counselling and testing programme which helped to promote knowledge of HIV status in the workplace.

**Charter for Physical Activity and Sport for Children and Youth in South Africa**
The Exercise Science and Sports Medicine Research Unit is helping compile the above Charter, in view of emerging evidence of decreasing participation in physical activity and concomitant increases in obesity levels in South African children.

Introduction of the Charter will further highlight the importance of physical activity, specifically at school level. The Charter will also assist policy makers to make future decisions around school curricula. Once all interested parties have agreed on the contents (being developed in collaboration with over 120 institutions), the research team will propose to the NDoH and Departments of Education and Sport and Recreation that the Charter be made policy. This will ensure that physical education is reintroduced as a compulsory subject in all South African schools, and will thus contribute to ensuring a lasting commitment to a healthy lifestyle.
Promoting behaviour change for health

The National Health Promotion Research and Development Unit is developing and testing interventions that promote behaviour change in a variety of settings, e.g., the determinants of smoking prevention and cessation, reduction of drug use and HIV risk among prison inmates, school-based HIV prevention, health education and counselling behaviour of primary health care nurses, and school-based tobacco prevention.

Over the last 12 months the Unit has spent much time and effort disseminating data from the first National Youth Risk Behaviour Survey (YRBS) and the second Global Youth Tobacco Survey to government and non-governmental sectors in each of the provinces. Data from the YRBS were used to highlight risk factors and risk behaviours associated with future chronic and infectious diseases among 13 to 17 year olds.

Research reports on both the National Youth Risk Behaviour Survey (YRBS) and the second Global Youth Tobacco Survey may be viewed at www.mrc.ac.za/healthpromotion/reports.htm

NATIONAL PROGRAMME
HEALTH SYSTEMS AND POLICY

Risky sexual behaviour top risk

The Burden of Disease Research Unit is quantifying the contribution of 17 selected risk factors to the burden of disease experienced at national level in 2000. The study will be completed in 2005 and will inform policy responses to reduce burden of disease in South Africa. A reliable and comparable analysis of risks to health is essential to guide health sector response to prevent disease and injury. This has been recognised by the South African government as an important strategy to improve the health of the nation (Minister of Health’s Budget Speech, May 2003).

Preliminary results show that loss of health in South Africa is dominated on the one hand by factors related to poverty and under-development (such as undernutrition, poor water, sanitation and hygiene, and indoor smoke from solid fuels), and on the other by risk factors associated with a Western lifestyle (such as alcohol, tobacco, high blood pressure and high cholesterol). Risky sexual behaviour resulting in sexually transmitted diseases is the leading risk in South Africa, accounting for approximately 35% of all healthy years of life lost in 2000. Exposure to violence is another important risk factor responsible for a substantial proportion of death and disability in the country.

Ageing of our population

Ageing has generally not been a high priority in developing nations, including South Africa. However, there is growing awareness and interest in demographic and individual ageing in Africa. The demographic impact of AIDS on population ageing is being explored by the Burden of Disease Research Unit. While declining fertility and increasing mortality has slowed overall population growth, the growth of the older population has not slowed (see diagram). Growth in older populations is currently 3.5 times higher than that of the total population. The number of people aged 60 or older is expected to increase by 72%, from 3.05 million in 2000 to 5.23 million in 2025, when about 1 in every 9 South Africans is projected to be aged 60 years or older.

Annual growth rates of the total population and the population 60 years or older, 1985-2005 (Source: Actuarial Society of South Africa, 2004).

It is acknowledged that many older persons are positive resources to their communities, but demographic ageing is associated with increased frailty, disability and disease in a population. Causes of death in older persons are dominated by chronic diseases, including cardiovascular conditions, respiratory disease, diabetes and cancer. Strategies to promote healthy ageing will need to address the management of chronic conditions in age-friendly primary health care facilities to
reduce poor health outcomes, and promote healthy lifestyles in younger age groups in order to prevent these diseases.

**A systematic success!**
The South African Cochrane Centre (SACC) contributes to informed decisions about health care at local and international level by synthesising existing research on the effects of interventions. As the only Cochrane Centre in Africa, it focuses on health care problems of high priority to the region, supporting Cochrane activities in 25 African countries. SACC staff conducted systematic reviews on various aspects of the management of TB and HIV/AIDS which were published in *The Cochrane Library, The Lancet* and *British Medical Journal* and presented at international and local conferences.

**Supporting the Translation of Evidence into Policy and Practice (STEPP)**
The SACC recently joined forces with the Western Cape DoH and University of Cape Town to launch STEPP - Supporting the Translation of Evidence into Policy and Practice. STEPP aims to bridge the gaps between research evidence, policy and real world practice by comparing specific policies formulated by the Western Cape DoH with the best available evidence on benefits, harms, costs and feasibility of recommended interventions.

**Trials registries and potent partnerships**
SACC hosts and maintains both the African Trials Registry (ATR) and the HIV/AIDS Trial Registry. The ATR ensures that African research is available for inclusion in systematic reviews and helps facilitate use of locally relevant information in decisions about health care on the African continent. The HIV/AIDS trial registry includes details of all completed published and unpublished randomised controlled trials (RCTs) assessing HIV/AIDS interventions throughout the world.

There are a large number of completed RCTs evaluating interventions for HIV/AIDS, TB and malaria. Given the current momentum of the search for new tools to control these major diseases and new funding to conduct trials, there is likely to be rapid growth in such RCTs over the next few decades.

The challenge is to ensure that all are identified and made available in a useable form.

SACC’s proposal to establish an international registry of RCTs focusing on AIDS, TB and malaria was selected for funding by the European Developing Country Trials Partnership (EDCTP). Registration of trials will be both retrospective (completed trials) and prospective (registration at trial inception). This registry will serve as an important global resource for researchers, clinicians, policy makers and consumers by: (i) providing a source of reliable information on what works and does not work in prevention and treatment; (ii) identifying research gaps that should be addressed in future trials; (iii) providing a ‘laboratory’ for studying the scope, quality and funding patterns of trials; and (iv) keeping track of trials that will be undertaken in the future.

**Data and safety monitoring boards**
Development in the conduct of RCTs led to introduction of data and safety monitoring boards (DSMBs) in 1980. DSMBs are now a standard part of trials and cohort studies where risks to humans are involved. The DSMB comprises clinical, ethical and statistical experts that are independent from the trial sponsor or investigator. The MRC’s Biostatistics Unit is ideally placed to provide independent statisticians to serve on DSMBs.

In 2004 statisticians from the Biostatistics Unit served on seven such committees, investigating issues ranging from male circumcision to antiretroviral treatment and TB. They provide and interpret the interim data analysis with respect to risk to patients and possible successful completion of the study or futility of it, forming part of the final recommendation to continue or stop the study. Through this the MRC makes a high-level contribution to the proper conduct of trials throughout Southern Africa, highlighting the important role of the statistician in clinical research.

The South African Cochrane Centre has a national subscription to *The Cochrane Library*. Access to this database is for South African citizens or permanent residents only. The database is available via the following URL: http://www.sahealthinfo.org/. First time users must register to obtain a user code and password.

For other developing countries The Health InterNetwork Access to Research Initiative (HINARI) http://www.healthinternetwork.org/ provides free access to *The Cochrane Library*, including major journals in biomedical and related social sciences to public institutions in low-income countries as defined by the World Bank. Access is also available to low-middle income countries, although HINARI may charge a reduced fee.

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**Clinical Trial Model**

**Strengthening STI care**

In 2004 the Health Policy Research Group was contracted by the NDoH to provide support for the development of policy analysis capacity, and by the Gauteng DoH to develop a surveillance system for monitoring the impacts of HIV/AIDS on the health system.

In the late 1990s the Group initiated work investigating STI care given by private providers, which is now coming to fruition. Since many people, even those of lower income, choose to use private providers for STI treatment, the quality and outcomes of their care is a significant public health issue, especially in the context of the national HIV/AIDS epidemic. Early work revealed that GPs commonly provide poor quality STI care. This fed into development of a 3-year action research project funded by the Wellcome Trust which provided the basis for four activities that will support translation of some of the project’s key findings into practice:

- feedback to and continuing discussion with the NDoH about how to strengthen STI care nationwide;
- publication of a manual for district programme managers on how to work with private providers around the control of STIs (available on request from lucy.gilson@nhls.ac.za);
- incorporation of budgets for training private providers into all nine provincial health department budgets, as a direct response to sustained engagement with departments of health on this issue; and
- implementation of training activities for public sector workers around STI treatment across Southern Africa (with the Health Systems Trust).

This demonstrates how the findings/activities of a programme of sustained research around an important health policy question can be translated into activities that serve to ensure benefits for the broader population.

**Powerful potential of lay health workers**

Lay health workers (LHWs) are widely used to provide care in a broad range of health issues. However, little is known about the effectiveness of LHW interventions. In collaboration with the London School of Hygiene and Tropical Medicine, Babcock University in Nigeria and the Liverpool School of Tropical Medicine, the Health Systems Research Unit conducted the first global systematic review of RCTs on the effects of LHWs in primary and community health care (Lewin et al., 2005). This Cochrane review demonstrated that LHW interventions have promising benefits in comparison with usual care in promoting immunisation uptake in children and adults and in improving outcomes for acute respiratory infections and malaria. LHWs also appear promising for breast-feeding promotion and to have a small effect in promoting breast cancer screening uptake.

A second project explored the effectiveness of farm-based LHWs in improving successful treatment completion by new smear-positive (NSP) adult TB patients. This RCT, the first to examine effects of LHWs in rural farm settings and conducted in collaboration with the Swedish Karolinska Institute, found the successful treatment completion rate in NSP adult TB patients to be 18.7% higher on farms in the intervention group than farms in the control group. Treatment interruption was 4% on intervention farms compared to 26% on control farms.

The study found that by implementing an LHW programme, the public health services could potentially save 59% of their direct staff costs for clinic-based directly observed treatment (DOT) of TB patients who live on farms. This saving is possibly underestimated since only direct staff costs were included. There is also the potential to increase NSP TB case finding by 42% and increase the cure rate of NSP TB cases by 10% if the momentum of the intervention can be maintained. It has been well received by the Boland Health District and is in the process of being extended to other areas.

**NATIONAL PROGRAMME INFECTION AND IMMUNITY**

**Developing and testing novel HIV vaccines**

Through the South African AIDS Vaccine Initiative (SAAVI), a lead programme of the MRC involving about 220 scientists, clinicians and other researchers at centres of excellence across the country, South Africa became the first developing country to run multiple phase I HIV vaccine trials and also the first...
in the world to test a subtype C HIV-1 vaccine – subtype C accounts for over 90% of all new HIV infections. South Africa is also likely to become the first developing country to submit candidate HIV vaccines to the US Food and Drug Administration for regulatory approval. If trials of the SAAVI-developed vaccines proceed we will also be the first developing country to be testing its own vaccines in the developed world – i.e. in the USA.

Three South African-developed products – two DNA-based and one MVA-based (see table) developed by the SAAVI-funded group at the University of Cape Town are being manufactured for trials and going through the regulatory processes preceding phase I human trials. These will be tested both singly and in combination in a prime-boost approach and are planned to enter trials in 2006. SAAVI plans to test these products in South Africa, Botswana and the USA, in collaboration with the NIH and HVTN.

### Progress in developing SAAVI candidate vaccines.

<table>
<thead>
<tr>
<th>Product</th>
<th>Development group</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant-based VLPs</td>
<td>SAAVI/UCT</td>
<td>Preclinical laboratory development phase.</td>
</tr>
<tr>
<td>BCG</td>
<td>SAAVI/UCT</td>
<td>Preclinical laboratory development phase.</td>
</tr>
<tr>
<td>Salmonella</td>
<td>SAAVI/UCT</td>
<td>Preclinical postgraduate student project.</td>
</tr>
</tbody>
</table>

The SAAVI-funded HIV Vaccine Ethics Group based at the University of KwaZulu-Natal collaborated with the NDoH’s interim National Health Research Ethics Committee and the MRC to develop the MRC Guidelines on Ethics for Medical Research: HIV preventive vaccine research, Book 5 of the MRC’s series of ethical guidelines, launched in April 2005.

### One of the first at the Perinatal Unit at Chris Hani Baragwanath Hospital to receive a trial vaccine

Studies reveal alarmingly high HIV rates

December 2004 saw completion of a study by the HIV Prevention Research Unit to estimate rates of HIV seroconversion among women from the community of Chatsworth and Hlabisa, and to assess the incidence of sexually transmitted infections. Two hundred and forty HIV-negative women from each research site were enrolled and followed up for 12 months. Women were screened for HIV infection before being enrolled, and the study revealed an alarmingly high prevalence of HIV in the targeted communities. This resulted in double the number of women having to be screened in order to enrol 240 HIV-negative women per site. HIV prevalence and incidence at both sites were very high, suggesting the need for an urgent intervention targeted at women.
Study status and HIV prevalence and incidence rates, Chatsworth and Hlabisa

<table>
<thead>
<tr>
<th></th>
<th>Chatsworth (Durban)</th>
<th>Hlabisa</th>
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<tbody>
<tr>
<td>Date of first screening</td>
<td>21 May 2003</td>
<td>26 May 2003</td>
</tr>
<tr>
<td>Date of first enrolment</td>
<td>3 June 2003</td>
<td>6 June 2003</td>
</tr>
<tr>
<td>Date of last enrolment</td>
<td>27 November 2003</td>
<td>17 December 2003</td>
</tr>
<tr>
<td>Total screened</td>
<td>561</td>
<td>526</td>
</tr>
<tr>
<td>Total enrolled</td>
<td>240</td>
<td>239</td>
</tr>
<tr>
<td>HIV prevalence rates</td>
<td>39.3%</td>
<td>34.7%</td>
</tr>
<tr>
<td>HIV incidence rates</td>
<td>5.0% per 100 women years</td>
<td>5.5% per 100 women years</td>
</tr>
<tr>
<td>Overall retention rate</td>
<td>96%</td>
<td>94%</td>
</tr>
</tbody>
</table>

The study data were presented to both communities. The Durban and Hlabisa sites have now been activated for the HPTN 035 Phase II/IIb microbicide clinical trial - the first sites worldwide to enrol women into the study.

A second study in Tongaat and Verulam north of Durban enrolled over 600 HIV-negative women from the community as well as women attending postnatal and family planning clinics, and followed them up for 1 year. Data from this study also showed alarmingly high HIV prevalence rates, again highlighting the urgent need for HIV prevention interventions among women in the community.

HIV prevalence and incidence rates, Tongaat and Verulam

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<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>HIV prevalence at screening</td>
<td>47.0%</td>
</tr>
<tr>
<td>HIV incidence rate</td>
<td>7.4% per 100 women years</td>
</tr>
<tr>
<td>STI prevalence at screening</td>
<td></td>
</tr>
<tr>
<td>Syphilis</td>
<td>3.5%</td>
</tr>
<tr>
<td>Gonorrhoea</td>
<td>1.6%</td>
</tr>
<tr>
<td>Chlamydia trachomatis</td>
<td>6.2%</td>
</tr>
<tr>
<td>Trichomonas vaginalis</td>
<td>6.9%</td>
</tr>
<tr>
<td>Bacterial vaginosis</td>
<td>47.8%</td>
</tr>
</tbody>
</table>

These two studies have generated very significant, pioneering data. They show, for the first time, HIV prevalence and incidence in non-pregnant women in the community.

The data have been presented to the Provincial DoH, and highlight the desperate and urgent need for more vigorous HIV prevention and education efforts in KwaZulu-Natal.

Model of care needed for those with both HIV and TB

TB is the most common opportunistic infection in HIV-positive individuals in South Africa, and the brunt of the HIV epidemic is currently seen in public health facilities providing TB care. A national survey to quantify the extent of HIV infection among TB patients confirmed the public health challenge of the joint epidemic in 2004, with co-infection rates ranging from 30% in the Western Cape to 72% in the Free State. It also showed that, on average, 1 in 2 TB patients is also infected with HIV.

