

Appendix 3: Calculations for overdiagnosis

Definition:

In the setting of screening to identify risk, we defined overdiagnosis as the identification of high risk in individuals who, if not screened, would never have known that they were at risk and would never have experienced a fracture. This calculation describes the extent of overdiagnosis in the screened population (compared to no screening).

Calculation:

W = proportion (%) of individuals deemed at high risk (based on threshold) or shared decision making

y = mean % risk in this high risk population

100 – y = % who would theoretically not fracture

Extent of overdiagnosis = $W \times (100-y) / 100$

Overdiagnosis using trial data:

Trials	SCOOP (Shepstone, 2018) Females 70-80 years 10-year risk of hip fracture		SALT (Merlijn, 2019) ^a Females 65-90 years 10-year risk of MOF
	Offer-to-screen in “select population”	Screened as high-risk with clinical FRAX and referred for BMD	Offer-to screen in “select population”
Number offered screening	6233	3064	5575
Number above the treatment threshold	898	898	1417
% above the treatment threshold (W)	14.4%	29.3%	25.4%
Mean risk in high risk group (y) ^b	17.9%	17.9%	23.9%
Calculation of overdiagnosis	$14.4 \times (100-17.9) / 100$	$29.3 \times (100-17.9) / 100$	$25.4 \times (100-23.9) / 100$
% overdiagnosed	11.8%	24.1%	19.3%

MOF = major osteoporotic fracture

^a This study included only women with at least one risk factor, so the proportion above the treatment threshold would be expected to be higher than the general population

^b Calculated using clinical FRAX (without BMD); note that the trials did not use clinical FRAX for treatment thresholds