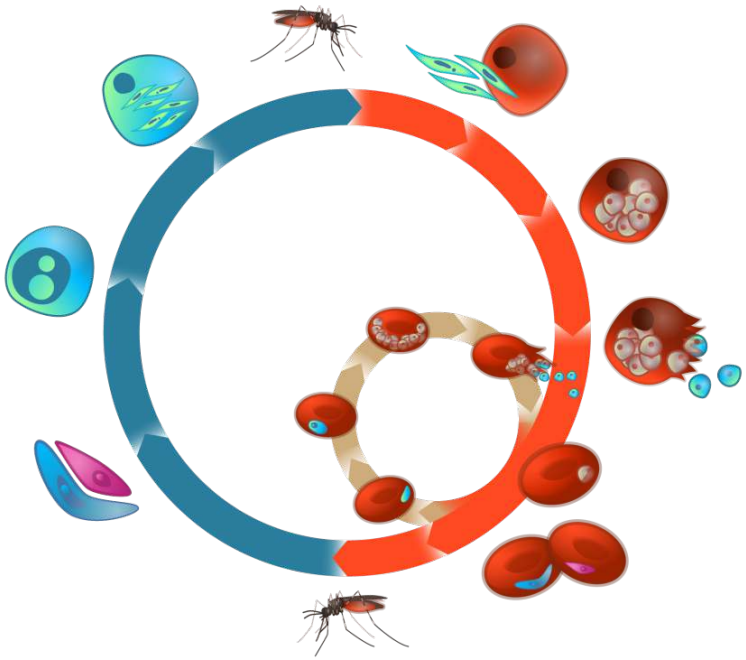
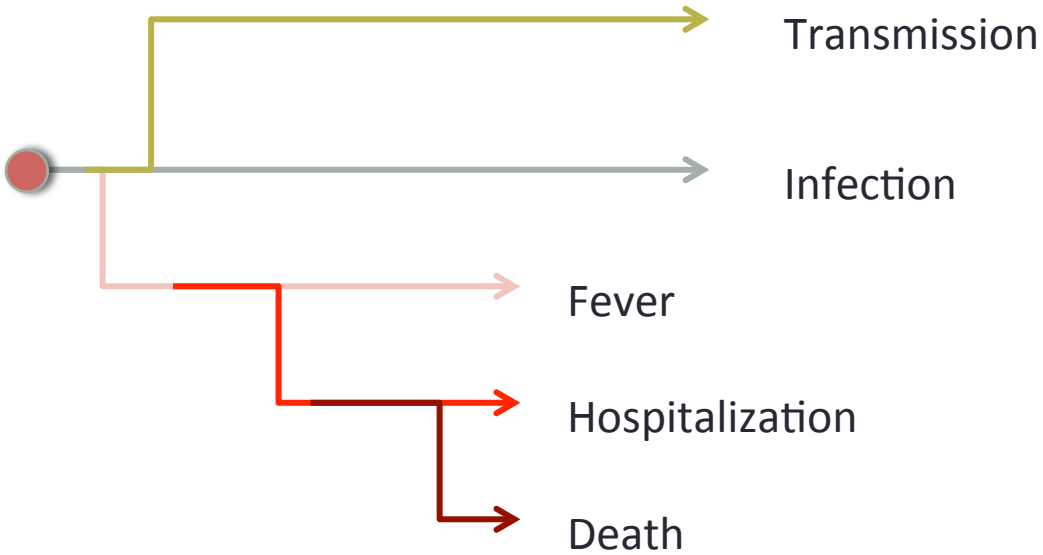
Modeling Future AMFm Scenarios

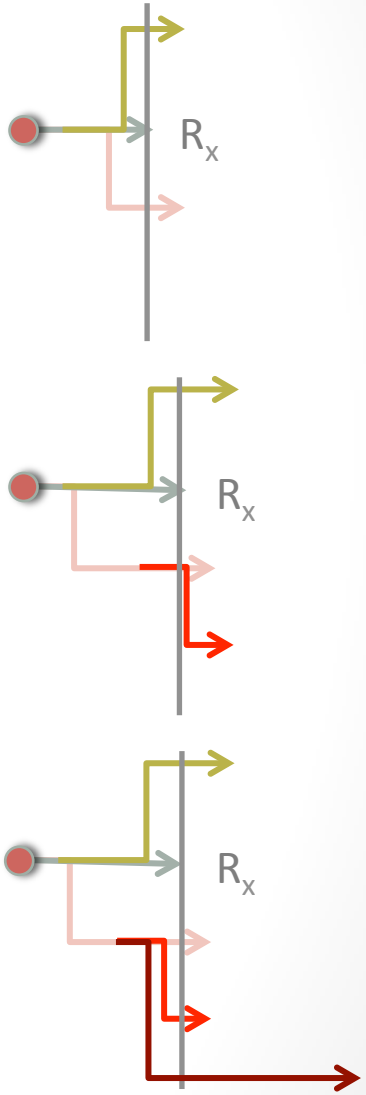
AMFm Scenarios Moving Forward

- Model Structure
- Inputs
- Scenarios
  - Child-Targeting
  - Partial Subsidy
- Summary



Model Structure





Antimalarial Drugs Avert Bad Outcomes,
& the Timing of Treatment Matters

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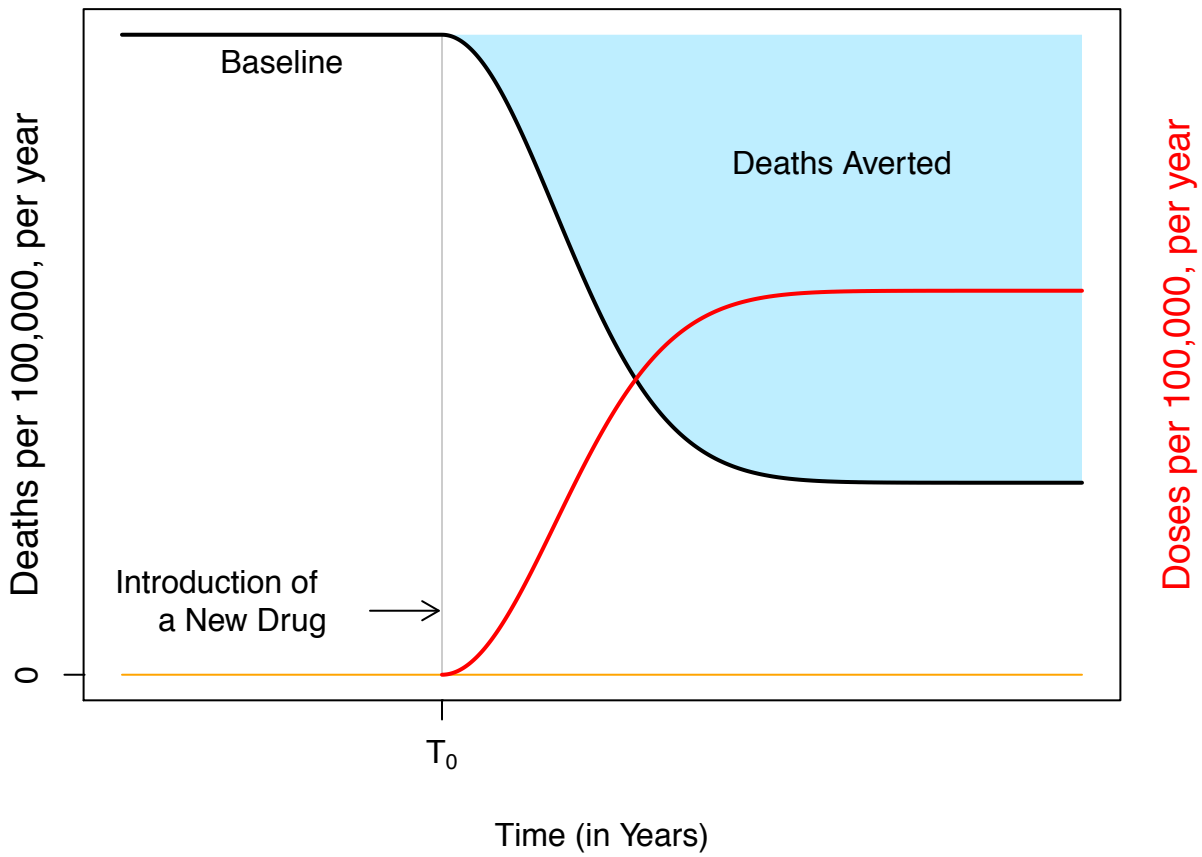
Model Structure



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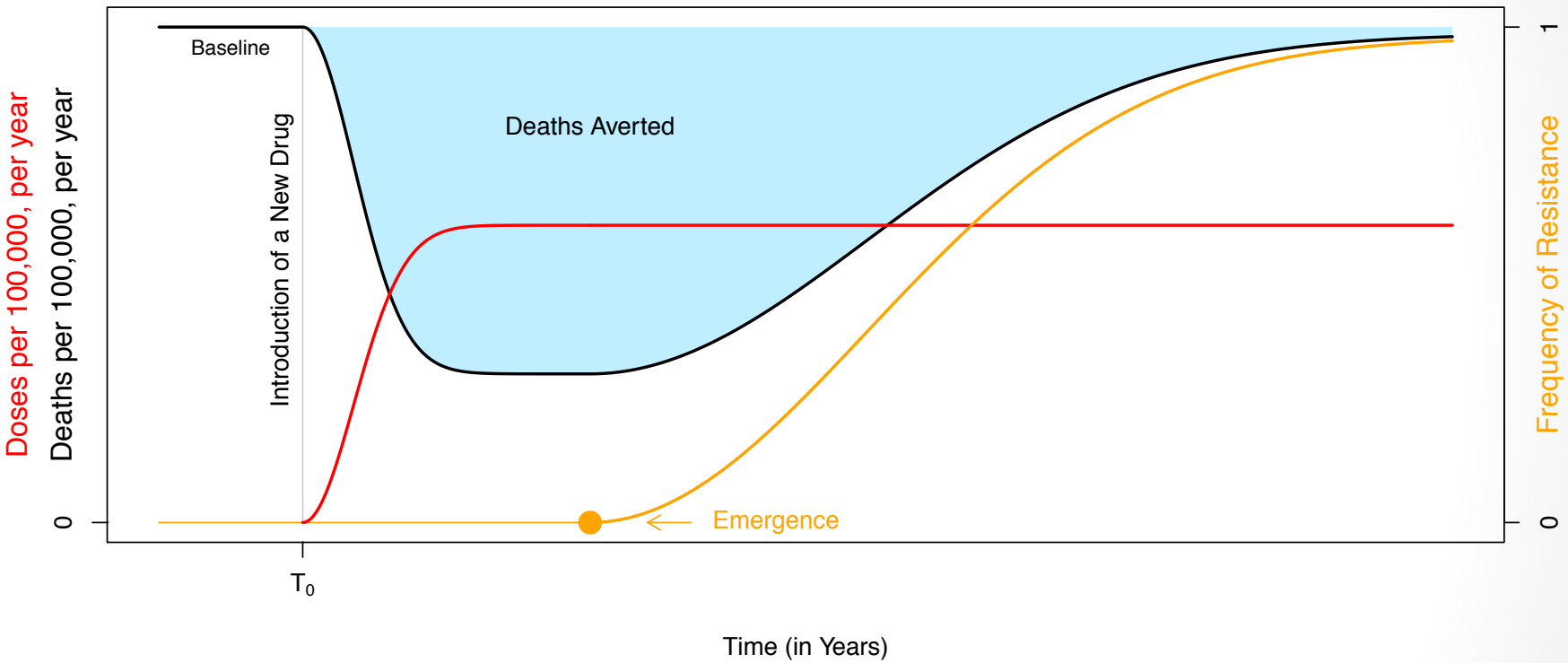

