

The Health and Nutrition Link

“ Can Functional Foods Reduce Health Care Costs?”

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Functional Food Definition

Any modified food or food ingredient that may provide a health benefit beyond the traditional nutrients it contains *

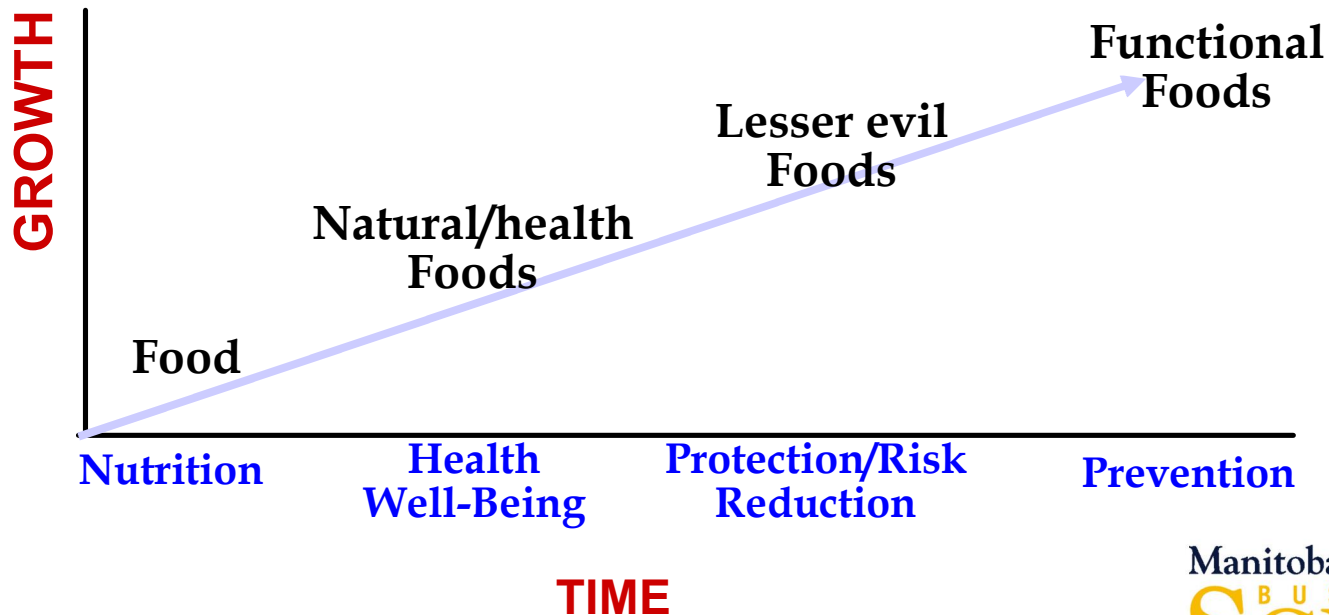
*C.Hasler, FFN, Univ. Illinois.

Transformation/Evolution of Foods

Eating Traditional Food \longrightarrow Healthy Eating / Functional Food



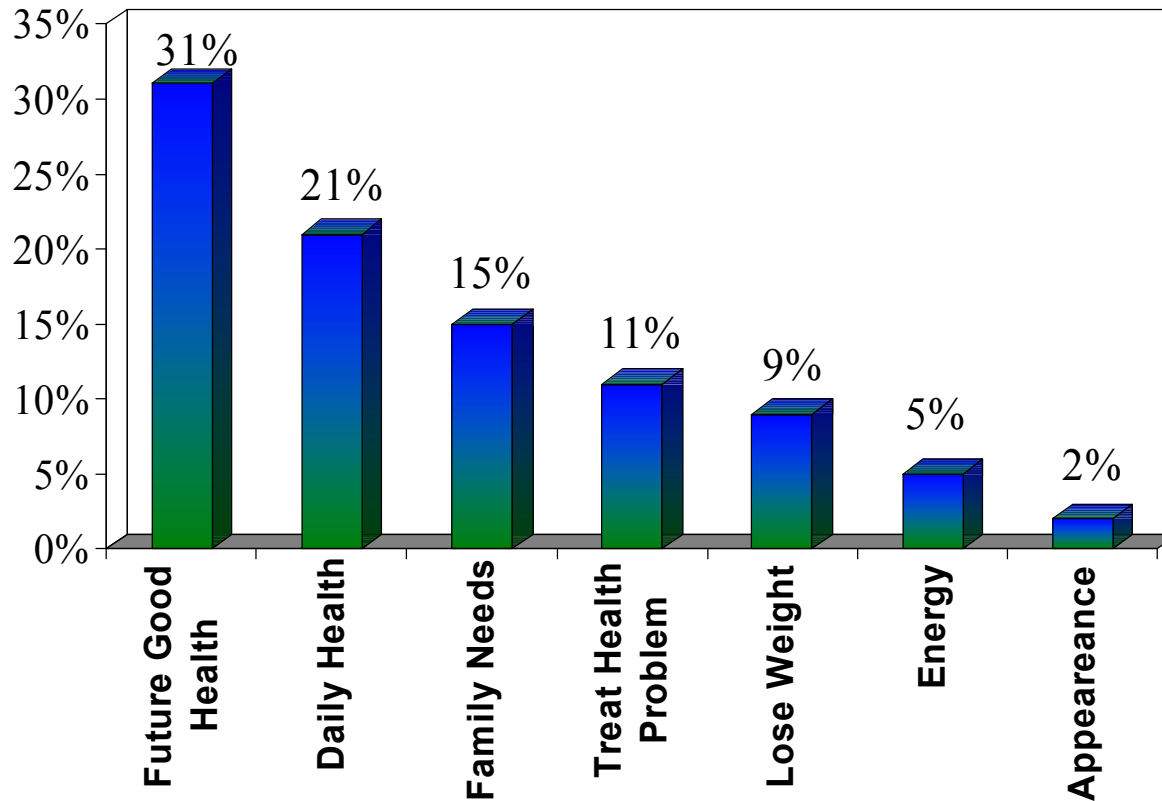
Developing Nutrition Science



Examples of Food/Eating Evolution

- **Orange Juice** → **Health Drink** (Ca, vitamins)
- **Energy Bars** (Sports persons) → **Health Bars** (All consumers)
- **Calcium Supplements** → **Viactive Chews**
- **Dairy products/yoghurt** → **Health Drink** (Yakult, Actimel, LC-1)
- **Spreads** → **Health Food** (Benecol et al)
- **RTE Cereals** → **Health Muesli** (Plus fortified)

Why Do People Purchase Healthy Foods/Beverages

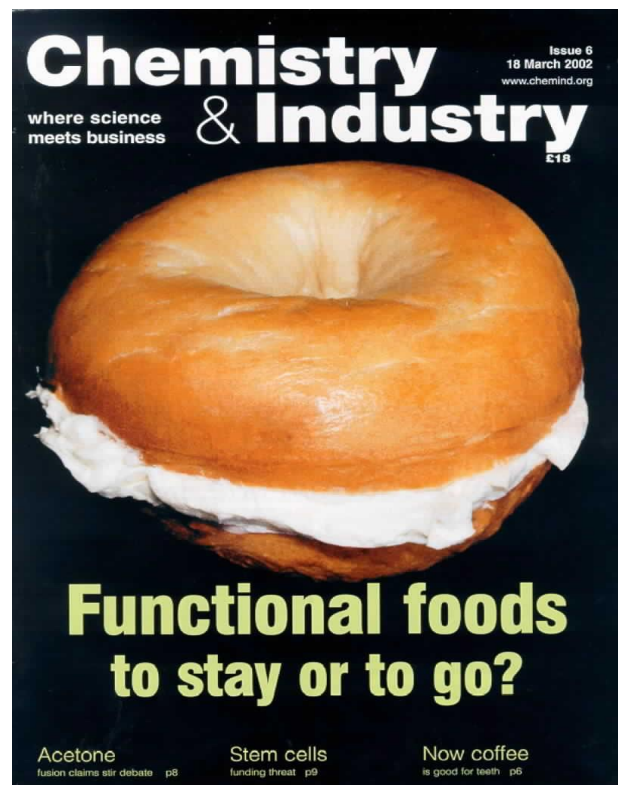


Functional Foods: Here Today Gone Tomorrow?

- Most people would argue that they are here to stay

Rationale

- Aging population
- Chronic disease epidemic
- Rising health care costs
- New nutrition science
- Consumer choice for healthier foods, eating habits changing
- Government regulations
- Food marketers looking for growth

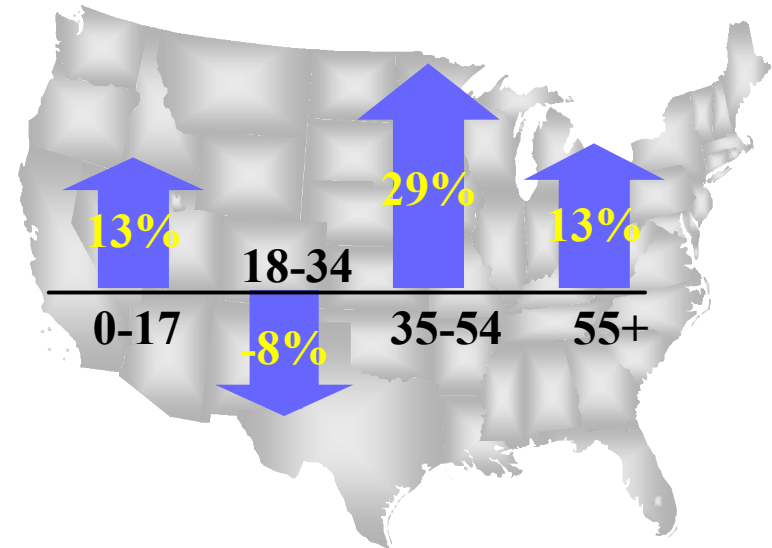


Population Growth and Chronic Disease

By 2005.....

