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## **Women's views about the timing of birth**

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## **Disclaimer**

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**Abstract** (239 words)

**Background:** Estimated date of birth (EDB) is used to guide clinical management of women during pregnancy and birth, although its imprecision is recognised.

Alternatives to the EDB have been suggested for use with women however their attitudes to timing of birth information have not been examined.

**Aims:** To explore women's expectations of giving birth on or near their EDB, and their attitudes to alternative estimates for timing of birth.

**Methods:** A survey of pregnant women attending four public hospitals in Sydney, Australia, between July and December 2012.

**Results:** Among 769 surveyed women, 42% expected to birth before their due date, 16% after the due date, 15% within a day or so of the due date, and 27% had no expectations. Nulliparous women were more likely to expect to give birth before their due date. Women in the earlier stages of pregnancy were more likely to have no expectations or to expect to birth before the EDB while women in later pregnancy were more likely to expect birth after their due date. For timing of birth information, only 30% of women preferred an EDB; the remainder favoured other options.

**Conclusions:** Most women understood the EDB is imprecise. The majority of women expressed a preference for timing of birth information in a format other than an EDB. In support of woman-centred care, it may be helpful to ask each woman how she would like to receive estimated timing of birth information.

*Keywords:*

Pregnancy; estimated date of birth; expectations; preferences; women; survey

**Summary of Relevance (words = 89)**

**Problem or Issue:** A woman's estimated date of birth is used to guide clinical decisions during pregnancy and birth, but its imprecision may lead to unrealistic expectations or confusion.

**What is Already Known:** Women's views about timing of birth information are not known.

**What this Paper Adds:** Evidence that most women understand the EDB is an approximation only, and most women prefer timing of birth information in a format other than a specific date. Discussions with each woman about her birth preferences should include timing of birth information options.

**Introduction (2303 words)**

The estimated date of birth (EDB) is a single date that indicates a pregnant woman's likely timing of childbirth. The EDB is vital for both clinicians and expectant mothers because the date informs the planning and, where appropriate, timing of obstetric interventions including inductions and planned caesarean sections. It also helps women to prepare emotionally and socially for childbirth and recovery postpartum.<sup>1</sup>

The EDB is determined primarily by two means: last menstrual period (LMP); and ultrasound assessment of fetal size parameters. The reliability of using the LMP for estimations of birth is limited by women's ability to accurately recall the date, the regularity of women's menstrual cycles, and the assumption that ovulation occurs midcycle for all women.<sup>2</sup> Ultrasound dating of pregnancy also has limitations arising from differences in operator skill, image quality, women's body shape and fetal position.<sup>3</sup> Furthermore, it assumes that all fetuses are the same size at early gestations, and that any differences in size are due to differences in the duration of

pregnancy or potential fetal compromise. Accuracy of the EDB using either technique is also influenced by factors such as normal variations in the length of gestation<sup>4</sup> as well as women's age, parity and ethnicity.<sup>5, 6</sup>

Clinicians understand both dating methods are imprecise;<sup>7</sup> only 5% of neonates are born on the EDB,<sup>7</sup> 33% are born within one week of the EDB and 66% are born one week either side of this date.<sup>8</sup> Some have questioned whether the specificity of the EDB is helpful or necessary.<sup>9</sup> Alternative ways for communicating timing of birth information to women other than the EDB have been proposed. Whitehouse suggested that providing women with a delivered-by-date at 42 weeks after the LMP would decrease maternal anxiety and encourage women to see delivery at any week of term pregnancy as normal.<sup>10</sup> Others have suggested use of the EDB be eliminated, especially in early pregnancy, and instead at 32 weeks women be given an individualised 'assigned week of delivery' depending on their clinical circumstances.<sup>9</sup> To the best of our knowledge, no studies have been conducted that have explored women's views about the EDB or their preferences for alternatives.

