

When it All Comes Down to a Matter of Time: Timeliness in Mammography Screening

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Outline

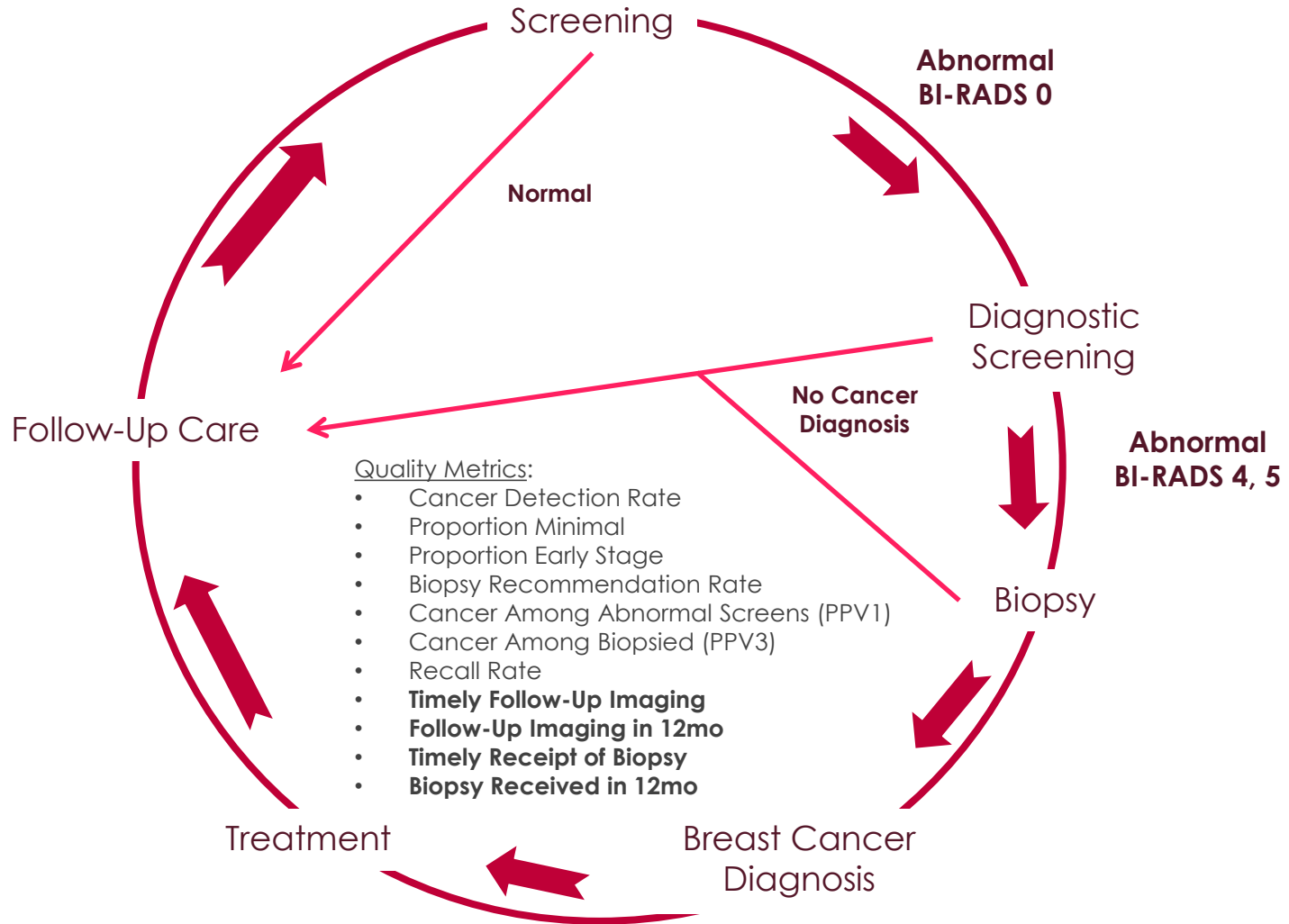
- Background
 - Disparities in Mammography Screening
 - Continuum of Care & Timely Follow-Up
- Specific Aims & Hypotheses
- Methods
- Results
- Limitations
- Conclusions & Future Directions

