# The increasing demand for reproductive urologists and male fertility care

## BACKGROUND

The World Health Organization reported recently that approximately 17.5% of couples worldwide experience infertility (1). This staggering number of 1 in 6 is the proportion of couples that will be unable to conceive a child by natural conception within 1 year of regular, unprotected intercourse. Among these couples, the male partner is implicated in up to one-half of cases.

The increasing rate of infertility has led to increased use of fertility services and assisted reproductive technology (ART). In vitro fertilization (IVF) cycles are registered and documented by the Centers for Disease Control and Prevention and the Society for Assisted Reproductive Technology Clinic Outcome Reporting System, which provide an easy measure to track care use and outcomes. To meet increasing demand, there has been significant growth of IVF cycles over the last few decades, leading to a 30% increase in live births per year using ART since 2011.

Despite the growth in ART over the last decade, it is estimated that millions of female patients still cannot obtain treatment because of the disproportionate mismatch between supply and demand for reproductive care. The United States currently performs a proportionally lower number of IVF cycles per million people in the population than developed countries—just 922 cycles per million compared with those in Japan (3,603), Australia (3,397), and Europe (1,368) as a whole. The growing demand for ART, along with a limited supply of infertility care providers, has been recognized as an imminent workforce shortage crisis by our colleagues in reproductive endocrinology and infertility (REI). This has led to calls to train more REI providers, increase the number of fertility clinics, improve efficiency at the clinic level, and lower the barriers for access to care.

Male fertility care is even further behind when it comes to supply and demand. Even among couples with infertility, men bypass fertility evaluation in almost one-third of cases (2). Although the Centers for Disease Control and Prevention and Society for Assisted Reproductive Technology Clinic Outcome Reporting System track IVF cycles and document male factor infertility (MFI) as an indication for ART, no centralized database measures the prevalence of MFI or the use of male reproductive services exclusively or accurately. Therefore, the number of men with infertility who require evaluation and medical or surgical treatment is difficult to quantify and remains poorly studied. In addition to limitations in characterizing the prevalence of MFI and growth in demand for male fertility services, the supply and workforce capacity of appropriately trained reproductive urologists (RUs) are unknown. There is already a projected shortage of urologists per capita of approximately 30% by the year 2030, in part because of aging of the urologic workforce. The number of RU fellows trained annually is typically <20, which is approximately one-third of the number of REI fellows. Moreover, RUs' clinical practice often includes treatment of sexual dysfunction, hypogonadism, and other men's health-related conditions that may detract from their capacity to provide reproductive care. Taken together, the demand for male fertility care has potentially surpassed the supply of RUs and is likely to worsen in the future. As a field, we must attempt to characterize the mismatch between supply and demand to begin structuring interventions that may help to close the gap and increase access to care, as is already being performed by our REI colleagues. This is particularly time-critical because the US Department of Health and Human Services estimates that policies intended to change the physician workforce require at least a decade or more to enact change, given the difficult task of changing the training infrastructure and the length of medical training programs (3).

As a first step, we can use demand forecast modeling to estimate the demand for RU care. Although the inputs are imperfect, we can use previously published research, institutional data, and national reports to identify the US population of reproductive-age men (aged 18–49 years), the distribution and rates of declining semen parameters, and the incidence of infertility to model projected demand. We can also use marriage rates and desire for children as a surrogate to predict desire for family building.

We applied these approaches using readily available data to construct multiple models that attempt to describe the current and future demand for RU care. Herein, we present 3 models that characterize different populations that may require RU evaluation: all male partners within a couple with infertility (model A); all men with subfertility, defined as a male partner in a couple with infertility with total motile sperm count (TMSC) of <20 million (model B); and the increase in number of patients requiring RU care over time according to the projected population-level decline in semen parameters (model C).

