

**OVERVIEW
OF
THE SOUTH AFRICAN
CANCER RESEARCH ENVIRONMENT
AS A BASIS FOR DISCUSSIONS
CONCERNING THE ACTIVATION
OF
CARISA**

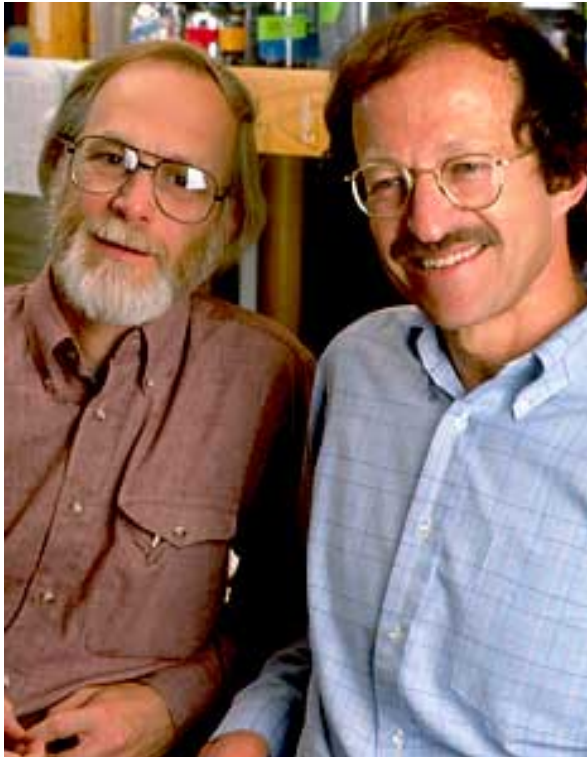
(Cancer Research Initiative of South Africa)

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Independent Medical Research Consultant
August 2006**



“The conquest of cancer continues to pose great challenges to medical science

- Harold Varmus & Michael Bishop. Nobel laureates 1989. Discoverers of oncogenes.



- *Cancer is minimally controlled by modern medicine. Age-adjusted mortality rate for cancer is about the same in the 21st century as it was 50 years ago.*
- Harold Varmus
- SCIENCE 26May 2006

Global quantitative picture

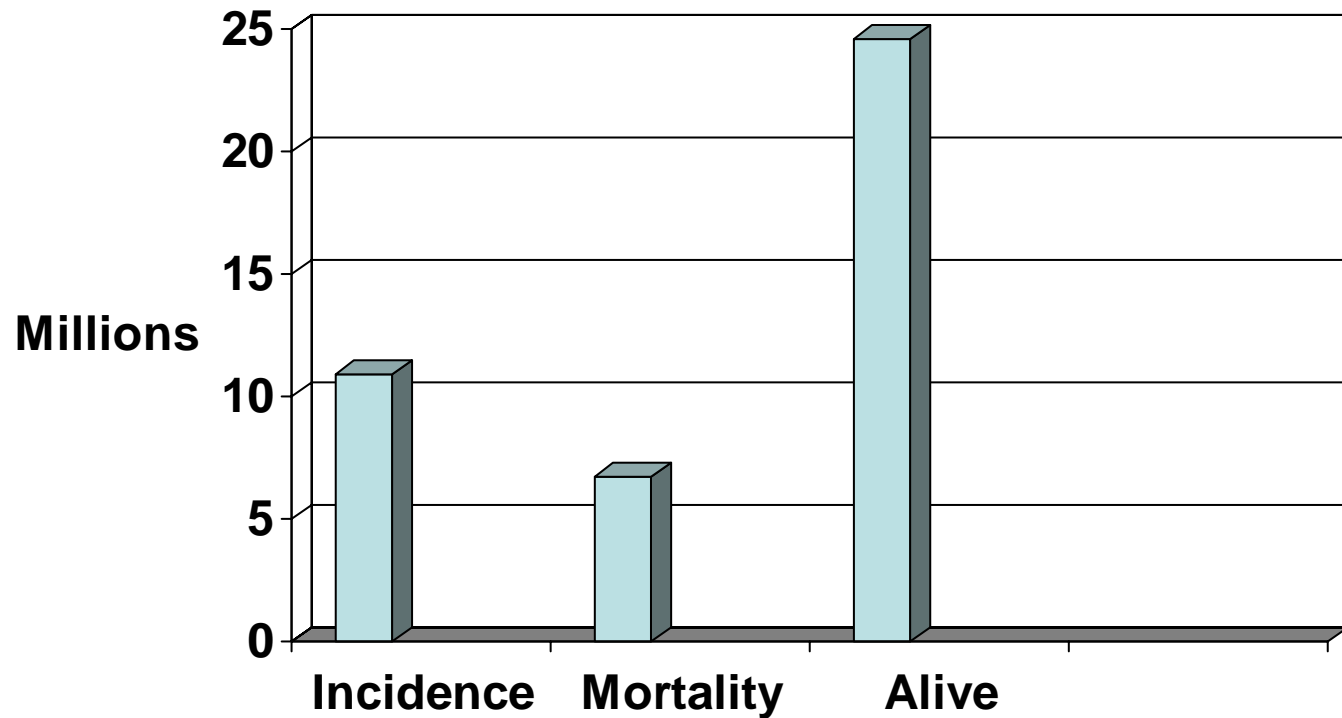
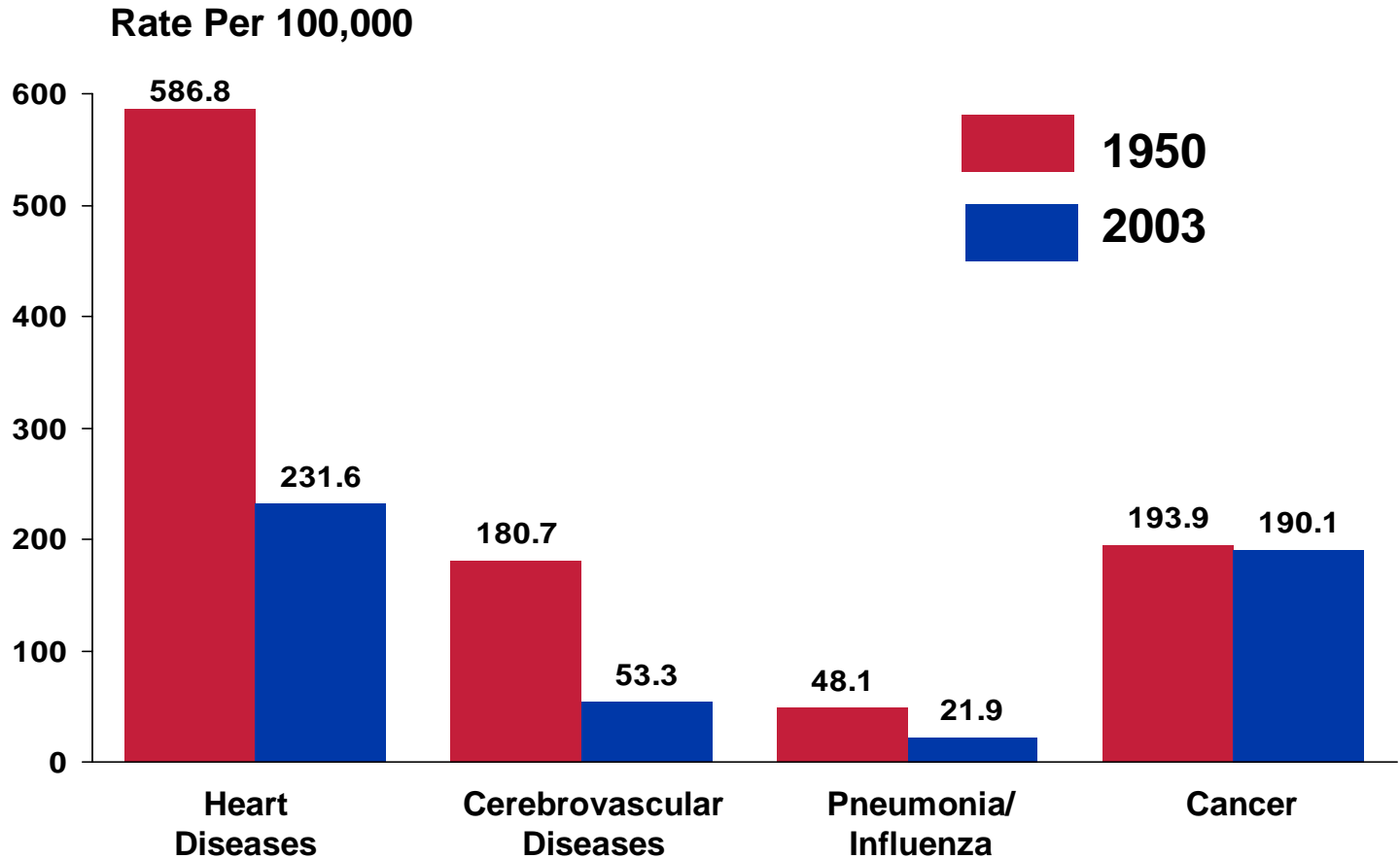


