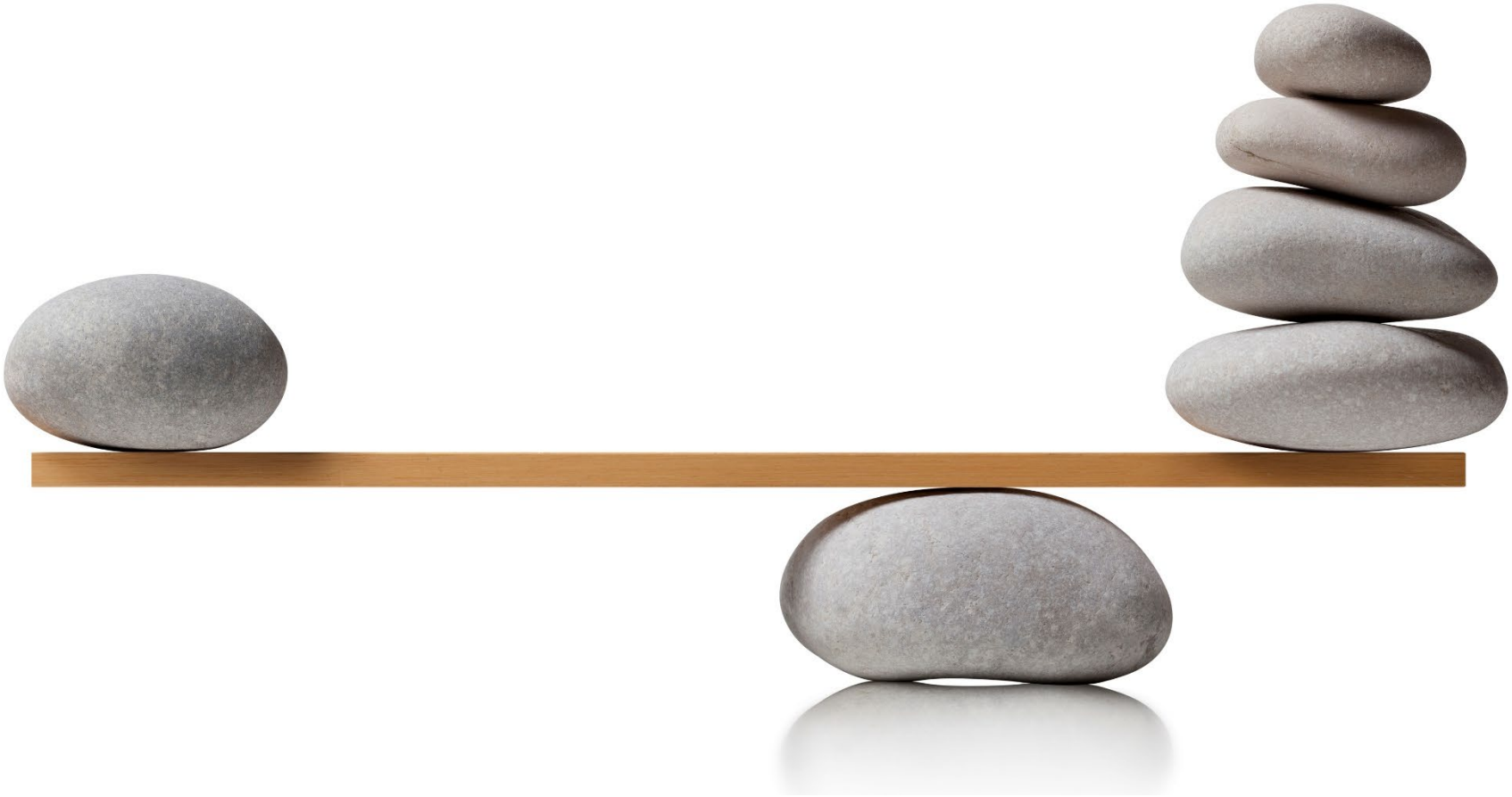

COST-BENEFIT ANALYSIS OF NEWBORN SCREENING FOR CONGENITAL CYTOMEGALOVIRUS (cCMV)

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Acknowledgement

- We would like to recognize Caitlin Maloney, who completed much of the cost-benefit work in 2022 during the original review of cCMV as a graduate student in the Institute for Public Health Genetics at the University of Washington.
- This is an updated model using the framework of Caitlin's 2022 analysis.

Washington State NBS Criteria

5. **Cost-benefit/Cost-effectiveness**: The outcomes outweigh the costs of screening. All outcomes, both positive and negative, need to be considered in the analysis.

- The economic analysis considers:
  - The prevalence of the condition among newborns.
  - The positive and negative predictive values of the screening and diagnostic tests.
  - Variability of clinical presentation by those who have the condition.
  - Dollar values for costs and benefits of screening vs. no screening.
- The impact of ambiguous results, adverse effects, or unintended consequences of screening, such as psycho-social or economic impacts on the family and medical system, must also be considered.
- The results of the economic analysis shows that the outcomes, financial or otherwise, outweigh the costs of screening.
- There is adequate evidence of acceptable quality to evaluate this criterion.

CMV and the RUSP

In 2022, the Advisory Committee on Heritable Disorders in Newborns and Children declined to move the CMV nomination forward to the evidence review step, due to the lack of a prospective population-based pilot study.

Strategy

Decision Tree

- Compares status quo v. screening model
- Data from primary literature, states currently screening or pilot studies, expert opinion

