

Epidemiology, Risk Factors, and Burden Associated With Peritoneal Metastases in Gastric Cancer: A Systematic Literature Review

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CONCLUSIONS

- PM remains a common and high-burden manifestation of GC and continues to be associated with poor outcomes in real-world settings
- Evidence on risk factors was consistent with prior literature and further expanded the evidence base by suggesting emerging roles for biomarker- and inflammatory marker-based risk identification
- Systemic chemotherapy was the most commonly reported treatment for GCPM, while targeted therapies and ICIs were reported less often, likely reflecting geographic variation and real-world evidence data lag
- Findings from this SLR underscore consistently poor OS associated with GCPM, particularly in patients with unresectable disease. This suggests there is an opportunity to enhance adoption of novel therapies to improve outcomes in this high-risk population

INTRODUCTION

- An estimated 31,510 patients in the United States will be newly diagnosed with gastric cancer (GC) in 2026, resulting in approximately 10,740 deaths¹
- Gastric cancer peritoneal metastases (GCPM), the spread of GC cells from the stomach to the peritoneum, represents a common and serious complication that typically occurs in advanced-stage GC²
- Although prognosis remains poor for many patients with GCPM, novel therapies such as immune checkpoint inhibitors (ICIs), including programmed cell death protein 1 (PD-1) inhibitors, have received FDA approval and may offer an opportunity to improve outcomes³
- The objective of this study was to conduct a systematic literature review (SLR) to assess recently published evidence related to epidemiology, risk factors, and clinical, humanistic, and economic outcomes associated with peritoneal metastases (PM) in GC in the era of novel therapies

METHODS

- An SLR was conducted using Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)-aligned methods and included studies published between August 2021 and September 2025, building on previously published reviews to reflect the evolving landscape of GC treatment
- PubMed, Embase, and Cochrane searches were conducted on September 16, 2025, followed by title and abstract screening, full-text screening, and data extraction
- Study eligibility was defined using Population, Intervention, Comparison, Outcome, Timing, and Setting (PICOTS) criteria (Table 1)

Table 1. Study Selection Criteria

Domain	Inclusion Criteria	Exclusion Criteria
Population	<ul style="list-style-type: none">Patients with GC, inclusive of those with gastroesophageal junction cancer, and synchronous PM	<ul style="list-style-type: none">Patients without both GC and synchronous PMPatients with metachronous PMNon-human studies (eg, animal, in-vitro, in-situ)
Intervention/comparator	<ul style="list-style-type: none">N/A	<ul style="list-style-type: none">N/A
Outcomes	<ul style="list-style-type: none">IncidenceRisk factorsSurvival outcomes, including OS and PFSTreatment distribution and associated outcomesPROs such as QoLEconomic outcomes and HCRU	<ul style="list-style-type: none">Studies not reporting outcomes of interest
Timeframe	<ul style="list-style-type: none">August 1, 2021-September 16, 2025	<ul style="list-style-type: none">Published before August 1, 2021
Setting	<ul style="list-style-type: none">Observational studies to include: cross-sectional, case-control, cohort studies (prospective, retrospective)	<ul style="list-style-type: none">RCT, SLR, case reviews
Country	<ul style="list-style-type: none">No limits	
Language	<ul style="list-style-type: none">English language	<ul style="list-style-type: none">Non-English language

Abbreviations: GC, gastric cancer; HCRU, healthcare resource utilization; N/A, not applicable; OS, overall survival; PFS, progression-free survival; PM, peritoneal metastasis; PRO, patient-reported outcome; QoL, quality of life; RCT, randomized controlled trial; SLR, systematic literature review.

