1. Chance of death from any cause

Life tables used to calculate the 10-year chance of death from any cause for US women starting at age 40, 50 and 60.

Women		Death	Number of	Life		Probality of being alive
	Aae	probability	lives b	expectancy	,	at end vear
40s	40	0.001422	97.534	42.76		0.998578
	41	0.001501	97.396	41.82		0.9970791
	42	0.001596	97.249	40.88		0.9954878
	43	0.001709	97.094	39.95		0.9937865
	44	0.001841	96.928	39.01		0.9919569
	45	0.001989	96.750	38.08		0.9899839
	46	0.002153	96.557	37.16		0.9878525
	47	0.002333	96.350	36.24		0.9855478
	48	0.00253	96,125	35.32		0.9830544
	49	0.002746	95,882	34.41		0.9803549
	50)	95,618			
		total deaths	1,916		prob death	1.96%
		% dead	1.96%		-	
50s	50	0.002981	95,618	33.5		0.997019
	51	0.003241	95,333	32.6		0.9937877
	52	0.00353	95,024	31.71		0.9902796
	53	0.003853	94,689	30.82		0.986464
	54	0.004208	94,324	29.93		0.982313
	55	0.004591	93,927	29.06		0.9778032
	56	0.004997	93,496	28.19		0.9729171
	57	0.005426	93,029	27.33		0.9676381
	58	0.005876	92,524	26.48		0.9619522
	59	0.006348	91,980	25.63		0.9558458
	60)	91,396			
		total deaths	4.222		prob death	4.42%
		% dead	4.42%		r	
		,,				
60s	60	0.006883	91,396	24.79		0.993117
	61	0.007457	90,767	23.96		0.9857113
	62	0.00801	90,090	23.14		0.9778158
	63	0.00852	89,369	22.32		0.9694848
	64	0.009031	88,607	21.51		0.9607294
	65	0.009617	87,807	20.7		0.95149
	66	0.010328	86,963	19.89		0.941663
	67	0.011167	86,065	19.1		0.9311475
	68	0.012158	85,103	18.31		0.9198266
	69	0.013312	84,069	17.52		0.9075819
	70)	82,950			
		total deaths	8,446		prob death	9.24%
		% dead	9.24%			

Data source

Actuarial life table. Social Security Administration. Period Life Table, 2019, as used in the 2022 Trustees Report https://www.ssa.gov/oact/STATS/table4c6_2019_TR2022.html

NOTE:

We used pre-COVID data (2019) to avoid overstating the chance of death from any cause, which, because of COVID-related deaths, was higher in subsequent years (2020 and 2021).

Search SSA.gov

Actuarial Life Table

Office of the Chief Actuary Life Tables

A period life table is based on the mortality experience of a population during a relatively short period of time. Here we present the 2019 period life table for the Social Security area population, as used in the 2022 Trustees Report (TR). For this table, the period life expectancy at a given age is the average remaining number of years expected prior to death for a person at that exact age, born on January 1, using the mortality rates for 2019 over the course of his or her remaining life.

This life table is available for certain other years.





Male Female Exact Number of Number of Death Life Death Life age probability^a lives ^b expectancy probability ^a lives ^b expectancy 0.002482 95,564 39.64 0.001356 97,667 43.70 39 0.002580 95,327 38.74 0.001422 97,534 42.76 40 41 0.002697 95,081 37.84 0.001501 97,396 41.82 36.94 40.88 42 0.002828 94,825 0.001596 97,249 0.002976 94,557 36.04 0.001709 39.95 97,094 43 0.003146 94,275 35.15 0.001841 96,928 39.01 44 45 0.003340 93,979 34.26 0.001989 96,750 38.08 0.003567 93,665 33.37 0.002153 37.16 46 96,557 0.003833 32.49 0.002333 47 93,331 96,350 36.24 48 0.004143 92,973 31.61 0.002530 96,125 35.32 49 0.004499 92,588 30.74 0.002746 95,882 34.41 0.004890 92,171 29.88 0.002981 95,618 33.50 50

Period Life Table, 2019, as used in the 2022 Trustees Report

2. Chance of breast cancer death without mammography

Steps to calculate the chance of death from breast cancer without screening at each age : 1/ Obtain overall chance of death from breast cancer (i.e., includes women who have and who have not been screened) - this is the observed chance of death from the National Cancer Institute DEVCAN website 2/ Parse out the chance of death without mammography - this is done by solving the following equation:

		-								
		Repo (DE	ted Risk = (Proportion _{Screened} X Risk _{Screened}) + (Proportion _{Unscreened} X Risk _{Unscreened})							
		but	Riskscreened = RRscre							
	rearranging the equation:									
	Reported Risl (DEVCAN)	k = (Proporti	on _{Screened} X RR _{Screened} X Risk _{Unscreened} + (Proportion _{Unscreened} X Risk _{Unscreened}							
	Solve for	Riskun								
		T Gottan	u-reenev							
Step 1 Ov	erall 10-yea	r chance of	death from breast cancer							
Ob	served risk o	of death	from the National Cancer In: (see FactCheck.docx, Figure S2b)							
	Age	40 0.14%	50 60 0.30% 0.48%							
Sten 2 Ca	Iculate 10-v	ear risk wit	nout screening lie chance of death without mamm							
51ep 2 <u>02</u>	iculate 10-y	ear risk wit	our screening (re, chance or death withour maining							
equation inputs: Reported risk		0 14%								
Proportionscreen	ed	59.1% 40.9%	from MMWR Morb Mortal Wkly Rep 2024;73:351-357. (see FactCheck.docx, Figure S4)							
RRscreening Riskscreened		0.63 Riskunse	this is the largest RR (i.e., maximizes I taken from the US Preventive Services modeling report, table 5, revend * RRscreening	(see also, FactCheck.docx, Figure S3)						
Riskunscreened		х	[solve for this value]							
0.14% 0.14% 0.14% Risk uns creened	= = = =	(0.18%	59.1% * 0.63 * X) + (40.9% * X) 0.37233 X + 0.41 X 0.78 X							
For age 50										
equation inputs: Reported risk		0.30%								
Proportionscreen Proportionunscreen	ed ened	76.5% 23.5%	from MMWR Morb Mortal Wkly Rep 2024;73:351-357. (see FactCheck.docx, Figure S4)	(and also FastChack door Figure S2)						
RRscreening Riskscreened Riskunscreened		Riskunso X	In its ine hardest kR (i.e., maximizes (<u>laken from the OS Preventive Services modeling report, labes</u> send * RRscreening [solve for this value]	(see also, racioneck.docx, rigure 53)						
0.30%	=	(76.5% * 0.694 * X) + (23.5% * X)							
0.30% 0.30% Risk uns creened	=	0.39%	0.5091 X + 0.24 X 0.77 X							
For age 60										
Reported risk	ed	0.48% 76.5%	from MMWR Morth Mortal Wkly Rep 2024/73:351-357 (see EarlCheck docx Figure S4)							
Proportionunscree RRscreening	ened	23.5% 0.694	this is the largest RR (i.e., maximizes I taken from the US Preventive Services modeling report, table 5	(see also, FactCheck.docx, Figure S3)						
Riskscreened Riskunscreened		Riskunso X	eend * RRscreening [solve for this value]							
0.48%	=	(76.5% * 0.694 * X) + (23.5% * X)							
0.48%	= =	```	0.53091 X + 0.24 X 0.77 X							
Risk uns creened	=	0.63%								

3. Chance of death with mammography

Steps to calculate the chance of death from breast cancer with screening at each age :

This simply entails applying the relative risk for each screening strategy. These are based on : Screening interval (annual vs. biennial)

Age (40, 50 or 60 years)

- Relative Risk (RR) of breast cancer death for screened vs. unscreened women
- 1/ largest effect of mammography (ie, + risk most) from USPTSF [see FactCheck.docx, Figure S3a for biennial, Figure S3b for annual]
- 2/ smallest effect of mammograrphy (ie, \downarrow risk least) from Cochrane [see FactCheck.docx, Figure S3c]

Calculate 10-year risk with screening (ie, chance of death with mammograms)

Riskscreened = Riskunscreened * RRscreening

Given 3 ages [40, 50, 60], 2 intervals [annual, biennial], and 2 sets of RR's [USPTSF (highest benefit), Cochrane (lowest benefit), there are 2*2*3=12 calculations:

Calculatio	n Interval	Age	RR Scenario	RRscreening	Riskunscreened	Riskscreened	Reduction	n in breast c	ancer	deaths from screening
1	annual	40	↓ risk most	0.63	0.18%	0.11%	0.07%	same as	0.7	fewer per 1000 women screened
2	annual	40	↓ risk least	0.87	0.18%	0.16%	0.02%	same as	0.2	fewer per 1000 women screened
3	biennial	40	↓ risk most	0.70	0.18%	0.13%	0.05%	same as	0.5	fewer per 1000 women screened
4	biennial	40	↓ risk least	0.87	0.18%	0.16%	0.02%	same as	0.2	fewer per 1000 women screened
5	annual	50	↓ risk most	0.694	0.39%	0.27%	0.12%	same as	1.2	fewer per 1000 women screened
6	annual	50	↓ risk least	0.94	0.39%	0.37%	0.02%	same as	0.2	fewer per 1000 women screened
7	biennial	50	↓ risk most	0.746	0.39%	0.29%	0.10%	same as	1.0	fewer per 1000 women screened
8	biennial	50	↓ risk least	0.94	0.39%	0.37%	0.02%	same as	0.2	fewer per 1000 women screened
9	annual	60	↓ risk most	0.694	0.63%	0.43%	0.19%	same as	1.9	fewer per 1000 women screened
10	annual	60	↓ risk least	0.94	0.63%	0.59%	0.04%	same as	0.4	fewer per 1000 women screened
11	biennial	60	↓ risk most	0.746	0.63%	0.47%	0.16%	same as	1.6	fewer per 1000 women screened
12	biennial	60	↓ risk least	0.94	0.63%	0.59%	0.04%	same as	0.4	fewer per 1000 women screened