

RESEARCH ARTICLE

Towards a better understanding of risk selection in maternal and newborn care: A systematic scoping review

Bahareh Goodarzi^{1*}, Annika Walker¹, Lianne Holten¹, Linda Schoonmade², Pim Teunissen^{3,4}, François Schellevis^{5,6}, Ank de Jonge¹

1 Department of Midwifery Science, AVAG, Amsterdam Public Health Research Institute, Amsterdam UMC, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands, **2** Medical Library, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands, **3** Department of Obstetrics and Gynaecology, Amsterdam UMC, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands, **4** School of Health Professions Education, Maastricht University, Maastricht, The Netherlands, **5** Department of General Practice and Elderly Care Medicine, Amsterdam Public Health research institute, Amsterdam UMC, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands, **6** NIVEL (Netherlands Institute for Health Services Research), Utrecht, The Netherlands

* b.goodarzi@amsterdamumc.nl

OPEN ACCESS

Citation: Goodarzi B, Walker A, Holten L, Schoonmade L, Teunissen P, Schellevis F, et al. (2020) Towards a better understanding of risk selection in maternal and newborn care: A systematic scoping review. PLoS ONE 15(6): e0234252. <https://doi.org/10.1371/journal.pone.0234252>

Editor: Russell Kabir, Anglia Ruskin University, UNITED KINGDOM

Received: December 17, 2019

Accepted: May 21, 2020

Published: June 8, 2020

Peer Review History: PLOS recognizes the benefits of transparency in the peer review process; therefore, we enable the publication of all of the content of peer review and author responses alongside final, published articles. The editorial history of this article is available here: <https://doi.org/10.1371/journal.pone.0234252>

Copyright: © 2020 Goodarzi et al. This is an open access article distributed under the terms of the [Creative Commons Attribution License](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Data Availability Statement: All relevant data are within the manuscript and its Supporting Information files.

Abstract

Globally, millions of women and their children suffer due to preventable morbidity and mortality, associated with both underuse and overuse of maternal and newborn care. An effective system of risk selection that differentiates between what care should be provided and who should provide it is a global necessity to ensure women and children receive appropriate care, at the right place and the right time. Poor conceptualization of risk selection impedes evaluation and comparison of models of risk selection across various settings, which is necessary to improve maternal and newborn care. We conducted a scoping review to enhance the understanding of risk selection in maternal and newborn care. We included 210 papers, published over the past four decades, originating from 24 countries. Using inductive thematic analysis, we identified three main dimensions of risk selection: (1) risk selection as an *organisational measure* to optimally align women's and children's needs and resources, (2) risk selection as a *practice* to detect and assess risk and to make decisions about the delivery of care, and (3) risk selection as a *tool* to ensure safe care. We found that these three dimensions have three themes in common: risk selection (1) is viewed as both *requiring and providing regulation*, (2) has a *provider centred focus* and (3) aims to *avoid underuse of care*. Due to the methodological challenges of contextual diversity, the concept of risk selection needs clear indicators that capture the complexity of care to make cross-setting evaluation and comparison of risk selection possible. Moreover, a comprehensive understanding of risk selection needs to consider access disparity, women's needs, and unnecessary medicalization.

Introduction

Maternal and newborn care (hereafter, MNC) services fail to meet many of the essential needs of childbearing women (when we use the term 'woman', we also refer to individuals with a

Funding: The author(s) received no specific funding for this work.

Competing interests: The authors have declared that no competing interests exist.

uterus who are not woman identified, including trans men and non-binary individuals) and their unborn or newborn children (hereafter, children). Every year there are an estimated 139 million births worldwide [1]. An estimated 303,000 women die during pregnancy, birth or soon after [2], 2.6 million babies are stillborn [3] and 2.5 million infants die in the first month of life [4]. Maternal and perinatal morbidity and mortality are partly preventable. In the USA, for example, an estimated 63% of pregnancy-related maternal deaths [5] and 27%-54% of infant deaths among children born full-term are avoidable [6]. The Lancet series addressing maternal and newborn health [7–12] emphasized that preventable morbidity and mortality is associated with both underuse and overuse of care. A meta-synthesis in the Lancet series on Midwifery [12] pointed out that childbearing women and their children need a care system that helps them to stay healthy, and that provides a timely transition to medical specialist care for those who develop complications.

Pregnancy and birth are primarily physiological processes but risks and complications can occur. The degree and type of risk related to pregnancy and birth differs between women and children, and between countries and care settings. To ensure women and children receive appropriate care, at the right place and the right time, an effective system of risk selection that differentiates between what care should be provided and who should provide it is a global necessity [13,14].

Kennedy and colleagues [15,16] identified the evaluation and comparison of models of risk selection across various settings as one of the top research priorities necessary to improve care. However, a key problem impeding cross-setting evaluation and comparison rests on the poor conceptualization of risk selection. The lack of conceptual clarity hinders the development of an evidence base for the most effective strategies to organise and practice risk selection. This is illustrated by the variety of ways in which risk selection is operationalized in research. For example, some scholars see risk selection as a skill in terms of health care professionals' cognitive process [17–19]. Others understand risk selection as a means of organizing care [20–22]. Sometimes, risk selection is defined as a tool, for example in the application of risk indicators [23,24], the use of guidelines and protocols [25,26], and screening instruments [27–29]. Often, risk selection is seen as a safety system, meant to minimize morbidity and mortality mainly due to undertreatment [30–32]. A comprehensive understanding of risk selection, encompassing the relationship between these operationalisations remains absent, indicating a lack of shared conceptualisation of what risk selection entails in MNC.

To enhance the understanding of risk selection in MNC we conducted a scoping review. We systematically searched the scientific literature, and examined papers spanning the last four decades to identify key dimensions of risk selection, using the following research question: how is the selection of childbearing women and children that require specialized care because of increased medical risks or actual complications conceptualized?

Methods

We conducted a scoping review, using a systematic design for the search and data selection, and inductive thematic analysis for the data analysis and data synthesis. We used a scoping review methodology based on the framework outlined by Arksey & O'Malley [33]. To enhance the framework, we took into consideration the following recommendations by Levac and colleagues [34] and Daudt and colleagues [35]: (1) we conducted considerable research about review studies to ensure an appropriate match between our research interest and the methodology, (2) we articulated a clear research question, rationale and purpose of the scoping review, which led the decision making throughout the study, (3) we assembled a research team with content and methodological expertise, consisting of an information specialist and researchers

from the fields of general medical practice, obstetrics, midwifery, anthropology, and psychology, (4) two reviewers conducted the selection of publications, (5) we used a charting form and qualitative content analysis approach for the data extraction, and (6) we report the results and consider the meaning of the findings as they relate to the purpose of the study and research question. The study protocol was not registered.

Search strategy

The literature search was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) statement extension for scoping reviews [36] (S1 Table). A comprehensive search was performed in the bibliographic databases PubMed, Embase.com, Cinahl (via Ebsco) and the Cochrane Library, in collaboration with a medical librarian (LS). Search terms included controlled terms (MesH in PubMed, Emtree in Embase and Cinahl Headings). We used free text term only in the Cochrane database. The search was conducted from inception to April 16th 2019.

Considering the breadth of the subject, we limited the scope of our review to risk selection based on medical risk factors, excluding risk selection based on social risk factors. Hence, the following terms, including synonyms and closely related words, were used as index terms or free-text words: “risk”, “selection”, “maternal and newborn care”, and “quality of care”. The search was performed without date or language restrictions. Duplicate articles were excluded. The search results were imported and merged in the reference database Mendeley [37]. The full search strategies for all databases can be found in S2 Table.

Selection criteria, data extraction and analysis

We used a systematic two-stage screening process to assess the relevance of the papers identified in the search [38]. In the first stage, two researchers (BG and AW) independently screened the papers' title and abstract for inclusion. To ensure inter-reviewer agreement, BG and AW met weekly to discuss uncertainties, and they specified and expanded the inclusion and exclusion criteria. In the second stage, the papers' full texts were assessed for eligibility. To ensure reviewer agreement, BG and AW assessed the first 20 full-texts independently, which resulted in complete agreement on inclusion. BG assessed the remaining papers by herself. A search update was conducted. AW randomly screened 500 of the additionally identified papers' title and abstract independently and BG and AW assessed the first 15 papers' full-texts independently, which reconfirmed inter-reviewer agreement. BG assessed the remaining title and abstracts and full-texts of the papers identified in the search update by herself.

We excluded papers published prior to the year 1981, and non-research papers such as statements, opinions, book chapters, guidelines, protocols, conference posters and presentations to enhance feasibility. We restricted the language to English and Dutch. Studies conducted in low income countries and war zones were excluded to enhance comparability.

Only studies were included focusing on the relation between the selection of medical risks, and referral between medical specialists delivering MNC. An inductive thematic synthesis approach [34,39,40] was used to identify how the concept of risk selection was approached in the included papers. Because we were interested in the operationalization of risk selection, we focused on the background, methods and discussion sections of the papers, and we did not assess the study results and the methodological quality of the papers. Following in-depth reading, we mapped the main focus of each paper using an excel sheet, which we then organised into main categories. We then searched for overarching themes (S3 Table). Data saturation was reached after data extraction of 125 papers. Screening of the remaining papers did not result in new main categories, confirming data saturation.

Results

Our systematic search resulted in a total of 8,509 references. Following evaluation of their title and abstract, 371 papers remained for full text review. After reviewing these papers, 171 papers did not meet our inclusion criteria, leaving 210 papers for analysis (Fig 1). The papers' study objective and study design are shown in S4 Table. The majority of the included papers used quantitative methods. We found an increase in the number of papers published over the past four decades, with a peak in the years 1989 (n = 9) and 1995 (n = 9) and more than half of the papers published in the last 10 years (2009–2018). The included papers originated from 24 high income countries. Most papers originated from North America, Europe and Australia, with the highest numbers of papers from the USA (n = 55), the Netherlands (n = 48), England (n = 27) and Australia (n = 27).

We identified three main categories, which can be seen as the three dimensions of risk selection; (1) risk selection as an *organisational measure* to optimally align women's and children's needs and resources, (2) risk selection as a *practice* to detect and assess risk and to make decisions about the delivery of care, and (3) risk selection as a *tool* to ensure safe care. We found that these dimensions of risk selection had three themes in common: across these dimensions risk selection is (1) viewed as both *requiring and providing regulation*, (2) has a *provider centred focus* and (3) aims to *avoid underuse of care* (Fig 2). In all papers one or more main categories were present. In S4 Table we show the dominant category per paper. We illustrate our findings by referring to the most relevant papers.

Risk selection as an organisational measure: Aligning risk and resources

Papers focussing on organisation of MNC refer to risk selection as a means for care systems to manage a common challenge: meeting the needs of childbearing women and their children with limited resources. These needs are referred to in terms of 'risk'. Risk has a negative connotation, associated with pathology or abnormality, and is described using terms such as, 'illness' [42], 'complication' [43], 'disease', [44], 'problem' [21], 'disorder' [45]. In the included papers, risk sometimes indicates an *unwanted event* [46,47], the *cause of an unwanted event* [48,49], or the *probability of an unwanted event* [50,51], which may or may not occur, adversely effecting outcomes of care.

Risk selection is used to allocate resources and align women's and children's needs with MNC services. Allocation of resources is considered effective when necessary care is provided by health care professionals with the appropriate level of expertise, in the most appropriate place, where the appropriate facilities and resources are located, with the type and timing of care planned appropriately [52–57]. For example, Posthumus and colleagues [58] studied the interaction between access to care, care demand and care supply. According to Reddy and colleagues [59] effective use of resources implies that specialist services should be reserved for women with complications or those at most risk of developing complications. Nuovo [60] pointed out that risk selection is especially important when consulting care providers do not have immediate access to specialist care, enabling them to plan the necessary care.