Sensitivity analysis – vary assumptions

- High and low estimates for parameters

cCMV does not fit typical newborn screening rationale

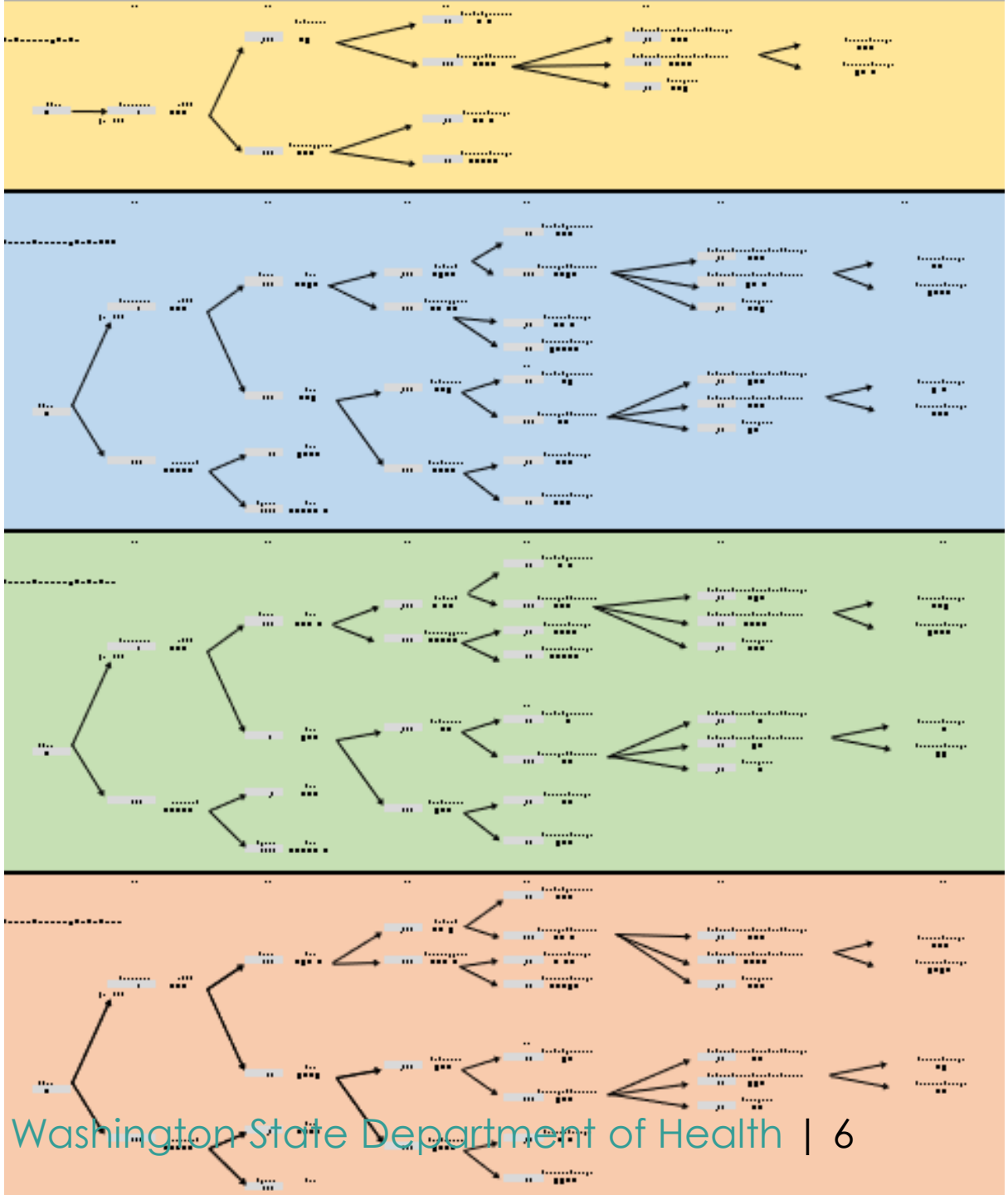
- No quantifiable difference in mortality/neurodevelopmental outcomes at this time
- Potential benefit: early identification and intervention of hearing loss for infants with clinically inapparent cCMV infection

No Screening

Universal Screening: Dried blood spot

Universal Screening: Dried Urine Filter Paper

Universal Screening: Dried Saliva Swab



Benefits vs. Costs: All Specimen Types

	Total Benefits	Total Costs	Start-up Cost (one-time)	Net Benefit	Benefit/ Cost Ratio
Dried Urine Filter Paper	$2,424,044	$3,383,327	$203,442	-$959,282	0.58-0.72
Dried Blood Spot	$1,872,903	$3,043,740	$94,765	-$1,170,836	0.49-0.62
Dried Saliva Swab	$2,320,401	$3,540,158	$203,442	-$1,219,756	0.53-0.66

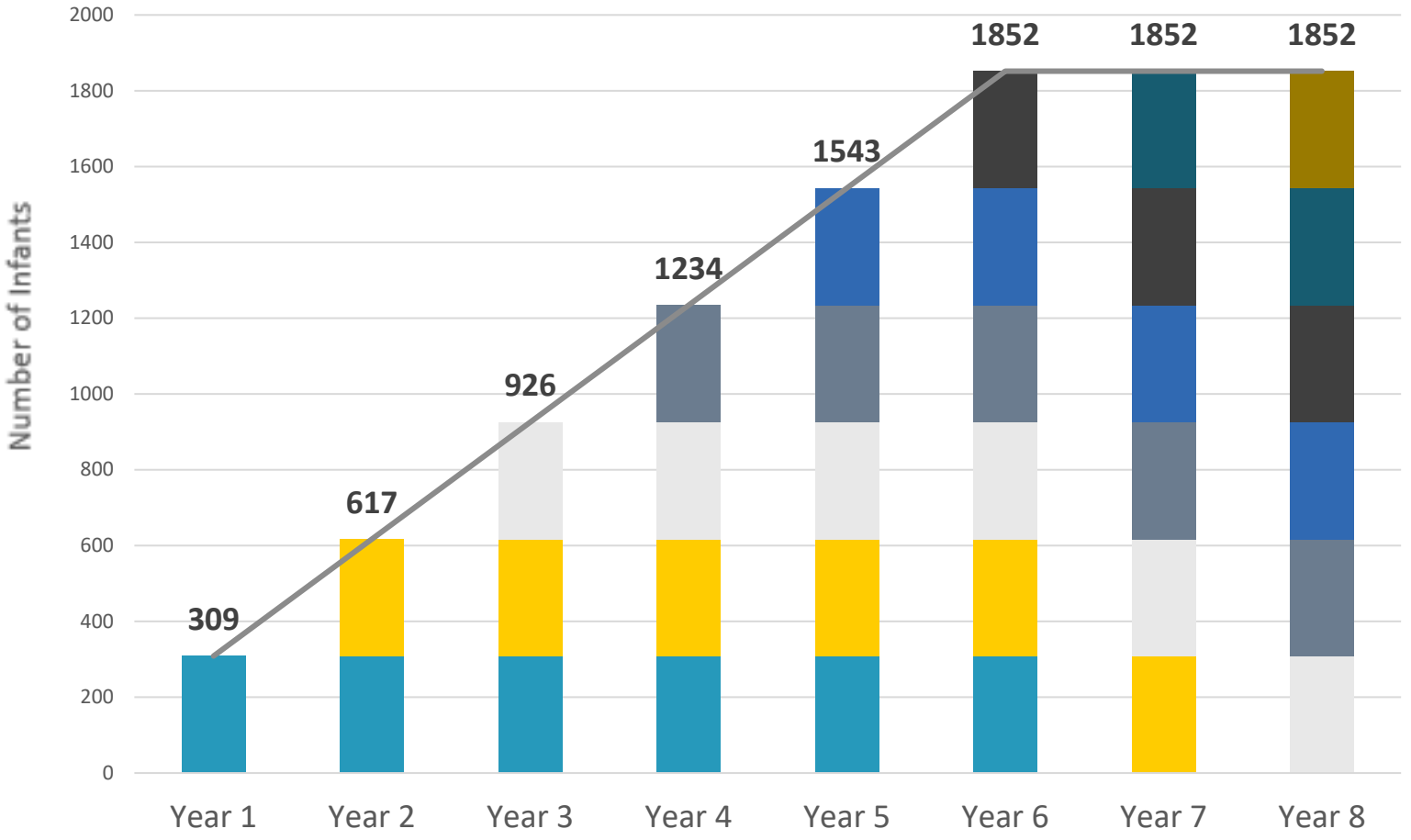
Minnesota CMV experience

- Minnesota became the first state to universally screen all newborns for cCMV by PCR on dried bloodspots
- They published findings after the first year of screening (2023-2024), which included 60,115 newborns
- Of note, they reported 75% of confirmed cases completed comprehensive initial evaluations and linkage to care
- Our cost – benefit model assumed all confirmed cases would complete the surveillance schedule, but that component may be more challenging in practice and may limit the amount of benefit a screening program could provide
- If we adjusted our model to reflect a 75% participation in hearing surveillance, the benefit cost ratio for urine screening would be reduced from 0.72 to 0.58

