

# The frequency of pregnancy recognition across the gestational spectrum and its consequences in the United States

## INTRODUCTION

People recognize they are pregnant at gestational ages ranging from implantation to delivery, yet there is no comprehensive study that identifies the prevalence of pregnancy recognition at different points across this spectrum in the United States. To help clinicians, policymakers, researchers, educators, and public health advocates understand what is known about the spectrum of pregnancy recognition, this commentary integrates key research in three types of literature that have not been brought together before—retrospective studies of people who carried a pregnancy to term, studies of pregnant people presenting for abortion care, and postpartum studies of people who did not recognize their pregnancy until between 20 weeks and delivery. Our commentary also offers a corrective to the psychiatric literature's inaccurate description of later pregnancy recognition as “pregnancy denial,” which forecloses consideration of the physiological and sociological reasons a pregnancy might be undetected until after 20 weeks.

The term “pregnancy recognition” does not have a standard definition, so in this commentary we repeat the meaning used by each article we discuss. For example, in some research “pregnancy recognition” refers to the gestational age at which a person self-reports that they knew they were pregnant, but that research does not specify whether the subject is referring to a personal conclusion based on the first missed period or other pregnancy symptoms, a positive result from a home pregnancy test, or receiving the news (or confirmation of a home test) via urine test or ultrasound from a physician. In addition, some of these studies do not ask respondents whether they are counting weeks from when they believe fertilization occurred, from the first day of their last menstrual period (LMP), or somewhere in between. There is also no standard definition of “late pregnancy recognition,” so we state the meaning each article discussed ascribes to this term as well.

Research on “pregnancy recognition” typically treats this phenomenon as an instantaneous, binary process—an informational switch is flipped and an unrecognized pregnancy becomes a recognized pregnancy. However, Peacock and colleagues argue that pregnancy discovery should be understood as a complex process which includes the phases of assessing pregnancy risk, perceiving and

correctly interpreting signs and symptoms, and seeking confirmation, and that pregnancy should be acknowledged as a socially constructed phenomenon as well as a biological reality.<sup>1</sup> Similarly, Bell and Fissell suggest that the binary model of pregnant versus not pregnant does not capture many women's\* experiences and propose an alternate model that emphasizes ambiguities in determining or confirming a pregnancy.<sup>2</sup> A liminal state is the period or process when one is betwixt and between different social states.<sup>3</sup> The time between conception and delivery has been analyzed as a transformative liminal experience between being a non-parent and being a parent,<sup>4</sup> because physiological analyses of pregnancy “that only focus on [a woman's] pregnant body and growing fetus diminish her personhood.” However, the fact one can be physically pregnant without being cognitively pregnant (because there are no test results or detectable markers of pregnancy) raises the possibility that the pregnancy recognition process itself should be considered a liminal state. What type of knowledge should be defined as “pregnancy recognition” is an important consideration for future research. Here we simply note that some people may experience a gap between initial suspicion of pregnancy and full acknowledgement in their recognition process and that this gap is different than the phenomenon of “denial” of pregnancy which we discuss below.

Home pregnancy tests were introduced in the United States in 1977<sup>5</sup> and they became a blockbuster product in 1988 when the first one-step test was introduced. This new technology was revolutionary because it moved the locus of control of pregnancy discovery from the doctor's office to the home.<sup>6</sup> However, we speculate that the ubiquitous knowledge and use of home pregnancy tests in high-resource settings may create an informational anchor that leads people who have not had a contradictory personal experience to believe that everyone can, does, or should discover their pregnancy early and at home. What is lost in this cultural narrative of early pregnancy detection is the fact that only people who suspect they might be pregnant have a reason to take a home pregnancy test. The question this narrative forecloses is an important one: What happens when people who do not suspect they are pregnant are in fact pregnant? A better understanding of the true spectrum of pregnancy recognition could expand this narrative to be more accurate and inclusive.