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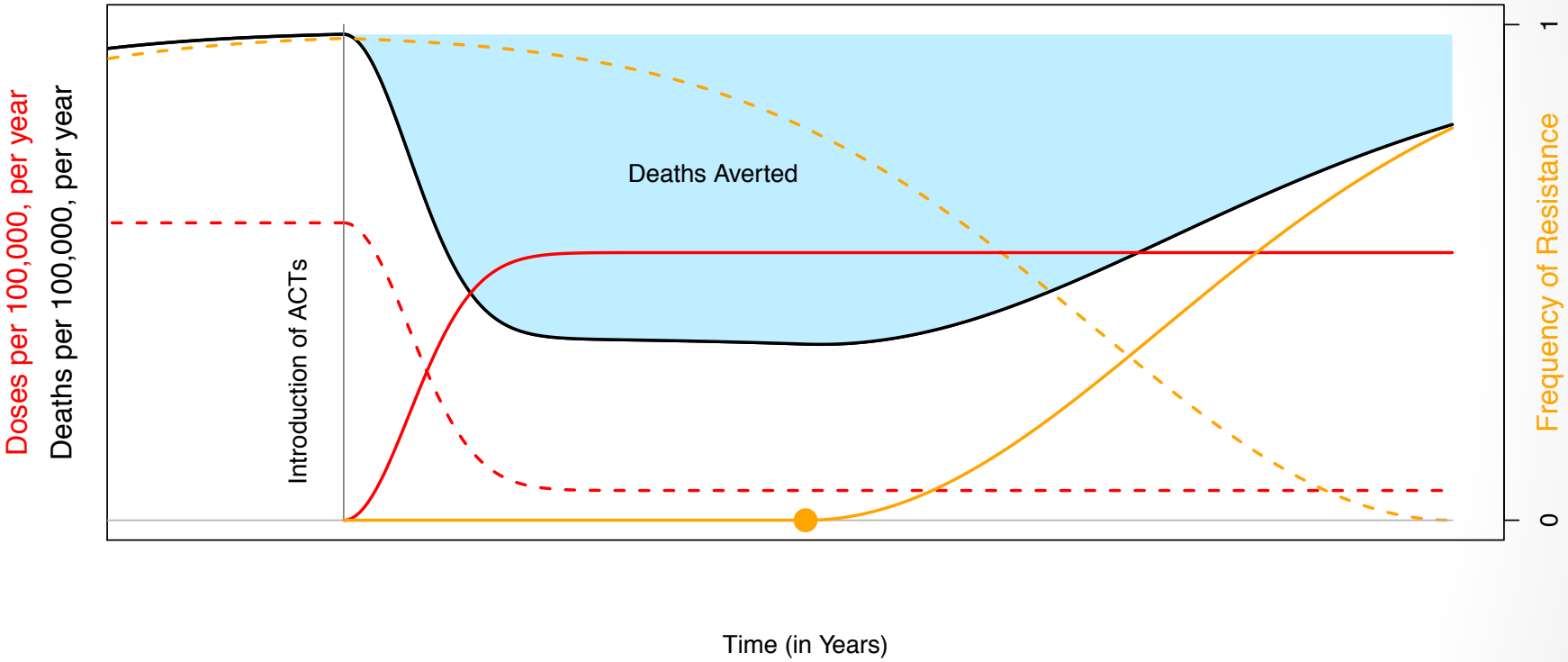

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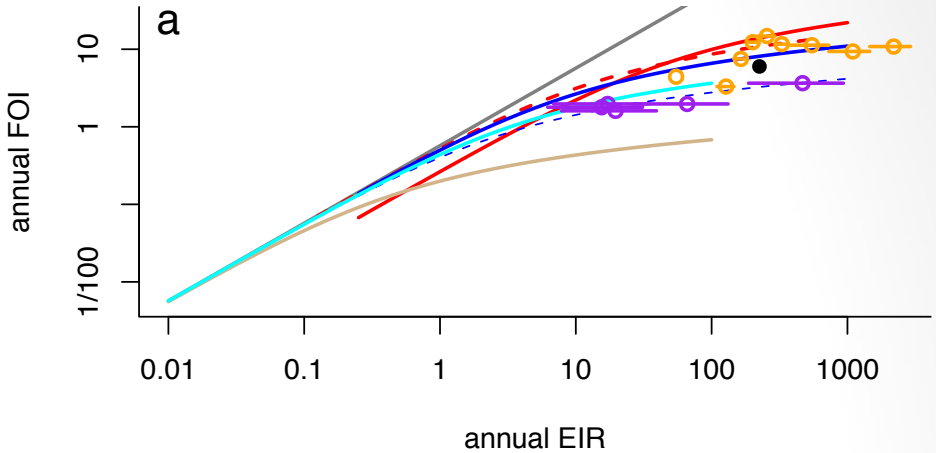
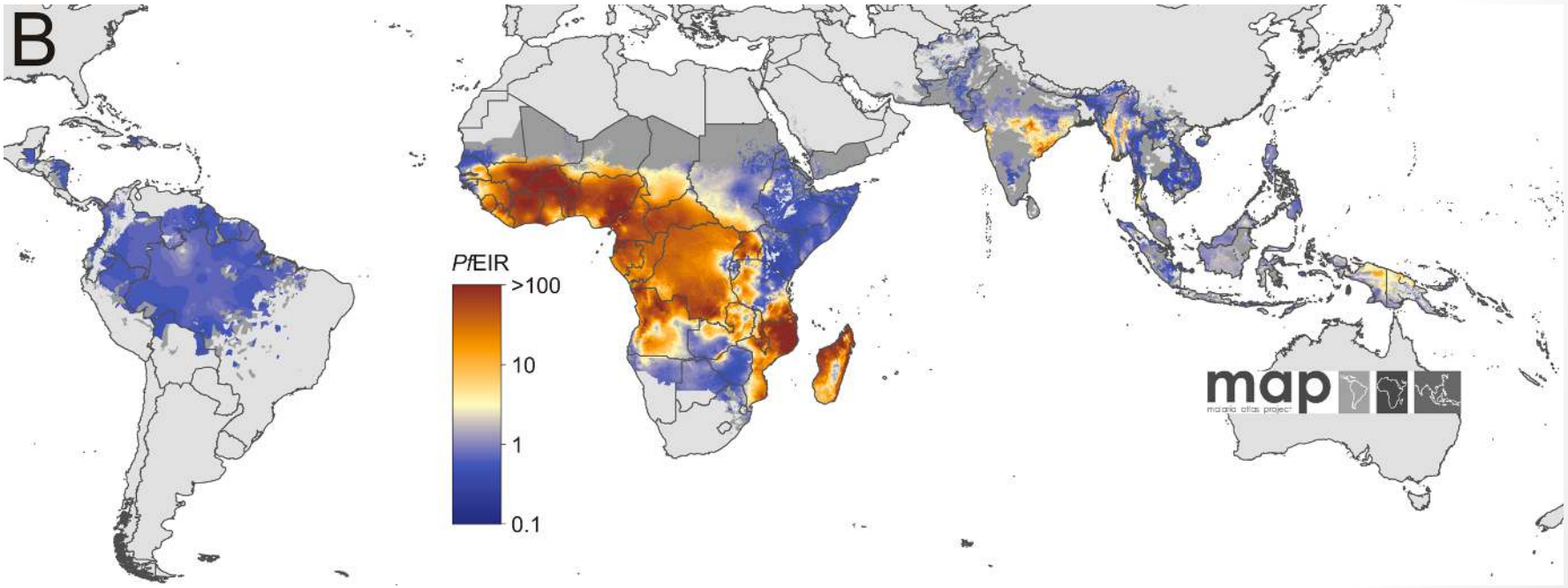
Model Structure



Malaria Transmission by Mosquitoes



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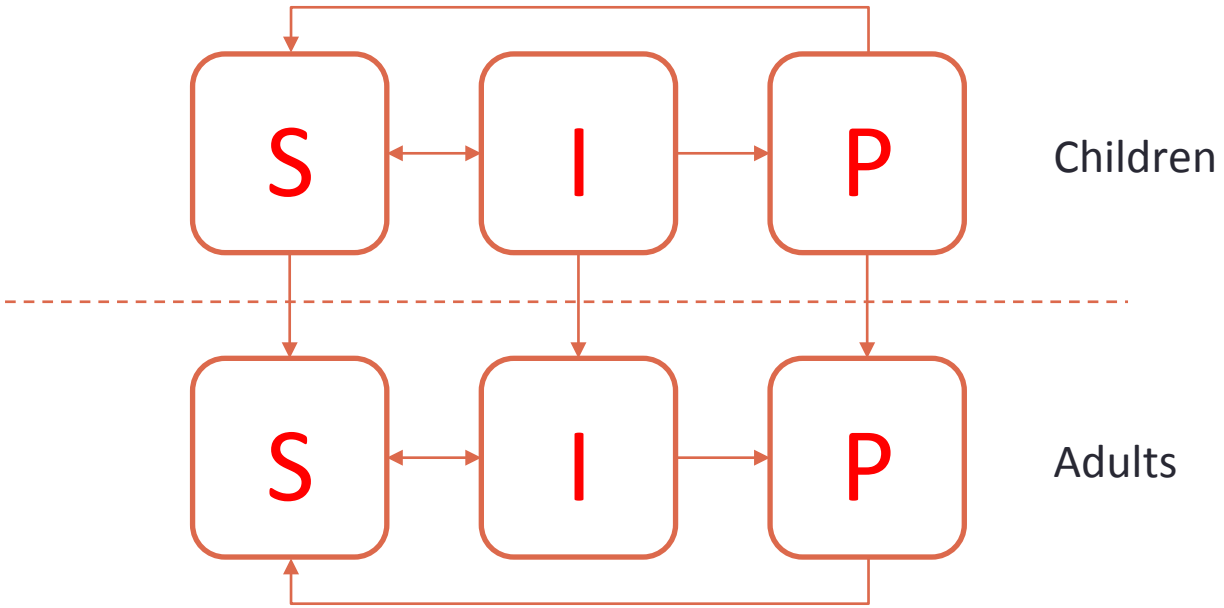
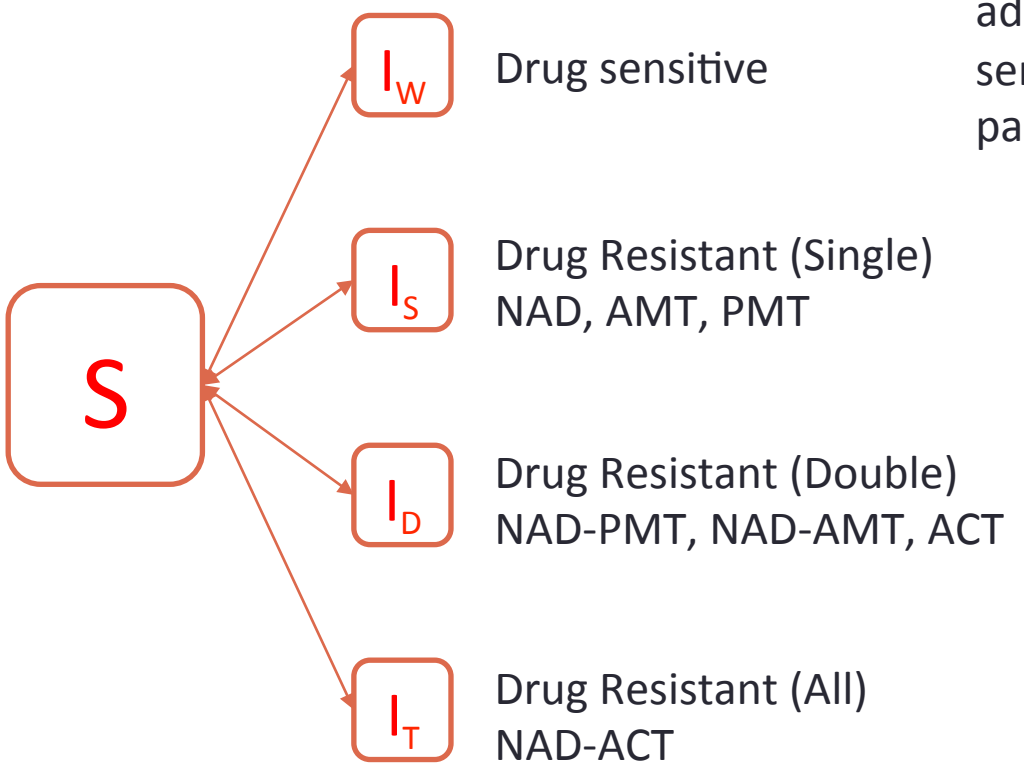
Model Structure