In the papers addressing the organisation of MNC, at least one of the following attributes of healthcare services is discussed as precondition to optimally align needs and resources: availability, access, and timeliness of care [61]. Risk selection is described as an instrument to balance access to, and availability of resources with the perceived likelihood of needs, while ensuring timeliness of care. Timeliness refers to the geographical distribution of resources, and the distance and time to reach them. As such, transportation is emphasized as essential to achieve timely care [62–66]. Availability of resources includes availability of expertise, facility, technology, diagnostics and therapy [67–74]. For example, Hein & Burmeister [75] explained

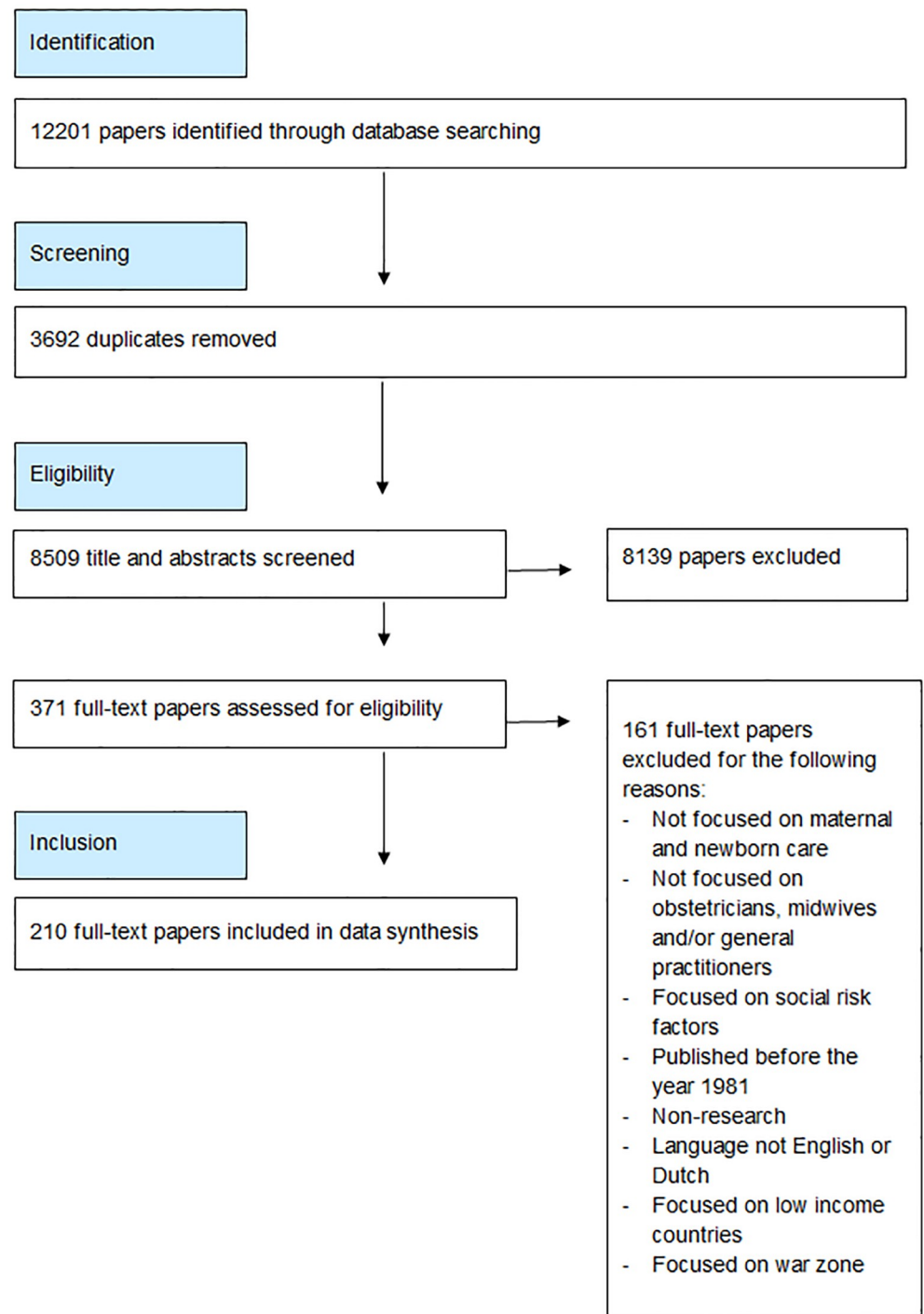


Fig 1. Study selection process [41].

<https://doi.org/10.1371/journal.pone.0234252.g001>

that risk selection enables care providers to anticipate the limitations of their own facilities, and Smit and colleagues [72], studied whether access to pulse oximetry for the assessment of infants born in a community based midwifery care setting could prevent referral to a paediatrician. Our analysis also showed that regulation of access to resources is sometimes used to

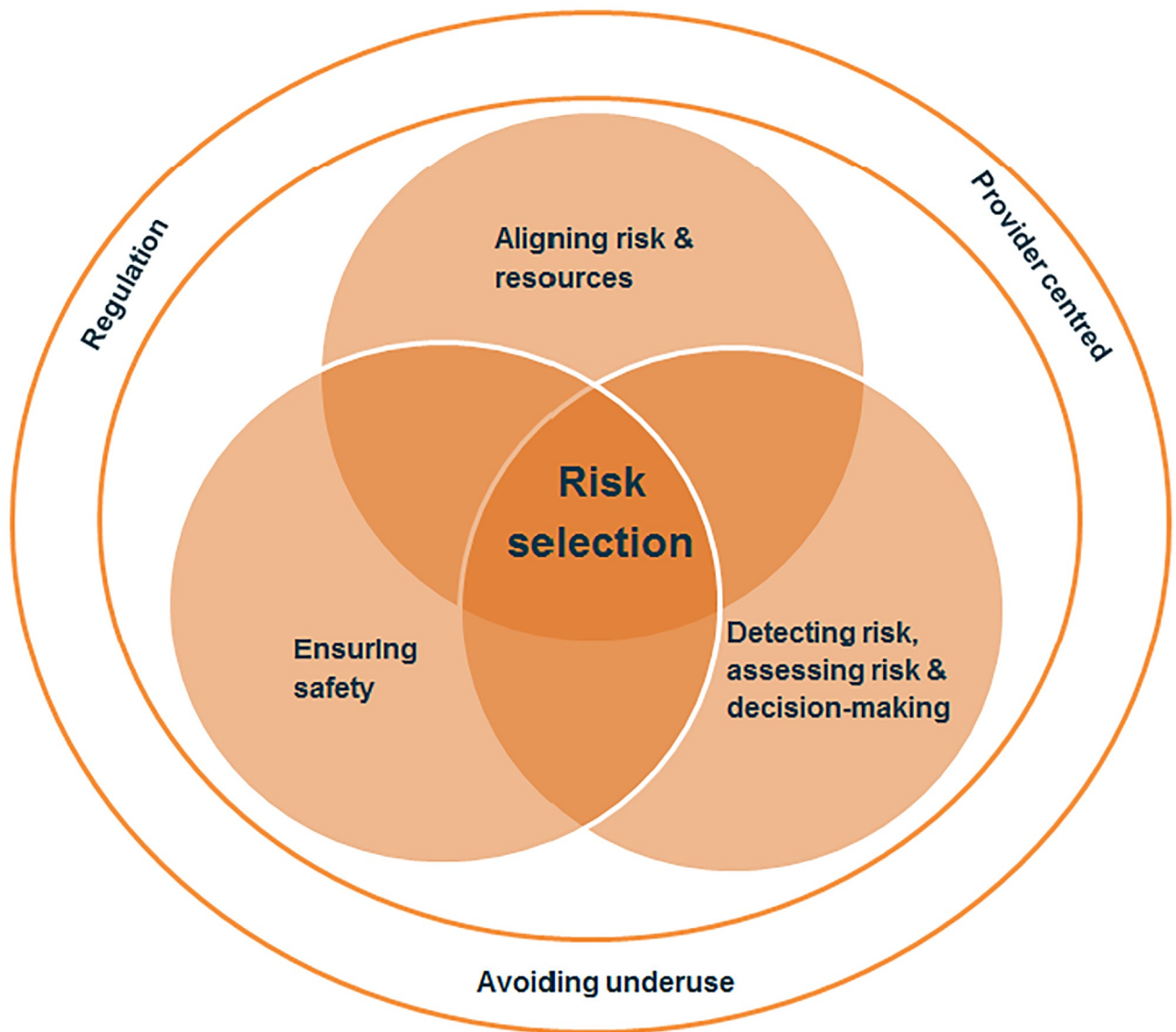


Fig 2. Identified dimensions and shared themes.

<https://doi.org/10.1371/journal.pone.0234252.g002>

optimally align needs and resources. We found three main approaches of access regulation; geographical, medical and financial. Geographical regulation is based on the location of women and children and care facilities. Regionalization is the most applied strategy of care access regulation, organizing care in different levels, by geographically spreading general services at the lowest level of care, and concentrating scarce resources and specialized services at the highest level of care [57,73,76–79]. Medical regulation is grounded in women’s and children’s needs, expressed in terms of medical risk criteria; care is provided only to those whose needs correspond to prevailing criteria [59,80–85]. In financially regulated access to care, remuneration of care provision is subject to certain requirements and restrictions. Insurers apply a variety of strategies, such as capitation schemes and mandatory authorization for treatment decisions and referral [86,87]. In some countries, care access is medically regulated,

where women and children can only access medical specialists via a primary care provider, sometimes referred to as 'gatekeeper' [86,88,89]. Britt and colleagues pointed out that many insurers used "...primary-care physicians to act as gatekeepers who must approve referrals to specialists and sub-specialists..." [90] "...to limit the use of so-called 'unnecessary' referrals..." [86] and "...keep costs down..." [90]. In their study about referrals for genetic counselling by GPs in the Netherlands, Aalfs and colleagues [91] explained that "...as stated in an agreement between the Dutch Society of Clinical Genetics and the Dutch health insurance companies, referral for genetic counselling to one of the eight academic centres for clinical genetics was the task of GPs exclusively. This means that every patient who wants to be referred for genetic counselling has to visit their GP first."

Risk selection as a practice: Detecting and assessing risk, and making decisions about the delivery of care

Part of the included papers address risk selection as a practice of detecting and assessing risk and making decisions about the delivery of care. Overall, this process is perceived in two contrary ways; on the one hand risk selection is defined as an objective and straightforward process; on the other hand risk selection is viewed as a subjective and complex process. As an objective process, risk is considered predictable and detectable using many data sources, including screening and diagnostic methods, such as risk scoring [60,92], a partogram [28], fetal fibronectin bedside testing for diagnosing preterm labour [27], and abdominal palpation and ultrasound for determining fetal presentation [93] and fetal growth [94]. In their paper about obstetrician-gynaecologists' management of mental health conditions, Leddy and colleagues [95] explained that "the purpose of screening is not to determine that complete realm of psychological needs of a patient, but instead is a means by which to identify patients who may require further assessment, monitoring or referral." Many papers predominantly consider risk selection as a process with a dichotomous outcome, risk classified as either present or absent. Detected risks can relate to the mother and the child, and differ in their nature, severity and urgency [65,66,96,97]. As a subjective process, authors acknowledge risk selection's complexity, determined by health care organisation, care providers and women [98]. Organisation characteristics include the number of care providers involved in care provision, location, communication, collaboration, and geography [30,58,69,93,99–113]. Health care providers' perceived risk, knowledge, expertise, confidence, personal views, awareness and attitude, financial considerations and women's characteristics and preference, amongst others, are described as decisive factors [17–19,26,46,86–88,95,99,100,105,107,109,114–118]. Providers' behaviour is considered influenceable via, for example, education [97,119–121], and guidelines [19,97,115,122]. Women bring in factors such as timing of presentation, sense of control, views and beliefs, sense of safety, perceived norms, perceived availability of options, and demographic characteristics such as age, level of educational and income [114,115,123–130]. Because a consulting care provider either needs additional resources or does not, the decision to refer is inherently a "threshold phenomenon" [108]. The contributing factors in the decision making process are weighed differently by different care providers, resulting in varying referral-thresholds, thus practice variation. According to several papers [19,63,108,117,131], this is especially the case for intermediate levels of risk, also referred to as the "grey zone". In contrast to clear high or low risks, these risks "...may be near the referral threshold, and therefore disproportionately susceptible to the marginal influences of numerous personal, social, cultural, and financial considerations..." [108].

