

## Results of a Dutch National and subsequent International Expert Meeting on Interconception Care

### Authors

Meertien K. Sijpkens<sup>1</sup>, MD

Céline Z. van den Hazel<sup>1</sup>, medical student

Ilse Delbaere<sup>2</sup>, RM, PhD

Tanja Tydén<sup>3</sup>, RNM, PhD, senior professor

Iryna Mogilevkina<sup>4</sup>, professor, MD, PhD

Eric A. P. Steegers<sup>1</sup>, professor, MD, PhD

Jill Shawe<sup>5</sup>, professor RN RM PhD

Ageeth N. Rosman<sup>1,6</sup>, RM, PhD

### Affiliations

1. Department of Obstetrics and Gynaecology, Division of Obstetrics and Prenatal Medicine, Erasmus University Medical Center, Erasmus MC, P.O. Box 2040, 3000 CA Rotterdam, The Netherlands
2. Department of Health Care, VIVES University College, Doorniksesteenweg 145, 8500 Kortrijk, Belgium.
3. Department of Women's and Children's Health, Uppsala University, Uppsala, Sweden
4. Educational and Research Center of Continuous Medical Education, Bogomolets National Medical University, Kiev, Ukraine.
5. Institute of Health & Community, Faculty of Health and Human Sciences, University of Plymouth, UK.
6. Rotterdam University of Applied Sciences, Rochussenstraat 198, 3015 EK, Rotterdam, The Netherlands

### Email addresses

m.sijpkens@erasmusmc.nl; celinevdhazel@hotmail.com; ilse.delbaere@vives.be;

Tanja.Tydén@kbh.uu.se; imogilevkina@gmail.com; e.a.p.steegers@erasmusmc.nl;

Jill.shawe@plymouth.ac.uk; a.n.rosman@hr.nl

### Corresponding author

Meertien K. Sijpkens, m.sijpkens@erasmusmc.nl, +31 (0) 010 70 38648

## **Results of a Dutch National and subsequent International Expert Meeting on Interconception Care**

**Introduction:** The potential value of preconception care and interconception care is increasingly acknowledged, but delivery is generally uncommon. Reaching women for interconception care is potentially easier than for preconception care, however the concept is still unfamiliar. Expert consensus could facilitate guidelines, policies and subsequent implementation. A national and subsequent international expert meeting were organized to discuss the term, definition, content, relevant target groups, and ways to reach target groups for interconception care.

**Methods:** We performed a literature study to develop propositions for discussion in a national expert meeting in the Netherlands in October 2015. The outcomes of this meeting were discussed during an international congress on preconception care in Sweden in February 2016. Both meetings were recorded, transcribed and subsequently reviewed by participants.

**Results:** The experts argued that the term, definition, and content for interconception care should be in line with preconception care. They discussed that the target group for interconception care should be ‘all women who have been pregnant and could be pregnant in the future and their (possible) partners’. In addition, they opted that any healthcare provider having contact with the target group should reach out and make every encounter a potential opportunity to promote interconception care.

**Discussion:** Expert discussions led to a description of the term, definition, content, and relevant target groups for interconception care. Opportunities to reach the target group were identified, but should be further developed and evaluated in policies and guidelines to determine the optimal way to deliver interconception care.

**Keywords:** internatal care; interpregnancy care; preconception care; maternal and child health; women’s health

## **Introduction**

In order to prevent adverse birth outcomes, the importance of preconception health and preconception care (PCC) has been recognized [1]. This applies to care before first pregnancies as well as to care before subsequent pregnancies, the latter often referred to as interconception care (ICC). However, more effort is needed to integrate PCC and ICC in current practice [2]. Compared to PCC, ICC could take advantage of available routine postnatal care, yet a complicating factor is that ICC is a rather unfamiliar concept, literature is scarce and different terms and definitions are used [3]. Clarity, for instance in guidelines, has been described as a determinant for implementation of new concepts in healthcare [4]. As such, achieving consensus on ICC could facilitate multidisciplinary guidelines and policies on ICC, which are currently not in place in many European countries [5]. Consensus meetings have been organized on PCC previously [6, 7, 8], however to our knowledge, this has not been done for ICC. We therefore organized a national and subsequent international expert meeting to discuss different aspects of ICC.

## **Materials and methods**

We used a similar approach for organizing and reporting on the ICC expert meetings, as was previously used for an expert meeting on PCC [6]. Firstly, we carried out a comprehensive literature search [see addendum for more details] to develop propositions as a starting point for discussion in the national expert meeting. We formulated propositions for consensus on five items related to ICC: the term ICC, the definition of ICC, the content of ICC, relevant target groups for ICC and ways to reach the target groups. In addition, studies that specifically reported on the impact of ICC interventions were summarized by describing participants, the intervention, and key findings [Addendum]. Also, three papers that provided an overview of ICC and together covered many of the topics described in the other papers [2, 3, 9], were sent in advance to the participants of the national expert meeting.

Secondly, during the national ICC expert meeting that we organized in the Netherlands in October 2015, the propositions based on the literature study were presented and discussed with nineteen participants. The results of this national meeting were subsequently discussed in an international meeting, which was organized during the Third European Congress on Preconception health and care (ECPHC) in Sweden in February 2016 and was joined by about 40 participants from seven countries. Different disciplines were involved in the meetings [see addendum for more details on the meetings]. Both meetings were chaired by members of the project team and were audio recorded. We produced transcripts and summarized the outcomes of the meetings that were reviewed by the participants of the national meeting and by country representatives of the international meeting.

The results will be presented per discussed ICC item in a fixed format: a summary of the *literature*; the *proposition* given as input for the national meeting; the *discussion outcomes* of the expert meetings; and lastly, a *summary of the expert's discussions* that had led to the outcome, including identified knowledge gaps.

