

# Health State Utility Values for Patients with Chemotherapy-Induced Myelosuppression: A Systematic Review

Zach Baldwin, PharmD candidate; Josh J Carlson PhD, MPH

## Background

Myelosuppression during chemotherapy can substantially impact a patient’s quality of life.

> Myelosuppression events include neutropenia, anemia, and thrombocytopenia.

> Up to 80% of patients may experience a myelosuppressive event during chemotherapy; this is dependent on cancer type, what therapies they use and when, and what event and event severities are being counted.<sup>1</sup>

Guidelines recommend treatment with the colony stimulating factors, filgrastim and peg-filgrastim, to reduce the risk of neutropenia development.

Treatments for anemia include transfusion therapy and erythropoietin stimulating agents, with the latter typically reserved for refractory patients.

Plinabulin and trilaciclib are two new agents, studied in breast cancer and lung cancer, to be used for the prevention of chemotherapy-induced myelosuppression.

Health state utility values (HSUVs) are a measure of health-related quality-of-life and can be used in economic evaluations of medications.

## Objectives

Identify and characterize health state utility values reported in the literature for chemotherapy-induced myelosuppressive events in the breast and lung cancer population.

## Methods

> Searches queried in PubMed and EMBASE.

> Search terms: chemotherapy, myelosuppression, febrile neutropenia, utilities, time trade off, standard gamble, visual analog scale, cost-utility analysis, cost-effectiveness analysis

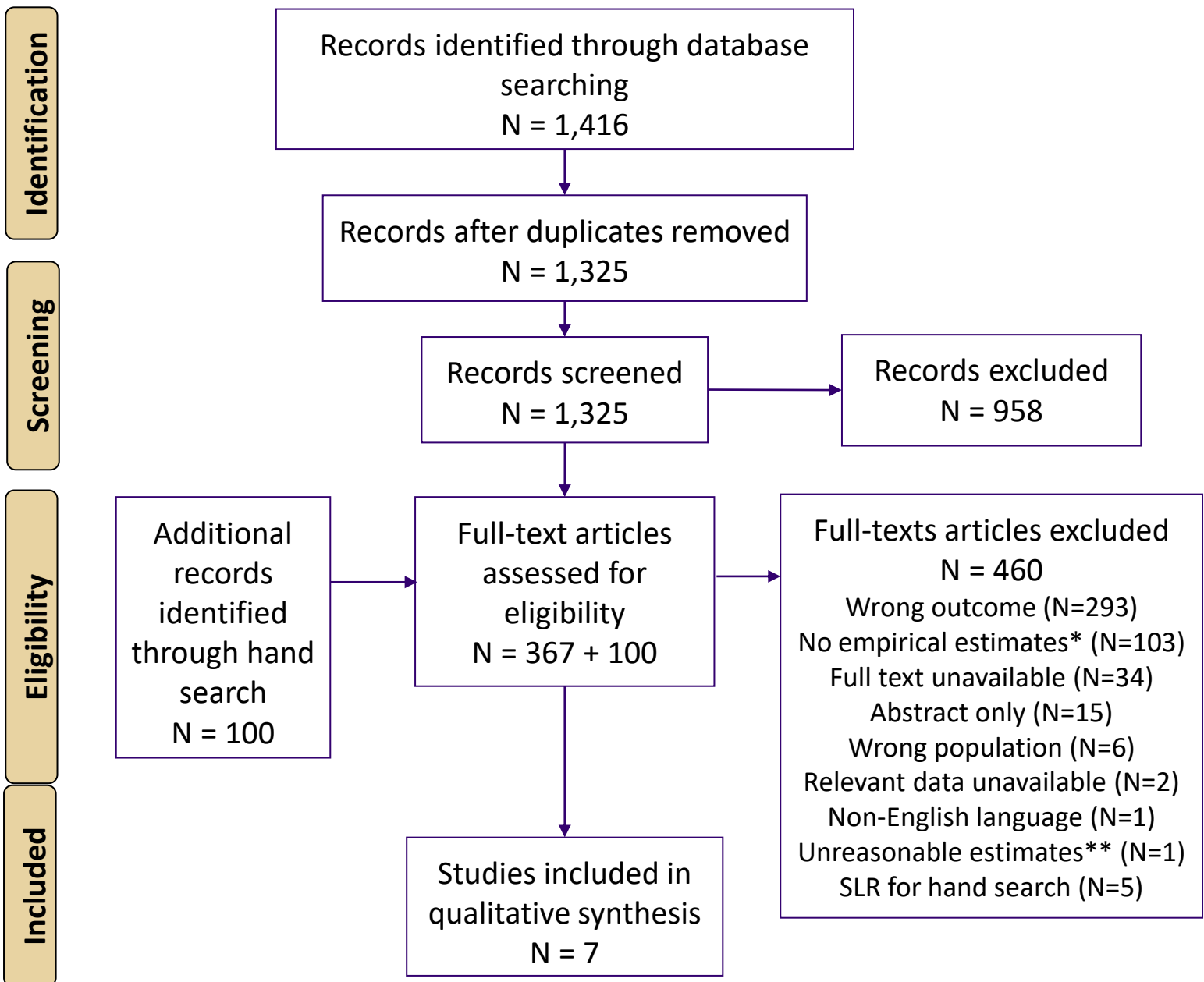
> Myelosuppression included: neutropenia, febrile neutropenia (FN), anemia, or thrombocytopenia.

