



## Scientific Advisory Report on the Effects of Group Prenatal Classes



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Direction du développement des individus et des communautés

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## Glossary<sup>1</sup>

### **Acceleration of labour**

Procedure meant to increase the strength and duration of contractions during labour in order to accelerate its progress when it slows.<sup>1</sup>

### **Apgar score**

An evaluation on a scale from 0 to 10, typically performed 1 and 5 minutes after birth to assess a newborn's vitality based on heartbeat, breathing, colour, muscle tone and responsiveness to stimulation.

### **Emergency caesarean section**

An unplanned caesarean section performed when medically indicated.

### **Epidural**

An anaesthetic technique requiring the introduction of a catheter in the epidural space (the anatomical space surrounding the dura mater, hence its name) to deliver an active product (analgesic, anaesthetic, glucocorticoid, etc.).

### **Gestational age**

Number of weeks since fertilization of the ovum that occurs in the middle of the menstrual cycle, that is, two weeks after the start of the last menstrual period.

### **Induction of labour**

Use of local or systemic pharmacological or mechanical means to induce contractions when a woman is not in labour, regardless of the duration of the pregnancy.

### **Intrapartum**

Refers to the period surrounding labour and childbirth.

### **Labour**

All of the phenomena that enable dilation of the cervix and expulsion of the foetus.

### **Multiparous**

Refers to a woman who has given birth one or more times.

### **Nulliparous**

Refers to a woman who has never given birth before.

### **Obstetrical procedure**

Drug or surgical intervention performed to optimize the course of the pregnancy and childbirth, and the health of the mother, unborn child and newborn.

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<sup>1</sup> Adapted from multiple definitions from the Institut national d'excellence en santé et en services sociaux (INESSS) [Québec's institute of excellence in health and social services].

**Planned caesarean section**

A caesarean section planned before labour begins, for medical or non-medical reasons.

**Postnatal**

Refers to the period of time after birth.

**Pregnancy outcomes**

The outcomes of conception and pregnancy, such as the child's sex, birth weight, congenital malformations, premature delivery and miscarriage.

**Premature birth**

Refers to a birth that occurs before 37 weeks of gestation.

**Prenatal**

Refers to the period of time before birth.

**Primiparous**

Refers to a woman who is giving birth for the first time.

**Systematic review**

A form of structured review of publications that answers a specific question through the analysis of articles. It involves objective research methods, the application of predetermined criteria for the inclusion or exclusion of articles, the critical evaluation of the relevant literature, and the extraction and summary of data.

## List of acronyms and abbreviations

CSSS	Centre de santé et de services sociaux (Québec) [health and social services centre]
INESSS	Institut national d'excellence en santé et en services sociaux (Québec) [Québec institute of excellence in health and social services].
INSPQ	Institut national de santé publique du Québec [Québec's public health institute]
MSSS	Ministère de la Santé et des Services sociaux (Québec) [ministry of health and social services]
OECD	Organisation for Economic Co-operation and Development
SIPPE	Services intégrés en périnatalité et pour la petite enfance [integrated perinatal and early childhood services]
VBAC	Vaginal Birth After Caesarean Section



## Summary

The Institut national de santé publique du Québec (INSPQ) [Québec's public health institute] was mandated by Québec's Ministère de la Santé et des Services sociaux (MSSS) [ministry of health and social services] to produce a report on the effects of group prenatal classes. In Québec, prenatal classes are meant to provide pregnant women and their partners with information and to prepare them for childbirth and their new role as parents.

The purpose of this report is to identify the effects of group prenatal classes based on the recent scientific literature in order to better position their contribution to the service offering in Québec.

### Methodology

Bibliographic research was conducted with a focus on publications dated between 2004 and 2015 in the Ovid SP, Medline and EBSCOhost databases using keywords related to health promotion, obstetrical procedures, pregnancy outcomes, breastfeeding, health and adaptation. The model of health status and its determinants developed by Québec's Ministère de la Santé et des Services sociaux (2012) is used to organize the presentation of the results.

### Key findings

The analysis has yielded four findings for the universal clientele. The current state of knowledge does not allow for confident assertions regarding effects on a vulnerable clientele:

- Group prenatal classes can inform, increase confidence and provide a greater sense of emotional support during pregnancy;
- Group prenatal classes can influence the determinants of health if the mother has control over them;
- Group prenatal classes cannot alone influence health;
- Group prenatal classes that meet these conditions have a greater chance of leading to positive effects:
  - Adapt content based on the needs of different clienteles;
  - Offer multiple classes;
  - Lower barriers to participation;
  - Add specific topics and approaches;
  - Include adult learning principles.

### Recommendations

The key findings resulted in four recommendations for the provision of prenatal classes as a service in Québec:

1. Continue to offer group prenatal classes as a service to all future parents in Québec, as indicated in the province's perinatal policy, *Politique de périnatalité 2008-2018*;
2. Place a focus during group prenatal classes on behaviours and choices over which parents have control, rather than on situations that involve other individuals or unforeseeable events;
3. Review the objectives of prenatal classes to target the determinants of health, that is, knowledge, confidence in their abilities and social support;

4. Draw on the five conditions that have a greater chance of leading to positive effects to establish implementation rules for group prenatal classes in Québec.

### **Conclusion**

The analysis of the effects of group prenatal classes highlights their potential for health promotion and reaffirms their usefulness as part of the service offering in Québec, as specified in the province's *Politique de périnatalité 2008-2018*.

Further studies are required for a better characterization of the effects of group classes on health status, women in vulnerable situations and fathers. There is also a need for better understanding of how the effects, if present, can be explained by the presence of certain conditions.



## 1 Introduction

Perinatal care in Québec is governed by the *Politique nationale de périnatalité 2008-2018*, which dictates what support is provided to pregnant women and their partners. It sets out a number of objectives: help pregnant women have a healthy pregnancy; promote the health, well-being and optimal development of the child; support mothers and fathers in their perinatal experience; and assist them in adapting to their new role as parents (Ministère de la Santé et des Services sociaux, 2008). Prenatal care is usually coupled with a regional service offering involving prenatal classes that differs from region to region. According to the policy implementation strategy (Ministère de la Santé et des Services sociaux, 2010), prenatal classes are a preferred approach to supporting expecting parents in their perinatal and postnatal experiences.

Most literature reviews on prenatal classes conclude that there is insufficient evidence to determine whether or not this type of intervention is effective. For example, Gagnon and Sandall (2007) conducted a systematic review on the effects of group and individual prenatal classes based on randomized studies from very different countries, including Iran. The authors could not make a confident finding as to the acquisition of new knowledge, the type of delivery, the birth experience, breastfeeding or parenting skills. Brixval et al. (2015) reached the same conclusion in analyzing the effects of group prenatal classes and different approaches to conveying prenatal information used in Western countries in connection with depression, pain management during childbirth and obstetrical procedures and preparation for parenthood. To our knowledge, no literature review focuses exclusively on the effects of group classes in countries that are comparable to ours and that take into consideration the social or economic vulnerability of participants.

The purpose of this report is to identify the effects of group prenatal classes specifically, taking into account the type of clientele (universal or vulnerable), in order to better position the contribution that these classes make to the service provided to pregnant women and their partners.

The first section of this report provides an overview of prenatal classes in Québec by giving a brief background on the topic and outlining the current service offering, parents' needs and their assessment of this type of service. The second section discusses the health status of pregnant women, their partners and their unborn children, and presents an analysis of the effects. The final section presents the conditions that can increase the effects of prenatal classes, and ends with findings and recommendations.



## 2 Prenatal classes in Québec

This section provides a brief background on prenatal classes in Québec, a summary of the current service offering, an outline of parents' needs and an assessment of this type of service based on three provincial surveys.

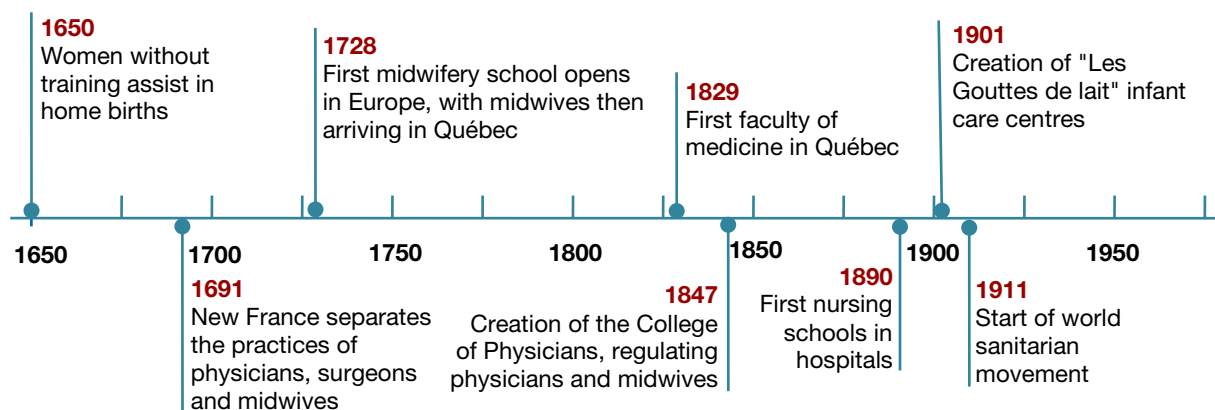
### 2.1 Background on prenatal classes in Québec

#### 2.1.1 EMERGENCE OF PERINATAL HEALTH PROFESSIONS

Over the centuries, the various professional practices involved in perinatal health in Québec have slowly established themselves (see Figure 1). At the beginning of colonization, women supported one another during the births of their children and some, without any training, called themselves midwives. Then, midwives trained in Europe arrived in New France. In 1691, the government of New France intervened to separate the fields of practice into three branches, those of physicians, surgeons and midwives. Some years later, the midwifery network took shape. Midwives became officially recognized and were able to train under physicians until 1850 and in maternity wards until 1919 (Université du Québec à Trois-Rivières, 2014).

Physician training was modernized in Québec with the first Canadian university faculty of medicine at McGill University in 1829. Then, the College of Physicians, created in 1847, stepped in to regulate the practice of physicians and midwives (Université du Québec à Trois-Rivières, 2014). It was also during this time that the first infant care centres began to emerge in Montréal and Québec called "Les Gouttes de lait" (Milot, 2010). These centres distributed better quality milk, encouraged breastfeeding and provided advice on infant health to reduce infant mortality.

**Figure 1** Timeline showing the emergence of various professional practices involved in perinatal health in Québec: From colonization to the early 20<sup>th</sup> century



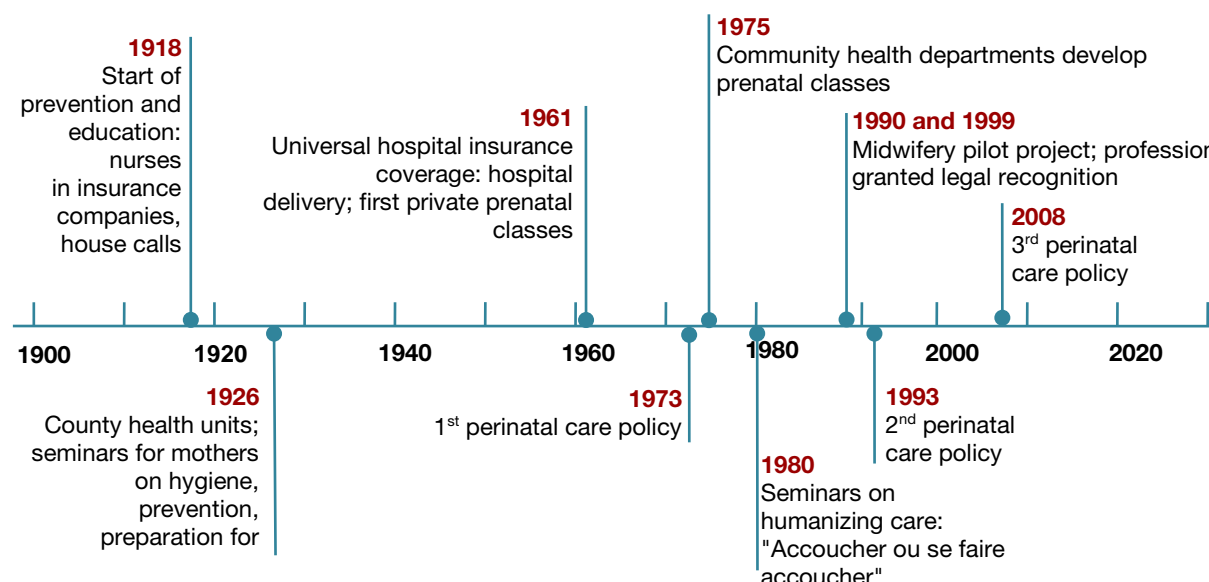
### 2.1.2 DEVELOPMENT OF PERINATAL RESOURCES

In 1918, perinatal prevention activities were organized within volunteer organizations and insurance companies, which hired nurses to pay home visits to pregnant women or to women who had just given birth (Petitat, 1988). Women would give birth at home most of the time (Ordre des infirmières et infirmiers du Québec, 2007). With the development of training for physicians and nurses, and a growing number of hospitals in Québec (Guérard, 1996), a medical approach to birth began gaining momentum (Bayard, 2008).

In the late 1920s, the infant mortality rate in Québec was high, with 127 deaths per 1000 live births (Bayard, 2008). In 1926, the provincial government established health units in counties that held seminars on hygiene, prevention and preparation for childbirth (Desrosiers et al., 1997). Neonatal clinics and a house call service also appeared (Ordre des infirmières et infirmiers du Québec, 2007). By 1931, the number of hospitals in Québec had increased by 50% in nearly 10 years. In 1961, the introduction of hospital insurance coverage in Québec gave more women the option to give birth in hospital, such that by 1965, hospitals were the top choice for 98% of women, compared to 16% in 1940 (McCord, 2011). During the same period, that is, between 1940 and 1968, the infant mortality rate dropped from 54 to 23 deaths per 1000 live births (Bayard, 2008).

Midwifery began to gradually disappear in the first half of the 20<sup>th</sup> century, when midwife training was not recognized, but then returned at the urging of women in the 70s. Midwifery was recognized as a legal profession in 1999. In 2012, general practitioners and obstetricians provided close to 98% of pregnancy care, with midwives providing the rest.<sup>2</sup> Perinatal nurses contribute to preparation for childbirth mainly through prenatal classes. They are also present during labour and childbirth in hospital, and provide systematic postnatal care at home. Figure 2 summarizes the emergence of various professional practices involved in perinatal health in Québec.

**Figure 2** Timeline showing the various professional practices involved in perinatal health in Québec starting from the 20<sup>th</sup> century



<sup>2</sup> <http://www.canadianmidwives.org/province/Quebec.html?prov=6>.

### 2.1.3 EMERGENCE OF PRENATAL CLASSES

Prenatal classes made their first appearance in the 60s, as the number of hospital births was increasing. For example, at Hôtel-Dieu d'Arthabaska, classes were run by the head obstetrics nurse, with other visits organized in certain hospitals. In 1975, the ministry of social welfare asked each community health department in the province to appoint a person responsible for perinatal care and at least one in charge of prenatal classes, and to set up a program through which preventive information on pregnancy and childbirth would be disseminated, among other things (Ministère des Affaires sociales, 1973). The community health departments therefore developed prenatal classes for all pregnant women and their spouses (Roy et al., 1983). These classes would eventually be called sessions, to value the discussion rather than lessons exchanged between participants and health care providers. There was little consistency in the format and objectives of the classes offered by public and private agencies (local community service centres, school boards, community organizations, privately by professionals).

Between 1978 and 1979, Robitaille and Kramer conducted a prospective cohort study on prenatal classes by surveying 1,747 primiparous women who gave birth in four Montréal hospitals. The authors wanted to test the hypothesis that the higher the risk of complications in pregnancy, the less likely women are to attend prenatal classes (Robitaille, 1979). The authors found that there is a direct relationship between a combination of multiple risk factors (e.g., low socioeconomic level, heavy smoker, less educated) and participation in prenatal classes. They concluded that classes have very little effect on lower cigarette consumption during pregnancy or the child's birth weight (Robitaille and Kramer; Robitaille, 1983).

Between 1980 and 1981, the provincial public health association, the Association pour la santé publique du Québec, organized seminars on the humanization of perinatal care called "Accoucher ou se faire accoucher." This was an opportunity to take a stand against the medicalization of childbirth, which led to criticism of prenatal classes. However, prenatal classes would be revisited and improved over the years to become what we know today.

## 2.2 Current offering

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In Québec, pregnant women and their partners can access prenatal information by consulting a guide entitled *Mieux vivre avec notre enfant de la grossesse à deux ans*<sup>3</sup> [From tiny tot to toddler, a guide for parents from pregnancy to age two] and by attending prenatal classes. Prenatal information is also available through intensive support for women in vulnerable situations (e.g., with low income or little education) as part of integrated perinatal and early childhood services called *Services intégrés en périnatalité et pour la petite enfance* (SIPPE). The Portail d'information périnatale [perinatal information portal]<sup>4</sup> was created following a recommendation made in the *Politique de périnatalité 2008-2018*. Its aim is to provide professionals in the health and social services network with good evidence-based information that is updated regularly. This information is used to develop content for prenatal classes.

In an effort to outline the offer of prenatal classes in Québec, we consulted perinatal health professionals from 18 Québec health and social services agencies in January 2015 (see Appendix 1).

<sup>3</sup> <https://www.inspq.qc.ca/en/tiny-tot>.

<sup>4</sup> <https://www.inspq.qc.ca/information-perinatale>.

Prenatal classes in Québec are meant to provide pregnant women and their partners with information and to prepare them for childbirth and their new role as parents. Nulliparous women, that is, women who have never given birth, are the target audience. In 10 out of 15 regions,<sup>5</sup> health and social services centres (known as centres de santé et services sociaux or CSSS in Québec) offer classes to a so-called universal clientele. In the 5 other regions, classes for this clientele are organized by either community or private agencies, often in partnership with health and social services centres. The vast majority of these centres offer specific group prenatal classes to individuals who meet the SIPPE criteria. Allophones and English speakers have access to classes in all health and social services centres across 3 regions. The percentage of centres that offer classes to allophones or English speakers in 6 other regions ranges from 0 to 50%.

The number of prenatal classes offered varies from two to eight depending on the region. The classes are each about two hours in length and typically begin in the second trimester (in 8 out of 15 regions). They are organized mainly in the evenings (14 out of 15 regions) and on weekends (6 out of 15 regions). Classes offered during the day are mainly for women who meet the SIPPE criteria. The classes are free in 9 out of 17 regions, with some health and social services centres in the other 8 regions requiring payment of \$20 to \$50. No regions require payment from SIPPE clients. The methods used for conveying information range from discussions to role-playing and hands-on workshops. Some regions also use interactive workshops, anatomical drawings, games, quizzes, slides, videos, documents and guides.

### 2.3 Needs of expecting parents and their assessment of classes

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Three recent Québec consultations explored the main needs of future parents and their assessment of prenatal classes: a consultation held by the Commissaire à la santé et au bien-être du Québec in 2011 with 49 parents of children under age five (Commissaire à la santé et au bien-être, 2011); a study conducted by the CSSS de l'Ouest-de-l'Île involving 17 mothers and 13 spouses (Beaudet and Legault, 2015); and a study of 254 parents on prenatal information carried out by the Agence de la santé et des services sociaux de la Capitale-Nationale [the health and social services agency of the Capital region of Québec] (Langlois, 2014).

According to these consultations, pregnant women are looking for good quality information on perinatal health in order to prepare for childbirth, pain management, baby's arrival and breastfeeding (Beaudet and Legault, 2015; Commissaire à la santé et au bien-être, 2011). Future parents express great interest in talking to a nurse and in opportunities for discussion and sharing of personal experiences (Beaudet and Legault, 2015).

Pregnant women and their partners want to have control over decisions surrounding the birth process. After attending prenatal classes, many said they feel equipped to talk to hospital staff and make certain decisions, such as skin-to-skin contact and breastfeeding, but find it difficult to maintain or express wishes that go against some hospital practices or routines (Beaudet and Legault, 2015).

According to the couples consulted in the Capitale-Nationale region, the information received meets their expectations. However, they would have liked to have received information tailored to the stage of their pregnancy and, for multiparous women, to the experiences they had in previous pregnancies (Langlois, 2014). After childbirth, some women in the universal clientele group would have liked to

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<sup>5</sup> Some regions did not answer all the consultation questions, which explains why the total number of regions does not always add up to 18.

have received more support to make their transition to parenthood easier (Commissaire à la santé et au bien-être, 2011), while others would have liked to have had classes after the child's birth (Beaudet and Legault, 2015).





### 3 Health status and its determinants during the prenatal, intrapartum and postnatal stages

For a clearer understanding of the analysis of the effects of prenatal classes, the health of pregnant women, their partners and their children during the prenatal, intrapartum and postnatal stages is briefly explored below. We will be using the model of health status and its determinants developed by Québec's Ministère de la Santé et des Services sociaux (Ministère de la Santé et des Services sociaux, 2012) to organize the information and present the results.

#### 3.1 Health status

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Expecting a child and becoming a parent is a major life event (Pinquart and Teubert, 2010) that influences all aspects of the psychosocial functioning of an individual and of a couple (Alhusen, 2008; Condon et al., 2004). It is a developmental stage (Delmore-Ko et al., 2000) for many, and a time of crisis (Gameiro et al., 2009) for some.

In Québec and Canada, women are generally in good health during pregnancy and after their child's birth (Chalmers et al., 2008). Over the past few decades, gains have been made in many aspects of infant health, including premature birth rates and low birth weight (Institut de la statistique du Québec, 2015).

However, the statistics on some aspects, such as maternal mental health, give cause for concern. Approximately 10% of women have depression during pregnancy<sup>6</sup> or after birth (Chalmers et al., 2008). The rate may potentially be comparable for fathers<sup>7</sup> (Garfield et al., 2014).

#### 3.2 Determinants of health status

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##### 3.2.1 INDIVIDUAL CHARACTERISTICS AND HEALTH

The individual characteristics of a pregnant woman and her partner are a major determinant of their own health and that of their unborn child. The model refers to four categories of factors: biological and genetic traits, personal and social skills, lifestyle and behaviours and socioeconomic characteristics (Ministère de la Santé et des Services sociaux, 2012).

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<sup>6</sup> [http://www.phac-aspc.gc.ca/mh-sm/preg\\_dep-eng.php](http://www.phac-aspc.gc.ca/mh-sm/preg_dep-eng.php).

<sup>7</sup> Study conducted among American fathers. Little data is available for the Québec or Canadian population.

### Biological and genetic traits

The age at pregnancy affects the health status of a pregnant woman and her unborn child. Pregnancy in adolescence increases the risk of premature birth, whereas pregnancy in women over the age of 35 increases the risk of gestational diabetes, complications during childbirth and emergency caesarean section (Canadian Institute for Health Information, 2011; Jolly et al., 2000). Besides age, pre-existing medical conditions, such as diabetes, can also lead to health problems, including hypoglycemia or hyperbilirubinemia at birth in newborns born to diabetic mothers (Weintrob et al., 1996).

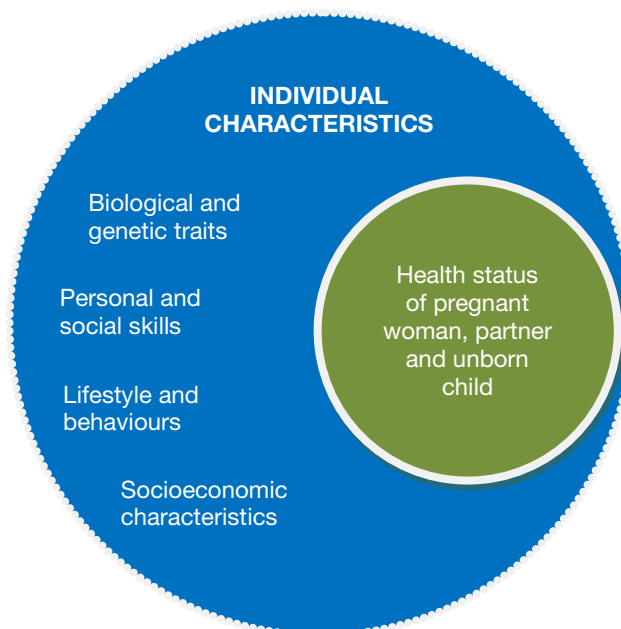
### Personal and social skills

Some personal and social skills affect the health status of a pregnant woman and her unborn child. For example, health-related knowledge during pregnancy increases motivation to adopt behaviours conducive to good health. Having a strong sense of control also makes it easier to adopt these behaviours (Stretcher et al., 1986). Emotionally, a previous birth experience that was negative or traumatizing makes it difficult to prepare for a subsequent pregnancy (Institut national de santé publique du Québec, 2014). Some women who had a caesarean section are reluctant to go through a vaginal birth and prefer to have a planned caesarean section (McGrath and Ray-Barruel, 2009). It is unclear what motivates a pregnant woman to attempt vaginal birth after caesarean section (VBAC), but some authors suggest that knowledge might play a part (Scaffidi et al., 2014), while others believe that it has to do with a sense of control (Dilks and Beal, 1997).

