

Sensitivity Analysis

Values in Decision Trees (Or Other Models)

- All values are estimates and approximations
 - E.g., proportion of women screened, proportion testing positive, etc.
 - Some are based on published data; some are informed estimates; some are our best uninformed estimates
 - The level of certainty you have in each estimate varies – you may only have one source, or you may have multiple sources that disagree on the estimate value
- What if our estimates aren't quite right?
- *Sensitivity analysis* informs outcomes change based on certain variations of model inputs

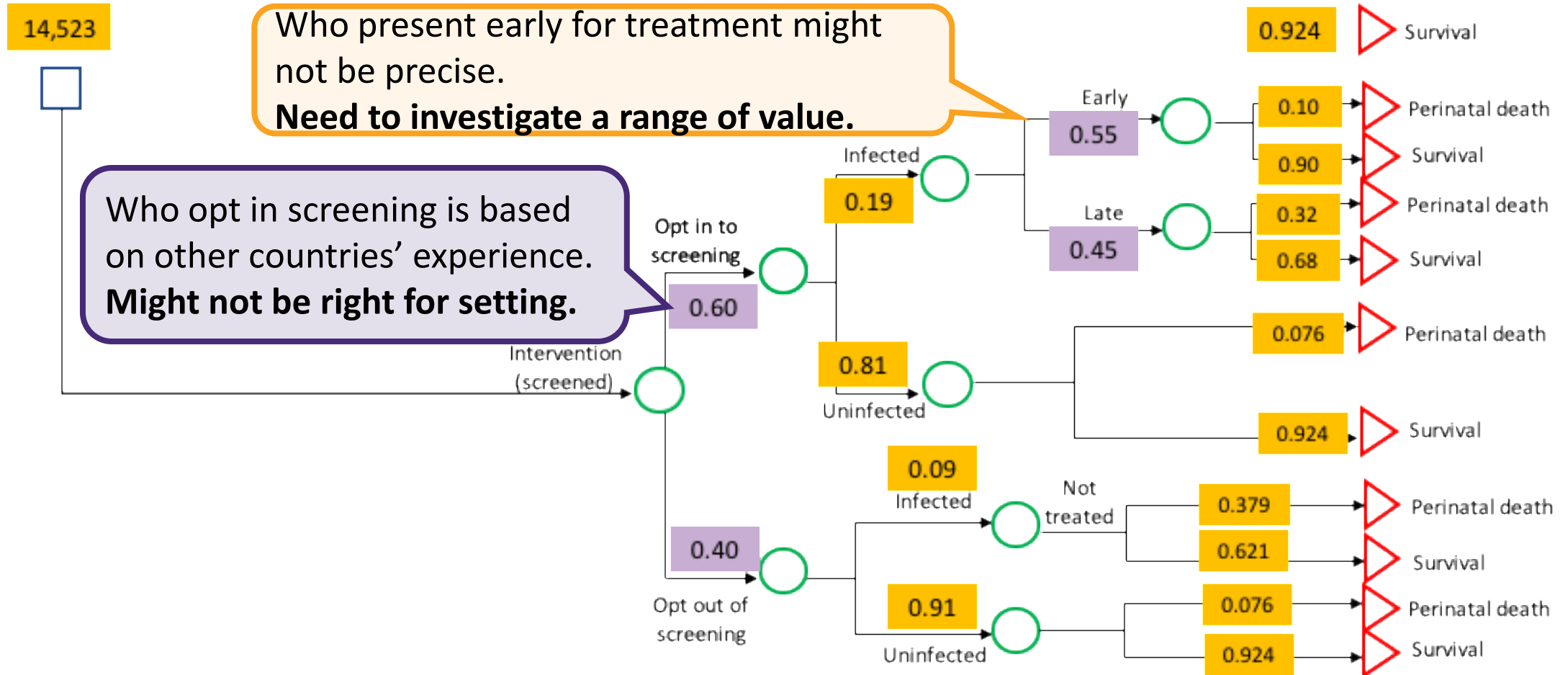
Sensitivity Analysis

- “what-if” analysis to predict changes in outcomes, given certain range of variations for inputs of the model
- Good way to estimate expected range of outcomes
- NOT a 95% confidence interval
 - No statistical backing
 - Subjective, but evidence supported
 - Rely on literature to inform how model inputs might vary

