**Appendix A: Literature Search Strategy**

We performed a literature search using electronic databases PubMed/Medline and EMBASE. The following key words were searched as text and exploded as medical subject headings (MeSH) where possible: ‘Patient Protection and Affordable Care Act,’ ‘Affordable Care Act,’ ‘health care reform,’ ‘healthcare reform,’ ‘Medicaid expansion,’ and ‘Obamacare,’ in conjunction with ‘cancer,’ ‘cancer screening,’ ‘cancer diagnosis,’ and ‘early detection of cancer’. Boolean operators AND and OR were used; the truncation symbol \* was also applied. The strategy used for PubMed/Medline was also adapted for EMBASE (Table A1). We used the Google Scholar search engine to identify potential studies not captured in the database search and checked the first 150 hits. We conducted a secondary search to identify any additional articles related to Massachusetts health reform and cancer screening or diagnosis. We reviewed all reference lists and bibliographies of included studies for relevant studies that were not picked up through electronic search. To identify new leads, we searched main health services research journals, public health journals, and conference proceedings (Table A2).

**Appendix Table A1. PubMed/MEDLINE Search Strategy**

|  |
| --- |
| Appendix: PubMed / MEDLINE Search  |
| 1 | "Mass Screening"[MeSH] OR "Early Detection of Cancer"[MeSH] |
| 2 | screening[all fields] OR diagnosis[all fields] |
| 3 | 1 OR 2 |
| 4 | "Neoplasms"[MeSH] |
| 5 | cancer[tiab] OR cancers[tiab] OR neoplasm[tiab] OR neoplasms[tiab] OR tumor[tiab] OR tumors[tiab] OR carcinoma[tiab] OR carcinomas[tiab] |
| 6 | 4 OR 5 |
| 7 | "Patient Protection and Affordable Care Act"[MeSH] |
| 8 | "affordable care act"[tiab] OR "medicaid expansion"[tiab] OR "health care reform"[tiab] OR "healthcare reform"[tiab] OR obamacare |
| 9 | 7 OR 8 |
| 10 | 3 OR 6 OR 9 |

Abbreviation: MeSH, Medical Subject Headings

**Appendix Table A2. Journals and Conference Proceedings Search Strategy**

|  |  |
| --- | --- |
| Hand searched journals | The following journals that we considered most likely to include relevant primary studies were hand searched for the years 2010 and 2016:American Journal of Preventive Medicine (AJPM); Applied Health Economics and Health Policy; Cancer; Cancer Epidemiology; Health Affairs; American Journal of Public Health; Cancer; Health Economics; Health Services Research (HSR); Journal of the American Medical Association(JAMA); Journal of Health Economic ; Journal of the National Cancer Institute (JNCI); New England Journal of Medicine (NEJM); Preventing Chronic Disease; Value in Health  |
| Conference proceedings | The following conferences proceedings that we considered most likely to identify ongoing studies were searched for the years 2010 and 2016:American Public Health Association (APHA); American Association for Cancer Research (AACR); AcademyHealth's (ARM); American Society of Clinical Oncology (ASCO); American Society of Health Economists (ASHEcon); Association for Public Policy Analysis and Management (APPAM); International Society For Pharmacoeconomics and Outcomes Research (ISPOR) |

**Appendix B: Study Quality Assessment Methods and Results**

The quality of the studies was assessed using the Quality Assessment Tool for Pre and Post Intervention Designs (Table B1).1 We revised the assessment tool somewhat to improve its suitability for the interventions included in this review. Quality assessment was based on five characteristics: sampling, research design, control of confounders, data collection and outcome measurement, measurement and statistical analysis. Each study was rated on a 3-point scale as low (<0.60), moderate (0.61-0.79), and high (0.8-1.0).

The studies we identified focused on multiple age groups and target populations, including Medicaid and Medicare beneficiaries, young adults, low-income adults, and commercially insured individuals. The studies used a variety of data sources, with the most frequent datasets being the Behavioral Risk Factor Surveillance System (BRFSS); 2-7 Surveillance, Epidemiology, and End Results (SEER); 8-10 the Medical Expenditure Panel Survey (MEPS) 11,12; and the American Community Survey (ACS).4,13 The majority of studies adopted a quasi-experimental design, with most articles employing a difference-in-differences estimation (n=11) framework. Because of the nature of the datasets, self-reported receipt of cancer screening was a predominant outcome. Comparisons were made only within each sample pre- and post-ACA to examine changes in receipt of cancer screening. Only two studies applied matching methods to mitigate selection bias due to observables.14,15 In a number of studies, a comparison group was defined based on states that did not implement the ACA Medicaid expansion, or an age group that was not targeted by the provision of the law being examined, though some did not include a comparison group. While substantial literature on the impacts of the ACA has emerged since its passage, most evidence available at this point captures only a short period after implementation due to lag in the availability of secondary data sources.

Reflecting all their differences, the methodological scoring for the studies was highly varied (quality scores ranged from 0.33 to 0.83). Four of the studies were rated as low quality, eighteen were rated as moderate quality, and two were rated as high quality. Most studies ranked high on simple before-and-after design, and the appropriateness of the main outcome. Of the articles identified, 19 did not report any information on missing data or handling techniques. The summary of quality assessment is available upon request.

