Provider Level Analyses of Screening Mammography Use in Women with Limited Life Expectancy

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Outline

- Two studies
  - Integrating Age and Comorbidity to Assess Screening Mammography Utilization
  - Variation Among Providers in Screening Mammography for Women with Limited Life Expectancies

Integrating Age and Comorbidity to Assess Screening Mammography Utilization

Background

- Screening mammography
  - Benefits
    - Early detection of breast cancer
    - Early treatment
    - Better survival
  - Harms
    - False-positives and follow-up diagnostic tests
    - Over-diagnosis and over-treatment

Background (con't)

- Current cancer screening guidelines base their recommendations primarily on age
  - USPSTF guideline
    - Biennial screening mammography in women aged 50-74 years
    - Individualized decision for women before the age of 50
    - Current evidence is insufficient to assess the additional benefits and harms of screening mammography in women 75 years or older.

Background (con't)

- Limitations of using age-cutoffs alone
  - Under-screening
    - 40% healthy women aged 80-84 did not have a recent screening mammogram (Schonberg, MaCarthy et al. 2004)
  - Over-screening
    - 25% women aged 70-74 years with severe cognitive impairment had a recent screening mammogram (Mehta, Fung et al. 2010)
    - 12% women aged 65-74 with advanced cancer at another site had a recent screening mammogram (Sima, Panageas et al. 2010)

Background (con't)

- Studies continue to use age cutoffs in evaluating screening mammography use
  - For example:
    - a study found that poor self-reported health predicted nonadherence to mammography screening and concluded that women with poor health may need more support from their providers to be screened (Gierish, Earp et al. 2010)

Objectives

- To develop a methodological framework to
  - Predict life expectancy using both age and comorbidity
  - Define appropriate and inappropriate target population for screening mammography based on life expectancy
- To evaluate screening mammography utilization in Texas
  - life-expectancy method vs. age-cutoff method