+ Background

Disparities in Mammography Screening

- Disparate rates
 - Convergence of breast cancer incidence rates for white women and African American women; however, incidence of later stage cancer has increased among African American women, which may be attributed to
 - ⊙ Less access to mammography
 - ⊙ Lower quality of mammography services
- Diagnosis at later stages
 - As compared to non-Hispanic white women, African American women are more likely to receive late-stage breast cancer diagnosis
 - ⊙ Leads to worse breast cancer outcomes and poorer survival
 - ⊙ Mortality rate of Hispanic women is lower than that of non-Hispanic white women
- Delay
 - “Studies examining the time from symptoms to diagnosis and diagnosis to initial treatment among patients with breast cancer indicate that **African American patients are more likely to experience diagnostic and treatment delays**, which are [...] associated with worse survival outcomes” (Fedewa *et al.*, 2010)
- Decrease the time between detection and diagnosis, as well as between diagnosis and treatment

Continuum of Care & Timely Follow-Up



Specific Aims & Hypotheses

- **Aim I: Assess the trends in timeliness-related quality metrics**
 - Hypothesis I: If timeliness-associated quality metrics are evaluated for trend, then both timely follow-up imaging and timely receipt of biopsy will improve between 2010, 2011, and 2013 among participating facilities.
- **Aim II: Determine if safety net institutions met benchmarks for timeliness quality metrics**
 - Hypothesis II: If a facility has a safety net designation then it will not meet the 12-month follow-up and biopsy benchmarks as compared to the non-safety net institutions.
- **Aim III: Identify potential barriers to care**
 - Hypothesis III: If a facility has a safety net designation then it will offer less services and contact its patients less than a non-safety net site.

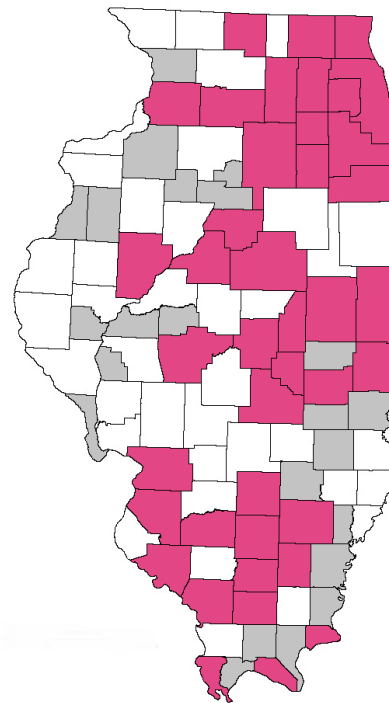


Methods

Metropolitan Chicago Breast Cancer Task Force & Consortium

Derivation of Analytic Sample

Geographic Distribution of Participating Facilities



- Participating Sites
- No mammography services
- Non-participating facilities

- ~~2006: 48 facilities~~
- ~~2009: 52 facilities~~
- 2010: 53 facilities
- 2011: 123 facilities
- ~~2012: No survey~~
- 2013: 151 facilities



39 facilities participating for 3 years of data collection



Inclusion of environmental scan data from 2011



***n* = 100 observations**

+ Methods

Study Design & Data Collection

- Serial cross-sectional study of facility performance
- Inclusion criteria
 - Surveys distributed in 2010, 2011, & 2013 to facilities
 - Participation in data submission over these 3 years
- Derivation of quality metrics
- Odds ratios as measure of association

Statistical Analysis

- STATA 14
- Validation and missingness
- Shapiro-Wilk test for normality
- X^2 tests and ptrend
- Kruskal-Wallis test by ranks
- Percent & annual percent change
- Linear & logistic regression with bootstrapping

