Version 1.2

Cost and cost-effectiveness evaluations:

2020 to 2050

Data and analysis tool (GUI)

Gambiense human African trypanosomiasis (gHAT or sleeping sickness) – **model data and results**

User Guide

Contents

ABOUT THIS GUIDE

DESCRIPTION	gHAT intervention strategy costs and cost-effectiveness evaluations
SOURCE	Cost data from national programmes via the Warwick Cost Collection Tool
DATE ISSUED	October 2020
LAST UPDATED	April 2022
SPATIAL COVERAGE	Democratic Republic of Congo, 5 health zones
YEARS(S)	Fitting to 2000 to 2016 and cost evaluations from 2020 to 2050
STATUS	Completed
CREATOR	Antillon et al, Swiss TPH
USAGE	Open access
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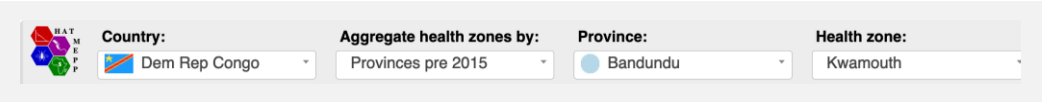
Quick guide to getting started

1) Go to: https://hatmepp.warwick.ac.uk/5HZCEA/v2/
   (We recommend you use Google Chrome, Microsoft Edge or Firefox as your browser to get the best experience)

2) Choose your **sub-region(s)** from the drop-down boxes. This version of the GUI is only for the five health zones: **Yasa Bonga, Mosango, Kwamouth, Boma Bungu and Budjala** in DRC, therefore, the country cannot be changed.



Note that health zones will be aggregated by pre-2015 provinces as the default.

3) The summary table immediately below will auto generate based on your geographical selection showing you the following information:

Dem Rep Congo: Bandundu Province: Kwamouth Health zone	
Information	
DRC population (2017)	81,339,988
Kwamouth population (est 2015)	127,205
Screening level (mean/max)	48.15%/69.21%
Existing vector control	None

4) A number of results tabs can be found under the maps and table. **Charts** under each results tab will auto-generate based on your health zone selection.

5) You can **download charts**, by clicking on 'Save Plot' (bottom left of each screen).

Definitions

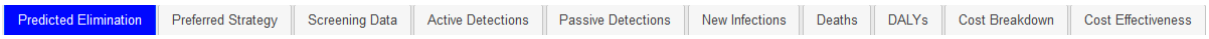
Terminology	*Definition*
Assumed (max)	Assumed number of people screened in the projections in the selected province or health zone under a maximum level of active screening (see *Max AS below*)
Assumed (mean)	Assumed number of people screened in the projections in the selected province or health zone under a mean level of active screening (see *Mean AS* below)
Fitted	Model outputs have been fitted to actual case data from the WHO HAT Atlas
Mean AS	The number of people screened is equal to the mean number screened during 2014–2018
Max AS	The coverage is the maximum number of people screened during 2000–2018
No inference performed	Insufficient data to provide predictions
Observed	Aggregate case data from the WHO HAT Atlas
PS (Passive Screening)	Passive screening (screening in fixed health facilities) is in place under all strategies
VC (Vector Control)	Vector control (VC) is simulated assuming a % tsetse density reduction.
Stage 1 treatment	Treatment of infected patient in the first stage of the disease, which is when the trypanosomes multiply in subcutaneous tissues, blood and lymph.
Stage 2 treatment	Treatment of infected patient in the second stage of the disease, which is when the parasites cross the blood-brain barrier to infect the central nervous system.
Stage 2, 2nd-line treatment	Further, more intensive treatment for patients who have not responded to the stage 2 treatment

You can also refer to the main Glossary for a description of commonly used terms and acronyms associated with the HAT projects.

