Changes in utilization of DXA screening for women and identification of risk factors for developing osteopenia and osteoporosis, 1999 through 2006: An upper-Midwest experience

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Objectives

- ***Assess changes in dual-energy x-ray absorptiometry (DXA) use by women, from 1999-2006.***
- ***Review practice guidelines, education and advertising campaigns over the same period of time, to see how they may be reflected in DXA utilization.***
- ***Determine if DXA is being utilized by those who may benefit most and identify areas of future intervention.***

Methods

- ***All 1999-2006 data for women's initial pre-diagnosis DXA scans (n=8571) was extracted from the Osteoporosis Program registry of a tertiary care center in the upper-Midwest.***
- ***Each was classified as either:***
  - ***Screening Only (n=6282)***
    - ***Includes age, post-menopausal and family history***
  - ***Other known condition – Elevated risk (n=1137)***
    - ***Thyroid, parathyroid, cancer, crohn's, respiratory, seizures, blood clotting, renal/kidney, steroid medications, etc.***
  - ***Symptom – Diagnostic (n=1152)***
    - ***Fractures, scoliosis, back pain, mobility issues, joint/bone disorder, back surgery***

Methods

- ***Literature was reviewed to identify practice pattern guidelines and published scientific findings.***
- ***Change in screening rates and outcomes was evaluated by year, age, BMI and diagnosis.***
- ***DXA screening changes were mapped along the timeline identified by literature review.***
- ***Remaining areas of focus for improved DXA screening were identified, based upon current screening guidelines and screening rates.***

Timeline of Selected Items

Nov. 1997 ***American College of Rheumatology:*** ***Position statement on bone density measurement***

Supported the use of bone density measurement in the diagnosis of bone mass in women:

- ***at or after menopause, if the results of the study will influence the decision for estrogen replacement therapy or other potential interventional therapy***
- ***who have early onset of menopause, have had surgical menopause, or with aberrations of the menstrual cycle, suspected of being estrogen malabsorbers or non-responders***
- ***who have a family history of osteoporosis***
- ***who have low body weight***
- ***Risk factors associated with medical care:*** ***receiving long term therapy with prednisone, glucocorticoids, phenytoin therapy, or heparin therapy, excessive doses of thyroid replacement***

Timeline of Selected Items

- ***Risk factors associated with other medical conditions:*** ***chronic malabsorption or documented calcium malabsorption, asymptomatic primary hyperparathyroidism***
- ***Recent fracture:*** ***spine, long bone, hip, or pelvis and the fracture is suspected to be associated with osteoporosis***
- ***Vertebral abnormalities or x-ray evidence of osteopenia***

Timeline of Selected Items

Nov. 2001 ***Agency for Healthcare Research and Quality (AHRQ): Osteoporosis in Postmenopausal Women: Diagnosis and Monitoring***

Identified the following risk factors as being consistently associated with low bone density and fracture:

- *nonuse of estrogen replacement*
- *increasing age*
- *white race*
- *low weight or weight loss*
- *history of previous fracture*
- *family history of fracture*
- *history of falls*
- *and low scores on one or more measures of physical activity or function*

Timeline of Selected Items

July 2002 ***Women's Health Initiative (WHI-1): Discontinued Estrogen-Progestin vs. Placebo trial arm due to increased risk of:***

- ***Breast cancer***
- ***CHD***
- ***Stroke***
- ***Venous thromboembolism***

Study arm also reported reduction in risk of osteoporotic fractures of the hip, vertebrae and wrist.

Timeline of Selected Items

Sept. 2002 ***U.S. Preventive Services Task Force (USPSTF):***

Recommendations for screening for osteoporosis

- *Recommended that women aged 65 and older be screened routinely*
- *Recommended routine screening begin at age 60 for women at increased risk for osteoporotic fractures*
  - *Lower body weight*
  - *No current use of estrogen therapy*
  - ***Found less consistent evidence existed for risk factors such as smoking, weight loss, family history, decreased physical activity, alcohol or caffeine use, or low calcium and vitamin D intake***
- *Made no recommendation for or against routine osteoporosis screening in postmenopausal women who are younger than 60 or in women aged 60-64 who are not at increased risk for osteoporotic fractures*

Timeline of Selected Items

Jan. 2004 ***American College of Obstetrics and Gynecology (ACOG): Guidelines for the clinical management of osteoporosis***

The guidelines recommend testing be performed based on the patient's risk factors and is not indicated unless the results will affect treatment.