The high co-infection rate may to a large extent be responsible for the increase in TB deaths currently being recorded in all nine provinces, since public health practitioners are much more inclined to report TB as the cause of death in co-infected patients. Antiretroviral treatment can drastically reduce HIV-associated mortality and ensure a better quality of life for dually infected patients. However, TB and HIV services currently primarily work in parallel, despite policies in place for dual care, making access to antiretroviral treatment difficult for TB patients. The Unit for TB Operational and Policy Research has therefore started antiretroviral treatment programmes for TB patients through a best-practice approach in four health care settings. This is aimed at developing a comprehensive model of care for dually infected patients, and is funded by the US Presidential Emergency Plan for AIDS Relief.

A key focus of the Clinical and Biomedical TB Research Unit’s research activity also underscores the impact of HIV co-infection on the TB epidemic. A recently completed study informs the timing of treatment initiation by describing the spectrum of CD4 levels and concomitant AIDS-related illnesses in dually infected individuals, particularly in resource-poor settings - where it is recommended that antiretroviral treatment is commenced later in the course of HIV disease, as determined by CD4 T-cell counts. In the light of this, further research has been developed to optimise and improve...
Management of TB in high HIV prevalent settings.

In order to improve communication and create an understanding of research conducted in KwaZulu-Natal, a Memorandum of Understanding was concluded between the above Unit and the KwaZulu-Natal DoH. This outlines collaborative research activity and founded a provincial research committee to synchronise TB research in the province.

**Managing multidrug-resistant TB (MDR-TB)**

**DOTS-Plus for MDR-TB in South Africa**

Treatment of multidrug-resistant TB (MDR-TB) requires drugs which are much more toxic than first-line TB drugs and cost up to 100 times more. A standardised DOTS-Plus approach to management of MDR-TB in South Africa was developed by the Unit for TB Operational and Policy Research a few years ago, and the Unit was tasked with co-ordinating DOTS-Plus implementation in the country by the NDoH. Currently around 6000 MDR-TB patients are managed under DOTS-Plus in 12 specialist centres throughout the country, with the Unit providing training of health care workers and technical support, monitoring health service adherence to DOTS-Plus policy and evaluating treatment outcomes.

Findings from the first 946 patients treated under DOTS-Plus in South Africa showed that up to 90% of patients can be cured if they stay on treatment for the full 2 years. Results also showed that the treatment regimen is safe for HIV-positive MDR-TB patients. A major problem, however, is that 1 in 4 MDR-TB patients currently default from treatment after discharge from the MDR-TB specialist hospitals. Almost half of these patients die soon thereafter, often because of HIV-related conditions. This led to a major study (see below) to establish risk factors for default from MDR-TB treatment.

**Risk factors for default from MDR-TB treatment**

A major study was done in five provinces to identify risk factors for default. Results showed that negative attitudes by health care staff were the most significant reason why patients did not finish treatment, followed by fear of stigma, and side-effects from the medication. These findings will now be translated into appropriate policy interventions, including comprehensive reorientation training of health care workers, and supervision and support to avoid staff burn-out and work overload, which will impact on their relationships with patients. Policy recommendations will also include a comprehensive treatment package for patients, including family support sessions, public education campaigns to reduce stigma, and supportive counselling and medical management of drug side-effects.

**Legal dilemmas in MDR-TB management**

Public health practitioners are confronted with a range of decisions around MDR-TB management that have legal as well as ethical implications, such as enforced hospitalisation of patients, enforced MDR-TB treatment, termination of treatment, and disclosure of patient information in the interests of public health. The Unit for TB Operational and Policy Research was contracted by the NDoH to review existing legislation and develop new policy directives in line with the Constitution of South Africa and current public health legislation. This identified specific shortcomings in the new Health Act which may put public health activities in direct conflict with the Constitution. An MRC Policy Brief has subsequently been prepared for the NDoH to help health care workers and policy makers to make legally sound and ethically justifiable decisions. The Unit is also assisting provincial health authorities with managerial decisions, ensuring through legal counsel that these are justified and ethical.

**Fight against malaria gains momentum**

**Inter-country collaboration on malaria control**

The Lubombo Spatial Development Initiative (LSDI), ratified by the heads of state of South Africa, Mozambique and Swaziland in July 1999, represents a continental first in inter-country collaboration on malaria control. The project is co-ordinated by the MRC through the Malaria Research Lead Programme, and was recently awarded a Global Fund allocation of US $22 million over 5 years.
From a regional perspective, the extension of malaria control to southern Mozambique has been expanded and the contiguous controlled area in the three countries now exceeds 100,000 km². Confirmation of pyrethroid resistance by the malaria-transmitting mosquito *Anopheles funestus* in Mozambique has required a policy change in the country in respect of malaria vector control.

Malaria control was gradually phased-in in the LSDI area in southern Mozambique. Parasite prevalence was measured in children (2-<15 years) before this and again annually. It can be seen from the diagram that the parasite rates dropped dramatically in successive years.

Reductions in malaria infection and declaration of St Lucia as a malaria-free area have enhanced the attractiveness of the area to tourists and developers. So far 10 tourist development tenders in St Lucia Park, valued at R450m, have been released by the LSDI - and are already providing employment and other economic benefits for local communities.

Surveys conducted at tourist facilities in the LSDI region show that malaria is perceived as less of a risk now than it was at the start of the initiative in 1999. These perceptions have largely been influenced by the extensive media coverage given to the dramatic reductions in the area.

**Plant extracts join the arsenal**

Increasing resistance of malaria vectors to insecticides is cause for concern. The Malaria Lead Programme is involved in screening indigenous plants for biological activity against the vectors of malaria-transmitting mosquitoes. Plant selection was based on use by traditional healers and mention in the ethnobotanical literature for treatment of fevers. So far 357 crude plant extracts have been evaluated, obtained from different parts of the plants and in some instances the whole plant. To date 21 extracts have shown great promise against the aquatic, immature stage of the mosquito. Four have been investigated further, and in dose-response studies two of these have shown great promise.

**Evidence-based drug policy changes**

Since effective malaria control requires both vector control and early effective treatment, the LSDI extended their objectives to ensure that the best malaria treatment was introduced. Widespread resistance to chloroquine and sulfadoxine-pyrimethamine has been reported from the region. The use of artemisinin-based combination therapy (ACT) not only improves cure rates, but also directly decreases malaria transmission and potentially slows drug resistance. To optimise the synergistic effects of indoor residual spraying and ACTs on reducing malaria transmission and thus disease burden, while minimising programme costs, the implementation of ACTs has been timed to follow establishment of effective vector control.

KwaZulu-Natal was the first Ministry of Health in Africa to implement an ACT malaria treatment policy when
it introduced Coartem in January 2001. The planned phased implementation of ACTs, resulting in their introduction in Mpumalanga in 2003 and two districts in southern Mozambique in 2004, is ahead of schedule and will ensure that ACTs will be in place throughout the LSDI region by 2006. The LSDI region is the first in Africa to use ACT.

**Powers of traditional plants**

The South African Traditional Medicines Research Unit continues to evaluate plants used by traditional healers to treat malaria and TB or as antiviral or immune-boosting agents. Pure compounds with antimalarial and anti-TB activity have been isolated and chemically characterised. The past year saw publication in the *Journal of Ethnopharmacology* of a major research paper reporting on the antimalarial activity of some 500 plant extracts tested by the Unit.

The traditional medicines database continues to be expanded and this information will be made more accessible to communities who use traditional medicines and to traditional healers. A second edition of the *Traditional Healers Primary Healthcare Handbook* is under consideration as well as its translation into a number of languages other than English.

**Influencing influenza and pneumonia**

The Respiratory and Meningeal Pathogens Research Unit has shown that a significant fraction (30-40%) of hospitalisations with influenza-associated pneumonia in both HIV-infected and uninfected children in Soweto were due to bacterial co-infection with *Streptococcus pneumoniae*. They also found that this was prevented by administration of pneumococcal conjugate vaccine. These findings were published in *Nature Medicine* in 2004, and suggest a major role for this vaccine in preventing influenza-associated morbidity. These data also suggest that antibiotics may greatly reduce influenza-associated morbidity by treating the bacterial co-infection.

The Unit’s discovery of the role of bacteria in severe pneumonia associated with influenza and other viruses changes the way we understand how people develop severe pneumonia. This discovery offers alternate strategies to prevent (with conjugate vaccine) and treat (with antibiotics) the very large burden of viral-associated pneumonia. Furthermore, the Unit’s studies on the role of human metapneumovirus in African children and genotyping of these isolates provides important information that may be used to formulate a vaccine against this virus.

These studies have clarified the burden of pneumonia prevented by the pneumococcal conjugate vaccine, providing decision-makers with the tools needed to evaluate impact of the vaccine on public health.

**Work continues on vaccine for diarrhoea**

Worldwide, it is reported that 4 to 5 million children annually die due to diarrhoea. In South Africa alone, 50-60 children under the age of 5 years die daily. Rotavirus appears to be involved in almost 25% of cases. Although two rotavirus vaccines are currently being tested and use of one has been approved by the Mexican health authorities, they are not yet generally available, and this condition is treated by administration of rehydration solution. Introduction of an effective rotavirus vaccine will have an enormous impact.
Research Highlights

New strategic biomaterials and soluble molecular signals that can engineer bone tissue regeneration have been identified, and a world-first discovery of the molecular signals initiating bone formation made.

The Bone Research Unit has identified new strategic biomaterials and soluble molecular signals that can engineer bone tissue regeneration after trauma with associated bone loss, diseases such as cancer, and age (e.g. osteoporosis). The Unit has provided possible mechanistic insights into this process of bone formation by induction, and embarked on a drive ultimately to provide novel treatments for human patients.

During late 2004 and the first quarter of 2005 the Unit published and highlighted a world-first discovery on the molecular signals initiating bone formation in non-human primates - and so in human patients. Particularly importantly, the Unit has shown the induction of cartilage and bone formation by Ebaf/Lefty-A, a new member of the super-family of proteins controlling pattern formation and skeletogenesis, and initiating the formation of cartilage in skull defect (as published as a cover article in the *South African Journal of Science*).

The Unit has also developed cost-effective and affordable biomaterial implants to treat skeletal defects with bone loss, and received much international coverage for their life-enhancing work.

NATIONAL PROGRAMME

MOLECULES TO DISEASE

Prioritising candidate disease genes

Working with the Wellcome Trust, the MRC/UWC/SANBI Bioinformatics Capacity Development Research Unit has developed and implemented an expression description system that connects genome to phenotype, including diseases. This system, eVOC (see http://www.sanbi.ac.za/evoc/) has recently been adopted by the ENSEMBL human genome annotation system to provide insight for genome researchers worldwide to prioritise candidate disease genes in the human genome.

The Unit’s most high impact study has been as part of an international collaboration to discover the function of over 20 000 human genes as they relate to disease. The clone set developed and tested through this study (NIA 21K) is widely used throughout the world.

The Unit applied its expertise in normal and diseased gene expression description, and also in expressed sequence clustering, to a large international consortium of transcriptome researchers, representing the highest impact to date of their genome annotation efforts (see *Science*, April 2004; ‘New global database lends a hand to gene hunters’, and *Nature*, News in Brief, 22 April 2004).

World-first discovery on bone formation

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New techniques and targets for diagnosing and treating TB

Workers at the MRC Centre for Molecular and Cellular Biology have developed techniques which can reduce time of diagnosis of MDR-TB from 60-90 days to 4-7 days. These results have filtered through to the National TB Control Programme, and been communicated to control programme staff during update seminars. The Centre’s work has changed the clinical approach to plural TB diagnosis at Tygerberg Hospital. Their published work on reinfection has stimulated...
clinical thinking regarding reactivation of TB. While it is too early to have changed the management of TB, it is clear that this will become a major research thrust in the future.

Using proteomics, a sophisticated, relatively new technique in TB research, workers in the same Centre have shown that *Mycobacterium tuberculosis* strains belonging to different genotypes exhibit variable protein and antigen expression patterns. This has important implications for vaccine development, and may possibly explain why previous *Mycobacterium tuberculosis* infection does not render an individual resistant to infection with a genetically different *Mycobacterium tuberculosis* strain. The findings also seriously undermine the use of serodiagnosis, a widely investigated technique for TB diagnosis.

Mutant strains of *Mycobacterium tuberculosis* lacking three members of a family of five Rpf-encoding genes were constructed in the MRC/NHLS/Wits Molecular Mycobacteriology Research Unit (MMRU). These strains were found to be defective for growth in a mouse model of TB and in their ability to resuscitate – i.e. to start growing again – after prolonged starvation in liquid culture. This provides conclusive evidence of a collective role for these proteins in promoting the resuscitation of *Mycobacterium tuberculosis* from a ‘dormant’ state, and makes them a potentially important new target for TB drug and/or vaccine development. This work was carried out in close collaboration with research groups in Russia and the UK, and has been accepted for publication in the prestigious international journal *Infection and Immunity*.

**From finding a new gene to clinical trial**

Publication of the finding of carbonic anhydrase IV (CA4), the gene responsible for the RP17 form of autosomal-dominant retinitis pigmentosa (Rebello et al. *PNAS* 2004; 101: 6617-6622) by scientists from the Human Genetics Research Unit heralded the culmination of 10 years of research in this laboratory. This was followed by publication by their collaborators (Prof. W Sly, Saint Louis University School of Medicine, St Louis, MO) (Bonapace et al. *PNAS* 2004, 101: 12300-12305) showing that the mutation causing retinal degeneration in the South African RP17 families was likely to be amenable to therapy by carbonic anhydrase inhibitors such as acetazolamide, commonly used in the treatment of glaucoma. This led the Unit to prepare the first stages of a clinical trial of carbonic anhydrase inhibitors in the treatment of retinal degeneration in individuals carrying the R14W mutation in CA4.

The translation of research here, from the identification of a ‘new gene’ to proposing a ‘clinical trial’ based on the findings, is remarkably short and vindicates the Unit’s drive to provide a genetic profile of individuals with retinal degenerative disorders so that they can benefit from new therapeutics or management regimens.

**Where do we come from?**

MRC/NHLS/Wits Human Genomic Diversity and Disease Research Unit Director Professor Himla Soodyall regards the most rewarding project undertaken by the Unit in the year under review to be their contribution to the M-Net documentary entitled ‘So, where do we come from?’, which involved dealing with the public – high-profile people in politics, sport, the media, etc., as well as ‘ordinary’ members of the public. The documentary resulted in several print media, radio and television outputs for the Unit. The demand for genetic ancestry testing has resulted in the National Health Laboratory Service endorsing this as a service to the public. Income generated will be used to supplement research within the Unit. Professor Soodyall has been approached by The National Geographic Society to be the African Principal Investigator on an international project entitled ‘Genographic’, to be launched in April 2005, which aims to sample a global population from 10 regions for mtDNA and Y chromosome variation.

**Selective non-surgical management of liver gunshot injuries**

Non-operative management of gunshot injuries to the liver is not widely accepted, in contrast to dealing with blunt liver trauma. A study was conducted by the Liver Research Centre to evaluate non-operative management in all patients presenting with liver gunshot injuries who were haemodynamically stable with no evidence of peritonism. Thirty-three patients (mean age 25, range 13-50) were enrolled over a 36-month period. Most (14/33) had grade III injuries,
while 11 and 8 patients sustained major (AAST IV/V) and minor (AAST I/II) injuries respectively. Non-operative management was successful in 31 of the 33 patients; 2 required delayed laparotomy for reasons unrelated to the hepatic trauma. One patient died from necrotising fasciitis, which appeared unrelated to the liver injury. This study showed that in centres with suitable facilities, non-surgical management of appropriately selected patients with liver gunshot injuries is feasible, safe and effective, regardless of the grade of liver trauma.

**Does papillomavirus play a role in oesophageal cancer?**

Studies by the Oesophageal Cancer Research Group showed that about 50% of their patients had integrated human papillomavirus DNA in their tumour DNA. If human papillomavirus plays a role in oesophageal cancer, this will be a major breakthrough in the understanding of the disease, and will radically change current thinking on the cause and course of the disease. Another of their focus areas is preparing a detox gene profile to determine how genetic polymorphisms in genes such as the cytochrome p450s and glutathione transferases contribute to oesophageal cancer risk. This will be useful in predicting how patients will respond to various anticancer drugs.

