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Developing base rates

Data sources:

a) Local insured population experience

b) Adjusted local general population statistics

c) Adjusted foreign statistics

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Issues with emerging population experience:

- Reports are age-banded
- Lack of credible results by age, disease, gender, smoking status, etc…
- Need to adjust for reporting lags
- Participating companies change over time
- Participating companies code events differently

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Issues with local general population data:

- Population incident rates must be adjusted:
  - to match insurance definitions
  - to account for overlaps between coverages
  - to account for first event
  - to reflect product features
- Trend population data from date published to current date
- Covert general population rates to insured population rates
- Incorporate selection, smoker differentials, etc

RGA

5

Issues using foreign statistics:

- Need to reflect:
  - Genetic difference,
  - Environmental differences,
  - Ability to underwrite and manage claims,
  - Health care system,
  - Legal system,
  - Impact of screening programs,
  - Sophistication of policyholders, agents and brokers
  - Etc…

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Reality is we generally are required to use a blend of the three methods discussed above.

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UK Emerging Insured Population Experience

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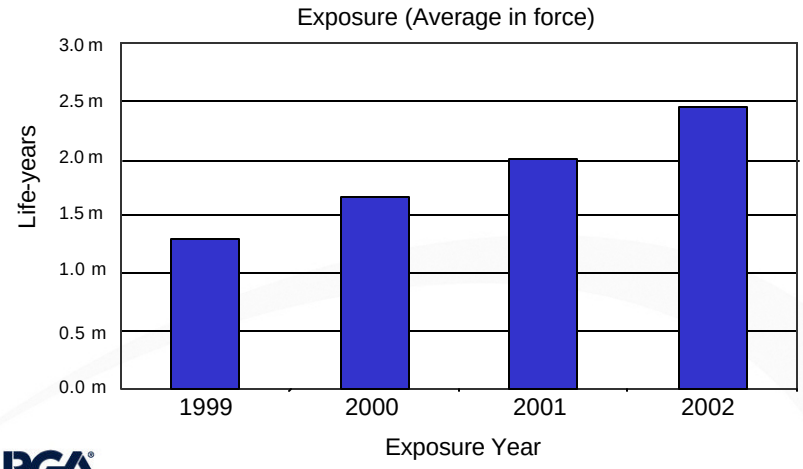
Exposure by Year



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9

Portfolio Turnover

Number of Portfolios			
Year	Joining	Leaving	Included
1999	13	0	13
2000	5	1	17
2001	0	0	17
2002	1	0	18

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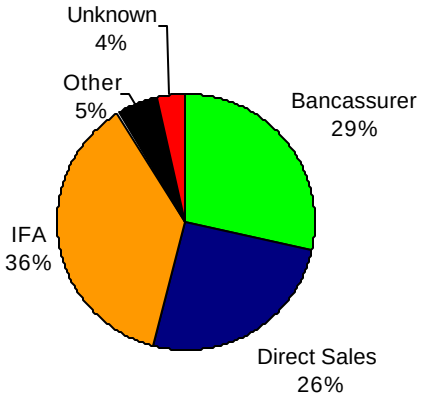
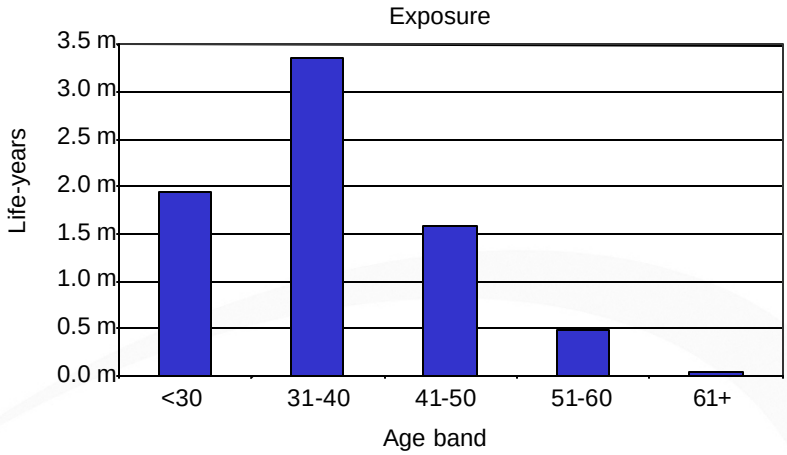
Split by Sales Channel



11

Exposure by Age Band



12

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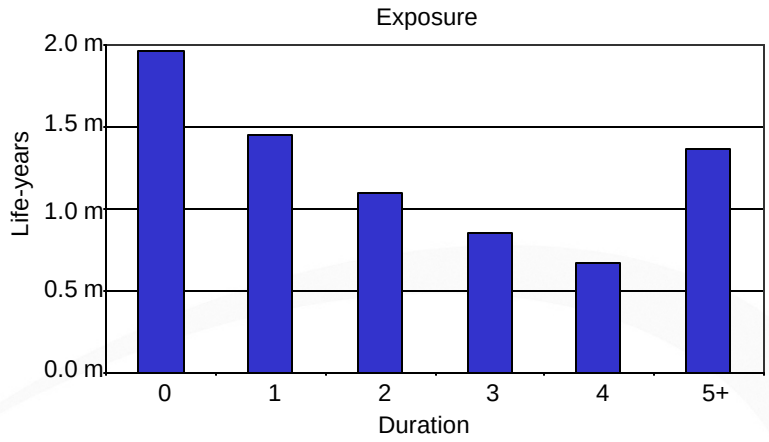
Exposure by Duration



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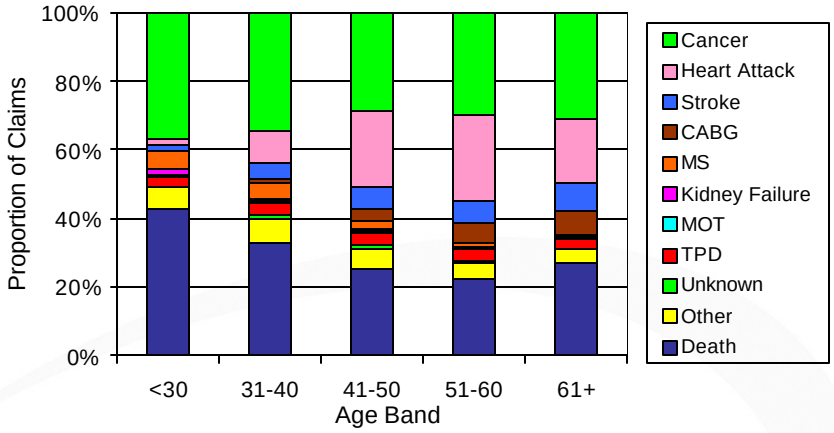
Claims by Cause and Age - Males