## **Results**

### ***ICC Term***

#### *Literature*

Our starting point was the term interconception care, which was already described as interconceptional care in the late 1970s [10, 11]. However, three different terms seem to be used interchangeably with ICC on a regular basis: preconception, interpregnancy, and internatal care [2, 3]. Based on the meaning of terms, these terms could differ in the period of care they enclose (figure 1).

### *Proposition*

The four different terms (figure 1) were introduced.

### *Expert discussion outcome*

ICC should be referred to as ‘PCC between pregnancies’ (figure 1). This PCC can then be part of internatal care, which is the whole package of healthcare from birth until the next birth.

### *Summary of the experts’ discussions*

The Dutch experts did not want to introduce another term for something that is actually the same as PCC. They argued that using just one term, PCC, would help in conveying the message of PCC. Furthermore, ICC can be a confusing term with regard to the period it covers, since it suggests care starting from conception onwards. Despite the period not being completely adequate, the experts preferred the term ICC when comparing it to the terms internatal and interpregnancy care.

During the international meeting two other terms were also mentioned: ‘prepregnancy care’ and ‘periconception care’. However, from a policymaker perspective, the helpfulness of using the same term was stressed again and it was argued that the WHO also uses the term PCC and the term ICC. From a public health point of view, using the term ICC instead of PCC can sometimes have an advantage, because ICC offers the opportunity to target a specific group of women (women who have been pregnant).

The result of the expert meetings was to use the term ‘PCC between pregnancies’. This is in line with the description of the WHO and the description used before by Lu et al in the context of internatal care.[3, 7] Dutch experts thought that ‘internatal care’ fits the whole package of care to both women and children between births.

## ***ICC Definition***

### *Literature*

Our literature search showed various descriptions for ICC. ICC is said to be in essence PCC for a subsequent pregnancy [3]. ICC has also been referred to as the identification and reduction of risks that affect the health of the woman and any future pregnancy, with additional intensive interventions in the interconception period for women who have had a prior adverse pregnancy outcome, such as fetal loss, preterm birth, low birth weight, congenital or genetic diseases and medical comorbidities [2, 12]. The interconception period is generally interpreted as the interpregnancy period or as a bridge from the postpartum period to either a subsequent pregnancy or the decision not to conceive again [8, 13, 14].

For PCC, more comprehensive definitions have already been formed. The Dutch expert meeting on PCC in 2012 adapted the definition of the Centers for Disease Control and Prevention (CDC) and the March of Dimes from 2005 to the following definition: ‘A set of interventions and/or programs that aims to identify and enable informed decision-making to modify biomedical, behavioral, and (psycho) social risks to parental health and the health of their future child, through counselling, prevention and management, emphasizing those factors that must be acted on before conception and in early pregnancy, to have maximal impact and/or choice<sub>1</sub>’ [6, 8]. This definition included a footnote: *1 Preconception care may be a good opportunity to reduce perinatal mortality and morbidity*

### *Propositions*

Two propositions were formed based on the PCC definition from 2012: 1) an adjusted version of the PCC definition including the aspects ‘risk factors from prior pregnancies’ and the period ‘between two pregnancies’; 2) ICC described as a subtype of PCC.

### *Expert discussion outcome*

The former definition of PCC was adjusted on several points (in bold), resulting in the following definition for ICC: Interconception care is preconception care\* between pregnancies.

\*A set of interventions and/or programs that aims to identify and enable informed decision-making **to optimize** biomedical, behavioral, and (psycho) social **factors** that can influence parental health (**including fertility potential**) and the health of their future child, through counselling, prevention and management, emphasizing those factors that must be acted on before conception and **continued** in early pregnancy, to have maximal impact and **enable informed choices**<sub>1</sub>.

<sub>1</sub> *Preconception care may be a good opportunity to reduce perinatal and **maternal mortality** and morbidity*

### *Summary of the experts' discussions*

In line with the discussion on the term, the Dutch experts agreed to define ICC as a subtype of PCC. They preferred to keep the definition of PCC and thereby not focusing on risk factors from prior pregnancies in particular, as all the components of PCC stay relevant for ICC. In addition, they argued that a focus on health promotion instead of risk factors would facilitate implementation of PCC by policymakers, professionals and researchers. At the international meeting, a discussion arose on the words 'in early pregnancy' being part of the definition, because this might diminish the importance of the preconception period. In the end, participants agreed that PCC interventions have to continue into early pregnancy, because women do not yet receive regular antenatal care. During the international expert meeting the suggestion was made to add fertility potential to the definition, because it reflects the positive effects of PCC on the health of gametes. Someone argued that this was already included in 'parental health', but other experts argued to explicitly mention it and hence to create a stronger link between PCC and fertility care.

## ***ICC Content***

### *Literature*

Evidence for risk factors to be taken up in PCC was provided by a review of Jack et al. from 2008 and an update of this review by Temel et al. in 2012, who also performed a systematic search to assess the effectiveness of preconceptional lifestyle interventions [6, 15, 16]. This evidence is likely to be applicable to ICC as well, as often no distinction has been made between PCC and ICC. Few studies have specifically assessed the effectiveness of an ICC intervention on improved pregnancy outcomes or proxy outcomes such as behavior change (see addendum table) [17]. Only two studies have shown a positive impact; suggesting improved folic acid use and suggesting increased pregnancy intervals and less adverse outcomes in a high-risk population [18, 19]. Many ICC programs have been described without reporting on effectiveness or only providing feasibility and process evaluations [20, 21, 22, 23, 24, 25, 26, 27, 28].

