

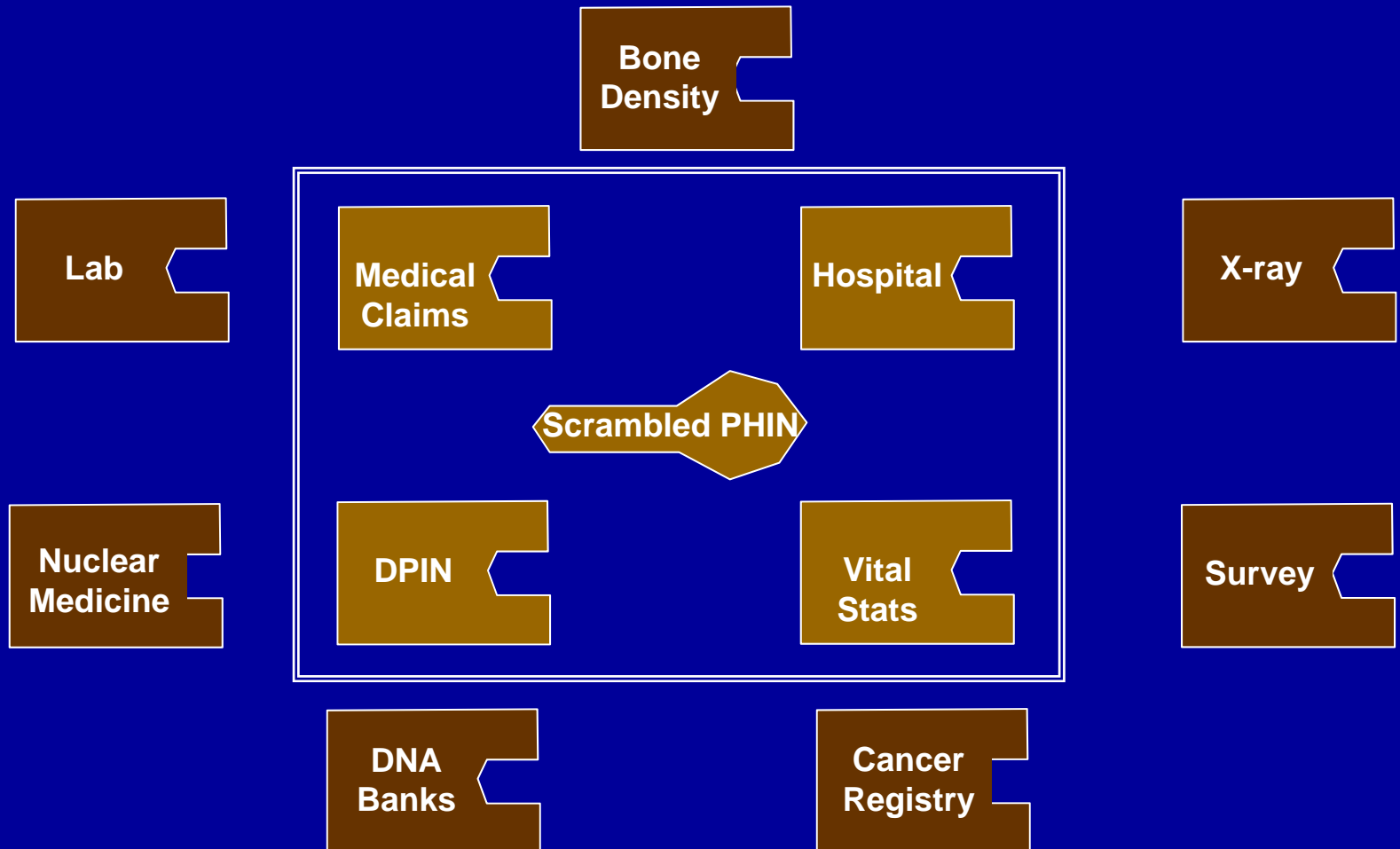
# **Physician Behaviour and Bone Health: The Final Frontier**

**William D. Leslie, MD MSc FRCPC  
University of Manitoba**

# Disclosures

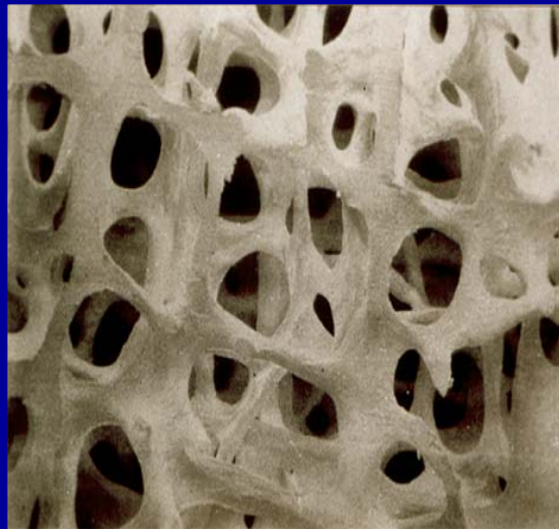
- Speaker fees, research honoraria, and unrestricted research grants from Merck Frosst Canada Ltd; Sanofi-Aventis, Procter & Gamble Pharmaceuticals Canada, Amgen Pharmaceuticals, Innovus 3M, Genzyme Canada Ltd.
- Administrative, scientific and guidelines duties with the Manitoba BMD Program, Osteoporosis Canada (OC), International Society of Clinical Densitometry (ISCD), OAR Facility Accreditation Quality Team, CAR BMD Accreditation Program

# MCHP Data Repository: A Clinician's Dramatization



# WHO Definition of Osteoporosis

“A disease characterized by low bone mass and microarchitectural deterioration of bone tissue leading to enhanced bone fragility and a consequent increase in fracture risk.”



Normal bone

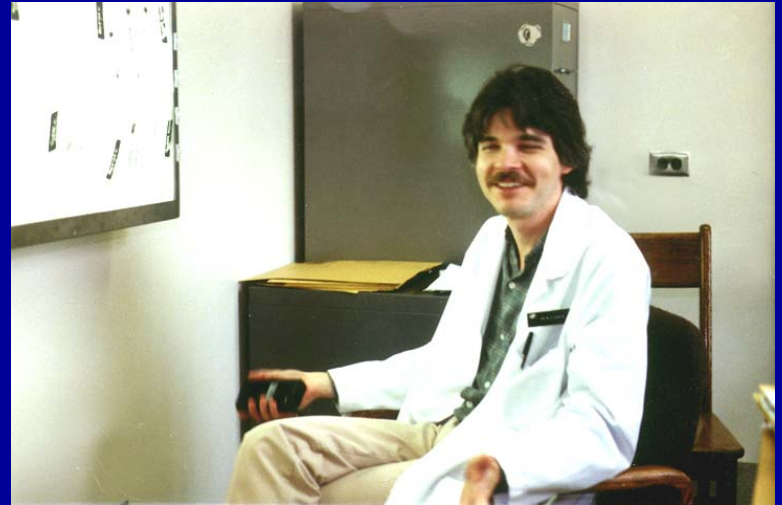


Osteoporosis



# BMD Reporting: A Short History

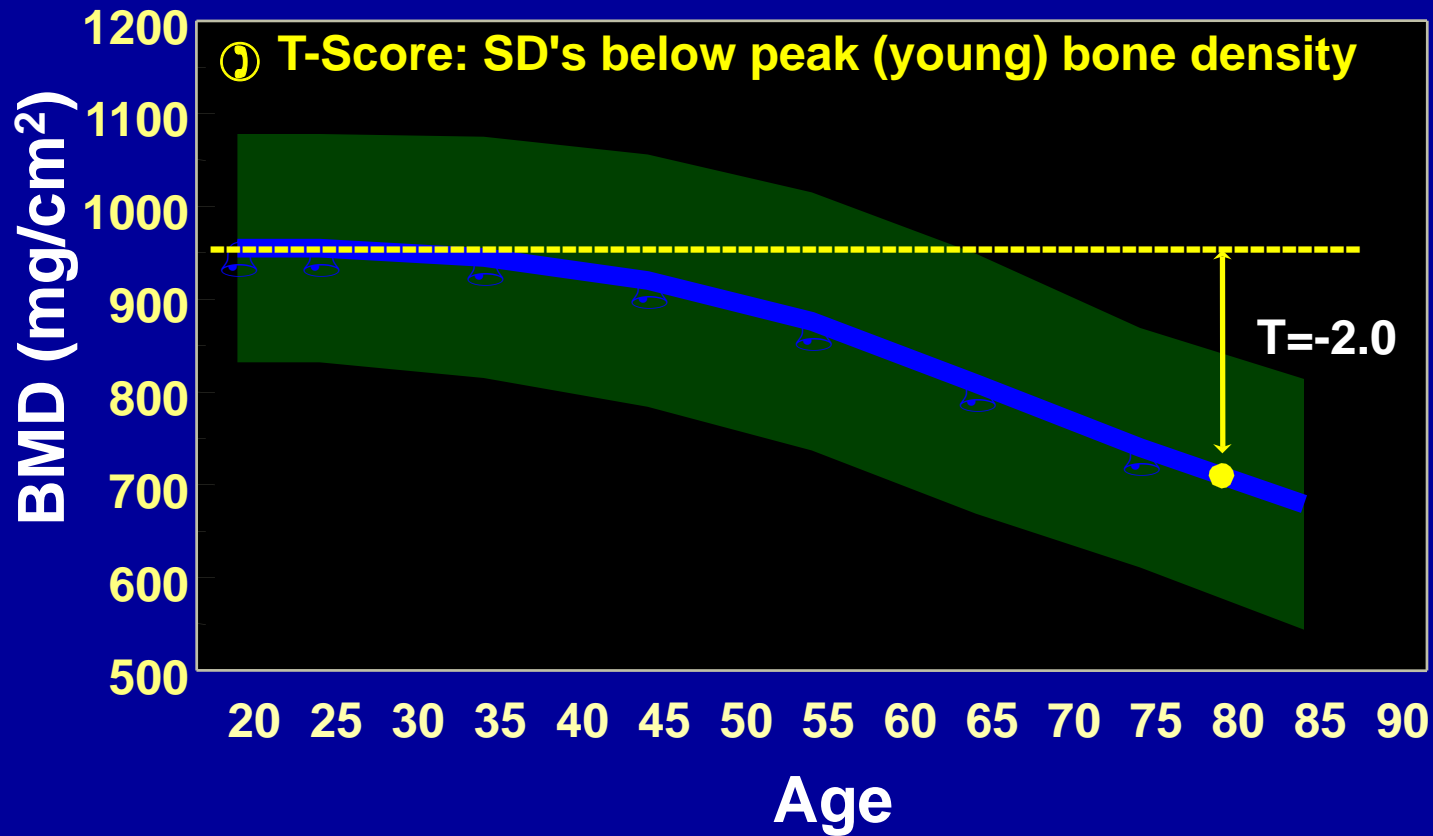
- % normal for age
- No T-scores
- No WHO category
- No osteoporosis diagnosis