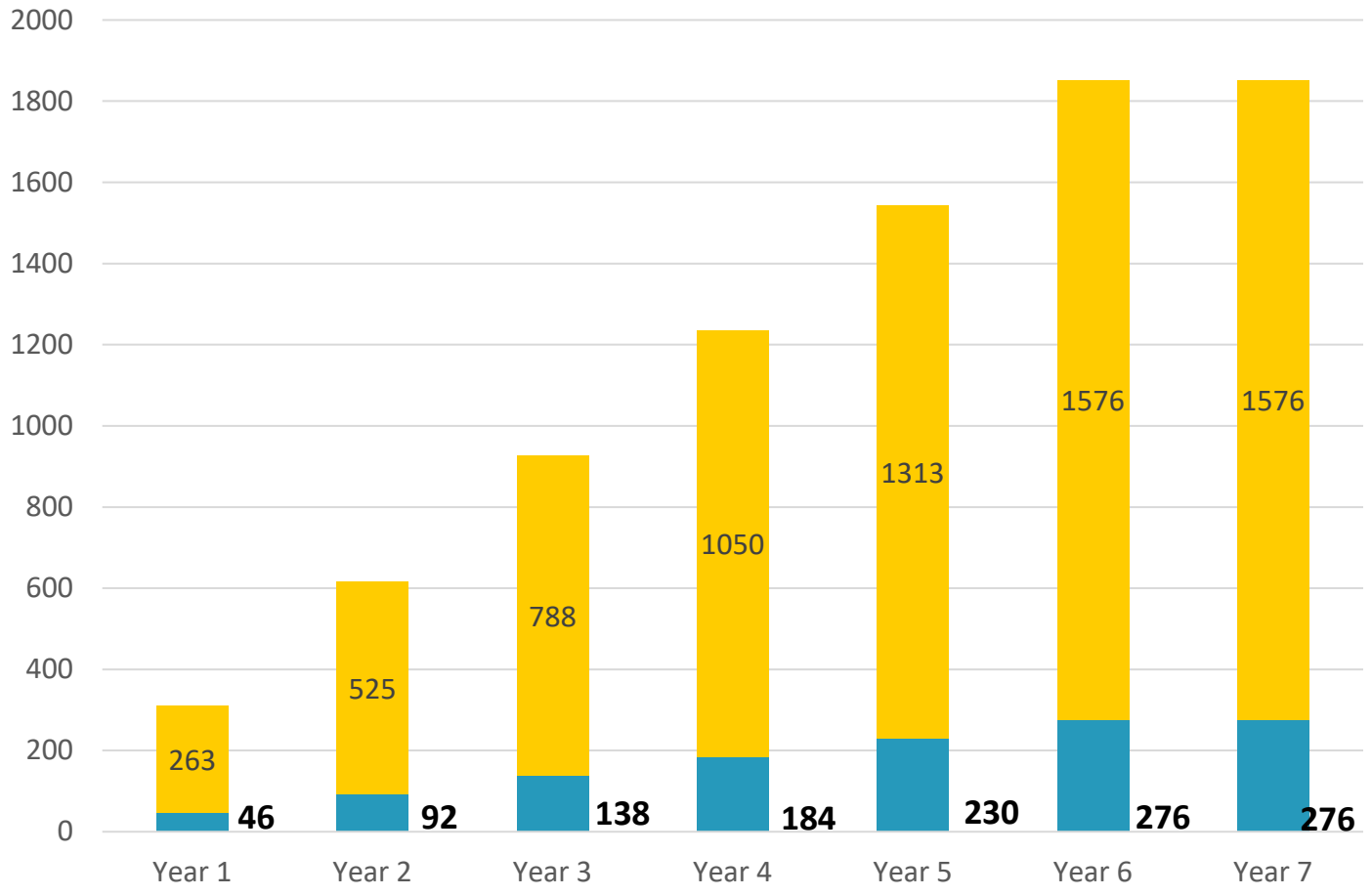
Intangible Benefits and Costs

- Emotional impact on individuals and families
  - 43 additional infants benefit from surveillance and early identification
  - 242 additional infants will go through surveillance and not receive benefits from early identification

Surveilling cCMV Positive Infants for Hearing Loss



cCMV Positive Infants Who Develop Late Onset Hearing Loss



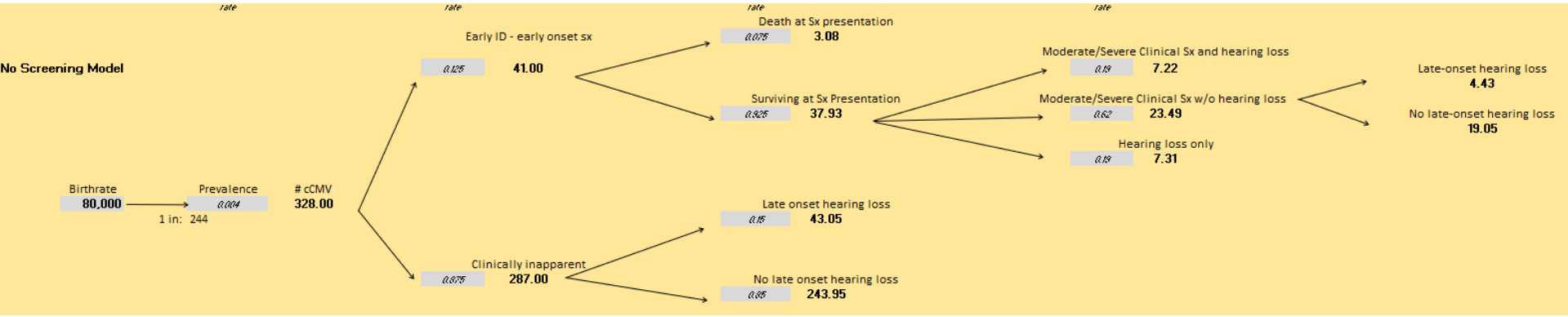
Intangible Benefits and Costs

- Emotional impact on individuals and families
  - 43 additional infants benefit from surveillance and early identification
  - 242 additional infants will go through surveillance and not receive benefits from early identification
- Wages lost for parents and families
- CMV infections prevented from prenatal education and outreach
  - State prenatal CMV education bill, SB 5829, which required DOH to develop educational materials for pregnant people to inform about CMV and strategies to reduce transmission

Questions?