The content of the reported ICC interventions is often widespread including social and medical services. In addition to the general content recommended for PCC [6], certain items have gained special attention for ICC based on risk factors in the period between pregnancies and the associations with pregnancy outcomes. Firstly, family planning should support effective use of contraception to avoid unintended pregnancies and short pregnancy intervals [2, 3, 29]. Since, these situations are associated with increased risk of adverse outcomes [3, 9, 30, 31, 32, 33, 34, 35]. Secondly, previous pregnancy outcomes should be considered ‘to reduce risks that may affect the woman’s health and any future birth she may have’ [2]. This includes outcomes such as preeclampsia and hypertensive disorders [36, 37], gestational diabetes [38, 39, 40, 41], recurrent miscarriages [42], preterm birth [43, 44, 45], a small-for-gestational-age baby [46], perinatal loss [13, 47, 48, 49], and adolescent pregnancy [34, 50]. Thirdly, optimizing health status in the interconception period related to weight [51, 52, 53,



54, 55, 56, 57, 58], HIV [59, 60], and chronic conditions [14, 61] has been recommended.

Lastly, psychosocial and behavioral components of ICC have been mentioned, such as paying attention to stress, depression, family violence and substance abuse [2, 3, 9]. On the same note, parenting support and breastfeeding promotion have been suggested [3].

### *Proposition*

Our proposition was to include the same content for ICC as was reached in the consensus for PCC previously [6]. In addition, special attention should be given to risk groups and to the following items that are specifically relevant in ICC: outcomes of prior pregnancies, the interpregnancy interval, contraception, breastfeeding, physical recovery and mental health after pregnancy.

### *Expert discussion outcome*

‘Continuing preconception care as delivered before a first pregnancy, as well as paying attention to outcomes of prior pregnancies and future pregnancy planning.’

### *Summary of the experts’ discussions*

When the content of ICC was discussed during the Dutch meeting, the importance of both emphasizing the general PCC message, as well as leaving out the focus on risk groups was expressed. The international experts agreed that the content of ICC is the same as the content of PCC, but mentioned that it should in practice also be a continuation of received PCC before the first pregnancy. In addition, it was deemed relevant to raise awareness on timely health seeking in case of secondary infertility, and combine this with other aspects of reproductive health such as contraception and birth spacing in the term ‘future pregnancy planning’. Lastly, in the international discussion topics such as future health, male health and domestic violence

were identified as important, but considered covered by the general PCC content.

### ***ICC Target Group***

#### *Literature*

ICC has been advised for everyone, but specifically for high-risk mothers, for whom it would be particularly beneficial [2, 3]. DeCesare et al. refer to the ‘every woman, every time’ slogan and include in ICC women actively trying get pregnant, women unsure of pregnancy plans, and women who are preventing pregnancy [9]. Instead of just women, Moore et al. refer to the couple [13]. Previous ICC interventions have often focused on specific risk groups (Addendum table), such as women with previous adverse outcomes, lower socio-economic status, minority background, or risk behavior, and adolescents, aiming to reduce disparities. Medical and behavioral risks (e.g. no folic acid supplementation) seem as relevant, if not more, in the interconception period as in the preconception period based on their prevalence [62, 63, 64, 65, 66, 67, 68, 69].

#### *Proposition*

‘All fertile women who have ever been pregnant, with a focus on high-risk groups.’

#### *Expert discussion outcome*

‘All women who have been pregnant and could be pregnant in the future and their (possible) partners.’

#### *Summary of the experts’ discussions*

The Dutch experts thought that ICC should be offered to a broad target group and that it is unnecessary to say that you pay extra attention to high-risk groups. Both the Dutch and

international experts agreed that 'partners' had to be added to the target group. In addition, the proposed formulation of 'fertile women' was adjusted in an effort to include women with fertility problems in the target group as well.

### ***Reaching ICC Target Groups***

#### *Literature*

Reaching parents before the (next) conception is essential for effective ICC. Women who have been pregnant can often be identified within the medical system. As such, Shannon et al. describe ICC as risk identification during a woman's hospital visit for labor and delivery [12]. A frequently suggested way to reach parents for ICC is at postpartum visits [2, 3, 9]. However, use of postpartum care can be dependable on sociodemographic characteristics and perceived need [70, 71]. The optimal frequency, timing, duration and intensity for postpartum visits is unknown [72]. In the Netherlands, a single visit around six weeks postpartum is recommended, but Lu et al. have recommended expanding the number of visits to apply ICC [3]. The role of maternity care providers in postpartum care and ICC has been described [11, 73, 74], but also other healthcare providers have been suggested to take part in ICC such as pediatric care providers [19, 23, 75, 76], internists [61], sexually transmitted disease clinics [77], general practitioners and genetic counsellors [78]. Actually, every office visit is an opportunity for ICC [9]. Also, group sessions such as CenteringParenting[79] and home visits can be used for ICC. On a general note, ICC should be part of a life course approach [78, 80, 81, 82].

#### *Proposition*

We proposed three fixed moments: six weeks postpartum by a midwife, gynecologist or pediatrician; six months and twelve months postpartum by a preventive child healthcare physician (well-baby clinics).

### *Expert discussion outcome*

The target group should be reached at different moments and as often as possible, for instance during postpartum visits by midwives, gynecologists or pediatricians, during regular check-up or vaccination moments by preventive child healthcare physicians or nurses, and during consultations with other healthcare professionals (e.g. general practitioners, nutritionists, and professionals at abortion and fertility clinics).

### *Summary of the experts' discussions*

The Dutch experts discussed the difference between ICC and an ICC consultation; ICC can be integrated in regular care and (if necessary) result in a separate ICC consultation. This distinction might facilitate implementation of ICC. It gives the opportunity to involve many healthcare professionals in the delivery of ICC, who can offer a form of ICC and refer patients for a separate ICC consultation. All healthcare professionals should continuously be aware of the opportunity to offer PCC and ICC. In addition, other options to involve healthcare professionals and the target group were mentioned, such as via social media, medical curricula, municipal public health policies and integrating ICC in CenteringParenting. The international experts discussed a few other opportunities: ICC provided by abortion services and fertility clinics, and by occupational physicians. A discussion arose about women who might be missed when they have a miscarriage at home and do not visit a healthcare provider. Yet, experts suggested that PCC opportunities should be in place to reach these women. Unfortunately, both expert meetings did not achieve consensus on an elaborate plan to reach the target group.