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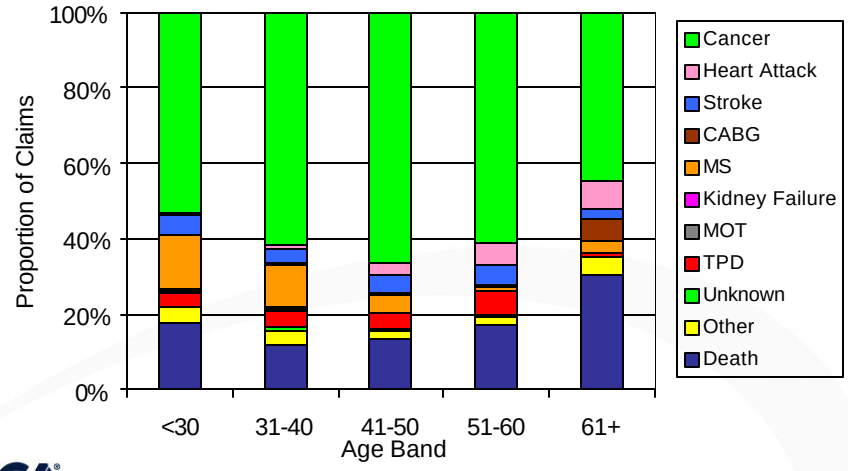
Claims by Cause and Age - Females



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Credibility

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Number of Claims

Accelerated vs. Stand-alone

Number of Claims		Number	% Split
Accelerated	CI Claims	7,978	67%
	Deaths	2,332	20%
		10,310	**87%**
Stand-Alone	CI Claims	1,493	13%
Total Claims		11,803	100%

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Claims by Category and Duration

Number of Claims by Category and Duration				
	MNS	MS	FNS	FS
Duration				
0	760	441	659	176
1	725	355	593	177
2	658	300	507	136
3	426	262	405	101
4	394	164	329	81
5+	1,198	370	764	208
Total	4,261	1,892	3,257	879

Poisson Confidence Table		
Prob.	5.00%	7.50%
90%	1082	481
95%	1537	683
99%	2656	1180

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Claims by Cause

Accelerated Business

Number of Claims by Cause		
Cause	No	% Split
Cancer	4,526	43.9%
Heart Attack	1,157	11.2%
Stroke	526	5.1%
CABG	229	2.2%
MS	465	4.5%
Kidney Failure	59	0.6%
MOT	25	0.2%
TPD	404	3.9%
Death	2,332	22.6%
Other	495	4.8%
Unknown	92	0.9%
	10,310	100.0%

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Adjusting for IBNS

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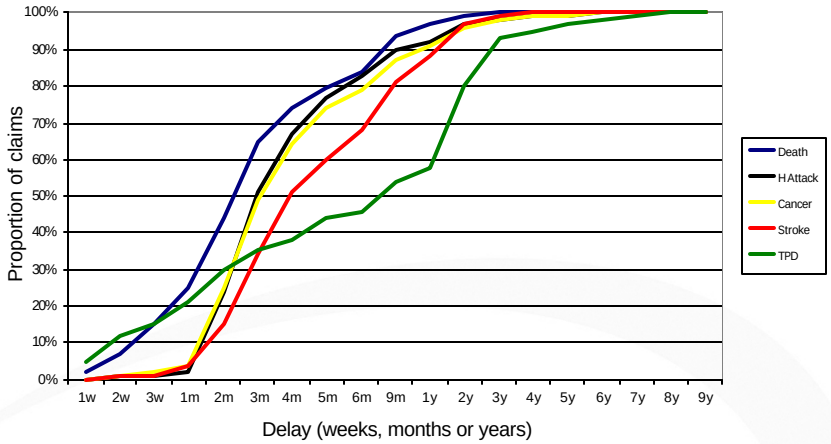
Claim Delays Observed by Cause



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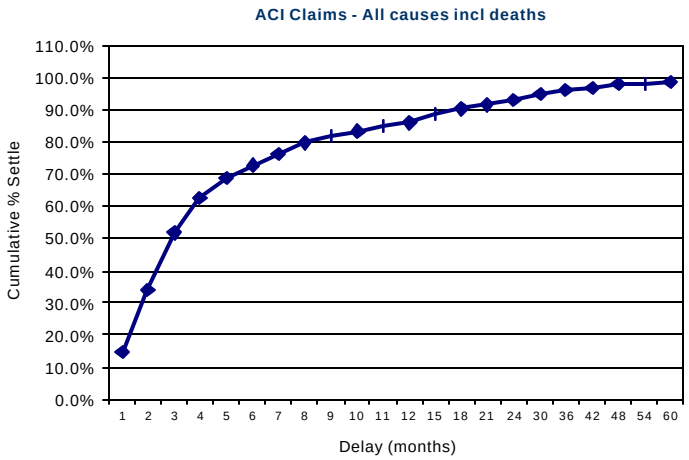
Claim Delays – All Causes

Accelerated Business



NOTE : Scale on x-axis is non-linear.

22

IBNS Gross-up Factors

Accelerated Business

Gross-Up Factor, for each year, by Duration				
Duration (yrs)	1999	2000	2001	2002
0	1.09	1.08	1.09	1.13
1	1.11	1.09	1.08	1.09
2	1.19	1.11	1.09	1.08
3	1.24	1.19	1.11	1.09
4	1.2	1.24	1.19	1.11
5	1.3	1.26	1.25	1.23
Total	1.17	1.15	1.14	1.14

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Overall Average 1.15

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Gross-up Factors for IBNS

A Deeper Level

- Different for different Investigation Years
- Different for different Durations
- Different for different Diseases
- Different for different Levels of Sum-assured

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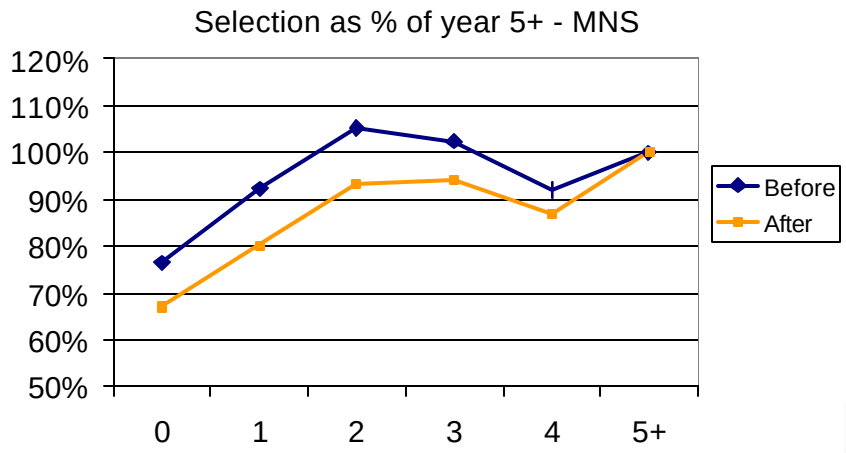
Shape of Selection

