

# Economic Evaluations and Value Considerations in ACIP Routine Vaccine Recommendations: A Comprehensive Review

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# Disclosure

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- I am a full-time employee of the National Pharmaceutical Council, a non-profit health policy research organization funded by leading biopharmaceutical companies.
- I have no other financial conflicts to report.
- My views are my own.

# Landscape and Value of the U.S. vaccination schedule



## Pediatric schedule<sup>1</sup>



**508M** cases prevented



**32M** hospitalizations averted



**\$540B / \$2.7T** direct / societal savings

## Adult schedule<sup>2</sup>



Favorable cost-effectiveness



Favorable health impact

# Is there standardized economic reporting in vaccine policy recommendations from ACIP?

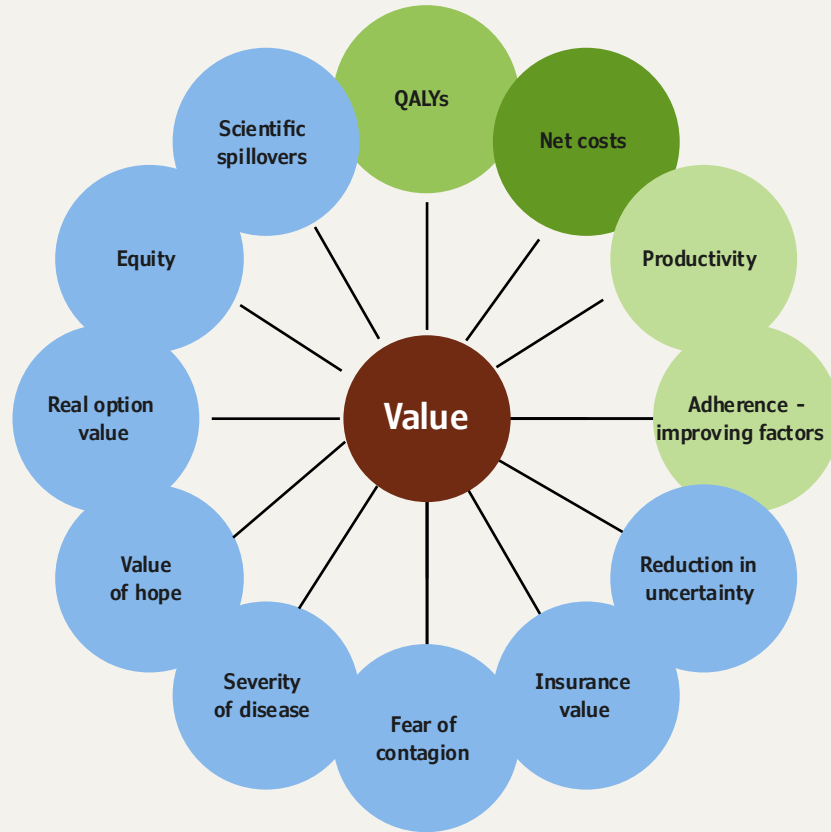


Figure 1. The Value Flower. Adapted from Lakdawalla et al. (2018).



Systematically examine the economic evidence used by ACIP to support routine vaccine recommendations



Assess the completeness of both **standard cost-effectiveness elements** and **novel value elements reporting**, including those described in the ISPOR Value Flower framework.

# Identifying routine ACIP recommendations

*From the 2025 CDC immunization schedule to economic evaluation extraction*



## 2025 CDC Immunization Schedules

Children/adolescents and adults; all **routinely** recommended vaccines



## Excluded

Travel, occupational, and non-routine populations (e.g., catch-up, risk-based)



## ACIP MMWR publications

Morbidity and Mortality Weekly Report Recommendations (MMWR), 2006–2025

**27** ACIP vaccine-specific recommendations



**15** Routine recommendations on 2025 CDC schedule



**13** Routine recommendations with economic evaluation data in ACIP

# Two levels of extraction

## 13 Routine vaccines

### CEA population stratum

37 strata

#### Standard cost-effectiveness elements

ICERs, incremental costs, QALYs gained, life-years, infections/hospitalizations/deaths averted, productivity costs

