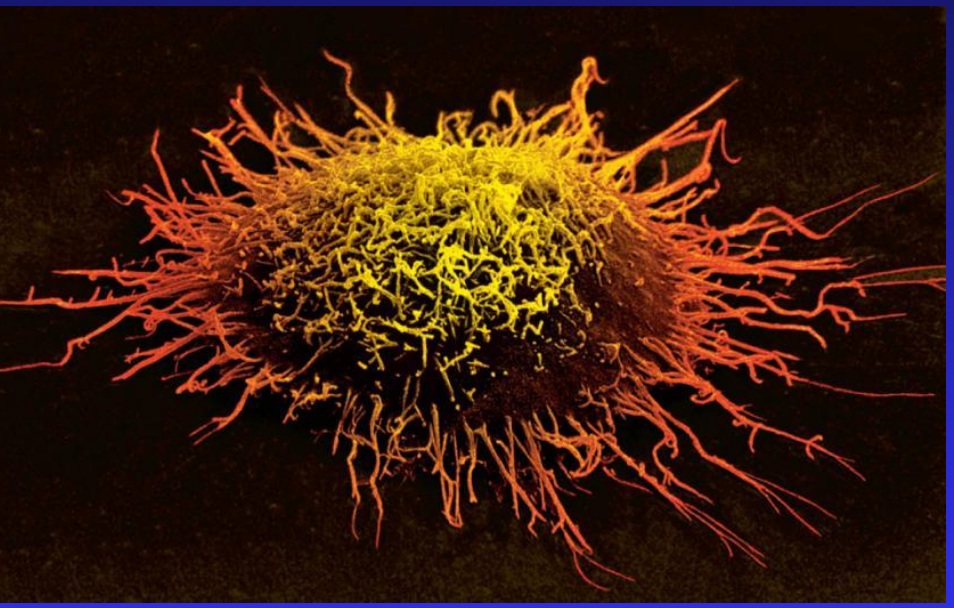
Epidemiology of Prostate Cancer In African Males



Shingai Mutambirwa (MD)
Urologist

ESMO Cape Town 2017

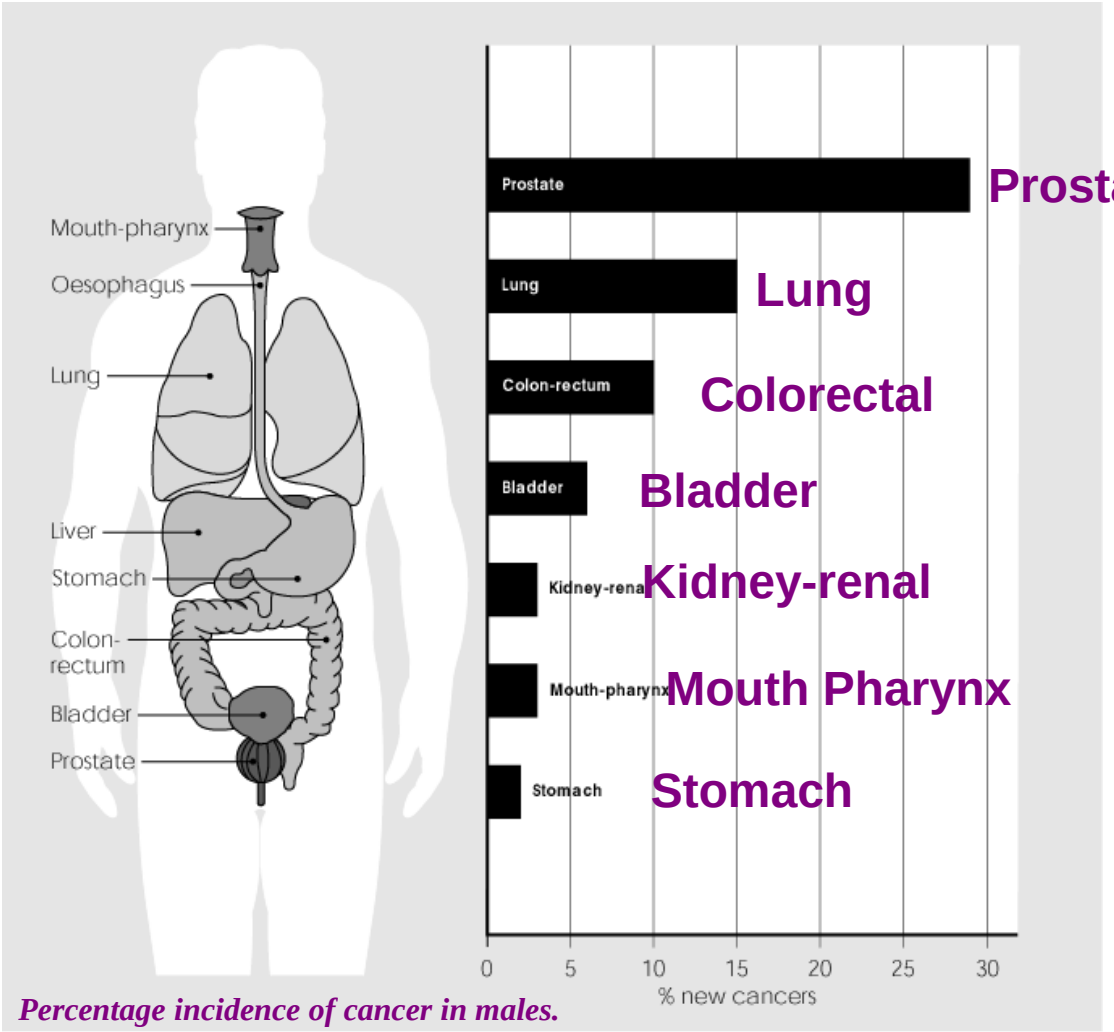
Disclosures

Advisory boards/Lecturer/Consultant-

- Astellas
- Astra-Zeneca
- Bayer
- Eli Lilly
- Ferring
- Janssen
- Pfizer
- Sanofi