- 1.5 million suffers of Alzheimer's disease
- 20 million diabetics
- 46 million cases of Hypertension
- 6 million congestive Heart Failure cases
- 195 million overweight or obese
- 200 thousand reports of Prostate Cancer
- 247 thousand Breast Cancer patients
- 2 million cataract operations per year

Population Growth Trends 1990 - 2000



Health Care Costs - Retirees to Pay More

Atlanta Journal-Constitution: ajc.com: Future retirees likely to pay most or all health care co - Microsoft Internet Explorer

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Future retirees likely to pay most or all health care costs

Leigh Strope - Associated Press
Monday, September 16, 2002

Washington --- Future retirees should expect to cover substantially more, if not all, of the costs of their health care not covered by Medicare as employers increasingly reduce retirement medical benefits.

Few workers today are getting ready for this significant change and may have to consider putting off retirement, says an author of a new study on the issue. By 2031, companies are expected to pay less than 10 percent of total medical expenses for retirees as part of actions already taken, says the report being released today by Watson Wyatt Worldwide, a human resources consulting firm that works with employers.

Large employers now typically pay more than half of total retiree medical expenses. But increasing health care costs are forcing companies to scale back how much they are willing to offer.

"The burden on future retirees to pay for their own medical costs is increasing

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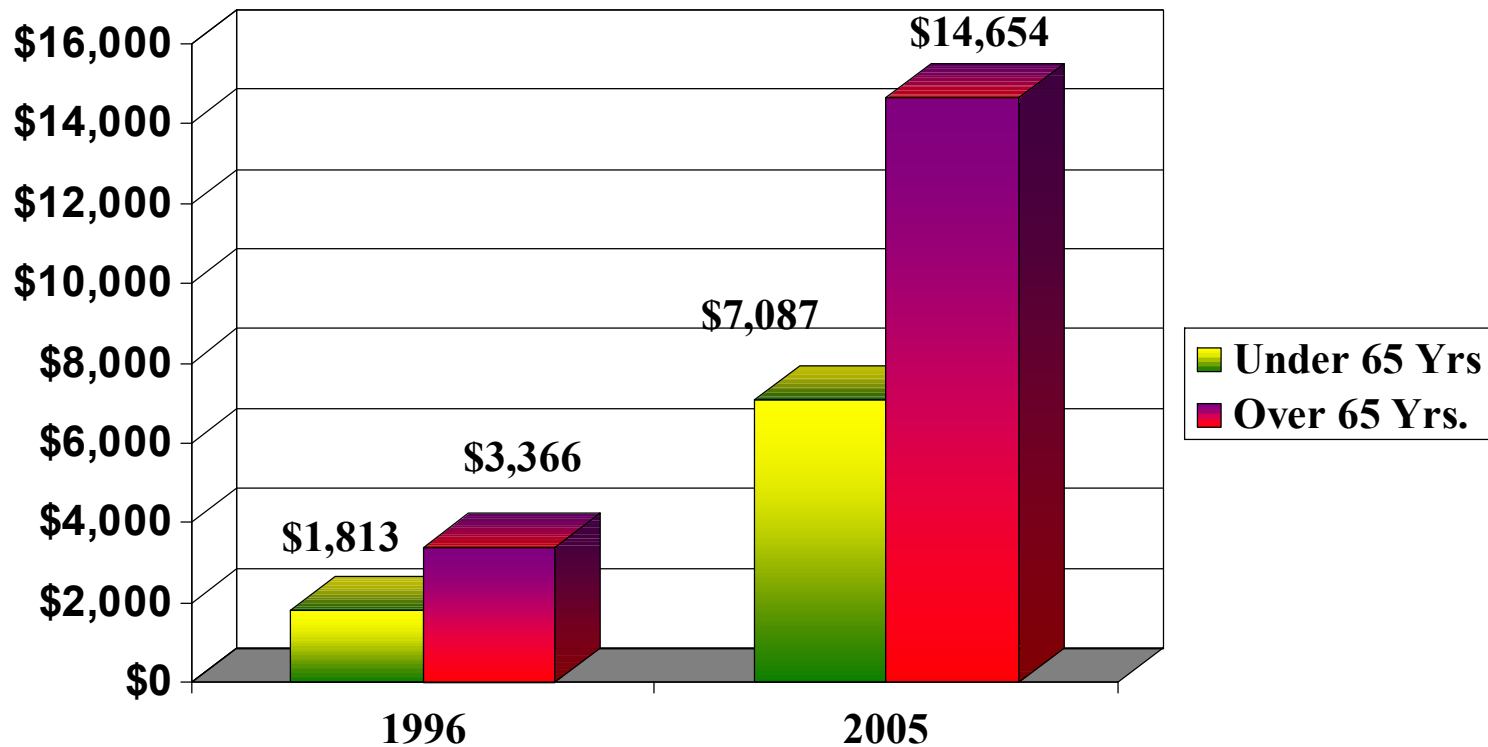
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Rising Health Care Costs

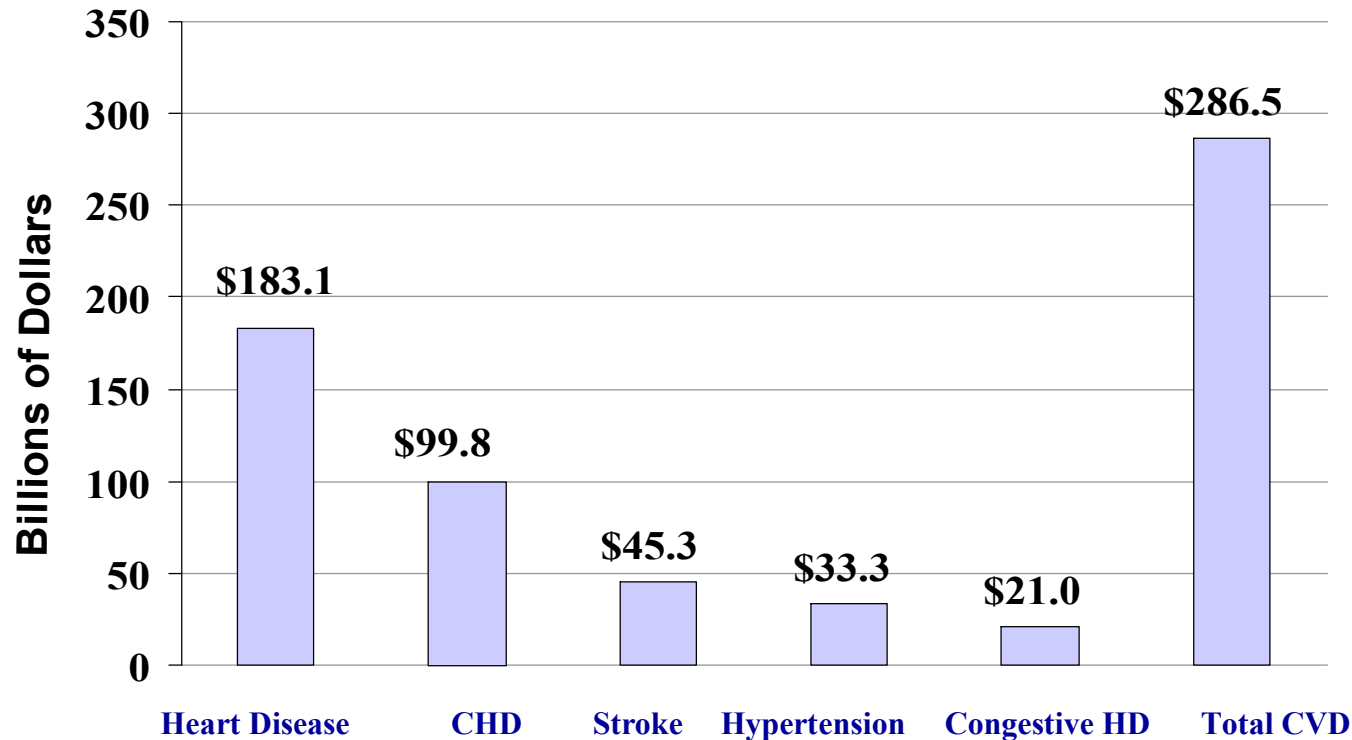
- Poor dietary health and activity #2 preventable cause of death in USA. (1993)
- Obesity and inactivity cost >\$100 billion annually
- Annual budget National Institutes of Health, ~\$20 billion
- 2000 Research budget for nutrition at NIH, \$400 million, dwarfed by the >\$250 BILLION annual cost of chronic disease in USA linked to poor nutrition
- Alzheimer's cost \$5.5 billion in Canada today,
- In USA Alzheimer's growing from 4 mio people today to 14 million by 2025 and costs expected to be \$100 billion.

USA Per Capita Health Care Spending 1996-2005

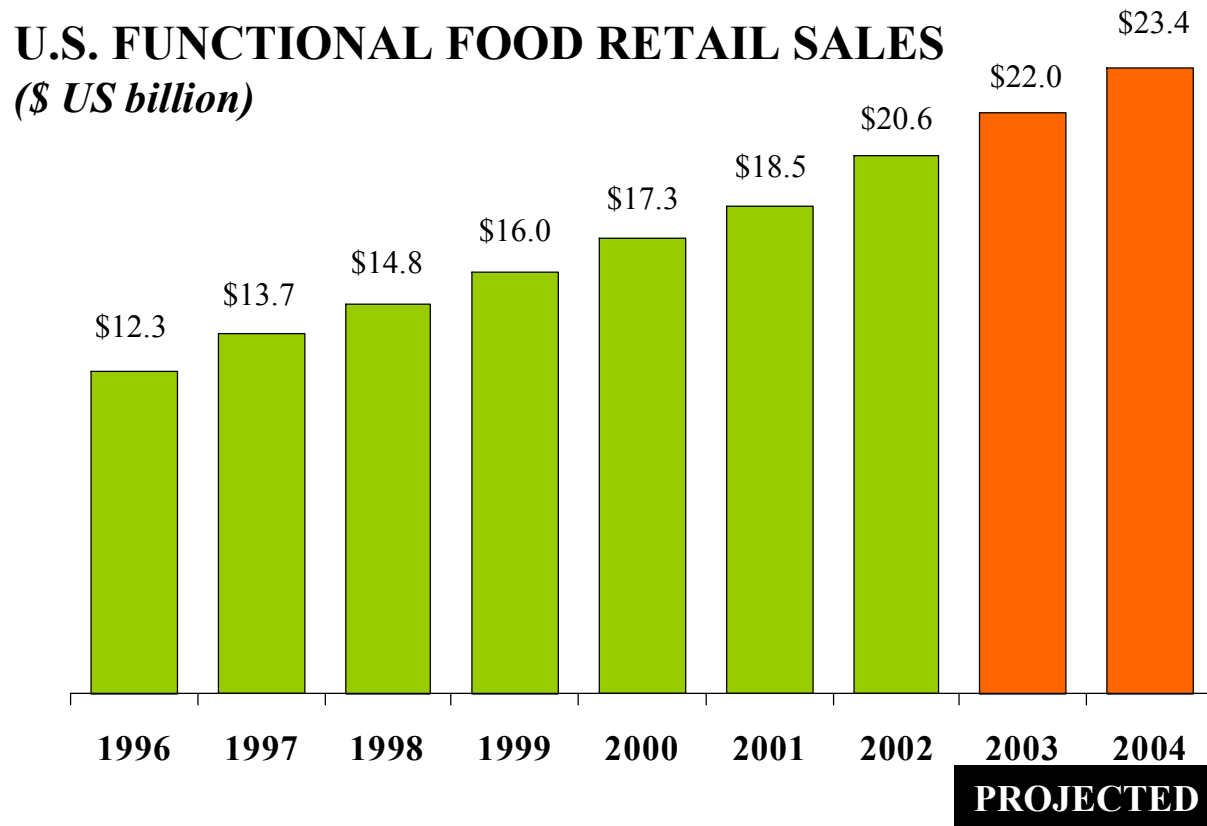


Estimated Direct and Indirect Costs of Cardiovascular Diseases and Stroke

(United States : 1999)

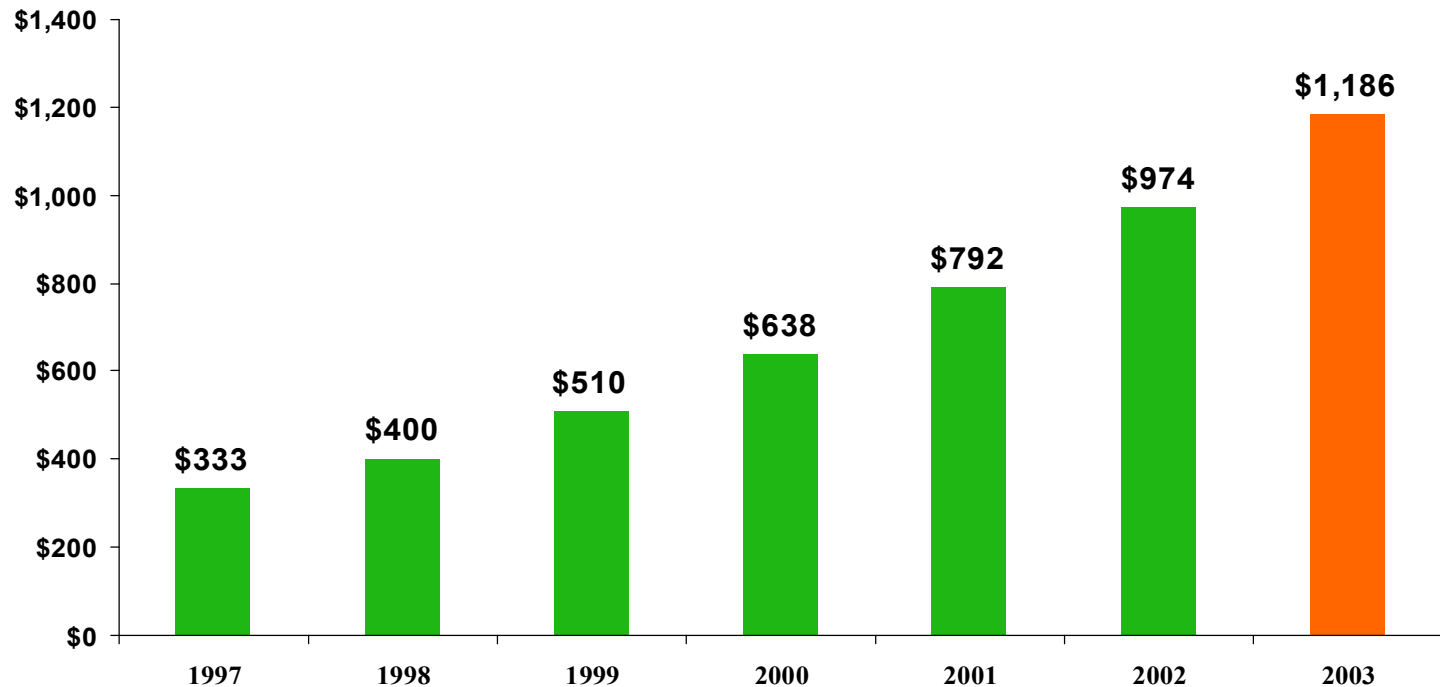


The \$20.6 Billion U.S. Functional Food Market Is Expected to Grow 7% Through 2004

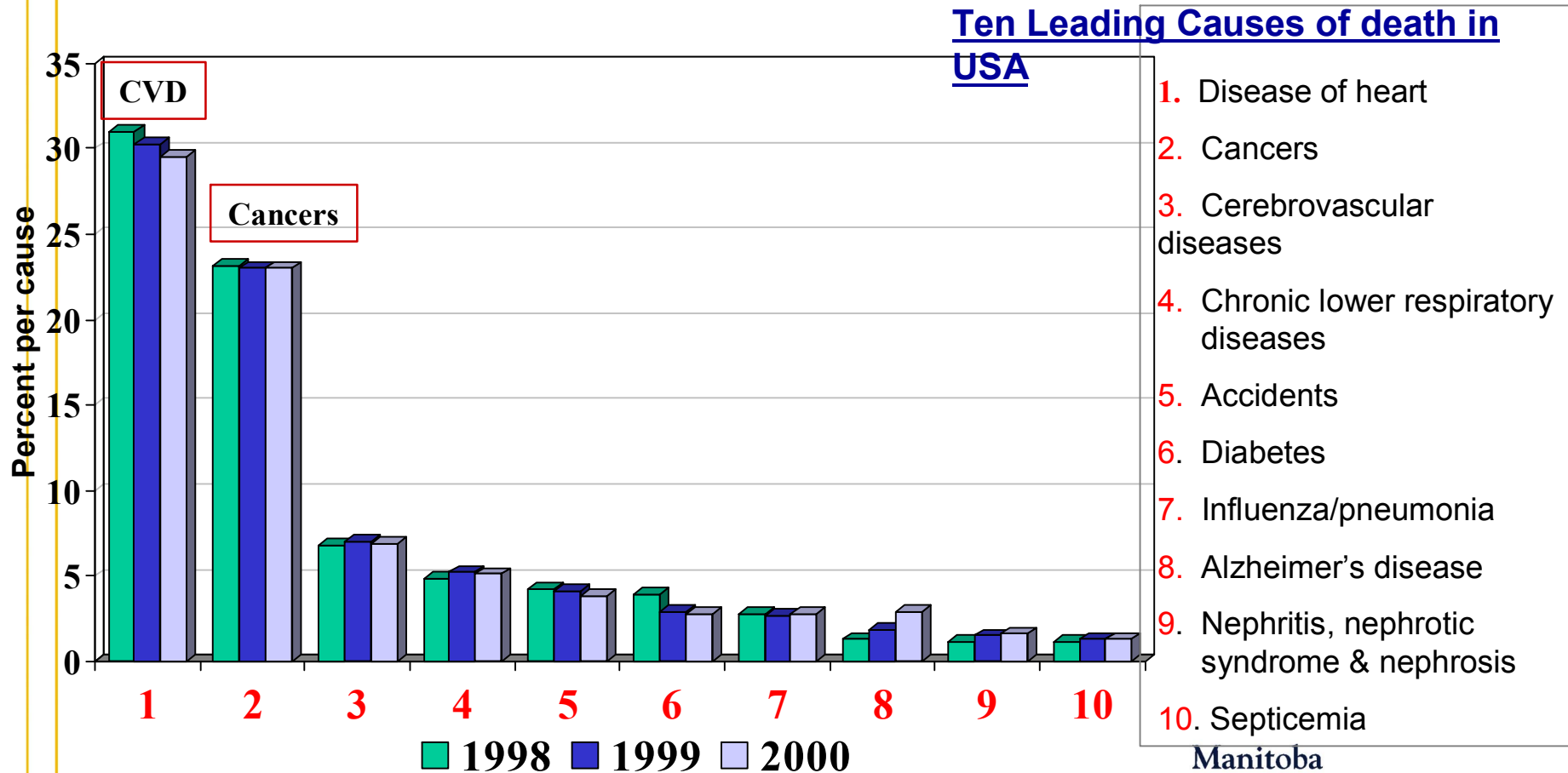


Source: NBJ

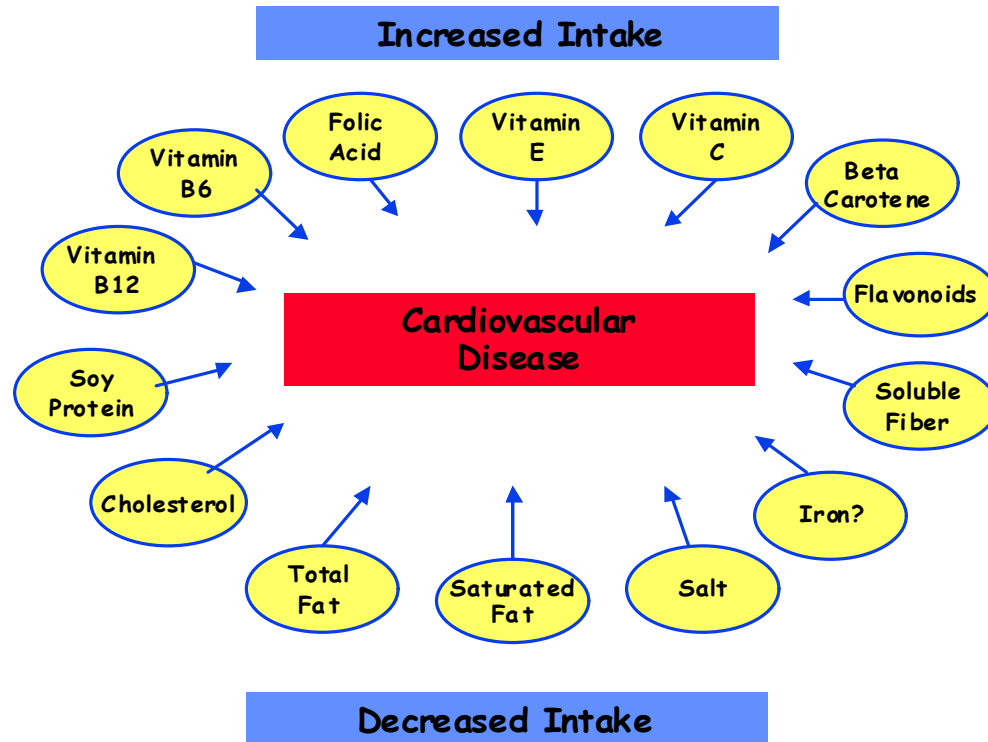
US Soymilk Sales grew 23% in 2002 to \$970 million.