1980's



# BMD Reporting: T-score



1980's

1990's



# BMD Reporting: WHO Definitions

Status	T-score
Normal	-1.0 or higher
Osteo <del>x</del> enia (low bone density)	Between -1.0 and -2.5
Osteoporosis	-2.5 or lower
Severe osteoporosis	$\leq -2.5$ + fragility fracture

1980's

1990's



Search

Go!

# Manitoba Bone Density Program



## Bone Density Testing Information for Professionals

- [Return to main](#)
- Information for Professionals**
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- [Testing sites](#)
- [Osteoporosis Education and Links](#)

- [Definition of Osteoporosis](#)
- [Clinical Role of Bone Density Measurement](#)
- [University of Manitoba Osteoporosis Flowchart - Page 1](#)
- [University of Manitoba Osteoporosis Flowchart - Page 2](#)
- [Anatomy of a Bone Density Report](#)
- [Explanation of a Bone Density Report](#)
- [Newsletters](#)

<http://www.gov.mb.ca/health/programs/mbd>

1980's

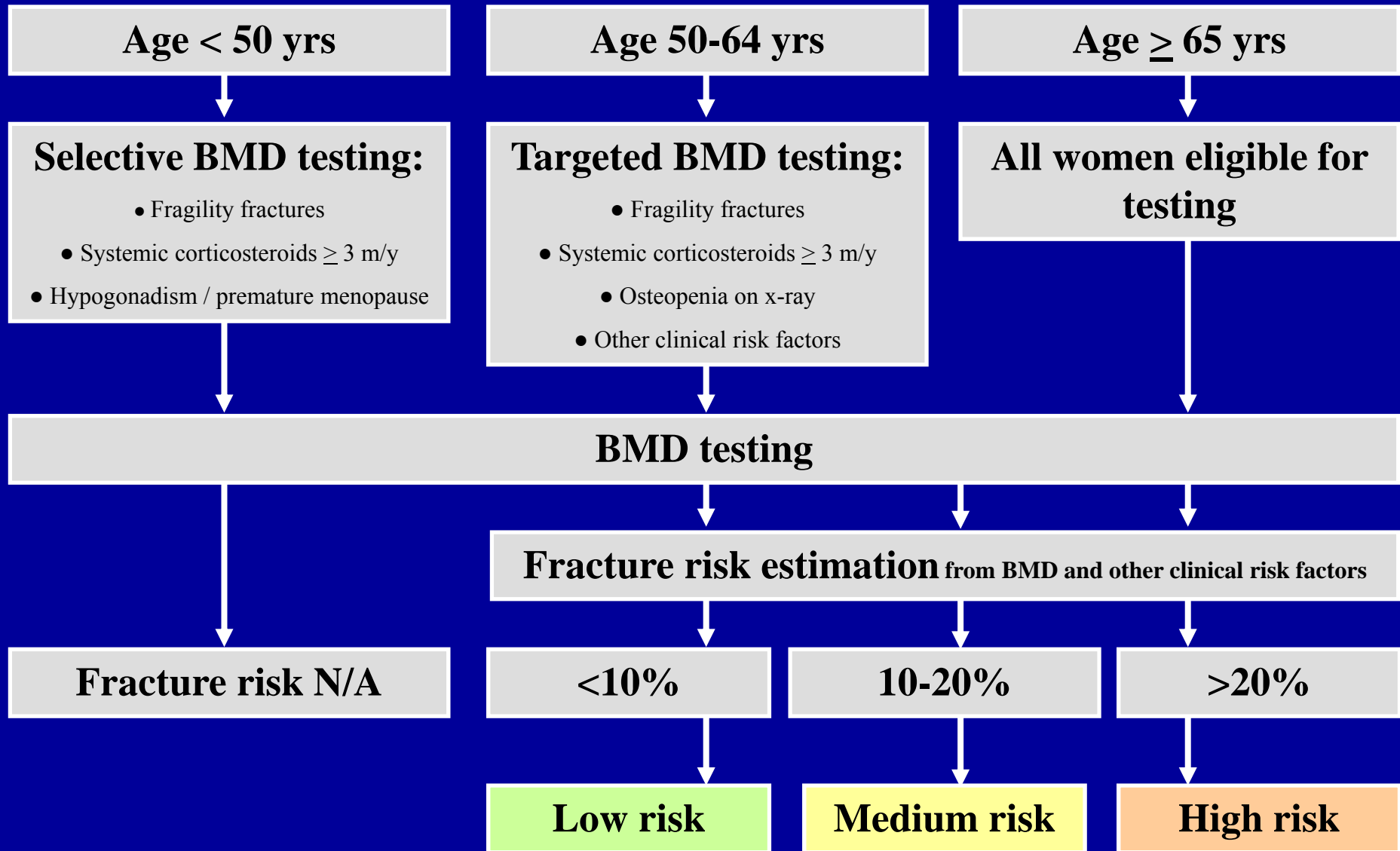
1990's

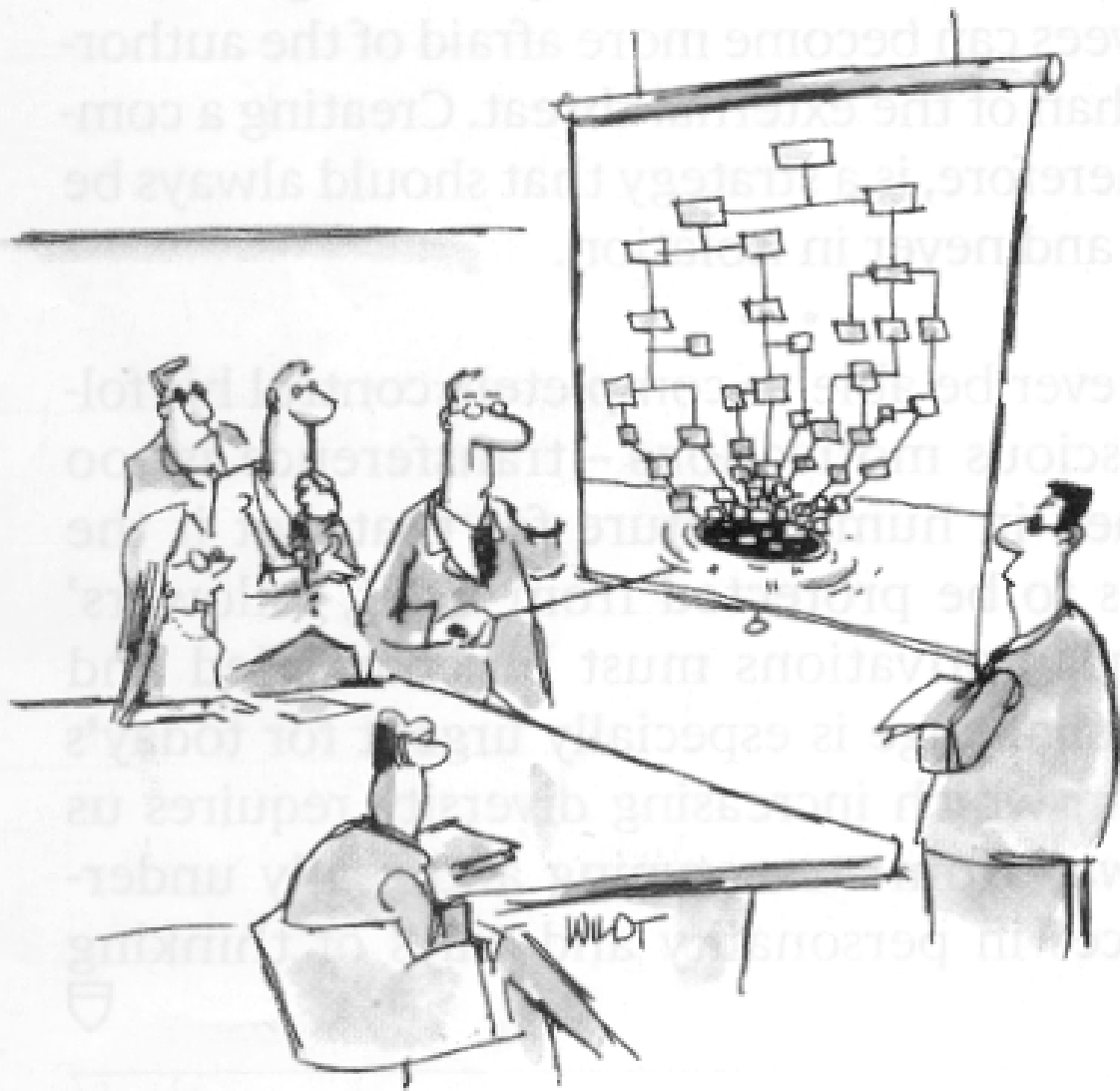


# The Manitoba Bone Density Program

- (A) To develop clinical protocols for bone density measurements
- (B) To assess clinical requirements for bone density services
- (C) Assessment of current and emerging bone density technologies.
- (D) Monitor the bone density program.