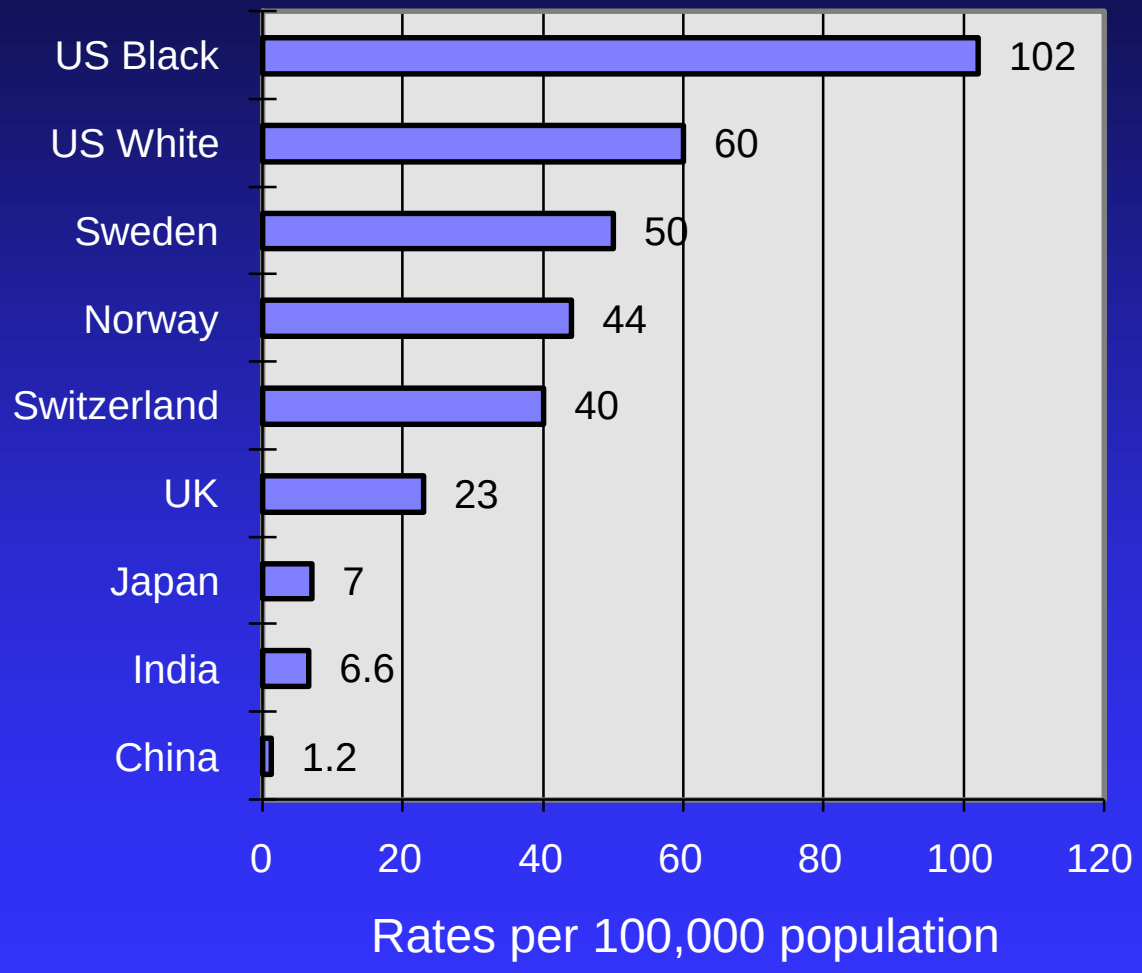
NHLS
NATIONAL
HEALTH
LABORATORY
SERVICE

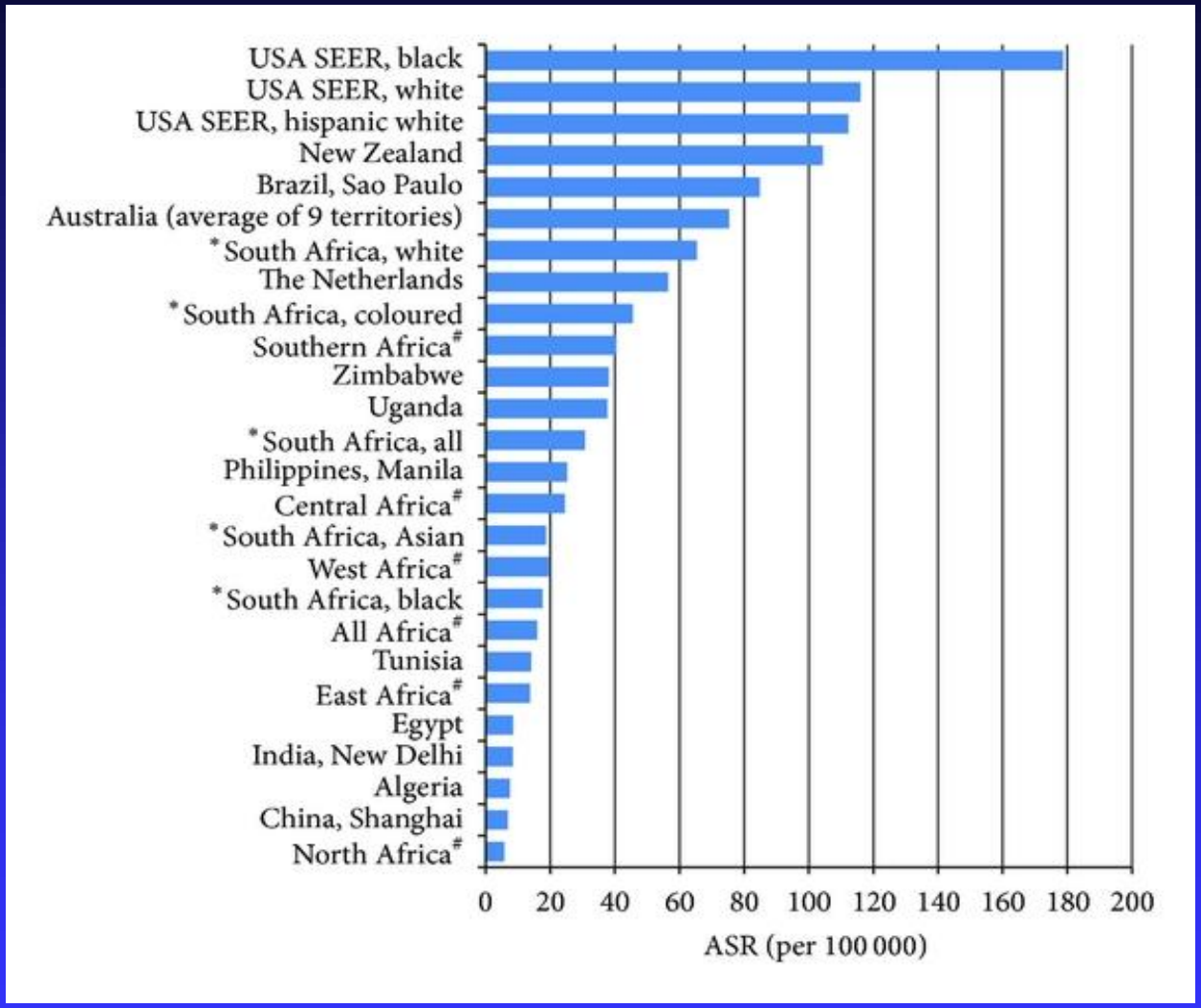
Incidence of cancer in males

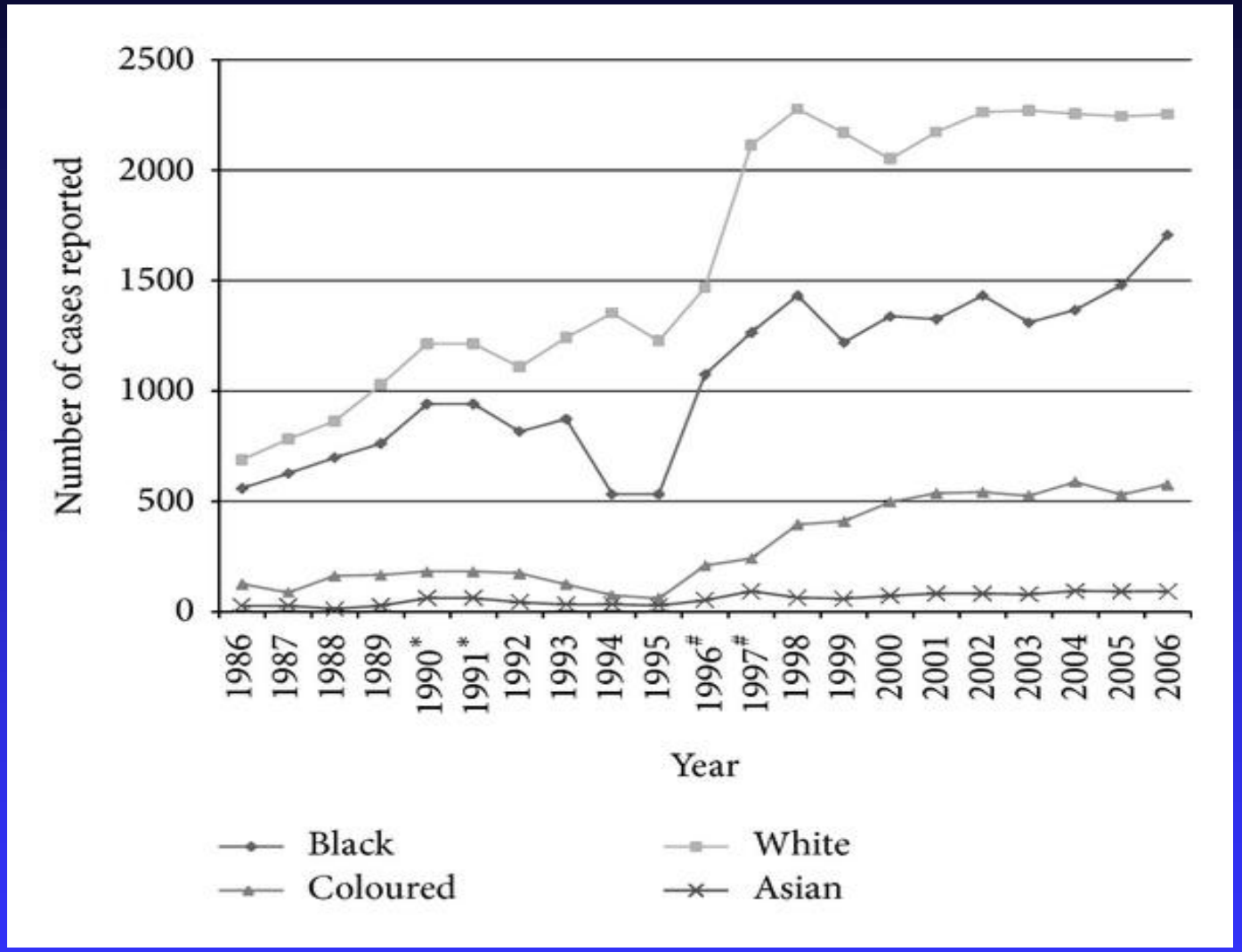


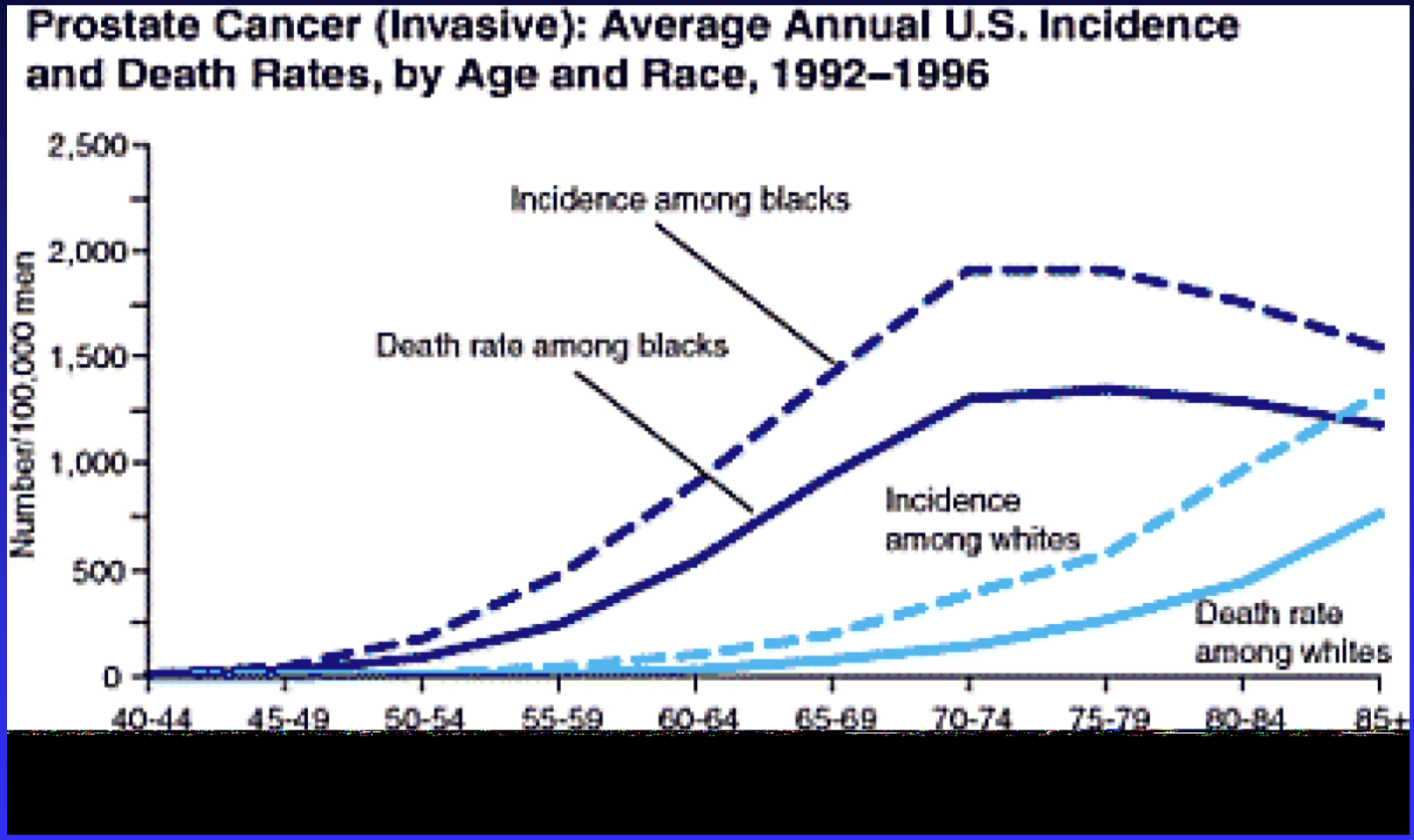
Percentage incidence of cancer in males.

