Table 1. Controlled Trials of Mammography and Clinical Breast Examination

Trial	HIP (19)	CNBSS-1 (13)	CNBSS-2 (13,20)	Edinburgh (18)	Gothenburg (14,23)	Stockholm (17)	Malmo (15)	Swedish 2-County Trial (16)
Description								
Year study began	1963	1980	1980	1978	1982	1981	1976-1978	1977
Setting/Population	New York health plan members	15 centers in Canada, self-selected subjects	15 centers in Canada, self-selected subjects	All women aged 45-64 from 87 general practices in Edinburgh	Entire female population, born between 1923-1944, of one Swedish town	Residents of southeast greater Stockholm, Sweden	All women born between 1927-1945 living Malmo, Sweden	From Ostergotland (E-County) and Kopparberg (W-County)
Age at enrollment (*years*)	40-64	40-49	50-59	45-64	39-59	40-64	45-70	40-74
Interventions								
Method of randomization	Age- and family size-stratified pairs of women randomized assigned individually by drawing from a list	Blocks (stratified by center and 5-year age group) after CBE		Cluster, based on general practitioner practices	Cluster, based on day of birth for 1923-1935 cohort (18%), by individual for 1936-1944 cohort (82%)	Individual, by day of month; ratio of screening to control group, 2:1	Individual, within birth year	Cluster, based on geographic units; blocks designed to be demographically homogeneous
Study Groups	Mammography + CBE vs usual care	Mammography + CBE vs usual care (all women prescreened and instructed in BSE)	Mammography + CBE vs CBE (all women prescreened and instructed in BSE)	Mammography + CBE vs usual care	Mammography vs usual care; controls offered screening after year 5, completed screening at approximately year 7	Mammography vs usual care; controls offered screening after year 5	Mammography vs usual care; controls offered screening after year 14	Mammography vs usual care; controls offered screening after year 7
Screening protocol:								
interval (*months*)	12	12	12	24	18	24-28	18-24	24-33
rounds (*n*)	4	4-5	4-5	4	5	2	9	3
views (*n*)	2	2	2	2 (1)	2 (1)	1	2 (1)	1
Subjects (*n*)								
Study group	30,239	25,214	19,711	28,628	20,724	40,318	21,088	77,080
Control group	30,256	25,216	19,694	26,015	28,809	19,943	21,195	55,985
Longest follow-up by 2002 (*years*)	18	13	13	14	12*	11.4*	11-13 15.5*	20 15.5*

Trial Quality

Assembly of comparable groups	Allocation concealment and baseline groups	*Use of lists and pairs made subversion possible. More menopausal women and women with previous breast lumps in a sample of controls; more education in the screened group*	*Use of lists and blocks made subversion possible.* In mammography arm, 17 had tumors with 4 nodes with initial screening vs 5 in control arm	*Use of lists and blocks made subversion possible*	Allocation concealment not described. *Significantly lower SES and higher all cause mortality in control group suggest inadequate randomization*	Allocation concealment not described	*Allocation concealment not described*	*Allocation concealment not described*	Allocation concealment not described; intervention women slightly older than controls
	All cause mortality relative risk (screened vs control group)	0.98	1.02	1.06	*0.8 (statistically significant)*	0.98	NR	0.99	1
Maintenance of comparable groups	Screening attendance								
	Round	1 2 3 4	1 2,4	1 2 5	1 7	1 2 - 5 control	1 2 control	1 2-5 control	1 2 3 control
	%	67 54 50 46	100 85-89	100 90.4 86.5	61 44	85 75-78 66	81 81 77	74 70 ???	89 83 84 ???
	Contamination (%)	Unknown, probably	25	16	NR	20	NR	25	13
	Post-randomization exclusions	Yes	No	No	Yes	One fewer death in screening group included in 1997	Yes	Yes	Yes
Validity of outcome assessment	Deaths included in analysis (follow-up vs evaluation method)	*Breast cancer deaths diagnosed within 7 years of followup*	Follow-up method	Follow-up method	Follow-up method and evaluation method	Initially, all four Swedish trials used the evaluation method of analysis (breast cancer cases diagnosed after screening period were excluded from count of breast cancer deaths), but this was corrected in re-analyses of the data in 1993 and in 2002. *Cont*			
	Method for verifying breast cancer deaths	Blinded review of the death certificate and medical records; *unclear how deaths were selected for review*	Blinded review of all deaths of women known to have breast cancer whose death certificate mentions liver, lung, colon cancer, or unknown primary, or whose medical record raised a question of breast cancer		All deaths with breast cancer deaths diagnosed within 14 years of follow-up; *not masked*	In the 1993 analysis, an independent panel used an explicit protocol to preform blinded assessment of cause of death.			
Analysis method	Intention-to-treat analysis; completeness of reporting†	*Did not provide relative risk, confidence intervals, or* P *values in recent report; estimated the number of subjects*	Appropriate	Appropriate	-	In all the Swedish trials, sample sizes differed for different publications because different methods were used to estimate the size of the underlying population.			
External validity	Comment	Poor mammography technique; only a third of cancer cases found by mammography alone	Many women with screening abnormalities (especially CBE) were "deemed not to require a diagnostic procedure," potentially reducing the sensitivity of screening		-	19% of controls and 13% of study women had mammography in the 2 years before the study	25% of all women entering the study had a mammogram before to entering the study	-	In the age group of 40-49 years, 3 women died after being invited to screening and 1 died before invitation but after randomization
GRADE	USPSTF Internal Validity	Fair	Fair or better	Fair or better	Poor	Fair	Fair	Fair	Fair

*Most recent results for age 40-49, if different

†All studies were analyzed using intention-to-treat methods.

Note: Italics indicate aspects of the design or conduct of trials that influenced the quality rating.

BSE indicates breast self-examination; CBE, clinical breast examination; CNBSS, Canadian National Breast Cancer Screening Study; HIP, Health Insurance Plan of Greater New York; NR, not reported; USPSTF, U.S. Preventive Services Task Force.