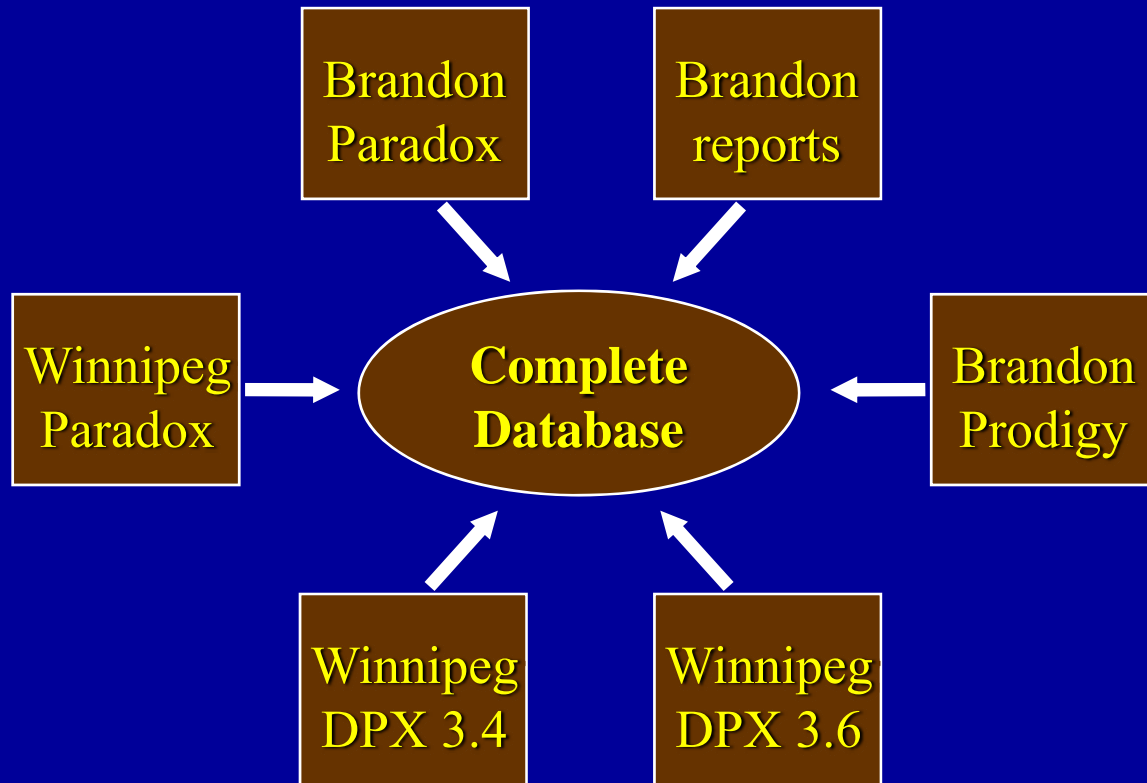
# BMD Testing In Manitoba





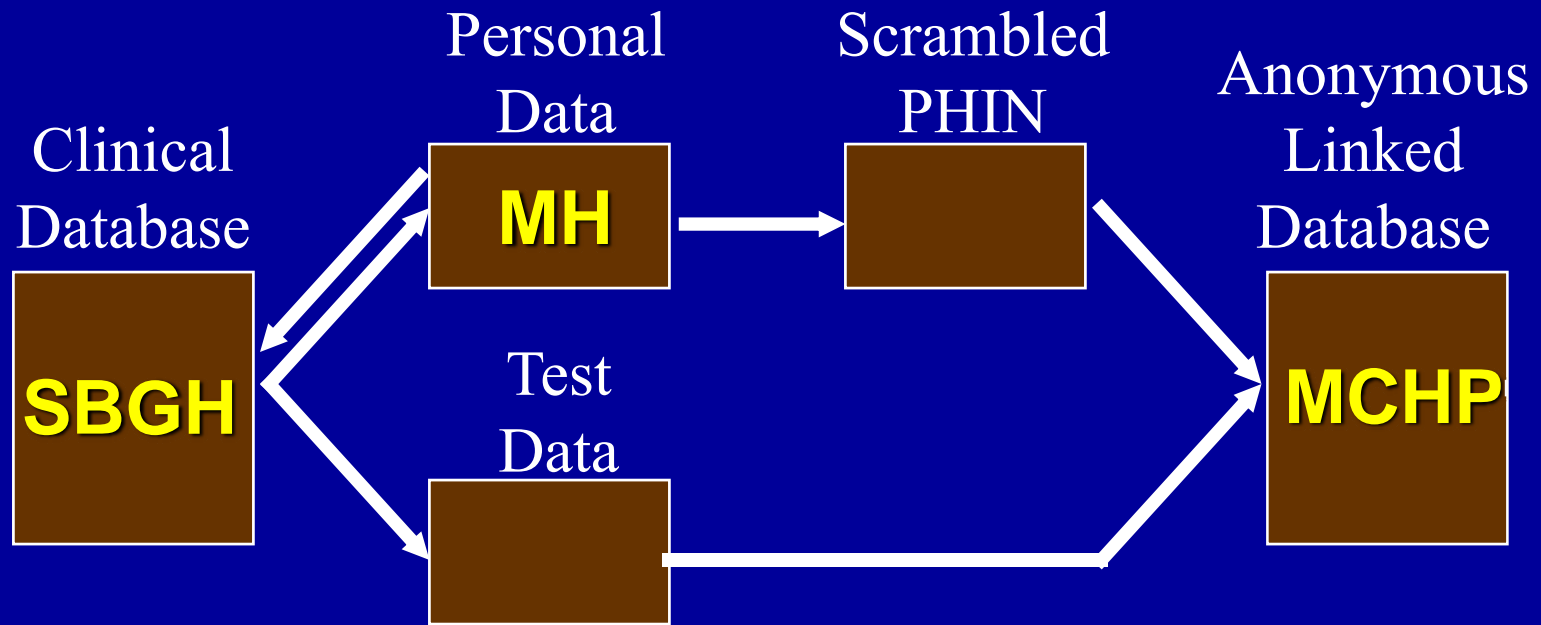
***“Frankly, at this point in the flow chart, we don’t know what happens to these people.”***

# Manitoba BMD Program: Database



Leslie WD et al. J Clin Densitom. 2005.