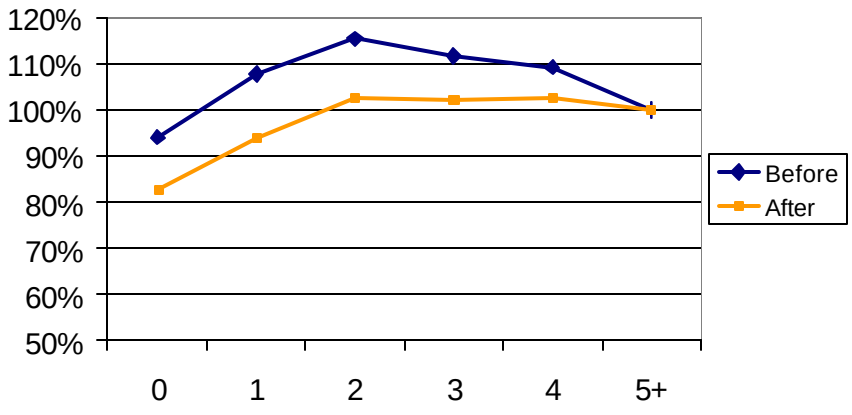
IBNS Selection Shape - MNS

Accelerated Business



IBNS Selection Shape - FNS

Accelerated Business



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Results and Comparisons

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Comparison with Previous

Comparison of Overall A/E 1999-2002 with 1998-2000 and 1991 to 1997				
A/E Ratios (Acceleration Business, Amounts Basis, incl. IBNS, all durations, all causes)				
	MNS	MS	FNS	FS
1999-2002	42.32%	74.32%	49.84%	61.22%
1998-2000	38.36%	75.15%	49.83%	61.17%
1991-1997	41.00%	62.00%	40.00%	49.90%
Differences				
1999/1998	10.33%	-1.11%	0.03%	0.09%
1999/1991	3.23%	19.87%	24.61%	22.69%

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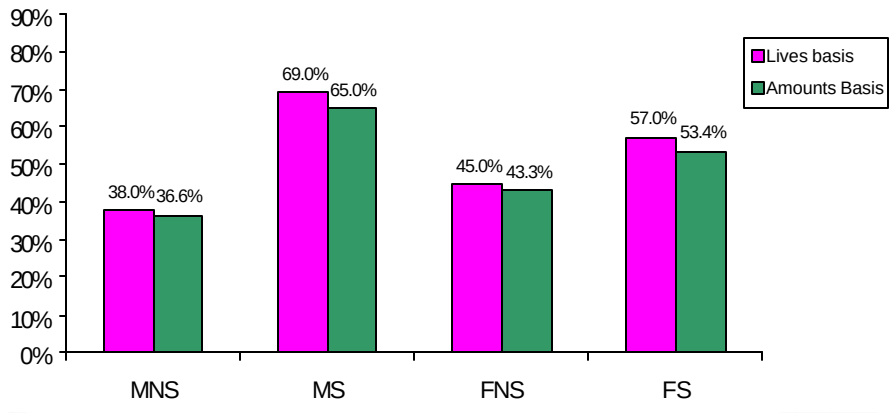
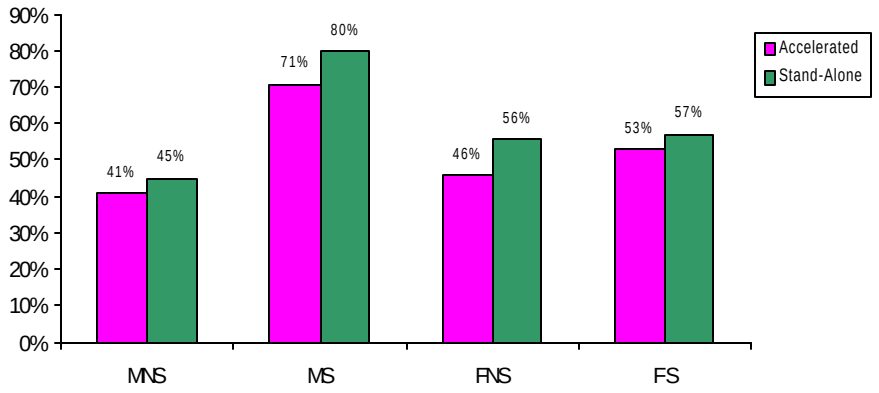
Lives Experience vs. Sum-Assured (Amounts) Experience 1999-2002



* A / E Ratios, before adjustment for IBNS
Acceleration Business 1999-2002
All durations, All causes

30

Accelerated vs. Stand-Alone 1999-2002



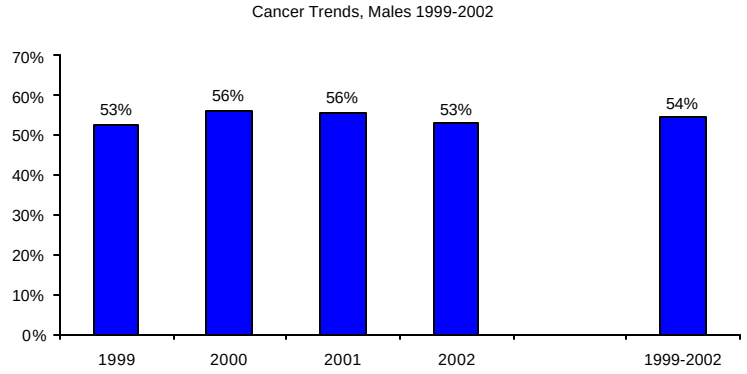
* A / E Ratios, before adjustment for IBNS
Amounts Basis 1999-2002
All durations, All causes excluding death

31

Trends in the Quadrennium

32

Trend in Claims by Cause:
Males 1999-2002



Acceleration business, lives basis

All Ages, All Durations NS +S

Not adjusted for IBNS; At the All Duration level, the IBNS adjustments are fairly similar across Investigation Years

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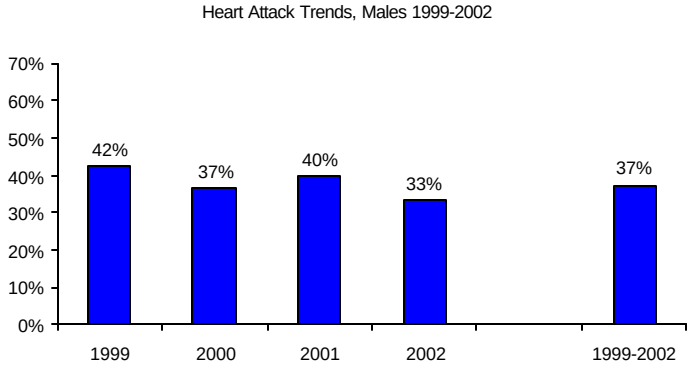
Trend in Claims by Cause:
Males 1999-2002



Acceleration business, lives basis

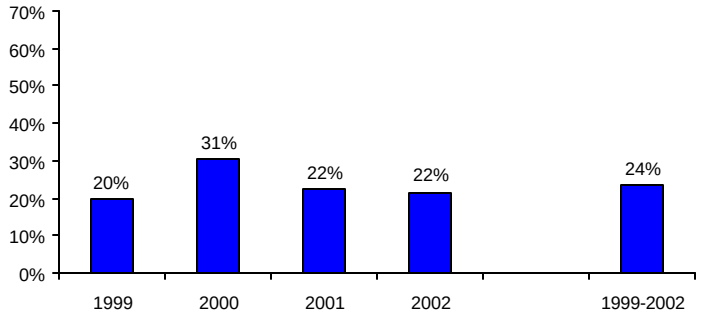
All Ages, All Durations NS +S

Not adjusted for IBNS; At the All Duration level, the IBNS adjustments are fairly similar across Investigation Years

