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Modelling The Impact On Education In A Cost-Effectiveness Analysis

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SCIENCE • POLICY • ECONOMICS

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How should a child’s time be valued?

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Valuing a child's time

Methods for valuing the opportunity cost of children's absence from formal education:

- Opportunity cost of school absence is based on school funding that is lost due to absence.
- Missed days of school can be valued using an estimate of the daily wage of a carer.
- Absence from formal education is linked to educational attainment and, in some cases, to potential future earnings.

(Andronis, Maredza and Petrou, 2019)

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Case study

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Malaria

In 2021, the WHO recommended a malaria vaccine for widespread use among children in Sub-Saharan Africa and other regions.

- Of global deaths among children and adults, malaria accounted for almost 8%.
- Ghana is one of three countries in the Malaria Vaccine Implementation programme.
- Ghana is among the 15th highest burden malaria countries in the world.

(WHO, 2021)

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Malaria vaccine literature

Constenla (2015) considers the impact of a change in education on the potential future income of a child in an investment life course framework:

- Assume a fixed number of years of education are gained as a result of a reduction in malaria
- This is multiplied by a returns to education variable
- The result is reported in terms of the increase in annual earnings
- Both the number of years of education and the returns to education can be adjusted however they do not depend on the outcomes within the model

This research aims to develop this method and incorporate years of education as a function of other outcomes in a CEA

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Model

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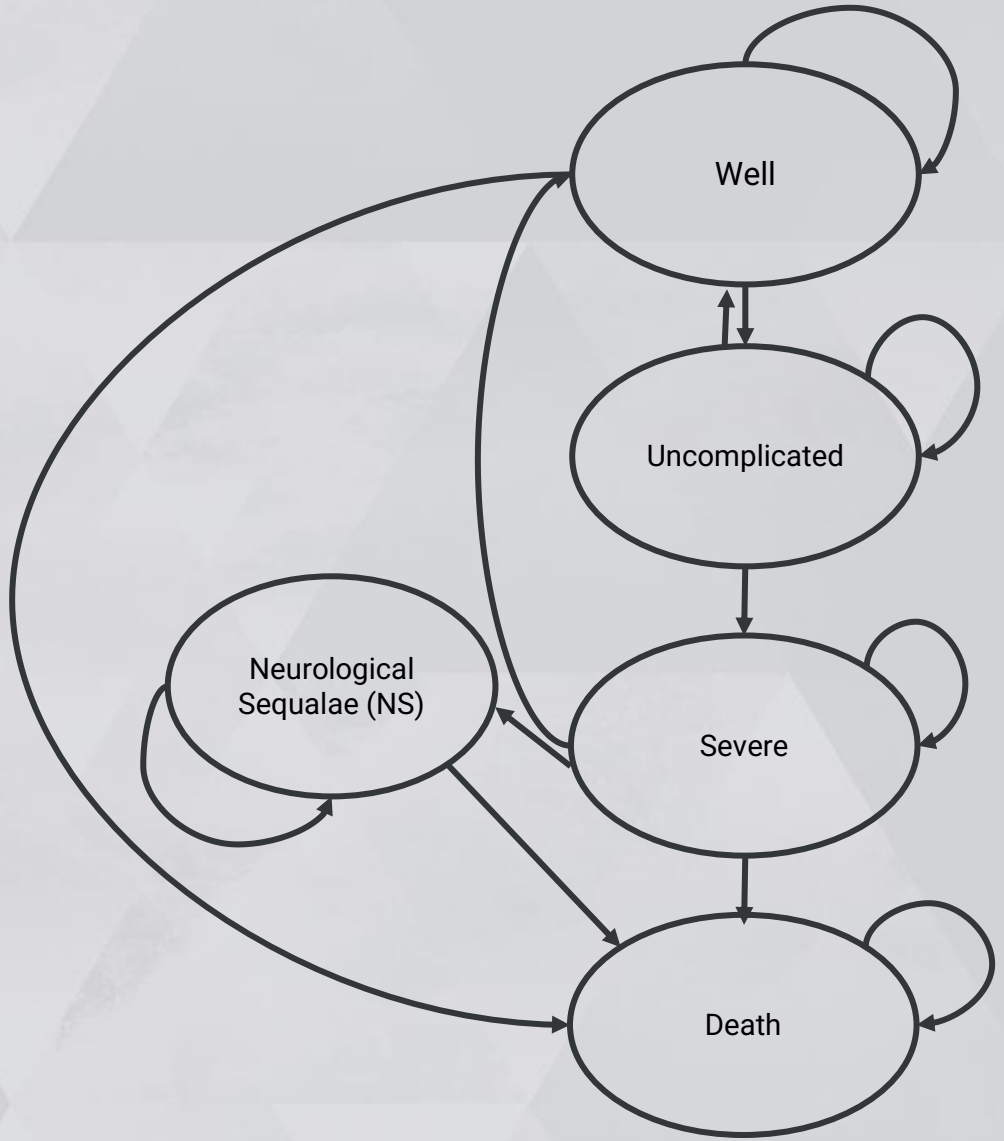
Markov Model