Table 1. Global Incidence, Mortality and Case Fatality Ratio of the top ten deadliest cancers:

	Site	INCIDENCE					MORTALITY			Ratio
		Males		Females		Total Mil A ***	Males	Females	Total Mil B ***	CFR **** B/A
		Cases	ASR*	Cases	ASR		Cases	Cases		
1	Lung	965241	35.5	386891	12.1	1.35	848132	330786	1.18	0.87
2	Stomach	603419	22.0	330518	10.3	0.93	446052	254297	0.70	0.75
3	Liver	442119	15.7	184 043	5.8	0.63	416882	181439	0.60	0.95
4	Colorectal	550465	20.1	472687	14.6	1.03	278446	250532	0.53	0.51
5	Breast	-	-	1151298	37.4	1.15		410 712	0.41	0.36
6	Oesophagus	315394	11.5	146723	4.7	0.46	261162	124730	0.39	0.38
7	Cervix	-	-	493243	16.2	0.49	-	273505	0.27	0.55
8	Prostate	679023	25.3	-	-	0.68	221002	-	0.22	0.32
9	Non-H L**	175123	6.1	125448	3.9	0.30	98865	72955	0.17	0.57
10	Bladder	273858	10.1	82699	2.5	0.32	108310	36699	0.15	0.31
	Totals mil	4.00		3.37		7.37	2.68	1.93	4.62	0.63
	Percentage	54		46		100	58	42	100	

