Reproductive Biology and Endocrinology

RESEARCH

Open Access

United States racial/ethnic disparities in PGT-A use: an analysis of 2014–2020 SART CORS database

Akailah Mason-Otey[1*] and David B. Seifer[2]

Abstract

Background The use of preimplantation genetic testing for aneuploidy (PGT-A) allows for the selection of euploid embryos and has been thought to improve outcomes in ART, particularly in women ≥ 35 years old. However, little is known regarding PGT-A utilization among minority women in the United States (US). The objective of this study was to determine the trend of utilization of PGT-A in the US among minority women.

Methods We conducted a retrospective cohort study using the Society for Assisted Reproductive Technology Clinic Outcome Reporting System (SART CORS) database. We included initial autologous ART cycles performed between 2014 and 2020. We assessed the rate of PGT-A utilization by race/ethnicity.

Results This study included 150,604 PGT-A and 287,979 non-PGT-A initial autologous cycles. The overall trend of PGT-A utilization, regardless of race/ethnicity, increased from 11.5 to 49.0% ($p < 0.001$) over seven years. Of all ART cycles, 33% of White women used PGT-A, in comparison to 24% of Black women, 31% of Hispanic women, and 44% of Asian women ($p < 0.001$). Multiple Logistic Regression (MLR) determined race/ethnicity as an independent predictor of PGT-A utilization when adjusting for age, BMI, and AMH ($p < 0.001$). Compared to White women, MLR showed that Black and Hispanic women were 35% and 16% less likely to use PGT-A (aOR = 0.65, 95% CI 0.63–0.67, and aOR = 0.86, 95% CI 0.84–0.88, respectively, $p < 0.001$). In contrast, Asian women were 41% (aOR = 1.41, 95% CI 1.39–1.44) more likely to use PGT-A ($p < 0.001$). Overall, regardless of race/ethnicity, women 35 and older were 71% (aOR = 1.71, 95% CI 1.69–1.74) more likely to use PGT-A compared to women younger than 35 ($p < 0.001$).

Conclusion Despite a significant increase in overall PGT-A utilization in the US over 7 years, utilization has been consistently less in ART cycles for Black and Hispanic women, in comparison to White women. This is in marked contrast to an increase in PGT-A utilization in cycles for Asian women.

Keywords Preimplantation genetic testing, Aneuploidy, PGT-A, Healthcare disparities, National registry, SART CORS, Minority women

*Correspondence:
Akailah Mason-Otey
Akailah.Mason-Otey@yale.edu
[1]Yale School of Medicine, Department of Obstetrics, Gynecology, and Reproductive Science, New Haven, CT, USA
[2]Yale School of Medicine, Department of Obstetrics, Gynecology and Reproductive Sciences, Division of Reproductive Endocrinology and Infertility, New Haven, USA

Background

Preimplantation genetic testing for aneuploidy (PGT-A) allows for the screening and selection of euploid embryos for assisted reproductive technology (ART). The impact of PGT-A on clinical outcomes remains inconclusive. However, several studies have suggested that PGT-A improves cumulative live birth rates (CLBR) in women 35 and older [1, 2]. As of 2018, PGT-A use accounted for nearly 50% of all ART cycles in the United States (US) [3].

The benefits of PGT-A as a screening tool for all patients undergoing ART have not been well established [4]. Two randomized controlled trials found no significant improvement in live birth rates (LBR) in women under 35 when using PGT-A [2, 5]. Additionally, a systematic review and meta-analysis of nine randomized controlled trials, which included 3,334 women, indicated that PGT-A was not associated with an increase in live birth rate (LBR) [1]. However, for women aged 35 and older, analyses have shown an increase in LBR when using PGT-A [6]. A retrospective cohort study that examined cumulative live-birth rates (CLBR) among 447,042 women resulting from 1,007,374 autologous cycles, using the 2014–2019 Society of Assisted Reproductive Technology Clinical Outcome Reporting System (SART CORS) database, revealed a lower CLBR for women under 35 years old. In contrast, women 35 or older experienced a higher CLBR when PGT-A was utilized [7].

