

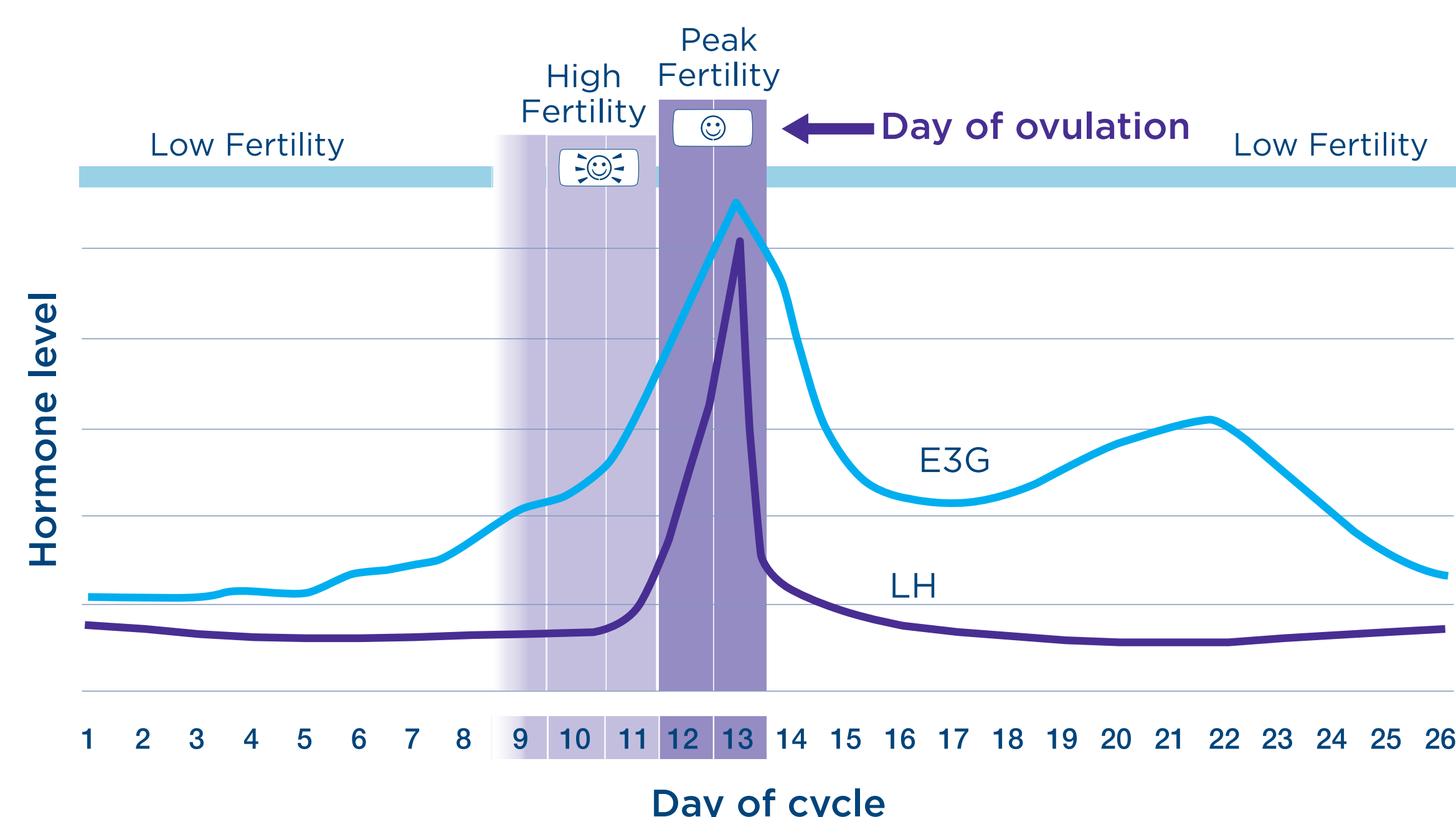
Connected ovulation testing: User's experience

