Screening and Treatment: USA and Uganda

# Summary of parameters

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| --- | --- | --- | --- |
|  | **United States** | **Uganda** | **Notes** |
| Age |  |  |  |
|  | 50 | 40 | Can distribute; but what is the target distribution? |
| Incidence |  |  |  |
| Source | SEER 1979 | GLOBOCAN 2012 | IHME may have “better” incidence data  Females breast cancer only? |
| Range, ages 40+ (per 100,000) | 109-382 | 55-136 |  |
| Stage, no screening |  |  |  |
| Source | SEER 1979 | Galukande 2015 (N=262) |  |
| Early vs Advanced | ~50% vs 50% | 11% vs 89% | This is using only the 80% of cases that had non-missing stage, so, assuming MAR |
| Stage shift |  |  |  |
|  | 15% | 15% |  |
| 5-yr exponential net survival (rate) |  |  |  |
| Early | 90.5% (0.01992) | 90.5% (0.01992) | Used SEER for early-stage Uganda because they had 100% 5-year survival |
| Advanced | 58.6% (0.10693) | 35% (0.21) | 35% is approximate based on their separate stage III and IV survivals, but confidence intervals are huge (15%-60%) |
| Prognostic factors |  |  |  |
| Source | SEER 2010 | Galukande 2013 |  |
| ER+ vs ER- | 82% vs 18% | 47% vs 53% | ER is similar across early vs advanced |
| Treatment |  |  |  |
| Distributions | US in 1979, 1999,  2015 | Same, but in 2015 there’s AI but no Trastuzumab | Galukande reports 16% HER2+, consistent with the US. We could include trastuzumab using assumptions about how HER2 and ER are cross-classified.  Do we want current distributions, or targets? Where do we get current distributions? Is the 1977 US treatment useful at all (20% advanced get chemo)? |
| Efficacies | EBCTCG | EBCTCG | Galukunde reports significant barriers to treatment adherence |
| Other-cause death |  |  |  |
| Source | Berklee Mort Database | IHME, GBD 2013 | Need to try WHO life tables; these look a bit off for the US, compared to Berklee/NCHS. I’m not surprised.  Interpolation  Extrapolation  Exp(-rate) versus 1-rate |

Get data directly from Tina/consult with her?

# Summary of results

Both are 15% stage shift

10-year follow-up

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **United States (as in Annals)** | | | **Uganda (10 sims only)** | | |
|  |  | 1977 | 1999 | 2015 | 1977 | 1999 | 2015 |
| Cumulative breast cancer mortality | |  |  |  |  |  |  |
|  | *No screening* | 48 (46,50) | 37 (37,38) | 30 (30,31) | 33 (30,36) | 28 (26,30) | 25 (23,27) |
|  | *Screening* | 43 (41,45) | 34 (33,35) | 27 (27,28) | 29 (27,32) | 25 (22,27) | 22 (20,25) |
| MRRs within trials |  | 0.90 (0.90,0.90) | 0.91 (0.90,0.93) | 0.90 (0.89,0.91) | 0.88 (0.85,0.91) | 0.88 (0.85,0.92) | 0.88 (0.85,0.92) |
| MRRs across trials |  |  |  |  |  |  |  |
|  | *No screening* | 1.00 (1.00,1.00) | 0.78 (0.76,0.79) | 0.63 (0.62,0.65) | 1.00 (1.00,1.00) | 0.84 (0.82,0.86) | 0.76 (0.73,0.78) |
|  | *Screening* | 0.90 (0.90,0.90) | 0.71 (0.71,0.71) | 0.57 (0.56,0.58) | 0.88 (0.85,0.91) | 0.74 (0.71,0.79) | 0.67 (0.65,0.72) |
| ARRs within trials |  | 4.7 (4.5,4.8) | 3.3 (2.8,3.8) | 2.9 (2.6,3.3) | 4.1 (3.1,5.3) | 3.4 (2.2,4.2) | 3.1 (2.3,4.0) |
| ARRs across trials |  |  |  |  |  |  |  |
|  | *No screening* | 0.0 (0.0, 0.0) | 10.6 (9.5,11.7) | 17.6 (16.0,19.1) | 0.0 (0.0,0.0) | 5.5 (4.5,6.0) | 8.0 (6.9,9.4) |
|  | *Screening* | 4.7 (4.5, 4.8) | 13.9 (13.2,14.6) | 20.5 (19.3,21.7) | 4.1 (3.1, 5.3) | 8.8 (7.2,10.0) | 11.1 (9.7,12.4) |

# Possible next (coding) steps

Code and compare more validation statistics: age-standardized incidence, all-stage survival (GLOBOCAN)

See if using US incidence in Uganda increases within-trial MRR

Investigate/validate incidence and life table data across multiple sources

Costs?