In recent years, there have been increasing calls for maternity care to be more woman-centred.<sup>11-14</sup> Feedback from women can help inform how best to meet their information and care needs. The aims of this study therefore were to explore women's views about the timing of birth, specifically, their expectations of giving birth on or near their EDB, and their attitudes to alternative estimates for timing of birth.

## **Methods**

Pregnant women attending antenatal clinics at four public hospitals in Sydney, Australia, between July and December 2012, completed a short anonymous survey while waiting for their appointment. The survey comprised 26 items that captured

demographic and pregnancy details, as well knowledge about, and attitude towards various aspects of pregnancy and birth. The survey was pilot-tested with 10 pregnant women and 30 women of childbearing age to ensure readability and clarity. Minimal wording changes were made. The final survey took approximately 5 minutes to complete. Further details of the survey and recruitment strategy are described elsewhere.<sup>15</sup>

Two survey items are the focus of this paper. To explore women's expectations about the timing of birth relative to their EDB, they were asked: "Personally, when do you think you will give birth?" The options were: "within a day or so of my due date", "sometime before my due date", "sometime after my due date", and "I have no expectations".

To gauge women's preferences for timing of birth information, they were asked: "Although pregnant women are given a due date, most women do not deliver on the exact day for many reasons. Of the options below, which one do you most prefer?" The following options were provided (the percentages shown were based on published estimates<sup>16</sup>):

- I would prefer to be given an exact due date, knowing that I had a 5% chance of giving birth on that day.
- I would prefer to be given an estimated week of birth, knowing that I had a 35% chance of giving birth sometime in that week.
- I would prefer to be given an estimated fortnight of birth, knowing that I had a 65% chance of giving birth during that two-week period.
- I would to be given the latest date by which I will almost certainly give birth (99% chance).
- Other (please specify)

The analysis for this study included percent tabulations and contingency tables to describe the study sample characteristics. We anticipated that multiparous women's views about expected timing of birth may be influenced by previous birth experiences. Therefore, nulliparous and multiparous women's responses about expected timing of birth were analysed separately and compared using Chi-square tests.

Multivariate logistic regression was used to examine the association between women's responses to the two survey items and the following potential explanatory factors (also collected in the survey): maternal age, country of birth, level of education, current working status, gestation at time of survey, multiple pregnancy, parity, and expecting a caesarean section. A p-value of 0.05 was considered statistically significant. All analyses were performed using SAS, version 9.3 (SAS Institute, Cary NC, USA). Ethical approval was obtained from the Northern Sydney Local Health District Human Research Ethics Committee prior to study commencement (LNR/12/HAWKE/151).

## **Results**

Of the 850 women who were invited to participate, 784 completed the survey (response rate 92%). The majority of surveyed women were over 30 years of age, held a university degree or higher (62%), and were in the third trimester of pregnancy (Table 1).

Among the 769 women who responded to the question about expected timing of birth, 42% expected they would birth sometime before their due date, 16% sometime after their due date, 15% within a day or so of their due date, and 27% had no expectations (Table 2). The expectations of nulliparous women were significantly

different from those of multiparous women ( $\chi^2=15.4$ ,  $p=0.002$ ): nulliparous women were much more likely to expect to give birth before their due date (Table 2).

The following explanatory factors were significantly associated with women's expectations about their timing of birth: gestation at time of survey ( $p<0.001$ ), multiple pregnancy ( $p=0.005$ ), parity ( $p=0.002$ ), and expecting a caesarean section ( $p<0.001$ ) (Table 3). Women who completed the survey early in pregnancy ( $\leq 24$  weeks) were more likely to have no expectations about their timing of birth; those between 25 and 36 weeks were more likely to expect birth sometime before their due date; and those at term ( $\geq 37$  weeks) were more likely to expect birth after their due date. None of the women with a multiple pregnancy expected to give birth after their due date. Women who were nulliparous or expecting a caesarean section were more likely to expect to give birth sometime before their due date (Table 3). The other maternal demographic factors examined were not significantly associated with women's expectations ( $p>0.1$ ).