- Two-stage model of malaria transmission
- Children are more likely to become clinically ill when infected
- Treated individuals remain uninfected until drug clears system

Model Structure



Individuals (both children and adults) can be infected by drug sensitive or drug resistant parasites

NAD - Non-Artemisinin Drugs
AMT - Artemisinin Monotherapy
PMT - Partner Drug Monotherapy

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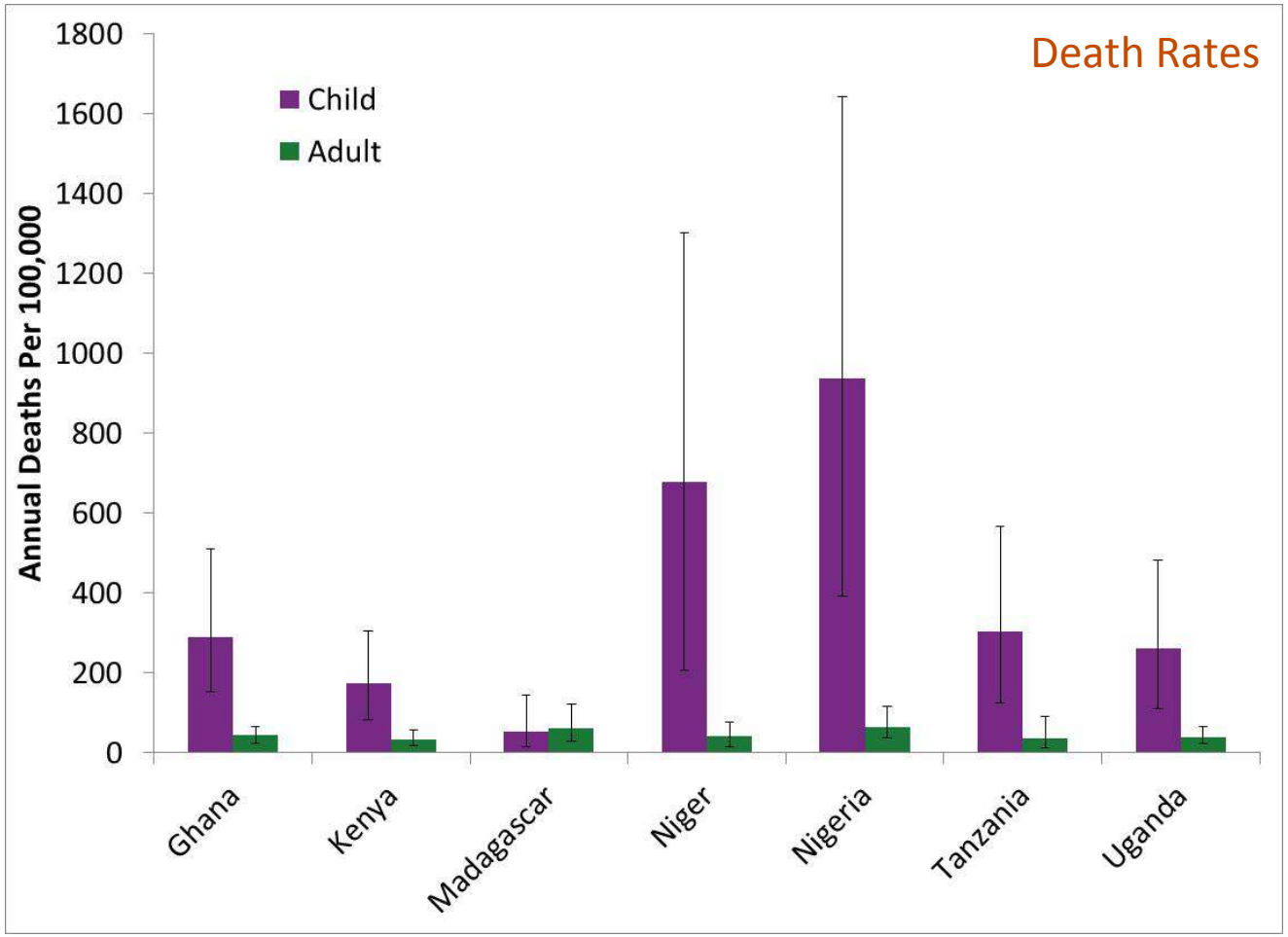
Inputs



Source: Murray, C. J. L., L. C. Rosenfeld, et al. (2012). "Global malaria mortality between 1980 and 2010: a systematic analysis." *The Lancet* **379**(9814): 413-431

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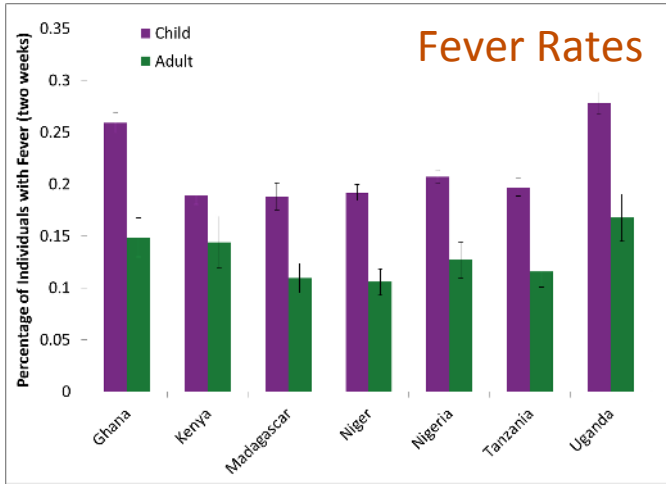
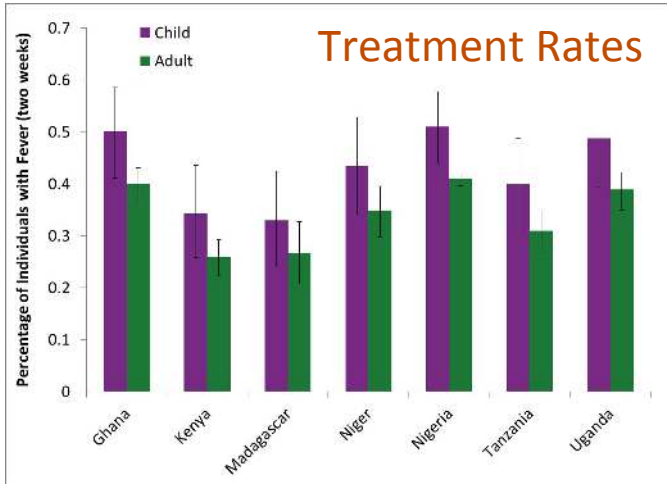
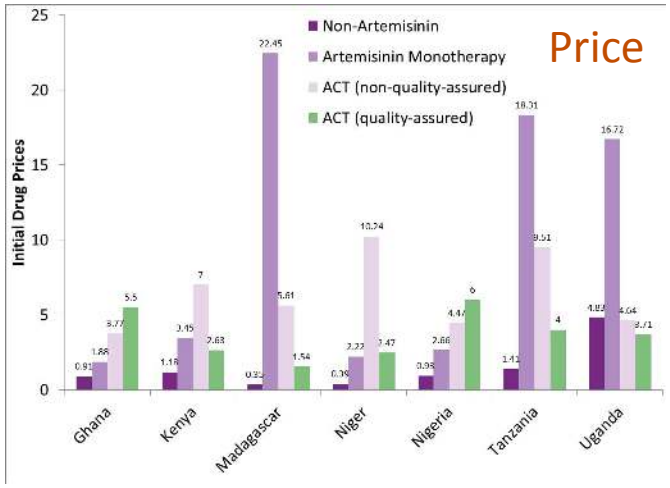
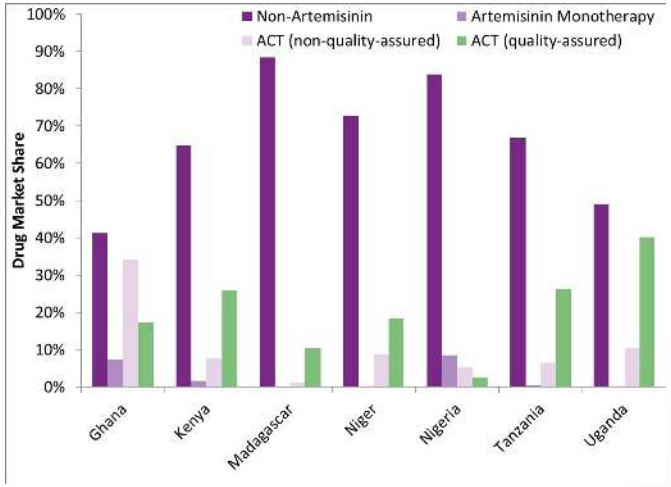
Inputs