Although there are no established screening recommendations for using PGT [4], the question about the cost-effectiveness of PGT-A persists [8, 9]. The cost of ART, along with the additional costs of PGT-A, poses a significant barrier to access for minority and underserved populations. Most insurance companies and/or state mandates for in vitro fertilization (IVF) do not cover the associated costs of PGT [10], which typically range from $3,000 - $12,000, depending upon number of embryo's biopsied and geographic location [11, 12].

To date, there is a paucity of data regarding PGT-A utilization among minority women in the United States (US). One small study, from a single institution with limited sample size, revealed a lower PGT-A utilization in Black women [13]. Our study aimed to evaluate the rate and trend of racial/ethnic utilization of PGT-A in ART cycles across the US using the SART CORS database from 2014 to 2020.

Methods

The data used for this study were obtained from SART CORS. Data were collected through voluntary submission, verified by SART, and reported to the Centers for Disease Control and Prevention (CDC) in compliance with the Fertility Clinic Success Rate and Certification Act of 1992 (Public Law 102–493). SART maintains HIPAA-compliant business associate agreements with reporting clinics. In 2004, following a contract change with the CDC, SART gained access to the SART CORS data system for the purposes of conducting research. Over 90% of all ART cycles in the United States are performed at SART-member clinics.

SART annually selects up to 10 clinics, approximately 2.5% of SART clinics, for an on-site validation visit utilizing metrics and a blinded selection process to identify outlier clinics. Medical records are reviewed during the validation visit to verify the designation, outcome, and reporting of cycles. Clinics with significant systematic reporting errors undergo data correction. Six primary metrics and twenty-six secondary metrics are used for clinic selection. The metrics include low prospective reporting for both egg retrieval cycles and total cycles, high live birth rates in the various age groups, low cancellation rate, high percentage of total fertility preservation cycles, high percentage of embryo banking and oocyte banking cycles, high percentage of fertility preservation cycles where oocytes were thawed or embryos were transferred within a year, high percentage of deleted cycles, high percentage of cycles converted from IUI, and low percentage of cycles in which no embryos were suitable for transfer with and without preimplantation genetic testing (PGT). SART does not validate the accuracy of data entry fields such as gonadotropin dosage, number of oocytes retrieved, number of fertilized oocytes, number of embryos cryopreserved, PGT results, or demographic fields such age and diagnosis.

We conducted a retrospective cohort analysis by selecting all initial autologous ART cycles from 2014 to 2020. This analysis included embryos that were selected for trophectoderm biopsy. We excluded cycles using donor oocytes and/or embryos, autologous embryo cleavage biopsies (day 3), gestational carriers, non-PGT-A (PGT-M, PGT-SR, HLA-typing, PGT-A for sex selection, and unknown/unspecified PGT status), fresh embryo transfers, and ART with the intended for gestational carry. We retrieved relevant clinical and demographic data from the SART CORS dataset, including age, body mass index (BMI), anti-Mullerian hormone (AMH), and infertility diagnoses.

The primary outcome metric was the utilization rate and trend of PGT-A by racial/ethnic groups: White, Black, Hispanic, Asian, American Indian/Alaska Native (AI/AN), and Native Hawaiian/Other Pacific Islander (NH/OP), as categorized by the US Office of Management and Budget.

Statistical analyses of PGT-A usage by race/ethnicity per year were performed using t-test and multiple logistic regression (MLR) to determine odds ratios (aOR), adjusting for demographic and clinical confounding variables of age, BMI, and AMH. Continuous data were reported as mean (± standard deviation). P-values were

deemed statistically significant if $p \leq 0.05$. All statistical analyses were performed using R and R-studio (Version 2023.12.1 + 402, Boston, MA).

This study was determined to be exempt from review by the Yale IRB because of its reliance on deidentified and anonymous data.

Results

Of the cycles initiated between 2014 and 2020, 438,583 ART cycles were included. Of these, 150,604 used PGT-A and 287,979 were non-PGT-A cycles. The racial/ethnic breakdown of this cohort consisted of 66% White women, 8% Black women, 8.4% Hispanic women, and 18% Asian. NH/OP and AI/AN women each represented 0.2% of this cohort. Patient demographics and clinical data are detailed in Table 1. Among all ART cycles, 33% of White women opted for PGT-A, in comparison to 24% of Black women, 31% of Hispanic women, and 44% of Asian women ($p < 0.001$), summarized in Fig. 1.

