Integration of the social determinants of health into quality indicators for colorectal cancer surgery: a scoping review protocol

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ABSTRACT

Introduction Quality monitoring is a critical component of high-performing cancer care systems. Quality indicators (QIs) are standardised, evidence-based measures of healthcare quality that allow healthcare systems to track performance, identify gaps in healthcare delivery and inform areas of priority for strategic planning. Social structures and economic systems that allow for unequal access to power and resources that shape health and health inequities can be described through the social determinants of health (SDoH) framework. Therefore, granular analysis of healthcare quality through SDoH frameworks is required to identify patient subgroups who may experience health inequity. Given the high burden of disease of colorectal cancer (CRC) and well-defined cancer care pathways, CRC is often the first disease site targeted by health systems for quality improvement. The objective of this review is to examine how SDoH have been integrated into QIs for CRC surgery. This review aims to address three primary questions: (1) Have SDoH been integrated into the development, reporting and assessment of CRC surgery QIs? (2) When integrated, what measures and statistical methods have been applied? (3) In which direction do individual SDoH influence QIs outputs?

Methods This review will follow Arksey and O’Malley frameworks for scoping reviews. We will search MEDLINE, EMBASE, HealthSTAR databases for papers that examine QIs for CRC surgery applicable to healthcare systems from database inception until January 2023. Interventional trials, prospective and retrospective observational studies, reviews, case series and qualitative study designs will be included. Two authors will independently review all titles, abstracts and full texts to determine which studies meet the inclusion criteria.

Ethics & dissemination No ethics approval is required for this review. Results will be disseminated through scientific presentation and relevant conferences targeted for researchers examining healthcare quality and equity in cancer care.

Registration details osf.io/vfd3-Open Science Framework.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This study utilises the expanded Arksey and O’Malley framework for scoping reviews to explore the literature examining how the social determinants of health are integrated into quality indicators for colorectal cancer surgery.
⇒ Inclusion criteria for quality indicators is kept intentionally broad in order to capture the breadth of use (or non-use) of social determinants of health in quality indicator development, measurement and reporting.
⇒ An integrated conceptual framework for understanding and addressing social determinants for cancer health equity will be utilised to structure data extraction and analysis, interpretation and reporting.
⇒ The concept of healthcare quality and quality indicators is relatively new, and therefore this search strategy may not capture all studies that examined quality indicators before this concept was clearly defined (early 2000s).
⇒ The population of interest in this study is adults with American Joint Committee on Cancer stages I–III colorectal cancer undergoing surgery, therefore, the findings may not be applicable to other cancer therapies (such as chemotherapy or radiation therapy), along different timepoints in cancer care (ie, cancer screening, survivorship or palliation), or to other cancer disease sites (ie, breast, lung, prostate, etc).

INTRODUCTION

Quality monitoring has become a key component of healthcare organisations and systems. This approach stems in-part from recommendations from the Institute of Medicine (IOM) as outlined in their reports To Err is Human: Building a Safer Health System (1999) and Crossing the Quality Chasm: A New Health System for the 21st Century.1,2 Six aims for improvement in healthcare systems were proposed, specifically, the delivery of safe, effective, patient-centred, timely, efficient and equitable care.2 This framework allows...
Surgical resection is a mainstay of curative intent therapy from this disease site can further support similar work in examining the integration of SDoH in QIs. Learning systems across geopolitical boundaries have incorporated QIs into care planning, including the Agency for Healthcare Research and Quality (AHRQ) in the USA and the Canadian Institute for Health Information (CIHI) in Canada.3–6

Within the field of oncology, several QIs are used to assess quality of care along the cancer care continuum, from cancer screening to survivorship care.7 By establishing tumor-site specific, evidence-based benchmarks in cancer care delivery, QIs can help identify gaps in healthcare delivery, patient experience and outcomes. Furthermore, they allow for comparisons over time within and between institutions, which inform areas of priority for organisations and accountability for quality improvement through targeted allocation of resources.8