The practice of risk selection in terms of detecting and assessing risk is not reserved to a certain profession, but rather performed by all professionals involved in care provision. The

criteria, policy, procedures and division of professional tasks and responsibilities, are laid down in local and international, monodisciplinary and multidisciplinary agreements, defining women's and children's needs for healthcare services accordingly [26,51,59,84,85,115,120,122,132–136].

Timing is considered a highly important feature of the detection, assessment and decision making process. Generally, risk selection is addressed in two ways; the time until risk detection [28,31,137–139] and the time between risk detection and care provision [30,31,66,101,140,141]. It is emphasized that prolonged time between risk detection and care provision can cause delay, leading to preventable morbidity and mortality.

Risk selection as a tool: Ensuring safety

The majority of the papers we reviewed perceived risk selection as a tool to ensure safe care, the shared notion being that adequate risk selection results in safe care. Risk selection as a tool to ensure safe care is regulated by designated bodies [30,75,104,139,142]. The quality of risk selection is considered measurable, reflected by care outcomes. Authors assess the quality of risk selection predominantly by short-term and quantitative outcome measures, most frequently using referral rates, intervention rates and morbidity and mortality rates. The premise is that high quality risk selection results in low morbidity and mortality rates, and cases of maternal and perinatal morbidity and mortality that occur in specialist care reflect providers' ability to screen for risks, to make a correct diagnosis, and to refer timely [30,31,62,101,140,143–148]. For example, Ferrazzi and colleagues [85] reflected on the results of their study on the outcomes of midwife-led labour in low-risk women: "as expected, maternal outcomes, such as mode of delivery, episiotomy and PPH, were significantly higher in women with compared to those without emerging risks identified by midwives. On the other hand, fetal outcomes were not significantly different between the two groups. This might be interpreted as a consequence of the quality of midwives' assessment of risk during labor, which allowed for early diagnosis and prompt treatment of incoming complications".

While most studies focus on risk selection as a tool to ensure safe care, the standards for optimal risk selection and the optimality threshold remain unclear. Care outcomes are interpreted through cross-setting comparison, using a variety of reference points, including population, location and practice. For example, Rowe and colleagues [131] compared different types of maternity units, Fullerton and colleagues [149] compared local and national outcomes, Law and colleagues [150] compared midwife managed and obstetrician managed care, Romijn and colleagues [117] compared primary care midwives, clinical midwives and obstetricians, and Blondel and colleagues [151] compared countries. Furthermore, for measuring the quality of risk selection, quality is defined in various ways. A clear example is the diverse use of referral rates as a quality measure. According to Blix and colleague [65], "transfers should not be regarded as an adverse outcome, and are not necessarily indicators of quality of care". Across the papers, high referral rates are perceived as indicators for effective risk selection [127,152] as well as failing risk selection [17,25,132,133]. Low referral rates are perceived in the same way; as indicators for effective risk selection [127] and failing risk selection [122,153]. Fourteen of the 210 papers use women's experience as outcome of risk selection [61,124–126,128–130,154–160] and one paper included partners' experience as quality indicator for risk selection [161].

Overarching themes: Regulation, provider centred focus and avoiding underuse

We found that the three dimensions of risk selection—an organisational measure to allocate resources, a practice to detect and assess risk and to make decisions about the delivery of care,

and as a tool to ensure safe care—have three themes in common: regulation, provider centred focus and avoiding underuse of care. First, risk selection is viewed as both requiring *and* providing regulation. Risk selection regulates allocation of tasks and responsibilities based on geographical, medical and/or financial criteria. In terms of risk detection and assessment and decision making about the delivery of care, risk selection regulates delivery of care, and is supported by local and international, monodisciplinary and multidisciplinary agreements. Risk selection as a tool to ensure safe care determines what is considered safe and is regulated by designated bodies. The second commonality is the provider centred focus; a small minority of the papers addressed women's experiences. At the organisational and practice level women and children gain access to care only after risk is detected or confirmed by the provider. At the control level, outcome is predominantly viewed and evaluated as providers' conduct. Thirdly, aligning needs and resources, assessing, detecting and deciding on risks, and risk selection as a means to ensure safe care share the focus of preventing underuse of care.

Discussion

We conducted this review to enhance the conceptual understanding of risk selection in MNC, which is necessary to optimise the organisation and practice of risk selection in MNC. The included 210 publications from 24 high income countries indicate that risk selection is a universal phenomenon, used to differentiate between what care should be provided and who should provide it to ensure women and children receive appropriate care, at the right place and the right time [13,14]. Thematic inductive synthesis identified three main dimensions of risk selection. (1) Risk selection is used at the level of health care organisation as a means to allocate resources, align women's and children's needs with healthcare services, and balance access to, and availability of resources with the perceived likelihood of needs, while ensuring timeliness of care. (2) At the practice level, risk selection refers to detecting and assessing risk and making decisions about delivery of care. (3) Risk selection is also used as a tool to ensure safe care. We found that these three dimensions have three themes in common: risk selection (1) is viewed as both requiring and providing regulation, (2) has a provider centred focus, and (3) aims to avoid underuse of care (Fig 1).

Evaluating the quality of risk selection: The challenge of contextual diversity

Our results show a paradox in the understanding of risk selection. On the one hand, risk selection is often assessed by cross-setting comparison, using quantitative, short-term, and infant outcome measures. On the other hand, our results emphasize the complexity of risk selection, showing that the operationalization of risk selection is highly contextualized, determined by numerous factors including geography, demography, government policy, laws and regulations, history and culture. For example, Scherjon and colleagues [20] and Papiernik and colleagues [22] discussed how these factors influence the organisation of risk selection in different countries. Some papers call for acknowledging the ambiguous nature of risk, emphasizing the constructionist character of risk [88,117,123,133,134,155,162], and address the impossibility to detect and eliminate all risks [47,53,94,163]. According to Reddy and colleagues [59] "it should be remembered that the risk status of a woman may change during the course of pregnancy", and sometimes no measures can be found to improve care [30,31,164]. The paradoxical perception of risk selection as objective and measurable versus relative and contextual is present throughout the included papers. The complexity of risk selection, for instance, is often emphasized [17,26,31,61,88,104,109,116,117,142,165]. Nevertheless, scholars rarely consider complex

metrics such as underlying causes of care outcomes, unnecessary interventions, long-term outcomes and inter-professional collaboration.

The contextual relativity of risk selection is a major challenge for cross-setting evaluation, complicating comparability necessary for evaluating risk selection's quality [166–168]. One of the problems is establishing equal understandings of quality indicators [16,167]. This explains the absence of clear and shared standards for optimal risk selection in our findings. For example, we found that transfer rates used as a quality measure of risk selection were interpreted in different ways. The absence of standards makes it “difficult to assess what transfer rate provides the best outcomes of care” [65]. It also hinders meaningful evaluation of the quality of risk selection because, as Offerhaus and colleagues [169] pointed out, “high intrapartum referral rates suggest that some of the referrals. . . might have been unnecessary. . . , on the other hand, . . . achieving a low referral rate is no goal in itself”. This ambiguity impedes recommendations to improve risk selection.

Only through careful, context-specific evaluation, with understanding of the reasons for variations, can cross-setting comparisons support the quest for quality improvement of risk selection. This calls for the use of composite measures for complex phenomena that capture the complexity of care, such as the interactions between cognitive, social and cultural factors [16]. A lack of contextual sensitivity in cross-setting comparisons may lead to misconceptions and erroneous policy decisions, leading to unsuccessful initiatives aiming to optimise risk selection. Furthermore, the 24 countries that are covered in this review are not represented evenly, and some countries are not represented at all, such as Switzerland, Croatia, Cyprus, Hungary and Luxembourg. Studies of risk selection in MNC from the underrepresented countries are necessary to gain insight in local practices, necessary for cross-setting learning.

Blind spots of risk selection: Equitable access to care, women-centred care, and overuse of care

Risk selection aims to ensure that women and children receive appropriate care, at the right place and the right time, predominantly by pursuing efficient, timely and safe care. However, to optimize risk selection, other aspects of quality of care, namely equitable access to care, women-centred and effective care [170], require further consideration.

Equitable access to care. A precondition to ensure that women and their children receive the care they need is equal opportunities to access care for those with equal needs, regardless of personal characteristics—such as gender, age, ethnicity, geographic location and socioeconomic status [170,171]. However, our results show that care provision is determined by many characteristics—often a combination, or intersection [172] of characteristics—including characteristics of health systems and care providers [173–179]. Although some salient potential barriers to care, such as geography, are considered in the papers, the notion of equity of access to care remains unaddressed. Including equitability in risk selection will contribute to creating awareness, and prioritizing the challenge of bias and social injustice in risk selection in MNC, which is necessary to optimize risk selection.

Women-centred care. Care providers hold a central position in risk selection. Not only do they co-manage access to care, risk selection is viewed and assessed as providers' conduct. The provider–woman dynamic in risk selection, and the tension that can arise when they disagree, is the focus of only one study in this review [123], and thus remains largely undiscussed. Care outcomes are measured by providers' performance indicators; of the 210 included papers, only fourteen papers encompass women's perspectives, and only one paper includes partners' experience of risk selection. Renfrew and colleagues [13] developed a women-centred framework for quality MNC, as part of the Lancet series on midwifery, showing that women highly

value communication, respect and understanding, and care that is tailored to their needs [12]. Reflecting on this framework, global health stakeholders in the Lancet's Series on Midwifery stress women's perspectives in MNC evaluation, recommending studies to "assess the views and preferences of women and families across a variety of settings about their experiences of maternal and newborn care. . ." [15]. The number of papers addressing women's and partners' perspectives on risk selection has increased over the years, indicating an advancing awareness in MNC about women-centred care. Further including the perspective of women in the understanding of risk selection creates room for women's individual unique needs [159,180–183], optimizing the alignment of risk selection with women's needs.

