The Application of Care Pathway Analysis and Economic Modelling in Early Health Technology Assessment: Learnings from Two Projects

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INTRODUCTION

Early health technology assessment (HTA) can help to explore the potential value of a new technology in the initial stages of development [1]. Care pathway analysis (CPA) is a method to identify and map clinical decisions in the current and new care pathway, including the new technology. The CPA can inform an early economic model to predict the likely cost-effectiveness profile of the technology. Together, these methods are valuable in early HTA.

CPA usually involves a pragmatic review to identify and synthesise clinical guidelines that describe the care pathway for the condition of interest. This is typically followed by a qualitative evaluation, which can include semi-structured interviews and thematic analysis. Interviews with relevant experts help to understand where (and why) real-world practices differ from published guidance and to validate the draft care pathway diagram. The interviews also provide insight into the strengths/weaknesses of the new technology, the potential population, its role in the pathway, and any barriers/facilitators to adoption [2].

This work presents two examples of CPA within the context of early HTA and describes the potential value of this method from the technology developers' perspective.

METHODS

The application of CPA in two projects is presented. Case Study 1 evaluated a medical device for treating cataracts, and Case Study 2 focussed on an innovative diagnostic test for respiratory tract infections (Figure 1).

Figure 1: Overview of case studies

	Case Study 1	Case Study 2
Technology	A non-surgical technology that uses light to excite the natural properties of protein in the lens of the eye to improve vision	A host-immune response assay to distinguish between bacterial and viral respiratory tract infections
Objectives	To identify the care pathway for adults with cataracts in the UK; To identify the potential uses, value propositions, and barriers to adoption of the new technology	To identify the role of the new test in the care pathway to support clinical decision making (e.g. antibiotic prescribing) in patients with suspected community acquired pneumonia presenting to secondary care in the UK
Methods	Review of 10 international guidelines; Interviews with ophthalmologists, ophthalmic surgeons, optometrists and budget holders (n=9)	Review of 2 published community acquired pneumonia guidelines; Interviews with clinicians, budget holders and diagnostic test experts (n=14)

In both projects, CPA and early economic modelling were used to inform the potential value propositions of the new technology. CPA was useful to optimise the structure of the early model and identify the evidence available. The early modelling identified the pathway that is more likely to be cost effective in the future.

RESULTS

In both case studies, the current and new care pathways were summarised in a detailed flow diagram that was used to inform the structure of the early economic model. This was validated during interviews with clinicians. High-level findings from Case Study 1 are presented in Figures 2 and 3.

Figure 2: Case Study 1 – CPA findings

Unmet needs: Long waiting time for surgery and cancellations at pre-operative assessment or later

Potential setting: To be delivered in primary care by optometrists or clinical technicians

Main barrier: Cataract surgery is highly cost effective

Populations: Those who are unsuitable for, elect not to have, or are waiting for surgery; and people with early or more complex cataracts

Key outcomes: Visual acuity, patient satisfaction, quality of life, tear break-up time, long-term efficacy and safety

Potential role: Could be used to improve or stabilise vision to slow disease progression and possibly for screening or diagnosis

Figure 3: Case Study 1 – early model insights

Intervention	Comparator	Evidence	Key findings
Population 1: Therapy used to prevent the progression of asymptomatic cataracts. People had detectable cataracts, but may not notice a deterioration in vision at this stage **Population 2:** Therapy used as an alternative to cataract surgery for those who do not wish to have surgery	There is no other treatment available for the prevention of progression (as established in the CPA) The only option for treatment is surgery	Very limited evidence available meant there was insufficient information about both populations Efficacy inputs were assumed and flexible Multiple scenarios were explored	**Population 1:** The technology is likely to be cost effective vs future cataract surgery **Population 2:** The technology is likely to dominate the no treatment option, meaning it is more expensive and less costly There are many uncertainties in the model parameters and assumptions. Areas for future evidence generation were identified

In Case Study 2, several potential value propositions of the new test were identified in the interviews, including reducing unnecessary antibiotics, hospital admissions, A&E waiting times, and the need for further tests (e.g. blood tests and chest x-rays). The early model revealed that introducing the new test has the potential to result in cost savings in patients presenting with suspected community acquired pneumonia. However, there is uncertainty in the model results and further randomised controlled trial evidence is needed to validate the findings and support the value propositions.

CPA is beneficial from the economic modellers' perspective because it can provide a good understanding of the clinical pathway to be analysed. This information is often difficult to obtain and is a common issue when building early models. CPA can also help to reduce uncertainties associated with the pathway, identify the most useful evidence for the model, clarify the points of intervention/testing, and define the population(s) of interest.

The value of CPA and early modelling for technology developers is summarised in Figure 4.

Figure 4: Value of CPA and early modelling

Treatment positioning in pathway: Provided understanding and validation of where the new technology could fit in the pathway

Evidence generation needs: Identified clinical data requirements to support technology adoption

Variation among countries: Highlighted between-country differences in decision making

Internal strategy decisions: Helped justifying business strategy and future spending decisions

Networking with clinicians: Informed marketing campaigns and networking with clinicians to increase awareness of the technology

Discussions with investors: Enhanced discussions with potential investors and provided evidence to inform key questions

CONCLUSIONS

CPA is a valuable method within the context of early HTA. Alongside identifying the potential role and positioning of the new technology, developers found the assessment useful for informing internal strategy decisions and discussions with potential external investors. The developers were able to demonstrate the clinical perspective around the value of the test, elicited through an independent and rigorous methodology.

REFERENCES

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