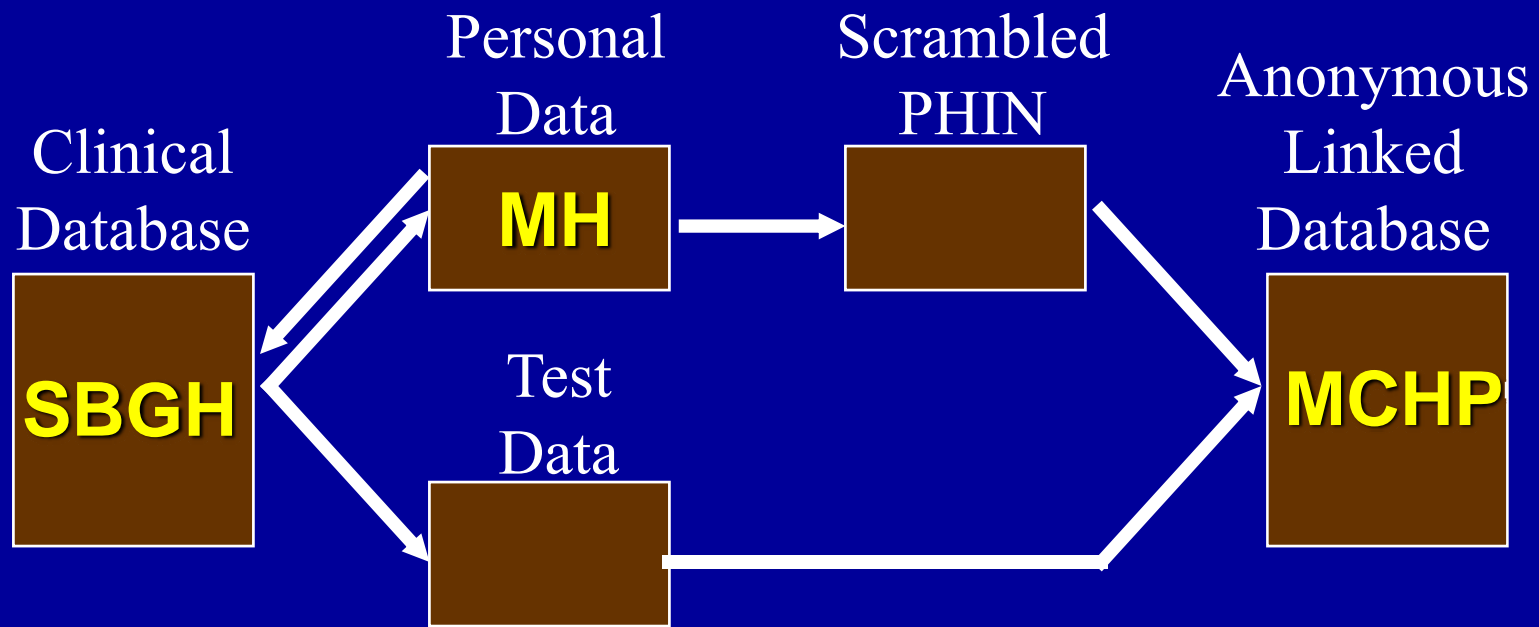
# Manitoba BMD Program: Data Linkage





*'From up here you can see five different layers of government'*

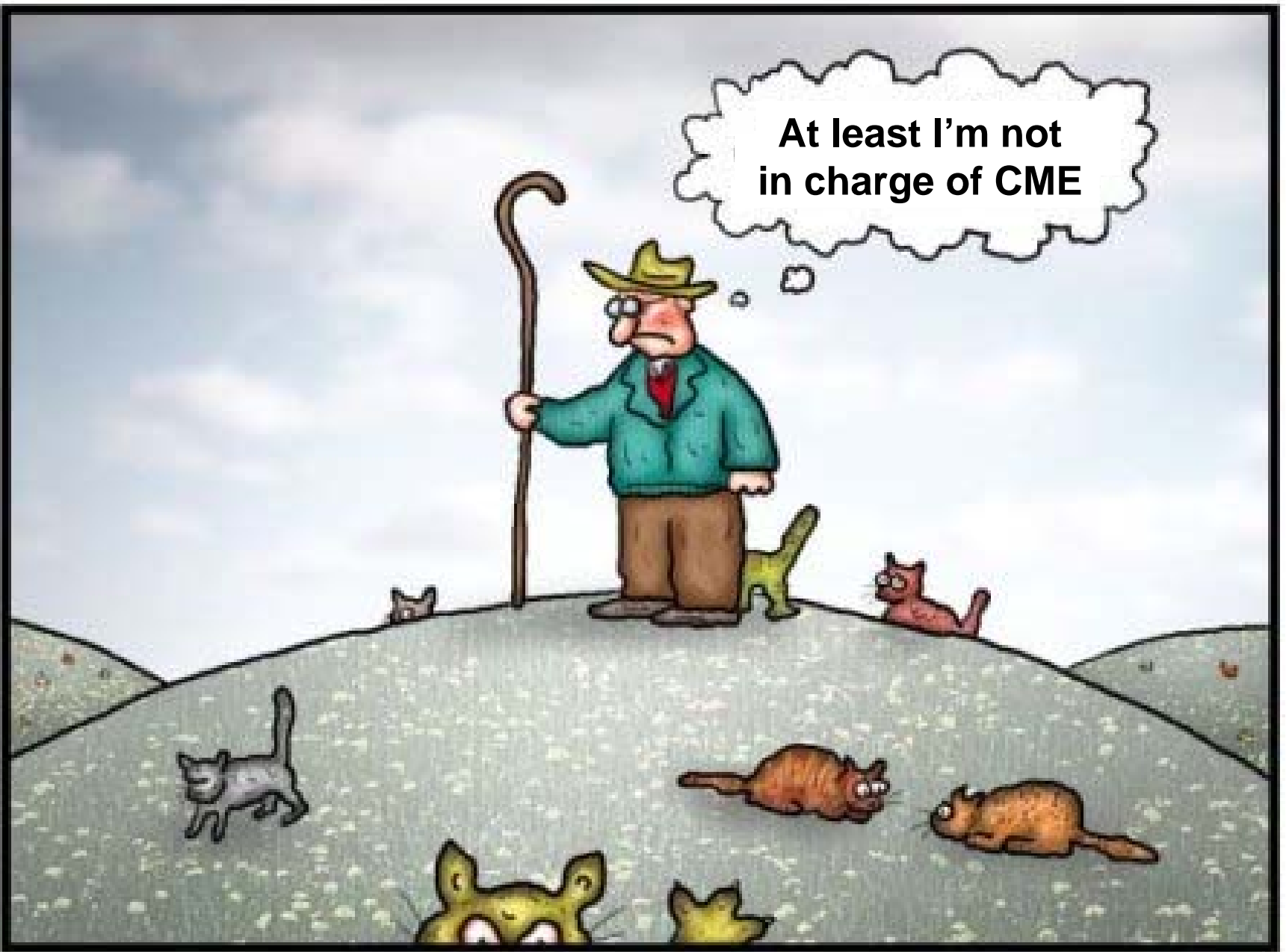
# Manitoba BMD Program: Data Linkage



40+ publications and a new WHO collaboration site

# Selected Projects

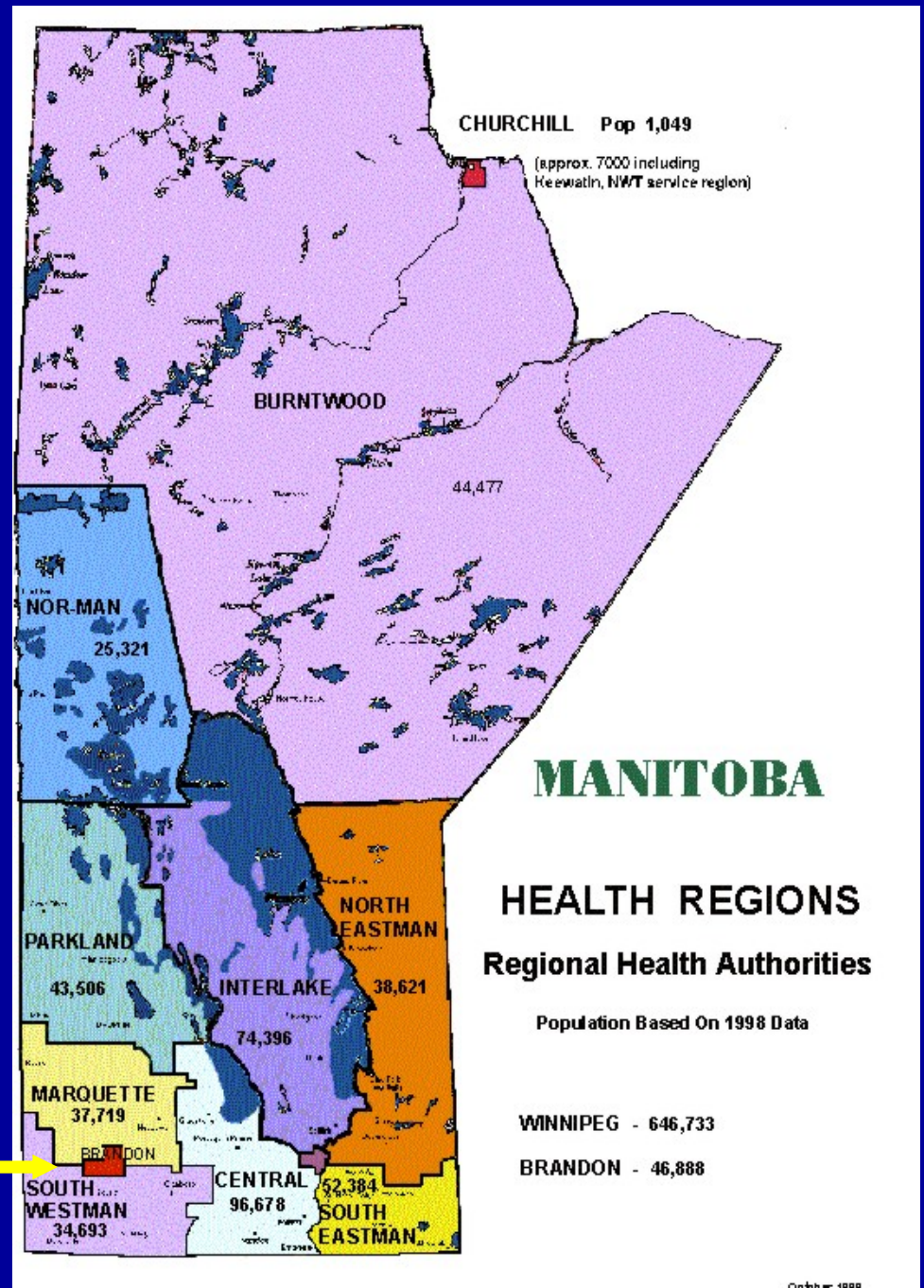
- Measuring behaviour
- Passively changing behaviour
- Actively changing behaviour



