

# Understanding the role of surveys in modern urology: an insight into survey trends over the decades

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**Introduction** To provide a comprehensive review of survey trends in urology, aiming to provide insight into changes in publication in the new millennium. Surveys in healthcare allow for a better understanding of the knowledge, attitudes, and practice patterns as well as gaps in healthcare systems.

**Material and methods** A comprehensive review of all “surveys in urology answered by urologists” was performed through the PubMed and Scopus databases, according to the SPICE framework. Included surveys were divided according to the subject: “Uro-oncology”, “Urolithiasis”, “Mental health” “Resident training”, and “Miscellaneous”. Publications were then divided into 2 main periods: Period-1 (2000–2011) and Period-2 (2012–2023).

**Results** A total of 361 surveys have been published since 2000, with a significant overall increasing trend in the recent decade ( $p < 0.001$ ). A significantly increasing focus is seen for publications on resident training ( $n = 86$ ; +660%;  $p = 0.003$ ), mental health ( $n = 31$ ; +650%;  $p = 0.001$ ), urolithiasis ( $n = 40$ ; +371%;  $p = 0.002$ ), and uro-oncology ( $n = 94$ ; +230%,  $p \leq 0.001$ ). In subanalysis, the largest increase in publications was noted for surveys on radical prostatectomy (+175%,  $p = 0.024$ ), surgical treatment of urolithiasis (+320%,  $p = 0.040$ ), quality of resident education (+483%,  $p < 0.001$ ), and personal satisfaction with resident training (+500%,  $p = 0.005$ ).

**Conclusions** Over the decades, surveys have served as an effective interactive tool for urologists to engage and investigate different aspects of practice and training across sub-specialties. In modern times, better evaluation tools integrated with AI will provide a bigger platform for urologists to use surveys as part of their armamentarium to address and evaluate not only clinical practices but also emotional challenges, training needs, and inequalities that hinder progress in urology.

**Key Words:** survey ↔ urologists ↔ questionnaires ↔ validation ↔ disparities ↔ trends

## INTRODUCTION

Surveys in healthcare allow for an understanding of the knowledge, attitudes, and practice patterns as well as gaps that could help improve practices in healthcare systems. This, when applied to urology, could help identify, validate, and provide insight into parameters known and hypothesised that could improve and strategise surgical and training experience. In this study, we aim to provide a comprehensive review of surveys in urology over the decades to identify salient features and assess changes in the publication and utility of urological surveys in the new millennium.

## MATERIAL AND METHODS

### Evidence acquisition

#### Literature search

A literature search was performed on 7 November 2023 using PubMed and Scopus. The following terms and Boolean operators were used: (“urology” OR “urological”) AND (“surveys” OR “questionnaires” OR “assessment”) AND (“role” OR “utility” OR “impact” OR “contribution”).

#### Selection criteria

The SPICE (Setting, Perspective, Intervention, Comparison, Evaluation) framework was used to frame and answer the question: S: urology practice; P: senior or training urologists; I: surveys.; C: none; E: repercussions on clinical practice, training and well-being of responders.

#### Study screening and selection

Studies were accepted based on SPICE eligibility criteria. Only English papers were accepted. Papers dealing with non-urologists, other healthcare professionals, or patients as respondents were excluded. All retrieved studies were screened by independent authors through Covidence Systematic Review Management® (Veritas Health Innovation, Melbourne, Australia). Discrepancies were solved by a third author. The full text of the screened papers was selected if found pertinent to the purpose of this review.

### Evidence synthesis

#### Literature screening

The literature search found 21,015 papers. Automated detection of duplicates removed 863 papers,

leaving 20,152 for screening. 19,246 papers were further excluded during screening against title and abstract, as irrelevant to the purpose of this review. Of the 906 studies deemed eligible for full-text screening, another 545 were further excluded. Finally, 361 papers were accepted and included (Appendix). The flow diagram of the literature search is shown in Figure 1.

### Study characteristics

The included papers were organised and labelled according to year of publication and subject of interest (Table 1). Eight papers were published before the year 2000 (1985-1999), and they were excluded by statistical analysis to simplify the organisation and evaluation of trends.

Ninety-nine surveys investigated on “uro-oncology”, while 40 surveys questioned different aspects of management of “urolithiasis”, and they were labelled accordingly. Surveys investigating aspects of “mental health” among urologists totalled 32. Eighty-seven surveys addressed training in urology. For each group, subgroups were labelled according to the area of interest (i.e. prostate cancer, kidney cancer, and alike for uro-oncology).

