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Large-Scale AI-Assisted Mapping of Health Economics and Outcomes Research Evidence Gaps Across Gastro-hepatic Diseases

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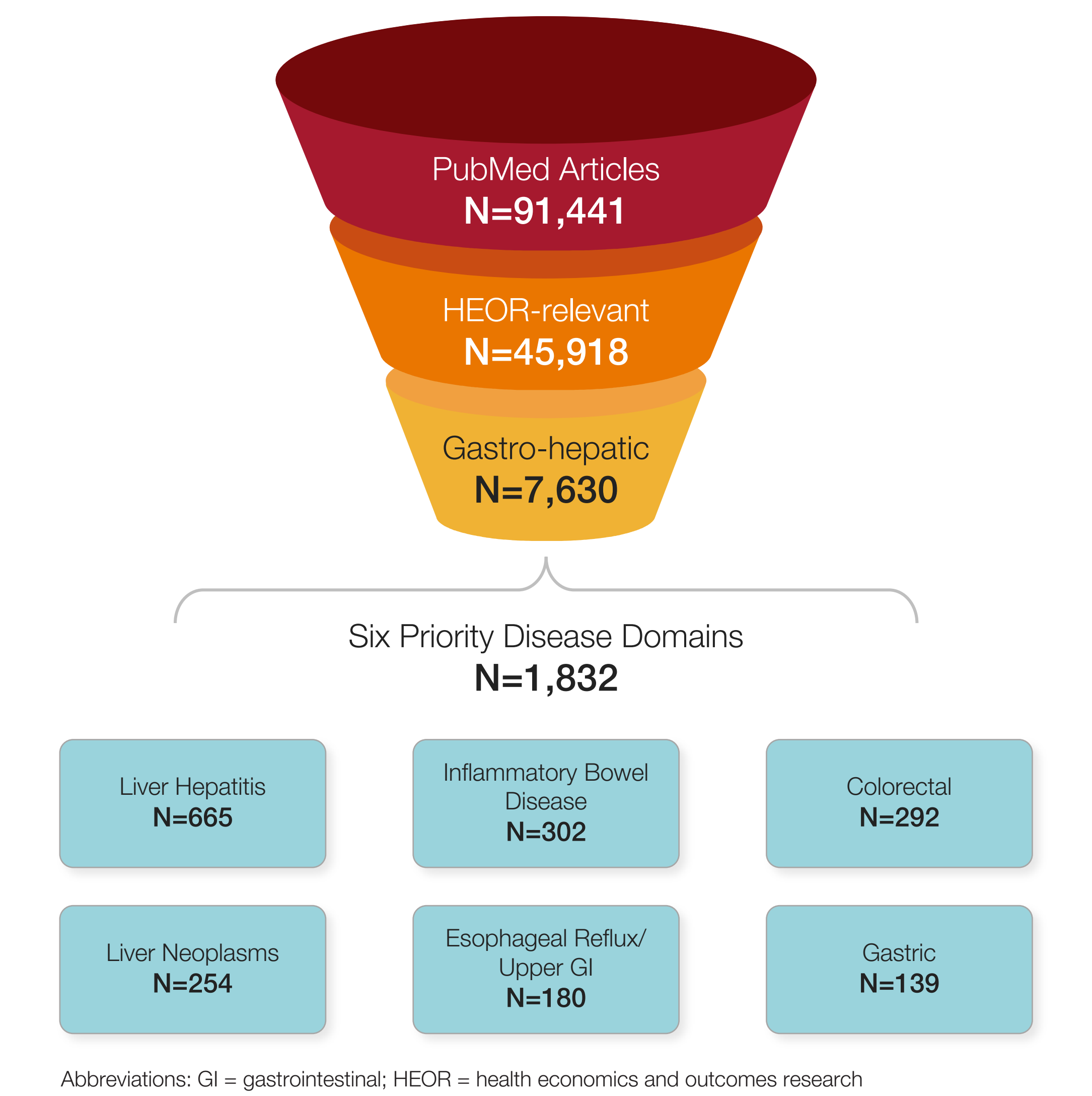
Objectives

- We refined an artificial intelligence (AI)-assisted pipeline to screen and categorize health economics and outcomes research (HEOR) evidence to:
 - Summarize evidence concentrations across Asia-relevant priority gastro-hepatic domains^{1,2}
 - Evaluate trends in economic evaluations by disease domain from 2000 to 2025
 - Identify HEOR evidence gaps to inform future research and strategic planning