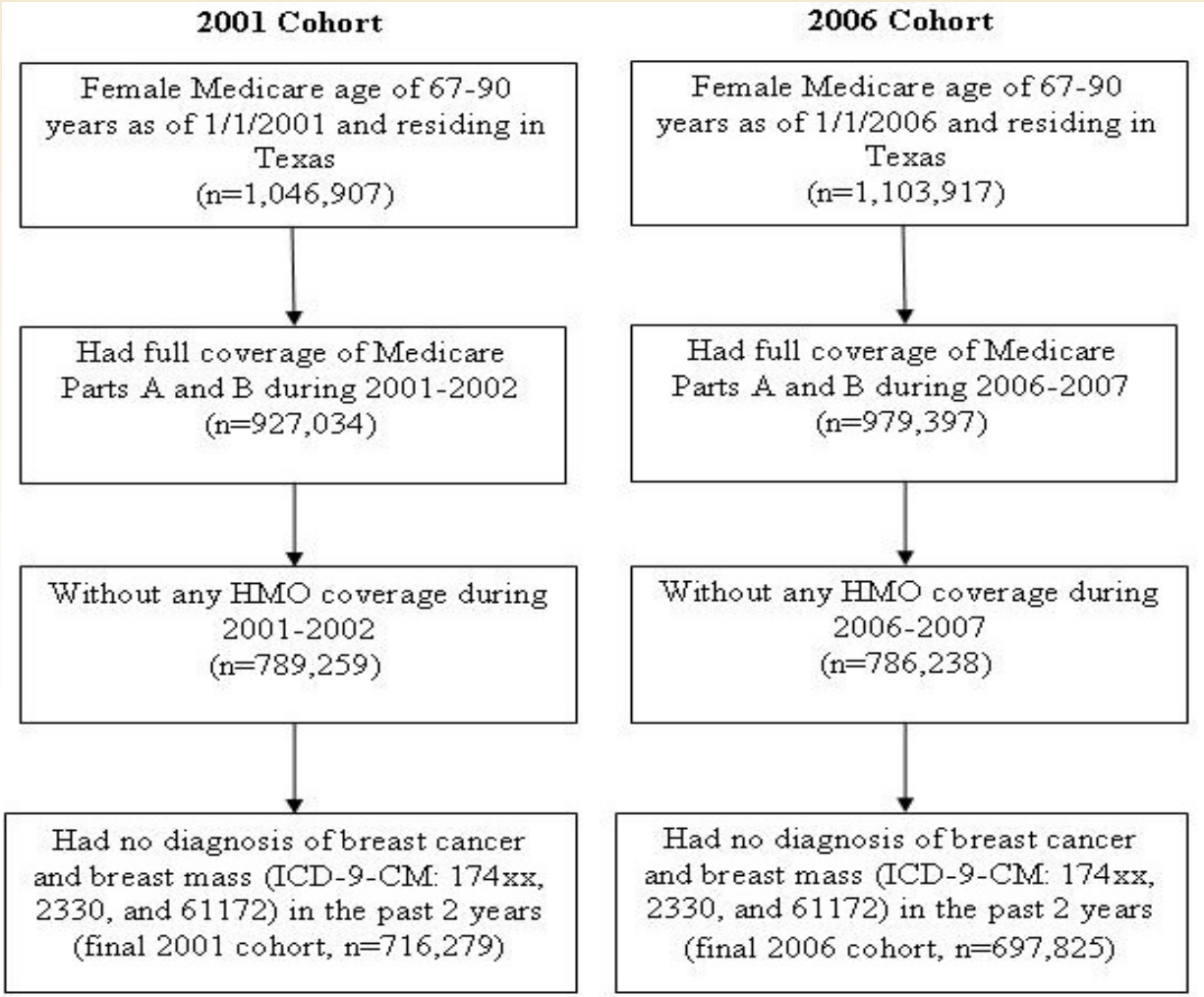
Methods

- Data Sources
  - 100% Texas Medicare data from 2000-2007
    - Medicare enrollment files
    - Carrier files
    - Outpatient Statistical Analysis Files
    - Medicare Provider Analysis and Review files

Methods (con't)

- Study Subjects
  - Two cohorts
    - The 2001 cohort – to estimate median survival time
    - The 2006 cohort – to estimate screening mammography rates
  - Include women
    - aged 67-90 in Texas
    - with 2-year full coverage of Pt A+Pt B, no HMO
    - no diagnosis of breast cancer or breast mass in the past 2 years

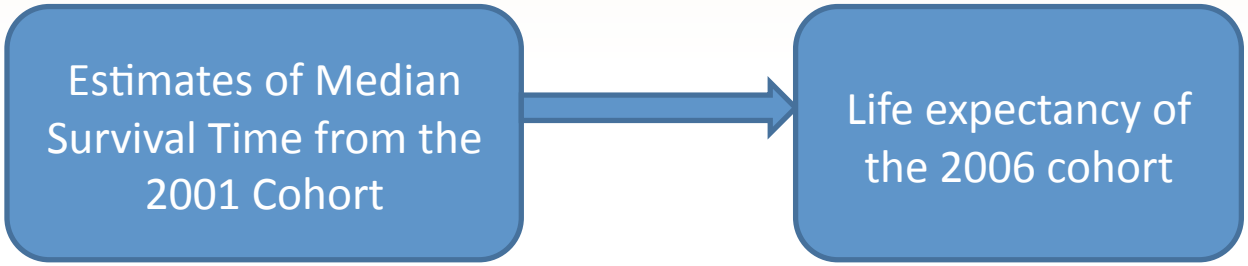
Methods (con't)



Methods (con't)

➢ Measures

- Screening mammography – algorithm by Freeman et al. (2002)
  - Bilateral mammogram
  - No BC, BM dx within the last 2 yrs
  - No any mammogram within the last 11 months
- Life expectancy predicted by
  - Age by 2-year interval
  - Comorbidity Index (none, 1, 2 and 3+)



Results (con't)

- Median Survival in Years, the 2001 Cohort

Age	Median Survival in Years (95% CI) by Comorbidity Index			
	0	1	2	3+
67-68	>7.0 (n/a)	>7.0 (n/a)	>7.0 (n/a)	6.4 (6.1, 6.7)
69-70	>7.0 (n/a)	>7.0 (n/a)	>7.0 (n/a)	6.1 (6.0, 6.3)
71-72	>7.0 (n/a)	>7.0 (n/a)	>7.0 (n/a)	5.9 (5.6, 6.0)
73-74	>7.0 (n/a)	>7.0 (n/a)	>7.0 (n/a)	5.6 (5.4, 5.9)
75-76	>7.0 (n/a)	>7.0 (n/a)	>7.0 (n/a)	5.2 (5.1, 5.5)
77-78	>7.0 (n/a)	>7.0 (n/a)	6.3 (6.2, 6.5)	5.1 (5.0, 5.1)
79-80	>7.0 (n/a)	>7.0 (n/a)	5.9 (5.8, 6.0)	4.7 (4.5, 4.9)
81-82	>7.0 (n/a)	6.3 (6.2, 6.4)	5.3 (5.2, 5.5)	4.4 (4.3, 4.6)
83-84	>7.0 (n/a)	5.8 (5.7, 5.9)	5.0 (4.8, 5.1)	4.2 (4.1, 4.4)
85-86	6.4 (6.4, 6.5)	5.1 (5.1, 5.2)	4.4 (4.2, 4.5)	3.9 (3.8, 4.1)
87-88	5.8 (5.7, 5.9)	4.9 (4.8, 5.0)	4.1 (4.0, 4.1)	3.7 (3.5, 3.9)
89-90	5.1 (5.1, 5.2)	4.2 (4.2, 4.3)	3.9 (3.8, 4.0)	3.6 (3.5, 3.8)