Initial Market Share

Source: CHAI evaluation of DHS Household Surveys

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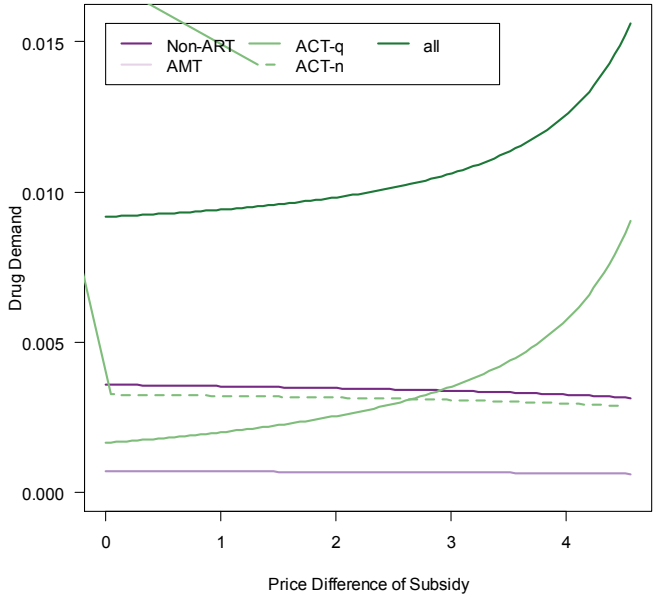
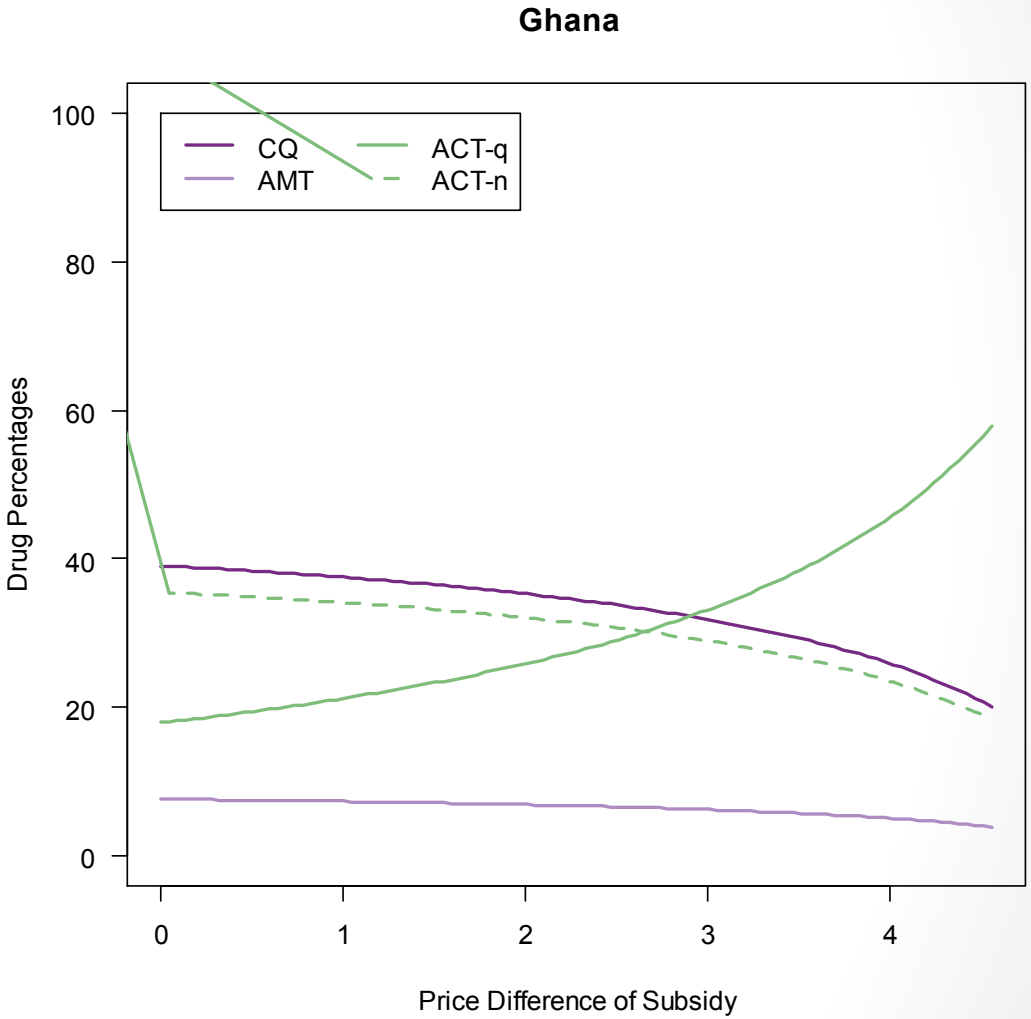
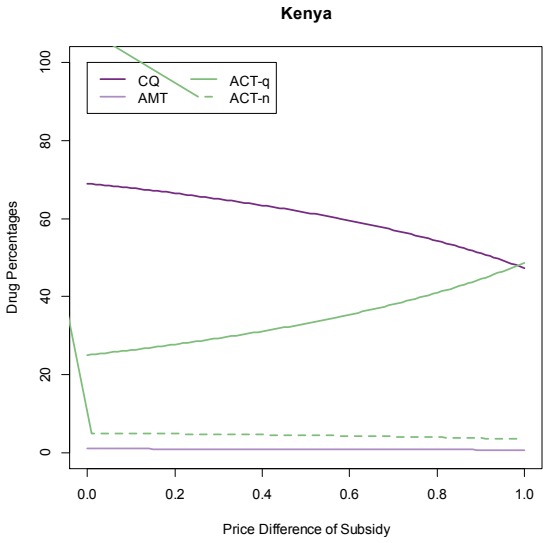
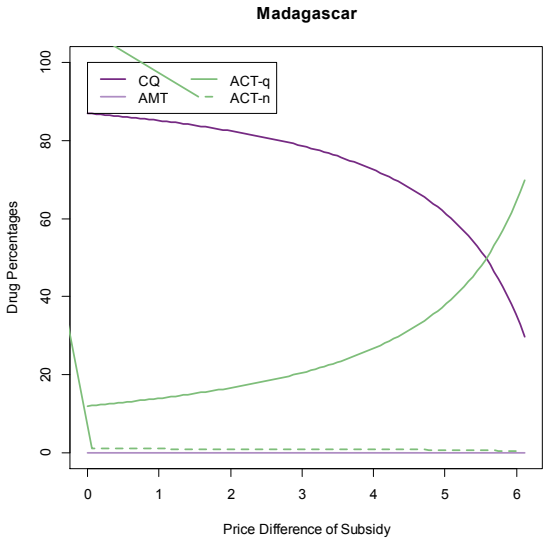
Inputs: Demand Functions

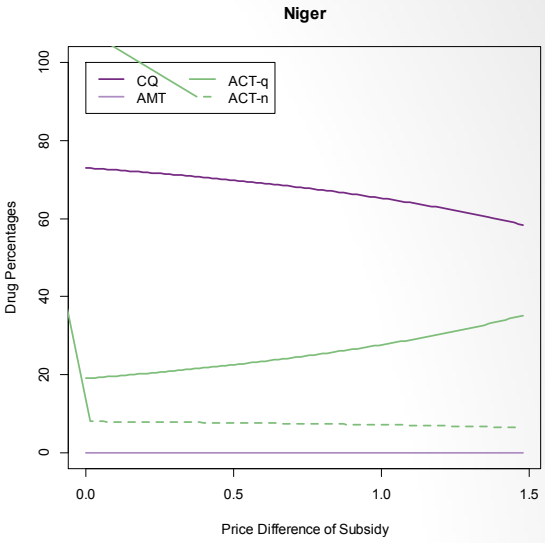


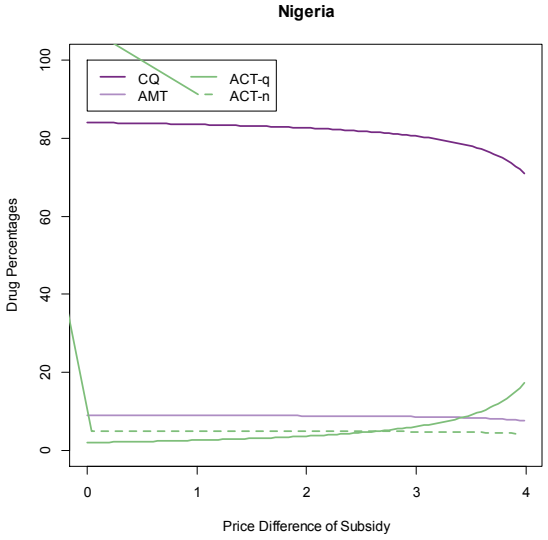


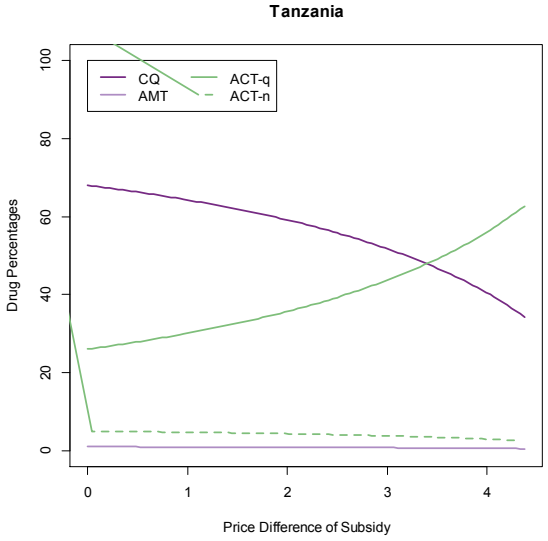
Increasing the subsidy increases the demand for ACTs as well as overall drug demand

