The uptake of R in NICE HTA: insights from technology assessment groups

HTA334

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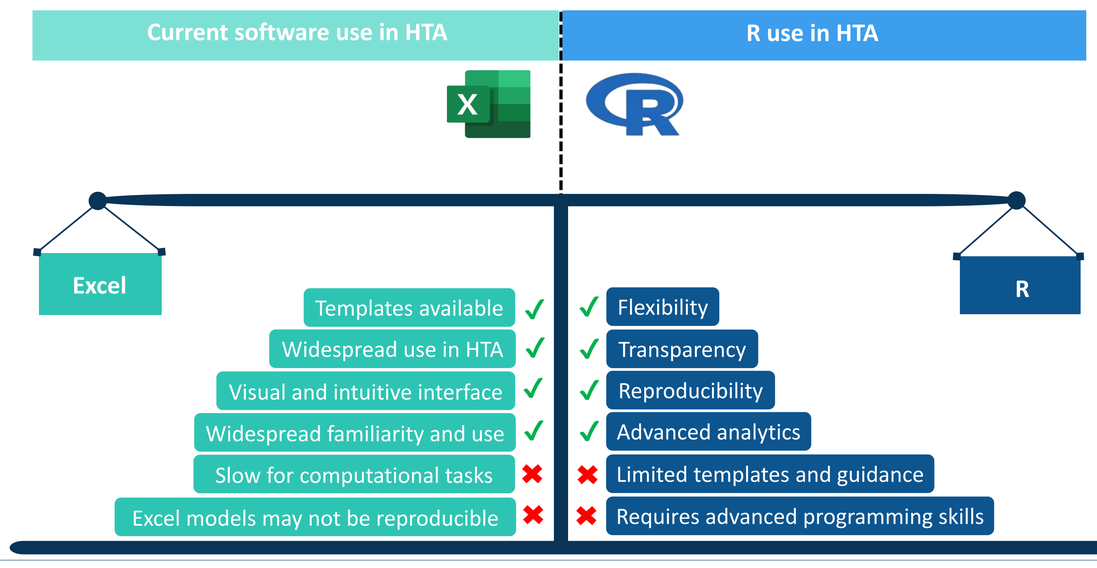
Introduction

- The use of R, an open-source programming software, is increasing in health economic modelling due to its flexibility, transparency, and strong community support, making it an attractive alternative to standard tools such as Excel **(Figure 1).**[1]
- Despite these significant advantages and its growing prominence in academic research, its adoption within formal health technology assessment (HTA) submissions to the National Institute for Health and Care Excellence (NICE) remains unclear and potentially limited.

Objective: We aimed to explore the current landscape of R adoption in HTA submissions and identify reasons and barriers to the widespread adoption of R.

Figure 1. Benefits and drawbacks of Excel and R programming software

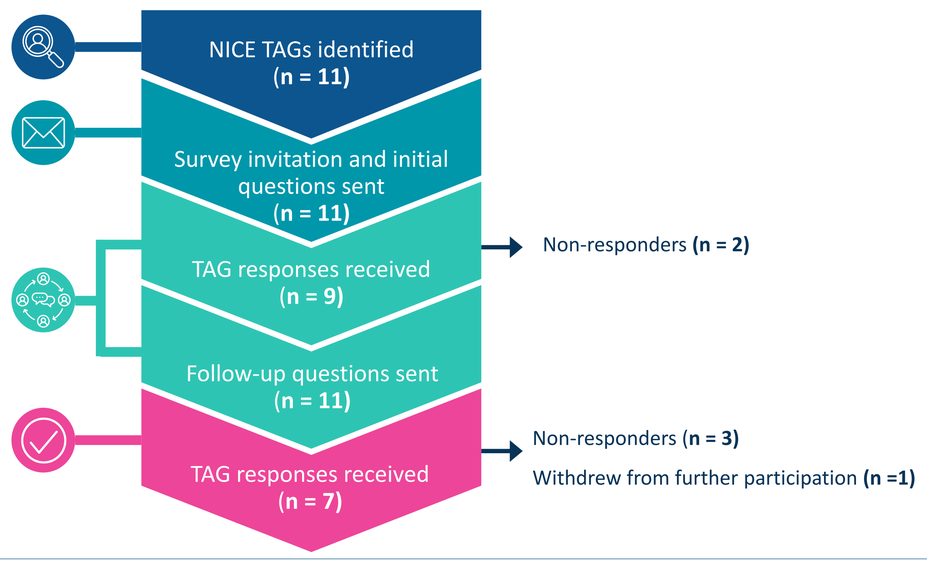


Abbreviations: HTA, health technology assessment.

