

Counseling and Use of Surrogacy Among Cancer Survivors (CUSACS)

Alexa Steckler

alexa_steckler@brown.edu

The Warren Alpert Medical School of Brown University

Christina A. Raker

Brown University Health Biostatistics

May-Tal Sauerbrun-Cutler

The Warren Alpert Medical School of Brown University

Stephanie L. Graff

The Warren Alpert Medical School of Brown University

Don S. Dizon

Tufts Medical Center and Tufts University

Christine Duffy

The Warren Alpert Medical School of Brown University

Research Article

Keywords: Oncofertility, gestational carrier, surrogacy, family-building

Posted Date: March 10th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-8959896/v1>

License:   This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Additional Declarations: Competing interest reported. Stephanie L. Graff: Stock Ownership (Current, Self) HCA Healthcare; Consulting (All Relationships Ended, Self): Pfizer, SeaGen, AstraZeneca, DaiichiSankyo, Gilead Sciences, Menarini Stemline, Genentech, Novartis, Lilly/Loxo@Lilly; Research Funding (All Funds to Institution): AstraZeneca, Novartis, Daiichi Sankyo, Lilly, Hoffmann-La Roche/Genentech, Menarini (Stemline) Group, Jazz Pharmaceuticals; Honoraria, Speaking (All Relationships Ended, Self): ASCO Advantage Don S. Dizon: Consultant for Medidata and Astra Zeneca; received grant funding to his institution by Bristol-Myers Squibb. The authors have no other conflicts of interest to disclose.

Version of Record: A version of this preprint was published at Journal of Cancer Survivorship on July 31st, 2026. See the published version at <https://doi.org/10.1007/s11764-026-02095-1>.

Abstract

Purpose: International guidelines recommend fertility counseling at diagnosis for all women with cancer of child-bearing potential, yet whether gestational surrogacy (GS) is included in such counseling is not clear, nor is whether and what proportion of survivors are aware of GS. We assessed the counseling and use of GS, and predictors of oncologist-provided GS counseling among female cancer survivors.

Methods: A survey on fertility and GS counseling was distributed via national advocacy organizations (April–November 2024). Descriptive statistics and logistic regression evaluated predictors of GS counseling.

Results: 519 participants were included. Median age at diagnosis was 32. Most participants had breast (61.5%) or hematologic (14.5%) cancers. 58.2% of participants learned about GS at diagnosis, most often from non-clinical sources (73.2%), including internet/social media (46.0%). Among those aware of GS at diagnosis (n=302), 134 (44.5%) considered it. Of these, 20 (14.9%) pursued GS, and 16 (80%) ultimately had a child using GS. Commonly cited barriers included cost (45.3%), not ready to build a family (41.4%) and preference to carry the pregnancy (29.9%). While 82.1% remembered receiving counseling on fertility risk, 18.7% recalled GS being included in the conversation. Younger patients without children, and those with gynecologic cancers were more likely to receive oncologist-led GS counseling.

Conclusion: Fewer than one in five survivors recalled GS counseling from their oncologist at diagnosis, with most learning from non-clinical sources. Predictors of oncologist-led GS counseling included younger current age, having no children, and gynecologic cancers.

Implications for Cancer Survivors: These findings highlight the need for improved family-building counseling at cancer diagnosis, including GS.

Introduction

Cancer survivorship has expanded substantially over the past decade, and with it, the importance of integrating fertility and family-building counseling into routine oncologic care. Recent guideline updates from The American Society of Clinical Oncology (ASCO) and The International Federation of Gynecology and Obstetrics (FIGO) emphasize that fertility counseling should begin at cancer diagnosis, continue throughout treatment, and incorporate various strategies but also alternative family-building pathways such as gestational surrogacy (GS).[1–3] GS is defined as someone who carries a pregnancy with no first-degree genetic link to the fetus using either an embryo from the intended parents or a donor embryo. Despite growing attention from these governing societies, real-world oncofertility counseling is infrequent and the content inconsistent. [4–8] Multiple contemporary studies demonstrate persistent gaps in fertility discussion content, referral to Reproductive Endocrinology and Infertility (REI) specialists, and survivorship-oriented reproductive care. [9–12]

These gaps are consequential. Fertility-related psychological distress remains prevalent among adolescent and young adult (AYA) survivors, shaping long-term quality of life, decision-making, and reproductive autonomy.[12–14] In some cases, fertility loss can be as distressing as the cancer diagnosis itself.[15] Survivors frequently face medical, financial, and informational barriers to achieving parenthood.[16, 17] Multiple studies highlight that these barriers, particularly limited counseling and lack of clarity around future reproductive potential, persist long after treatment ends.[18, 19]

While fertility preservation (FP) options are increasingly well-defined [20–22], far less is known about how often third-party reproduction and specifically, GS, is discussed in oncology settings. Emerging evidence shows that GS use among survivors is higher than previously recognized. Ellington et al. reported that nearly one in five cancer patients undergoing IVF ultimately used a gestational carrier, with higher utilization among those who had completed chemotherapy or who pursued IVF initially for FP. [23] Recent expert commentaries have called for greater recognition of GS as a family-building option for cancer survivors and for its deliberate inclusion in fertility conversations. [24, 25]

Against this backdrop, the objective of this study was to evaluate GS awareness, counseling, and utilization among reproductive-aged women diagnosed with cancer, and to identify predictors of oncologist-led GS discussions. Given the dearth of literature concerning GS utilization among patients with cancer, the a priori hypothesis was that young women with a cancer diagnosis are given little to no information about GS.

Materials and Methods

The study consisted of two phases.

Phase I: Survey development and validation

A literature review of published surveys exploring oncofertility counseling was conducted to identify prior points that should be covered related to fertility and to identify gaps related to GS inclusion in counseling.[8, 26–28] Phase I followed the Consolidated Criteria for Reporting Qualitative Research (COREQ) guidelines to ensure transparency and rigor in reporting interview data.[29] The primary team consisted of two female interviewers, author CD (MD and MPH with prior qualitative research experience and training) and author AS (BA in Global Public Health, MD candidate). These authors developed a preliminary set of questions adapted as an internet-based survey managed through Research Electronic Data Capture (REDCap). Content analysis methodology underpinned the study. A semi-structured interview model was used to pilot test the survey through partnering patient advocacy organizations (Young Survival Coalition (YSC), Cervivor, The Chick Mission, For the Breast of Us), which included cancer survivors, and content was refined based on feedback. After incorporating feedback, the refined survey instrument was re-reviewed by partnering organizations, who then initiated interview recruitment. Phase I interview recruitment was handled by the partnering organizations.