Change in the US Death Rates* by Cause, 1950 & 2003

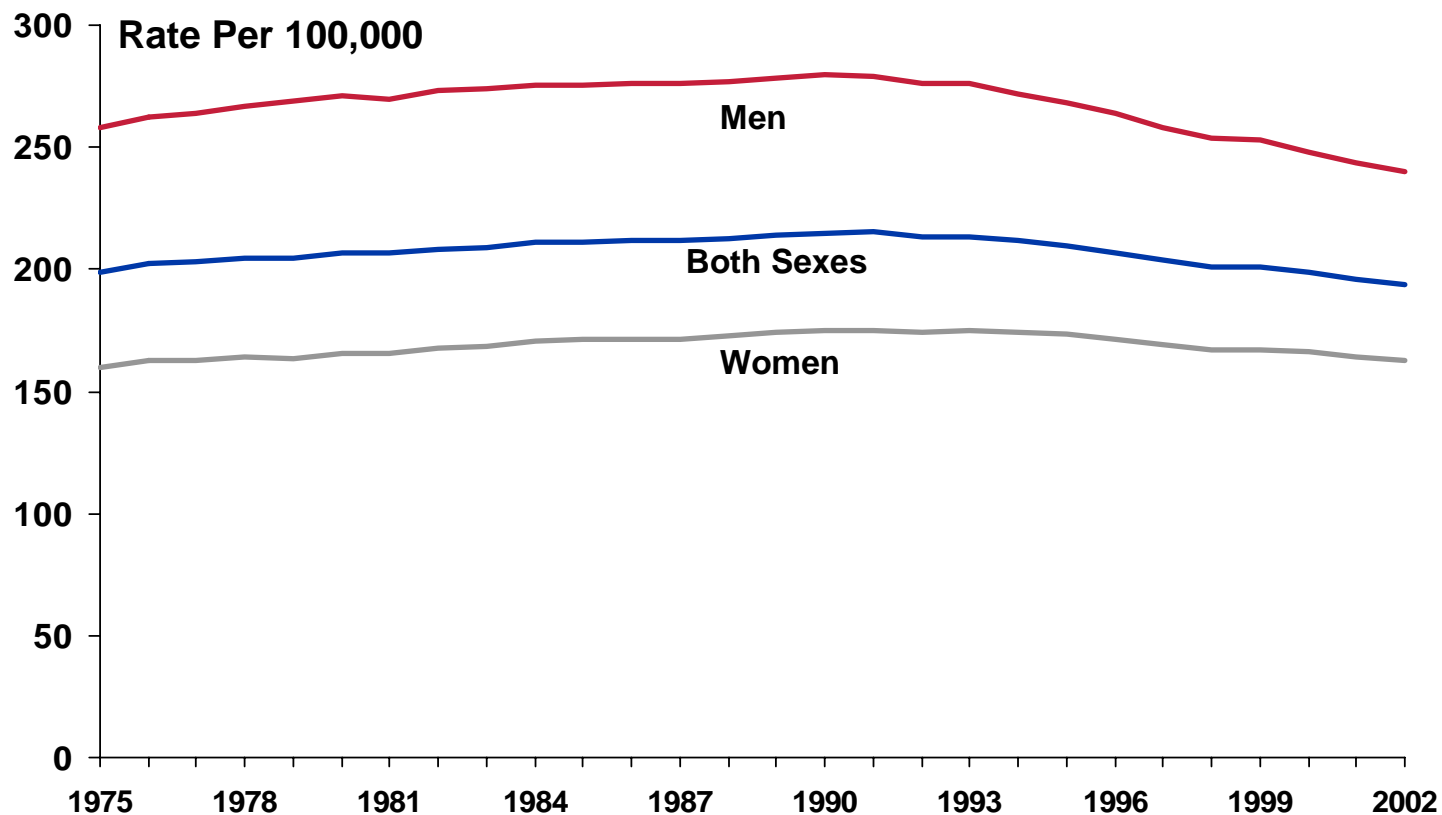


* Age-adjusted to 2000 US standard population.

Sources: 1950 Mortality Data - CDC/NCHS, NVSS, Mortality Revised.

2003 Mortality Data: US Mortality Public Use Data Tape, 2003, NCHS, Centers for Disease Control and Prevention, 2006

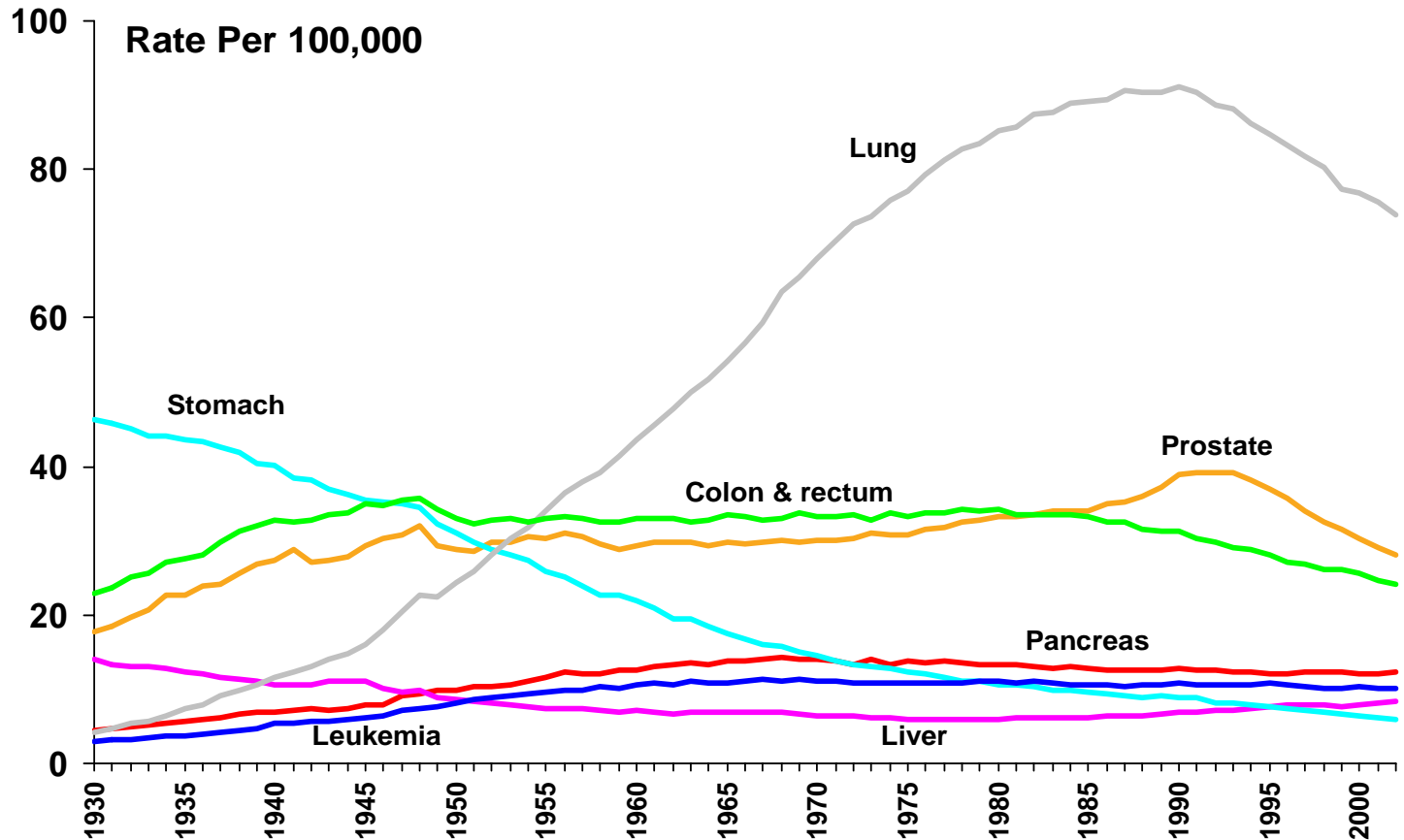
Cancer Death Rates*, All Sites Combined, All Races, US, 1975-2002



*Age-adjusted to the 2000 US standard population.