## MODEL A

The US Census Bureau reports 70.2 million men aged 18–49 years, our primary demographic of reproductive-age men. The marriage rate in the United States as of 2022 was 52% (4). Therefore, among 70.2 million reproductive-age men, an estimated 36.5 million US men are married. According to the General Social Survey, married men desire an average of 2.5 children in their lifetime. Taken together, approximately 8.1% (2.5 births per 31 reproductive years) of married men aged 18–49 years, or 2.96 million men, are attempting to conceive annually, of whom 1 of 6 experience infertility. Per American Urological Association guidelines, both male and female partners in a couple with infertility should undergo concurrent evaluation and assessment. Therefore, nearly 500,000 men require fertility evaluation per year. This estimate does not account for the number of unmarried men who are also attempting to conceive, which is likely substantial. In a more conservative estimate, we assume that 40%–50% of infertility is attributable to MFI. Therefore, approximately 197,333–246,666 men require evaluation by an RU every year (men attempting to conceive × rate of infertility × % caused by MFI).

## MODEL B

Our second model attempts to identify all men with subfertility, or TMSC of <20 million and in a couple with infertility. Among all men presenting for initial fertility evaluation at our institution between 2002 and 2023 (n = 16,404), 23.9% had TMSC of <20 million. When applied to nationwide population estimates, there are approximately 118,000 men with subfertility attempting to conceive annually (men attempting to conceive annually × rate of infertility × % men with TMSC of <20 million).

## MODEL C

Our last model attempts to estimate the increase in number of patients requiring RU care over time. Previous reports have found that sperm concentration has decreased 0.87 million/mL per year over the last few decades (5). If this linear trend continues, we can use our findings from model B to predict the change in the proportion of men with TMSC <20 million over the next 5 years. During this span, the percentage of men under this TMSC cutoff would increase from 23.9% to 27.6%, or an additional 18,200 men per year.

## CONCLUSION AND FUTURE DIRECTIONS

On the basis of our models, we estimate that between 118,000 and over 500,000 men require RU care annually, and this number is expected to increase over time. As with any predictive modeling, we acknowledge the inherent limitations regarding the underlying assumptions of our estimates. Furthermore, identifying the number of men requiring RU care is only the first step in characterizing overall demand. Further efforts are needed to determine how this translates into number of clinic visits, surgical procedures, and hours of care delivered for management of male fertility. We also require further understanding of our existing RU workforce. Factors such as the number of fellowship-trained RUs, the proportion of their practice dedicated to fertility care, and their projected rate of retirement are critically important to quantify if we aim to narrow the gap between RU supply and demand.

There are numerous ways to increase the urology workforce's capacity to provide reproductive care. On the one hand, there is room for expansion of the RU workforce at various levels of training. At the residency level, we can ensure that non–fellowship-trained urologists are proficient in providing reproductive care. At the fellowship level, we can expand the number of fellowship positions. Lastly, at the clinical practice level, we can train advanced practice practitioners to perform the initial fertility evaluation. On the other hand, additional efforts may improve the practice capacity of existing RUs. This can be performed through the adoption of telehealth, ensuring that RUs can focus most of their clinical practice on fertility-related care (if that is their preference) and incorporating alternative diagnostics such as home-based semen testing.

We believe that the American Urological Association, American Society for Reproductive Medicine, and other professional societies and stakeholders should focus efforts on defining the gap between supply and demand for RU care. Only once we have a better understanding of this dynamic can our field determine the best ways to improve access to care for MFI.

## CRediT Authorship Contribution Statement

**Daniel R. Greenberg:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing – original draft, Writing – review & editing. **Catherine S. Nam:** Conceptualization, Formal analysis, Methodology, Writing – review & editing. **Joshua A. Halpern:** Conceptualization, Formal analysis, Investigation, Methodology, Project administration, Supervision, Writing – review & editing.

## Declaration of Interests

D.R.G. has nothing to disclose. C.S.N. has nothing to disclose. J.A.H. is a full-time employee of Posterity Health.

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