Eligible participants for phase I were assigned female at birth, diagnosed with cancer between ages 15–45, over 18 years old at the time of the interview, had completed primary cancer treatment, and were proficient in English. The partnering organizations recruited eligible and willing participants (purposive sampling), and connected them with the investigators (AS, CD) via email, keeping participant identity anonymous. No prior relationships existed between interviewers and participants. Interviewees were informed of the investigators' affiliation with Brown University and their research interest in cancer survivorship and fertility. Informed consent was obtained with an IRB-approved informational script, and interviews were conducted virtually with video off to enhance anonymity. Each interview lasted between 45–90 minutes. None were repeated.

We performed these cognitive interviews to ensure questionnaire items are understandable to respondents and to have content validity. Cognitive Interviewing, based on cognitive theory, is widely used to help ensure survey questions achieve their intended purpose by examining respondents' thought processes when they answer survey questions.[30–32] We used a “think aloud approach” (TAP), encouraging participants to describe their thought processes, understanding of the questions, and emotional responses to the survey.[30] We created a script for cognitive interviews which provided background on the purpose of the study, descriptions of TAP and scripted probes (ie. “Can you tell us in your own words what a gestational carrier is?”) when we were concerned about comprehension of specific questions [30, 33] Participants shared their screen (via computer or phone) with authors while completing the online REDCap survey to identify any display or content errors. A final open-ended question was asked: “Is there anything that we have not discussed yet about the survey, or your experiences that you would like to share?” Interviews started on July 19, 2023, and concluded on January 10, 2024. Interviews were audio-recorded, transcribed verbatim, and analyzed (AS and CD) with consensus reached through face-to-face discussions. Field notes were made after interviews. Transcripts were not returned to participants. Feedback was incorporated iteratively after every third interview, with survey revisions based on ongoing feedback regarding content, points of confusion, readability, and themes derived from the data. Analysis did not require data software given the relatively small volume of transcript data to be reviewed. Data saturation was reached after 17 interviews, and the final survey was approved by the IRB for use in phase II of the project.

Phase II: Survey distribution

Survey distribution was through eight US-based patient advocacy organizations: Young Survival Coalition (YSC), Cervivor, The Chick Mission, For the Breast of Us, The Alliance for Fertility Preservation, Stupid Cancer, The Breasties, and National Breast Cancer Coalition. Survey dissemination consisted of distribution on each organizations' websites and social media platforms between April and November 2024. All responses were self-reported and secured in a de-identified REDCap database on institutional servers.

Participants provided information on demographics, cancer history (type, age at diagnosis, treatments received), reproductive history and aspirations, and fertility counseling experiences. Participants were

asked to reflect on the information they received specifically at the time of their cancer diagnosis, even if they had been aware of some of the options prior to diagnosis (ie. adoption). Participants who were not interested in additional family building at the time of their cancer diagnosis were able to opt out of the survey. Branching logic was employed to create a personalized experience, tailoring content to optimize engagement. Questions asked about familiarity with ART and other family-building methods, including GS. Visual definitions were added to enhance comprehension (Fig. 1). Respondents could discontinue their involvement at any time by closing the survey.

Participants had the option to enter a raffle for a \$100 gift card upon survey completion. Raffle entries were collected through a separate, de-identified export of email addresses, and five winners were randomly selected and emailed the gift cards. Email addresses could not be linked to the survey responses, preserving respondent anonymity.

This study was granted exempt status by the Institutional Review Board at Brown University Health-Rhode Island Hospital.

Statistical Methods:

Data analysis was performed (SAS Institute, Cary, NC). The primary outcome, GS awareness at the time of cancer diagnosis, was defined as an affirmative response to the following questions: “Did your cancer healthcare providers discuss gestational carrier with you at the time of your diagnosis?” and “Did you learn about gestational carrier from any other sources? Please check all that apply.” The latter question included nine options for sources of information. Respondents had the ability to select multiple responses for this question, as well as other not mutually exclusive questions on the survey. The secondary outcome, predictors of oncologist-led GS counseling, was based on responses to the first question alone. Participants with multiple cancers identified the one that most impacted their fertility; this diagnosis was used in all analyses. Response distributions were summarized by frequencies, proportions, and exact binomial 95% confidence intervals (CI). Demographic and cancer-specific characteristics were compared by GS counseling using Fisher’s exact test for categorical variables and the Wilcoxon rank sum test for continuous variables. Variables associated with GS counseling with $p < 0.1$ were included in a multivariable logistic regression model to estimate adjusted odds ratios (OR) and 95% CIs for GS. Firth’s penalized likelihood was used to adjust for bias due to sparse data. A complete case analysis was performed, including only respondents with information on all variables of interest. All p-values presented were two-tailed with $p < 0.05$ considered statistically significant. No adjustments for multiplicity were performed.

Results

Figure 2 presents a flow diagram detailing participant eligibility, exclusions, and final sample size (N = 519). 152 participants reported no interest in future family-building at the time of their diagnosis. Of these, 38 opted to exit the survey, while 114 elected to continue the survey and recount their counseling

experiences. Of those that continued the survey, 18 records were removed from the analysis due to incomplete survey responses, leaving 96 in the final sample of 519 participants for analysis.

A summary of demographics is compiled in Table 1. The distribution by cancer type was 61.5% breast, 14.5% hematologic, 6.6% cervical, 4.4% ovarian, 3.5% GI, 1.5% uterine, and 8.1% other. 36 (6.9%) reported a history of multiple cancers. Of the 36 participants with multiple cancers, only five (13.8%) responded to the fertility questions based on their second cancer. Median age (IQR) was 32 (27–36) at diagnosis and 36 (32–41) at survey response. At diagnosis, 30% had one or more children and 75.9% expressed a desire for children post-cancer.

Among this sample, more than half (58.2%; 95% CI 54.0–62.4) reported they were aware of GS at diagnosis. Respondents were then able to select multiple choices for their source of information about GS. Similar proportions of participants learned about GS through oncologists (32.1%; 95% CI 26.9–37.4) or REI specialists (31.1%; 95% CI 25.9–36.4). The most frequently reported source of information about GS were non-clinical resources (73.2%; 95% CI 68.2–78.2), including internet/social media (46.0%; 95% CI 40.5–51.7). However, 27% cited internet/social media as their only source of information regarding GS.

