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Age ranges in breast cancer screening: simulated scenarios and analysis of benefits and harms
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Background:
The Valencia Region Breast Cancer Screening Programme (VR-BCSP) (Spain) invites women aged 45-69 for mammography every 2 years (y). The aim is to evaluate benefits and harms of 3 age range scenarios of the VR-BCSP according to different adherence rates.

Methods:
Long-term impact simulation study (2020-2050) of 3 age range screening scenarios (S) for women ≥40y of the VR in 2020 (n = 1487000): S1, 45-69y (current VR-BCSP scenario); S2, 50-69y (excluding 45-49y) and S3, 45-74y (including 70-74y). A biennial screening interval was considered. The simulations were performed for 4 participation rates: A = current adherence (72.7%), B = +5%, C = +10% and D = +20%. Benefit indicators were: nº of BC in situ and invasive (screened vs. clinically detected), nº of BC deaths and % of BC mortality reduction. Harms indicators were: nº of false positives (FP) and % of overdiagnosis. Screening scenarios were simulated using the EUTOPIA evaluation tool.

Results:
Considering the current adherence, a reduction of BC mortality was observed in all scenarios (S1A = 30.6%, S2A = 27.9%, S3A = 32.2%). In S2A the harms decreased vs. S1A: nº of FP (236vs423 x1000) and overdiagnosis (4.9%vs5.0%), but also the benefits: BC mortality reduction (27.9%vs30.6%) and nº of invasive BC screen detected (15/28vs18/25). In S3A vs S1A, an increase of benefits was observed: BC mortality reduction (32.2%vs30.6%) and nº of in situ BC screen detected (5/2vs4/3). On the other hand the nº of FP increased (460vs423 x1000), but overdiagnosis decreased (4.8%vs5.0%). All the results with an increased adherence had similar trend as the previous scenarios, showing a gradual increment in BC mortality reduction. Nevertheless overdiagnosis increase significantly in S3 (5.8% in all adherence increments), being higher than S1 (S1B = 5.0%, S1C = 4.9%, S1D = 5.0%) and S2 (S2B = 4.9%, S2C = 4.9%, S2D = 4.9%).

Conclusions:
The wider age range, the greater reduction in BC mortality but also the probability of FP and overdiagnosis.

Key messages:
• The wider age range, the greater reduction in BC mortality but also the probability of FP and overdiagnosis.
• This study provides a balance between benefits and harms of different screening scenarios allowing evidence-based decision making.