The daydreams of cat herders

# Impact Of Establishing A Brandon Bone Densitometry Program in 1999

Brandon  
Pop. 46,888

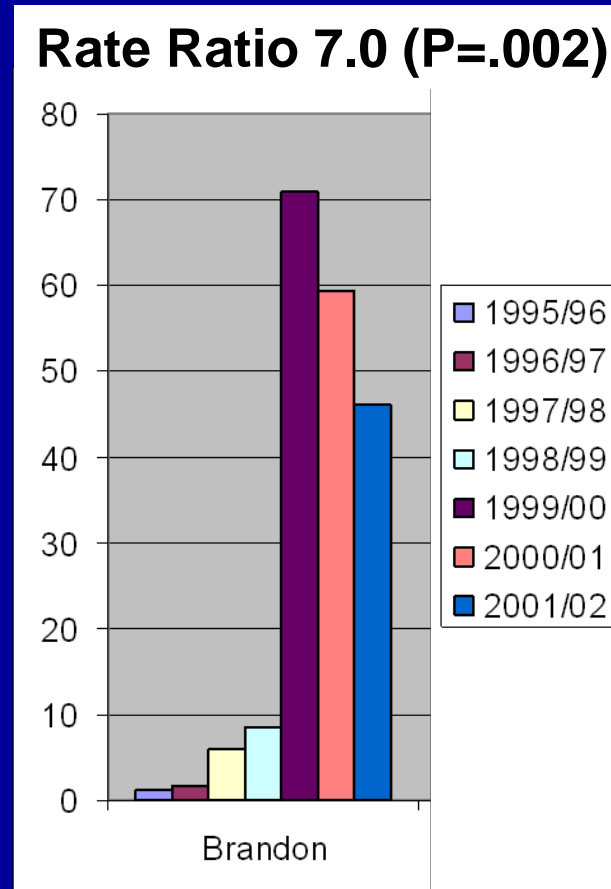


# Physician claims for bone densitometry vs. clinical database

Year	Physician claims N	Bone density database N	Completeness of physician claims %
1990/01	0	409	0.00
1991/92	0	431	0.00
1992/93	0	542	0.00
1993/94	0	706	0.00
1994/95	0	790	0.00
1995/96	0	900	0.00
1996/97	0	964	0.00
1997/98	0	2253	0.00
1998/99	0	4939	0.00
1999/00	45	4334	1.04
2000/01	1055	6347	16.62
2001/02	1014	6745	15.03

# BMD Testing Before/After 1999

(per 1,000 women age 50+, reference: Winnipeg)

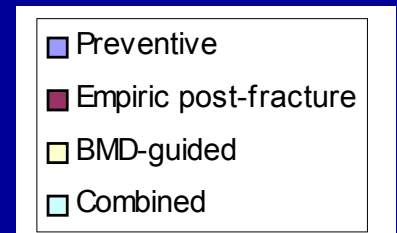
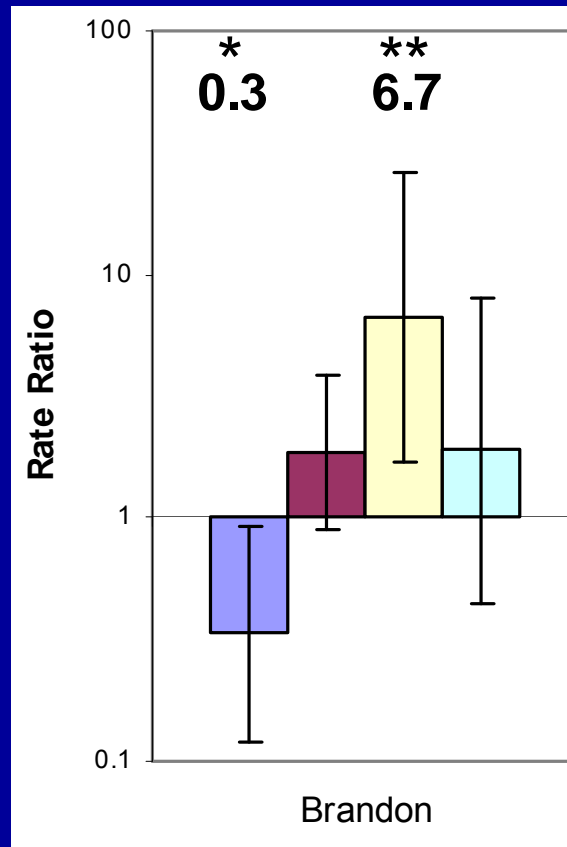
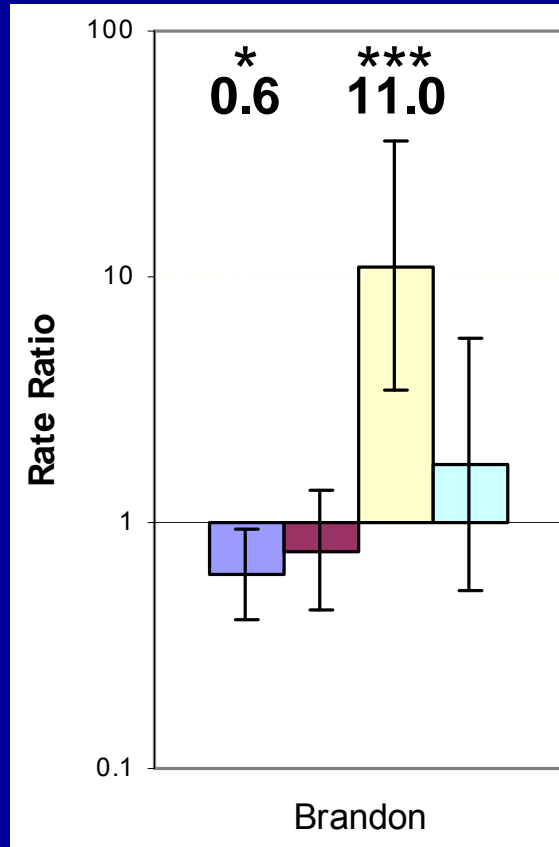


Leslie WD et al. Osteoporos Int. 2005.

# Drug Initiation Before/After 1999

Women age 50-65

Women age >65



Winnipeg reference region

P<0.05

\*\* P<0.01

\*\*\* P<0.0001

# Universality and BMD Testing: Highest versus Lowest income quintile

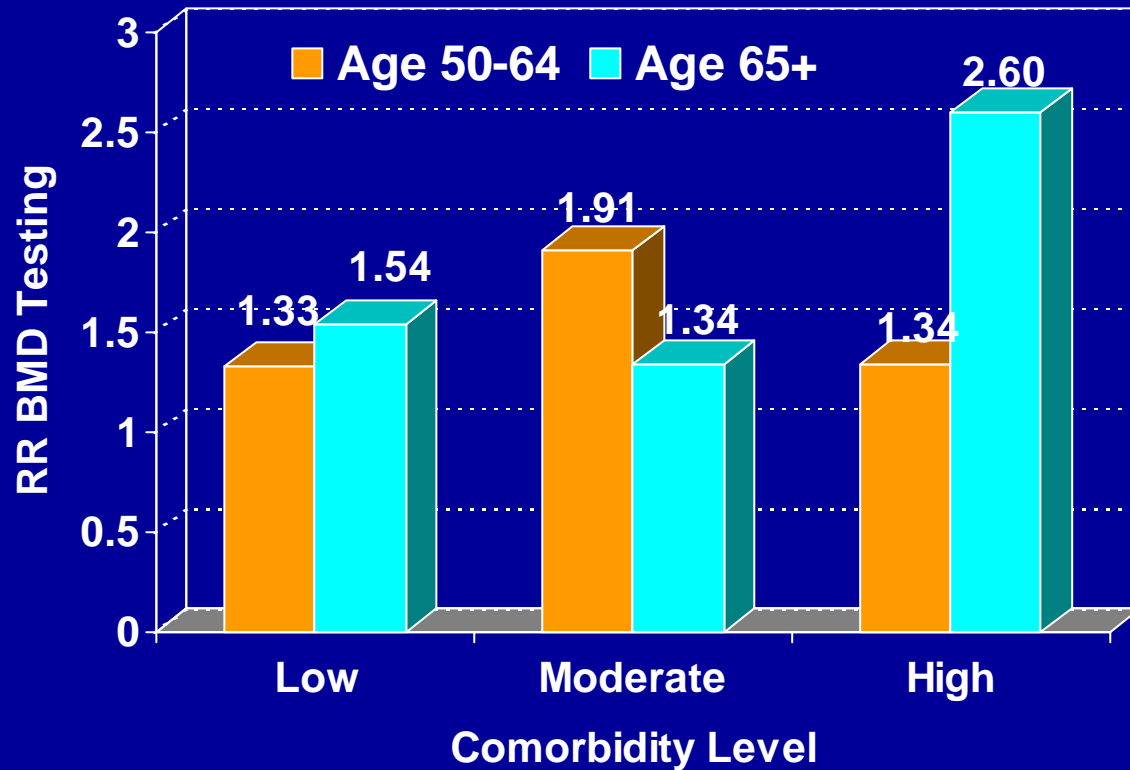
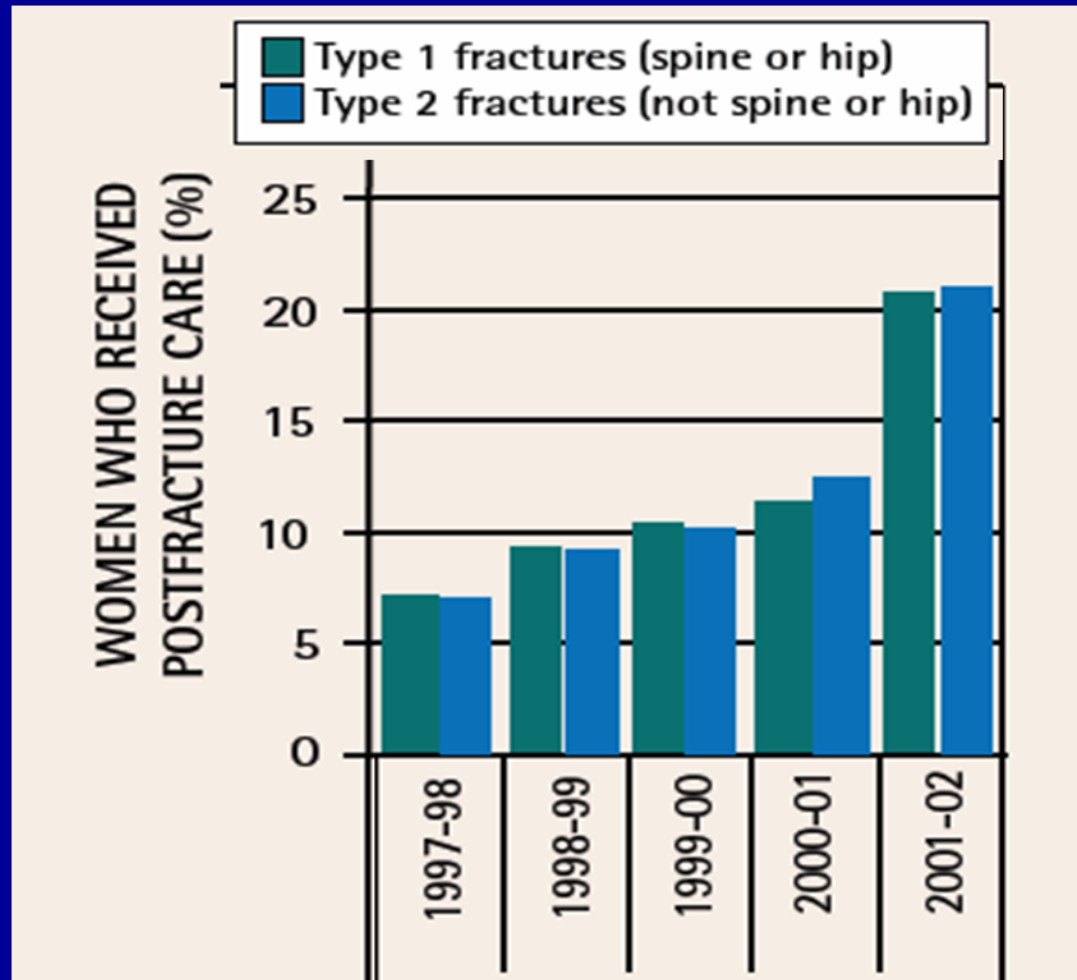