- ***All postmenopausal women aged 65 and older be screened***
- ***Postmenopausal women less than 65 years of age, with at least one risk factor be screened***
- ***May be used in pre- and postmenopausal women with certain diseases:***
  - ***acquired immunodeficiency syndrome, human immunodeficiency virus, chronic obstructive pulmonary disease, inflammatory bowel disease, hyperparathyroidism, rheumatoid arthritis and those who take medications associated with an increased risk of osteoporosis***

Timeline of Selected Items

Feb. 2004 ***Women's Health Initiative (WHI-2): Discontinued Estrogen vs Placebo post-hysterectomy trial trial arm due to increased risk of:***

- ***Stroke***
- ***Calculated lack of overall health benefit***

Study arm also reported reduction in risk of osteoporotic fractures of the hip, vertebrae and wrist.

Timeline of Selected Items

Dec. 2004 ***American Medical Association (AMA):***
Osteoporosis management: Recommendations for BMD measurement and techniques for testing
Reported the guidelines from the National Osteoporosis Foundation, USPSTF, and International Society for Clinical Densitometry:

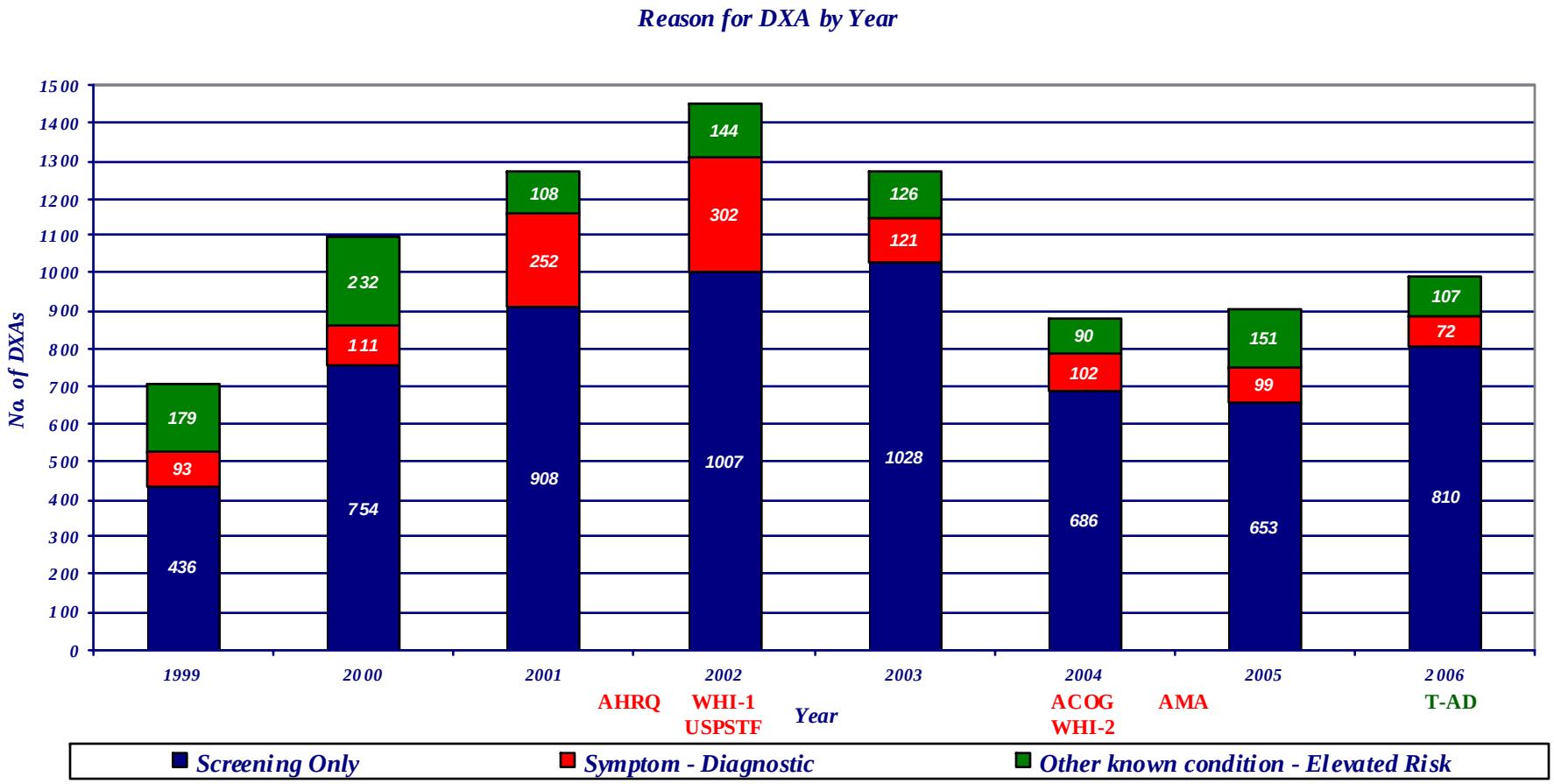
- ***All women aged 65 or older***
- ***Postmenopausal women < 65 with 1+ risk factors***
- ***Women with a disease or condition associated with low bone mass or bone loss***
- ***Women taking medications associated with low bone mass or bone loss***
- ***Women who present with fractures (BMD measurements are not required for a clinical diagnosis of osteoporosis). In these instances, BMD measurements are useful in establishing a baseline for assessing the response to treatment and quantifying fracture risk***
- ***Women discontinuing estrogen should be considered for BMD testing***