While quality and performance monitoring are crucial in providing high-quality cancer care, the impact of such programmes may be limited by inequalities and inequities within the measures.9 QIs are most often reported by hospitals, regions or providers, for large groups of patients. However, analyses stratifying these outputs by social determinants of health (SDoH; such as, gender, race, ethnicity, socioeconomic status (SES), education, income, immigrant status, etc) are sparse. QIs that do not account for SDoH are inherently interpreted through unconscious biases and favour dominant groups of patients from whose data they were derived.10 The lack of measurement and understanding of potential inequalities and inequities in QIs by SDoH may hamper the ability to improve care for all patients and even exacerbate existing disparities. In short: we cannot address what we do not know about.11

Given the high burden of disease, effectiveness of screening and well-defined multimodal treatment pathways, colorectal cancer (CRC) is often one of the first cancer sites targeted by healthcare systems and organisations globally for quality improvement strategies.12–13 Surgical resection is a mainstay of curative intent therapy for American Joint Committee on Cancer (AJCC) stages I–III disease and in select stage IV patients with resectable low-volume liver, lung or peritoneal metastases.14–16 Five-year overall survival (OS) rates for patients with stages I, II, III and IV cancers are as high as 92%, 88%, 82% and 32%, respectively.16 17 However, disparities by SDoH in CRC outcomes have been described along the cancer care continuum.18–20 Therefore, CRC lends itself well to examining the integration of SDoH in QIs. Learning from this disease site can further support similar work in other sites.

With this scoping review, we seek to describe how SDoH have been used in the development, measurement and reporting of QIs for CRC surgery. The goal of this study is to form a foundational basis for the exploration of social context in the assessment of quality cancer surgery. This work will inform future efforts aimed at formally examining the relationships between SDoH and QIs to support equity in the use of QIs for healthcare providers, organisations and systems.

METHODS AND ANALYSIS
A scoping review methodology will be used to explore the literature describing the use of SDoH for QIs in CRC surgery utilising the expanded Arksey and O’Malley framework for scoping reviews.21–23 The Preferred Reporting Items for Systematic Reviews and Meta-Analysis Extension for Scoping Reviews will be used for the development of this scoping review.24 This review has been registered with Open Science Framework (osf.io/vzd3). The planned start date for this study is September 2023 and the end date is January 2024.

Objectives
This scoping review will answer the following questions specific to surgical resection in patients with CRC:
1. Are SDoH being integrated into the development, reporting, and assessment of QIs?
2. When SDoH have been integrated into QIs, what measures and statistical methods have been applied?
3. In which direction do individual social determinants influence QIs (association with higher or lower QIs)?

Eligibility criteria
Table 1 outlines the inclusion and exclusion criteria for this review. Given that this scoping review seeks to explore the landscape of how SDoH are integrated into QIs, the inclusion criteria are intentionally broad to capture the breadth of use (or non-use) of SDoH in QIs development, measurement and reporting. To capture potential gaps in the use of SDoH for QIs, we will include all studies discussing QIs, with or without direct reference to SDoH.

Outcomes: quality indicators
QIs have been defined in many ways including: (1) measures that assess a particular healthcare process or outcome, (2) quantitative measures that can be used to monitor and evaluate the quality of important governance, management, clinical and support functions that affect patient outcomes and (3) measurement tools, screens or flags that are used as guides to monitor, evaluate and improve the quality of patient care, clinical support services and organisational function that affect patient outcomes.25 For this study, QIs will be defined according to the AHRQ definition: ‘standardized, evidence-based measures of health care quality that can be used with readily available hospital inpatient administrative data to measure and track clinical performance and outcomes’.3
QIs for CRC surgery that are applicable to healthcare systems, hospitals and teams of clinicians will be considered (table 1). Studies that do not define QIs or that measure specific outcomes without an explicit mention of their relationship to QIs will be excluded.