Figure 2. Percentage of women 50 years old or older who had bone mineral density testing or designated osteoporosis medications dispensed during the first 12 months after fractures

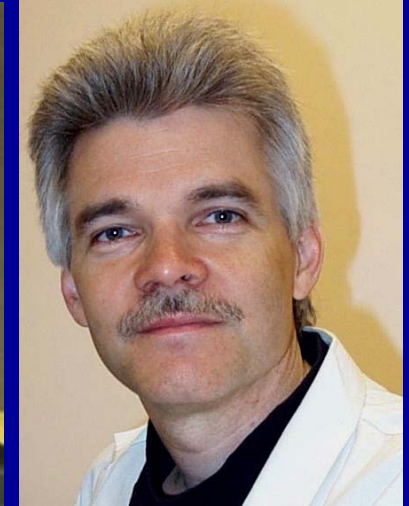


So How Are We Doing?



# What's Changed?

- Clinical risk factors
- Absolute fracture risk



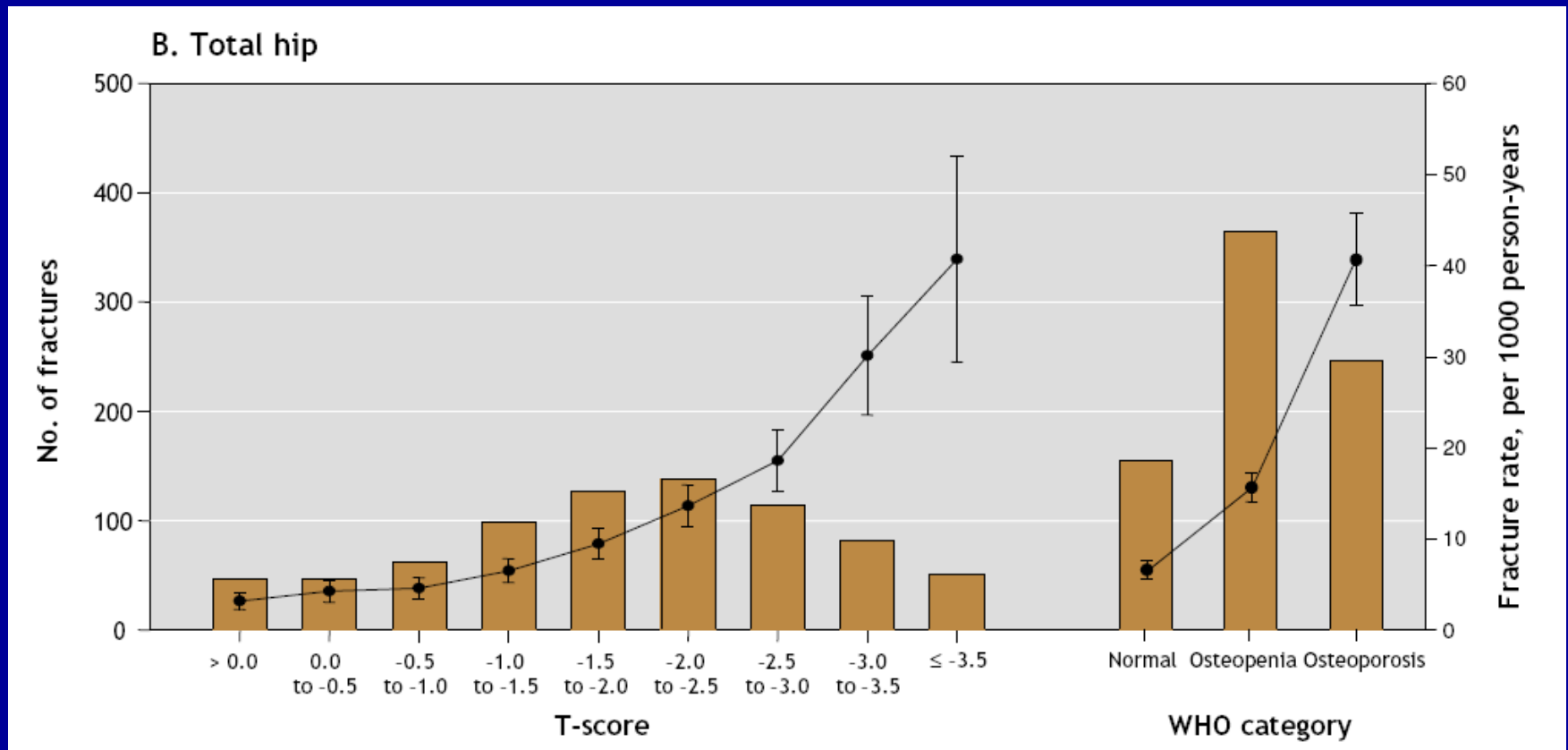
1980's

1990's

2000's



# Most Osteoporotic Fractures Occur in Non-Osteoporotic People!



Cranney, A. et al. CMAJ 2007.

# BMD-Independent Risk Factors

- Age and Sex
- Fragility fracture after age 50
- Parental hip fracture
- Current smoker
- BMI lowest quartile ( $<22 \text{ kg/m}^2$ )
- Unable to rise from chair
- Current oral corticosteroid use

Black-D et al. Osteoporos Int 2001.

Baltzan-MA et al. Lancet 1999.