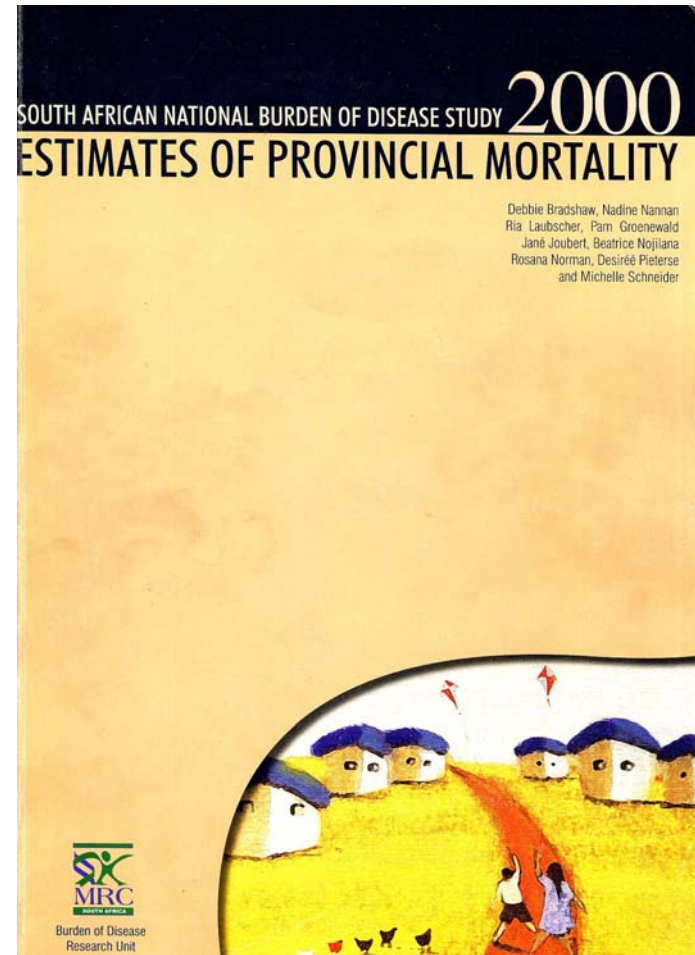
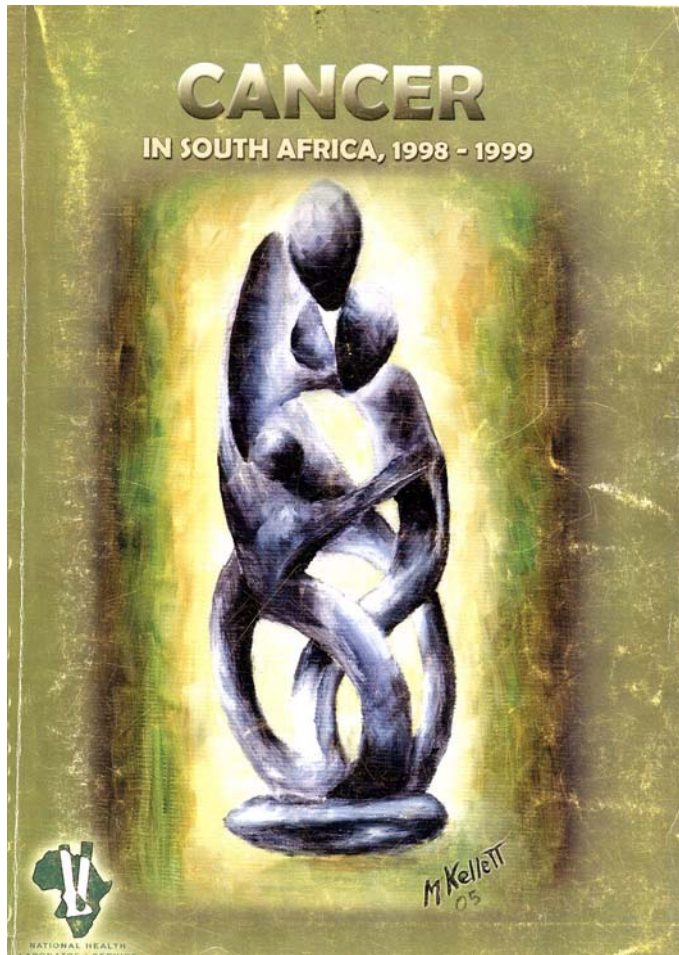
Source: Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Mortality - All COD, Public-Use With State, Total U.S. (1969-2002), National Cancer Institute, DCCPS, Surveillance Research Program, Cancer Statistics Branch, released April 2005. Underlying mortality data provided by NCHS (www.cdc.gov/nchs).

Cancer Death Rates*, for Men, US, 1930-2002



*Age-adjusted to the 2000 US standard population.
Source: US Mortality Public Use Data Tapes 1960-2002, US Mortality Volumes 1930-1959, National Center for Health Statistics, Centers for Disease Control and Prevention, 2005.

