

# Comprehensive Review of Methods to Estimate Market Share Uptakes of Pharmaceuticals and Medical Devices in Budget Impact Models

Raymond Lee<sup>1</sup>, Noor-E Zannat<sup>1,\*</sup>, Mike Dolph<sup>1</sup>, Gabriel Tremblay<sup>1</sup>

<sup>1</sup>Cytel, Inc., Waltham, MA, US

## Background

- Budget impact models (BIM) are developed to estimate the overall effect of new pharmaceuticals and medical devices on the budget constraints of healthcare systems.
- One of the highly sensitive parameters in BIMs is the market share uptake which estimates the percent of new therapies replacing the competing therapies over time. Current estimation methods use key opinion leader inputs, estimates from previous models, or general “educated guess” assumptions which may not accurately approximate what would happen once new therapies or medical devices enter the model.
- New methods that accurately represent real-world uptake benefit health insurance providers by supplying predictive results in BIMs and giving better information to pharmaceutical and medical device companies to value their new products.
- As such, there is a need to identify new methods to estimate market share uptakes to provide better predictive results in BIMs.

## Objective

- The aim of this study was to evaluate the techniques informing market share uptakes in previously published BIMs.

## Methods

- A comprehensive search was conducted in PubMed to identify articles published between 2017 and 2022 on BIMs estimating projected market share over their modeled time horizon. Studies were assessed to identify techniques and market penetration estimates used.
- The inclusion criteria used to select the relevant BIMs are presented in **Table 1**. No restrictions were placed on the patient population or outcomes as they were not relevant to methods estimating market shares.

**Table 1. PICOS criteria**

PICOS	Inclusion	Exclusion
Patient population	Any	No restriction
Intervention and comparators	Pharmaceutical therapies or medical devices	<ul style="list-style-type: none"><li>If no comparators are stated</li><li>Public health interventions</li><li>Any screening tests</li><li>Surgical techniques</li><li>Behavioral therapies</li></ul>
Outcomes measures	Any	No restriction
Study design	Budget impact analysis with a time horizon >1 year	<ul style="list-style-type: none"><li>BIM with time horizon ≤1 year</li><li>BIM with no information on market share</li><li>BIMs that do not state the methods used for market share estimates</li><li>Any other economic evaluations</li><li>Systematic literature review or network meta-analysis</li><li>Costing studies</li><li>Commentary/research notes/case studies</li></ul>
Time limit and language	2017–2022 English publications	<ul style="list-style-type: none"><li>Studies published before 2017</li></ul>

Abbreviations: BIM, budget impact model; PICOS, population, intervention, comparators, outcomes, and study design

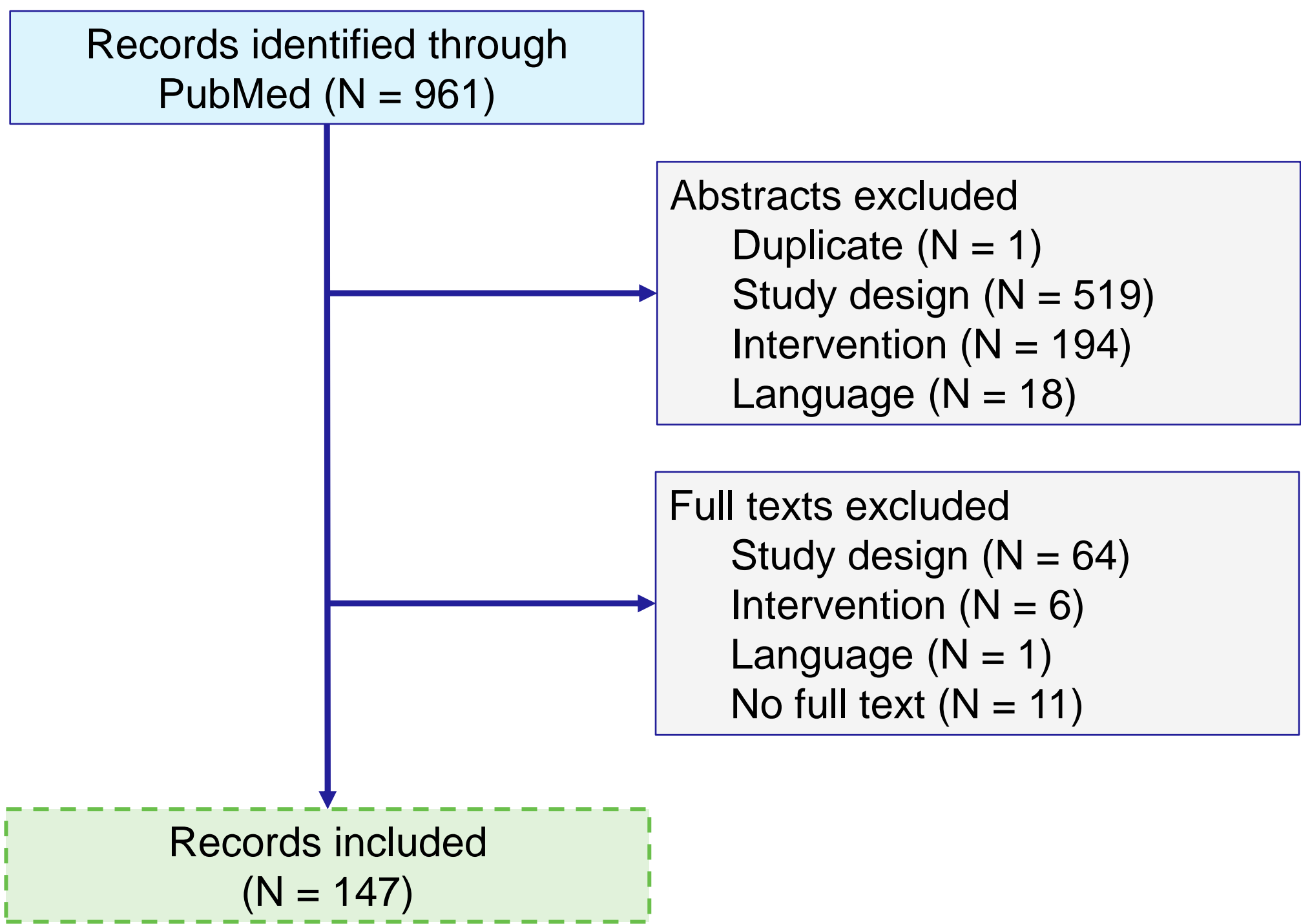
## Methods (cont.)