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Background

- There are only a limited number of days in a woman's cycle where unprotected intercourse can lead to pregnancy, known as the fertile window
- Timing of intercourse to the fertile window maximises chances of natural conception, and has been shown to reduce the time to pregnancy
- Home ovulation tests, especially those that measure estrogen as well as luteinising hormone (LH) to identify the full fertile window, provide an accurate tool for timing intercourse
- Free apps are now very popular but can lack accuracy
- A new connected ovulation test aims to combine the accuracy of hormone measurements with the convenience of an app (Figure 1)

Figure 1: Clearblue Connected Ovulation Test System enables monitoring of hormone levels to identify the fertile period. This test determines three phases of fertility: Low (LH and estrogen metabolite E3G at baseline), High (E3G rise from baseline), and Peak (LH surge detected). Bluetooth® connectivity enables test results to be synced to an app. Users can add intercourse, menses and cycle data to the app, and the app also indicates testing days.



Objective

- This study sought to examine whether a new connected ovulation test with an app provides additional benefits to women trying to conceive

Methods

- This was a home-based study of women trying to conceive or wishing to do so in the future
- Women were recruited (n=287) to use the Clearblue Connected Ovulation Test System for one menstrual cycle. During the study, volunteers were required to complete several questionnaires regarding usage experience: a connectivity assessment as soon as they pair their device via Bluetooth® (n=229) and a usability questionnaire after 4 weeks (n=226)
- A system usability questionnaire was completed at the end of the study (n=221). This is an industry tool designed to assess whether an app is robust. Note: scores are not on a percentage scale, a score of 68 or above is considered acceptable and deemed as positive feedback. An example of this questionnaire is shown in Figure 2

Figure 2: System usability questionnaire.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1. I think that I would like to use this app frequently	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I found the app unnecessarily complex	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I thought the app was easy to use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I think that I would need the support of a technical person to be able to use this app	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I found the various functions in this app were well integrated	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I thought there was too much inconsistency in this app	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I would imagine that most people would learn to use this app very quickly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I found the app very cumbersome to use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I felt very confident using the app	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I needed to learn a lot of things before I could get going with this app	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Volunteers were also randomly selected for qualitative interview (n=39)

Results

- Users were successfully able to connect their holders, conduct tests and sync the results to the app
- Both Android and iOS users reported the app to be easy to use at the 4-week questionnaire (92.5% and 96.3% respectively) (Table 1)
- The end-of-study system usability questionnaire demonstrated that the app met users' requirements, with 85.5% of Android users and 88.9% of iOS users scoring the app as above average
- User daily usage diaries were compared to the device results stored in the Cloud; there was 99.0% and 100.0% agreement of data for Android and iOS respectively
- Daily diaries also found users had a good experience, with 82.7% (Android) and 72.0% (iOS) of daily app experiences ranked as very positive
- Most women added intercourse/menses data, with an average of 9 data entries/cycles
- Qualitative interview data found some women were fearful of connecting the device at the beginning, but most found it a smooth experience
- Benefits of the test were articulated as providing immediate access to data, assisting with cycle monitoring, accuracy, reminders on when to test and being able to keep data in one place

Table 1: Cumulative percentage of volunteers scoring 3 (on 7-point Likert Scale where 1 is very easy) or less in the 4-week system usability questionnaire

Question	Android		iOS	
	Number answered question	% scoring 3 or less	Number answered question	% scoring 3 or less
How EASY was the test to use?	197	98.0	27	100.0
How EASY was the smartphone app to use?	199	92.5	27	96.3
How CLEAR was the advice in the smartphone app?	199	94.5	27	96.3
How EASY TO READ were the test results on the app?	197	95.9	27	96.3

Discussion

- Women can now keep pertinent, accurate fertility information on an app to help them conceive naturally or, if unsuccessful, share with their healthcare professional
- The individual, anonymous test data for users are available in the Cloud, so can be used to understand women's behaviour and examine cycle/fertility level characteristics in women
- This can provide insights to improve tests and understand fertility characteristics of the population

Declaration of interest

Authors are employees of SPD Development Company Ltd, a wholly owned subsidiary of SPD Swiss Precision Diagnostics GmbH, the manufacturer of Clearblue pregnancy and fertility tests. The study was funded by SPD Development Company Ltd. Poster intended for UK audience.

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