Results (con't)

- Screening Mammography Use, 2006 Cohort

Age (years)	Total Rate (%) of Screening Mammography by Comorbidity			
	0	1	2	3+
67-68	65711 (55.3)	16995 (55.9)	4774 (49.9)	3111 (37.9)
69-70	59593 (54.7)	16835 (53.7)	5136 (48.4)	3237 (34.6)
71-72	53536 (53.7)	16264 (52.7)	5181 (45.6)	3339 (35.6)
73-74	49109 (52.4)	15782 (50.5)	5153 (42.5)	3486 (33.0)
75-76	46117 (49.9)	15478 (47.4)	5357 (41.0)	3715 (31.0)
77-78	41543 (46.7)	14278 (43.3)	5184 (36.5)	3551 (29.8)
79-80	37820 (42.3)	13344 (38.5)	4957 (32.7)	3504 (22.9)
81-82	33081 (37.4)	11941 (34.1)	4575 (27.9)	3336 (22.2)
83-84	28085 (31.2)	10166 (28.6)	4045 (22.9)	2888 (17.9)
85-86	21123 (25.5)	7841 (22.7)	3264 (18.4)	2384 (14.6)
87-88	15344 (19.8)	5758 (17.2)	2412 (14.3)	1680 (10.4)
89-90	10695 (13.3)	4068 (12.6)	1827 (8.3)	1222 (6.8)

Life expectancy (years) – Unshaded : 7+ ; light shaded : 5 to 7; dark shaded: <5

Limitations

- Could not include other clinically relevant information associated with patients' life expectancy (e.g., self-rated health, functional status, cancer, severity of comorbid illness) or with risk of breast cancer (e.g. family history)
- The maximum life expectancy we estimated was 7 years
- An individual survival probability may differ from the estimated life expectancy
- Could not evaluate the impact of patient preference in mammography decisions

Conclusions

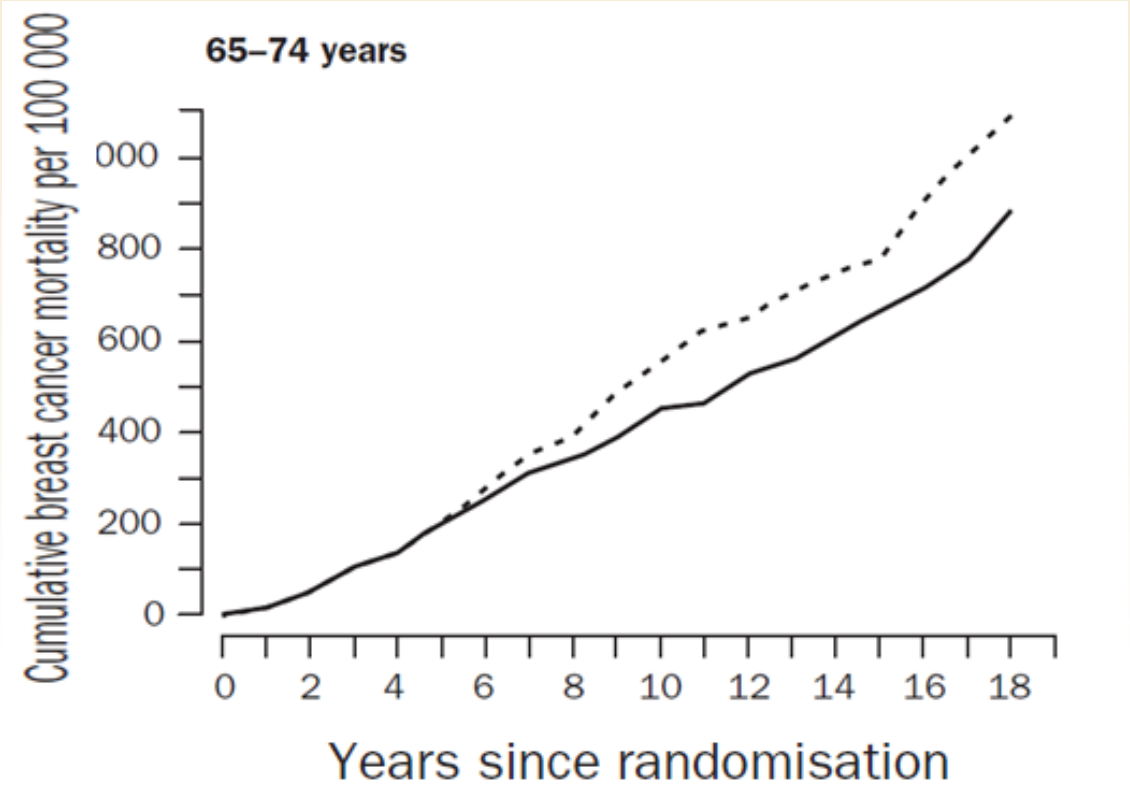
- The life expectancy method results in better estimates of appropriate and inappropriate screening mammography utilization in the community
- Future studies to evaluate population-based estimates of screening use should follow this direction