Worldwide variation in prostate cancer incidence rates




USA SEER, black
USA SEER, white
USA SEER, hispanic white
New Zealand
Brazil, Sao Paulo
Australia (average of 9 territories)
*South Africa, white
The Netherlands
*South Africa, coloured
Southern Africa#
Zimbabwe
Uganda
*South Africa, all
Philippines, Manila
Central Africa#
*South Africa, Asian
West Africa#
*South Africa, black
All Africa#
Tunisia
East Africa#
Egypt
India, New Delhi
Algeria
China, Shanghai
North Africa#
0 20 40 60 80 100 120 140 160 180 200
ASR (per 100 000)

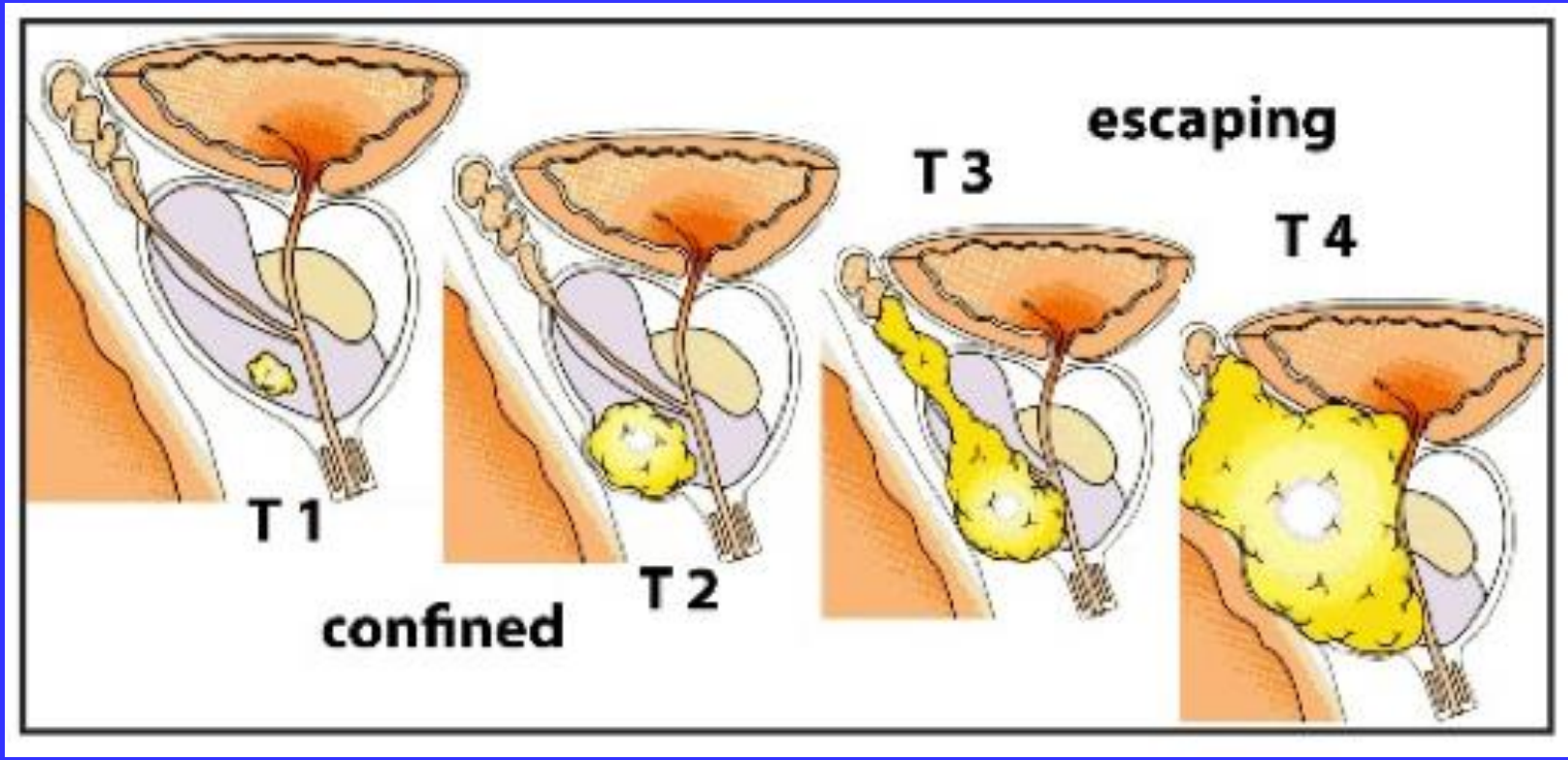

Number of cases reported
2500
2000
1500
1000
500
0
1986
1987
1988
1989
1990*
1991*
1992
1993
1994
1995
1996#
1997#
1998
1999
2000
2001
2002
2003
2004
2005
2006
Year
Black
White
Coloured
Asian


Prostate Cancer (Invasive): Average Annual U.S. Incidence and Death Rates, by Age and Race, 1992–1996
Number/100,000 men
2,500
2,000
1,500
1,000
500
0
Incidence among blacks
Death rate among blacks
Incidence among whites
Death rate among whites
40-44
45-49
50-54
55-59
60-64
65-69
70-74
75-79
80-84
85+

Prostate Cancer in Sub-Saharan Africa

- Epidemiology:
- 34-320/100 000
  - 1/6 will develop Pca in next 20yrs- 20% increase
  - Deaths from PCa to double in next 20yrs
  - 23% all male cancers
  - 41-96% Locally Advanced
  - 16-59% Metastatic

Local staging of prostate cancer



http://www.tackleprostate.org/the-gleason-score-and-staging.php

SRE

- Skeletal related event is a series of complications or treatment requirement that happen in routine practice
- “Field” endpoint : need for irradiation, chemotherapy or surgery, pathological fractures, spinal cord compression, and/or hypercalcaemia

Surgery to bone

Pathological fracture

Spinal cord compression

Radiotherapy to bone

Prostate Cancer: Remarkably Common With Many Unanswered Questions

Understood:

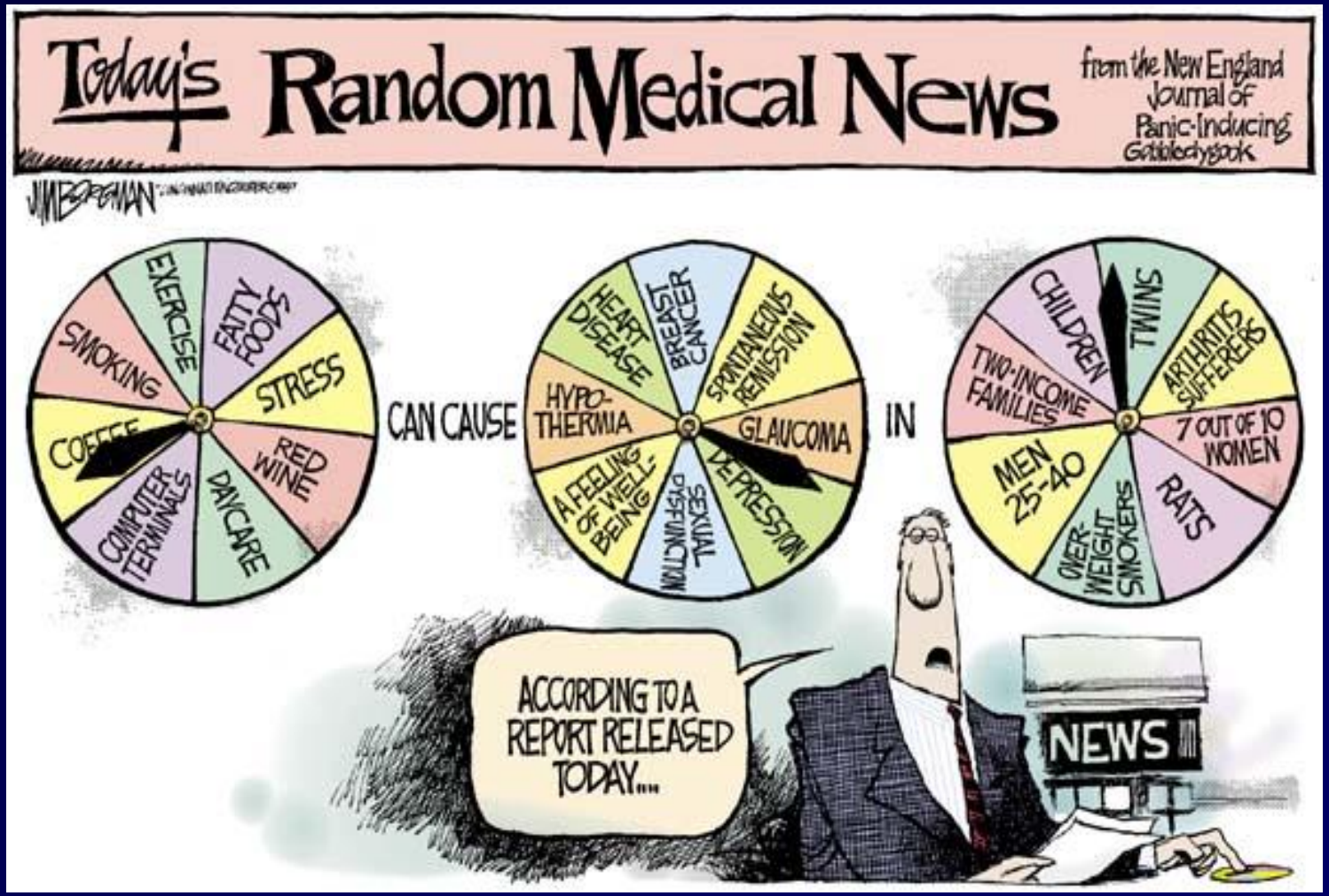
- **Natural history**
- **Prevalence**
- **Patterns of spread**