### Lifestyle and behaviours

The effects of many lifestyles and behaviours on health during pregnancy are well documented. For example, a healthy diet gives a pregnant woman the nutrients she needs and helps her recover faster after childbirth (Institut national de santé publique du Québec, 2014). An active lifestyle has both physical and psychological benefits, including improved self-esteem, better mental health and higher energy levels, and reduces the risk of excessive maternal weight gain, gestational diabetes or giving birth to a baby with a low birth weight (Institut national de santé publique du Québec, 2014). However, smoking, drug use, alcohol consumption and exposure to high stress levels in pregnant women are linked to many health problems, including low birth rate in infants (Institut canadien de la santé infantile, 2000), attention deficit hyperactivity disorders and learning disabilities (Institut national de santé publique du Québec, 2014).

After birth, many behaviours, such as skin-to-skin contact, promote parent-child bonding and support breastfeeding initiation (Institut national de santé publique du Québec, 2014; Moore et al., 2012; Vincent, 2011a; Vincent, 2011b). This has multiple health benefits for the newborn, including reduced risk of various infections (otitis media, respiratory and gastrointestinal infections), leukemia and sudden infant death, (Institut national de santé publique du Québec, 2014; World Health Organization, 2015) and for the mother, including reduced risk of diabetes and ovarian or breast cancer (Institut national de santé publique du Québec, 2014).



### Socioeconomic characteristics

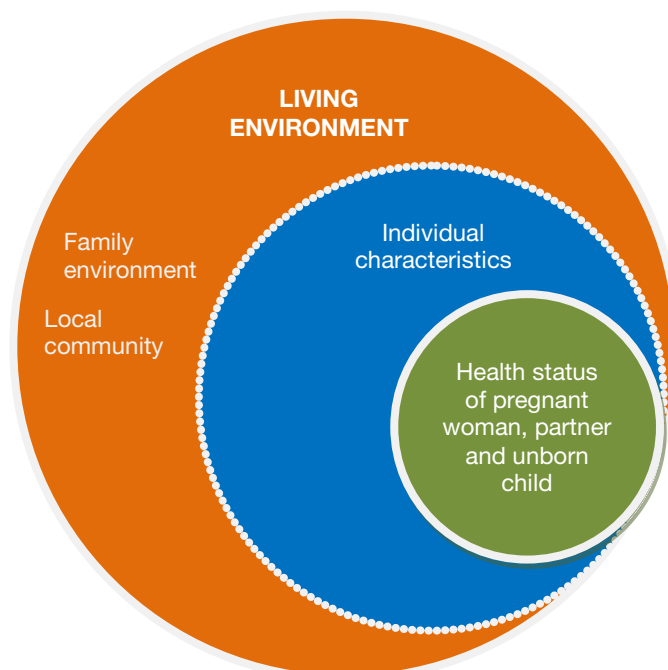
The effects of inadequate income and low social status on health are widely documented. For pregnant women, these situations inevitably cause high stress since an inordinate proportion of their energy is spent on daily survival. This stress can lead to increased risk of health problems (Mikkonen and Raphael, 2010), including low birth weight and premature birth (Larson, 2007; Ministère de la Santé et des Services sociaux, 2012; Weck et al., 2008).

#### 3.2.2 LIVING ENVIRONMENTS AND HEALTH

Different environments in which a pregnant woman and her partner live also affect health.

##### Family and community

The support a pregnant woman receives from her spouse or members of her family during the prenatal stage reduces stress levels (Collins et al., 1993; Oakley, 1985) and fosters an emotional bond (e.g., expression of love, affection and solidarity), in addition to providing tangible benefits (e.g., goods, services, money and help with tasks). Being able to rely on a social support network protects the mental health of the pregnant woman (Kawachi and Berkman, 2001), is linked to a lower incidence of postpartum depression (Widarsson et al., 2012) and causes less psychological distress for the couple six months after the child's birth (Castle et al., 2008).



For future parents, opportunities to talk to other parents in their community or social circles and share their experiences with them is also a source of significant emotional support (Beaudet and Legault, 2015; Commissaire à la santé et au bien-être, 2011; Fabian et al., 2005; Fletcher et al., 2004; Grady and Bloom, 2004; Klima et al., 2009; Little et al., 2013; Widarsson et al., 2012). Conversely, the lack of support is linked to a less satisfying birth experience (Waldenstrom et al., 2004).

#### 3.2.3 SYSTEMS

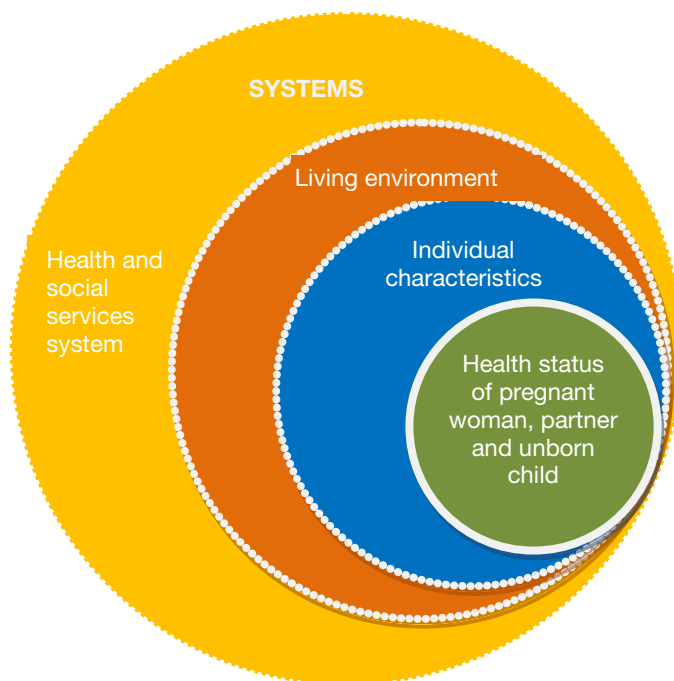
Many care options and services during pregnancy, labour and childbirth available to women in Québec affect the mother's health and that of her unborn child.

### Health and social services systems

Depending on the planned birth location, some practices can affect the mother's health and that of her unborn child during labour and childbirth. For example, in hospital, use of pharmacological means such as the epidural to manage pain during labour and childbirth has side effects and carries risks, including nausea, vomiting or dizziness for the mother, or difficulty initiating breastfeeding (Institut national de santé publique du Québec, 2014).

Obstetrical procedures also carry risks and have side effects for the mother and infant, accumulating with each additional obstetrical procedure, and can negatively affect postnatal adaptation (Institut national de santé publique du Québec, 2014). Despite that, the

caesarean section rate is fairly high, with the procedure being used in close to one-quarter of births in Québec (about 23% in 2009–2010) (Institut national d'excellence en santé et en services sociaux [INESSS], 2012). In birth centres, midwives support the natural physiological process of pregnancy and childbirth. However, there are also risks without medical intervention in some cases, which is why health care professionals are increasingly concerned with optimizing use of obstetrical procedures by improving risk management.



#### 3.2.4 THE BROADER CONTEXT

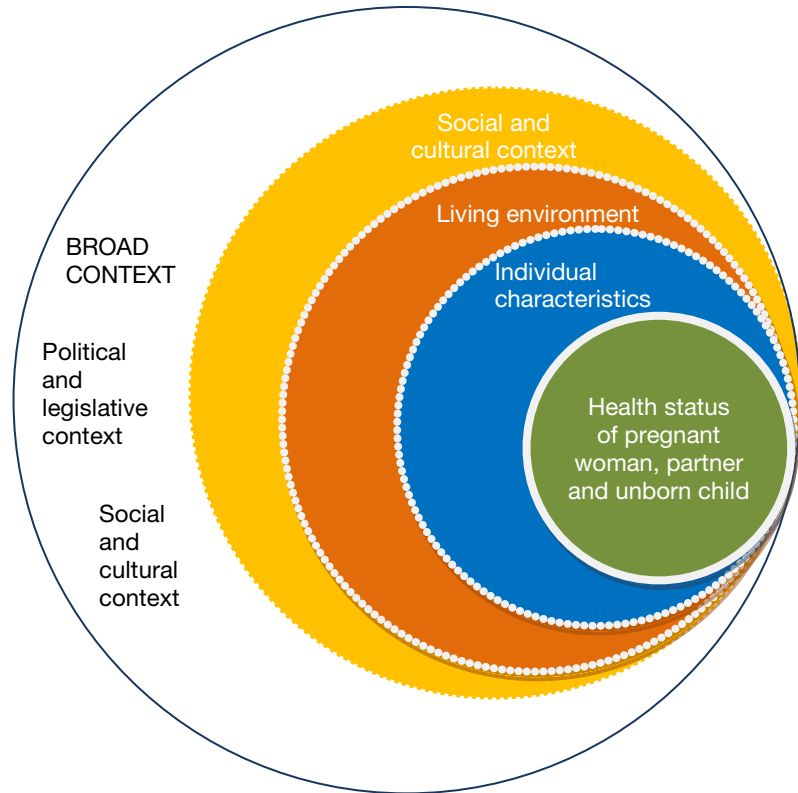
The broader context within which pregnancy occurs also influences health.

#### Political and legislative context

Canada stands out for its physical and social conditions conducive to maternal and infant health, social and health infrastructure, and medical, economic, material and human resources. These conditions, among the best in the world, directly affect life expectancy by keeping neonatal, infant and maternal mortality rates low and ensuring a gradual increase in life expectancy at birth (OECD, 2015).

Public policies in each country promote the health of pregnant women, their partners and their children (Fosse et al., 2014; Kamerman, 2000; Staehelin et al., 2007; Waldfogel, 2001). For example, paid parental leave of several months creates favourable conditions for breastfeeding (Baker and Milligan, 2008; Carter-Spaulling et al., 2011; Cooklin et al., 2012; Ogbuanu et al., 2011), the adoption of a physically active lifestyle (Johansson et al., 2014) and beneficial effects for the vaccination of newborns (Daku et al., 2012).

However, socioeconomic characteristics, unemployment, housing availability and quality and the availability of nearby quality food services differ from one region to the next and have an effect on health as well. Living in a disadvantaged neighbourhood is linked to increased risks of low birth weight (adjusted for gestational age) (Agyemang et al., 2009; Sundquist et al., 2011), obesity (Li et al., 2014b) and asthma in a child (Li et al., 2013), as well as to a higher premature birth rate (Bonet et al., 2013) and a poorer perception of one's own health (Tunstall et al., 2012).



**Social and cultural context**

Social norms greatly influence some health-related behaviours, such as diet. They are based on common, social and cultural values that constitute informal behaviour rules (Baril et al., 2012; Fougeyrollas and Beauregard, 2003) and involve a certain degree of pressure to adopt healthy eating habits (Baril et al., 2012). Some norms are similar across many cultural groups, whereas others are specific to individual cultural sub-groups (Marquis and Shatenstein, 2005). The cultural context, defined based on ethnic, linguistic, religious, sexual and geographic characteristics, as well as education and life experience can affect the birth experience of a pregnant woman and her partner. It impacts the acceptability of the father's presence during childbirth or the positions adopted during labour and childbirth, pain management, ease of interaction with professionals of the opposite sex, the immediate care of a baby and contraception (Chalmers, 2012).



## 4 Methodology

### 4.1 Selection of studies and quality analysis

We focused our bibliographic research on publications dated between 2004 and 2015 to overlap the period examined by Gagnon and Sandall (2007), while including recent data. In order to identify studies relevant to the effects analysis, we established the following inclusion criteria: the studies 1) must distinguish between prenatal care and prenatal classes; 2) must have been conducted in one of the 34 OECD member countries for similarity with the Québec context; and 3) must differentiate between effects for the universal versus the vulnerable clientele. A vulnerable clientele consists of individuals who have little education (unfinished high school) and low income according to the criteria defined in their country of residence. The four exclusion criteria left out studies that may have limited the scope of results: 1) use of recent, non-widespread approaches, such as childbirth under hypnosis or meditation (Mongan, 2005); 2) focus on a single theme, such as smoking cessation; 3) identification of a particular clientele, such as previous perinatal loss, multiple pregnancy or high risk of congenital malformations; and 4) poor study quality due to inconsistent interpretation of results.

To assess study quality, like INESSS, we used the *Critical Appraisal Skills Programme (CASP)* evaluation checklist. We selected studies that were classified as being of poor quality due to insufficient details provided by their authors, but that had a clearly formulated research issue and an adequate methodology.

After applying the inclusion and exclusion criteria, 36 studies (31 of parents in the universal clientele and 5 of women in the vulnerable clientele) were analyzed further. The number of available studies appears to be limited.

### 4.2 Findings from studies

We developed a checklist for this report to classify the findings into four types so that we could determine the effects despite the limited number of studies. The number of studies required (at least two) and their required quality (at least one good quality study) depend on the average number of studies for each indicator (around four studies of variable quality). This checklist divides the effects into four separate types: 1) probable effects, 2) no probable effects, 3) contradictory effects, and 4) insufficient studies to make any assertions about the effects (see Table 1).

**Table 1** Symbols and criteria used for types of findings

Type of finding	Criterion used	Symbol
Probable effects	At least two more studies (including at least one of good quality) showing positive effects than there are studies showing no effects.	+
No probable effects	At least two more studies (including one of good quality) showing no effects than there are studies showing positive effects.	⊗
Contradictory effects	A comparable number of studies (equal or plus one) showing positive effects and showing no effects.	⚖
Insufficient studies	A single study showing positive effects or no effects.	?

### 4.3 List of indicators

Table 2 shows a list of 56 indicators taken from studies and classified under the MSSS framework (Ministère de la Santé et des Services sociaux, 2012).

**Table 2 List of indicators under MSSS framework**

Prenatal stage	Intrapartum stage	Postnatal stage
<b>Indicators linked to health status</b>		
<b>Parents</b>		
Recommended gestational weight gain, distress and anxiety, prenatal adaptation.	Perineal trauma.	Adaptation to parenthood, assessment of birth experience, mental health.
<b>Infant</b>		
	Intrauterine death, gestational age, premature birth, mean birth weight, low birth weight, low weight adjusted for gestational age, Apgar score, blood pH, admission to intensive care unit, average length of hospital stay.	
<b>Determinants related to individual characteristics</b>		
<b>Personal and social skills</b>		
Knowledge of prenatal and intrapartum health, sense of control over the health of the foetus, confidence about what happens next.	Intention to use pharmacological means to manage pain, intention to have a caesarean section for non-medical reasons, expectation to have obstetrical procedures performed, recognition of the stages of labour, stage of labour on arrival in hospital, duration of stages of labour.	Knowledge, intention to breastfeed, sense of parenting competence, self-esteem, confidence in ability to provide care, perception of pain.
<b>Lifestyle, behaviours</b>		
Seeking prenatal care as recommended, adoption of healthy lifestyle during pregnancy.		Skin-to-skin contact, breastfeeding (initiation, breastfeeding in the first weeks, at 3 months, at 6 months and after 6 months, duration, cessation), having a physician that follows the infant's progress.
<b>Determinants related to living environments</b>		
<b>Family environment</b>		
Support and involvement by spouse		
<b>Local community</b>		
Support between future parents		Support between future parents
<b>Determinants related to systems</b>		
<b>Health and social services systems</b>		
Support from professionals	Induction of labour, use of labour accelerator, cooperation with staff, use of epidural, use of pharmacological and non-pharmacological means to manage pain, vaginal birth, caesarean section, attempted vaginal birth after caesarean section.	



## 5 Effects of group prenatal classes

The analysis of the effects will be presented according to three stages (prenatal, intrapartum and postnatal) and based on two types of clientele (universal and vulnerable).

### 5.1 Prenatal stage in universal clientele

Table 3 shows 17 studies that evaluated the effects of prenatal classes in the universal clientele. The appendix 4 contains a detailed description of these studies.

**Table 3 Description of studies on prenatal stage in universal clientele**

Study authors and characteristics	Prenatal class characteristics
<b>Andersson et al. (2012):</b> Good quality qualitative study of 8 men and 20 women from Sweden.	<i>Centering Pregnancy Care</i> *: 6 to 9 classes, 2 hours each, in groups of 6 to 8. Spouses can participate. Classes start at around week 12 of pregnancy. The class end date is not specified.
<b>Artieta-Pinedo et al. (2010):</b> Good quality cohort study of 616 Spanish women.	Lamaze-type prenatal classes†: 8 group classes, 2 hours each (90 minutes of theory and 30 minutes of physical exercises). The class start date is not specified, but classes ended around week 40 of pregnancy.  Comparison group: At least 6 prenatal care visits.
<b>Baldwin (2006):</b> Average quality quasi-experimental study of 98 American women.	<i>Centering Pregnancy Care</i> : No information on the number or content is provided by the authors. Classes start between weeks 12 and 16 of pregnancy. The class end date is not specified.  Comparison group: Individual prenatal care visits.
<b>Fletcher et al. (2004):</b> Average quality quasi-experimental study of 412 Australian men.	Prenatal classes: No details provided. Group 1: Participation in classes and birth of child in past year.  Group 2: Participation in classes and imminent birth of child.
<b>Hildingsson et al. (2014):</b> Good quality cohort study of 365 Swedish fathers.	Prenatal classes: No details provided. Comparison group: Fathers who did not attend classes.
<b>Ickovics et al. (2007):</b> Good quality randomized study of 993 young American women.	<i>Centering Pregnancy Care</i> : 10 structured classes, 2 hours each (for a total of 20 hours), in groups of 8 women on average. Classes start at around week 16 of pregnancy. The class end date is not specified.  Comparison group: Individual prenatal care visits.
<b>Jakubiec et al. (2014):</b> Poor quality quasi-experimental study of 70 Polish women.	Prenatal classes: No details provided. Comparison group: Women who did not take part in classes. It is unclear whether or not they all received prenatal care.
<b>Little et al. (2013):</b> Average quality cohort study of 32 American women of Japanese descent.	Japanese adaptation of <i>Centering Pregnancy Care</i> : 5 monthly classes, then 3 classes every 2 weeks. The class start and end dates are not specified.




**Table 3 Description of studies on prenatal stage in universal clientele (continued)**

Study authors and characteristics	Prenatal class characteristics
<b>Maimburg et al. (2010):</b> Good quality randomized study of 1,193 Danish women.	<i>Ready for Child</i> classes: 3 classes totalling 9 hours, run by midwives. Classes start at around week 30 of pregnancy and end around week 35.  Comparison group: Individual prenatal care and optional access to relaxation classes.
<b>Redshaw and Henderson (2013):</b> Good quality cohort study of 4616 British men.	Prenatal classes: No details provided by the authors. Comparison group: Men whose partners did not take part in classes.
<b>Robertson et al. (2009):</b> Average quality quasi-experimental study of 49 American women of Hispanic descent.	<i>Centering Pregnancy Care</i> : Structured 90-minute classes in groups of 8 to 12, monthly for 4 months and then every 2 weeks for the rest of pregnancy (participation in at least 4 classes). Classes start before week 24, but the end date is not specified.  Comparison group: At least 4 individual prenatal care visits.
<b>Sercekus and Mete (2010):</b> Good quality quasi-experimental study of 118 Turkish women.	Prenatal classes: 7 classes in groups of 6 to 10, 2 hours each once a week, with time set aside for discussion, interaction and questions. Classes start at week 26 of pregnancy. The class end date is not specified.  Comparison group: Individual prenatal care visits.
<b>Shia and Alabi (2013):</b> Average quality cohort study of 69 British men.	Prenatal classes: 2 to 6 classes run by midwives, offered at the end of the day. The class start and end dates are not specified.
<b>Stoll and Hall (2012):</b> Average quality case control study of 624 Canadian women.	Prenatal classes: No details provided. Comparison group: It is unclear whether or not they all received prenatal care.
<b>Tanner-Smith et al. (2013a):</b> Good quality quasi-experimental study of 393 American women.	<i>Centering Pregnancy Care</i> : Participation in at least one class. The class start and end dates are not specified.  Comparison group: Individual prenatal care visits.
<b>Trudnak et al. (2013):</b> Good quality historical cohort study of 487 American women of Hispanic descent.	<i>Centering Pregnancy Care</i> : 10 structured classes in groups of 8 to 12. The class start and end dates are not specified.  Comparison group: Individual prenatal care visits.
<b>Widarsson et al. (2012):</b> Good quality qualitative study of 22 Swedish women and 10 Swedish men.	Group classes: Sessions addressing the social, emotional, psychological and physical aspects of pregnancy. The class start and end dates are not specified.





\* This program consists of three components: prenatal care in which pregnant women take an active part, prenatal education and social support between participants. The first 15 minutes of each 90-minute class are dedicated to prenatal care with a midwife or physician in a private area of the same room where the prenatal education activities are held.

† This psychoprophylactic method is based on breathing, physiology and information on the physiological side of childbirth (Lamaze, 1956). These are the benefits and drawbacks that come with each decision. Ways of managing pain naturally and building bonds of affection with the baby are the key aspects addressed.

### 5.1.1 EFFECTS ON HEALTH STATUS

Health status	Finding
<p><b>Recommended gestational weight gain</b></p> <p>The risks of gestational weight gain below the recommended weight were less significant in women who attended classes (Trudnak et al., 2013). However, for weight gain above the recommended weight, the findings of two good quality studies are contradictory: where one study notes no difference (Trudnak et al., 2013), another notes fewer women with weight gain above the recommended weight, particularly women who are overweight or obese (Tanner-Smith et al., 2013a).</p>	
<p><b>Distress and anxiety</b></p> <p>Spanish-born women who attended classes had less severe anxiety (measured on a standardized scale) upon admission to hospital to give birth (Artieta-Pinedo et al., 2010). This is not the case for a sub-group of immigrant women, who experience greater anxiety even after having taken classes. In the same vein, women in the Ickovics et al. study who attended classes do not have less distress (on a standardized scale) than those in the comparison group.</p>	
<p><b>Prenatal adaptation</b></p> <p>Adaptation during pregnancy in women, on a standardized scale that measures concerns about their health and that of their unborn child, is improved following participation in classes according to the study by Sercekus and Mete (2010).</p>	

### 5.1.2 EFFECTS ON DETERMINANTS OF HEALTH

Individual characteristics	Finding
<p><b>Lifestyle during pregnancy</b></p> <p>No difference in healthy lifestyles (taking vitamins, eating well and exercising) during pregnancy was noted between Hispanic women who attended classes and those who did not (Robertson et al., 2009).</p>	
<p><b>Seek prenatal care as recommended</b></p> <p>Two good quality studies reveal that participation in classes increases the proportion of women who seek prenatal care as recommended (Ickovics et al., 2007; Trudnak et al., 2013).</p>	
<p><b>Knowledge about prenatal and intrapartum health (mothers)</b></p> <p>Three studies, including one of good quality, show that women's participation in prenatal classes is linked to better knowledge about the prenatal (Baldwin, 2006; Ickovics et al., 2007) and intrapartum care they should be receiving (Jakubiec et al., 2014). These data are in line with the data reported by pregnant women of Japanese descent living in the United States (Little et al., 2013). However, one study finds that women's participation in classes has no influence on their knowledge about prenatal health (Robertson et al., 2009).</p>	
<p><b>Knowledge about prenatal and intrapartum health (fathers)</b></p> <p>The only study on the knowledge of future fathers shows that, of the men who attended prenatal classes, 78.3% say they gained relevant knowledge to prepare them for childbirth (Shia and Alabi, 2013).</p>	









Individual characteristics (continued)	Finding
<p><b>Sense of control over the health of the foetus</b></p> <p>A single study explored this topic and notes that women do not report having a greater sense of control over the health of their foetus after attending prenatal classes (Baldwin, 2006).</p>	
<p><b>Confidence about what happens next (mothers)</b></p> <p>Three studies, including two of good quality (Andersson et al., 2012; Ickovics et al., 2007; Little et al., 2013), indicate that women feel confident and well-prepared for labour and childbirth after having attended classes. These results are consistent with the study by Fabian et al. showing that after childbirth, a vast majority of women (74%) feel that prenatal classes helped them prepare for childbirth. Lastly, a recent study shows that pregnant women feel prepared for the arrival of their baby after having taken part in prenatal classes (Little et al., 2013). This is contrary to the results of two studies (Maimburg et al., 2010; Stoll and Hall, 2012) showing that participation in classes does not make pregnant women any less afraid of giving birth.</p>	
<p><b>Confidence about what happens next (fathers)</b></p> <p>According to three studies of fathers, including one of good quality, participation in classes helped the men feel better prepared and confident about childbirth (Andersson et al., 2012; Fletcher et al., 2004; Shia and Alabi, 2013). In addition, a number of fathers who did not attend classes are more often found saying that they have a fear of childbirth (Hildingsson et al., 2014).</p>	
Determinants related to living environments	Finding
<p><b>Support and involvement by spouse</b></p> <p>Two studies discuss a father's support or involvement during pregnancy, labour and childbirth. One shows greater involvement by the father in families where the pregnant woman has attended prenatal classes (Redshaw and Henderson, 2013), whereas in the other study, participation in classes was not linked to a sense of greater social support from the spouse (Baldwin, 2006).</p>	
<p><b>Support between future parents (mothers)</b></p> <p>Three studies, including two of good quality, show that participation in prenatal classes helps future parents create a social network. The study by Little et al. reveals that the social support women receive during and after prenatal classes is appreciated and that many intend to stay in touch with the other participants after giving birth. Andersson et al. note that after the classes, women take the initiative to meet with the other participants. Widarsson discusses the importance for future mothers to be able to talk to one another about their experiences with pregnancy, a major source of emotional support. A single study, the one by Baldwin, reaches a different conclusion: participation in prenatal classes is not linked to a sense of greater social support from other pregnant women after the classes.</p>	
<p><b>Support between future parents (fathers)</b></p> <p>According to two studies of fathers, including one of good quality, prenatal classes are also an opportunity for social support (Fletcher et al., 2004; Widarsson et al., 2012), even though the men established or maintained contact with other participants to a lesser extent (Fletcher et al., 2004).</p>	
Determinants related to systems	Finding
<p><b>Support from professionals</b></p> <p>The author of one study notes that participation in prenatal classes is not linked to a sense of greater (prenatal) social support from the midwife (Baldwin, 2006).</p>	

Table 4 shows the findings on each indicator during the prenatal stage in the universal clientele.