34

Trend in Claims by Cause: Males 1999-2002

Stroke Trends, Males 1999-2002



Acceleration business, lives basis

All Ages, All Durations NS +S

Not adjusted for IBNS; At the All Duration level, the IBNS adjustments are fairly similar across Investigation Years

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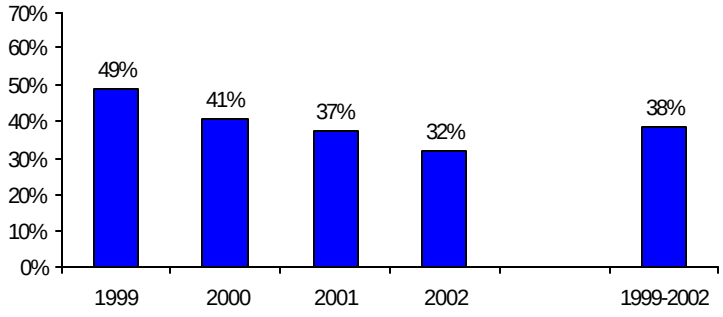
Trend in Claims by Cause: Males 1999-2002

Death Trends, Males 1999-2002



Acceleration business, lives basis

All Ages, All Durations NS +S

Not adjusted for IBNS; At the All Duration level, the IBNS adjustments are fairly similar across Investigation Years

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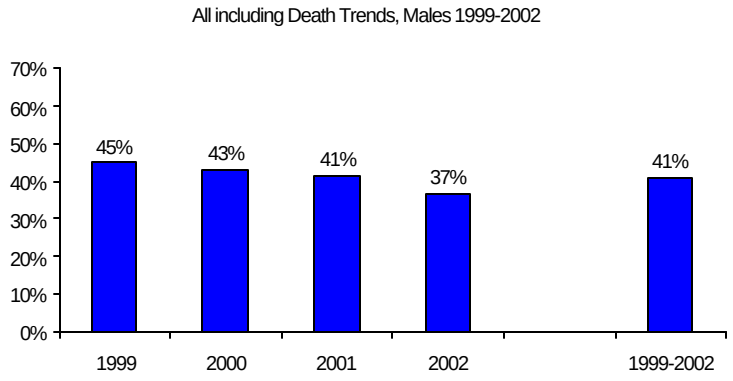
Trend in Claims by Cause:
Males 1999-2002



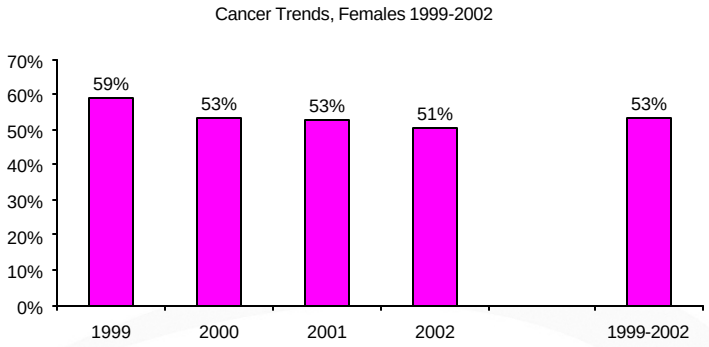
Acceleration business, lives basis

All Ages, All Durations NS +S

Not adjusted for IBNS; At the All Duration level, the IBNS adjustments are fairly similar across Investigation Years

37

Trend in Claims by Cause:
Females 1999-2002



Acceleration business, lives basis

All Ages, All Durations NS +S

Not adjusted for IBNS; At the All Duration level, the IBNS adjustments are fairly similar across Investigation Years

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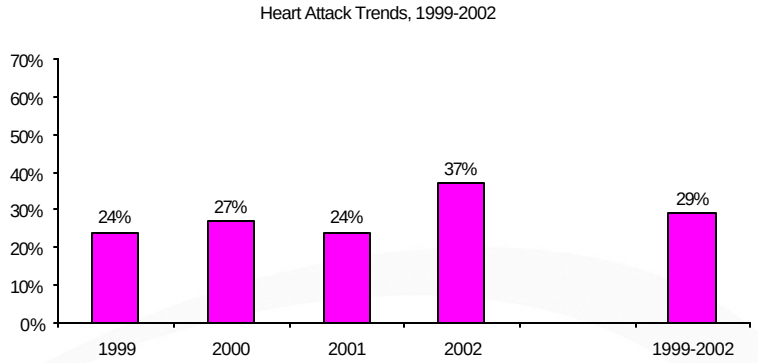
Trend in Claims by Cause: Females 1999-2002



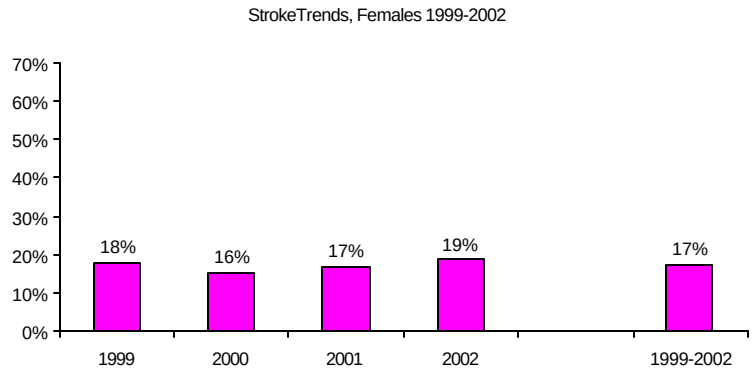
Acceleration business, lives basis

All Ages, All Durations NS +S

Not adjusted for IBNS; At the All Duration level, the IBNS adjustments are fairly similar across Investigation Years

39

Trend in Claims by Cause: Females 1999-2002



Acceleration business, lives basis

All Ages, All Durations NS +S

Not adjusted for IBNS; At the All Duration level, the IBNS adjustments are fairly similar across Investigation Years

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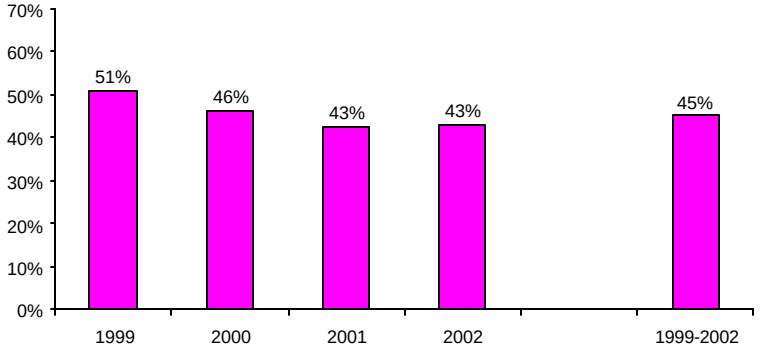
Trend in Claims by Cause:
Females 1999-2002
A/E



Acceleration business, lives basis

All Ages, All Durations NS +S

Not adjusted for IBNS; At the All Duration level, the IBNS adjustments are fairly similar across Investigation Years

11

Summary – UK experience

- CMI exposure grew rapidly, portfolios in flux.
- Exposure biased to shorter durations.
- Data significant for most categories and durations at 'all causes' level.
- Data less significant down to specific disease and age level.
- Claim delay pattern established – helpful for IBNS
- CMI raw results need grossing-up adjustments for IBNS.