Timeline of Selected Items

Apr. 2006 ***"Do you know your T-score?" advertising campaign (T-AD): Women on the television screen asked the simple question, "Do you know your T-score?" and explained who should be screened:***

- *All women aged 65 or older*
- *Postmenopausal women < 65 with risk factors, especially:*
  - *History of broken bones,*
  - *Thin build, or*
  - *Strong family history of osteoporosis*

Results



$\chi^2 = 389.7$ $df = 14$ $p < 0.001$

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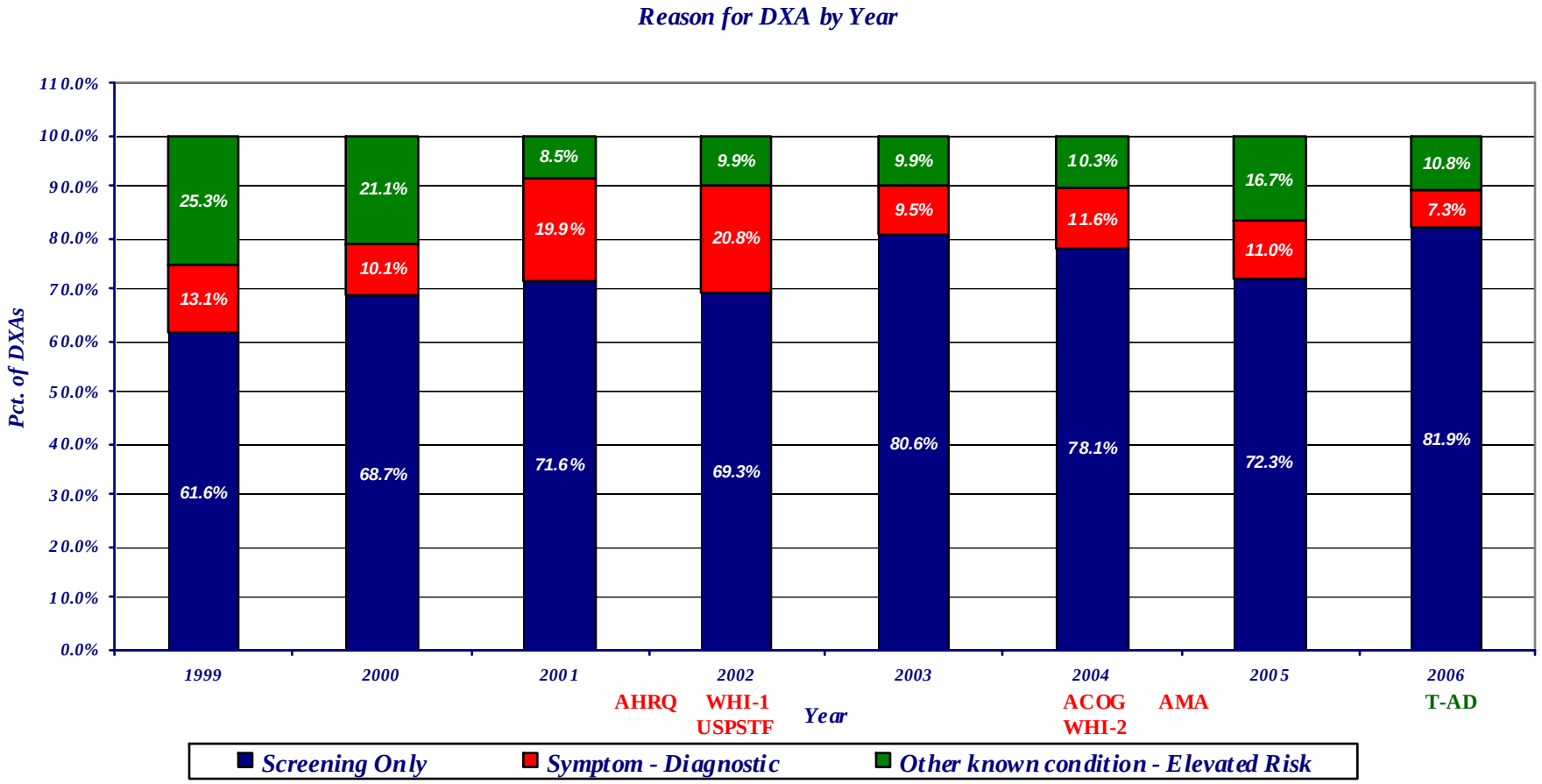
Results



