Summary

Chapter one
This chapter introduces the studies carried out in this thesis, using the Model for Planned Health Education and Promotion as a framework. Background information is provided about earlier studies carried out on maternal health, health behaviours and prenatal health promotion; areas are described which need more research. Two central objectives addressed in the two main parts of this thesis are introduced in this chapter. The first objective is to investigate maternal health and health behaviours in pregnant women in primary midwife-led care in the Netherlands, as well as maternal characteristics associated with these health indicators. The second objective is to examine the prenatal health education that is currently provided by midwives to pregnant women in primary care.

Part I: Prevalence and characteristics of maternal/perinatal health and maternal health behaviours

Chapter two
Preterm occurs in about 7.6% of all pregnancies in the Netherlands. It is associated with perinatal morbidity and mortality, as well as physical and mental/cognitive disabilities later in life. Previous research has led to some evidence of a relationship between maternal behavioural and psychological characteristics and preterm birth. This study investigates the relationships of these self-reported maternal characteristics with spontaneous preterm birth in nulliparous women.

The health behaviour characteristics we examined were smoking, folic acid supplementation, alcohol consumption, daily intake of fruit, daily intake of fresh vegetables, daily hot meal, and daily breakfast consumption. Psychological characteristics were anxious or depressed mood, and health control beliefs. In our final statistical model, where we adjusted for socio-demographic characteristics (age, education, ethnicity and relationship status), anthropometric characteristics (BMI and height), and the other health behaviour/psychological characteristics, we found only health control beliefs to be significantly associated with spontaneous preterm birth. Women with lower health control beliefs during pregnancy were twice as likely to have a spontaneous preterm birth than women with higher health control beliefs. Heavy smoking had a significant univariable relationship with spontaneous preterm birth, but once we adjusted for socio-demographic characteristics, the relationship was no longer statistically significant.

We conclude that the relationship between health control beliefs and preterm birth should be investigated further, using validated and multidimensional scales of health
control beliefs. Further studies should examine health control beliefs as a possible marker for spontaneous preterm birth and as a potentially modifiable characteristic embedded within interventions designed to reduce the risk of spontaneous preterm birth.

**Chapter three**

Maternal health issues (such as obesity, underweight, depression and stress) and health behaviours (such as smoking, alcohol consumption and unhealthy nutrition) during pregnancy have been associated with adverse pregnancy outcomes. The first aim in this study was to give an overview of the self-reported health status and health behaviours of pregnant women under midwife-led primary care in the Netherlands. The second aim was to identify potential differences in these health status indicators according to educational level (as a proxy for socio-economic status) and ethnicity (as a proxy for immigration status).

This study showed that almost one third of pregnant women started their pregnancies overweight or obese, 15.1% had low health control beliefs, 19.9% currently felt somewhat to very depressed or anxious, 9.2% reported smoking, 11.0% drinking alcohol at least once during pregnancy, 8.6% did not take folic acid supplements, 54.3% did not attend any antenatal classes, 18.6% reported not eating fresh vegetables daily, 14.7% did not eat fruit daily, 11.1% did not have breakfast daily and 3.2% did not eat a hot meal daily. For 17.6% of women, the pregnancy was unplanned. Given the extent of socio-demographic inequality we found in these health indicators, and the fact that ethnicity minorities were somewhat and low education very underrepresented in our study sample, the percentages of many of these adverse health indicators are likely to be considerably higher in the general population.

Substantial socio-demographic inequalities were apparent in maternal health status and health behaviours, to the disadvantage of those with lower education and immigrants (in particular non-Western immigrants). Substantial inequalities according to educational level with regard to health status included lower health control beliefs, depressed/anxious mood and obesity as well as underweight. Strong inequalities according to educational level were apparent in health behaviours such as smoking, passive smoking, not attending antenatal classes, not taking folic acid, unplanned pregnancy and skipping meals. Ethnic disparities were also apparent: non-Western women were more likely to experience passive smoking, not take folic acid supplements and not attend antenatal classes. They also more frequently reported having lower health control beliefs, being depressed or anxious, and having nausea and back pains.

We conclude that much health gain could be achieved if the large disparities in socio-demographic maternal health are adequately addressed. For many women, pregnancy may be the only time that they have regular contact with health care providers, such as
midwives; therefore pregnancy should be considered an opportunity to help increase the quality of life for women and their families beyond the care of their pregnancies. A greater understanding by prenatal health care providers of the non-medical risks of adverse pregnancy outcomes may benefit those social groups at greater risk; improved strategies are needed to address the structures underlying social inequalities.

Chapter four
Maternal smoking during pregnancy is associated with various adverse pregnancy outcomes and with adverse physical and cognitive health conditions throughout childhood and adulthood. In this study, we investigated the maternal socio-demographic and lifestyle-related characteristics which were most strongly associated with any, daily and occasional self-reported smoking during pregnancy.

Our findings showed that 9.2% of all respondents in our sample reported smoking (5.4% daily and 3.8% occasionally). As the proportion of higher educated women was much higher in our sample than in the general population (48.8% versus 26.7%), the prevalence of maternal smoking in the general population in of pregnant women in the Netherlands is likely to be considerably higher. Educational level was the characteristic most strongly associated with any smoking, with those of lower education being ten times more likely to smoke than those of higher education. Other characteristics strongly associated with any smoking were having no religion compared to identifying with a religion, being of Turkish or Dutch origin compared to any other origin, and having no partner, compared to having a partner or spouse. Characteristics somewhat associated with any smoking were being underweight, being depressed or anxious, having a lower neighbourhood socio-economic status (SES), not taking folic acid, any alcohol consumption, unplanned pregnancy, and low health control beliefs. Examining daily smokers separately, we found that those of lower education were 20 times more likely to smoke daily than those of higher education. Other strongly associated characteristics of daily smokers were having no partner, being of Turkish or Dutch origin, having no religion and being underweight. More lifestyle-related characteristics were associated with daily smoking than occasional smoking.