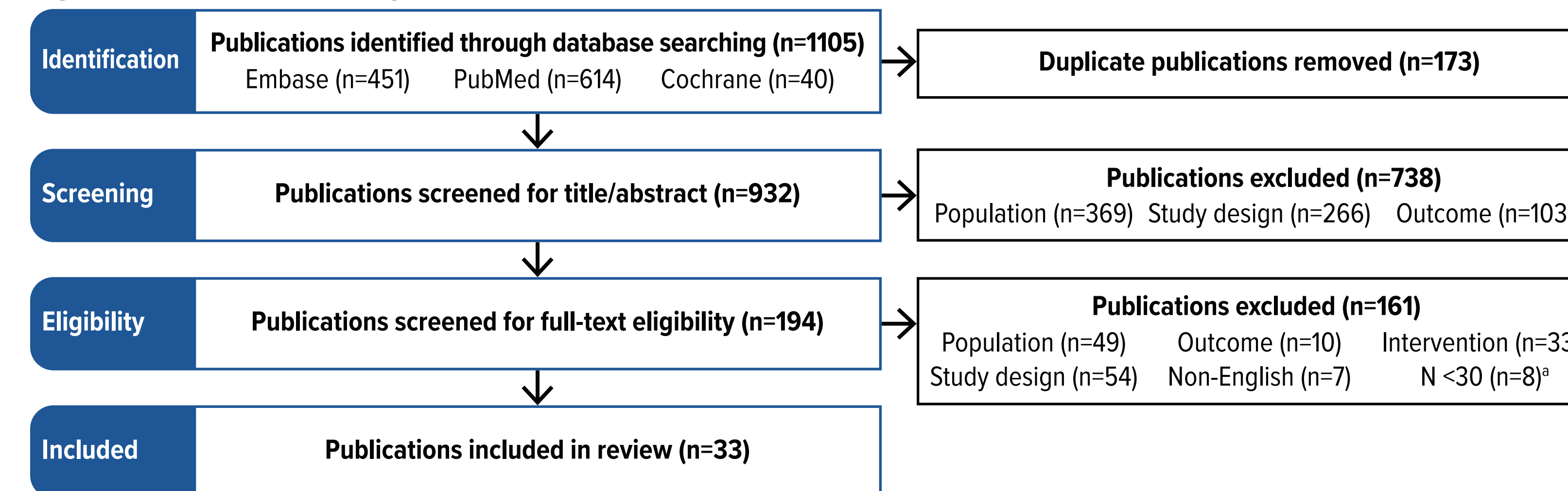
- Dual independent screening and data extraction were performed, with disagreements resolved by a third reviewer
- The methodological quality of included studies was assessed using the Methodological Items for Non-Randomized Studies (MINORS) instrument, a validated framework for assessing risk of bias and reporting adequacy in non-randomized designs⁴