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## THE SPECTRUM OF PREGNANCY RECOGNITION

Some people confirm pregnancy before a first missed period. The population that recognizes pregnancy extremely early—at implantation—is likely to only include parents of the approximately 1.9% of US infants born annually who are conceived using assisted reproductive technologies,<sup>7</sup> and people who are actively tracking signs of pregnancy at home with ovulation predictor kits and home pregnancy tests.

Some people who carry pregnancies to term learn they are pregnant shortly after their first missed period. In 2016, Branum and Ahrens published the first examination of trends in timing of pregnancy awareness for live births across the US in an analysis of the 1995–2013 data from the National Survey of Family Growth (NSFG).<sup>8</sup> This survey asked 17,406 women in the US who had one or more pregnancies within 5 years of the interview that did not end in abortion or adoption, “How many weeks pregnant were you when you learned that you were pregnant?” but it did not ask them how they knew they were pregnant. The average gestational age at time of retrospective self-reported pregnancy awareness was 5.5 weeks. Ayoola and colleagues analyzed data from the Pregnancy Risk Assessment and Monitoring System (PRAMS) of 136,373 women in 29 states who had a live birth within 6 months of contact in 2000–2004.<sup>9</sup> The PRAMS study, which also excluded people who chose abortion, asked subjects by mail or telephone survey, “How many weeks or months pregnant were you when you were sure you were pregnant? (e.g., you had a pregnancy test or a doctor or nurse said you were pregnant).” The median recognition was 4.1 weeks in the “early recognition” group ( $\leq 6$  weeks), and 10.6 weeks in the “late recognition” group ( $> 6$  weeks). In the PRAMS data set 7.5% of all subjects reported recognizing their pregnancy after 12 weeks.<sup>9,10</sup>

These analyses of the NSFG and PRAMS data sets report similar incidence of pregnancy discovery. Twenty-seven percent of NSFG respondents report pregnancy recognition after 7 weeks and 28% of PRAMS respondents report it after 6 weeks. In the PRAMS data set, 27% of those in the “late” category ( $> 6$  weeks) recognized their pregnancy at 12 weeks.

Unintended pregnancy is associated with later recognition of pregnancy. In a third analysis of the PRAMS data, Ayoola and colleagues found women with unintended pregnancies recognized them 2 weeks later than those with intended pregnancies (7.2 weeks vs 5.2 weeks).<sup>11</sup> Braunum and Ahrens report that in the NSFG data, “women with unwanted and mistimed pregnancies were more likely than those with intended pregnancies to learn of their pregnancies late” (p. 722). Ralph and colleagues surveyed 259 pregnant people with varied plans for pregnancy outcomes (25% presenting for prenatal care, 34% for abortion care, 31% for a pregnancy test, 10% for other health care) and patients reporting an unplanned pregnancy were more likely to take their first pregnancy test after 6 weeks compared to those with planned or ambivalent pregnancies (42% vs. 26%). Overall, 36% of these pregnant people took their pregnancy test at 6 weeks gestation or more and 21% did so at 7 weeks or more.<sup>12</sup>

People with unplanned pregnancies often seek abortion care<sup>13</sup> and because unplanned pregnancy is associated with later pregnancy recognition, research with people who had abortions adds an indispensable new dimension to research with people who had a live birth. The timing of pregnancy recognition may determine the type of abortion services available or whether abortion services are available at all in the United States, and the importance of this timing is about to increase. The US Supreme Court is likely to allow states to ban abortion before viability when it rules in *Dobbs v Jackson Women’s Health Organization* in 2022 and it has allowed the US state of Texas to effectively ban abortion after approximately 6 weeks LMP since September 1, 2021. “Medication abortion” is a type of induced abortion triggered by ingestion of the drug mifepristone, which can be followed by the drug misoprostol to increase efficacy. In the United States, the federal Food and Drug Administration has approved medication abortion through 10 weeks LMP,<sup>14</sup> and some US clinicians prescribe it off-label through 11 weeks LMP.<sup>15,16</sup> The availability of instrumentation abortion also decreases in the United States as gestational age increases through factors including legal restrictions, increasing cost, and provider availability. For example, in 2012 only 34% of all facilities that provided abortion in the United States offered the procedure at 20 weeks’ gestation; 16% did so at 24 weeks.<sup>17</sup>