Ten Leading Causes of Death 1998 - 2000



Convergence of Various Factors in CVD

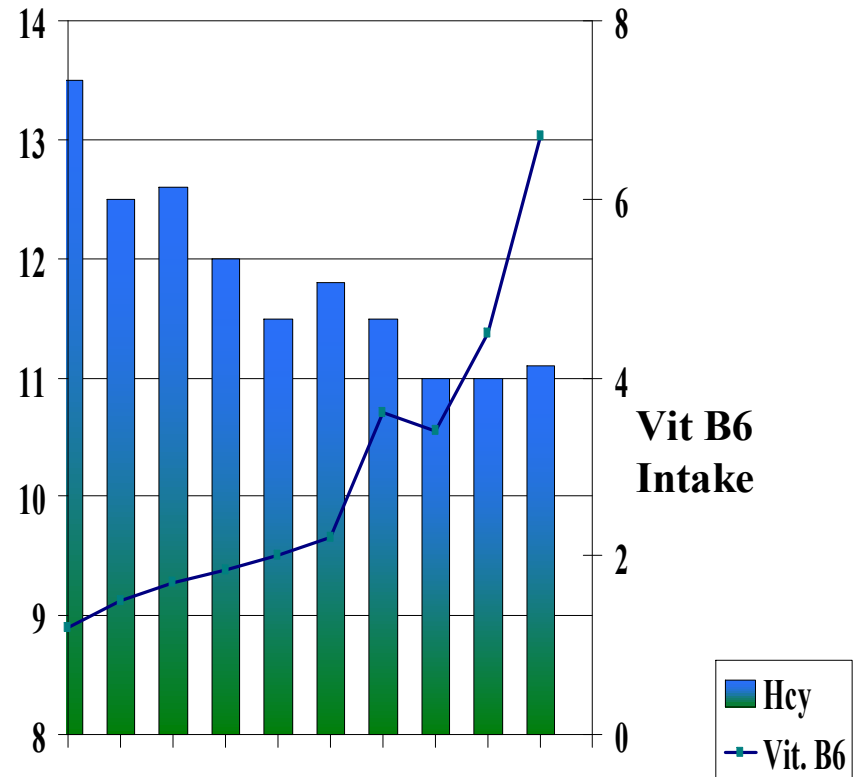
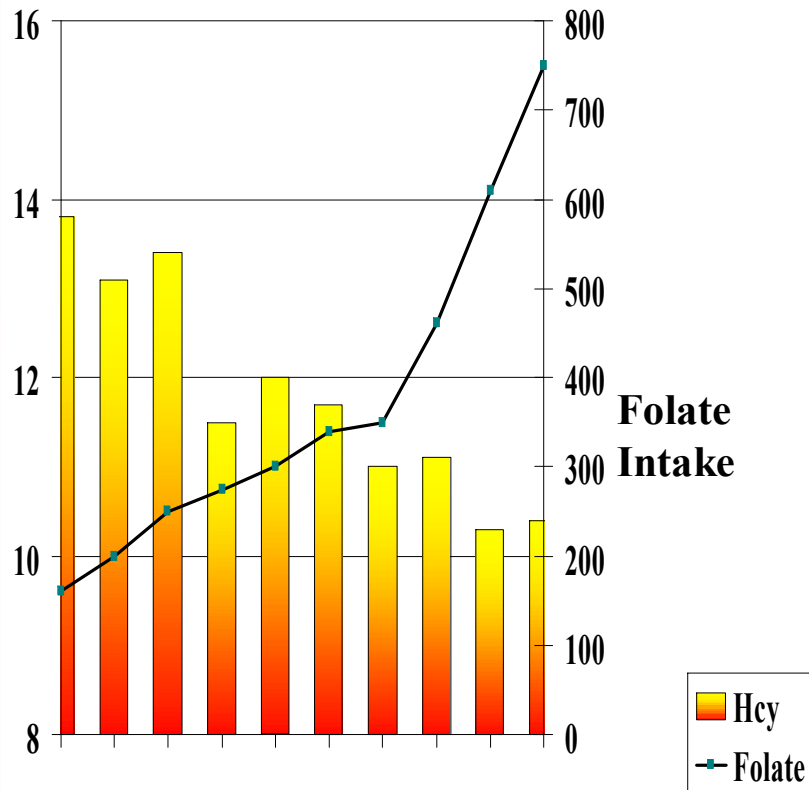


Plasma Homocysteine As A Risk Factor

- Meta analysis of 27 studies, elevation in homocysteine (tHcy) an independent risk factor for arteriosclerosis.
- Every 5 mmol/l increase of tHcy, risk of CAD increases 60%-80% for adults
- 10% of population's CVD risk attributable to Homocysteine
- Two different Meta analyses of 21 studies on folate, showed reductions in Hcy risk.
- B12 alone was also effective in lowering Hcy.

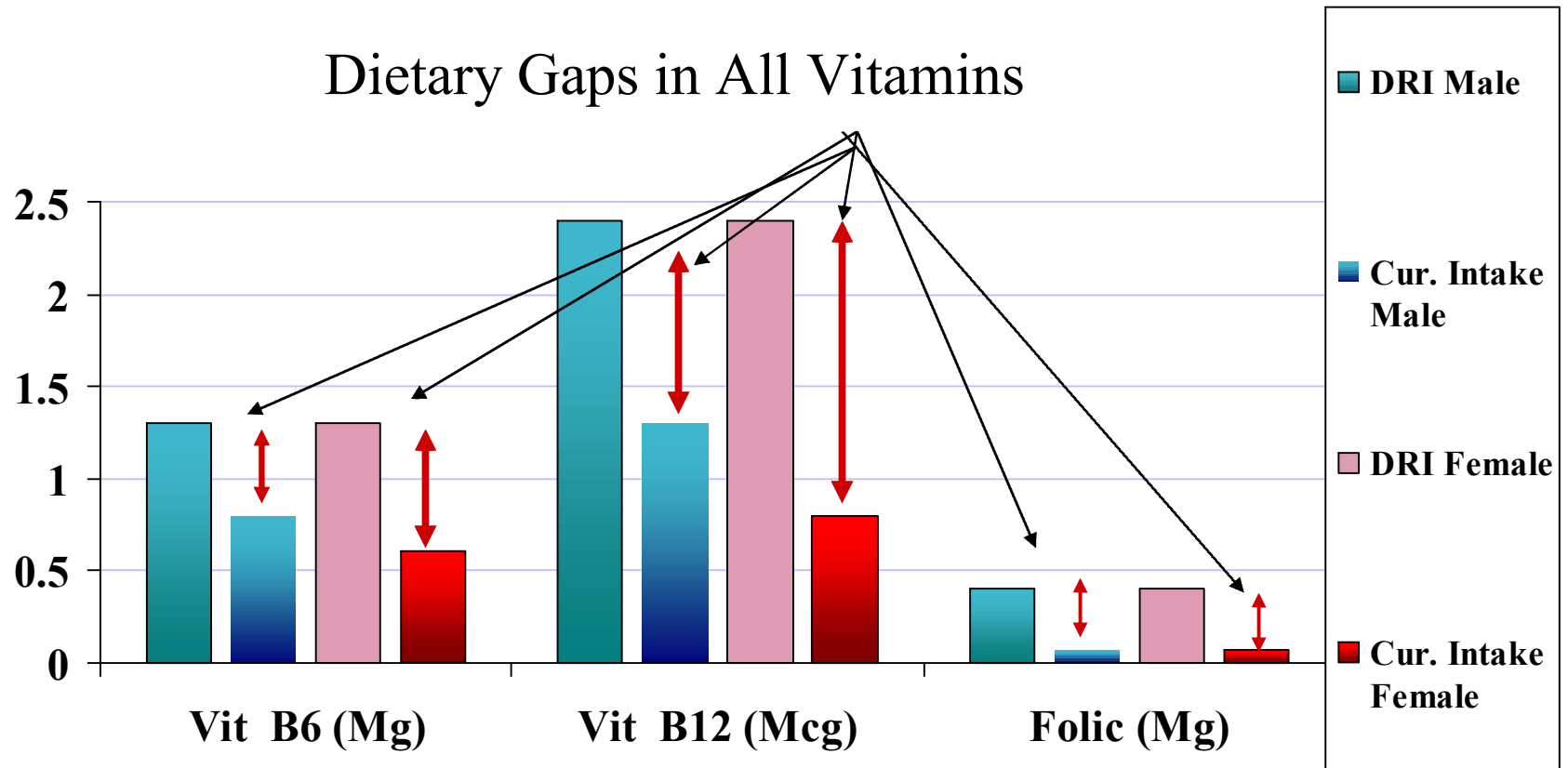
**In general ~20% reduction in Homocysteine levels lower
CAD/stenosis ~30%**

