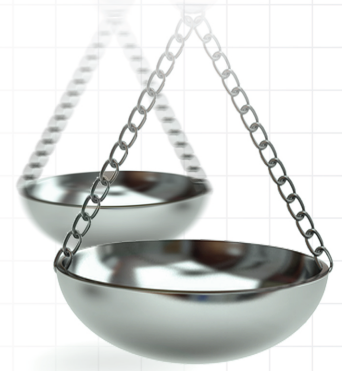




Economic impact of reduced postoperative visits after inflatable penile prosthesis implantation

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Aim: This study assessed the economic impact of reducing one postoperative visit following inflatable penile prosthesis (IPP) implantation. **Methods:** Scenario analyses were used to model the effects of eliminating one 30-min IPP postoperative visit from the expected 2.5 visits accounted for by the American Medical Association resource-based relative value scale data. The reduction was attributed to simplified teaching with a modified device. The recaptured time was applied to: the most frequent in-office CPT codes utilized by IPP implanters; evaluation and management of new ED patients pursuing/receiving IPPs; and in-office vasectomy. Physician work time and reimbursement were conservatively estimated using the 2024 Medicare Physician Fee Schedule and an alternative scenario where Advanced Practice Providers conducted IPP teaching was also modeled. **Results:** Annually, reducing one 30-min IPP postoperative visit for practices performing 25/50/100 IPP implants recaptured 750/1500/3000 min, respectively. This recaptured time translates into as much as \$17,654 additional annual Medicare reimbursement. At 25 implants yearly, urologists could help an additional 13–25 patients with office visits and observe an additional \$2054–\$2234 reimbursement. At 50 implants yearly, office evaluation and counseling for 7 ED patients who progress to IPP implantation results in an additional \$4048 reimbursement, excluding any diagnostic procedures and/or downstream surgical cases. At 100 implants yearly, recaptured schedule capacity can facilitate 37 in-office vasectomies, which translates to a \$12,234 reimbursement. **Conclusion:** Achieving fewer IPP postoperative visits can optimize postoperative care and open schedule capacity that improves access to care for patients with urological needs.

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Keywords: economic impact • erectile dysfunction • inflatable penile prosthesis • postoperative visits • reimbursement

Limited access to urological care is unfortunately common. The supply of practicing urologists in the United States (US) falls short of the projected number necessary to meet the demand for urological services, as estimated by the US Department of Health [1]. In 2019, there were 3.99 urologists per 100,000 persons, which is expected to decrease to 3.1–3.3 by 2060 [2]. The American Urological Association (AUA) brought attention to this shortage, noting that only 60% of US counties have practicing urologists. The aging urologic workforce is expected to exacerbate this issue, as many are nearing retirement [3]. These constraints contribute to longer wait times for appointments and surgeries [4], often causing delays in care that can negatively impact patient outcomes and quality of life [5].

An area of urology that is among the most impacted by these limitations is the treatment of erectile dysfunction (ED), particularly with advanced surgical therapies such as inflatable penile prosthesis (IPP) placement for men with refractory ED. Untreated ED can profoundly impact patients, detracting from their physical well-being, quality of life, self-esteem, relationships, self-worth and productivity [6,7]. However, access to IPP remains limited due to a

shortage of trained urologists. A 2020 AUA survey highlighted a shortage of US urologists trained in inflatable penile prosthesis (IPP) implantation and other restorative therapies [3], while a 2023 claims analysis reported that 90% of urologists who perform penile implants do fewer than 20 annually [8]. Additionally, there is an uneven geographic distribution of these specialists [3]. These barriers may lead some men to abandon treatment [10], continue to suffer poor quality of life [6] and even experience lost productivity in the workforce [11]. Such challenges are often more severe in underserved and/or marginalized populations [12]. With approximately 1.7 million insured men in the US who are candidates for surgical ED treatment [9], implementing measures to optimize urology practices without compromising patient outcomes is essential.

To address these constraints, many urology practices have adopted various approaches to improve efficiency and access to care. One such strategy is optimizing postoperative care pathways by reducing the number of postoperative visits following IPP placement. Postoperative visits involve educating patients on proper device use and care to ensure they can achieve safe and independent operation of their implant. While valuable, these visits, which may be planned or unplanned pending the needs and capabilities of the patient and clinic [13,14], can be burdensome for both patients and practices [15], particularly given the limited resources of the urologic workforce. Reducing the number of postoperative visits may free up time and resources, enabling practices to focus on other patient care activities and improving overall access to care.

This study assessed the impact of reducing the number of IPP postoperative visits within the immediate 90-day post-operative period, especially the effect on patient access to care and its economic implications for urology practices. By addressing these questions, we aim to provide insights into how efficiency improvements in IPP postoperative care can help mitigate the challenges posed by workforce shortages.

Materials & methods

Study design

This study utilized data from the American Medical Association (AMA) resource-based relative value scale (RBRVS) related to IPP implantation (current procedural terminology [CPT®] 54405). A scenario analysis was developed to explore the impact of eliminating a single 30-min postoperative visit (CPT 99213), dedicated to educating patients on the device use and care, on patient access, practice volume and Medicare reimbursement. The eliminated visit reflects the potential efficiency gains from simplified and easier teaching methods associated with a modified device. The basis for comparison utilized in the model was the assumption of an average 2.5 postoperative visits within the first 90 days (global period) after surgery, as anticipated by Medicare reimbursement, which accounts for this number of visits [16]. The primary objective of this study was to quantify the improvements in access to care provided by eliminating a postoperative visit. The secondary objective was to determine the impact of these changes on Medicare reimbursement.

Scenario analyses

Models of practices performing 25, 50 or 100 IPPs annually were created based on annual implant volume categories established in the literature [9]. Definitive Healthcare 2021 medical claims clearinghouse and Medicare fee-for-service (FFS) claims data were analyzed to identify the most common in-office procedures and services provided by urologists and advanced practice providers (APPs) working in urology. The CPT codes for these services were used to construct the models and were identified from commercial, Medicare Advantage, Medicaid and Medicare FFS claims in these data sets.

Model inputs

Physician reimbursement was conservatively estimated using the 2024 Centers for Medicare and Medicaid Services (CMS) Medicare Physician Fee Schedule [16]. Physician work time was derived from the Physician Work Time data file within the CMS Medicare Physician Fee Schedule [16]. As APPs account for a growing proportion of urology procedural claims submitted to public and private health insurers in the US [17], and given the declining number of urologists available to provide care [2], a reimbursement model was also developed where APPs in the urology practice provided post-operative IPP teaching was also developed [17]. APP reimbursement was calculated as 85% of physician reimbursement based upon CMS payment guidelines [18].

Table 1. Additional patient care and weighted average Medicare reimbursement resulting from reducing one 30-minute, post-operative teaching visit per unit time for a urologist performing 100 inflatable penile prosthesis implantations, annually.

Scenario	CPT	Definition	100 annual implants					
			Yearly		Monthly		Weekly	
			Additional patient care activities	Medicare physician reimbursement	Additional patient care activities	Medicare physician reimbursement	Additional patient care activities	Medicare physician reimbursement
1	99213	Office o/p est low 20–29 min	100	\$8937	8	\$745	2	\$172
	99214	Office o/p est mod 30–39 min	64	\$8045	5	\$670	1	\$155
	99204	Office o/p new mod 45–59 min	50	\$8217	4	\$685	1	\$158
	52000	Cystoscopy	75	\$17,654	6	\$1471	1	\$339
2	New visit: 99204 + 3 est visit: 99214	New ED patient management	15	\$8096	1	\$675	0	NA
3	55250	Vasectomy	37	\$12,234	3	\$1020	1	\$235

CPT: Current procedural terminology; ED: Erectile dysfunction; Est: Established; O/p: Outpatient; Mod: Moderate.

Outcomes evaluated & data analyses

The effects on patient access to urology care were evaluated by reapplying the time recaptured from the reduction in postoperative visits, presumed to result from simplified teaching, under three scenarios: the most frequent in-office CPT codes used by IPP implanters; evaluation and management of new ED patients who then pursue/receive an IPP (CPT 99204 + 3x CPT 99214) based upon previously published research showing the average number of visits involved in their care [16]; and, as a control measure, vasectomy procedures (CPT 55250). Vasectomy was selected because of its ubiquitous nature across urology practices and well-known level of reimbursement. The same scenario analysis was done for APPs excluding the vasectomy procedure scenario. In each scenario, the total min recaptured and Medicare reimbursement realized for services provided were evaluated. Scenario 1 encompasses a range of established outpatient visits and procedures, including moderate to low complexity office visits (CPT codes 99213 and 99214) and more specialized procedures like cystoscopy (CPT code 52000). Scenario 2 focused on the management of new erectile dysfunction (ED) patients, combining an initial comprehensive evaluation (CPT code 99204) with three established patient visits (CPT code 99214). Scenario 3 details the inclusion of vasectomy (CPT code 55250), a common urologic surgery. Data management and analyses were conducted using Microsoft® Excel® (WA, USA).

Results

The reduction of one 30-min post-operative IPP postoperative visit dedicated to teaching patients how to use and care for their prosthesis for practices performing 25/50/100 IPP implants resulted in recapturing 750/1500/3000 min annually, respectively. Applying this recaptured time, presumed to result from simplified and easier teaching, to: commonly performed in-office services (Table 1); the evaluation and management of new ED patients; or vasectomy procedures translated to significant additional Medicare reimbursement, as high as \$17,654 annually. Higher IPP volumes were associated with greater time recaptured and reimbursement for services provided during this recaptured office time.

When a surgeon implants 25 IPPs per year, that same urologist could provide care for 13–25 additional patients through office visits, resulting in \$2054–\$2234 annual Medicare reimbursement. For surgeons with an annual volume of 50 IPP implants, clinical workups for 7 ED patients who go on to IPP implantation can result in \$4048 of reimbursement, excluding any reimbursement from additional diagnostic procedures and/or the downstream surgical cases. At 100 IPP procedures yearly, recaptured schedule capacity could enable 37 patients to undergo vasectomy, resulting in \$12,234 of Medicare reimbursement (Table 1).

Table 2 presents scenarios in which patient care was provided by APPs, rather than physicians. When these activities are performed by the APPs specifically, this adjustment enables the provision of 100 additional low-

Table 2. Additional patient care and weighted average Medicare reimbursement generated by reducing one 30-min, post-operative teaching visit per unit time for a practice with a urologist who performs 100 inflatable penile prosthesis implantations annually and an advanced practice provider provides post-operative IPP teaching.

Scenario	CPT	Definition	100 annual implants					
			Yearly		Monthly		Weekly	
			Additional patient care activities	Medicare APP reimbursement	Additional patient care activities	Medicare APP reimbursement	Additional patient care activities	Medicare APP reimbursement
1	99213	Office o/p est low 20–29 min	100	\$7597	8	\$633	2	\$146
2	99214	Office o/p est mod 30–39 min	64	\$6838	5	\$570	1	\$132
3	99203	Office o/p new low 30–39 min	86	\$7990	7	\$666	2	\$154
4	99212	Office o/p est. low 10–19 min	188	\$8870	16	\$739	4	\$171
5	New visit: 99204 + 3 est visit: 99214	New ED patient management	15	\$6882	1	\$573	0	N/A

APP reimbursement was calculated using 85% of reimbursement of a urologist based on Centers for Medicare and Medicaid Services payment guidelines.
APP: Advanced Practice Provider; CPT: Current Procedural Terminology; ED: Erectile dysfunction; Est: Established; O/p: Outpatient; Mod: Moderate.

complexity office visits [CPT 99213], 64 medium-complexity visits [CPT 99214], 86 new patient consultations for low-complexity cases [CPT 99203], or 188 very low-complexity follow-ups [CPT 99212]. Annually, this approach yields Medicare reimbursement of \$7597 for low-complexity visits, \$6838 for medium-complexity visits, \$7990 for new patient consultations and \$8870 for very low-complexity follow-ups. Regarding the management of new ED patients with an initial new patient assessment and three follow-up visits, the analysis showed bandwidth for an additional 15 extra patients can be achieved on an annual basis. This results in a \$6882 Medicare reimbursement.

Discussion

To our knowledge, this is the first study to investigate the impact of reduced IPP postoperative visits on access to care and practice economics. The analysis modeled a reduction of one postoperative visit within the 90-day postoperative period, during which an average of 2.5 postoperative visits are typically expected. By reducing a single 30-min post-operative IPP postoperative visit, practices performing various volumes of IPP surgeries could recapture 750 to 3000 min, annually. This additional schedule bandwidth can facilitate care for up to 50 new patients, 100 established patients or 37 vasectomy procedures. As a result, practices could then see up to \$17,654 of reimbursement, conservatively estimated at Medicare rates.

IPP is a definitive treatment option for ED, recommended by multiple international guidelines [19–25]. It is particularly valuable for the many men who become refractory to medical therapy and/or are seeking a more effective long-term therapy [26]. With high satisfaction rates that may surpass that of medical therapy [27], IPPs provide reliable and durable treatment of ED, a condition that is increasing in prevalence with the aging population [27]. However, access to IPP treatment is limited, in part due to the small number of implanters who routinely perform IPP surgeries and the projected decline in the total number of practicing urologists per capita in the coming decades [2]. This shortage will further strain access to care, particularly as the demand for urologic services grows with the aging population. To address these challenges, efforts to improve the efficiency of urology practices and expand access to care are critical to ensure patients receive the care they need in a timely manner.

Reducing postoperative visits is one potential strategy to streamline postoperative care and enhance efficiency in urologic practices. Other methods that have been successfully employed include telemedicine visits and advanced patient education tools. Telemedicine has been shown to reduce the need for in-person follow-up visits while maintaining high patient satisfaction and comparable clinical outcomes [28]. Video education in postoperative patient counselling has also proven effective with a quality improvement initiative demonstrating that it can enhance patient understanding and satisfaction, potentially reducing the necessity for multiple in-person follow-up visits [29]. Practices optimizing care and able to care for patients with fewer post-operative IPP visits could unearth

additional schedule capacity that can be utilized to help reduce wait times for office visits and procedures and enable patients to be more efficiently evaluated for surgical treatment, should their condition require it. These practice efficiency gains, from a financial and economic perspective, will help ensure practice viability in the era of decreasing reimbursement.

A limitation of this study is that models were based upon Medicare reimbursement rates. Thus, the findings may differ for patients with commercial insurance or private/self-pay. However, Medicare reimbursement data are widely used as benchmarks and provide conservative financial estimates (directional results) that can be applicable to most urology practices. A further limitation of the study is the analysis of only a small subset of outpatient visits and procedures in urology, as the specific results generated in these models may not be applicable to all practices. Last, as with any economic model, certain assumptions were made regarding the model parameters and should inform the context in which the results are interpreted.

Future research should build on these findings by incorporating estimates of scenario prevalence and evaluating time savings and efficiency gains across a broader range of outpatient urology services. Additionally, investigating the economic impact on patients with commercial insurance or private/self-pay warrant further investigation, as well as exploring the patient perspective, such as satisfaction and out-of-pocket costs, will provide a more comprehensive understanding of the implications of reduced postoperative visits.

Conclusion

Practices optimizing care and achieving fewer post-operative IPP postoperative visits, regardless of IPP volume, gain additional schedule capacity that can improve access to care and be used to serve more patients' urological needs. This time savings and gain in practice efficiency will enable IPP implanters and their practices to better manage patient demand and workload amidst the worsening scarcity of urologists and growing wait times for care, while also helping ensure practice viability in the era of decreasing reimbursement.

Summary points

- The supply of urologists in the USA is projected to decline, exacerbating an existing shortage and increasing wait times for appointments and surgeries.
- Erectile dysfunction (ED) patients, especially those seeking treatments like inflatable penile prosthesis (IPP) implantation, are particularly impacted by limited access to care.
- Reducing post-operative IPP postoperative visits has been identified as a strategy to improve practice efficiency and increase patient access to urology services.
- Eliminating one 30-min post-operative IPP postoperative visit in practices performing 25–100 IPPs annually can recapture 750–3000 min, which can be applied to treat more patients.
- The recaptured time allows practices to perform additional office visits, procedures, or vasectomies, potentially generating up to \$17,654 in Medicare reimbursement annually.
- Utilizing advanced practice providers (APPs) for post-operative teaching could further enhance practice efficiency, providing more patient care while maintaining financial viability.
- The study's findings highlight how optimizing practice efficiency through reduced postoperative visits can mitigate the negative effects of the urologist shortage on patient care access.
- While the study used Medicare reimbursement rates for its models, the approach provides a useful benchmark for future research into commercial insurance and patient satisfaction.

Author contributions

B Gill: study design, data interpretation and manuscript writing and editing; A Sun and P Babbar: data interpretation and manuscript editing; YE Shin, S Rojanasart and K Durand: study design, implementation of data analysis, data interpretation and manuscript writing and editing.

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The study was supported by Boston Scientific. The authors have no other relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript apart from those disclosed.

Competing interests disclosure

B Gill, A Sun and P Babbar are practicing urologists and were not compensated for their participation in this study, however each serves as a consultant for Boston Scientific in other capacities. K Durand and S Rojanasarot were employees of Boston Scientific when the study was conducted and hold stock options within the company. YE Shin was a contractor for Boston Scientific when the study was conducted. The authors have no other competing interests or relevant affiliations with any organization/entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript apart from those disclosed.

Writing disclosure

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Ethical conduct of research

Ethics approval from an institutional review board and informed consent were not required for this study as it did not use patient-specific data.

Data sharing statement

The data that support the findings of this study are available from the corresponding author.

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