Publications were then divided into 2 main periods: period 1 (2000–2011) and period 2 (2012–2023), with

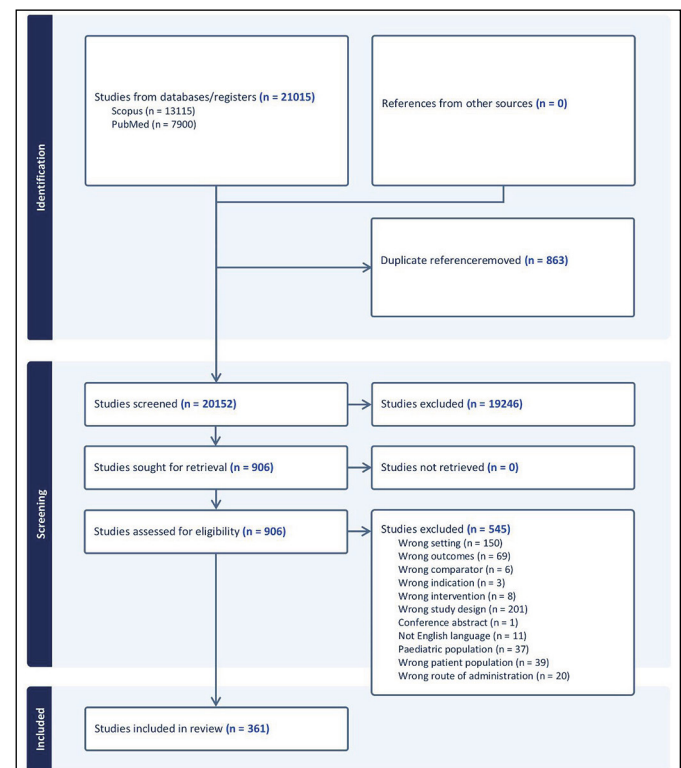


Figure 1. Flow diagram for literature search and screening.

the exception of “Mental health”, that was divided into period 1 (2004–2013) and period 2 (2014–2023) due the lack of publications between 2000 and 2003.

### Statistical analysis

All publications over the years were collected in a preformed Excel sheet (Excel 2021, Microsoft Office Professional Plus 2021, Microsoft Corporation). XLSTAT (XLSTAT statistical software for Microsoft Excel, Lumivero) was used for statistical analysis. Extracted data were analysed through calculation of the difference ( $\Delta$ ) among periods, and the independent t test was used to evaluate differences in publications among periods and topics. To rule out significant changes in the trend of publication, the Mann-Kendall trend test was performed. Statistical significance was set at  $p < 0.05$ .

## RESULTS

The retrieved articles were published since 2000. The included articles covered a spectrum of domains, namely 40 on urolithiasis, 94 on uro-oncology, 86 on resident training, 31 on mental health, and 102 on miscellaneous topics (Table 1). The Mann-Kendall trend test showed an increasing trend in publications over the past 23 years ( $p < 0.001$ ). Table 2 summarises the results of the trend analysis.

**Table 1.** Distribution of published surveys in the different domains of urology

	Total	Before 2000	From 2000	Notes on number of papers published after 2000
Urolithiasis	41	1	40	Medical management: 8; surgical treatment: 26; OR safety: 6
Uro-oncology	97	3	94	Bladder cancer: 18; kidney cancer: 12; prostate cancer: 51; other (penile cancer, upper tract cancer, other): 13
Resident training	87	1	86	Quality of education: 41; satisfaction: 21; wellbeing: 7; other: 17
Mental Health	32	1	31	Disparities: 17; life choices: 6; wellbeing: 8
Miscellaneous	104	3	102	Subjects are: infections; ureteric strictures; andrology; prostatic hyperplasia; transplants; incontinence; costs of practice; role of laparoscopy/robotic surgery etc.
Total	361	9	353	

Across the years, a significant rise was noted in the number of publications regarding resident training (+660%,  $p = 0.003$ ), mental health (+650%,  $p = 0.001$ ), urolithiasis (+371%,  $p = 0.002$ ), and uro-oncology (+230%,  $p \leq 0.001$ ) (Figure 2).