Methods

- We conducted a survey of all NICE Technology Assessment Groups (TAGs). All 11 TAGs were contacted and requested to provide information on their experience with R software over the past five years.
- We asked TAGs to report on the prevalence of R-based economic models in company submissions, their internal use of R for de novo economic analyses, specifically within multiple technology appraisals (MTAs) and other appraisal types (e.g., diagnostics assessment reports [DARs], early value assessments [EVAs]), the technical and organisational challenges faced in adopting R, and potential facilitators and common barriers to its use.
- Responses were collated and analysed descriptively to identify key themes and trends.

Figure 2. NICE TAG survey process



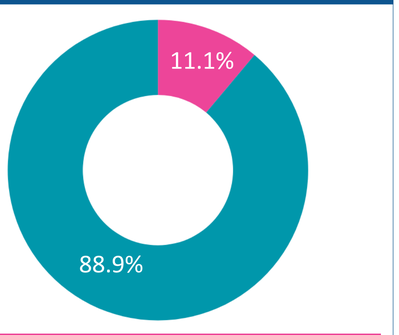
Abbreviations: NICE, National Institute for Health and Care Excellence; TAG, technology assessment group.

Results

Sample characteristics

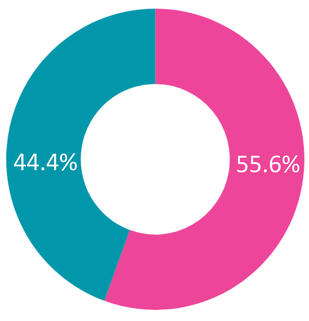
- We received responses to initial questions from 9/11 TAGs. 7 TAGs (Bristol, CRD, KSR, LRiG, PenTAG, ScHARR, SHTAC) responded to the follow-up questions **(Figure 2).**
- On the company submission side, use of R for an economic model was very rare, with only 1/9 TAGs reporting a single company submission developed in R **(Figure 3).**
- **Figure 4** shows that TAG use of R was more common in assessments, with 5/9 TAGs reporting using R for economic modelling in DARs and EVAs but not for MTAs.
- TAGs also outlined that their views on R and Excel for modelling were primarily shaped by economist preference, NICE/TAG familiarity, and the technical requirements of the model— some necessitate R, while Excel is sufficient for others **(Figure 5).**

Figure 3. Company submissions to TAGs in R



1/9 TAGs reported receiving a model built in R

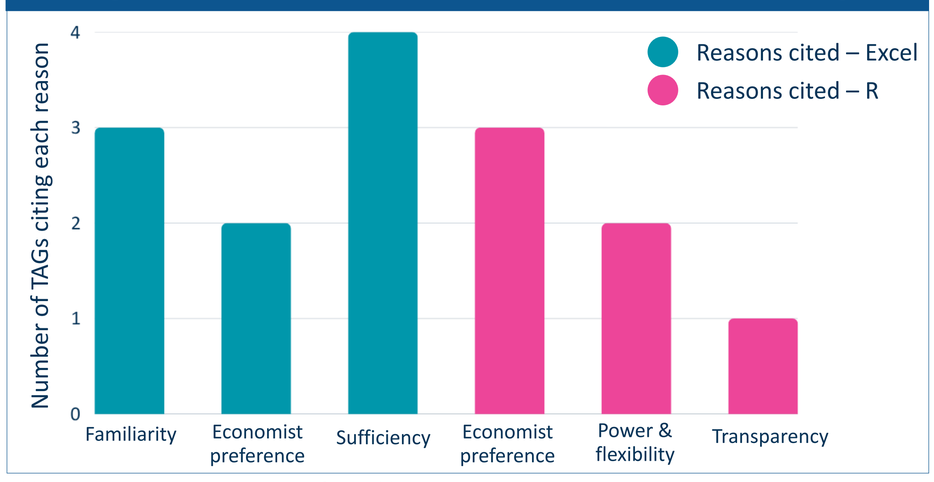
Figure 4. R software use by TAGs in NICE evaluations



5/9 TAGs reported using R in a NICE evaluation

Reported, **not reported**. **Abbreviations:** TAGs, technology assessment groups.

Figure 5. What TAGs value in R and Excel for modelling



Abbreviations: NICE, National Institute for Health and Care Excellence; TAGs, technology assessment groups.