Materials on the following slides are for reference

No Screening Model



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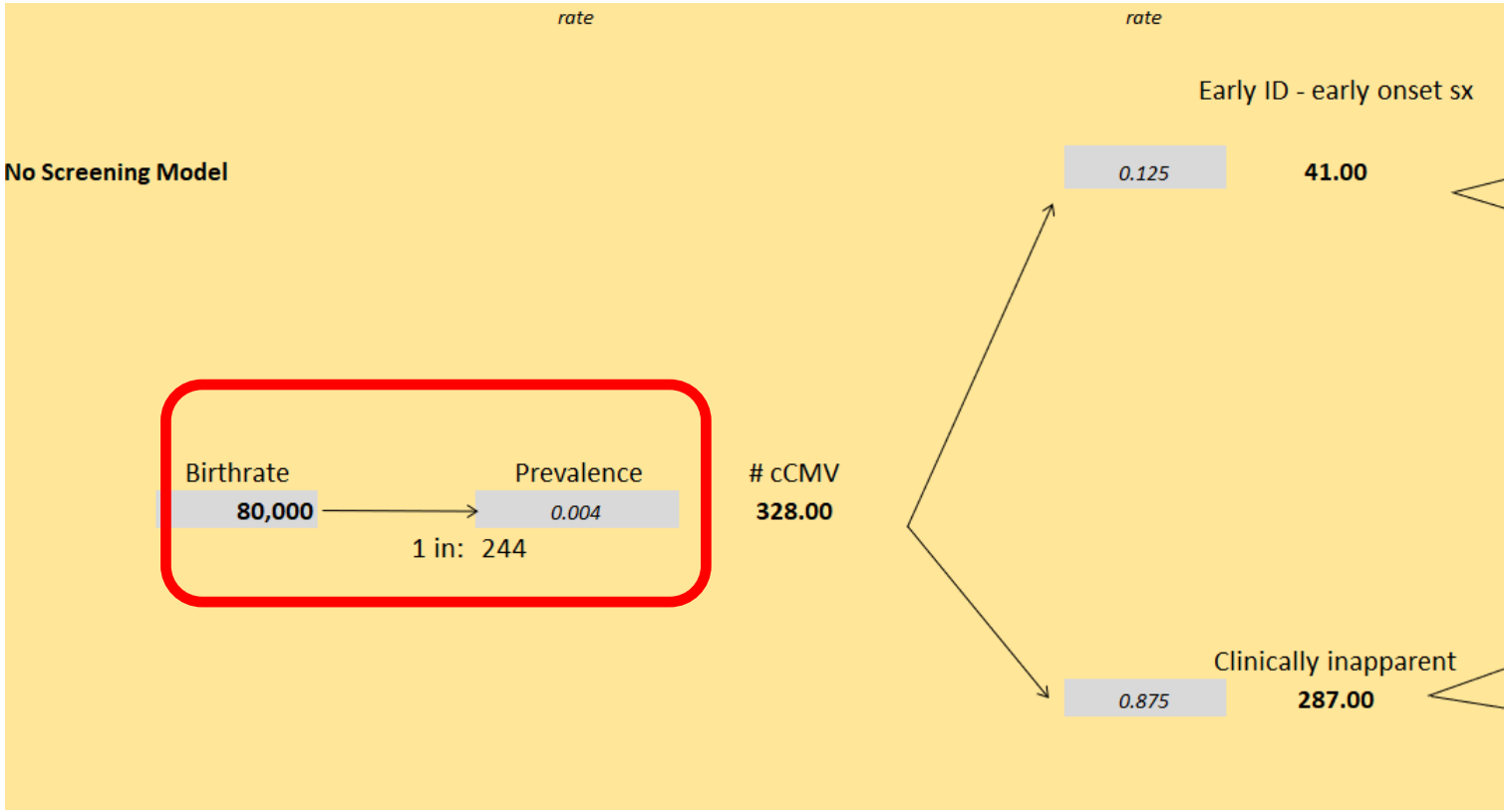

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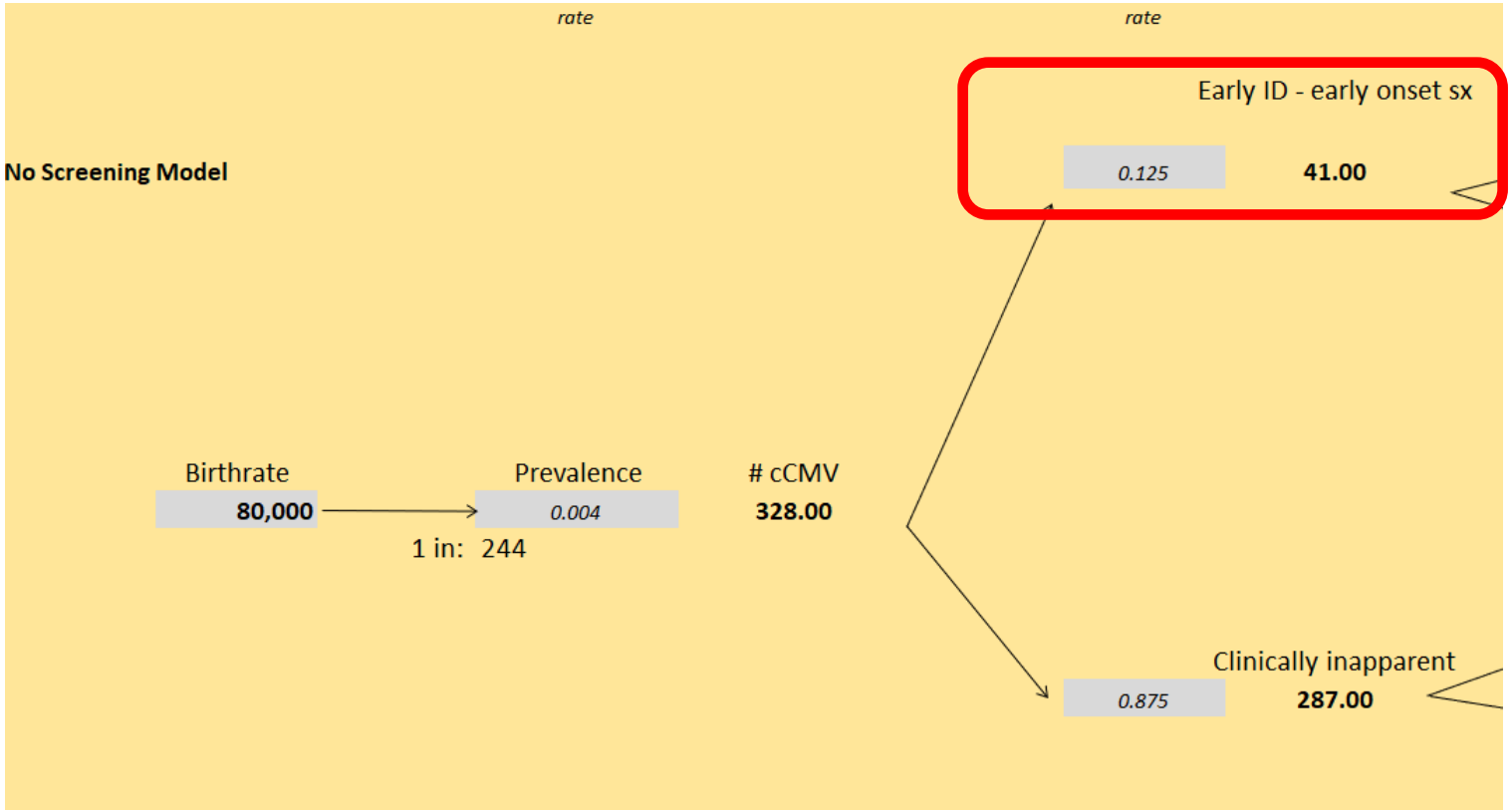