## **Discussion**

The literature study showed how little uniformity there is in the implementation of ICC and how little literature is available on the evaluation of ICC. The expert meetings offered a unique opportunity to discuss the topic of ICC with experts of different disciplines and different nationalities. Although we have to be careful in stating that we reached consensus on ICC, for instance since more official methods for reaching consensus exist [83], the described results can give the necessary attention to this still uncommon form of care. The summarized expert discussions and the suggested international discussion outcomes on the definition, term, content, target group and ways to reach the target group for ICC will be helpful in bringing the implementation of ICC forward. In addition, the outcomes are graphically summarized in figure 2.

The prevailing opinion was to refrain from putting much emphasis on ICC, but focus on PCC. PCC is a more familiar term that is extensive in its definition and content, and includes ICC. Sometimes, referring specifically to ICC can be useful, for example when a specific focus is desired on the target group of women who have been pregnant. Yet, even then ICC should not be explained differently than ‘PCC between pregnancies’. This latter description has been used before by Lu et al, but they preferred the term *internatal care* to ICC in contrast to our experts [3]. Another dominant view at the national expert meeting was to put less emphasis on risks, but put more emphasis on promoting health instead. Moreover, this way a more general approach of reaching the target group could be pursued, including ‘all women who have been pregnant and could be pregnant in the future and their (possible) partners’ and ‘any healthcare provider in contact with the target group’. Verbiest et al. have also advocated the importance of increasing the provision of comprehensive, woman-centered care to promote women’s health and wellness in the postpartum and interconception period and recently Barker et al referred to the postpartum or interpartum care opportunities to improve health behavior [84,

85]. A final recurrent theme at the international meeting was to make a stronger connection between fertility care and PCC and ICC.

Both expert meetings did not result in a detailed plan to reach the target group. Many opportunities were identified, but implementation of ICC should be further developed and evaluated in policies and guidelines to formulate the optimal way to deliver ICC.

## **Declarations**

### ***Funding details***

No funding was acquired for this report.

### ***Acknowledgments***

We thank D.W. van Veen for her work on figure 2, and W.M. Bramer of the Medical Library Erasmus MC for his support in conducting the electronic search.

### ***Disclosure of interest***

The authors report no conflict of interest.

### ***Ethical statement***

This report is not based upon clinical study or patient data

### ***Word count***

3085

## References

1. Johnson K, Posner SF, Biermann J, et al. Recommendations to improve preconception health and health care--United States. A report of the CDC/ATSDR Preconception Care Work Group and the Select Panel on Preconception Care. *MMWR Recomm Rep*. 2006 Apr 21;55(RR-6):1-23. doi: rr5506a1 [pii]. PubMed PMID: 16617292; eng.
2. Johnson KA, Gee RE. Interpregnancy care. *Semin Perinatol*. 2015 Jun;39(4):310-5. doi: S0146-0005(15)00046-4 [pii]10.1053/j.semperi.2015.05.011. PubMed PMID: 26188595; eng.
3. Lu MC, Kotelchuck M, Culhane JF, et al. Preconception care between pregnancies: The content of prenatal care. *Matern Child Health J*. 2006;10(SUPPL. 7):107-122. doi: 10.1007/s10995-006-0118-7.
4. Fleuren M, Wiefferink K, Paulussen T. Determinants of innovation within health care organizations: literature review and Delphi study. *Int J Qual Health Care*. 2004 Apr;16(2):107-23. doi: 10.1093/intqhc/mzh030 16/2/107 [pii]. PubMed PMID: 15051705; eng.
5. Shawe J, Delbaere I, Ekstrand M, et al. Preconception care policy, guidelines, recommendations and services across six European countries: Belgium (Flanders), Denmark, Italy, the Netherlands, Sweden and the United Kingdom. *Eur J Contracept Reprod Health Care*. 2015 Apr;20(2):77-87. doi: 10.3109/13625187.2014.990088. PubMed PMID: 25548961; eng.
6. Temel S, van Voorst SF, de Jong-Potjer LC, et al. The Dutch national summit on preconception care: a summary of definitions, evidence and recommendations. *Journal of Community Genetics*. 2015 Jan;6(1):107-15. doi: 10.1007/s12687-014-0204-2. PubMed PMID: 25394755; PubMed Central PMCID: PMC4286565. eng.
7. World Health Organization. Meeting to develop a global consensus on preconception care to reduce maternal and childhood mortality and morbidity. Geneva: World Health Organization; 2012.
8. Posner SF, Johnson K, Parker C, et al. The national summit on preconception care: a summary of concepts and recommendations. *Matern Child Health J*. 2006 Sep;10(5 Suppl):S197-205. doi: 10.1007/s10995-006-0107-x. PubMed PMID: 16773451; PubMed Central PMCID: PMC1592248. eng.
9. DeCesare JZ, Jackson JR, Phillips B. Interconception Care Opportunities for Mom and Baby. *Obstet Gynecol Surv*. 2015 Jul;70(7):465-72. doi: 10.1097/OGX.000000000000196. PubMed PMID: 26185918; eng.
10. Freda MC, Moos MK, Curtis M. The history of preconception care: evolving guidelines and standards. *Matern Child Health J*. 2006 Sep;10(5 Suppl):S43-52. doi: 10.1007/s10995-006-0087-x. PubMed PMID: 16710764; PubMed Central PMCID: PMC1592152. eng.
11. Burst HV. History of nurse-midwifery in reproductive health care. *J Nurse-Midwifery*. 1998 Nov-Dec;43(6):526-9. doi: S0091218298000597 [pii]. PubMed PMID: 9871384; eng.
12. Shannon GD, Alberg C, Nacul L, et al. Preconception healthcare delivery at a population level: construction of public health models of preconception care. *Matern Child Health J*. 2014 Aug;18(6):1512-31. doi: 10.1007/s10995-013-1393-8. PubMed PMID: 24234279; eng.
13. Moore T, Parrish H, Black BP. Interconception care for couples after perinatal loss: A comprehensive review of the literature. *J Perinat Neonatal Nurs*. 2011;25(1):44-51. doi: 10.1097/JPN.0b013e3182071a08.
14. Misra DP, Grason H, Weisman C. An intersection of women's and perinatal health: the role of chronic conditions. *Womens Health Issues*. 2000 Sep-Oct;10(5):256-67. doi: S1049-3867(00)00054-2 [pii]. PubMed PMID: 10980443; eng.
15. Jack BW, Atrash H, Coonrod DV, et al. The clinical content of preconception care: an overview and preparation of this supplement. *Am J Obstet Gynecol*. 2008 Dec;199(6 Suppl 2):S266-79. doi: S0002-9378(08)00887-9 [pii] 10.1016/j.ajog.2008.07.067. PubMed PMID: 19081421; eng.

