Medical Research Council of South Africa:

Briefing to the Portfolio Committee on Health
July 2014

Glenda E Gray

President, Medical Research Council of South Africa
Scope of Presentation

- SAMRC Board & Mission of the SAMRC: Mike Sathekge
- SAMRC scientific progress, performance, governance and strategic direction: Glenda Gray
- SAMRC financial report: Nick Buick
- Why funding science is critical to the wealth and health of the nation: Glenda Gray
VISION
Building a healthy nation through research and innovation

MISSION
To improve the nation’s health and quality of life by conducting and funding relevant and responsive health research, development, innovation and research translation
The MRC’s strategic goals

1. Administer South African health research effectively and efficiently
2. Lead the generation of new knowledge and facilitate its translation into policies and practices to improve health
3. Support innovation and technology development to improve health
4. Build capacity for long-term sustainability of the country’s health research
At the SAMRC, our impact in health is on the whole health value chain from BENCH, BEDSIDE, to COMMUNITY.
<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
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<tbody>
<tr>
<td><strong>Prof Mike Machaba Sathekge</strong></td>
<td>Chairperson</td>
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<td></td>
<td>Chief Specialist and head of department of Nuclear Medicine at the University of Pretoria / Steve Biko Academic Hospital.</td>
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<tr>
<td><strong>Prof Zodwa Dlamini</strong></td>
<td>Vice-Chairperson</td>
</tr>
<tr>
<td></td>
<td>Professor of Functional Genomics and Molecular Medicine and the Deputy Executive Dean at UNISA Science Campus.</td>
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<tr>
<td><strong>Dr Francesca Conradie</strong></td>
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<td></td>
<td>Dr Conradie is a Clinical Investigator at the University of Witwatersrand.</td>
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<tr>
<td><strong>Prof Charles Feldman</strong></td>
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<td></td>
<td>Professor of Pulmonology and Chief Physician in the Pulmonology Division of Carlotte Maxeke Johannesburg Academic Hospital and University of the Witwatersrand.</td>
</tr>
<tr>
<td>Name</td>
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<tr>
<td>Dr Sibongile Gumbi</td>
<td>Group Executive Biotechnology at the Technology Innovation Agency (TIA)</td>
</tr>
<tr>
<td>Dr Patricia Hanekom</td>
<td>Member of the Ministerial Advisory Task Team for the establishment of the National School of Government and serves on a number of Boards and Audit Committees.</td>
</tr>
<tr>
<td>Dr Zilungile Kwitshana</td>
<td>Lecturer and Medical Scientist at the University of KwaZulu-Natal.</td>
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<tr>
<td>Prof. Khaya Mfenyana</td>
<td>Head: Office of the Vice Chancellor and Outgoing Executive Dean of the Medical School, Walter Sisulu University.</td>
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<tr>
<td><strong>Prof Pindile Mntla</strong></td>
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<td>------------------------</td>
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</tr>
<tr>
<td>Head of the Department of Cardiology at the University of Limpopo: Medunsa Faculty of Health Sciences and Dr George Mukhari Academic Hospital.</td>
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<thead>
<tr>
<th><strong>Prof Kebogile Mokwena</strong></th>
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<tr>
<td>Head of Department of Public Health, Medunsa Campus.</td>
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<tr>
<th><strong>Prof Keymanthri Moodley</strong></th>
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<tbody>
<tr>
<td>Associate Professor at the Bioethics Unit – Tygerberg Division and works as an investigator on clinical trials.</td>
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<tr>
<th><strong>Prof Yusuf Osman</strong></th>
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<tr>
<td>Prof Osman is Dean/Manager: Dental Faculty/ Oral Health Centres at the University of the Western Cape.</td>
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</table>
Adv. Josephine Ralefatane
Advocate of the Supreme Court of South Africa.

Prof Keitshepile Setswe
Professor of Public Health and the founding Head of the School of Health Sciences at Monash University South Africa campus.

Prof Andrew Walubo
Head of the Department of Pharmacology, University of the Free State, and Chief Clinical Pharmacologist, Universitas Academic Hospital.

Prof Elizabeth Anne Bukusi
Deputy Director, Research and Training at the Kenya Medical Research Institute (KEMRI) and Chief Research Officer, KEMRI Centre for Microbiology Research.
Scope of Presentation

SAMRC scientific progress, performance, governance and strategic direction: Glenda Gray
The MRC’s new indicators

1. Administering SA’s health research effectively and efficiently:
   1. MRC’s audit findings
   2. % of MRC budget spent on administration

2. Leading the generation of new knowledge for policy / practice:
   3. ISI articles with an MRC-affiliated author
   4. ISI articles that acknowledge MRC support
   5. MRC articles in the top 4 journals: NEJM, Lancet, Science & Nature
   6. MRC first-author ISI journal articles
   7. Policies and guidelines that reference MRC research
   8. Research grants awarded by the MRC