Questions:

- **Universal use of screening tests**
- **Choices of therapy**
- **Contributing factors**

Sources: Nelson WG, DeMarzo AM, Isaacs WB. Prostate cancer. *NEJM*. 2003;349:366-381.

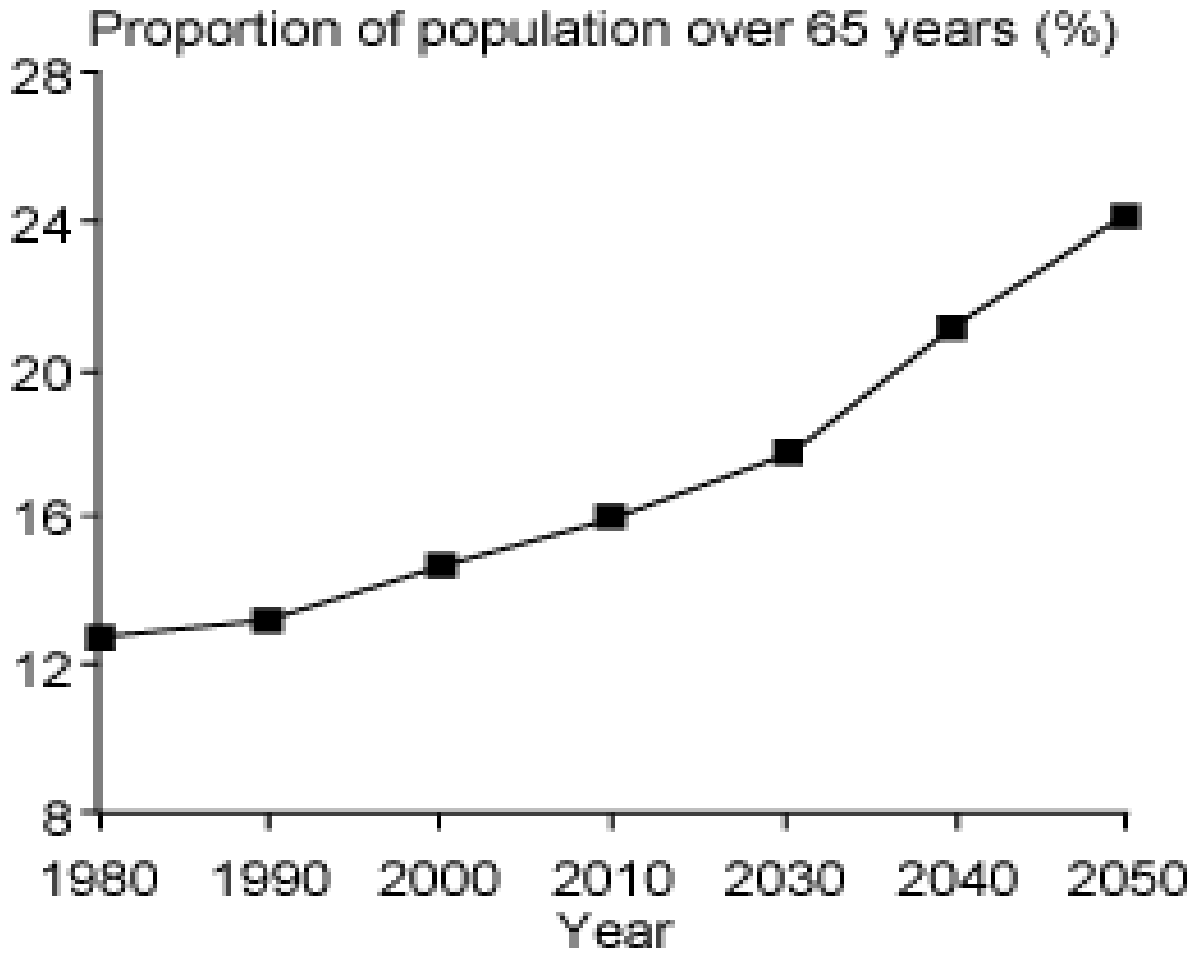
What “causes” Prostate cancer?



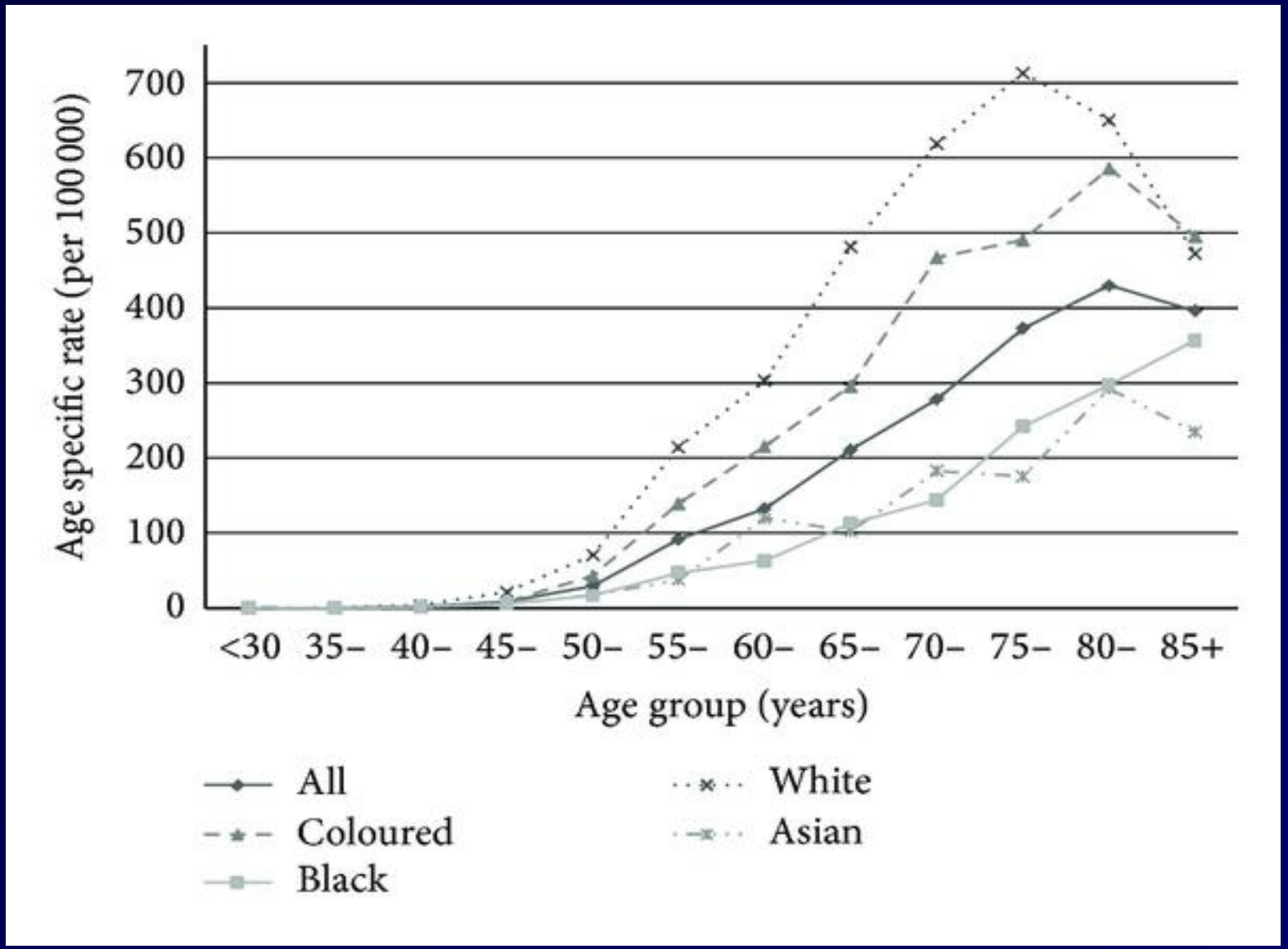
Factors Increasing Risk of Prostate Cancer

- Age
- Lifestyle
- Hormones
- Race
- Genetics

Predicted increase in incidence



PROBABLY 50% DON'T NEED TREATMENT!