RESULTS

Study Characteristics

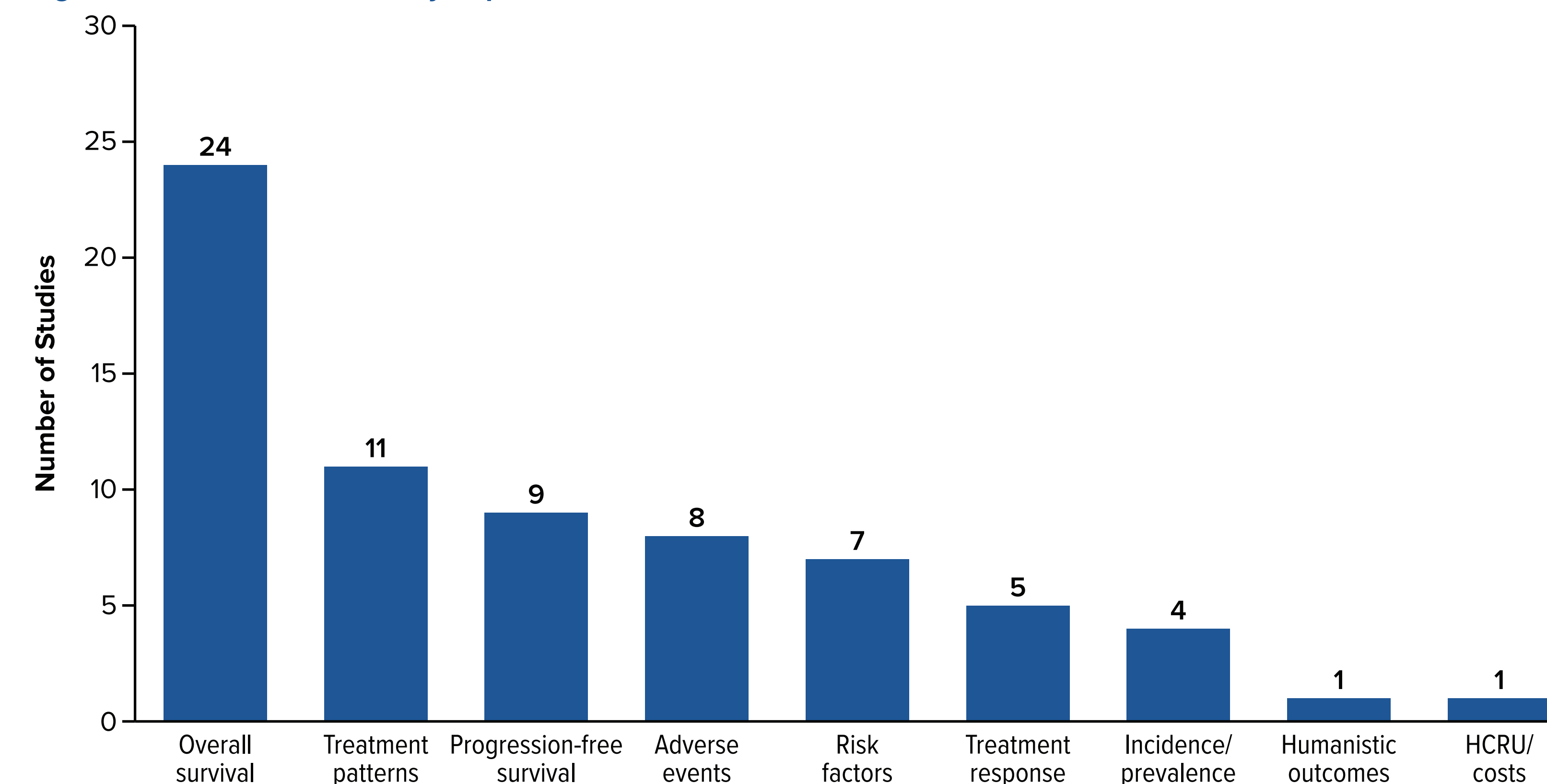
- From 1105 identified records, 33 observational real-world studies met the criteria for data extraction (Figure 1)
- Included studies were predominantly retrospective cohorts and were conducted across Asia, Europe, and North America, with the largest number from China, Japan, and the Netherlands
- Many studies reported clinical outcomes, such as overall survival (OS), progression-free survival (PFS), and adverse events; however, only one study each reported quality-of-life and healthcare resource utilization (HCRU) outcomes (Figure 2)
- Of 33 included studies, 27 were comparative and six were non-comparative; quality scores ranged from 9 to 21 (out of 24) and 6 to 9 (out of 16), respectively
- Study quality was variable but acceptable for a non-randomized evidence base. While comparative studies showed a wide range of quality scores, five achieved MINORS scores ≥ 18 . Non-comparative studies showed lower quality scores, reflecting the inherent limitations of non-comparative study designs

Figure 1. PRISMA Flow Diagram



*Studies that reported only surgical outcomes or had a sample size of fewer than 30 were excluded for data extraction.

Figure 2. Number of Studies by Reported Outcome



Note: The sum of studies exceeds 33 because multiple studies reported more than one outcome.

Abbreviation: HCRU, healthcare resource utilization.