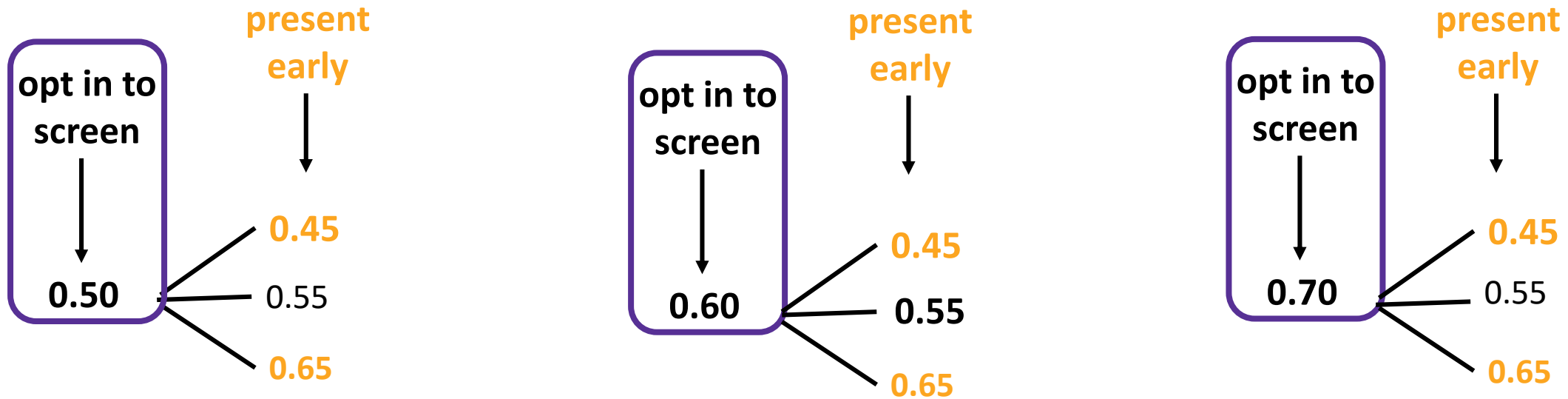
Return to syphilis example

- In rural Philippines, syphilis in pregnant women accounts for many adverse pregnancy outcomes
- Group of antenatal clinics (**n=5**) in a high-burden rural area are trying to decide if they should screen and treat pregnant women for syphilis
 - Option 1. Not screen or treat pregnant women (status quo)
 - Option 2. To screen and treat and require \$3 from patient
 - Option 3. Treat without screening & require \$3 from patient
- Which option to choose?

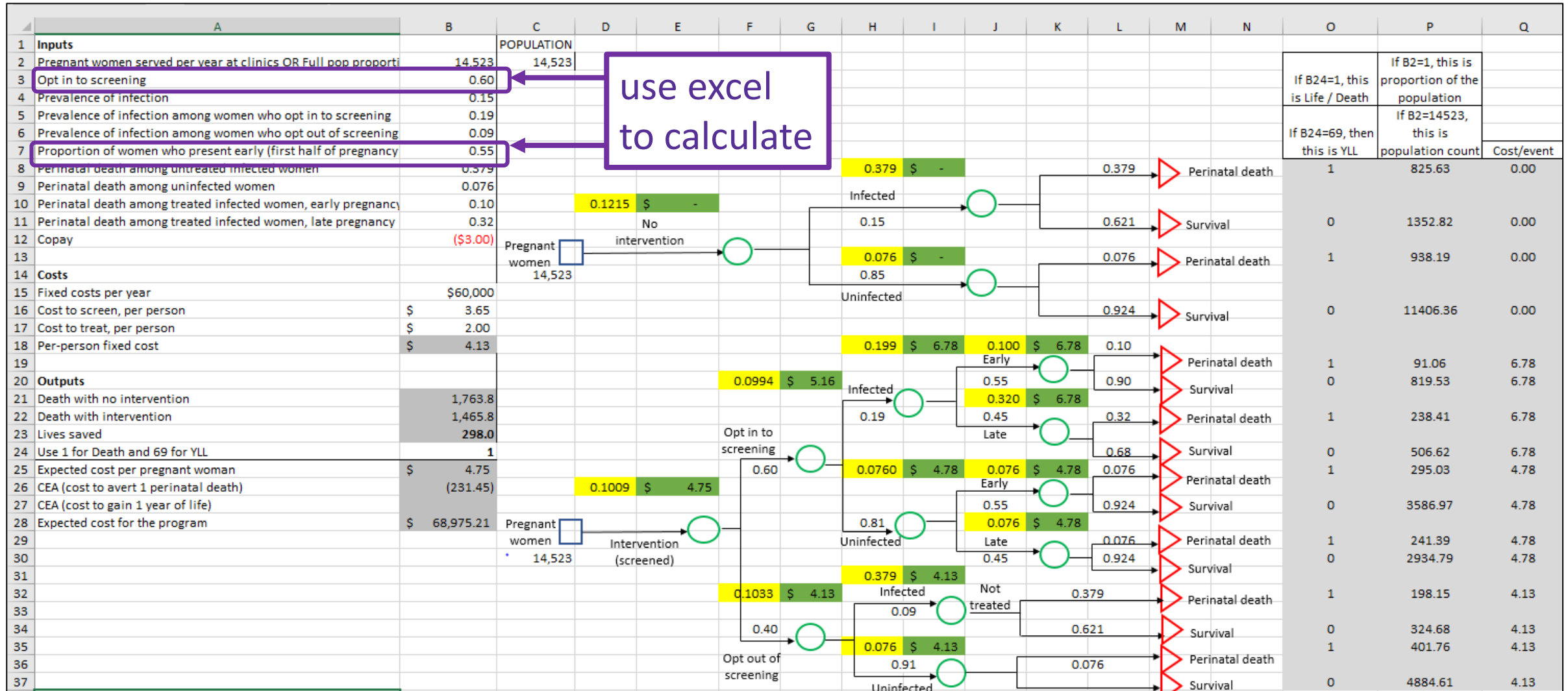
Which values are least certain?



Estimate outcome changes based on input variations



Use the excel model to calculate



Sensitivity Analysis Results

Deaths with no intervention = 1,764 (from health impact lecture)

Intervention	Opt in to screen probability	Present early Probability	N, Deaths	Lives saved v. no intervention
Current estimates	0.60	0.55	1,466	298
Scenario 1	0.60	0.45	1,502	262
Scenario 2	0.60	0.65	1,429	334
Scenario 3	0.50	0.55	1,471	292
Scenario 4	0.50	0.45	1,502	262
Scenario 5	0.50	0.65	1,441	323
Scenario 6	0.70	0.55	1,460	304
Scenario 7	0.70	0.45	1,503	261
Scenario 8	0.70	0.65	1,418	346

Conclusion – after sensitivity analysis

- Best estimate: prevents 298 of 1,764 deaths (16.9%)
- Given the uncertainty, our intervention
 - ...could prevent as few as 261 deaths (14.8%)
 - ...or could prevent as many as 346 deaths (19.6%)
- Is the intervention effective enough?
 - How do we determine if something is “effective enough” to implement?
- What other factors do we need to consider in order to have a more informed decision?

END