Methods

- **Timely follow-up imaging** = [Timely Imaging/Screened within 12mo]
 - Timely imaging defined as women screened within the 45-day (2010 and 2011) or 30-day (2013) period
 - Raised standards by lowering timeframe from 45 to 30 days
 - Benchmark $\geq 90\%$
- **Follow-up imaging** = [Imaged within 12mo/Abnormal Recall Screens]
- **Timely receipt of biopsy** = [Timely Biopsy/Biopsied within 12mo]
 - Timely biopsy defined as women biopsied within 60 days from abnormal diagnostic screen
 - Benchmark $\geq 90\%$
- **Receipt of biopsy** = [Biopsied within 12mo/Biopsy Recommended]

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Outcomes of Interest

Facility Care Process Quality Metrics Associated with Timeliness



Results

Distribution of Screening Mammography, 2010, 2011, & 2013

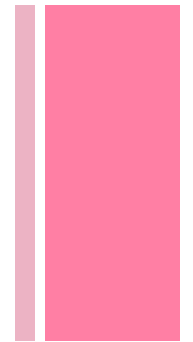
[Table 1] Distribution of Mammography Screening for Participating Facilities, (n = 100)

Facilities Participated	2010		2011		2013	
	24		39		37	
	n	%	n	%	n	%
Total Screens	173,539	100.00	261,474	100.00	222,427	100.00
BI-RADS 0: Incomplete	17,904	10.32	28,414	10.87	26,248	11.80
BI-RADS 1: Negative	68,216	39.31	90,964	34.79	79,108	35.57
BI-RADS 2: Benign	85,476	49.25	140,400	53.70	115,125	51.76
BI-RADS 3: Probably Benign	1,270	0.73	1,302	0.50	1,447	0.65
BI-RADS 4: Suspicious	200	0.12	334	0.13	413	0.19
BI-RADS 5: Malignancy	42	0.02	42	0.02	65	0.03
Specific Screening Classifications**...						
Screening BI-RADS (0, 1, 2)	171,596	98.88	259,778	99.35	220,481	99.13
Misclassified BI-RADS (3, 4, 5)	1,512	0.87	1,678	0.64	1,925	0.87
Recall (0, 4, 5)	18,146	10.46	28,790	11.01	26,726	12.02
Abnormal Screens (0, 3, 4, 5)	19,416	11.19	30,092	11.51	28,173	12.67