**Role of semen in cervical cancer**

The MRC/UCT Research Group for Receptor Biology has shown that seminal fluid can stimulate the COX-2/PGE2 pathway in a cervical cell line, suggesting that sexual activity can promote cervical tumorigenesis in women with pre-malignant lesions in their cervix. In order to dissect the role of seminal fluid, PGE2 and EP4 in cervical cancer, the Group created cell lines generated from a cervical tumour that over-express and under-express the EP4 receptor. Employing these cells they found that seminal fluid and PGE2, through the EP4 receptor stimulate the growth rate of these cells, and activate genes that enhance development of blood vessels. This supports the notion that seminal fluid can promote cervical tumour development, and postulates that EP4 antagonists can be used for treatment and prevention of cervical tumours.

Recent research into the role of COX, prostaglandins and their cognate receptors in cervical cancer suggests that treatment of women with aspirin and/or EP4 antagonists can be beneficial in reducing the risk of cervical cancer development and progression. Further research is required before embarking on a clinical trial to test this proposal.

**NATIONAL PROGRAMME NON-COMMUNICABLE DISEASES**

**A first in functional magnetic resonance imaging**

The Anxiety and Stress Disorders Research Unit recently made history when researchers from the Unit became the first in sub-Saharan Africa to capture functional magnetic resonance imaging (fMRI) data at Tygerberg Hospital.

This amazing technology, first developed in the 1990s, allows clinicians and researchers to probe the mind at work and is currently the pre-eminent form of functional neuro-imaging worldwide. It comprises a special technique, utilising conventional magnetic resonance imaging principles to acquire images of the brain as it responds to any number of tasks while the patient is in the scanner. fMRI differs from other functional imaging in that it is remarkably safe, allows repeated scanning,
Research Highlights

The Unit’s Mental Health Information Centre is devoted to outreach activities. In 2004 the Centre published several volumes, ran focused awareness campaigns (e.g. Brain Awareness Week, Anxiety Disorders Week, World Mental Health Day), did frequent media work and presented an annual media award, and operated a call centre for the public. Contact the Mental Health Information Centre at (021) 938 9229; mhic@sun.ac.za See also www.mentalhealthsa.co.za

and does not require the use of ionising radiation. It also enables the safe use of normal populations with which to compare findings in sufferers of anxiety disorders, for instance, where changes in brain function may be very subtle.

Funding has been received from the National Institute on Drug Abuse in the USA for the Unit’s first fMRI study, examining the effects of cannabis and Mandrax abuse on neuropsychological and brain function in recently abstinent abusers. As in the case of the local Mandrax abuse epidemic, fMRI lends itself to studies in mental health with particular relevance to the disease and patient profiles in South Africa, including HIV/AIDS and substance abuse in disadvantaged and marginalised communities including women and children.

Link between cancer and HIV in black South Africans

The Cancer Epidemiology Research Group examined the relationship between HIV and cancer in black South Africans. Approximately 10 000 patients were interviewed and had blood tested for HIV (10 years of patient data, from 1995 to the end of 2004). HIV infection was found to be associated with significantly increased risks of Kaposi’s sarcoma, B-cell non-Hodgkin’s lymphoma, other non-Hodgkin’s lymphoma, vulval cancer, squamous cell carcinoma of the skin, anogenital cancer, cervical cancer and Hodgkin’s lymphoma. HIV infection was not associated with any of the other major cancer types examined, including Hodgkin’s disease, multiple myeloma and lung cancer. This study allows for ongoing monitoring of cancer patterns among HIV-infected patients in South Africa. It will be interesting to compare these results with what is found after the widespread use of antiretroviral treatment.

Deaths attributable to tobacco use

Cancer Epidemiology Research Group researchers analysed a question introduced on the South African death notification form in mid-1998: ‘Was the deceased a smoker five years ago?’. Comparison was made of the prevalence of smoking among adults aged 25+ who died of different causes. After adjustment for age, gender and education, significantly increased relative risks were found for deaths from TB, chronic obstructive pulmonary disease, lung cancer, other upper aerodigestive cancer, and ischaemic heart disease. If smokers had the same death rate as non-smokers, then 60% of lung cancer deaths, 35% of chronic obstructive pulmonary disease deaths, 20% of TB deaths, and 8% of vascular disease deaths would have been avoided.

From tuck shops to your ticker

Two studies by the Chronic Diseases of Lifestyle Research Unit dispelled an earlier held notion that black African people are not going to develop high rates of heart attacks in the future. The African data of the INTERHEART study and a study at Kalafong Hospital showed that heart attacks in black African people are caused by smoking tobacco, having hypertension, diabetes and high blood cholesterol. In addition, a strong family history of cardiovascular disease or their risk factors also predict heart attacks in this group of people. In this community heart attacks occur more frequently in people of high socio-economic standing than in the poor.

Data on smoking during pregnancy presented at a workshop in February 2004 and to the NDoH alerted health professionals of this health risk to the unborn child. This resulted in workshops being held for midwives to be trained in better patient communication techniques, planning policies for smoking cessation during pregnancy, and official support from NDoH for the Unit to develop and evaluate a smoking cessation programme for poor women with high smoking rates during pregnancy.

If smokers had the same death rate as non-smokers, then 60% of lung cancer deaths, 35% of chronic obstructive pulmonary disease deaths, 20% of TB deaths, and 8% of vascular disease deaths would have been avoided.
The Dietary Assessment and Education Kit (DAEK) developed by researchers from the Unit and the University of Stellenbosch was launched. The kit comprises a training manual, flash cards and a food photo manual of all food eaten in South Africa. Nutrition researchers report that the DAEK greatly facilitates the collection of good nutrition data, and to date more than 100 kits have been sold.

The Unit also recently evaluated tuckshops at schools, and the findings resulted in development of a manual aimed at helping tuckshops to change the way that they operate, to improve the quality of foods sold to children.

**Key outcomes on crime, violence and injury**
The Crime, Violence and Injury Lead Programme (CVIP) had a number of key outcomes for 2004, including strengthening and automation of a national fatal injury surveillance system to enhance data collection at local, provincial and national levels, and promotion of data uptake by key decision-makers. A utility study tracing the outcome of surveillance reports was produced at city level, and several successfully completed data collection drives were carried out on specific incidence and risk patterns related to road rage, childhood injuries and youth injuries, among others. Primary prevention and injury control measures were studied at local and national levels, with a specific focus on school, home and community safety, environmental and traffic safety. Data produced by the CVIP were used in campaigns advocating for firearm control, child safety, pedestrian safety, and the provision of medico-legal services for women.

The electronic media have become an increasingly integral part of the information dissemination and profiling process vital to the CVIP, with two newly updated sites available for end-user convenience, at http://www.unisa.ac.za/dept/ishs and http://www.mrc.ac.za/crime/crime.htm The CVIP made a successful bid to host the 8th World Conference on Injury Prevention and Safety Promotion in Durban in 2006.

**All aspects of healing hearts**
The MRC Cape Heart Group, comprising the Cardiovascular Research Unit, Hatter Institute and Lipidology Division of Internal Medicine at Groote Schuur Hospital and the University of Cape Town as well as the Department of Physiological Sciences at the University of Stellenbosch, has diverse fields of interest that have in common cardiovascular health and disease, from causation to treatment.

The Cardiovascular Research Unit successfully used their heparin-modified polymeric surfaces to deliver two important angiogenic growth factors in a sequential fashion - long a desired outcome in the field of therapeutic angiogenesis (blood vessel development). Analysis is ongoing but strongly suggests that delivery of these growth factors in this manner has generated more stable blood vessels.

Professor L. H. Opie of the Hatter Institute has been appointed Associate Editor of *Circulation*, the leading cardiovascular journal of the American Heart Association, a first for a South African, which will help develop an African dimension to this international journal. *Circulation* has one of the highest impact factors in cardiology.

The main interest in terms of lipidology is determination of causes of severe disorders of lipid metabolism, mainly those that cause atherosclerosis. Recently, arterial imaging has been developed to evaluate atherosclerosis in disorders of lipoprotein metabolism as well as vascular function, delivering useful information on the nature of genetic dyslipidaemias and therapeutic strategies. A major impact has been involvement in international collaborative studies on drug development for severe disorders, and being invited reviewers in this field.

The primary impact of research by the team in the Department of Physiological Sciences at the University of Stellenbosch has been to increase basic science knowledge related to the use of stem cells to improve cardiac muscle repair. This team has also increased the amount of local stem cell research, which has become a vital part of basic science internationally but is currently not prominent in South Africa. The ultimate aim is to decrease the cost of cardiac rehabilitation and prevent the cost of transplants.

**Imaginative imaging garners patents**
The MRC/UCT Medical Imaging Research Unit has made great strides with novel technologies. The Unit has recently received patent protection in the USA for limited angle computed tomography (LACT). Here the range of available
Despite incomplete projection data, LACT can recover the original structure. Another recent patent by the Unit is in the domain of population screening, where they explored the potential of Lodox technology for detecting breast cancer. By recognising that the thoracic cavity underlying the breast has a circular cross-section (opposite, left), the Unit has simulated the concept of circular slot scanning for mammography and demonstrated that it is possible to reproduce the true structure of the original phantom. Breast compression, which leads to patient pain and discomfort, will be eliminated with the Unit’s design (opposite, right). The US National Institutes of Health is funding a grant, and the next step is to implement the Unit’s ideas in a physical prototype to improve patient comfort and provide greater breast coverage.

The TB laboratory at the National Health Laboratory Service in Green Point, Cape Town, examines 950 sputum specimens a day, requiring trained personnel to view up to 50 microscope fields in each slide. The Medical Imaging Research Unit has developed a prototype smart microscope capable of automated analysis of sputum smear slides (concentrating on Ziehl-Neelsen-stained specimens), to reduce the manual load on technicians. A grant has just been submitted to the NIH to provide further support for testing this important technology.
NATIONAL PROGRAMME
WOMEN AND CHILD HEALTH

Gender and health research

Research on murder of and violence against women
The Gender and Health Research Unit has had a major impact on advocacy around gender-based violence, showing that South Africa has the highest incidence of intimate femicide recorded in any country. The level of one such murder every 6 hours is 12 times higher than previously estimated. There has been very substantial media coverage of this, and advocacy campaigns use this research extensively. This work has been presented to the South African Police Services and National Directorate of Public Prosecutions, both of which have considered the implications of recommendations made for the management of female murder cases. The Unit published its initial results in an MRC Policy Brief in 2004.

Their work showed that female partners of men who own legal guns are at substantially elevated risk of being killed by their partners. Two-thirds of such deaths would have been prevented if the men had not had guns. Amnesty International has drawn extensively on this work on the links between handgun ownership and gender-based violence, particularly the risks of being killed, in a new campaign they have launched to draw attention to the risks of small arms. Work by the Unit on association between HIV risk and different forms of gender-based violence was published in The Lancet.

What do women want most from sexual assault health services?
The Gender and Health Research Unit has shown that providing high-quality services is important for effective public health policy, as well as for respecting women’s basic human rights. Women value being able to have an HIV test and receive post-exposure prophylaxis for HIV after rape. They also highly value counselling and are prepared to travel to receive better quality services. This work has been presented to the NDoH, and used to provide context to the new Sexual Assault Policy and Clinical Management Guidelines launched by the Department in March 2005. Staff of the Unit played a substantial role in drafting both of these documents.

The Unit has shown that in a country like South Africa, with a high prevalence of rape and HIV, post-exposure prophylaxis for HIV is affordable for health services. However, unless it is delivered through high-quality sexual assault services that are really supportive of drug course completion, only a modest number of HIV cases can be averted annually.

Why babies, children and mothers die
The MRC Unit for Maternal and Infant Health Care Strategies continued creating and field-testing useful audit systems. An under-5 child mortality audit system was successfully tested in 10 sites in the northern half of South Africa, finding that approximately 60% of all deaths of children between 1 month and 5 years of age were related to exposure to HIV.

The fourth perinatal care survey of South Africa showed that most babies die because of poor management of women in labour, and because of being born prematurely. Many of these deaths could be prevented with minimal expenditure. The Unit is responsible for the Saving Babies reports, keeping communication with the over 120 sentinel sites and collating the data. The system is supported by the NDoH, and recommendations have been incorporated into the Maternal and Child Health Strategies document of the Department.

A basic antenatal care training programme has been developed by the Unit and is currently being tested in Pretoria and Port Elizabeth. This was developed in response to a series of focus groups with nursing staff in primary health care clinics in the Pretoria area, held after documentation of poor quality of antenatal care provision in the area. Further expansion of the training programme is being planned in collaboration with the NDoH and other major stakeholders.

A study comparing changes in outcome in 1997-8 and 2002-3 showed that active use of auditing in maternal care results in improved practice. A theoretical exercise indicated that using the protocols developed from the original audit would have prevented 23 maternal deaths. This provided the first direct evidence that use of audits of near-misses in maternity care results in a reduction in maternal deaths.
**Massive study of bone health in children**

The Mineral Metabolism Research Unit’s activities concentrated on bone and mineral metabolism in humans. The Bone Health Study is the first longitudinal study of bone development and growth in children living in a developing country, assessing over 600 children born in 1990. The children are entering their 15th year of life, a critical period in the acquisition of bone mass.

Two major modifiable factors are thought to be important in optimising peak bone mass during adolescence: calcium intake and exercise. Despite significantly lower physical activity levels and dietary calcium intakes in black than white children, black children have higher bone mass at the hip than white children. These findings suggest that the higher bone mass at the hip in black children (also seen in black adults) is due to genetic differences and may account for lower hip fracture incidence in elderly black subjects in South Africa.

This study is important in understanding how to optimise growth and bone mass in childhood, and reduce minimal trauma fractures in later life. Information obtained so far points to an important role for adequate physical activity during childhood. The lack of formal physical activity periods in many schools in South Africa may have significant detrimental effects on long-term bone mass development.

**What really causes rickets?**

Studies by the Mineral Metabolism Research Unit into dietary calcium deficiency rickets in Nigeria continue. Despite a dramatic clinical, biochemical and radiological response to calcium supplements in affected children, the Unit has been unable to show significant differences in calcium intake between affected and non-affected children. However, the Unit has found that maternal breast milk calcium concentrations are lower in mothers who have children with rickets than those who do not have affected children, suggesting that lower calcium intakes during infancy may predispose children to rickets during weaning.

The Unit has also found that children with calcium-deficiency rickets respond differently to vitamin D supplements than do vitamin D-deficient children. It appears that children with dietary calcium deficiency may require higher levels of vitamin D to optimise calcium absorption than children with vitamin D deficiency. This suggests that vitamin D requirements in children may vary, depending on calcium intake. This has important implications for setting nutritional recommendations for vitamin D requirements.

**Nutritional nuggets**

**Fatty fish does make you brainy**

The MRC was part of a consortium responsible for the development of a fish meal fit for human consumption using fish waste products (mainly hake heads). The Nutritional Intervention Research Unit (NIRU) in collaboration with the University of Stellenbosch was responsible for developing a savoury sandwich spread using the fish meal. Sandwiches made with this spread were used in a study involving school children (6-9 years) from a rural low socio-economic community. It was found that the sandwiches improved the children’s learning and memory, as well as spelling ability. Compared to those receiving the spread without the fish meal, fewer children were absent. In this way fish waste previously discarded at sea, causing severe pollution, can be used to effectively improve the quality of life of children.

**Unconventional marketers should sell only iodised salt**

Marketing of non-iodised salt through unconventional distribution channels is one of the factors weakening the national salt iodisation
programme in South Africa. A national survey found that 77.7% of households obtained their table salt from typical food shops. However, between 8% and 37% of households used unconventional sources which distribute mainly non-iodised salt, including distributors of agricultural salt, spaza shops in peri-urban and rural townships, street vendors, and salt sachets in the packaging of maize meal bags. Countrywide around 30% of low socio-economic households obtained their salt from unconventional sources compared to fewer than 5% of high socio-economic households. This emphasises the vulnerability of low socio-economic groups to the use of non-iodised salt. Role-players involved in unconventional marketing channels of household salt should be encouraged to provide only iodised salt to consumers, as required by law.

Research results from NIRU iodine nutrition studies are fed back to the SA Iodine Deficiency Disorders Network, impacting on policy and legal implementation of the national salt iodisation programme.