GS was considered by 134 (44.5%) participants who were aware of GS, of which 20 (14.9%) pursued GS. Of those who pursued it, 16 (80%) had a child using GS (Fig. 2). Of those who were aware but did not pursue GS, common barriers included cost (45.3%), not ready to build a family (41.4%), preference to carry the pregnancy (29.9%), and using/planning other methods (20.5%) including ART, egg/embryo donation, or adoption. Less commonly reported reasons were religious objections (5%), and legal barriers (2%).

82.1% of participants recalled their oncologist discussing the impact of cancer treatment on fertility at the time of their diagnosis. Yet only 18.7% of all participants (95% CI 15.3–22.0) recalled specific GS counseling being part of a conversation with their oncologist. Patients with cervical (35.3%), uterine (37.5%), and ovarian (30.4%) cancer were more likely to receive oncologist-led GS counseling compared to breast (19.1%), hematologic (12.0%), GI (5.6%), and other cancers (9.5%) ($p = 0.009$). Patients who were younger at diagnosis (median 31 vs. 32 years, $p = 0.03$), had a younger current age (median 34 vs. 37 years, $p < 0.001$), and were childless at diagnosis (21.3% vs. 12.9% with children, $p = 0.03$) were more likely to receive oncologist-led GS counseling. This counseling did not vary by patient race, sexual orientation, relationship status, geographic location, income, or education. Multivariable regression showed older current age (aOR = 0.90; 95% CI 0.85–0.95) and having children (aOR = 0.54; 95% CI 0.30–0.96) decreased odds, while cervical cancer increased odds of oncologist-led GS counseling (aOR = 2.44; 95% CI 1.09–5.32) (Table 2).

Discussion

Consistent with contemporary literature describing fragmented or incomplete fertility discussions [9, 10], fewer than one in five participants in our cohort recalled GS in conversation with their oncologist at the

time of diagnosis. Although most survivors were aware of GS, the majority learned about it from non-clinical sources, including the internet/social media, reinforcing prior findings that cancer survivors frequently turn to the internet for fertility information when clinical guidance is incomplete.[34, 35] Predictors of GS counseling in our cohort – particularly younger age, nulliparity, and gynecologic cancers – mirror documented patterns in oncofertility counseling more broadly, suggesting that GS discussions may be shaped by similar clinician assumptions.[36, 37] However, given that GS may be relevant for a broad range of survivors, selective counseling may exclude patients with non-gynecologic cancer who would benefit from early information. The bias towards GS counseling for patients with gynecologic cancers may reflect the probability that their treating oncologist was trained as a gynecologist-oncologist, with more education, counseling/communication skills, and/or knowledge in gynecology and reproductive endocrinology. This represents an opportunity to increase provider education in other oncologic specialties on all pathways for family-building, including GS.

A study by Abdo et al. stresses the importance of early, comprehensive fertility discussions.[12] Researchers surveyed breast cancer survivors who received oncofertility counseling prior to receiving chemotherapy at Memorial Sloan Kettering Cancer Center (MSKCC) between 2009–2017, examining the decision-making and outcomes of patients who pursue FP before treatment and family building afterwards. Of the 108 women who responded to the survey, 49 attempted family building after the completion of cancer treatment, and 37 had a child after treatment. Notably, six participants used a surrogate to achieve parenthood after treatment, demonstrating that GS is a relevant family-building pathway even for patients with non-gynecologic cancers. Abdo et al. also identified financial toxicity as a major barrier to both FP and post-treatment family building, aligning with our findings that cost remains a central obstacle to pursuing GS. Most women cited these factors as “very important” in their decision-making: a desire to have a biologic child, the ability to feel hopeful about their future, the chance of success, feeling overwhelmed by their diagnosis, and concerns about having regret if they didn’t freeze their eggs/embryo.[12] Together, these data highlight the need to expand counseling at diagnosis to include the full spectrum of family-building options and to address the significant financial and informational constraints that shape survivors’ reproductive decision-making.

Carr’s foundational ethical analysis on surrogacy in women with cancer emphasizes that withholding information about GS constitutes an informational injustice, particularly when cancer therapies uniquely threaten reproductive autonomy.[38] Carr argues that it is the responsibility of the oncologist to understand and be able to discuss the potential harms and benefits of GS with “the same degree of knowledge and professionalism as they would any other method of assisted reproduction.”[38] While emerging data from the POSITIVE trial supports disruption of breast cancer therapy to pursue pregnancy, some patients – particularly at initial diagnosis – may not anticipate being able to manage the anxiety or fear of recurrence that would accompany a disruption in treatment [39]. As a result, they may elect to not pursue FP prior to treatment if they remain unaware of GS as an option or only have a weak understanding from social media, which may lead to future regret about not having genetically related children. This comprehensive discussion of options upfront can introduce a patient to an REI specialist for the nuanced discussion necessary. Our findings support calls for universal fertility and family-

building counseling at cancer diagnosis that covers the full scope of options, including GS, and referral to REI.

The experience of navigating GS amid a cancer diagnosis is distinct from other GS-seeking patients and warrants directed attention and reliable information. The patient-oncologist dyad is unique from other medical relationships. When a patient is diagnosed with cancer, they look to their oncologist as a source of information and support. Studies have shown that while many patients seek supplementary information about their cancer diagnosis or treatment from the internet, family, or media, the information provided by clinicians is often cited as the main reason for not seeking additional information online.[34] Even when patients use other sources, they are met with conflicting information, and report they overwhelmingly trust their oncologist's recommendations for decision-making. [12, 40]

48.1% of participants in our study were not aware of GS at diagnosis, and only 18.7% of all participants recalled GS counseling being part of a conversation with their oncologist. Our study echoes oncofertility literature: the information patients receive about fertility and their options for family-building (including GS), may not be enough. [8, 37] As a result, patients are more likely to pursue alternative sources, including internet/social media. Indeed, this was the most frequently reported source for GS awareness in our cohort and suggests that patients may not be receiving the comprehensive, evidence-backed GS counseling that they need to make informed decisions. Timing of this counseling is crucial, as the initiation of gonadotoxic cancer treatment will jeopardize their reproductive potential.