Follow-Up Imaging

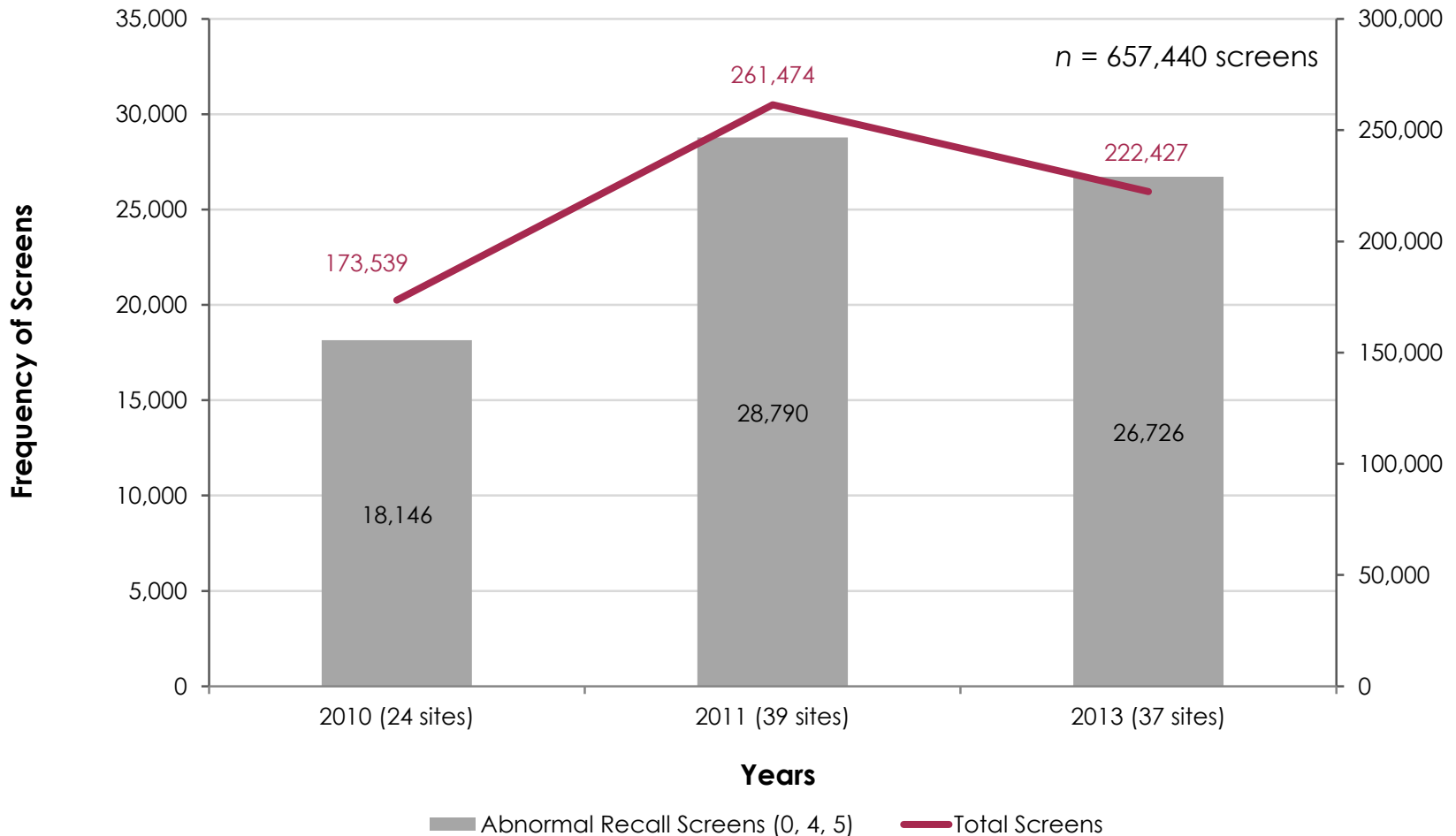
Biopsy Recommended

Impacted by Timeliness



Results

Overall Distribution of Screening Mammography, 2009, 2011, & 2013 Among 39 Facilities Participating in Screening & Environmental Scan Data Submission