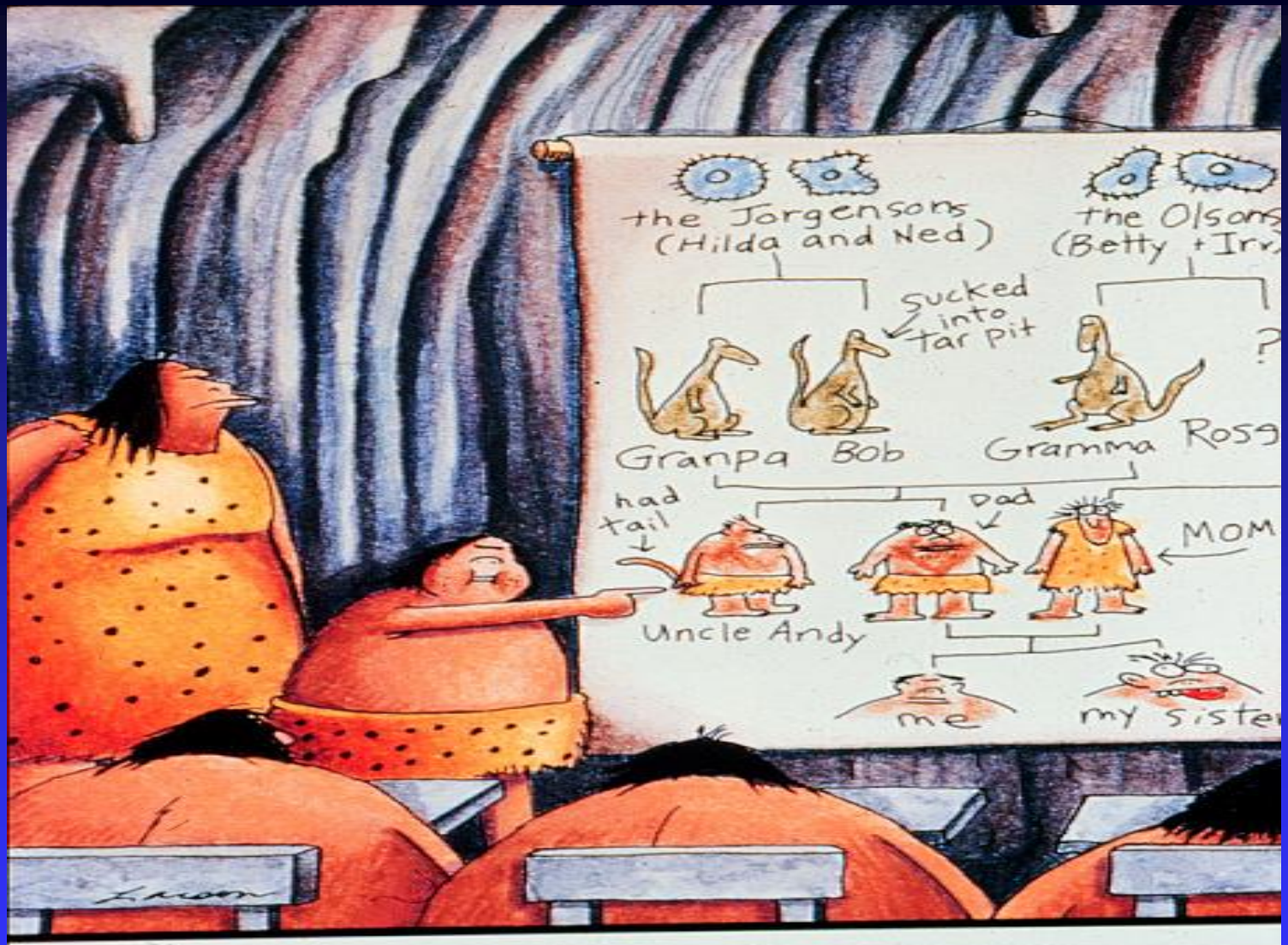

Age specific rate (per 100 000)
700
600
500
400
300
200
100
0
<30
35–
40–
45–
50–
55–
60–
65–
70–
75–
80–
85+
Age group (years)
All
Coloured
Black
White
Asian

Like finding a needle in a haystack.....

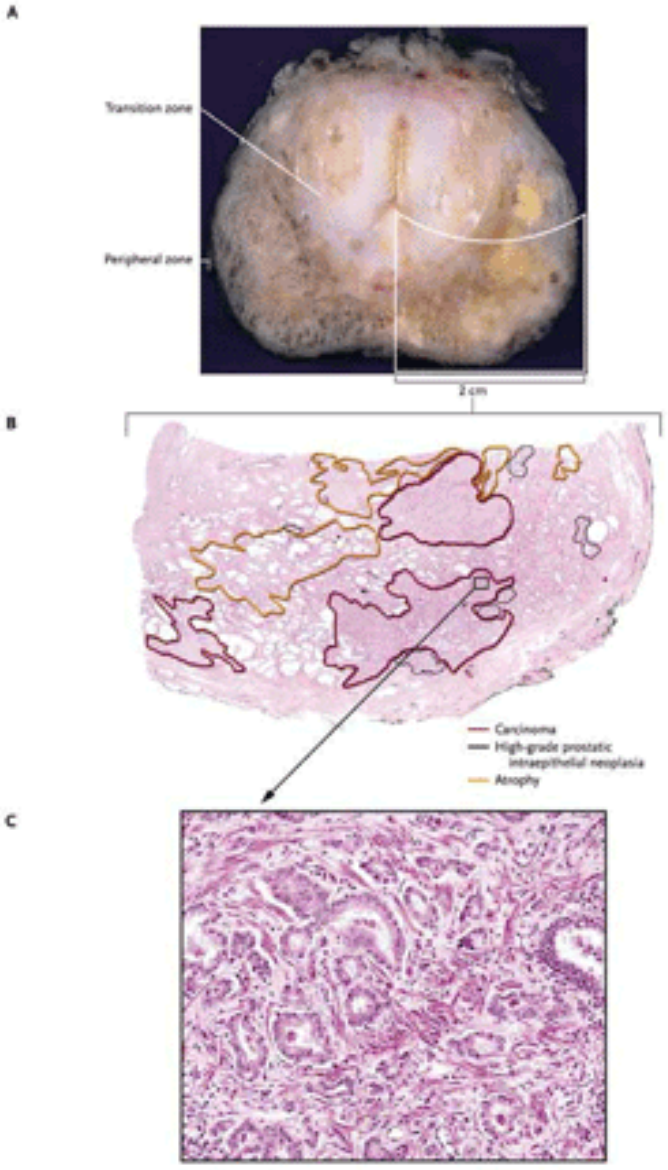
- BRCA1: 22 coding exons, > 5,500 bp
- BRCA2: 26 coding exons, > 11,000 bp