**Table 4 Finding on each indicator during prenatal stage in universal clientele**

Indicators for health status or determinants of health	Finding
Seeking prenatal care as recommended Knowledge about prenatal and intrapartum health (mothers) Confidence about what happens next (mothers and fathers) Support between future parents (mothers and fathers)	+
Recommended gestational weight gain* Distress and anxiety* Support and involvement by spouse	
Prenatal adaptation* Lifestyle during pregnancy Knowledge about prenatal and intrapartum health (fathers) Sense of control over the health of the foetus Support from professionals	?

Legend: probable effects +, no probable effects ⊗, contradictory effects ±, insufficient studies ?.

\* Is an indicator of health status.

## 5.2 Prenatal stage in vulnerable clientele

Table 5 describes four studies that discussed health during the prenatal stage involving women in vulnerable situations. None of these studies included fathers.

**Table 5 Description of studies on prenatal stage in vulnerable clientele**

Study authors and characteristics	Prenatal class characteristics
<b>Duggan (2012):</b> Average quality qualitative study of 27 vulnerable American women.	<i>Centering Pregnancy Care:</i> 10 classes, each 90 to 120 minutes. Classes start between weeks 12 and 16 of pregnancy. The class end date is not specified.  Comparison group: Women who only had prenatal care.
<b>Grady and Bloom (2004):</b> Poor quality cohort study of 501 African-American women under age 17.	<i>Centering Pregnancy Care:</i> 12 structured classes, 90 minutes each, in groups of 8 to 12. Classes start between weeks 12 and 18 of pregnancy, and end with a postpartum class.  Comparison group: All adolescent girls who gave birth in the same hospital in 1998, including those who did not receive prenatal care.
<b>Klima et al. (2009):</b> Average quality cohort study of 268 low-income African-American women.	<i>Centering Pregnancy Care:</i> 10 structured classes, 2 hours each, in groups of 4 to 10 (average of 5.5 female participants per group). Classes start before week 18 of pregnancy. The class end date is not specified.  Comparison group: Individual prenatal care only.
<b>Picklesimer et al. (2012):</b> Good quality cohort study of 4083 low-income American women.	<i>Centering Pregnancy Care:</i> 10 structured classes, 2 hours each, in groups of 8 to 12. Median participation of 7 classes. The class start and end dates are not specified.  Comparison group: Individual prenatal care only.

### 5.2.1 EFFECTS ON HEALTH STATUS

No studies explored the health status of these women.

### 5.2.2 EFFECTS ON DETERMINANTS OF HEALTH

Determinants related to individual characteristics	Finding
<p><b>Knowledge about prenatal health</b></p> <p>Two poor or average quality studies reveal that African-American women, adolescent girls or low-income women who attended prenatal classes say they learned more about prenatal health (Grady and Bloom, 2004; Klima et al., 2009).</p>	⓪
<p><b>Seeking prenatal care as recommended</b></p> <p>One study observes that more women obtain prenatal care if they attend prenatal classes (Picklesimer et al., 2012).</p>	⓪
<p><b>Confidence about what happens next</b></p> <p>Three poor or average quality studies reported that participation in classes was linked to greater confidence. According to the study by Grady and Bloom, 94% of women who attended classes were confident about how well they were prepared for labour and childbirth. The qualitative study by Klima et al. reveals similar reports. Pregnant women in the study by Duggan feel that prenatal classes instill greater confidence about what to expect after birth and what care to provide to the infant.</p>	⓪
Determinants related to living environments	Finding
<p><b>Support between future parents</b></p> <p>Three studies (Duggan, 2012; Grady and Bloom, 2004; Klima et al., 2009) highlight the importance for pregnant women to be able to talk to one another about their experience with pregnancy and note that sharing personal experiences in a group setting is a source of emotional support. None of these studies were of good quality.</p>	⓪

Table 6 shows the findings on each indicator during the prenatal stage in the vulnerable clientele.

**Table 6 Finding on each indicator during prenatal stage in vulnerable clientele**

Indicators for health status or determinants of health	Finding
<p>Knowledge about prenatal health</p> <p>Seeking prenatal care as recommended</p> <p>Confidence about what happens next</p> <p>Support between future parents</p>	⓪

Legend: probable effects +, no probable effects ⊗, contradictory effects ±, insufficient studies ⓪.


### 5.3 Intrapartum stage in universal clientele

Table 7 shows ten studies that assessed the effects of participation in prenatal classes on various health indicators during the intrapartum stage in the universal clientele.






**Table 7 Description of studies on intrapartum stage in universal clientele**

Study authors and characteristics	Prenatal class characteristics
<b>Artieta-Pinedo et al. (2010):</b> Good quality cohort study of 616 Spanish women.	Lamaze-type prenatal classes: 8 group classes, 2 hours each (90 minutes of theory and 30 minutes of physical exercises). The class start date is not specified, but classes end around week 40 of pregnancy. Comparison group: At least 6 prenatal care visits.
<b>Fabian et al. (2005):</b> Good quality cohort study of 1,197 Swedish pregnant women.	Prenatal classes: 1 to 11 classes on preparation for childbirth, breastfeeding and parenthood. The class start and end dates are not specified. Comparison group: Recruited during prenatal care visits.
<b>Knape et al. (2014):</b> Good quality cohort study of 946 German women.	Prenatal classes: No details provided. Comparison group: No details as to whether they received prenatal care.
<b>Maimburg et al. (2010):</b> Good quality randomized study of 1,193 Danish women.	<i>Ready for Child</i> classes: 3 classes focusing on birth, the child and the parent, totalling 9 hours and run by midwives. Classes start at around week 30 of pregnancy and end around week 35. Comparison group: Individual prenatal care and optional access to relaxation classes.
<b>Martinez-Galiano and Gado-Rodriguez (2014):</b> Good quality cohort study of 520 Spanish women.	Prenatal classes: No details provided. Comparison group: It is unclear whether or not they all received prenatal care.
<b>Robertson et al. (2009):</b> Average quality quasi-experimental study of 49 American women of Hispanic descent.	<i>Centering Pregnancy Care</i> : Structured 90-minute classes in groups of 8 to 12, monthly for 4 months and then every 2 weeks for the rest of pregnancy (participation in at least 4 classes). Classes start before week 24. The class end date is not specified. Comparison group: At least 4 individual prenatal care visits.
<b>Simpson et al. (2010):</b> Average quality cohort study of 1,694 American women.	Lamaze-type prenatal classes: Classes offered in a condensed format in one day or spread out over 4 to 6 weeks. Classes start at around week 32 of pregnancy and end around week 38 (depending on the selected format). Comparison group: Individual prenatal care only.
<b>Stoll and Hall (2012):</b> Average quality case control study of 624 Canadian women.	Prenatal classes: No details provided. Comparison group: Women who did not attend prenatal classes. It is unclear whether or not they all received prenatal care.
<b>Trudnak et al. (2013):</b> Good quality historical cohort study of 487 American women of Hispanic descent.	<i>Centering Pregnancy Care</i> : 10 structured classes in groups of 8 to 12. The class start and end dates are not specified. Comparison group: Individual prenatal care.
<b>Williams et al. (2008):</b> Average quality cohort study of 100 British women.	Prenatal classes: No details provided. Comparison group: Recruited during prenatal care visits.









### 5.3.1 EFFECTS ON HEALTH STATUS





Health status	Finding
<p><b>Perineal trauma (tearing or episiotomy)</b></p> <p>According to three good quality studies, women's participation in prenatal classes does not affect the rate of perineal trauma, whether in relation to trauma due to unspecified causes (episiotomy or tearing) (Artieta-Pinedo et al., 2010), perineal tears specifically (Martinez-Galiano and Gado-Rodriguez, 2014) or episiotomies only (Maimburg et al., 2010).</p>	

### 5.3.2 EFFECTS ON DETERMINANTS OF HEALTH

Determinants related to individual characteristics	Finding
<p><b>Intention to use pharmacological means to manage pain</b></p> <p>One study focused on this indicator and reveals that women's participation in prenatal classes does not affect the intention they expressed during pregnancy to use an epidural or other pharmacological means to manage pain (Williams et al., 2008) (e.g., pethidine, NO<sub>2</sub> &amp; O<sub>2</sub>).</p>	
<p><b>Intention to have a caesarean section for non-medical reasons</b></p> <p>According to the study by Stoll and Hall, nulliparous women who attended prenatal classes are less inclined to opt for a caesarean section between weeks 35 and 39 of pregnancy, compared to women in the comparison group. This was not observed in multiparous women.</p>	
<p><b>Expectation to have obstetrical procedures performed</b></p> <p>According to the single study on expectations regarding obstetrical procedures, participation in prenatal classes has no effect on the expectation to have obstetrical procedures performed during childbirth (other than a caesarean section) (Stoll and Hall, 2012).</p>	
<p><b>Stage of labour on arrival in hospital</b></p> <p>A good quality study notes that women who attended prenatal classes arrive in hospital at a more advanced stage of labour (more dilated) than other women from the comparison group (Maimburg et al., 2010). In contrast, another good quality study finds that there is no difference between women in an active (established) stage of labour on arrival in hospital based on whether or not they attended classes (Artieta-Pinedo et al., 2010).</p>	
<p><b>Duration of stages of labour</b></p> <p>The two good quality studies (Artieta-Pinedo et al., 2010; Martinez-Galiano and Gado-Rodriguez, 2014) do not show any effects of prenatal classes on the duration of the active and transitional stages of labour (elapsed time leading to full dilation) or on the duration of the foetal descent and the birth of the child (time elapsed between full dilation and birth). More generally, Martinez-Galiano and Gado-Rodriguez did not observe any difference, based on participation in prenatal classes, between the rate of childbirth for which labour was deemed to be of normal duration and the rate of childbirth following slow or difficult labour (dystocia).</p>	






Determinants related to systems	Finding
<p><b>Induction of labour</b></p> <p>Four studies, including two of good quality (Maimburg et al., 2010; Martinez-Galiano and Gado-Rodriguez, 2014; Simpson et al., 2010; Stoll and Hall, 2012), reveal that participation in prenatal classes does not affect the rate of induction of labour (all induction methods combined, irrespective of the stage of pregnancy or the reason for induction). However, when factoring in the context in which induction is considered, a good quality study indicates that in a post-term pregnancy, participation in classes is linked to a lower induction rate (Maimburg et al., 2010).</p>	
<p><b>Use of labour accelerator</b></p> <p>Two studies, including one of good quality (Maimburg et al., 2010; Stoll and Hall, 2012), reveal that participation in prenatal classes does not affect the rate of use of labour accelerators (e.g., oxytocin) to promote stronger, more frequent contractions once labour begins.</p>	
<p><b>Cooperation with staff during childbirth</b></p> <p>A single study on cooperation with staff reveals that women who attended classes cooperate more actively with medical staff during childbirth than those in the comparison group (Martinez-Galiano and Gado-Rodriguez, 2014).</p>	
<p><b>Use of epidural</b></p> <p>One good quality study observes a significantly lower use of the epidural among women who attended classes (Maimburg et al., 2010), whereas the authors of three other studies, including two of good quality (Artieta-Pinedo et al., 2010; Martinez-Galiano and Gado-Rodriguez, 2014; Stoll and Hall, 2012), have not found this to be the case. Furthermore, in their good quality study, Fabian et al. note higher use of the epidural among women who attended prenatal classes.</p>	
<p><b>Use of pharmacological means excluding epidural</b></p> <p>The use of medication specifically during the dilation process does not differ based on participation in prenatal classes for women in the good quality study by Martinez-Galiano and Gado-Rodriguez. Similarly, three studies, including two of good quality, indicate that participation in prenatal classes does not affect the use of pharmacological means to manage pain during childbirth (e.g., pethidine/morphine, codeine, nitric oxide/oxygen, pudendal nerve block) (Fabian et al., 2005; Maimburg et al., 2010; Stoll and Hall, 2012).</p>	
<p><b>Use of non-pharmacological means</b></p> <p>The authors of three good quality studies observe no effects of participation in classes on the use of non-pharmacological means to manage pain during childbirth (e.g., bath or shower, acupuncture, injections of micro-quantities of sterile water, transcutaneous electrical nerve stimulation, psychoprophylaxis*) (Fabian et al., 2005; Maimburg et al., 2010; Martinez-Galiano and Gado-Rodriguez, 2014).</p>	
<p><b>Vaginal birth without instrumental assistance</b></p> <p>Two good quality studies show that participation in prenatal classes does not affect the proportion of vaginal births without instrumental assistance (Artieta-Pinedo et al., 2010) or the rate of spontaneous vaginal births (compared to all other types of childbirth) (Knapé et al., 2014).</p>	
<p><b>Vaginal birth with instrumental assistance</b></p> <p>Three studies, including two of good quality, do not establish any effect of participation in classes on instrumental assistance for medical reasons (e.g., forceps or vacuum) (Maimburg et al., 2010; Martinez-Galiano and Gado-Rodriguez, 2014; Stoll and Hall, 2012).</p>	

Determinants related to systems (continued)	Finding
<p><b>Caesarean section in general</b></p> <p>Results are split on the effect of participation in prenatal classes and the rate of caesarean section (all causes combined: emergency, medical reasons, elective). Two studies, including one of good quality (Stoll and Hall, 2012; Trudnak et al., 2013), show a lower rate of caesarean section among primiparous women who attended classes. However, in two studies of Hispanic women, including one study of good quality, participation in classes was not shown to have any effect on the use of caesarean section (Martinez-Galiano and Gado-Rodriguez, 2014; Robertson et al., 2009). Nor is any effect shown in multiparous women in the Stoll and Hall (2012) study.</p>	
<p><b>Planned caesarean section</b></p> <p>Results are split on the effect of participation in prenatal classes and the rate of planned caesarean section. Two good quality studies report no effects on planned caesarean sections (Fabian et al., 2005; Maimburg et al., 2010), while one average quality study indicates lower proportions of planned caesarean sections among women who attended prenatal classes, although this difference is only true for primiparous women (Stoll and Hall, 2012).</p>	
<p><b>Emergency caesarean section</b></p> <p>Three studies, including two of good quality, show no effects on the use of emergency caesarean section (Fabian et al., 2005; Maimburg et al., 2010; Stoll and Hall, 2012).</p>	
<p><b>Attempt of vaginal birth after caesarean section (VBAC)</b></p> <p>The Stoll and Hall study reveals that participation in prenatal classes is linked to a higher prevalence of VBAC for multiparous women.</p>	

\* Psychoprophylaxis: [translation of *Larousse* definition] "Psychological training designed to prevent adverse responses that can keep the body from functioning properly."

Table 8 shows the findings on each indicator during the intrapartum stage in the universal clientele.

**Table 8 Finding on each indicator during intrapartum stage in universal clientele**

Indicators for health status or determinants of health	Finding
Stage of labour on arrival in hospital Use of epidural Caesarean section in general Planned caesarean section	
Perineal trauma* Duration of stages of labour Induction of labour Use of labour accelerator Use of pharmacological means excluding epidural Use of non-pharmacological means Vaginal birth without instrumental assistance Vaginal birth with instrumental assistance Emergency caesarean section	
Intention to use pharmacological means to manage pain Intention to have a caesarean section for non-medical reasons Expectation to have obstetrical procedures performed Cooperation with staff during childbirth Attempt of vaginal birth after caesarean section (VBAC)	

Legend: probable effects +, no probable effects ⊗, contradictory effects ±, insufficient studies ?.

\* Is an indicator of health.

## 5.4 Intrapartum stage in vulnerable clientele

Table 9 shows three studies that specifically discuss the effects of prenatal classes on the intrapartum health status of mothers in vulnerable situations.

**Table 9 Description of studies on intrapartum stage in vulnerable clientele**

Study authors and characteristics	Prenatal class characteristics
<p><b>Duggan (2012):</b> Average quality qualitative study of 27 vulnerable American women.</p>	<p><i>Centering Pregnancy Care:</i> 10 classes, each 90 to 120 minutes. Classes start between weeks 12 and 16 of pregnancy. The class end date is not specified.</p> <p>Comparison group: Women who only had prenatal care.</p>
<p><b>Grady and Bloom (2004):</b> Poor quality cohort study of 501 African-American women under age 17.</p>	<p><i>Centering Pregnancy Care:</i> 12 structured classes, 90 minutes each, in groups of 8 to 12. Classes start between weeks 12 and 18 of pregnancy, and end with a postpartum class.</p> <p>2001 comparison group: Adolescent girls who gave birth in the same hospital in 2001, with prenatal care only.</p> <p>1998 comparison group: Adolescent girls who gave birth in the same hospital in 1998, including those who did not receive prenatal care.</p>
<p><b>Pitcock (2013):</b> Average quality quasi-experimental study of 70 low-income American women of Hispanic descent living in rural areas.</p>	<p>Prenatal classes: One 6-hour class on preparation for childbirth, breastfeeding, child care and contraception. Classes begin at the start of the third trimester. The class end date is not specified.</p> <p>Comparison group: Women who only had prenatal care.</p>

### 5.4.1 EFFECTS ON HEALTH STATUS

No studies explored the intrapartum health status of women in vulnerable situations.

#### 5.4.2 EFFECTS ON DETERMINANTS OF HEALTH

Determinants related to individual characteristics	Finding
<p><b>Recognition of stages of labour</b></p> <p>Only one study observes that, despite participating in prenatal classes, women were unsure about the signs and symptoms of labour (Duggan, 2012). They found differences between their own symptoms and those presented during class, and were unable to decide when to seek medical assistance.</p>	⊗
Determinants related to systems	Finding
<p><b>Vaginal birth</b></p> <p>The only study on the type of delivery involving vulnerable women shows the absence of any difference between the groups for the type of delivery among low-income Hispanic women (Pitcock, 2013).</p>	⊗
<p><b>Caesarean section in general</b></p> <p>Grady and Bloom (2004) did not observe a difference between the groups in the rate of caesarean section in adolescent girls (17 years of age and younger) in their study.</p>	⊗

Table 10 shows the findings on each indicator during the intrapartum stage in the vulnerable clientele.

**Table 10 Finding on each indicator during intrapartum stage in vulnerable clientele**

Indicators for health status or determinants of health	Finding
Recognition of stages of labour Vaginal birth Caesarean section in general	⊗

Legend: probable effects +, no probable effects ⊗, contradictory effects -I-, insufficient studies ⊗.








## 5.5 Intrapartum stage for children of women in universal clientele

Table 11 shows seven studies that evaluated the effects of prenatal classes on the intrapartum health of children of women in the universal clientele.

**Table 11 Description of studies on pregnancy outcomes in children of women in universal clientele**

Study authors and characteristics	Prenatal class characteristics
<p><b>Artieta-Pinedo et al. (2010):</b> Good quality cohort study of 616 Spanish women.</p>	<p>Lamaze-type prenatal classes: 8 group classes, 2 hours each (90 minutes of theory and 30 minutes of physical exercises). The class start date is not specified, but classes end around week 40 of pregnancy.</p> <p>Comparison group: Women who did not attend prenatal classes, but who had at least 6 prenatal care visits.</p>
<p><b>Ickovics et al. (2007):</b> Good quality randomized study of 993 young American women.</p>	<p><i>Centering Pregnancy Care</i>: 10 structured classes, 2 hours each (for a total of 20 hours), in groups of 8 women on average. Classes start at around week 16 of pregnancy. The class end date is not specified.</p> <p>Comparison group: One individual prenatal care visit (for a total of 2 hours spread out throughout the pregnancy).</p>
<p><b>Maimburg et al. (2010):</b> Good quality randomized study of 1,193 Danish women.</p>	<p><i>Ready for Child</i> classes: 3 classes focusing on birth, the child and the parent, totalling 9 hours and run by midwives. Classes start at around week 30 of pregnancy and end around week 35.</p> <p>Comparison group: Individual prenatal care only and optional access to relaxation classes.</p>
<p><b>Robertson et al. (2009):</b> Average quality quasi-experimental study of 49 American women of Hispanic descent.</p>	<p><i>Centering Pregnancy Care</i>: Structured 90-minute classes in groups of 8 to 12, monthly for 4 months and then every 2 weeks for the rest of pregnancy (participation in at least 4 classes). Classes start before week 24. The class end date is not specified.</p> <p>Comparison group: At least 4 individual prenatal care visits.</p>
<p><b>Tanner-Smith et al. (2013a):</b> Good quality quasi-experimental study of 393 American women.</p>	<p><i>Centering Pregnancy Care</i>: Participation in at least one class. The class start and end dates are not specified.</p> <p>Comparison group: Individual prenatal care only.</p>
<p><b>Tanner-Smith et al. (2014):</b> Good quality quasi-experimental study of 6,155 American women.</p>	<p><i>Centering Pregnancy Care</i>: 10 structured 90-minute classes in groups of 8 to 12, monthly for 4 months and then every 2 weeks for the rest of pregnancy. The class start and end dates are not specified.</p> <p>Comparison group: Individual prenatal care only.</p>
<p><b>Trudnak et al. (2013):</b> Good quality historical cohort study of 487 American women of Hispanic descent.</p>	<p><i>Centering Pregnancy Care</i>: 10 structured classes in groups of 8 to 12. The class start and end dates are not specified.</p> <p>Comparison group: Individual prenatal care only.</p>

### 5.5.1 EFFECTS ON HEALTH STATUS

Health status	Finding
<p><b>Intrauterine death</b></p> <p>The proportion of intrauterine deaths is not linked to participation in prenatal classes according to Ickovics et al. (2007), but the Tanner-Smith et al. (2014) study reports a lower proportion in women who did attend classes.</p>	
<p><b>Mean gestational age</b></p> <p>The study by Robertson et al. notes no difference for mean gestational age based on participation in classes for children born after week 37 of pregnancy. Ickovics et al. (2007) draw the same conclusion from their results, noting that the mean gestational age at birth of newborns born to mothers who attended prenatal classes is not different. Conversely, the study by Tanner-Smith et al. (2014) reveals that the gestational age of newborns born to prenatal class participants is on average more advanced by about two days. In addition, the authors report that for children born prematurely, participation in prenatal classes is linked to a longer gestational age by about two weeks.</p>	
<p><b>Premature birth</b></p> <p>Three studies, including two of good quality (Maimburg et al., 2010; Robertson et al., 2009; Trudnak et al., 2013), indicate no difference in relation to the rate of premature births before week 37 of pregnancy. In their good quality study, Ickovics et al. (2014) draw the opposite conclusion, however: the rate of premature births (before week 37 of pregnancy) is significantly lower in women who attended prenatal classes, even when considering only primiparous women (this aspect had been taken into account because premature birth is a risk factor for a subsequent premature birth). They estimate a 33% reduction in risk and observe that the effect is even more beneficial for children born to African-American women compared to women of other ethnicities.</p>	
<p><b>Mean birth weight</b></p> <p>Neither the good quality studies by Ickovics et al. (2007) and Tanner-Smith et al. (2013a) nor the average quality study by Robertson et al. note differences in mean birth weight based on participation in prenatal classes. Conversely, the other good quality study by Tanner-Smith et al. (2014) on a larger and more varied sample (from five Tennessee sites) shows a significantly higher birth weight in children born to mothers who attended classes. In addition, for premature or low-weight infants, participation in classes is linked to an even higher mean birth weight (more than 300 grams) than for other infants (Tanner-Smith et al., 2014).</p>	
<p><b>Low birth weight</b></p> <p>Three good quality studies (Ickovics et al., 2007; Maimburg et al., 2010; Trudnak et al., 2013) looked at the effects of participation in classes on the rate of low birth weight, with none of the studies finding any effect.</p>	
<p><b>Low birth weight for gestational age</b></p> <p>The only study on this indicator does not note any difference in the rate of low weight for gestational age based on participation in prenatal classes (Ickovics et al., 2007).</p>	
<p><b>Blood pH of foetus</b></p> <p>Respiratory problems in a foetus can be identified by analyzing certain blood components (with samples often taken from the umbilical cord). These respiratory problems cause a change in blood gas levels (e.g., O<sub>2</sub> and CO<sub>2</sub>) and possibly alter the blood pH. A single study examined these problems and reports that participation in classes is not linked to a difference in the umbilical blood pH or an excess of base (Maimburg et al., 2010).</p>	

Health status (continued)	Finding
<p><b>Apgar score</b></p> <p>The Apgar score is used from birth to assess a newborn's adaptation to extrauterine life. A total score is assigned after an evaluation of the heart rate, breathing rate, muscle tone, skin colour and reflexes. The good quality study by Maimburg et al. (2010) does not indicate any difference in the Apgar score (score of &lt; 7) at 1 minute or at 5 minutes in relation to participation in prenatal classes by mothers. The same conclusion is noted for the 5-minute Apgar score (score ≥ 9) in the good quality study by Artieta-Pinedo et al. (2010) as well as for the average 5-minute Apgar score in the good quality study by Ickovics et al. (2007).</p>	⊗
<p><b>Admission to neonatal intensive care unit</b></p> <p>According to the study by Ickovics et al. (2007), participation in classes is not linked to a lower incidence of admission to a neonatal intensive care unit.</p>	❓
<p><b>Average length of hospital stay</b></p> <p>Robertson et al. do not note any difference in the length of time an infant stays in hospital after birth as a result of participation in classes.</p>	❓

### 5.5.2 EFFECTS ON DETERMINANTS OF HEALTH

No studies explored the determinants of health of infants during the intrapartum stage.