# Feasible Implementation

- “In evaluating fracture risk, BMD should be considered in conjunction with other clinical risk factors for fracture. Whether to intervene and how to intervene should be based on combined assessment of BMD and clinical risk factors for fracture.” *ISCD Canadian Panel CMAJ 2002.*
- Non-BMD clinical risk factors are not used treatment initiation. *Cranney A. Osteoporos Int 2009.*

# Manitoba Model

## INTERPRETATION

Fracture Risk:	<b>Medium fracture risk</b>
Patient's Risk:	<b>14.3%</b> 10-year risk of osteoporotic fracture
Average Risk:	<b>6.7%</b> 10-year fracture risk for an average 52 year old
NNT:	<b>140</b> similar patients would have to be treated for 1 year to prevent 1 osteoporotic fracture
BMD Category:	<b>Osteoporotic</b>

## RESULTS

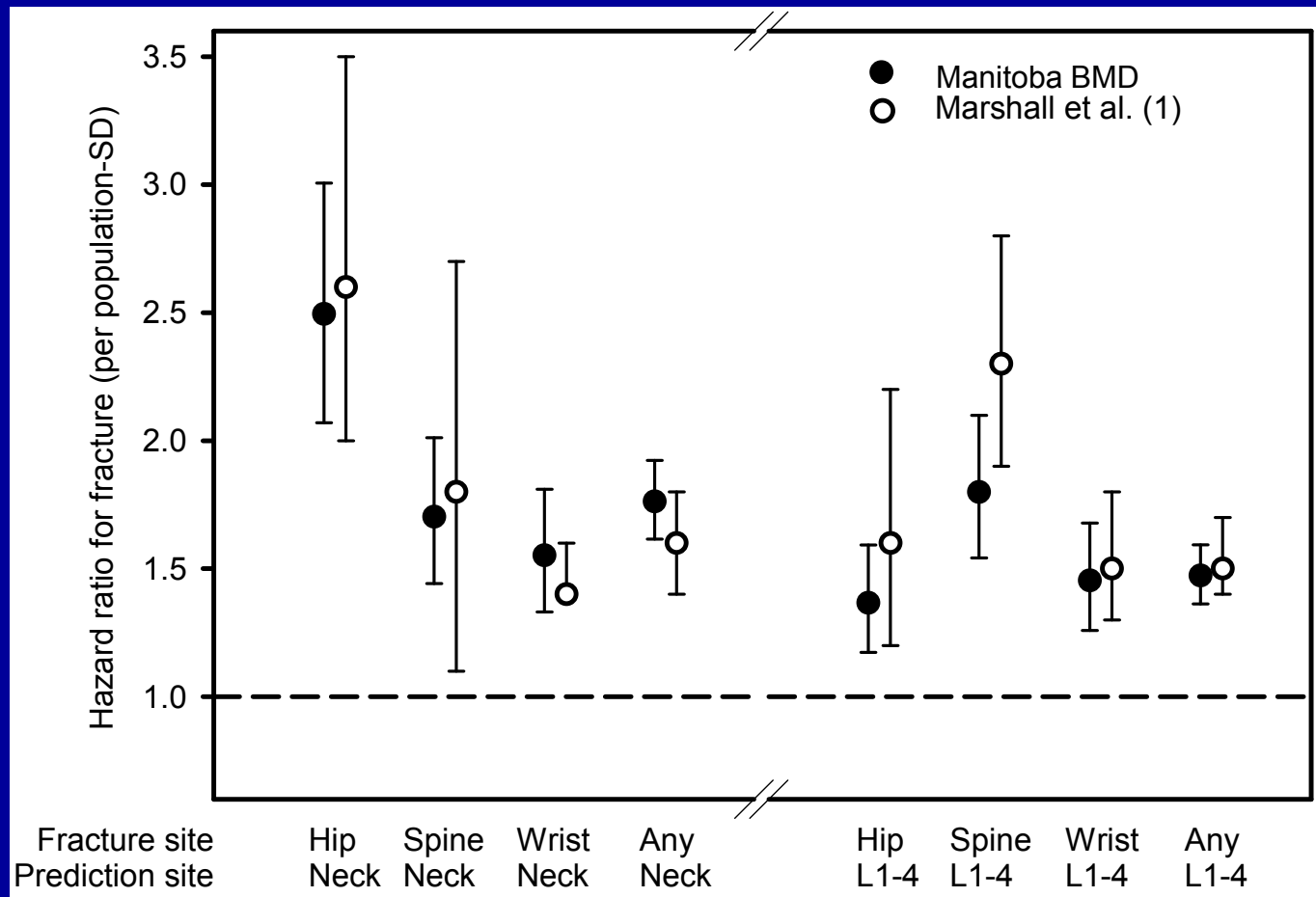
### Spine

Levels:	L2-4
BMD =	1.054 g/cm <sup>2</sup>
T-Score =	-1.2
Comparison:	Significant decrease in L2-L4 since Nov. 2001 (previous Prodigy BMD 1.138 g/cm <sup>2</sup> ).

### Total Hip

Site:	Right Total Hip
BMD =	0.681 g/cm <sup>2</sup>
T-Score =	-2.7
Comparison:	Significant decrease in the right total hip since Nov. 2001 (previous Prodigy BMD 0.789 g/cm <sup>2</sup> ).

# Age-adjusted risk for fracture (95% CI): Manitoba BMD dataset vs Marshall meta-analysis



Leslie WD et al. JCEM. 2007.

# In Manitoba spine-less BMD reporting...



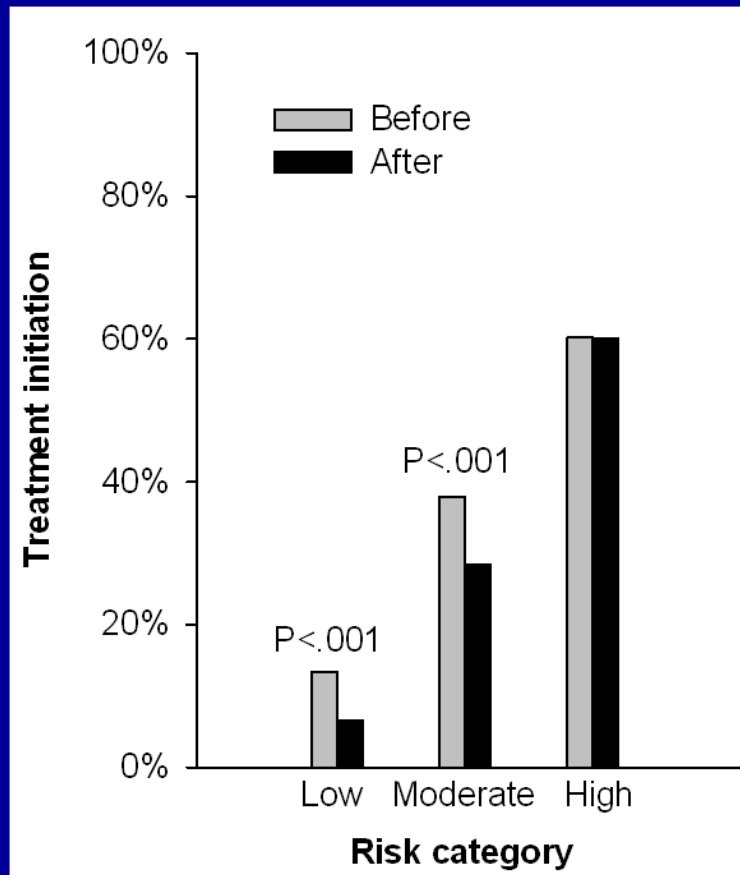
...is

**totally hip**™



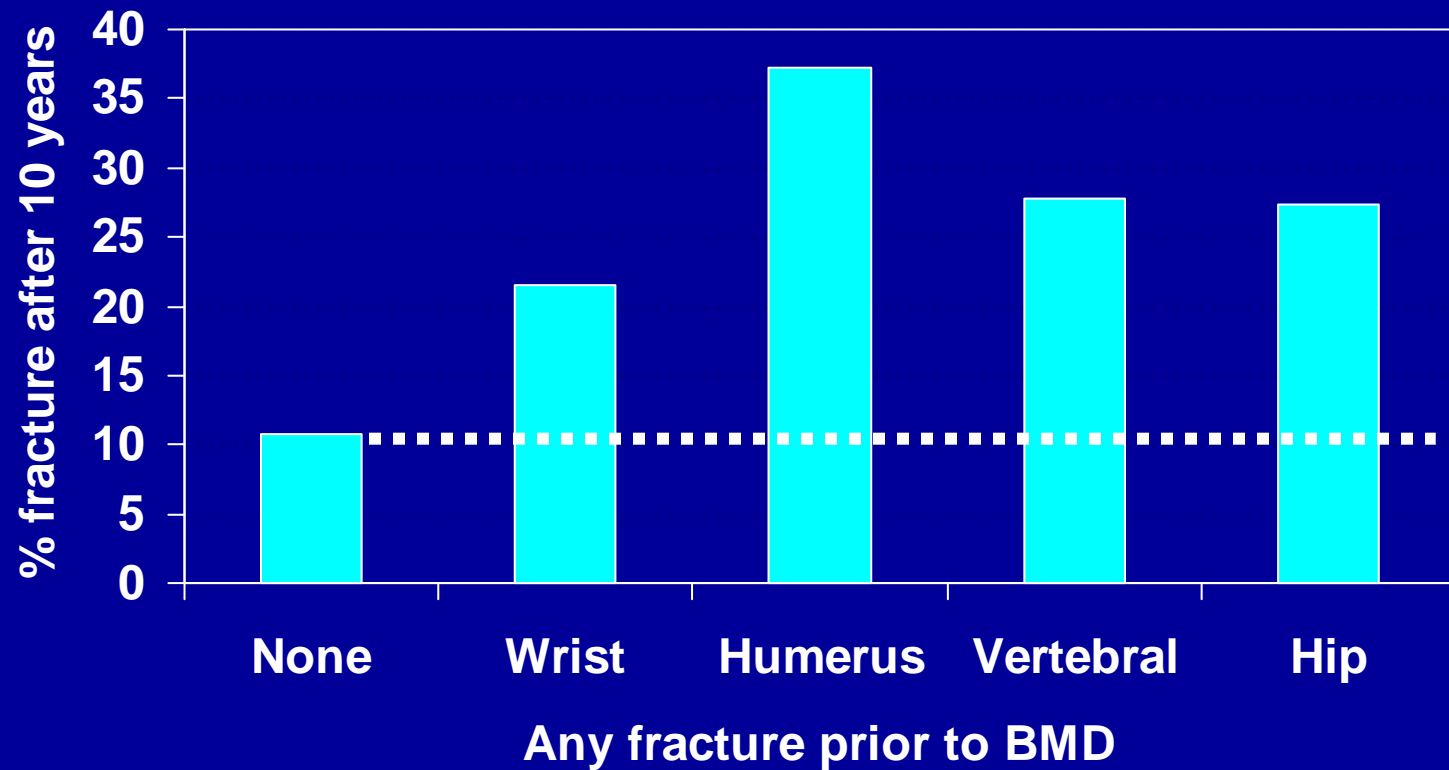
Leslie WD et al. Arch Intern Med. 2007

# Behavioural Change Through Systems Change: before (Apr – Dec 2005) and after (Jan–Dec 2006)



- Introduction of 10y # risk based upon age and 7 risk factors:
  - 25% reduction in treatment initiation
  - 55% reduction in osteopenia treatment
  - Tx initiation responsive to non-BMD risk factors
  - Equivalent # rates.

