R for Health Technology Assessment

One-day Workshop 9th July 2019

R for Health Technology Assessment

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Welcome!

The problem

- Majority of cost-effectiveness analysis (CEA) conducted in Excel
  - Computationally slow
  - Inflexible so limited to simple models
  - Calculations are opaque
  - Limited statistical analysis
- R statistical programming language overcomes these issues
  - Although so do MATLAB, Julia, Python…

What software do you mostly use for cost-effectiveness analysis?

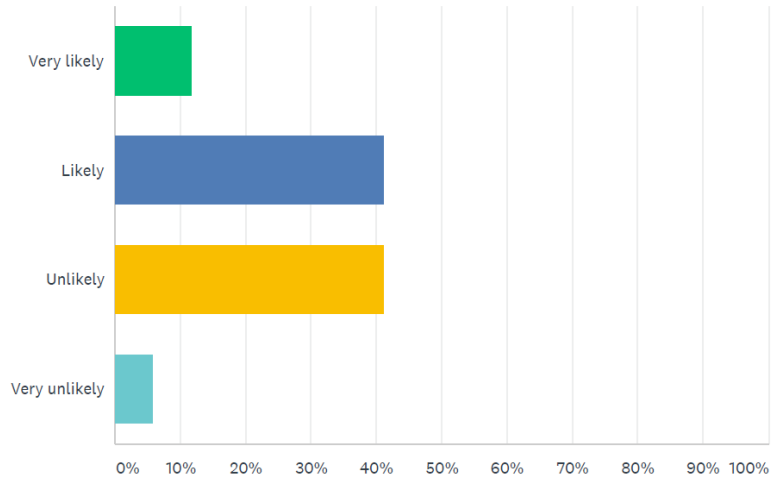
CHOICE	VOTES	
Excel or other spreadsheet	54	87%
R	4	6%
MATLAB	1	2%
STATA	3	5%
BUGS (WinBUGS, OpenBUGS, JAGS, STAN)	0	0%

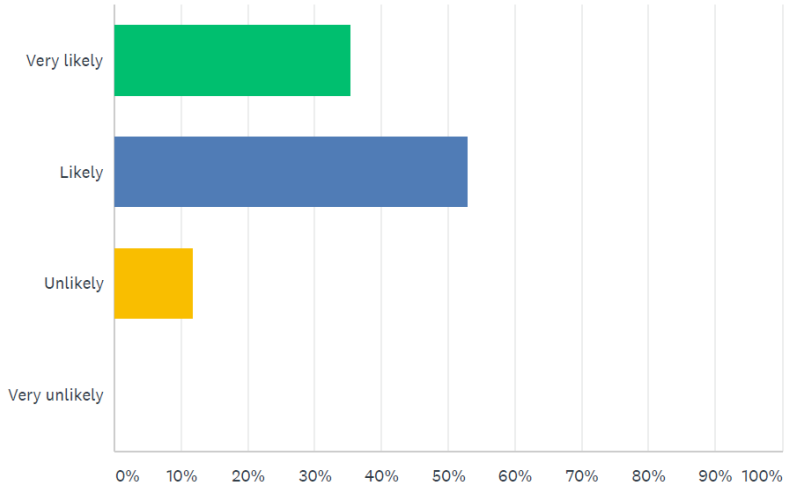
ANSWER CHOICES	RESPONSES
Excel or other spredsheet	60.61%
R	18.18%
Matlab	0.00%
STATA	18.18%
BUGS (WinBUGS, OpenBUGS, JAGS, STAN)	3.03%
TOTAL	

R for CEA one-day workshop

- One-day workshop at UCL in July 2018
- Over 50 attendees from across the country and from academia, government, and industry.

Workshop convinced people





ANSWER CHOICES	RESPONSES	
Very likely	11.76%	2
Likely	41.18%	7
Unlikely	41.18%	7
Very unlikely	5.88%	1
TOTAL		17

ANSWER CHOICES	RESPONSES	
Very likely	35.29%	6
Likely	52.94%	9
Unlikely	11.76%	2
Very unlikely	0.00%	0
TOTAL		17

Asked how likely attendees were to use R before and after the workshop

R for CEA ISPOR 2019 workshop

- One hour workshop on aspects of R for CEA
- Almost 200 people came to our session

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HTA Ready

R for CEA ISPOR workshop

Following our presentations, how much more likely are you to start using R for decision modelling?

CHOICE	VOTES		
Much more likely	21	34%	
More likely	20	33%	
About the same	10	16%	
Less likely	4	7%	
Much less likely	6	10%	

- Also changed peoples minds

Value in Health anniversary paper

ScienceDirect

Contents lists available at sciencedirect.com
Journal homepage: www.elsevier.com/locate/jval

Decision-Analytic Modeling: Past, Present, and Future

R You Still Using Excel? The Advantages of Modern Software Tools for Health Technology Assessment

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ABSTRACT

Economic models are used in health technology assessments (HTAs) to evaluate the cost-effectiveness of competing medical technologies and inform the efficient use of healthcare resources. Historically, these models have been developed with specialized commercial software (such as TreeAge) or more commonly with spreadsheet software (almost always Microsoft Excel). Although these tools may be sufficient for relatively simple analyses, they put unnecessary constraints on the analysis that may ultimately limit its credibility and relevance. In contrast, modern programming languages such as R, Python, Matlab, and Julia facilitate the development of models that are (i) clinically realistic, (ii) capable of quantifying decision uncertainty, (iii) transparent and reproducible, and (iv) reusable and adaptable. An HTA environment that encourages use of modern software can therefore help ensure that coverage and pricing decisions confer greatest possible benefit and capture all scientific uncertainty, thus enabling correct prioritization of future research.

