BIBLIOGRAPHY

Bongani Mayosi

Bibliography

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Portrait of Professor Bongani Mayosi by Gabriele Jacobs – CC-BY-ND 4.0

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Foreword

In 1967, African renaissance was blessed with one of its great exemplars. The concept is based on the idea that with the right consciousness and mindset, the current generation of Africans, by working hard to build, produce, invent and innovate, will lead the continent on a new journey to reclaim and restore it to its great historical heights and, in so doing, overcome the challenges confronting it and its people. One could not have imagined a greater natural champion of the movement than Professor Bongani Mawethu Mayosi. Sadly, on the 27th of July 2018, this humble giant of our time lost his battle with major depression and the continent was prematurely robbed of one of its most accomplished sons. This devastating disease deprived him of access to his renowned reservoir of rich internal resources and the capacity to deal decisively with the sustained faculty-wide tension and turmoil which had placed him at its symbolic centre.

With his untimely passing at the tender age of just 51, Mayosi left behind a powerful legacy of contributions to society, many of which are captured in this wonderful bibliographic compilation of his published original research, opinion pieces, editorials, health reports and policy positions. This comprehensive bibliography, which UCT Libraries has put together as their inspired contribution to keeping the Mayosi legacy alive, will be a fantastic resource for generations to come, and will serve as a great testimony to his incredible achievements, accomplishments and what can be done when one combines a life of purpose with passion and courage.

Born and bred in rural Eastern Cape, he grew up watching his district surgeon father and nurse mother look after members of their communities with care and compassion. Reflecting on the impact of those early years, he always highlighted how important that time and environment was to developing his signature "everything is possible" mindset. Everyone around him grew up and went to school together, regardless of their status in life, with no real or apparent barriers to fulfilling their potential except will and desire. His upbringing helped him understand at a very early age that much more could and should be done to improve the health and well-being of our continent's people, which suffered from the impact of generations of structural and systematic neglect.

As is evident from the large volume, breadth, depth and impact of this published work, Bongani made a huge contribution. He was blessed with an abundance of intelligence, intellect, imagination, innovation, insight and an incredible work ethic. One of the many secrets of his success was his ability to inspire individuals and institutions to work tirelessly towards determining and defining Africa's health priorities and problems, and to encourage and support so many to conduct the appropriate research needed to provide the much-needed solutions. This is reflected in organizations such as the Pan African Society of Cardiovascular Cardiology (PASCAR) which he helped to transform into a force for good across the continent, and the very large number of people with whom he collaborated and co-authored his numerous contributions. Bongani had five main areas on which he focused

his scientific enquiry and made his most important contributions. These included heart muscle disease and heart failure, rheumatic heart disease, tuberculous pericarditis, rare genetic disorders amongst Africans and strengthening health care systems to improve and optimize service delivery.

Asked when and how he developed his knack for research he was clear that the research bug bit during a crucial year in which he detoured from the traditional six-year MBChB program to study the intricacies of the navicular bone at his alma mater, the University of Natal School of Medicine. However it was many years later, after post-graduate clinical and research training at the Universities of Cape Town and Oxford, that he returned to South Africa armed with a DPhil and a dream of building a program of clinical research and creating a cadre of people who would tackle the unacceptably high burden of neglected diseases of poverty and neglect afflicting sub-Saharan Africa. Whereas most academics have a single aspect of health care or a disease on which they focus and become expert in, the bibliography provides testimony of Mayosi's rare capacity to tackle so many diverse but linked areas concurrently. He was driven by questions such as how can it be that decades after Europe and North America had either eradicated or drastically reduced the burden of diseases such as rheumatic heart disease, tuberculosis of the heart and heart muscle disease in young people, that these diseases remain endemic and major causes of disability and death on our continent? Why is it that our medical school curricula and the bulk of our research funding seem to continue to ignore these diseases and perpetuate these historical injustices?

UCT Libraries should be congratulated for compiling this treasure and making it available and accessible in all of its forms. Keeping the work of Professor Mayosi alive in this way is a unique and important part of eternalizing the fire that fuelled his vision and hopefully inspiring current and future generations of bright young likeminded people to pick up the many batons he left for all of us to run with in our individual ways.