> Patient population consisted of cancer of any severity or line of therapy for: breast cancer, non-small cell lung cancer, and small cell lung cancer.

> Conducted a complete review over reference lists of systematic reviews, meta-analyses, and cost-effectiveness studies.

> Used descriptive statistics to characterize the value estimates from the collected literature.

Figure 1: PRISMA Flowchart



SLR: systematic literature review  
\* Studies without empirical estimates were hand searched to find original utilities  
\*\* The study includes death utilities above 0 which is against general consensus for this value.

## Results

After duplicate removal, 1,325 records were screened with the inclusion and exclusion criteria, resulting with 467 records for full text review. After full-text screening, 7 studies met inclusion criteria.

> Only HSUVs for febrile neutropenia and neutropenia were identified.

## Results (cont.)

> FN utility values ranged from 0.19—0.57 across all cancer types and stages.

> Grade 4 neutropenia utility was cited at 0.32, while disutility ranged from -0.08 to -0.5 across different cancer types and stages.

> Disutility values for neutropenia and FN were greater in first line therapy patients (-0.15 to -0.59) than in second line patients (-0.08 to -0.09).

Table 1: Utilities and Disutilities of Chemotherapy-Induced Myelosuppression

Author, Year, Region	Study Design	Population	Therapy Line	Interventions, Comparators	Method and Source of Valuation	Outcomes
Breast Cancer						
Brown 1998 <sup>2</sup> ; US	CUA	Advanced, metastatic cancer	2L	Docetaxel vs. paclitaxel	SG; Nurse	FN and hospitalized: US 0.42 Six country average: 0.30
Brown 2001 <sup>3</sup> ; UK	CUA	Advanced, anthracycline-resistant	NS	Docetaxel vs. paclitaxel and vinorelbine	SG; Nurse	Febrile neutropenia and hospitalized: 0.24 (SD 0.12)
Lloyd 2006 <sup>4</sup> ; UK	Utility survey (n=100)	Metastatic	NS	NS	SG & VAS; Public	Febrile neutropenia: -0.15
Non-Small Cell Lung Cancer						
Lewis 2010 <sup>5</sup> ; UK	CUA	Stages III and IV	NS	Erlotinib vs docetaxel	VAS; Public	Grade 4 neutropenia: 0.32 Febrile neutropenia: 0.19
Nafees 2008 <sup>6</sup> ; UK	Utility survey (n=100)	Metastatic	2L	NS	SG & VAS; Public	Neutropenia: -0.08 Febrile neutropenia: -0.09
Nafees 2017 <sup>7</sup> ; Global	Utility survey (n=451)	Metastatic	1L	NS	TTO & VAS; Public	Febrile neutropenia vs Neutropenia: Global: -0.47 vs -0.35 AUS: -0.49 vs -0.50 China: -0.42 vs -0.20 France: -0.59 vs -0.47 Korea: -0.40 vs -0.15 Taiwan: -0.36 vs -0.25 UK -0.50 vs -0.46
Small Cell Lung Cancer*						
Chouaid 1998 <sup>8</sup> ; US	Utility survey (n=10)	History of FN	NS	NS	VAS; Patient	No Febrile neutropenia and no CSF: 1 Febrile neutropenia and no CSF: 0.57 (SD 0.16) No febrile neutropenia and CSF: 0.85 (SD 0.08) Febrile neutropenia and CSF: 0.36 (SD 0.23)

1L: first line; 2L: second line; AUS: Australia; CSF: colony stimulating factors; CUA: cost-utility analysis; FN: febrile neutropenia; N: neutropenia; NS: non-specific; SG: Standard Gamble; TTO: Time trade-off; UK: United Kingdom; US: United States; VAS: Visual analog scale

\* This study was included for its estimates around SCLC, though the baseline utility estimate of 1 in SCLC patients without FN and CSF is lacking acceptability.

## Conclusion

> There was a lack of utility values for anemia and thrombocytopenia for breast or lung cancers.

> First line patients may represent a subgroup of patients that would derive substantial benefit from avoidance of adverse chemotherapy side effects.

> More recent studies covering all myelosuppressive events in these cancers would facilitate robust value assessments of preventative therapies.

### Key takeaways:

> Substantial disutility exists for those experiencing myelosuppression.

> The extent of this disutility varied across cancer type and severity, and myelosuppressive event seen.

> Most studies are published more than 10 years ago.

References:  
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