**Example:** Herpes zoster 2018 — 4 age strata extracted independently (50–59, 60–69, 70–79, ≥80 years)

### ACIP recommendation

19 recommendations

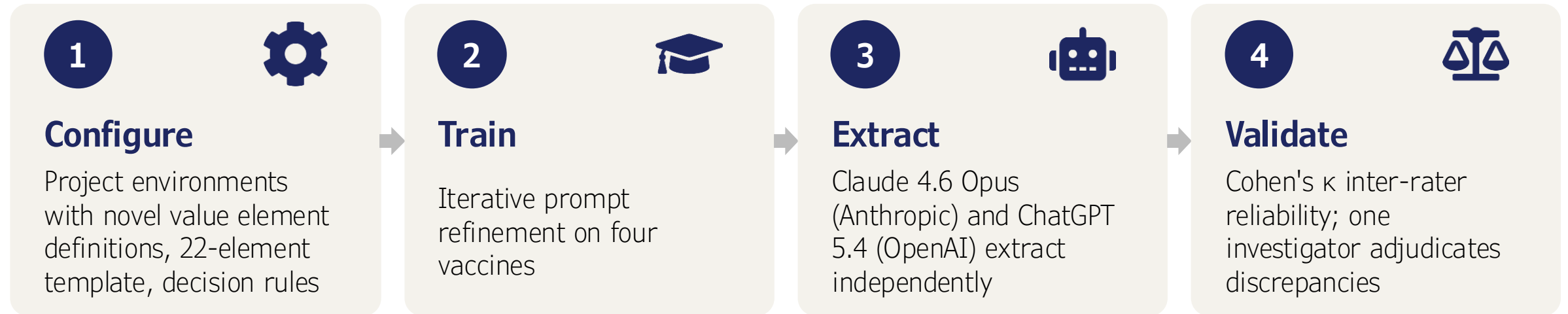
#### Novel value elements

Severity of disease, equity, value of hope, real option value, scientific spillovers, fear of contagion, insurance value, value of knowing, adherence-improving factors