In another study knowledge of iodine nutrition was assessed in a survey of 2164 households representative of the South African population. Only 15.4% of respondents correctly identified iodised salt as the primary dietary source of iodine; 16.2% knew the thyroid gland needs iodine to function; while a mere 3.9% considered brain damage and 0.8% considered cretinism as the most important health consequence of iodine deficiency. Low socio-economic groups fared worse in the knowledge stakes. In the light of the legislated iodisation of salt, these results present a challenge to information, education and communication initiatives by the NDoH.

Carotino spread now on learners’ menu
The MRC/Carotino spread, based on red palm oil fat, developed by NIRU and tested in an RCT among primary school children, has now been patented and licensed to the industry. It has been incorporated in the Department of Education’s list of items for the School Nutrition Programme. This is an excellent natural source of vitamin A, is aflatoxin-free, and can easily be fortified with vitamins and minerals. It is sure to play a significant role in improving the health and educability of South African learners.
CORPORATE REPORTS

HUMAN RESOURCE MANAGEMENT

This short report briefly reflects on the integrated approach to employee development at the MRC. It outlines the Ph.D. fellowship initiative that targets the development of young black and female researchers, and supplies more detail about the Accelerated Development Plan. It also concentrates on the MRC’s growth patterns as well as the administrative impact resulting from this. A number of other human resources milestones for the period are highlighted, including the launch of the HIV/AIDS Workplace Programme. The success of the MRC’s Employment Equity Strategy is illustrated by a table showing the growth in representivity between 1997 and 2004.

Employee development

Ph.D. fellowships

The National Research and Development Strategy of 2002 identified the need for a well-balanced human resource development approach in the science, engineering and technology arena to address national imperatives relating to gender and race equity and South Africa’s ability to compete in the global arena.

To give effect to this strategy, the Department of Science and Technology (DST) has launched the DST Professional Development Programme with a pool of funding to the value of R15 million for 2005. The programme is expected to increase the diversity in Science Councils, provide support to a core of promising young researchers, and supply highly qualified South Africans with leading-edge scientific and research skills.

DST invited Science Councils to submit business proposals to compete for the development of promising scientists.

The Human Resources and Organisational Development Directorate of the MRC responded with a business proposal, and a total amount of R4.5m was allocated for 2005/6. This will be applied in the development of 15 scientists from the designated groups. Research fellows will be encouraged to engage in research projects that fall within the priorities for health research in the country. These research fellowships will create opportunities for young scientists and encourage them to remain in the country. A process of monitoring investments in individuals will be initiated to encourage them to take up positions in the academic, public or private sector. The Directorate will ensure that at least 80% of the successful candidates will be black and at least 60% will be women.

Accelerated Development Plan

As part of achieving its strategic objective of building a competent and sustainable employee base, the Human Resources and Organisational Development Directorate embarked on the Accelerated Development Plan of the MRC. This transformation initiative places a clear focus on developing research leadership in the MRC by growing potential Unit and Group Directors in strategic research areas. It also serves as a staff retention initiative and identifies successors for retiring Unit/Group Directors.

This contributes to the Employment Equity Strategy of the MRC by increasing black and female representation at Director level. It incentivises ‘high-flyers’ to develop research careers through the submission of development proposals. These 3- to 4-year development plans encourage international exchange/exposure and managerial development, and successful applicants are assured of ongoing support for the duration of the plan.

Employee growth

The continuous growth of employees in the MRC is placing considerable pressure on the administrative processes within the HR Directorate. New appointments, the requirement that contract staff should belong to employee benefits, and the constant renewal of contracts have impacted on the already stretched resources of all departments in this Directorate. There is a constant need to be vigilant of the effects that this might have on service levels that are offered.

Other Human Resources milestones

The Directorate launched the MRC HIV/AIDS Workplace Programme on World HIV/AIDS Day. This took place in all the major centres and included the telecasing of events to Hlabisa and Umtata. The Executive Management Committee (EMC) is showing ongoing commitment to the programme and at least 100 MRC employees have already been tested.
voluntarily, including the former Interim President and members of the EMC.

An MRC health day held in each of the major centres contributed to employee wellness. The existing medical aid fund contributed greatly to the success of these events.

The Directorate collaborated with a consultancy to develop and implement a web-based job evaluation system specifically for research institutions. This is not only a national benchmark but it also, through contractual agreements, protects the MRC’s intellectual property and as such ensures income generation.

The MRC’s good record of successfully defending CCMA challenges further confirms the organisation’s maintenance of fair employment practices.

On the national front, the MRC’s HR Directorate obtained a mandate from COHORT to lead the investigation into the impact of HIV/AIDS on human resources in the science system, including strategic responses at policy and funding levels. A 10-year horizon is envisaged, i.e. the study plans projections until 2014. The study is managed jointly by the MRC/DST and SABS.

**Employment equity**

Our strategic business approach of empowerment through diversity has led to the MRC being a leading South African organisation in race and gender profiles.

The tables below illustrate the MRC’s internal growth for 1997-2004, and also compare the MRC against the national average percentages from the Second Employment Equity Report of the Department of Labour. They show that the MRC is exceeding national averages, for both black and female profiles, in all occupational categories.

<table>
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<th>2004</th>
<th>Current SA EE Statistics</th>
<th>2007 Projection</th>
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<td>67</td>
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<td>24</td>
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<td>32</td>
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<tr>
<td>Middle Management Level 2</td>
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<td>49</td>
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<td>Junior Management Level 3</td>
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<th>Current SA EE Statistics</th>
<th>2007 Projection</th>
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<td>Top Management Level 1</td>
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<td>14</td>
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<tr>
<td>Senior Management Level 1</td>
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<td>Junior Management Level 3</td>
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<td>75</td>
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<tr>
<td>Semi-Skilled Level 4</td>
<td>79.4</td>
<td>66</td>
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<td>75</td>
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<tr>
<td>Unskilled Level 5</td>
<td>47.6</td>
<td>42</td>
<td>36</td>
<td>55</td>
</tr>
</tbody>
</table>
CORPORATE COMMUNICATIONS AND STAKEHOLDER RELATIONS MANAGEMENT

This Directorate’s mandate is to facilitate the building of a healthy nation through appropriately packaging the MRC’s health research outputs and communicating these using various platforms to reach the MRC’s stakeholders. The five functional Divisions of this Directorate are as follows:

• Events and exhibition management;
• Studio/graphic design;
• PR/media (internal communication/media relations/database management/photography);
• Stakeholder relations (international, national and regional community levels); and
• Science writing and editing.

Report-back is given on achievements in each of these areas, with particular focus on translation of MRC research into reality – real products, practices and promotions that impact on real people.

Events and exhibition management
This Division provides a one-stop health events management service to MRC researchers, health managers, national and international organisations, community groups and the health industry in support of the MRC’s strategy.

In terms of research translation initiatives, this Division oversaw the running of 5 exhibitions in 2004/5, including the MRC exhibition at Insite and the first South African AIDS Conference in Durban.

MRC Studio
The MRC Studio aims to paint the MRC’s corporate image for the world canvas, to be viewed by multiple audiences, woven into the fabric of our communication strategy, and displaying our corporate reputation, advocacy, employee communications, investor relations and government/stakeholder relations. The MRC Studio is the palette that renders the MRC’s corporate identity. Through high-quality products it depicts the MRC’s contribution to South African society and its role as a globally competitive centre of research excellence.

High-level publications, e.g. the MRC’s Strategic Plan, Budget Submission, Annual Report, policy briefs, newsletters: MRC News, AIDS Bulletin, Crime Violence and Injury Monitor, SACENDU Report, etc., corporate electronic presentations, graphic elements and design for the MRC website, ad hoc advertising for various media and audiences, exhibition material and stands, corporate brochures, corporate stationery, scientific posters and technical reports, are all effective vehicles of research translation created by the Studio.

PR/media (internal communication/media relations/database management/photography)
This Division’s main mission is to manage all external communications with the MRC’s external target audiences, which includes the media, i.e. broadcast media (radio, TV, websites) and print media (newspapers, journals, and magazines), the general public (communities at large) and international target audiences.

This year’s PR/media liaison value amounted to an estimated cost saving of R10m – in other words, the MRC would have paid R10m if we had paid for the exposure received through appearing for several minutes on TV and on radio and through column space in newspapers and magazines. This figure is low in comparison to previous years, as a result of the MRC adopting a Media Policy which guides everyone in terms of media liaison activities. Training in how to deal with the media and what/how to write to the media was conducted in conjunction with the Department of Science and Technology’s community arm, SASTA.

In terms of direct marketing value, the MRC advertised its services and commitment to finding health solutions in targeted magazines and newspapers to the value of R60,000 (Mail & Guardian’s ‘Investing in Life’ supplement and the Healthy Living for Children campaign run by the Environmental Health Research Group in Your Pregnancy).
The MRC also carried out below-the-line marketing, with popular magazines called YOU/Huisgenoot using MRC articles and pictures.

The MRC photographer has embarked on developing his skills in videography. This entailed making videos of MRC-related research projects, i.e. following researchers in the field and filming them and editing the video, which is used as a training tool and reference for the unit’s annual work. MRC photos have been used in various national magazines.

National, community and government stakeholder projects

This Division exhibits and conducts workshops at SciFest, in collaboration with the Public Understanding of Biotechnology and the MTN ScienCentre, also exhibiting and conducting workshops during the National Science Week in Western Cape and Limpopo. It also carries out teacher empowerment projects in collaboration with the Universities of Cape Town and the Western Cape. The Division plays a role in the Khanyagula Science Expo for township schools, and takes part in Women’s Day events celebrating women in science, and in taking biotechnology to rural communities in the Eastern Cape.

The Division also looks after continued improvement of the relationship between government and other key stakeholders through active promotion and lobbying of the image, quality and capacity of the MRC. Research translation initiatives included assisting with the Insite and SA AIDS Conference, and carrying out PR and media liaison to the value of R5 million.

In terms of stakeholder relations with national government, projects included:

- making a presentation to Dr Makubalo of the Department of Health for the establishment of a Research Translation Office;
- presentations to the Portfolio Committees of Health and of Science and Technology;
- drawing up a Government Liaison Policy for the MRC;
- arranging field trips to MRC for university students;
- nominating MRC employees for NSTF Awards;
- co-ordination of visits to MRC for possible collaborations;
- visits to Portfolio Committees within Parliament and to government departments in Pretoria;
- facilitation of design and layout of the Department of Health’s Epidemiological Comments document, and of their ‘Monitoring and Evaluation of the ARV Rollout’ brochure;
- project management of a workshop on ‘Diabetes movement’ and for the units/groups’ 2004 meeting; and
- active membership of the Communication Forum for Science Councils.

Science writing and editing

This functional Division helps disseminate the MRC’s research and other activities to its various stakeholders: policy makers, researchers, health professionals and the general public. It produces MRC News, translating MRC research into articles that are both interesting and informative, and which appeal to as wide an audience as possible. The magazine is distributed directly to policy makers and other researchers, and is also sent to specific members of the media (newspapers, magazines, radio and television), who then adapt articles of their choice to suit their specific audiences.

This Division also compiles brochures, web pages and posters for the MRC itself and its units and groups. It produces the Bits & Bytes newsletter every 2 weeks and communicates with MRC operational staff and researchers and with collaborating scientists at other institutions. The Division also assists researchers with writing and editing research papers, reports and policy briefs.

The Division reported on the 2004 Department of Science and Technology Insite exhibition, producing a CD with slideshow presentation and additional photographs that were distributed to the units concerned for promotional use. Several
stories from MRC News were picked up by the media and re-used, for example in the Sunday Times newspaper (Hidden genes on a lonely island, MRC News: October 2004). Ten research papers and six Cochrane Reviews were edited and translated for magazine and newsprint use.

INFORMATICS AND KNOWLEDGE MANAGEMENT

In 2004 the Informatics and Knowledge Management Directorate (IKMD) had a planning meeting to review its strategic direction. This strategic review led to a new approach in terms of the IKMD’s direction, functions and roles. The new direction meant a new perspective in knowledge management at the MRC: “From an ICT-centred approach to a people-centred approach.”

Goals of the Directorate

• Make MRC a leading knowledge-based organisation
• Create a seamless MRC
• Provide accurate information for policy- and decision-making
• Become the knowledge-based organisation of choice for information and knowledge for consumers

Selected Division highlights

The Informatics and Knowledge Management Directorate of the MRC has seven divisions: the Web and Media Technology Division, Management Information and Knowledge Systems Division, Information Services Division, Regional Informatics Services Division KZN, Health Informatics Research and Development Division, Biomedical Informatics Research Division and Information Technology Services Division.

The Web and Media Technology Division continued to focus on the effective use of the World Wide Web as one of the most powerful and appropriate services through which the MRC’s health information resources can be communicated and distributed. This was done through the maintenance and ongoing development of resources such as the MRC’s corporate web site (www.mrc.ac.za) and SA HealthInfo, an important health knowledge network for Southern Africa (www.sahealthinfo.org).

The Health Informatics Research and Development Division is working on a computerised decision support system for use by community members. The aim of this project is to develop a simple decision support system to be deployed via information terminals in communities, to enable community members to decide whether it is necessary to seek medical help for common symptoms. This is an attempt to encourage self-care among community members.

The Information Technology Services Division has installed a new core switch to replace the old one, which was unserviceable and obsolete. This installation will pave the way to upgrading all satellite switches, and users both internally and externally will start to reap the benefits of a faster and more fault-tolerant network. This is one of the activities which seeks to ensure that the MRC remains connected to national and international stakeholders.

The Biomedical Informatics Research Division’s most significant current project is the development of an informatics platform accompanying the antiretroviral treatment programme in the Free State province in collaboration with the UCT Lung Institute, the University of Pretoria and the provincial Department of Health. The work is funded by a grant to this Division from the International Development Research Centre in Canada. The system was used to produce the first quarterly report on the status of the treatment programme which was presented to various government bodies and the national Minister of Health. In the next phase of the project, information feedback and resistance genotyping systems will be implemented. The overall aim is to develop a comprehensive information system for monitoring and evaluating the treatment programme and improving patient care.

Wide area network

During the past year the Regional Informatics Services Division KZN added two new sites to the network, Westville in June 2004 (which is a new office for the Health Promotion Research and Development Group), and Isipingo, a satellite site for the same Group, in November 2004. Three more sites are currently being planned.
TECHNOLOGY AND BUSINESS DEVELOPMENT DIRECTORATE

Review of activities, November 2004-March 2005

The Technology and Business Directorate has revisited its value proposition to the MRC, and agrees that it is a support and enabling function whose challenge is to realise value and impact from the value created through the MRC’s core function, namely research and development. This Directorate has taken up this challenge by working in teams across the MRC to ensure that the organisation’s innovation capabilities are demonstrated.