Variation Among Providers in Screening Mammography for Women with Limited Life Expectancies

Background

- Receipt of screening mammography is commonly used as an indicator of high-quality primary care
- Women with limited life expectancy are unlikely to benefit from screening

Background (con't)



Nystrom L., et al. *Lancet* 2002; 359(9310):909-19

Background (con't)

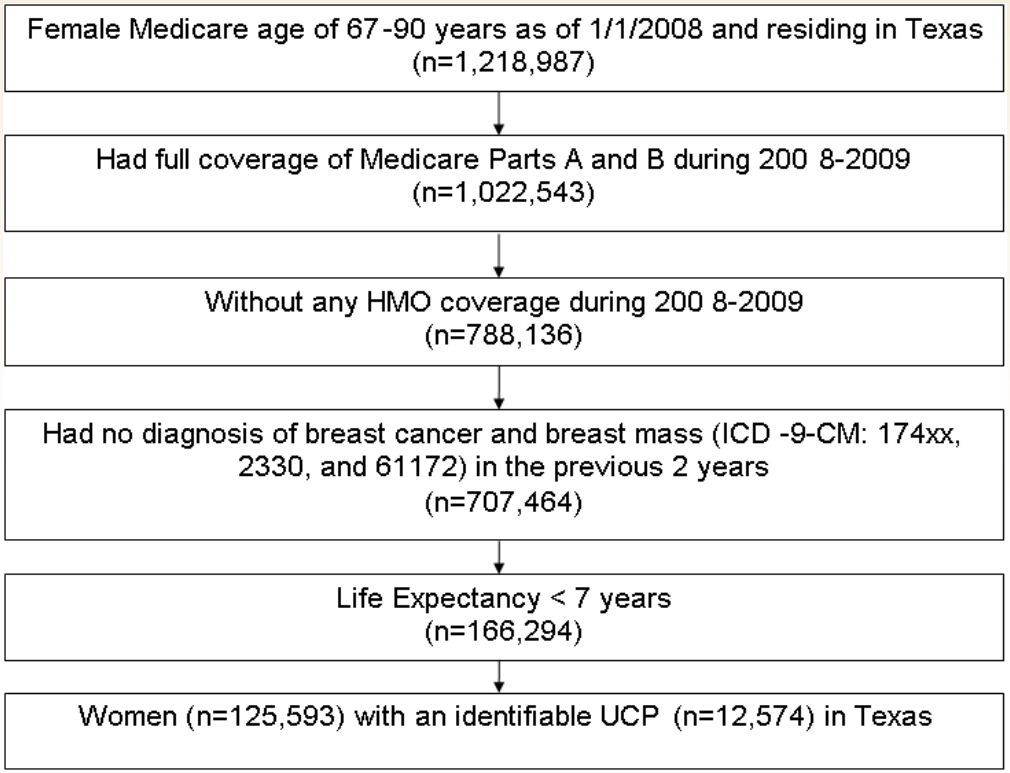
- Receipt of screening mammography among women with limited life expectancies is an indicator of over-utilization, not of high quality
  - One quarter of women aged 70-74 years with severe cognitive impairement were screened
  - 12% of those aged 65-74 with advanced cancer at another site were screened
- The ideal quality indicator would include estimates of the
  - Avoidance of overscreening
  - Receipt of appropriate screening

Objectives

- To assess the feasibility physician level quality measure of screening mammography in women with an estimated life expectancy of less than 7 years

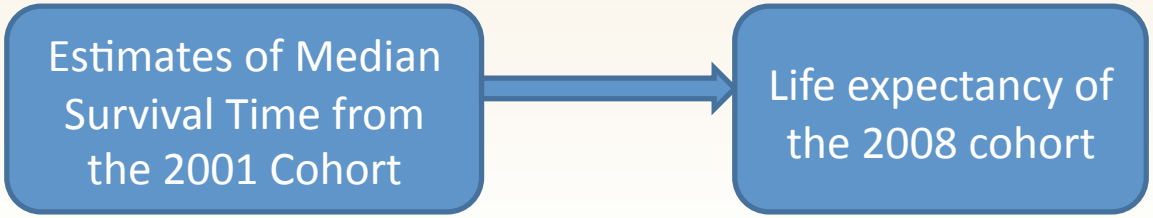
Methods

- Subjects
  - Data Source: 100% Texas Medicare claims



Methods (con't)