Effective care. The contemporary understanding of risk selection holds a blind spot for overuse of care. Our analysis shows that risk selection is focused on preventing underuse of care. In the included papers, the quality of risk is evaluated by questioning timeliness of care, in terms of whether more care delivered sooner could have led to better care outcomes [24,30–32,90,104,137,140,155]. A few papers in our review discussed the notion of a "cascade of interventions" [17,169,184], ". . . where one intervention in a labouring woman leads to another and so on" [17], warning for overuse of care. The vast majority of the studies focused on upscaling of care; referral from generalist to sub-specialist care. The appropriateness of the referral, however, remained largely undiscussed. Although care that is provided "too little too late" [8] is a global problem, overuse of care is increasingly associated with poor quality care and preventable maternal and perinatal morbidity and mortality, also in high income countries [7,8,185]. Variation in care and rising rates of interventions without evident benefit [185] are indicators of care that is delivered "too much too soon" [8]. Our results indicate that this is particularly related to intermediate levels of risk, also referred to as the "grey zone" [186–195]. According to Brownlee and colleagues [185], most health care services fall into the grey zone—which include services that offer little health benefit, those for which the balance between benefits and harms differs amongst individuals, and the numerous services that are backed by little or no scientific evidence. Excluding the notion of overuse of care and downscaling of care services in the understanding of risk selection undermines the purpose of risk selection and impedes enhancing the effectivity of risk selection [8]. The challenge is finding the right balance in effective delivery of care, striving for risk selection that is not only effective in terms of preventing harm due to underuse of care, but also avoiding overuse of care.

Strengths and limitations

To our knowledge, this is the first study to review the concept of risk selection in MNC. The search was systematically conducted with the help of an information specialist and was updated to include recent publications. We made an effort to include a wide and comprehensive range of terms in the literature search strategy. Our broad search strategy, the search update and the inductive thematic data synthesis approach enabled us to obtain a broad and deep view of the operationalisation of risk selection across the full scope of MNC during the past four decades. Due to the vast number of included papers, we restricted the search strategy to four databases that usually cover MNC literature, we only included papers in English and Dutch, and we did not apply the snowball method to extend the search. Furthermore, we only included studies conducted in high-income countries, including studies from 24 countries. Not all countries were evenly represented in our results, and some countries were not represented at all. We can only speculate on the underlying reasons, including that our search did not identify all relevant studies, for example because papers may have been published in local—non-English—journals, which are not clearly indexed within the scientific databases. However, we did reach data saturation.

Conclusion

This systematic scoping review shows that current understanding of risk selection encompasses three main dimensions. Risk selection is used at the level of health care organisation as a means to allocate resources, align women's and children's needs with healthcare services and balance access to, and availability of resources with the perceived likelihood of needs, while ensuring timeliness of care. At the practice level, risk selection refers to detecting and assessing risk and making decisions about delivery of care. Risk selection is also used as a tool to ensure safe care. We found that these three dimensions have three themes in common; across these dimensions, risk selection is viewed as both requiring and providing regulation, has a provider centred focus, and aims to avoid underuse of care. Due to the methodological challenges of contextual diversity, the concept of risk selection needs clear indicators that capture the complexity of care to make cross-setting evaluation and comparison of risk selection possible. Moreover, a comprehensive understanding of risk selection needs to consider access disparity, women's needs, and unnecessary medicalization.

Supporting information

S1 Table. PRISMA checklist.

(DOCX)

S2 Table. Search strategies.

(DOCX)

S3 Table. Overarching themes, main categories and sub categories.

(DOCX)

S4 Table. Characteristics of included references.

(DOCX)

S5 Table. List of included references.

(DOCX)

Acknowledgments

We thank Yvonne Smit and Michelle ten Berge for their support during the first phase of this study, and Henk Koffijberg, Michelle Willard and Gülgen Öztas, for helping with retrieving the full texts.

Author Contributions

Conceptualization: Bahareh Goodarzi, Pim Teunissen, François Schellevis, Ank de Jonge.

Data curation: Bahareh Goodarzi.

Formal analysis: Bahareh Goodarzi, Annika Walker, Lianne Holten, Pim Teunissen, François Schellevis, Ank de Jonge.

Investigation: Bahareh Goodarzi.

Methodology: Bahareh Goodarzi, Linda Schoonmade, Pim Teunissen, François Schellevis, Ank de Jonge.

Project administration: Bahareh Goodarzi.

Supervision: Ank de Jonge.

Writing – original draft: Bahareh Goodarzi.

Writing – review & editing: Bahareh Goodarzi, Annika Walker, Lianne Holten, Linda Schoonmade, Pim Teunissen, François Schellevis, Ank de Jonge.

References

1. United Nations Department of Economic and Social Affairs Population Division. World Population Prospects: The 2017 Revision, custom data acquired via website [Internet]. 2017 [cited 2018 Dec 27]. <https://population.un.org/wpp/DataQuery/>
2. WHO UNICEF UNFPA World Bank Groups and the United Nations Populations Division. Trends in maternal mortality: 1990 to 2015. 2015.
3. Blencowe H, Cousens S, Jassir FB, Say L, Chou D, Mathers C, et al. National, regional, and worldwide estimates of stillbirth rates in 2015, with trends from 2000: a systematic analysis. *Lancet Glob Heal*. 2016; 4(2):e98–108.
4. The UN Inter-Agency Group for Child Mortality Estimation. Levels & trends in child mortality report 2018. 2018.
5. Building U.S. Capacity to Review and Prevent Maternal Deaths. Report from nine maternal mortality review committees. 2018.
6. Bairoliya N, Fink G. Causes of death and infant mortality rates among full-term births in the United States between 2010 and 2012: an observational study. *PLOS Med*. 2018; 15(3):e1002531. <https://doi.org/10.1371/journal.pmed.1002531> PMID: 29558463
7. Glasziou P, Straus S, Brownlee S, Trevena L, Dans L, Guyatt G, et al. Evidence for underuse of effective medical services around the world. *Lancet*. 2017; 390(10090):169–77. [https://doi.org/10.1016/S0140-6736\(16\)30946-1](https://doi.org/10.1016/S0140-6736(16)30946-1) PMID: 28077232
8. Miller S, Abalos E, Chamillard M, Ciapponi A, Colaci D, Comandé D, et al. Beyond too little, too late and too much, too soon: a pathway towards evidence-based, respectful maternity care worldwide. *Lancet*. 2016; 388(10056):2176–92. [https://doi.org/10.1016/S0140-6736\(16\)31472-6](https://doi.org/10.1016/S0140-6736(16)31472-6) PMID: 27642019
9. The Lancet. Lancet Series Every Newborn [Internet]. 2014 [cited 2019 Dec 4]. <https://www.thelancet.com/series/everynewborn>
10. The Lancet. The Lancet Series Child death in high-income countries [Internet]. 2014 [cited 2019 Dec 4]. <https://www.thelancet.com/series/child-death-in-high-income-countries>
11. The Lancet. The Lancet Series Maternal Health [Internet]. 2016 [cited 2019 Dec 4]. <https://www.thelancet.com/series/maternal-health-2016>
12. The Lancet. The Lancet Series Midwifery [Internet]. 2014 [cited 2019 Dec 4]. <https://www.thelancet.com/series/midwifery>
13. Renfrew MJ, McFadden A, Bastos MH, Campbell J, Channon AA, Cheung NF, et al. Midwifery and quality care: findings from a new evidence-informed framework for maternal and newborn care. *Lancet*. 2014; 384(9948):1129–45. [https://doi.org/10.1016/S0140-6736\(14\)60789-3](https://doi.org/10.1016/S0140-6736(14)60789-3) PMID: 24965816
14. Souza JP, Gülmezoglu AM, Vogel J, Carroli G, Lumbiganon P, Qureshi Z, et al. Moving beyond essential interventions for reduction of maternal mortality (the WHO Multicountry Survey on Maternal and Newborn Health): a cross-sectional study. *Lancet*. 2013; 381(9879):1747–55. [https://doi.org/10.1016/S0140-6736\(13\)60686-8](https://doi.org/10.1016/S0140-6736(13)60686-8) PMID: 23683641
15. Kennedy HP, Yoshida S, Costello A, Declercq E, Dias MA, Duff E, et al. Asking different questions: research priorities to improve the quality of care for every woman, every child. *Lancet Glob Heal*. 2016; 4(11):e777–9.
16. Kennedy HP, Cheyney M, Dahlen HG, Downe S, Foureur MJ, Homer CSE, et al. Asking different questions: a call to action for research to improve the quality of care for every woman, every child. *Birth*. 2018 Sep; 45(3):222–31. <https://doi.org/10.1111/birt.12361> PMID: 29926965
17. Styles M, Cheyne H, O'Carroll R, Greig F, Dagge-Bell F, Niven C. The Scottish Trial of Refer or Keep (the STORK study): midwives' intrapartum decision making. *Midwifery*. 2011; 27:104–11. <https://doi.org/10.1016/j.midw.2009.12.003> PMID: 20137838
18. Cohen L, Schaeffer M, Davideau J-L, Tenenbaum H, Huck O. Obstetric knowledge, attitude, and behavior concerning periodontal diseases and treatment needs in pregnancy: influencing factors in France. *J Periodontol*. 2015; 86(3):398–405. <https://doi.org/10.1902/jop.2014.140371> PMID: 25427617
19. Offerhaus PM, Otten W, Boxem-Tiemessen JCG, de Jonge A, van der Pal-de Bruin KM, Scheepers PLH, et al. Variation in intrapartum referral rates in primary midwifery care in the Netherlands: a

- discrete choice experiment. *Midwifery*. 2015; 31:e69–78. <https://doi.org/10.1016/j.midw.2015.01.005> PMID: 25660846
20. Scherjon S. A comparison between the organization of obstetrics in Denmark and The Netherlands. *Br J Obstet Gynaecol*. 1986; 93:684–9. PMID: 3730337
 21. Hemminki E, Heino A, Gissler M. Should births be centralised in higher level hospitals? Experiences from regionalised health care in Finland. *BJOG*. 2011; 118:1186–95. <https://doi.org/10.1111/j.1471-0528.2011.02977.x> PMID: 21609379
 22. Papiernik E, Keith LG. The regionalization of perinatal care in France—description of a missing policy. *Eur J Obstet Gynecol Reprod Biol*. 1995; 61:99–103. [https://doi.org/10.1016/0301-2115\(95\)02107-i](https://doi.org/10.1016/0301-2115(95)02107-i) PMID: 7556849
 23. Reynolds J., Yudkin PL, Bull MJV. General practitioner obstetrics: does risk prediction work? *J R Coll Gen Pract*. 1988; 38:307–10. PMID: 3255826
 24. Lagendijk J, Vos AA, Bertens LCM, Denktas S, Bonsel GJ, Steyerberg EW, et al. Antenatal non-medical risk assessment and care pathways to improve pregnancy outcomes: a cluster randomised controlled trial. *Eur J Epidemiol*. 2018; 33:579–89. <https://doi.org/10.1007/s10654-018-0387-7> PMID: 29605891
 25. Offerhaus PM, de Jonge A, van der Pal-de Bruin KM, Hukkelhoven CWPM, Scheepers PLH, Lagro-Janssen ALM. Change in primary midwife-led care in the Netherlands in 2000–2008: A descriptive study of caesarean sections and other interventions among 807,437 low risk births. *Midwifery*. 2015; 31:648–54. <https://doi.org/10.1016/j.midw.2015.01.013> PMID: 26203475
 26. Tucker J. Guidelines and management of mild hypertensive conditions in pregnancy in rural general practices in Scotland: issues of appropriateness and access. *Qual Saf Heal Care*. 2003; 12:286–90.
 27. Giles W, Bisits A, Knox M, Madsen G, Smith R. The effect of fetal fibronectin testing on admissions to a tertiary maternal-fetal medicine unit and cost savings. *Am J Obstet Gynecol*. 2000; 182:439–42. [https://doi.org/10.1016/s0002-9378\(00\)70236-5](https://doi.org/10.1016/s0002-9378(00)70236-5) PMID: 10694349
 28. Lavender T, Alfirovic Z, Walkinshaw S. Effect of different partogram action lines on birth outcomes—a randomized controlled trial. *Obstet Gynecol*. 2006; 108(2):295–302. <https://doi.org/10.1097/01.AOG.0000226862.78768.5c> PMID: 16880298
 29. Matthey S, Souter K, Mortimer K, Stephens C, Sheridan-Magro A. Routine antenatal maternal screening for current mental health: evaluation of a change in the use of the Edinburgh Depression Scale in clinical practice. *Arch Womens Ment Health*. 2016; 19:367–72. <https://doi.org/10.1007/s00737-015-0570-8> PMID: 26349571
 30. Martijn L, Jacobs A, Amelink-Verburg M, Wentzel R, Buitendijk S, Wensing M. Adverse outcomes in maternity care for women with a low risk profile in The Netherlands: a case series analysis. *BMC Pregnancy Childbirth*. 2013; 13:219. <https://doi.org/10.1186/1471-2393-13-219> PMID: 24286376
 31. Koshida S, Ono T, Tsuji S, Murakami T, Takahashi K. Recommendations for preventing stillbirth: a regional population-based study in Japan during 2007–2011. *Tohoku J Exp Med*. 2015; 235:145–9. <https://doi.org/10.1620/tjem.235.145> PMID: 25746158
 32. Knight M. The findings of the MBRRACE-UK confidential enquiry into maternal deaths and morbidity. *Obstet Gynaecol Reprod Med*. 2018; 29(1):21–3.
 33. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol*. 2005; 8(1):19–32.
 34. Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. *Implement Sci*. 2010; 5:69. <https://doi.org/10.1186/1748-5908-5-69> PMID: 20854677
 35. Daudt HM, van Mossel C, Scott SJ. Enhancing the scoping study methodology: a large, inter-professional team's experience with Arksey and O'Malley's framework. *BMC Med Res Methodol*. 2013; 13:48. <https://doi.org/10.1186/1471-2288-13-48> PMID: 23522333
 36. Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann Intern Med*. 2018; 169(7):467. <https://doi.org/10.7326/M18-0850> PMID: 30178033
 37. Mendeley Ltd. Mendeley [Internet]. 2016 [cited 2017 Feb 24]. <https://www.mendeley.com/>
 38. Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, et al, editors. *Cochrane Handbook for Systematic Reviews of Interventions version 6.0 (updated July 2019)* [Internet]. Cochrane; 2019 [cited 2019 Dec 4]. www.training.cochrane.org/handbook
 39. Barnett-Page E, Thomas J. Methods for the synthesis of qualitative research: a critical review. *BMC Med Res Methodol*. 2009; 9:59. <https://doi.org/10.1186/1471-2288-9-59> PMID: 19671152
 40. Thomas J, Harden A. Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Med Res Methodol*. 2008; 8:45. <https://doi.org/10.1186/1471-2288-8-45> PMID: 18616818

41. Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *BMJ*. 2009; 339:b2535. <https://doi.org/10.1136/bmj.b2535> PMID: [19622551](https://pubmed.ncbi.nlm.nih.gov/19622551/)
42. Eide BI, Nilsen ABV, Rasmussen S. Births in two different delivery units in the same clinic—a prospective study of healthy primiparous women. *BMC Pregnancy Childbirth*. 2009; 9:25. <https://doi.org/10.1186/1471-2393-9-25> PMID: [19545412](https://pubmed.ncbi.nlm.nih.gov/19545412/)
43. Monk A, Tracy M, Foureur M, Grigg C, Tracy S. Evaluating Midwifery Units (EMU): a prospective cohort study of freestanding midwifery units in New South Wales, Australia. *BMJ Open*. 2014; 4:e006252. <https://doi.org/10.1136/bmjopen-2014-006252> PMID: [25361840](https://pubmed.ncbi.nlm.nih.gov/25361840/)
44. Ryan TD, Kidd GM. Maternal morbidity associated with in utero transfer. *BMJ*. 1989 Dec 2; 299:1383–5. <https://doi.org/10.1136/bmj.299.6712.1383> PMID: [2513972](https://pubmed.ncbi.nlm.nih.gov/2513972/)
45. Laube DW. Experience with an alternative birth center in a university hospital. *J Reprod Med*. 1983;391–6. PMID: [6887145](https://pubmed.ncbi.nlm.nih.gov/6887145/)
46. Kwong AJ, Chang MS, Tuomala RE, Riley LE, Robinson JN, Mutinga ML, et al. Peripartum care for mothers diagnosed with hepatitis B during pregnancy: a survey of provider practices. *Matern Child Health J*. 2018; 22:1345–51. <https://doi.org/10.1007/s10995-018-2515-0> PMID: [29512054](https://pubmed.ncbi.nlm.nih.gov/29512054/)
47. Eskes M, Waelput AJM, Scherjon SA, Bergman KA, Abu-Hanna A, Ravelli ACJ. Small for gestational age and perinatal mortality at term: An audit in a Dutch national cohort study. *Eur J Obstet Gynecol Reprod Biol*. 2017; 215:62–7. <https://doi.org/10.1016/j.ejogrb.2017.06.002> PMID: [28601729](https://pubmed.ncbi.nlm.nih.gov/28601729/)
48. Daemers DOA, Wijnen HAA, van Limbeek EBM, Budé LM, Nieuwenhuijze MJ, Spaanderman MEA, et al. The impact of obesity on outcomes of midwife-led pregnancy and childbirth in a primary care population: a prospective cohort study. *BJOG*. 2014; 121:1403–14. <https://doi.org/10.1111/1471-0528.12684> PMID: [24618305](https://pubmed.ncbi.nlm.nih.gov/24618305/)
49. George A, Dahlen HG, Blinkhorn A, Ajwani S, Bhole S, Ellis S, et al. Evaluation of a midwifery initiated oral health-dental service program to improve oral health and birth outcomes for pregnant women: a multi-centre randomised controlled trial. *Int J Nurs Stud*. 2018; 82:49–57. <https://doi.org/10.1016/j.ijnurstu.2018.03.006> PMID: [29605753](https://pubmed.ncbi.nlm.nih.gov/29605753/)
50. Hollingworth J, Pietsch R, Epee-Bekima M, Nathan E. Time to delivery: transfers for threatened preterm labour and prelabour rupture of membranes in Western Australia. *Aust J Rural Health*. 2018; 26:42–7. <https://doi.org/10.1111/ajr.12380> PMID: [29168589](https://pubmed.ncbi.nlm.nih.gov/29168589/)
51. Morley K. Epilepsy in pregnancy: the role of the midwife in risk management. *Br J Midwifery*. 2018 Sep; 26(9):564–73.
52. Knox GE, Schnitker KA. In-utero transport. *Clin Obstet Gynecol*. 1984; 27(1):11–6. <https://doi.org/10.1097/00003081-198403000-00005> PMID: [6705304](https://pubmed.ncbi.nlm.nih.gov/6705304/)
53. Cordero L, Schurman S, Zuspan FP. Appropriateness of antenatal referrals to a regional perinatal center. *J Perinatol*. 1989; 9(1):38–42. PMID: [2709150](https://pubmed.ncbi.nlm.nih.gov/2709150/)
54. Badgery-Parker T, Ford JB, Jenkins MG, Morris JM, Roberts CL. Patterns and outcomes of preterm hospital admissions during pregnancy in NSW, 2001–2008. *Med J Aust*. 2012; 196(4):261–5. <https://doi.org/10.5694/mja11.10717> PMID: [22409693](https://pubmed.ncbi.nlm.nih.gov/22409693/)
55. Hutchinson FH, Davies MW. Time-to-delivery after maternal transfer to a tertiary perinatal centre. *Biomed Res Int*. 2014;325919. <https://doi.org/10.1155/2014/325919> PMID: [24745012](https://pubmed.ncbi.nlm.nih.gov/24745012/)
56. Tucker J, McVicar A, Pitchforth E, Farmer J, Bryers H. Maternity care models in a remote and rural network: assessing clinical appropriateness and outcome indicators. *Qual Saf Heal Care*. 2010; 19:83–9.
57. Van Otterloo LR, Connelly CD. Risk-appropriate care to improve practice and birth outcomes. *J Obstet Gynecol Neonatal Nurs*. 2018; 47:661–72. <https://doi.org/10.1016/j.jogn.2018.05.004> PMID: [30196808](https://pubmed.ncbi.nlm.nih.gov/30196808/)
58. Posthumus AG, Borsboom GJ, Poeran J, Steegers EAP, Bonsel GJ. Geographical, ethnic and socio-economic differences in utilization of obstetric care in the Netherlands. *PLoS One*. 2016; 11(6):e0156621. <https://doi.org/10.1371/journal.pone.0156621> PMID: [27336409](https://pubmed.ncbi.nlm.nih.gov/27336409/)
59. Reddy K, Reginald P, Spring J, Nunn L, Mishra N. A free-standing low-risk maternity unit in the United Kingdom: does it have a role? *J Obstet Gynaecol (Lahore)*. 2004; 24(4):360–6.
60. Nuovo J. Clinical application of a high-risk scoring system on a family practice obstetric service. *J Fam Pract*. 1985; 20(2):139–44. PMID: [3968521](https://pubmed.ncbi.nlm.nih.gov/3968521/)
61. Kim JJ, La Porte LM, Corcoran M, Magasi S, Batza J, Silver RK. Barriers to mental health treatment among obstetric patients at risk for depression. *Am J Obstet Gynecol*. 2010; 202:312.e1–312.e5.
62. Delaney-Black V, Lubchenco LO, Joseph Butterfield L, Goldson E, Koops BL, Lazotte DC. Outcome of very-low-birth-weight infants: are populations of neonates inherently different after antenatal versus neonatal referral? *Am J Obstet Gynecol*. 1989; 160(3):545–52. [https://doi.org/10.1016/s0002-9378\(89\)80023-7](https://doi.org/10.1016/s0002-9378(89)80023-7) PMID: [2929672](https://pubmed.ncbi.nlm.nih.gov/2929672/)