With respect to women's preferences for timing of birth information, 30% preferred to receive a single EDB, 34% an estimated week of birth; 15% an estimated fortnight of birth; 19% the latest date by which I would give birth; and 2% other (e.g., 'I have no preference', 'when the baby is ready'). None of the maternal explanatory factors we examined were significantly associated with these responses ( $p>0.1$ ).

## **Discussion**

This is the first Australian study to explore women's expectations about their timing of birth and their preferences towards timing of birth information. Four out of 10 women expected to give birth before their EDB. Nulliparous women were more likely than multiparous women to expect birth before their due date. Women in the earlier stages of pregnancy were more likely to have no expectations or to expect to birth

before the EDB. Women in later pregnancy, whose chances of birthing before the EDB had diminished, were more likely to expect birth after their due date. Women's preferences for timing of birth information showed that about one-third preferred to receive a specific date (i.e., an EDB); the remaining majority favoured other options like an estimated week or fortnight of birth, or the latest date by which birth is almost guaranteed.

Less than 15% of women believed their baby would be delivered within a day or so of the EDB, suggesting that most women understood that the EDB is imprecise and/or only an estimate. Approximately 40% of women believed they would give birth before the EDB. In NSW, there has been a gradual left shift in the gestational age at birth, with the modal gestational age declining from 40 to 39 weeks gestation and over 50% of women giving birth before their EDB.<sup>17</sup> It is possible that women are accepting that birth before the EDB is 'normal' or common, perhaps informed by their own past experiences or those of family and friends. Another potential explanation may relate to how the EDB is interpreted. Colloquially, the EDB is known as the 'Due Date' which, in everyday settings, often means the last date by which a substance is viable or a task is to be completed. Being overdue also carries negative connotations. For these reasons, perhaps some women were biased towards expecting an earlier birth rather than a later one.

Gestation at the time of the survey was associated with expectations about the timing of the baby's birth. Women who completed the survey earlier in pregnancy were more likely to have no expectations about the timing of birth than women of later gestations. For many women in early pregnancy, the timing of labour and birth can seem like a long way away. Conversely, for women who have already reached early term, the likelihood of an early birth diminishes with every passing day. It is therefore



interesting that a sizeable proportion of women at term still expected (perhaps hoped) that their baby would arrive before the EDB.

In the present study, women were presented with different options for estimated timing of birth information (that is, a day, a week, a fortnight, the latest possible date of birth) combined with an indicative percentage of the accuracy of each estimate. Some women find a definite date helpful to prepare for the arrival of their newborn. Anecdotally, women have commented that having an exact date assists with organising travel arrangements for family visiting from afar, or applying for parental leave and childcare services. However, most women expressed a preference for other types of estimates for timing of birth.

In the present study we do not know to what extent women used the accuracy estimates when making their decision about preferred timing of birth information. Only 19% of the women chose the option with the highest accuracy (the latest date by which I will almost certainly give birth, 99% chance). However, this certainty is coupled with the longest possible length of pregnancy, which may be relatively unattractive to many women. At the same time, the relatively poor predictive value of a specific date (i.e., EDB, 5% chance) and the stress associated with what can become a 'deadline' date may also make it less appealing or helpful to women. We suspect many of the women in our sample chose one of the other two options (an estimated week or fortnight of birth) as these offered "better odds" but also possibly less stress than a definite date or a prolonged length of pregnancy; further research would help elucidate this.

It has been argued that decision-making involves two parallel processing systems: a rational system that is primarily conscious and guided by rules of logic and evidence; and an experiential system that operates more automatically and is influenced by

emotion and past experience. In any given decision-making situation, the greater the emotional involvement the greater the influence of the experiential system.<sup>18</sup> In the current study, the majority of women rejected the option for timing of birth information with the best odds (latest date for birth, 99% chance). This may suggest this decision had high emotional content for many women. There is also evidence that many people find quantitative information difficult to understand and use, in large part due to limited quantitative literacy.<sup>19</sup> At the same time, numeric information presented as simple frequencies (1 in 4) or percentages (25%) is generally easier to understand than other formats such as fractions (1/4) or decimals (0.25).<sup>19</sup> Although we used percentages in our study, it is possible some women did not know how to interpret them and did not use them at all.