Table 12 shows the findings on each indicator during the intrapartum stage for children of women in the universal clientele.

**Table 12 Finding on each indicator during intrapartum stage for children of women in universal clientele**

Indicators for health status or determinants of health	Finding
Intrauterine death* Mean gestational age*	⚖
Premature birth* Mean birth weight* Low birth weight* Apgar score*	⊗
Low birth weight for gestational age* Blood pH of foetus* Admission to neonatal intensive care unit* Average length of hospital stay*	❓

Legend: probable effects +, no probable effects ⊗, contradictory effects ⚖, insufficient studies ❓.

\* Is an indicator of health.









## 5.6 Intrapartum stage for children of women in vulnerable clientele

Table 13 shows four studies that specifically discuss the effects of prenatal classes on the intrapartum health of children of women in the vulnerable clientele (little education or low income). None of these studies include fathers.

**Table 13** Description of studies on pregnancy outcomes in children of women in vulnerable clientele

Study authors and characteristics	Prenatal class characteristics
<p><b>Grady and Bloom (2004):</b> Poor quality cohort study of 501 African-American women under age 17.</p>	<p><i>Centering Pregnancy Care:</i> 12 structured classes, 90 minutes each, in groups of 8 to 12. Classes start between weeks 12 and 18 of pregnancy, and end with a postpartum class.</p> <p>2001 comparison group: Adolescent girls who gave birth in the same hospital in 2001, with prenatal care only.</p> <p>1998 comparison group: Adolescent girls who gave birth in the same hospital in 1998, including those who did not receive prenatal care.</p>
<p><b>Klima et al. (2009):</b> Average quality cohort study of 268 low-income African-American women.</p>	<p><i>Centering Pregnancy Care:</i> 10 structured classes, 2 hours each, in groups of 4 to 10 (average of 5.5 female participants per group). Classes start before week 18 of pregnancy. The class end date is not specified.</p> <p>Comparison group: Individual prenatal care only.</p>
<p><b>Picklesimer et al. (2012):</b> Good quality cohort study of 4,083 low-income American women.</p>	<p><i>Centering Pregnancy Care:</i> 10 structured classes, 2 hours each, in groups of 8 to 12. Median participation of 7 classes. The class start and end dates are not specified.</p> <p>Comparison group: Individual prenatal care only.</p>
<p><b>Pitcock (2013):</b> Average quality quasi-experimental study of 70 low-income American women of Hispanic descent living in rural areas.</p>	<p>Group with prenatal classes: One 6-hour class on preparation for childbirth, breastfeeding, child care and contraception. Classes begin at the start of the third trimester. The class end date is not specified.</p> <p>Comparison group: Women who only had prenatal care.</p>

### 5.6.1 EFFECTS ON HEALTH STATUS

Health status	Finding
<p><b>Mean gestational age</b></p> <p>The mean gestational age at birth of newborns is not more advanced as a result of participation in classes, according to the average quality study by Klima et al. However, the good quality study by Picklesimer et al. of ethnically diverse low-income women reveals a mean gestational age at birth that is more advanced for the group that attended prenatal classes. This difference was still present after considering primiparous women only.</p>	
<p><b>Premature births</b></p> <p>Two studies, including one of good quality, reveal that the rate of births occurring before week 37 of pregnancy was significantly lower in women who attended classes, in adolescent girls (Grady and Bloom, 2004) and in ethnically diverse low-income women (Picklesimer et al., 2012). The beneficial effect of participation on the prevention of premature births persisted even when primiparous women were studied exclusively (Picklesimer et al., 2012). For premature births occurring before week 32 of pregnancy, they arrive at the same conclusion as for births before week 37, that is, the rate of premature births is significantly lower in women who attended prenatal classes (Picklesimer et al., 2012). Contrary to these studies, the average quality study by Klima et al. does not observe any difference in the rate of premature births as a result of participation in classes.</p>	
<p><b>Mean birth weight</b></p> <p>No difference in the mean birth weight of babies as a result of participation in classes is noted in the average quality study by Klima et al. In contrast, Picklesimer et al. observe, in their good quality study, a higher mean birth weight in newborns born to mothers who attended classes. This difference was still present after considering primiparous women only.</p>	
<p><b>Low birth weight</b></p> <p>The low quality study by Grady and Bloom reveals that the rate of infants born with low weight (under 2500 g) was lower in mothers who had attended classes. The authors of two other studies, including one of good quality, do not draw the same conclusion for low-income African-American women (Klima et al., 2009), and for women in the study by Picklesimer et al. This absence of any difference remains even when considering the potential risk factor that a previous premature birth may carry.</p>	
<p><b>Admission to neonatal intensive care unit</b></p> <p>The only study on this indicator notes that participation in classes is not linked to admission to a neonatal intensive care unit (Picklesimer et al., 2012).</p>	
<p><b>Average length of hospital stay*</b></p> <p>Pitcock is the only author to note a slightly shorter hospital stay for women who attended prenatal classes (2.39 days on average) compared to women who only received prenatal care (2.77 days on average).</p>	



\* The authors did not specify whether the hospital stay applied to the mother or the infant.





### 5.6.2 EFFECTS ON DETERMINANTS OF HEALTH

No studies examined the determinants of health during the intrapartum stage for children of women in the vulnerable clientele.

Table 14 shows the findings on each indicator during the intrapartum stage for children of women in the vulnerable clientele.

**Table 14 Finding on each indicator during intrapartum stage in children of vulnerable clientele**

Indicators for health status or determinants of health	Finding
Mean gestational age* Premature birth* Mean birth weight* Low birth weight*	
Admission to neonatal intensive care unit* Average length of hospital stay*	

Legend: probable effects , no probable effects , contradictory effects , insufficient studies .

\* Is an indicator of health.

## 5.7 Postnatal stage in universal clientele

Table 15 shows 21 studies that evaluated the effects of prenatal classes on postnatal health in the universal clientele.

**Table 15 Description of studies on postnatal stage in universal clientele**

Study authors and characteristics	Prenatal class characteristics
<b>Andersson et al. (2012):</b> Good quality qualitative study of 8 Swedish men and 20 Swedish women.	<i>Centering Pregnancy Care:</i> 6 to 9 classes, 2 hours each, in groups of 6 to 8. Spouses are welcome to attend. Classes start at around week 12 of pregnancy. The class end date is not specified.
<b>Arcamone (2005):</b> Good quality quasi-experimental study of 158 American women.	Prenatal classes: About 8 hours as one 8-hour class, two 4-hour classes or three weekly classes from 2 to 5 hours each, depending on the mother's preference.  Additional prenatal class time: 8 hours on preparation for childbirth and one class about 2 hours in length on caring for a baby. The class start and end dates are not specified by the authors.  Comparison group: Women who did not attend classes.
<b>Artieta-Pinedo et al. (2013):</b> Good quality cohort study of 614 Spanish women.	Lamaze-type prenatal classes: 8 group classes, 2 hours each (90 minutes of theory and 30 minutes of physical exercises). The class start date is not specified, but classes end around week 40 of pregnancy.  Comparison group: At least 6 prenatal care visits.
<b>Britton (2008):</b> Good quality cohort study of 296 American women.	Prenatal classes: No details provided.  Comparison group: Women who did not attend classes.
<b>Fabian et al. (2005):</b> Good quality cohort study of 1,197 Swedish pregnant women.	Group with prenatal classes: 1 to 11 classes on preparation for childbirth, breastfeeding and parenthood. The class start and end dates are not specified.  Comparison group: Women who did not attend classes.
<b>Fletcher et al. (2004):</b> Average quality quasi-experimental study of 412 Australian men.	Prenatal classes: No details provided. Group 1: Participation in classes and birth of child in past year.  Group 2: Participation in classes and birth of child in near future. The class start and end dates are not specified.
<b>Ickovics et al. (2007):</b> Good quality randomized study of 993 young American women.	<i>Centering Pregnancy Care:</i> 10 structured classes, 2 hours each (for a total of 20 hours), in groups of 8 women on average. Classes start at around week 16 of pregnancy. The class end date is not specified.  Comparison group: One individual prenatal care visit (for a total of 2 hours spread out throughout the pregnancy).
<b>Jakubiec et al. (2014):</b> Poor quality quasi-experimental study of 70 Polish women.	Prenatal classes: No details provided.  Comparison group: No details as to whether all received prenatal care.
<b>Kervin et al. (2010):</b> Average quality cross-sectional study of 164 Australian women.	Prenatal classes: Classes on preparation for childbirth, breastfeeding and parenthood. The class start and end dates are not specified.  Comparison group: Women who did not attend classes.

**Table 15 Description of studies on postnatal stage in universal clientele (continued)**

Study authors and characteristics	Prenatal class characteristics
<b>Little et al. (2013):</b> Average quality cohort study of 32 American women of Japanese descent.	Japanese adaptation of <i>Centering Pregnancy Care</i> : 5 monthly classes, then 3 classes every 2 weeks. The class start and end dates are not specified.
<b>Maimburg et al. (2010):</b> Good quality randomized study of 1,193 Danish women.	<i>Ready for Child</i> classes: 3 classes focusing on birth, the child and the parent, totalling 9 hours and run by midwives. Classes start at around week 30 of pregnancy and end around week 35.  Comparison group: Individual prenatal care only and optional access to relaxation classes.
<b>Martinez-Galiano and Gado-Rodriguez (2014):</b> Good quality cohort study of 520 Spanish women.	Prenatal classes: No details provided. Comparison group: No details as to whether all received prenatal care.
<b>Robertson et al. (2009):</b> Average quality quasi-experimental study of 49 American women of Hispanic descent.	<i>Centering Pregnancy Care</i> : Structured 90-minute classes in groups of 8 to 12, monthly for 4 months and then every 2 weeks for the rest of pregnancy (participation in at least 4 classes). Classes start before week 24. The class end date is not specified.  Comparison group: At least 4 individual prenatal care visits.
<b>Roig et al. (2010):</b> Good quality case control study of 248 Spanish women.	Prenatal classes: No details provided. Comparison group: Women who did not attend classes.
<b>Rossiter and Evers (2013):</b> Average quality case control study of 546 Canadian children aged 3 months.	Prenatal classes: No details provided. Comparison group: Children whose mothers did not attend classes.
<b>Sercekus and Mete (2010):</b> Good quality quasi-experimental study of 118 Turkish women.	Group classes: 7 classes in groups of 6 to 10, 2 hours each once a week, with time set aside for discussion, interaction and questions. Classes start at week 26 of pregnancy. The class end date is not specified.  Comparison group: Women who only had prenatal care.
<b>Scott et al. (2006):</b> Good quality cohort study of 586 Australian women.	Prenatal classes: No details provided. Comparison group: Women who did not attend classes.
<b>Stoll and Hall (2012):</b> Average quality case control study of 624 Canadian women.	Prenatal classes: No details provided. Comparison group: Women who did not attend prenatal classes. It is unclear whether or not they all received prenatal care.
<b>Tanner-Smith et al. (2013b):</b> Good quality retrospective quasi-experimental study of 704 American women.	<i>Centering Pregnancy Care</i> : 10 structured classes (90 to 120 minutes each) in groups of 8 to 12. The class start and end dates are not specified.  Comparison group: Individual prenatal care only.









**Table 15 Description of studies on postnatal stage in universal clientele (continued)**

Study authors and characteristics	Prenatal class characteristics
<b>Trudnak et al. (2013):</b> Good quality historical cohort study of 487 American women of Hispanic descent.	<i>Centering Pregnancy Care:</i> 10 structured classes in groups of 8 to 12. The class start and end dates are not specified.  Comparison group: Individual prenatal care only.
<b>Waldenstrom et al. (2004):</b> Average quality case control study of 2,541 Swedish women.	Prenatal classes: No details provided.  Comparison group: Women who did not attend prenatal classes.

**5.7.1 EFFECTS ON HEALTH STATUS**

Health status	Finding
<p><b>Adaptation to parenthood (mother)</b></p> <p>In his good quality study, Arcamone does not note better adaptation to parenthood by mothers in terms of their confidence in their duties, their satisfaction with motherhood or their relationships with their spouses or partners after having attended classes. The good quality study by Sercekus finds that participation in classes does not influence postnatal adaptation in mothers assessed at six weeks postpartum, measured on a standardized scale that evaluates the mother's relationship with the spouse, perception of her spouse's involvement in caring for the baby, gratification following the birth experience, satisfaction with life, confidence in her maternal skills, satisfaction with motherhood and infant care and support from family and friends. Lastly, the authors of two other good quality studies note that a number of mothers would have liked to have been better prepared for parenthood after the classes and did not feel ready for the transition to parenthood (Andersson et al., 2012; Fabian et al., 2005).</p>	⊗
<p><b>Adaptation to parenthood (father)</b></p> <p>Two studies, including one of good quality, show that fathers who attended classes do not feel well-prepared for parenthood (Andersson et al., 2012), changes in their lifestyle or interpersonal relationships after the birth of their child (Fletcher et al., 2004).</p>	⊗
<p><b>Assessment of birth experience</b></p> <p>According to three good quality studies, participation in prenatal classes does not appear to have a positive effect on the assessment of the birth experience. In fact, regardless of whether the assessment is given two days after birth (Artieta-Pinedo et al., 2010), six weeks after (Maimburg et al., 2010) or even two months after (Fabian et al., 2005), there is no difference between the groups. In addition, according to Waldenstrom et al., not attending classes is linked to lower risk of a negative birth experience.</p>	⊗
<p><b>Mental health</b></p> <p>Three studies measured the effects of participation in classes on postnatal mental health. In their poor quality study, Jakubiec et al. note that the signs of psychological distress (measured through a questionnaire) are less significant in women who attended classes, particularly for aspects related to sleep issues due to worry, confidence in overcoming challenges and mood in daily activities. Robertson et al. note in their average quality study that there is no difference in the symptoms of depression measured at six weeks postpartum between women who attended classes and those who did not. According to the good quality study by Britton, the level of anxiety one month after birth is not linked to a lack of participation in prenatal classes.</p>	⚖

### 5.7.2 EFFECTS ON DETERMINANTS OF HEALTH




Determinants related to individual characteristics	Finding
<p><b>Knowledge about postnatal health</b></p> <p>The only average quality study on knowledge about postnatal health (e.g., caring for a baby and breastfeeding) shows no effect of participation in classes for Hispanic women (Robertson et al., 2009).</p>	
<p><b>Intention to breastfeed</b></p> <p>The intention to breastfeed during the first year of the child's life in women who attended classes in the study by Kevin is more frequent than in women who did not attend classes.</p>	
<p><b>Parenting skills</b></p> <p>According to the findings of the good quality study by Fabian, participation in classes has no effect on feelings of competence as a parent, as reported by mothers.</p>	
<p><b>Self-esteem</b></p> <p>Robertson et al. point out that participation in classes is not linked to improved self-esteem in women who attended classes, between the prenatal and postnatal stages, compared to those in the comparison group.</p>	
<p><b>Confidence in ability to provide care</b></p> <p>According to the good quality study by Andersson, a number of mothers and fathers who attended prenatal classes in the past year would have liked to have been better prepared for caring for a baby. Ickovics et al. note in their good quality study that participation in classes has no effect on the feeling of confidence in caring for a baby.</p>	
<p><b>Perception of pain</b></p> <p>Arcamone observes that participation in classes is linked to lower self-reported perineal pain at two weeks postpartum, compared to women who did not attend classes. The author explains that this may be as a result of mothers using information they received on relaxation techniques and causes of perineal trauma. Two other studies, including one of good quality, notes no difference as a result of participation in classes on memories of pain during labour two months after childbirth (Fabian et al., 2005) or during childbirth (Jakubiec et al., 2014).</p>	
<p><b>Skin-to-skin contact</b></p> <p>Participation in classes is linked to considerably higher use of skin-to-skin contact in the hour following childbirth according to the good quality study by Martinez-Galiano and Gado-Rodriguez.</p>	
<p><b>Breastfeeding initiation</b></p> <p>Three studies, including one of good quality (Artieta-Pinedo et al., 2010; Kervin et al., 2010; Stoll and Hall, 2012), show no link between participation in classes and the rate of breastfeeding initiation. However, three other studies, including two of good quality, note beneficial effects. According to Ickovics et al., women who attended classes initiate breastfeeding more frequently than those who did not. In addition, women who attended five or more classes were more inclined to breastfeed their newborn (exclusively or partially) on discharge from hospital than those who did not (Tanner-Smith et al., 2013b). Lastly, women who did not attend classes are more likely to use infant formula in the days following birth (Rossiter and Evers, 2013).</p>	




Determinants related to individual characteristics (continued)	Finding
<p><b>Breastfeeding in the first weeks</b></p> <p>A number of studies, including three of good quality, note no effects of participation in classes on the rate of breastfeeding in the first two weeks (Kervin et al., 2010; Scott et al., 2006), first four weeks (Scott et al., 2006) or first six weeks after birth (Robertson et al., 2009; Tanner-Smith et al., 2013b; Trudnak et al., 2013).</p>	⊗
<p><b>Breastfeeding at 3 months</b></p> <p>Two good quality studies, namely the ones by Artieta-Pinedo et al. and by Scott et al., indicate that participation in classes was linked to a higher rate of breastfeeding three months after birth. The rate was higher with participation in more prenatal classes (Artieta-Pinedo et al., 2013).</p>	+
<p><b>Breastfeeding at 6 months and after 6 months</b></p> <p>Three good quality studies did not observe a link between participation in classes and the rate of breastfeeding at six months or after six months (Artieta-Pinedo et al., 2013; Fabian et al., 2005; Scott et al., 2006).</p>	⊗
<p><b>Breastfeeding duration</b></p> <p>According to two good quality studies, breastfeeding duration in the first six months is not influenced by participation in prenatal classes (Fabian et al., 2005; Scott et al., 2006).</p>	⊗
<p><b>Breastfeeding cessation</b></p> <p>Roig et al. note in their good quality study that participation in classes is linked to a lower rate of exclusive or partial breastfeeding cessation in the six months after birth. The authors conclude that prenatal classes have a protective effect in relation to breastfeeding cessation.</p>	⓪
Determinants related to living environments	Finding
<p><b>Support between future parents</b></p> <p>Fabian et al. point out that, two months after birth, more than one-third of women who attended classes met again with other class participants; one year later, the rate increased to 58%.</p>	⓪



Table 16 shows the findings on each indicator during the postnatal stage in the universal clientele.

**Table 16 Finding on each indicator during postnatal stage in universal clientele**

Indicators for health status or determinants of health	Finding
Breastfeeding at 3 months	+
Mental health* Perception of pain Breastfeeding initiation	
Adaptation to parenthood (mother and father)* Assessment of birth experience* Confidence in ability to provide care Breastfeeding in the first weeks Breastfeeding at 6 months and after 6 months Breastfeeding duration	
Knowledge about postnatal health Intention to breastfeed Parenting skills Self-esteem Skin-to-skin contact Breastfeeding cessation Support between future parents	

Legend: probable effects +, no probable effects , contradictory effects , insufficient studies .

\* Is an indicator of health.


## 5.8 Postnatal stage in vulnerable clientele

Table 17 shows 5 studies that evaluated the effects of prenatal classes on postnatal health in the vulnerable clientele. None of these studies include fathers.

**Table 17 Description of studies on postnatal stage in vulnerable clientele**

Study authors and characteristics	Prenatal class characteristics
<b>Duggan (2012):</b> Average quality qualitative study of 27 vulnerable American women.	<i>Centering Pregnancy Care:</i> 10 classes, each 90 to 120 minutes. Classes start between weeks 12 and 16 of pregnancy. The class end date is not specified.  Comparison group: Women who only had prenatal care.
<b>Grady and Bloom (2004):</b> Poor quality cohort study of 501 African-American women under age 17.	<i>Centering Pregnancy Care:</i> 12 structured classes, 90 minutes each, in groups of 8 to 12. Classes start between weeks 12 and 18 of pregnancy, and end with a postpartum class.  2001 comparison group: Adolescent girls who gave birth in the same hospital in 2001, with prenatal care only.  1998 comparison group: Adolescent girls who gave birth in the same hospital in 1998, including those who did not receive prenatal care.
<b>Klima et al. (2009):</b> Average quality cohort study of 268 low-income African-American women.	<i>Centering Pregnancy Care:</i> 10 structured classes, 2 hours each, in groups of 4 to 10 (average of 5.5 female participants per group). Classes start before week 18 of pregnancy. The class end date is not specified.  Comparison group: Individual prenatal care only.
<b>Picklesimer et al. (2012):</b> Good quality cohort study of 4,083 ethnically diverse low-income American women.	<i>Centering Pregnancy Care:</i> 10 structured classes, 2 hours each, in groups of 8 to 12. The class start and end dates are not specified.  Comparison group: Individual prenatal care only.
<b>Pitcock (2013):</b> Average quality quasi-experimental study of 70 low-income American women of Hispanic descent living in rural areas.	Group with prenatal classes: One 6-hour class on preparation for childbirth, breastfeeding, child care and contraception. Classes begin at the start of the third trimester. The class end date is not specified.  Comparison group: Women who only had prenatal care.

### 5.8.1 EFFECTS ON HEALTH STATUS

Indicators linked to health status	Finding
<p><b>Adaptation to parenthood – Mothers</b></p> <p>The study by Duggan reveals that mothers say they are surprised by not being as prepared as they thought they would be despite having attended prenatal classes. Parenthood is not what they thought it would be. Many of them feel more worried about caring for the infant in the weeks following birth in spite of having felt prepared during pregnancy.</p>	

### 5.8.2 EFFECTS ON DETERMINANTS OF HEALTH

Determinants related to individual characteristics	Finding
<p><b>Intention to breastfeed</b></p> <p>Pitcock did not observe any difference in the intention to exclusively breastfeed in low-income Hispanic women who attended prenatal classes.</p>	⊗
<p><b>Sense of confidence</b></p> <p>Grady et al. show that nearly all women who attended classes said they were prepared to care for the unborn child.</p>	⊗
<p><b>Breastfeeding initiation</b></p> <p>Three poor or average quality studies note that considerably more women who attended classes initiate breastfeeding (Grady and Bloom, 2004; Klima et al., 2009; Pitcock, 2013). By comparison, the good quality study by Picklesimer et al. of ethnically diverse low-income women does not reach the same conclusion: the rate of breastfeeding initiation does not differ as a result of participation in classes.</p>	⚖
<p><b>Having a physician that follows the infant's progress</b></p> <p>Of the adolescent mothers in the study by Grady et al., those who attended classes are more likely than other mothers to have a physician for their child at the time of admission to hospital.</p>	⊗

Table 18 shows the findings on each indicator during the postnatal stage in the vulnerable clientele.

**Table 18 Finding on each indicator during postnatal stage in vulnerable clientele**

Indicators for health status or determinants of health	Finding
Breastfeeding initiation	⚖
Adaptation to parenthood* Intention to breastfeed Sense of confidence Having a physician that follows the infant's progress	⊗

Legend: probable effects +, no probable effects ⊗, contradictory effects ⚖, insufficient studies ⊕.

\* Is an indicator of health.



## 6 Emerging conditions that may increase the effects of prenatal classes

This section presents the conditions that may increase the effects of group prenatal classes. To identify these conditions, we again examined the studies from the bibliographic research. The studies we selected show variations in effects according to the presence or absence of certain conditions. Knowledge summaries and expert consensus published since 2004 exploring the conditions complete the list of documents analyzed.

Five conditions emerged, although each is supported by few studies. They are therefore referred to as emerging conditions. They should be considered as avenues worth exploring to determine whether there is alignment between the conditions and the local or regional offer of group prenatal classes.

### **First condition: Adapt content based on needs of different clientele**

A panel of British experts looked at perinatal education programs. They note that future parents share many of the same needs, but that some groups also have specific needs. For example, young parents are more involved in interactive prenatal programs offered to young people with similar social characteristics. Similarly, when classes are designed to meet the needs of fathers, those men become more involved and benefit more from the classes. The panel of experts also suggests taking into account participants' cultural characteristics, that is, providing information that is consistent with their beliefs and norms. Lastly, the panel proposes a framework for professionals who want to offer local education programs on preparation for pregnancy, childbirth and parenthood to future parents. Six key themes are included, based on which participants can choose topics that interest them given their needs. These are foetal development, changes experienced as a future mother and as a couple, the well-being of the future parents, childbirth, knowing how to care for a baby and support resources (Billingham, 2011).

### **Second condition: Offer multiple classes**

One study documents the link between the number of classes and the effects. The cohort study by Fabian et al. (2005) of 1,197 Swedish primiparous women reveals that the proportion of women who feel that prenatal classes are useful to them in their new roles as parents is three times higher for those who attended six or more classes than those who attended just one class. More specifically, the classes are viewed as being useful when it comes to preparing for childbirth when women attend at least three classes. To be viewed as being useful in fostering a smooth transition to parenthood, at least four classes should be attended. Lastly, when women attend five or more classes, they have a greater chance of staying in touch with the other participants one year after their child's birth.