3. Innovation and technology development:
   9. MRC projects on new diagnostics, drugs, devices & vaccines

4. Capacity-building:
   10. MRC bursaries/ scholarships/ fellowships for post-graduate study
### SA’s burden of disease

#### Cause of death

<table>
<thead>
<tr>
<th>Cause of death</th>
<th>Deaths</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>HIV/AIDS</td>
<td>180,870</td>
<td>29.4</td>
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<tr>
<td>Hypertensive heart disease</td>
<td>39,272</td>
<td>6.4</td>
</tr>
<tr>
<td>Lower respiratory infections</td>
<td>38,576</td>
<td>6.3</td>
</tr>
<tr>
<td>Cerebrovascular disease</td>
<td>37,913</td>
<td>6.2</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>37,519</td>
<td>6.1</td>
</tr>
<tr>
<td>Diarrhoeal diseases</td>
<td>26,564</td>
<td>4.3</td>
</tr>
<tr>
<td>Ischaemic heart disease</td>
<td>24,510</td>
<td>4.0</td>
</tr>
<tr>
<td>Interpersonal violence</td>
<td>20,155</td>
<td>3.3</td>
</tr>
<tr>
<td>Road injuries</td>
<td>18,166</td>
<td>3.0</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>13,667</td>
<td>2.2</td>
</tr>
<tr>
<td>COPD</td>
<td>11,458</td>
<td>1.9</td>
</tr>
<tr>
<td>Nephritis/nephrosis</td>
<td>9,130</td>
<td>1.5</td>
</tr>
<tr>
<td>Top 12 causes</td>
<td>457,800</td>
<td>74.3</td>
</tr>
<tr>
<td>Total</td>
<td>615,788</td>
<td>100.0</td>
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</tbody>
</table>

#### The quadruple burden of disease in South Africa: A cocktail of four colliding epidemics

- **Maternal, newborn & child health**
  - ~1% of global burden
  - 2-3 times > average for comparable countries

- **HIV/AIDS and TB**
  - 17% of HIV burden
  - 23 times > global average
  - 5% of TB burden
  - 7 times > global average

- **Non-communicable diseases**
  - <1% of global burden
  - 2-3 times > average for developing countries

- **Violence and injury**
  - 1.3% global burden of injuries
  - 2 times global average for injuries
  - 5 times global average for homicide

Source: Lancet Series
ART roll-out leading to major gains in life expectancy

GAINS MADE BY ART ROLL OUT

Bor et al. Science 2013
Elimination of HIV infection in infants?

- South Africa progresses to elimination of HIV infection in children!

- Prevention of mother to child transmission (PMTCT) programme with antiretroviral (ART) had reduced the infection rate from 25% (2004) to less than 2% (2013).
Mortality in Children

SAMRC IS PRIORITISING RESEARCH IN THIS AREA
SAMRC IS PRIORITISING RESEARCH IN THIS AREA
Size of the problem

- **Worldwide:**
  - ~450,000 prevalent cases of MDR-TB in 2012
- **South Africa:**
  - 2012 - 14,419 MDR-TB cases (culture-confirmed)
  - 2011 - 10,085 cases
- Only 6,500 started on treatment in 2012
- ~10% were culture confirmed XDR-TB

NHLS communicable diseases survey bulletin; vol 9; August 2011

SAMRC IS PRIORITISING RESEARCH IN THIS AREA
What is the Cost of Diagnosis and Management of Drug Resistant Tuberculosis in South Africa?

Anil Pooran, Elize Pieterson, Malika Davids, Grant Theron, Keertan Dheda*

Lung Infection and Immunity Unit, Division of Pulmonology and UCT Lung Institute, Department of Medicine, University of Cape Town, Cape Town, South Africa

- XDR-TB: 741 cases (0.2%)
- MDR-TB: 7386 cases (2%)
- DS-TB: 336,332 cases (98%)

Total number of cases:

- XDR-TB: $50 million (13%)
- MDR-TB: $86 million (55%)
- DS-TB: Other*: $4 million (3%)

Total cost of cases:

- XDR-TB: $50 million (13%)
- MDR-TB: $86 million (32%)
- DS-TB: Diagnostic/ Monitoring tests: $38 million (37%)

Break down of total costs of cases:

- Anti-TB drugs: $55 million (35%)
- Outpatient/clinic visits: $22 million (14%)
- Inpatient: $17 million (11%)
Administer South African health research effectively and efficiently
– Big ideas, big science, high impact – promoting knowledge economy.

– Developing health solutions – Improving health of the nation.

– Building research infrastructure and human capacity.
Receive government funding through DOH & DST
- Fund intramural & extramural research
- Leverage government funding to increase spend on research e.g. NIH, BMGF, Wellcome

Investigating disease pathogenesis & drug/vaccine discovery
- Validating models for predicting type-2 diabetes
- Discovery of links between HLA & clinical TB disease
- Prevention of brain injuries during sports

RESEARCH PLATFORMS
- Non Human Primate Facilities
SAMRC CO-FUNDS PROJECTS
ZAR 23.5 million per year

TB Drugs
- Discovery (ZAR 14 million)
- Largest DD projects in the world
- Paediatric formulations (ZAR 2.5 million)

TB Diagnostics
- PCR with 30 mins readout
- Urine based diagnostics

TB Vaccines
- Systems biology & bio-informatics
- Investigating transmission and correlates of protection & disease
Malaria Drug Discovery

- Largest drug discovery project in Africa
- Entire lifecycle of parasite

Malaria clinical candidate

- 1 clinical candidate delivered in 2014
- 1 back up series profiles

Insectary

- Two insectaries in RSA

GIS service to SADAC

MALARIA ZAR 10 MILLION/YEAR IN PARTNERSHIP WITH TIA, BMGF, MMV
Support innovation and technology development to improve health
SHIP is a new MRC unit based on the Product Development Partnership approach.