12

Summary – UK experience

- Males experience is more select than females.
- 99-02 results slightly worse than 98-00, much worse than 91-97.
- IFA experience clearly better than the rest.
- Amounts experience better than lives experience.
- Acceleration experience better than stand-alone.
- No clear trends in quadrennium, but deaths look 'fishy'.

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Medical Advances Affecting Critical Illness

By Dr. Philip Smalley MD, FRCPC
Vice President and Medical Director
RGA International

Written for and presented at 8th GCA, Mumbai 10-11 March, 2006

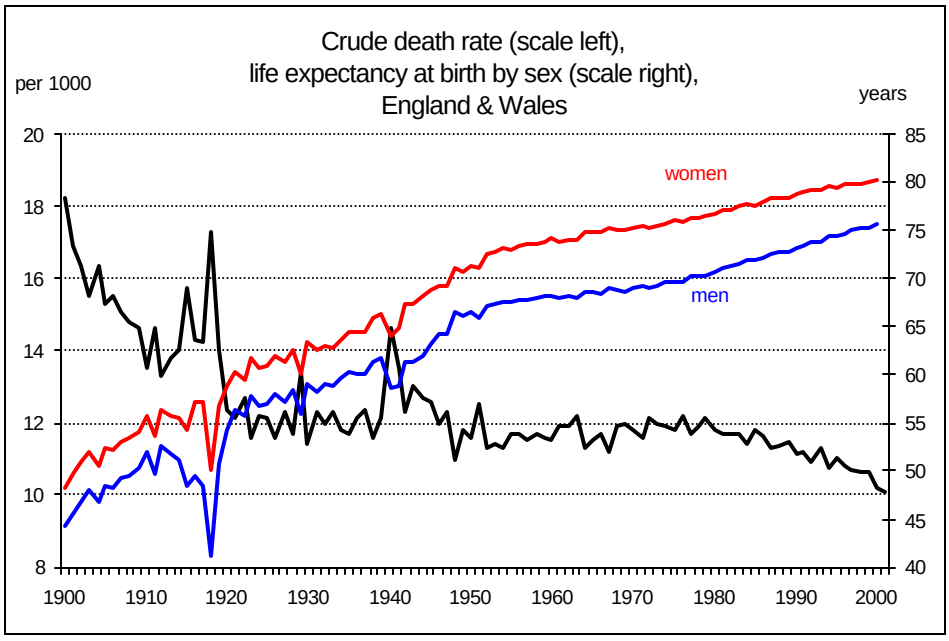
Age-Standardized Death Rates by Cause, Males

	Malignant neoplasms	Diabetes mellitus	Circulatory	Bronchitis, emphysema and asthma	Accidents and adverse events	All causes
Males						
Australia (2002)	*133*	*11*	*136*	*20*	*27*	*433*
Australia (1999)	**141**	**10**	**158**	**23**	**33**	**474**
Canada (1998)	149	13	168	5	30	511
Czech Republic (2000)	214	8	332	15	49	735
Denmark (1998)	169	13	202	35	32	616
Finland (2000)	126	8	231	19	52	595
France (1998)	163	8	136	8	43	558
Germany (1999)	158	11	228	21	24	577
Greece (1999)	146	4	220	1	47	538
Hungary (2000)	264	12	418	30	55	999
Ireland (1999)	161	10	252	7	32	651
Italy (1999)	164	12	178	16	31	515
Japan (1999)	151	6	122	10	29	465
Korea, Republic of (2000)	163	27	144	24	60	664
Netherlands (1999)	172	10	183	30	19	553
New Zealand (1999)	156	15	204	12	33	547
Norway (1999)	143	8	200	21	31	540
Poland (2000)	204	9	339	21	54	828
Portugal (2000)	154	14	198	5	31	663
Slovakia (2000)	219	10	389	17	54	874
Spain (1998)	171	9	163	6	39	556
Sweden (1999)	122	9	201	13	21	483
Switzerland (1999)	137	10	159	20	n.a.	484
United Kingdom (1999)	152	8	213	8	19	567
United States (1999)	147	16	206	28	42	597

Australian Institute of Health and Welfare 2004

ABS Cat. No. 3201.0; AIHW National Population Database

Death Rates and Life Expectancy



What are we concerned about?

- Population Trends
  - You can only stop smoking once
  - Obesity
  - Infection / Pandemics
- Changes
  - Screening / Early Detection
  - Awareness
  - Disease Definitions
- New cures
- Legal Challenges

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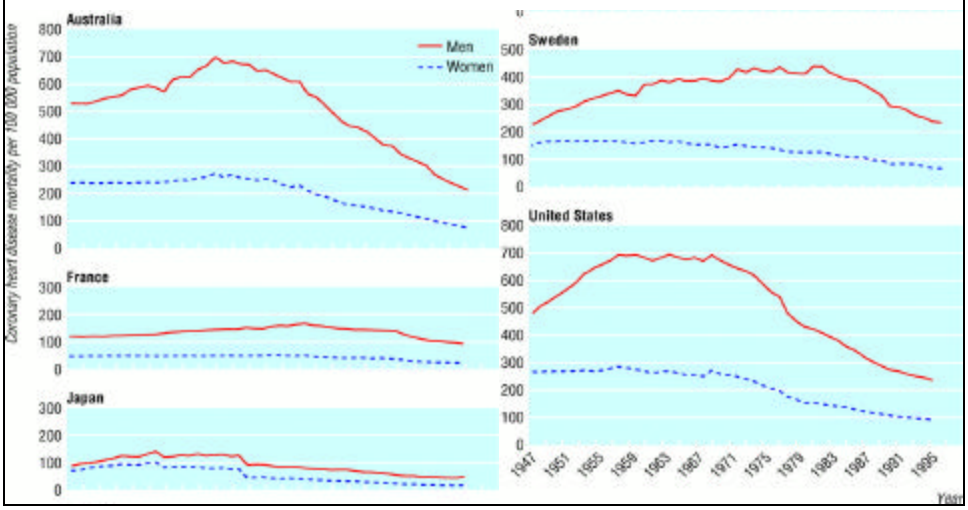
Trends in Coronary Heart Disease Mortality



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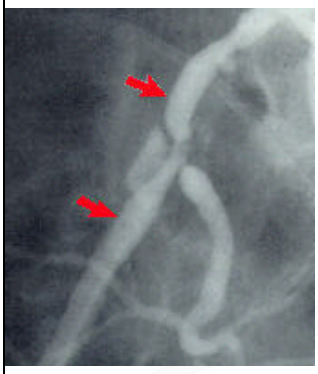
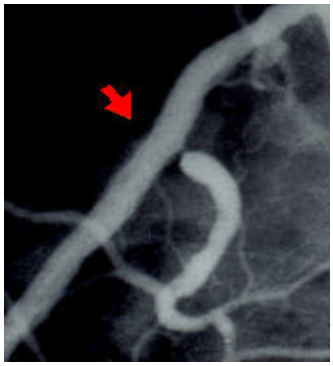
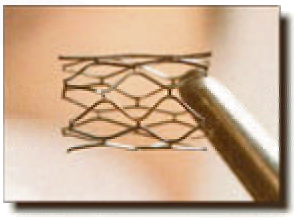
New Cardiovascular Disease Treatments