Methods – Analysis

- Title and abstracts were processed with predefined prompts at different stages of the study to assign HEOR relevance, disease area, and subtype. Accuracy was assessed through blinded human review of a random sample of 350 records (Figure 1).
- Gastro-hepatic HEOR publications were identified from PubMed.
- AI was then used to develop inclusion and exclusion criteria and generate R code to categorize eligible gastro-hepatic studies into predefined priority disease domains and HEOR evidence categories. Human review guided the taxonomy and verified ambiguous classifications.
- Six Asia-relevant priority gastro-hepatic domains were analyzed across 11 HEOR evidence categories (Figure 1).

Figure 1. AI-Assisted Pipeline for HEOR Abstract Screening and Gastro-hepatic Classification



- Publication counts and within-disease-area percentages were summarized.
- HEOR evidence category distributions were compared across disease domains.
- Annual economic evaluation counts were summarized by disease domain from 2000 to 2025.
- Evidence concentrations and gaps were identified by comparing disease domain, HEOR category, and longitudinal publication patterns.

Limitations

- Findings were limited to English-language PubMed-indexed records from 2000 to 2025.
- Results depend on the search strategy, taxonomy definitions, and AI classification performance.
- AI classifications may be affected by (1) incomplete abstracts, (2) inconsistent terminology, (3) prompt variability, (4) using a general-purpose AI model not specifically trained on disease and HEOR classification, and (5) potential hallucinations.
- Broad gastro-hepatic retrieval included many records that were unspecified or outside predefined gastro-hepatic domains; these were excluded from priority-domain analyses, highlighting the need for continued taxonomy refinement.
- Publication counts reflect evidence volume but not study quality, regional applicability, decision impact, or direct proportionality to disease burden.

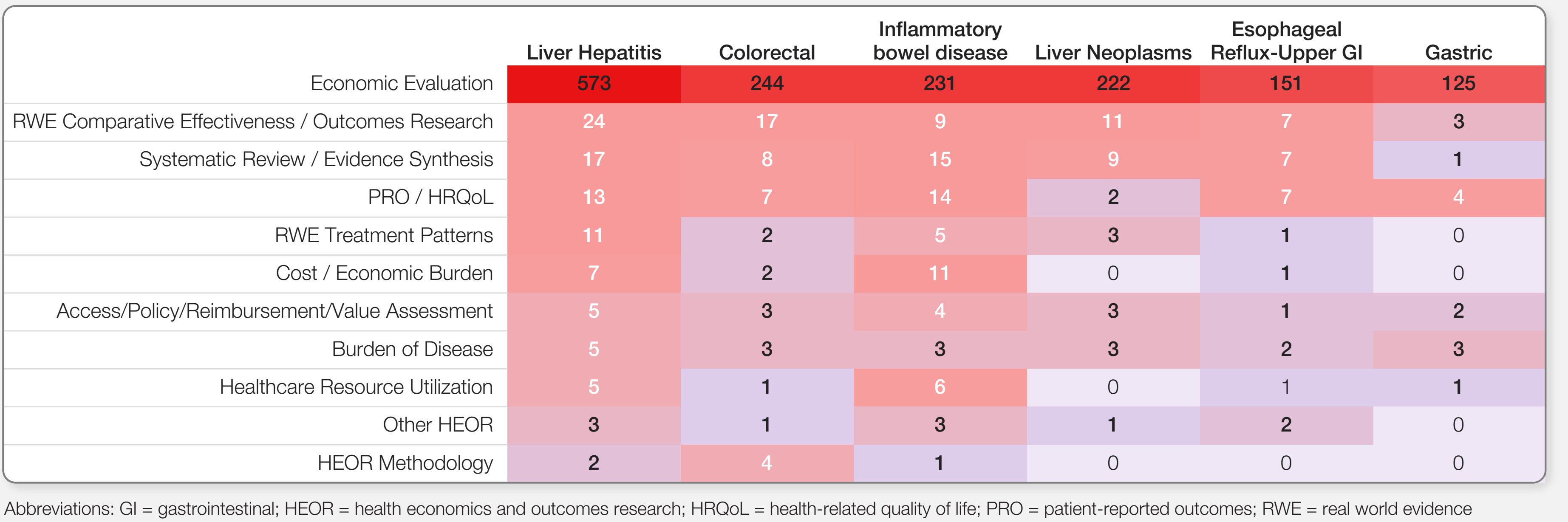
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Results