### **Third condition: Lower barriers to participation by women**

Fabian et al. (2004) studied the characteristics of Swedish women who did not attend group prenatal classes. In their cohort study of 2,546 women, 93% of primiparous women attended classes, whereas 81% of multiparous women did not. What characterizes (primiparous and multiparous) women who did not attend classes is speaking a language other than the country's official language, having little education, having an unplanned pregnancy and having negative expectations of childbirth. A number of other factors predict non-participation by primiparous women: being unemployed, smoking during pregnancy, considering giving the child up for adoption, having had fewer prenatal care visits and having negative expectations of parenthood. The most frequently cited reason for not attending classes by primiparous women is lack of interest and the timing of classes.

For multiparous women, it is having attended classes during a previous pregnancy. Additional factors for multiparous women are being over 35 years of age and presenting with depressive symptoms. The authors suggest placing particular attention on reaching individuals who are in vulnerable situations and properly adapting classes to their needs. The findings in the cohort study by Artieta-Pinedo et al. (2013) follow along the same lines. Future mothers who attend more classes (five or more, compared to one to four) are much older, more educated, better off financially and born in the country.

The cohort study by Artieta-Pinedo et al. (2013) shows that women who attend more classes get the most out of them. The authors explored the effectiveness of Lamaze-type prenatal classes (two hours a week for eight weeks) on breastfeeding among women based on the number of classes (none, one to four, or five or more). Their results show that compared to women who attended five or more classes, women who did not attend classes and those who attended fewer than four classes are more likely to stop (exclusive or mixed) breastfeeding in the first month. These results highlight the importance of lowering the barriers to access before the start of the program and during the program to maximize participation.

#### **Fourth condition: Add specific topics and approaches**

A number of studies assess the effects of adding a specific component to the core curriculum of group prenatal classes.

The randomized study by Simpson et al. (2010) explores the effects of adding a 40-minute education component on the risks and benefits of induced labour. The results show that, when comparing women in the group who attended classes with an additional component on induction, far fewer of these women opted for induction than women in the group who did not attend. Most female participants also say that this specific content was influential.

The randomized study by Svensson et al. (2009) compares the effects of an additional component on parenthood. The traditional program consists of seven two-hour classes, whereas the enhanced program called "Having a Baby" consists of seven two-hour classes plus one other class six weeks after birth. The enhanced program includes parenting activities throughout the classes, testimonials from new parents during one of the classes, a demonstration on how to give a newborn a bath, and a proactive approach to learning based on problem-solving and experimentation related to the challenges of parenting. The results show that women who participated in the enhanced program feel more capable as parents and have more knowledge about parenting, eight weeks after their child's birth, than those who participated in the regular program. The author concludes that even if focus is placed on parenting to better meet the needs of future parents at the expense of information on labour and childbirth, the pregnancy outcomes are not significantly different between the groups.

Another Australian randomized study, namely the one by Matthey et al. (2004), assesses the effects of adding a class focused specifically on reducing distress after birth. Three groups were created. The first control group attended six two-hour weekly classes on preparing for parenthood, which covered the physical aspects of pregnancy and childbirth as well as breastfeeding and postnatal depression. The second control group attended the same classes plus an additional class on the importance of parent-child play and received recall information in the mail after the classes and after birth. The third group, which was experimental, attended the same six classes as the two control groups, received recall information in the mail like the second control group, and attended a special class on distress. This special class discussed awareness of the other partner's psychosocial concerns and aimed to develop problem-solving strategies. The results show that this additional component has beneficial effects on mood, feelings of competence and satisfaction with the division

of tasks between spouses at six weeks, but only for women who had low self-esteem when the intervention began. The partners of these women were also more aware of the way in which their significant others experienced the transition to parenthood, compared to the partners of women in the two control groups. No effect was noted at six months after birth.

Ngai et al. (2009) used a pre-post quasi-experimental approach in two Hong Kong hospitals to assess the effects of adding a psychoeducational component based on the Rosenbaum theory called "Learned Resourcefulness" (Rosenblum, 1990). The approach involves a repertoire of cognitive and behavioural skills to regulate emotions and negative thoughts that can interfere with the target behaviour. The additional three-hour component (one hour added to traditional prenatal classes, three times) aims to strengthen problem-solving and decision-making skills, develop a greater sense of self-efficacy and increase control over emotions or negative thoughts (self-control). The purpose of the study was to assess the effects of this program on three measures, that is, self-control, feelings of competence as a parent and depressive symptoms. The specific analyses for each measure show program effects on self-control at six weeks after birth but not at six months, and observe a reduction in depressive symptoms at six months after childbirth, compared to women who attended traditional classes only. However, no difference was noted for feelings of competence as a parent.

Ip et al. (2009) use a randomized approach to measure the effects of adding a component on self-efficacy— Bandura's social learning theory (1977) —to two 90-minute classes between weeks 33 and 35 of pregnancy for women living in Hong Kong. Most women, in the control and experimental groups, also attended prenatal education classes ranging from one to six sessions. The main elements of the additional component are the course of birth from a biophysical standpoint and strategies for managing discomfort during birth in connection with self-efficacy and learning strategies, such as relaxation, breathing, cognitive restructuring of pain and distraction. The authors note that this component is effective in increasing women's confidence in their abilities to manage the birth and in reducing the perception of pain and anxiety during the first two stages of labour. No difference was noted for the final stage of labour.

#### **Fifth condition: Include adult learning principles**

Meedya et al. (2014) use a quasi-experimental study of Australian primiparous women to compare the effects of an intervention on breastfeeding consisting of three 90-minute group classes starting in the second trimester, activities to do at home and two phone consultations on breastfeeding after childbirth. This program, called the "Milky Way," relies on adult learning principles through an interactive, multimodal approach. The content follows the Ten Steps to Successful Breastfeeding established by WHO in "Baby-Friendly" hospitals, including the benefits of breastfeeding, skin-to-skin contact, attachment, breastfeeding positions, indicators of fullness and so on. The authors also added content to foster the feeling of self-efficacy in mothers. The purpose of these classes is to encourage mothers to breastfeed and to increase self-efficacy, visualization, looking at breastfeeding photos and role playing. During this intervention, women are encouraged to seek social support from people close to them. The control group received traditional care only. The authors noted that participation in the specific component on breastfeeding with the adult learning approach was linked to a higher rate of breastfeeding at one month, four months and six months, and a rate of exclusive breastfeeding at six months.

In a randomized study of Canadian primiparous women, Noel-Weiss et al. (2006) assess the effects of a group class two and a half hours long on breastfeeding that includes a hands-on component (with a doll). The women in the control group did not attend this class. The women in the two groups could have attended the prenatal classes in addition to receiving traditional prenatal care. This class is based on adult learning principles and the self-efficacy theory. The authors note that women who

took the additional workshop on breastfeeding were more inclined to breastfeed exclusively eight weeks after birth and demonstrated greater self-efficacy in relation to breastfeeding.



## 7 Findings and recommendations

This final section explains the key findings stemming from the analysis of effects and emerging conditions. Recommendations for service offerings in Québec will also be presented. Table 19 shows the main results for the universal clientele. The current state of knowledge does not allow for confident assertions regarding findings for the vulnerable clientele. An appended table shows all the results for both clienteles.

**Table 19 Indicators with a probable positive effect or with no probable effect for the universal clientele**

Indicators for health status or determinants of health	Finding
<b>Prenatal stage</b>	
Knowledge about prenatal and intrapartum health (mother)	+
Confidence about what happens next (mother and father)	+
Seeking prenatal care as recommended	+
Support between future parents in prenatal stage (mother and father)	+
<b>Intrapartum stage</b>	
Emergency caesarean section	⊗
Perineal trauma*	⊗
Premature birth*	⊗
Mean birth weight*	⊗
Low birth weight*	⊗
Apgar score*	⊗
Duration of stages of labour	⊗
Induction of labour	⊗
Use of labour accelerator	⊗
Use of pharmacological means to manage pain	⊗
Use of non-pharmacological means to manage pain	⊗
Vaginal birth with or without instrumental assistance	⊗
<b>Postnatal stage</b>	
Adaptation to parenthood* (mother/father)	⊗
Assessment of birth experience*	⊗
Confidence in ability to provide care	⊗
Breastfeeding in the first weeks	⊗
Breastfeeding at 3 months	+
Breastfeeding at 6 months and after 6 months	⊗
Breastfeeding duration	⊗

Legend: probable effects +, no probable effects ⊗.

\* Is an indicator of health.

**FIRST FINDING: Group prenatal classes can inform, increase confidence and provide a greater sense of emotional support during pregnancy.**

The effects analysis shows that participation in group prenatal classes may be linked, during pregnancy, to better knowledge of prenatal and intrapartum health (of the future mothers), increased confidence in what happens next (future mothers and fathers) and a greater sense of emotional support between partners (future mothers and fathers).

According to the descriptions of prenatal classes provided in the analyzed studies, the classes are organized with a view to enhancing knowledge and increasing self-confidence, and encourage discussions between partners and with other future parents (Andersson et al., 2012; Andersson et al., 2013; Artieta-Pinedo et al., 2010; Grady et Bloom, 2004; Ickovics et al., 2007; Klima et al., 2009; Maimburg et al., 2010; Picklesimer et al., 2012; Robertson et al., 2009; Tanner-Smith et al., 2013a; Tanner-Smith et al., 2013b; Tanner-Smith et al., 2014; Trudnak et al., 2013). Those teaching the classes help future parents feel more confident through the new knowledge they impart and through encouragement to get involved in making pregnancy- and birth-related decisions. The sense of confidence felt during pregnancy, however, does not appear to extend to confidence in caring for a baby measured after birth. The time elapsed between classes and the birth of the child, and possibly the sparse class content dedicated to baby care, may in part explain this result.

The probable effects noted on better knowledge, confidence and perception of support are consistent with observations made during consultations with the Commissaire à la santé et au bien-être (Commissaire à la santé et au bien-être, 2011) and in the CSSS de l'Ouest-de-l'Île (Beudet and Legault, 2015) or CSSS de la Capitale-Nationale (Langlois, 2014) reports. These effects are also in line with the role that prenatal classes are expected to play in the strategy to implement the *Politique de périnatalité du Québec* (Ministère de la Santé et des Services sociaux, 2010).

**Recommendation 1**

Continue to offer group prenatal classes to all future parents in Québec, as indicated in the province's perinatal policy, *Politique de périnatalité 2008-2018*.

**SECOND FINDING: Group prenatal classes can influence the determinants of health if the mother has control over them.**

The effects analysis reveals that group prenatal classes may foster the adoption of certain favourable behaviours or choices, including greater follow-through with the recommended prenatal care and breastfeeding at three months, two major determinants of health.

The effect on determinants seems to depend on the level of control over the situation. Whether or not a pregnant woman follows through with the recommended prenatal care depends mainly on her level of control. The probable effects on breastfeeding at three months only, and not at six months or more, may be due to the many factors influencing whether or not breastfeeding will be continued over several months (Li et al., 2014a).

Furthermore, when a pregnant woman and her partner have less control, no effect of participation is observed. This is true, for example, for the duration of the stages of labour, the induction of labour and the use of a labour accelerator or (pharmacological or non-pharmacological) means to manage pain, or the type of delivery (emergency caesarean section, vaginal birth with or without instruments). If the situation involves multiple people or health care setting constraints, or follows unforeseeable events, it is unlikely that the information or support received during prenatal classes can positively influence choices or behaviours.

These findings are reflected in the study of future parents conducted in Montréal. Those parents say they feel equipped after prenatal classes to talk to hospital staff and make certain decisions, such as skin-to-skin contact and initiating breastfeeding. However, some have had difficulties maintaining or expressing choices that were against some hospital practices or routines. Women said they were encouraged to adjust their requests for an epidural based on the physician's availability (Beaudet and Legault 2015).

### **Recommendation 2**

Place a focus during group prenatal classes on behaviours and choices over which parents have control, rather than on situations that involve other individuals or unforeseeable events.

### **THIRD FINDING: Group prenatal classes cannot alone influence health.**

The analysis suggests that participation in classes does not have an effect on the health of the mother, father or child. The authors of various selected studies note no effect on perineal trauma during childbirth, assessment of the birth experience or a couple's adaptation to parenthood. No effect was observed in relation to premature birth, mean birth weight, low birth weight or the Apgar score.

Is the conclusion then that group prenatal classes have no effect on health? In his literature review, Koehn raises the wide variability in topics covered, methods and procedures in the various prenatal class models (Koehn, 2002). This would at least in part explain the lack of consensus on the effects. The limited number of good quality studies, the discrepancy between the content covered and the needs of future parents, and the small number of classes could also explain the absence of effects. Further studies therefore need to be conducted before any assertions can be made regarding the lack of effect of prenatal classes on health.

### **Recommendation 3**

Review the objectives of prenatal classes to target the determinants of health, that is, knowledge, confidence in their abilities and social support.

### **FOURTH FINDING: Prenatal classes that meet certain conditions have a greater chance of leading to positive effects.**

Five conditions emerging from the literature can increase the effects of prenatal classes, and are avenues for enhancing prenatal classes in a Québec context. These conditions are:

1. Adapt content based on the needs of different clientele;
2. Offer multiple classes;
3. Lower barriers to participation;
4. Add specific topics and approaches;
5. Include adult learning principles.

### **Recommendation 4**

Draw on the five conditions that have a greater chance of leading to positive effects to establish implementation rules for group prenatal classes in Québec.



## 8 Conclusion

The analysis of the effects of group prenatal classes highlights their potential for health promotion and reaffirms their usefulness as part of the service offering in Québec, as specified in the province's *Politique de périnatalité 2008-2018*.

Further studies are required to understand the effects of group classes on health, on women in vulnerable situations and on fathers. There is also a need for better understanding of how the effects, if present, can be explained by the presence of certain conditions.



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## **Appendix 1**

### **Consultation on the provision of prenatal classes as a service in Québec**





## Consultation on the provision of prenatal classes as a service in Québec

In fall 2014, we consulted perinatal care respondents from 18 Québec health and social services agencies. This consultation provided a brief overview of prenatal classes offered as a service to pregnant women and their partners. The key findings are presented below.

### Who provides the service to the universal clientele?

Health and social services centres (CSSSs) are mainly the ones to offer prenatal classes to the universal clientele. Community or private agencies provide part of this service offering. Table 20 below shows this distribution by region across Québec.

**Table 20** Distribution of prenatal classes offered as a service by CSSSs and community or private agencies by region across Québec

Region	CSSS	Community agency	Private or other agency
Bas-Saint-Laurent	100	5	0
Saguenay–Lac-Jean	83	17	0
Québec	100	10	20
Mauricie–Centre-du-Québec	75	20	5
Estrie	15	40	45
Montréal	85	10	5
Outaouais	100	5	0
Abitibi–Témiscamingue	100	100	1
Côte-Nord	100	0	0
Nord-du-Québec	No response	No response	No response
Gaspésie	90	10	0
Chaudière–Appalaches	100	No response	No response
Laval	50	5	45
Lanaudière	60	20	20
Laurentides	42	14	42
Montérégie	80	20	20
Nunavik	100	No response	0
Baie-James	No response	No response	No response

### What clientele do prenatal classes target?

Most health and social services centres offer prenatal classes to universal clienteles and those who meet the SIPPE criteria. For allophone and English-speaking clienteles, the percentage varies from one region to the next. Table 21 shows the distribution of this service offering by type of clientele.

**Table 21 Clientele targeted by CSSSs by region across Québec**

Region	Universal	SIPPE	Allophone/ English-speaking*
Bas-Saint-Laurent	100	100	0
Saguenay–Lac-Jean	100	83	
Québec	100	100	100
Mauricie–Centre-du-Québec	100	100	0
Estrie	14	100	Not applicable
Montréal	90	100	100
Outaouais	100	100	100
Abitibi–Témiscamingue	100	100	20
Côte-Nord	100	100	Case by case
Nord-du-Québec			
Gaspésie	75	Close to 100	50
Chaudière–Appalaches	100	100	
Laval	100	0	
Lanaudière		100	
Laurentides	42	100	42
Montérégie	80	60	10
Nunavik			
Baie-James	100	100	

\* Universal or SIPPE.

### How are prenatal classes offered?

The number of classes offered in the various regions ranges from two to eight. They typically begin in the second trimester (8 out of 15 regions) or in the third trimester (5 out of 15 regions). In two regions, classes can begin in the second or third trimester. They are organized mainly in the evenings (14 out of 15 regions) and on weekends (6 out of 15 regions). Classes offered during the day are mainly for women who meet the SIPPE criteria. Table 22 shows these details.

**Table 22 Prenatal class arrangements by region across Québec**

Region	Number of classes	Duration of each class	Day	Evening	Weekend	Variable schedule
Bas-Saint-Laurent	6 to 8	2 hours				✓
Saguenay–Lac-Jean	6	2 hours	✓	✓		
Québec	4	2 to 3 hours		✓	✓	
Mauricie–Centre-du-Québec	6.5	2 hours		✓	✓	
Estrie	<ul style="list-style-type: none"> <li>▪ 2 classes on baby's arrival and breastfeeding</li> <li>▪ 6 regular classes</li> </ul>	2.5 hours per class on baby's arrival and breastfeeding. Variable duration depending on format: 6 classes 2.5 hours each, or 2 to 4 intensive classes 3 hours each.	✓	✓	✓	
Montréal	5 (4 to 7)	1.5 to 3 hours	✓	✓		
Outaouais	5.5 (5 to 6)	1.5 to 2 hours		✓		
Abitibi–Témiscamingue	4 to 6	2 to 2.5 hours	✓	✓		
Côte-Nord	5	2 to 3 hours		✓		✓
Nord-du-Québec						
Gaspésie	Highly variable	Highly variable		✓		
Chaudière–Appalaches	3 or 4	2 hours		✓		
Laval	No response	No response				
Lanaudière	4 to 7	2 hours		✓		
Laurentides	5 to 7	2 to 3 hours in the evening and 5.5 hours on the weekend	✓	✓	✓	
Montérégie	2 to 4 (44%) or 5 to 6 (25%)	2 hours	✓	✓		
Nunavik						
Baie-James	4 to 7	1.5 to 2 hours		✓	✓	

\* Based on 2012 profile.



## **Appendix 2**

**Finding on each indicator for all three stages  
in universal and vulnerable clienteles**



Table 23 shows the finding on each indicator for all three stages in both the universal and the vulnerable clientele.

**Table 23 Finding on each indicator for all three stages in universal and vulnerable clienteles**

Indicators for health* or determinants of health	Universal clientele	Vulnerable clientele
<b>Prenatal stage</b>		
Recommended gestational weight gain*	⚖	
Distress and anxiety*	⚖	
Prenatal adaptation*	?	
Knowledge about prenatal and intrapartum health (mother)	+	?
Knowledge about prenatal and intrapartum health (father)	?	
Sense of control over the health of the foetus	?	
Confidence about what happens next (mother and father)	+	?
Seeking prenatal care as recommended	+	?
Adoption of a healthy lifestyle during pregnancy	?	
Support and involvement by spouse	⚖	
Support between future parents in prenatal stage (mother and father)	+	?
Support from professionals	?	
<b>Intrapartum stage</b>		
Caesarean section in general	⚖	?
Planned caesarean section	⚖	
Emergency caesarean section	⊗	
Perineal trauma*	⊗	
Intrauterine death*	⚖	
Mean gestational age*	⚖	⚖
Premature birth*	⊗	⚖
Mean birth weight*	⊗	⚖
Low birth weight*	⊗	⚖
Low birth weight for gestational age*	?	
Apgar score*	⊗	
Blood pH of foetus*	?	
Admission to intensive care unit*	?	?
Average length of hospital stay*	?	?
Intention to use pharmacological means to manage pain	?	
Intention to have a caesarean section for non-medical reasons	?	
Expectation to have obstetrical procedures performed	?	

**Table 23 Finding on each indicator for all three stages in universal and vulnerable clientele (continued)**

Indicators for health* or determinants of health	Universal clientele	Vulnerable clientele
<b>Intrapartum stage (continued)</b>		
Recognition of stages of labour		?
Stage of labour on arrival in hospital	⊥	
Duration of stages of labour	⊗	
Induction of labour	⊗	
Use of labour accelerator	⊗	
Cooperation with staff during childbirth	?	
Use of epidural	⊥	
Use of pharmacological means to manage pain	⊗	
Use of non-pharmacological means to manage pain	⊗	
Vaginal birth with or without instrumental assistance	⊗	?
Attempt of vaginal birth after caesarean section (VBAC)	?	
<b>Postnatal stage</b>		
Adaptation to parenthood* (mother)	⊗	?
Adaptation to parenthood* (father)	⊗	
Assessment of birth experience*	⊗	
Mental health*	⊥	
Knowledge about postnatal health	?	
Intention to breastfeed	?	?
Parenting skills	?	
Self-esteem	?	
Confidence in ability to provide care	⊗	?
Perception of pain	⊥	
Skin-to-skin contact	?	
Breastfeeding initiation	⊥	⊥
Breastfeeding in the first weeks	⊗	
Breastfeeding at 3 months	+	
Breastfeeding at 6 months and after 6 months	⊗	
Breastfeeding duration	⊗	
Breastfeeding cessation	?	
Having a physician that follows the infant's progress		?
Support between future parents during postnatal stage	?	

Legend: probable effects +, no probable effects ⊗, contradictory effects ⊥, insufficient studies ?.

\* Is an indicator of health.



## **Appendix 3**

**Bibliographic research approach to selecting  
studies on the effects of group classes**



## Bibliographic research approach to selecting studies on the effects of group classes

We conducted a search in the Ovid SP, Medline and EBSCOhost databases using keywords related to prenatal classes, health promotion, obstetrical procedures, pregnancy outcomes, breastfeeding, health and adaptation (see syntax on next page). One author then made an initial selection of studies by analyzing the title and summary. The other author followed with a similar selection, but for 20% of the studies for quality control purposes. This ensures that the study selection can be replicated by others using the same inclusion and exclusion criteria. Overall, the studies were selected with an agreement rate between the two authors of more than 90%. The two authors examined and discussed disagreements where required.

After this initial search, we performed a secondary search by reviewing the bibliographic list of selected articles, which enabled us to add some studies.

### Search syntax used in Ovid and Medline

#### *Prenatal classes*

((online or on-line or on line or Web\* or electronic or internet or e health or e-health or ehealth or digital or (classes or education or information\* or meeting\* or preparation or workshop\* or workshop\*)) adj3 (antenatal\* or ante-natal\* or ante natal or birth\* or childbearing or child-bearing or childbirth\* or child-birth\* or child birth or pregnan\* or prenatal\* or pre-natal\* or pre natal or peri natal or perinatal\* or peri-natal\*)). ti, ab.

#### *Health and lifestyle promotion*

Caffein\*/ or Vitamin\*/ or folic acid/ or exp food habits/ or exp Eating/ or feeding behavior?r/ or feeding habits/ or exp Motor Activity/ or physical fitness/ or exp Sports/ or exp sports/ or exp exercise/ or motor activity/ or (((eating or feeding or food or dietary) adj2 (behavio?r\* or habit\* or pattern\*) ) or (meal\* adj2 ( intake or "use" or consumption or ingestion or uptake)) or nourishment or ((physical or locomotor) adj2 (activit\* or conditioning\*)) or exercise\* or sport\* or fitness or pelvic). ti, ab.

#### *Attitude*

"attitude to health"/ or "health knowledge, literacy, attitudes, practice"/ or health behavio?r/ or health belief\*/ or ((life adj1 habit\*) or (health adj2 (attitude\* or behavio?r\* or belief\*))). ti, ab.

#### *Breastfeeding*

breast feed\* OR breast-feed\* OR breastfeed\*. ti,ab.

#### *Substances*

alcohol intake/ or alcohol consumption/ or drinkers/ or addiction/ or alcoholic beverage/ or alcoholism/ or alcohol abstinence/ or alcohol abuse/ or smoking/ or smoking habit/ or maternal smoking/ or paternal smoking/ or smoking cessation/ or tobacco dependence/ or tobacco smoke/ or tobacco smoking/ or cigarettes/ or tobacco/ or ((passive smoking/ OR passive drinking/) adj2 (behavio?r\* or habit\* or pattern\*)) or ((alcohol or tobacco or cigaret\* or nicotin\*) adj2 (intake or "use" or consumption or ingestion or uptake or abuse or abstinence or addiction or dependence)) or alcoholic\* or alcoholism or drinker\* or smoker\* or smoking.ti,ab.

### *Mental health and adaptation*

postpartum depression/ OR psychological well being/ OR psychological aspect/ OR wellbeing/ OR depression/ OR puerperal depression/ OR social support/ OR emotional/ OR mental stress/ OR perception/ OR psychological needs/ OR psychosocial aspects/ OR self esteem/ OR self perception/ OR depression/ OR ((father\* OR paternal OR maternal OR mental OR mood OR mother\* OR parent\* OR psychic OR psychologic\* OR depressive OR prenatal OR pre-natal OR postnatal OR post-natal OR postpartum OR post-partum OR puerperium OR puerperal) ADJ2 (condition\* OR wellbeing OR well-being OR aspect\* OR factor\* OR balance OR stress OR depression\* OR disease\* OR episode\* OR illness OR symptom\* OR syndrome\* OR distress OR disturbance OR equilibrium OR instability OR assessment OR wellness OR well-ness OR psychosis)). ti, ab.