AYA cancer survivors, particularly those who are white, well-educated, and have unmet oncologist-driven counseling needs are the groups most likely to utilize online fertility resources.[1, 37, 41] Barriers such as lack of provider-initiated counseling, limited access to oncofertility services, and financial or geographic constraints also increase reliance on online resources.[37, 41] Studies in breast cancer survivors show that younger women, those without children, and those with a strong interest in future fertility are more likely to seek additional counseling, especially if they perceive inadequate information from their oncology team.[37, 42] Younger age, nulliparity, and gynecologic malignancies are predictors of oncologist-initiated GS counseling in our study, and patients who fall outside of these demographics are less likely to receive counseling, and may seek information from non-clinical resources, if at all.

Financial toxicity is well-established as a major barrier to family-building after cancer, and our results align with current survivorship work describing layered financial, logistical, and emotional challenges.[12, 16, 17, 43] A GS arrangement can cost \$100,000-200,000 and is not likely to be covered by insurance.[44] In our study, cost was cited as a barrier by 45.3% of participants who considered GS but did not pursue it. Legal and ethical complexities around third-party reproduction (GS, use of donor gametes, adoption or fostering) for patients with a cancer diagnosis further compound these difficulties. [28, 45] Opposition to surrogacy has been voiced by religious leaders and international groups worldwide and must be acknowledged. In 2024, Pope Francis referred to GS as "deplorable" and called for a global ban so that the unborn child would not be turned into an "object of trafficking." [46] While the Catholic Church is the most explicit in their opposition to GS, other groups including Orthodox Judaism and Islam have raised

concerns about human dignity, lineage, and the commodification of women and children. [47, 48] In our study, only 5% of participants aware of GS cited religious objections as a reason for not pursuing it. Despite these challenges, there are ways to navigate the GS process that require oncologist and auxiliary support staff. Organizations like Worth the Wait, Circle Surrogacy, A Chance for Life and The Chick Mission provide guidance and grant aid to partially defray the cost of family-building processes for patients with cancer. Connecting patients with the tools to make fertility decisions, including expert organizations, is part of the cancer team's role in promoting quality whole-person care.

These findings corroborate studies showing that reproductive counseling – and in our study, GS counseling – during survivorship (from diagnosis) remains inconsistent, under-addressed, and burdened by financial barriers. [12, 18, 19]. Emerging interventions show promise for improving counseling delivery. Trainee-led initiatives, electronic medical record prompts, and structured telehealth models have increased adherence to guideline-recommended counseling. [49, 50] Integrating GS explicitly within these frameworks could help normalize its inclusion in initial fertility conversations.

Limitations:

Our findings must be interpreted in the context of several limitations. Recruitment through survivorship-focused advocacy organizations may introduce sample bias, possibly oversampling survivors who are more engaged in cancer-related communities or those with strong reproductive concerns. To preserve anonymity, data were collected through an open survey link without email or IP tracking; although we implemented multiple verification strategies including CAPTCHA, time-based monitoring, and review for patterned responses, duplicate entries cannot be entirely excluded. As with all retrospective self-reported surveys, recall bias is possible, particularly regarding counseling received at diagnosis, which in some cases occurred many years before survey participation. Yet research supports that patient-reported health details, including among breast cancer survivors, have high accuracy.[51] Broad inclusion criteria improved sample diversity but limited disease-specific granularity. Additionally, response fatigue may have influenced the completeness of longer survey items, and we were unable to calculate a response rate because dissemination occurred through shared public links rather than individualized invitations. Although participants were asked to recall information as it was presented at the time of their cancer diagnosis, knowledge of family-building options occurring prior to or after may have influenced their responses. Finally, variability in counseling content and an inability to assess the comprehensiveness of those conversations limit interpretation.

Conclusion

This study reinforces that GS remains under-discussed in oncology care despite its clinical relevance and high success rates. While almost 60% of participants were aware of GS, the most frequently reported source of information was non-clinical resources. Fewer than 1 in 5 survivors received GS counseling from their oncologist, with younger, nulliparous, and patients with gynecologic cancers more likely to receive counseling. These findings highlight potential biases in counseling practices and

underscore the need for universal fertility education—including GS—among patients of child-bearing age diagnosed with cancer and especially in cases where cancer treatment compromises the patient’s ability to carry a pregnancy. Resources developed from oncological and fertility societies are needed to ensure oncologists and their support staff are equipped to provide access to accurate, patient-centered oncofertility care, including REI referral. Expanding awareness of GS may provide another family-building option for cancer survivors, restoring quality of life post-cancer and mitigating infertility-related distress.

Declarations

Funding Statement: No funding was received for conducting this study.

Acknowledgements: Not applicable

Competing Interests:

Stephanie L. Graff: Stock Ownership (Current, Self) HCA Healthcare; Consulting (All Relationships Ended, Self): Pfizer, SeaGen, AstraZeneca, DaiichiSankyo, Gilead Sciences, Menarini Stemline, Genentech, Novartis, Lilly/Loxo@Lilly; Research Funding (All Funds to Institution): AstraZeneca, Novartis, Daiichi Sankyo, Lilly, Hoffmann-La Roche/Genentech, Menarini (Stemline) Group, Jazz Pharmaceuticals; Honoraria, Speaking (All Relationships Ended, Self): ASCO Advantage

Don S. Dizon: Consultant for Medidata and Astra Zeneca; received grant funding to his institution by Bristol-Myers Squibb.

The authors have no other conflicts of interest to disclose.

Author Contributions: *All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Alexa Steckler, Christine Duffy, and Christina A Raker. The first draft of the manuscript was written by Alexa Steckler and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.*

Data availability statement: *To protect the privacy of the individuals that participated in the study, the data underlying this article cannot be shared given the sensitive nature of the information collected. As noted in the protocol exempted by our IRB, “The final analyzed results will be published in group format, without traceable responses.” Additional summary level data has been included in the tables without individual source data.*

Ethics Approval: This study was granted exempt status by the Institutional Review Board at Brown University Health-Rhode Island Hospital.

Consent to Participate: Informed consent was obtained from all individual participants included in the study.

Previous presentations: Preliminary results from this study were presented at the American Society of Clinical Oncology (ASCO) Annual Meetings in 2024 and 2025. This manuscript significantly expands on that work.