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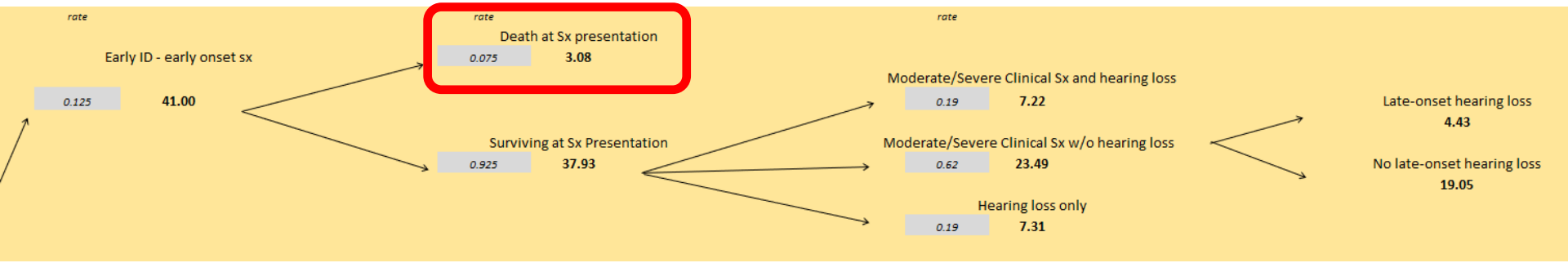

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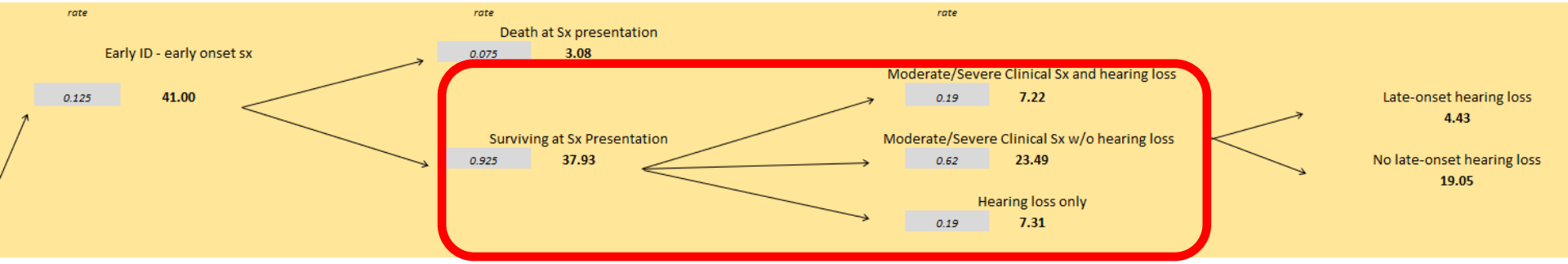

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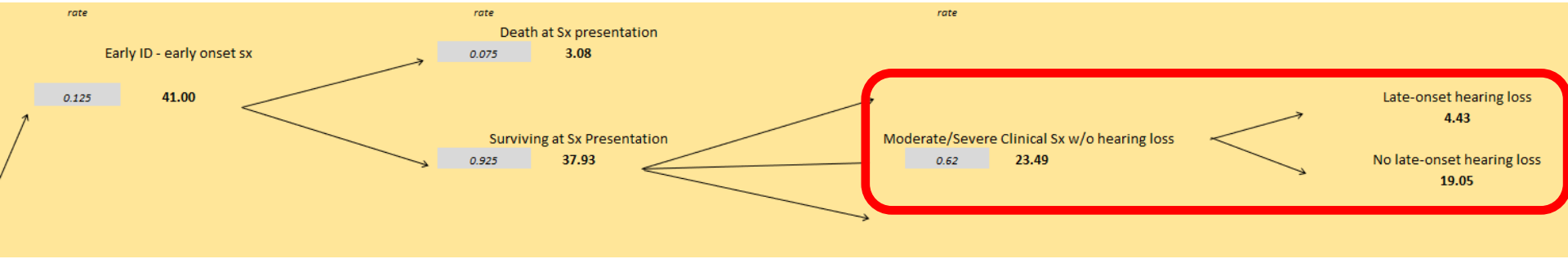

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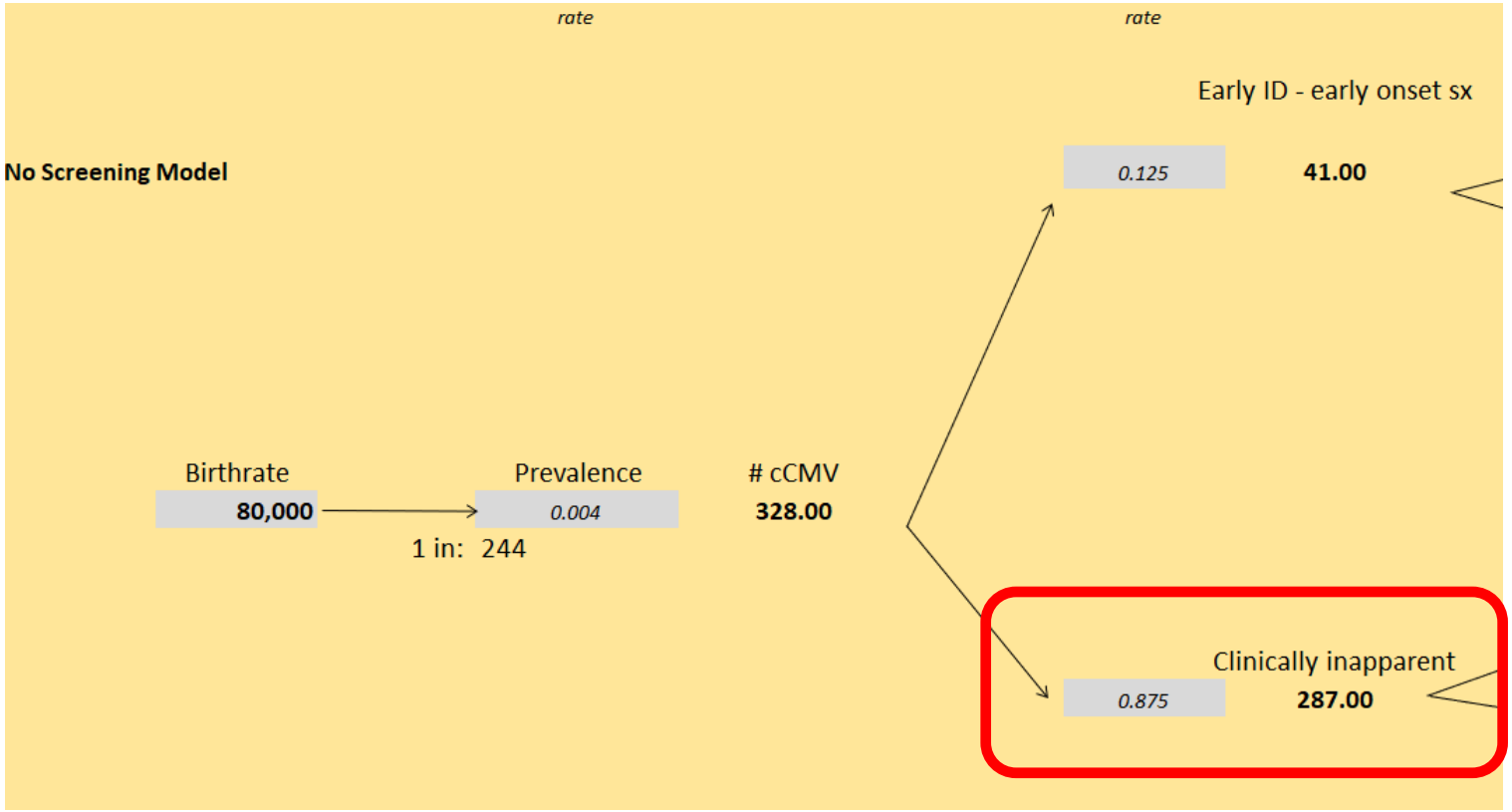