Results tabs

Predicted elimination | Preferred strategy | Screening data | Detections and new infections | Deaths and DALYs | Cost breakdown | Cost effectiveness

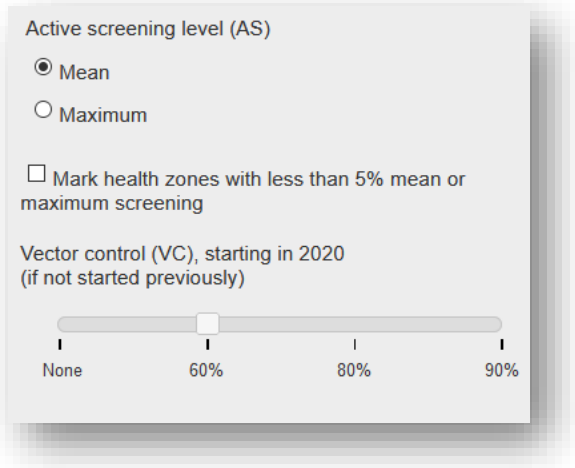
Predicted elimination

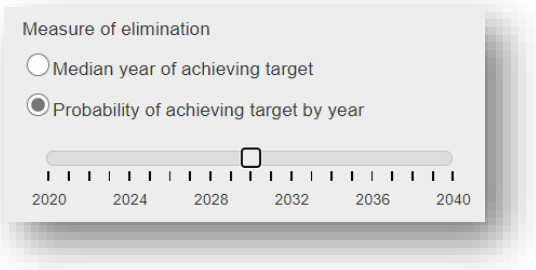


The **Predicted Elimination** results tab will show you the model predictions for the year of elimination of transmission of gHAT for each of the five health zones, resulting from different levels of active screening (mean and maximum) and vector control effectiveness (i.e. 0 to 90% reduction in tsetse populations after one year of biannual target deployments).

Tips:

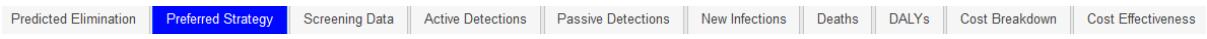
- Amend the Active screening level and vector control selections to see the impact on the year of elimination of transmission (EOT), shown on the map via colour coding. Dark orange to dark red health zones indicate a predicted elimination year post 2030, therefore requiring more intensive interventions (maximum screening and/or vector control) to reach EOT by 2030.





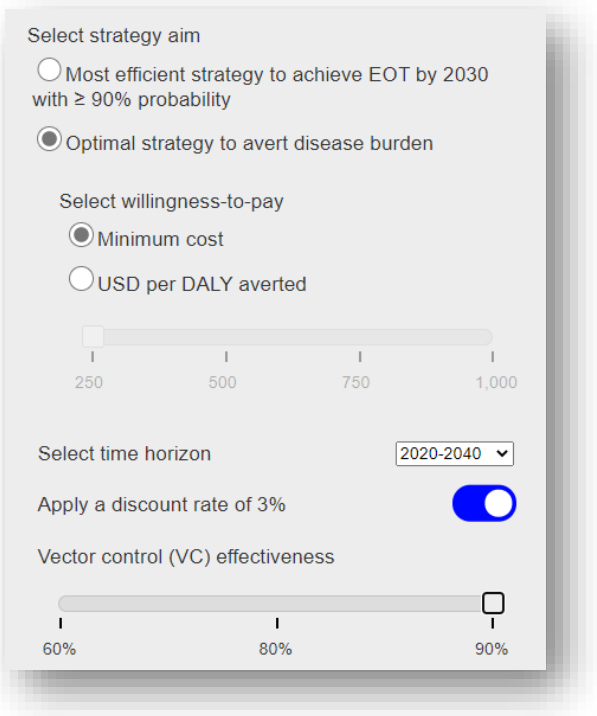
- Use the slider bar to amend the target year of elimination to see the predicted probability (% chance) of achieving elimination of transmission by this date.

Preferred strategy



The **Preferred Strategy** results tab will confirm the intervention strategy recommended through the model predictions for achieving elimination of transmission (EOT) (90% probability) by 2030 for the five health zones. This includes the (expected) lowest cost way to reach elimination and when and whether optimal interventions at different willingness to pay (WTP) thresholds will lead to EOT by 2030.