- Cohort of 1 million babies, over a lifetime
- 5 day cycle length
- Outcomes were measured in DALYs and discounted at 3.5%
- Costs estimated were healthcare costs, return to education, and foregone productivity in adults. Costs were discounted at 3.5%
- ICERs evaluated against a WTP threshold of 1xGDP per capita



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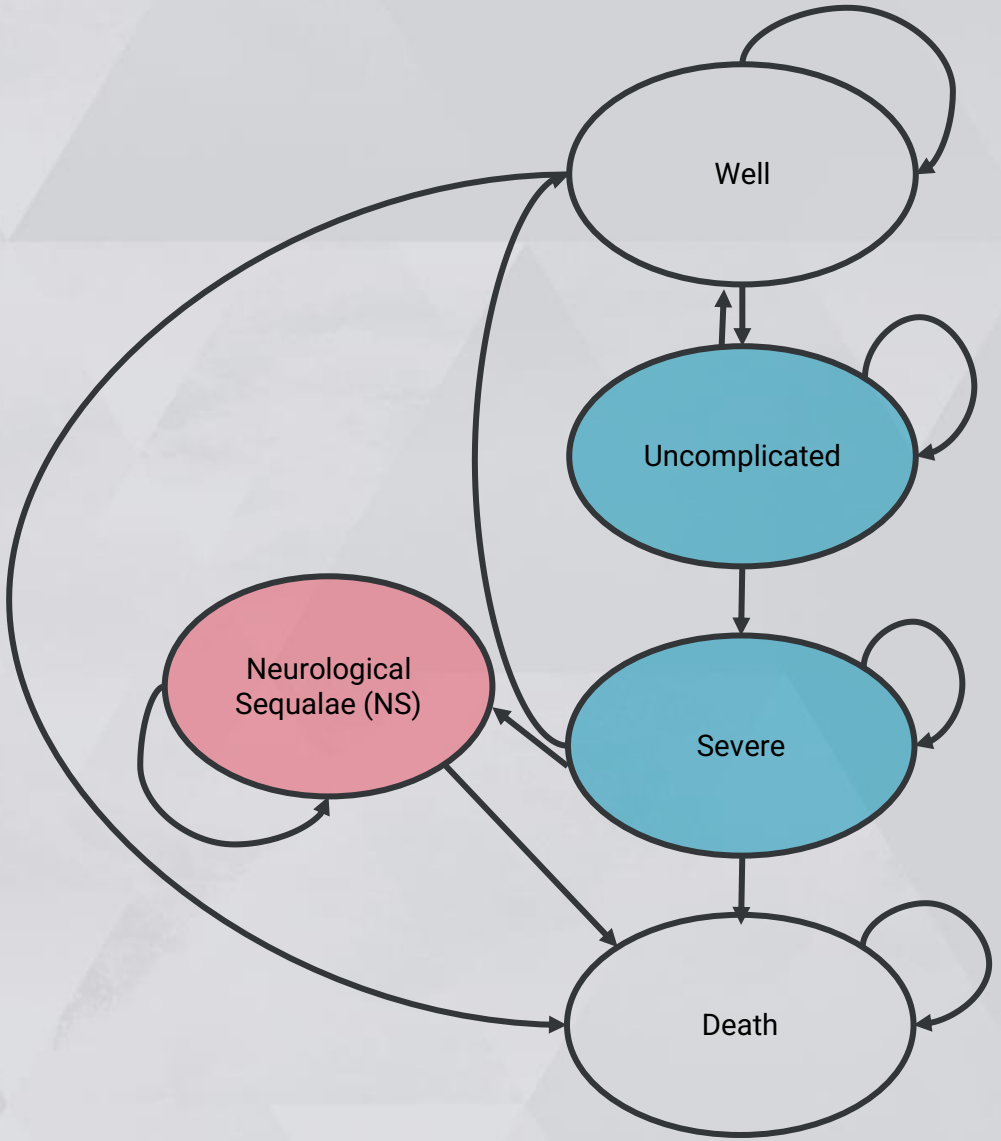
Days of education lost

Absenteeism

Individuals in the uncomplicated and severe health state are assumed absent from school for the duration of infection.