- Life Expectancy predicted by
  - Age by 2-year interval
  - Comorbidity Index (none, 1, 2 and 3+)



Methods (con't)

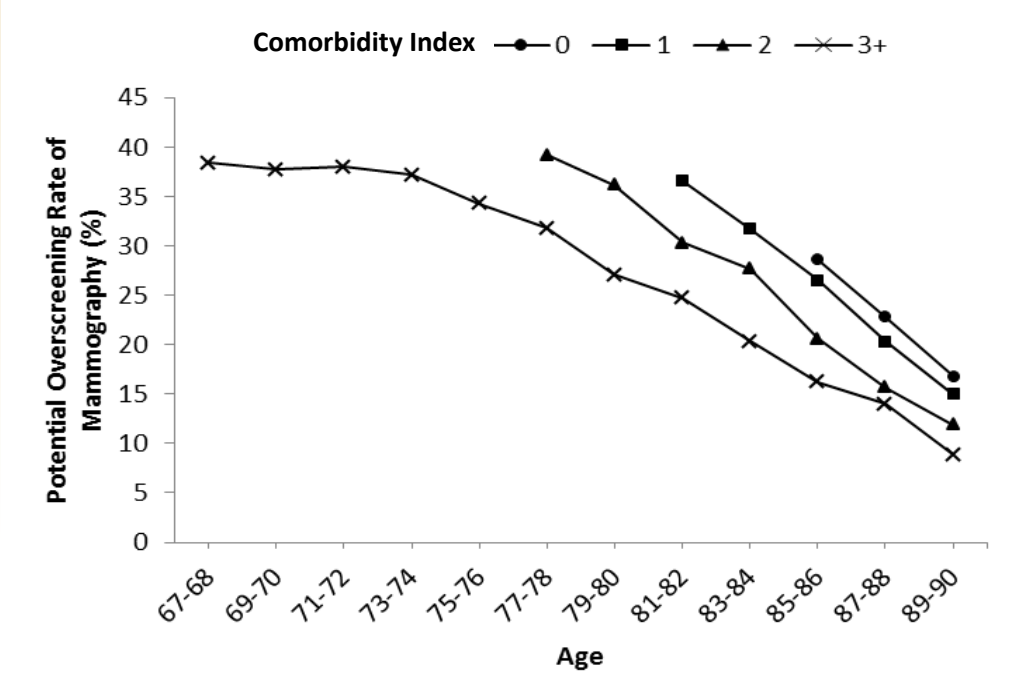
- UCP
  - Definition
    - physician who saw the woman on 2+ occasions in an outpatient setting for evaluation and management in 2007
      - CPT codes of 99201-99205 and 99211-99215
    - Physician who provided most evaluation and management, if a woman had 1+ identified physicians
    - Physician who provided most recent evaluation and management, if there were ties
  - Characteristics
    - Source: linked AMA master file

Methods (con't)

- Screening Mammography
  - Bilateral mammogram (CPT code of 76091 or 76092)
  - No mammogram within the last 11 months (CPT code of 76090, 76091 and 76092)
- Analysis
  - Descriptive statistics
  - Multilevel modeling
    - Effect of UCP characteristics, adjusting for patient characteristics
    - UCP profiling (3,803 UCPs with 10+ patients)
  - Spearman rank correlation, Wilcoxon signed rank test
    - Stability of UCP profiling over time (2,800 UCPs with 10+ patients in both 2006 and 2008 cohorts)