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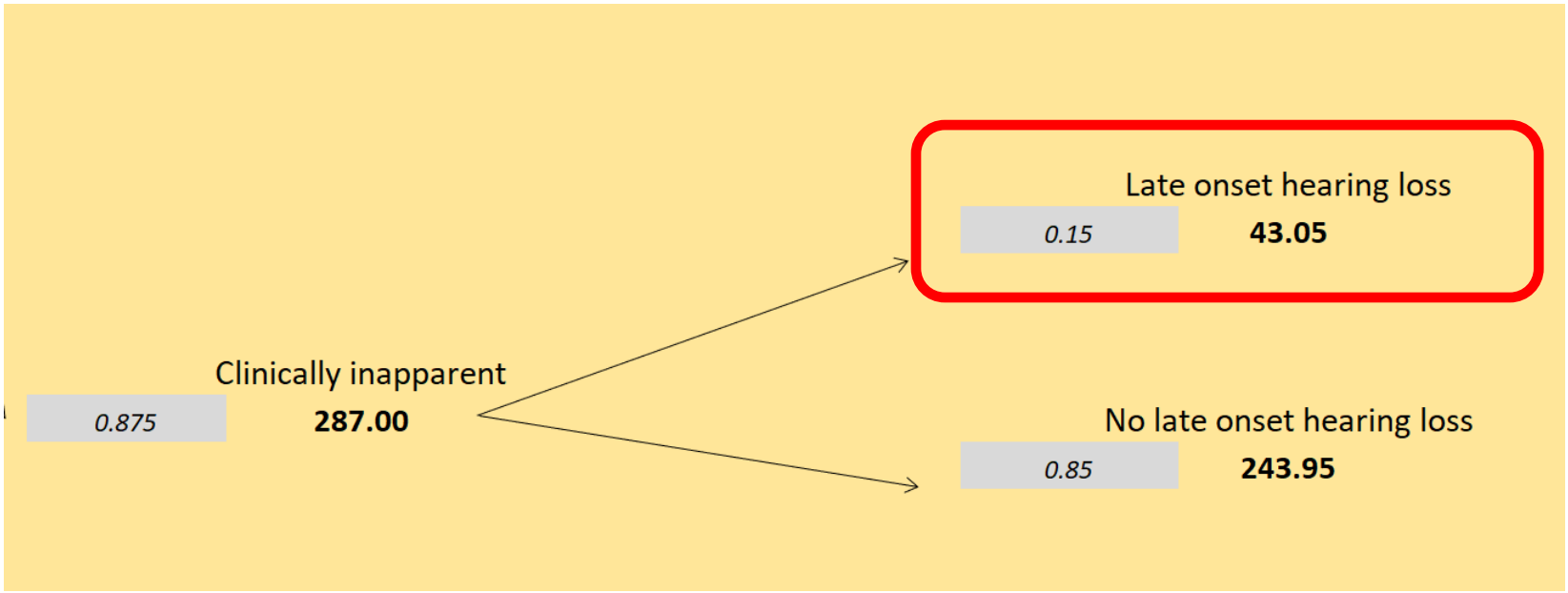
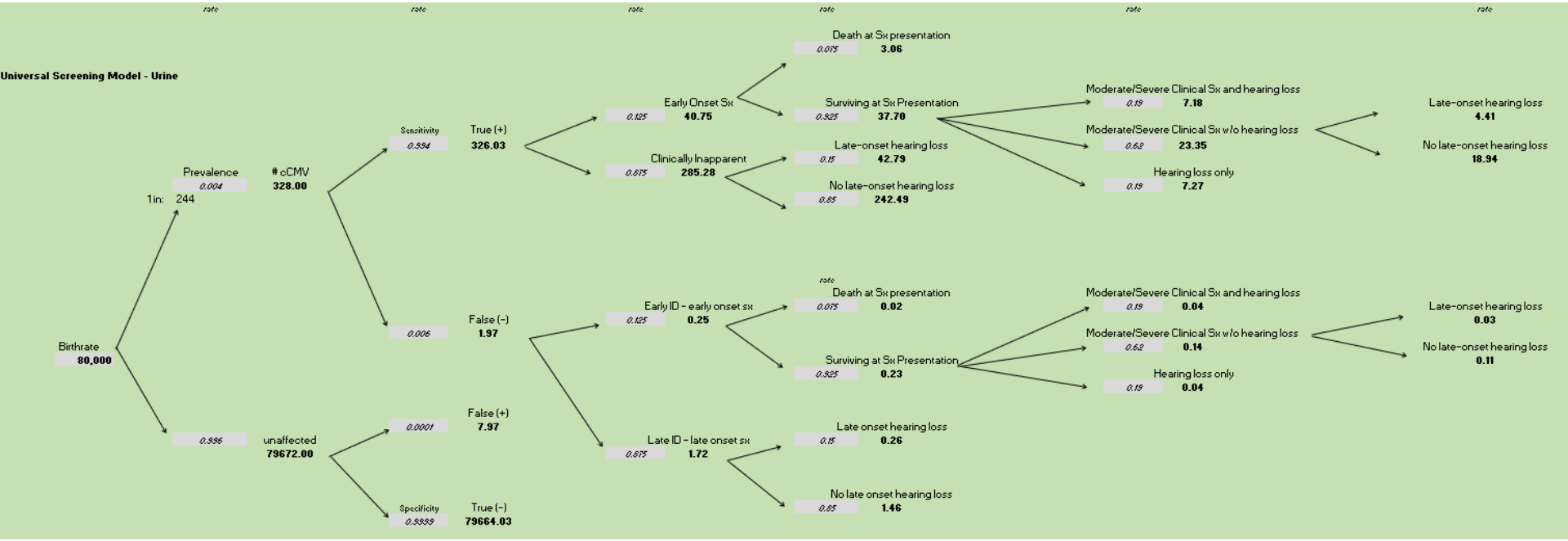


