

# Detection of the fertile window using a wearable medical device and the calendar method: A comparative study

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## Introduction

- The calendar method remains a popular Natural Family Planning (NFP) method among conception-seeking women for its relative ease of use.<sup>1,2</sup> However, it makes erroneous assumptions about a woman's cycle, rendering it imprecise.<sup>3-5</sup>
- Tracking several physiological parameters simultaneously, wearable sensor technology learns each woman's cycle and detects the fertile window with up to 90% accuracy.<sup>6</sup>
- Research aim:** To compare the performance of traditional NFP calendar methods to an individualized, AI-driven wearable device in predicting the fertile window (FW)

## Methods

- Design:** Retrospective analysis of data from a clinical sample where women (n=34) wore Ava Fertility Tracker daily for up to 1 year or through pregnancy and recorded  $\geq 3$  cycles.
- Ava Fertility Tracker measures:
  - Wrist skin temperature
  - Pulse rate
  - Respiratory rate
  - Skin perfusion
  - Heart rate variability (HRV)
- Predicted FW for each cycle using the following calendar methods:
  - Standard Days Method**<sup>3,5,7</sup>: Cycle days 8-19
  - Rhythm Method**<sup>5,7</sup>: Begins day  $x - 18$  and ends day  $y - 11$ , where  $x$  and  $y$  represent the shortest and longest cycle durations, respectively, in the last 3 months
  - Alternate Rhythm Method**<sup>7</sup>: Begins cycle day  $\frac{x}{2} - 5$  and lasts for  $y - x + 8$  days, where  $x$  and  $y$  represent the shortest and longest cycle durations, respectively, in the last 3 months
- Calculated each method's accuracy, precision, and specificity based on its predicted FW compared to a reference standard (LH-determined FW)
  - Accuracy:** Percentage of correct predictions, regardless of cycle day
  - Precision:** Percentage of days predicted as fertile that were actually fertile
  - Specificity:** Percentage of days predicted as infertile that were actually infertile

## Conclusion

- Wearable technology can provide more accurate, precise predictions of the FW than traditional calendar methods.
- Our findings have implications for women across the reproductive lifespan; whether trying to conceive or minimize the number of days requiring back up contraception, wearable technology represents a significant step forward in individualized, AI-driven healthcare.

## Results

Figure 1. Ava Fertility Tracker and its mobile application.



Figure 2. Boxplot distribution representing the 25/50/75% percentiles of the fertile window start and end for each method.