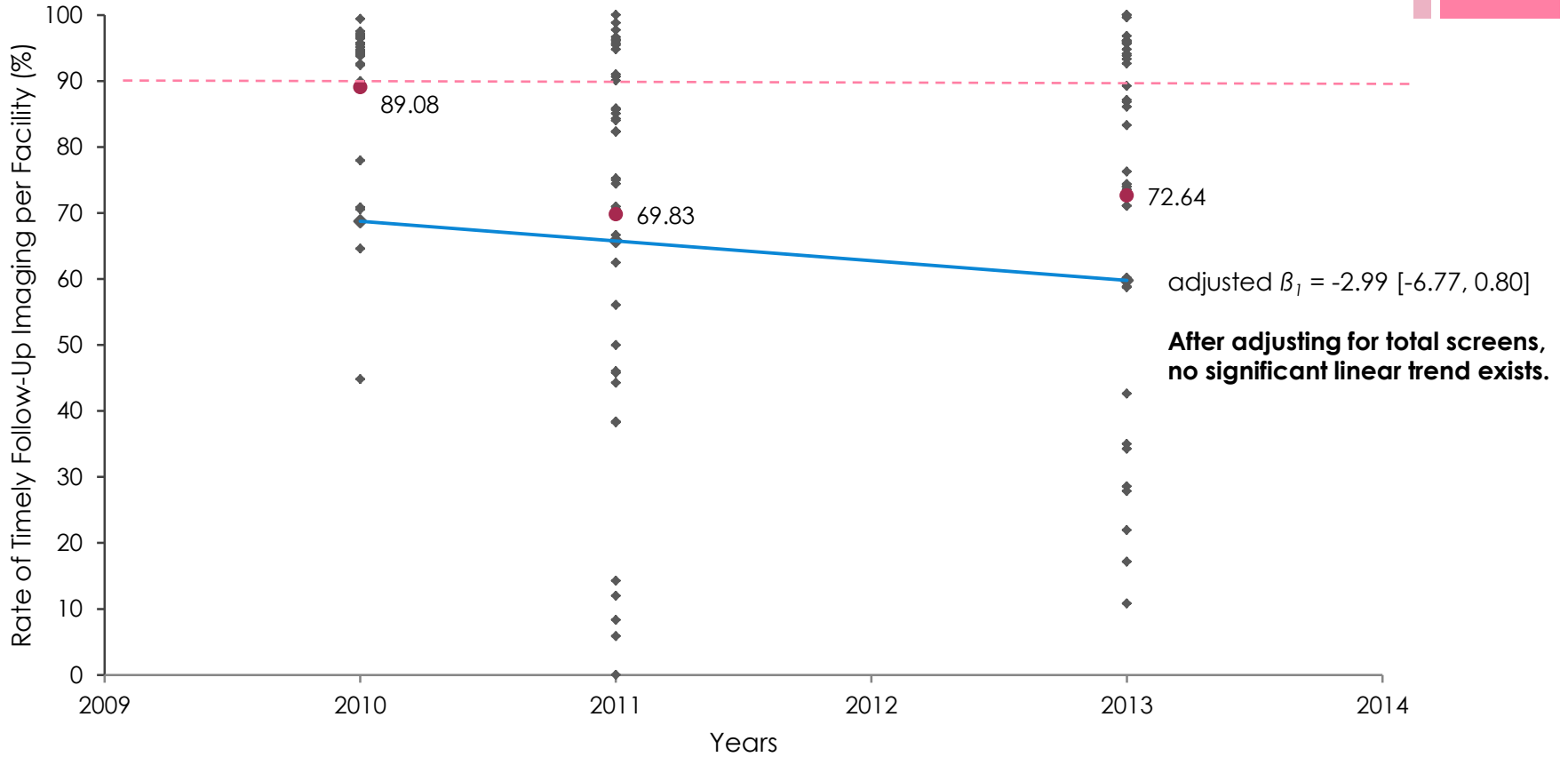




Aim I Results: Screening

Timely Follow-Up Imaging [Timely Imaging/Screened within 12mo]

Among 39 Facilities Participating in Screening & Environmental Scan Data Submission (n = 100), 2010, 2011, & 2013