Exposures: social determinants of health
SDoH are defined by the WHO as non-medical factors that influence health outcomes and are the conditions in which people are born, grow, work, live and age, and the wider set of forces and systems shaping the conditions of daily life. SDoH include social structures and economic systems that allow for unequal access to power and resources and shape health and health inequities.

Individual, group-level and population-level SDoH will be included as described by Singh et al of the US Department of Health and Human Services, Office of Health Equity. Individual and group-level examples include gender, race, ethnicity, SES, social class, education, income, occupation, employment status, housing tenure, immigrant status, language use, disability status and social capital. Population level examples include socioeconomic deprivation, poverty rate, income inequality, educational opportunity, labour market structure, affordable housing, access to healthy foods/good nutrition, provision of health services, access to essential goods and services, transportation infrastructure, physical and built environments, racial/ethnic population composition, medically underserved or health professional shortage areas and spending on public safety, social and welfare services.

Population
The population of interest includes adults (≥18 years) with a diagnosis of AJCC stages I–III CRC undergoing surgical resection.

Study details
Studies that examine QIs for CRC surgery in English will be retained. Randomised and non-randomised interventional trials, prospective and retrospective observational studies, reviews, case series and qualitative study designs will be included. Editorials, opinion pieces, case-reports, dissertations, conference abstracts, protocols and grey literature studies will be excluded.

Search strategy and information sources
The search strategy was developed in consultation with a health sciences librarian. The strategy was initially developed for use within MEDLINE (table 2), and subsequently adopted for EMBASE and HealthSTAR (online supplemental tables 1,2). Additional text words may be added to the search in an iterative manner as reviewers explore the evidence base.

The three databases for this study (MEDLINE, EMBASE and HealthSTAR) were selected in consultation with the health sciences librarian and were selected to cover a significant portion of the literature. MEDLINE database

### Table 1: Summary of inclusion and exclusion criteria to be applied to citations identified through the literature search

<table>
<thead>
<tr>
<th>Inclusion criteria</th>
<th>Exclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome Measurement or discussion of ≥1 QIs Example: documentation of extent of lymphadenectomy, pathological examination of ≥12 lymph nodes, margin status, proportion of patients with anastomotic leak</td>
<td>No measurement or discussion of specific QIs</td>
</tr>
<tr>
<td></td>
<td>Measurement of discussion of the following outcomes only: Survival, Progression free survival, Cost to healthcare system, Quality of life measures, Patient reported outcome measures (eg, symptoms)</td>
</tr>
<tr>
<td>Exposure Including or not including SDoHs</td>
<td>Population Age≥18 years (all participants), Age&lt;18 years (any participants)</td>
</tr>
<tr>
<td>Population AJCC stages I–III patients undergoing surgery for CRC</td>
<td>No CRC diagnosis (any participants), Interventions outside of surgery (screening or diagnosis), Interventions outside the context of cancer care, Palliative surgery</td>
</tr>
<tr>
<td>Study details Randomised and non-randomised interventional trials, Prospective and retrospective observational studies, Reviews and meta-analysis, Case series of 10 or more subjects, Qualitative and epistemological studies, Written in English</td>
<td>Editorials, opinion pieces, case-reports, dissertations, conference abstracts, protocols, Grey literature</td>
</tr>
</tbody>
</table>

Table definitions: outcome=primary outcome of the study; exposure=primary exposure of the study; population=study population of interest; study details=study design and details.
CRC, colorectal cancer; QIs, quality indicators; SDoH, social determinants of health.
Table 2  Ovid MEDLINE Search strategy