The map is colour coded by preferred strategy type (mean AS, max AS or mean AS + VC – see definitions) for the five health zones. The default map indicates which health zones are in need of intensified interventions to achieve EOT by 2030, with vector control in addition to active screening. The preferred strategy target probability default is 90% (predicted 90% chance of achieving EOT by 2030).

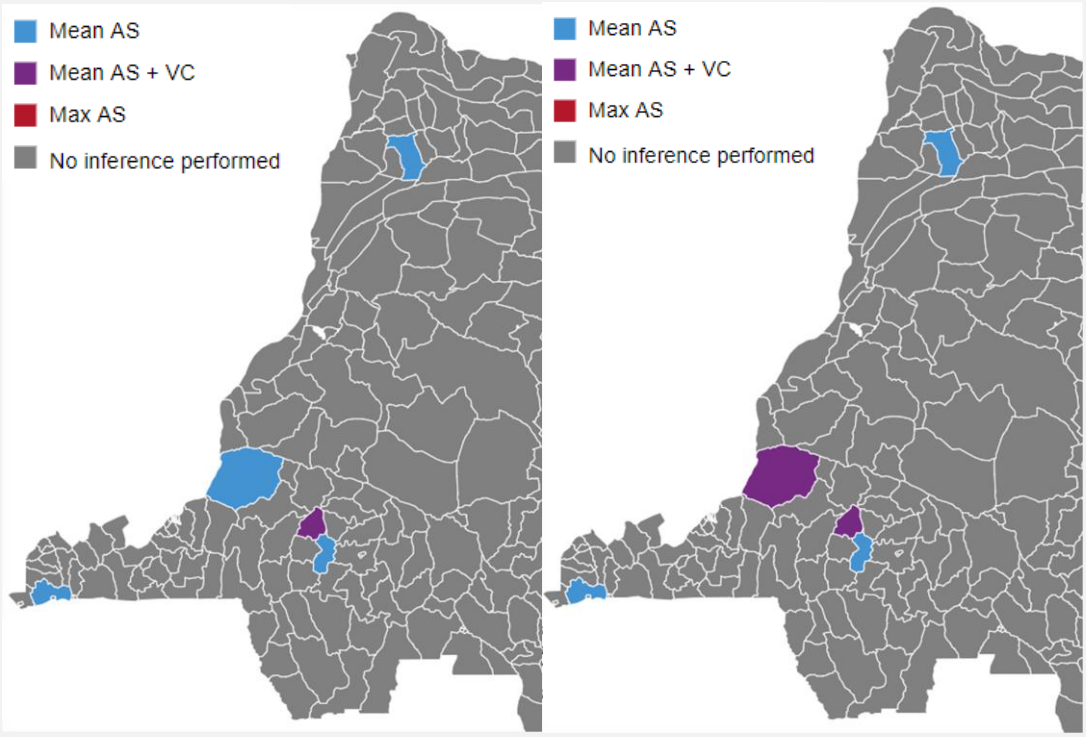


Tips:

- Amend the first selection under (select strategy aim) to 'optimal strategy to avert disease burden' to amend the willingness-to-pay settings.
- Select 'minimum cost' to see the recommended, lowest cost way to reach elimination (see illustration 1).
- Alternatively, you can select your willingness-to-pay between $250 and $1000 per DALY averted (see illustration 2).
- You can also amend the time horizon and desired % reduction of tsetse (VC effectiveness).