$\chi^2 = 389.7$ $df = 14$ $p < 0.001$

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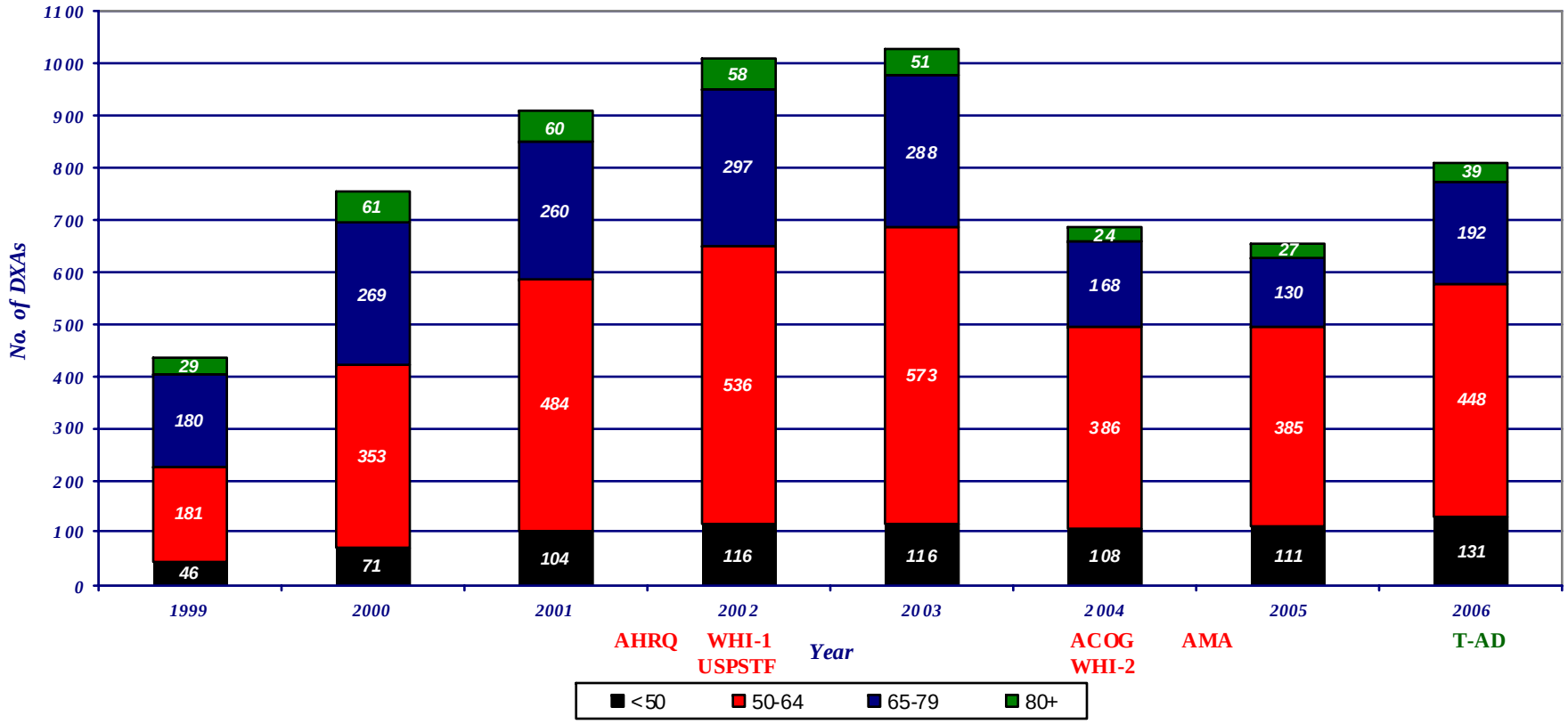
Results