The overall mean AMH was lowest in NH/OP, Asian, and Hispanic women compared to White women. White women were the most likely to have a diagnosis of unexplained infertility. In comparison, Black women were most likely to receive a diagnosis of tubal factor infertility, yet least likely to be diagnosed with polycystic ovary syndrome (PCOS). Asian women were least likely to have male factor and tubal factor infertility. However, there was a notable increase in the diagnosis of diminished ovarian reserve (DOR) among cycles from Asian women (35.5%) compared to cycles from White (27%) and other minority groups (26–30%), $p < 0.001$. AI/AN women were most likely to have a diagnosis of PCOS, while NH/OP women were more likely to have diagnoses of male factor infertility and endometriosis.

From 2014 to 2020, the overall PGT-A utilization, regardless of race/ethnicity, increased 4.3 times from 11.5 to 49% ($p < 0.001$). Figure 2 demonstrates a steady increase in the use of PGT-A for each racial/ethnic group for each advancing year between 2014 and 2020. However, the relative trend in PGT-A usage remains consistently disparate between each of the major minority groups for each yearly time interval, with Asian usage > White > Hispanic > NH/OP > AI/AN > Black over the 2014–2020 period ($p < 0.001$). Notably, Black women had the highest rate of increased PGT-A use from, 6.8% in 2014 to 38.8% in 2020, increasing by 5.7 times. The percentage of White women using PGT-A increased 11–48.6% (4.4 times increase), while Hispanic women saw an increase from 9.4 to 46.8% (5 times increase). Among Asian women, usage went from 16.6 to 57.7% (3.5 times increase), NH/OP women increased from 9 to 44.6% (5 times increase), and AI/AN women increased from 10.9 to 46% (4.3 times increase).

Table 1 Characteristics and patient demographics by race/ethnicity of initial autologous cycles

	All		White		Black		Hispanic		Asian		AI/AN		NH/OP		*p* value
	438,583		287,114	65.5%	34,905	8.0%	36,831	8.4%	77,717	17.7%	950	0.2%	1,066	0.2%	
Age (%)															< 0.001
< 35	183,172	41.8%	131,264	45.7%	11,146	31.9%	13,184	35.8%	26,768	34.4%	408	43.0%	401	37.6%	
≥ 35	255,412	58.2%	155,849	54.3%	23,759	68.1%	23,647	64.2%	50,949	65.6%	542	57.0%	665	62.4%	
Average Age ± SD	35.5	±4.7	35.1	±4.7	36.7	±4.9	36	±4.8	36.4	±4.6	35.5	±4.7	36.1	±4.7	
BMI (kg/m^2)± SD	26.3	±6.2	26.3	±6.3	29.4	±6.4	27.5	±6.4	23.9	±4.7	27.0	±5.9	27.2	±6.3	< 0.001
AMH (ng/mL) ± SD	1.3	±2.5	1.4	±2.5	1.3	±2.5	1.2	±2.3	1.2	±2.5	1.3	±2.3	1.1	±2.7	< 0.001
PGT-A use (%)	150,604	34.3%	95,762	33.4%	8,480	24.3%	11,291	30.7%	34,456	44.3%	316	33.3%	299	28.0%	< 0.001
Diagnosis (%) *															
Male infertility	149,337	34.0%	101,405	35.3%	11,967	34.3%	12,279	33.3%	22,942	29.5%	324	34.1%	420	39.4%	< 0.001
Endometriosis	34,860	8.0%	24,587	8.6%	2,261	6.5%	2,668	7.2%	5,173	6.7%	68	7.2%	103	9.7%	< 0.001
Ovulatory/PCOS	23,368	5.3%	16,612	5.8%	1,336	3.8%	1,769	4.8%	3,531	4.5%	61	6.4%	59	5.5%	< 0.001
DOR	127,638	29.1%	77,639	27.0%	10,772	30.9%	11,123	30.2%	27,582	35.5%	245	25.8%	277	26.0%	< 0.001
Uterine	26,264	6.0%	13,429	4.7%	5,125	14.7%	2,617	7.1%	4,958	6.4%	63	6.6%	72	6.8%	< 0.001
Tubal	57,907	13.2%	30,470	23.2%	10,241	29.3%	8,551	23.2%	8,278	10.7%	138	14.5%	229	21.5%	< 0.001
Unexplained	52,512	12.0%	36,963	12.9%	2,442	7.00%	3,198	8.7%	9,709	12.5%	103	10.8%	97	9.1%	< 0.001