Illustration 1: Recommended, **lowest cost** intervention strategies to achieve elimination between 2020 and 2040

Illustration 2: Recommended intervention strategies where **willingness-to-pay** is **$250** per DALY averted

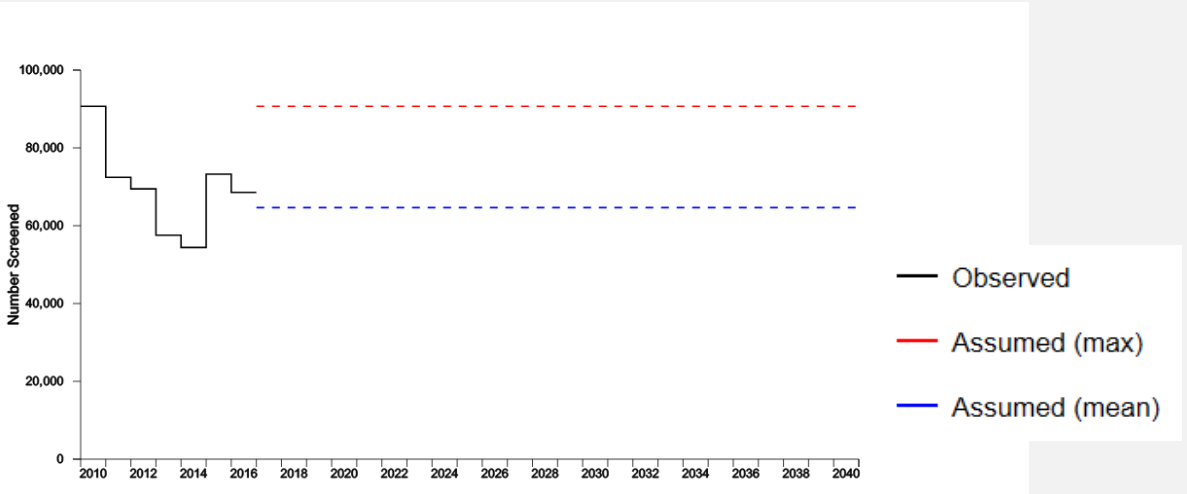


Screening data

Predicted Elimination | Preferred Strategy | Screening Data | Active Detections | Passive Detections | New Infections | Deaths | DALYs | Cost Breakdown | Cost Effectiveness

The **Screening** results tab provides a chart showing you the (i) the number of people actively screened by year from 2000-2018 (i.e. the "observed" level in the data) and (ii) the assumed number of people that are screened in the selected province or health zone under a mean

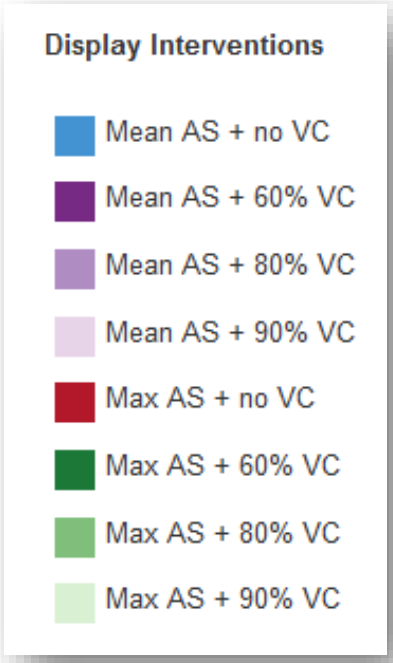
Illustration 3: Assumed number of people to be screened under a mean and maximum level of active screening



level of active screening compared to a maximum level of active screening (see definitions) from 2020 onwards.
Please note that the "Display year range" is defaulted to show the results from 2010 to 2040. You can change this year range by changing the default selection in the drop-down boxes in the menu on the left-hand side of the screen.

Detections & new infections

These three results tabs provide charts to show you past (2000 to 2018) and predicted (2020 to 2050) active and passive case reporting by year for the location you have selected, as well as new infections that wouldn't be picked up in the data, viewable for each intervention strategy (Display Interventions).