References

1. Su HI, Lacchetti C, Letourneau J, Partridge AH, Qamar R, Quinn GP, et al. Fertility Preservation in People With Cancer: ASCO Guideline Update. *JCO*. Wolters Kluwer; 2025;0:JCO-24-02782. <https://doi.org/10.1200/JCO-24-02782>
2. Maxwell C, Adam S, Bergman L, Nanda S, Tiempo Guinto V, Popovits-Hadari N, et al. Pregnancy after cancer: FIGO Best practice advice. *Intl J Gynecology & Obste*. 2025;169:1119–26. <https://doi.org/10.1002/ijgo.70139>
3. Purandare N, Ruiloba F, Nguyen-Hoang L, Wilailak S, Yanaihara N, Chung JPW, et al. Cancer and fertility management: FIGO best practice advice. *Intl J Gynecology & Obste*. 2025;171:32–44. <https://doi.org/10.1002/ijgo.70426>
4. Swain M, Miller M, Cannella C, Daviskiba S. Disparities in fertility preservation among patients diagnosed with female breast cancer. *J Assist Reprod Genet*. 2023;40:2843–9. <https://doi.org/10.1007/s10815-023-02968-9>
5. Bentsen L, Pappot H, Hjerming M, Colmorn LB, Macklon KT, Hanghøj S. How Do Young Women with Cancer Experience Oncofertility Counselling during Cancer Treatment? A Qualitative, Single Centre Study at a Danish Tertiary Hospital. *Cancers (Basel)*. 2021;13:1355. <https://doi.org/10.3390/cancers13061355>
6. Shnorhavorian M, Harlan LC, Smith AW, Keegan THM, Lynch CF, Prasad PK, et al. Fertility preservation knowledge, counseling, and actions among adolescent and young adult patients with cancer: A population-based study. *Cancer*. 2015;121:3499–506. <https://doi.org/10.1002/cncr.29328>
7. Trèves R, Grynberg M, Parco S le, Finet A, Poulain M, Fanchin R. Female fertility preservation in cancer patients: an instrumental tool for the envisioning a postdisease life. *Future Oncol*. 2014;10:969–74. <https://doi.org/10.2217/fon.13.265>
8. Young K, Shliakhtsitsava K, Natarajan L, Myers E, Dietz AC, Gorman JR, et al. Fertility counseling before cancer treatment and subsequent reproductive concerns among female adolescent and young adult cancer survivors. *Cancer*. 2019;125:980–9. <https://doi.org/10.1002/cncr.31862>
9. Stal J, Roche CI, Yi SY, Freyer DR, Ceasar RC, Kim SE, et al. Behind closed doors: a qualitative study exploring the content of fertility discussions between oncologists and their adolescent and young adult cancer patients from the perspective of oncologists at an NCI-designated comprehensive cancer center. *Support Care Cancer*. 2025;33:308. <https://doi.org/10.1007/s00520-025-09269-0>
10. Martinet-Kosinski F, Lamy S, Bauvin E, Dalenc F, Vaysse C, Grosclaude P. Access to information and oncofertility consultation for young women with breast cancer: a population-based study. *Sci Rep*. 2023;13:3313. <https://doi.org/10.1038/s41598-023-30423-3>

11. Boedeker D, Hunkler K, Pekny C, Watson N, Yamasaki M, Drayer S, et al. Assessing Knowledge, Counseling, and Referral Patterns Regarding Fertility Preservation Before Gonadotoxic Treatments Among Physicians in the Military Health System. *Journal of Adolescent and Young Adult Oncology*. 2024;13:607–13. <https://doi.org/10.1089/jayao.2023.0162>
12. Abdo N, Thom B, Chang C, Feldman M, Benedict C, Semler R, et al. Decisions of young women with breast cancer regarding fertility preservation before cancer treatment and family building after treatment. *J Cancer Surviv [Internet]*. 2025 [cited 2025 Dec 22]; <https://doi.org/10.1007/s11764-025-01809-1>
13. Benedict C, Stal J, Davis A, Zeidman A, Pons D, Schapira L, et al. Greater fertility distress and avoidance relate to poorer decision making about family building after cancer among adolescent and young adult female survivors. *Psycho-Oncology*. 2023;32:1606–15. <https://doi.org/10.1002/pon.6212>
14. Mottram R, Feltbower RG, Jones G, Gelcich S, Rostron H, Allen M, et al. From Storage to Survivorship: A Scoping Review of Young Adult Cancer Survivors' Experiences and Preferences in Reproductive Survivorship Care After Fertility Tissue Preservation. *Journal of Pediatric and Adolescent Gynecology*. 2025;38:26-34.e2. <https://doi.org/10.1016/j.jpag.2024.08.009>
15. Letourneau JM, Ebbel EE, Katz PP, Katz A, Ai WZ, Chien AJ, et al. Pre-treatment fertility counseling and fertility preservation improve quality of life in reproductive age women with cancer. *Cancer*. 2012;118:1710–7. <https://doi.org/10.1002/cncr.26459>
16. Hoffman A, Denham CJ, Fu S, Mendoza T, Nitecki R, Jorgensen KA, et al. Assessing gaps in motherhood after cancer: development and psychometric testing of the Survivorship Oncofertility Barriers Scale. *International Journal of Gynecological Cancer*. 2023;33:778–85. <https://doi.org/10.1136/ijgc-2023-004302>
17. Benedict C, Thom B, Diefenbach M, Schapira L, Simon P, Ford JS. The Impact of Cancer-Related Financial Toxicity on Reproductive Concerns and Family-Building Decision-Making in Post-Treatment Survivorship. *Journal of Adolescent and Young Adult Oncology*. 2022;jayao.2022.0088. <https://doi.org/10.1089/jayao.2022.0088>
18. Gerstl B, Signorelli C, Wakefield CE, Deans R, Vaishnav T, Johnston K, et al. Sexual and reproductive complications and concerns of survivors of childhood, adolescent and adult cancer. *J Cancer Surviv*. 2024;18:1201–10. <https://doi.org/10.1007/s11764-023-01349-6>
19. Lehmann V, Vlooswijk C, Van Der Graaf WTA, Bijlsma R, Kaal SEJ, Kerst JM, et al. Pre-treatment fertility preservation and post-treatment reproduction in long-term survivors of adolescent and young adult (AYA) cancer. *J Cancer Surviv*. 2025;19:1143–54. <https://doi.org/10.1007/s11764-024-01538-x>
20. Quinn GP, Bayefsky M, Cherven B, Ghazal LV, Goldman KN, Francis Levin N, et al. Update and new advances in fertility preservation and cancer. *CA: A Cancer Journal for Clinicians*. 2025;75:602–29. <https://doi.org/10.3322/caac.70029>