**Appendix Table B1. Quality Assessment of Pre/Post Intervention Designs**

|  |
| --- |
| **Impact of Affordable Care Act on Cancer Screening and Diagnosis** **Pre/Post Intervention – Design Quality Assessment Tool** |
| **A. Sampling** | Yes | No | N/A |
| 1. Was probability sampling used? (1) | 1 | 0 |  |
| 2. Was sample size justified to obtain an appropriate power? (1) | 1 | 0 |  |
| **Subtotal** (n/2) |  |  |  |
| **B: Design** |  |  |  |
| a) One pre-test or baseline and several post-test measures (2) **or** | 2 | 0 |  |
| b) Simple before-and-after study (1) | 1 | 0 |  |
| **Subtotal** (n/2) |  |  |  |
| **C. Control of Confounders** |  |  |  |
| Does the study employ a comparison strategy? An attempt to create or assess equivalence of groups at baseline by: |  |  |  |
| a) Matching group participants (2) **or** | 2 | 0 |  |
| b) Statistical control (1) **or** | 1 | 0 |  |
| c) None (0) | 0 | 0 |  |
| **Subtotal** (n/2) |  |  |  |
| **D. Data Collection and Outcome Measurement** |  |  |  |
| Measurement: 1. Were the dependent variable either:1. directly measured (2) **or**
2. self-reported (1)

2. Were dependent variables measured reliably/validity (with reliability indices previously or for this study / with validity assessments previously or for this study)? (1) | 211 | 000 |  |
| **Subtotal** (n/3) |  |  |  |
| **E. Statistical Analysis and Conclusions** |  |  |  |
| 1. Was/were the statistical test(s) used appropriate for the main outcome and at least the 80% of the others? (1)2. Were p values and confidence intervals reported properly? (1)3. If multiple outcomes were studied, were correlations analyzed? (1)4. Were missing data managed appropriately? (1) | 1111 | 0000 | N/A |
| **Subtotal** (n/4) |  |  |  |
| **Total: Total number of points** (n/12) |  |  |  |
| **Overall Validity Rating:**Total number of points obtainedTotal possible points – N/AKey: <0.60 – LO; 0.61-0.79 = MED; 0.8-1.0 = HI TOTAL: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_LO MED HI  |

**REFERENCES**

1. Cummings G, MacGregor T, Davey M, Wong C, Paul L, Stafford E. Factors contributing to nursing leadership: a systematic review. Journal of Health Services Research & Policy 2008;13:240-8.

2. Hamman MK, Kapinos KA. Affordable Care Act provision lowered out-of-pocket cost and increased colonoscopy rates among men in Medicare. Health Affairs 2015;34:2069-76.

3. Choi SK, Adams SA, Eberth JM, et al. Medicaid coverage expansion and implications for cancer disparities. American Journal of Public Health 2015;105 Suppl 5:S706-12.

4. Ku L, Bysshe T, Steinmetz E, Bruen BK. Health reform, Medicaid expansions, and women's cancer screening. Women's Health Issues 2016;26:256-61.

5. Portela M, Sommers BD. On the outskirts of national health reform: a comparative assessment of health insurance and access to care in Puerto Rico and the United States. The Milbank Quarterly 2015;93:584-608.

6. Sabik LM, Tarazi WW, Bradley CJ. State Medicaid expansion decisions and disparities in women's cancer screening. American Journal of Preventive Medicine 2015;48:98-103.

7. Simon K, Soni A, Cawley J. The impact of health insurance on preventive care and health behaviors: evidence from the first two years of the ACA Medicaid expansions. Journal of Policy Analysis and Management 2017.

8. Aizer AA, Falit B, Mendu ML, et al. Cancer-specific outcomes among young adults without health insurance. Journal of Clinical Oncology 2014;32:2025-30.

9. Han X, Zang Xiong K, Kramer MR, Jemal A. The Affordable Care Act and cancer stage at diagnosis among young adults. Journal of the National Cancer Institute 2016;108.

10. Mahal BA, Aizer AA, Ziehr DR, et al. The association between insurance status and prostate cancer outcomes: implications for the Affordable Care Act. Prostate Cancer and Prostatic Diseases 2014;17:273-9.

11. Han X, Robin Yabroff K, Guy GP, Jr., Zheng Z, Jemal A. Has recommended preventive service use increased after elimination of cost-sharing as part of the Affordable Care Act in the United States? Preventive Medicine 2015;78:85-91.

12. Richman I, Asch SM, Bhattacharya J, Owens DK. Colorectal cancer screening in the era of the Affordable Care Act. Journal of General Internal Medicine 2016;31:315-20.

13. Levy AR, Bruen BK, Ku L. Health care reform and women's insurance coverage for breast and cervical cancer screening. Preventing Chronic Disease 2012;9:E159.

14. Jena AB, Huang J, Fireman B, et al. Screening mammography for free: impact of eliminating cost sharing on cancer screening rates. Health Services Research 2016;52:191-206.

15. Wharam JF, Zhang F, Landon BE, LeCates R, Soumerai S, Ross-Degnan D. Colorectal cancer screening in a nationwide high-deductible health plan before and after the Affordable Care Act. Medical Care 2016;54:466-73.