PC = -10.34%

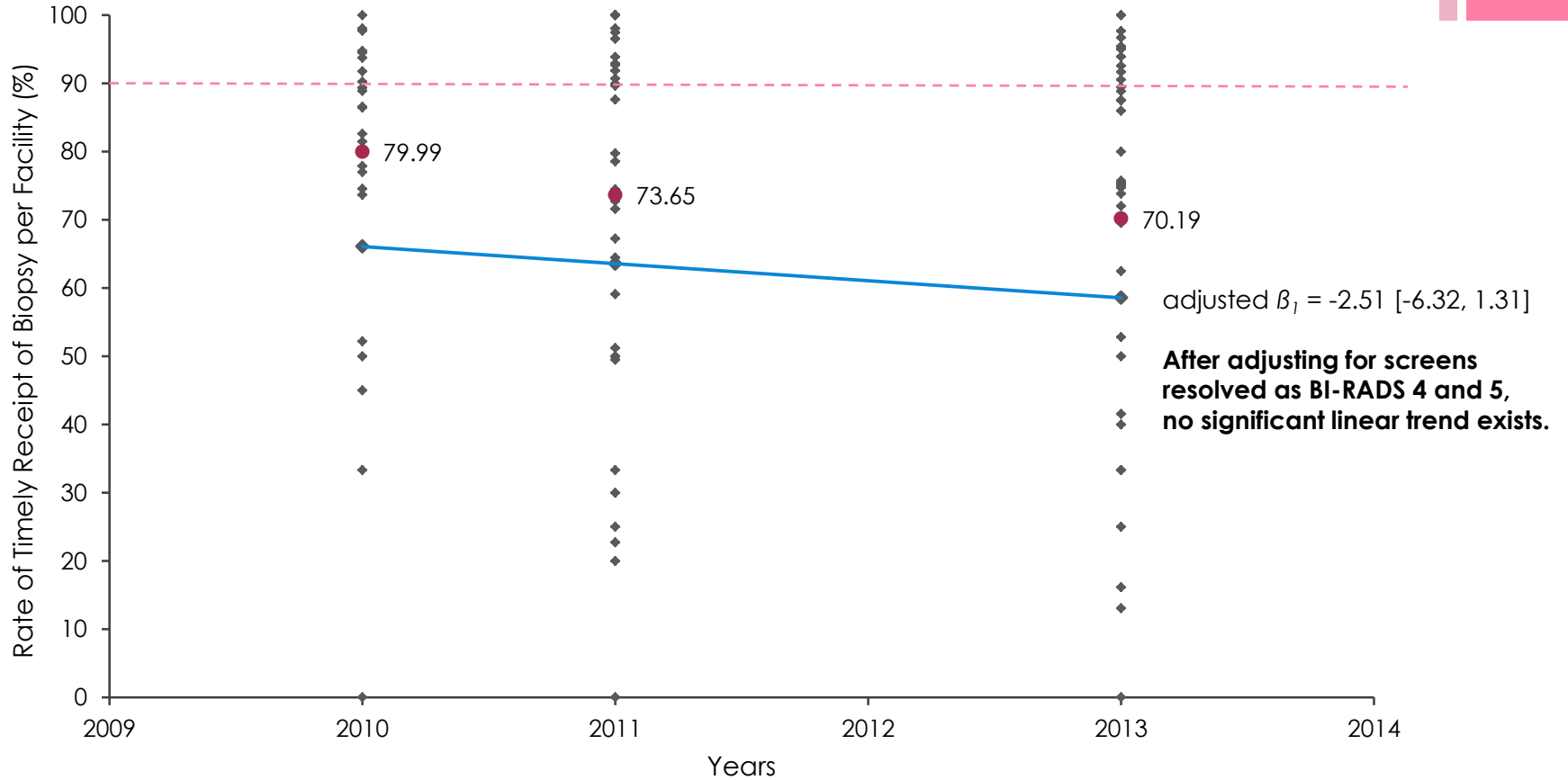
APC = -5.40% [-16.73%, 7.49%]



Aim I Results: Biopsy

Timely Receipt of Biopsy [Timely Biopsy/Biopsied within 12mo]

Among 39 Facilities Participating in Screening & Environmental Scan Data Submission (n = 100), 2010, 2011, & 2013



PC = -6.38%

APC = -4.00% [-6.69%, -1.23%]*

*p-value significant at 0.05



Aims II & III:

Safety Net Institutions & Barriers to Care



Chicago's safety net hospitals.