### *Pregnancy outcomes*

Apgar Score/ OR fetal weight/ OR fetus outcome/ OR exp birth weight/ OR "low birth weight"/ OR exp prematurity/ OR exp obstetric complications/ OR exp "pregnancy disorder"/ OR birth injur\*/ OR "infant disorders"/ OR "infant mortality"/ OR exp "embryonic and fetal development"/ OR "uterine hemorrhage"/ OR ((fetus/ OR exp "infant, newborn"/ OR newborn/ OR neonates/) AND (body height/ OR body weight/ OR disease susceptibility/)) OR "maternal mortality"/ OR ("Apgar score\*" OR birthweight\* OR ((antenatal OR ante-natal OR baby OR babies OR birth\* OR born\* OR child OR children OR childbirth\* OR child-birth\* OR deliver\* OR embryo\* OR fetal OR fetus OR foetal OR foetus OR gestation\* OR infant\* OR labo?r OR neonatal OR neo-natal OR neonate\* OR neo-nate\* OR newborn\* OR new-born\* OR labo?r OR "obstetric\* labo?r\*" OR offspring\* OR off-spring\* OR parturient\* OR parturition\* OR partus OR perinatal OR peri-natal OR placenta\* OR prenatal OR pre-natal OR pregnan\* OR reproducti\* OR singleton\* OR trimester\* OR unborn\*) ADJ2 (abnormal\* OR aborted OR (adverse ADJ2 event\*) OR anomaly OR anomalies OR birthweight\* OR birth-weight\* OR complication\* OR condition\* OR danger\* OR death\* OR defect\* OR deformit\* OR development\* OR diabet\* OR disabilit\* OR distress OR disease\* OR disorder\* OR effect\* OR exposure\* OR factor\* OR failure\* OR growth OR hazard\* OR health OR hypertension OR hyper-tension OR anemi\* OR anaemi\* OR impact\* OR impaired OR infection\* OR injur\* OR issue\* OR lethality OR loss OR malformation\* OR mal-formation\* OR morbid\* OR mortalit\* OR outcome\* OR patholog\* OR prejudice\* OR prematur\* OR preterm\* OR pre-term\* OR problem\* OR rejection\* OR risk\* OR small-for-gestational-age OR SGA OR stress\* OR weight\*)) OR "nonreassuring fetal status" OR "non-reassuring fetal status" OR LBW OR miscarriage\* OR preeclampsia\* OR pre-eclampsia\* OR primigravidit\*). ti, ab.

## **Search syntax used in EBSCOhost**

### *Prenatal classes*

TI ((antenatal\* or ante-natal\* or birth\* or childbearing or child-bearing or childbirth\* or child-birth\* or pregnan\* or prenatal\* or pre-natal\* or perinatal\* or peri-natal\*) N2 (classes or education or information\* or meeting\* or preparation or workshop\* or work-shop\*)) OR AB ((antenatal\* or ante-natal\* or birth\* or childbearing or child-bearing or childbirth\* or child-birth\* or pregnan\* or prenatal\* or pre-natal\* or perinatal\* or peri-natal\*) N2 (classes or education or information\* or meeting\* or preparation or workshop\* or work-shop\*)) OR SU ((antenatal\* or ante-natal\* or birth\* or childbearing or child-bearing or childbirth\* or child-birth\* or pregnan\* or prenatal\* or pre-natal\* or perinatal\* or peri-natal\*) N2 (classes or education or information\* or meeting\* or preparation or workshop\* or work-shop\*))

*Mental health and adaptation*

SU ("mental health" OR "mental disorders" OR "mood disorders" OR "depressive disorder" OR "depression, postpartum" OR "puerperal disorders+" OR parenting OR "family relations" OR "parent-child relations+" ) OR TI (((father\* OR maternal OR mental OR mood OR mother\* OR parent\* OR psychic OR psychologic\* OR depressive OR prenatal OR pre-natal OR postnatal OR post-natal OR postpartum OR post-partum OR puerperium OR puerperal) N2 (adaptation OR health OR state\* OR status OR condition\* OR wellbeing OR well-being OR aspect\* OR factor\* OR balance OR stress OR depression\* OR disorder\* OR disease\* OR episode\* OR illness OR symptom\* OR syndrome\* OR distress OR disturbance OR equilibrium OR instability OR assessment OR wellness OR well-ness OR psychosis)) OR kinship OR (((child\* N2 (parent\* OR father\* OR mother\* OR patern\* OR matern\*)) OR family) N2 (relation\* OR attachment\* OR bonding\* OR role\* OR behavio#r\* OR practice\* OR rearing))) OR AB (((father\* OR maternal OR mental OR mood OR mother\* OR parent\* OR psychic OR psychologic\* OR depressive OR prenatal OR pre-natal OR postnatal OR post-natal OR postpartum OR post-partum OR puerperium OR puerperal) N2 (adaptation OR health OR state\* OR status OR condition\* OR wellbeing OR well-being OR aspect\* OR factor\* OR balance OR stress OR depression\* OR disorder\* OR disease\* OR episode\* OR illness OR symptom\* OR syndrome\* OR distress OR disturbance OR equilibrium OR instability OR assessment OR wellness OR well-ness OR psychosis)) OR kinship OR (((child\* N2 (parent\* OR father\* OR mother\* OR patern\* OR matern\*)) OR family) N2 (relation\* OR attachment\* OR bonding\* OR role\* OR behavio#r\* OR practice\* OR rearing)))

*Obstetrical procedures*

SU (obstetrics OR "obstetric surgical procedures+" OR "delivery, obstetric" OR "obstetrical nursing" OR "injections, epidural" OR "analgesia, epidural" OR "anesthesia, epidural") OR TI (((abdominal OR caeser?an OR cesar?an) N2 (birth\* OR deliver\* OR operation\* OR section\*)) OR C-section\* OR episiotom\* OR ((dural OR epidural OR extradural OR peridural) N2 (analgesia OR anaesthesia OR anesthesia OR "anesthetic agent\*" OR block OR blockade OR injection\* OR pharmacology OR medication\*)) OR fetectom\* OR ((abortion\* OR accouchement\* OR birth\* OR childbirth\* OR child-birth\* OR deliver\* OR extraction\* OR labo#r\* OR obstetric\* OR parturition\*) N2 (inhibition\* OR induction\* OR inducing OR induced OR intervention\* OR management OR "medical care" OR nursing\* OR operation\* OR procedure\* OR surger\* OR surgical OR technic\* OR technique\*)) OR AB (((abdominal OR caeser?an OR cesar?an) N2 (birth\* OR deliver\* OR operation\* OR section\*)) OR C-section\* OR episiotom\* OR ((dural OR epidural OR extradural OR peridural) N2 (analgesia OR anaesthesia OR anesthesia OR "anesthetic agent\*" OR block OR blockade OR injection\* OR pharmacology OR medication\*)) OR ((abortion\* OR accouchement\* OR birth\* OR childbirth\* OR child-birth\* OR deliver\* OR extraction\* OR labo#r\* OR obstetric\* OR parturition\*) N2 (inhibition\* OR induction\* OR inducing OR induced OR intervention\* OR management OR "medical care" OR nursing\* OR operation\* OR procedure\* OR surger\* OR surgical OR technic\* OR technique\*))

*Pregnancy outcomes*

TI ("Apgar score\*" OR birthweight\* OR ((antenatal OR ante-natal OR baby OR babies OR birth\* OR born\* OR child OR children OR childbirth\* OR child-birth\* OR deliver\* OR embryo\* OR fetal OR fetus OR foetal OR foetus OR gestation\* OR infant\* OR labo#r OR neonatal OR neo-natal OR neonate\* OR neo-nate\* OR newborn\* OR new-born\* OR labo#r OR "obstetric\* labo#r\*" OR offspring\* OR off-spring\* OR parturient\* OR parturition\* OR partus OR perinatal OR peri-natal OR placenta\* OR prenatal OR pre-natal OR pregnan\* OR reproducti\* OR singleton\* OR trimester\* OR unborn\*) N2 (abnormal\* OR aborted OR (adverse N2 event\*) OR anomaly OR anomalies OR birthweight\* OR birth-weight\* OR complication\* OR condition\* OR danger\* OR death\* OR defect\* OR deformit\* OR development\* OR diabet\* OR distress OR disease\* OR disorder\* OR exposure\* OR factor\* OR failure\* OR growth OR hazard\* OR health OR hypertension OR hyper-tension OR impact\* OR impaired OR

infection\* OR injur\* OR issue\* OR loss OR malformation\* OR mal-formation\* OR morbid\* OR mortalit\* OR outcome\* OR prematur\* OR preterm\* OR pre-term\* OR problem\* OR rejection\* OR risk\* OR small-for-gestational-age OR SGA OR stress\* OR weight\*)) OR "nonreassuring fetal status" OR "non-reassuring fetal status" OR LBW OR miscarriage\* OR preeclampsia\* OR pre-eclampsia\* OR primigravidit\*) OR AB ("Apgar score\*" OR birthweight\* OR ((antenatal OR ante-natal OR baby OR babies OR birth\* OR born\* OR child OR children OR childbirth\* OR child-birth\* OR deliver\* OR embryo\* OR fetal OR fetus OR foetal OR foetus OR gestation\* OR infant\* OR labo#r OR neonatal OR neo-natal OR neonate\* OR neo-nate\* OR newborn\* OR new-born\* OR labo#r OR "obstetric\* labo#r\*" OR offspring\* OR off-spring\* OR parturient\* OR parturition\* OR partus OR perinatal OR peri-natal OR placenta\* OR prenatal OR pre-natal OR pregnan\* OR reproducti\* OR singleton\* OR trimester\* OR unborn\*) N2 (abnormal\* OR aborted OR (adverse N2 event\*)) OR anomaly OR anomalies OR birthweight\* OR birth-weight\* OR complication\* OR condition\* OR danger\* OR death\* OR defect\* OR diabet\* OR disabilit\* OR distress OR disease\* OR disorder\* OR effect\* OR exposure\* OR factor\* OR failure\* OR growth OR health OR hypertension OR hyper-tension OR impact\* OR impaired OR infection\* OR injur\* OR issue\* OR malformation\* OR mal-formation\* OR morbid\* OR mortalit\* OR outcome\* OR prematur\* OR preterm\* OR pre-term\* OR problem\* OR rejection\* OR risk\* OR small-for-gestational-age OR SGA OR stress\* OR weight\*)) OR "nonreassuring fetal status" OR "non-reassuring fetal status" OR LBW OR miscarriage\* OR preeclampsia\* OR pre-eclampsia\* OR primigravidit\*)

#### *Health promotion*

SU ("attitude to health" OR "health knowledge, attitudes, practice" OR "health behavior") OR TI ((life N1 habit\*) OR (health N2 (attitude\* OR behavio#r\* OR belief\*))) OR AB ((life N1 habit\*) OR (health N2 (attitude\* OR behavio#r\* OR belief\*)))

#### *OR*

SU ("drinking behavior" OR "alcohol drinking" OR alcoholism OR "food habits+" OR "feeding behavior" OR smoking OR "smoking cessation" OR "motor activity" OR "physical fitness" OR sport+ OR exercise+) OR TI (((drinking OR eating OR feeding OR food OR dietary) N1 (behavio#r\* OR habit\* OR pattern\*)) OR ((alcohol OR food\* OR feed\* OR meal\* OR tobacco OR cigaret\* OR nicotin\*) N1 (drinking OR intake OR "use" OR consumption OR ingestion OR uptake OR abuse OR abstinence OR addiction OR dependence)) OR alcoholic\* OR alcoholism OR drinker\* OR alimentation OR nourishment OR smoker\* OR smoking OR ((physical OR locomotor) N1 (activit\* OR conditioning\*)) OR exercise\* OR sport\* OR fitness) OR AB (((drinking OR eating OR feeding OR food OR dietary) N1 (behavio#r\* OR habit\* OR pattern\*)) OR ((alcohol OR food\* OR feed\* OR meal\* OR tobacco OR cigaret\* OR nicotin\*) N1 (drinking OR intake OR "use" OR consumption OR ingestion OR uptake OR abuse OR abstinence OR addiction OR dependence)) OR alcoholic\* OR alcoholism OR drinker\* OR nutrition OR nourishment OR smoker\* OR smoking OR ((physical OR locomotor) N1 (activit\* OR conditioning\*)) OR exercise\* OR sport\* OR fitness)

#### *OR*

SU ("breast feeding") OR TI ("breast feed\*" OR breastfeed\*) OR AB ("breast feed\*" OR breast-feed\*)

## **Appendix 4**

### **Detailed description of studies for universal clientele**





**Table 24 Detailed description of studies for universal clientele**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Andersson et al. (2012)</b> Country: Sweden Level of evidence: Qualitative Study quality: Good</p>	<p><b>Objective:</b> To study parents' adaptation to parental role and social support following group-based care prenatal classes in Sweden.</p> <p><b>Measures:</b></p> <ul style="list-style-type: none"> <li>▪ Semi-structured individual or group interview.</li> </ul>	<p>8 men and 20 women recruited by a midwife at around week 12 of pregnancy.</p> <p>No details on participant demographics.</p>	<p><b>Centering Pregnancy Care:</b> 6 to 9 classes, 2 hours each, in groups of 6 to 8. Spouses are welcome to attend.</p> <p>Classes start at around week 12 of pregnancy. The class end date is not specified by the authors.</p>
<p><b>Arcamone (2005)</b> Country: United States Level of evidence: Quasi-experimental Study quality: Good</p>	<p><b>Objective:</b> To describe and compare postpartum adaptation two weeks after vaginal birth in primiparous women based on their participation in prenatal classes.</p> <p><b>Measures:</b> Questionnaires mailed out the week after birth, with instructions to fill them out the following week.</p> <ul style="list-style-type: none"> <li>▪ Demographics through a questionnaire designed by the authors;</li> <li>▪ Perineal pain: through the <i>Short-form McGill Pain Questionnaire</i> (SF-MPQ, validated);</li> <li>▪ Postpartum adaptation to motherhood: through the <i>Postpartum Self-Evaluation Questionnaire</i> (PSQ, validated), assessing confidence in maternal tasks, satisfaction with motherhood and caring for a baby, and satisfaction with the quality of mother's relationship with her spouse.</li> </ul>	<p>158 primiparous women recruited by the author during prenatal classes and in the postpartum unit after birth.</p> <p><b>Group 1</b> (preparation for childbirth and caring for a baby):</p> <ul style="list-style-type: none"> <li>▪ 52 women</li> <li>▪ Average age: 31.4</li> <li>▪ Average number of years of schooling completed: 17.3</li> </ul> <p><b>Group 2</b> (preparation for childbirth):</p> <ul style="list-style-type: none"> <li>▪ 53 women</li> <li>▪ Average age: 30.8</li> <li>▪ Average number of years of schooling completed: 17.3</li> </ul> <p><b>Group 3</b> (no prenatal classes):</p> <ul style="list-style-type: none"> <li>▪ 53 women</li> <li>▪ Average age: 23.4</li> <li>▪ Average number of years of schooling completed: 13.9</li> </ul> <p>The percentage of women with little education or low income is not specified by the authors.</p>	<p>The topics covered are as follows:</p> <ul style="list-style-type: none"> <li>▪ Preparation for childbirth (without further details)</li> <li>▪ Relaxation techniques</li> <li>▪ Causes of perineal trauma</li> <li>▪ Management of perineal pain</li> <li>▪ Caring for a baby for a sub-group of women</li> </ul> <p>Preparation for childbirth: about 8 hours as one 8-hour class, two 4-hour classes or three weekly classes from 2 to 5 hours each.</p> <p>Caring for a baby: one 2-hour class.</p> <p>The class start and end dates are not specified by the authors.</p>

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Artieta-Pinedo (2013)</b> Country: Spain Level of evidence: Cohort Study quality: Good</p>	<p><b>Objective:</b> To document the prenatal experience, course of childbirth, use of obstetrical procedures and pregnancy outcomes of a group of nulliparous women.</p> <p><b>Measures:</b></p> <ul style="list-style-type: none"> <li>▪ Participation in prenatal classes: self-reported by female participants.</li> <li>▪ Socioeconomic variables: birth setting, age, nationality, education level, social class;</li> <li>▪ Assessment of the birth experience based on a question developed by the authors;</li> <li>▪ Anxiety on arrival in hospital: Questionnaire (<i>Hospital Anxiety and Depression</i>, HAD);</li> <li>▪ Course of childbirth (cervical dilation on arrival, duration of active stage and birth, use of pharmacological means to manage pain [including epidural], type of delivery, birth weight, gestational age and 5-minute Apgar score) based on hospital medical and birth records.</li> </ul>	<p>616 nulliparous women recruited at week 36 of pregnancy.</p> <p><b>No prenatal classes</b> (at least 6 individual prenatal care visits):</p> <ul style="list-style-type: none"> <li>▪ 45 women</li> <li>▪ Average age: 28.7</li> <li>▪ Low education level: 42%</li> </ul> <p><b>From 1 to 4 prenatal classes:</b></p> <ul style="list-style-type: none"> <li>▪ 62 women</li> <li>▪ Average age: 30.0</li> <li>▪ Low education level: 24%</li> </ul> <p><b>From 5 to 8 prenatal classes:</b></p> <ul style="list-style-type: none"> <li>▪ 509 women</li> <li>▪ Average age: 31.6</li> <li>▪ Low education level: 14%</li> </ul> <p>The percentage of women with low income is not specified by the authors.</p>	<p><b>Lamaze-type prenatal classes:</b></p> <ul style="list-style-type: none"> <li>▪ 8 group classes, 2 hours each (90 minutes of theory and 30 minutes of physical exercises);</li> <li>▪ The start date is not specified, but classes ended around week 40 of pregnancy;</li> <li>▪ Classes are run by midwives;</li> <li>▪ Topics covered include the physiology of pregnancy and childbirth, types of delivery and pain management strategies, the period immediately following birth, caring for a baby and breastfeeding, bottle-feeding and contraception.</li> </ul>

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Artieta-Pinedo (2006)</b> Country: Spain Level of evidence: Cohort Study quality: Good</p>	<p><b>Objective:</b> To assess the link between participation in prenatal classes and continued (partial or exclusive) breastfeeding in the first year following birth.</p> <p><b>Measures:</b></p> <ul style="list-style-type: none"> <li>▪ Demographic variables: described in an article by the same author, Artieta-Pinedo (2010)</li> <li>▪ Breastfeeding initiation</li> <li>▪ Breastfeeding at 3, 6 and 12 months</li> </ul>	<p>614 primiparous women recruited at week 36 of pregnancy*, with a low-risk pregnancy.</p> <p><b>No prenatal classes</b> (but at least 6 prenatal care visits):</p> <ul style="list-style-type: none"> <li>▪ 44 women</li> <li>▪ Average age: 28.9</li> <li>▪ Low education level: 40.9%</li> </ul> <p><b>1 to 4 structured prenatal classes:</b></p> <ul style="list-style-type: none"> <li>▪ 61 women</li> <li>▪ Average age: 30</li> <li>▪ Low education level: 24.5%</li> </ul> <p><b>5 to 8 structured prenatal classes:</b></p> <ul style="list-style-type: none"> <li>▪ 509 women</li> <li>▪ Average age: 31.7</li> <li>▪ Low education level: 14.1%</li> </ul> <p>The percentage of women with low income is not specified by the authors.</p>	<p><b>Lamaze-type prenatal classes:</b></p> <ul style="list-style-type: none"> <li>▪ 8 group classes, 2 hours each (90 minutes of theory and 30 minutes of physical exercises);</li> <li>▪ The class start date is not specified, but classes ended around week 40 of pregnancy;</li> <li>▪ Classes are run by midwives;</li> <li>▪ Topics covered include the physiology of pregnancy and childbirth, types of delivery and pain management strategies, the period immediately following birth, caring for a baby and breastfeeding, bottle-feeding and contraception.</li> </ul>

\* Information from Artieta-Pinedo (2010).

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Baldwin (2008)</b></p> <p>Country: United States</p> <p>Level of evidence: Quasi-experimental</p> <p>Study quality: Average</p>	<p><b>Objective:</b> To compare knowledge, perceived social support, perception of health locus of control and satisfaction with prenatal care and prenatal education received by women who took part in <i>Centering Pregnancy Care</i>.</p> <p><b>Measures:</b></p> <ul style="list-style-type: none"> <li>▪ Perinatal health knowledge: validated questionnaire (<i>Rising’s Pregnancy Review Sheet</i>);</li> <li>▪ Fetal health locus of control: validated questionnaire (Labs and Wurtele’s Fetal Health Locus of Control);</li> <li>▪ Social support: validated questionnaire (Curry, Campbelle &amp; Christian’s Prenatal Psychosocial Profile);</li> <li>▪ Satisfaction with care received from physician and perception of physician’s involvement in prenatal care and during prenatal classes: validated questionnaire (<i>Littlefield &amp; Adams’ Participation and Satisfaction Tool</i>).</li> </ul>	<p>98 primiparous and multiparous American women recruited during their first prenatal care visit.</p> <p><b>Centering Pregnancy Care:</b></p> <ul style="list-style-type: none"> <li>▪ 50 women</li> <li>▪ Average age: 26.10</li> <li>▪ Average number of years of schooling completed: 13.18</li> <li>▪ Average income: \$29,284</li> </ul> <p>The percentages of women with little education and low income are not specified by the authors.</p> <p><b>Comparison group</b> (women who only had prenatal care):</p> <ul style="list-style-type: none"> <li>▪ 48 women</li> <li>▪ Average age: 25.48</li> <li>▪ Average number of years of schooling completed: 13.19</li> <li>▪ Average income: \$34,010</li> </ul>	<p><b>Centering Pregnancy Care:</b></p> <ul style="list-style-type: none"> <li>▪ The class start and end dates are not specified by the authors;</li> <li>▪ The topics covered are not specified by the authors.</li> </ul>

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Britton (2005)</b> Country: United States Level of evidence: Cohort Study quality: Good</p>	<p><b>Objective:</b> To explore variables that can explain maternal anxiety at one month after birth.</p> <p><b>Measures:</b></p> <ul style="list-style-type: none"> <li>▪ Demographics from medical records;</li> <li>▪ Information on prenatal preparation: planned pregnancy, participation in prenatal classes, choice of pediatrician (<i>Infant Health Care Provider</i>);</li> <li>▪ Information on hospital stay after birth (e.g., duration of stay, problems involving mother or infant justifying a longer stay);</li> <li>▪ Maternal anxiety: through a validated questionnaire (<i>State Trait Anxiety Inventory, STAI</i>) administered before discharge from hospital after birth and at one month postpartum.</li> </ul>	<p>296 primiparous (50.3%) and multiparous women recruited after birth. 62.4% of women attended prenatal classes.</p> <p>Demographics are available only for all participants:</p> <ul style="list-style-type: none"> <li>▪ Average age: 25</li> <li>▪ Low education level (unfinished high school): 22.5%</li> <li>▪ Low income: actual proportion not specified but 46% of participants had an income of less than \$10,000 during their participation in 1998–99.</li> </ul>	<p><b>Prenatal classes:</b></p> <ul style="list-style-type: none"> <li>▪ The class start and end dates are not specified by the authors;</li> <li>▪ The topics covered are not specified by the authors.</li> </ul>

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Fabian et al. (2004)</b>                      Country: Sweden                      Level of evidence: Cohort                      Study quality: Good</p>	<p><b>Objective:</b> To document the opinion of Swedish primiparous women regarding childbirth and their role as a parent, their birth experience, the course of childbirth and breastfeeding initiation.</p> <p><b>Measures:</b> Through questionnaires designed by the authors and mailed out at the beginning of pregnancy and at 2 months and 1 year after the child's birth:</p> <ul style="list-style-type: none"> <li>▪ Demographics (age, marital status, mother tongue, education level, residential density, occupation, smoker status) measured at the beginning of pregnancy;</li> <li>▪ Assessment of classes to prepare for childbirth and new role as parents (measured at 2 months postpartum);</li> <li>▪ Number of prenatal classes attended by women (measured at 2 months postpartum);</li> <li>▪ Assessment of classes to prepare for childbirth and new role as parents (measured at 2 months postpartum);</li> <li>▪ Social contact with other prenatal class participants (measured at 2 months and 1 year postpartum);</li> <li>▪ Breastfeeding: duration and exclusivity (measured at 1 year postpartum).</li> </ul>	<p>1,197 primiparous women recruited by midwives from among their own clients during the first prenatal care visit, including 101 women who did not attend prenatal classes.</p> <p><b>Group with prenatal classes*:</b></p> <ul style="list-style-type: none"> <li>▪ Age: 66.7% of participants are over 25</li> <li>▪ Low education level (unfinished high school): 4.4%</li> <li>▪ Low income: not specified</li> </ul> <p>* In this study, the demographics are grouped by assessment of the classes (as useful or not useful) by the female participants who attended those (1,057 women). The proportions presented below were recalculated to represent all participants.</p> <p><b>Comparison group:</b> Women who did not attend prenatal classes, but who were recruited during a prenatal care visit. No data are available on them.</p>	<p><b>Prenatal classes:</b></p> <ul style="list-style-type: none"> <li>▪ 1 to 11 classes on preparation for childbirth, breastfeeding and parenthood;</li> <li>▪ The class start and end dates are not specified by the authors.</li> </ul>