*Percentages may equate to more than 100% given the possibility of multiple diagnoses

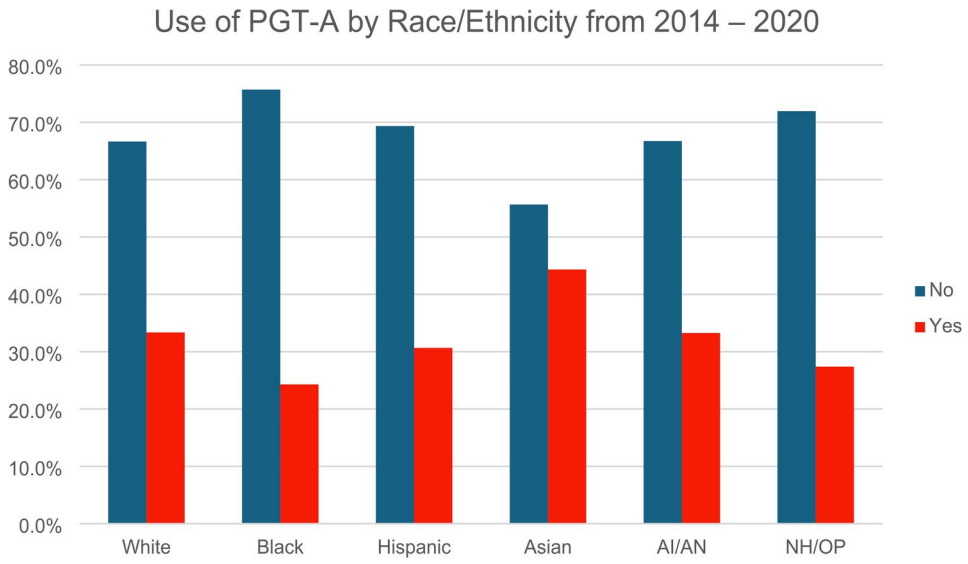

Fig. 1 Use of PGT-A by Race/Ethnicity from 2014–2020

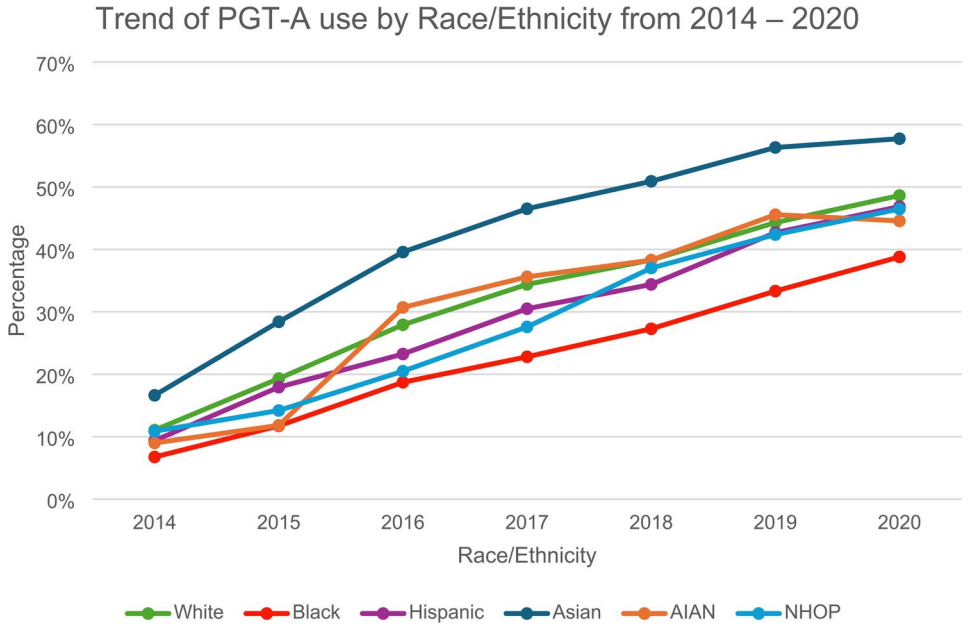

Fig. 2 Trend of PGT-A use by Race/Ethnicity from 2014–2020

Multiple Logistic Regression (MLR) identified race/ethnicity as an independent predictor of PGT-A utilization after adjusting for age, BMI, and AMH ($p < 0.001$). Compared to White women, MLR showed that Black and Hispanic women were 35% and 16% less likely to use PGT-A (aOR = 0.65, 95% CI 0.63–0.67, and aOR = 0.86, 95% CI 0.84–0.88, respectively, $p < 0.001$). In marked contrast, Asian women were 41% more likely to use PGT-A when compared to White women (aOR = 1.41, 95% CI 1.39–1.44) ($p < 0.001$).

Regardless of race/ethnicity, 67.2% of women using PGT-A were 35 and older and therefore were 71% more likely to have used PGT-A than women younger than 35 (aOR = 1.71, 95% CI 1.69–1.74). The utilization rate of PGT-A among all women 35 and older increased from 19.8% in 2014 to 60.2% in 2020. White women had the lowest percentage of women 35 or older (54.3%), while Black women had the highest at 68.1%. Asian women represented the second oldest cohort, with an average age of 36.4 years, and 65.6% were 35 and older at the initiation of their first cycle.

Discussion

This large, comprehensive nationwide cohort study demonstrates a significant and steady increase in PGT-A utilization from 2014 to 2020, yet the rate of utilization of PGT-A notably varies by race/ethnicity. These data are consistent with other studies, confirming the overall PGT-A use has increased in US clinical practice over recent years [10, 14]. Cycles from Black and Hispanic women consistently used PGT-A at lower rates than White women. This is in marked contrast to an increase in PGT-A cycles used in Asian women. NH/OP and AI/AN women also consistently use PGT-A more than Black women. Interestingly, despite Black women using PGT-A consistently less than all other racial/ethnic groups, they experienced the largest increase of 5.7 times in usage over the seven years.