Our study included a large sample size, multiple survey sites as well as a very high response rate. However our study did not account for women in rural settings, those who have private healthcare and those of non-English speaking backgrounds. These factors may limit the generalisability of our results. We considered a number of potential explanatory factors (demographic and pregnancy-related) that may have been associated with women's views about timing of birth. Nonetheless, factors such as information sources the women may have accessed, for example, clinical staff, antenatal classes, online resources, books and magazines, past personal experience, and advice from family and friends, were not collected in the current short survey, and could be the focus of further research.

## **Conclusion**

Despite the imprecision of the EDB, clinically it supports important management decisions including evaluations of fetal growth and development, the timing of pregnancy tests, and decisions around obstetric interventions such as induction or caesarean section. Women also need timing of birth information to help them

prepare for and plan during their pregnancy, birth and life afterwards with their newborn. The findings from this study suggest that while some women favour receiving an EDB, many women may prefer less specific estimates for their timing of birth. In the spirit of promoting woman-centred care, clinicians should consider discussing other options like an estimate week or fortnight of birth with the women they care for.

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**Table 1:** Characteristics of survey respondents (N = 784)<sup>a</sup>

<b>Characteristic</b>	
Maternal age (mean (SD), years)	32 ( $\pm$ 5)
<25 years	37 (5%)
25-34 years	481 (62%)
$\geq$ 35 years	253 (33%)
Country of birth other than Australia	298 (39%)
Tertiary education	475 (62%)
Employed in paid work	472 (62%)
Gestational age at time of survey (mean (SD), weeks)	30 ( $\pm$ 8)
Multiple pregnancy	59 (8%)
Nulliparous	379 (48%)
Gestational age at previous birth (multipara, n=404, mean (SD))	39 ( $\pm$ 3)

<sup>a</sup> Missing data on some variables, maximum N=17

Abbreviations: SD, standard deviation

**Table 2:** Women's responses about expected timing of birth (N=769)<sup>a</sup>

	All women	Nulliparous	Multiparous <sup>b</sup>
	N=769	N=373	N=396
<b>Expectations about timing of birth</b>	N (%)	N (%)	N (%)
Within a day or so of my due date	114 (15)	48 (13)	66 (17)
Sometime before my due date	326 (42)	185 (50)	141 (36)
Sometime after my due date	123 (16)	53 (14)	70 (18)
I have no expectations	206 (27)	87 (23)	119 (30)

<sup>a</sup> Missing data N = 15

<sup>b</sup> Nulliparous vs Multiparous,  $\chi^2=15.4$ , p=0.002

**Table 3:** Association between maternal obstetric factors and women's responses about expected timing of birth (N=769)<sup>a</sup>

Explanatory factors	Expectations about timing of birth				p-value
	Within a day or so of my due date, N=114 %	Sometime before my due date, N=326 %	Sometime after my due date, N=123 %	I have no expectations, N=206 %	
Maternal age					0.97
<25 years	4	5	4	5	
25-34 years	64	62	61	64	
≥35 years	33	33	35	31	
Country of birth other than Australia	68	63	58	57	0.14
Tertiary education	62	59	70	60	0.24
Employment in paid work	63	60	60	63	0.81
Gestation at time of survey					<0.001
≤24 weeks	27	25	26	37	
25-36 weeks	41	55	32	42	
≥37 weeks	32	21	42	21	
Multiple pregnancy	9	10	0	8	0.005
Parity - nulliparous	42	57	43	42	0.002
Expecting caesarean section	12	29	2	12	<0.001

<sup>a</sup> Missing data N = 15