**Why:** Inclusion reflects overall model design, not sub-population application

# AI-assisted extraction with human verification

*Dual-platform extraction validated by inter-rater reliability*



## 22-element extraction template, two tiers:

### Tier 1 **Standard cost-effectiveness elements**

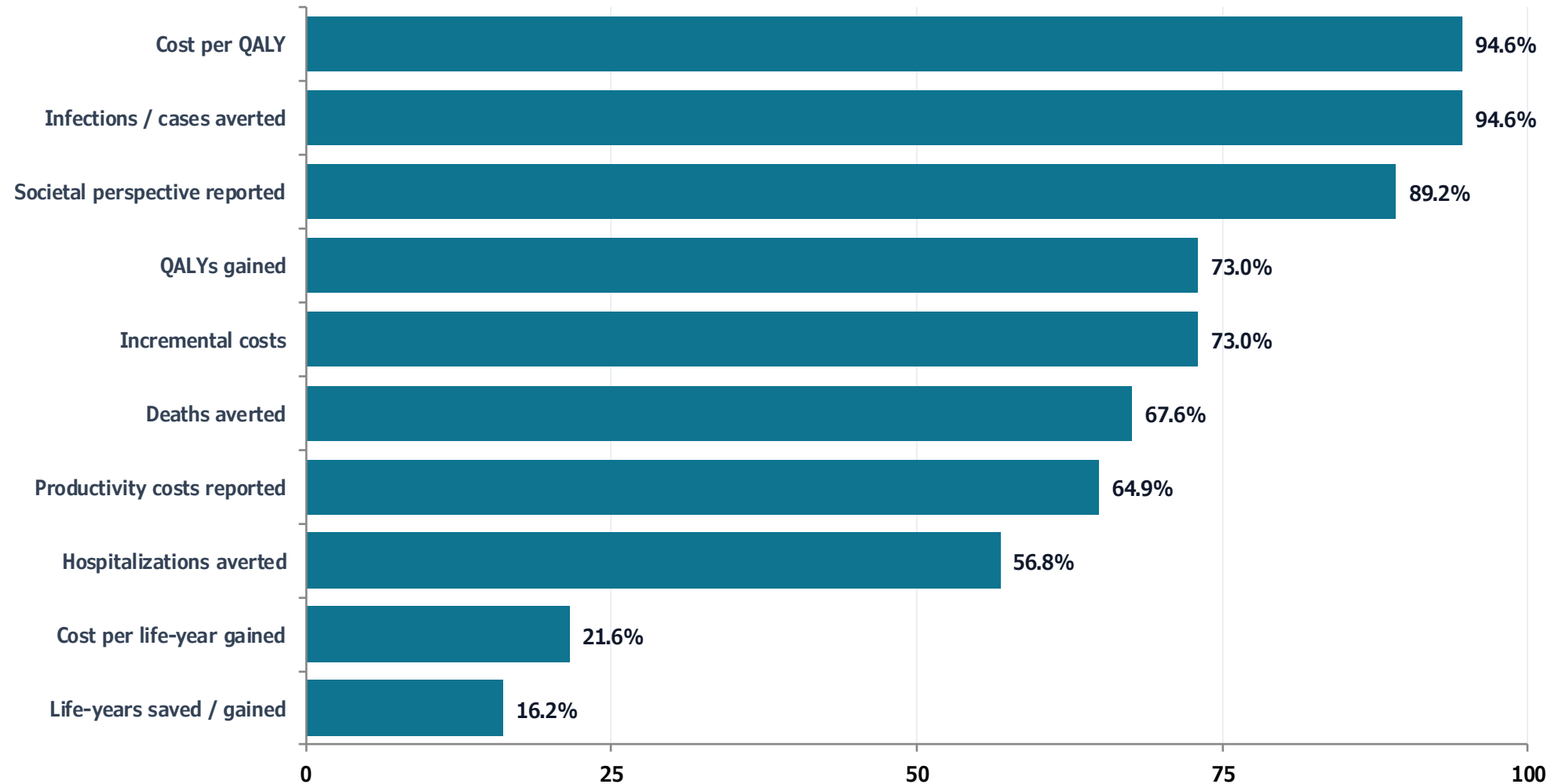
e.g., ICERs (cost per QALY); QALYs gained, life-years, infections/hospitalizations/deaths averted, productivity costs, analytic perspective

### Tier 2 **Novel value elements**

e.g., Severity of disease, equity considerations, value of hope, real option value, scientific spillovers, and more