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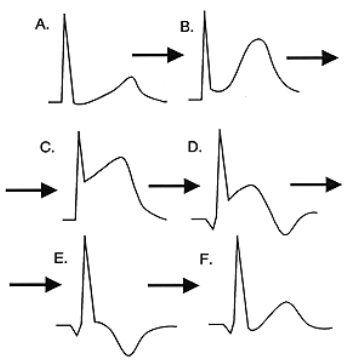
Old Heart Attack Definition

- Chest pain
- ECG changes
- Cardiac enzymes leak into blood stream



Evolution of Acute MI

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New Heart Attack Definition: American ACC/European ESC 2000

- Clinical context compatible with ischemic myocardial damage
- Elevated Cardiac Troponin

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Impact of New MI Definition

- Pell et al showed that “The new criteria increased admissions for myocardial infarction by 58%”

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Pell JP, BMJ. 2003 January 18; 326 (7381): 134–135

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UK ABI Critical Illness Definition for Stroke

- A cerebrovascular incident resulting in permanent neurological damage. Transient ischaemic attacks are specifically excluded.

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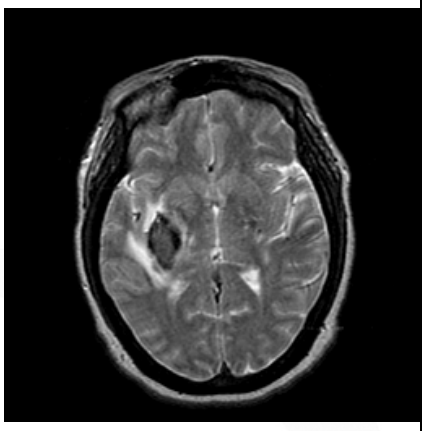
What is "Damage" or "Deficit"?

- Psychiatric?
- Seizures?
- Silent Strokes
  - Cardiovascular Health Study
  - 3,324 participants without a history of stroke
  - 28% had evidence of silent infarcts (n = 923)



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Bernick C et al, Neurology 2001 Oct 9;57(7):1222-9

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Obesity

Observed and Projected Life Expectancy at Age 65 for U.S. Females (1900 to 2000)

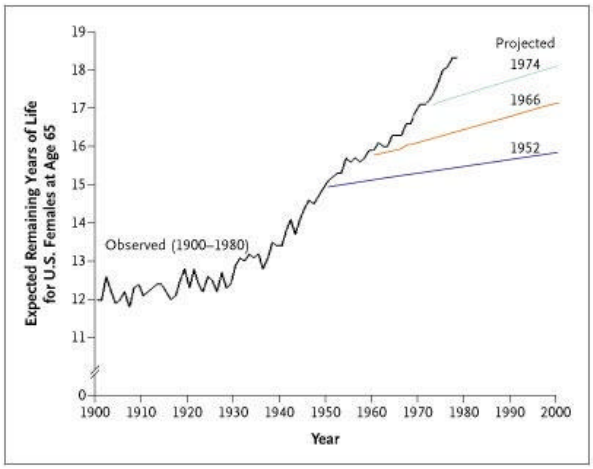

Figure from Olshansky, SJ et al, NEJM, March 17,2005;352 (11):1138

Observed and Projected Life Expectancy at Age 65 for U.S. Females (1980 to 2050)

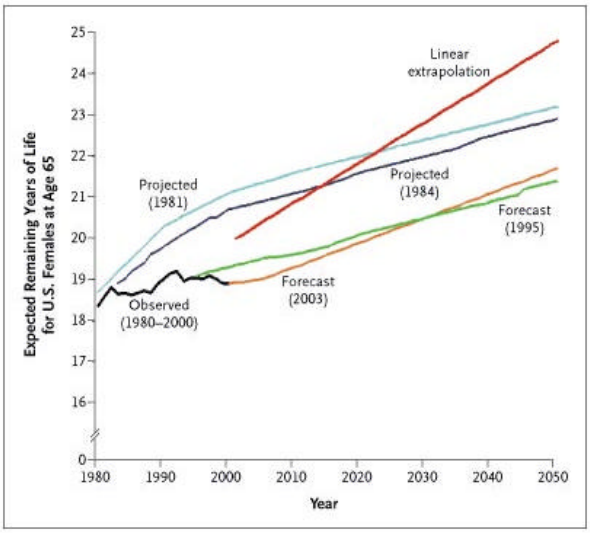

Figure from Olshansky, SJ et al, NEJM, March 17,2005;352 (11):1138

Cancer Advances

- Better screening and earlier diagnosis
- New treatments and cures

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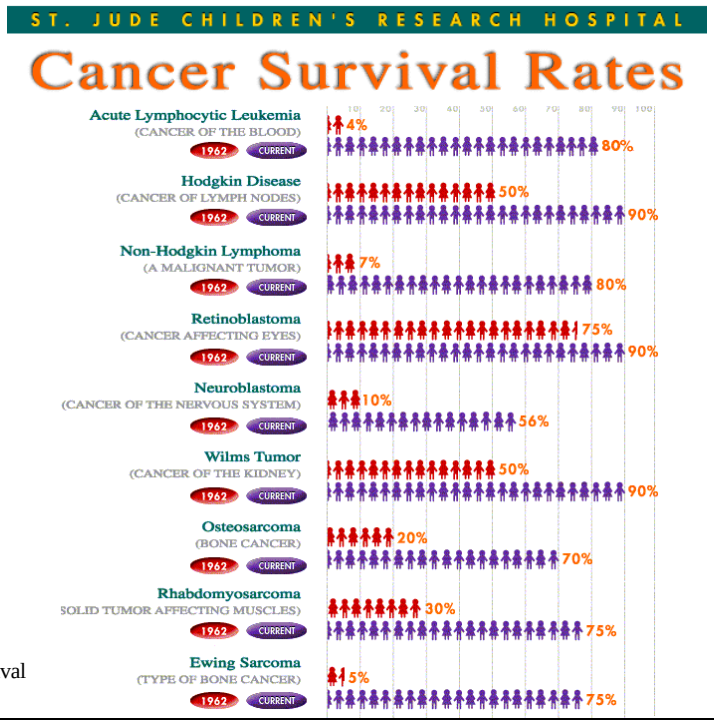

St. Jude's Children's Research Hospital – Cancer Survival Rates

Magic Bullet Therapy

- Gleevec (imatinib meslate)
  - BCR-ABL tyrosine kinase inhibitor
  - Only Leukemia cancer cells die
  - FDA approval May 10, 2001
  - US $2,400 per month

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Doctors of the Past….

Doctor of the Future…..