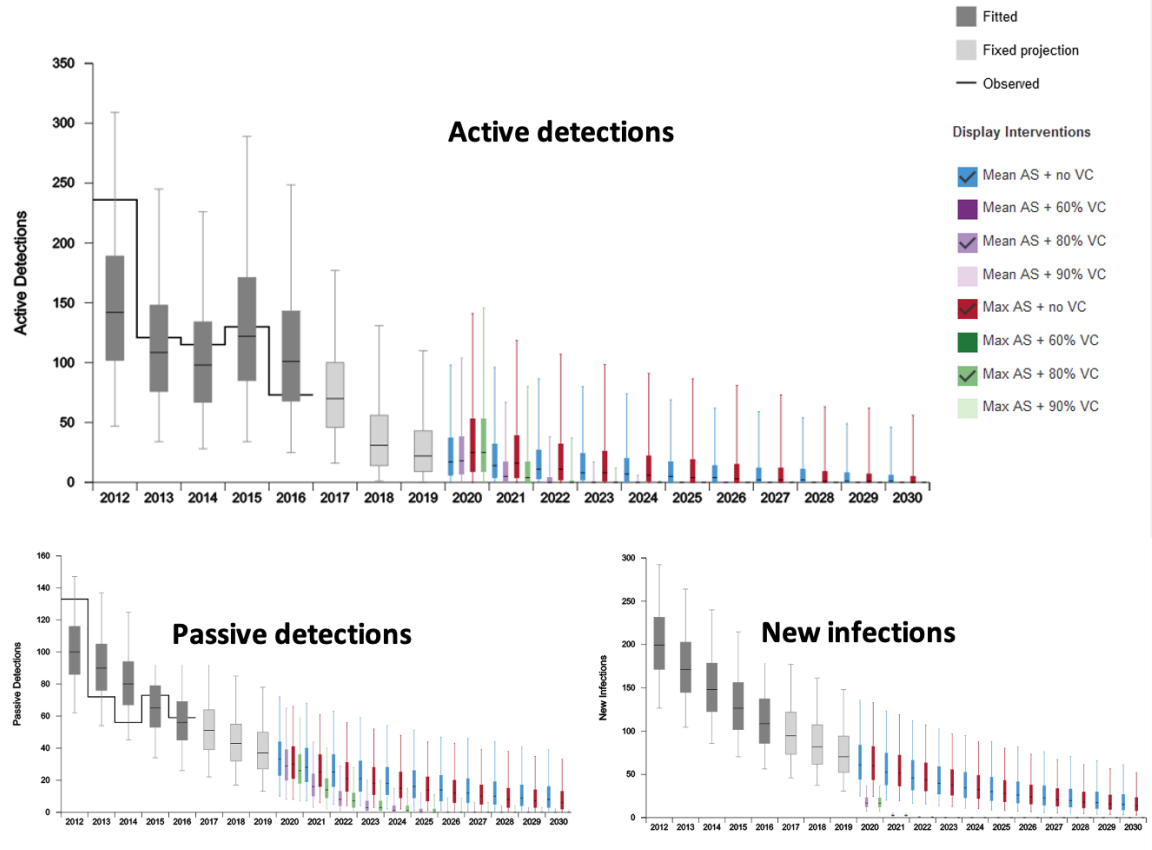
The list of Display Interventions (see opposite) is a tick box function to allow you to select and compare the results based on different intervention strategies. The tick box will default to Mean AS + no VC, regardless of preferred strategy (see illustration below).

Tips:

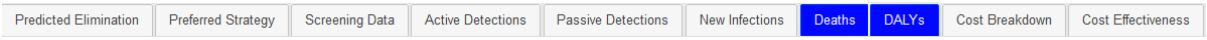
- Amend the time period as required (defaulted to 2010 to 2040, but this can be scaled to any period between 2000 and 2050).

- Hover over the results for the year you are interested in to view an information box confirming the predicted highest, lowest and median number of cases within the range.