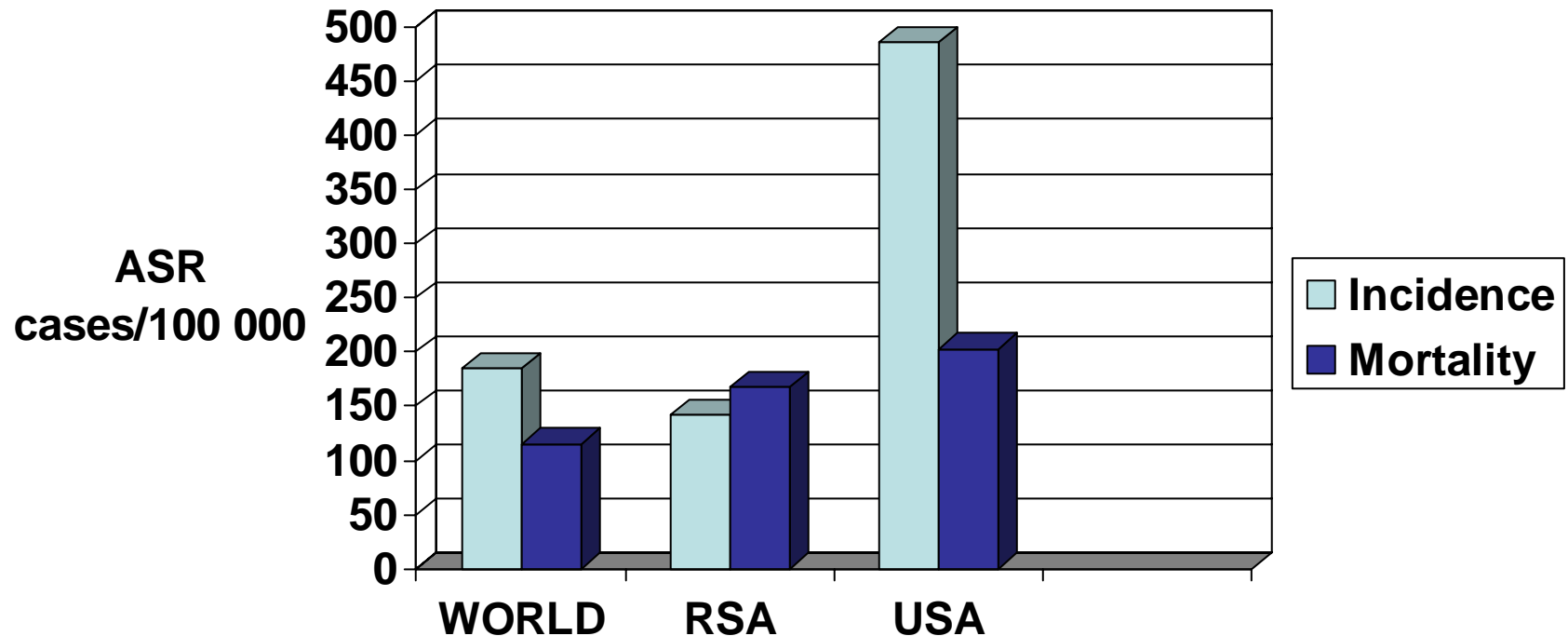
Sources of South African cancer incidence and mortality data



Comparison of the top 10 most common cancers in RSA in terms of incidence and mortality rates

Cancer Site	MALES			FEMALES			Total cases
	Cases	INCIDENCE	MORTALITY	Cases	INCIDENCE	MORTALITY	
Breast	-	-	-	5901	33	18	5901
Cervix	-	-	-	5203	29	19	5203
Prostate	3860	34	27	-	-	-	3860
Lung	1738	14	40	721	5	12	2459
Oesophagus	1540	11	25	909	6	11	2449
Colon	1245	10	10	1122	6	7	2367
Bladder	1005	8	9	395	2	2	1400
Stomach	775	6	11	442	3	5	1217
Non-H L	630	4	7	545	3	4	1175
Liver	360	2	12	215	1	5	575
Totals	11153			15453			26606

NCR could be under-reporting by 48%
or 54 507 cancer cases p.a.



Calculation of “new cancer incidence deficit”

- The World ratio of mortality/incidence = 0.62
- Assume that for RSA mortality/incidence also is 0.62
- RSA mortality rate = 168 (Burden of Disease, MRC)
- Then RSA mortality/incidence = 0.62
- Then RSA $168/X = 0.62$
- Then $X = 168/0.62$
- Then $X = 271$
- NCR value for $X = 142$...much lower
- If $X = 142$, new cancer cases = 60 000 p.a. (NCR data 1999)
- If $X = 271$, then new cancer cases = $271/142 \times 60\ 000 = 114\ 507$
- This is 54 507 more cases than recorded by NCR for 1999.
- Therefore NCR could be under-reporting by 48%

Female lung, female and male colon, lowest common cancers in RSA according to mortality data

	RSA		World		USA	
	Males	Females	Males	Females	Males	Females
Lung	40	12	31	10	74	41
Breast		18		13		26
Prostate	27		25		29	
Colon	10	7	15	20	24	17

Calculation of increased number of mortalities due to top 4 cancers if RSA ASR equals current USA ASR rates

Cancer site	RSA :A		USA:B		Difference:B-A	
	Mortality cases ASR		Mortality cases ASR		Mortality cases ASR	
	Males	Females	Males	Females	Males	Females
Lung	40	12	74	41	34	29
Breast		18		26		8
Prostate	27		29		2	
Colon	10	7	24	17	14	10
				Totals	50	47

Cancer Site	Increased ASR units* A	Population size** B	Sum of A x B AxB
Lung	31	450	13 950
Breast	8	225	1 800
Prostate	2	225	500
Colon	12	450	5 400
		Total	21 650