As Vit. B6 and Folate Intake Rise Hcy Declines

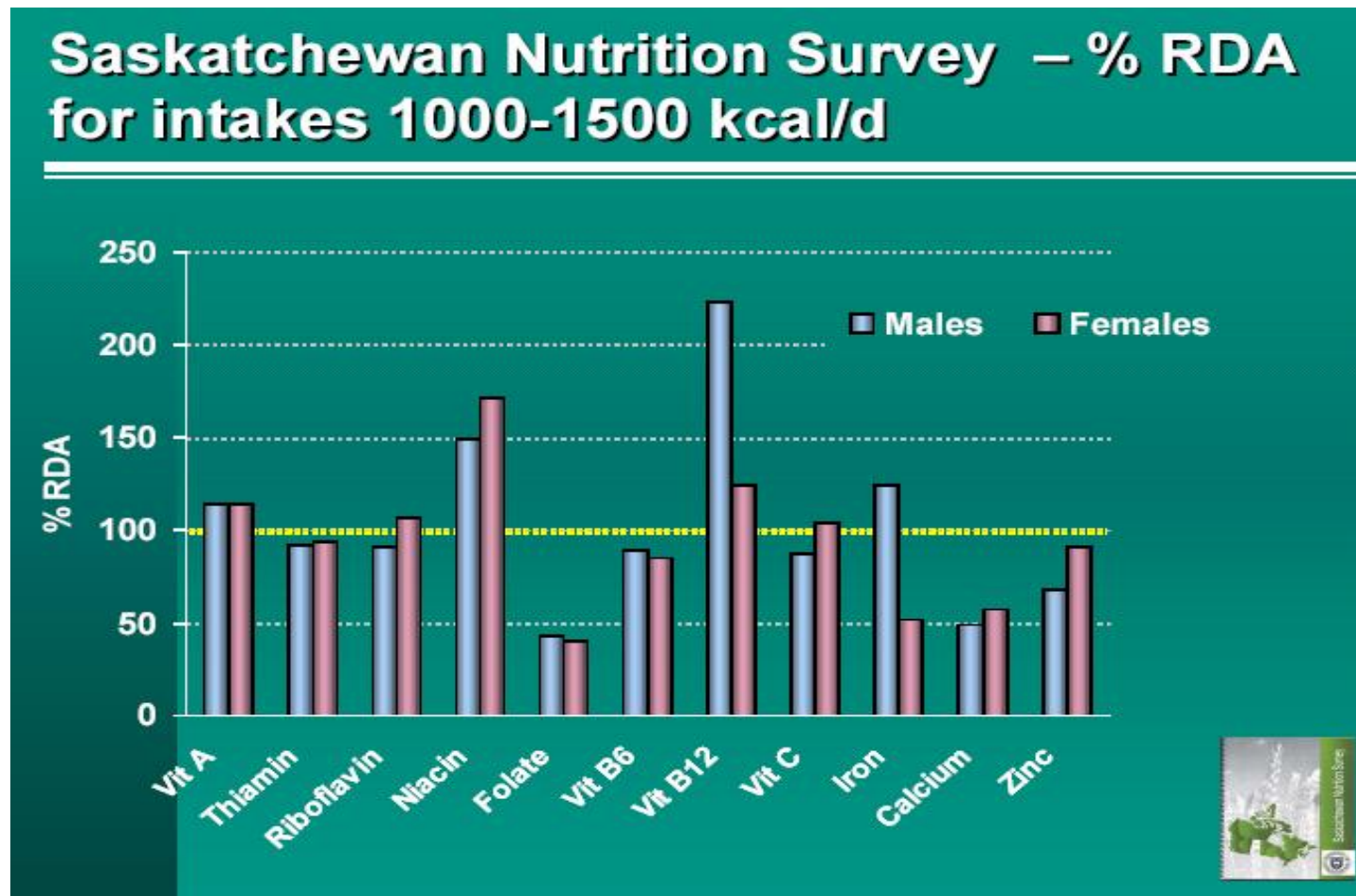


Selhub et al, JAMA 270:2693, 1993

Comparison of DRI's and Intakes



Saskatchewan Nutritional Intakes for 1000-1500 kcal/d vs RDA



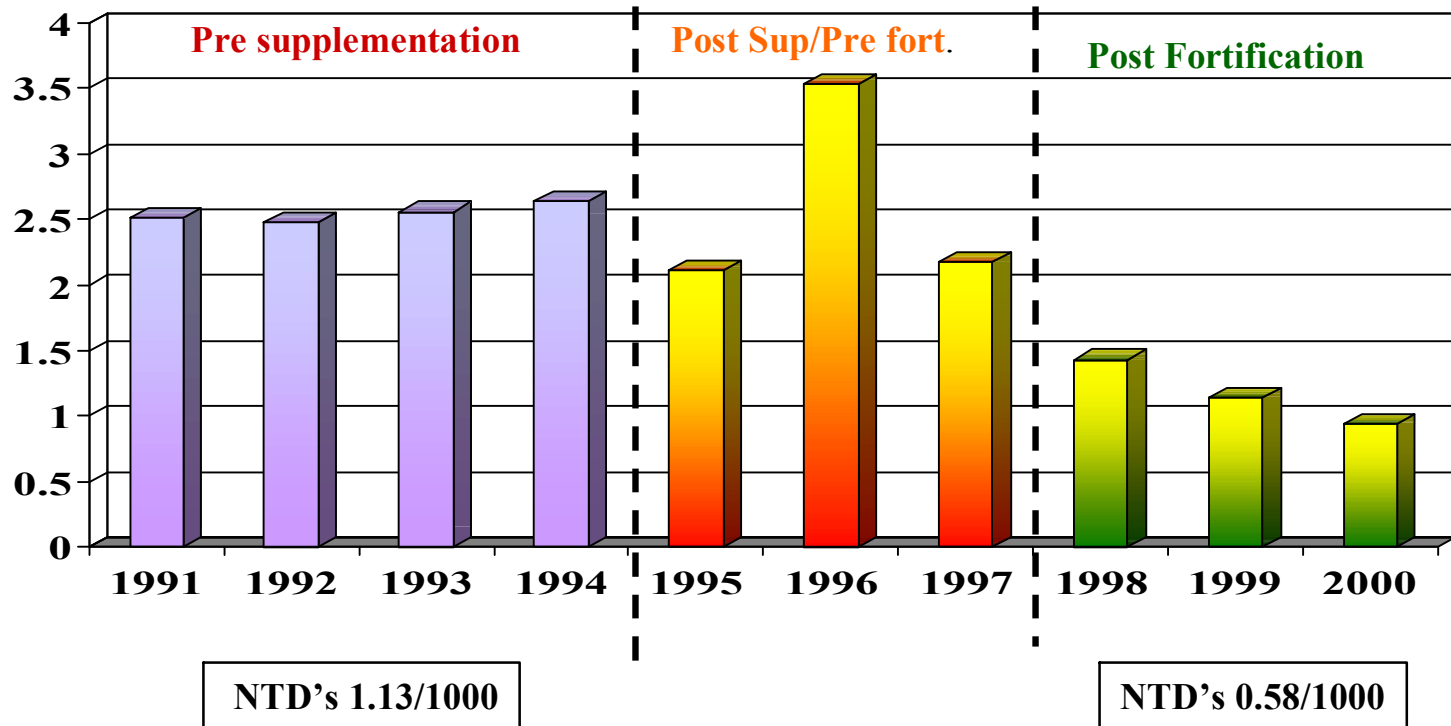
Economic Benefits of Multivitamin Supplementation and Birth Complications

- Many studies show that use of folate prior to conception lowers NTD's ~50-70%
- Study reviewed birth defects, premature birth, CVD
- Utilized epidemiological and intervention studies with risk estimates
- Used hospital discharge data for codes and costs

<u>Risk reductions</u>	<u>Estimated Savings</u>
40% for birth defects	\$90 million
60% LBW babies	\$1.5 billion
38% CHD	\$1.6 billion

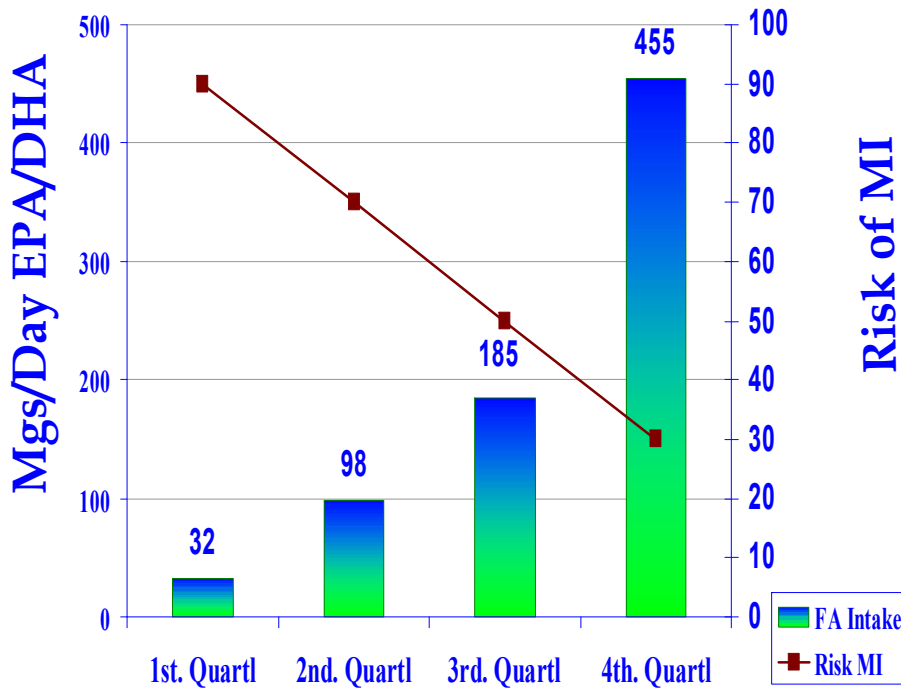
Total cost savings: ~\$3 Billion by use of folic acid and zinc containing multivitamins