21. De Paola L, Napoletano G, Gullo G, Circosta F, Montanari Vergallo G, Marinelli S. The era of increasing cancer survivorship: Trends in fertility preservation, medico-legal implications, and ethical challenges. *Open Med (Wars)*. 2025;20:20251144. <https://doi.org/10.1515/med-2025-1144>
22. Arecco L, Omar A, De Moura Leite L, Janković K, Gentile G, Stana M, et al. The Value of Offering Oncofertility Counseling in Young Patients With Newly Diagnosed Cancer Is Unquestionable. *JCO Oncol Pract*. 2025;21:578–9. <https://doi.org/10.1200/OP-24-00634>
23. Ellington TD, Wardell AC, Deal AM, Mersereau J, Cameron K, Spandorfer S, et al. In vitro fertilization with cryopreserved oocytes or embryos after cancer: The role of gestational carriers. *Cancer*. 2025;131:e35844. <https://doi.org/10.1002/cncr.35844>
24. Applebaum JC, Ginsburg ES. Parenthood after cancer: The critical, yet complex, contribution of gestational carriers. *Cancer*. 2025;131:e35853. <https://doi.org/10.1002/cncr.35853>
25. Printz C. Fertility counseling for reproductive-age women with cancer should address gestational carriers. *CA: A Cancer Journal for Clinicians*. 2025;75:365–7. <https://doi.org/10.3322/caac.70031>
26. Benedict C, Hahn AL, McCready A, Kelvin JF, Diefenbach M, Ford JS. Toward a theoretical understanding of young female cancer survivors' decision-making about family-building post-treatment. *Support Care Cancer*. 2020;28:4857–67. <https://doi.org/10.1007/s00520-020-05307-1>
27. Benedict C, McLeggon J-A, Thom B, Kelvin JF, Landwehr M, Watson S, et al. "Creating a family after battling cancer is exhausting and maddening": Exploring real-world experiences of young adult cancer survivors seeking financial assistance for family building after treatment. *Psychooncology*. 2018;27:2829–39. <https://doi.org/10.1002/pon.4898>
28. Rosen A. Third-Party Reproduction and Adoption in Cancer Patients. *JNCI Monographs*. 2005;2005:91–3. <https://doi.org/10.1093/jncimonographs/lgi021>
29. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007;19:349–57. <https://doi.org/10.1093/intqhc/mzm042>
30. Willis GB, Caspar RA, Lessler JT. Cognitive interviewing: A "how to" guide — Reducing survey error through research on the cognitive and decision processes in surveys. Research Triangle Institute (RTI); 1999 [cited 2026 Jan 24]. p. 1–37. <https://www.hkr.se/contentassets/9ed7b1b3997e4bf4baa8d4eceed5cd87/gordonwillis.pdf/>. Accessed 24 Jan 2026
31. Ryan K, Gannon-Slater N, Culbertson MJ. Improving Survey Methods With Cognitive Interviews in Small- and Medium-Scale Evaluations. *American Journal of Evaluation*. 2012;33:414–30. <https://doi.org/10.1177/1098214012441499>
32. Boeije H, Willis G. The Cognitive Interviewing Reporting Framework (CIRF): Towards the Harmonization of Cognitive Testing Reports. *Methodology*. 2013;9:87–95. <https://doi.org/10.1027/1614-2241/a000075>
33. Balza JS, Cusatis R, McDonnell SM, Basir MA, Flynn KE. Effective questionnaire design: How to use cognitive interviews to refine questionnaire items. *NPM*. 2022;15:345–9.

<https://doi.org/10.3233/NPM-210848>

34. López-Gómez M, Ortega C, Suárez I, Serralta G, Madero R, Gómez-Raposo C, et al. Internet use by cancer patients: should oncologists “prescribe” accurate web sites in combination with chemotherapy? A survey in a Spanish cohort. *Ann Oncol*. 2012;23:1579–85. <https://doi.org/10.1093/annonc/mdr532>
35. Ha J, Kim M, Park H. Digital health interventions for oncofertility in female patients: a systematic review. *Womens Health Nurs*. 2025;31:119–29. <https://doi.org/10.4069/whn.2025.06.13>
36. Yuen S, McCool K, Bharucha M, Narloch K, Zhu J, Yong H. Evaluating Trends in Fertility Counseling among Reproductive-Age Patients with Breast Cancer. *Ann Surg Oncol*. 2025;32:8425–31. <https://doi.org/10.1245/s10434-025-17857-x>
37. Leah HB, Mersereau JE, Anderson C, Rodriguez JL, Hodgson E, Weinberg CR, et al. Fertility-related experiences after breast cancer diagnosis in the Sister and Two Sister Studies. *Cancer*. 2019;125:2675–83. <https://doi.org/10.1002/cncr.32126>
38. Carr SV. Surrogacy and ethics in women with cancer. *Best Practice & Research Clinical Obstetrics & Gynaecology*. 2019;55:117–27. <https://doi.org/10.1016/j.bpobgyn.2018.11.001>
39. Partridge AH, Niman SM, Ruggeri M, Peccatori FA, Azim HA, Colleoni M, et al. Interrupting Endocrine Therapy to Attempt Pregnancy after Breast Cancer. *New England Journal of Medicine*. Massachusetts Medical Society; 2023;388:1645–56. <https://doi.org/10.1056/NEJMoa2212856>
40. Moyer AM, Madsen H, Johnson J, Del Chiaro M, Gleisner A, Lieu CH, et al. Informational Needs of Surgical Oncology Patients: A Cross-Sectional Patient Survey. *J Surg Res*. 2023;283:771–7. <https://doi.org/10.1016/j.jss.2022.11.027>
41. Bhatia S, Pappo AS, Acquazzino M, Allen-Rhoades WA, Barnett M, Borinstein SC, et al. Adolescent and Young Adult (AYA) Oncology, Version 2.2024, NCCN Clinical Practice Guidelines in Oncology. *Journal of the National Comprehensive Cancer Network*. National Comprehensive Cancer Network; 2023;21:851–80. <https://doi.org/10.6004/jnccn.2023.0040>
42. Zaami S, Melcarne R, Patrone R, Gullo G, Negro F, Napoletano G, et al. Oncofertility and Reproductive Counseling in Patients with Breast Cancer: A Retrospective Study. *J Clin Med*. 2022;11:1311. <https://doi.org/10.3390/jcm11051311>
43. Baner S, Howard AF, Thorne S, Goddard KJ. Artificial Reproductive Technology Use and Family-Building Experiences of Female Adult Childhood Cancer Survivors: A Qualitative Study. *Current Oncology*. 2025;32:369. <https://doi.org/10.3390/curroncol32070369>
44. Dehmler S. What is the Average Cost of Surrogacy in the United States? (2025) [Internet]. [cited 2025 Jun 20]. <https://www.illumefertility.com/fertility-blog/average-cost-of-surrogacy-in-the-united-states>. Accessed 20 Jun 2025
45. Lee IT, Humphries LA, Shah DK. Oocyte Donation, Gestational Carriers, and Adoption for Breast Cancer Survivors. *Curr Breast Cancer Rep*. 2020;12:361–6. <https://doi.org/10.1007/s12609-020-00391-y>