Universal Screening Model: Dried Urine Filter Paper



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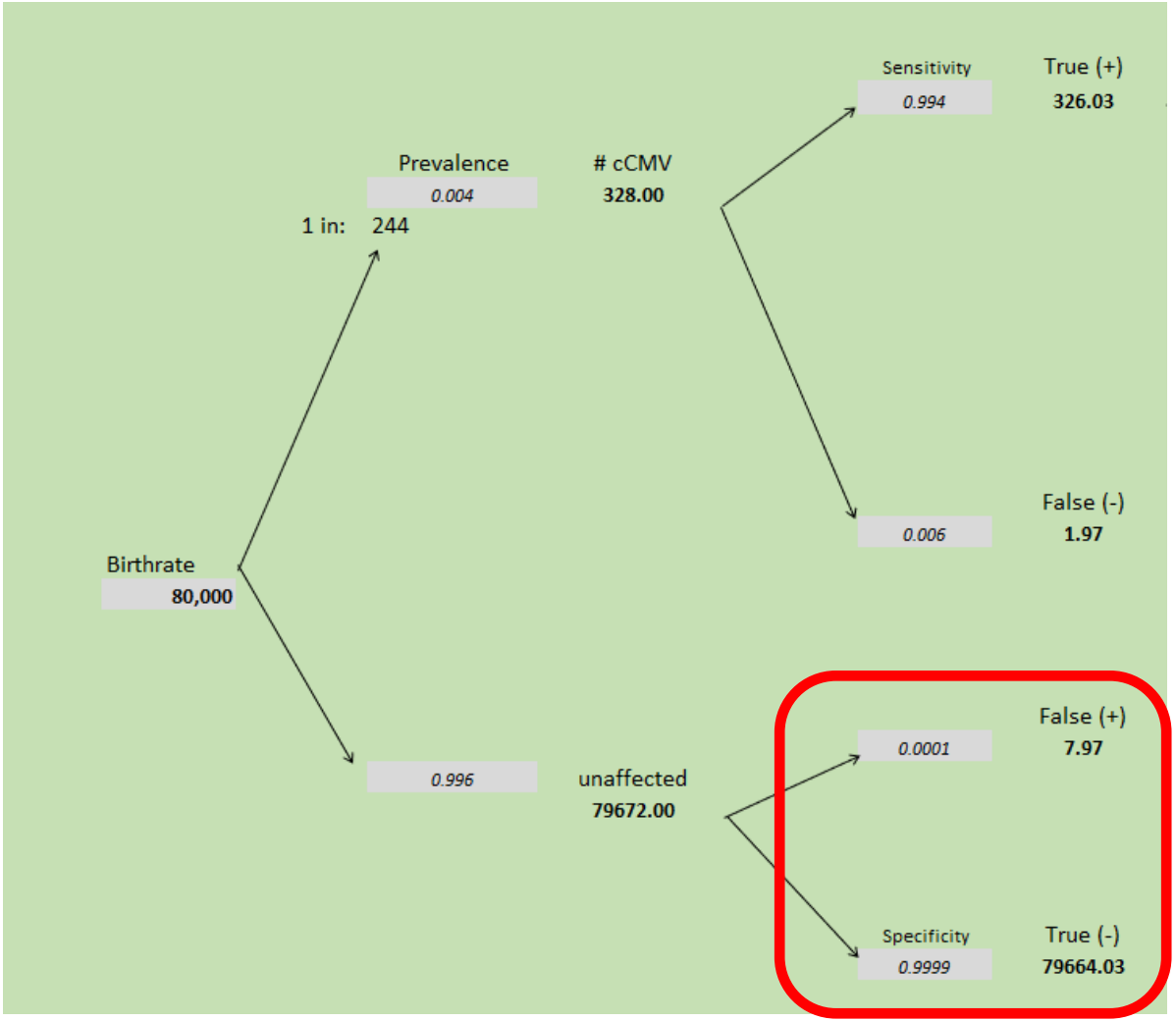

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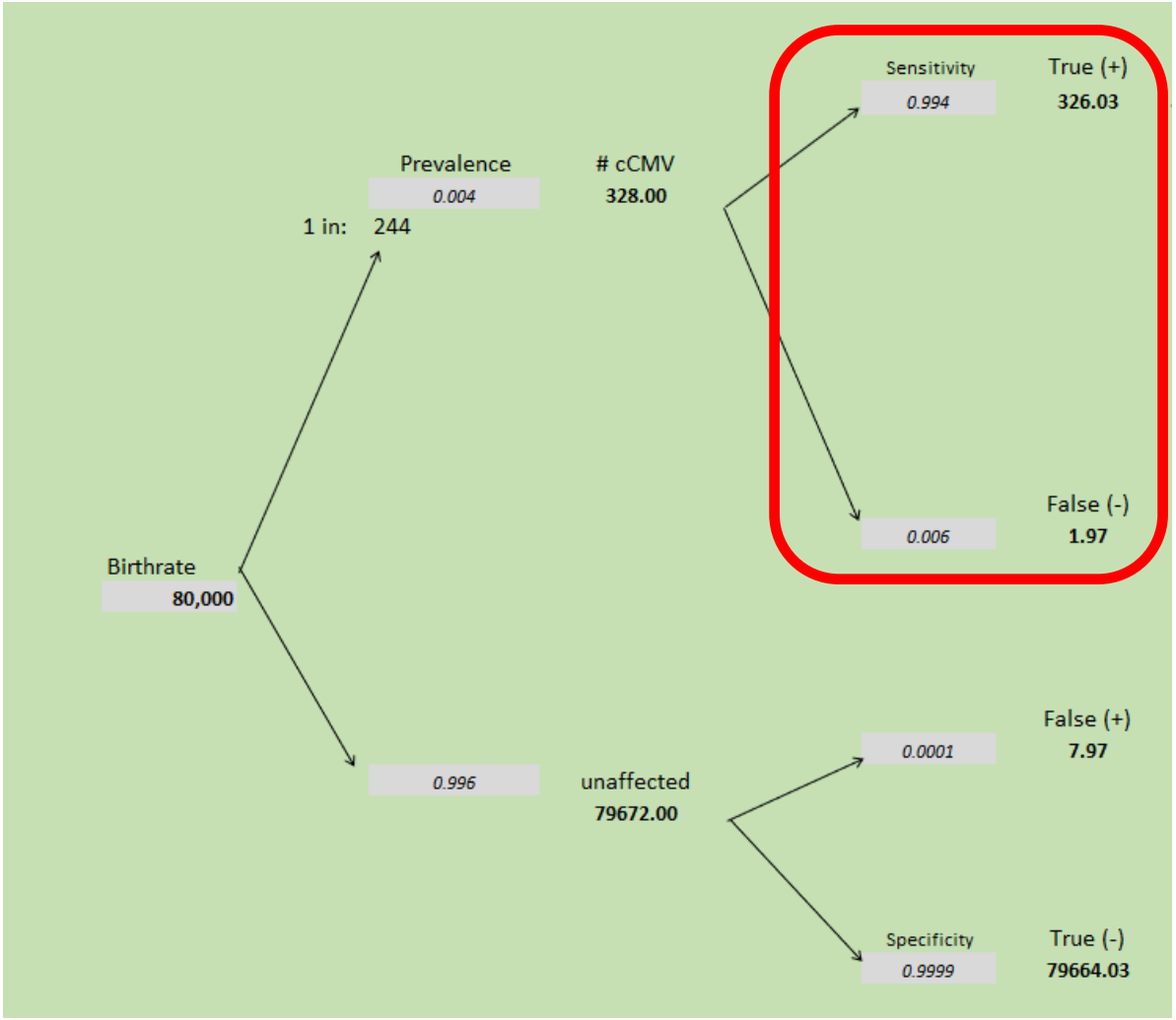