- Built on an unprecedented DST and MRC/DOH partnership.
- BMGF (ZAR 120 million)
- The focus of SHIP is multidisciplinary translational research and product development.
- SHIP’s goal is to seek, manage and fund multidisciplinary projects aimed at developing new:
  - Diagnostics and medical devices
  - Vaccines
  - Drugs

SHIP UP TO ZAR 100 million per year
Doppler to avert still birth and early neonatal death

COLLABORATING WITH CSIR
• **Umbiflow = Umbilical Artery Doppler:**
  - Doppler software app
  - Doppler handheld probe

• **Mobile-connected notebook:**
  - Hosts Umbiflow app
  - Computer terminal for nurses at clinical level to generate and access EHR, book/refer patients

• **Central database/ health information exchange**
  - Store, filter, access EHR by authenticated users
  - Allows community health care workers to book patients, facilitate feed-back loop
Tshwane “Mamelodi Khulelwé” Study (CSIR-Tshwane Municipality-UP-MRC)

- Create evidence for **effectiveness** of integrated community-based antenatal care to increase the number of pregnant women who attend antenatal care.
- Create evidence for **clinical significance** of routine Doppler screening (operated by nurses) at primary antenatal care to reduce the number of unexplained stillbirths.  
  
  *Approx R10m*?
Partnership with TOMPSA

Triage Prototype
Sticker Printing Solution, Integration into the clinical workflow
Broader HIV Programme ZAR 40 million/year (DST, DOH, BMGF)

Funding Areas:

1 project: Targeting latent HIV reservoirs

1 project tbc: Low dose duranovir

- Drugs / formulations / treatment strategies
- Diagnostics
- Other prevention strategies
- Vaccines
Broader HIV Programme

Funding Areas:

- **Drugs / formulations / treatment strategies**
  - 1 project: Targeting latent HIV reservoirs
  - 1 project: Vaginal inflammation diagnostic for HIV risk

- **Diagnostics**
  - 1 project tbc: Low dose duranovir
  - 1 project tbc: HIV drug resistance genotyping software

- **Other prevention strategies**

- **Vaccines**
Broader HIV Programme

Funding Areas:

- Drugs / formulations / treatment strategies
  - 1 project: Targeting latent HIV reservoirs
  - 1 project tbc: Low dose duranovir

- Diagnostics
  - 1 project: Vaginal inflammation diagnostic for HIV risk
  - 1 project tbc: HIV drug resistance genotyping software

- Other prevention strategies

- Vaccines
  - 1 project: Silver-based microbicides
Broader HIV Programme

Funding Areas:

• **Drugs / formulations / treatment strategies**
  - 1 project: Targeting latent HIV reservoirs
  - 1 project tbc: Low dose duranovir

• **Diagnostics**
  - 1 project: Vaginal inflammation diagnostic for HIV risk
  - 1 project tbc: HIV drug resistance genotyping software

• **Other prevention strategies**
  - 2 projects: Platform support
  - 1 project: Silver-based microbicides

• **Vaccines**
  - 1 project: LTNPs and ECs
  - 4 projects: HIV immunogens
  - 4 projects (2 tbc): Broadly neutralising antibodies
  - 1 project: Assessing breakthrough infections in HIV vaccine trials
Holistic approach – e.g. Broadly Neutralising Antibodies

### Active Immunization

- Design of Env immunogen cocktails and adjuvants for eliciting BNAbs
- Identification of NAb epitopes on Indian and South African viruses for HIV vaccine design
- Design and development of novel Env immunogens
- Env-CD4 complexes
- Determine epitope specificities of BNAbs elicited by Env-CD4 complexes

### Passive Immunization

- Identification of new BNAbs that arise in natural infections
- Mouse and/or NHP studies on novel candidates
- CAP-VRC 256 BNAbs

### Passive Immunization

- Passive immunization / therapeutic studies in NHP
- Proof of concept study on Biopharming as a method of producing GMP-quality MAbs
- Gene therapy approaches to delivering BNAbs
HIV Vaccines – Platform Support

- Maintenance of the rhesus macaque facility at the MRC – SHIP-supported studies are conducted on a direct cost basis
- Establishment of the humanized mouse and SHIV challenge models for HIV vaccine development in South Africa – Clade C SHIV and Chinese vs Indian macaques
- Bridging support for the Walter Sisulu University HIV Clinical Research Unit
- Support for national community engagement efforts (in relation to HIV vaccine trials)
• Member of the P5 Consortium

• Funding immunology assays for HVTN 097

• Supporting site leadership training in South Africa for the P5 trials

• Supporting community engagement at a national and (from next year) a site level

• Facilitate participation of South Africa in the global HIV vaccine effort
Early Diabetes Diagnostic
- Blood & Urine
- Clinical validation

Early Diabetes Drug
- Comprehensive pharmacology evaluation
- Vivo support model
Pharmacogenonomic: Breast Cancer

Pharmacogenonomic: Diabetes
Flagship projects

• Concept
  – Big ideas, big science, high impact – promoting knowledge economy
  – Developing health solutions – Improving health of the nation
  – Building research infrastructure and equipment – long-term benefit
  – New scientists, technicians, etc – creating new jobs
  – Provide masters and PhD opportunities – building capacity

• Funding levels
  – Category 1: R16.5m over 3 years
  – Category 2: R8.25m over 3 years
## Flagship projects –

<table>
<thead>
<tr>
<th>Institution</th>
<th>PI</th>
<th>Title</th>
<th>Research Program Area</th>
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</thead>
<tbody>
<tr>
<td>Stellenbosch University</td>
<td>Professor Soraya Seedat</td>
<td>Understanding the SHARED ROOTS of Neuropsychiatric Disorders and Modifiable Risk Factors for Cardiovascular Disease</td>
<td>Mental Health/ Cardiovascular and Metabolic Diseases</td>
</tr>
<tr>
<td>University of Cape Town</td>
<td>Professor Robin Wood</td>
<td>Tuberculosis Transmission: Host, Bacterium and Environment</td>
<td>TB</td>
</tr>
<tr>
<td>University of KwaZulu-Natal</td>
<td>Dr Tulio de Oliveira</td>
<td>A multi-disciplinary approach to understand the causes and consequences of HIV transmission and drug resistance in hyper-epidemic setting in rural South Africa</td>
<td>HIV</td>
</tr>
<tr>
<td>University of Limpopo (MEDUNSA)</td>
<td>Professor Akhter Goolam-Mahomed</td>
<td>Evaluating a new drug regimen for patients with multi-drug resistant TB – a randomised controlled trial</td>
<td>TB</td>
</tr>
<tr>
<td>University of Pretoria</td>
<td>Professor Michael S Pepper</td>
<td>Stem cell research and therapy – addressing South Africa’s disease burden</td>
<td>Stem cells</td>
</tr>
<tr>
<td>University of Witwatersrand</td>
<td>Professor Lynn Morris</td>
<td>Antiviral properties of HIV vaccine-elicited antibodies</td>
<td>HIV</td>
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</table>
• **Purpose**