46. Meaney J. The Wrongs of Altruistic Surrogacy [Internet]. The National Catholic Bioethics Center. 2025 [cited 2026 Feb 10]. <https://www.ncbcenter.org/messages-from-presidents/humanembryooptionnvol2-gm4jy>. Accessed 10 Feb 2026

47. ר ם ם ם. What does Jewish Law Have to Say about Surrogacy? [Internet]. The Schechter Institutes. 2012 [cited 2026 Feb 10]. <https://schechter.edu/what-does-jewish-law-have-to-say-about-surrogacy-responsa-in-a-moment-volume-7-issue-no-3-december-2012/>. Accessed 10 Feb 2026

48. Serour GI. Islamic perspectives in human reproduction. *Reprod Biomed Online*. 2008;17 Suppl 3:34–8. [https://doi.org/10.1016/s1472-6483\(10\)60328-8](https://doi.org/10.1016/s1472-6483(10)60328-8)

49. Sena LA, Sedhom R, Scott S, Kagan A, Marple AH, Canzoniero JV, et al. Trainee-Led Quality Improvement Project to Improve Fertility Preservation Counseling for Patients With Cancer. *JCO Oncology Practice*. 2022;18:e403–11. <https://doi.org/10.1200/OP.21.00479>

50. Romero SAD, Au L, Flores-Ortega RE, Helsten T, Palomino H, Kaiser BN, et al. Let’s TOC Fertility: A stepped wedge cluster randomized controlled trial of the Telehealth Oncofertility Care (TOC) intervention in children, adolescent and young adult cancer survivors. *Contemporary Clinical Trials*. 2024;141:107537. <https://doi.org/10.1016/j.cct.2024.107537>

51. Liu Y, Diamant AL, Thind A, Maly RC. Validity of self-reports of breast cancer treatment in low-income, medically underserved women with breast cancer. *Breast Cancer Res Treat*. 2010;119:745–51. <https://doi.org/10.1007/s10549-009-0447-5>

Tables

Table 1. Participant characteristics

Participant characteristics	N=519
Cancer type	
Breast	319 (61.5)
Hematologic	75 (14.5)
Cervical	34 (6.6)
Uterine	8 (1.5)
Ovarian	23 (4.4)
GI	18 (3.5)
Other	42 (8.1)
Multiple cancers	36 (6.9)
Recurrence	58 (11.2)
Current age, median (IQR)	36 (32-41)
Age at diagnosis, median (IQR)	32 (27-36)
Treatments (not mutually exclusive)	
Chemotherapy	444 (85.5)
Immunotherapy (ie. Herceptin)	175 (33.7)
Radiation	295 (56.8)
Hormonal therapy	230 (44.3)
Surgery	420 (80.9)
Clinical trial	50 (9.6)
None of the above	1 (0.2)
Other	32 (6.2)
Race	
Asian	28 (5.4)
Black or African American	41 (7.9)
White	399 (76.9)
Multiracial, Other	14 (2.7)
Prefer not to answer	37 (7.1)
Hispanic/Latino ethnicity	59 (11.4)

Sexual orientation at diagnosis	
Bisexual	44 (8.5)
Gay or lesbian	5 (1.0)
Straight or heterosexual	452 (87.1)
Other	11 (2.1)
Prefer not to answer	7 (1.3)
Relationship status at diagnosis	
Single	167 (32.2)
Married	227 (43.7)
Partnered	104 (20.0)
Other	18 (3.5)
Prefer not to answer	3 (0.6)
Location of residence at diagnosis	
Northeast	146 (28.1)
Midwest	79 (15.2)
South	135 (26.0)
West	115 (22.2)
US territories/Outside of US	41 (7.9)
Prefer not to answer	3 (0.6)
Insurance/payment at diagnosis	
Any private insurance	441 (85.0)
Any public insurance	59 (11.4)
Self-pay and/or other only	14 (2.7)
I don't remember/Prefer not to answer	5 (1.0)
Education level at time of diagnosis	
High school grad/GED or less	33 (6.4)
Some college or associate degree	92 (17.7)
Bachelor's Degree	182 (35.1)
Post-graduate education	208 (40.1)

Prefer not to answer	4 (0.8)
Income level at time of diagnosis	
Less than \$50,000	111 (21.4)
\$50,000-\$99,999	175 (33.7)
\$100,000 - \$149,999	89 (17.1)
\$150,000 - \$199,999	47 (9.1)
More than \$200,000	63 (12.1)
	34 (6.6)
I don't remember/Prefer not to answer	
Pregnant at time of diagnosis	24 (4.6)
Had children at time of diagnosis	155 (30.0)
Interested in having more children, if already a parent	(n = 155)
Yes	78 (50.3)
No	49 (31.6)
Maybe	28 (18.1)
Interested in becoming a parent in the future, if not already	(n = 360)
Yes	313 (86.9)
No	47 (13.1)

Table 2. Multivariable Logistic Regression for Predictors of Oncologist-led GS Counseling*

*Included 516 participants with complete covariate data

	Adjusted OR (95% CI)
Cancer type	
Breast	1.00 (Ref)
Hematologic	0.32 (0.13-0.71)
Cervical	2.44 (1.09-5.32)
Uterine	1.57 (0.34-6.35)
Ovarian	0.98 (0.35-2.55)
GI	0.22 (0.024-0.93)
Other	0.30 (0.087-0.81)
Age at diagnosis (per year)	1.03 (0.96-1.10)
Current age (per year)	0.90 (0.85-0.95)
Had children at time of diagnosis (vs. no)	0.54 (0.30-0.96)