Screening Only

Age by Year



$\chi^2 = 145.1$ $df = 21$ $p < 0.001$

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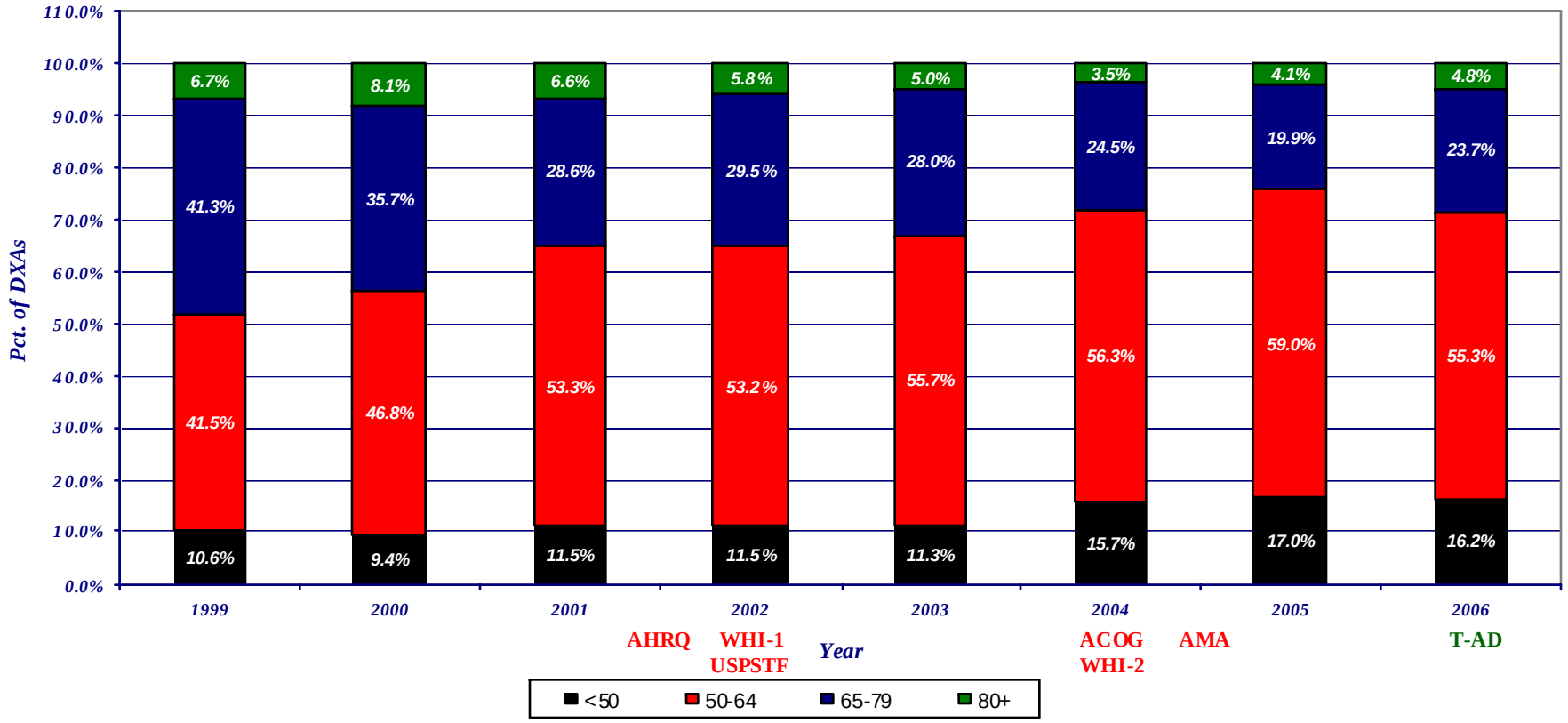
Results