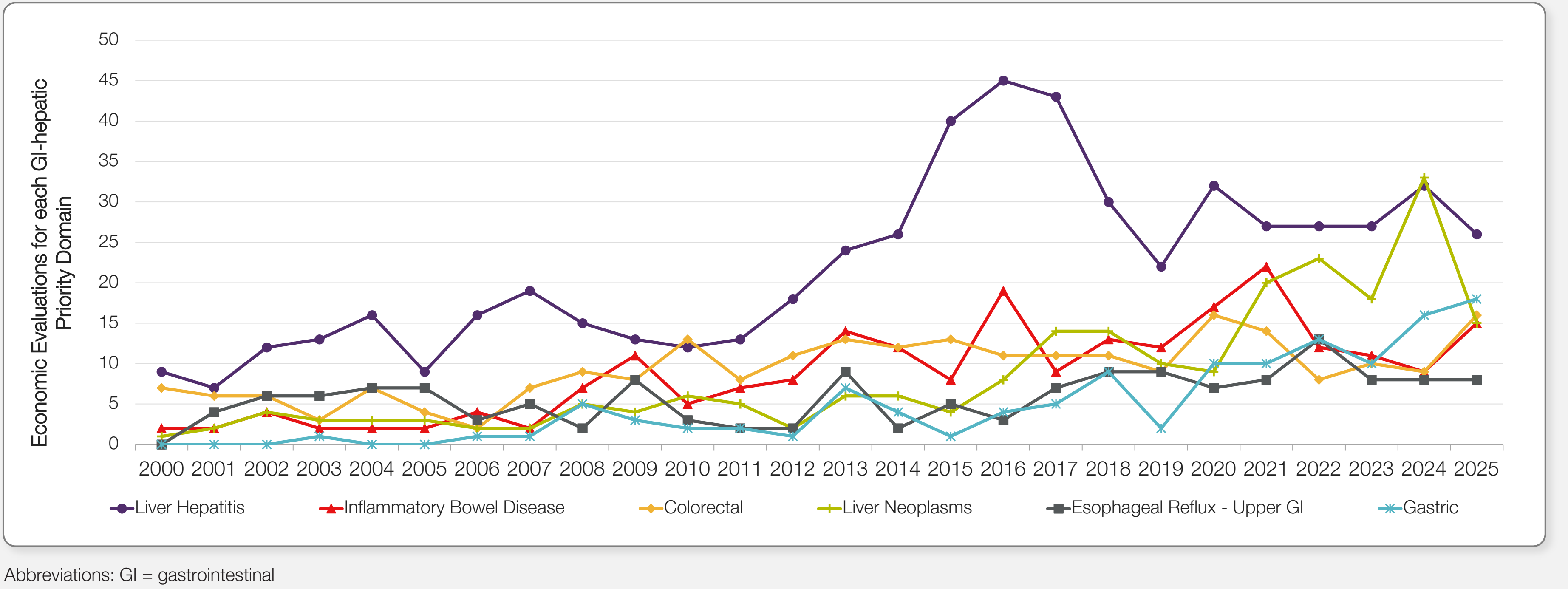
- Liver hepatitis represented the largest priority domain, followed by inflammatory bowel disease, colorectal disease, liver neoplasms, esophageal/reflux/upper gastrointestinal disease, and gastric disease. The remaining seven domains combined represented less than 4% of the total gastro-hepatic records and were not included in the analysis.
- Economic evaluations were the leading HEOR category across all six priority disease domains; the highest counts were seen in liver hepatitis, colorectal disease, inflammatory bowel disease, and liver neoplasms. By contrast, noneconomic-evaluation evidence was limited across domains; the largest remaining categories were real-world evidence (RWE) comparative effectiveness/outcomes research, systematic reviews/evidence synthesis, and patient-reported outcome/health-related quality of life studies (Figure 2).