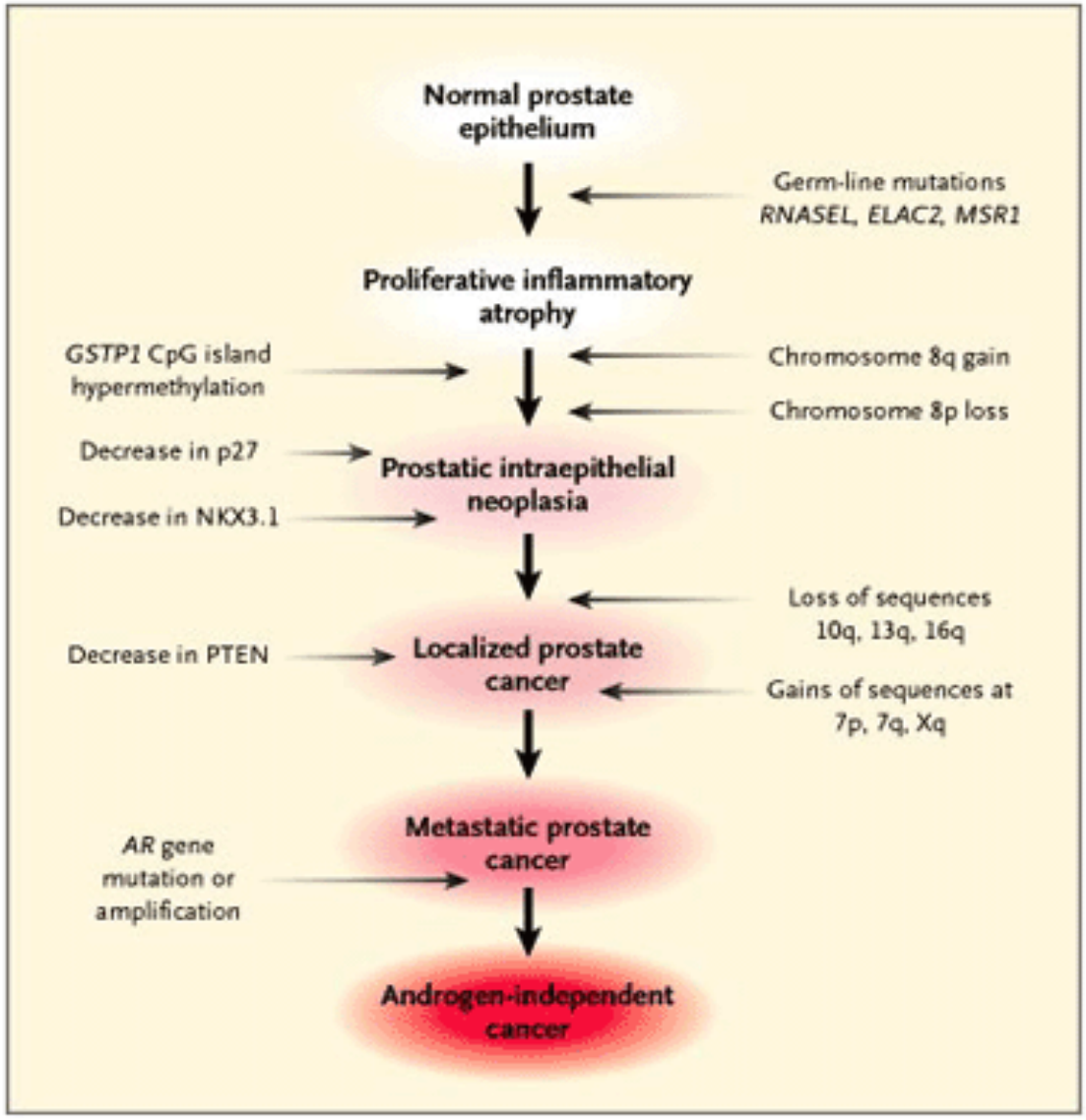
GGCTTTAAGTATCCAT

© 2000 Myriad Genetic Laboratories

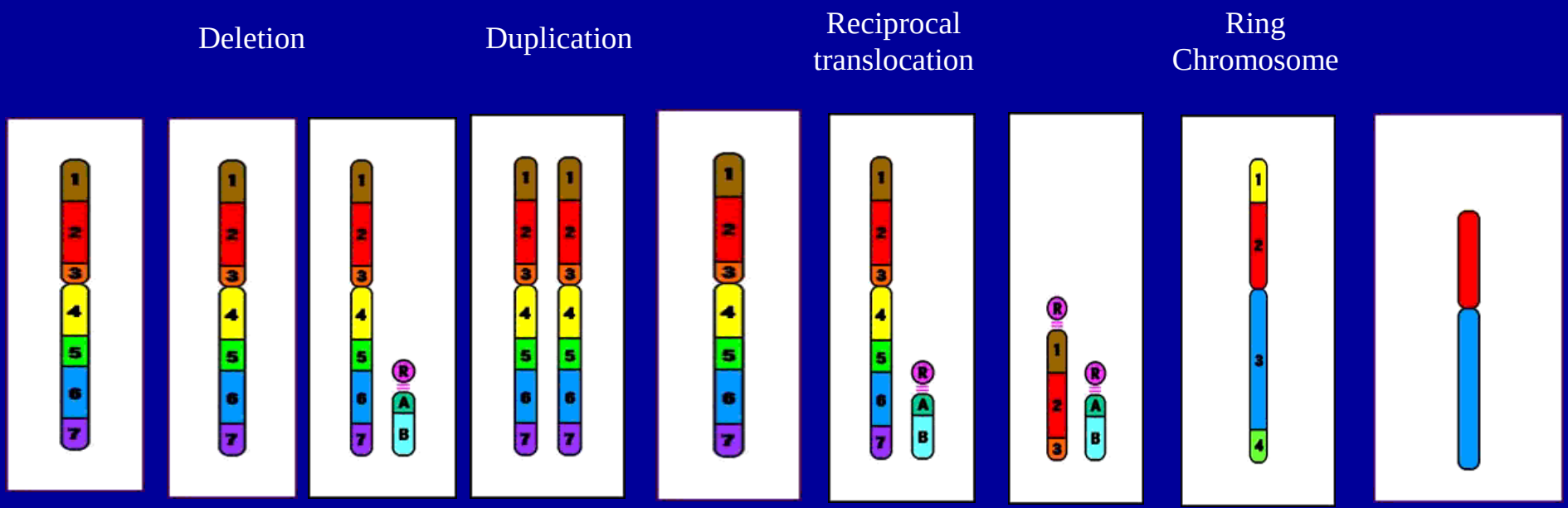


Dirk brings his family tree to class.


A
Transition zone
Peripheral zone
2 cm
B
Carcinoma
High-grade prostatic intraepithelial neoplasia
Atrophy
C


Normal prostate epithelium
Germ-line mutations
RNASEL, ELAC2, MSR1
Proliferative inflammatory atrophy
GSTP1 CpG island hypermethylation
Chromosome 8q gain
Chromosome 8p loss
Decrease in p27
Prostatic intraepithelial neoplasia
Decrease in NKX3.1
Loss of sequences 10q, 13q, 16q
Decrease in PTEN
Localized prostate cancer
Gains of sequences at 7p, 7q, Xq
Metastatic prostate cancer
AR gene mutation or amplification
Androgen-independent cancer

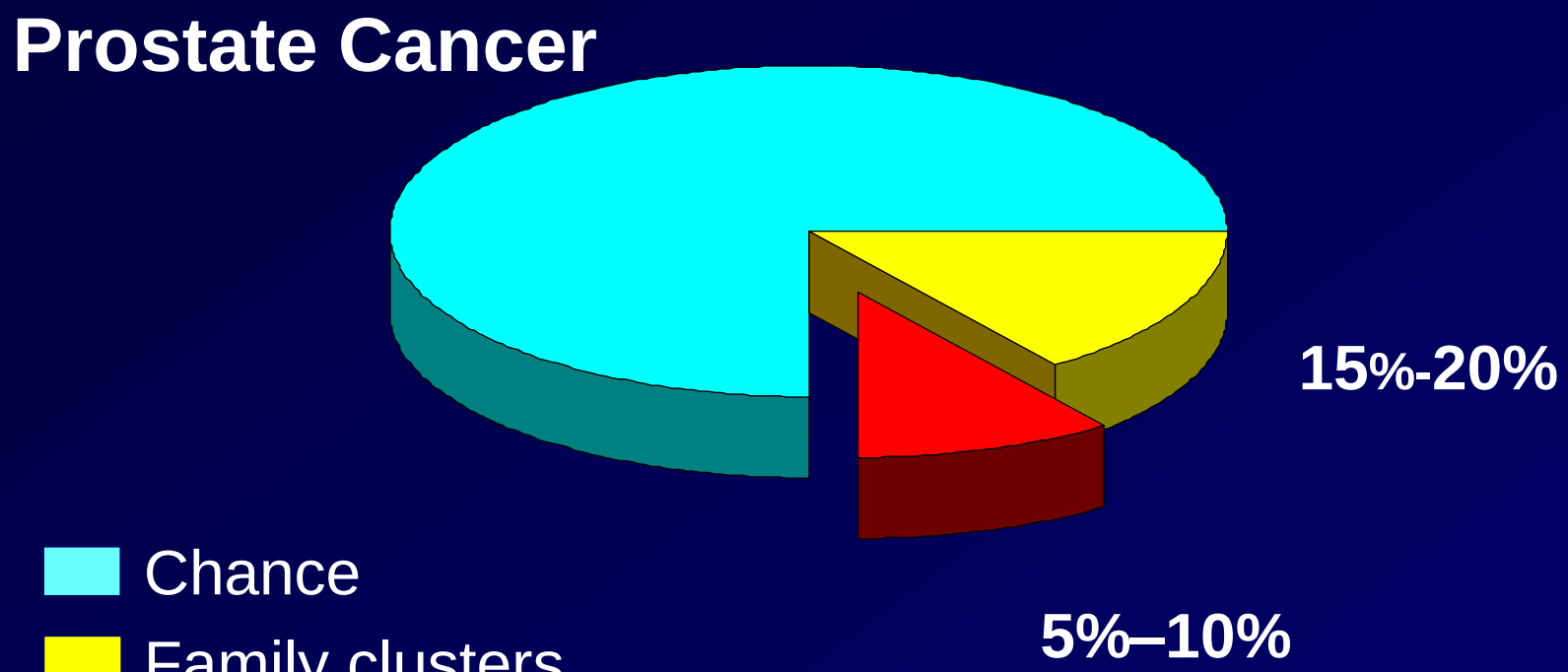
Chromosomal changes in the genome of cancer cells: tip of the iceberg