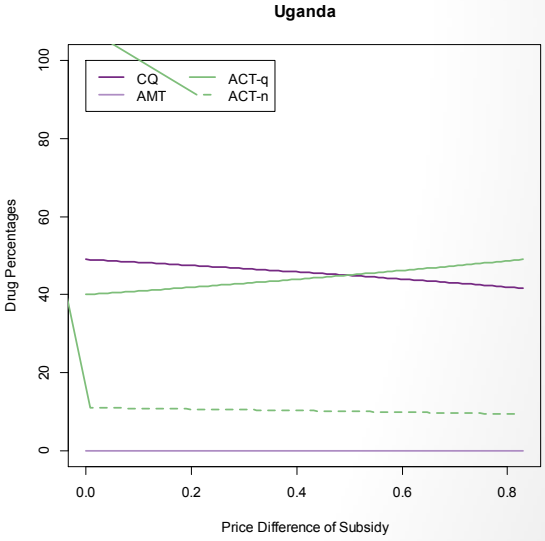












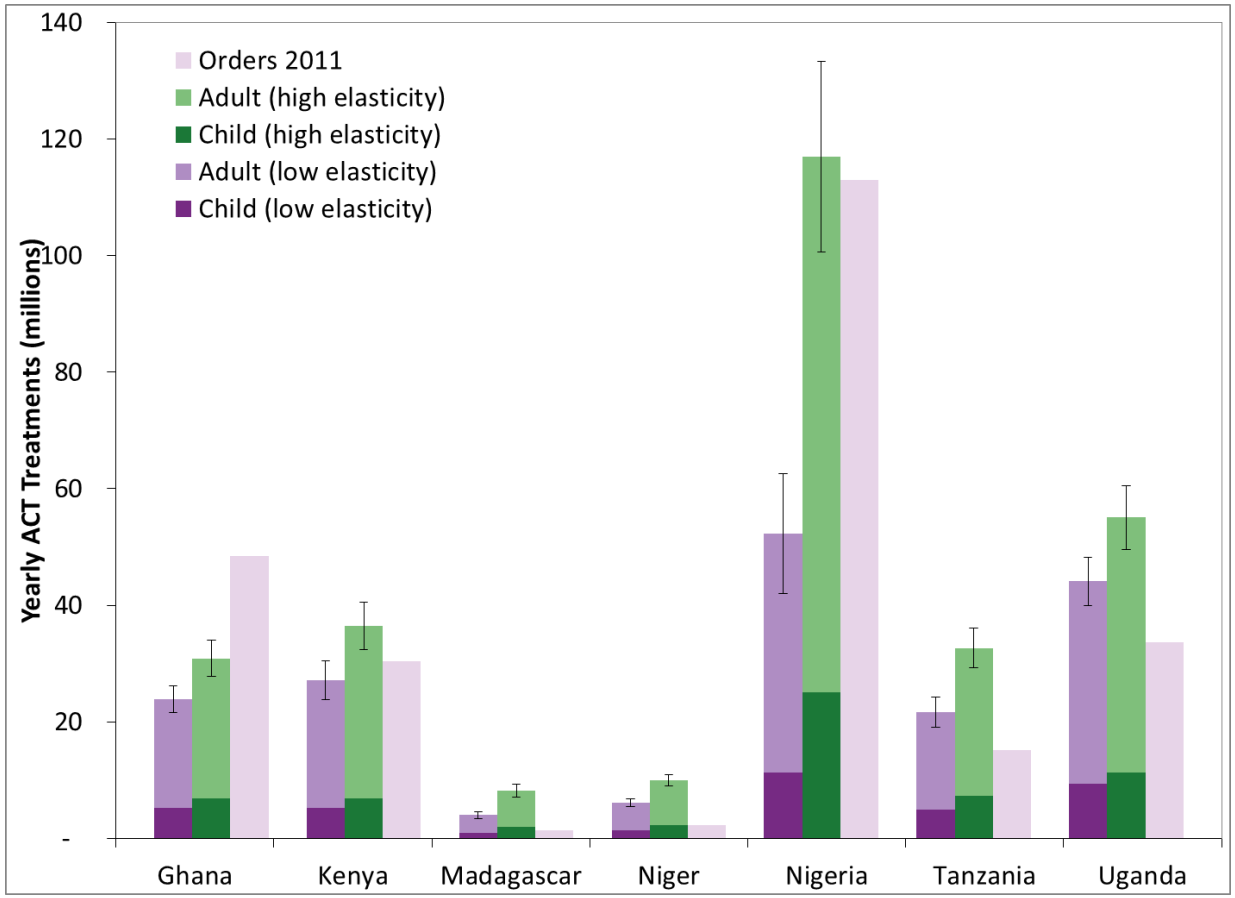
Scenarios

- Child-Targeting
  - Subsidize child packets only
  - Assume different levels of leakage to adults
    - Adults that take child packs either “stack” or underdose
- Partial Subsidy
  - Pricing Options
    - No-subsidy
    - Partial Subsidy
    - Full Subsidy
  - Tiering Options

Scenarios: Baseline

Annual ACT Treatments (high and low elasticity)

Number of estimated annual ACT treatments demanded



- Universal Subsidy
- Assumes a proportion with no malaria infections
- Individuals treat
- Child doses cost 50% of adults (~$1)

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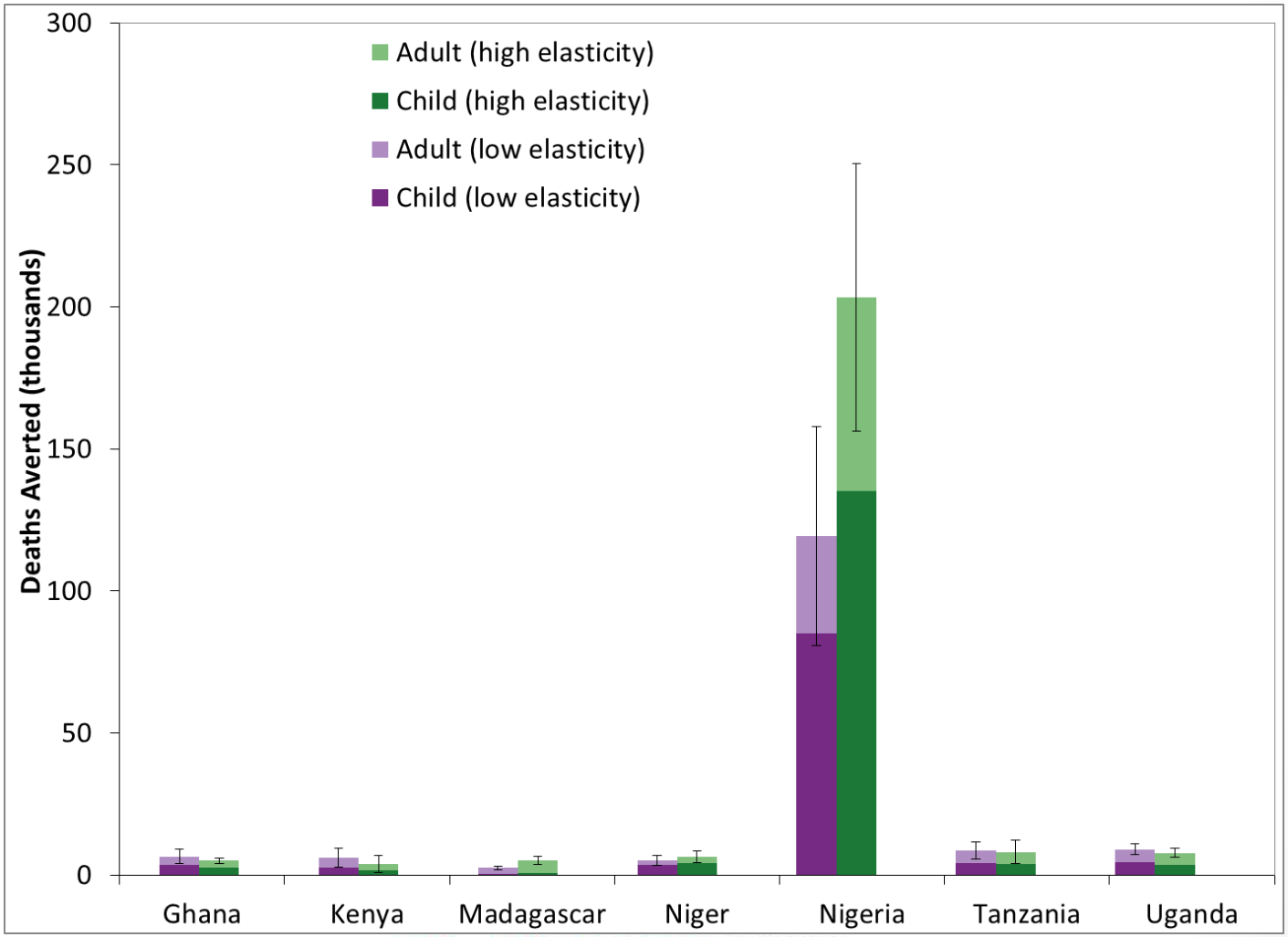
Scenarios: Baseline

Number of Deaths Averted (high and low elasticity)



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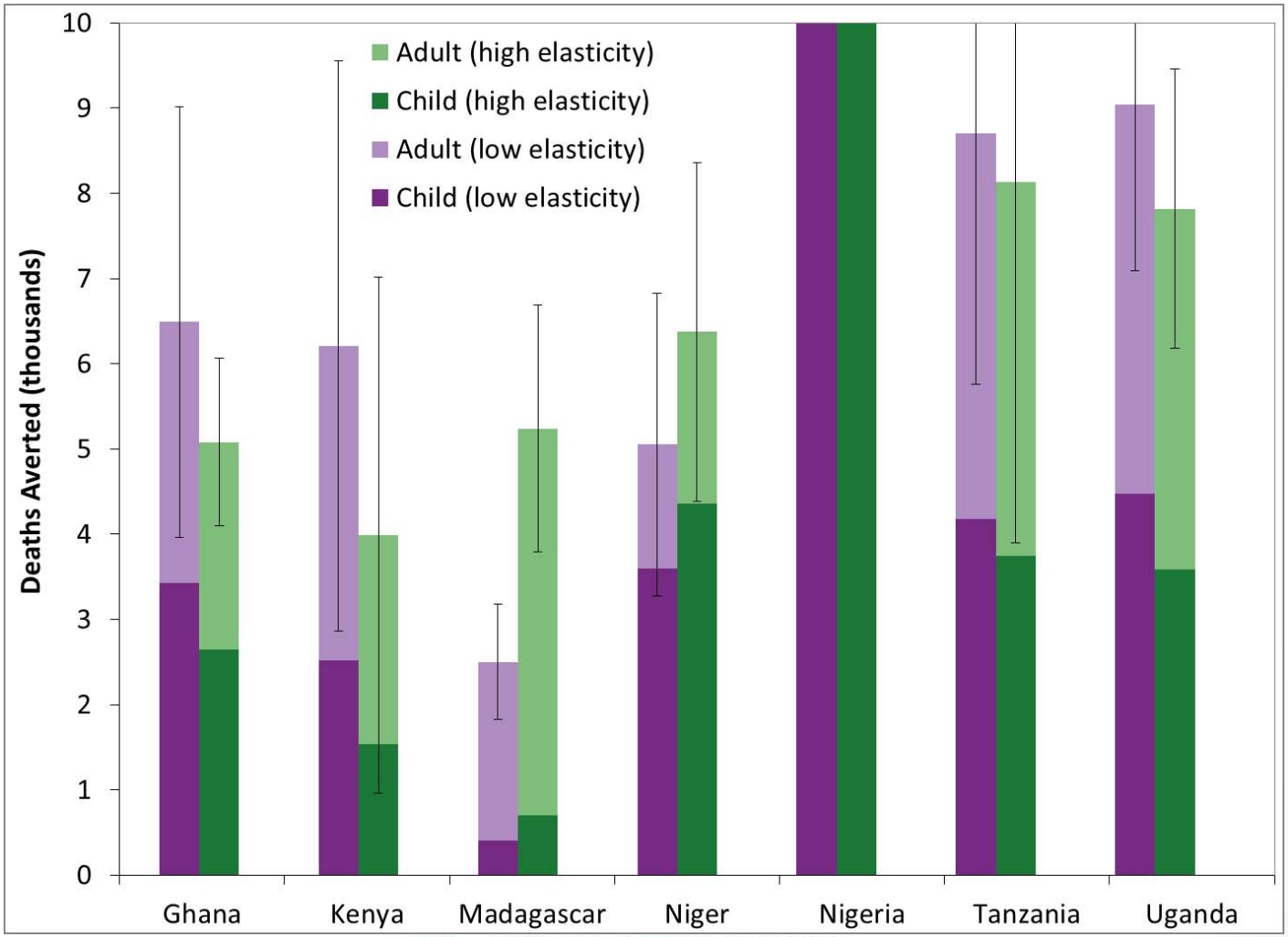
Scenarios: Baseline