<table>
<thead>
<tr>
<th>#</th>
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<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>exp Quality Indicators, Health Care/</td>
<td>24642</td>
</tr>
<tr>
<td>2</td>
<td>(Quality Metric* or Quality Measure* or Quality Indicator* or Performance Indicator* or Key Performance Indicator* or Surg* Indicator* or Outcome Indicator* or Outcome Measure* or Textbook outcome* or Failure to rescue or Health Care Quality or Healthcare Quality or Clinical Indicator* or Patient Safety Indicator*),tw,kf.</td>
<td>311287</td>
</tr>
<tr>
<td>3</td>
<td>exp Colonic Neoplasms/</td>
<td>81304</td>
</tr>
<tr>
<td>4</td>
<td>exp Rectal Neoplasms/</td>
<td>52949</td>
</tr>
<tr>
<td>5</td>
<td>exp Colorectal Neoplasms/</td>
<td>232037</td>
</tr>
<tr>
<td>6</td>
<td>(colonic neoplasm* or rectal neoplasm* or colorectal neoplasm* or colon cancer* or Rectal cancer* or Colorectal cancer* or Cancer of the colon or Cancer of the rectum or Colon* tumor?r or Colon* malignanc* or Colon* mass or Colon* neoplasm* or rectal tumor?r or Rectal malignanc* or Rectal mass or Rectal neoplasm*),tw,kf.</td>
<td>205648</td>
</tr>
<tr>
<td>7</td>
<td>exp Surgical Oncology/</td>
<td>739</td>
</tr>
<tr>
<td>8</td>
<td>exp Colorectal Surgery/</td>
<td>4277</td>
</tr>
<tr>
<td>9</td>
<td>(surgery or colon* surgery or Rectal surgery or Surgical oncology or Colorectal surgeon* or Cancer surgeon* or Colon resection or Large bowel resection or Bowel resection or Rectal resection or Right hemicolectomy or Extended right hemicolectomy or Transverse colectomy or Left hemicolectomy or Extended left hemicolectomy or Sigmoid colectomy or Sigmoidectomy or Rectosigmoidectomy or Rectosigmoidectomy or Low anterior resection or Anterior resection or Ultra low anterior resection or Ultralow anterior resection or Abdominoperineal resection or Protocolectomy or Total proctocolectomy or Total colectomy or Total abdominal colectomy or Subtotal colectomy).tw,kf.</td>
<td>1456575</td>
</tr>
<tr>
<td>10</td>
<td>1 or 2 (concept 1: quality indicators)</td>
<td>328507</td>
</tr>
<tr>
<td>11</td>
<td>3 or 4 or 5 or 6 (concept 2: colorectal cancer)</td>
<td>292593</td>
</tr>
<tr>
<td>12</td>
<td>7 or 8 or 9 (concept 3: cancer surgery)</td>
<td>1458184</td>
</tr>
<tr>
<td>13</td>
<td>10 and 11 and 12 (concepts: quality indicators, colorectal cancer, colorectal cancer surgery)</td>
<td>1722</td>
</tr>
</tbody>
</table>

is the National Library of Medicines (NLM) premier bibliographic database that contains more than 29 million references to journal articles in life sciences with a concentration on biomedicine. MEDLINE is the primary component of PubMed, and includes literature published from 1966 to present. Similarly, EMBASE contains citation information for the health sciences and biomedicine discipline, however, it contains more European-oriented publications. Embase, published by Elsevier science, contains records from 1947 onwards on more than 10 million articles from more than 7600 scientific journals including approximately 2000 journals not indexed in Medline. The overlap between EMBASE and MEDLINE is 10%–75% depending on the topic. Therefore, EMBASE was selected to find more published work outside of the North American focused MEDLINE. Finally, HealthSTAR database contains research on the health services, technology, administration and research. However, HealthSTAR focus’ on clinical and non-clinical aspects of healthcare delivery. Therefore, HealthSTAR was selected in this study because of its non-clinical and administrative focus which will add to the richness and robustness of our search strategy.

Study selection
Study selection will follow guidelines from the JBI Manual for Evidence Synthesis and Arksey and O’Malley framework or scoping reviews and be reported according to Preferred Reporting Items for Systematic reviews and Meta-Analyses reporting guidelines (figure 1). Two members of the research team will pilot the selection strategy on the first 10 studies.