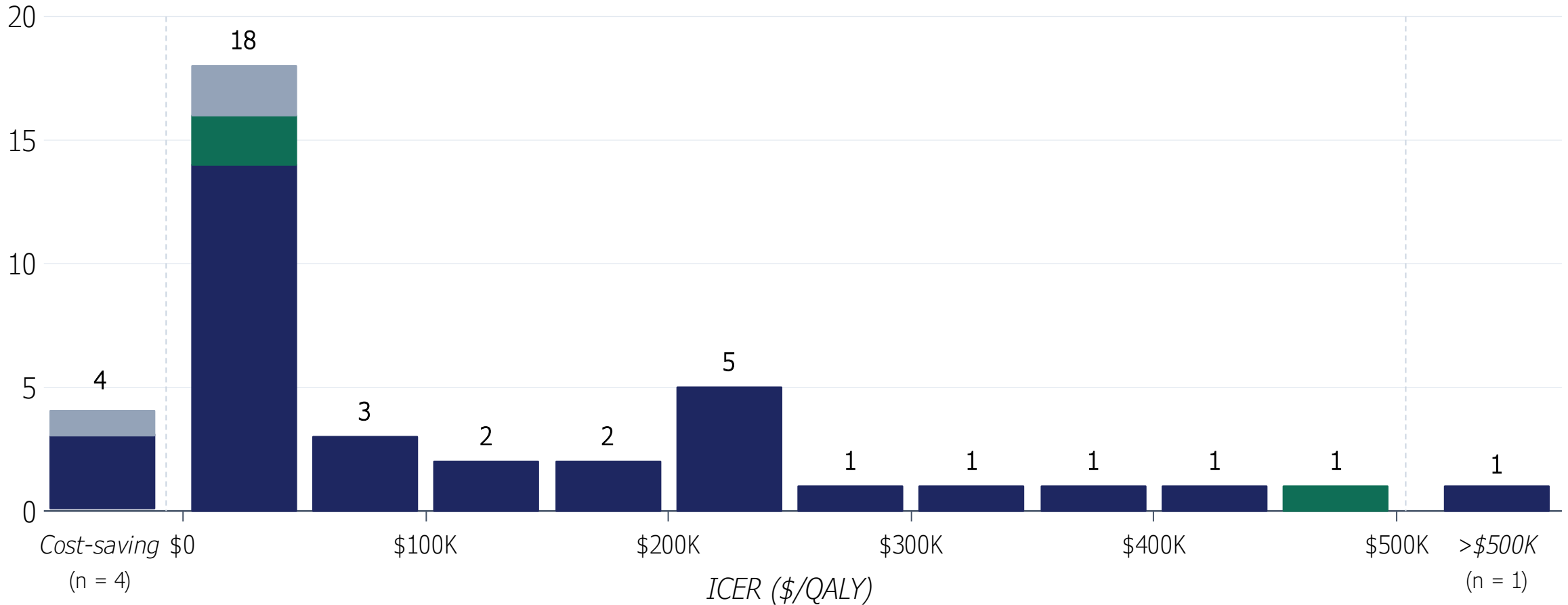
# Aggregate standard CEA measures present, component reporting varies

Reporting frequency across 37 CEA population strata (19 ACIP recommendations)



# Distribution of reported ICERs across routine vaccine CEA strata

*n = 40 CEA population strata, binned in \$50,000 / QALY increments*



## Reported Perspective

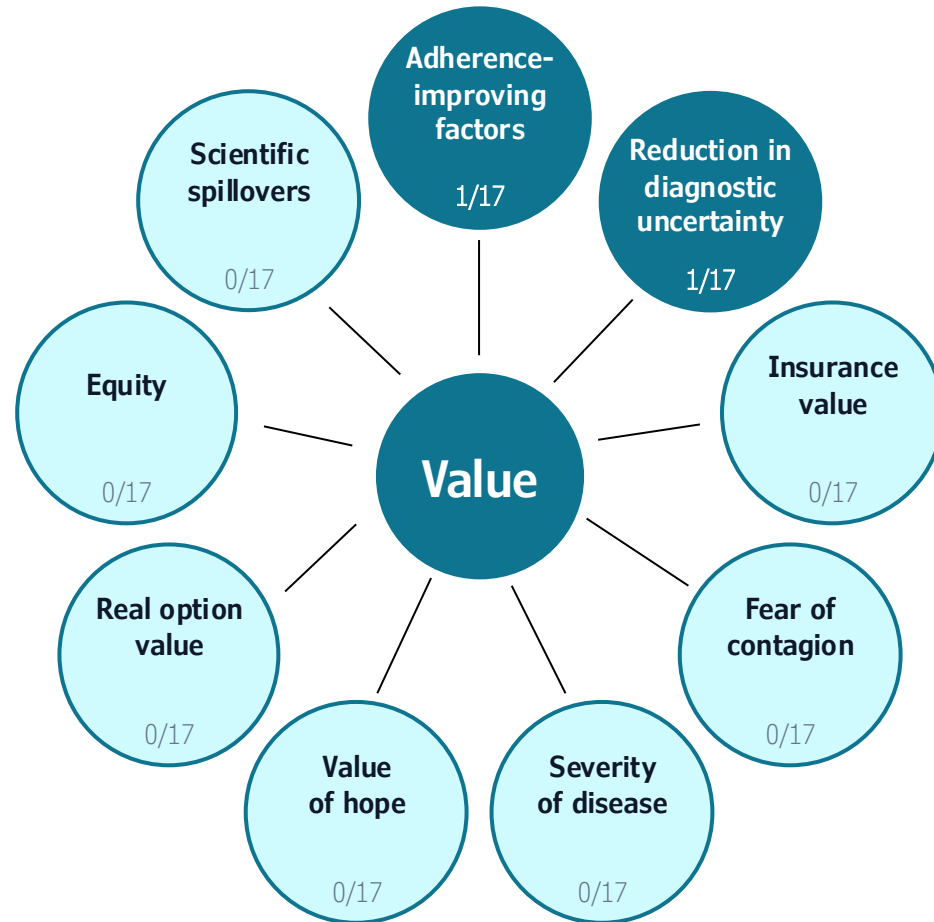
- Societal** (n = 34)
- Unspecified** (n = 3)
- Healthcare system** (n = 3)