63. Goh A, Browning Carmo K, Morris J, Berry A, Wall M, Abdel-Latif M. Outcomes of high-risk obstetric transfers in New South Wales and the Australian capital territory: the high-risk obstetric transfer study. *Aust New Zeal J Obstet Gynaecol*. 2015;1–6.
64. Stolp I, Smit M, Luxemburg S, van den Akker T, de Waard J, van Roosmalen J, et al. Ambulance transfer in case of postpartum hemorrhage after birth in primary midwifery care in the Netherlands: a prospective cohort study. *Birth*. 2015; 42(3):227–34. <https://doi.org/10.1111/birt.12171> PMID: 26184111
65. Blix E, Kumle MH, Ingversen K, Huitfeldt AS, Hegaard HK, Ólafsdóttir ÓÁ, et al. Transfers to hospital in planned home birth in four Nordic countries—a prospective cohort study. *Acta Obstet Gynecol Scand*. 2016; 95:420–8. <https://doi.org/10.1111/aogs.12858> PMID: 26830511
66. Grigg CP, Tracy SK, Tracy M, Schmied V, Monk A. Transfer from primary maternity unit to tertiary hospital in New Zealand—timing, frequency, reasons, urgency and outcomes: part of the Evaluating Maternity Units study. *Midwifery*. 2015; 31:879–87. <https://doi.org/10.1016/j.midw.2015.04.018> PMID: 26002990
67. Sidhu H, Heasley RN, Patterson CC, Halliday HL, Thompson W. Short term outcome in babies refused perinatal intensive care. *BMJ*. 1989 Sep 9; 299:647–9. <https://doi.org/10.1136/bmj.299.6700.647> PMID: 2508848
68. Shenai JP, Major CW, Gaylord MS, Blake WW, Simmons A, Oliver S, et al. A successful decade of regionalized perinatal care tennessee: the neonatal experience. *J Perinatol*. 1991; 11(2):137–43. PMID: 1890472
69. Lennox CE. Transferring at-risk babies in-utero or neonatally: a decade's experience from a peripheral consultant maternity unit. *Health Bull (Raleigh)*. 1992; 50(5):362–7.
70. Allen C, Greene R, Higgins J. Audit of antenatal clinic for high-risk obstetric patients; activity and outcomes. *Ir Med J*. 2007; 100(9):591–3. PMID: 18196883
71. Kirke AB. How safe is GP obstetrics? An assessment of antenatal risk factors and perinatal outcomes in one rural practice. *Rural Remote Health*. 2010; 10:1545. PMID: 20815656
72. Smit M, Ganzeboom A, Dawson JA, Walther FJ, Bustraan J, van Roosmalen JJM, et al. Feasibility of pulse oximetry for assessment of infants born in community based midwifery care. *Midwifery*. 2014; 30:539–43. <https://doi.org/10.1016/j.midw.2013.06.005> PMID: 23866687
73. Marlow N, Bennett C, Draper ES, Hennessy EM, Morgan AS, Costeloe KL. Perinatal outcomes for extremely preterm babies in relation to place of birth in England: the EPICure 2 study. *Arch Dis Child—Fetal Neonatal Ed*. 2014; 99:F181–8. <https://doi.org/10.1136/archdischild-2013-305555> PMID: 24604108
74. Engjom HM, Morken N-H, Høydahl E, Norheim OF, Klungsøyr K. Risk of eclampsia or HELLP-syndrome by institution availability and place of delivery—a population-based cohort study. *Pregnancy Hypertens*. 2018; 14:1–8. <https://doi.org/10.1016/j.preghy.2018.05.005> PMID: 30527094
75. Hein HA, Burmeister LF. The effect of ten years of regionalized perinatal health care in Iowa, U.S.A. *Eur J Obstet Gynecol Reprod Biol*. 1986; 21:33–48. [https://doi.org/10.1016/0028-2243\(86\)90043-2](https://doi.org/10.1016/0028-2243(86)90043-2) PMID: 3956827
76. Meuli RL, Cohen LJ. Regionalization of perinatal care. *West J Med*. 1984; 141(5):695–7. PMID: 6542730
77. Peddle LJ, Brown H, Buckley J, Dixon W, Kaye J (MacDonald), Muise M, et al. Voluntary regionalization and associated trends in perinatal care: The Nova Scotia Reproductive Care Program. *Am J Obstet Gynecol*. 1983; 145(2):170–6. [https://doi.org/10.1016/0002-9378\(83\)90485-4](https://doi.org/10.1016/0002-9378(83)90485-4) PMID: 6849351
78. Kruske S, Schultz T, Eales S, Kildea S. A retrospective, descriptive study of maternal and neonatal transfers, and clinical outcomes of a primary maternity unit in rural Queensland, 2009–2011. *Women and Birth*. 2015; 28:30–9. <https://doi.org/10.1016/j.wombi.2014.10.006> PMID: 25458610
79. Kruske S, Kildea S, Jenkinson B, Pilcher J, Robin S, Rolfe M, et al. Primary maternity units in rural and remote Australia: results of a national survey. *Midwifery*. 2016; 40:1–9. <https://doi.org/10.1016/j.midw.2016.05.004> PMID: 27428092
80. Craig AS, Berg AO, Kirkwood CR. Obstetric consultations during labor and delivery in a university based family practice. *J Fam Pract*. 1985; 20(5):481–5. PMID: 3989488
81. Street P, Gannon MJ, Holt EM. Community obstetric in West Berkshire. *BMJ*. 1991; 302:698–700. <https://doi.org/10.1136/bmj.302.6778.698> PMID: 1878023
82. Baker SL, Kronenfeld JJ. High risk channeling to improve medicaid maternal and infant care. *J Health Soc Policy*. 1992; 3(4):29–49. https://doi.org/10.1300/J045v03n04_04 PMID: 10121846
83. van Haaren KMA, Springer MP. De kwaliteit van het verloskundig handelen van de huisarts [The quality of obstetric care given by the general practitioner]. *Huisarts Wet*. 2002; 45(11):586–91.
84. Suzuki S. Trend analysis of primary midwife-led delivery care at a Japanese perinatal center. *Int J Med Sci*. 2014; 11:466–70. <https://doi.org/10.7150/ijms.8204> PMID: 24688310

85. Ferrazzi E, Visconti E, Paganelli AM, Campi CM, Lazzeri C, Cirillo F, et al. The outcome of midwife-led labor in low-risk women within an obstetric referral unit. *J Matern Neonatal Med.* 2015; 28(13):1530–6.
86. Eden RD, Edén RD, Penka A, Britt DW, Landsberger EJ, Evans MI. Re-evaluating the role of the MFM specialist: lead, follow, or get out of the way. *J Matern Neonatal Med.* 2005; 18(4):253–8.
87. Lessaris KJ, Annibale DJ, Southgate MW, Hulseley TC, Ohning BL. Effects of changing health care financial policy on very low birthweight neonatal outcomes. *South Med J.* 2002; 95(4):426–30. PMID: [11958241](#)
88. Ferndale D, Meuter RFI, Watson B, Gallois C. 'You don't know what's going on in there': a discursive analysis of midwifery hospital consultations. *Health Risk Soc.* 2017; 19(7–8):411–31.
89. Baldwin A, Harvey C, Willis E, Ferguson B, Capper T. Transitioning across professional boundaries in midwifery models of care: a literature review. *Women and Birth.* 2019; 32:195–203. <https://doi.org/10.1016/j.wombi.2018.08.003> PMID: [30145166](#)
90. Britt DW, Edén RD, Evans MI. Matching risk and resources in high-risk pregnancies. *J Matern Neonatal Med.* 2006; 19(10):645–50.
91. Aalfs CM, Smets EMA, de Haes HCJM, Leschot NJ. Referral for genetic counselling during pregnancy: limited alertness and awareness about genetic risk factors among GPs. *Fam Pract.* 2003; 20(2):135–41. <https://doi.org/10.1093/fampra/20.2.135> PMID: [12651786](#)
92. Humphrey MD, Foxcroft KF, Callaway LK. Obstetric risk score—revalidated for triaging high-risk pregnancies in rural areas. *Aust New Zeal J Obstet Gynaecol.* 2017; 57:63–7.
93. Ressler B, O'Beirne M. Detecting breech presentation before labour: lessons from a low-risk maternity clinic. *J Obstet Gynaecol Canada.* 2015; 37(8):702–6.
94. Bais JMJ, Eskes M, Pel M, Bonsel GJ, Bleker OP. Effectiveness of detection of intrauterine growth retardation by abdominal palpation as screening test in a low risk population: an observational study. *Eur J Obstet Gynecol Reprod Biol.* 2004; 116:164–9. <https://doi.org/10.1016/j.ejogrb.2004.01.037> PMID: [15358457](#)
95. Leddy MA, Lawrence H, Schulkin J. Obstetrician-gynecologists and women's mental health: Findings of the collaborative ambulatory research network 2005–2009. *Obstet Gynecol Surv.* 2011; 66(5):316–23. <https://doi.org/10.1097/OGX.0b013e31822785ee> PMID: [21794195](#)
96. Amelink-Verburg MP, Verloove-Vanhorick SP, Hakkenberg RMA, Veldhuijzen IME, Bennebroek Gravenhorst J, Buitendijk SE. Evaluation of 280 000 cases in Dutch midwifery practices: a descriptive study. *BJOG.* 2008; 115:570–8. <https://doi.org/10.1111/j.1471-0528.2007.01580.x> PMID: [18162116](#)
97. Binder S, Hill K, Meinen-Derr J, Greenberg JM, Narendran V. Increasing VLBW deliveries at subspecialty perinatal centers via perinatal outreach. *Pediatrics.* 2011; 127(3):487–93. <https://doi.org/10.1542/peds.2010-1064> PMID: [21321032](#)
98. Quinn EK, Noble J, Seale H, Ward JE. Provision of maternity care for women in remote Far West New South Wales: how far have we come? *Aust J Rural Health.* 2014; 22:114–20. <https://doi.org/10.1111/ajr.12088> PMID: [25039845](#)
99. Dijkstra K, Kuyvenhoven M, Verheij T, Iedema H, Springer M, Visser G. Dreigende vroeggeboorte; opvattingen en werkwijze van verloskundigen, huisartsen en gynaecologen [Threatened pre-term delivery: opinions and working methods of midwives, GPs and gynaecologists]. *Huisarts Wet.* 2003; 46(3):129–33.
100. Magann EF, Bronstein J, McKelvey SS, Wendel P, Smith DM, Lowery CL. Evolving trends in maternal fetal medicine referrals in a rural state using telemedicine. *Arch Gynecol Obstet.* 2012 Dec; 286(6).
101. Evers ACC, Brouwers HAA, Nikkels PGJ, Boon J, van Egmond-Linden A, Groenendaal F, et al. Substandard care in delivery-related asphyxia among term infants: prospective cohort study. *Acta Obstet Gynecol Scand.* 2013; 92:85–93. <https://doi.org/10.1111/aogs.12012> PMID: [22994792](#)
102. Mito A, Arata N, Sakamoto N, Miyakoshi K, Waguri M, Osamura A, et al. Present status of clinical care for postpartum patients with hypertensive disorders of pregnancy in Japan: findings from a nationwide questionnaire survey. *Hypertens Pregnancy.* 2015; 34(2):209–20. <https://doi.org/10.3109/10641955.2014.1001902> PMID: [25774557](#)
103. James A, Endacott R, Stenhouse E. Maternity High Dependency Care (MHDC) in Obstetric Units remote from tertiary referral centres; findings of a modified Delphi study. *Evid Based Midwifery.* 2017; 15(4):120–7.
104. Stewart MJ, Smith J, Boland RA. Optimizing outcomes in regionalized perinatal care: integrating maternal and neonatal emergency referral, triage, and transport. *Curr Treat Options Pediatr.* 2017; 3:313–26.
105. Morriss FH. Increased risk of death among uninsured neonates. *Health Serv Res.* 2013; 48(4):1232–55. <https://doi.org/10.1111/1475-6773.12042> PMID: [23402526](#)