A study of 458 women seeking abortion in Utah produced results comparable to those found in the NSFG and PRAMS data. Based on patients’ self-report of date or week of “pregnancy discovery” in response to the question, “When did you find out you were pregnant?” the authors report that 28% discovered their pregnancy later than 6 weeks LMP and 72% discovered it before that point.<sup>18</sup> However, this study did not report the gestational age at which the subjects sought abortion care, and because a small proportion of abortion patients (12%) end their pregnancies at or after 13 weeks,<sup>19</sup> random sampling of abortion patients may not capture the experience of people seeking later abortion services.

Research by Drey and colleagues helps fill this knowledge gap. They studied 398 women presenting for abortion, half in the first trimester and half in the second trimester.<sup>20</sup> Women having second-trimester abortions presented an average of 10 weeks later than those having first-trimester abortions and delay in suspecting pregnancy after a missed period was responsible for approximately one third of this difference (22 days). The mean number of days between missed period to suspecting pregnancy was higher for second-trimester patients than first-trimester patients (27.7 vs. 6) and the same was true for days between suspecting pregnancy to pregnancy testing (27.8 vs. 14.7). In this study, second-trimester patients were less certain about their LMP and had fewer pregnancy symptoms than first-trimester patients.

The Turnaway study also compared people seeking abortion at different gestational ages. Foster and colleagues recruited a national sample of 956 abortion seekers across the gestational age range—25% in the first trimester, 30% between 14 and 19 weeks, and 45% 20+ weeks.<sup>21</sup> In this study, 86% of women seeking a first trimester

abortion discovered their pregnancy within 8 weeks LMP. In contrast, 54% of those seeking early second-trimester abortion (14–19 weeks) and 67% of those seeking late second-trimester abortion (20–23 weeks) discovered their pregnancy after 8 weeks LMP. Eighteen to twenty percent of those seeking second-trimester abortions and 34% of those seeking abortions at 24+ weeks did not discover their pregnancy until 20+ weeks.<sup>22</sup> Using a hormonal contraceptive in the month of the fertilization event and never having given birth were factors associated with an increase in likelihood of later discovery of pregnancy, and some of the 31 subjects who participated in in-depth interviewed did not experience pregnancy symptoms.

In the Turnaway study patients who sought abortion care before 14 weeks (“the early group”) recognized pregnancy at an average of 5 weeks and patients who sought abortion care after 20 weeks (“the later group”) recognized it at an average of 12 weeks.<sup>22</sup> However, access delays increased the difference between when the early and later groups were able to receive an abortion by an additional 7 weeks. The average gestational age at termination in the early group was 8 weeks (3 weeks after average pregnancy recognition at 5 weeks), but it was 22 weeks in the later group (10 weeks after average pregnancy recognition at 12 weeks).<sup>23</sup>

Research by Blanchard and colleagues, Janiak and colleagues, and Finer and colleagues also contribute to knowledge of pregnancy recognition among second-trimester abortion patients. In all three of these studies, second-trimester abortion patients reported delay in pregnancy recognition as the third most common reason for delay in obtaining an abortion. Blanchard and colleagues asked 108 second trimester abortion patients in Iowa, Nebraska, New Jersey, and Pennsylvania about reasons for delaying care and 29.6% of patients checked “I did not realize I was pregnant/I did not have symptoms” in a self-administered questionnaire.<sup>24</sup> Janiak and colleagues analyzed referral records for 232 low-income people seeking abortion care between 19 and 24 weeks who were asked in an intake interview to name any factor that contributed to their delay in accessing abortion care; 21.6% reported that “having recently realized she was pregnant” was a factor (“recently” was not defined). Finer and colleagues reported that 58% of a nationally representative sample of 1209 patients surveyed in abortion facilities reported they would have preferred to have had their abortion earlier than they did; when this group was asked the reason(s) for delay, 36% checked the survey statement, “It took some time before I knew I was pregnant or how far along I was” (“some time” was not defined).<sup>25</sup> The mean time for second trimester abortion patients to suspect pregnancy was longer than for first trimester patients (56 days from LMP at 13+ weeks, vs. 28–38 days) and the same was true for time from suspecting pregnancy to taking a pregnancy test (16 days vs. 5–11 days).