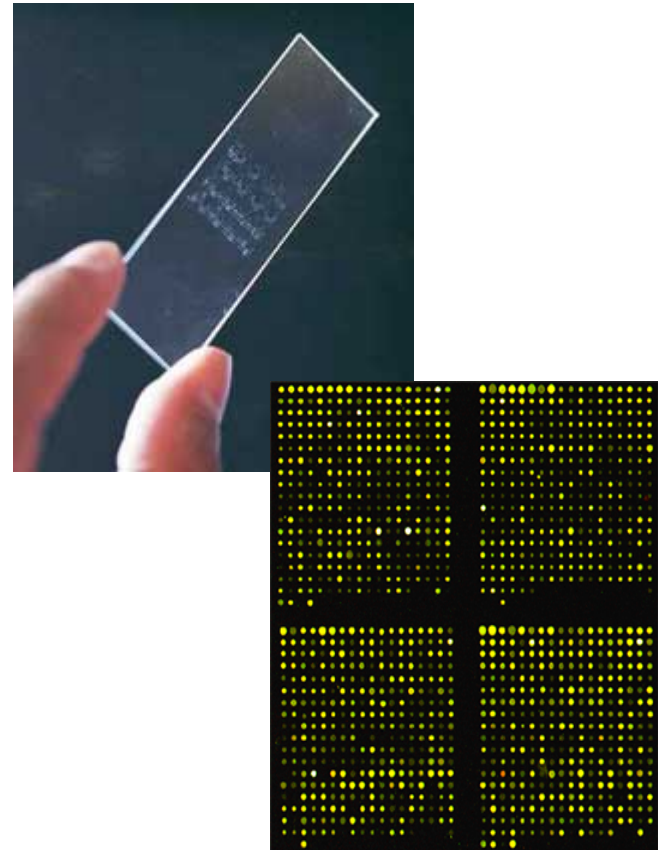
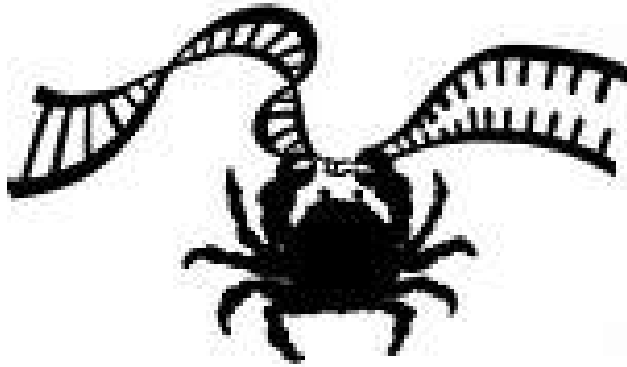
The rise of Molecular Oncology



- “Understanding the genetic and biochemical mechanisms by which cancers arise and behave is now widely believed to portend improvements in the way we detect, classify, monitor, and treat these diseases”

