Supplementary Table 1. Algorithms to detect SBCE* or cancer recurrences using HMO medical record data and SEER variables, developed by Chubak† in the Group Health Cooperative HMO.

Named in this paper	Location in Chubak et al.	Description	
SBCE	In main paper		
Algorithm 1	Figure 1	High sensitivity	- Two visits with a code for a secondary malignant neoplasm within 60 days, >365 days after the primary -A second breast cancer record in SEER -Mastectomy>180 days after the primary breast cancer -A code for a secondary non-breast malignant neoplasm >180 days after the primary breast cancer
Algorithm 2	Figure 2	High specificity, PPV	-Two visits with a code for a secondary malignant neoplasm within 60 days, >365 days after the primary -A second breast cancer record in SEER -A non-breast cancer record in the SEER registry after the primary breast cancer -A mastectomy>180 days after the primary -Surgical procedure for the primary breast cancer (SEER)—mastectomy or lumpectomy
Algorithm 3	Figure 3	Extremely high sensitivity	-A code for a secondary malignant neoplasm >365 days after the primary breast cancer -Breast surgery >180 days after the primary -Maximum time between two consecutive visits for chemotherapy (≤43 or >43 days) -A second breast cancer record in SEER
Recurrence	Supplementary		
Algorithm 7	Supplementary Figure 2	High sensitivity	-A code for a secondary non-breast malignant neoplasm >180 days after the primary breast cancer -A mastectomy >180 days after the primary -Radiation therapy >365 days after the primary
Algorithm 8	Supplementary Figure 3	High specificity	- Two visits with a code for a secondary malignant neoplasm within 60 days, >365 days after the primary -A mastectomy >180 days after the primary -Surgical procedure for the primary breast cancer (SEER registry)—mastectomy or lumpectomy
Algorithm 9	Supplementary Figure 4	High specificity and PPV	-Two visits with a code for a secondary malignant neoplasm within 60d, >365d after the primary cancer -A non-breast cancer record in the SEER registry after the primary breast cancer
Algorithm 10	Supplementary Figure 5	Extremely high sensitivity	-A code for a secondary malignant neoplasm >365 days after the primary breast cancer -Maximum time between 2 consecutive visits for breast surgery (≤32 vs. >32 days) -Maximum time between 2 consecutive visits for chemotherapy (≤94 vs. >94 days) -A mastectomy >180 days after the primary -A second breast cancer record in SEER -Radiation therapy >120 days after the primary

*SBCE signifies second breast cancer events. HMO is a health maintenance organization. SEER is the Surveillance, Epidemiology, and End Results Program. PPV signifies positive predictive value and NPV signifies negative predictive value. "d" denotes days.

†Chubak et al., J Natl Cancer Inst 2012. In this paper, we focused on algorithms using SEER data (i.e., Algorithms 1, 2, 3 and 7, 8, 9, and 10). Algorithms 4-6 and 11-14 do not use SEER