The Use of Real-World Evidence in Health Technology Assessment Decisions in Sweden and the UK: A Natural Language Processing (NLP) Approach

Salma Eltahir Mohammed[1&2], Bine Kjøller Bjerregaard [3]

[1]Université de Bordeaux, Bordeaux, France ; [2] University of Khartoum, Sudan ; [3] IQVIA Denmark, Copenhagen, Denmark

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Introduction

- Health Technology Assessment (HTA) systematically evaluates the full lifecycle value of health technologies.
- Real-world evidence (RWE) offers insights from diverse patient data, but its use in HTA varies.
- Natural Language Processing (NLP) has potential in HTA research, but its application remains limited

Objective

The objective of this study was to apply NLP techniques to analyse the utilization of RWE in HTA decisions in Sweden (TLV) and the UK (NICE).

Methods

Data source:
- IQVIA HTA Accelerator
- PubMed publications

Methodology:
Employed Natural Language Processing (NLP)

Techniques:
- Sentiment analysis
- Unsupervised Topic modelling

Results

The PubMed search found 3,213 relevant publications, while the IQVIA HTA Accelerator showed RWE in 666 HTA submissions.

Since 2018, RWE inclusion in HTA appraisals has increased, underscoring its growing importance in HTA decision-making.

Cohort studies and patient registry designs emerged as top RWE sources, indicating increased RWE integration in HTA processes.

However, prevailing negative sentiments surrounding RWE utilization indicated significant acceptance concerns

General sentiment analysis:

- NICE showed a preference for RWE with 326 positive sentiments.

- TLV was more cautious with 149 negative and 103 positive sentiments.

The Influence of RWE on HTA Decisions – Sentiment Analysis

The sentiment analysis reveals that TLV tends to have a more favourable stance towards the impact of RWE on HTAs NICE maintains a more neutral position.

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Agency	Clinical_Evidence_Sentiment				Recommendations_Sentiment			
	min	max	mean	std	min	max	mean	std
0	NICE	-0.148810	0.60	0.120846	0.145505	-0.186111	0.4	0.097847	0.155338
1	TLV	0.031871	0.36	0.194044	0.120663	-0.063889	0.6	0.107222	0.276857

When using RWE solely, TLV exhibits a more optimistic stance, while NICE maintains a nearly neutral perspective.

The Influence of RWE on HTA Decisions – Topic Modelling

TLV Agency - Main Topics Identified:

1. Discuss reimbursement acceptance criteria, potential for reconsideration, uncertainties cases, and patient groups.
2. The cost-effectiveness of drugs, patient groups, and stakeholders' agreement concerning reimbursements.
3. Patient populations, criteria for reimbursement, and associated restrictions.
4. Application status, whether met or rejected based on benefits, and higher pricing issues.
5. Severity of conditions, benefits, scheme, and pricing influence the decision to accept or reject applications.

NICE Agency - Main Topics Identified:

1. Committee decisions and conclusions based on clinical evidence, treatment options, model Analysis and cost-effectiveness.
2. Committee, comparison analyses, the company's role in presenting evidence, and associated uncertainties.
3. Disease-specific discussions, treatment approaches, and the appropriate cost, and acceptance criteria.
4. Utility values, model, cure states, and committee acceptance approaches.
5. Decision-making processes, committee agreements, the company model result, and the acceptance.

The Influence of RWE on HTA Wordcloud

TLV has successfully accepted RWE for supporting effectiveness (42.86%) and treatment patterns (28.57%), while NICE primarily utilized RWE for effectiveness (27.17%).

Abstract Clustering & Topic Modeling :

Cluster 0 emphasised real-world evidence in clinical settings versus designs like RCTs, RWE (RWD) Quality, and the methods used to gather and analyse RWE.

Cluster 1 revolved around HTA; the evidence used in the decision-making process.

Cluster 2 explored clinical and economic outcomes and RWD's role in assessing treatment efficacy and cost-effectiveness.

RWE Limitation and Challenges:
Data generation, access issues, concerns about RWE's validity, the limited scope or applicability of RWE in certain contexts, and challenges related to data integration.

Conclusion

The growing integration of RWE in HTA, coupled with divergent acceptance patterns between TLV and NICE, highlights the importance of comprehensively addressing challenges and leveraging RWE as a valuable tool in evidence synthesis for HTA decision-making.

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