Specific activities and achievements for the period reported here are listed below:

• The Intellectual Property Policy for MRC was completed, and after organisation-wide sharing and consultation the Policy was approved by the EMC on 8 February 2005.
• A patent audit of all MRC patents has been completed. The MRC patent portfolio has now been consolidated to a total of 11 patents which are currently valid and in force. A detailed assessment is under way on each of these patents to identify and respond to potential commercial opportunities. An exploitation strategy unique to each patent or family of patents will be completed by the end of 2005.
• A license was secured for an online patent search database (with support from the Innovation Fund Commercialisation Office) which will be made available for use by other publicly funded institutions in the Western Cape region and adjoining provinces. The MRC has developed a desktop-based online booking system to facilitate access to the patent search database for all registered users.
• Due diligence on patents granted to MRC inventors that have been nominated for awards in terms of the Innovation Fund’s Patent Incentive Scheme was completed. Through this process MRC inventors could receive incentives from the Innovation Fund.
• The Innovation Centre in consultation with other relevant groups in the MRC is in the process of developing a web-based knowledge asset management system (eKAM) as a revenue-generating product for own use and for use by all public and private R&D institutions. To date the full functional specifications have been developed and coded and beta testing started in mid-March.
• Funding for the final commercialisation phase of Umbiflow has been requested from the Innovation Fund and a resulting due diligence has been undertaken. Funding is expected forthwith.
• The Innovation Centre facilitated the renegotiation of the milestone terms of a license agreement between the MRC/Carotino partnership and Pioneer Foods for the commercialisation of a nutritional spread developed by the MRC’s Nutritional Intervention Research Unit.
• The Innovation Centre facilitated the negotiation of license agreements and the establishment of joint ventures between the MRC and local and international partners, for the commercialisation of intellectual property generated by research conducted in the MRC’s Diabetes Research Group.
• A strategically significant visit to Malaysia was undertaken by the Business Development Division. The purpose was to develop scientific collaboration with Malaysia, with special reference to University Sains Malaysia, the national drug regulatory authority, the private sector, the Novartis Institute for Tropical Diseases in Singapore, and to explore the potential for establishing a shared database for medicinal plants and novel drug development between the two countries. Recommendations from the visit are:
  - Consolidation of respective countries’ national traditional medicines databases;
  - Scientific exchanges of students (Ph.D. and Master’s) and of staff in both directions;
  - Marine flora studies - explore feasibility from South African side;
  - Explore formulation and biopharmaceuticals jointly with Malaysian partners;
  - Consider establishment of a shared clinical trials platform;
  - Strengthening of genomics studies within the TM1002 FP platform;
  - HIV: establish a traditional medicines proof of principal herbal medicines testing platform using both in vitro and in vivo testing systems.
• The following proposals are in development:
  - Diabetes Research Centre of Excellence to be submitted to NRF.
  - Human Genetics Centre of Excellence to be submitted to NRF.
  - SA-India bilateral for Department of Science and Technology.
• The Collaborative Project Office is continuing to provide excellent multi-partner project management support. This office has managed projects to the value of more than R150 million since 2002. These included projects such as Glaxo, DST TB Lead Programme, THRIP and TB Innovation Fund. The office also manages the SAAVI project portfolio.
• The Legal Office is increasingly functioning as a Corporate Legal Office attending to all legal aspects of the MRC’s activities. Involvement in corporate governance, labour and employment issues, intellectual property and contracts are increasingly well covered. The office has also extended its networks to super-specialist suppliers for speedy responses to specialist cases, e.g. licensing of multi-ownership intellectual property.
• The three technology platforms incubated in the Technology and Business Development Directorate, namely Essential Healthcare Technology Package, Telemedicine and Indigenous Knowledge Systems (IKS) are all in a performing phase.
• IKS has grown its funding base to over R8 million and has completed a strategic framework as a national resource. The Lead Programme covers IKS R&D, IKS Knowledge Management and IKS Utilisation. The latter involves community empowerment projects as a key component of the IKS value chain.
• Telemedicine has firmly printed its footsteps in strategic partnerships with the Departments of Health and of Science and Technology, SITA and DOC as well as WHO, NEPAD and private sector players. The Lead Programme has taken centre stage at the NEPAD e-Schools projects. The vision to create a Private Public Partnership (PPP) in e-Health is progressing well.
• The Essential Healthcare Technology Package (EHTP) WHO Collaborative Centre will complete its life cycle as a WHO Collaborative Centre on 8 March 2005. A process has started to prepare a submission to WHO for full Resource Centre status. This will be done in close collaboration with the South African Department of Health. EHTP is currently successful in its roll-out programme in South Africa, with Limpopo the leading province in implementing EHTP.

**MRC Research and Technology Platforms – update**

One of MRC’s strategies to ensure ongoing renewal and progress in its scientific and technological basis is through the creation, incubation and growth of new platforms. The decision process on creating new science and technology platforms is informed by factors such as the strategic priorities of the South African government, global trends in medical and biosciences, WHO and Africa’s burden of disease trends calling for R&D capacity as a requirement for effective interventions, as well as MRC’s organisation strategy aimed at sustainability and competitive advantage.

The table opposite provides an update on MRC Science and Technology Platforms in the incubation phase as well as in preparation for launching. The table only covers those managed or enabled through efforts in this Directorate, and is by no means the full picture.
### MRC Technology and Business Development Directorate Managed/Enabled Platforms Portfolio

<table>
<thead>
<tr>
<th>Platform</th>
<th>Status</th>
<th>Key progress (Feb. 05)</th>
<th>Desired product/output</th>
</tr>
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<tbody>
<tr>
<td>Drug development – natural products</td>
<td>Creation/performing</td>
<td>• 8 early drug candidates for malaria</td>
<td>• Malaria, TB, Immunomodulators and tonic novel therapeutics</td>
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<tr>
<td>Diabetes research platform</td>
<td>Creation</td>
<td>• Strategy development in final stage</td>
<td>• Therapeutics and diagnostic agents</td>
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<tr>
<td>IKS</td>
<td>Performing</td>
<td>• Successful fund-raising</td>
<td>• Novel therapeutics for key diseases</td>
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<td></td>
<td></td>
<td>• Pipeline of drug candidates</td>
<td>• Reference Centre for Traditional Medicines</td>
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<td></td>
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<td>• Traditional healer training</td>
<td>• Successful community businesses</td>
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<td></td>
<td></td>
<td>• Zprogrammes completed</td>
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<tr>
<td></td>
<td></td>
<td>• Community empowerment projects launched in three provinces. Roll-out to others under way</td>
<td></td>
</tr>
<tr>
<td>Telemedicine</td>
<td>Performing</td>
<td>• Successful fund-raising</td>
<td>• MRC stakeholder value created</td>
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<tr>
<td></td>
<td></td>
<td>• Key strategic partnerships completed</td>
<td>• Successful platform building</td>
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<tr>
<td></td>
<td></td>
<td>• PPP model evolving</td>
<td>• Capacity building</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• NEPAD e-Schools project accepted</td>
<td>• PPP established</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• International recognition</td>
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<tr>
<td>Essential Healthcare Technology Package</td>
<td>Performing</td>
<td>• WHO International Roll-out, e.g. Mexico</td>
<td>• Worldwide implementation</td>
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<td>• SA Limpopo Province new contract</td>
<td>• WHO affiliation to continue</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Improved health care systems in South Africa</td>
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<tr>
<td>Immuno-Nutrition (convergence of technology,</td>
<td>Proposal phase</td>
<td>• Buy-in from CSIR, MRC, and UCT</td>
<td>• Novel therapeutics</td>
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<tr>
<td>biotech, nutrition, chemistry immunology, etc.)</td>
<td></td>
<td>• Working group established</td>
<td>• Disease management practices</td>
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<td></td>
<td></td>
<td></td>
<td>• Capacity building</td>
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<tr>
<td>Systems biology (biotechnology, natural</td>
<td>Concept development</td>
<td>• Early concept discussions</td>
<td>• Strengthen research linkages</td>
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<tr>
<td>products, IKS convergence)</td>
<td></td>
<td></td>
<td>• Publications</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Patents</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Strategic positioning in global arena</td>
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FINANCIAL STATEMENTS

REPORT OF THE AUDITOR-GENERAL TO
THE EXECUTIVE AUTHORITY ON THE
FINANCIAL STATEMENTS OF THE SOUTH
AFRICAN MEDICAL RESEARCH COUNCIL
(MRC) FOR THE YEAR ENDED 31 MARCH
2005

1. AUDIT ASSIGNMENT
The financial statements as set out on pages 6 to 11 and 71 to 88, for the year ended 31 March 2005, have been audited in terms of section 188 of the Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996), read with sections 4 and 20 of the Public Audit Act, 2004 (Act No. 25 of 2004) and section 14(2) of the South African Medical Research Council Act, 1991 (Act No. 58 of 1991). These financial statements, the maintenance of effective control measures and compliance with relevant laws and regulations are the responsibility of the accounting authority. My responsibility is to express an opinion on these financial statements, based on the audit.

2. NATURE AND SCOPE
The audit was conducted in accordance with Statements of South African Auditing Standards. Those standards require that I plan and perform the audit to obtain reasonable assurance that the financial statements are free of material misstatement.

An audit includes:
• examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements,
• assessing the accounting principles used and significant estimates made by management, and
• evaluating the overall financial statement presentation.

Furthermore, an audit includes an examination, on a test basis, of evidence supporting compliance in all material respects with the relevant laws and regulations which came to my attention and are applicable to financial matters.

The audit was completed in accordance with Auditor-General Directive No. 1 of 2005.

I believe that the audit provides a reasonable basis for my opinion.

3. AUDIT OPINION
In my opinion, the financial statements fairly present, in all material respects, the financial position of the MRC at 31 March 2005 and the results of its operations and cash flows for the year then ended, in accordance with generally accepted accounting practice and in the manner required by Schedule 4 of the Companies Act, 1973 (Act No. 61 of 1973) and other reporting requirements as set out in the Public Finance Management Act, 1999 (Act No. 1 of 1999).

4. EMPHASIS OF MATTER
Without qualifying the audit opinion expressed above, attention is drawn to the following matter:

Non-Compliance with laws, rules and regulations

The MRC has failed to institute a Fraud Prevention Plan as required by Treasury Regulation 27.2.1.

5. APPRECIATION
The assistance rendered by the staff of the MRC during the audit is sincerely appreciated.

JM Williams for Auditor-General
Cape Town
31 July 2005
REPORT OF THE AUDIT COMMITTEE FOR THE YEAR ENDED 31 MARCH 2005

The Audit Committee has adopted appropriate formal terms of reference, which have been confirmed by the Board, and has satisfied its responsibilities as set out in the terms of reference.

In performing its responsibilities the Audit Committee has reviewed the following:
- The effectiveness of the internal control systems;
- The effectiveness of internal audit;
- The output of a risk assessment workshop to identify the major risks faced by the organisation;
- The risk areas of the entity’s operations to be covered in the scope of internal and external audits;
- The adequacy, reliability and accuracy of financial information provided to management;
- The accounting or auditing concerns identified as a result of the internal or external audits;
- The adequacy of policies and procedures considered necessary to comply with the requirements of the Public Finance Management Act;
- The entity’s compliance with legal and regulatory provisions;
- The activities of the internal audit function, including its annual work programme, co-ordination with the external auditors, the reports of significant investigations and the responses of management to specific recommendations;
- The adequacy of the terms of reference of the Audit Committee;
- The scope and results of the external audit, and its cost effectiveness.

The Audit Committee has also been responsible for:
- Approving the internal audit charter and work plan;
- Ensuring adequate segregation between non-audit services and the internal audit function, where these services were provided by the same accounting firm;
- Recommending the appointment of a new firm to perform the internal audit function;
- Encouraging improved coordination and liaison between board committees in those areas where their responsibilities overlap.

The Audit Committee notes that during the past year there has been an improvement in the internal controls and financial management systems, and the Committee considers that the system of internal controls has ensured that the organisation’s major risks have been reduced to an acceptable level.

The Audit Committee has evaluated the annual financial statements of the South African Medical Research Council for the year ended 31 March 2005 and concluded that they comply, in all material respects, to the requirements of the Companies Act (Act 61 of 1973, as amended), the Public Finance Management Act (Act 1 of 1999, as amended), together with the associated Treasury Regulations, and South African Statements of Generally Accepted Accounting Practice.

The Audit Committee concurs with the going concern premise in preparing the annual financial statements, and has recommended their adoption by the Board of Directors.

Chairman
July 2005

Committee members:
Mr AZ Dlamini (Chairperson)
Prof H Schneider
Prof MS Mokgokong
Mr MP Canca
Prof AD MBewu (President of MRC)
REPORT OF THE ACCOUNTING AUTHORITY
(BOARD) OF THE MRC ON THE KEY
PERFORMANCE AREAS AND ANNUAL
FINANCIAL STATEMENTS FOR THE YEAR
ENDED 31 MARCH 2005

NATURE OF THE OPERATIONS
Medical Research Council is an independent statutory body set up by government, to co-ordinate health and medical research activities throughout South Africa. Research takes place at Head Office (Cape Town) and at the two satellites, Durban and Pretoria.

The total revenue of MRC increased by 12.5%, and the bulk of this was from the contracts and grants. As indicated in the notes, the assets and liabilities relating to the Post Retirement Benefit have been included in the balance sheet as at 31 March 2005. Previously, these accounts were accounted for off balance sheet.

CORPORATE GOVERNANCE AND CONTROL FRAMEWORK

• Board’s responsibility for financial statements
  The Board is responsible for preparing the annual financial statements and other information presented in the annual report in a manner that fairly presents the financial position and the results of the operations of the entity.

  The external auditors are responsible for carrying out an independent examination of the annual financial statements in accordance with Statements of South African Auditing Standards, and for reporting their findings thereon.

  The key performance indicators (pp. 6 to 11) and annual financial statements (pp. 71 to 88) have been prepared in accordance with South African Statements of Generally Accepted Accounting Practice and are based on appropriate accounting policies which have been consistently applied in all material respects, and are supported by reasonable and prudent estimates where appropriate. Adequate accounting records have been maintained throughout the period under review.

• Internal controls
  A comprehensive review and testing to ensure that group maintain adequate accounting records and effective systems of internal controls was carried out internally.

• Going concern
  The Board has reviewed the entity’s budget and cash-flow forecast for the year ended 31 March 2005. On the basis of the review, and in the light of the current financial position, the Board is satisfied that the entity is a going concern, and has continued to adopt the going concern basis in preparing the financial statements.

• Audit Committee
  The Audit Committee met three times during the year. The new Audit Committee came to being during the year, and it is chaired by Mr A Dlamini (not an MRC Board Member). The other members of committee are Professors S Mokgokong and H Schneider, and Mr P Canca.

• Internal Audit
  Gobodo Risk Management did a risk assessment during the year, and a number of audits were performed.

• Fees of Board members and remuneration of senior management
  The fees paid to members of the Board, and the remuneration of the senior management have been detailed under notes 19 and 20, in the notes to annual financial statements.

SUBSIDIARY
MRC has a 100% shareholding at MEDRES Investments (Pty) Ltd. The subsidiary remains dormant, without any material assets or liabilities.

DISCLOSURE IN TERMS OF PFMA
Section 47 of the PFMA requires us to disclose material losses as a result of criminal offences or irregular, fruitless or wasteful expenditures, and any criminal procedures instituted as a result of the offences. There were no material losses. There was fruitless and wasteful expenditure amounting to R64,956 (2004 – R4,157). The fruitless and wasteful expenditure came about because the accident reports were not presented on time. One accident happened in Maputo, the other in the Eastern Cape. Because of the delay, the insurance company paid R61,403 instead of R126,359 claimed.