Over time, Black women are increasingly utilizing PGT-A as an add-on to their ART cycle. However, within this cohort, it is unlikely that a disparity in access to ART explains the lower utilization of PGT-A seen in Black and Hispanic women as they are actively receiving infertility care. A more plausible explanation for the overall lower utilization of PGT-A may be a bias from providers regarding who gets counseling on PGT-A and its potential benefits. Additionally, the added cost of PGT-A can undoubtedly be a barrier for many minority women, especially in the absence of insurance coverage.

One smaller study, limited in sample size and to a single institution, noted that Black women utilized PGT-A less than White women [13]. Additionally, a previous study showed that Black and Hispanic women who underwent frozen embryo transfers used PGT less than White women [15]. However, that study examined data from the SART CORS database from 2014 to 2016 and did not specify the type of PGT used (i.e. PGT-A, PGT-M, PGT-SR). Despite these limitations, their findings were similar to ours in that PGT was used less frequently in Black and Hispanic women, while Asian women used PGT more. We speculate that a reason Asian women may undergo use PGT-A at higher rates than other racial/ethnic groups is due to a great portion of cycles linked to a diagnosis of diminished ovarian reserve (DOR) and, thus, their increased concern for embryo aneuploidy. Furthermore, Asian women may choose PGT-A for information regarding the sex of the tested embryo [16]. Finally, Asian women are less likely to report income as a barrier to accessing ART [17] and, therefore, may be more likely to request PGT-A.

When controlling for age, BMI, and AMH covariates, we found that race and age were independent predictors of PGT-A use. Notably, our findings revealed that Black and Hispanic women were more likely to be 35 and older at the time of their first cycle. This is observation is consistent with several studies that show that minority women often present for ART at older ages [18–20]. Despite the increasing trend of PGT-A use in Black and Hispanic women, the overall rates of PGT-A use in these racial/ethnic groups were lower in comparison to White women. It has been suggested that in women 35 and older, PGT-A use improves CLBR and helps to lower miscarriage rates for the general population [1]. However, the racial/ethnic influences on these clinical outcomes are still not fully understood.