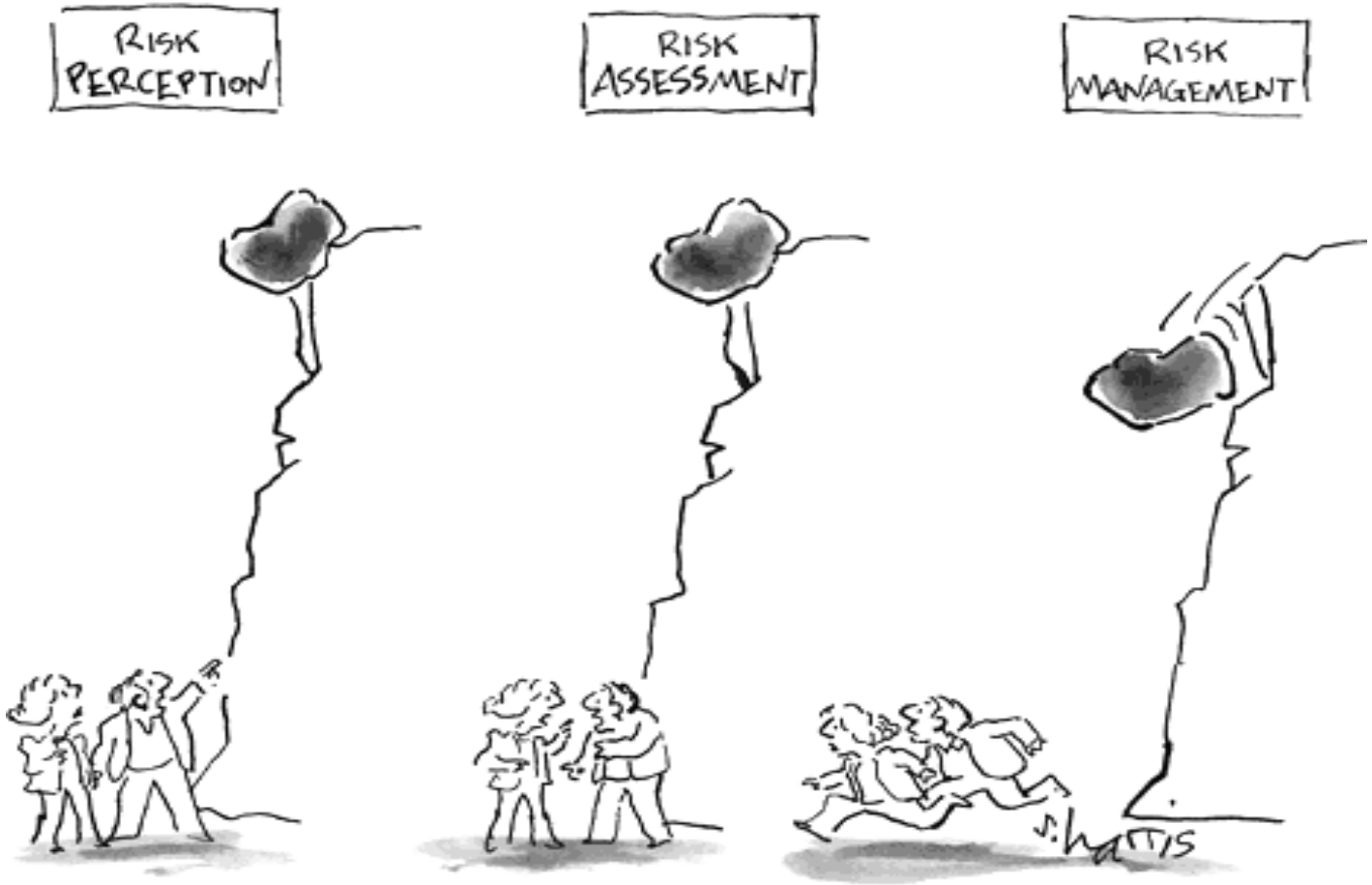


http://www.tokyo-med.ac.jp/genet/cai-e.htm

Prostate Cancer

Only a proportion is inherited





PSA /PCA3 POLARIS CONFIRM-Dx

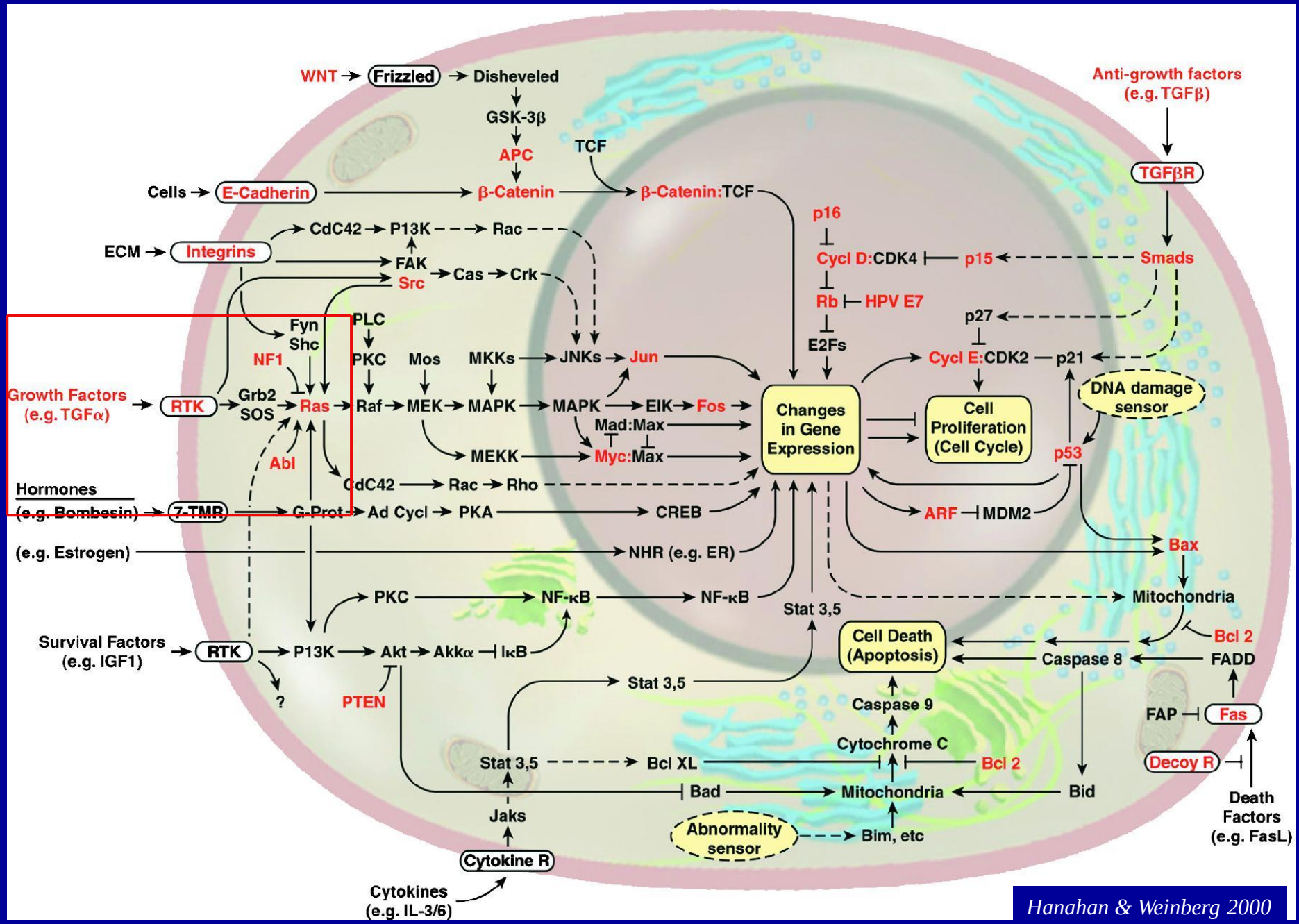
The six SNPs with the smallest P values of the SAPCS cohort (Stage 2)

SNP ID	P*value	OR (95% CI)*	Location
1. rs6983561 (C)	0.0024 *	1.54 (1.12-2.13)	8q24 region 2
2. rs1859962 (G)	0.0276 *	1.50 (1.03-2.20)	17q24
3. rs13254738 (C)	0.0363 *	0.70 (0.50-0.96)	8q24 region 2
4. rs10090154 (T)	0.0815	0.55 (0.36-0,83)	8q24 region 1
5. rs4242382 (A)	0.3189	0.07 (0.50-1.00)	8q24 region 1
6. rs1465618 (A)	0.4336	1.80 (1.02-3.16)	2p21

Tindall E; Hayes V; Bornman R; Segone A

Nat Gen, May 2007

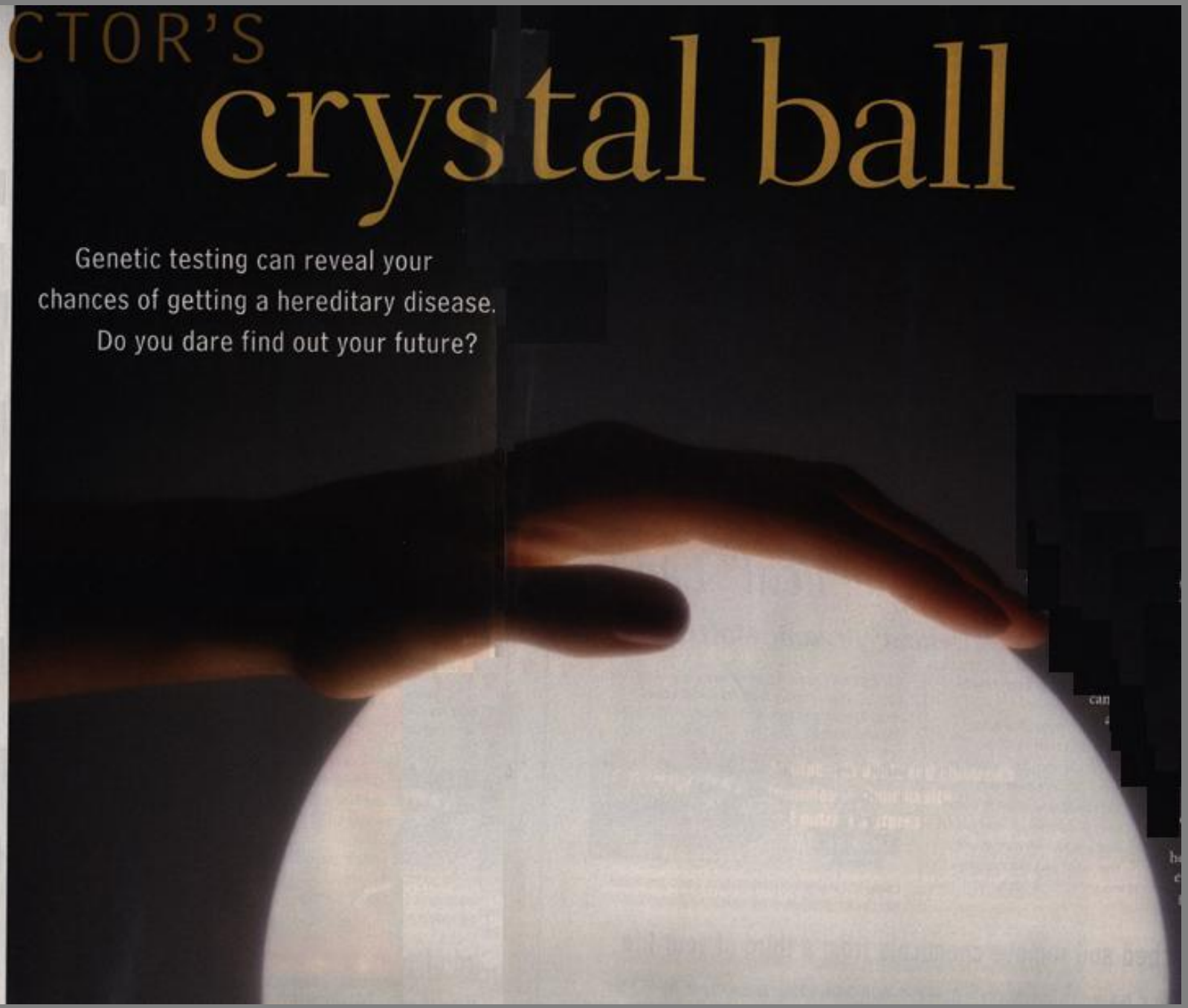
Summary of 30 years of research (1971-2001)