Caters for health research applications that propose novel studies initiated by a researcher at a recognized research institution.
Applications by Research Priority Area - SIRs

- Maternal, Infant and Child Health: 13%
- Malaria: 2%
- Infectious Disease: 6%
- Health Systems: 8%
- HIV and AIDS: 14%
- Nutrition: 2%
- Tuberculosis: 5%
- African Trad. Med & Drug Discovery: 10%
- Brain and Behaviour: 5%
- Cancer: 9%
- Cardiovascular Disease: 11%
- Environment and Health: 10%
- Genomics and Proteomics: 5%
Build capacity for long-term sustainability of the country’s health research
MRC Scholarship Programmes

• The new MRC Clinician Researcher Programme (for MDs wanting to do a PhD)

• The Career Development Award (funding for Post docs)

• MRC/NRF Health and Allied Disciplines Scholarship Programme

• The Local Post Graduate PhD scholarships (phasing out)

• The MRC Internship Programme (phasing out)

• The new National Health Scholars Programme (NHSP)
Clinicians

- MBChB studying towards PhD
- R500 000.00 pa (South Africans only)

<table>
<thead>
<tr>
<th>Call</th>
<th>Date of call</th>
<th>Award letters</th>
<th>Budget / Funder</th>
<th>Number of successful candidates</th>
<th>Gender</th>
<th>No. of institutions represented</th>
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<tbody>
<tr>
<td>1st</td>
<td>2nd quarter 2013</td>
<td>3rd quarter 2013</td>
<td>7 million</td>
<td>14</td>
<td>7 M 7 F</td>
<td>Three 5 SUN 7 UCT 2 UKZN</td>
</tr>
<tr>
<td>2nd</td>
<td>June (Call open) 2014</td>
<td>3rd quarter 2014</td>
<td>7.5 million</td>
<td>15</td>
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</table>
Number of Clinician PhDs by Race and Institution

- **W:**
  - UKZN: 1
  - SUN: 5
  - UCT: 2

- **B:**
  - UKZN: 1
  - SUN: 2
  - UCT: 2

- **I:**
  - UKZN: 1
  - SUN: 2
  - UCT: 2

- **C:**
• Post doc funding: 10 nationally (annually): R300 000.00 renewable over 4 years

  R200 000.00 top up to university salary

  R100 000.00 contribution to matched research costs
Funding for health and Allied disciplines research degrees

R70 000.00 for Masters: 32 candidates for 2015 intake

R100 000.00 for PhD: 32 candidates for 2015 intake
Total 17: 15 Females and 2 Males

17 PhD scholarships: R60 000.00 pa
Budget = R1 020 000.00
Race by Institution
18 Generic Black MRC PhD Internship Programme Candidates by University

MRC Internship Programme: Gender representation
10 Females, 8 Males
• a tax free scholarship for full-time PhD degree awarded to eligible South Africans

TOTAL VALUE OF BUDGET (1\textsuperscript{ST} AND 2\textsuperscript{ND} CALL): R15 000 000

Total number of Candidates: 35

• 1\textsuperscript{st} call Budget: 5 mil
  – 13 Candidates

• 2014 Budget:10 mil
  – 22 Candidates
Race Representation in 1st and 2nd Call

BUDGET RECEIVED: 15 MIL

Total Supported: 35

- BLACK 10
- COLOURED 3
- INDIAN 4
- WHITE 19

Race Representation

- WHITE 53%
- BLACK 28%
- COLOURED 8%
- INDIAN 11%
BUDGET RECEIVED: 15 MIL

Total Supported: 35

- UCT 12
- UKZN 8
- SUN 5
- WITS 4
- UP 1
- UWC 1
- UL 1
- ABROAD 3
Gender Representation

1st and 2nd Call

Males 25%
Females 75%

1st Call

Males 31%
Females 69%

2nd Call

Males 22%
Females 78%
Representation of Field in Universities

Number of candidates

- ABROAD
- UL
- SUN
- UWC
- UP
- WITS
- UKZN
- UCT

Medical_Practitioner
Medical_Scientist
Psychologist
Nursing
Occupational_Therapy
Pharmacist
Speech_Therapist
Physiotherapists
Public_Health
Oral_Health
Optometrist
Audiologist
Biomedical_Engineer
Dental_Practitioner
Dietitian
Social_sciences

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The MRC’s strategic goals

Lead the generation of new knowledge and facilitate its translation into policies and practices to improve health
RAMICS: TRAINABLE, HIGH-SPEED AND BIOLOGICALLY RELEVANT ALIGNMENT OF HIGH-THROUGHPUT SEQUENCING READS TO CODING DNA