I am eternally grateful for the role Professor Mayosi played in my own life and career as supervisor, mentor, role model and friend.

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Preface

Professor Bongani Mawethu Mayosi, a staunch supporter of libraries and an open access advocate, inspired the University of Cape Town Libraries to compile and publish this open access bibliography to celebrate his legacy. The untimely death of Professor Mayosi, an A-rated researcher, prompted the Libraries to use its knowledge and expertise to compile this bibliography of the research output of Professor Mayosi. The online version of the bibliography enhances the visibility and accessibility of his scholarship to the widest possible audience.

This abstract bibliography differs from a straightforward bibliography in that each citation is followed by an abstract. The purpose of this bibliography is to assist in locating Mayosi's scholarship, and to share such with fellow researchers and the public in general. The abstracts in the bibliography provide short, descriptive summaries of the various research outputs of Professor Mayosi. Their inclusion is designed to cover the main points of the research output to assist the reader in making a decision as to whether an article is relevant for the furtherance of research. It is anticipated that the reader would benefit from having sight of the abstract before deciding to acquire the full text. The online version of the bibliography has a link to most of the citations which gives the reader access to the full text. This open access to content will be significant to researchers from the Global South.

This bibliography was compiled through the extraction of citations from databases such as PubMed and verified against the National Research Foundation documentation. After creating the base bibliography document, the compilers linked the full text that was openly accessible to the citation. This bibliography does not include, at the time of compilation, scholarly material that was still in press.

The Libraries would like to acknowledge the encouragement and support of his widow, Professor Nonhlanhla Khumalo for the project. The team responsible for the compilation of this bibliography was well led by Saskia Vonk, Namhla Madini, Marja Wren-Sargent and Niel Mostert. There were substantial contributions by Roberto Sass, Dianne Steele, Jeremiah Pietersen and Jill Claassen. The online publication of this bibliography using the open source software Open Journals System was coordinated by Jill Claassen and Tamzyn Suliaman. The portrait, developed under the watchful eye of Professor Virginia MacKenny, was done by Gabriele Jacobs.

The legacy of Professor Bongani Mawethu Mayosi will live on with, amongst others, this bibliography and

his research will continue to be accessible to all including the researchers from the Global South.

Dr Reggie Raju
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Introduction

Abbreviated biography of Professor Bongani Mayosi

Bongani Mawethu Mayosi was born on 28 January 1967 in Mthatha, Eastern Cape, the second son of Dr George Sikhumbuzo Mayosi and Mrs Nontle Mayosi. He attended primary school in Upper Ngculu village, Ngqamakhwe, Eastern Cape. He completed his secondary schooling at the age of fifteen, matriculating from St John's College, Mthatha, and passing six subjects with distinction. His first two degrees were a BMedSci completed in 1986 and concurrently an MBChB completed in 1989 at the University of KwaZulu-Natal, both obtained *cum laude* and at the top of his class.

He worked as an intern at Livingstone Hospital in Port Elizabeth, then moved to Cape Town the following year to work as a senior house officer and later join the medical registrar rotation at Groote Schuur Hospital (GSH) and the University of Cape Town (UCT). Within three years he had been admitted to the Fellowship of the College of Physicians of South Africa. Immediately after this, he was awarded the prestigious Oxford Nuffield Medical Scholarship, allowing him to read for a DPhil in Cardiovascular Medicine on a project on cardiovascular genetics at the University of Oxford, under the supervision of Prof. Hugh Watkins. He returned from Oxford to complete his clinical training in cardiology at GSH and UCT. Thereafter, he worked as a consultant in the Cardiac Clinic. He was appointed as the seventh Chair and Head of the Department of Medicine at UCT and GSH in 2006. Following an illustrious tenure, during which he transformed the Department of Medicine, growing it to be the largest and leading medicine department on the African continent, he was appointed as the Dean of the Faculty of Health Sciences at UCT in 2016 and occupied this position until his untimely death on Friday 27 July 2018.

His enduring legacy will be one of research excellence, academic development and the transforming effect he had on individual lives, institutions and countries, particularly on the African continent. Professor Mayosi embarked on building research capacity on the African continent and went into countries with no existing research management infrastructure or ethics committees and helped to set these structures up *ab initio*.