Benefits of Folic Acid on Total NTD's, Nova Scotia

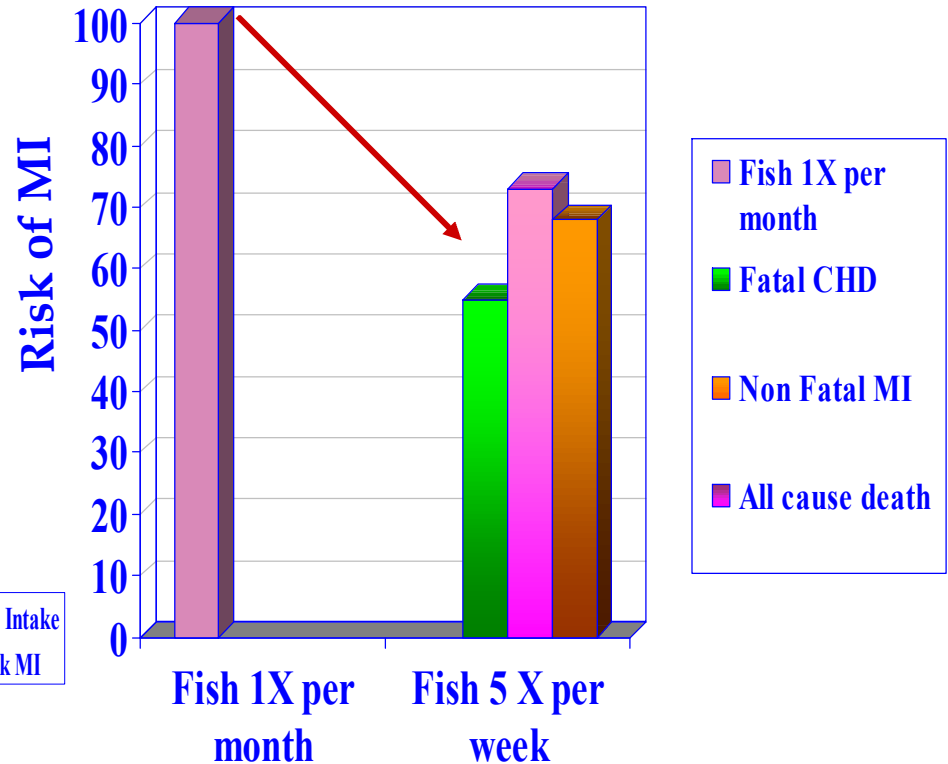


Dietary Intake of Omega-3's and Risk of Cardiac Arrest

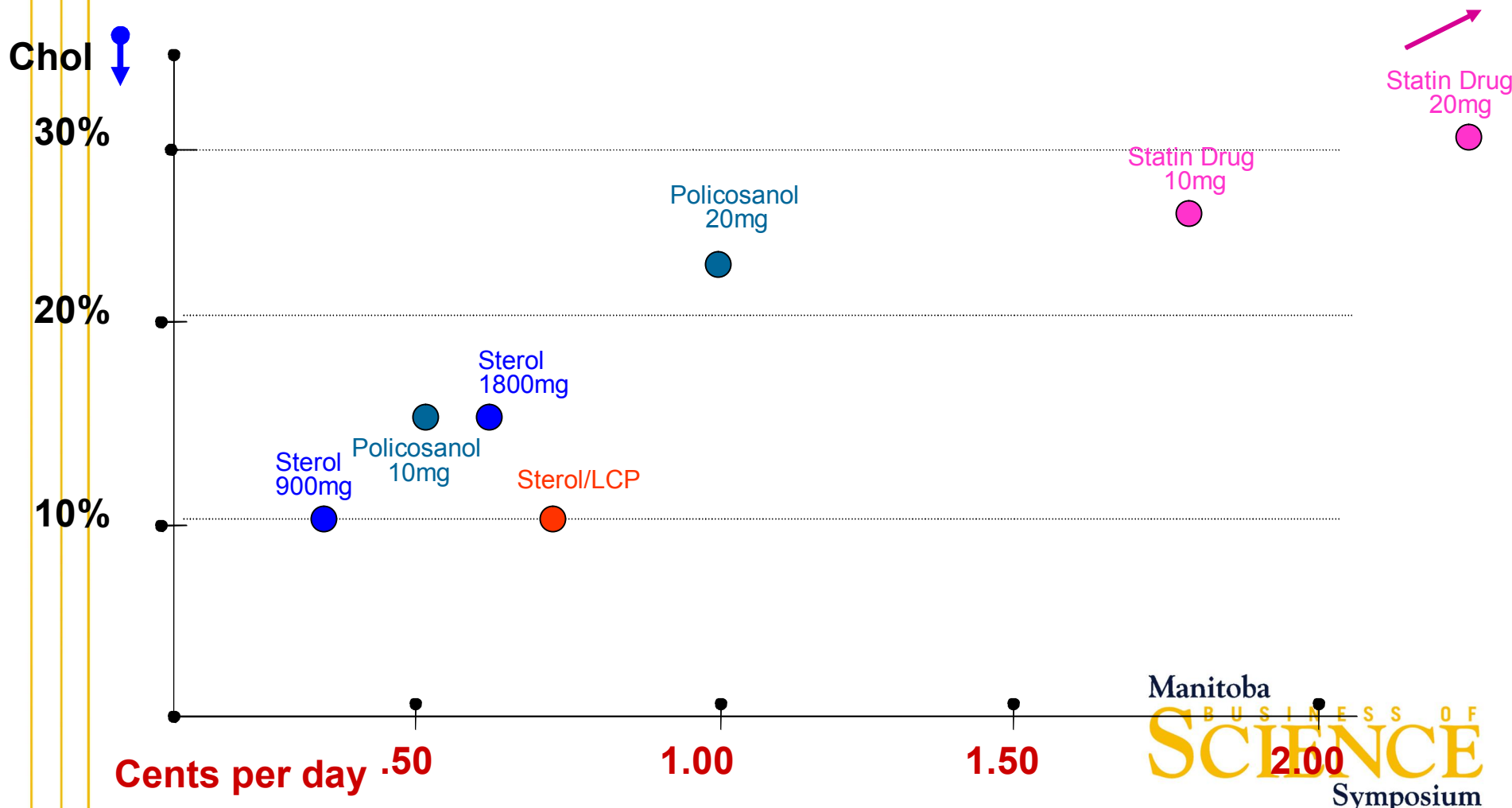
Reduced risk 70%



Reduced risk ~55%



Cost Effectiveness Cholesterol lowering Agents



Hospital Costs Vs Nutritional Status (admissions)

Prevalence of malnutrition in hospitals significant, several studies show that 40-50% malnourished

	Nutritional Risk Gp.	Not at Risk Gp.	Other Studies
Malnutrition %	46%	-	40-50%
Length of Stay Costs	\$6200 (+35%)	\$4600	2X
LOS	6D	4D	
Readmission	NS	NS	
Home services	31%	12%	

More Post Op complications, morbidity, mortality and higher complications, and costs 36% higher

Vitamin and Trace mineral Supplements on Immunity/Infection

Nutrient deficiencies increase with age.
80% of the independent elderly over 79 yrs. consume inadequate amounts of 4 or more nutrients

Vitamin/mineral supplementation trial with ~ one RDA of 18 vitamins

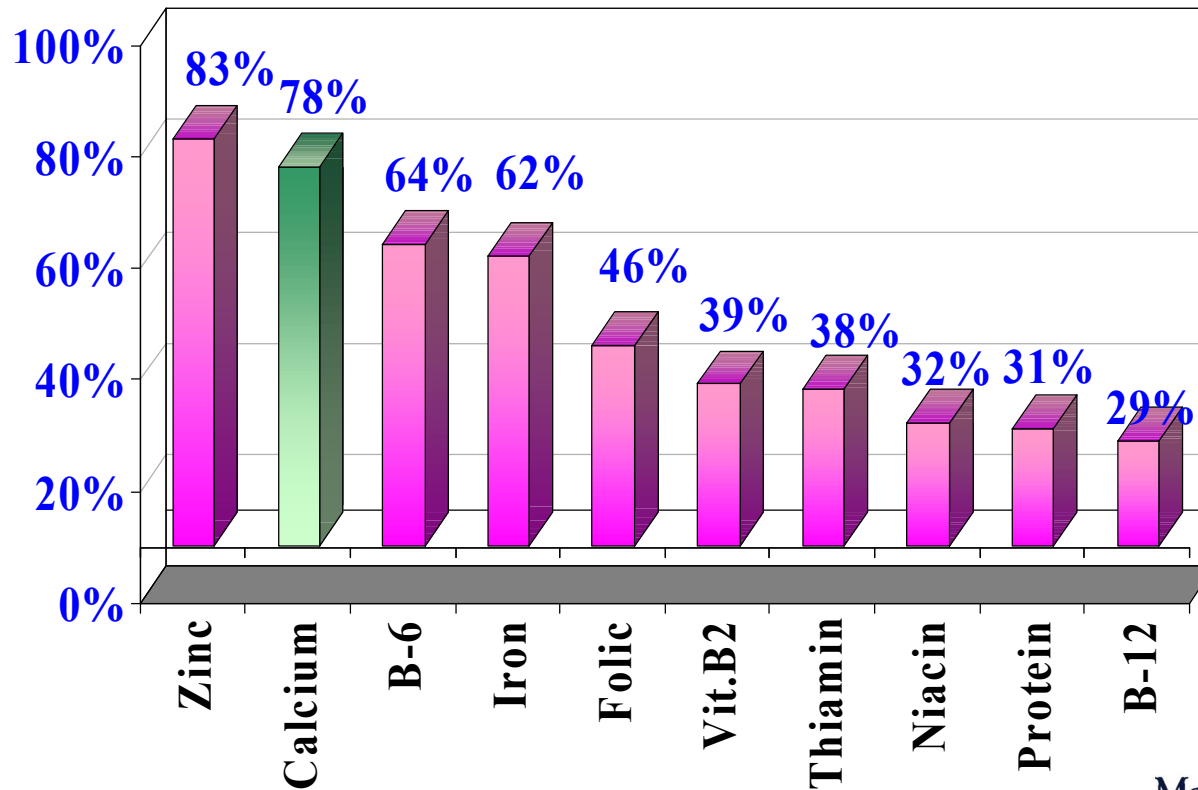
Parameter	Users	Non-Users
Deficiencies	Reductions for A, BC, B6, C, Fe, Zn	No change
Immune Status	Improvement (Increased T4, NK, DTH, IL-2)	No change
Infection illness	23 Days	48 Days
Antibiotic Use	18 Days	32 Days

Cost Benefit \$28 dollars saved for every dollar spent

Calcium and Hip Fractures

- 14% women over 50 years have osteoporosis
- 30% of persons with hip fractures go into a nursing home within a year
- 20% of persons die within one year of a hip fracture
- Estimated 1,500,000 fractures and 300,000 hip fractures per year
- Estimated \$10-15 billion savings in direct costs