BEYOND THE IFN-γ HORIZON: BIOMARKERS FOR IMMUNODIAGNOSIS OF INFECTION WITH MYCOBACTERIUM TUBERCULOSIS

CIRCULATING BIOMARKERS OF IMMUNE ACTIVATION DISTINGUISH VIRAL SUPPRESSION FROM NONSUPPRESSION IN HAART-TREATED PATIENTS WITH ADVANCED HIV-1 SUBTYPE C INFECTION
ASSOCIATION BETWEEN HEALTH SYSTEMS PERFORMANCE AND TREATMENT OUTCOMES IN PATIENTS CO-INFECTED WITH MDR-TB AND HIV IN KWAZULU-NATAL, SOUTH AFRICA: IMPLICATIONS FOR TB PROGRAMMES

116E ROTAVIRUS VACCINE DEVELOPMENT: A SUCCESSFUL ALLIANCE

ENERGY METABOLISM AND DRUG EFFLUX IN MYCOBACTERIUM TUBERCULOSIS
WORLDWIDE PREVALENCE OF NON-PARTNER SEXUAL VIOLENCE: A SYSTEMATIC REVIEW

RECOMBINANT ADENOVIRUS TYPE 5 HIV GAG/POL/NEF VACCINE IN SOUTH AFRICA: UNBLINDED, LONG-TERM FOLLOW-UP OF THE PHASE 2B HVTN 503/PHAMBILI STUDY
DIHYDROARTEMISININ-PIPERAQUINE FOR TREATING UNCOMPLICATED PLASMODIUM FALCIPARUM MALARIA

HIV INFECTION, VIRAL LOAD, LOW BIRTH WEIGHT, AND NEVIRAPINE ARE INDEPENDENT INFLUENCES ON GROWTH VELOCITY IN HIV-EXPOSED SOUTH AFRICAN INFANTS
MEDICAL RESEARCH COUNCIL CHILDREN’S ENVIRONMENTAL HEALTH FACT SHEET

Is your child at risk of Lead Poisoning?

THE YOUNGER THE CHILD, THE GREATER THE RISK.

Lead is a useful, but toxic, heavy metal that is used in petrol, paint, computers, television sets, electrical appliances, motor cars, batteries and many other products. Because of its widespread use, lead has caused environmental contamination throughout the world. Lead particles tend to concentrate in dust and soil, but may also be found in the air.

IMPORTANT SOURCES OF LEAD EXPOSURE IN SOUTH AFRICA

Lead in petrol
Lead in paint peeling or flaking from old houses, schools and other buildings
Lead-related activities at home such as fixing television sets, toasters and other appliances, fixing motor cars, and spray painting
Bringing lead particles into homes from work settings in which lead is used

Children may get lead particles into their bodies when they chew their nails, suck their fingers or put toys, sticks, stones or other items into their mouths (the “hand-to-mouth” pathway). Children who eat non-food items such as soil, paint chips and cigarette butts (also known as pica) are at particular risk of lead exposure. Because lead is added to petrol, children living or attending schools close to busy roads tend to have high blood lead levels.

When lead solder is used at home, for example in fixing television sets, toasters and other appliances, or if car repairs or spray painting is undertaken, the living environment can become contaminated and result in high blood lead levels in children. Adults who work with lead, for example in a battery factory or lead mine, may bring lead particles from work into their homes on their clothes, shoes, skin or hair.

Studies done in cities and certain rural areas have shown that many South African children have high blood lead levels, well above the internationally accepted action level of 10 μg/dl. High lead levels in children have been linked to lowered IQ scores, learning difficulties and poor performance at school, hyperactivity, short concentration spans, hearing problems, decreased growth, anaemia and even brain damage. High lead levels have also been associated with lowered lifetime achievement and earnings. In pregnant women lead can pass to the growing baby, and cause development problems. In adults high lead levels have been linked to high blood pressure and sperm abnormalities.

Children can have high blood lead levels without anyone knowing it, because you can’t taste or smell lead. Only a blood test can tell whether a child’s blood lead level is too high.

The good news is that simple steps can be taken to protect children from exposure to lead in the environment – turn over the page to learn more.
SOUTH AFRICAN MEDICAL RESEARCH COUNCIL
CHILDREN'S ENVIRONMENTAL HEALTH ALERT

BE AWARE OF LEAD IN PAINTED TOYS

What is lead?
Lead is a heavy metal that is widely used in modern life. Lead exposure and poisoning is an age-old problem that persists to this day. Lead is a powerful poison that mostly affects the brain.

Children, whose bodies are still growing, are highly vulnerable to lead. The aim of this leaflet is to provide information on the hazards of lead, and how to prevent lead poisoning in children.

Where does lead come from?
Lead is used in many products, including paint, petrol, batteries, plumbing, computers, cellular telephones, electrical appliances, radios, music and television sets, jewellery, cables, protective clothing, fishing weights and many other items.

The focus of this information leaflet however, is the lead added to paint and used on children's toys.
1. Research in the area of alcohol and HIV

Alcohol & HIV

2. Service Quality Measures
Discovery of links between HLA & clinical TB disease

Abstract
Background. The development of active tuberculosis disease has been shown to be multifactorial. Interactions between host and bacterial genotype may influence disease outcome, with some studies indicating the adaptation of M. tuberculosis strains to specific human populations. Here we investigate the role of the human leukocyte antigen (HLA) class I genes in this biological process.

Methods. Three hundred patients with tuberculosis from South Africa were typed for their HLA class I alleles by direct sequencing. Mycobacterium tuberculosis genotype classification was done by IS6110 restriction fragment length polymorphism genotyping and spoligotyping.

Results. We showed that Beijing strain occurred more frequently in individuals with multiple disease episodes (P < .001) with the HLA-B27 allele lowering the odds of having an additional episode (odds ratio, 0.21; P = .006). Associations were also identified for specific HLA types and disease caused by the Beijing, LAM, LCC, and Quebec strains. HLA types were also associated with disease caused by strains from the Euro-American or East Asian lineages, and the frequencies of these alleles in their sympatric human populations identified potential coevolutionary events between host and pathogen.