Number of Deaths Averted (high and low elasticity)



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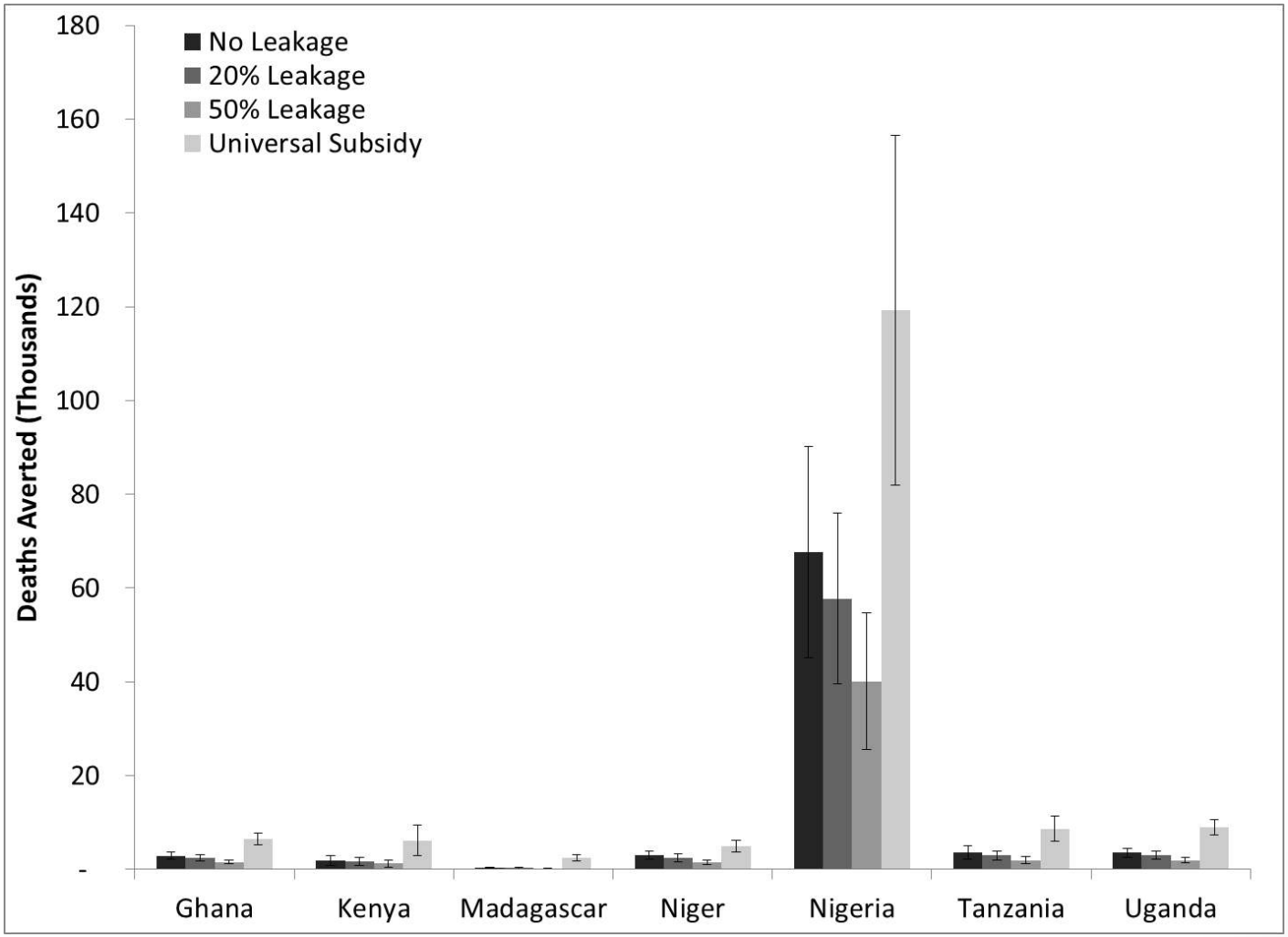
Same as prior slide – different scale

Scenarios: Child-Targeted

Number of Deaths Averted (low elasticity)



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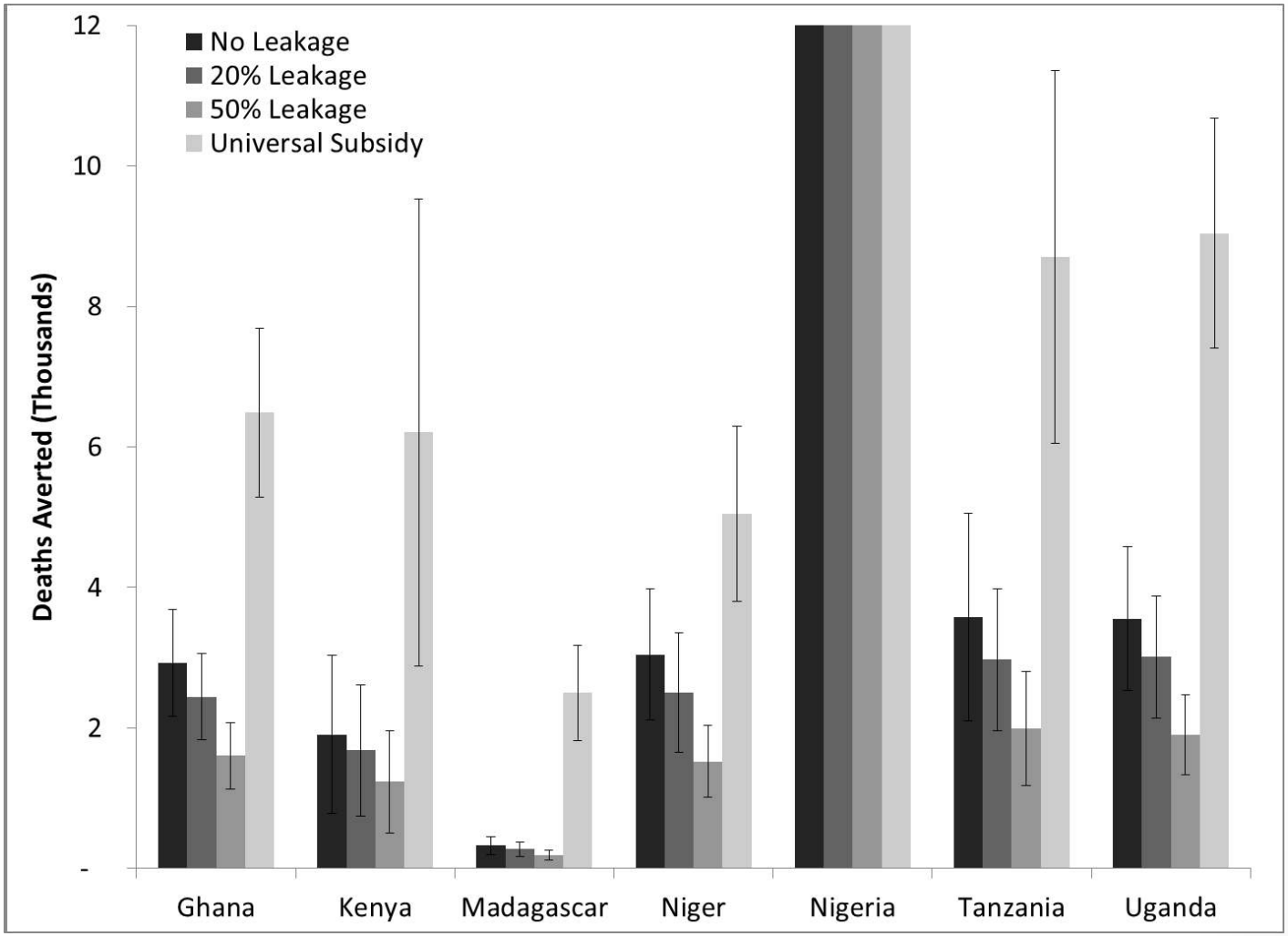
Scenarios: Child-Targeted

Number of Deaths Averted (low elasticity)



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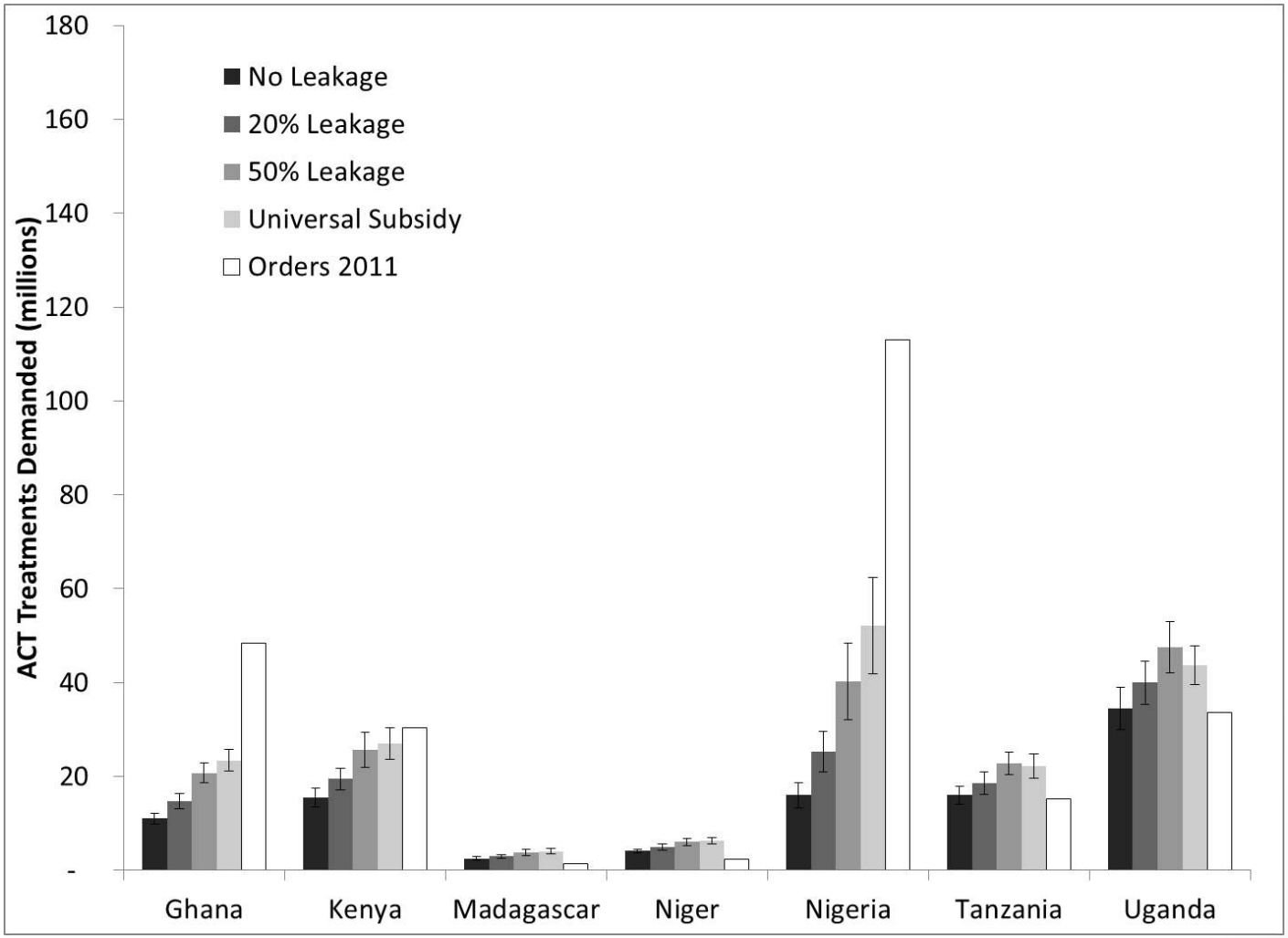
Same as prior slide – different scale