# Risk of A Second Fracture...



Hodsman A. Arch Intern Med. 2008.

# Is education the answer?

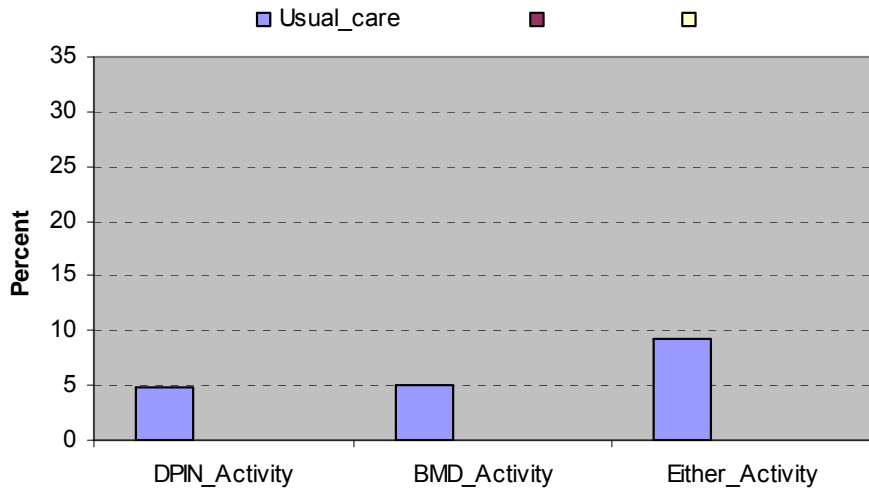
- RCT of education intervention for 828 primary care physicians and 13,455 eligible at-risk patients
  - women  $\geq 65$  yrs, men/women  $\geq 65$  y with a prior fracture, and men/women  $\geq 65$  y using oral glucocorticoids
- Outcome BMD test or initiating treatment:
  - “...patient and/or physician education did not work to improve the management of osteoporosis”

# Manitoba RCT

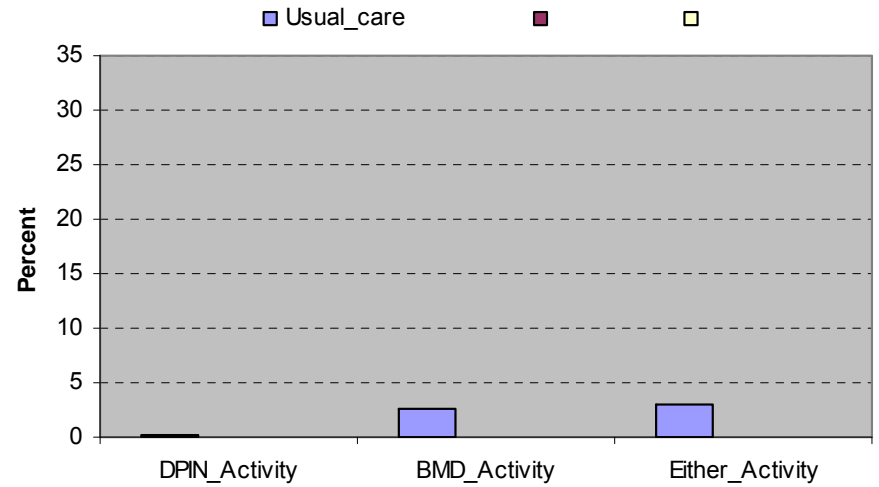
- Women and men age 50 and older with:
  - Hip, Spine, Humerus or Colle's fracture.
- 2,901 incident fracture cases randomized (1:1:1) to one of the three groups:
  - usual care,
  - mailed physician-only notification or
  - mailed physician & patient notification.
- Assessed:
  - BMD testing, treatment initiation (DPIN).

# Usual "Care"

Females

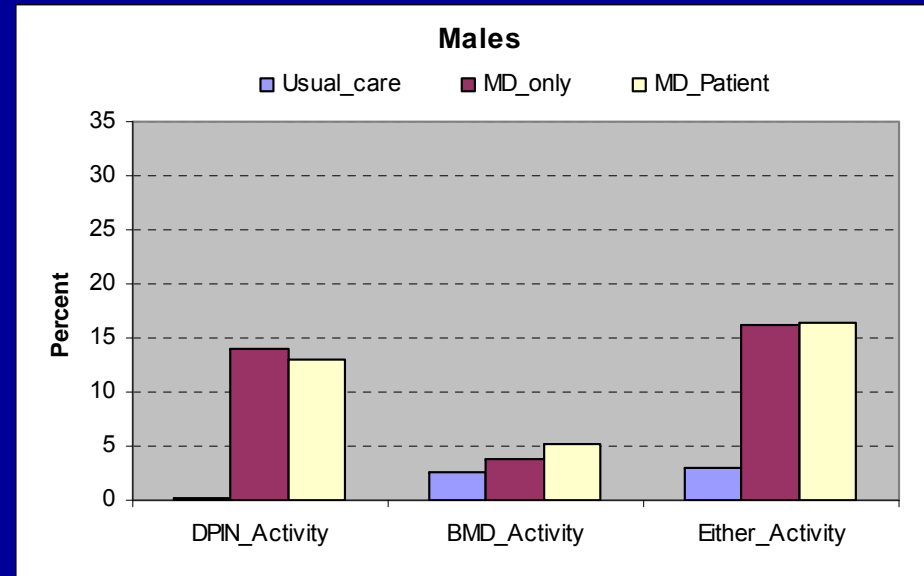
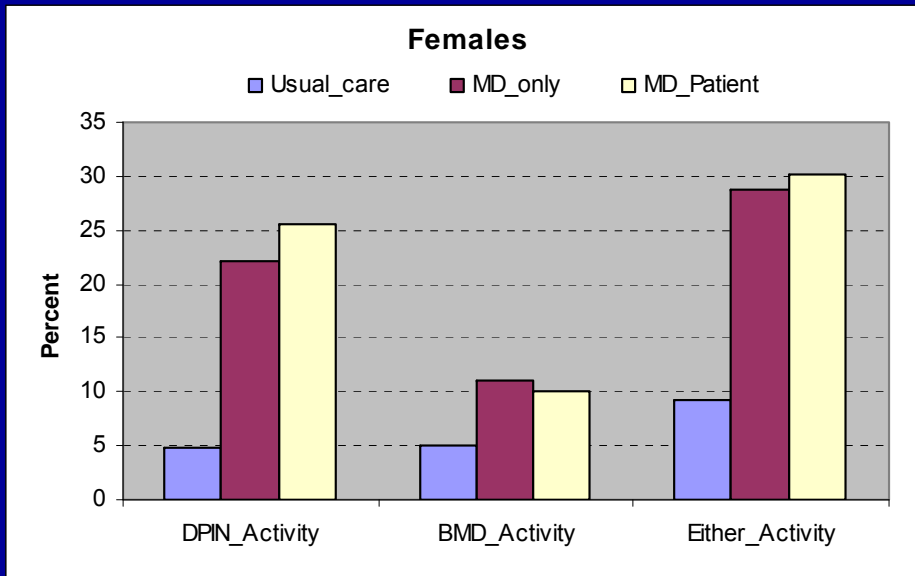


Males



Leslie WD. Unpublished data.

# Interventions



Age- and sex-adjusted OR 4.3 (MD only) and 4.6 (MD-patient)  
Cost per intervention (net above usual care) = \$30.64

Leslie WD. Unpublished data.

# Prescription for a Fractured Health Care System

- We're working to (re)engineer systems that facilitate:
  - identification of high risk populations
  - post-fracture care
  - “physician-proof” decision making.



**FRACTURE ASSESSMENT**

***RISKY BUSINESS***

# Thanks and Acknowledgements

## **BMD Program Committee**

Dr. F. Berard

Dr. E.A. Salamon

Dr. S. Mitoo

Dr. B. Kvern

Dr. H. Frame

Ms. S. Eustace

Dr. C. Metge

Ms. B. Fyfe

Ms J. Jackson

Dr. S. Demeter

**Colleagues, Staff and Friends  
from SBGH and Brandon  
Manitoba Health  
Winnipeg RHA  
Brandon RHA  
Many Collaborators**



**And the Manitoba Centre for Health Policy**