Illustration 4: predicted active detections, passive detections and new infections under four intervention strategies in Kwamouth

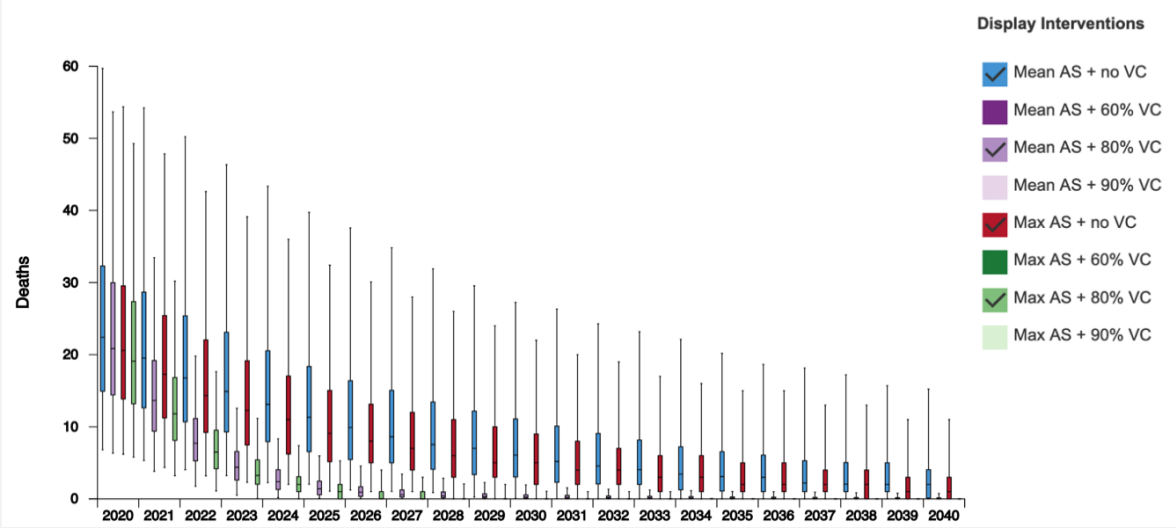


Deaths and DALYs



As with **Detections & New Infections**, the results tabs for **Deaths and DALYs** provide charts to show you predicted cases by year for the location you have selected.

Illustration 5: predicted deaths under four intervention strategies in Kwamouth

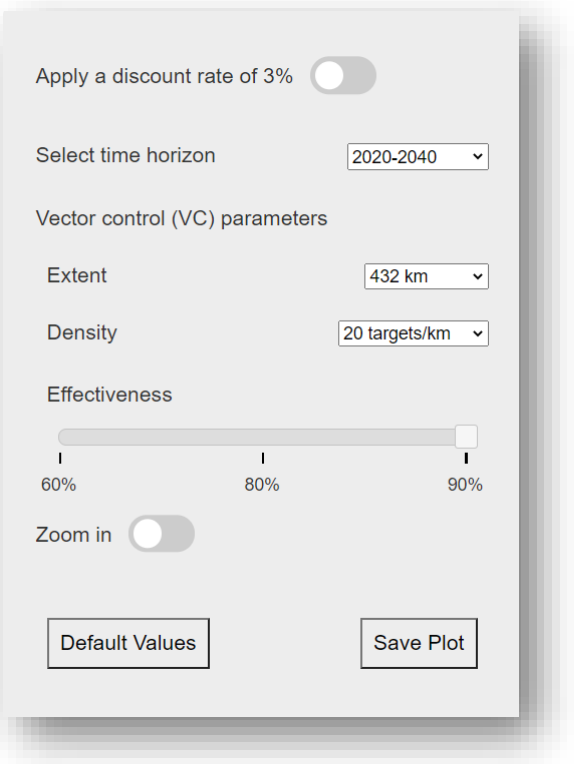


Tip: You can amend the date range from 2020 up to 2050.

Cost breakdown

Predicted Elimination | Preferred Strategy | Screening Data | Active Detections | Passive Detections | New Infections | Deaths | DALYs | **Cost Breakdown** | Cost Effectiveness

The **Cost Breakdown** shows the total cost in dollars of four different intervention strategies and their individual components (mean costs) (see illustration 6 below, also see definitions).