Figures

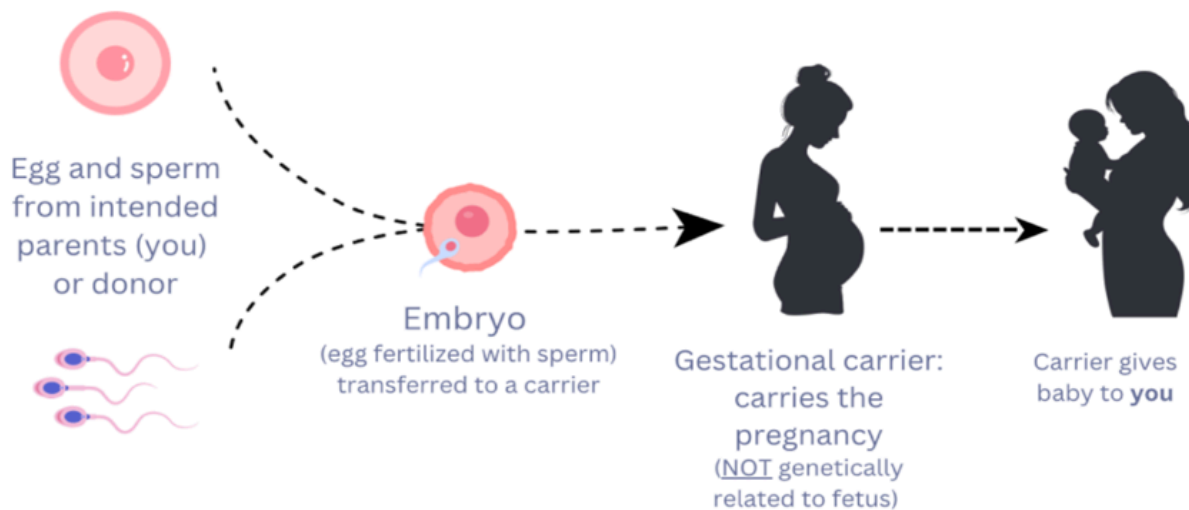


Figure 1

Gestational Surrogacy (GS) Visual definition

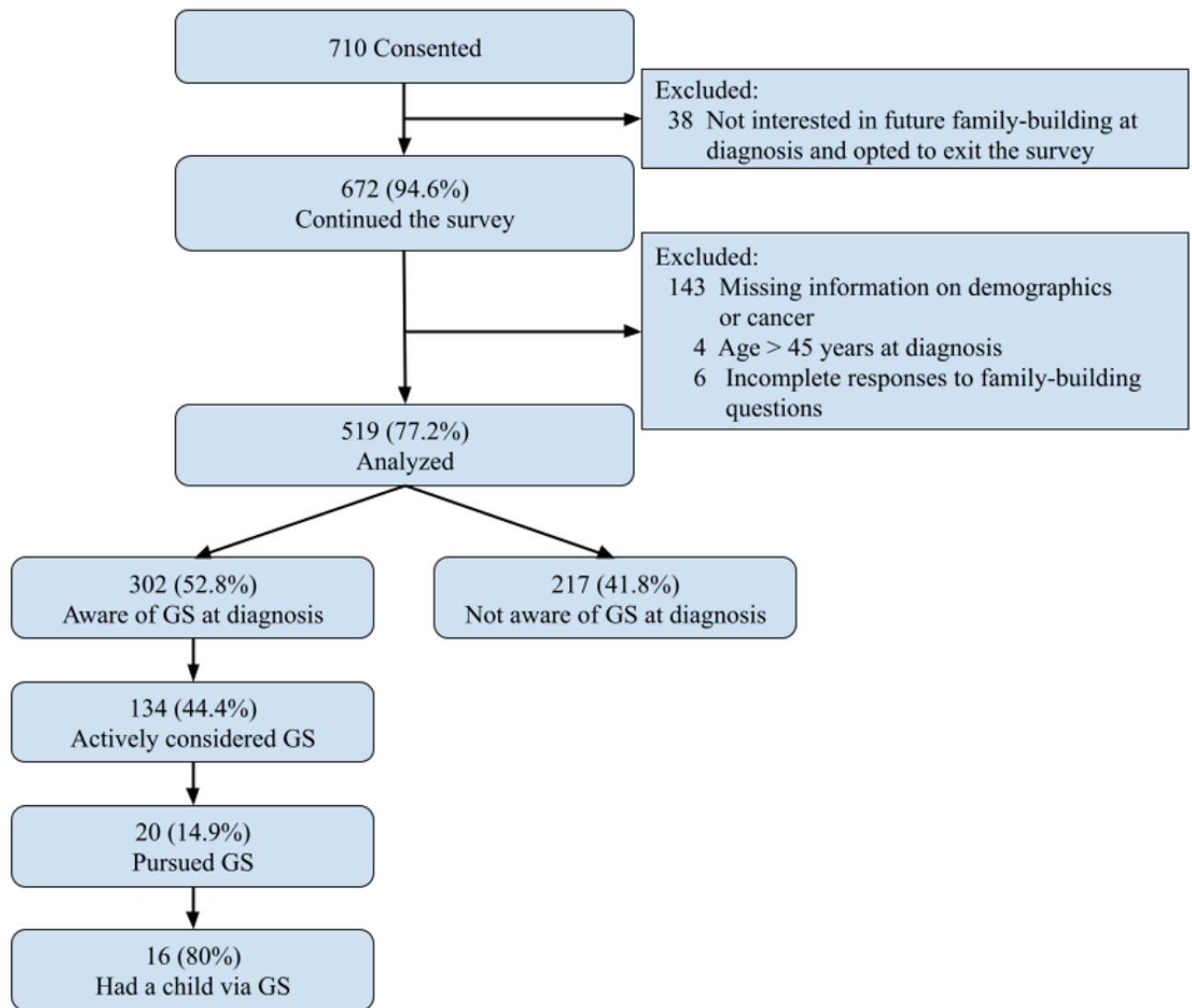


Figure 2

Flow diagram depicting participant recruitment, exclusions, and final study sample