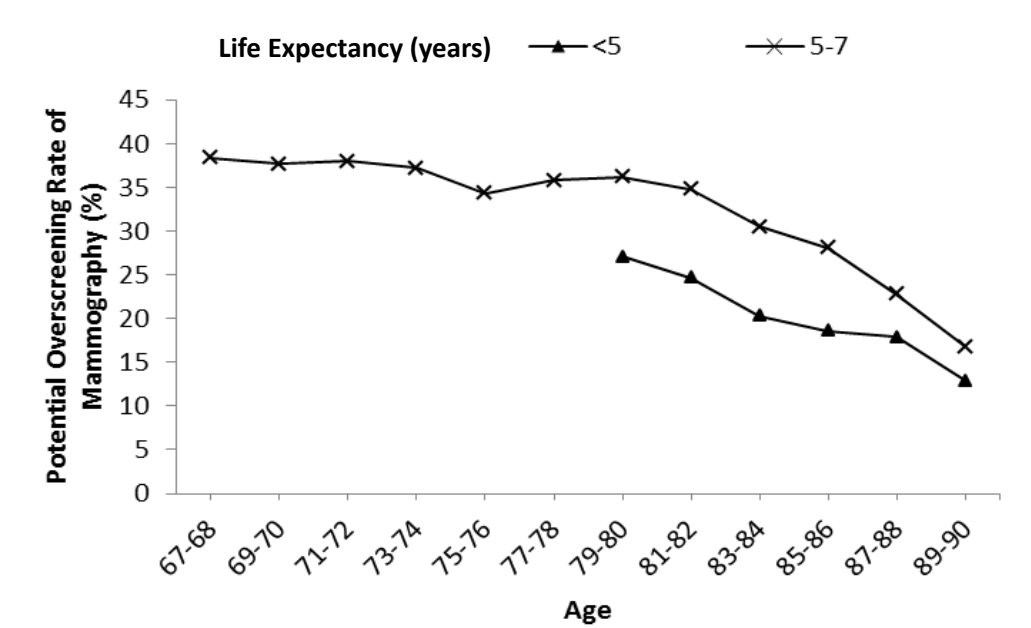
Results

- Screening mammography rate, by age and comorbidity



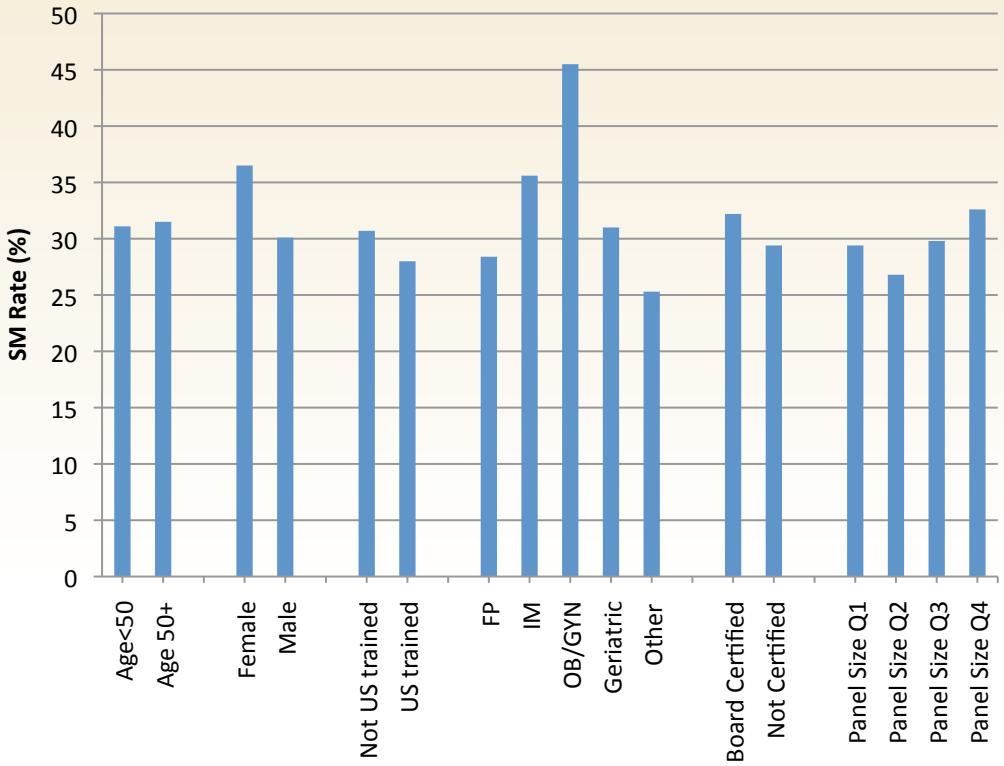
Results (con't)

- Screening mammography rate, by age and life expectancy



Results (con't)

