The University Of Sheffield.

SAVI link

How to Calculate Value of Information in Seconds using SAVI
The Sheffield Accelerated Value of Information Web App

All you need is your PSA sample

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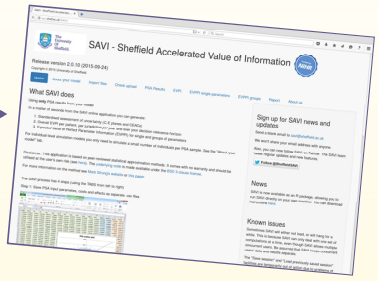
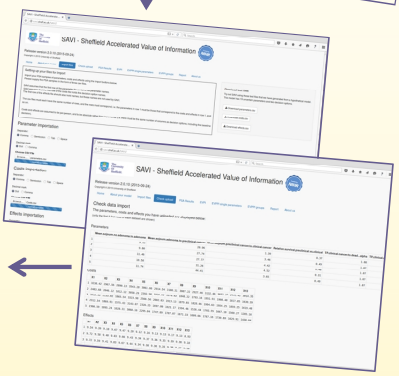
STEP 1: Launch SAVI by going to http://savi.shef.ac.uk/SAVI

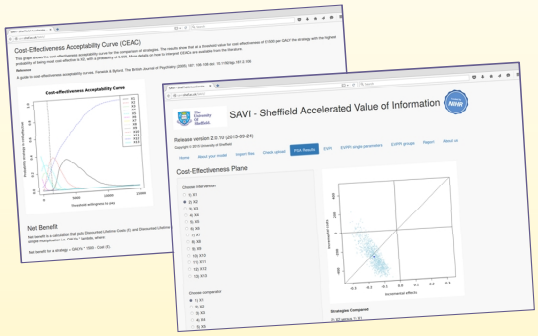
Or, download and run SAVI on your own machine



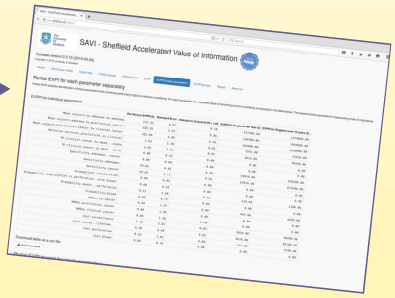
STEP 2: Upload your PSA and check



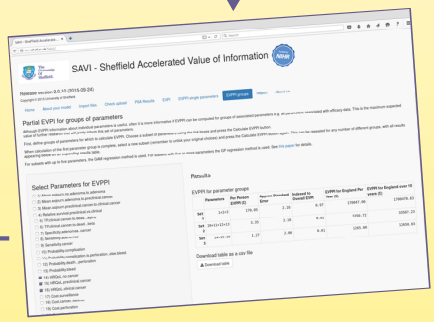
STEP 3: Select any PSA results and figures you want



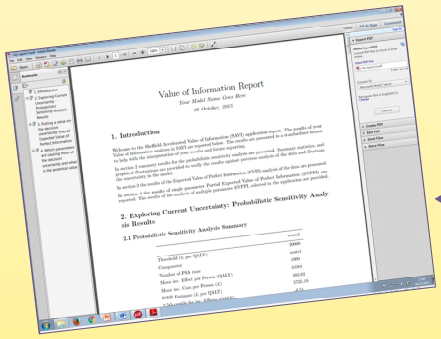
STEP 4: The partial EVPI tab gives you the EVPI for each parameter



STEP 5: Select any group EVPI values you would like



STEP 6: Download a summary report in Word, PDF or HTML



How SAVI works - partial EVPI

Let the model for the net benefit of decision $d \in \mathcal{D}$ be denoted $\mathrm{NB}(d, \boldsymbol{\theta})$, where $\boldsymbol{\theta}$ is a vector of uncertain 'state of the world' model parameters. Let's assume we are interested in the EVPI for the group of parameters $\boldsymbol{\theta}_i$. The remaining parameters are denoted $\boldsymbol{\theta}_{-i}$. The Partial EVPI for $\boldsymbol{\theta}_i$ is

$$\mathrm{EVPI}(\boldsymbol{\theta}_i) = \mathbb{E}_{\boldsymbol{\theta}_i}\left[\max_{d\in\mathcal{D}} \mathbb{E}_{\boldsymbol{\theta}_{-i}|\boldsymbol{\theta}_i}\{\mathrm{NB}(d, \boldsymbol{\theta}_i, \boldsymbol{\theta}_{-i})\}\right] - \max_{d\in\mathcal{D}} \mathbb{E}_{\boldsymbol{\theta}}\{\mathrm{NB}(d, \boldsymbol{\theta})\}.$$

We often resort to two-level nested Monte Carlo to evaluate the first term. This can be very slow.

However, SAVI approximates the inner expectation $\mathbb{E}_{\boldsymbol{\theta}_{-i}|\boldsymbol{\theta}_i}\{\mathrm{NB}(d, \boldsymbol{\theta}_i, \boldsymbol{\theta}_{-i})\}$ using a non-parametric regression of the net benefits, $\mathrm{NB}(d, \boldsymbol{\theta})$, calculated from the costs and QALYs in the PSA sample, on the parameters of interest, $\boldsymbol{\theta}_i$, again from the PSA sample.

For details see our open access paper in MDM.[1] Google 'Mark Strong Sheffield' for a link.

1. Strong, Oakley, Brennan. (2014) Medical Decision Making.

How SAVI works - EVSI

SAVI can also calculate Expected Value of Sample Information (EVSI). The EVSI for data $\boldsymbol{X}$ is

$$\mathrm{EVSI}(\boldsymbol{X}) = \mathbb{E}_{\boldsymbol{X}}\left[\max_{d\in\mathcal{D}} \mathbb{E}_{\boldsymbol{\theta}|\boldsymbol{X}}\{\mathrm{NB}(d, \boldsymbol{\theta})\}\right] - \max_{d\in\mathcal{D}} \mathbb{E}_{\boldsymbol{\theta}}\{\mathrm{NB}(d, \boldsymbol{\theta})\}.$$

Again, we approximate the inner expectation $\mathbb{E}_{\boldsymbol{\theta}|\boldsymbol{X}}\{\mathrm{NB}(d, \boldsymbol{\theta})\}$ using non-parametric regression. First, we simulate a dataset, $\boldsymbol{X}$, for each row of our PSA. We then calculate a summary statistic, $T(\boldsymbol{X})$, for each dataset (i.e. one for each row of our PSA) and upload these to SAVI along with the rest of the PSA. SAVI then regresses the net benefits from the PSA, $\mathrm{NB}(d, \boldsymbol{\theta})$, on the summary statistics $T(\boldsymbol{X})$ in order to approximate $\mathbb{E}_{\boldsymbol{\theta}|\boldsymbol{X}}\{\mathrm{NB}(d, \boldsymbol{\theta})\}$.

For details see our open access paper in MDM.[2]

Google 'Mark Strong Sheffield' for a link, or scan this QR code.

2. Strong, Oakley, Brennan, Breeze. (2015) Medical Decision Making.

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