Psychiatric and obstetric research on pregnancy recognition in the second half of the gestational spectrum (20+ weeks) among women with live births is another source of data, and it shines light on an underrecognized population. Unfortunately, this literature uses the misleading term “pregnancy denial” to describe women’s subjective lack of awareness of being pregnant after 20 weeks gestation and “complete” or “pervasive pregnancy denial” to describe not knowing

one is pregnant until labor or delivery. These problematic terms<sup>26–29</sup> play into the inaccurate cultural narrative that pregnancy is or always can be recognized early, and therefore someone who says they did not know they were pregnant until a later gestational age must be lying. “Pregnancy denial” suggests the woman must have been aware of her pregnancy at some level because “denial” is a psychological defense in which one avoids awareness of an emotionally painful aspect of reality. The term also has a quasi-criminal connotation because “denial” (or confession) is the response of a person accused of something. However, “pregnancy denial” is not included in International Classification of Disease (ICD-10) or the Diagnostic and Statistical Manual (DSM-5). Therefore, we recommend substituting neutral terms, like “pregnancy recognition” or “unrecognized pregnancy,” when possible. This change in terminology also has the advantage of distinguishing lack of pregnancy awareness from the phenomenon of “concealed pregnancy,” which occurs when a woman knows she is pregnant but intentionally hides it from others.

The epidemiologic research on the frequency of women who did not recognize they were pregnant until between 20+ weeks and labor or delivery comes from Germany, France, the United Kingdom, and Australia. It is unclear whether the incidence of this in the United States would be comparable, higher, or lower given differences between countries, such as access to universal health care, contraceptive access, systems of sex education, and levels of income inequality. However, collectively this research provides clues to what the late end of the pregnancy recognition spectrum might be in the United States.

In a study of German women with unrecognized pregnancies ending in births, Wessel and Buscher found pregnancy was not recognized until after 20 weeks in one in 475 births.<sup>30</sup> In a study of French women with no pregnancy diagnosis until after 20 weeks gestation, Simermann and colleagues found pregnancy was not recognized until after 20 weeks in one in 300 births.<sup>31</sup>

People who do not recognize they are pregnant until labor or delivery are at the latest end of the pregnancy recognition spectrum. Lack of pregnancy recognition until labor or delivery happens more frequently than other widely known serious complications of pregnancy, like eclampsia<sup>32</sup> and vasa previa,<sup>33</sup> and occurs at a rate three times more common than triplets.<sup>30</sup> In the German study, pregnancy was not recognized until labor or delivery in 1 in 2455 births<sup>30</sup> and in a study of women at a hospital in the United Kingdom who said they did not know they were pregnant until hospital admission in labor, Nirmal and colleagues found a similar rate.<sup>34</sup> In a study of women with pregnancies diagnosed intrapartum at an Australian hospital, Schultz and colleagues found a rate of one in 1420 pregnancies.<sup>35</sup>