Figure 2. HEOR Subtypes by Gastro-Hepatic Priority Disease Domain Heatmap



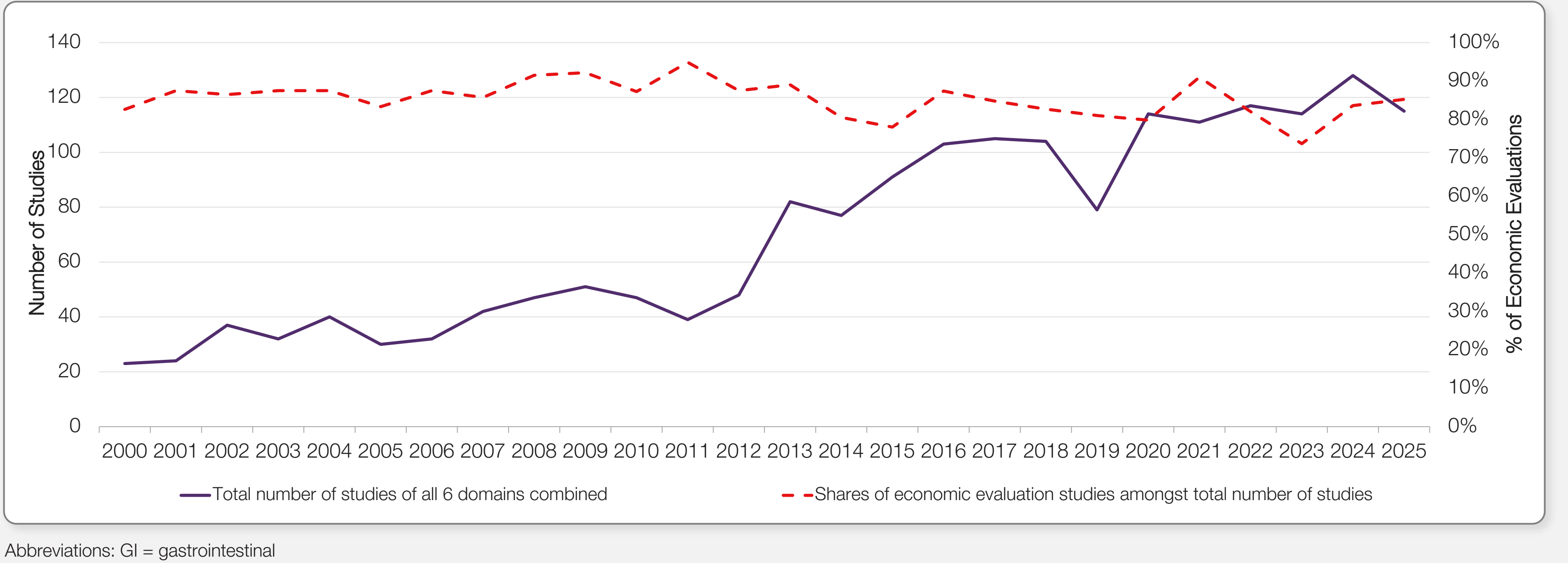
- From 2000 to 2025, annual economic evaluations across the six priority domains increased more than fivefold, with recent economic-evaluation growth especially notable for liver neoplasms and gastric disease. More than half of liver neoplasm and gastric economic evaluations were published from 2020 to 2025. Gastric disease showed the strongest recent rise, increasing to its highest annual count in 2025 (Figure 3).

Figure 3. Gastro-Hepatic Priority Domain Economic Evaluations by Year



- Among economic evaluations, cost-effectiveness analyses were the most common; budget impact models were uncommon.
- The number of gastro-hepatic priority studies increased substantially over time, despite a notable dip in 2019, whereas economic evaluations consistently accounted for a relatively stable proportion of the evidence base across the study period (Figure 4).

Figure 4. All Gastro-Hepatic Priority Domain Evidence by Year



Conclusions

- AI-assisted evidence mapping identified substantial gastro-hepatic HEOR evidence across Asia-relevant priority disease domains.
- Evidence was heavily concentrated in economic evaluations, which dominated across all six priority domains and increased substantially over time.
- Recent growth in economic evaluations was particularly evident for liver neoplasms and gastric disease.
- Despite this growth, important gaps remain in RWE, patient-centered outcomes, evidence synthesis, HEOR methods, access/policy, treatment patterns, burden of disease, and healthcare utilization.
- These findings highlight priority areas for future HEOR evidence generation beyond economic evaluations in gastro-hepatic diseases.

References

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