Percent of Women Over 20yrs. Who Do Not Meet RDA



Diabetes Facts

- One quarter of obese people have undetected diabetes, 150 million people globally, of which 90 million type II, and expected to double in next 25 years.
- Diabetes costs about \$100 billion annually in USA
- Diabetes leads to a cascade of disease such as CVD, nerve damage, cataracts, kidney disease and amputations
- 20-30% of children in USA overweight leading experts to predict a future diabetes epidemic

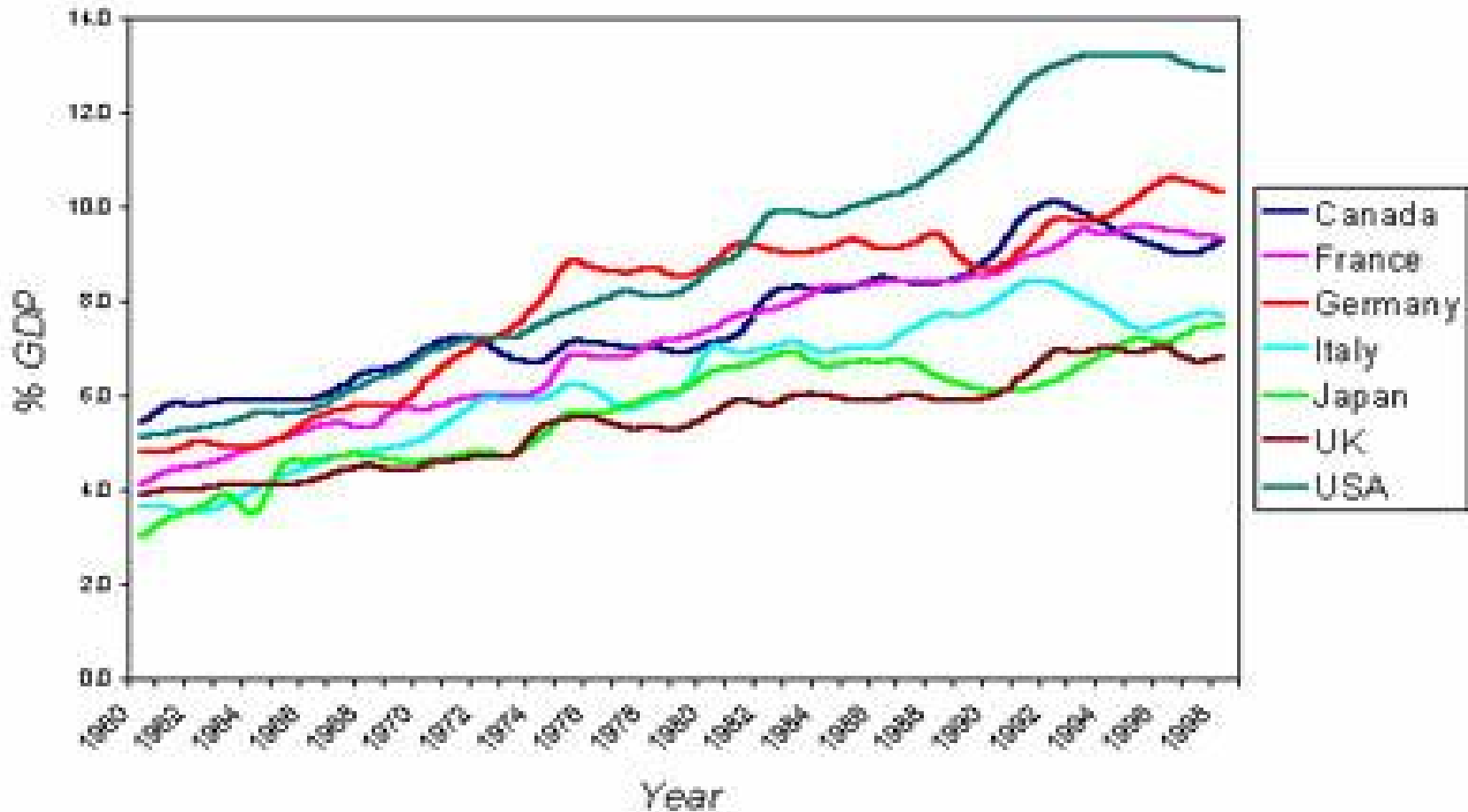
Diabetes Trial for Cost Savings (USA)

- Type II diabetes glycemic control trial in an HMO (n=4744)
- No new drugs added to regimens and lifestyle a major contributor
- 1% Improvement in glycemic control over four years lead to statistically significant savings.
- Savings were between \$685-950 per patient per year
- Based on 17 million Type II diabetics in US, this amounts to annual savings:

\$11.6-\$16.15 billion savings per year.

Health Care Costs Rising Globally

G7 Nation's Expenditures on Health Care



Costs Associated with 7 Major Diet Related Diseases in USA (1995)

<u>Cause</u>	<u>Deaths</u>		<u>Annual Cost Billions</u>
CHD	739,860	32.6%	\$56.3 (\$250)
Cancer	530,870	23.4%	\$104.0
Stroke	149,740	6.6%	\$19.7
Diabetes	55,110	2.4%	\$40.0
Obesity	NA		\$2.4 (total \$117.0)
Hypertension	NA		\$17.4
Osteoporosis	NA		\$10.0
TOTAL		65%	\$250 BILLION!

Researchers estimate proper diets could forestall 20% of deaths

Costs Associated with Major Diet Related Diseases in Canada (2001)

Cause	Annual Costs Billions	% Diet Related	Potential Saving Bio
CHD	\$13	40-50%	\$6
Cancer	\$20	80%	\$8
Diabetes	\$10	35-50%	\$1
Dementia's/Alz	\$5-6	?	n/a
Kidney	\$3	?	n/a
Arthritis	\$11	20%	\$0.5
Psychiatric	\$3	?	n/a
Other	\$44		
TOTAL \$100			\$19 Billions

Per Capita spending; \$3,174, Seniors \$10,834

Foods

We Are What We Eat.....

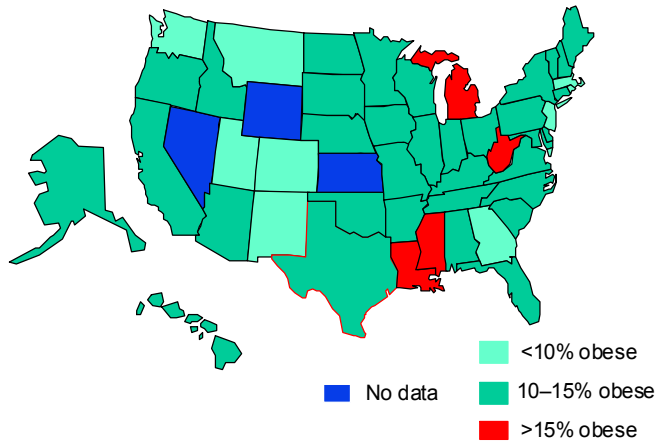
Obesity Facts.....

- One billion people worldwide obese/overweight (AHA, JAHA 2002)
- 64% of population in USA, (obese 31%, overweight 33%) 120 million PERSONS
- Percent obese:
1976-80 15%,
1988-94 23%,
1999 27%
- Three times as many teens overweight vs. 1980 and twice as many children
- 300,000 deaths, 7% of total health care spending



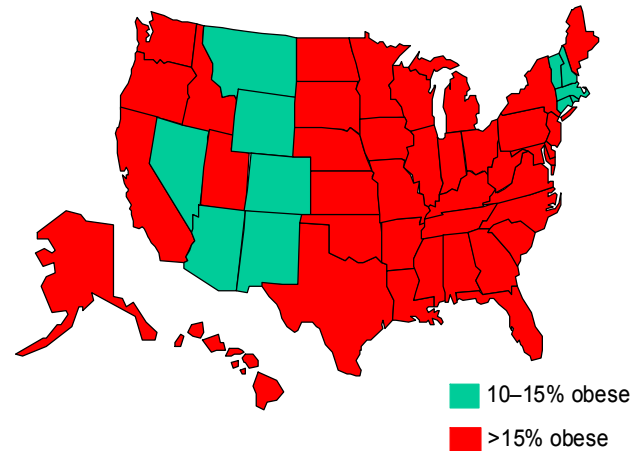
Prevalence of Obesity 1991 & 1998

Prevalence of Obesity - 1991



Source: Mokdad AH, et al. JAMA. 1999;282:1519-1522.

Prevalence of Obesity - 1998



Source: Mokdad AH, et al. JAMA. 1999;282:1519-1522.



10-15% of population obese



> 15% of population obese

Obesity Trends in Canada 1990-2000

Obesity Trends* Among Canadian Adults

HPS, 1990

(*BMI ≥ 30 , or ~ 30 lbs overweight for 5'4" woman)



No Data <10% 10%-14% 15-19% $\geq 20\%$

Source: Katzmarzyk PT. *Can Med Assoc J* 2002;166:1039-1040.

Obesity Trends* Among Canadian Adults

CCHS, 2000

(*BMI ≥ 30 , or ~ 30 lbs overweight for 5'4" woman)



No Data <10% 10%-14% 15-19% $\geq 20\%$

Source: Statistics Canada. *Health Indicators*, May, 2002.