There may be something physiologically different about some of these pregnancies that makes them go unnoticed, rather than a psychological problem that leads these people to ignore the reality of their pregnancies. One reason some people do not recognize they are pregnant until after 20 weeks is absence of typical physical manifestations of pregnancy, like amenorrhea, weight gain, nausea, and fetal movements. For example, over half of women with pregnancies diagnosed after 20 weeks’ gestation in the German and Australian studies

report menstrual like-bleeding during unrecognized pregnancies.<sup>29,35</sup> In other cases, symptoms of pregnancy are present but misinterpreted or go unnoticed. For example, 15% of women reported the use of oral contraception during their unrecognized pregnancy in the German group,<sup>29</sup> which may explain why some women would misinterpret or ignore symptoms they might otherwise associate with pregnancy. Women who are susceptible to late pregnancy recognition may be at risk in subsequent pregnancies. In the UK study, 8% of women with “surprise deliveries” reported having had already experienced a prior surprise delivery.<sup>34</sup>

Health care providers do not recognize these women's pregnancies in some cases, a fact that supports the hypothesis that there may be something physiologically different about some of these pregnancies. In the German study, 38% of women with pregnancies not detected until after 20 weeks' gestation visited a doctor during their pregnancy without being diagnosed with pregnancy, although these doctors “were generally not gynecologists.”<sup>29</sup> Schultz and Bushati reported a case of a woman in Australia who had a surgical repair of an umbilical hernia 2 months prior to giving birth without the surgeon detecting the pregnancy,<sup>35</sup> and Stammers and Long reported a case of a 23-year-old woman in the United States who was on an oral contraceptive pill and went to her primary care physician several times for generalized myalgia, malaise, and recurrent urinary tract infections, including 2 days prior to delivery at 35 weeks' gestation, without a pregnancy diagnosis.<sup>36</sup>

The lack of pregnancy recognition can extend to the pregnant person's partners, families, and friends. In the German study, over 80% of the women who recognized their pregnancies after 20 weeks had a partner, including 65% who lived with her partner. In the Australian study, 50% of the women who had a surprise birth following an unrecognized pregnancy were in a relationship at the time of delivery and presumably the partner did not detect the pregnancy either.<sup>35</sup> Yet instead of affirming the subjective experience of these people and their contacts, the psychiatric literature uses the term “collective denial” to describe the phenomenon of family, partners, and medical providers also not recognizing a pregnancy.<sup>37</sup>

People who do not recognize pregnancy until 20+ weeks are a heterogeneous group. The initial hypothesis was that women experience pregnancy denial when unable to psychologically tolerate the reality of pregnancy in social systems where unwed motherhood is highly stigmatized.<sup>37</sup> However, contemporary research shows that there is no single profile of people who experience unrecognized pregnancies. The age range of women with unrecognized pregnancies after 20 weeks mirrors the reproductive age span<sup>38</sup> with a mean maternal age ranging from 24.8<sup>34</sup> to 30.6<sup>35</sup> in empirical studies published since 2000. In the German study, upwards of 70% of women with unrecognized pregnancy had prior pregnancies,<sup>38</sup> making limited sexual or reproductive experience an unlikely explanation for lack of pregnancy recognition. In a US study of infants born to mothers without prenatal care, Friedman and colleagues noted that around 70% of women with pregnancies not recognized until the onset of labor or birth had a supportive mother, undermining the hypothesis that women with unrecognized pregnancies are typically paralyzed by fear of familial rejection.<sup>39</sup>

Pregnancies that are recognized after 20 weeks and continued to delivery are associated with higher-than average rates of negative maternal and infant health outcomes. Preterm birth, low-birth weight, pre-eclampsia and eclampsia, and neo-natal intensive care unit admissions are reported at relatively high rates.<sup>34,39,40</sup> The reported stillbirth rate among babies born following pregnancies recognized after 20 weeks through intrapartum ranges from 1.5% to 5%<sup>31,40</sup> compared to a stillbirth rate in high-income countries of 0.5%.<sup>41</sup> In the UK study, the stillbirth rate among people who did not recognize pregnancy until labor and delivered at a hospital was 8%.<sup>34</sup> While lack of prenatal care and potentially more underlying medical or social problems are potential factors, this associated morbidity and mortality is an additional reason to consider the hypothesis that physiological differences may contribute to these pregnancies going unrecognized.