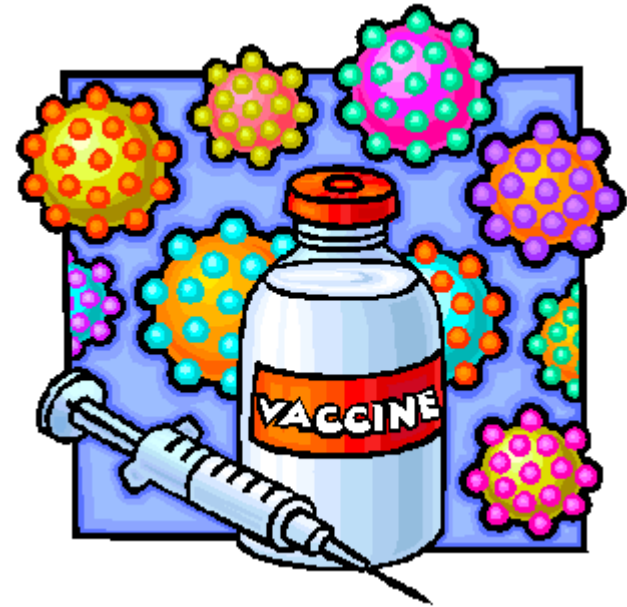
- Harold Varmus

DNA as the basis of molecular oncology

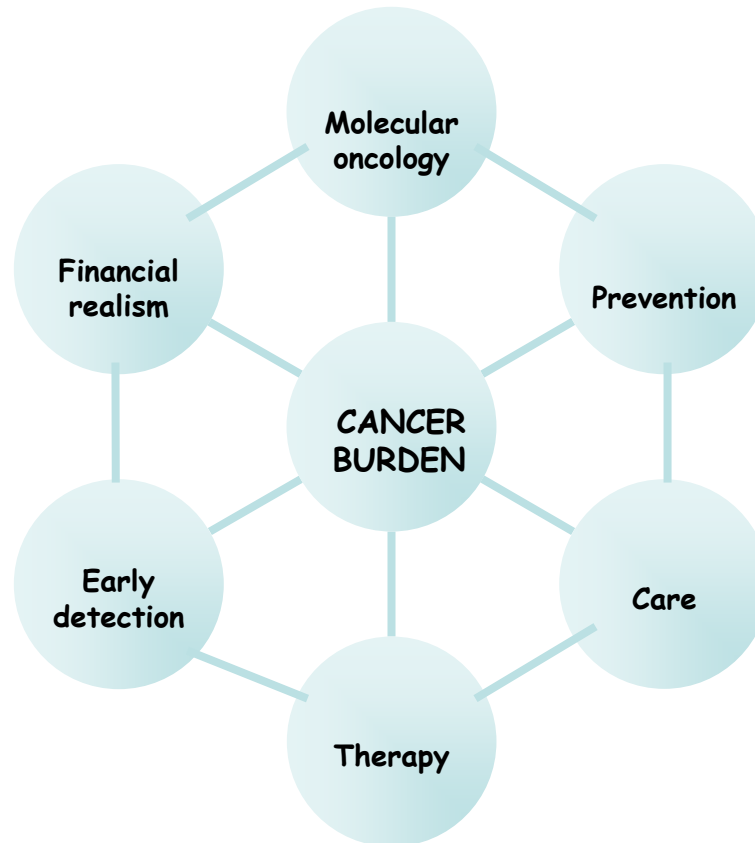


30-60% of cancers can be prevented or treated early

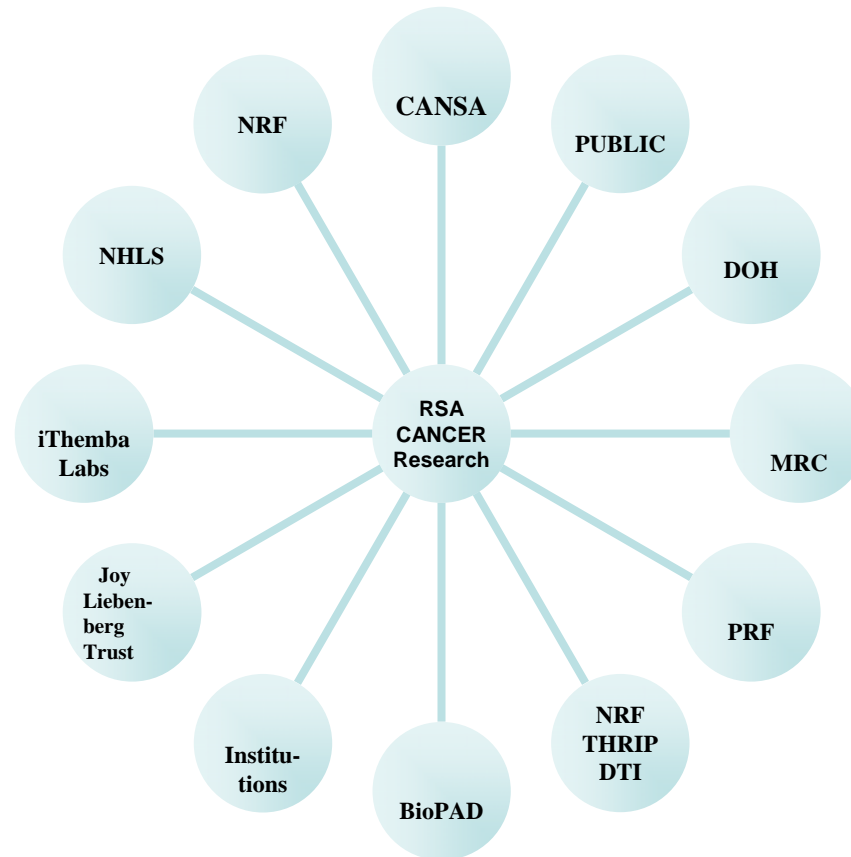
- PAP smear
- Vaccination



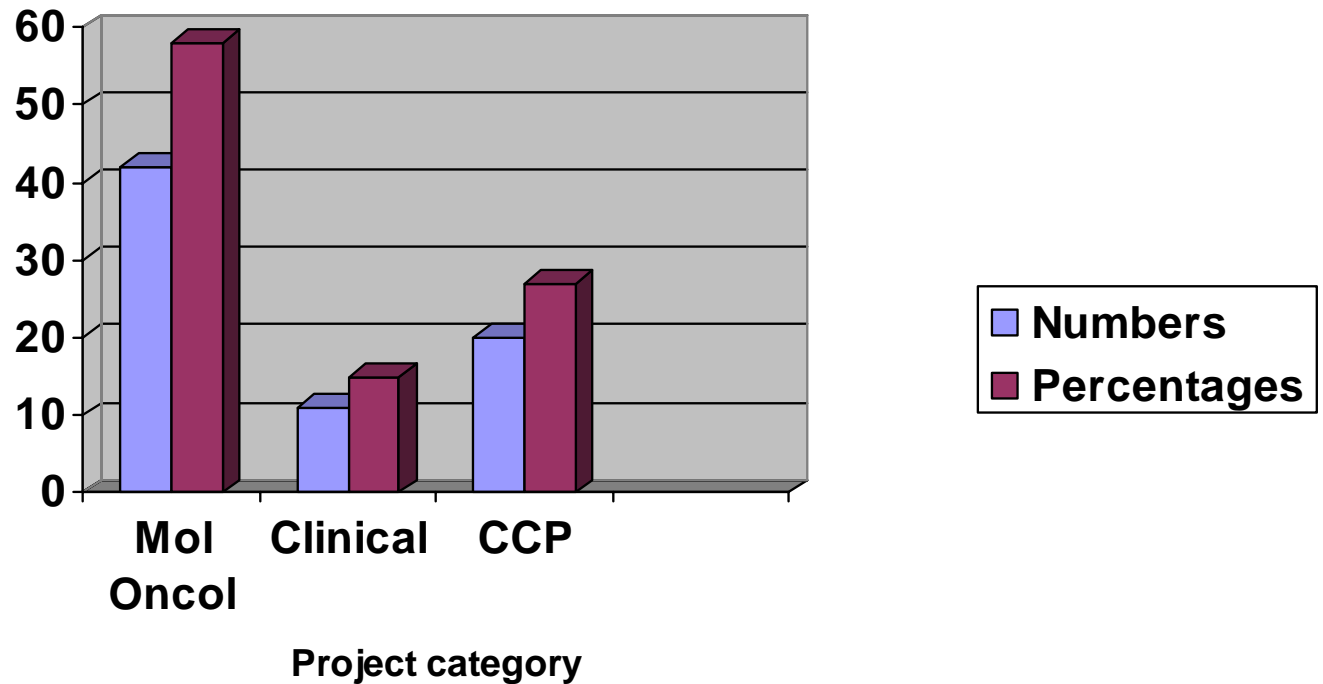
Holistic approach to cancer research and control