Screening Only

Age by Year



$\chi^2 = 145.1$ $df = 21$ $p < 0.001$

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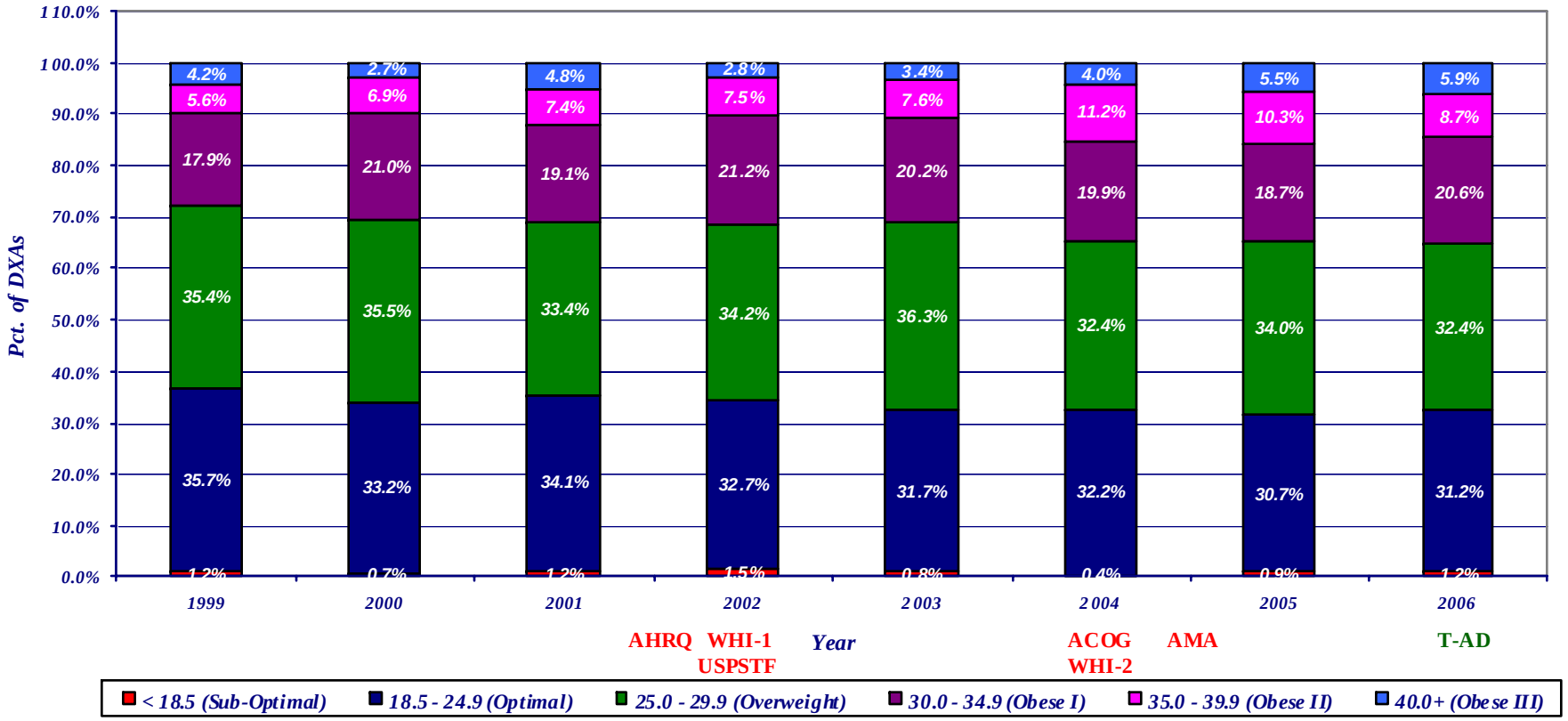
Results