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Fletcher (2014)</b>                      Country: Australia                      Level of evidence: Cohort                      Study quality: Average</p>	<p><b>Objective:</b> To assess fathers' reactions to prenatal classes after their birth experience and identify reasons why they do not use available services and strategies that could be of more help to them.</p> <p><b>Measures:</b> Survey questionnaire designed by the authors on:</p> <ul style="list-style-type: none"> <li>▪ Demographics: parent's age, child's age, parity.</li> </ul>	<p>212 fathers and 216 mothers recruited during their participation in prenatal classes who answered the survey upon class completion, and 200 fathers who gave an assessment in the months following the birth of their child.</p> <p>Participant demographics are unavailable.</p> <p>The percentage of women with little education or low income is not specified by the authors.</p>	<p><b>Prenatal classes:</b></p> <ul style="list-style-type: none"> <li>▪ The topics covered are not specified by the authors;</li> <li>▪ The class start and end dates are not specified by the authors.</li> </ul>

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Hildingsson (2007)</b> Country: Sweden Level of evidence: Cohort Study quality: Good</p>	<p><b>Objective:</b> To determine whether group prenatal classes improve pregnancy outcomes, psychosocial functioning and patient satisfaction, and whether there are differences in costs associated with prenatal care and childbirth.</p> <p><b>Measures:</b></p> <ul style="list-style-type: none"> <li>▪ Demographics: age, marital status, parity, lifestyle, education level and mental health on a five-point scale;</li> <li>▪ Fear of childbirth towards the end of pregnancy: through the <i>Fear of Birth Scale</i> questionnaire and an evaluation of their current impression on a visual analogue scale;</li> <li>▪ Around 2 months after birth: participation in prenatal classes;</li> <li>▪ One year after birth: parental stress through the <i>Parental Stress Questionnaire</i> (Swedish version).</li> </ul>	<p>1,047 fathers recruited mid-pregnancy in three different hospitals in Sweden, with three visits: towards the end of pregnancy, and at 2 months and 1 year after birth.</p> <p>Characteristics are differentiated based on the fear of childbirth.</p> <p><b>No fear:</b></p> <ul style="list-style-type: none"> <li>▪ 905 fathers</li> <li>▪ Average age: 32.4</li> <li>▪ Education: 5.5% completed 9 years or less of schooling, 57.3% finished secondary III, IV or V</li> </ul> <p><b>Fear:</b></p> <ul style="list-style-type: none"> <li>▪ 142 women</li> <li>▪ Average age: 31.5</li> <li>▪ Education: 7.1% completed 9 years or less of schooling, 50.4% finished secondary III, IV or V.</li> </ul> <p>The percentages of women with little education and low income are not specified by the authors.</p>	<p><b>Prenatal classes:</b></p> <ul style="list-style-type: none"> <li>▪ The topics covered are not specified by the authors;</li> <li>▪ The class start and end dates are not specified by the authors.</li> </ul>



**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Ickovics et al. (2014)</b></p> <p>Country: United States</p> <p>Level of evidence: Randomized</p> <p>Study quality: Good</p>	<p><b>Objective:</b> To determine whether group prenatal classes improve pregnancy outcomes, psychosocial functioning and patient satisfaction, and whether there are differences in costs associated with prenatal care and childbirth.</p> <p><b>Measures:</b></p> <ul style="list-style-type: none"> <li>▪ Demographics and medical history assessed during first prenatal class;</li> <li>▪ Information on pregnancy outcomes (gestational age, premature birth, birth weight, low birth weight, 5-minute Apgar score, admission to intensive care unit and intrauterine death) from hospital birth and medical records;</li> <li>▪ Breastfeeding through a self-reported measure postpartum;</li> <li>▪ Costs associated with prenatal care and childbirth based on billing for hospital services;</li> <li>▪ Seeking prenatal care as recommended, (Kotelchuck Index) according to medical records.</li> <li>▪ Psychosocial variables (prenatal health knowledge); prenatal distress through the <i>Pregnancy Distress Questionnaire</i>;</li> <li>▪ Preparation for childbirth, through a non-validated questionnaire;</li> <li>▪ Satisfaction with prenatal care through a questionnaire adapted from the <i>Patient Participation and Satisfaction Questionnaire</i>, measured during the third trimester of pregnancy.</li> </ul>	<p>1,047 primiparous and multiparous women aged 14 to 25 with singleton, low-risk pregnancies. African-American women were overrepresented in the sample (80%).</p> <p><b>Centering Pregnancy Care:</b></p> <ul style="list-style-type: none"> <li>▪ 623 women</li> <li>▪ Average age: 20.3</li> <li>▪ Number of years of schooling completed: average of 11.4</li> <li>▪ Average income: \$34,415</li> </ul> <p><b>Comparison group:</b> individual prenatal care (2 hours in total):</p> <ul style="list-style-type: none"> <li>▪ 370 women</li> <li>▪ Average age: 20.6</li> <li>▪ Number of years of schooling completed: average of 11.3</li> <li>▪ Average income: \$33,198</li> </ul> <p>The percentages of women with little education and low income are not specified by the authors.</p>	<p><b>Centering Pregnancy Care:</b></p> <ul style="list-style-type: none"> <li>▪ 10 structured classes, 2 hours each for a total of 20 hours, in groups of 8 women on average;</li> <li>▪ Classes start at around week 16 of pregnancy. The class end date is not specified by the authors.</li> </ul>

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Jakubiec (2010)</b> Country: Poland Level of evidence: Quasi-experimental Study quality: Poor</p>	<p><b>Objective:</b> To study the differences in emotional distress between women who attended prenatal classes and those who did not.</p> <p><b>Measures:</b> Two questionnaires designed by the authors, mailed out after birth (exact moment not specified):</p> <ul style="list-style-type: none"> <li>▪ Demographics: age, marital status, mother tongue, education level, residential density, occupation and smoker status, measured at the beginning of pregnancy;</li> <li>▪ <i>General Health Questionnaire</i> (12 items), translated into Polish to assess psychological distress;</li> <li>▪ Knowledge about childbirth and perceived pain; participation in prenatal classes.</li> </ul>	<p>70 women recruited following childbirth (moment not specified by the authors).</p> <p><b>Group with prenatal classes*:</b></p> <ul style="list-style-type: none"> <li>▪ 35 women</li> <li>▪ Age, education and income: not specified</li> </ul> <p><b>Comparison group:</b> women who did not attend prenatal classes:</p> <ul style="list-style-type: none"> <li>▪ 35 women</li> <li>▪ Age, education and income: not specified</li> </ul> <p>The percentages of women with little education and low income are not specified by the authors.</p>	<p><b>Prenatal classes:</b></p> <ul style="list-style-type: none"> <li>▪ The class start and end dates are not specified by the authors;</li> <li>▪ The topics covered are not specified by the authors.</li> </ul>

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Kervin et al. (2014)</b>                      Country: Australia                      Level of evidence: Cross-cutting                      Study quality: Average</p>	<p><b>Objective:</b> To determine the types of breastfeeding support and the moments chosen to provide support to mothers of newborns, and the effects on the intention to breastfeed as well as breastfeeding behaviours (during the first 24 hours of life and 2 weeks after birth) in a region known for its low rate of breastfeeding initiation and duration.</p> <p><b>Measures:</b> Through a questionnaire derived from major surveys (<i>Ingleburn Baby Information System, Ten Steps to Successful Breastfeeding</i> policy documents, <i>NSW Child Health Survey 2001, 1995 National Health Survey</i>). This questionnaire was tested in a pilot study to facilitate administration and for internal validity:</p> <ul style="list-style-type: none"> <li>▪ Partial or exclusive breastfeeding: initiation (during the first 24 hours of life) and at 2 weeks (assessed through a phone questionnaire);</li> <li>▪ Types of support, when support is provided and satisfaction with sources of personal and professional support;</li> <li>▪ Attitude about breastfeeding.</li> </ul>	<p>164 primiparous and multiparous Australian women, aged over 17, recruited 24 hours after birth.</p> <p><b>Prenatal classes:</b> 38 women (23.2%) attended prenatal classes.</p> <p>Demographics are available only for all 164 participants:</p> <ul style="list-style-type: none"> <li>▪ Average age: 28.5</li> <li>▪ Low education level: 0.6% with unfinished high school and 48.8% with completed high school</li> </ul> <p>The percentage of women with low income is not specified by the authors.</p>	<p><b>Prenatal classes:</b> Part of a list of professional resources that can provide breastfeeding support, among other types of support (e.g., support immediately after birth):</p> <ul style="list-style-type: none"> <li>▪ The class start and end dates are not specified by the authors;</li> <li>▪ The topics covered are not specified by the authors.</li> </ul>

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Knape (2013)</b> Country: Germany Level of evidence: Cohort Study quality: Good</p>	<p><b>Objective:</b> To study the link between support provided by midwives during childbirth and the rate of spontaneous childbirth versus all other types of delivery. Participation in prenatal classes is considered in the secondary analyses presented in the study.</p> <p><b>Measures:</b></p> <ul style="list-style-type: none"> <li>▪ Demographics: questionnaire administered during pregnancy;</li> <li>▪ Type of delivery (vaginal or caesarean section / instrumental): from hospital medical records;</li> <li>▪ Participation in classes: through a questionnaire designed by the authors, mailed out around 8 weeks postpartum.</li> </ul>	<p>946* primiparous and multiparous women with a low-risk pregnancy, including 175 women in the comparison group (characteristics are available only for all female participants):</p> <ul style="list-style-type: none"> <li>▪ Average age: 31</li> <li>▪ Low education level: 4% did not finish school (according to author's definition)</li> </ul> <p>The percentage of women with low income is not specified by the authors.</p> <p><b>Comparison group:</b> Women who did not attend prenatal classes. It is unclear whether or not they all received prenatal care.</p>	<p><b>Prenatal classes</b> (no details provided by the authors):</p> <ul style="list-style-type: none"> <li>▪ The class start and end dates are not specified;</li> <li>▪ The topics covered are not specified by the authors.</li> </ul>

\* 999 women participated in this component of the study, but only 946 answered the question on participation in prenatal classes.

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Little et al. (2010)</b> Country: United States Level of evidence: Qualitative Study quality: Good</p>	<p><b>Objective:</b> To study the feasibility of offering group prenatal classes to Japanese women who know little English.</p> <p><b>Measures:</b> Prenatal interview:  <ul style="list-style-type: none"> <li>▪ Program evaluation (Centering Health Institute, CHI session evaluation, 9 items) after final class.</li> </ul>                     Postnatal interview: semi-structured, designed by the authors, at 2 months postpartum for women who attended 4 out of the recommended 5 classes:  <ul style="list-style-type: none"> <li>▪ Personal experience with prenatal classes: how are group classes perceived, how are they accepted, whether classes affected social support;</li> <li>▪ Demographics.</li> </ul> </p>	<p>32 primiparous and multiparous Japanese women recruited at the beginning of prenatal care. All attended prenatal classes adapted from <i>Centering Pregnancy Care</i>:</p> <ul style="list-style-type: none"> <li>▪ Average age: 34</li> <li>▪ Education: all female participants completed at least high school</li> </ul> <p>The percentage of women with low income is not specified by the authors.</p>	<p><b>Japanese adaptation of <i>Centering Pregnancy Care</i>:</b></p> <ul style="list-style-type: none"> <li>▪ 5 monthly group classes (rather than 9) and 3 classes every 2 weeks;</li> <li>▪ Women could also have private classes;</li> <li>▪ Children were welcome to join their mothers during classes;</li> <li>▪ A postnatal class was scheduled at around week 8.</li> </ul>

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Maimburg et al. (2014)</b> Country: Denmark Level of evidence: Randomized Study quality: Good</p>	<p><b>Objective:</b> To compare cervical dilation and the ability to manage fear on arrival in hospital, the birth experience and pregnancy outcomes in nulliparous women based on their participation in group prenatal classes.</p> <p><b>Measures:</b> Questionnaires mailed out or emailed at weeks 24 and 36 of pregnancy and at 6 weeks and 1 year postpartum:</p> <ul style="list-style-type: none"> <li>▪ Demographics (age, body mass index, smoker status, marital status, education level) assessed at week 24 of pregnancy;</li> <li>▪ Evaluation of prenatal class program (compliance) at around week 36 of pregnancy;</li> <li>▪ Cervical dilation on arrival in hospital measured by a midwife;</li> <li>▪ pH and blood gas analysis (indicators of foetal respiratory function);</li> <li>▪ Fear on arrival in hospital, through an adaptation of the <i>Delivery Fear Scale</i>;</li> <li>▪ Birth experience on a scale from 1 to 5, assessed at 6 weeks postpartum;</li> <li>▪ Information on course of childbirth, use of an epidural, caesarean section, cervical dilation, birth weight and gestational age from hospital birth and medical records.</li> </ul>	<p>1,193 primiparous women recruited between weeks 10 and 21 of pregnancy.</p> <p><b>Group with prenatal classes:</b></p> <ul style="list-style-type: none"> <li>▪ 603 women</li> <li>▪ Average age: 28.9</li> <li>▪ Low education level (7 to 10 years): 7%</li> <li>▪ Low income: not specified</li> <li>▪ 4% of women attended other workshops and prenatal classes</li> </ul> <p><b>Comparison group:</b> Prenatal care and optional access to various relaxation classes:</p> <ul style="list-style-type: none"> <li>▪ 590 women</li> <li>▪ Average age: 29.2</li> <li>▪ Low education level (7 to 10 years): 7%</li> <li>▪ Low income: not specified</li> <li>▪ 45% of women attended prenatal classes or workshops (3 hours of classes with a midwife and workshops with relaxation therapists on psychoprophylactic method).</li> </ul> <p>The percentage of women with low income is not specified by the authors.</p>	<p><b>Ready for Child classes:</b></p> <ul style="list-style-type: none"> <li>▪ Three modules focusing on birth, the child and the parent, totalling 9 hours and run by midwives;</li> <li>▪ Classes start at around week 30 of pregnancy and end around week 35;</li> <li>▪ Topics covered include birth (physiological processes of childbirth, pain control, obstetrical procedures), breastfeeding and caring for a baby, vaccination, infant illnesses, transition to parenthood, sexual contact, conflicts, role of family and friends, postpartum depression;</li> <li>▪ Spouses are welcome to attend classes.</li> </ul>

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Martinez-Galiano et al. (2013)</b></p> <p>Country: Spain</p> <p>Level of evidence: Cohort</p> <p>Study quality: Good</p>	<p><b>Objective:</b> To evaluate the influence of an educational program during pregnancy on labour and childbirth (type of delivery, use of an epidural, other types of analgesia, perineal tearing) and on women's involvement during childbirth (cooperation with staff) and skin-to-skin contact.</p> <p><b>Measures:</b> based on medical records and through individual interviews, by way of a questionnaire designed by the authors:</p> <ul style="list-style-type: none"> <li>▪ Demographics;</li> <li>▪ Condition during pregnancy;</li> <li>▪ Obstetrical information: type of delivery, mode of onset of labour, episiotomy, perineal tearing, medication intake during dilation phase, use of an epidural and other types of analgesia, duration of each stage of labour, postpartum complications, skin-to-skin contact in the first hour after birth, mother's involvement during labour and childbirth.</li> </ul>	<p>520 women recruited in four hospitals following childbirth.</p> <p><b>Group with prenatal classes:</b></p> <ul style="list-style-type: none"> <li>▪ 354 women</li> <li>▪ Average age: 30.7</li> <li>▪ Low education level (unfinished high school): 22%</li> <li>▪ Low income (monthly income of 1,000 €): 14.2%</li> </ul> <p><b>Comparison group:</b> women who did not attend prenatal classes:</p> <ul style="list-style-type: none"> <li>▪ 166 women</li> <li>▪ Average age: 28.2</li> <li>▪ Low education level (unfinished high school): 43%</li> <li>▪ Low income (monthly income of &lt; 1000 €): 39.9%</li> </ul>	<p><b>Prenatal classes</b> (no details provided by the authors):</p> <ul style="list-style-type: none"> <li>▪ The class start and end dates are not specified;</li> <li>▪ The topics covered are not specified by the authors.</li> </ul>

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Redshaw and Henderson (2009)</b></p> <p>Country: United Kingdom</p> <p>Level of evidence: Cohort</p> <p>Study quality: Good</p>	<p><b>Objective:</b> To identify who is involved in the pregnancy and after birth, the level and manner of involvement, and the effect of the father's involvement in the use of services by the mother, her assessment of care and the effects on the mother's health and well-being. Participation in classes was one of the variables studied to understand the father's involvement.</p> <p><b>Measures</b> (survey questionnaire):</p> <ul style="list-style-type: none"> <li>▪ Demographics: age, parity, marital status, years of schooling completed, deprivation index (<i>Index of Multiple Deprivation</i>);</li> <li>▪ Father's involvement in pregnancy and childbirth, and after the child's birth;</li> <li>▪ Worries and concerns about labour and childbirth, and mother's assessment of care.</li> </ul>	<p>4,616 fathers whose wives had been recruited for a national survey about 3 months after the child's birth.</p> <p>Demographics are available only for all female participants:</p> <ul style="list-style-type: none"> <li>▪ Father's age: 58.6% between 25 and 34</li> <li>▪ Mother's age: 58.2% between 25 and 34</li> <li>▪ Mother's education level: 77% with more than 16 years of schooling</li> </ul> <p>The percentages of women with little education and low income are not specified by the authors.</p>	<p><b>Prenatal classes</b> (no details provided by the authors):</p> <ul style="list-style-type: none"> <li>▪ The class start and end dates are not specified;</li> <li>▪ The topics covered are not specified by the authors.</li> </ul>



**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Robertson et al. (2010)</b></p> <p>Country: United States</p> <p>Level of evidence: Quasi-experimental</p> <p>Study quality: Average</p>	<p><b>Objective:</b> To compare the effect of participating in <i>Centering Pregnancy Care</i> among Hispanic women against those who received only prenatal care.</p> <p><b>Measures:</b></p> <ul style="list-style-type: none"> <li>▪ Demographics: age, expected date of delivery, history of previous and current pregnancy (<i>Pregnancy History Scale</i>), education level, occupation, financial support and marital status;</li> <li>▪ Duration of hospital stay, birth weight, gestational age (source not specified by the author);</li> <li>▪ At weeks 34 to 36 of pregnancy: Self-esteem (<i>Rosenberg Self-Esteem Scale</i>), knowledge about prenatal and postnatal care and about lifestyle (<i>Prenatal/Postnatal Care Knowledge Scale</i> and <i>Pregnancy Relevant Health Behaviors</i>), depression (<i>Center for Epidemiological Studies: Depression Scale</i>), satisfaction with prenatal care (<i>Patient Participation and Satisfaction Questionnaire</i>) and information on breastfeeding (<i>Breastfeeding Behavior Scale</i>);</li> <li>▪ At 6 weeks postpartum, female participants' assessment of prenatal classes.</li> </ul>	<p>49 primiparous and multiparous Hispanic women recruited during weeks 24 and 26 of pregnancy, who themselves chose the type of classes they wanted to attend (group or individual) and who attended 4 or more classes.</p> <p><b>Group with <i>Centering Pregnancy Care</i></b> (with at least 4 classes):</p> <ul style="list-style-type: none"> <li>▪ 24 women</li> <li>▪ Average age: 24.6</li> <li>▪ Low education level (unfinished high school): 33%</li> </ul> <p><b>Comparison group</b> (with at least 4 prenatal care visits):</p> <ul style="list-style-type: none"> <li>▪ 25 women</li> <li>▪ Average age: 26.5</li> <li>▪ Low education level (unfinished high school): 16%</li> </ul> <p>The percentage of women with low income is not specified by the authors.</p>	<p><b><i>Centering Pregnancy Care:</i></b></p> <ul style="list-style-type: none"> <li>▪ The total number of classes is not specified by the authors. This type of program typically consists of 10 to 12 prenatal classes and one postnatal class;</li> <li>▪ Classes start at around week 24 of pregnancy. The class end date is not specified by the authors.</li> </ul>

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Roig et al. (2013)</b> Country: Spain Level of evidence: Case control Study quality: Good</p>	<p><b>Objective:</b> To identify determinants of cessation of exclusive and partial breastfeeding 6 months after birth.</p> <p><b>Measures:</b> Obtained during the first postpartum visit by the midwife, at 1 and 4 months (by phone), and at 6 months after birth through a face-to-face interview:</p> <ul style="list-style-type: none"> <li>▪ Demographics;</li> <li>▪ Self-reported breastfeeding duration before cessation of exclusive breastfeeding and all breastfeeding in the 6 months after birth.</li> </ul>	<p>248 primiparous and multiparous women. 196 women (79.0%) attended prenatal classes.</p> <p>Exclusion of premature births, low birth weight, 5-minute Apgar scores below 6, newborns with congenital problems and those who were not breastfed:</p> <ul style="list-style-type: none"> <li>▪ Average age: 30.4</li> <li>▪ Low education level (unfinished high school): 66.9%</li> <li>▪ Low income: 55.5% in social classes IV–V (manual and unskilled)</li> </ul>	<p>Participation in prenatal classes is on a list of several determinants of breastfeeding cessation studied by the authors (e.g., family and professional support):</p> <ul style="list-style-type: none"> <li>▪ The class start and end dates are not specified by the authors;</li> <li>▪ The topics covered are not specified by the authors.</li> </ul> <p>We assume that these are group classes for all female participants.</p>
<p><b>Rossiter and Evers (2010)</b> Country: Canada Level of evidence: Case control Study quality: Average</p>	<p><b>Objective:</b> To study feeding practices applicable to young Canadian children in disadvantaged neighbourhoods at 3 months and 4 years.</p> <p><b>Measures:</b> Data from the <i>Better Beginnings, Better Futures</i> prevention initiative:</p> <ul style="list-style-type: none"> <li>▪ Demographics;</li> <li>▪ Method of feeding child at birth;</li> <li>▪ Duration of breastfeeding or use of infant formula;</li> <li>▪ Age at which the child is exposed to milk other than through breastfeeding or infant formula;</li> <li>▪ Participation in prenatal classes.</li> </ul>	<p>546 children, assessed at 3 months and 4 years. Data available for 467 children whose parents provided information on participation in prenatal classes:</p> <ul style="list-style-type: none"> <li>▪ Average age: 27</li> <li>▪ Low education level: 39% did not finish high school</li> <li>▪ Low income: 72% of parents live below the low-income cut-off (LICO)</li> </ul>	<p><b>Prenatal classes:</b></p> <ul style="list-style-type: none"> <li>▪ The class start and end dates are not specified by the authors;</li> <li>▪ The topics covered are not specified by the authors.</li> </ul>

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Sercekus and Mete (2013)</b>                      Country: Turkey                      Level of evidence: Quasi-experimental                      Study quality: Average</p>	<p><b>Objective:</b> To study the effects of prenatal classes on prenatal and postnatal adaptation in Turkish women.</p> <p><b>Measures:</b></p> <ul style="list-style-type: none"> <li>▪ Demographics;</li> <li>▪ Prenatal adaptation through a questionnaire translated into Turkish and validated by the Turkish public (<i>Prenatal Self-Evaluation Questionnaire</i>, PSEQ, 79 items);</li> <li>▪ Postnatal adaptation through a questionnaire translated into Turkish and validated by the Turkish public (<i>Postpartum Self-Evaluation Questionnaire</i>, PPSEQ, 82 items).</li> </ul>	<p>120 Turkish women recruited at around week 26 of pregnancy.</p> <p><b>Group prenatal classes:</b></p> <ul style="list-style-type: none"> <li>▪ 40 women</li> <li>▪ Average age: 27.6</li> <li>▪ Low education level (unfinished high school): 10%</li> </ul> <p><b>Individual prenatal classes:</b></p> <ul style="list-style-type: none"> <li>▪ 40 women</li> <li>▪ Average age: 26.2</li> <li>▪ Low education level (unfinished high school): 12.5%</li> </ul> <p><b>Comparison group</b> (prenatal care only):</p> <ul style="list-style-type: none"> <li>▪ 38 women</li> <li>▪ Average age: 26.5</li> <li>▪ Low education level (unfinished high school): 30%</li> </ul> <p>The percentage of women with low income is not specified by the authors.</p>	<p>Individual and group prenatal classes cover topics such as conception, prenatal and postnatal nutrition, discomfort during pregnancy and ways for relieving this discomfort, exercise, relaxation, care for the mother and unborn child, physical and emotional changes after birth, and breastfeeding.</p> <p><b>Group classes:</b> 7 classes, 2 hours each once a week, in groups of 6 to 10 with time set aside for discussion, interaction and questions.</p> <p><b>Individual prenatal classes:</b> 10 hours over 5 weeks.</p>