In some cases, the unrecognized pregnancy is welcome and in others it is unwanted. Nearly 90% of babies went home with their mothers in the French study of women with no pregnancy diagnosis until 20+ weeks,<sup>31</sup> suggesting that delayed pregnancy recognition is not evidence that a child is necessarily unwanted or that the mother is too symptomatic from a mental illness to parent. Rarely, surprise deliveries end tragically with the mother killing the baby, as Spinelli described in a case-series of 16 women in the United States who delivered alone and were then charged with homicide “after they could not account for the dead infant.”<sup>42</sup> Other cases end with the baby dying of natural causes or the risks inherent in an unassisted birth, and sometimes that heartbreak is compounded by unfounded legal charges against the mother.

## THE CONSEQUENCES OF PREGNANCY RECOGNITION TIMING

There is no standard definition of what constitutes “pregnancy recognition” and for many women pregnancy recognition is a complex process rather than a binary one. Therefore, researchers in this area should carefully consider, define, and state what knowledge, event, or process they have chosen to investigate. The timing of pregnancy recognition is related to other critical aspects of people's pregnancy trajectories, including deciding between abortion and childbearing, and seeking prenatal care, and additional research on the spectrum of pregnancy recognition, and the physiological and social factors that shape it, is needed.

Clinicians should be aware that unrecognized pregnancy is not only possible but it can lead to negative outcomes, because it is associated with significant health risks to mother and baby for those who deliver, and with delays and obstacles for those who seek later abortion. Therefore, clinicians should consider the possibility of pregnancy in all reproductive age people with a uterus irrespective of contraceptive use, conditions that reduce fertility, reported last menses, or relationship status. People who experience an unrecognized pregnancy should be offered emotional support, including reassurance that this is a known medical condition. In the event of pregnancy recognition after 20 weeks, after patients are supported in their decision to continue or terminate their current pregnancy, they should be counseled

that people with a prior unrecognized pregnancy are at risk for future unrecognized pregnancies, and about potential strategies to mitigate this, such as using the most effective contraception possible for those seeking to avoid future pregnancy and occasional self-monitoring with home pregnancy tests or regular medical follow-up for all. Those who have surprise deliveries should be reassured that this is not indicative of a lack of capacity for parenting and, depending on the circumstances, referral to a therapist may be helpful in the adjustment to parenting. Future research on the physiological reasons pregnancies may go unrecognized could benefit these patients and their infants.

Policymakers should be aware that new proposals for lower gestational age bans on abortion do not affect all pregnant people in the same way. Informed decision-making requires knowledge of one's medical condition, but variation in the timing of pregnancy recognition means some people will have less, or even no, time to decide whether to end or continue their pregnancy. However, like pregnant people who learn their fetus has a severe anomaly later in pregnancy, people who do not discover they are pregnant until later in pregnancy are often responding as quickly as they can.

Lawyers in the criminal justice system should use this information to prevent unjust legal charges against or convictions of women for their actions (or inaction) after a surprise delivery that prosecutors or juries misconstrue as an intentionally concealed pregnancy.

The incidence of late pregnancy recognition might be reduced if policy makers and public health professionals worked to make free pregnancy tests easily available and if educators taught young people the symptoms of pregnancy, how to use home pregnancy tests, and the advantages of quick pregnancy recognition during classes on sexual or health education. Public health campaigns could also teach these facts to people who are no longer in school.

Additional research on this topic is warranted. Increased knowledge about variation in pregnancy recognition and its causes in the United States and other countries could increase pregnant people's options and dignity and it could improve the health of pregnant people and their infants.

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#### ENDNOTE

\*Most of the research on pregnancy suspicion and recognition explores the experiences of "women" and "girls." We recognize that not all pregnancy capable people identify as women and girls. However, in this commentary we repeat the language used in each article.

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