16. Temel S, van Voorst SF, Jack BW, et al. Evidence-based preconceptional lifestyle interventions. *Epidemiol Rev.* 2014;36(1):19-30. PubMed PMID: 23985430.
17. Whitworth M, Dowswell T. Routine pre-pregnancy health promotion for improving pregnancy outcomes [Review]. *Cochrane Database Syst Rev.* 2009 (4). PubMed PMID: WOS:000270687000040.
18. Dunlop AL, Dubin C, Raynor BD, et al. Interpregnancy primary care and social support for African-American women at risk for recurrent very-low-birthweight delivery: A pilot evaluation. *Matern Child Health J.* 2008;12(4):461-468. doi: 10.1007/s10995-007-0279-z.
19. de Smit DJ, Weinreich SS, Cornel MC. Effects of a simple educational intervention in well-baby clinics on women's knowledge about and intake of folic acid supplements in the periconceptional period: a controlled trial. *Public Health Nutr.* 2015 Apr;18(6):1119-26. doi: S1368980014000986 [pii] 10.1017/S1368980014000986. PubMed PMID: 24866258; eng.
20. Badura M, Johnson K, Hench K, et al. Healthy Start. Lessons Learned on Interconception Care. *Women's Health Issues.* 2008;18(6 SUPPL.):S61-S66. doi: 10.1016/j.whi.2008.07.010.
21. Brand A, Walker DK, Hargreaves M, et al. Intermediate outcomes, strategies, and challenges of eight healthy start projects. *Matern Child Health J.* 2010;14(5):654-665.
22. Rosenbach M, O'Neil S, Cook B, et al. Characteristics, access, utilization, satisfaction, and outcomes of healthy start participants in eight sites. *Matern Child Health J.* 2010;14(5):666-679.
23. Feinberg E, Smith MV, Morales MJ. Improving women's health during internatal periods: developing an evidenced-based approach to addressing maternal depression in pediatric settings. *Journal of Women's ....* 2006.
24. Hogan VK, Amamoo MA, Anderson AD, et al. Barriers to women's participation in inter-conceptional care: a cross-sectional analysis. *BMC Public Health.* 2012;12((Hogan V.K.) Gillings School of Global Public Health, University of North Carolina at Chapel Hill, Chapel Hill, NC, USA.):93. doi: 10.1186/1471-2458-12-93.
25. Handler A, Rankin KM, Peacock N, et al. The implementation of interconception care in two community health settings: lessons learned. *Am J Health Promot.* 2013;27(3 Suppl):eS21-31.
26. Kent H, Streeter N. Title V strategies to ensure a continuum of women's health services. *Womens Health Issues.* 2008 Nov-Dec;18(6 Suppl):S67-73. doi: S1049-3867(08)00134-5 [pii] 10.1016/j.whi.2008.08.008. PubMed PMID: 19059551; eng.
27. Cheng D, Patel P. Optimizing women's health in a Title X family planning program, Baltimore County, Maryland, 2001-2004. *Prev Chronic Dis.* 2011 Nov;8(6):A126. doi: A126 [pii]. PubMed PMID: 22005619; PubMed Central PMCID: PMC3221568. eng.
28. Webb DA, Mathew L, Culhane JF. Lessons learned from the Philadelphia Collaborative Preterm Prevention Project: the prevalence of risk factors and program participation rates among women in the intervention group. *BMC Pregnancy Childbirth.* 2014 Nov 01;14:368. doi: 10.1186/s12884-014-0368-0 s12884-014-0368-0 [pii]. PubMed PMID: 25361563; PubMed Central PMCID: PMC4230507. eng.
29. Thiel de Bocanegra H, Chang R, Menz M, et al. Postpartum contraception in publicly-funded programs and interpregnancy intervals. *Obstet Gynecol.* 2013 Aug;122(2 Pt 1):296-303. doi: 10.1097/AOG.0b013e3182991db6 00006250-201308000-00017 [pii]. PubMed PMID: 23969798; eng.
30. Wendt A, Gibbs CM, Peters S, et al. Impact of increasing inter-pregnancy interval on maternal and infant health. *Paediatr Perinat Epidemiol.* 2012 Jul;26 Suppl 1:239-58. doi: 10.1111/j.1365-3016.2012.01285.x. PubMed PMID: 22742614; PubMed Central PMCID: PMC4562277. eng.
31. Conde-Agudelo A, Rosas-Bermudez A, Castano F, et al. Effects of birth spacing on maternal, perinatal, infant, and child health: a systematic review of causal mechanisms. *Stud Fam Plann.* 2012 Jun;43(2):93-114. PubMed PMID: 23175949; eng.