Safety net providers “by mandate or mission offer access to care regardless of a patient’s ability to pay and whose **patient population** includes a substantial share of **uninsured, Medicaid**, and other **vulnerable patients.**”

(IOM, 2000)

“**Barriers to care** include, but are not limited to:

- Lack of availability
- High cost
- Lack of adequate coverage”

(AHRQ, 2008)

Healthy People 2020 explicates, “access to health services means the **timely** use of personal health services to achieve the best health outcomes.”

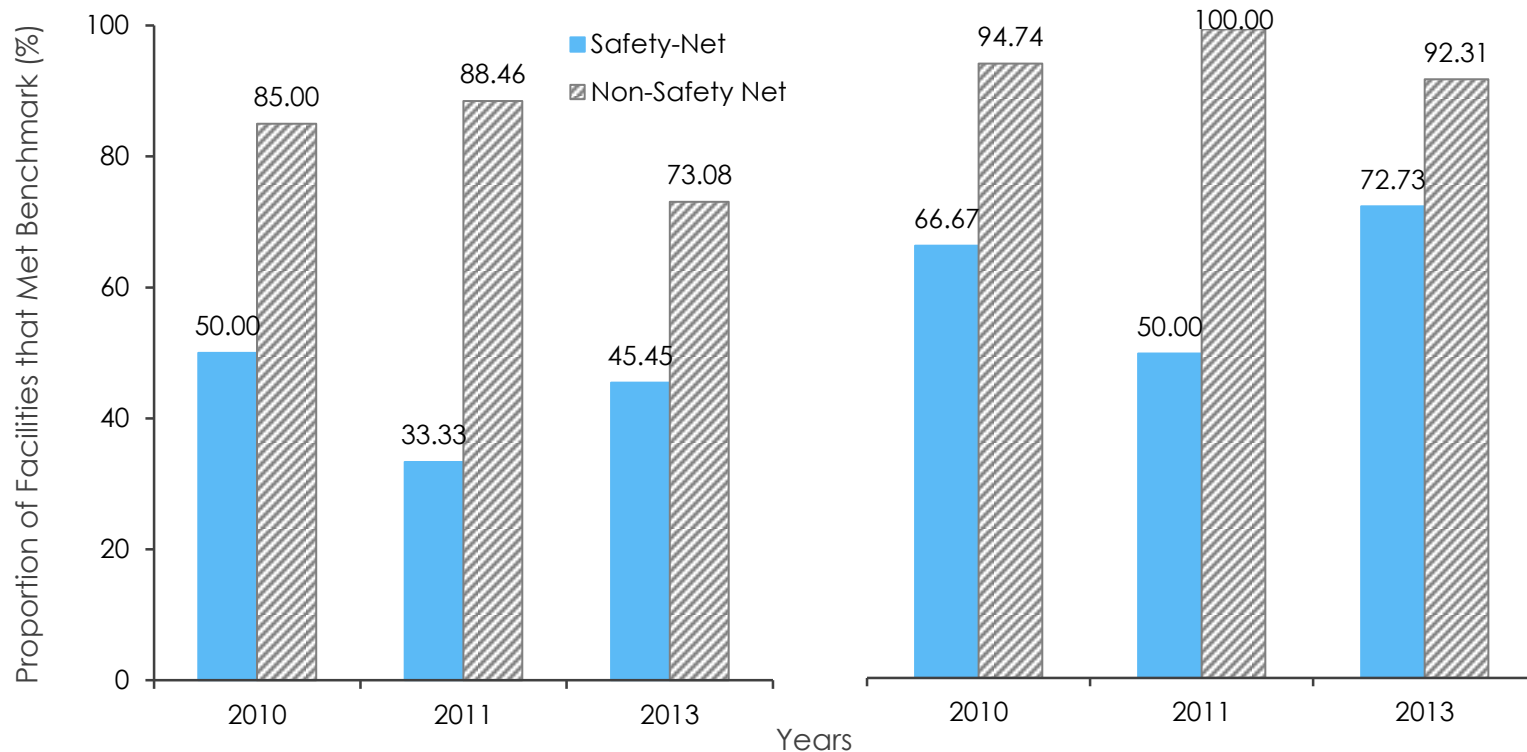
(IOM, 1993)