106. Phillippi JC, Holley SL, Thompson JL, Virostko K, Bennett K. A planning checklist for interprofessional consultations for women in midwifery care. *J Midwifery Womens Health*. 2019; 64:98–103. <https://doi.org/10.1111/jmwh.12900> PMID: 30325575
107. Reither M, Germano E, DeGrazia M. Midwifery management of pregnant women who are obese. *J Midwifery Womens Health*. 2018; 63:273–82. <https://doi.org/10.1111/jmwh.12760> PMID: 29778087
108. Richardson DK, Gabbe SG, Wind Y. Decision analysis of high-risk patient referral. *Obstet Gynecol*. 1984; 63:496–501. PMID: 6700895
109. Tilyard MW, Seddon RJ, Oakley W, Murdoch CJ. Is outcome for general practitioner obstetricians influenced by workload and locality? *N Z Med J*. 1988 Apr 27; 101:207–9. PMID: 3362469
110. Jordan JM, Gaspar D. Family practice obstetrics in a teaching hospital—Does a tertiary care environment make a difference? *Can Fam Physician*. 1995; 41(April):610–5.
111. Sullivan NH, Witte M. Care of the at-risk neonate born at home—a model for nurse-midwife/physician collaboration. *J Nurse Midwifery*. 1995; 40(6):534–40. [https://doi.org/10.1016/0091-2182\(95\)00058-5](https://doi.org/10.1016/0091-2182(95)00058-5) PMID: 8568578
112. Wallace EM, Mackintosh CL, Brownlee M, Laidlaw L, Johnstone FD. A study of midwife-medical staff interaction in a labour ward environment. *J Obstet Gynaecol (Lahore)*. 1995; 15(3):165–70.
113. Schwartz RM, Muri JH, Overpeck MD, Pezzullo JC, Kogan MD. Use of high-technology care among women with high-risk pregnancies in the United States. *Matern Child Health J*. 2000; 4(1):7–18. <https://doi.org/10.1023/a:1009537817450> PMID: 10941756
114. de Jonge A, Rijnders M, Agyemang C, van der Stouwe R, den Otter J, Van den Muijsenbergh METC, et al. Limited midwifery care for undocumented women in the Netherlands. *J Psychosom Obstet Gynecol*. 2011; 32(4):182–8.
115. Bronstein JM, Ounpraseuth S, Jonkman J, Lowery CL, Fletcher D, Nugent RR, Hall RW. Improving Perinatal Regionalization for Preterm Deliveries in a Medicaid Covered Population: Initial Impact of the Arkansas ANGELS Intervention. *Health Serv Res*. 2011; 46(4):1082–103. <https://doi.org/10.1111/j.1475-6773.2011.01249.x> PMID: 21413980
116. Wright JD, Silver RM, Bonanno C, Gaddipati S, Lu Y-S, Simpson LL, et al. Practice patterns and knowledge of obstetricians and gynecologists regarding placenta accreta. *J Matern Neonatal Med*. 2013; 26(16):1602–9.
117. Romijn A, Muijtjens AMM, de Bruijne MC, Donkers HHLM, Wagner C, de Groot CJM, et al. What is normal progress in the first stage of labour? A vignette study of similarities and differences between midwives and obstetricians. *Midwifery*. 2016; 41:104–9. <https://doi.org/10.1016/j.midw.2016.08.006> PMID: 27586088
118. Morriss F. Interhospital transfers of maternal patients: cohort analysis of nationwide inpatient sample, 2011. *Am J Perinatol*. 2018; 35:65–77. <https://doi.org/10.1055/s-0037-1606099> PMID: 28806847
119. Accortt EE, Wong MS. It Is Time for Routine Screening for Perinatal Mood and Anxiety Disorders in Obstetrics and Gynecology Settings. *Obstet Gynecol Surv*. 2017; 72(9):553–68. <https://doi.org/10.1097/OGX.0000000000000477> PMID: 28905985
120. Hopkins MK, Goldstein SA, Ward CC, Kuller JA. Evaluation and management of aternal congenital ceart disease: a review. *Obstet Gynecol Surv*. 2018; 73(2):116–24. <https://doi.org/10.1097/OGX.0000000000000536> PMID: 29480926
121. Gillespie M, Sinclair M, Stockdale J, Bunting B, Condell J. Online educational resources for health professionals caring for pregnant women with heart disease: a scoping literature review using Arksey and O'Malley's methodological framework. *Evid Based Midwifery*. 2018; 16(2):55–61.
122. Godbole G, Irish D, Basarab M, Mahungu T, Fox-Lewis A, Thorne C, et al. Management of hepatitis B in pregnant women and infants: a multicentre audit from four London hospitals. *BMC Pregnancy Childbirth*. 2013; 13:222. <https://doi.org/10.1186/1471-2393-13-222> PMID: 24289183
123. Symon A, Winter C, Donnan PT, Kirkham M. Examining autonomy's boundaries: a follow-up review of perinatal mortality cases in UK independent midwifery. *Birth*. 2010; 37(4):280–7. <https://doi.org/10.1111/j.1523-536X.2010.00422.x> PMID: 21083719
124. Geerts Caroline C, Trudy K, Lagro-Janssen Antoine LM, Twisk Jos WR, Dillen V Jeroen, et al. Birth setting, transfer and maternal sense of control: results from the DELIVER study. *BMC Pregnancy Childbirth*. 2014; 14:27. <https://doi.org/10.1186/1471-2393-14-27> PMID: 24438469
125. Jackson CJ, Bosio P, Habiba M, Waugh J, Kamal P, Dixon-Woods M. Referral and attendance at a specialist antenatal clinic: qualitative study of women's views. *BJOG*. 2006; 113:909–13. <https://doi.org/10.1111/j.1471-0528.2006.01016.x> PMID: 16907936
126. Lalor JG, Devane D, Begley CM. Unexpected diagnosis of fetal abnormality: women's encounters with caregivers. *Birth*. 2007; 34(1):80–8. <https://doi.org/10.1111/j.1523-536X.2006.00148.x> PMID: 17324182

127. McMurtrie J, Carling-Paul C, Teate A, Caplice S, Chapman M, Homer C. The St. George Homebirth Program: an evaluation of the first 100 booked women. *Aust New Zeal J Obstet Gynaecol*. 2009; 49:631–6.
128. Montgomery-Andersen RA, Willén H, Borup I. 'There was no other way things could have been.' Greenlandic women's experiences of referral and transfer during pregnancy. *Anthropol Med*. 2010; 17(3):301–13. <https://doi.org/10.1080/13648470.2010.526696> PMID: 21153964
129. van Stenus CMV, Gotink M, Boere-Boonekamp MM, Sools A, Need A. Through the client's eyes: using narratives to explore experiences of care transfers during pregnancy, childbirth, and the neonatal period. *BMC Pregnancy Childbirth*. 2017; 17:182. <https://doi.org/10.1186/s12884-017-1369-6> PMID: 28606067
130. Patterson J, Foureur M, Skinner J. Remote rural women's choice of birthplace and transfer experiences in rural Otago and Southland New Zealand. *Midwifery*. 2017; 52:49–56. <https://doi.org/10.1016/j.midw.2017.05.014> PMID: 28600971
131. Rowe R, Fitzpatrick R, Hollowell J, Kurinczuk J. Transfers of women planning birth in midwifery units: data from the Birthplace prospective cohort study. *BJOG*. 2012; 119:1081–90. <https://doi.org/10.1111/j.1471-0528.2012.03414.x> PMID: 22702241
132. Suzuki S, Satomi M, Miyake H. Referrals during labor in midwifery care. *J Nippon Med Sch*. 2009; 74(4):226–8.
133. Amelink-Verburg MP, Buitendijk SE. Pregnancy and labour in the Dutch maternity care system: what is normal? The role division between midwives and obstetricians. *J Midwifery Womens Health*. 2010; 55(3):216–25. <https://doi.org/10.1016/j.jmwh.2010.01.001> PMID: 20434081
134. Amelink-Verburg MP, Rijnders MEB, Buitendijk SE. A trend analysis in referrals during pregnancy and labour in Dutch midwifery care 1988–2004. *BJOG*. 2009; 116:923–32. <https://doi.org/10.1111/j.1471-0528.2009.02202.x> PMID: 19522796
135. Mansbridge K. Nurse-to-nurse referral of patients in early pregnancy. *Emerg Nurse*. 2014; 22(1):27–31. <https://doi.org/10.7748/en2014.04.22.1.27.e1285> PMID: 24689481
136. Perdok H, Jans S, Verhoeven C, van Dillen J, Batenburg R, Mol BW, et al. Opinions of professionals about integrating midwife- and obstetrician-led care in the Netherlands. *Midwifery*. 2016; 37:9–18. <https://doi.org/10.1016/j.midw.2016.03.011> PMID: 27217232
137. Evers ACC, Brouwers HAA, Hukkelhoven CWPM, Nikkels PGJ, Boon J, van Egmond-Linden A, et al. Perinatal mortality and severe morbidity in low and high risk term pregnancies in the Netherlands: prospective cohort study. *BMJ*. 2010; 341:c5639. <https://doi.org/10.1136/bmj.c5639> PMID: 21045050
138. Vause S, Clarke B. Risk stratification and hierarchy of antenatal care. *Best Pract Res Clin Obstet Gynaecol*. 2014; 28:483–94. <https://doi.org/10.1016/j.bpobgyn.2014.03.004> PMID: 24726852
139. Jeffery J, Hewison A, Goodwin L, Kenyon S. Midwives' experiences of performing maternal observations and escalating concerns: a focus group study. *BMC Pregnancy Childbirth*. 2017; 17:282. <https://doi.org/10.1186/s12884-017-1472-8> PMID: 28865442
140. De Reu PAOM Oosterbaan HP, Smits LJM Nijhuis JG. Avoidable mortality in small-for-gestational-age children in the Netherlands. *J Perinat Med*. 2010; 38(3):311–8. <https://doi.org/10.1515/jpm.2010.027> PMID: 20121528
141. Scherman S, Smith J, Davidson M. The first year of a midwifery-led model of care in Far North Queensland. *Med J Aust*. 2008; 188:85–8. PMID: 18205580
142. Richardson D, Rosoff A, Mcmenamin JP. Referral practices and health care costs: the dilemma of high risk obstetrics. *J Leg Med*. 1985; 6(4):427–64. <https://doi.org/10.1080/01947648509513454> PMID: 3879263
143. de Jonge A, Mesman JAJM, Manniën J, Zwart JJ, Buitendijk SE, van Roosmalen J, et al. Severe adverse maternal outcomes among women in midwife-led versus obstetrician-led care at the onset of labour in the Netherlands: a nationwide cohort study. *PLoS One*. 2015; 10(5):e0126266. <https://doi.org/10.1371/journal.pone.0126266> PMID: 25961723
144. Anderson RE, Murphy PA. Outcomes of 11,788 planned home births attended by certified nurse-midwives. A retrospective descriptive study. *J Nurse Midwifery*. 1995; 40(6):483–92. [https://doi.org/10.1016/0091-2182\(95\)00051-8](https://doi.org/10.1016/0091-2182(95)00051-8) PMID: 8568573
145. Baird AG, Jewell D, Walker J. Management of labour in an isolated rural maternity hospital. *BMJ*. 1996; 312:223–6. <https://doi.org/10.1136/bmj.312.7025.223> PMID: 8563590
146. de Galan-Roosen AEM, Kuijpers JC, Mackenbach JP. Perinatal mortality in Delft and environs, 1983–1992: further decrease possible by specific attention to lethal congenital anomalies and placental insufficiency. *Ned Tijdschr voor Geneesk*. 1999; 143:152–7.
147. Holt J, Vold IN, Backe B, Johansen MV, Øian P. Child births in a modified midwife managed unit: Selection and transfer according to intended place of delivery. *Acta Obstet Gynecol Scand*. 2001; 80:206–12. PMID: 11207485