*All ICERs reported in year-of-study dollars; values not adjusted for inflation.  
ICER: Incremental cost-effectiveness ratio*



# Novel value elements were absent from nearly every recommendation

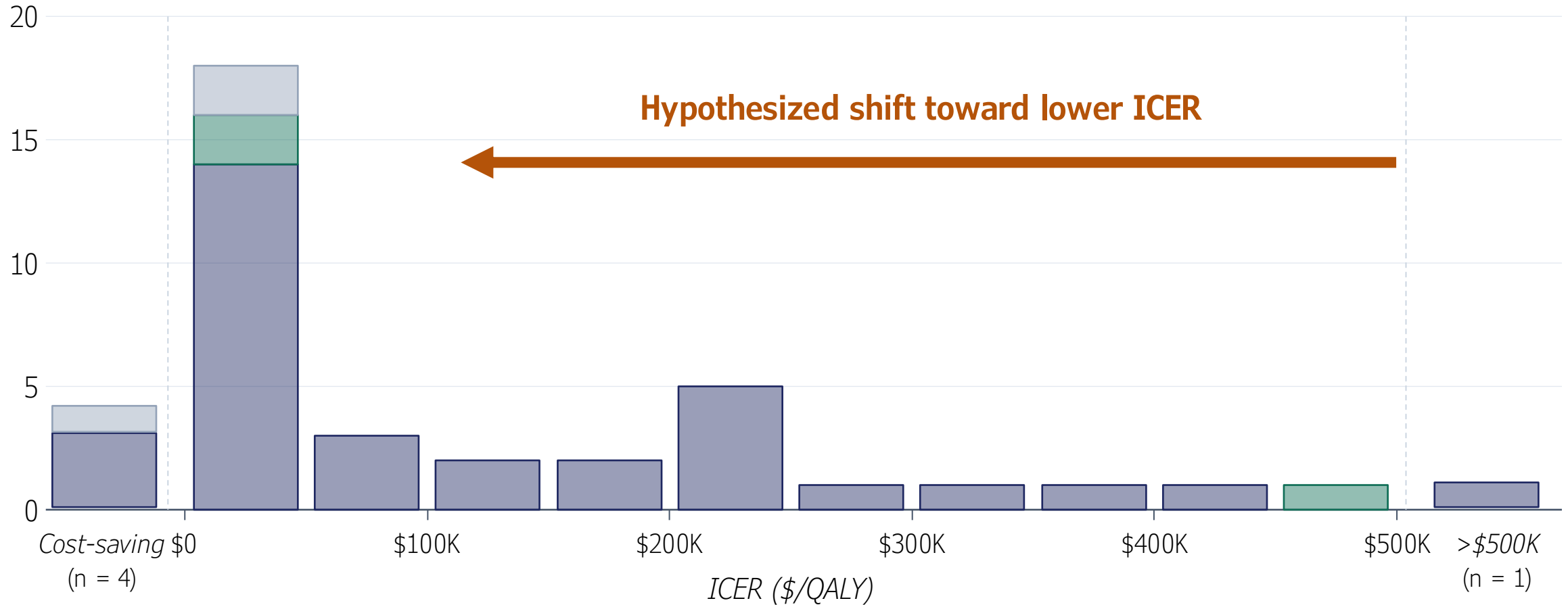
Nine novel value elements measured across 17 ACIP recommendations