Conclusions. This is the first report of the association of human HLA types and M. tuberculosis strain genotype, highlighting that both host and pathogen genetics need to be taken into consideration when studying tuberculosis disease development.
Prevention of brain injuries during sports

Risk factors for sports concussion: an evidence-based systematic review.
Abrahams S, Mc Fie S, Patricios J, Posthumus M, September AV.

MRC researchers:
S Abrahams, S Mc Fie, M Posthumus, AV September
(UCT/MRC Research Unit for Exercise Science and Sport Medicine)
The Global Prevalence of Intimate Partner Violence Against Women


1Gender Violence and Health Centre, London School of Hygiene and Tropical Medicine, London WC1E 7HT, UK. 2World Health Organization (WHO), 1211 Geneva, Switzerland. 3University of Gothenburg, 411 37 Gothenburg, Sweden. 4Institute for Health Metrics and Evaluation, University of Washington, Seattle, WA 98121, USA. 5Medical Research Council, Tygerberg 7505, South Africa.

The global prevalence of intimate partner homicide: a systematic review

Heidi Stöckl, Karen Devries, Alexandra Rotstein, Naeemah Abrahams, Jacqualyn Campbell, Charlotte Watts, Claudia Garcia Moreno

External experts and WHO staff involved in the preparation of the guidelines

Guideline Development Group members

* Members of the Steering Group

Rachel JEWKES

Director

Gender & Health Research Unit

Medical Research Council

Private Bag X385

Pretoria 0001

South Africa

This report was written by Claudia Garcia-Moreno and Christine Pallitto of the Department of Reproductive Health and Research (RHR) of the World Health Organization (WHO), Karen Devries and Charlotte Watts of the London School of Hygiene and Tropical Medicine (LSHTM), and Naeemah Abrahams from the South African Medical Research Council (SAMRC). Mia Persson from the University of Gothenburg provided statistical support to all of the analyses.

No public health response is complete without prevention. Violence against women can and should be prevented. Promoting programmes with strong links to promoting gender equality so that the full potential of the world’s women and girls can be realized. Let the report serve as a shielded call to action those working for a world without violence against women.

Mia Persson

Assistant Director General

Family, Women and Children’s Health

World Health Organization

Professor Salim S. Abdool Karim

President

South African Medical Research Council

Greg Chilcott

Assistant Director General

Non-communicable Diseases and Mental Health

World Health Organization
Effect of home based HIV counselling and testing intervention in rural South Africa: cluster randomised trial.


Medical Research Council, Parow, Cape Town, 7535, South Africa. tanya.doherty@mrc.ac.za

Conclusions: Home based HIV counselling and testing increased the prevalence of HIV testing in a rural setting with high levels of stigma. Benefits also included higher uptake of couple counselling and testing and reduced sexual risk behaviour.
Leveraging Resources

- SAMRC & NIH
- SAMRC & GATES
- SAMRC & PATH
- SAMRC & Newton fund (British MRC, Wellcome & GSK)
Scope of Presentation

SAMRC financial report: Nick Buick
<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>2013/14</th>
<th>% Incr</th>
<th>2014/15</th>
<th>% Incr</th>
<th>2015/16</th>
<th>% Incr</th>
<th>2016/17</th>
<th>% Incr</th>
<th>2017/18</th>
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<td>303,799,421</td>
<td>34%</td>
<td>408,598,000</td>
<td>5%</td>
<td>430,649,123</td>
<td>5%</td>
<td>451,131,579</td>
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<td>Economic Competitive &amp; Support Package</td>
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<td>87,719,000</td>
<td>50%</td>
<td>131,578,947</td>
<td>5%</td>
<td>138,157,895</td>
<td>-37%</td>
<td>87,719,298</td>
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<tr>
<td>* Total Allocation from National Treasury</td>
<td>365,314,000</td>
<td>7%</td>
<td>391,518,421</td>
<td>38%</td>
<td>540,176,947</td>
<td>5%</td>
<td>568,807,018</td>
<td>-5%</td>
<td>538,850,877</td>
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<tr>
<td>Other Income</td>
<td></td>
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<td>64,000,000</td>
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<td>67,000,000</td>
<td>6%</td>
<td>71,000,000</td>
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<td>635,807,018</td>
<td>-4%</td>
<td>609,850,877</td>
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<td>CONTRACT FUNDING</td>
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<td></td>
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<tr>
<td>DST funding for SHIP</td>
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<td>36,000,000</td>
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<td>57,000,000</td>
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<tr>
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<tr>
<td>Leverage Funding</td>
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<td></td>
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<td>35,000,000</td>
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<tr>
<td>MRC Contract Research Funding (estimated)</td>
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<td>216,000,000</td>
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<td>222,480,000</td>
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<td>229,154,400</td>
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<tr>
<td>TOTAL ESTIMATED FUNDING</td>
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<td>31%</td>
<td>958,656,947</td>
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<td>953,961,418</td>
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<td>934,879,909</td>
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</table>

* Baseline Vat incl.  