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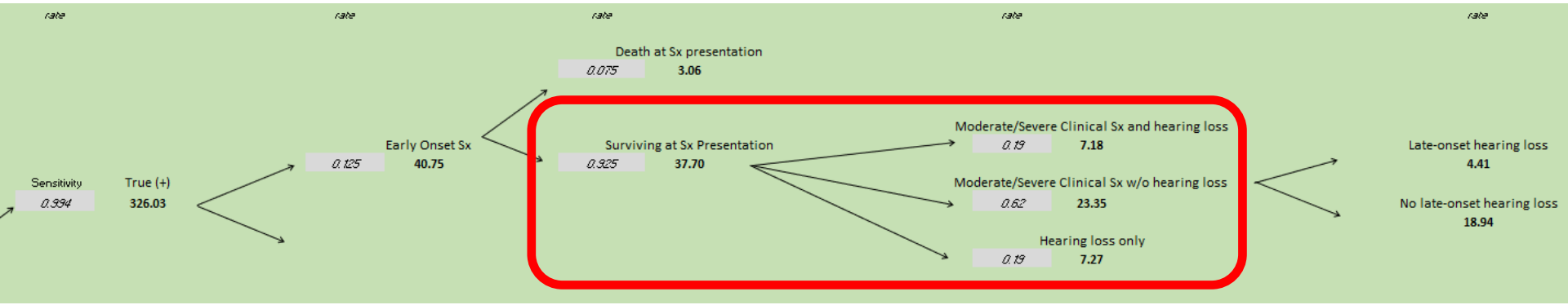

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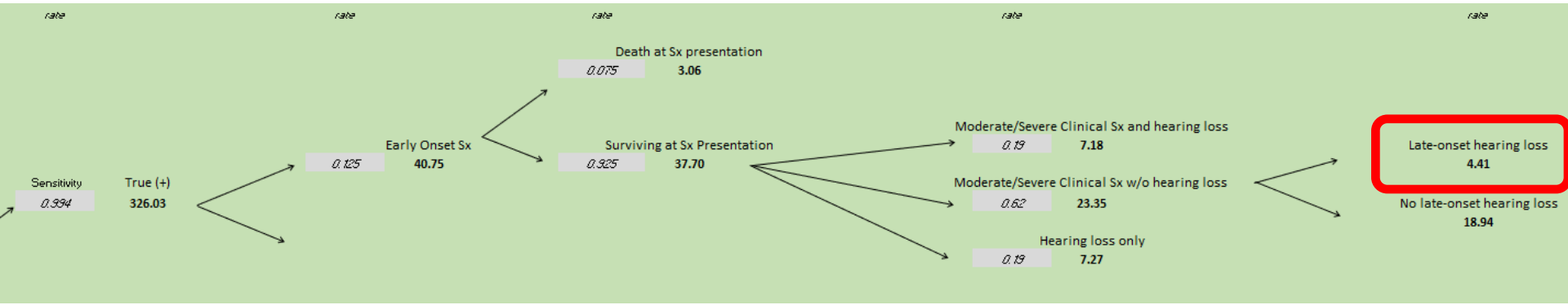

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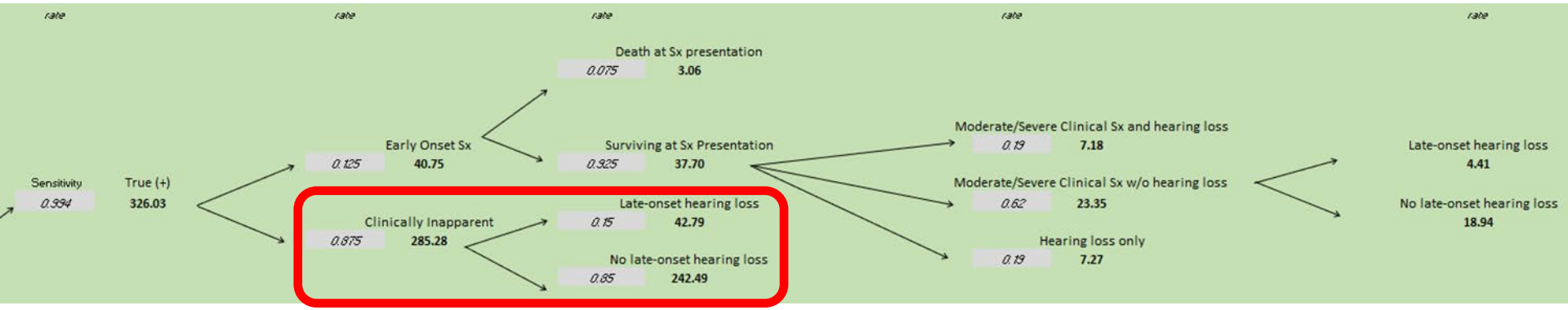

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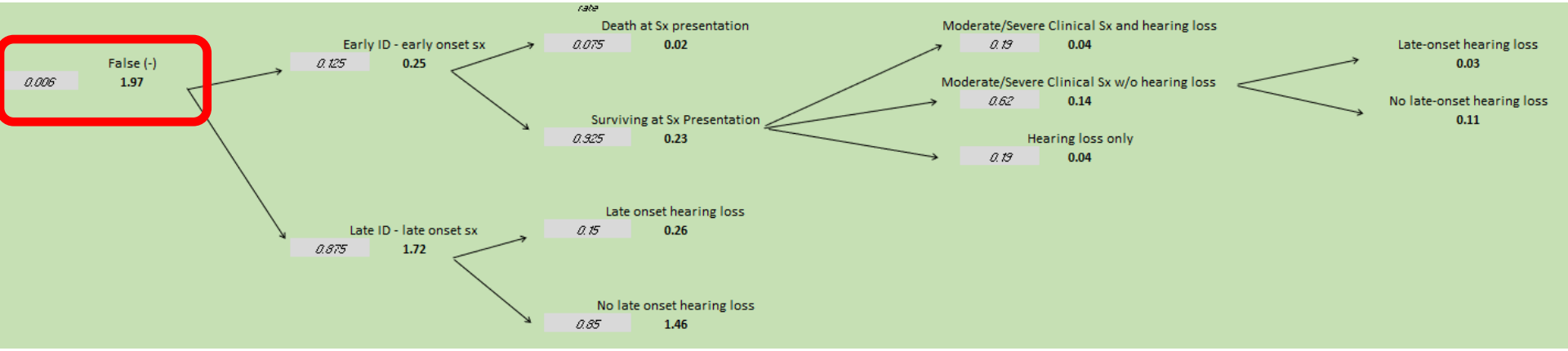

No Screening vs. Universal Urine Screening

	No Screening	Universal Screening (Urine)
Deaths	3.08	3.08
# of babies with diagnostic testing	41.00	334.25
# of babies w/ late onset hearing loss and early intervention	4.43	47.22
# of babies w/o hearing loss but 6 years surveillance	19.05	261.55

No Screening vs. Universal Urine Screening

	No Screening	Universal Screening (Urine)	Shift
Deaths	3.08	3.08	0.00
# of babies with diagnostic testing	41.00	334.25	+293.25
# of babies w/ late onset hearing loss and early intervention	4.43	47.22	+42.79
# of babies w/o hearing loss but 6 years surveillance	19.05	261.55	+242.50