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INVITED REVIEW

Male Fertility

Insurance coverage for male infertility care in the United States

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Infertility is a common condition experienced by many men and women, and treatments are expensive. The World Health Organization and American Society of Reproductive Medicine define infertility as a disease, yet private companies infrequently offer insurance coverage for infertility treatments. This is despite the clear role that healthcare insurance plays in ensuring access to care and minimizing the financial burden of expensive services. In this review, we assess the current knowledge of how male infertility care is covered by insurance in the United States. We begin with an appraisal of the costs of male infertility care, then examine the state insurance laws relevant to male infertility, and close with a discussion of why insurance coverage for male infertility is important to both men and women. Importantly, we found that despite infertility being classified as a disease and males contributing to almost half of all infertility cases, coverage for male infertility is often excluded from health insurance laws. Excluding coverage for male infertility places an undue burden on their female partners. In addition, excluding care for male infertility risks missing opportunities to diagnose important health conditions and identify reversible or irreversible causes of male infertility. Policymakers should consider providing equal coverage for male and female infertility care in future health insurance laws.
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INTRODUCTION

Infertility, defined as the inability to conceive after 12 months of regular, unprotected intercourse,[1] is very common. According to data from the National Survey of Family Growth, 6% of married women (aged 15–44 years) report being unable to get pregnant after 1 year of regular, unprotected intercourse.[2] In addition, 11% of all women (aged 15–44 years) report having impaired fecundity, which is defined as a physical difficulty getting pregnant or carrying a pregnancy to live birth.[2] Among women aged 25–44 years, 17% report ever using infertility services, but only 9% of men aged 25–44 years report ever using infertility services.[3]

Unlike other medical conditions, the diagnosis of infertility is applied to a pair of individuals: the two partners attempting to conceive a child. Therefore, discussions of female infertility must be accompanied by discussions of male infertility. However, 18%–27% of infertility couples (aged 15–44 years) report that the male partner did not undergo an infertility evaluation.[4] In this review, we will assess the current state of knowledge of how male infertility care is covered by insurance in the United States. We begin with an appraisal of the costs of infertility care, then examine the state insurance laws relevant to male infertility care, and close with a discussion of why insurance coverage for male infertility is important to both men and women.

COSTS OF INFERTILITY CARE

Infertility care is expensive. Smith *et al.* followed 391 women presenting for infertility care at a single institution. The patients were followed for 18 months and asked to report on the services they received. Using standardized costs, they found that 207 women received *in vitro* fertilization (IVF) treatments, with average costs of $30 274. Women who had intrauterine insemination (IUI) reported costs of $7704 and women who received only fertility medications reported costs of $1403. Even women who received no treatments reported average costs of $903.[5]

There are also high out-of-pocket costs associated with receiving infertility care. Wu *et al.* asked 332 couples to complete cost diaries during 18 months of receiving infertility care. Both male and female patients were included. Of the 178 couples who underwent IVF, the average out-of-pocket cost was $19 234. IUI out-of-pocket costs were $2623 and fertility medications cost an average of $912.[6]

Male infertility care is also expensive. 111 men pursing infertility care were asked to complete cost questionnaires at the end of their therapy. 64% of the men had out-of-pocket expenses of more than $15 000 whereas 16% reported expense of >$50 000. Overall, the male patients spent 16%–20% of their annual incomes on infertility-related expenses. In addition, 47% experienced financial strain due to infertility treatments and 46% had treatment options limited by cost.[7] With a 2013 median US household income of $51 939,[8] it is not surprising that these costs represented a substantial burden for male patients undergoing infertility treatments.

INSURANCE COVERAGE FOR INFERTILITY CARE

With high out-of-pocket costs for infertility care, it is easy to understand why insurance coverage of infertility care is important. Insurance

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has long been used as a tool to mitigate the costs associated with healthcare, and the passage of the Medicare law in 1965 provides relevant background. While the development of the Medicare bill was complicated and multifactorial, a major motivating factor was the need to relieve America's seniors of their high out-of-pocket healthcare expenses and expand their access to care. When he signed the Medicare bill on July 30, 1965, President Johnson, quoting President Truman, said:

> *"Millions of our citizens do not now have a full measure of opportunity to achieve and to enjoy good health. Millions do not now have protection or security against the economic effects of sickness. And the time has now arrived for action to help them attain that opportunity and to help them get that protection".*[9]

IMPORTANCE OF ACCESS TO MALE INFERTILITY CARE

Insurance coverage for male infertility is important to both members of the infertile couple. Both the World Health Organization (WHO)[10] and the American Society of Reproductive Medicine (ASRM)[1] define infertility as a disease. Specifically, infertility is a disease because it is a "deviation from or interruption of the normal structure or function of any part, organ, or system of the body …".[1] Male factor infertility contributes to about half of all cases of infertility,[11] and the ASRM,[12] the National Institute for Health and Care Excellence,[13] and the Centers for Disease Control and Prevention[14] recommend that couples with infertility begin their work-ups together.

Evaluation and treatment for male infertility can benefit both members in an infertile couple. The goals of male infertility evaluations include (1) identifying and correcting reversible causes of male infertility, (2) identifying irreversible conditions that may be amenable to assisted reproductive techniques, and (3) identifying irreversible conditions in which the man's sperm are not obtainable.