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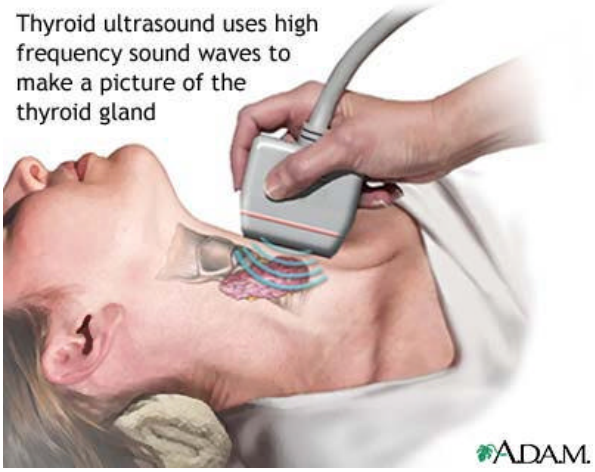
Thyroid ultrasound



http://www.nlm.nih.gov/medlineplus/ency/imagepages/18056.htm

Thyroid Cancer Screening

- 697 women who presented for breast U/S with no thyroid history
  - 246 (35.3%) were found to have thyroid nodules
  - 21 (3.0%) found to have thyroid cancer

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Lee HK et al, Yonsei Med J. 2003 Dec 30;44(6):1040-4

Trends in Breast Carcinoma In-Situ Australia

Table 1: Cancer registry new cases of DCIS, 1993 to 1998

Age at diagnosis	1993	1994	1995	1996	1997	1998
0–19 years	0	0	0	0	1	0
20–29 years	4	2	5	2	10	5
30–39 years	41	46	52	37	48	46
40–49 years	151	174	182	207	237	240
50–59 years	190	227	283	287	328	367
60–69 years	159	193	214	234	256	308
70+ years	90	113	189	175	167	219
Total	**635**	**755**	**925**	**942**	**1,047**	**1,185**

Source: State and Territory Cancer Registries

~ 17% of all new breast cancers are CIS

Claim for Breast Cancer

- 38 year old female
- Mother had breast cancer at 52 years old
- Sister had breast cancer at 39 years old
- Critical Illness issued at +100

- 6 months post issue:
  - Genetic Test BRCA 1 positive
  - Treated with bilateral mastectomy and oopherectomy

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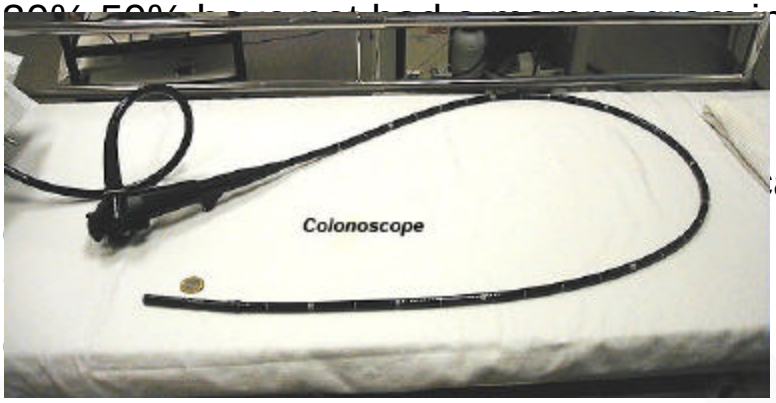
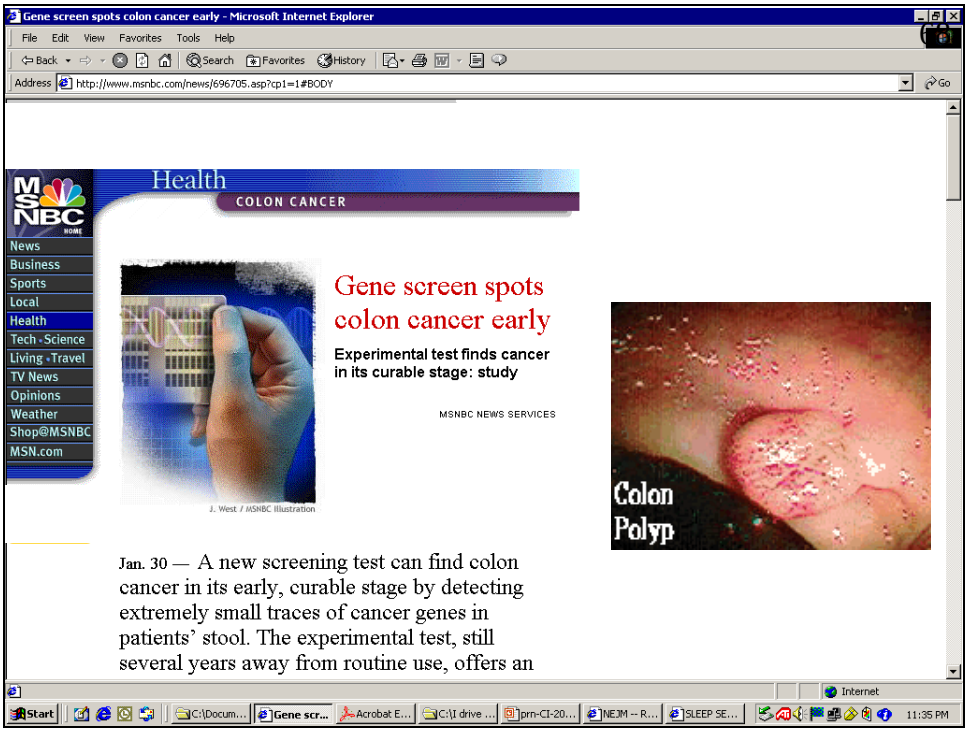
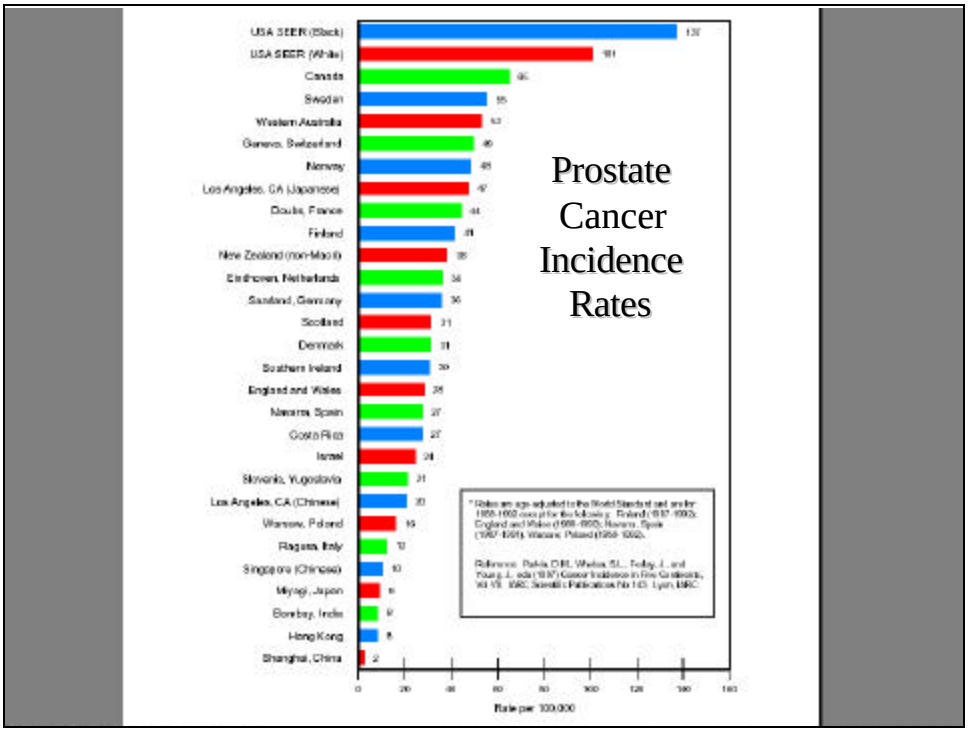
Screening