- Screening mammography rate, by UCP characteristics



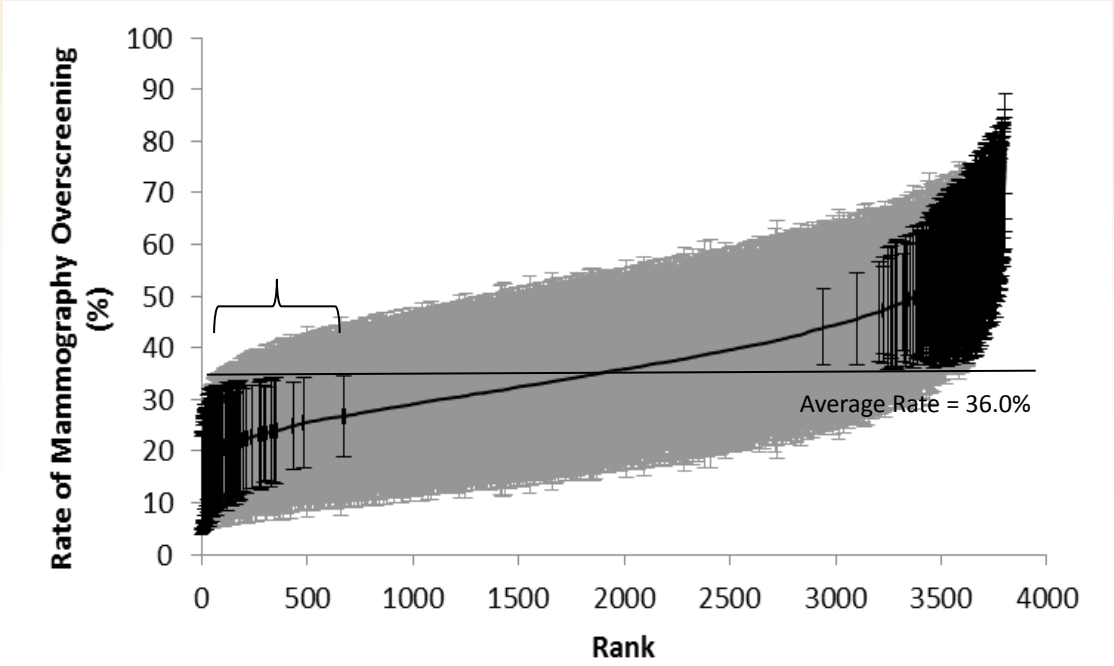
Results (con't)

- Multilevel analysis of UCP effects on screening mammography use in women with limited life expectancy

UCP Characteristics	OR(95% CI)	
	Model 1 (UCP characteristics only)	Model 2 (add patient characteristics)
Age (years): <50 vs. 50+	0.93 (0.90, 0.97)	0.92 (0.88, 0.95)
Sex: F vs. M	1.31 (1.25, 1.37)	1.29 (1.23, 0.31)
US Trained: N vs. Y	1.27 (1.22, 1.32)	1.25 (1.20, 1.31)
Board Certification: N vs. Y	0.91 (0.87, 0.94)	0.91 (0.88, 0.95)
Panel Size: Q1 vs. Q4	0.92 (0.86, 0.99)	0.86 (0.80, 0.93)
Panel Size: Q2 vs. Q4	0.87 (0.82, 0.92)	0.84 (0.79, 0.89)
Panel Size: Q3 vs. Q4	0.96 (0.91, 1.00)	0.94 (0.90, 0.98)
Specialty: FP vs. IM	0.74 (0.70, 0.77)	0.74 (0.70, 0.77)
Specialty: OB vs. IM	1.65 (1.42, 1.91)	1.73 (1.48, 2.01)
Specialty: Ger vs. IM	0.82 (0.64, 1.05)	0.89 (0.69, 1.14)
Specialty: Other vs. IM	0.67 (0.63, 0.71)	0.67 (0.63, 0.70)

Results (con't)

- Profiling of UCPs with 10+ patients with a life expectancy less than 7 years in the 2008 cohort (n=3,803)