32. Cheslack-Postava K, Suominen A, Jokiranta E, et al. Increased risk of autism spectrum disorders at short and long interpregnancy intervals in Finland. *J Am Acad Child Adolesc Psychiatry*. 2014 Oct;53(10):1074-81 e4. doi: S0890-8567(14)00521-8 [pii] 10.1016/j.jaac.2014.06.009. PubMed PMID: 25245351; PubMed Central PMCID: PMC4174278. eng.
33. Chen I, Jhangri GS, Chandra S. Relationship between interpregnancy interval and congenital anomalies. *Am J Obstet Gynecol*. 2014 Jun;210(6):564 e1-8. doi: S0002-9378(14)00119-7 [pii] 10.1016/j.ajog.2014.02.002. PubMed PMID: 24508646; eng.
34. Dean SV, Lassi ZS, Imam AM, et al. Preconception care: promoting reproductive planning. *Reprod Health*. 2014 Sep 26;11 Suppl 3:S2. doi: 1742-4755-11-S3-S2 [pii] 10.1186/1742-4755-11-S3-S2. PubMed PMID: 25415259; PubMed Central PMCID: PMC4196558. eng.
35. Nilsen RM, Mastroiacovo P, Gunnes N, et al. Folic acid supplementation and interpregnancy interval. *Paediatr Perinat Epidemiol*. 2014 May;28(3):270-4. doi: 10.1111/ppe.12111. PubMed PMID: 24506308; eng.
36. Barton JR, Sibai BM. Prediction and prevention of recurrent preeclampsia. *Obstet Gynecol*. 2008;112(2 PART 1):359-372. doi: 10.1097/AOG.0b013e3181801d56.
37. van Oostwaard MF, Langenveld J, Schuit E, et al. Recurrence of hypertensive disorders of pregnancy: an individual patient data metaanalysis. *Am J Obstet Gynecol*. 2015 May;212(5):624 e1-17. doi: S0002-9378(15)00010-1 [pii] 10.1016/j.ajog.2015.01.009. PubMed PMID: 25582098; eng.
38. Mielke RT, Kaiser D, Centuolo R. Interconception Care for Women With Prior Gestational Diabetes Mellitus. *J Midwifery Women's Health*. 2013;58(3):303-312. doi: 10.1111/jmwh.12019.
39. Tieu J, Bain E, Middleton P, et al. Interconception care for women with a history of gestational diabetes for improving maternal and infant outcomes. *Cochrane Database Syst Rev*. 2013;6((Tieu J., joanna.tieu@gmail.com) ARCH: Australian Research Centre for Health of Women and Babies, The Robinson Institute, Discipline of Obstetrics and Gynaecology, The University of Adelaide, Adelaide, Australia. joanna.tieu@mh.org.au.):CD010211.
40. Castorino K, Jovanovic L. The postpartum management of women with gestational diabetes using a continuum model for health care. *Clin Obstet Gynecol*. 2013 Dec;56(4):853-9. doi: 10.1097/GRF.0b013e3182a8e0bb. PubMed PMID: 24036480; eng.
41. Boghossian NS, Yeung E, Albert PS, et al. Changes in diabetes status between pregnancies and impact on subsequent newborn outcomes. *Am J Obstet Gynecol*. 2014 May;210(5):431 e1-14. doi: S0002-9378(13)02237-0 [pii] 10.1016/j.ajog.2013.12.026. PubMed PMID: 24361790; PubMed Central PMCID: PMC4011935. eng.
42. Field K, Murphy DJ. Perinatal outcomes in a subsequent pregnancy among women who have experienced recurrent miscarriage: a retrospective cohort study. *Hum Reprod*. 2015 May;30(5):1239-45. doi: dev044 [pii] 10.1093/humrep/dev044. PubMed PMID: 25759495; eng.
43. Lang CT, Iams JD. Goals and strategies for prevention of preterm birth: an obstetric perspective. *Pediatric Clinics of North America*. 2009.
44. Simonsen SE, Lyon JL, Stanford JB, et al. Risk factors for recurrent preterm birth in multiparous Utah women: a historical cohort study [Article]. *Bjog-an International Journal of Obstetrics and Gynaecology*. 2013 Jun;120(7):863-872. PubMed PMID: WOS:000318795500011.
45. Laughon SK, Albert PS, Leisher K, et al. The NICHD Consecutive Pregnancies Study: recurrent preterm delivery by subtype. *Am J Obstet Gynecol*. 2014 Feb;210(2):131 e1-8. doi: S0002-9378(13)00955-1 [pii] 10.1016/j.ajog.2013.09.014. PubMed PMID: 24036403; PubMed Central PMCID: PMC3934564. eng.
46. Voskamp BJ, Kazemier BM, Ravelli AC, et al. Recurrence of small-for-gestational-age pregnancy: analysis of first and subsequent singleton pregnancies in The Netherlands. *Am J Obstet Gynecol*. 2013 May;208(5):374 e1-6. doi: S0002-9378(13)00128-2 [pii] 10.1016/j.ajog.2013.01.045. PubMed PMID: 23419319; eng.