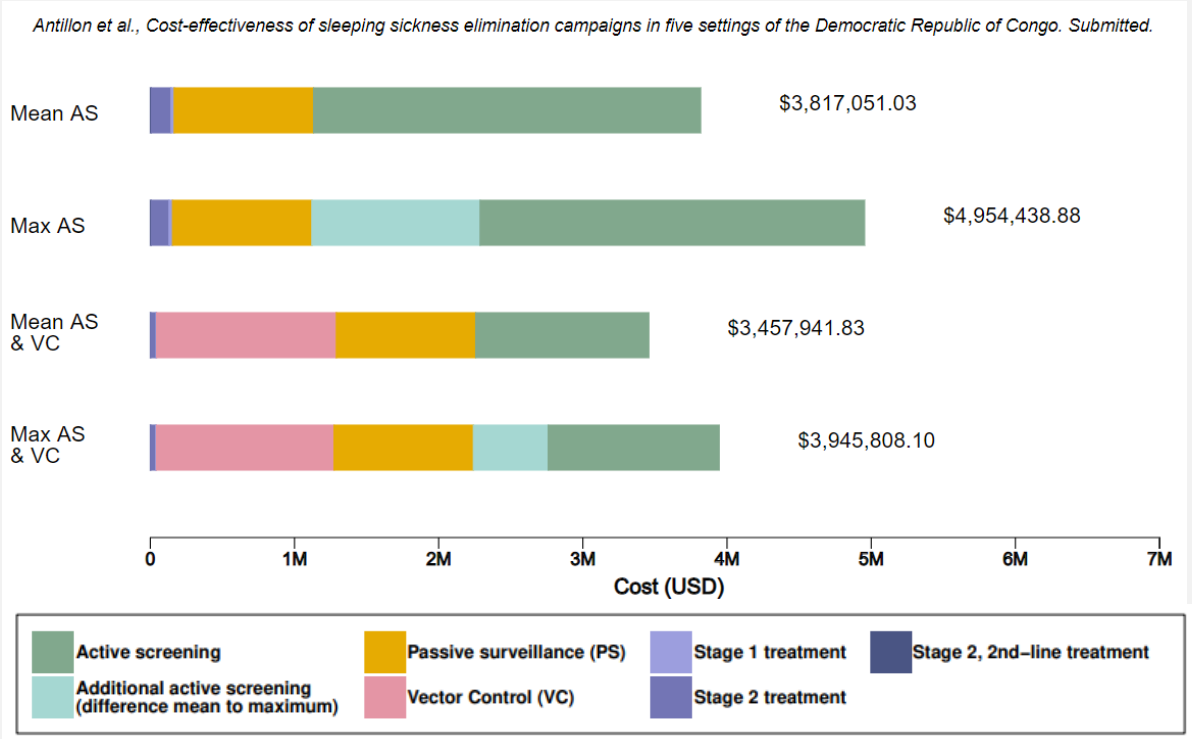


Tips:

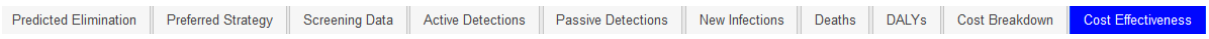
- Use the menu on the left-hand side of the screen to amend variables such as the discount rate of 3%, time horizon, extent, density and effectiveness of vector control.

- Not all options are available for all health zones. For example, the only “extent” option in Kwamouth is 432km as it is large, whereas 100km and 210km are options in most health zones. Unavailable options for the health zone will be greyed out and therefore cannot be selected.

Illustration 6: Cost of four different intervention strategies and their components for Kwamouth (undiscounted)



Cost effectiveness

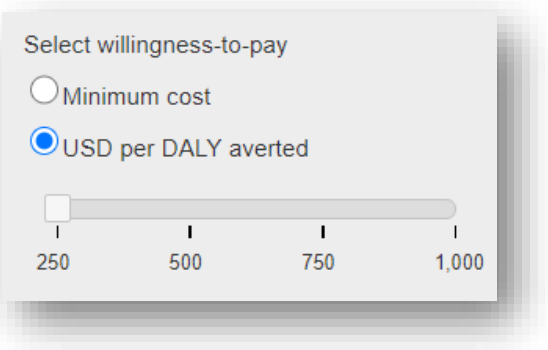


The pie chart under the **Cost Effectiveness** results tab shows the **probability** of each of the four intervention strategies being optimal in terms of cost-effectiveness, which means the chance that each strategy maximises health benefits for a given investment (in terms of willingness-to-pay in US$ per DALY averted) taking into account the cost of interventions, the cost of ill-health, and time lost to disability and death.