148. Schmidt N, Abelsen B, Oian P. Deliveries in maternity homes in Norway: results from a 2-year prospective study. *Acta Obstet Gynecol Scand*. 2002; 81:731–7. <https://doi.org/10.1034/j.1600-0412.2002.810808.x> PMID: 12174157
149. Fullerton JT, Jackson D, Snell BJ, Besser M, Dickinson C, Garite T. Transfer rates from freestanding birth centers—a comparison with the National Birth Center Study. *J Nurse Midwifery*. 1997; 42(1):9–16. [https://doi.org/10.1016/s0091-2182\(96\)00104-8](https://doi.org/10.1016/s0091-2182(96)00104-8) PMID: 9037930
150. Law YYH, Lam K-Y. A randomized controlled Trial comparing midwife-managed care and obstetrician-managed care for women assessed to be at low risk in the initial intrapartum period. *J Obstet Gynaecol Res*. 1999; 25(2):107–12. <https://doi.org/10.1111/j.1447-0756.1999.tb01131.x> PMID: 10379125
151. Blondel B, Papiernik E, Delmas D, Künzel W, Weber T, Maier R, et al. Organisation of obstetric services for very preterm births in Europe: results from the MOSAIC project. *BJOG*. 2009 Sep; 116(10):1364–72. <https://doi.org/10.1111/j.1471-0528.2009.02239.x> PMID: 19538415
152. Sloan EP, Kirsh S. Characteristics of obstetrical inpatients referred to a consultation-liaison psychiatry service in a tertiary-level university hospital. *Arch Womens Ment Health*. 2008; 11:327–33. <https://doi.org/10.1007/s00737-008-0034-5> PMID: 19015935
153. Ammari F, Gregory R. Screening for gestational diabetes in a population at high risk. *Pract Diabetes Int*. 1995; 13(5):150–2.
154. Carolan M, Hodnett E. Discovery of soft markers on fetal ultrasound: maternal implications. *Midwifery*. 2009; 25:654–64. <https://doi.org/10.1016/j.midw.2007.11.002> PMID: 18314233
155. Bernstein JA, McCloskey L, Gebel CM, Iverson RE, Lee-Parritz A. Lost opportunities to prevent early onset type 2 diabetes mellitus after a pregnancy complicated by gestational diabetes. *BMJ Open Diabetes Res Care*. 2016 Jun 17; 4:e000250. <https://doi.org/10.1136/bmjdc-2016-000250> PMID: 27347422
156. van Stenus CMV, Boere-Boonekamp MM, Kerkhof EFGM, Need A. Client experiences with perinatal healthcare for high-risk and low-risk women. *Women and Birth*. 2018; 31:e380–8. <https://doi.org/10.1016/j.wombi.2018.01.006> PMID: 29395696
157. Woodhart L, Goldstone J, Hartz D. The stories of women who are transferred due to threat of preterm birth. *Women and Birth*. 2018; 31:307–12. <https://doi.org/10.1016/j.wombi.2017.10.015> PMID: 29217168
158. Wiegers TA, van der Zee J, Keirse MJNC. Transfer from home to hospital: what is its effect on the experience of childbirth? *Birth*. 1998; 25(1):19–24. <https://doi.org/10.1046/j.1523-536x.1998.00019.x> PMID: 9534501
159. Shaw R, Kitzinger C. Calls to a home birth helpline: empowerment in childbirth. *Soc Sci Med*. 2005; 61:2374–83. <https://doi.org/10.1016/j.socscimed.2005.04.029> PMID: 15936864
160. Rijnders M, Baston H, Schönbeck Y, van der Pal K, Prins M, Green J, et al. Perinatal factors related to negative or positive recall of birth experience in women 3 years postpartum in the Netherlands. *Birth*. 2008; 35(2):107–16. <https://doi.org/10.1111/j.1523-536X.2008.00223.x> PMID: 18507581
161. Kuliukas L, Hauck Y, Duggan R, Lewis L. The phenomenon of intrapartum transfer from a western Australian birth centre to a tertiary maternity hospital: the overall experiences of partners. *Midwifery*. 2015; 31:e87–93. <https://doi.org/10.1016/j.midw.2015.01.010> PMID: 25682533
162. Bovbjerg ML, Cheyney M, Brown J, Cox KJ, Leeman L. Perspectives on risk: Assessment of risk profiles and outcomes among women planning community birth in the United States. *Birth*. 2017; 44:209–21. <https://doi.org/10.1111/birt.12288> PMID: 28332220
163. David M, Berg G, Werth I, Pachaly J, Mansfeld A, Kentenich H. Intrapartum transfer from a birth centre to a hospital—reasons, procedures, and consequences. *Acta Obstet Gynecol Scand*. 2006; 85:422–8. <https://doi.org/10.1080/00016340600593174> PMID: 16612703
164. Stern C, Permezel M, Petterson C, Lawson J, Eggers T, Kloss M. The Royal Women's Hospital Family Birth Centre: the first 10 years reviewed. *Aust New Zeal J Obstet Gynaecol*. 1992; 32(4):291–6.
165. Roberts Christine L, Henderson-Smart D, Ellwood DA, The High Risk Obstetric and Perinatal Advisory Working Group. Antenatal transfer of rural women to perinatal centres. *Aust New Zeal J Obstet Gynaecol*. 2000; 40:377–84.
166. Cacace M, Ettelt S, Mays N, Nolte E. Assessing quality in cross-country comparisons of health systems and policies: towards a set of generic quality criteria. *Health Policy (New York)*. 2013 Sep; 112(1–2):156–62.
167. Landman T, Carvalho E. Issues and methods in comparative politics: an introduction. 4th ed. Abington and New York: Routledge; 2017.
168. Marmor T, Wendt C. Conceptual frameworks for comparing healthcare politics and policy. *Health Policy (New York)*. 2012 Sep; 107(1):11–20.

169. Offerhaus PM, Geerts C, de Jonge A, Hukkelhoven CWPM, Twisk JWR, Lagro-Janssen ALM. Variation in referrals to secondary obstetrician-led care among primary midwifery care practices in the Netherlands: a nationwide cohort study. *BMC Pregnancy Childbirth*. 2015; 15:42.
170. Committee on Quality of Health Care in America. *Crossing the quality chasm, a new health system for the 21st century*. Washington: National Academies Press; 2001. 364 p.
171. Oliver A. Equity of access to health care: outlining the foundations for action. *J Epidemiol Community Heal*. 2004 Aug; 58:655–8.
172. Crenshaw K. Demarginalizing the intersection of race and sex: a black feminist critique of antidiscrimination doctrine, feminist theory and antiracist politics. *Univ Chic Leg Forum*. 1989; 1989(1):139–67.
173. Haddrill R, Jones GL, Anumba D, Mitchell C. A tale of two pregnancies: a critical interpretive synthesis of women's perceptions about delayed initiation of antenatal care. *Women and Birth*. 2018; 31(3):220–31. <https://doi.org/10.1016/j.wombi.2017.09.017> PMID: 29037485
174. Hajizadeh S, Ramezani Tehrani F, Simbar M, Farzadfar F. Factors influencing the use of prenatal care: a systematic review. *J Midwifery Reprod Heal*. 2016; 4:544–57.
175. Kantor E, Guglielminotti J, Azria E, Luton D, Laurent M, Oury J-F, et al. Socioeconomic deprivation and utilization of anesthetic care during pregnancy and delivery. *Anesth Analg*. 2017 Sep; 125(3):925–33. <https://doi.org/10.1213/ANE.0000000000002275> PMID: 28708666
176. Konstantina D. Access to maternal health and midwifery for vulnerable groups in the EU. 2019.
177. Small MJ, Allen TK, Brown HL. Global disparities in maternal morbidity and mortality. *Semin Perinatol*. 2017 Aug; 41(5):318–22. <https://doi.org/10.1053/j.semperi.2017.04.009> PMID: 28669415
178. Vedam S, Stoll K, Taiwo TK, Rubashkin N, Cheyney M, Strauss N, et al. The Giving Voice to Mothers study: inequity and mistreatment during pregnancy and childbirth in the United States. *Reprod Health*. 2019 Dec; 16:77. <https://doi.org/10.1186/s12978-019-0729-2> PMID: 31182118
179. Kramer MR, Strahan AE, Preslar J, Zaharatos J, St Pierre A, Grant JE, et al. Changing the conversation: applying a health equity framework to maternal mortality reviews. *Am J Obstet Gynecol*. 2019 Dec; 221(6):609.e1–609.e9.
180. Avery MD, Bell AD, Bingham D, Corry MP, Delbanco SF, Leavitt SG, et al. Blueprint for advancing high-value maternity care through physiologic childbearing [Internet]. 2018 [cited 2019 Dec 6]. <https://www.nationalpartnership.org/our-work/health/reports/maternity-blueprint.html>
181. The International MotherBaby Childbirth Organization, Federation of Gynecology and Obstetrics. The International Childbirth Initiative (ICI) [Internet]. 2018 [cited 2019 Dec 6]. <https://www.internationalchildbirth.com/>
182. World Health Organization. WHO recommendations on antenatal care for a positive pregnancy experience [Internet]. 2016 [cited 2019 Dec 6]. p. 152. https://www.who.int/reproductivehealth/publications/maternal_perinatal_health/anc-positive-pregnancy-experience/en/
183. World Health Organization. WHO recommendations: Intrapartum care for a positive childbirth experience [Internet]. 2018 [cited 2019 Dec 6]. <https://www.who.int/reproductivehealth/publications/intrapartum-care-guidelines/en/>
184. Hundley VA, Cruickshank FM, Lang GD, Glazener CMA, Milne JM, Turner M, et al. Midwife managed delivery unit: a randomised controlled comparison with consultant led care. *BMJ*. 1994 Nov 26; 309(6966):1400–4. <https://doi.org/10.1136/bmj.309.6966.1400> PMID: 7819846
185. Brownlee S, Chalkidou K, Doust J, Elshaug AG, Glasziou P, Heath I, et al. Evidence for overuse of medical services around the world. *Lancet*. 2017; 390(10090):156–68. [https://doi.org/10.1016/S0140-6736\(16\)32585-5](https://doi.org/10.1016/S0140-6736(16)32585-5) PMID: 28077234
186. Berger TM. Decisions in the gray zone: evidence-based or culture-based? *J Pediatr*. 2010 Jan; 156(1):7–9. <https://doi.org/10.1016/j.jpeds.2009.08.044> PMID: 20006758
187. Bryar R, Sinclair M. *Theory for Midwifery Practice*. New York: Palgrave MacMillan; 2011.
188. Burton-Jeangros C, Cavalli S, Gouilhers S, Hammer R. Between tolerable uncertainty and unacceptable risks: how health professionals and pregnant women think about the probabilities generated by prenatal screening. *Health Risk Soc*. 2013 Apr; 15(2):144–61.
189. Cheyne H, Dagleish L, Tucker J, Kane F, Shetty A, McLeod S, et al. Risk assessment and decision making about in-labour transfer from rural maternity care: a social judgment and signal detection analysis. *BMC Med Inform Decis Mak*. 2012; 12:122. <https://doi.org/10.1186/1472-6947-12-122> PMID: 23114289
190. Lankshear G, Ettorre E, Mason D. Decision-making, uncertainty and risk: exploring the complexity of work processes in NHS delivery suites. *Health Risk Soc*. 2005 Dec; 7(4):361–77.
191. Main E., Morton CH, Hopkins D, Giuliani G, Melsop K, Gould JB. Cesarean deliveries, outcomes, and opportunities for change in California: toward a public agenda for maternity care safety and quality

[Internet]. Palo Alto, CA: CMQCC; 2011 [cited 2019 Dec 6]. <https://www.cmqcc.org/resource/cesarean-deliveries-outcomes-and-opportunities-change-california-toward-public-agenda>

192. Meyer Y, Frank F, Schläppy Muntwyler F, Fleming V, Pehlke-Milde J. Decision-making in Swiss home-like childbirth: a grounded theory study. *Women and Birth*. 2017; 30(6):e272–80. <https://doi.org/10.1016/j.wombi.2017.05.004> PMID: 28624364
193. Page M, Mander R. Intrapartum uncertainty: a feature of normal birth, as experienced by midwives in Scotland. *Midwifery*. 2014 Jan; 30(1):28–35. <https://doi.org/10.1016/j.midw.2013.01.012> PMID: 23453698
194. Suresh GK. In the 'gray zone,' a doctor faces tough decisions on infant resuscitation. *Health Aff*. 2013 Oct; 32(10):1841–5.
195. The Scottish Government. The best start. A five-year forward plan for maternity and neonatal care in Scotland—Executive summary. 2017.