

Failed thaw cycles (FThC) as a key performance indicator (KPI): Accounting for the potential impact of preimplantation genetic testing (PGT) on embryo survival



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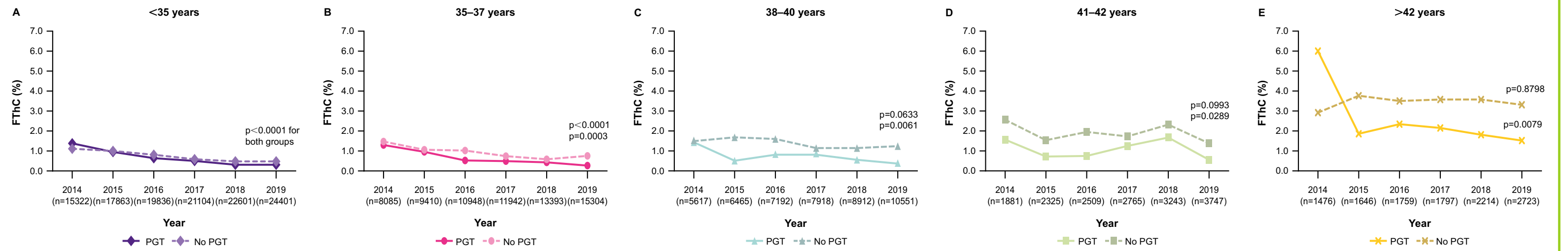
RESULTS

FThC

- Across all ages, the proportion of FThC significantly decreased over time, independent of PGT, except in patients aged >42 years (**Figure 1**)
- The proportion of FThC increased with age (>42 years vs <35 years: unadjusted odds ratio=4.4; 95% CI 3.9–5.0; p<0.0001; **Figure 1**)
 - After adjusting for year and age, the odds of FThC were 37% lower with PGT versus without PGT (adjusted odds ratio=0.63; 95% CI 0.57–0.70; p<0.0001)

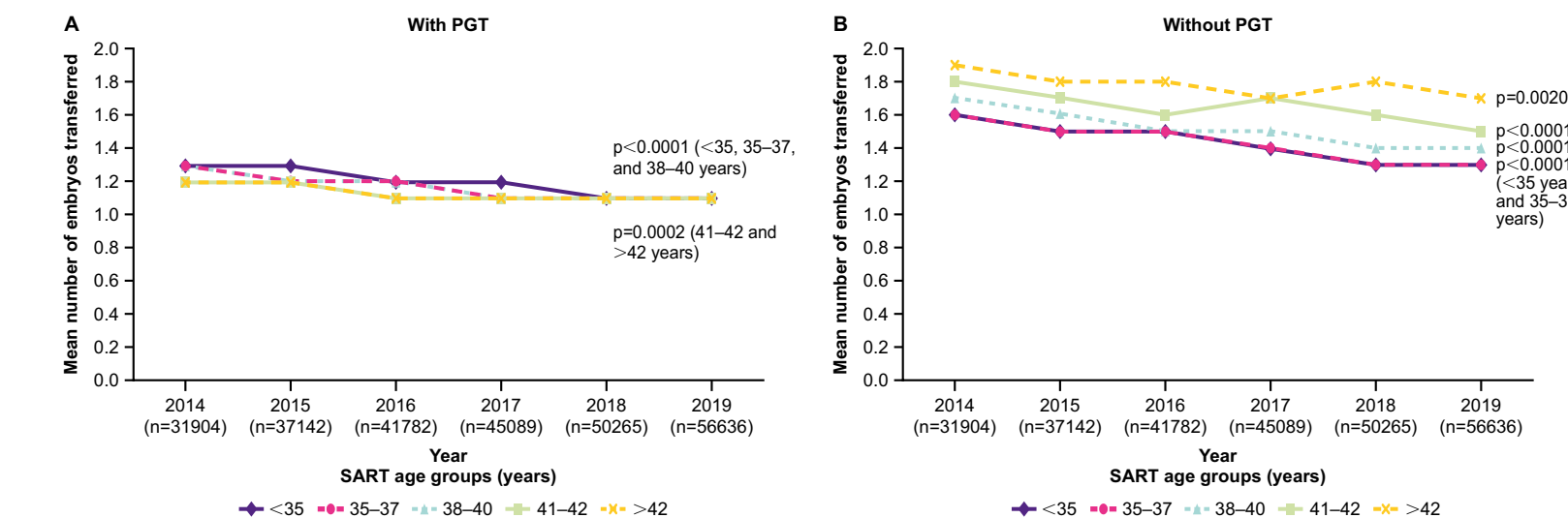
- In older patients, the effect of PGT on FThC was more apparent (**Figure 1**)
 - In older age groups, the proportion of FThC did not change significantly over time for cycles without PGT but showed significant improvement with PGT, particularly in patients aged >42 years
 - In patients aged <35 or 35–37 years, the proportion of FThC decreased over time with or without PGT (p<0.001 for all)