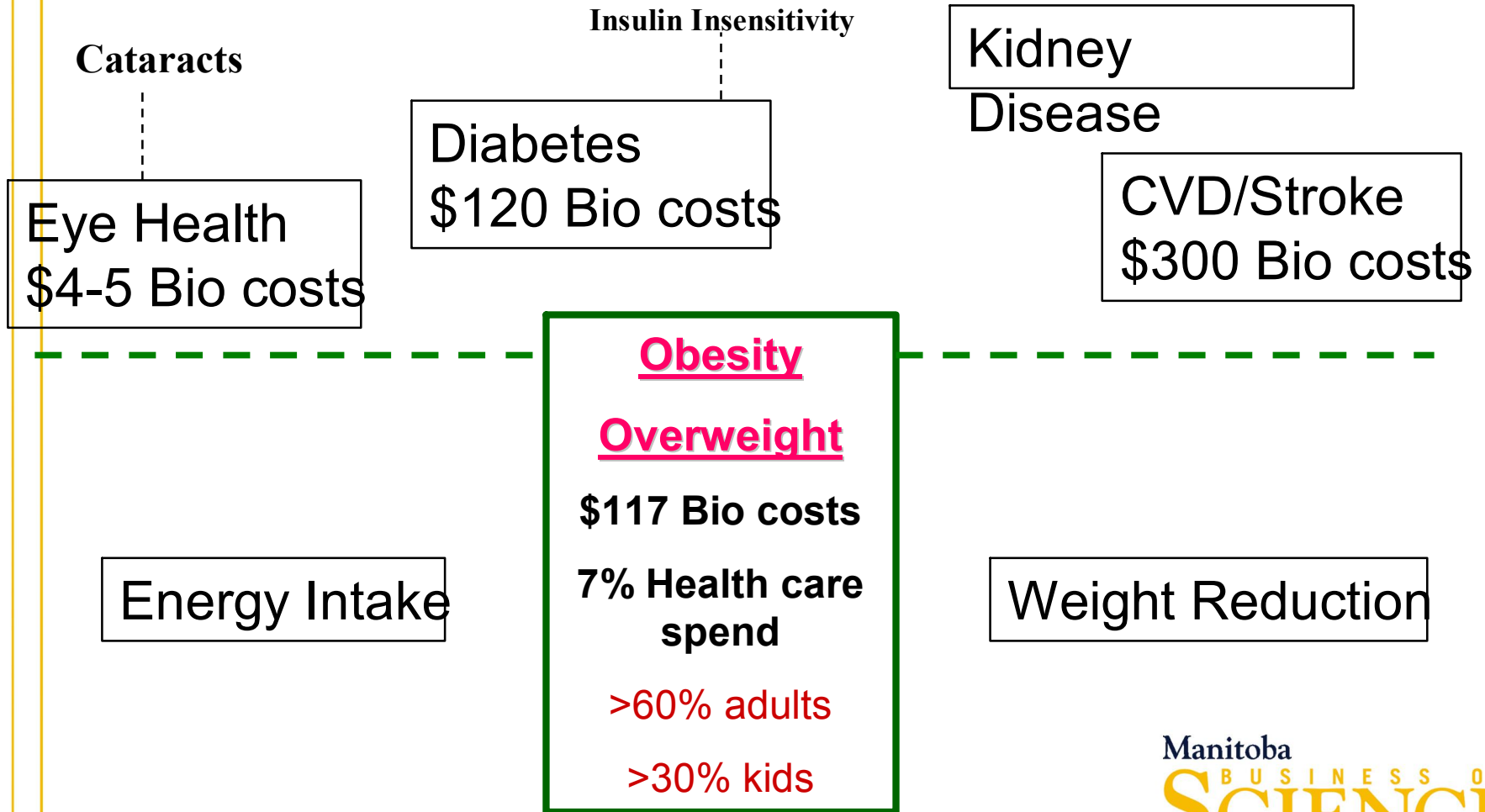


Obesity 15-19%



Obesity >20%

Obesity the Root Cause of Many Diseases



Costs Associated with Obesity and Inactivity in USA (1995)

	<u>Inactivity</u>	<u>Obesity</u>
Diabetes II	\$6.4	\$36.6
CHD	\$8.9	\$16.2
Hypertension	\$2.3	\$7.6
Gall Bladder	\$1.9	\$4.3
Cancer		
Breast	\$0.38	\$0.53
Colon	\$2.0	\$0.89
Osteoporosis Fractures	\$2.4	\$3.6

Total Billions	\$24.3	\$70.0 billion
% of Health Costs	2.4%	7.0%

% of Health Costs Other Sources/Countries:

USA	5.0%
France	2.0%
NL	4.0%
Austral.	2.0%

Can Functional Foods Reduce Chronic Disease Costs?

- Is there a good rationale?
- Is there supporting clinical data?
- Is the ingredient safe for all populations/ages?
- Is the food in a form the consumer wants?
- Is the price premium reasonable?
- Can you get health professionals support?

Reductions in Mortality of Fruit Eaters in UK

- **24% reduction in heart disease**
- **32% reduction in stroke death**
- **21% reduction in all cause death**

**Rationale: High content Vit. C for antioxidant protection;
Vit. C protection of Vit. E; carotenes or other nutrients**

Physicians Support for Vitamins and Their Health Benefits

Majorities of physicians believe vitamins can be very or somewhat effective in reducing the risk or delaying the onset of:

**Osteoporosis (92%)
Cardiovascular disease (85%)
High cholesterol (80%)
Cancer (76%)
Macular degeneration (67%)
Arthritis (66%)
Alzheimers (54%)
Cataracts (50%)**

Estimated Cost Savings from Sterol Spreads UK

- National Health Service Estimate
- Plant sterol spreads have potential to lower country costs by \$150 million dollars
- Due to lowering LDL cholesterol 10-15% as a part of healthy diet.
- Benefit also accrue to those persons on statin drugs.
- Annual cost to patients \$70 with **NO** cost to NHS
- Additional savings in primary cost care

Estimated Savings with Functional Foods for Cardiovascular Disease (Canada 2002)

Fibers	Wholesale cost/Day for 8% Chol reduction	Expected Decrease in risk	Reduced Expenditure (net)	
Citrus pectins	8 cents	20%	\$2.58 billion	
Guar Gum	7 cents	20%	\$2.65 billion	
Plant sterols	20 cents	20%	\$1.56 billion	
LC Omega Fatty acids. TG lowering by 15%	13 cents	20% women 7.5% men	\$1.6 billion	
Ingredient	Cost per Day for 20% Cholesterol Lowering	Cost per Year	Target Pop. Cost/Yr	Net Savings
STATIN Drug	\$1.50	\$913	\$4.97 billion	-
Cholestin,(red yeast rice)	\$1.50	\$548	\$2.98	\$2.0 billion
policosanol	\$1.50	\$548	\$2.98	\$2.0 billion
Ingredient	Cost per Day for TG Lowering	Cost per Year	Target Pop. Cost/Yr	Net Savings
Gemfibrozil	\$1.70	\$621	\$3.38 billion	-
LC Omega-3 Fatty acids	\$0.30	\$110	\$0.66 billion	\$2..72 billion

US Health Claims Currently Permitted

<u>Claim</u>	<u>Food</u>	<u>DS</u>	<u>CANADA</u>
- Saturated Fat and cholesterol and CHD (CFR 101.75)	X		X
- Fat and cancer (CFR 101.73)	X		
- Fiber containing fruit,vegetables,grains and cancer (CFR 101.76)	X		
- Fiber containing fruits,vegetables,grains and CHD (CFR 101.77)	X		X
- Fruits and vegetables and cancer (CFR 101.78)	X		
- Calcium and Osteoporosis (CFR 101.72)	X	X	X
- Folate and neural tube defects (CFR 101.79)	X	X	
- Potassium and blood pressure and stroke (FDAMA)	X		
- Whole grains and CHD and certain cancers (FDAMA)	X		
- Sodium and hypertension (CFR 101.74)	X		X
- Soluble fiber from psyllium or whole oats and CHD (CFR 101.81)	X	X	
- Sugar alcohol and dental decay (CFR 101.80)	X	X	X
- Soy protein and CHD (CFR 101.82)	X	X	
- Stanol/Stanol esters and CVD (CFR 101.83)	X		
- LC Pufa and CVD (Q)		X	
- B Vitamins and CVD (homocystein) (Q)		X	
- Folic acid and neural tube defects (Q)		X	
- AO vitamins and certain kinds of cancer		X	

INDUSTRY OF WELLNESS FOODS

LEGISLATION/REGULATION

CONSUMER AWARENESS

HEALTHCARE COSTS

MEDIA COVERAGE

PROF.INTEREST/SUPPORT

SCIENCE DATA-EFFICACY/SAFETY

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SINCESS OF
SCIENCE

Symposium

Functional Foods for Risk Reduction...Maybe at the Supermarket in the Future



High cholesterol? Head for Aisle 3

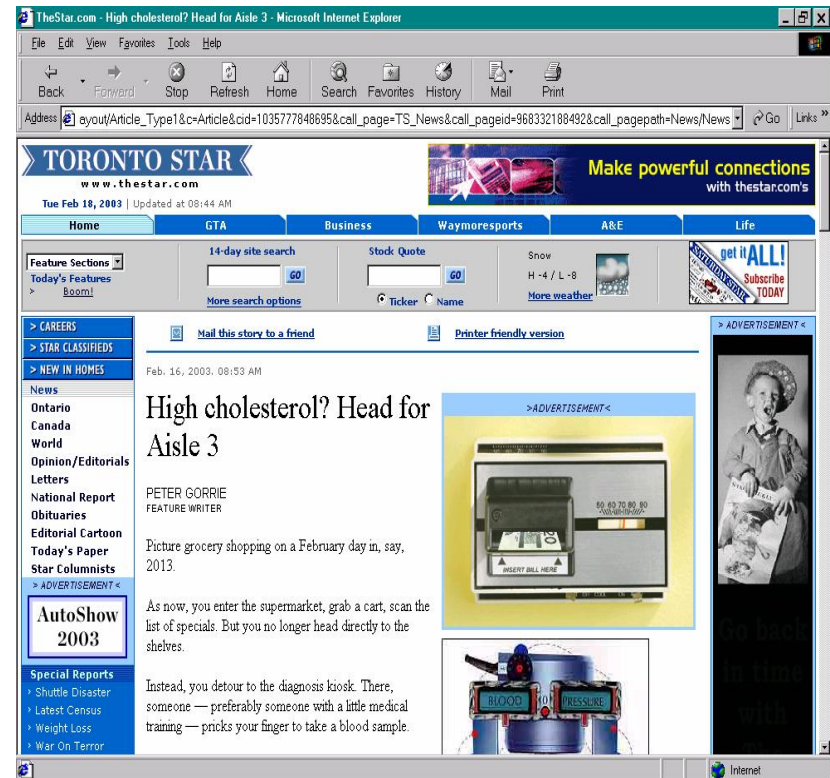
PETER GORRIE
FEATURE WRITER

Picture grocery shopping on a February day in, say, 2013.

As now, you enter the supermarket, grab a cart, scan the list of specials. But you no longer head directly to the shelves.

Instead, you detour to the diagnosis kiosk. There, someone — preferably someone with a little medical training — pricks your finger to take a blood sample.

In a couple of minutes, you have the test results: "Your cholesterol is high; go directly to Aisle 3:



“ Can Functional Foods Reduce Health Care Costs?”

The answer is yes, so let’s start changing now.

Thank You

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Manitoba
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Symposium