Excluding insurance coverage for male infertility places an undue burden on female partners for the remainder of infertility treatments. Treatments for male infertility can downgrade the intensity of intervention required for the couple to achieve a pregnancy.[15] Interventions for men with infertility can also be cost-effective methods to help couples achieve pregnancies,[16] and skipping male factor treatments could lead to increased use of higher cost-assisted reproductive technologies. Finally, excluding male infertility evaluations risks missing opportunities to identify serious medical diseases associated with infertility and genetic conditions that may be transmitted to offspring. In a retrospective study from two academic medical centers, 6% of patients (33 of 536) presenting for infertility evaluations had important medical pathology identified such as 24 cases of cystic fibrosis mutations and two cases of cancer.[17] In addition, male infertility has been associated with an increased risk of cardiovascular disease,[18] testicular[19] and prostate cancer,[20] and early mortality.[21]

INSURANCE COVERAGE FOR FEMALE INFERTILITY IN THE UNITED STATES

Evidence from the National Health Interview Survey confirms that in the modern era, a lack of insurance remains an important barrier to seeking needed care.[22] The Patient Protection and Affordable Care act is silent on federal infertility benefits,[23] which leaves decisions about mandating coverage for infertility care to individual states and employers.

Unfortunately, we know little about the current state of insurance coverage infertility care in the private insurance market. A 2006 survey of employers with ≥200 employees found that 63% of the 931 employers reported offering insurance coverage for infertility evaluations for their employees. Unfortunately, only 39% reported covering fertility medication therapy and only 22% reported covering IVF.[24]

At the state level, several publications have evaluated the impact of insurance mandates for female infertility care. Those studies found 15 states that mandate some form of insurance coverage for infertility, with various exceptions based on employer size, religious status, and type of insurance product. When examining the relationship between insurance mandates and infertility outcomes, previous authors have found that compared with states without infertility insurance mandates, state with insurance mandates perform more IVF cycles,[25] more IUI cycles,[26] and more hybrid cycles.[26] When examining IVF outcomes, states with insurance mandates were found to have fewer embryos transferred per cycle, a lower percent of live births per cycle, and a lower rate of multiples.[25]

INSURANCE COVERAGE FOR MALE INFERTILITY IN THE UNITED STATES

While there have been multiple studies evaluating state mandates for female infertility coverage, only one study has examined state laws for male infertility mandates. We performed a primary, systematic review of state laws and found that of the 15 states with laws mandating coverage for female infertility care; only eight included any discussion of care for male infertility.[27]

Two states, Montana and West Virginia, have laws that mandate coverage for undefined infertility services in Health Maintenance Organization (HMO) plans. Six states, including California, Connecticut, Massachusetts, New Jersey, New York, and Ohio, also have laws that mandate some form of coverage for male infertility care (**Table 1**). In California, insurance companies must offer employers insurance plan options that include infertility coverage, but employers are not required to include those plans for their employees. Connecticut law requires that insurance plans cover diagnosis and treatment for individuals unable to produce conception. In Ohio, only HMO plans must provide for the diagnosis and treatment of testicular failure. Massachusetts, New Jersey, and New York laws offer the most comprehensive coverage for male infertility care, with Massachusetts' law also including coverage for sperm procurement and sperm banking.[27]

Table 1: Summary of state laws with specific mandates for coverage of male infertility[27]

State	*Male factor evaluation and treatment coverage included in law*	*Restrictions*
California	Diagnosis and treatment (medication and surgery) of conditions causing infertility must be offered to employers	
Connecticut	Diagnosis and treatment for individuals unable to "produce conception"	
Massachusetts	Diagnosis and treatment of infertility, including sperm procurement, processing, and banking	Correction of elective sterilization; experimental procedures*
New Jersey	Diagnosis and treatment of infertility	Correction of elective sterilization; cryopreservation; experimental procedures*
New York	Semen analysis, testis biopsy, correction of malformation, disease, or dysfunction resulting in infertility	Correction of elective sterilizations; cryopreservation; experimental procedures*
Ohio	Diagnostic and exploratory procedures for testicular failure	Only mandated for Health Maintenance Organizations

*Not otherwise defined

INTERNATIONAL INSURANCE COVERAGE FOR INFERTILITY

While little has been published about the coverage of male infertility treatments in the United States, even less is known about insurance coverage for male infertility care internationally. In the Ontario province of Canada, three cycles of IVF are covered for women with "complete bilateral anatomical fallopian tube blockage that did not result from sterilization."[28] The province is considering expanding the indications for IVF, but again, there is no mention of male infertility evaluation or treatment in the announcements.[29] The Canadian province of Québec provides more comprehensive coverage of infertility evaluation and treatment for both partners. For male partners, there is coverage, with some exceptions, for basic infertility evaluations, surgical sperm retrieval, and sperm cryopreservation.[30]

In Europe, national policies about insurance coverage for infertility services vary from country to country.[31] However, in general, there is more widespread inclusion of infertility services in European national health plans as compared to state laws in the United States.[32]

CONCLUSIONS

Health insurance plays a critical role in ensuring access to healthcare and minimizing the financial burden of expensive services. Despite infertility being classified as a disease and males contributing to almost half of all infertility cases, coverage for male infertility is often excluded from US state laws that mandate infertility coverage. Evaluation and treatment for male infertility is expensive, and excluding coverage for male infertility places an undue burden on female partners. In addition, excluding care for male infertility evaluations risks missing opportunities to diagnose important health conditions and identify reversible or irreversible causes of male infertility. Policymakers should consider providing equal coverage for male and female infertility care in future health insurance laws.

AUTHOR CONTRIBUTIONS

JMD was the author for this manuscript. He provided the conception and design, acquisition of data, and analysis and interpretation of data. He drafted, revised, and gave final approval for the published final version of the manuscript.

COMPETING INTERESTS

James M. Dupree receives salary support from Blue Cross Blue Shield of Michigan for his position as Co-Director of the Michigan Value Collaborative and resource physician for the Michigan Urological Surgery Improvement Collaborative.

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