Advancing age is well-documented to be associated with decreasing ovarian reserve, lower AMH, and reduced oocyte quality [21–23]. Additionally, the rate of aneuploidy increases with age [24]. For patients older than 38, age was a better predictive factor of aneuploidy compared with AMH, which was more predictive of aneuploidy for patients younger than 38 [25]. Current data suggests that aneuploidy rates do not differ significantly among different racial/ethnic groups. Alkon-Meadows et al. suggested that White women tend to have higher euploid embryos; however, after controlling for confounders like age and BMI, there were no significant differences in euploidy rates based on self-reported race [26]. Additionally, Franasiak et al. showed there were no differences in aneuploidy rates based on maternal ethnicity as determined by genetic ancestry [27]. That study, however, was limited in its heterogeneity of the population as the breakdown of ethnic groups was heavily skewed towards European ancestry, with only 4.4% of genetically confirmed African ancestry. Additional studies using a more extensive databases with more precisely defined racial/ethnic groups and larger sample sizes should be completed to see if these conclusions remain consistent.

The main strength of this study lies in its large sample size from a contemporary, validated nationwide database over a seven-year period. This allows for a comprehensive comparison of six different race and ethnicity groups, providing an inclusive and more informative analysis than the White versus non-White classification often found in smaller studies. However, the limitations of this study include the percentage of missing race/ethnicity documentation of the SART CORS database and its potential confounding impact [28, 29]. Within our specific cohort, 35% of the initial sample did not document race/ethnicity, which remains consistent with previously mentioned data [28, 29]. Another limitation of this study is that the PGT method was not specified in the SART CORS database. Methods likely evolved during the study period between 2014 and 2020 from comparative genomic hybridization to single nucleotide polymorphism microarray to next generation sequencing (NGS) but were not specified in the SART CORS database. It is believed that most PGT-A was performed by NGS in the

latter years of this study concomitant with the development of more precise technological platforms.

Further studies are ongoing to better appreciate the possible underlying causes of racial/ethnic disparities of PGT-A utilization, in addition to understanding if the PGT-A utilization racial/ethnic disparities are reflected in differences in clinical outcomes among minority women using PGT-A with ART. Additional future studies could assist in better understanding if PGT-A in specific groups of women would be more or less beneficial in improving clinical outcomes.

Conclusion

Despite a significant increase in overall PGT-A utilization in the US over 7 years, utilization has been consistently less in ART cycles for Black and Hispanic women, in comparison to White women. This is in marked contrast to an increase in PGT-A utilization in cycles for Asian women. Further research Is needed to understand the impact of this disparity on clinical outcomes.

Abbreviations

PGT-A	Preimplantation genetic testing for aneuploid
NGS	Next generation sequencing
ART	Assisted reproductive technology
LBR	Live birth rate
CLBR	Cumulative live birth rates
SART CORS	Society of Assisted Reproductive Technology Clinical Outcome Reporting System
MLR	Multiple logistic regression
IVF	In vitro fertilization
BMI	Body mass index
AMH	Anti-Mullerian hormone
AI/AN	American Indian/Alaska Native
NH/OP	Native Hawaiian/Other Pacific Islander
PCOS	Polycystic ovary syndrome
DOR	Diminished ovarian reserve

Acknowledgements

Not applicable.

Author contributions

A.M.O. conceived idea for study, analyzed and interpreted data, performed the statistical analysis, designed tables and figures, assisted in writing, reviewing, and revising the manuscript. D.S. obtained data from SART CORS, assisted in writing, reviewing, and revising the manuscript. All authors read and approved the final manuscript.

Funding

Not applicable.

Data availability

The data that support the findings of this study are available from SART CORS but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of SART.