Epidemiology

- Four studies reported the incidence or prevalence of GCPM (Table 2)
- Incidence and prevalence of GCPM were substantial, with the highest reported prevalence of 43% (US; 2016) and incidence of 34% (Netherlands; 2015-2016)

Table 2. GCPM Reported Prevalence & Incidence

Study Author (Year), Country	Data Source, Study Period	Patient Population	Total Patients (n)	Prevalence/Incidence
Sirody (2022), US	National Cancer Database, 2014-2016	Metastatic gastric adenocarcinoma patients in 2016	4749	Prevalence of GCPM: 43%
Rijken (2024), The Netherlands	Netherlands Cancer Registry, 2015-2016	GC diagnosed in 2015-2016	2206	Incidence of GCPM: 34% Incidence of synchronous GCPM: 23%
Wang (2023), China	Single-center registry, Jan 1, 2019-Dec 31, 2021	GC diagnosed in 2019-2021	1623	Prevalence of GCPM: 26.2%
Yang (2023), China	National Cancer Center of China, 2016 National Bureau of Statistics of China, 2010-2020	Total Chinese population	1,412,120,000	Prevalence of GCPM in 2020: 371.0/ million (absolute number: 523,937) Incident cases by year 2017: 295,540 2018: 296,682 2019: 297,668 2020: 298,099

Abbreviations: GC, gastric cancer; GCPM, gastric cancer peritoneal metastases; US, United States.

Risk Factors

- Risk factors for GCPM were evaluated in seven studies, with most studies from China (n=4)
- Consistently reported risk factors for PM in GC included younger age, diffuse-type histology, signet ring cell carcinoma, and advanced T stage
- Emerging evidence determined biomarkers and inflammatory markers that may be important in PM risk identification
- Overall, identified risk factors were consistent with findings reported in prior literature, including younger age, signet ring cell carcinoma, diffuse type histology, and T4 stage

Treatment Patterns

- Eleven studies reported data on the treatment patterns of GC with PM, drawing on population-based registries and single-center cohorts across multiple countries (Table 3)
- Systemic chemotherapy was the most frequently reported treatment across settings, while use of immunotherapy and targeted therapy was less frequent and often limited to later lines or selected cohorts
- Best supportive care was commonly reported, particularly in registry-based studies