Screening Only

Body Mass Index by Year



$\chi^2 = 53.7$ $df = 35$ $p = 0.022$

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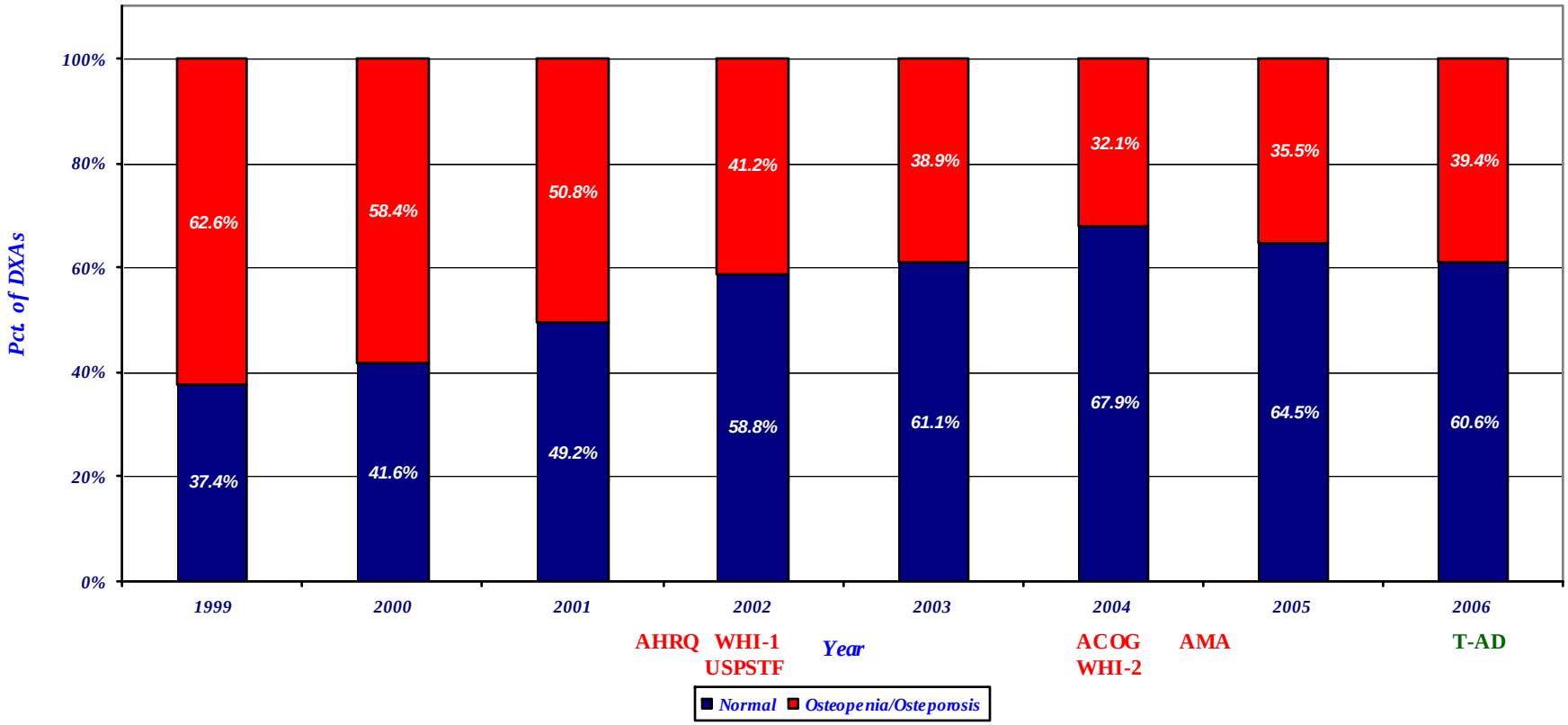
Results

Screening Only

Results by Year



$\chi^2 = 221.0$ $df = 7$ $p < 0.001$

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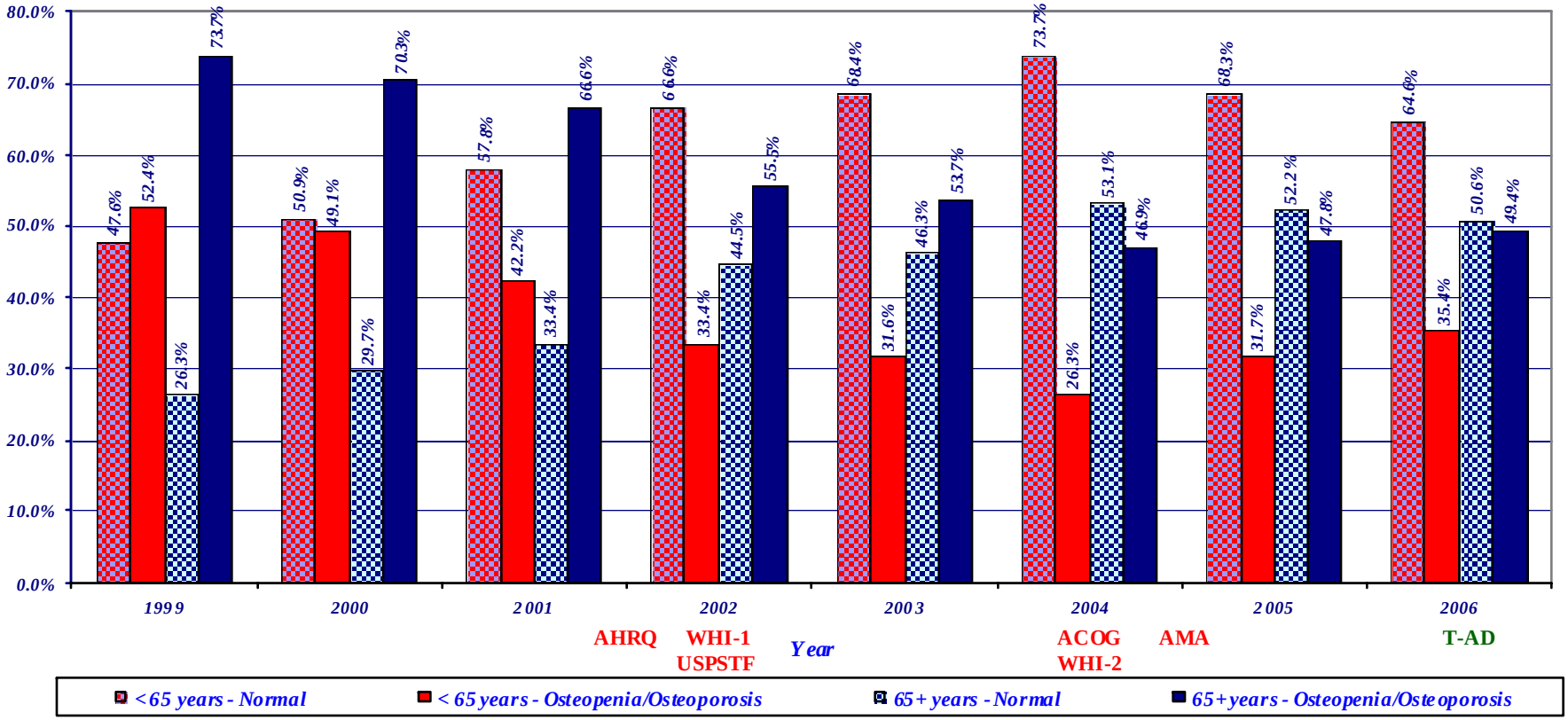
Results