Declarations

Ethics approval and consent to participate

This study was determined to be exempt from review by the Yale IRB because of its reliance on deidentified and anonymous data.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Received: 14 April 2025 / Accepted: 23 April 2025
Published online: 10 May 2025

References

1. Simopoulou M, Sfakianoudis K, Maziotis E, Tsioulou P, Grigoriadis S, Rapani A, et al. PGT-A: who and when? A systematic review and network meta-analysis of RCTs. J Assist Reprod Genet. 2021;38(8):1939–57. https://doi.org/10.1007/s10815-021-02227-9.
2. Munne S, Kaplan B, Frattarelli JL, Child T, Nakhuda G, Shamma FN et al. Preimplantation genetic testing for aneuploidy versus morphology as selection criteria for single frozen-thawed embryo transfer in good-prognosis patients: a multicenter randomized clinical trial. Fertil Steril. 2019;112(6):1071-9e7. https://doi.org/10.1016/j.fertnstert.2019.07.1346
3. Hipp H, Crawford S, Boulet S, Toner T, Sparks A, Kawwass J. Trends and outcomes for preimplantation genetic testing in the united States, 2014–2018. JAMA. 2022;327(13):1288–90. https://doi.org/10.1001/jama.2022.1892.
4. Penzias A, Bendikson K, Butts S, Coutifaris C, Falcone T, Fossum G, et al. The use of preimplantation genetic testing for aneuploidy (PGT-A): A committee opinion. Fertil Steril. 2018;109(3):429–36. https://doi.org/10.1016/j.fertnstert.2018.01.002.
5. Yan J, Qin Y, Zhao H, Sun Y, Gong F, Li R, et al. Live birth with or without preimplantation genetic testing for aneuploidy. N Engl J Med. 2021;385(22):2047–58. https://doi.org/10.1056/NEJMoa2103613.
6. Cheng X, Zhang Y, Deng H, Feng Y, Chong W, Hai Y, et al. Preimplantation genetic testing for aneuploidy with comprehensive chromosome screening in patients undergoing in vitro fertilization: A systematic review and Meta-analysis. Obstet Gynecol. 2022;140(5):769–77. https://doi.org/10.1097/AOG.0000000000004962.
7. Wang SF, Seifer DB. Assessment of a decade of change in U.S. Assisted reproductive technology cumulative Live-Birth rates. Obstet Gynecol. 2024;143(6):839–48. https://doi.org/10.1097/aog.0000000000005598.
8. Goldman RH, Racowsky C, Farland LV, Fox JH, Munne S, Ribustello L, et al. The cost of a euploid embryo identified from preimplantation genetic testing for aneuploidy (PGT-A): a counseling tool. J Assist Reprod Genet. 2018;35(9):1641–50. https://doi.org/10.1007/s10815-018-1275-5.
9. Lee M, Lofgren KT, Thomas A, Lanes A, Goldman R, Ginsburg ES, et al. The cost-effectiveness of preimplantation genetic testing for aneuploidy in the united States: an analysis of cost and birth outcomes from 158,665 in vitro fertilization cycles. Am J Obstet Gynecol. 2021;225(1):e551–17. https://doi.org/10.1016/j.ajog.2021.01.021.
10. Bedrick BS, Tipping AD, Nickel KB, Riley JK, Jain T, Jungheim ES. State-Mandated insurance coverage and preimplantation genetic testing in the united States. Obstet Gynecol. 2022;139(4):500–8. https://doi.org/10.1097/AOG.0000000000004712.
11. Facadio Antero M, Singh B, Pradhan A, Gornet M, Kearns WG, Baker V, et al. Cost-effectiveness of preimplantation genetic testing for aneuploidy for fresh donor oocyte cycles. F S Rep. 2021;2(1):36–42. https://doi.org/10.1016/j.xfre.2020.11.005.
12. Murugappan G, Ohno MS, Lathi RB. Cost-effectiveness analysis of preimplantation genetic screening and in vitro fertilization versus expectant management in patients with unexplained recurrent pregnancy loss. Fertil Steril. 2015;103(5):1215–20. https://doi.org/10.1016/j.fertnstert.2015.02.012.
13. Lee IT, Berger DS, Koelper N, Senapati S, Mainigi M. Race, ovarian responsiveness, and live birth after in vitro fertilization. Fertil Steril. 2023;120(5):1023–32. https://doi.org/10.1016/j.fertnstert.2023.08.001.
14. Roche K, Racowsky C, Harper J. Utilization of preimplantation genetic testing in the USA. J Assist Reprod Genet. 2021;38(5):1045–53. https://doi.org/10.1007/s10815-021-02078-4.
15. Makhijani R, Godiwala P, Grady J, Christy A, Thornton K, Grow D, et al. Black race associated with lower live birth rate in frozen-thawed blastocyst transfer cycles: an analysis of 7,002 society for assisted reproductive technology frozen-thawed blastocyst transfer cycles. Fertil Steril. 2022;117(2):360–7. https://doi.org/10.1016/j.fertnstert.2021.11.019.