The treasury regulations require for the purpose of significant and material events and transactions, as spelt out in sections 50 (1), 54 (2), 55 (2) and 66 (1) of PFMA, the accounting authority develops and agrees framework of acceptable levels of materiality and significance with the relevant executive authority, and in consultation with the auditors. Though this process has not been completed yet, the risks are low as MRC discloses all transactions, irrespective of the size of amounts involved.
SOUTH AFRICAN MEDICAL RESEARCH COUNCIL
BALANCE SHEET AT 31 MARCH 2005

<table>
<thead>
<tr>
<th>Notes</th>
<th>2005 R</th>
<th>2004 R</th>
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<tr>
<td><strong>ASSETS</strong></td>
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<tr>
<td>Non-current assets</td>
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</tr>
<tr>
<td>Property, plant and equipment</td>
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<td>62,332,189</td>
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<tr>
<td>Investments</td>
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<td>46,721,797</td>
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<td></td>
<td><strong>109,053,986</strong></td>
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<tr>
<td>Current assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investments</td>
<td>3</td>
<td>179,716,712</td>
</tr>
<tr>
<td>Inventory</td>
<td>4</td>
<td>698,108</td>
</tr>
<tr>
<td>Trade and other receivables</td>
<td>5</td>
<td>15,515,715</td>
</tr>
<tr>
<td>Cash and cash equivalents</td>
<td>6</td>
<td>48,025,022</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>243,955,557</strong></td>
</tr>
<tr>
<td>Total assets</td>
<td></td>
<td><strong>353,009,543</strong></td>
</tr>
</tbody>
</table>

| **EQUITY AND LIABILITIES** | | |
| Capital and reserves | | |
| General fund | | 25,788,988 | 21,832,045 |
| Capital funds | | 76,818,048 | 75,553,662 |
| | | **102,607,036** | **97,385,707** |
| Non-current liabilities | | |
| Trust funds | 3 | 1,369,476 | 1,334,167 |
| Long-term loans | 7 | 20,229 | 27,219 |
| Provisions | 9 | 64,022,863 | 58,780,226 |
| | | **65,412,568** | **60,141,612** |
| Current liabilities | | |
| Provision | 9 | 8,957,767 | 6,400,300 |
| Research funds received in advance | 10 | 148,348,717 | 121,959,186 |
| Trade and other payables | 11 | 27,676,465 | 22,323,959 |
| Current portion of long-term loans | 7 | 6,990 | 4,894 |
| | | **184,989,939** | **150,688,339** |
| Total equity and liabilities | | **353,009,543** | **308,215,658** |

Signed on behalf of the SA Medical Research Council

Professor M. F. Ramashala
Chairperson of the Board

Date: 12 August 2005
### SOUTH AFRICAN MEDICAL RESEARCH COUNCIL

#### INCOME STATEMENT FOR THE YEAR

**ENDED 31 MARCH 2005**

<table>
<thead>
<tr>
<th>Notes</th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td><strong>Revenue</strong></td>
<td>335,178,615</td>
<td>297,941,380</td>
</tr>
<tr>
<td>Government grants</td>
<td>155,726,284</td>
<td>152,081,591</td>
</tr>
<tr>
<td>Total Government grants</td>
<td>154,388,000</td>
<td>156,695,000</td>
</tr>
<tr>
<td>Add/(Less): Transfer from/to Capital funds</td>
<td>1,338,284</td>
<td>(4,613,409)</td>
</tr>
<tr>
<td>Income from contracts and grants</td>
<td>161,889,591</td>
<td>126,854,413</td>
</tr>
<tr>
<td>Gross income</td>
<td>162,853,009</td>
<td>128,560,836</td>
</tr>
<tr>
<td>Add: Transfer from/to Capital funds</td>
<td>(963,418)</td>
<td>(1,706,423)</td>
</tr>
<tr>
<td><strong>Other income</strong></td>
<td>17,562,740</td>
<td>19,005,376</td>
</tr>
<tr>
<td>Sundry income</td>
<td>3,833,495</td>
<td>4,136,941</td>
</tr>
<tr>
<td>Interest received</td>
<td>13,729,245</td>
<td>14,868,435</td>
</tr>
<tr>
<td><strong>Expenditure</strong></td>
<td>328,127,011</td>
<td>287,816,953</td>
</tr>
<tr>
<td>Collaborative research</td>
<td>77,483,664</td>
<td>61,721,942</td>
</tr>
<tr>
<td>Staff costs</td>
<td>150,118,069</td>
<td>132,387,287</td>
</tr>
<tr>
<td>Other operating costs</td>
<td>100,525,278</td>
<td>93,707,724</td>
</tr>
<tr>
<td>Operating surplus before transfers</td>
<td>7,051,604</td>
<td>10,124,427</td>
</tr>
<tr>
<td>Increase in rationalisation reserve (interest capitalised)</td>
<td>594,104</td>
<td>728,921</td>
</tr>
<tr>
<td>Payments from rationalisation reserve</td>
<td>316,365</td>
<td>418,671</td>
</tr>
<tr>
<td>Payments from motor vehicle self-insurance reserve</td>
<td>12,685</td>
<td>2,631</td>
</tr>
<tr>
<td><strong>NET SURPLUS FOR THE YEAR</strong></td>
<td>6,128,450</td>
<td>8,974,204</td>
</tr>
</tbody>
</table>
SOUTH AFRICAN MEDICAL RESEARCH COUNCIL
STATEMENT OF CHANGES IN EQUITY
FOR THE YEAR ENDED 31 MARCH 2005

<table>
<thead>
<tr>
<th>Note</th>
<th>Capital Fund</th>
<th>General Fund</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Balance at 1 April 2003</td>
<td>67,384,590</td>
<td>17,627,818</td>
<td>85,012,408</td>
</tr>
<tr>
<td>Transfer to research funds received in advance</td>
<td></td>
<td>(5,193,478)</td>
<td></td>
</tr>
<tr>
<td>Surplus for the year</td>
<td>—</td>
<td>8,974,204</td>
<td>8,974,204</td>
</tr>
<tr>
<td>Interest capitalised</td>
<td>3</td>
<td>—</td>
<td>728,921</td>
</tr>
<tr>
<td>Allocation during the year</td>
<td>3</td>
<td>—</td>
<td>186,820</td>
</tr>
<tr>
<td>Capitalisation adjustments</td>
<td>1,849,240</td>
<td>(1,849,240)</td>
<td>—</td>
</tr>
<tr>
<td>Capitalisation of additions</td>
<td>6,319,832</td>
<td>—</td>
<td>6,319,832</td>
</tr>
<tr>
<td>Balance at 31 March 2004</td>
<td>75,553,662</td>
<td>20,475,045</td>
<td>101,222,185</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Note</th>
<th>Capital Fund</th>
<th>General Fund</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Balance at 1 April 2004</td>
<td>75,553,662</td>
<td>20,475,045</td>
<td>101,222,185</td>
</tr>
<tr>
<td>Surplus for the year</td>
<td>—</td>
<td>6,128,450</td>
<td>6,128,450</td>
</tr>
<tr>
<td>Interest accruing to rationalisation fund</td>
<td>3</td>
<td>—</td>
<td>594,104</td>
</tr>
<tr>
<td>Allocation during the year</td>
<td>3</td>
<td>—</td>
<td>230,641</td>
</tr>
<tr>
<td>Capitalisation adjustments</td>
<td>1,639,252</td>
<td>(1,639,252)</td>
<td>—</td>
</tr>
<tr>
<td>Capitalisation of additions</td>
<td>(374,866)</td>
<td>—</td>
<td>(374,866)</td>
</tr>
<tr>
<td>Balance at 31 March 2005</td>
<td>76,818,048</td>
<td>25,788,988</td>
<td>107,800,514</td>
</tr>
</tbody>
</table>
## SOUTH AFRICAN MEDICAL RESEARCH COUNCIL
### CASH FLOW STATEMENT FOR THE YEAR
#### ENDED 31 MARCH 2005

<table>
<thead>
<tr>
<th>Notes</th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R</td>
<td>R</td>
</tr>
</tbody>
</table>

### CASH FLOWS FROM OPERATING ACTIVITIES

- Cash receipts from grants and contracts: 321,723,457, 282,752,258
- Cash paid to suppliers and employees: (279,825,307), (244,106,066)

Cash generated from operations: 12.1, 41,898,150, 38,646,192

Net interest received: 13,710,503, 14,833,573

Net cash inflow from operating activities: 55,608,653, 53,479,765

### CASH FLOWS FROM INVESTING ACTIVITIES

- Property, plant and equipment acquired: (15,554,220), (17,049,388)
- Proceeds on disposal of plant and equipment: 459,358, 62,021
- Additions to investments: (7,063,111), (26,378,728)

Net cash outflow from investing activities: (22,157,973), (43,366,095)

### CASH FLOWS FROM FINANCING ACTIVITIES

- Loans repaid: (4,894), (2,796)

Net cash outflow from financing activities: (4,894), (2,796)

Net increase in cash and cash equivalents: 33,445,786, 10,110,874

Cash and cash equivalents at beginning of year: 14,579,236, 4,468,362

Cash and cash equivalents at end of year: 12.2, 48,025,022, 14,579,236
SOUTH AFRICAN MEDICAL RESEARCH COUNCIL
NOTES TO THE FINANCIAL STATEMENTS FOR THE PERIOD ENDED 31 MARCH 2005

1. Significant accounting policies and basis of preparation
The annual financial statements are prepared on the historical cost basis, except for certain financial instruments recognised at fair value as stated below.

The annual financial statements have been prepared in accordance with South African Statements of Generally Accepted Accounting Practice. The principal accounting policies adopted in the preparation of these financial statements are set out below and are consistent in all material respects with those applied in the previous year.

1.1 Revenue recognition
Turnover represents the parliamentary grant from the government, external grants and contracts, services rendered, and rentals. All the turnover is stated net of Vat.

1.2 Government grants received
Government grants received for the purposes of giving immediate financial support with no future related costs are recognised as income in the period in which they become receivable. Government grants relating to specific expenditure are deferred and recognised in the year in which the expenses are incurred.

1.3 Property, plant and equipment
Property, plant and equipment are stated at cost less accumulated depreciation, unless stated otherwise.

Property, plant and equipment are depreciated on a straight-line basis, over the useful lives of the assets, to their estimated residual values.

The depreciation rates applicable to each category of property, plant and equipment are as follows:

- Buildings ___________________________ __________ 2%
- Usufruct buildings ___________________________ over life of usufruct
- Prefabricated buildings ___________________________ 5%
- Laboratory equipment ___________________________ 20%
- Vehicles and containers ___________________________ 20%
- Furniture and office equipment ___________________________ 20%
- Computer equipment ___________________________ 33.3%

Gains and losses arising on the disposal of property, plant and equipment in the normal course of business are included in capital items to the extent that these are material.

1.4 Leases
Leases are classified as finance leases where substantially all the risks and rewards associated with ownership have been transferred to MRC. Capitalised leased assets are depreciated to their estimated residual values over their estimated useful lives. Lease rentals are appropriated between capital and interest elements, using the sum of the digits method.

Operating leases are leases where the lessor retains the risks and rewards of ownership of the underlying asset. Payments made under operating leases are charged against income on a straight line basis, over the period of the lease.

1.5 Inventory
Consumable stores are valued at the lower of weighted average cost or net realisable value.

1.6 Research and development costs
Research and development expenditure is written off as incurred.

1.7 Pension scheme arrangements
It is the policy of the Council to provide retirement benefits for employees. Contributions to retirement funds are charged against income in the year in which they become payable. Deficits in respect of the defined benefit component of the Council Pension Fund will be met by the Council through lump sum payments or through increased future contributions.

1.8 Financial instruments
Financial assets and financial liabilities are recognised in the balance sheet when MRC has become party to contractual provisions of the instrument. Subsequent to initial recognition of these instruments are measured as set out below.
Investments
After initial recognition, investments are measured at their fair values, adjusted for any transaction costs that may be incurred on sale or other disposal. Investments also include deposits on call.

Cash and cash equivalents
Cash and cash equivalents are measured at fair value.

Trade and other receivables
Trade and other receivables originated by the MRC are stated at their amortised cost less provision for doubtful debts. An estimate of doubtful debts is made based on a review of outstanding amounts at balance sheet date. Bad debts written off during the period in which they are identified.

Accounts payable
Non-derivative financial liabilities are recognised at amortised cost, comprising the original debt less principal payments and amortisations.

1.9 Foreign currencies
At the balance sheet date, monetary assets and liabilities denominated in foreign currencies are translated into South African Rands, at exchange rates ruling at the balance sheet date. Gains and losses arising from the settlement of such transactions are recognised in the Income Statement.

1.10 Capital items
Capital items are items of income and expense relating to the acquisition, disposal or impairment of property, plant and equipment, investments and intangible assets. To the extent that the gains and losses are immaterial, these are included in operating income.

1.11 Offset
Financial assets and financial liabilities are offset and the net amount reported in the balance sheet when the company has a legally enforceable right to set off the recognised amounts, and intends either to settle on a net basis, or to realise the asset and settle the liability simultaneously.

1.12 Provisions
Provisions are recognised when the Council has a present legal or constructive obligation as a result of past events, for which it is probable that an outflow of economic benefits will occur, and where a reliable estimate can be made of the amount of the obligation. Where the effect of discounting is material, provisions are discounted. The discount rate used reflects current market assessments of the time value of money and, where appropriate, the risks specific to the liability.
## 2. Property, plant and equipment

<table>
<thead>
<tr>
<th></th>
<th>Land and buildings R</th>
<th>Laboratory equipment R</th>
<th>Vehicles &amp; containers R</th>
<th>Furniture &amp; office equipment R</th>
<th>Total R</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2005</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carrying value at beginning of year</td>
<td>38,545,883</td>
<td>13,615,776</td>
<td>6,783,193</td>
<td>3,190,683</td>
<td>62,135,535</td>
</tr>
<tr>
<td>Cost</td>
<td>49,777,734</td>
<td>51,513,848</td>
<td>9,880,803</td>
<td>11,589,683</td>
<td>122,762,068</td>
</tr>
<tr>
<td>Accumulated depreciation</td>
<td>(11,231,851)</td>
<td>(37,898,072)</td>
<td>(3,097,610)</td>
<td>(8,399,000)</td>
<td>(60,626,533)</td>
</tr>
<tr>
<td>Additions</td>
<td>2,602,669</td>
<td>6,578,177</td>
<td>3,611,314</td>
<td>2,762,060</td>
<td>15,554,220</td>
</tr>
<tr>
<td>Disposals</td>
<td>—</td>
<td>(77,558)</td>
<td>(659,564)</td>
<td>(53,588)</td>
<td>(790,710)</td>
</tr>
<tr>
<td>Depreciation on disposals</td>
<td>—</td>
<td>61,704</td>
<td>620,512</td>
<td>50,615</td>
<td>732,831</td>
</tr>
<tr>
<td>Depreciation</td>
<td>(1,067,731)</td>
<td>(8,800,743)</td>
<td>(2,473,166)</td>
<td>(2,958,047)</td>
<td>(15,299,687)</td>
</tr>
<tr>
<td>Carrying value at end of the year</td>
<td>40,080,821</td>
<td>11,377,356</td>
<td>7,882,289</td>
<td>2,991,723</td>
<td>62,332,189</td>
</tr>
<tr>
<td>Cost</td>
<td>52,380,403</td>
<td>58,014,467</td>
<td>12,832,553</td>
<td>14,298,155</td>
<td>137,525,578</td>
</tr>
<tr>
<td><strong>2004</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carrying value at beginning of year</td>
<td>36,142,918</td>
<td>12,542,096</td>
<td>3,795,242</td>
<td>2,638,905</td>
<td>55,119,161</td>
</tr>
<tr>
<td>Cost</td>
<td>46,222,071</td>
<td>44,121,784</td>
<td>5,995,221</td>
<td>9,628,055</td>
<td>105,967,131</td>
</tr>
<tr>
<td>Accumulated depreciation</td>
<td>(10,079,153)</td>
<td>(31,579,688)</td>
<td>(2,199,979)</td>
<td>(6,989,150)</td>
<td>(50,847,970)</td>
</tr>
<tr>
<td>Additions</td>
<td>3,555,663</td>
<td>7,413,118</td>
<td>4,076,060</td>
<td>2,004,547</td>
<td>17,049,388</td>
</tr>
<tr>
<td>Disposals</td>
<td>—</td>
<td>(21,054)</td>
<td>(190,478)</td>
<td>(41,663)</td>
<td>(253,195)</td>
</tr>
<tr>
<td>Depreciation on disposals</td>
<td>—</td>
<td>21,044</td>
<td>190,475</td>
<td>33,475</td>
<td>244,994</td>
</tr>
<tr>
<td>Depreciation</td>
<td>(1,152,698)</td>
<td>(6,339,428)</td>
<td>(1,088,106)</td>
<td>(1,444,581)</td>
<td>(10,024,813)</td>
</tr>
<tr>
<td>Carrying value at end of the year</td>
<td>38,545,883</td>
<td>13,615,776</td>
<td>6,783,193</td>
<td>3,190,683</td>
<td>62,135,535</td>
</tr>
<tr>
<td>Cost</td>
<td>49,777,734</td>
<td>51,513,848</td>
<td>9,880,803</td>
<td>11,589,683</td>
<td>122,762,068</td>
</tr>
<tr>
<td>Accumulated depreciation</td>
<td>(11,231,851)</td>
<td>(37,898,072)</td>
<td>(3,097,610)</td>
<td>(8,399,000)</td>
<td>(60,626,533)</td>
</tr>
</tbody>
</table>

Furniture and office equipment having a book value of R32,045 is pledged as security against instalment sale agreements (note 7 refers).
### 3. Investments

#### 3.1 Short-term investments

<table>
<thead>
<tr>
<th>Description</th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-listed investments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investment in Corporation for Public Deposits at cost</td>
<td>179,716,712</td>
<td>173,786,298</td>
</tr>
<tr>
<td>Post retirement Medical Aid Benefit - under provisions</td>
<td>28,000,000</td>
<td>28,000,000</td>
</tr>
<tr>
<td>Research funds received in advance</td>
<td>148,348,717</td>
<td>121,959,186</td>
</tr>
<tr>
<td>Reserves and other accounts</td>
<td>3,367,995</td>
<td>23,827,112</td>
</tr>
</tbody>
</table>

#### 3.2 Long-term investments

<table>
<thead>
<tr>
<th>Description</th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listed investments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sanlam demutualisation shares</td>
<td>171,514</td>
<td>129,978</td>
</tr>
<tr>
<td>(No. of shares 14 128) (No. of shares: 14 128 - 2004)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sanlam Unit Trust</td>
<td>1,086,660</td>
<td>822,827</td>
</tr>
<tr>
<td>Old Mutual demutualisation shares</td>
<td>66,265</td>
<td>49,215</td>
</tr>
<tr>
<td>(No. of shares: 4210) (No. of shares: 4210 - 2004)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-listed investment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investment in Medres (Pty), a dormant MRC company</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Earmarked investments</td>
<td>17,476,881</td>
<td>16,363,382</td>
</tr>
<tr>
<td>Rationalisation reserve</td>
<td>8,094,899</td>
<td>7,817,160</td>
</tr>
<tr>
<td>Personnel provision reserve</td>
<td>8,385,203</td>
<td>7,767,399</td>
</tr>
<tr>
<td>Motor vehicle self-insurance reserve</td>
<td>996,779</td>
<td>778,823</td>
</tr>
<tr>
<td>Trust fund investments</td>
<td>1,369,476</td>
<td>1,334,167</td>
</tr>
<tr>
<td>Bruhns Trust at cost</td>
<td>538,305</td>
<td>502,996</td>
</tr>
<tr>
<td>WHO Steps Workshops - Agency Funds</td>
<td>569,535</td>
<td>569,535</td>
</tr>
<tr>
<td>Botha Trust</td>
<td>261,636</td>
<td>261,636</td>
</tr>
<tr>
<td>Investments in various instruments - to fund post retirement benefits</td>
<td>26,551,000</td>
<td>22,190,000</td>
</tr>
</tbody>
</table>

| Total                                            | 46,721,797 | 40,889,570 |
3.2.1 Rationalisation fund

The fund was instituted in terms of the regulations regarding the framework autonomy and provides for the expenditure associated with institutional restructuring or rationalisation.