Table 3. Treatment Patterns of GC With PM

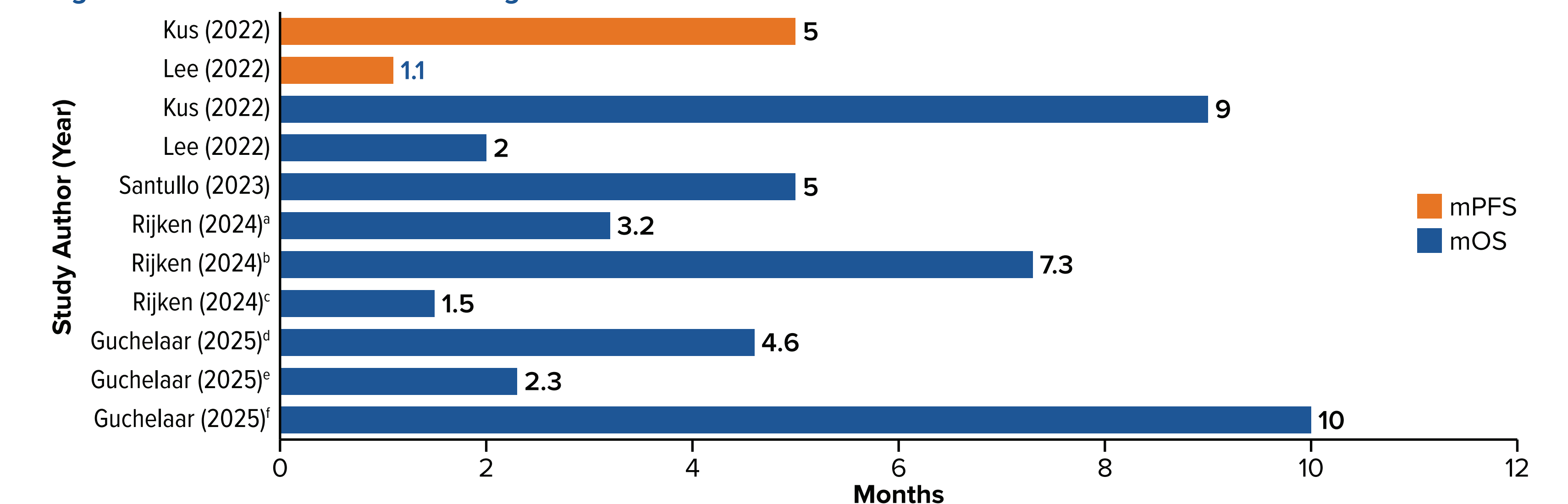
Study Author (Year)	Country	Data Source/Setting	Study Period	Treatment Pattern
Sirody (2022)	US	National Cancer Database	2004-2016	63% received systemic CT; \sim 10% surgery
Pereira (2024)	Brazil	Cohort study	Not reported	64.9% received 1L palliative CT
Santullo (2023)	Italy	Cohort study	2016-2021	\sim 80% received 1L fluoropyrimidine + platinum
Nakashima (2023)	Japan	Cohort study	2002-2022	IP-PTX + systemic CT; platinum/taxane regimens most common
Guchelaar (2025)	Netherlands	Netherlands Cancer Registry	2015-2020	Systemic therapy in 39%-43%; doublets most common
Zhang (2022)	China	Cohort study	2016-2021	ICI + CT in 8.6%-12.9%; trastuzumab in 83.3% of HER2+ patients
Lee (2022)	South Korea	Cohort study	2017-2021	Nivolumab mainly used in later lines
Guo (2025)	China	Cohort study	2020-2023	1L PD-1 + anti-angiogenic therapy + CT in selected patients
Dai (2023)	China	Cohort study	2018-2022	52.2% received CT + ICI
Van der Sluis (2024)	Netherlands	Registry-based study	2016-2021	42% best supportive care; 42% systemic therapy; 16% resection
Rijken (2024)	Netherlands	Registry-based study	2016-2021	56% best supportive care; 9% surgery

Abbreviations: 1L, first line; CT, chemotherapy; IP-PTX, intraperitoneal paclitaxel; ICI, immune checkpoint inhibitor; PD-1, programmed cell death protein 1.

Clinical Outcomes

- Clinical outcomes varied by resectability: median OS reached up to 39 months in patients with resectable disease or mixed populations, but was typically 2-10 months in unresectable disease (Figure 3)
- PFS followed a similar pattern, with longer PFS in resectable cohorts and shorter PFS in patients with unresectable disease

Figure 3. Median OS and PFS Among Patients With Unresectable Disease



Among studies that reported survival by treatment subgroup, the following annotations indicate how subgroups were defined:

*All synchronous PM; †Tumor-direct treatment; ‡Best supportive care; §Overall; ¶No systemic therapy; ††Systemic therapy.

Abbreviations: mOS, median overall survival; mPFS, median progression-free survival; PM, peritoneal metastases.

Humanistic Outcomes & Healthcare Resource Utilization and Costs

- Humanistic and HCRU evidence were very limited, with only one study identified for each outcome
- The available data suggest some quality-of-life benefit with combination therapy (apatinib mesylate plus SOX vs SOX alone), and slightly longer hospital stays following diagnostic laparoscopy among patients at higher versus lower risk of mortality (6.4 vs 5.9 days)
- No data were available on healthcare costs associated with GCPM

Limitations

- The interpretation of findings is limited by variance in how PM was identified, defined, and reported across studies
- Similarly, there was inconsistent reporting of treatment patterns across included studies, which limits comparability between patient groups
- The use of novel therapies like PD-1 inhibitors is likely underestimated due to the retrospective nature of the included studies as well as lag time caused by data collection and publication time

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DISCLOSURES

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