His professional achievements and accolades are too many to list, but include the Order of Mapungubwe (Silver) in 2009 and an A-rating by the National Research Foundation. He was a member of the Academy of Science of South Africa and a former President of the College of Physicians of South Africa. In 2017 he was elected to the US National Academy of Medicine (arguably one of the highest honours in the fields of health and medicine, which recognises individuals who have demonstrated outstanding professional achievement and commitment to service). He was instrumental in securing dedicated funding for clinicians from

organisations such as Netcare, for the Hamilton Naki Scholarship and the Discovery Academic Fellowships. This culminated in the '1000 PhDs in 10 years project' (also known as the National Health Scholars Programme – recently renamed the Mayosi National Health Scholars Programme, in recognition of the critical role he played in the development and curating of the project), in collaboration with the Department of Health, the National Health Research Committee, the Public Health Enhancement Fund and the South African Medical Research Council.

As a clinician, he was second to none. He was loved by his patients, who remember his gentle and impeccable bedside manner. He had a fascination for the understanding of the mechanisms of physical signs, and an encyclopaedic knowledge of clinical medicine. As a researcher, he was a global leader in his field. At the time of his demise, he had published over 350 peer-reviewed articles and book chapters. He had an h-index of 67 and over 40 000 citations. He is one of only a handful of A-rated scientists in South Africa. Many papers that were in development at the time of his death have since been published.

As a teacher, he was legendary. His knowledge of the cardiovascular system was outstanding. He was revered by undergraduate students for his approach to his teaching of neurology. He graduated over 30 masters and doctoral students for whom he had provided supervision. All of them will remember him as a caring supervisor who invested substantially in them and created opportunities that have defined their careers. Many of his students have gone on to be leaders in academia, industry and government in this country, on the continent and throughout the world.

As a leader, he was awesome. His brand of leadership was honest, full of integrity and characterised by creativity and innovation. His commitment and passion were evident at all times. He is one of the most inspiring people I will ever know. He believed that there was no problem that could not be solved, and his work ethic was unquestionable. He played the long game, and always reminded me: 'A journey of a thousand miles begins with a few steps.'

As an advocate of health research, he made seminal contributions to health policy and practice in several important areas. Following appointment by the Academy of Science of South Africa to chair a Consensus Panel on the Revitalisation of Clinical Research and Related Training in South Africa, he published a report in 2009 that has significantly shaped the policy framework on the revitalisation of health research in South Africa. This formed the blueprint of the approach adopted by the government.

How will I remember Professor Bongani Mayosi? I will remember him as a dear friend, a mentor and a confidant. I will remember him for tireless dedication to advance a great cause. I salute him for a life of integrity, his humility, his outstanding intelligence and his absolute pursuit of knowledge and truth.

How will the Faculty of Health Sciences at UCT and GSH remember him? He will be remembered as the consummate professional and the epitome of hard work. A leader who was exemplary in every fashion. A man with immense dignity and an infectious optimism. A visionary who imagined an Africa capable of driving its own agenda and using science to improve the health of its nations. He will be remembered for his absolute

love of the UCT students. His fundamental drive was the transformation of society through investment in future generations of scientists, physicians and future leaders. He will be remembered for his absolute love of the hospital, the Department of Medicine, the Faculty and the University.

Both those who knew him well and those who hardly knew him spoke of their love of the man, and their sense of his apparent and evident affection for them. He will be remembered for his unwavering belief in the potential of others and for his excellence in research, and translation of that research into work with a meaningful impact. His ultimate belief was that science should be a vehicle for social and political change, and ultimately a vehicle for economic upliftment. As he often reminded us, 'health comes before wealth'.

Above all, he will be remembered for his absolute love of his family. He was a devoted husband and father and never missed an opportunity to share how much his family meant to him. He spoke often of his gratitude for the support of his wife, and the love he received from his daughters, whom he constantly referred to as his 'pride and joy'. He is survived by his wife, Nonhlanhla, and three daughters, Nosipho, Sivuyile and Camagu (and many other 'daughters' raised in his home). He also leaves behind his mother, Nontle, eldest brother, Sipho, and two sisters, Khuthala and Ncumisa. He will be dearly missed by his family, friends and colleagues.