- Interventions were specific to pharmaceutical therapies or medical devices. Any screening tests, surgical techniques, or mental health behavioral therapies were not included as market share uptakes in these interventions may be estimated with different methods.
- Models were selected if the time horizon was more than one year to identify methods of estimating market share uptakes over time.
- A search was conducted on December 20, 2022 using title and abstract search terms: “budget impact models,” “pharmaceuticals,” “medical devices,” “budget impact analysis,” and “economic impact.”
- Comprehensive screening was conducted by two reviewers at the title/abstract and full-text levels with disagreements resolved by a third reviewer.
- The search followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines of reporting reviews. A bias assessment was not conducted in this review.

## Results

- In total, 961 publications were identified by the search, of which 147 studies were selected for final inclusion (**Figure 1**).





**Figure 1. PRISMA flow diagram**



- Almost half of the studies were conducted in North America (45%), followed by Europe (34%), and Asia (12%) (**Table 2**).
- A total of 108 studies (73%) used assumptions without explanation to estimate their projected market shares and 12 studies (7%) employed expert opinion. Seven (5%) used sponsor estimates and 16 studies (11%) used historical data either from market research or pharmaceutical sales data. Three studies used statistical methods to project their market shares such as approximation using a Lehman curve,<sup>105</sup> using a ratio of generic products and both generic and associated patented drugs sold,<sup>21</sup> and multiplying the eligible cohort by the percent of total market and the number of years in the model to show the increase in market cap per year.<sup>147</sup>

## Results (cont.)

**Table 2. Comprehensive review results**

	Categories	Proportion of studies
<div>Continent</div> <div></div>	North America	66 (45%)
	Europe	50 (34%)
	South America	7 (5%)
	Asia	17 (12%)
	Africa	5 (3%)
	Australia	1 (<1%)
	2+ continents	1 (<1%)
<div>Time horizon</div> <div></div>	2 years	4 (3%)
	3 years	62 (42%)
	4 years	3 (2%)
	5 years	76 (51%)
	20 years	1 (1%)
	Lifetime	1 (1%)
<div>Perspective</div> <div></div>	Public	84 (57%)
	Private	60 (41%)
	Societal	3 (2%)
<div>Market share estimation methods</div> <div></div>	Assumption	108 (73%)
	Estimates from data	16 (11%)
	Clinical input	12 (8%)
	Estimates from sponsors	7 (5%)
	Calculation (statistical approximation)	3 (2%)
	Estimates from literature	1 (<1%)

## Discussion

- While most studies used “educated guess” assumptions, expert opinion, or sponsor estimates, statistical approximation methods were used to estimate market share data in three studies.
- The market share ranges differed depending on the methods used.
- While various other considerations were present (e.g., disease indication, country, public vs. private payer), assumption- and clinician-based approximation generally estimated market shares to be higher than those based on historical data.
- Market share uptake estimates using historical data were as high as 40% but generally were lower (around 2%–3% per year with an increase of 0.5% per year).
- Methods using historical data with post-market analyses (after the products have entered the insurance market) indicated that therapies may potentially have slower uptake than in the real world than when relying entirely on assumptions.
- Approximation methods also require data to provide accurate market shares. Using historical data on older therapies in the same indication may be an avenue to improve accuracy in market share uptakes for new therapies. This may signal the need for real-world data structures to help ensure future market shares used in BIMs are robust and accurate.

## Conclusion

- This is the first targeted review that investigated techniques used for market share uptakes in BIMs. Most studies relied on a standard method of devised assumptions and expert opinion, while a smaller proportion used market share research and historical data. Novel methods were also identified in several studies.
- While curve approximations can be used in estimating market shares, reliable data are required to provide accurate estimations.
- Further transparency and established guidance in estimating market share uptake (with proper justification) would be valuable in ensuring the robustness and accuracy of BIMs.

References are available using this QR code:

