

ORIGINAL RESEARCH

Medicaid coverage of male infertility treatments

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Abstract

Background: Infertility treatments are costly and have poor coverage, thereby deterring or limiting access to care. Medicaid patients are even less likely than the average patient to pursue intervention and there is limited transparency of coverage of fertility interventions. We aimed to evaluate Medicaid reimbursement of common interventions used for the diagnosis and/or treatment of male infertility. **Methods:** Physician fee schedules were accessed for the year 2023. Current procedural terminology codes utilized for male infertility interventions were evaluated. The Medicaid physician fee index was accessed on a state by state basis. Linear regression analysis was performed to determine whether reimbursements were attributable to a state's tendency to reimburse more for Medicaid services. **Results:** 49 states publish accessible physician fee schedules. No states offered reimbursement for microscopic testicular extraction of sperm thus requiring coding alternatives. Certain procedures were covered by every state (testis biopsy), while others were rarely covered (vasovasostomy). Reimbursement patterns significantly varied based on the state physician fee index, although these were weak correlations. **Conclusions:** Discrepancies in coverage and reimbursement for fertility procedures is evident. The absence of clear methodology regarding coverage and reimbursement contribute to poor transparency within Medicaid which may be partially responsible for the underutilization of infertility treatments among Medicaid patients.

Keywords

Male; Infertility; Reimbursement

1. Background

Infertility is defined as the inability to conceive after 6 or 12 months of regular, unprotected intercourse in those over or under age 35, respectively [1]. The diagnosis of infertility is unique as it usually applies to a pair of individuals. Approximately 12% of couples experience infertility, with half of these being primary or secondarily due to male factor infertility [2]. Infertility causes significant psychological and economic costs on patients and health care systems [3, 4]. Earlier diagnosis and intervention can, however, mitigate these factors. Furthermore, given that male infertility is associated with overall decreased health, higher mortality risks, and higher cancer risks, early diagnosis of male infertility can offer the opportunity for identification of other medical conditions [5–8]. Similarly, there is evidence that paternal health can affect his children's metabolic health via transmission of epigenetic modifications. In other words, diabetes and obesity may not only contribute to male infertility but can negatively impact the health of future children [9–11]. It is therefore crucial to view male infertility as a medical condition which is related to and promotes metabolic disorders.

Semen analysis and endocrine testing remain the initial diagnostic evaluation of infertile males. Endocrine evaluation typically involves assessment of testosterone and follicle-

stimulating hormone (FSH) [12]. Males with low testosterone may further be assessed for luteinizing hormone (LH), estradiol, free testosterone, total testosterone, and prolactin levels. They may require pituitary imaging depending on their endocrine results. Meanwhile, semen analysis values have several parameters which are interpreted based on World Health Organization guidelines [12]. Furthermore, ideally there are two semen analyses obtained at least 1 month apart. One of the possible most severe semen analysis findings, azoospermia, or absence of any sperm on semen analysis, can only be made after examination of two separate centrifuged specimens.

Azoospermia itself can be divided into obstructive or non-obstructive etiologies which can significantly guide management and treatment of these individuals. Differential diagnosis between these two entities is made via the patient's history, physical exam findings, endocrine tests, semen analysis, and genetic testing results [13]. Although not yet included in testing guidelines, there are associations regarding the serum hormone leptin being higher in infertile males. In particular, obese males have significantly higher circulating levels of leptin. Thus, in the future, leptin may prove to be another possible endocrine test to be performed in the diagnosis of male infertility [14]. Although the role of leptin in fertility is not fully known, leptin receptor gene polymorphisms can

negatively affect sperm motility [15]. Per the American Urological Association and American Society for Reproductive Medicine (AUA/ASRM) guidelines, it is not recommended to perform testicular biopsy in men with findings suggestive of non-obstructive azoospermia (NOA) [16]. In contrast, in those with findings more consistent with obstructive azoospermia (OA), such as normal testicle volume, a nondilated epididymis, and normal FSH levels, then a testicular biopsy may be useful. Additionally, the practitioner can utilize transrectal ultrasonography to evaluate for ejaculatory duct obstruction [12]. There are numerous other imaging modalities, such as scrotal ultrasound or vasography, and surgical interventions, including but not limited to varicocelectomy, microsurgical testicular sperm extraction, percutaneous epididymal sperm aspiration, transurethral resection of the ejaculatory ducts, vasovasostomy, and epididymovasostomy which can be performed to further optimize sperm production, increase sperm delivery, and retrieve sperm for artificial reproductive technologies [17–21]. There exist newer potential therapies currently still undergoing research, such as the use of bone marrow mesenchymal stem cells which can be differentiated into Leydig-like cells, potentially reconstructing the testicular environment. This could possibly provide treatment options for disorders of abnormal spermatogenesis [22].

There also exist numerous interventions for fertility preservation, which refers to the use of interventions to safeguard an individual's fertility in whom a disease or treatment of a disease (such as cancer) may result in infertility [23]. Fertility preservation (FP) may involve freezing sperm, testicular tissue, embryos, oocytes or ovarian tissue. In certain individuals, this may be their only option for future reproduction. ASRM and American Society of Clinical Oncology recommend referral to specialists for FP consultation, however despite this, only about 4.6% of oncologic patients of reproductive age utilize FP procedures [24]. Several barriers to FP exist, including cost (the most prohibitive factor), poor insurance coverage, and lack of awareness of both providers and patients. One cycle of oocyte cryopreservation or embryo cryopreservation can cost \$10,000 to \$15,000 and patients may require two or three cycles [23, 25]. Relatedly, insurance coverage of FP is poor. While 21 states do have mandates regarding coverage of infertility, only 3 (Montana, Illinois, and Utah) have mandates that include non-commercial insurance such as Medicaid to provide coverage for FP [26, 27]. States are often hesitant to incorporate mandates that include non-commercial insurance as provisions within the Affordable Care Act require the states to cover additional costs for FP which may strain state budgets [28]. Thus, despite a variety of interventions available for FP and guidelines recommending referral of patients to specialists, few patients with Medicaid can reasonably access these services.

Similarly, despite a plethora of diagnostic and treatment options and with a substantial part of the population experiencing infertility, there remains issues in access to infertility treatment. In women aged 25–44, 17% report ever using infertility services, but only 9% of men in the same age group report use of these services [29]. However, the percentage of women aged 25–44 years old who have ever used any infertility services has declined by 8% and 18% since 1995 and

1982, respectively [30]. This is likely not due to improvement in fertility, but rather due to increased barriers and costs to care. Furthermore, and worryingly, several studies have shown declining sperm counts over the past several decades [31–33]. Despite these negative trends and current guidelines in favor of diagnosis and intervention for both the female and male partner, there remains poor Medicaid coverage with varying reimbursements for physicians. Based on publicly available data, there are 74.6 million individuals enrolled in Medicaid. Approximately 45% of these individuals, or 33.6 million, are within the age group of 19 to 44, the prime age for infertility intervention. In this study, Medicaid coverage status was evaluated for the most common interventions used in the diagnosis and treatment of male infertility on a state-by-state basis.

2. Methods

Individual state Medicaid websites were accessed for the year 2023 and physician fee schedules were obtained from these websites. All fee schedules evaluated were queried for the outpatient, ambulatory reimbursement rates. The fee schedules were then searched for the following current procedural terminology codes: 10021 (fine needle aspiration), 52402 (transurethral resection of ejaculatory ducts), 54500 (testis biopsy, needle), 54505 (testis biopsy, incisional), 54800 (epididymis biopsy), 54900 (epididymovasostomy), 54901 (epididymovasostomy, bilateral), 55200 (vasostomy), 55300 (vasostomy for vasograms), 55400 (vasovasotomy), 55530 (varicocelectomy, scrotal), 55535 (varicocelectomy, abdominal), 55550 (varicocelectomy, laparoscopic), 55870 (electroejaculation), 55899 (unlisted genitourinary procedure), 69990 (microscope use, surgical), 74440 (vasography), 76870 (scrotal ultrasound), 76872 (transrectal ultrasound) and 89230 (semen analysis).

Although there exist other procedures utilized for male infertility, they lack current procedural terminology (CPT) codes.

The Medicaid physician fee index for each state was utilized and linear regression analysis was conducted to evaluate if variance in a state's reimbursement of infertility intervention could be attributable to a tendency for that state to offer higher reimbursement for Medicaid services compared to the national average. The fee index for the year 2019 was utilized as it was the most recent update published by the Kaiser Family Foundation [34]. The fee index was treated as our independent variable. There were no covariates in this study as the only information available was the reimbursement rates for a given CPT.

3. Results

Of the 50 US states that were analyzed, 49 states publish publicly accessible fee schedules. One state (Tennessee) will not release fee schedules without submission of patient claim data. Of the remaining 49 states, none offered reimbursement for microscopic testicular extraction of sperm (55261) or percutaneous extraction of sperm (55260) thus requiring alternatives for coding (such as 55899—Unlisted genitourinary procedure) or the use of out-of-pocket billing. Certain

procedures were covered by every state, such as testis biopsy or varicocelectomy, while others were rarely covered, such as vasovasostomy (Table 1). Furthermore, certain CPT codes had significant variation between states regarding reimbursement. For example, vasotomy (55200) varied from \$84 in Rhode Island to \$1108 in Arizona. Despite such large discrepancies between states, there were no significant differences in reimbursement rates between geographic groupings of states (Northeast, Southeast, Midwest, *etc.*). Evaluation of Medicaid-to-Medicare fee index on a state by state level was also employed and linear regression was conducted. This allowed us to assess if variance in the reimbursement patterns of states can be attributed to an overall likelihood for that state to provide larger reimbursements for Medicaid services relative to the national average. While the reimbursement of

most queried CPTs did correlate with the fee index, the overall variance attributable to this tended to be minimal with the largest R^2 being only 0.317 (Table 2). Most CPT codes queried either were covered or were not covered; there were few mentions of a CPT requiring prior authorization. Some codes can be utilized for procedures outside of infertility interventions, such as a varicocelectomy being conducted for scrotal pain, and it was not possible to determine if CPT coverage was based on the infertility indication or other indication(s) based on publicly available data.

4. Discussion

Male infertility can be a challenging medical diagnosis to evaluate and treat despite the plethora of options available. With

TABLE 1. Medicaid coverage and reimbursement of infertility procedures.

CPT (Procedure)	States with Medicaid Coverage (N)	Mean Reimbursement (\$)	Median Reimbursement (\$)	Reimbursement Range (Min to Max)
10021—(Fine Needle Aspiration)	49	67.5	62	12–149
52402—(Transurethral resection of ejaculatory ducts)	47	226	212	7–537
54500—(Testis biopsy, needle)	49	70	58	11–400
54505—(Testis biopsy, incisional)	48	166	158	59–263
54800—(Epididymis biopsy)	49	107	104	11–300
54900—(Epididymovasostomy)	31	638	603	210–1240
54901—(Epididymovasostomy, bilateral)	32	865	821	319–1641
55200—(Vasostomy, with or without cannulization)	43	276	228	84–1108
55300—(Vasotomy for vasograms)	37	161	152	105–289
55400—(Vasovasotomy)	16	432	422	168–641
55530—(Varicocelectomy, scrotal)	49	306	291	180–568
55535—(Varicocelectomy, abdominal)	49	363	343	216–673
55550—(Varicocelectomy, laparoscopic)	49	358	341	213–661
55870—(Electroejaculation)	13	133	141	71–199
55899—(Unlisted genitourinary procedure) ^a	16	54	0	0–250
69990—(Microscope use, surgical)	41	181	170	121–315
74440—(Vasography)	46	71	65	13–182
76870—(Scrotal ultrasound)	48	82	79.5	29–168
76872—(Transrectal ultrasound)	48	114	102	31–284
89320—(Semen analysis)	23	9.7	12	0–27

^aInitially, not reimbursed in most states but requires manual review and reimbursement is based on which procedure it is re-coded to. CPT: current procedural terminology; Min: minimum; Max: maximum.

TABLE 2. Infertility reimbursement rates vs. Medicaid physician fee index.

Current Procedural Terminology (CPT) Code	R^2	Significant?
10021—(Fine Needle Aspiration)	0.068	No
52402—(TUR ejaculatory ducts)	0.086	$p = 0.046$
54500—(Testis biopsy, needle)	0.318	$p < 0.001$
54505—(Testis biopsy, incisional)	0.317	$p < 0.001$
54800—(Epididymis biopsy)	0.041	No
54900—(Epididymovasostomy)	0.317	$p < 0.001$
54901—(Epididymovasostomy, bilateral)	0.315	$p < 0.001$
55200—(Vasostomy, with or without cannulization)	0.142	$p = 0.013$
55300—(Vasotomy for vasograms)	0.075	No
55400—(Vasovasotomy)	0.223	No
55530—(Varicocelectomy, scrotal)	0.181	$p = 0.002$
55535—(Varicocelectomy, abdominal)	0.179	$p = 0.002$
55550—(Varicocelectomy, laparoscopic)	0.230	$p < 0.001$
55870—(Electroejaculation)	0.010	No
55899—(Unlisted genitourinary procedure) ^a	0.033	No
69990—(Microscope use, surgical)	0.142	$p = 0.015$
74440—(Vasography)	0.137	$p = 0.011$
76870—(Scrotal ultrasound)	0.215	$p < 0.001$
76872—(Transrectal ultrasound)	0.168	$p = 0.004$
89230—(Semen analysis)	0.002	No

^aInitially, not reimbursed in most states but requires manual review and reimbursement is based on which procedure it is re-coded to.

a substantial part of the population experiencing infertility, there remain issues in access to infertility treatment by the patient. However, Medicaid coverage and reimbursement of various CPTs commonly used for infertility vary widely among states. Although this is the first study to report this in regards to infertility, discrepancies in state coverage of benefits and reimbursement rates are well known [35–37]. Certain CPTs are covered by every state, other CPTs are covered by less than one-third of states.

The absence of clear methodologies regarding state decisions to cover (or not cover) certain infertility procedures and physician reimbursement rates is a crucial factor which contributes to overall lack of transparency. Thus, not only do patients have to contend with a confusing landscape, but the physicians must do the same. For example, certain procedures utilized for male infertility such as microsurgical epididymal sperm aspiration, testicular sperm aspiration, and percutaneous epididymal sperm aspiration, do not have category 1 CPT codes. Instead, they have category 2 codes. Category 1 codes have descriptors that correspond to a procedure or service and range from 00100 to 99499. Meanwhile, category 2 codes are alphanumeric which are supplemental. Medicare will cover category 1 codes but will not cover category 2 codes. Thus, physicians must utilize other codes (such as CPT 55899—Unlisted procedure of male genital system) either alone or

in combination (*i.e.*, CPT 88172—cytopathology, evaluation of fine needle aspirate) and submit them instead. As noted in Table 1, CPT 55899 is not covered in most states or the procedure will be re-coded into the next most applicable code and the physician will be reimbursed at that rate. This creates additional steps for the physician and often results in rejection of the submitted code.

Limited transparency at both the patient and physician level may be partially responsible for the underutilization of infertility interventions. Medicaid is the largest health insurer in the United States, covering 18.9% of the overall population [38]. Current evidence suggests that Medicaid does improve access to care when compared to those who are uninsured, however they are less likely to use fertility services when compared with private insurance [39, 40]. Given the poor coverage of various infertility treatments, individuals have to resort to paying out-of-pocket. However, out-of-pocket costs for various infertility treatments are likely prohibitively expensive for those individuals with Medicaid [40]. From the physician point-of-view, physicians are less likely to offer procedures if they will not be reimbursed. Thus, both patients and physicians may make decisions under the assumption that performing or obtaining an infertility intervention is not financially viable. Increasing transparency on Medicaid coverage of surgical infertility options will allow patients and physicians to review

available treatment modalities without hesitations.

There are several limitations to this study. There was significant heterogeneity in physician fee schedules available on each state's Medicaid website. For example, some states publish schedules on a monthly or quarterly basis, while others publish once per year. For certain states, due to either poor website design or confusing organization, it was difficult to ascertain which fee schedule was the most up-to-date. Many states also have managed Medicaid plans, which may have varying fee schedules as well. Furthermore, even if state fee schedules contained a CPT, that does not necessarily mean that the physician will be reimbursed if it is submitted. There were no means to obtain approval rates in any reasonable manner. Lastly, fee schedules and reimbursement rates are constantly changing, and thus the data presented here may differ from contemporary rates.

5. Conclusions

In summary, male infertility can be a challenging diagnosis to both evaluate and treat, with patients experiencing issues accessing care and providers facing a landscape characterized by limited transparency in coverage and reimbursement. There is an absence of clear methodologies utilized in determining what is covered and the reimbursement patterns. This may, in part, result in underutilization of these services, particularly in those patients who use Medicaid. However, this study does have several limitations, primarily regarding the publicly available physician fee schedules. Practitioners need to stay vigilant and up-to-date in the ever-changing landscape of male infertility reimbursement trends.

AVAILABILITY OF DATA AND MATERIALS

All data used in this publication are freely available online in the data/document repository for each respective state's Medicaid website.

AUTHOR CONTRIBUTIONS

AP and AA—designed the research study. AP, KJ and MP—performed the research. KJ and MP—provided help and advice on data collection. AP—analyzed the data. AA—provided help and advice on analysis interpretation. AP, KJ and AA—wrote the manuscript. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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