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance at beginning</td>
<td>7,817,160</td>
<td>7,506,910</td>
</tr>
<tr>
<td>Interest capitalised</td>
<td>594,104</td>
<td>728,921</td>
</tr>
<tr>
<td>Rationalisation payments</td>
<td>(316,365)</td>
<td>(418,671)</td>
</tr>
<tr>
<td>Balance at end of the year</td>
<td>8,094,899</td>
<td>7,817,160</td>
</tr>
</tbody>
</table>

3.2.2 Motor vehicle self-insurance reserve

This reserve was established to provide for the self-insurance of motor vehicles with a low market value.

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance at beginning</td>
<td>778,823</td>
<td>594,634</td>
</tr>
<tr>
<td>Allocation for the year</td>
<td>230,641</td>
<td>186,820</td>
</tr>
<tr>
<td>Expenditure</td>
<td>(12,685)</td>
<td>(2,631)</td>
</tr>
<tr>
<td>Balance at end of the year</td>
<td>996,779</td>
<td>778,823</td>
</tr>
</tbody>
</table>

4. Inventory

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumable stores</td>
<td>698,108</td>
<td>674,140</td>
</tr>
</tbody>
</table>

5. Trade and other receivables

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade receivables</td>
<td>11,802,122</td>
<td>12,921,242</td>
</tr>
<tr>
<td>Provisions</td>
<td>(627,510)</td>
<td>(798,324)</td>
</tr>
<tr>
<td>Value Added Taxes</td>
<td>2,811,435</td>
<td>2,742,200</td>
</tr>
<tr>
<td>Staff advances</td>
<td>114,403</td>
<td>224,621</td>
</tr>
<tr>
<td>Prepaid expenses</td>
<td>933,262</td>
<td>371,388</td>
</tr>
<tr>
<td>Travel &amp; Subsistence</td>
<td>422,515</td>
<td>649,403</td>
</tr>
<tr>
<td>Other receivables</td>
<td>59,488</td>
<td>40,349</td>
</tr>
<tr>
<td></td>
<td><strong>15,515,715</strong></td>
<td><strong>16,150,879</strong></td>
</tr>
</tbody>
</table>
6. Cash and cash equivalents

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank balances</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absa and Standard Bank</td>
<td>3,914,477</td>
<td>14,564,166</td>
</tr>
<tr>
<td>Absa - a funder account</td>
<td>44,098,657</td>
<td>—</td>
</tr>
<tr>
<td>Petty cash</td>
<td>11,888</td>
<td>15,070</td>
</tr>
<tr>
<td></td>
<td>48,025,022</td>
<td>14,579,236</td>
</tr>
</tbody>
</table>

7. Long-term loans

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-term loans</td>
<td>27,219</td>
<td>32,113</td>
</tr>
<tr>
<td>Current portion included in long-term loan</td>
<td>(6,990)</td>
<td>(4,894)</td>
</tr>
<tr>
<td></td>
<td>20,229</td>
<td>27,219</td>
</tr>
</tbody>
</table>

8. Post employee benefits

8.1 Pension funds
MRC personnel are members of the following pension funds:
- Pension Fund of Associated Institutions (Act No. 51 of 1963)
- Pension Fund for Temporary Employees (Act No. 75 of 1979)
- MRC Pension Fund (since January 1994)
(a) The first two funds were established by Law and are regulated by the respective Acts.
(b) The last-named fund is regulated by the Pension Fund Act and is managed by an independent Board of Trustees. The fund was actuarially valued as at 1 April 2005 and it was found that the fund is fully funded and financially sound.
(c) The first two funds offer defined benefits to staff. With regard to the MRC Pension Fund, however, some members are on a defined benefit scheme, while the remainder are on a defined contribution scheme.

8.2 Actuarial assumptions

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discount rate</td>
<td>7.00%</td>
<td>9.00%</td>
</tr>
<tr>
<td>Consumer price inflation</td>
<td>5.10%</td>
<td>5.00%</td>
</tr>
<tr>
<td>Health care cost trend</td>
<td>10.50%</td>
<td>8.00%</td>
</tr>
<tr>
<td>Expected return on assets</td>
<td>7.60%</td>
<td>9.20%</td>
</tr>
<tr>
<td>Compensation increase rate*</td>
<td>6.00%</td>
<td>6.00%</td>
</tr>
</tbody>
</table>

* excludes merit increase
8.3 Changes in benefit obligation

The MRC Pension Fund is registered in terms of the Pension Funds Act. As a result of the Pension Funds Second Amendment Act, benefit obligations in these funds have been increased to equal the fair value of their assets resulting in zero surpluses.

<table>
<thead>
<tr>
<th></th>
<th>2005 R</th>
<th>2004 R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefit obligation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>at 1 April 2004</td>
<td>56,238,000</td>
<td></td>
</tr>
<tr>
<td>Current year</td>
<td>7,759,000</td>
<td></td>
</tr>
<tr>
<td>contributions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plus interest cost</td>
<td>2,977,000</td>
<td></td>
</tr>
<tr>
<td>Plus service cost</td>
<td>4,536,000</td>
<td></td>
</tr>
<tr>
<td>Actuarial (gain) /</td>
<td>932,000</td>
<td></td>
</tr>
<tr>
<td>loss</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benefits paid</td>
<td>-7,707,000</td>
<td></td>
</tr>
<tr>
<td><strong>Benefit obligation</strong></td>
<td><strong>64,735,000</strong></td>
<td><strong>67,001,000</strong></td>
</tr>
</tbody>
</table>

8.4 Fair value of plan assets

8.5 Components of net periodic cost

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Service cost</td>
<td>4,536,000</td>
<td></td>
</tr>
<tr>
<td>Interest cost</td>
<td>2,977,000</td>
<td></td>
</tr>
<tr>
<td>Expected return on</td>
<td>-3,303,000</td>
<td></td>
</tr>
<tr>
<td>Plan Assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recognised actuarial</td>
<td>846,000</td>
<td></td>
</tr>
<tr>
<td>(gain) / loss</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Net periodic cost</strong></td>
<td><strong>5,056,000</strong></td>
<td></td>
</tr>
</tbody>
</table>


9.1 Long term

**Personnel Provision Fund**

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance at beginning</td>
<td>8,590,226</td>
<td>7,865,186</td>
</tr>
<tr>
<td>of year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest capitalised</td>
<td>784,976</td>
<td></td>
</tr>
<tr>
<td>Leave payouts</td>
<td>(823,244)</td>
<td>(559,936)</td>
</tr>
<tr>
<td>Transfer from general</td>
<td>1,704,881</td>
<td>500,000</td>
</tr>
<tr>
<td>fund</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>9,471,863</td>
<td>8,590,226</td>
</tr>
</tbody>
</table>

**Post retirement medical aid benefit**

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance at beginning</td>
<td>50,190,000</td>
<td>41,173,000</td>
</tr>
<tr>
<td>of year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Movement during the</td>
<td>4,361,000</td>
<td>9,017,000</td>
</tr>
<tr>
<td>year</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>54,551,000</td>
<td>50,190,000</td>
</tr>
<tr>
<td></td>
<td>64,022,863</td>
<td>58,780,226</td>
</tr>
</tbody>
</table>
### 10. Research funds received in advance

Monies received in advance in respect of research grants awarded to the MRC for specific research projects.

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>10. Research funds received in advance</td>
<td>148,348,717</td>
<td>121,959,186</td>
</tr>
</tbody>
</table>

### 11. Trade and other payables

Accounts payable comprises:

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Trade creditors</td>
<td>14,372,829</td>
<td>11,620,771</td>
</tr>
<tr>
<td>Provision for audit fees</td>
<td>280,000</td>
<td>246,962</td>
</tr>
<tr>
<td>Accruals</td>
<td>10,178,778</td>
<td>8,564,261</td>
</tr>
<tr>
<td>Outstanding cheques</td>
<td>2,844,858</td>
<td>1,891,965</td>
</tr>
<tr>
<td></td>
<td>27,676,465</td>
<td>22,323,959</td>
</tr>
</tbody>
</table>

### 12. Notes to the cash flow statement

#### 12.1 Cash generated from operations

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>Operating loss before interest</td>
<td>(7,582,053)</td>
<td>(9,695,847)</td>
</tr>
</tbody>
</table>

Adjustments for cash items within specific funds not included in operating loss:

- Leave payout from Personnel Provision Fund: (823,244) (559,936)
- Allocation to motor vehicle self-insurance reserve: 230,641 186,820
Financial Reports

12.1 Cash generated from operations (contd.)

<table>
<thead>
<tr>
<th>Description</th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjustment for non-cash items:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depreciation of property, plant and equipment</td>
<td>15,299,687</td>
<td>10,024,813</td>
</tr>
<tr>
<td>Bad debts</td>
<td>84,540</td>
<td>27,935</td>
</tr>
<tr>
<td>Transfer (from)/to Other Property, Plant and Equipment capital fund</td>
<td>(1,338,284)</td>
<td>4,613,409</td>
</tr>
<tr>
<td>Transfer to funds</td>
<td>1,704,881</td>
<td>500,000</td>
</tr>
<tr>
<td>Profit on disposal of plant and equipment</td>
<td>(401,479)</td>
<td>(53,820)</td>
</tr>
<tr>
<td>Profit on revaluation of financial instruments</td>
<td>(303,221)</td>
<td>(275,642)</td>
</tr>
<tr>
<td>Cost to service post-retirement medical aid contributions</td>
<td>—</td>
<td>6,800,000</td>
</tr>
<tr>
<td>Adjustment to cost to service post-retirement medical aid contributions</td>
<td>—</td>
<td>(282,607)</td>
</tr>
<tr>
<td>Transfer to cost of land and buildings fund</td>
<td>963,418</td>
<td>1,706,423</td>
</tr>
<tr>
<td>Interest on rationalisation fund</td>
<td>594,104</td>
<td>728,921</td>
</tr>
<tr>
<td>Interest on Personnel Provision Fund</td>
<td>—</td>
<td>784,976</td>
</tr>
<tr>
<td></td>
<td><strong>8,428,990</strong></td>
<td><strong>14,505,445</strong></td>
</tr>
</tbody>
</table>

Movements in working capital:

<table>
<thead>
<tr>
<th>Description</th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase in inventory</td>
<td>(23,968)</td>
<td>(278,886)</td>
</tr>
<tr>
<td>Decrease / (increase) in accounts receivable</td>
<td>550,624</td>
<td>(7,989,562)</td>
</tr>
<tr>
<td>Increase in accounts payable and deferred income</td>
<td>32,942,504</td>
<td>32,409,195</td>
</tr>
<tr>
<td></td>
<td><strong>41,898,150</strong></td>
<td><strong>38,646,192</strong></td>
</tr>
</tbody>
</table>

12.2 Cash and cash equivalents

<table>
<thead>
<tr>
<th>Description</th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank balances</td>
<td>48,025,022</td>
<td>14,579,236</td>
</tr>
</tbody>
</table>
13. Commitments

13.1 Capital commitment
At year-end, a capital commitment of R100,000 exists in respect of the new building and building improvements. This will be funded from existing cash resources.

13.2 Operating lease commitments
MRC leases certain of its plant and equipment in terms of operating leases. The MRC does not have the option to acquire the assets at the termination on the lease. There are no restrictions imposed by leases.

Future minimum lease payments for (non-cancellable) operating leases are as follows:

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payable within one year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Premises</td>
<td>1,788,182</td>
<td>370,152</td>
</tr>
<tr>
<td>Furniture and office equipment</td>
<td>16,909</td>
<td>16,253</td>
</tr>
<tr>
<td>Vehicles</td>
<td>263,507</td>
<td>196,542</td>
</tr>
<tr>
<td></td>
<td>2,068,598</td>
<td>582,947</td>
</tr>
<tr>
<td>Payable thereafter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Premises</td>
<td>1,949,895</td>
<td>440,376</td>
</tr>
<tr>
<td>Vehicles</td>
<td>102,606</td>
<td>137,285</td>
</tr>
<tr>
<td></td>
<td>2,052,501</td>
<td>577,661</td>
</tr>
</tbody>
</table>

13.3 Finance lease commitments
An installment sale agreement is payable in monthly installments of R936 (2004: R820) increased by 15% (2004: 15%) per year. The agreement matures on 10 July 2007. The effective interest rate changes from prime to 0.5% above prime per annum. The installment sale liabilities are secured by office equipment (note 7 refers).