Both present elements appear in a single recommendation — **the 2022 hepatitis B adult recommendation.**



# If novel value elements were included, how would the distribution shift?



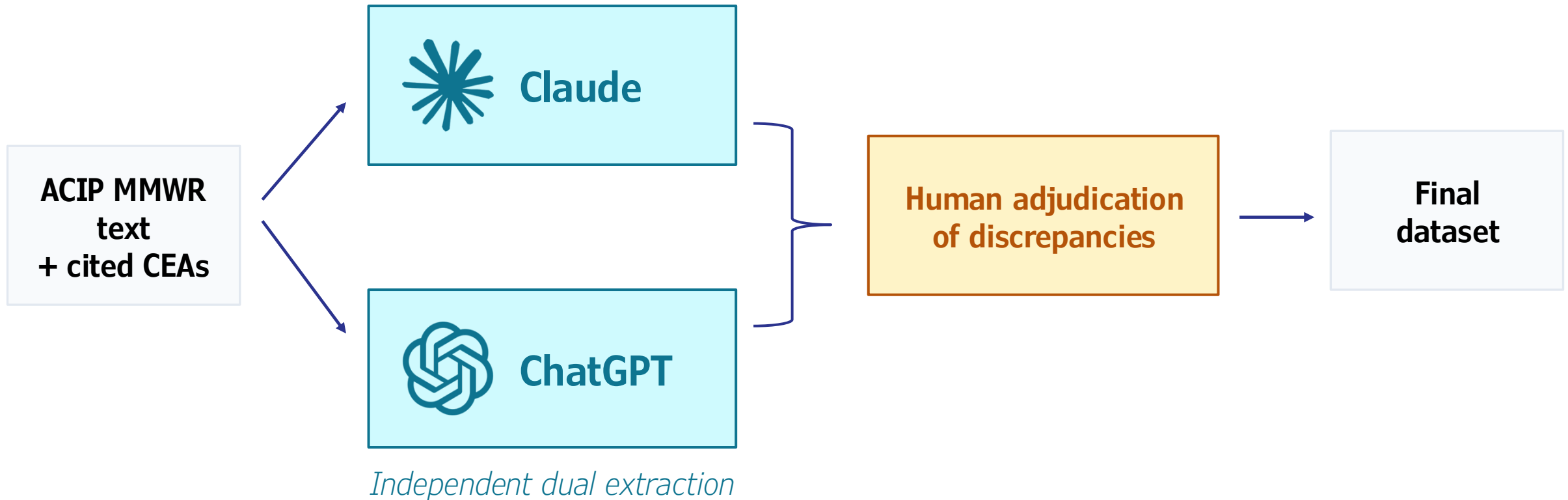
## Reported Perspective

- Societal** (n = 34)
- Unspecified** (n = 3)
- Healthcare system** (n = 3)

All ICERs reported in year-of-study dollars; values not adjusted for inflation. 13



# Dual-LLM extraction: a scalable approach to evidence synthesis



Calculated **Cohen's kappa = 0.91** (95% CI: 0.85 to 0.94)

# Limitations

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## Scope

Restricted to routine vaccines on the 2025 CDC schedule. Findings may not generalize to other contexts.

## Binary coding

Elements coded as present/absent

## Era effects

Data reporting gaps may reflect era-specific conventions, not deliberate omission.

## AI extraction

Inter-rater reliability between platforms was high, but AI extraction may carry systematic blind spots

# Toward a more complete picture

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For routine vaccines, economic analyses reflect the **consistent reporting of many standard cost-effectiveness elements** — yet these analyses have **systematically omitted novel value elements.**

The absence of novel value elements suggests the economic case presented to ACIP **may not fully reflect** the value of these vaccines.



## Looking forward

As health economists develop methods and empirical support for novel value elements, future evaluations can present a more complete picture of vaccine value to decision-makers.

# Questions? Thank You!

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