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Shia and Alabi (2010)</b></p> <p>Country: United Kingdom</p> <p>Level of evidence: Qualitative</p> <p>Study quality: Average</p>	<p><b>Objective:</b> To study what influences men's participation and involvement during childbirth, and to identify factors detrimental to participation in prenatal classes within ethnic minority groups.</p> <p><b>Measures:</b></p> <ul style="list-style-type: none"> <li>▪ Demographics (age, marital status, ethnicity, parity, education level, household income), medical history and type of prenatal care;</li> <li>▪ Questionnaire on participants' opinion of prenatal classes, obstacles to participation, preferences as to care professional, their confidence and their knowledge about upcoming birth.</li> </ul>	<p>69 men who never had children and who all attended prenatal classes:</p> <ul style="list-style-type: none"> <li>▪ Average age: not specified, but 33 out of 69 (47.8%) fathers are between 31 and 40.</li> </ul> <p>The percentages of women with little education and low income are not specified by the authors.</p>	<p><b>Prenatal classes:</b></p> <ul style="list-style-type: none"> <li>▪ 2 to 6 classes;</li> <li>▪ The class start and end dates are not specified by the authors;</li> <li>▪ The topics covered are not specified by the authors.</li> </ul>
<p><b>Simpson et al. (2012)</b></p> <p>Country: United States</p> <p>Level of evidence: Cohort</p> <p>Study quality: Average</p>	<p><b>Objective:</b> To assess the effects of an educational program designed to prepare women for childbirth on lower rates of elective induction of labour among nulliparous women.</p> <p><b>Measures:</b></p> <ul style="list-style-type: none"> <li>▪ Decision-making processes leading to requests for induction of labour, assessed through a validated survey questionnaire;</li> <li>▪ Induction information from medical records.</li> </ul>	<p>613 primiparous American women, recruited at week 32 of pregnancy.</p> <p><b>Prenatal classes:</b></p> <ul style="list-style-type: none"> <li>▪ 301 women</li> <li>▪ Average age: 27.2</li> </ul> <p><b>Comparison group</b> (women who did not attend classes):</p> <ul style="list-style-type: none"> <li>▪ 312 women</li> <li>▪ Average age: 24.8</li> </ul> <p>The percentages of women with little education and low income are not specified by the authors.</p>	<p><b>Prenatal classes:</b></p> <ul style="list-style-type: none"> <li>▪ Classes start at around week 32 of pregnancy. The class end date is not specified by the authors;</li> <li>▪ Classes are run by qualified Lamaze staff;</li> <li>▪ The topics covered are not specified by the authors.</li> </ul>

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Stoll and Hall (2013a)</b></p> <p>Country: Canada</p> <p>Level of evidence: Case control</p> <p>Study quality: Average</p>	<p><b>Objective:</b> To study links between participation in prenatal classes and maternal characteristics, maternal psychological states, type of care received, expectations expressed during prenatal stage, actual rates of obstetrical procedures and rate of breastfeeding initiation.</p> <p><b>Measures:</b></p> <ul style="list-style-type: none"> <li>▪ Demographics (age, marital status, ethnicity, parity, education level, household income), medical history, type of prenatal care and intention to have a caesarean section, during recruitment;</li> <li>▪ Information related to pregnancy outcomes, based on data from <i>Perinatal Services British Columbia</i>: data on obstetrical procedures (parity, labour, childbirth, epidural, anaesthesia, instrumental delivery, type of delivery, macrosomia and breastfeeding rate on discharge from hospital);</li> <li>▪ Expectations regarding obstetrical procedures through the <i>Wijma Delivery Expectancy/Experience Questionnaire – A</i> (W-DEQ, 33 items);</li> <li>▪ Anxiety through the <i>Spielberger State Anxiety Inventory</i> (STAI-S, 20 items).</li> </ul>	<p>624 Canadian women, recruited between weeks 35 and 39 of pregnancy, excluding those with twin or at-risk pregnancies. Demographics are presented based on parity.</p> <p><b>Nulliparous:</b></p> <ul style="list-style-type: none"> <li>▪ 311 women attended classes</li> <li>▪ Average age: not specified, but 14.5% are over 35</li> <li>▪ 61 did not attend classes</li> <li>▪ Average age: not specified, but 13.1% are over 35</li> </ul> <p><b>Multiparous:</b></p> <ul style="list-style-type: none"> <li>▪ 32 women attended classes</li> <li>▪ Average age: not specified, but 50.0% are over 35</li> <li>▪ 220 did not attend classes</li> <li>▪ Average age: not specified, but 28.2% are over 35</li> </ul> <p>The percentages of women with little education and low income are not specified by the authors.</p> <p>It is unclear whether or not the women who did not attend classes all received prenatal care.</p>	<p><b>Prenatal classes:</b></p> <ul style="list-style-type: none"> <li>▪ The class start and end dates are not specified by the authors;</li> <li>▪ The topics covered are not specified by the authors.</li> </ul> <p>The authors describe classes in British Columbia, where the study was based. These classes are offered beginning in the second trimester and range from 7 hours (one full day) to 16 hours (over several weeks). They cover topics such as recognizing the signs of labour, immediate care of a newborn and basic breastfeeding principles. Additional workshops on breastfeeding are available.</p>

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Tanner-Smith et al. (2014)</b></p> <p>Country: United States</p> <p>Level of evidence: Quasi-experimental</p> <p>Study quality: Good</p>	<p><b>Objective:</b> To study the effects of weight gain during pregnancy based on participation in prenatal classes of a type similar to <i>Centering Pregnancy Care</i>, compared to individual prenatal care.</p> <p><b>Measures</b> (retrospectively based on medical records):</p> <ul style="list-style-type: none"> <li>▪ Demographics: mother's age, ethnicity, marital status, health insurance;</li> <li>▪ Medical information: history of hypertension, non-gestational diabetes, smoking, alcohol consumption, prenatal care visits and gestational weight gain.</li> </ul>	<p>393 American women. (The study is retrospective, with information taken from participants' medical records. Participants were not recruited specifically for this study.)</p> <p><b>Group with <i>Centering Pregnancy Care</i>:</b> women who attended at least one class</p> <ul style="list-style-type: none"> <li>▪ 158 women</li> <li>▪ Average age: 22.07</li> </ul> <p><b>Comparison group</b> (individual prenatal care only):</p> <ul style="list-style-type: none"> <li>▪ 235 women</li> <li>▪ Average age: 22.59</li> </ul> <p>The percentages of women with little education and low income are not specified by the authors.</p>	<p><b><i>Centering Pregnancy Care</i>:</b></p> <ul style="list-style-type: none"> <li>▪ The topics covered are not specified by the authors. Topics could be those typically covered by <i>Centering Pregnancy Care</i>.</li> <li>▪ The class start and end dates are not specified by the authors.</li> </ul>

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Tanner-Smith et al. (2013b)</b></p> <p>Country: United States</p> <p>Level of evidence: Quasi-experimental</p> <p>Study quality: Good</p>	<p><b>Objective:</b> To study the effects of prenatal classes of a type similar to <i>Centering Pregnancy Care</i> at five sites on gestational age, birth weight and intrauterine mortality, compared to individual prenatal care.</p> <p><b>Measures</b> (retrospectively based on medical records):</p> <ul style="list-style-type: none"> <li>▪ Demographics: mother's age, ethnicity, marital status, health insurance, history of hypertension, non-gestational diabetes, smoking, alcohol consumption and prenatal care visits;</li> <li>▪ Information on pregnancy outcomes: gestational age, birth weight, premature birth, low birth weight, very low birth weight and intrauterine mortality.</li> </ul>	<p>6,155 American women from five sites in Tennessee. (The study is retrospective, with information taken from participants' medical records. Participants were not recruited specifically for this study.)</p> <p><b>Group with <i>Centering Pregnancy Care</i>:</b></p> <ul style="list-style-type: none"> <li>▪ 651 women</li> <li>▪ Average age: between 22.2 and 25.7 depending on site</li> </ul> <p><b>Comparison group</b> (individual prenatal care only):</p> <ul style="list-style-type: none"> <li>▪ 5,504 women</li> <li>▪ Average age: between 23.2 and 27.8 depending on site</li> </ul> <p>The percentages of women with little education and low income are not specified by the authors.</p>	<p><b><i>Centering Pregnancy Care</i>:</b></p> <ul style="list-style-type: none"> <li>▪ 10 structured 90-minute classes in groups of 8 to 12, monthly for 4 months and then every 2 weeks for the rest of pregnancy;</li> <li>▪ The class start and end dates are not specified by the authors.</li> </ul>

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Tanner-Smith et al. (2013)</b></p> <p>Country: United States</p> <p>Level of evidence: Quasi-experimental</p> <p>Study quality: Good</p>	<p><b>Objective:</b> To study the effects of <i>Centering Pregnancy Care</i> on breastfeeding compared to individual prenatal care in women from Tennessee.</p> <p><b>Measures:</b></p> <ul style="list-style-type: none"> <li>▪ Information on (partial or exclusive) breastfeeding initiation taken from medical records retrospectively;</li> <li>▪ Information on partial or exclusive breastfeeding at 6 weeks taken during a postpartum visit.</li> </ul>	<p>794 primiparous and multiparous women from four sites in Tennessee.</p> <p><b>Group with <i>Centering Pregnancy Care</i>:</b> 308 women who attended at least 5 classes</p> <p><b>Comparison group:</b> 486 women who had at least 5 prenatal care visits, without participation in prenatal classes.</p> <p>Demographics for all women are presented:</p> <ul style="list-style-type: none"> <li>▪ Average age: between 22.4 and 26.4 depending on site</li> </ul> <p>The percentages of women with little education and low income are not specified by the authors.</p>	<p><b><i>Centering Pregnancy Care</i>:</b></p> <ul style="list-style-type: none"> <li>▪ 10 structured classes (90 to 120 minutes each) in groups of 8 to 12. The program includes prenatal care, education and support;</li> <li>▪ The class start and end dates are not specified by the authors.</li> </ul>



**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Trudnak et al. (2004)</b></p> <p>Country: United States</p> <p>Level of evidence: Cohort</p> <p>Study quality: Good</p>	<p><b>Objective:</b> To study pregnancy outcomes among Spanish-speaking Latin women who attended <i>Centering Pregnancy Care</i> classes compared to those who received individual prenatal care.</p> <p><b>Measures</b> (retrospectively based on medical records):</p> <ul style="list-style-type: none"> <li>▪ Demographics: age, ethnicity, country of origin, marital status, highest education level, occupation, planned pregnancy, smoking, history of pre-term delivery, parity and body mass index before pregnancy;</li> <li>▪ Information on pregnancy outcomes and course of childbirth: birth weight, premature birth, gestational weight gain, type of delivery, assessment of prenatal care, breastfeeding;</li> <li>▪ Routine postpartum care visits.</li> </ul>	<p>487 primiparous and multiparous women.</p> <p><b>Group with <i>Centering Pregnancy Care</i></b> (247 women):</p> <ul style="list-style-type: none"> <li>▪ Age: 17.2% under 20 and 36.0% between 20 and 24</li> <li>▪ Low education level (unfinished high school): 30%</li> </ul> <p><b>Comparison group</b> (240 women who gave birth during the same period and who received full individual prenatal care consisting of a dozen or so visits, totalling 2 hours):</p> <ul style="list-style-type: none"> <li>▪ Age: 12.9% under 20 and 31.3% between 20 and 24</li> <li>▪ Low education level (unfinished high school): 48.8%</li> </ul> <p>The percentage of women with low income is not specified by the authors.</p>	<p><b><i>Centering Pregnancy Care:</i></b></p> <ul style="list-style-type: none"> <li>▪ 10 structured classes in groups of 8 to 12;</li> <li>▪ The class start and end dates are not specified by the authors.</li> </ul>

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Waldenstrom et al. (2012)</b></p> <p>Country: Sweden</p> <p>Level of evidence: Case control</p> <p>Study quality: Average</p>	<p><b>Objective:</b> To study the prevalence and risk factors linked to a negative birth experience.</p> <p><b>Measures</b> (through questionnaires administered at 2 months and 1 year after birth):</p> <ul style="list-style-type: none"> <li>▪ Questionnaire at beginning of pregnancy: covering topics such as socio-demographic characteristics, obstetrical information (parity, previous method of delivery, previous experience, spouse's support, expectations regarding upcoming birth, intensity of pain and attitudes towards pharmacological means of managing pain, well-being during pregnancy) through a validated questionnaire, <i>Edinburgh Postnatal Depression Scale and Cambridge Worry Scale</i>;</li> <li>▪ Questionnaire administered at 2 months: questions on prenatal care, participation in prenatal classes, number of care visits and prenatal classes and opinion on these sessions, course of childbirth, questions about intrapartum care, experience with pain and control during labour, pregnancy outcomes (premature birth, admission to neonatal care unit and chronic or functional illnesses);</li> <li>▪ Questionnaire administered at 1 year postpartum: parenthood, memories of childbirth and assessment of birth experience on a scale from 1 to 7.</li> </ul>	<p>2,541 primiparous and multiparous Swedish women recruited during their first prenatal care visit, including 1,186 women who did not attend prenatal classes.</p> <p>Demographics presented for all participants, based on their birth experience.</p> <p><b>Negative experience:</b></p> <ul style="list-style-type: none"> <li>▪ 173 women</li> <li>▪ Age: not specified</li> <li>▪ Low education level: 8.1%</li> </ul> <p>57 women did not attend prenatal classes</p> <p><b>Mixed or positive experience:</b></p> <ul style="list-style-type: none"> <li>▪ 2,368 women</li> <li>▪ Age: 447 women (18.9%) under 25</li> <li>▪ Low education level: 5.6%</li> </ul> <p>1,129 women did not attend prenatal classes</p> <p>The percentage of women with low income is not specified by the authors.</p>	<p><b>Prenatal classes</b> (no details provided by the authors):</p> <ul style="list-style-type: none"> <li>▪ The class start and end dates are not specified by the authors;</li> <li>▪ The topics covered are not specified by the authors.</li> </ul>

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Widarsson et al. (2008)</b>                      Country: Sweden                      Level of evidence: Qualitative                      Study quality: Good</p>	<p><b>Objective:</b> To describe the support needs of pregnant women and their spouses during pregnancy.</p> <p><b>Measures:</b> in a focus group and individual semi-structured* interview.</p> <p>Questions asked during interviews:</p> <ul style="list-style-type: none"> <li>▪ What types of support do future parents need?</li> <li>▪ Are sources of prenatal care aligned with parents' support needs during pregnancy?</li> <li>▪ Do prenatal health services meet the needs of mothers and fathers in a comparable way?</li> </ul>	<p>22 Swedish women and 10 Swedish men, both primiparous (22 out of 32 parents) and multiparous.</p> <p>The number of women who attended prenatal classes is not specified. Most women were recruited during a prenatal care visit. The exact number is not specified:</p> <ul style="list-style-type: none"> <li>▪ Average age: 31</li> <li>▪ Low education level (unfinished high school): 13%</li> </ul> <p>The percentage of women with low income is not specified by the authors.</p>	<p><b>Prenatal health services:</b> Group-based parental education covering the social, emotional, psychological and physical aspects of pregnancy, physical and psychological health promotion, and support in transitioning to parenthood.</p>

\* The interview took place during pregnancy, but the author did not specify at what point.

**Table 24 Detailed description of studies for universal clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Williams et al. (2012)</b></p> <p>Country: United Kingdom</p> <p>Level of evidence: Cohort</p> <p>Study quality: Average</p>	<p><b>Objective:</b> To study the links between participation in prenatal classes and the intention to use pharmacological means, such as NO<sub>2</sub> &amp; O<sub>2</sub>, pethidine and an epidural during childbirth.</p> <p><b>Measures:</b></p> <ul style="list-style-type: none"> <li>▪ Demographics: age, marital status, education level, length of pregnancy, complications during pregnancy, parity, medication during childbirth, and participation in prenatal classes;</li> <li>▪ Intention to use the three medications under study: through a Likert-type 7-point scale.</li> </ul>	<p>100 primiparous British women, recruited in the third trimester.</p> <p>Demographics are very briefly presented for all participants.</p> <p>49 women attended prenatal classes.</p> <p>All women were recruited during a prenatal care visit. The assumption therefore is that the women who did not attend classes received prenatal care.</p>	<p><b>Prenatal classes</b> (women who attended prenatal classes):</p> <ul style="list-style-type: none"> <li>▪ The class start and end dates are not specified by the authors;</li> <li>▪ The topics covered are not specified by the authors.</li> </ul>

## **Appendix 5**

### **Detailed description of studies for vulnerable clientele**



**Table 25 Detailed description of studies for vulnerable clientele**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Duggan (2004)</b></p> <p>Country: United States</p> <p>Level of evidence: Qualitative</p> <p>Study quality: Good</p>	<p><b>Objective:</b> To study the transition to motherhood among low-income primiparous women in order to determine the specific needs of these under-represented women.</p> <p><b>Measures:</b></p> <p>Through a journal completed at different times during pregnancy:</p> <ul style="list-style-type: none"> <li>▪ Emotional and physical changes;</li> <li>▪ Expectations of pregnancy and maternity;</li> <li>▪ Knowledge about and preparation for pregnancy and maternity.</li> </ul> <p>Semi-structured interview (during pregnancy, at the end of the first trimester or at the beginning of the second trimester):</p> <ul style="list-style-type: none"> <li>▪ Changes and differences, involvement, personal meaning, preparation, knowledge and support during pregnancy.</li> </ul> <p>Semi-structured interview (postpartum, during postpartum visit, 6 to 8 weeks):</p> <ul style="list-style-type: none"> <li>▪ Preparation, knowledge, personal meaning, changes and differences, developing confidence and coping, feeling connected to motherhood.</li> </ul>	<p>Qualitative interview of 27 vulnerable American women, including 5 in the comparison group (women who did not attend prenatal classes and who only received prenatal care).</p> <p>Demographics for all participants:</p> <ul style="list-style-type: none"> <li>▪ Average age: 23</li> </ul> <p>The percentages of women with little education and low income are not specified by the authors.</p>	<p><b>Centering Pregnancy Care:</b></p> <ul style="list-style-type: none"> <li>▪ 10 classes, each 90 to 120 minutes;</li> <li>▪ Classes start between weeks 12 and 16 of pregnancy. The class end date is not specified.</li> </ul>

**Table 25 Detailed description of studies for vulnerable clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Grady and Bloom (2009)</b></p> <p>Country: United States</p> <p>Level of evidence: Cohort</p> <p>Overall quality: Poor</p>	<p><b>Objective:</b> To compare the effects of participation in <i>Centering Pregnancy Care</i> on pregnancy outcomes and the level of satisfaction expressed by adolescent girls against participation in individual prenatal care visits.</p> <p><b>Measures:</b></p> <ul style="list-style-type: none"> <li>▪ Assessment of various aspects of prenatal classes and preparation for childbirth through a questionnaire designed by the authors (not validated), administered near the end of pregnancy and during a class before week 8 postpartum;</li> <li>▪ Information on pregnancy outcomes (premature birth, low birth weight) from hospital birth and medical records;</li> <li>▪ Caesarean section performed according to medical records;</li> <li>▪ Breastfeeding initiation according to information reported by female participants.</li> </ul>	<p>501 young women* under 17, most African-American (over 85%), who themselves chose the type of care they wanted to receive.</p> <p><b>Centering Pregnancy Care:</b></p> <ul style="list-style-type: none"> <li>▪ 124 young women</li> <li>▪ Average age: 15.85</li> </ul> <p><b>2001 comparison group:</b> Adolescent girls who gave birth in the same hospital in 2001 and received prenatal care, without prenatal education:</p> <ul style="list-style-type: none"> <li>▪ 144 young women</li> <li>▪ Average age: 16.5</li> </ul> <p><b>1998 comparison group:</b> All adolescent girls who gave birth in the same hospital in 1998, including those who did not receive prenatal care:</p> <ul style="list-style-type: none"> <li>▪ 233 young women</li> <li>▪ Average age: 16.3</li> </ul> <p>The percentages of women with little education and low income are not specified by the authors.</p>	<p><b>Centering Pregnancy Care:</b></p> <ul style="list-style-type: none"> <li>▪ 12 structured classes, 90 minutes each, in groups of 8 to 12 plus a postpartum class;</li> <li>▪ Topics covered include pregnancy outcomes, nutrition, exercise and relaxation, preparation for childbirth, problems that may occur during pregnancy, caring for and feeding baby, postpartum adaptation, contraception, communication, self-esteem, abuse and parenthood;</li> <li>▪ Classes start between weeks 12 and 18 of pregnancy, and end before week 8 postpartum.</li> </ul>

\* Although the author does not specify the participants' parity, most can be assumed to be primiparous given their young age.



**Table 25 Detailed description of studies for vulnerable clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Klima et al. (2012)</b></p> <p>Country: United States</p> <p>Level of evidence: Cohort with qualitative component</p> <p>Study quality: Average</p>	<p><b>Objective:</b> To compare the feasibility and effects of <i>Centering Pregnancy Care</i> on pregnancy outcomes and health promotion in a large urban hospital for low-income African-American women.</p> <p><b>Measures:</b></p> <ul style="list-style-type: none"> <li>▪ Demographics (maternal age) from medical records;</li> <li>▪ Information on pregnancy outcomes (birth weight and gestational age) from medical records;</li> <li>▪ Assessment of group prenatal classes and preparation for childbirth through a focus group with female participants;</li> <li>▪ Satisfaction with prenatal care and classes through a survey with an abridged version of a validated questionnaire;</li> <li>▪ Breastfeeding (initiation) upon discharge from hospital through information from prenatal clinic records;</li> <li>▪ Weight gain during pregnancy according to prenatal clinic records.</li> </ul>	<p>268 low-income African-American women (all women are eligible for Medicaid).</p> <p><b>Centering Pregnancy Care:</b></p> <ul style="list-style-type: none"> <li>▪ 61 women</li> <li>▪ Average age: 21.8 (19.7% adolescents)</li> <li>▪ Low education level: not specified by the authors</li> </ul> <p><b>Comparison group:</b> Women who gave birth in the same hospital during the same period but who only had prenatal care:</p> <ul style="list-style-type: none"> <li>▪ 207 women</li> <li>▪ Average age: 22.1 (21.3% adolescents)</li> <li>▪ Low education level: not specified by the authors</li> </ul> <p>The percentage of women with little education is not specified by the authors.</p>	<p><b>Centering Pregnancy Care:</b></p> <ul style="list-style-type: none"> <li>▪ 10 structured classes, 2 hours each, in groups of 4 to 10 (average of 5.5 female participants per group);</li> <li>▪ Classes start before week 18 of pregnancy, but the authors do not specify when they end.</li> </ul>

**Table 25 Detailed description of studies for vulnerable clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Picklesimer et al. (2013)</b></p> <p>Country: United States</p> <p>Level of evidence: Cohort</p> <p>Study quality: Good</p>	<p><b>Objective:</b> To compare the effects of <i>Centering Pregnancy Care</i> on the rate of premature births in a low-income, ethnically diverse population against the effects of prenatal care.</p> <p><b>Measures:</b></p> <ul style="list-style-type: none"> <li>▪ Demographics from electronic birth certificate (maternal age, ethnicity, marital status, education level, history of prenatal care, Seeking prenatal care as recommended, according to Kotelchuck Index, smoking during pregnancy, sexually transmitted infections, parity, history of previous premature births);</li> <li>▪ Information from medical records on gestational age at birth, birth weight, admission to neonatal intensive care unit and breastfeeding.</li> </ul>	<p>4,083 low-income, ethnically diverse primiparous and multiparous women living in the United States with a low-risk pregnancy. The women themselves chose the type of care they wanted to receive.</p> <p><b>Centering Pregnancy Care:</b></p> <ul style="list-style-type: none"> <li>▪ 316 women</li> <li>▪ Average age: 23.1</li> <li>▪ Low education level (unfinished high school): 36.1%</li> <li>▪ Low income: 100% eligible for Medicaid</li> </ul> <p><b>Comparison group:</b> Women who received individual prenatal care:</p> <ul style="list-style-type: none"> <li>▪ 3,767 women</li> <li>▪ Average age: 25.1</li> <li>▪ Low education level (unfinished high school): 40.7%</li> <li>▪ Low income: 100% eligible for Medicaid</li> </ul>	<p><b>Centering Pregnancy Care:</b></p> <ul style="list-style-type: none"> <li>▪ 10 structured classes, 2 hours each, in groups of 8 to 12;</li> <li>▪ Inclusion in this group if attended a class. Median participation was 7 classes;</li> <li>▪ The class start and end dates are not specified by the authors.</li> </ul>

**Table 25 Detailed description of studies for vulnerable clientele (continued)**

Study characteristics	Study objectives and measures	Participant characteristics	Prenatal class characteristics
<p><b>Pitcock</b> Country: United States Level of evidence: Quasi-experimental Study quality: Average</p>	<p><b>Objective:</b> To assess the effects of a prenatal class program on the rate of intention to breastfeed exclusively and to initiate breastfeeding among low-income Hispanic women.</p> <p><b>Measures</b> (based on medical record):</p> <ul style="list-style-type: none"> <li>▪ Type of delivery: vaginal or not;</li> <li>▪ Length of hospital stay;</li> <li>▪ Intention to breastfeed;</li> <li>▪ Breastfeeding initiation rate on discharge from hospital.</li> </ul>	<p>70 low-income Hispanic women living in rural areas.</p> <p><b>Group with prenatal classes:</b></p> <ul style="list-style-type: none"> <li>▪ 38 women</li> <li>▪ Average age: 27.47</li> </ul> <p><b>Comparison group:</b></p> <ul style="list-style-type: none"> <li>▪ 32 women who did not attend prenatal classes and who only received prenatal care</li> <li>▪ Average age: 27.88</li> <li>▪ The percentages of women with little education and low income are not specified by the authors.</li> </ul>	<p><b>Prenatal classes:</b></p> <ul style="list-style-type: none"> <li>▪ One 6-hour class on preparation for childbirth, breastfeeding, child care and contraception;</li> <li>▪ Classes are offered in the third trimester but the exact start and end dates are not specified by the authors.</li> </ul>



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