Theoretical framework
An integrated conceptual framework for understanding and addressing social determinants for cancer health equity will be utilised to structure data extraction and analysis, interpretation and reporting. Four primary concepts will be incorporated: SDoH (exposures, as above), health equity, health disparities and marginalisation. Health equity refers to the absence of systematic disparities in health between social groups who have different levels of underlying social advantage/disadvantage. Health disparities represent a metric used to measure progress towards achieving health equity. Reduction in health disparities is objective evidence of moving towards health equity as these two concepts can be thought of as having an inverse relationship. For the purposes of this review, health disparities and health inequities will be used interchangeably. Marginalisation is a process through which persons are peripheralised to the ‘margins’ based on their identities, associations, experiences and environment which results in economic, socio-political and cultural isolation. As a result, persons who experience marginalisation are excluded from meaningful and equitable distribution of resources in society,
have less power and may experience increased disparity. Therefore, the concept of marginalisation in conjunction with SDoH, health equity and health disparity will be used as the conceptual basis for this scoping review.

**Data extraction**
Data extraction will follow an iterative process as outlined in the JBI Manual for Evidence Synthesis and Arksey and O’Malley. Data extraction tables have been designed by the research team (tables 3,4). Data extraction will be reviewed by the research team and changes will be implemented as needed to effectively incorporate the research objectives as outlined in best practice for scoping reviews. A pilot will first be conducted whereby two independent researchers (AB-S and TR) will extract data from the first 10 studies into preliminary tables. Results from pilot data extraction will be reviewed by the research team and changes to the tables will be made as necessary.

Careful examination of the studies’ methods will be performed to determine whether high-quality research to identify subgroups of the population experiencing health inequity was conducted. Therefore, data extraction will include methodological description of how SDoH are integrated into studying of QIs (objective 2). We will document the methodology used to assess whether gaps exist but will not grade nor score the quality of studies as recommended by scoping review methodology. We will report the measures and statistical methods applied to the examination of the relationship between SDoH and QIs. We will document the use of causal frameworks to inform the research questions, as well as methods to measure SDoH and covariates. Indeed, methodology such as approach to covariate adjustment, consideration of appropriate reference group and reporting additive or relative effect estimates has an impact on the conclusions.

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Figure 1 Summary of inclusion and exclusion criteria to be applied to citations identified through the literature search.
and quality of research.48–50 Patients and service users is known to enhance the relevance, validity and participation of SDoH into their development, reporting, and use of SDoH in this literature. Potential implications on research, policy or clinical use will be discussed, and drawing and whether authors discover health inequities or not.10 44 45

Data analysis
In keeping with scoping review objectives and methodology, data analysis will include a descriptive numerical analysis followed by thematic analysis.21 22 47 A descriptive numerical summary using tables and charts will describe proportions of study characteristics as guided by study objectives and data extraction. Key study characteristics will include study design, aims, SDoH studies, direction of observed associations and methods used (tables 3, 4). The nature and distribution of the included studies examining QIs in CRC surgery will provide an insight into the scope and use of SDoH in this literature. Potential implications on research, policy or clinical use will be discussed, including a list of reported QIs and strategies for incorporating SDoH into their development, reporting, and assessment.

Patient and public involvement
Stakeholder engagement with inclusion of patients and service users is known to enhance the relevance, validity and quality of research.44–56 Patients and service users (such as patient caregivers, community members or the general public/citizens) are critical partners in research as they add a unique perspective through lived experiences that contextualise research outputs. Following the patients and service users engagement framework, we will involve engaged patients, service users, healthcare professionals and health decision-makers to obtain additional sources of information, perspectives and applicability to the study.34 Patient partners with lived experience of CRC will be recruited to the research team and will participate in the execution of the study to ensure clinical relevance. This involvement will include interpretation of the results and communication of findings to the broader patient community. Consultation with stakeholders will be conducted to share preliminary findings, validate and seek out gaps in our understanding to inform an integrated holistic equitable research process.