47. Monari F, Facchinetti F. Management of subsequent pregnancy after antepartum stillbirth. A review. *J Matern Fetal Neonatal Med.* 2010 Oct;23(10):1073-84. doi: 10.3109/14767051003678036. PubMed PMID: 20504070; eng.
48. Lamont K, Scott NW, Jones GT, et al. Risk of recurrent stillbirth: systematic review and meta-analysis. *BMJ.* 2015 Jun 24;350:h3080. PubMed PMID: 26109551; eng.
49. Wallerstedt C, Lilley M, Baldwin K. Interconceptional counseling after perinatal and infant loss. *Journal of obstetric, gynecologic, and neonatal nursing : JOGNN / NAACOG.* 2003;32(4):533-542.
50. Reime B, Schucking BA, Wenzlaff P. Reproductive outcomes in adolescents who had a previous birth or an induced abortion compared to adolescents' first pregnancies. *BMC Pregnancy Childbirth.* 2008 Jan 31;8:4. doi: 1471-2393-8-4 [pii] 10.1186/1471-2393-8-4. PubMed PMID: 18237387; PubMed Central PMCID: PMC2266899. eng.
51. Villamor E, Cnattingius S. Interpregnancy weight change and risk of adverse pregnancy outcomes: a population-based study. *Lancet.* 2006 Sep 30;368(9542):1164-70. doi: S0140-6736(06)69473-7 [pii] 10.1016/S0140-6736(06)69473-7. PubMed PMID: 17011943; eng.
52. Getahun D, Ananth CV, Peltier MR, et al. Changes in prepregnancy body mass index between the first and second pregnancies and risk of large-for-gestational-age birth. *Am J Obstet Gynecol.* 2007 Jun;196(6):530 e1-8. doi: S0002-9378(06)02481-1 [pii] 10.1016/j.ajog.2006.12.036. PubMed PMID: 17547882; eng.
53. Getahun D, Kaminsky LM, Elsass DA, et al. Changes in prepregnancy body mass index between pregnancies and risk of primary cesarean delivery. *Am J Obstet Gynecol.* 2007 Oct;197(4):376 e1-7. doi: S0002-9378(07)00744-2 [pii] 10.1016/j.ajog.2007.06.015. PubMed PMID: 17904966; eng.
54. Villamor E, Sparen P, Cnattingius S. Risk of oral clefts in relation to prepregnancy weight change and interpregnancy interval. *Am J Epidemiol.* 2008 Jun 01;167(11):1305-11. doi: kwn065 [pii] 10.1093/aje/kwn065. PubMed PMID: 18375499; eng.
55. Hoff GL, Cai J, Okah FA, et al. Pre-pregnancy overweight status between successive pregnancies and pregnancy outcomes. *J Women's Health.* 2009;18(9):1413-1417. doi: 10.1089/jwh.2008.1290.
56. Whiteman VE, Aliyu MH, August EM, et al. Changes in prepregnancy body mass index between pregnancies and risk of gestational and type 2 diabetes. *Arch Gynecol Obstet.* 2011;284(1):235-240. doi: 10.1007/s00404-011-1917-7.
57. Jain AP, Gavard JA, Rice JJ, et al. The impact of interpregnancy weight change on birthweight in obese women. *Am J Obstet Gynecol.* 2013 Mar;208(3):205 e1-7. doi: S0002-9378(12)02228-4 [pii] 10.1016/j.ajog.2012.12.018. PubMed PMID: 23246318; eng.
58. Arabin B, Stupin JH. Overweight and Obesity before, during and after Pregnancy: Part 2: Evidence-based Risk Factors and Interventions. *Geburtshilfe Frauenheilkd.* 2014 Jul;74(7):646-655. doi: 10.1055/s-0034-1368462. PubMed PMID: 25100879; PubMed Central PMCID: PMC4119107. eng.
59. Stewart RD, Wells CE, Roberts SW, et al. Benefit of interpregnancy HIV viral load suppression on subsequent maternal and infant outcomes. *Am J Obstet Gynecol.* 2014 Sep;211(3):297 e1-6. doi: S0002-9378(14)00380-9 [pii] 10.1016/j.ajog.2014.04.020. PubMed PMID: 24746998; eng.
60. Drake K, Youchah J, Damus K. Human immunodeficiency virus disease in pregnancy. *J Assoc Acad Minor Phys.* 1995;6(3):105-11. PubMed PMID: 7663099; eng.
61. Carson MP, Ehrenthal D. Medical issues from preconception through delivery: a roadmap for the internist. *Med Clin North Am.* 2008 Sep;92(5):1193-225, xi. doi: S0025-7125(08)00053-9 [pii] 10.1016/j.mcna.2008.04.010. PubMed PMID: 18721658; eng.