Scenarios: Child-Targeted

Number of ACT Treatments Demanded (low elasticity)



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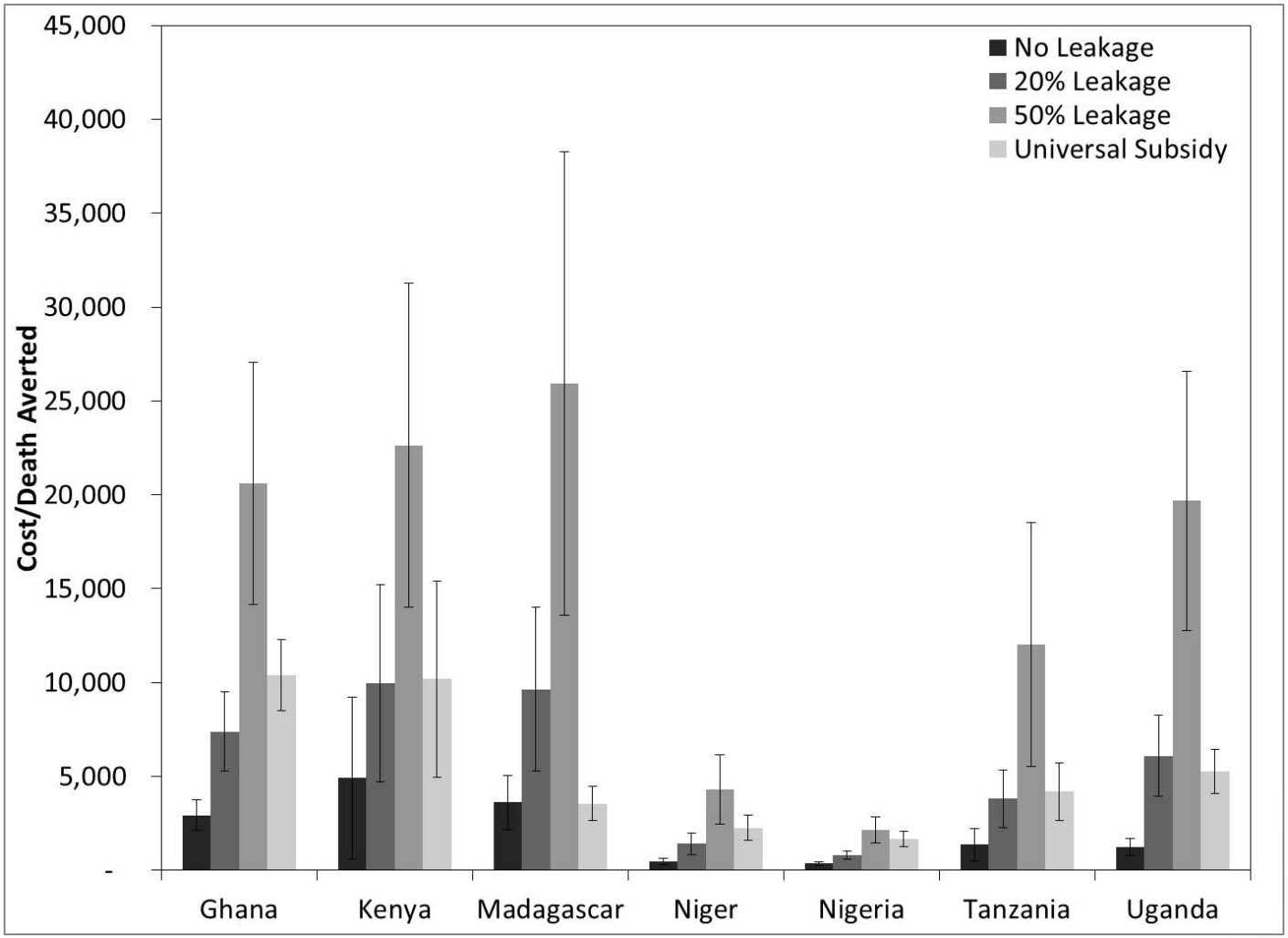
Scenarios: Child-Targeted

Cost-Effectiveness (low elasticity)



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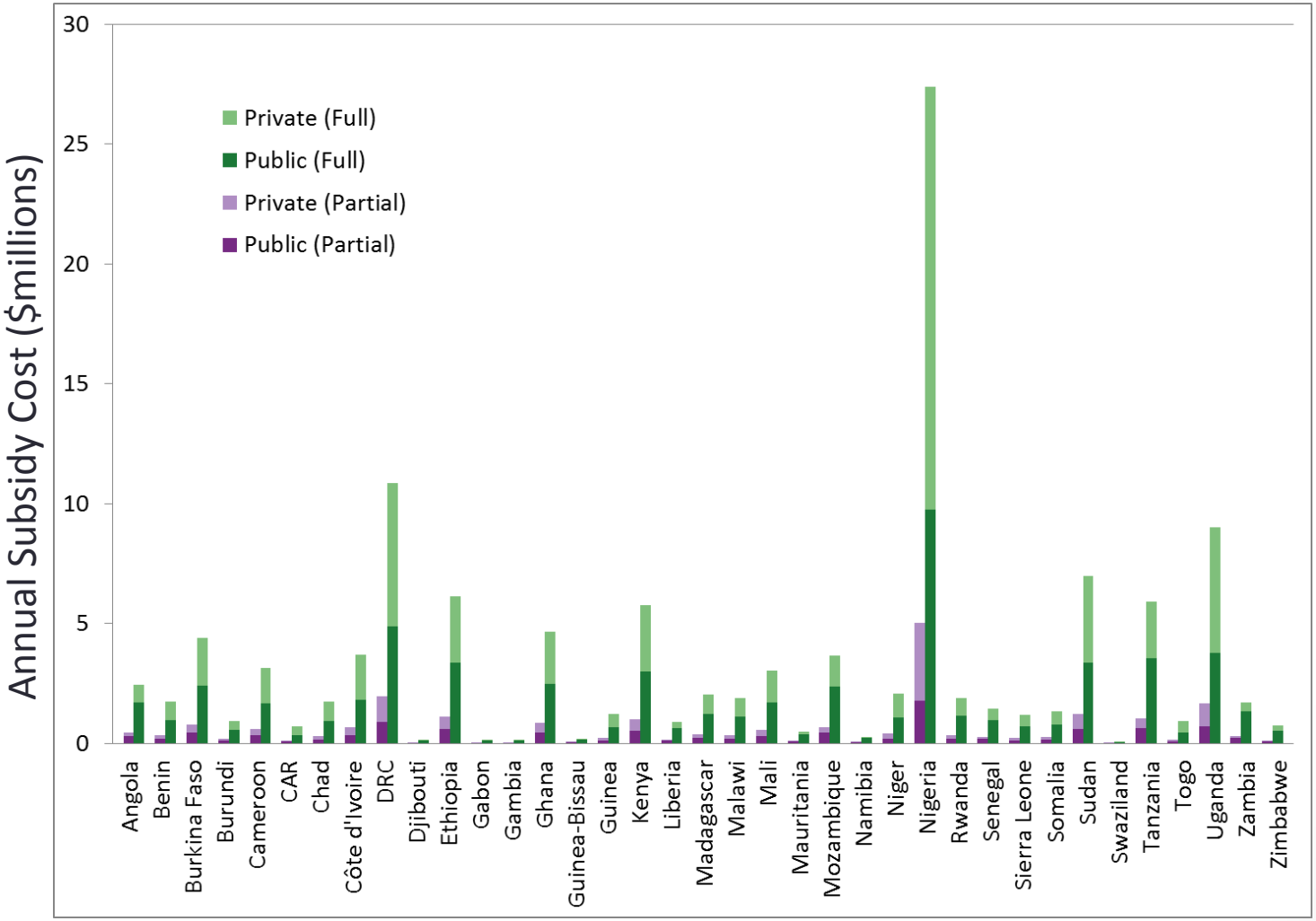
Partial Subsidy

- No Subsidy
  - Countries have access to AMFm mechanism to purchase qa-ACTs at negotiated price (but no subsidy)
  - Reduces end-user price
- Partial Subsidy
  - Subsidy covers a portion (50%) of the cost of quality-assured ACTs, but not the full price.
  - Results in larger reduction in end-user price
- Full Subsidy
  - Subsidy covers 95% of the cost of quality-assured ACTs
  - Results in significant reduction in end-user price