Colonoscope


Gene screen spots colon cancer early - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://www.msnbc.com/news/696705.asp?cp1=1#BODY
MSNBC
Health
COLON CANCER
News
Business
Sports
Local
Health
Tech - Science
Living + Travel
TV News
Opinions
Weather
Shop@MSNBC
MSN.com
Gene screen spots colon cancer early
Experimental test finds cancer in its curable stage: study
MSNBC NEWS SERVICES
Colon Polyp
Jan. 30 — A new screening test can find colon cancer in its early, curable stage by detecting extremely small traces of cancer genes in patients' stool. The experimental test, still several years away from routine use, offers an



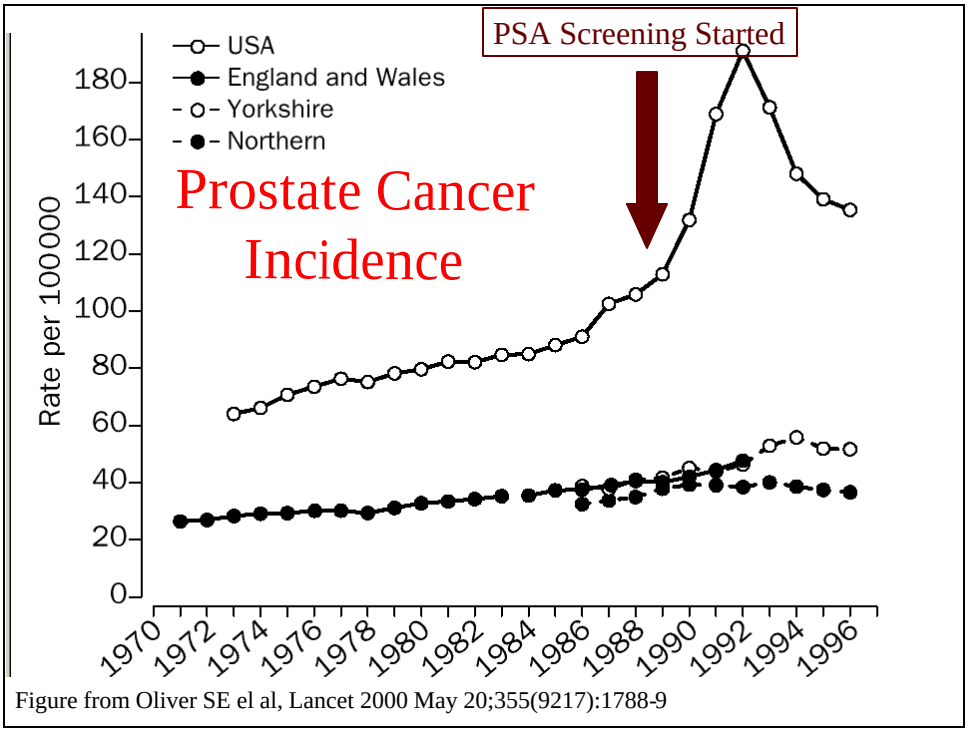
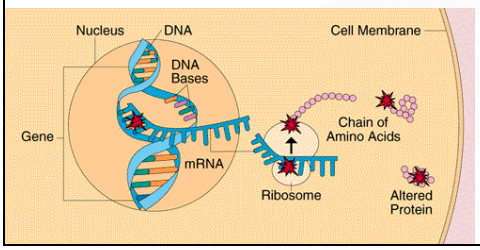


Figure from Oliver SE el al, Lancet 2000 May 20;355(9217):1788-9

Proteomic Screening

- PSA misses about 1/3 of prostate cancers
- NMP48
  - Increased specificity and sensitivity compared to PSA with a 91% predictive value
  - detected 92% of the PSA missed cancers



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UK Critical Illness Cancer Definition

- Any malignant tumour characterized by the uncontrolled growth and spread of malignant cells and invasion of tissue. The term cancer includes leukaemia and Hodgkin's disease but the following are excluded:

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UK Cancer Exclusions

- All tumours which are histologically described as pre-malignant, as non-invasive or as cancer in situ
- All tumours of the prostate unless histologically classified as having a Gleason score greater then 6 or having progressed to at least TNM classification T2N0M0
- All forms of lymphoma in the presence of any Human Immunodeficiency Virus
- Kaposi's sarcoma in the presence of any Human Immunodeficiency Virus
- Any skin cancer other than invasive malignant melanoma

Extra Singapore Cancer Exclusions

- Melanomas of less than 1.5mm Breslow thickness, or less than Clark Level 3
- Prostate Cancers histologically described as TNM Classification T1a or T1b or Prostate cancers of another equivalent or lesser classification
- T1N0M0 papillary micro-carcinoma of the Thyroid less than 1 cm in diameter
- Papillary micro-carcinoma of the Bladder
- Chronic Lymphocytic Leukemia less than RAI Stage 3
- All tumors in presence of HIV

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What is the definition?????

- Insurer's view
- Doctor's view
- Policyholder's view
- Ombudsman's and Lawyer's view

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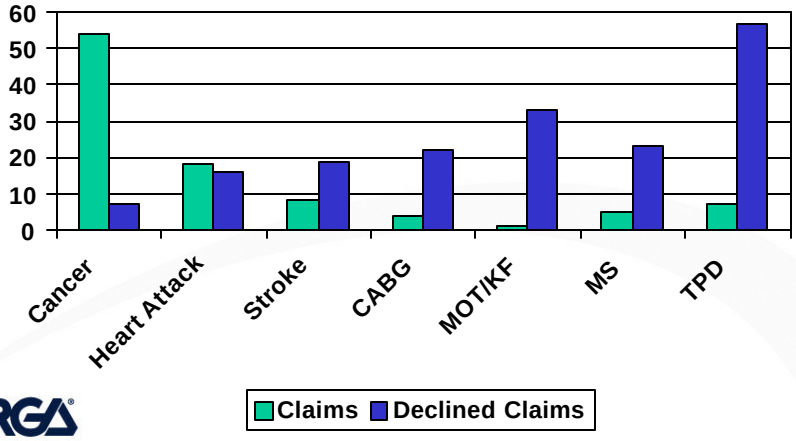
Cause of Claims and Decline Rates – UK data 1991 - 1997



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Summary

- Past trends do not necessarily reflect future incidence rates
- More screening and prevention
- New therapies and cures
- Medical definitions are evolving
- Need to be clear to public what is covered and what is not

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Indian Insights

By Stuart Land, FIA, FASSA

Thank You !!

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