The % reflects the number of model simulations where that strategy was found to have the highest net monetary benefit. The preferred strategy (or recommended strategy) in relation to cost-effectiveness is indicated on the pie chart ('P'). This is usually (but not always) the largest piece of the pie.

Illustration 7 shows how the lowest cost strategy is likely to be meanAS (blue) and has a 52% probability in being optimal. Illustration 8 shows that if we are willing to pay $250/DALY averted then the meanAS+VC strategy becomes the most likely to be cost-effective, with 63% probability. In both of these illustrated cases the MaxAS+VC strategy has 0% probability of being cost-effective in our simulations and so there is no red piece in the pie chart.

Tips:



- Use the menu on the left-hand side of the screen to amend variables such as the time horizon, willingness-to-pay, extent and density of vector control.
- Select 'minimum cost' to see the recommended, lowest cost way to reach elimination (see illustration 7).
- Alternatively, you can select your willingness-to-pay between $250 and $1000 per DALY averted (see illustration 8).

Recommended intervention strategy for cost-effectiveness (highest net monetary benefit when comparing four different intervention strategies)

Illustration 7: Recommended, **lowest cost** strategy to achieve elimination between 2020 and 2040

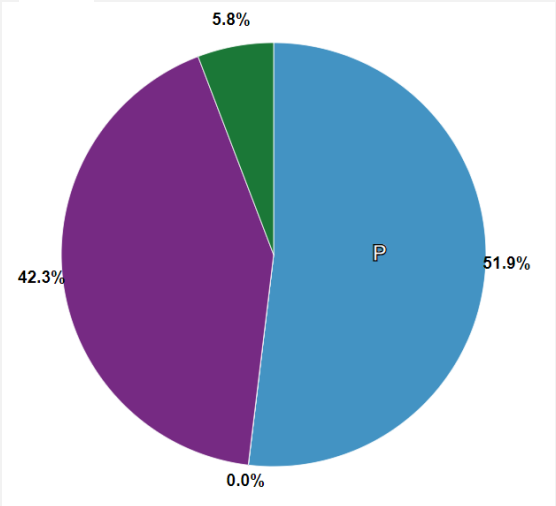
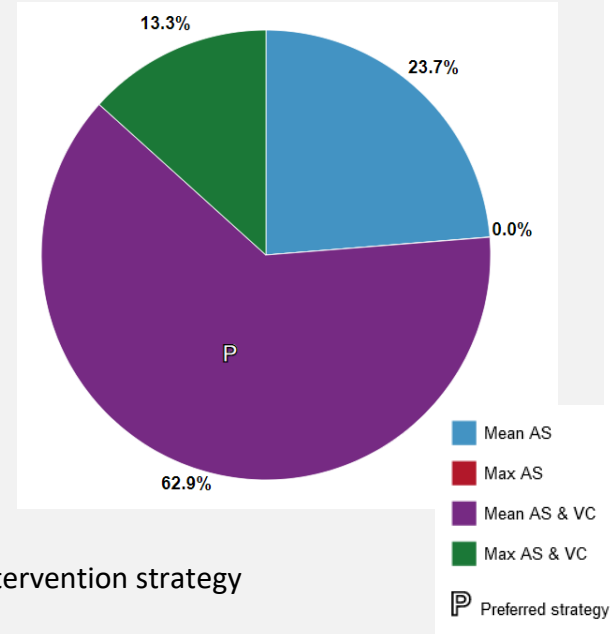


Illustration 8: Recommended strategy if **willingness-to-pay** is **$250** per DALY averted



ℙ = preferred intervention strategy