14. Interest received

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank account</td>
<td>505,352</td>
<td>621,249</td>
</tr>
<tr>
<td>Unit Trusts</td>
<td>42,071</td>
<td>51,856</td>
</tr>
<tr>
<td>Call account investments</td>
<td>16,414,619</td>
<td>16,714,732</td>
</tr>
<tr>
<td>Interest (reversed)/charged on Debtors accounts</td>
<td>(37,918)</td>
<td>44,420</td>
</tr>
<tr>
<td>Interest payable to funders</td>
<td>(3,194,879)</td>
<td>(2,563,822)</td>
</tr>
<tr>
<td></td>
<td>13,729,245</td>
<td>14,868,435</td>
</tr>
</tbody>
</table>

15. Collaborative Research

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consulting costs and honorarium payments</td>
<td>24,667,432</td>
<td>15,311,557</td>
</tr>
<tr>
<td>Payments made to external institutions</td>
<td>52,816,232</td>
<td>46,410,385</td>
</tr>
<tr>
<td></td>
<td>77,483,664</td>
<td>61,721,942</td>
</tr>
</tbody>
</table>
### 16. Staff costs

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td><strong>Salaries and wages</strong></td>
<td>127,244,738</td>
<td>106,528,262</td>
</tr>
<tr>
<td><strong>Basic salaries</strong></td>
<td>70,665,973</td>
<td>65,499,508</td>
</tr>
<tr>
<td><strong>Performance awards</strong></td>
<td>8,043,308</td>
<td>5,606,832</td>
</tr>
<tr>
<td><strong>Periodic payments</strong></td>
<td>1,179,043</td>
<td>316,258</td>
</tr>
<tr>
<td><strong>Other non-pensionable allowances</strong></td>
<td>23,990,420</td>
<td>17,947,631</td>
</tr>
<tr>
<td><strong>Temporary staff</strong></td>
<td>21,979,477</td>
<td>16,249,033</td>
</tr>
<tr>
<td><strong>Leave payments</strong></td>
<td>1,028,927</td>
<td>559,738</td>
</tr>
<tr>
<td><strong>Overtime pay</strong></td>
<td>357,591</td>
<td>349,261</td>
</tr>
<tr>
<td><strong>Defined Pension contribution plan expense</strong></td>
<td>4,834,217</td>
<td>3,495,890</td>
</tr>
<tr>
<td><strong>Social contributions</strong></td>
<td>9,068,247</td>
<td>7,529,407</td>
</tr>
<tr>
<td>(Employer’s contributions)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Medical</strong></td>
<td>4,572,376</td>
<td>4,132,765</td>
</tr>
<tr>
<td><strong>UIF</strong></td>
<td>668,591</td>
<td>598,942</td>
</tr>
<tr>
<td><strong>Other salary related costs</strong></td>
<td>3,827,280</td>
<td>2,797,700</td>
</tr>
<tr>
<td><strong>Defined Pension benefit plan expense</strong></td>
<td>3,448,229</td>
<td>2,721,601</td>
</tr>
<tr>
<td>- current service cost</td>
<td>2,629,079</td>
<td>2,697,587</td>
</tr>
<tr>
<td>- past service cost</td>
<td>819,150</td>
<td>24,014</td>
</tr>
<tr>
<td><strong>Other long-term employee benefits including long-service leave</strong></td>
<td>5,522,638</td>
<td>12,112,127</td>
</tr>
<tr>
<td></td>
<td>150,118,069</td>
<td>132,387,287</td>
</tr>
</tbody>
</table>
### 17. Net surplus for the year

<table>
<thead>
<tr>
<th>Notes</th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td><strong>INCOME</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profit on disposal of plant and equipment</td>
<td>401,479</td>
<td>53,820</td>
</tr>
<tr>
<td>Profit on revaluation of financial instruments</td>
<td>303,221</td>
<td>275,642</td>
</tr>
<tr>
<td>Rent received</td>
<td>2,367,961</td>
<td>2,419,376</td>
</tr>
<tr>
<td><strong>EXPENDITURE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auditor’s remuneration</td>
<td>273,561</td>
<td>305,818</td>
</tr>
<tr>
<td>- Audit fees</td>
<td>238,218</td>
<td>301,524</td>
</tr>
<tr>
<td>- Fees for other services and expenses</td>
<td>2,305</td>
<td>4,294</td>
</tr>
<tr>
<td>- Increase in provision</td>
<td>33,038</td>
<td>—</td>
</tr>
<tr>
<td>Depreciation of assets</td>
<td>15,299,687</td>
<td>10,024,813</td>
</tr>
<tr>
<td>Land and buildings</td>
<td>1,067,731</td>
<td>1,152,698</td>
</tr>
<tr>
<td>Laboratory equipment</td>
<td>8,800,743</td>
<td>6,339,428</td>
</tr>
<tr>
<td>Vehicles and containers</td>
<td>2,473,166</td>
<td>1,088,106</td>
</tr>
<tr>
<td>Furniture and fittings</td>
<td>2,958,047</td>
<td>1,444,581</td>
</tr>
<tr>
<td>Board Members’ Emoluments</td>
<td>19</td>
<td>340,821</td>
</tr>
<tr>
<td>Executive Directors’ and Managers’ Remuneration</td>
<td>20</td>
<td>6,299,935</td>
</tr>
<tr>
<td>Finance cost</td>
<td>40,458</td>
<td>57,074</td>
</tr>
<tr>
<td>Operating lease payments</td>
<td>405,909</td>
<td>438,887</td>
</tr>
</tbody>
</table>
18. Restatement of balance

18.1 Liabilities previously treated as income

Interest due to funders was previously treated as part of MRC income, instead of it accruing to the projects.

<table>
<thead>
<tr>
<th></th>
<th>Before adjustment</th>
<th>After adjustment 2005</th>
<th>Before adjustment 2004</th>
<th>After adjustment 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest received</td>
<td>16,924,124</td>
<td>13,729,245</td>
<td>17,432,257</td>
<td>14,868,435</td>
</tr>
<tr>
<td>Provisions - current liabilities</td>
<td>—</td>
<td>7,600,767</td>
<td>—</td>
<td>6,400,300</td>
</tr>
<tr>
<td>General funds - 1 April 2004</td>
<td>—</td>
<td>17,627,818</td>
<td>13,791,340</td>
<td></td>
</tr>
</tbody>
</table>

18.2 Post retirement medical aid benefit previously treated as an off balance sheet transaction

Provisions (current) and short term investments, each increased by R26,55m as at 31 March 2005, and by R22,19m as at 31 March 2004, as a result of the restatement of balances.

19. Board Members’ Emoluments

Fees for the board and board sub-committee meetings for the period 1 April 2004 to 31 March 2005 were as follows:

<table>
<thead>
<tr>
<th></th>
<th>Honorarium</th>
<th>Vehicle and parking</th>
<th>Reimbursive</th>
<th>2005 Total</th>
<th>2004 Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof AA Azad</td>
<td>12,390</td>
<td>—</td>
<td>3,239</td>
<td>15,629</td>
<td>—</td>
</tr>
<tr>
<td>Mr MP Canca</td>
<td>55,476</td>
<td>766</td>
<td>—</td>
<td>36,242</td>
<td>15,847</td>
</tr>
<tr>
<td>Prof D Du Toit</td>
<td>11,256</td>
<td>882</td>
<td>—</td>
<td>12,138</td>
<td>41,928</td>
</tr>
<tr>
<td>*** Prof RA Emsley</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>8,480</td>
</tr>
<tr>
<td>Prof T Gugushe</td>
<td>3,752</td>
<td>153</td>
<td>—</td>
<td>3,905</td>
<td>18,892</td>
</tr>
<tr>
<td>Dr JK Hartzell</td>
<td>14,658</td>
<td>153</td>
<td>3,086</td>
<td>17,897</td>
<td>—</td>
</tr>
<tr>
<td>Prof LJ King</td>
<td>11,256</td>
<td>233</td>
<td>—</td>
<td>11,489</td>
<td>—</td>
</tr>
<tr>
<td>Ms JN Makhanya</td>
<td>13,132</td>
<td>673</td>
<td>200</td>
<td>14,035</td>
<td>9,625</td>
</tr>
<tr>
<td>Ms ZP Manase</td>
<td>3,752</td>
<td>—</td>
<td>—</td>
<td>3,752</td>
<td>7,504</td>
</tr>
<tr>
<td>** Ms MK Matsau</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Prof DL Mkize</td>
<td>10,514</td>
<td>214</td>
<td>—</td>
<td>10,728</td>
<td>—</td>
</tr>
<tr>
<td>Prof MS Mokgokong</td>
<td>24,822</td>
<td>1,204</td>
<td>—</td>
<td>26,026</td>
<td>12,981</td>
</tr>
<tr>
<td>Prof TR Mokoena</td>
<td>28,480</td>
<td>787</td>
<td>149</td>
<td>29,416</td>
<td>31,575</td>
</tr>
<tr>
<td>Prof DJ Ncayiyana</td>
<td>8,638</td>
<td>218</td>
<td>55</td>
<td>8,911</td>
<td>8,911</td>
</tr>
<tr>
<td>Prof G Padayachee</td>
<td>27,440</td>
<td>428</td>
<td>—</td>
<td>27,868</td>
<td>10,906</td>
</tr>
<tr>
<td>Prof JM Pettifoe</td>
<td>10,164</td>
<td>275</td>
<td>—</td>
<td>10,439</td>
<td>—</td>
</tr>
<tr>
<td>Col DC Qolohie</td>
<td>13,524</td>
<td>398</td>
<td>—</td>
<td>13,922</td>
<td>—</td>
</tr>
<tr>
<td>Prof MF Ramashala</td>
<td>39,060</td>
<td>—</td>
<td>—</td>
<td>39,060</td>
<td>8,208</td>
</tr>
<tr>
<td>Prof H Schneider</td>
<td>16,142</td>
<td>61</td>
<td>—</td>
<td>16,203</td>
<td>11,674</td>
</tr>
<tr>
<td>Prof LR Uys</td>
<td>8,288</td>
<td>196</td>
<td>—</td>
<td>8,484</td>
<td>15,775</td>
</tr>
<tr>
<td>Prof K Voi</td>
<td>17,668</td>
<td>505</td>
<td>—</td>
<td>18,173</td>
<td>—</td>
</tr>
<tr>
<td>Dr C Walsh</td>
<td>16,534</td>
<td>—</td>
<td>—</td>
<td>16,534</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td><strong>326,946</strong></td>
<td><strong>7,146</strong></td>
<td><strong>6,729</strong></td>
<td><strong>340,821</strong></td>
<td><strong>202,304</strong></td>
</tr>
</tbody>
</table>

Reimbursive column represents payments in lieu of travel costs.

** No honorarium due. *** No meetings attended.
20. Executive Directors'/Managers' Emoluments

<table>
<thead>
<tr>
<th>Name</th>
<th>Salary</th>
<th>Travel</th>
<th>Leave</th>
<th>Package Total</th>
<th>Bonus</th>
<th>S&amp;T</th>
<th>Company Contributions</th>
<th>2004/2005 Total</th>
<th>2003/2004 Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>TF Jackson</td>
<td>537,108</td>
<td>60,000</td>
<td>1,935</td>
<td>599,043</td>
<td>69,103</td>
<td>2,445</td>
<td>93,916</td>
<td>764,507</td>
<td>690,612</td>
</tr>
<tr>
<td>JA Louw</td>
<td>224,837</td>
<td>2,577</td>
<td>118,629</td>
<td>346,043</td>
<td>36,524</td>
<td>20,202</td>
<td>26,204</td>
<td>428,973</td>
<td>752,705</td>
</tr>
<tr>
<td>R Maharaj</td>
<td>190,736</td>
<td>16,400</td>
<td>64,584</td>
<td>271,720</td>
<td>—</td>
<td>1,415</td>
<td>27,239</td>
<td>300,374</td>
<td>566,208</td>
</tr>
<tr>
<td>BJ Mahlangu</td>
<td>578,439</td>
<td>29,161</td>
<td>110,21</td>
<td>607,600</td>
<td>59,016</td>
<td>7,156</td>
<td>86,703</td>
<td>760,475</td>
<td>698,804</td>
</tr>
<tr>
<td>ND Mbananga</td>
<td>306,009</td>
<td>—</td>
<td>11,021</td>
<td>317,030</td>
<td>22,818</td>
<td>28,984</td>
<td>22,408</td>
<td>391,240</td>
<td>—</td>
</tr>
<tr>
<td>AD MBewu</td>
<td>640,620</td>
<td>115,344</td>
<td>—</td>
<td>755,964</td>
<td>73,047</td>
<td>5,897</td>
<td>69,965</td>
<td>904,873</td>
<td>727,476</td>
</tr>
<tr>
<td>K Mtunzi-Hairwadzi</td>
<td>409,465</td>
<td>66,935</td>
<td>—</td>
<td>476,400</td>
<td>40,896</td>
<td>9,542</td>
<td>34,800</td>
<td>561,638</td>
<td>414,042</td>
</tr>
<tr>
<td>W Pick</td>
<td>580,458</td>
<td>—</td>
<td>—</td>
<td>580,458</td>
<td>108,609</td>
<td>1,319</td>
<td>795</td>
<td>691,181</td>
<td>750,784</td>
</tr>
<tr>
<td>AP Terblanche</td>
<td>296,640</td>
<td>22,590</td>
<td>—</td>
<td>319,230</td>
<td>—</td>
<td>7,220</td>
<td>26,832</td>
<td>353,782</td>
<td>—</td>
</tr>
<tr>
<td>NM Walters</td>
<td>201,953</td>
<td>3,180</td>
<td>114,538</td>
<td>319,671</td>
<td>40,156</td>
<td>1,655</td>
<td>29,154</td>
<td>390,636</td>
<td>764,335</td>
</tr>
<tr>
<td>BK Williams</td>
<td>577,956</td>
<td>38,928</td>
<td>—</td>
<td>616,884</td>
<td>55,544</td>
<td>2,410</td>
<td>77,418</td>
<td>752,256</td>
<td>687,035</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4,544,221</td>
<td>355,115</td>
<td>310,707</td>
<td>5,210,043</td>
<td>505,713</td>
<td>88,745</td>
<td>495,434</td>
<td>6,299,935</td>
<td>6,052,001</td>
</tr>
</tbody>
</table>

Executive Directors'/Managers’ resignation; contract end dates and appointment dates:

- JA Louw        Contract ended 30 June 2004
- NM Walters     Contract ended 30 June 2004
- R Maharaj      Resigned on 31 August 2004
- ND Mbananga    Appointed on 01 September 2004
- AP Terblanche  Appointed on 15 October 2004
- W Pick         Resigned on 31 December 2004

Bonus paid to W Pick was for years ended March 2004 and March 2005
TRIBUTE TO MRC RESEARCHERS

All MRC staff play an integral part in helping to build a healthy nation through research. Many of them receive local and international awards and honours for their achievements. We highlight just a few of them on this page.

1. **Professor P Becker**, Biostatistics Unit: Presidential Travel Award for the best presentation given at the 21st Annual Conference of the American Association of Clinical Anatomists (AACA) meeting in San Francisco, USA, 9-12 June 2004.

2. **Dr WM Faber**, Nutritional Intervention Research Unit: Unifoods award (1st prize) for nutrition research in the category Established Scientist for a paper presented at the Nutrition Congress 2004. Also awarded the William Fox Memorial Prize for best presentation by a dietician at the same congress.


4. **Dr Baveesh Kana**, Molecular Mycobacteriology Research Unit: Awarded a second postdoctoral training fellowship from the Columbia University-Southern African Fogarty AIDS Training and Research Program.


6. **Professor Keith Klugman**, Respiratory and Meningal Pathogens Research Unit: Co-recipient of the Emanuel Wolinsky Award given by the Infectious Diseases Society of America as an author of the Best Article Published in *Clinical Infectious Diseases* in 2003; Honor Award from the Department of Health and Human Services, Secretary’s Award for Distinguished Service, the SARS and Monkeypox Public Health Response Teams, US Centers for Disease Control and Prevention.

7. **Dr MG Matsabisa**, Indigenous Knowledge Systems Lead Programme: Award for Best Project and Presentation, International Conference on Promotion, Development and Legal Aspects of Traditional Medicines, Kolkata, India.

8. **Prof. Valerie Mizrahi**, Molecular Mycobacteriology Research Unit: Co-awarded a DST-NRF Centre of Excellence with Prof. Paul van Helden from the MRC Centre for Molecular and Cellular Biology and University of Stellenbosch. Their joint DST-NRF Centre of Excellence for Biomedical TB Research was launched in September 2004; First Runner-Up in the Distinguished Woman Scientist category of the Department of Science and Technology’s 2004 Women in Science Awards.


11. **Ms. Mohube B. Mowa**, Molecular Mycobacteriology Research Unit: Awarded a Department of Labour Scarce Skills Doctoral Bursary from the NRF.

12. **Prof. Charles Parry**, Alcohol and Drug Abuse Research Unit: Meritorious award for outstanding service to SANCA (WC) and to the field of substance abuse prevention, 2005.

13. **Prof. J Smook**, Centre for Molecular and Cellular Biology: Wellcome Trust senior fellowship award; NRF P rating; Rector’s Award for Excellence in Research (Stellenbosch University).

14. **Dr Bavanisha Vythilingum**, Anxiety and Stress Disorders Research Unit: US Faculty of Health Sciences Award, Best Postgraduate Student; Novartis medal for best results in FCPsych; Harry Eidelman Award for Best Registrar in Final Exams; Finalist – Women in Science Fellowship Award.
Building a healthy nation through research

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