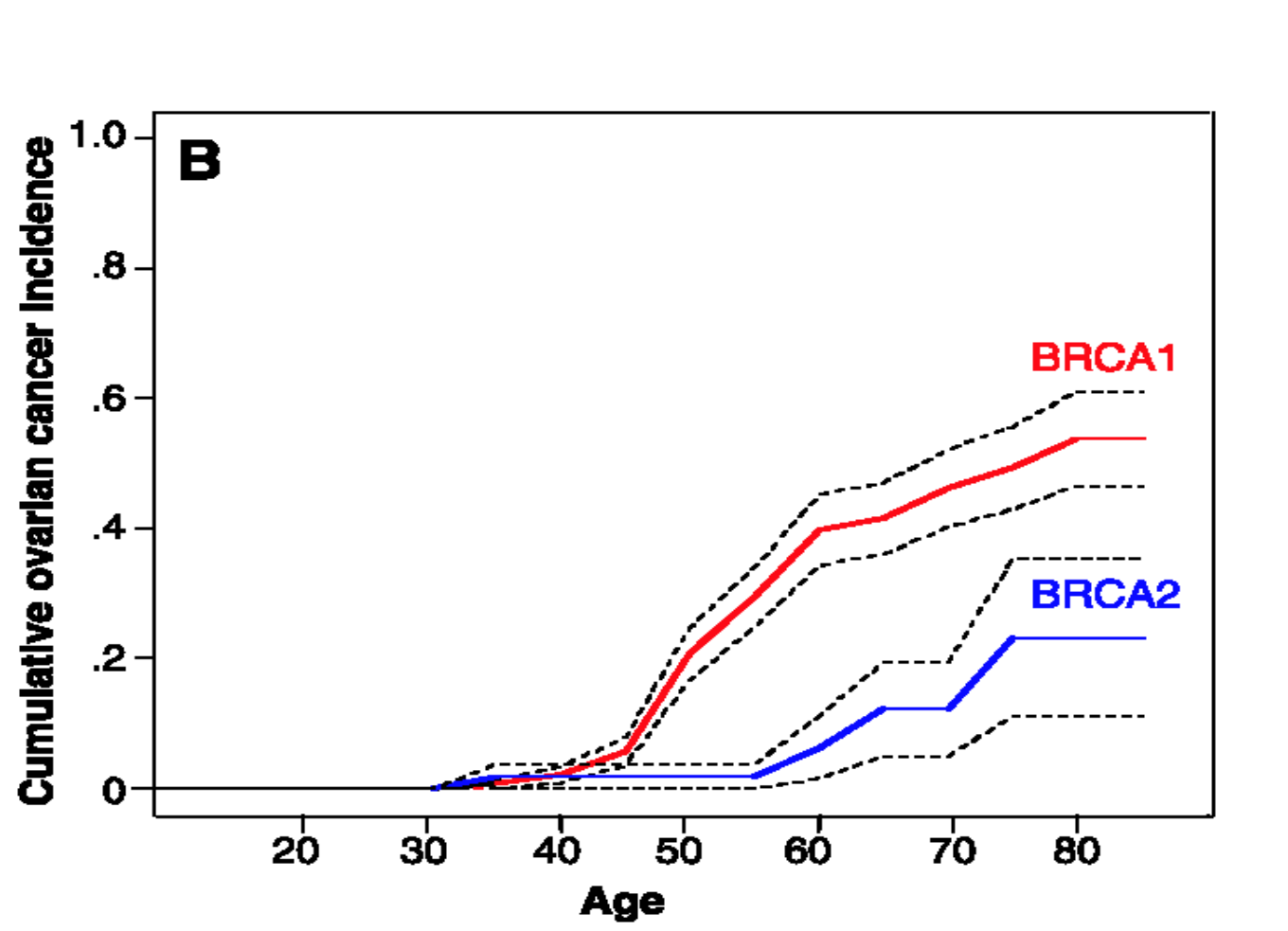
Hanahan & Weinberg 2000

A DOCTOR'S crystal ball

Genetic testing can reveal your chances of getting a hereditary disease. Do you dare find out your future?



Ovarian Cancer Incidence in BRCA+ Women

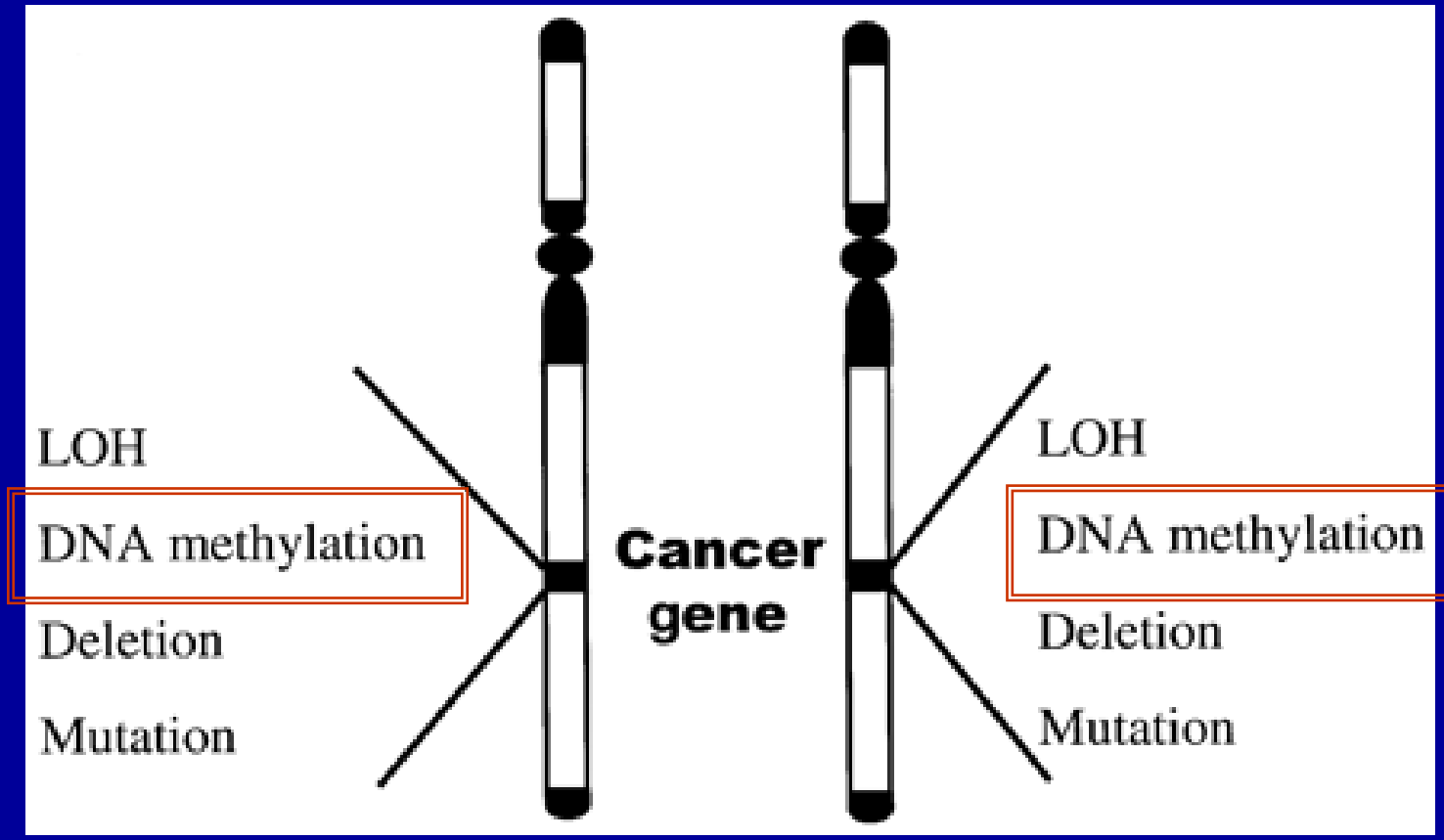


54% lifetime

23% lifetime

MC King (2003) Science.

Genetic and Epigenetic Silencing of Tumor Suppressor Genes



Plass - 2002

HAMBURGER $2.35
CHEESEBURGER $2.95
TUNA SALAD $2.75
EGG SALAD $2.65
OMELETTE $3.10
BEEF STEW $3.45
FISH FILI $3.10
RISKS
BENEFITS