Figure 1. Proportion of FThC over time, stratified by SART age groups and PGT status



P-values were obtained using Pearson's Chi square test of significance
FThC, failed thaw cycles; PGT, preimplantation genetic testing; SART, Society for Assisted Reproductive Technology

Figure 2. Mean number of embryos transferred over time, stratified by SART age groups and PGT status



P-values were obtained using a linear test of trend
n values indicate the total number of thawing cycles for the specified year
PGT, preimplantation genetic testing; SART, Society for Assisted Reproductive Technology

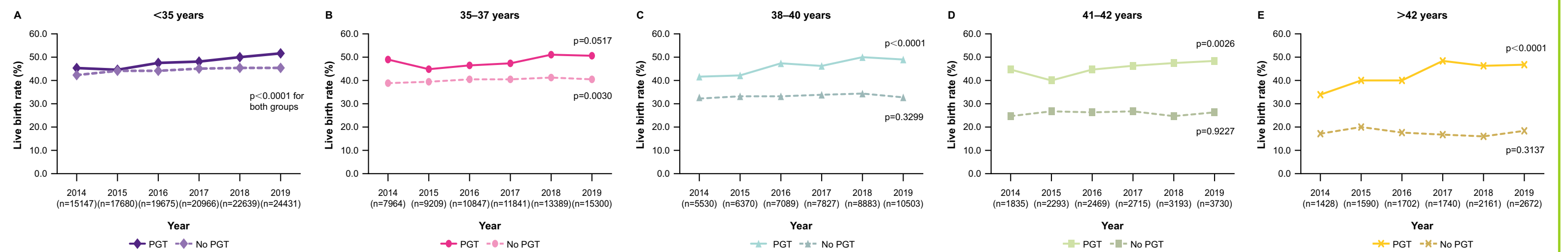
Mean number of embryos transferred

- Across all ages, the mean number of embryos transferred significantly decreased over time (p<0.0001). This observation was independent of PGT status (**Figure 2**)

LBR

- Before considering PGT status, across all ages, LBR significantly increased over time (p<0.0001)
- When considering PGT use, in older patients, LBR increased over time with PGT (38–40 years, p<0.0001; 41–42 years, p=0.0026; >42 years, p<0.0001), but no significant change was detected without PGT (**Figure 3**)

Figure 3. LBR^a, stratified by SART age groups and PGT status



P-values were obtained using a linear test of trend
^aLBR by year independent of PGT status implantation
LBR, live birth rate; PGT, preimplantation genetic testing; SART, Society for Assisted Reproductive Technology

CONCLUSIONS

- Preimplantation genetic testing (PGT) was associated with improved proportions of failed thaw cycles (FThC) and live birth rates (LBR), particularly in older patients
- Thawing embryos screened as euploid appears to be a significant contributor to embryo survival and clinical outcomes; other possible contributors include evolution of freezing criteria, procedures, and clinical/laboratory decisions that positively impact LBRs
- Laboratories should consider the impact of PGT when evaluating FThC as a key performance indicator (KPI) for frozen embryo transfer (FET) cycles

BACKGROUND

- KPIs are important measures in assisted reproductive technology, used for the evaluation of a technique or process and quality management as well as benchmarking and quality improvement¹
- FThC are thaw procedures that fail to produce any embryos suitable for transfer
- The percentage of FThC has been suggested as a surrogate for laboratory competency in freezing and thawing procedures, thereby functioning as a potential KPI for IVF laboratories
- The Society for Assisted Reproductive Technology (SART) database captures real-world data related to the practice of assisted reproductive technologies (including patient care) in the USA²
- According to the SART database, the proportion of FThC significantly decreased across all ages and infertility diagnoses in the USA—while the number of FET thaw procedures increased—between 2014 and 2019³
- PGT (including PGT for aneuploidies [PGT-A], for monogenic/single gene defects [PGT-M], and for structural chromosomal rearrangements [PGT-SR]) is widely used in *in vitro* fertilization centers for selecting euploid embryos for transfer⁴
- Here, we postulated that PGT could be one of the key drivers of FThC improvement

OBJECTIVE

- To evaluate the impact of PGT on the proportion of FThC over time (stratified by age), and assess whether the use of PGT should be considered when evaluating FThC as a KPI for FET cycles

METHODS

- A total of six years of data from the SART database from 2014–2019 were analyzed
 - The database included 264,949 thawing cycles for first FETs (defined as those ≥12 months after retrieval) and second or later FETs, stratified by SART age groups and PGT use
- Outcomes included:
 - Proportion of FThC
 - Mean number of embryos transferred
 - LBRs
- Proportion of FThC by SART age group and PGT status was assessed using Pearson's Chi square test of significance. Relationships between variables for the proportion of FThC were assessed using multivariate logistic regression
- Differences in mean number of embryos transferred and LBR over time were evaluated using a linear test of trend

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DISCLOSURES

KAW, BH, FC, KM, and ABC are employees of EMD Serono, Inc., Rockland, MA, USA. MCM, GM, and MB have nothing to disclose.