TAGs' perspectives on software use

- The results in **Table 1** show the TAGs' opinions on the reasoning for the software use in HTA. Established expertise and training in Excel, use of pre-built or global Excel model templates and perception that NICE/TAGs prefer/understand Excel were the most common reasons given by TAGs to explain Excel model submissions by companies.
- The majority of TAGs reported barriers to using R on the company side, as NICE stipulates that models in R are accepted. All TAGs cited lack of R skills/familiarity/templates as a barrier to R use, with time/investment required for the transition to R and TAG/NICE reviewer familiarity and comfort with R being other frequently mentioned barriers.
- Five TAGs stated that developing standardised code, templates and guidance could alleviate the barriers to R adoption. Additional suggestions included training initiatives, R showcases, developing user-friendly interfaces and engaging industry stakeholders such as pharmaceutical companies, TAGs, HTA bodies and industry bodies to promote collaborative development. Two TAGs stated no immediate action could/should be taken to change current practices.

Table 1. TAGs' perspectives on software use in HTA

Questions	TAG responses						
	1	2	3	4	5	6	7
Why do submitting companies use Excel to develop economic models?							
Established expertise and training in Excel	✓				✓	✓	✓
Use of pre-built/global Excel model templates	✓			✓	✓		✓
Perception that NICE/TAGs prefer/understand Excel	✓	✓	✓		✓		
Fear R models will not be accepted/reviewed well		✓	✓				
Global model needs (other jurisdictions accept Excel)			✓			✓	
Excel has advantages over R	✓				✓		
What are the perceived barriers to R? Do these barriers exist on the company side or submission body side?							
Company-side barriers	✓	✓	✓	NR	✓	✓	NR
Submission body barriers	✓			NR	✓		NR
Lack of R skills/familiarity/templates	✓	✓	✓	✓	✓	✓	✓
Time/investment required for transition					✓	✓	✓
TAG/NICE reviewer familiarity and comfort with R	✓		✓		✓		
Lack of standardised guidance/accepted packages		✓	✓				
Lack of perceived need/advantage ("Excel works")	✓						
Transparency/black-box concerns with code		✓					
How can barriers be alleviated?							
Develop standardised code, templates and guidance	✓	✓	✓		✓		✓
Training and upskilling initiatives	✓		✓				
Pilot projects and showcases to build confidence and demonstrate benefit					✓		✓
Develop user-friendly interfaces (e.g., R Shiny)	✓				✓		
Stakeholder engagement and collaboration			✓		✓		
No immediate action identified				✓		✓	

Abbreviations: NICE, National Institute for Health and Care Excellence; TAG, Technology Assessment Group; NR, not reported.

Conclusions

Implications of findings

- This study revealed a disconnect in the HTA landscape: while NICE accepts models developed in R, its practical adoption remains extremely limited. A near-total use of Excel for submissions is underpinned by a self-reinforcing cycle of familiarity and perception. Companies have little incentive to use R, compounded by barriers to R use such as potential lack of R training, and concerns about reviewer comfort on both the HTA body side and the TAG side. However, these barriers appear largely perceived rather than real; in practice, many HTA assessors now report readiness and capability to evaluate R-based models.[2]
- The path forward requires a coordinated effort. The strong consensus among TAGs points to clear actions: the development of standardised code, templates and guidance in R, training, and pilot projects to build confidence. Without these initiatives, the dominance of Excel is likely to persist, potentially forgoing the technical advantages of R for more complex modelling needs.

Study limitations

- The findings are based on NICE's TAGs, which may not represent all perspectives from other global HTA bodies.
- Responses from TAGs are subjective and may include bias.
- Company/submission-side barriers are based on TAG opinion. Limited research exists on the company/HTA body side experiences and reasonings, although some focus group work has been done to begin to explore this.[3]

References: *(1) Incerti, D. et al. 'R You Still Using Excel? The Advantages of Modern Software Tools for Health Technology Assessment', Value in Health, vol. 22,5 (2019): 575-579. doi: 10.1016/j.jval.2019.01.003. (2) Hart R, Use of R models for HTA submission, (2025), doi: 10.5281/zenodo.15056439*
(3) Marks, Yanara et al. "Barriers and Facilitators of Using R for Decision Analytic Modeling in Health Technology Assessment: Focus Group Results." PharmacoEconomics vol. 42,7 (2024): 783-795. doi:10.1007/s40273-024-01374-y.
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