Ethics and dissemination
This scoping review protocol outlines a method to systematically search and map the literature on QIs for CRC surgery while applying validated social frameworks to the understanding of QIs development, reporting and

<table>
<thead>
<tr>
<th>Author (year)</th>
<th>Research groups institution</th>
<th>Study design</th>
<th>Population</th>
<th>QIs studied</th>
<th>QIs assessment</th>
<th>SDoH considered? (yes/no)</th>
<th>Specific SDoH (if yes)</th>
<th>Direction of SDoH effect on QIs (for each SDoH if &gt;1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development</td>
<td>Measurement</td>
<td>Reporting</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

Table definitions: Author (year)=first author last name and year of study; Research groups institution=the senior authors institutional affiliation and country; Study design=type of study utilised; Population=population for which the study participants were drawn from; QIs studied=the specific quality indicator studied (eg, lymph node harvest, anastomotic leak, etc); QIs assessment=how was the quality indicator assessed in the study? (ie, development of new quality indicator, measurement of a pre-existing quality indicator or reporting a quality indicator); SDoH considered? (yes/no)=were the SDoH considered in the development, measurement or reporting of the listed quality indicator? (yes/no); Specific SDoH (if yes)=what specific element of the SDoH were considered in the development, measurement or reporting of the listed quality indicator (ie, sex, race, income, etc); Direction of SDoH effect on QIs (for each SDoH if >1)=was the SDoH negatively or positively associated with the quality indicator?

CRC, colorectal cancer; QI, quality indicators; SDoH, social determinants of health.

Table 3 Data extraction table for studies examining QIs in CRC surgery

<table>
<thead>
<tr>
<th>Author (year)</th>
<th>Analytic methods (SDoH, covariates and confounders)</th>
<th>Reference group</th>
<th>Reporting of additive effect? (yes/no)</th>
<th>Reporting of relative effect? (yes/no)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDoH used (individual or neighbourhood level):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>► eg, age, race or ethnicity, language, occupation, gender or sex, religion, education, socioeconomic status, disability, place of residence, social capital</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Covariates and control of confounders</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table definitions: Author (year)=first author last name and year of study; Analytic methods (SDoH, covariates and confounders)=what analytic methods were utilised in the study including SDoH of interest, covariates, confounders and model type; Reference group=what was the reference group utilised in the authors analytic method?; Reporting of additive effect? (yes/no)=did the authors report an additive effect estimate? (yes/no); Reporting of relative effect? (yes/no)=did the authors report a relative effect estimate? (yes/no).

CRC, colorectal cancer; QI, quality indicators; SDoH, social determinants of health.
assessment. Since this study will only utilise published data, ethics approval will not be required. The results of this study will be shared and disseminated through scientific publication and presentation at conferences. This review represents the first of its kind to apply the SDoh lens for the analysis of QIs for cancer care surgery. The information generated by this review may be used by healthcare system administrators, policy makers, patient organisations, researchers and healthcare professionals advocating for the integration of SDoh in the routine use of quality metrics in healthcare to support health equality and equity in cancer care surgery.

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Contributors AB-S, TR, NGC and JH conceived the idea and developed the research questions and study methods. AB-S and JH drafted the protocol. AB-S and TR conceived and executed the search strategy. AB-S, TR, HB, AL, RS, RA, CC, NG and JH contributed meaningfully to the editing and critical review of this protocol and approved the final manuscript.

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Patient and public involvement Patients and/or the public were involved in the design, conduct, or reporting or dissemination plans of this research. Refer to the Methods section for further details.

Patient consent for publication Not required.

Provenance and peer review Not commissioned; externally peer reviewed.