Partial Subsidy Cost by Country

Low Elasticity-Low Initial ACT Use



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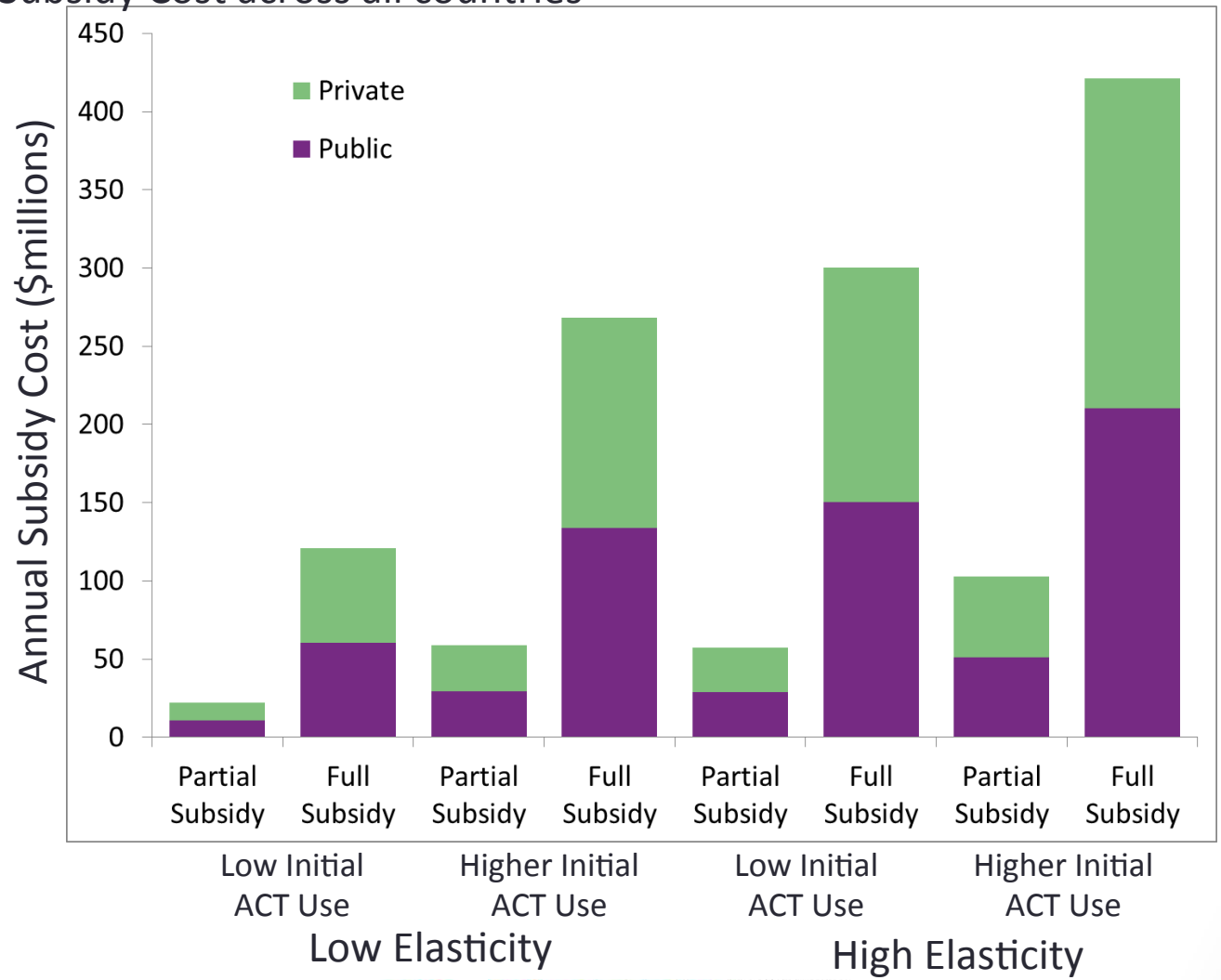
Partial Subsidy Cost

Total Subsidy Cost across all countries



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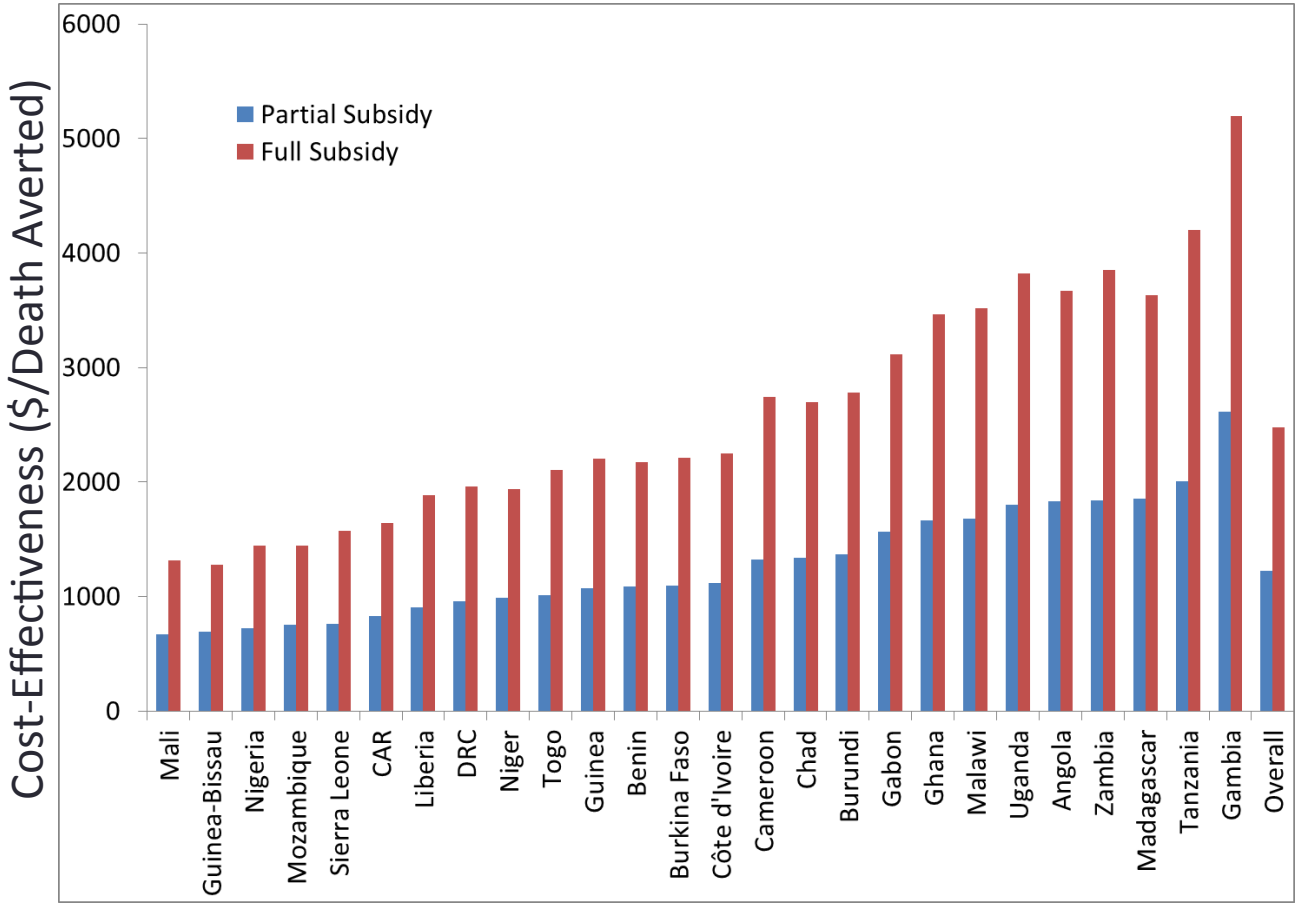
Cost-Effectiveness

Cost-Effectiveness across all countries (low elasticity)



Excludes: Senegal, Somalia, Kenya, Rwanda, Zimbabwe, Sudan, Ethiopia, Mauritania, Namibia, Swaziland, Djibouti

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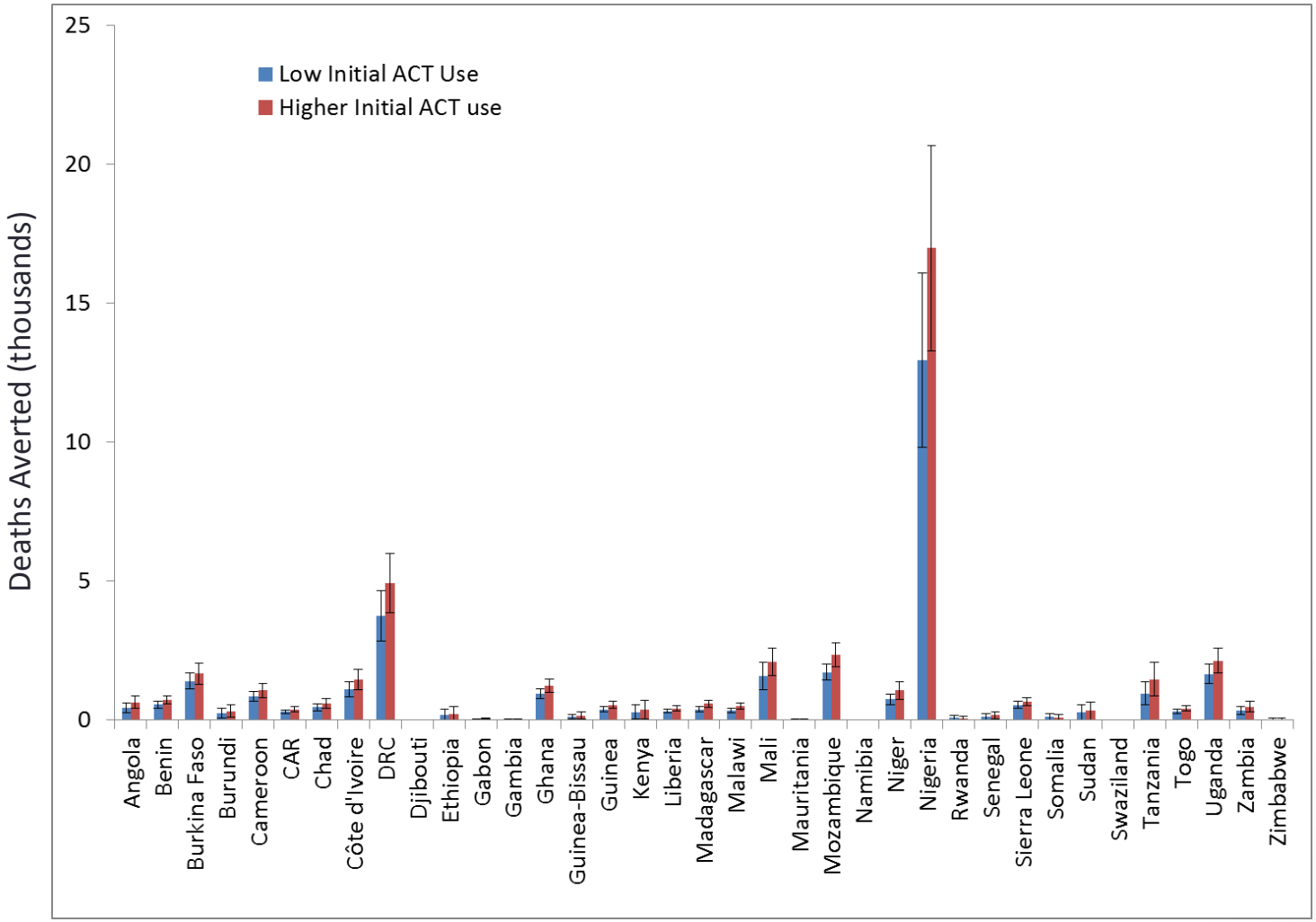
Partial Subsidy: No Subsidy

Deaths Averted over Five Years (low elasticity)



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Summary

- Saving lives usually comes at a (diminishing marginal) cost:
  - A universal subsidy saves the most lives and costs the most
  - A partial subsidy or a child targeted subsidy with low leakage to adults tends to be more cost-effective To maximize the number of lives saved
- To maximize the number of lives saved:
  - Expand access to drugs purchased at the AMFm negotiated price. Reduces risk of leakage across borders, lower negotiated prices and improve access to QA-ACTs.
  - Tailor AMFm to county needs: Spend $$ on countries that give the biggest bang for buck – whether on child targeted subsidy or partial subsidy depending on local context.