Keywords: cost-effectiveness analysis, HTA, software, R

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HTA Ready

R for Health Technology Assessment

Initiatives for the future and challenges in gaining R acceptance

Howard Thom[1], Gianluca Baio[2], Anthony Hatswell[3], Nathan Green[4], Boby Mihaylova[5], Iryna Schlackow[5], Padraig Dixon[1], Pedro Saramago[6], Claire Williams[1], Jeroen Jansen[7], Devin Incerti[7] and Nicky Welton[1]

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Website: https://n8thangreen.wixsite.com/hermes-hack-london

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HTA Ready

ISPOR Open Source Models Special Interest Group

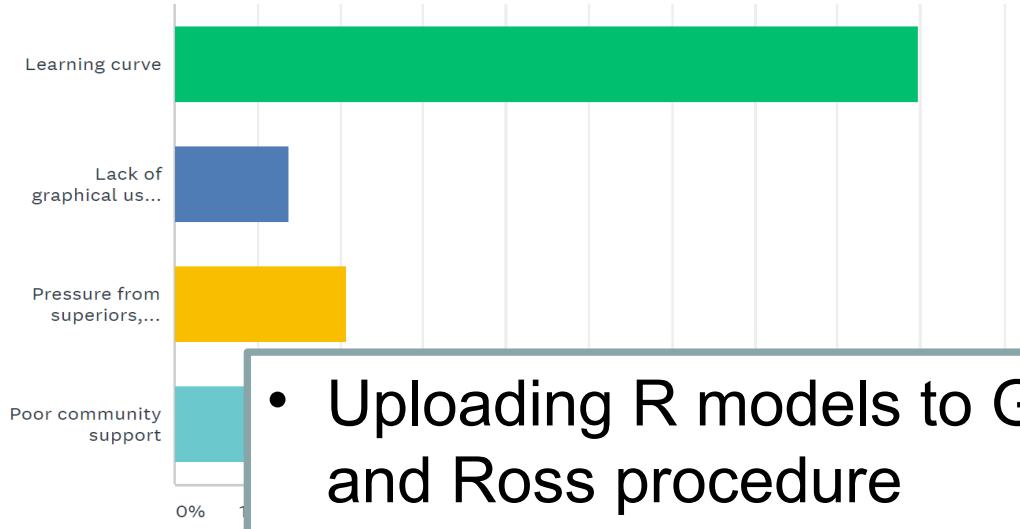
- Jeroen Jansen
- Chris Sampson
- Devin Incerti
- Howard Thom

And an ISPOR Taskforce!

- Jeroen Jansen
- Gianluca Baio
- Devin Incerti
- Howard Thom

Learning curve is main barrier to adopting R

SurveyMonkey Analyze - R for CEA pre-workshop survey

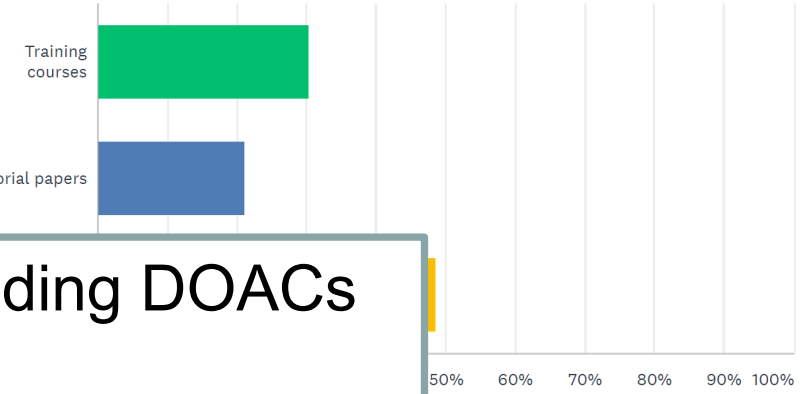


ANSWER CHOICES	RESPONSES
Learning curve	89.66%
Lack of graphical user interface	13.79%
Pressure from superiors, clients or assessors	20.69%
Poor community support	10.34%

Total Respondents: 29

What would be most helpful to ease transition to R?

Answered: 33 Skipped: 0



ANSWER CHOICES	RESPONSES
Training courses	30.30%
Tutorial papers	21.21%
Example models	48.48%
TOTAL	

- Uploading R models to GitHub, including DOACs and Ross procedure
- And…

R for CEA short course

- Launching Population Health Sciences short course on R for economic evaluation (EE)
- Successful internal pilot in 2019
- Will open externally for 9/10th July 2020
  - Decision trees, Markov models, Value of Information
- Registration at Population Health Sciences website will open in early October.

https://www.bristol.ac.uk/medical-school/study/short-courses/

Questions for discussion

- What remains the greatest barrier to uptake of R for HTA?

- Do we even want to be using R for HTA? (Selection bias in this particular audience)

- What do we want from future training events?

- Do we want this workshop to repeat in 2020? What should we change?