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REFERENCES
1 Kohn LT, Corrigan JM, Donaldson MS, eds. Institute of medicine Committee on quality of health care in A [Copyright 2000 by the National Academy of Sciences. All rights reserved]. In: To Err is Human: Building a Safer Health System. Washington (DC): National Academies Press (US); 2000.

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34 WHO. Social Determinants of Health, . 2022Available: https://www.who.int/health-topics/social-determinants-of-health#tab=tab_1


43 Baah FO, Teitelman AM, Riegel B. Marginalization: Conceptualizing patient Vulnerabilities in the framework of social determinants of health-an integrative review. *Nurs Inq* 2019;26:e12268.


45 King NB, Harper S, Young ME. Use of relative and absolute effect measures in reporting health inequalities: structured review. *BMJ* 2012;345:e5774.


## Supplemental Table 1. HealthSTAR search strategy

<table>
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<th>#</th>
<th>Search</th>
<th>Results</th>
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<td>24124</td>
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<td>(Quality Metric* or Quality Measure* or Quality Indicator* or Performance Indicator* or Key Performance Indicator* or Surg* Indicator* or Outcome Indicator* or Outcome Measure* or Failure to rescue or Health Care Quality or Healthcare Quality or Clinical Indicator* or Patient Safety Indicator*).tw,kf.</td>
<td>248915</td>
</tr>
<tr>
<td>3</td>
<td>exp Colonic Neoplasms/</td>
<td>38853</td>
</tr>
<tr>
<td>4</td>
<td>exp Rectal Neoplasms/</td>
<td>37338</td>
</tr>
<tr>
<td>5</td>
<td>exp Colorectal Neoplasms/</td>
<td>144727</td>
</tr>
<tr>
<td>6</td>
<td>(colonic neoplasm* or rectal neoplasm* or colorectal neoplasm* or colon cancer* or Rectal cancer* or Colorectal cancer* or Cancer of the colon or Cancer of the rectum or Colon* tumor or Colon* malignanc* or Colon* mass or Colon* neoplasm* or rectal tumor or Rectal malignanc* or Rectal mass or Rectal neoplasm*).tw,kf.</td>
<td>114627</td>
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<td>9</td>
<td>(surgery or colon* surgery or Rectal surgery or Surgical oncology or Colorectal surger* or Cancer surger* or Colon resection or Large bowel resection or Bowel resection or Rectal resection or Right hemicolecotomy or Extended right hemicolecotomy or Transverse colectomy or Left hemicolecotomy or Extended left hemicolecotomy or Sigmoid colectomy or Sigmoidectomy or Rectosigmoid colectomy or Rectosigmoidectomy or Low anterior resection or Anterior resection or Ultra low anterior resection or Ultralow anterior resection or Abdominoperineal resection or Protocolectomy or Total protocolectomy or Total colectomy or Total abdominal colectomy or Subtotal colectomy).tw,kf.</td>
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<td>11</td>
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<td>12</td>
<td>7 or 8 or 9 [concept 3: cancer surgery]</td>
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<td>13</td>
<td>10 and 11 and 12 [concepts: quality indicators, colorectal cancer, colorectal cancer surgery]</td>
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## Supplemental Table 2. EMBASE search strategy

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<tr>
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<tr>
<td>4</td>
<td>exp rectum tumor/</td>
<td>314369</td>
</tr>
<tr>
<td>5</td>
<td>exp colorectal tumor/</td>
<td>34664</td>
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<tr>
<td>6</td>
<td>(colonic neoplasm* or rectal neoplasm* or colorectal neoplasm* or colon cancer* or Rectal cancer* or Colorectal cancer* or Cancer of the colon or Cancer of the rectum or Colon* tumor? or Colon* malignanc* or Colon* mass or Colon* neoplasm* or rectal tumor? or Rectal malignanc* or Rectal mass or Rectal neoplasm*).tw,kf.</td>
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<td>exp cancer surgery/</td>
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<tr>
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<td>exp Colorectal Surgery/</td>
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</tr>
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