Stakeholders in RSA cancer research



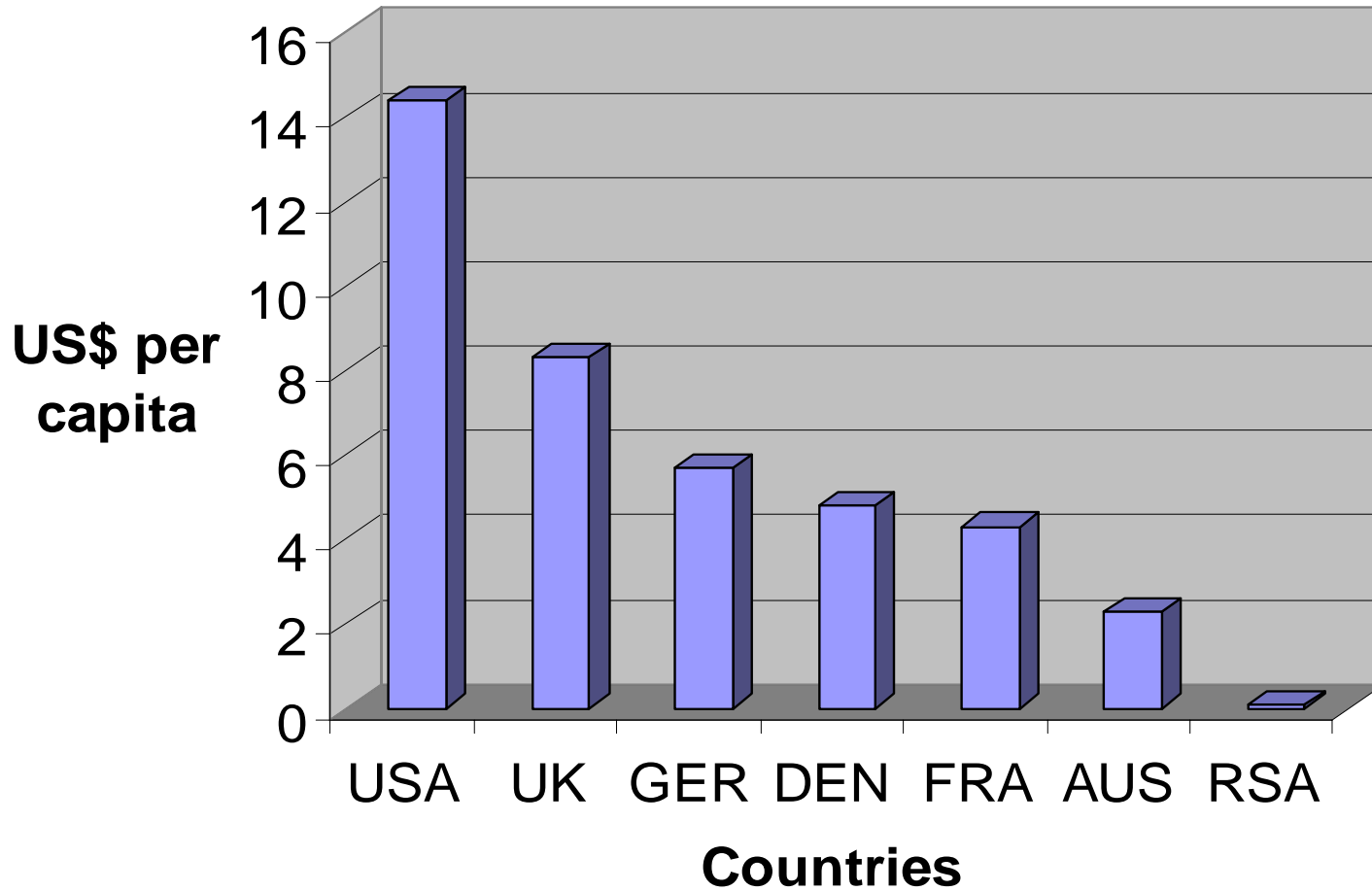
RSA cancer research project categories n=73



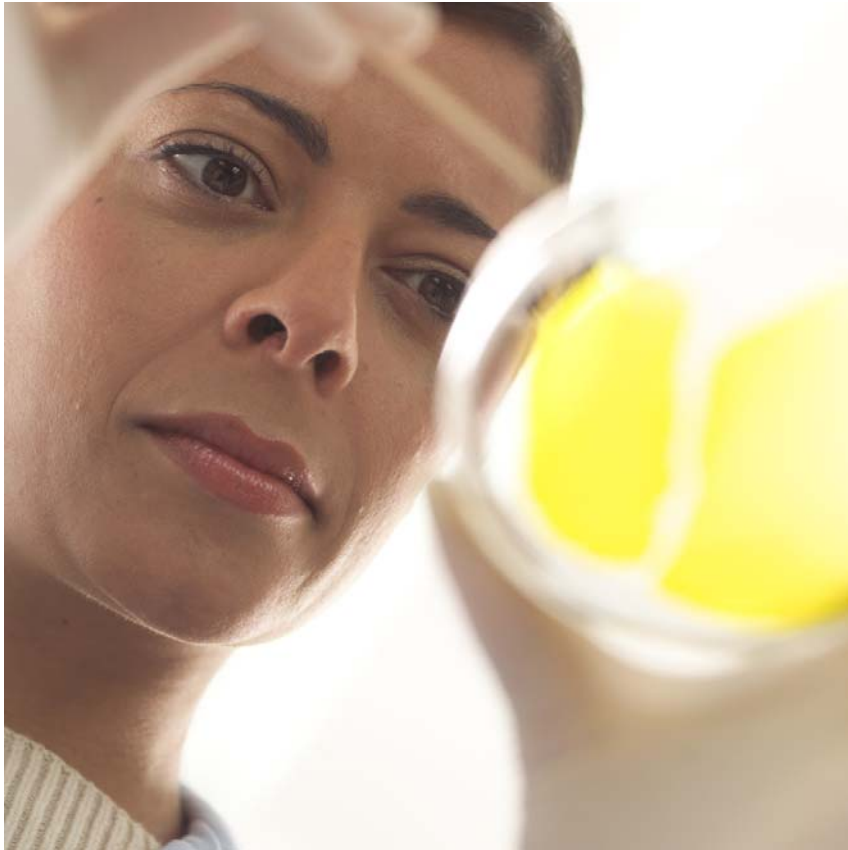
Funding of cancer research in the RSA

	Funder	Amount (millions of RSA Rands)
1	CANSA	R2.7
2	MRC-self initiated projects	R1.2
3	MRC-Unit projects	R7.7
4	THRIP	R1
5	BioPad	R2
6	NHLS	R2
7	DOH	R0.3
8	NRF: Innovation Fund	?
9	iThemba labs	R15
	TOTAL	R32

GLOBAL CANCER RESEARCH FUNDING



Outcome of CANSA 10 years of cancer research funding



- 129 researchers
- 192 projects
- 570 PubMed publications
- Mean impact factor 3.8
- 5 patents directly or indirectly
- R50 000 cost per publication
- Expenditure R28.2 million
- Publications per researcher 0-79
- 36% did not publish at all
- Outcome expectation contract being developed