Presenteeism

Individuals in the NS health state are assumed to go to school; however, their overall educational attainment is reduced by an estimated amount.



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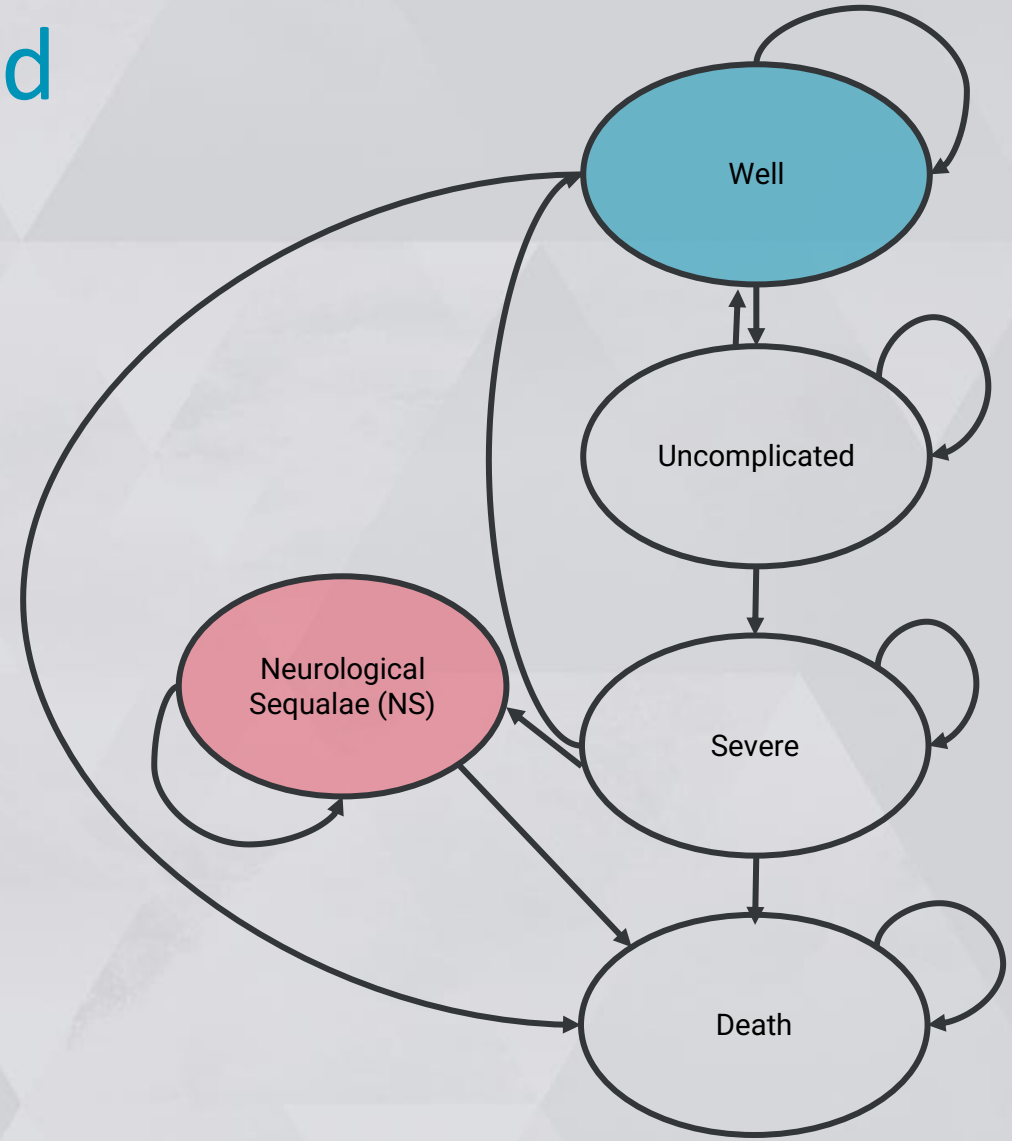
Days of education attained

The estimated days of education achieved are taken from the well health state.



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Results

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Days of education lost

Days of education lost in each health state:

- Severe malaria: 17 thousand days (SoC arm) and 14 thousand days (vaccine arm)
- Uncomplicated malaria: 3.5 million days (SoC arm) and 3.6 million days (vaccine arm)

The net effect of the vaccine from all education channels, is a decrease in lifetime income of $110,000 (across the cohort).