Screening Only

Results by Age and Year



$< 65\ \chi^2 = 117.4\ \ df = 7\ \ p < 0.001$

$65+\ \chi^2 = 129.7\ \ df = 7\ \ p < 0.001$

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Results: Multivariate Logistic Regression

Screening Only

Step		Osteoporosis/ Osteopenia No	Yes	β	O.R.	95% Conf. Int. UL	LL
1	**Age**						
	<50	543	260		1.000	------	------
	50-64	2103	1243	0.361	1.435	1.204	1.710
	65-79	789	995	1.116	3.053	2.526	3.688
	80+	87	262	1.863	6.441	4.772	8.693
2	**Body Mass Index**						
	<18.5 (Suboptimal)	18	45	2.304	10.009	5.249	19.088
	18.5-24.9 (Optimal)	843	1172	1.599	4.950	3.583	6.839
	25.0-29.9 (Overweight)	1206	913	0.888	2.431	1.761	3.357
	30.0-34.9 (Obese I)	830	407	0.43	1.537	1.101	2.146
	35.0-39.9 (Obese II)	388	116	0.029	1.029	0.707	1.500
	40.0+ (Obese III)	199	54		1.000	------	------
3	**Calendar Year**						
	1999	163	273		1.000	------	------
	2000	314	440	-0.162	0.850	0.656	1.102
	2001	447	461	-0.424	0.655	0.510	0.841
	2002	592	415	-0.877	0.416	0.325	0.533
	2003	628	400	-0.935	0.393	0.307	0.503
	2004	466	220	-1.168	0.311	0.238	0.407
	2005	421	232	-0.950	0.387	0.295	0.507
	2006	491	319	-0.829	0.436	0.338	0.564
	Constant			-0.081	0.922		

Discussion

Significant changes in screening and diagnosis occurred over time:

1) Proportion of screened women < 65 years of age increased across time, with the proportion of women 65+ rallying in 2006
2) The proportion of screened women diagnosed with osteoporosis/osteopenia demonstrated a similar pattern, steadily decreasing until it rebounded in 2006.
3) As expected, age and BMI were found to be significant predictors of a diagnosis of osteoporosis/osteopenia. However, after adjusting for age and BMI, year was also found to be a significant predictor, demonstrating that other consistent differences defined the patient populations.

Conclusions

Significant changes occurred over time, with screening rates and the makeup of the patient population impacted by information and guidance provided to providers and patients over time.

These changes resulted in initial rapid increases in DXA screening, followed by rapid decreases, particularly among women 65+ years of age. Eventually, a slight increase occurred, with a more rapid increase among women 65+ years of age.

As rates of DXA screening increased, those being screened were not necessarily those who would benefit the most. Higher rates of diagnosis continued in the 65+ patient population, even as they became a significant minority of those being screened.

Notably, as screening in the 65+ patient population began to improve, odds of diagnosis increased to a near high level. Suggesting that improved efforts to screen women 65+ years of age are critical.