Aim II Results: Safety Net

Follow-Up Imaging, Receipt of Biopsy, & Safety Net Facilities

Among 39 Facilities Participating Data Submission ($n = 100$), 2010, 2011, & 2013



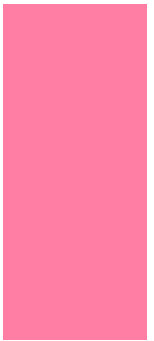
Follow-Up Imaging ≤ 12 months
[Imaged within 12mo/Abnormal Recall Screens]

Receipt of Biopsy ≤ 12 months
[Biopsied within 12mo/Biopsy Recommended]

Safety net facilities have **76% lesser odds** of not meeting the **timely follow-up imaging** benchmark as compared to non-safety net sites, after adjusting for total screen volume ($adjOR = 0.24^*$ [0.063, 0.89], $p = 0.033$).

Safety net facilities have **93.1% lesser odds** of not meeting the **timely receipt of biopsy** benchmark as compared to non-safety net sites, after adjusting for those recommended for biopsy ($adjOR = 0.069^*$ [0.017, 0.28], $p = 0.000$).

*Significant at 0.05





Aim III Results: Barriers to Care

Assessed six responses from environmental scan survey data collected in 2011 and compared safety net vs. non-safety net facilities ($n = 100$)

■ Questions included...

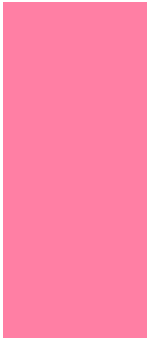
1. Does the breast imaging site offer screening mammogram appointments after 5PM during the week?
2. In addition to a letter, does the site also call the patient with abnormal findings (BI-RADS 0, 4, & 5) to discuss next steps?
3. Does the site call patients to remind them of a scheduled diagnostic mammogram appointment?
4. Does the site call patients who do not show up for their diagnostic mammogram?
5. For patients with abnormal findings, does the site call to setup the next step appointment for them (ie. biopsy)?
6. Does the site have a navigator to support breast cancer diagnostic patients?

■ Evaluation of crude odds ratios...

1. crOR 13.44* [4.44, 40.69], $p = 0.000$
2. crOR 2.65 [0.92, 7.67], $p = 0.072$
3. crOR 0.61 [0.18, 2.10], $p = 0.433$
4. crOR 1.50 [0.57, 3.96], $p = 0.409$
5. crOR 0.74 [0.21, 2.62], $p = 0.646$
6. crOR 1.12 [0.32, 3.86], $p = 0.859$

* p -value significant at 0.05

+ Limitations



Limitations

- Data quality
- Facility participation
 - Safety nets
 - Consistency
- Change in timeliness standard
- Non-linear relationships not assessed
- Cell frequency issues in estimating odds ratios

Bias & Confounding

- Bias
 - Misclassification
 - Information
- Confounding
 - Lack of covariates
 - Clustering effect



Conclusion & Future Directions

- Examine trends in timeliness associated metrics and explore how safety net facilities compare in meeting benchmarks
 - During 2009, 2010, and 2013, timely follow-up imaging and receipt of timely biopsy have slightly decreased, yet inconclusive
 - Safety net sites did not meet the follow-up imaging and biopsy benchmarks within the 12-month period as compared to non-safety nets
 - Safety net sites offer less late appointments as compared to their non-safety net counterparts, which elucidates a potential barrier to care
- Conclusions
 - Reduce delay and disparity along the breast cancer continuum of care
 - Create equal access to care
- Future directions
 - Improve data quality and facility participation
 - Identify factors perpetuating patient delay and system delay
 - Execute qualitative studies which could elucidate barriers
 - ⊙ Focus groups
 - Actionable change
 - ⊙ Accessible hours

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