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<tr>
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<tbody>
<tr>
<td>Baseline Vat incl.</td>
<td>416,457,960</td>
<td>446,331,000</td>
<td>615,801,720</td>
<td>648,440,000</td>
<td>614,290,000</td>
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</tbody>
</table>
Projected Growth in Income

Baseline Allocation
Total Budget

2013/14 2014/15 2015/16 2016/17 2017/18
### SOUTH AFRICAN MEDICAL RESEARCH COUNCIL

#### SUMMARY BUDGET

<table>
<thead>
<tr>
<th>Budgeted Expenses</th>
<th>2014/15 (R'000')</th>
<th>2015/16 (R'000')</th>
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<tbody>
<tr>
<td></td>
<td>Total Baseline</td>
<td>% Contract Funded</td>
</tr>
<tr>
<td>Intramural Research</td>
<td>116,672</td>
<td>24%</td>
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<tr>
<td>Extramural Research</td>
<td>178,090</td>
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<tr>
<td>Research Capacity Development</td>
<td>23,195</td>
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<td>SHIP</td>
<td>22,740</td>
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<td>Support</td>
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<td>Other</td>
<td>17,253</td>
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<td><strong>Total Budgeted Expenses</strong></td>
<td><strong>491,787</strong></td>
<td><strong>282,000</strong></td>
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<table>
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<tr>
<th>Income</th>
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<tbody>
<tr>
<td>Baseline Allocation</td>
<td>303,799</td>
<td>42%</td>
<td>408,598</td>
<td>408,598</td>
<td>34%</td>
<td>43%</td>
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<td>Competitive Allocation</td>
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<td>12%</td>
<td>131,579</td>
<td>131,579</td>
<td>50%</td>
<td>14%</td>
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<tr>
<td>Contract Income</td>
<td>282,000</td>
<td>39%</td>
<td>354,480</td>
<td>354,480</td>
<td>26%</td>
<td>37%</td>
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<tr>
<td>Investment Income/Interest</td>
<td>23,000</td>
<td>3%</td>
<td>27,000</td>
<td>27,000</td>
<td>17%</td>
<td>3%</td>
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<tr>
<td>Sundry Income</td>
<td>13,269</td>
<td>2%</td>
<td>14,000</td>
<td>14,000</td>
<td>6%</td>
<td>1%</td>
<td></td>
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<tr>
<td>Overhead Recovery from contracts</td>
<td>20,000</td>
<td>3%</td>
<td>23,000</td>
<td>23,000</td>
<td>15%</td>
<td>2%</td>
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<tr>
<td><strong>Total Income</strong></td>
<td><strong>447,787</strong></td>
<td><strong>282,000</strong></td>
<td><strong>729,787</strong></td>
<td><strong>604,177</strong></td>
<td><strong>354,480</strong></td>
<td><strong>958,657</strong></td>
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<table>
<thead>
<tr>
<th>Surplus / (Deficit)</th>
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<tr>
<td>-44,000</td>
<td>-44,001</td>
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<td>0</td>
<td>0</td>
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</table>

**Total Projected Deficit**

-44,000

0
<table>
<thead>
<tr>
<th>R thousand</th>
<th>Audited outcome</th>
<th>Revised estimate</th>
<th>Average growth rate (%)</th>
<th>Expenditure/total: Average (%)</th>
<th>Medium-term estimate</th>
<th>Average growth rate (%)</th>
<th>Expenditure/total: Average (%)</th>
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</thead>
<tbody>
<tr>
<td>Administration</td>
<td>143,962</td>
<td>156,463</td>
<td>175,327</td>
<td>161,793</td>
<td>4.0%</td>
<td>23.9%</td>
<td>181,965</td>
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<tr>
<td>Core research</td>
<td>423,423</td>
<td>406,011</td>
<td>471,099</td>
<td>549,329</td>
<td>9.1%</td>
<td>68.6%</td>
<td>615,386</td>
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<td>Innovation and technology</td>
<td>4,951</td>
<td>7,752</td>
<td>59,015</td>
<td>83,247</td>
<td>156.2%</td>
<td>5.1%</td>
<td>201,230</td>
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<td>Capacity development</td>
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<td>6,726</td>
<td>22,311</td>
<td>34,231</td>
<td>61.0%</td>
<td>2.4%</td>
<td>35,700</td>
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<tr>
<td>Total expense</td>
<td>580,543</td>
<td>576,952</td>
<td>727,752</td>
<td>828,600</td>
<td>12.6%</td>
<td>100.0%</td>
<td>1,034,281</td>
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Highlights/Concerns

• Income will grow by 31% in 2015/16
  – Increase in Economic Competitive Support Package funding by R50m
  – Anticipated Leverage funding of R35m p.a for three years from Newton and Welcome Trust (UK funding) and Grand Challenges 2015 from Gates Foundation (USA funding)

• Further leverage funding from National Institutes of Health (NIH in USA) to the value of R40m p.a. for 3 ears will benefit South African researchers

• Spending on Administration in relation to total costs will decrease from 23.9% in 2014/15 to 18.3% in 2017/18

• Reduction of funding by R50m in 2017-18 a concern
Why funding science is critical to the wealth and health of the nation: Glenda Gray
Table 7: Number of Web of Science Journal Publications by South Africans

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Publications</th>
<th>% of World Share</th>
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</thead>
<tbody>
<tr>
<td>2003</td>
<td>4.173</td>
<td>0.49</td>
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<tr>
<td>2004</td>
<td>4.526</td>
<td>0.50</td>
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<tr>
<td>2005</td>
<td>4.799</td>
<td>0.51</td>
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<tr>
<td>2006</td>
<td>5.446</td>
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<td>2007</td>
<td>6.117</td>
<td>0.58</td>
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<td>2008</td>
<td>6.949</td>
<td>0.62</td>
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<tr>
<td>2009</td>
<td>7.629</td>
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<tr>
<td>2010</td>
<td>8.155</td>
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<td>2011</td>
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<tr>
<td>2012</td>
<td>9.793</td>
<td>0.73</td>
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Source: Thomson Reuters “InCites”