We conclude that there is much potential for substantial health gain, if smoking cessation during pregnancy is made a priority. When designing smoking cessation programs, it is important to be aware of the social groups that are at greater risk for smoking, to take into consideration that daily smoking during pregnancy is associated with multiple suboptimal health behaviours, and also to consider possible underlying factors related to smoking, such as lack of social support.
Part II: Prenatal health education provided by primary care midwives

Chapter five
There is much evidence that a woman’s health behaviours during pregnancy can have both a short-term and long-term impact on the health of her children. In the Netherlands, 84.9% of women start their pregnancy under the care of primary care midwives. One of the tasks of midwives is to provide health education and promote optimal health behaviours during pregnancy. This interview study explored the experiences, wishes and needs of pregnant women in primary care with respect to the health education provided by their midwives.

Our study showed that women considered the midwife to be the designated health provider for health education and that they generally appreciated the amount of information they had received. Most women recalled receiving basic information on how to avoid infectious diseases, e.g. by means of safe nutrition and they recalled being asked whether they smoked or drank alcohol. Women, however, generally did not recall receiving verbal information during prenatal visits on nutrition for promoting good health, benefits of physical activity, recommended weight gain and on why alcohol was harmful. Some expressed the wish for more extensive health education on various topics, and others, despite having reported being satisfied with the health education provided by their midwives, reported having questions and uncertainties about various health behaviours, including nutrition, weight gain and physical activity. Women assumed that midwives provided individualized care according to their parity, educational level or general health status, and according to questions posed by the women. Some women were concerned that this assessment may have led to incorrect assumptions about their needs and wishes for health education. Nulliparous women generally had more of a need for additional health education and often expressed wishing they could have more contact with their midwives during the first trimester. Women differed with respect to how accessible they felt their midwives were for questions between prenatal visits. Women generally believed that there should be a relationship of trust with their midwives and that they should make them feel at ease.

We conclude that it would be beneficial if midwives cover all essential topics, such as alcohol, smoking, physical activity, healthy nutrition and recommended weight gain during prenatal visits for those who express wanting more information and for those who believe they do not need it, but are nevertheless not aware of, or have forgotten recent health recommendations. Encouraging clients to ask questions, however minor, between prenatal visits may be helpful for those who are hesitant to call their midwives.

Chapter six
Earlier studies have shown that suboptimal maternal nutrition, high pre-pregnancy...
weight and weight gain, low physical activity, and exposure to alcohol and tobacco are associated with unfavourable pregnancy outcomes, such as preterm births and intra-uterine growth restriction, as well as an increased likelihood of adverse physical and cognitive health throughout life for the child. In the Netherlands, 84.9% of women start their pregnancy under primary care provided by midwives. The Royal Dutch Organization of Midwives guideline on prenatal care advises midwives to discuss health behavioural topics with pregnant women during the prenatal booking visit, usually between 6 and 8 weeks of pregnancy. The first aim of this video analysis study was to quantify the extent to which evidence-based health behaviour topics relevant for pregnancy were discussed with clients during the prenatal booking visit. The second aim was to assess the association of client characteristics with the extent of information provided to them. Thirteen topics regarding toxic substances, nutrition, maternal weight, vitamin supplements, and health promoting activities were categorized according to a predefined measurement tool, as either ‘never mentioned’, ‘briefly mentioned’, ‘basically explained’ or ‘extensively explained’.

The study showed that women who did not take folic acid supplementation, who smoked, or had a partner who smoked, were usually provided basic explanations and occasionally extensive explanations about these topics. The majority of clients were provided with no information on recommended weight gain (91.9%), fish promotion (90.8%), caffeine limitation (89.6%), vitamin D supplementation (87.3%), physical activity promotion (81.5%) and antenatal class attendance (75.7%) and only brief mention of alcohol (91.3%), smoking (81.5%), folic acid (58.4) and weight at the start of pregnancy (52.0%). The importance of having a nutritious diet was generally either never mentioned (38.2%) or briefly mentioned (45.1%). Fruit and vegetable consumption, fish intake and physical activity tended to be discussed with the focus on avoiding the possible risks associated with these health behaviours, rather than in promoting their benefits. Nulliparous women were typically given more information on most topics than multiparous women. Being overweight or obese was associated with more explanation about limiting vitamin A and less explanation about antenatal class attendance, but not associated with discussion of any nutritional topics, supplements, weight at the beginning of pregnancy, recommended weight gain, or physical activity. There were generally few notable differences in the extent of information provided to women across client characteristics.

We conclude that more extensive information regarding all pregnancy-relevant health behaviours should be provided to all women, and if possible tailored to their specific needs. The development of a guideline for midwives with specific information on what to convey to clients about health behaviours may be beneficial.
Chapter seven
This chapter summarizes the main findings of the studies and discusses methodological issues regarding the design, sample, measures and analyses of each study. Implications for practice and policy are then discussed in terms of the extent and structure of prenatal health education. Recommendations are given regarding the provision of standardized and tailored health education to pregnant women during the booking visit, the midwife relationship with her clients, the importance of sufficient and up-to-date knowledge by midwives about pregnancy-relevant health behaviours and the promotion of awareness by midwives of the specific needs of their clients. Recommendations for further research are discussed and provided. This chapter ends with the main conclusions of this thesis.