62. D'Angelo D, Williams L, Morrow B, et al. Preconception and interconception health status of women who recently gave birth to a live-born infant--Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 26 reporting areas, 2004. *MMWR Surveill Summ.* 2007;56(10):1-35.
63. Robbins CL, Zapata LB, Farr SL, et al. Core state preconception health indicators - pregnancy risk assessment monitoring system and behavioral risk factor surveillance system, 2009. *Morb Mortal Wkly Rep Surveill Summ.* 2014 Apr 25;63(3):1-62. PubMed PMID: 24759729.
64. Okah FA, Cai J. Primiparous outcomes and future pregnancy health behaviors. *Am J Health Behav.* 2014 Mar;38(2):316-320. PubMed PMID: 24629560.
65. Chuang CH, Weisman CS, Hillemeier MM, et al. Pregnancy intention and health behaviors: Results from the Central Pennsylvania women's health study cohort. *Maternal and Child Health Journal.* 2010;14(4):501-510. doi: 10.1007/s10995-009-0453-6.
66. Leonard SA, Gee D, Zhu Y, et al. Associations between preterm birth, low birth weight, and postpartum health in a predominantly Hispanic WIC population. *J Nutr Educ Behav.* 2014 Nov-Dec;46(6):499-505. doi: S1499-4046(14)00584-3 [pii]  
10.1016/j.jneb.2014.06.008. PubMed PMID: 25092236; PubMed Central PMCID: PMC4252510. eng.
67. Watson LF, Brown SJ, Davey MA. Use of periconceptional folic acid supplements in Victoria and New South Wales, Australia. *Aust N Z J Public Health.* 2006 Feb;30(1):42-9. PubMed PMID: 16502951; eng.
68. Timmermans S, Jaddoe VW, Mackenbach JP, et al. Determinants of folic acid use in early pregnancy in a multi-ethnic urban population in The Netherlands: the Generation R study. *Prev Med.* 2008 Oct;47(4):427-32. doi: S0091-7435(08)00339-3 [pii]  
10.1016/j.ypmed.2008.06.014. PubMed PMID: 18644404; eng.
69. Forster DA, Wills G, Denning A, et al. The use of folic acid and other vitamins before and during pregnancy in a group of women in Melbourne, Australia. *Midwifery.* 2009 Apr;25(2):134-46. doi: S0266-6138(07)00034-4 [pii]  
10.1016/j.midw.2007.01.019. PubMed PMID: 17543431; eng.
70. Bryant AS, Haas JS, McElrath TF, et al. Predictors of compliance with the postpartum visit among women living in healthy start project areas. *Matern Child Health J.* 2006 Nov;10(6):511-6. doi: 10.1007/s10995-006-0128-5. PubMed PMID: 16807794; eng.
71. DiBari JN, Yu SM, Chao SM, et al. Use of postpartum care: predictors and barriers. *J Pregnancy.* 2014;2014:530769. doi: 10.1155/2014/530769. PubMed PMID: 24693433; PubMed Central PMCID: PMC3945081. eng.
72. Yonemoto N, Dowswell T, Nagai S, et al. Schedules for home visits in the early postpartum period. *Cochrane Database of Systematic Reviews.* 2013 (7). doi: Artn Cd009326  
10.1002/14651858.Cd009326.Pub2. PubMed PMID: ISI:000322568300036; English.
73. Mahan CS. New views on education for maternity care providers. *Womens Health Issues.* 1997 Sep-Oct;7(5):289-92. doi: S1049-3867(97)00052-2 [pii]  
10.1016/S1049-3867(97)00052-2. PubMed PMID: 9360462; eng.
74. Mottl-Santiago J. Women's public health policy in the 21st century. *J Midwifery Womens Health.* 2002 Jul-Aug;47(4):228-38. doi: S1526952302002672 [pii]. PubMed PMID: 12138930; eng.
75. Corchia C, Mastroiacovo P. Health promotion for children, mothers and families: here's why we should "think about it before conception" [Article]. *Ital J Pediatr.* 2013 Oct;39. PubMed PMID: WOS:000326337300001.
76. Cheng TL, Kotelchuck M, Guyer B. Preconception women's health and pediatrics: An opportunity to address infant mortality and family health. Elsevier; 2012. (Academic pediatrics).
77. Parker CS, Ghaddar S, Zhang Q, et al. Factors affecting the willingness of counselors to integrate preconception care into sexually transmitted disease clinics. *Womens Health Issues.* 2010 Sep;20(5):329-34. doi: S1049-3867(10)00062-9 [pii]  
10.1016/j.whi.2010.05.005. PubMed PMID: 20800769; eng.

78. Dolan SM, Moore C. Linking family history in obstetric and pediatric care: assessing risk for genetic disease and birth defects. *Pediatrics*. 2007 Sep;120 Suppl 2:S66-70. doi: 10.1542/SUPPLEMENT\_2/S66 [pii] 10.1542/peds.2007-1010E. PubMed PMID: 17767007; eng.
79. Bloomfield J, Rising SS. CenteringParenting: An Innovative Dyad Model for Group Mother-Infant Care. *Journal of Midwifery & Womens Health*. 2013 Nov;58(6):683-689. doi: 10.1111/jmwh.12132. PubMed PMID: ISI:000329430900009; English.
80. Misra DP, Grason H. Achieving safe motherhood: applying a life course and multiple determinants perinatal health framework in public health. *Womens Health Issues*. 2006 Jul-Aug;16(4):159-75. doi: S1049-3867(06)00044-2 [pii] 10.1016/j.whi.2006.02.006. PubMed PMID: 16920521; eng.
81. Wise PH. Transforming Preconceptional, Prenatal, and Interconceptional Care Into A Comprehensive Commitment To Women's Health. *Women's Health Issues*. 2008;18(6 SUPPL.):S13-S18. doi: 10.1016/j.whi.2008.07.014.
82. Lu MC, Kotelchuck M, Hogan V, et al. Closing the Black-White gap in birth outcomes: a life-course approach. *Ethn Dis*. 2010 Winter;20(1 Suppl 2):S2-62-76. PubMed PMID: 20629248; PubMed Central PMCID: PMC4443479. eng.
83. Jones J, Hunter D. Consensus methods for medical and health services research. *BMJ*. 1995 Aug 05;311(7001):376-80. PubMed PMID: 7640549; PubMed Central PMCID: PMC2550437. eng.
84. Verbiest S, Bonzon E, Handler A. Postpartum Health and Wellness: A Call for Quality Woman-Centered Care. *Matern Child Health J*. 2016 Nov;20(Suppl 1):1-7. doi: 10.1007/s10995-016-2188-5 10.1007/s10995-016-2188-5 [pii]. PubMed PMID: 27757754; eng.
85. Barker M, Dombrowski SU, Colbourn T, et al. Intervention strategies to improve nutrition and health behaviours before conception. *Lancet*. 2018 May 5;391(10132):1853-1864. doi: S0140-6736(18)30313-1 [pii] 10.1016/S0140-6736(18)30313-1. PubMed PMID: 29673875; PubMed Central PMCID: PMC6075694. eng.

## Figures

Figure 1. Different terms used in the context of Interconception care

Figure 2. Preconception care and Interconception care impact