Innovations and contributions to the health sciences

Professor Mayosi's scholarship focused on non-communicable diseases. He believed in a diversified portfolio of research, and projects of varying risk. For him, that portfolio included research on the epidemiology and genetics of heart muscle disease; heart failure; pathophysiology, clinical outcomes and genetics of rheumatic heart disease; tuberculous infections of the heart; HIV infection as it involves the heart; rare genetic disorders among Africans; and strengthening of health systems in South Africa and on the African continent. When criticised by many that his research focus was too divergent, he always emphasised the important thematic linkage: he studied cardiovascular diseases of the poor – as he called them, 'the afflictions of the wretched of the earth'. It was his firm belief that by studying these diseases of pestilence, he could make his greatest contribution to the world.

During his career, he made seminal contributions to all these seven areas. He was considered the doyen of heart muscle disease on the African continent and has clarified the clinical profile, epidemiology and genetic basis of cardiomyopathies in Africans. Through his scholarship, he was involved in the discovery of many novel genes that cause sudden cardiac death and heart failure in Africans. In cardiovascular genetics, Professor Mayosi's discoveries included genes causing dilated cardiomyopathy, hypertrophic cardiomyopathy, arrhythmogenic cardiomyopathy, coronary artery disease and hypertension. He established an internationally renowned laboratory at UCT, which at the time of his death was leading unique studies of the genetics of rheumatic heart disease and congenital heart disease in Africa. Among his contributions to knowledge in single-gene disorders, his discovery in 2017 of a new gene for arrhythmogenic cardiomyopathy was recognised as one of the most important medical advances made by a South African scientific team since the first human

heart transplant.

He also provided the most complete investigation of the contemporaneous causes, clinical profile and optimal approaches to management of heart failure among Africans. He advanced our understanding of the biology of rheumatic heart disease, the role of screening and the employment of a strategy of syndromic treatment of pharyngitis to prevent this disease in children. His research has influenced policy and guidelines on the management of this disease globally, and these have been adopted by the African Union, the World Heart Federation, the World Health Organization and the World Health Assembly. More recently, he advocated for the widespread availability of penicillin for the eradication of rheumatic heart disease in the global south. Through his investigation of tuberculosis in the heart, he clarified the appropriate diagnostic strategy and role of adjunctive steroids in tuberculous pericarditis. He showed that unstimulated interferon gamma is the most sensitive and specific screening test for tuberculous pericarditis. In addition, his IMPI trial showed that adjunctive steroids cause cancer in HIV-infected individuals but reduce constrictive pericarditis and hospitalisations in all patients. This has led to the recommendation for the selective use of adjunctive steroids in HIV-negative individuals alone. These findings resulted in the revision of clinical practice guidelines for tuberculous pericarditis. He reviewed the state of healthcare in South Africa and on the continent and made important recommendations on how health systems could be strengthened to improve the health of all Africans, in particular those in rural and under-served areas.

Contributions to growing the next generation of academics, researchers and clinicians

While the contributions Professor Mayosi made will influence the outcomes of future generations, I believe that his academic career will be remembered most for the relationships he built. He made friends everywhere he went. He recognised potential and invested substantially in the development of human capacity as part of the academic project. He used research to advance his dream of '1000 PhDs'. He wanted to undertake research that would answer the prevailing fundamental questions on African cardiovascular health, and to answer these questions definitively. Through the search for these critical answers, he laid the blueprint for building capacity of the future generation of academics, researchers and scientists, both on the African continent and abroad.

He has contributed significantly to the shaping of the careers of thousands of clinicians and researchers at UCT, in South Africa, on the African continent and beyond. Many of his students and mentees are now professors of medicine, leaders in industry, pioneering academics, caring clinicians and policy developers. Indeed, our world, and Africa, in particular, is richer for having him as a son. The challenge for this new generation of leaders is to produce knowledge, to lead services, to teach and train, and to produce another generation of African clinician-scientists who will have as transformative effect on the lives of fellow citizens. For Professor Mayosi, I can imagine no greater satisfaction. And for the youth of our continent, I can imagine no greater legacy to continue than the work he started.

Professor Ntobeko Ntusi
(Student, mentee and friend)
Cardiologist and Professor of Medicine
Chair and Head: Department of Medicine
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