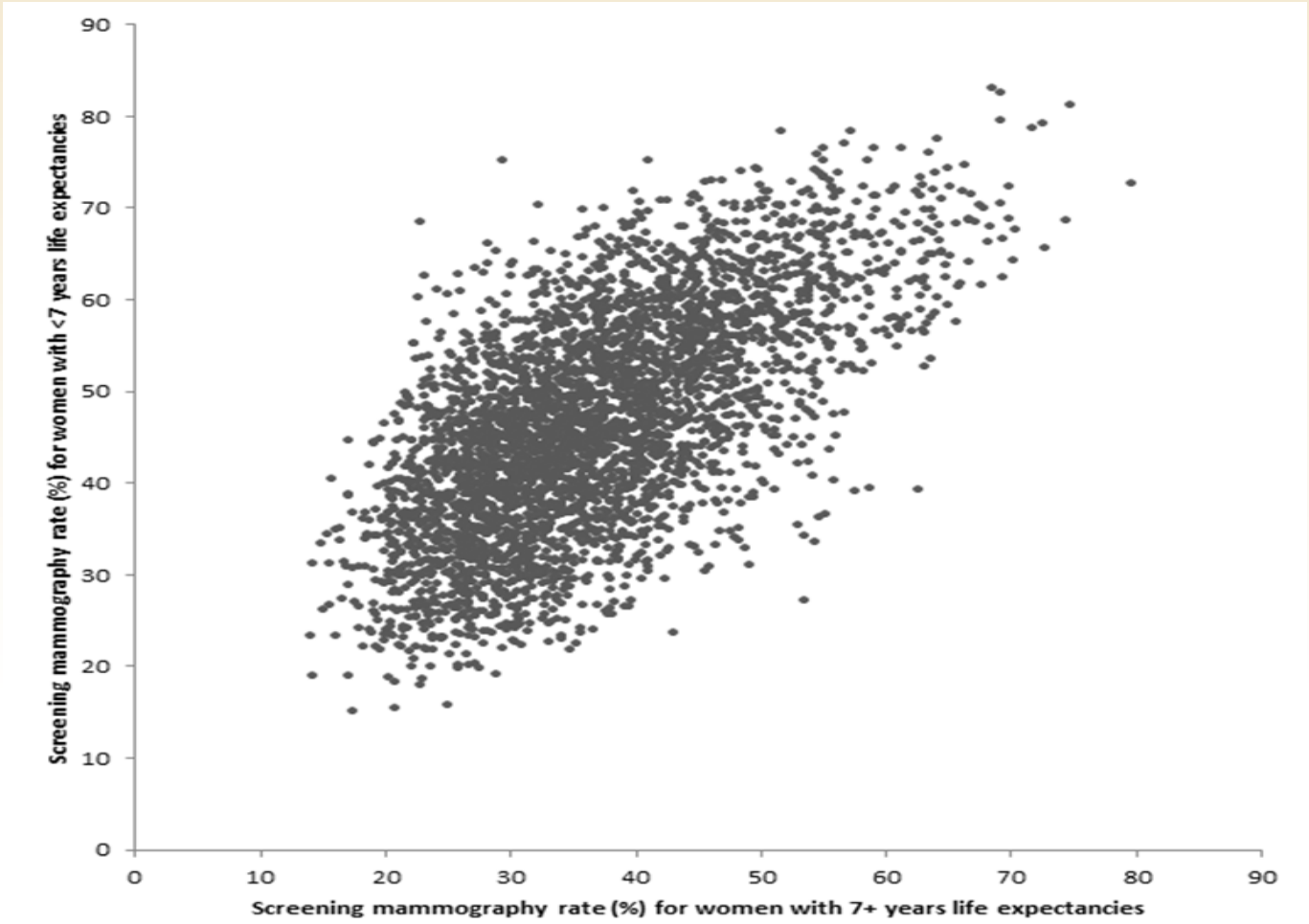
Results (con't)

- The agreement between UCP profiling between 2006 and 2008. The comparison only includes UCPs with 10+ patients with a life expectancy less than 7 years in both cohorts (n=3,803)

2006 Cohort	2008 Cohort, row %				
	Quintile 1 (13.9-37.4%)	Quintile 2 (27.5-32.7%)	Quintile 3 (32.8-38.3%)	Quintile 4 (38.4-45.9%)	Quintile 5 (46.0-74.7%)
Quintile 1 (11.4-23.6%)	47.5	27.7	17.9	5.7	1.3
Quintile 2 (23.7-28.8%)	29.3	27.9	25.7	13.0	4.1
Quintile 3 (28.9-34.2%)	14.3	23.9	23.8	27.9	10.2
Quintile 4 (34.3-42.5%)	7.7	15.9	19.1	32.3	25.0
Quintile 5 (42.6-78.7%)	1.3	4.6	13.6	21.1	59.5

Spearman rank correlation coefficient = 0.65 (P<0.001)
Wilcoxon signed rank test: P=0.62

Results (con't)



Summary of Results

- The overall screening rate in women with <7 yrs life expectancy was 31.3%
- Age played a greater role than level of comorbidity in screening mammography use
- Among UCPs with 10+ patient with limited life expectancy, 2.9% had significantly lower screening rates, 8.6% had significantly higher than average rates
- UCP profiling were stable over time
- OB/GYNs were more likely and Family Medicine physicians were less likely to screen patients with limited life expectancy, compared to Internal Medicine physicians
- Female and foreign-trained UCPs were more likely to screen patients with limited life expectancy

Limitations

- No information on patient preferences
- Only age and comorbidity were used in life expectancy estimates
- The life expectancy estimates may lack precision at the individual level
- The life expectancy for the 2008 cohort were predicted from 2001 estimates. Life expectancy may change over time.

Conclusions

UCP over-screening rates should be considered together with the corresponding appropriate screening rates to achieve a balanced assessment of the quality of screening mammography services at the physician level

Research Team

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