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Days of education gained

Compared to SOC, the vaccine resulted in:

- Less DALYs lost
- Higher healthcare costs
- Lower education costs
- Lower productivity costs

ICERs

- Healthcare perspective: $6.08 per DALY averted
- Healthcare and education: Dominant strategy

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Discussion

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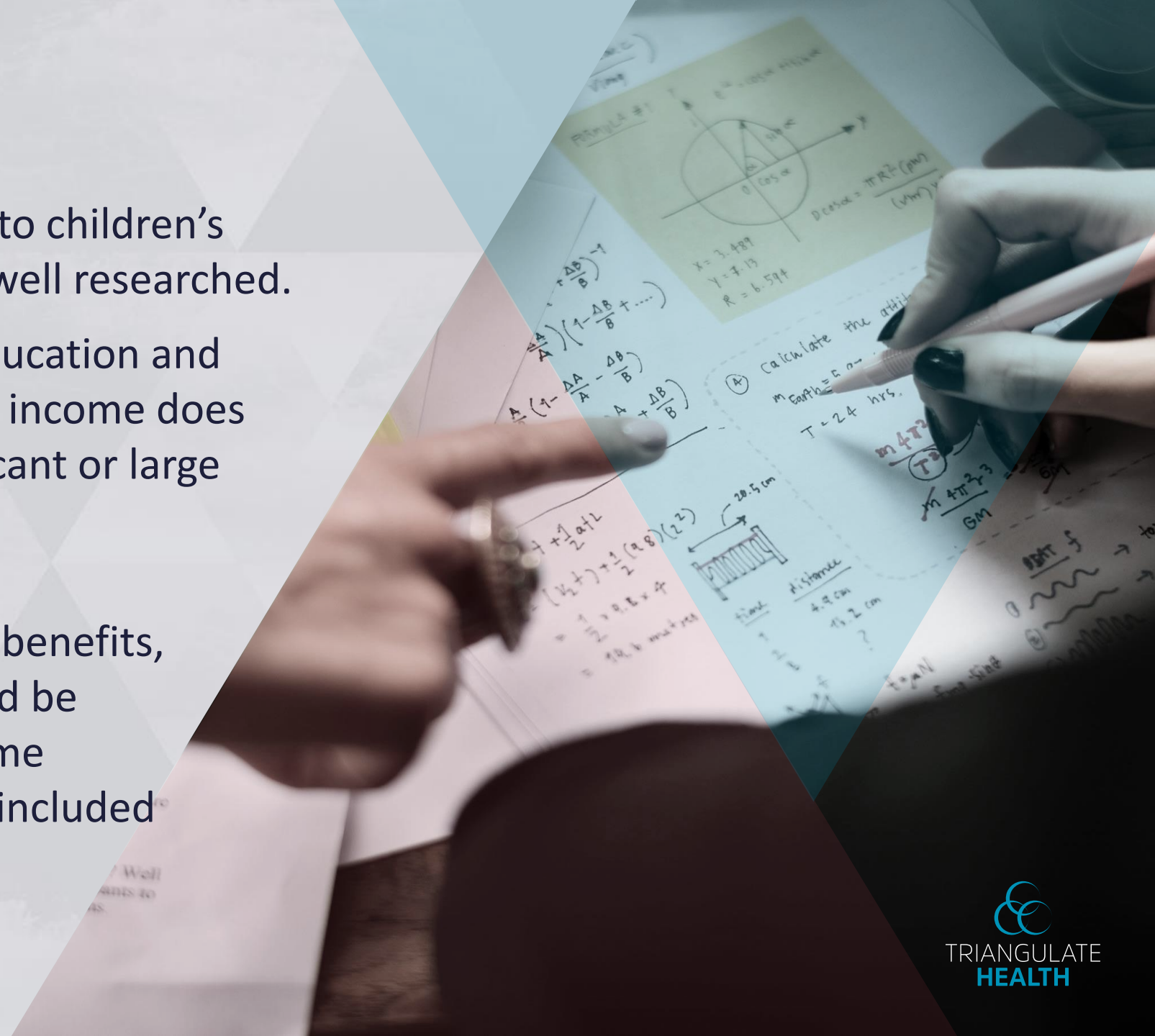
Discussion

- Attaching a monetary value to children's time is challenging and not well researched.
- Measuring the impact on education and subsequent potential future income does not always result in a significant or large outcome.

- As with other wider societal benefits, several considerations should be taken into account before time related costs in children are included in economic evaluations.



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Thank you

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