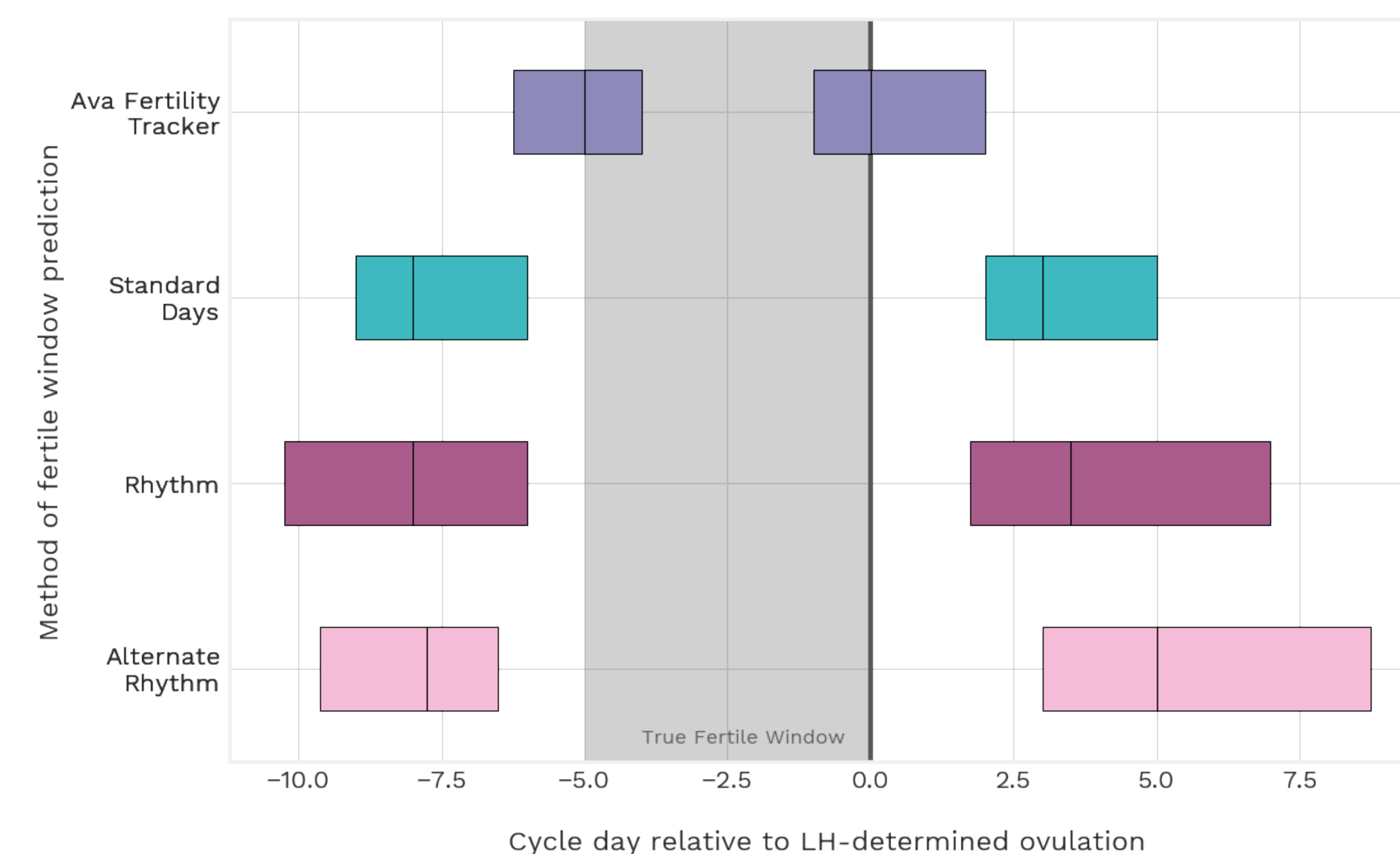


Table 1. Performance statistics for each method

	Accuracy	Precision	Specificity
Ava Fertility Tracker	88.1% (5.2%)	73.0% (13.5%)	91.5% (5.7%)
Standard Days	76.4% (5.0%)	48.1% (4.3%)	71.5% (3.7%)
Rhythm	75.8% (9.3%)	48.6% (8.8%)	61.6% (2.0%)
Alternate Rhythm	73.0% (10.1%)	45.9% (8.9%)	59.5% (2.0%)

Note: Mean values reported, with standard deviations in parentheses.

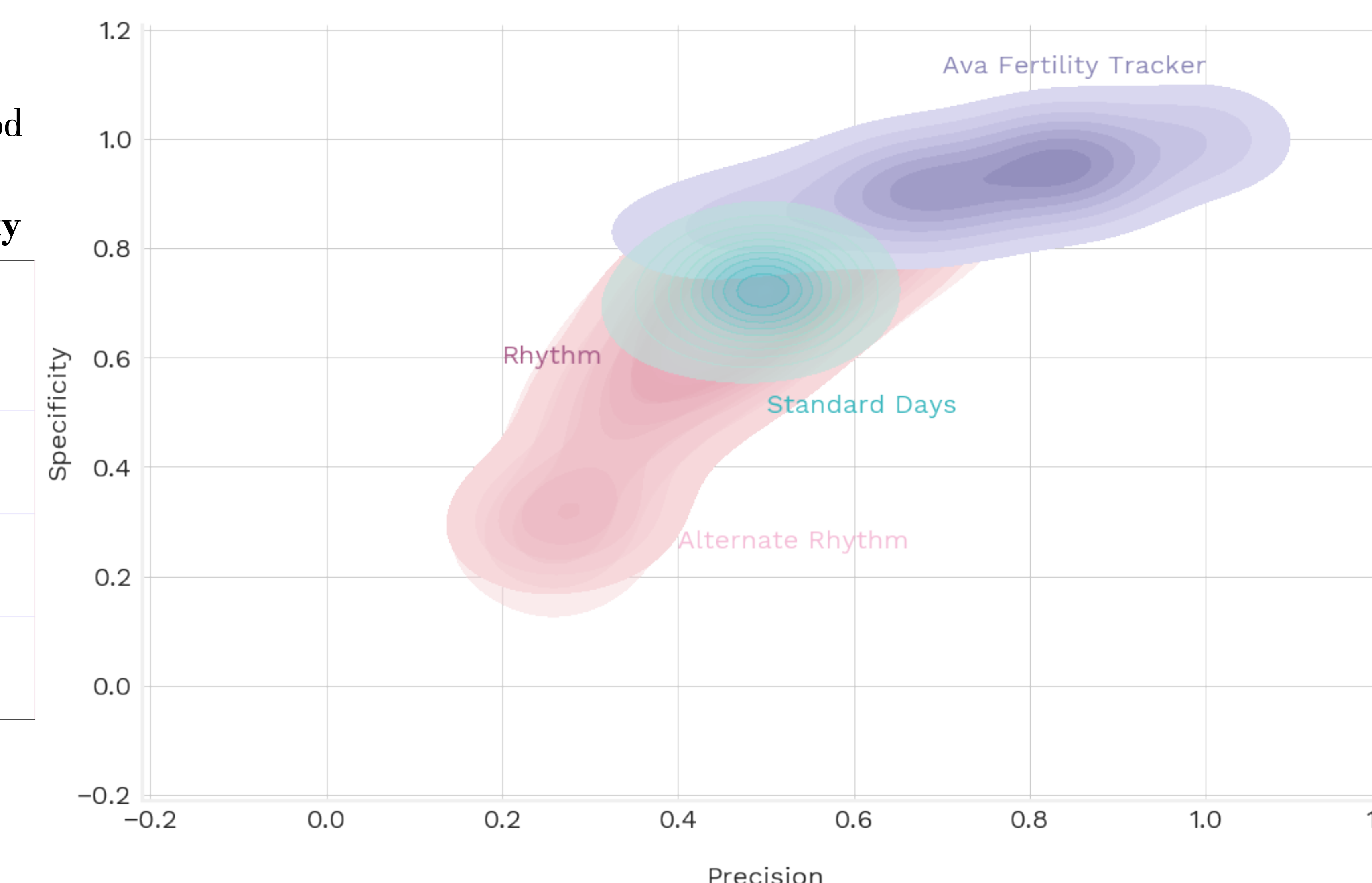


Figure 3. Tradeoff between specificity and precision for each method.

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