Figure 4: SA Scientific Publications in We
<table>
<thead>
<tr>
<th></th>
<th>South Africa</th>
<th>Brazil</th>
<th>China</th>
<th>India</th>
<th>Russia</th>
<th>Japan</th>
<th>United Kingdom</th>
<th>United States</th>
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<tbody>
<tr>
<td>ISI Journal Publications</td>
<td>9,793</td>
<td>37,346</td>
<td>186,577</td>
<td>48,151</td>
<td>28,050</td>
<td>77,125</td>
<td>103,528</td>
<td>369,258</td>
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<td>Number of Citations</td>
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<td>14,315</td>
<td>88,164</td>
<td>19,045</td>
<td>11,863</td>
<td>43,166</td>
<td>86,794</td>
<td>282,590</td>
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<td>Publications per Million Capita (pmc)</td>
<td>192</td>
<td>192</td>
<td>138</td>
<td>38</td>
<td>196</td>
<td>604</td>
<td>1,638</td>
<td>1,176</td>
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<td>% Share of the World</td>
<td>0.73</td>
<td>2.78</td>
<td>13.90</td>
<td>3.59</td>
<td>2.09</td>
<td>5.75</td>
<td>7.71</td>
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<td>Publications per 100 Researchers FTE</td>
<td>52</td>
<td>28</td>
<td>14</td>
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<tr>
<td>Citations per 100 Researchers FTE</td>
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<td>3</td>
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<td>Publications per 100 Million $ PPP R&amp;D Expenditure</td>
<td>244</td>
<td>147</td>
<td>105</td>
<td>198</td>
<td>84</td>
<td>55</td>
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<tr>
<td>Citations per 100 Million $ PPP R&amp;D Expenditure</td>
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<td>56</td>
<td>49</td>
<td>78</td>
<td>35</td>
<td>31</td>
<td>220</td>
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Sources: Citations data from Thomson Reuters “InCites”; 2012 population data from Population Reference Bureau; 2010/11 R&D expenditure and FTE researchers from OECD “Main Science and Technology Indicators”; South Africa’s R&D expenditure and FTE researchers from DST “National Survey of Research and Experimental Development”, 2010/11; R&D expenditure and FTE researchers data for Brazil and India from UNESCO “2010 Science Report”
<table>
<thead>
<tr>
<th></th>
<th>South Africa</th>
<th>Brazil</th>
<th>China</th>
<th>India</th>
<th>Russia</th>
<th>Japan</th>
<th>United Kingdom</th>
<th>United States</th>
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<td>Tertiary, Gross Enrolment Ratio</td>
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<td>24</td>
<td>23</td>
<td>75</td>
<td>60</td>
<td>61</td>
<td>95</td>
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<tr>
<td>Publications per 100 Researchers FTE</td>
<td>52</td>
<td>28</td>
<td>14</td>
<td>32</td>
<td>6</td>
<td>12</td>
<td>40</td>
<td>26</td>
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<tr>
<td>Publications per 100 Million $ PPP R&amp;D Expenditure</td>
<td>244</td>
<td>147</td>
<td>198</td>
<td>105</td>
<td>84</td>
<td>55</td>
<td>282</td>
<td>90</td>
</tr>
<tr>
<td>GERD as % of GDP</td>
<td>0.76</td>
<td>1.16</td>
<td>1.84</td>
<td>-</td>
<td>1.09</td>
<td>3.39</td>
<td>1.77</td>
<td>2.77</td>
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<td>Technology Payments to GERD (%)</td>
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<td>10</td>
<td>12</td>
<td>23</td>
<td>14</td>
<td>21</td>
<td>10</td>
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<tr>
<td>Researchers per 1 000 FTE Employed</td>
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<td>-</td>
<td>1.6</td>
<td>-</td>
<td>6.3</td>
<td>10.2</td>
<td>8.2</td>
<td>-</td>
</tr>
<tr>
<td>Patents Applications per 100 Researchers FTE</td>
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<td>5</td>
<td>36</td>
<td>11</td>
<td>7</td>
<td>72</td>
<td>20</td>
<td>31</td>
</tr>
<tr>
<td>Patents Published per 100 Million $ PPP R&amp;D Expenditure</td>
<td>44</td>
<td>25</td>
<td>245</td>
<td>65</td>
<td>94</td>
<td>340</td>
<td>128</td>
<td>108</td>
</tr>
<tr>
<td>Manufacturing Value Added (% of GDP)</td>
<td>12</td>
<td>13</td>
<td>30</td>
<td>14</td>
<td>16</td>
<td>19</td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td>Life Expectancy at Birth (Years)</td>
<td>59</td>
<td>73</td>
<td>75</td>
<td>66</td>
<td>69</td>
<td>83</td>
<td>81</td>
<td>79</td>
</tr>
<tr>
<td>Unemployment Rate (%)</td>
<td>24.7</td>
<td>8.3</td>
<td>4.1</td>
<td>3.5</td>
<td>6.6</td>
<td>4.5</td>
<td>7.8</td>
<td>8.9</td>
</tr>
<tr>
<td>GDP per Capita ($ PPP)</td>
<td>11 440</td>
<td>11 909</td>
<td>9 233</td>
<td>3 876</td>
<td>23 504</td>
<td>35 178</td>
<td>36 901</td>
<td>49 965</td>
</tr>
</tbody>
</table>
Knowledge & Wealth have been recognised as related since ancient times

“there cannot be a great nation without great mathematics”

Napoleon
Scientific Productivity is a much better predictor of economic wealth and human development than any other variables.

Jaffe K et, al Plos one, June 2013
Acknowledgements

- DOH
- DST
- CSIR
- NRF
- NICD
- TIA
- TREASURY