16. Gleicher N, Barad DH. The choice of gender: is elective gender selection, indeed. sexist? Hum Reprod. 2007;22(11):3038–41. https://doi.org/10.1093/humrep/dem227.
17. Galic I, Negris O, Warren C, Brown D, Bozen A, Jain T. Disparities in access to fertility care: who's in and who's out. F S Rep. 2021;2(1):109–17. https://doi.org/10.1016/j.xfre.2020.11.001.
18. Seifer DB, Simsek B, Wantman E, Kotlyar AM. Status of Racial disparities between black and white women undergoing assisted reproductive technology in the US. Reprod Biol Endocrinol. 2020;18(1). https://doi.org/10.1186/s12958-020-00662-4.
19. Ghidei L, Wiltshire A, Raker C, Ayyar A, Brayboy LM. Factors associated with disparate outcomes among black women undergoing in vitro fertilization. F S Rep. 2022;3(2 Suppl):14–21. https://doi.org/10.1016/j.xfre.2021.12.002.
20. Seifer DB, Frazier LM, Grainger DA. Disparity in assisted reproductive technologies outcomes in black women compared with white women. Fertil Steril. 2008;90(5):1701–10. https://doi.org/10.1016/j.fertnstert.2007.08.024.
21. Practice Committee of the American Society for Reproductive Medicine. Testing and interpreting measures of ovarian reserve: a committee opinion. Fertil Steril. 2020;114(6):1151–7. https://doi.org/10.1016/j.fertnstert.2020.09.134.
22. Broekmans FJ, Soules MR, Fauser BC. Ovarian aging: mechanisms and clinical consequences. Endocr Rev. 2009;30(5):465–93. https://doi.org/10.1210/er.2009-0006.
23. Seifer DB, Feinberg EC, Hsu AL. Ovarian aging and fertility. JAMA. 2024;332(20):1750–1. https://doi.org/10.1001/jama.2024.18207.
24. Frederiksen L, Ølgaard SM, Roos L, Petersen OB, Rode L, Hartwig T, et al. Maternal age and the risk of fetal aneuploidy: A nationwide cohort study of more than 500 000 Singleton pregnancies in Denmark from 2008 to 2017. Acta Obstet Gynecol Scand. 2024;103(2):351–9. https://doi.org/10.1111/aogs.14713.
25. Li HJ, Seifer DB, Tal R. AMH independently predicts aneuploidy but not live birth per transfer in IVF PGT-A cycles. Reprod Biol Endocrinol. 2023;21(1). https://doi.org/10.1186/s12958-023-01066-w.
26. Alkon-Meadows T, Hernandez-Nieto C, Jackson-Bey T, Cacchione TA, Lee J, Luna-Rojas M, et al. Correlation of self-reported Racial background to euploidy status and live birth rates in assisted reproductive technology cycles. J Assist Reprod Genet. 2024;41(3):693–702. https://doi.org/10.1007/s10815-024-03039-3.
27. Franasiak JM, Olcha M, Shastri S, Molinaro TA, Congdon H, Treff NR, et al. Embryonic aneuploidy does not differ among genetic ancestry according to continental origin as determined by ancestry informative markers. Hum Reprod. 2016;31(10):2391–5. https://doi.org/10.1093/humrep/dew195.
28. Seifer DB, Richard-Davis G, Alvero R. Closing the gap on Racial disparities-Increasing race and ethnicity demographics reporting in the society for assisted reproductive technology clinic outcome reporting system registry. Fertil Steril. 2024;122(1):40–1. https://doi.org/10.1016/j.fertnstert.2024.02.012.
29. Wellons MF, Fujimoto VY, Baker VL, Barrington DS, Broomfield D, Catherino WH, et al. Race matters: a systematic review of Racial/ethnic disparity in society for assisted reproductive technology reported outcomes. Fertil Steril. 2012;98(2):406–9. https://doi.org/10.1016/j.fertnstert.2012.05.012.

Publisher's note