

Multi-centre assessment of the efficacy of CHLOE-EQ (Fairtility) in automatically assessing zygotes on Day 1

Knight, Samantha¹; Joshi, Raj¹; Venkataraman, Suvir¹; Venkat, Geetha¹; Cawood, Suzanne²; Vasilic, Mina²; Mahews, Rebecca³; Dodge, Sally³; Thompson, Andrew⁴; Mania, Anastasia⁵; Ippokras, Sarris⁵; Zepeda, Alexa⁶; Bergelson, Noam⁶; Brualla, Adriana⁶; Hickman, Cristina⁶

¹Harley Street Fertility Clinic, United Kingdom

²CRGH, United Kingdom

³CRGW Plymouth, United Kingdom ; ⁴CRGW, United Kingdom

⁵Kings Fertility, United Kingdom

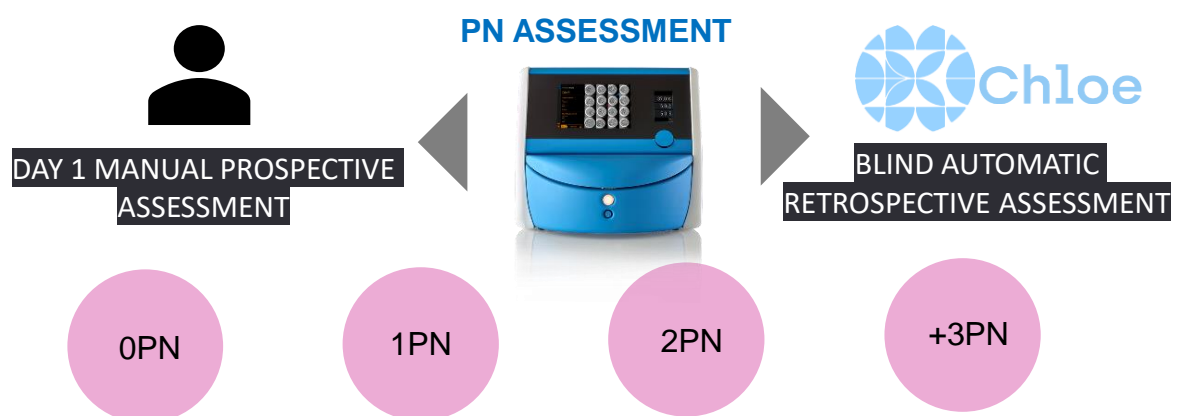
⁶Fairtility, Israel

Objective

TO COMPARE MANUAL ASSESSMENT OF PRONUCLEATES IN TIME-LAPSE IMAGES WITH AUTOMATIC ASSESSMENT USING ARTIFICIAL INTELLIGENCE IN 3 CLINICS

Methods

Time-lapse images of 6048 zygotes (Clinic 1: n=518, Clinic 2: n=307, Clinic 3: n=5223).



Level of agreement was quantified in:

(1) accuracy = total agreement / total number of zygotes assessed

(2) Kappa agreement across all categories (Kappa score +/- 95% confidence interval).

Results

- Overall level of agreement across all clinics was 94%, with similar ($p < 0.05$) levels of agreement between the three clinics
- The overall accuracy for 2PNs was 95% which was similar ($p < 0.05$) between the three clinics
- The kappa agreement overall was almost perfect across the individual clinics which had at least substantial agreement between CHLOE-EQ and embryologist PN assessment
- The agreement observed was significantly higher than the agreement expected by chance (chance vs actual: 1:66%vs95%; 2:59%vs90%; 3:61%vs94%; $p < 0.001$)

	Overall	Clinic 1	Clinic 2	Clinic 3
PN Level of agreement	94% 5664/6048 $p < 0.05$	95% 491/518 $p < 0.05$	90% 275/307 $p < 0.05$	94% 4898/5223 $p < 0.05$
Overall accuracy for 2PNs	95% 5761/6048 $p < 0.05$	96% 499/518 $p < 0.05$	91% 278/307 $p < 0.05$	95% 4984/5223 $p < 0.05$
Kappa PN agreement	0.834 (0.819-0.850)	0.846 (0.791-0.900)	0.748 (0.668-0.827)	0.839 (0.822-0.855)

Conclusion

- CHLOE-EQ has at least a strong level of agreement with the PN assessment by human embryologists
- Further studies will assess the nature of the few disagreements observed
- The high agreement allows for increased consistency between operators, automatic EMR data entry, and automatic KPI assessment