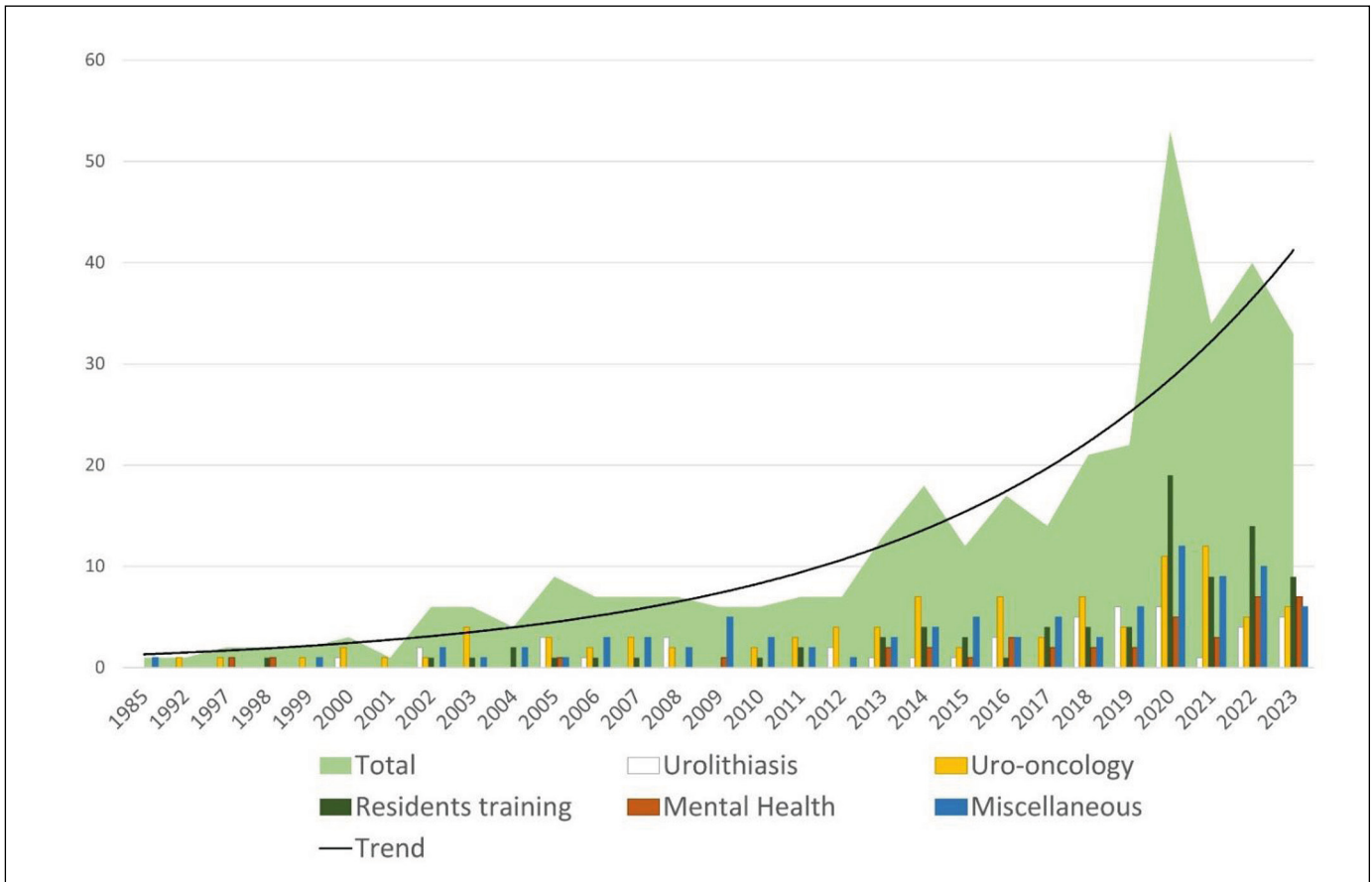
Publications on surveys related to uro-oncology represented the largest part, accounting for 26.6% over the past 23 years. There were 51 articles on prostate cancer, followed by 18 on bladder cancer, 13 on upper tract urothelial carcinoma and penile cancer, and 12 on kidney cancer. Amongst publications regarding prostate cancer, there were non-significant increases regarding diagnosis of prostate cancer (+225%,  $p = 0.090$ ) and advanced stage prostate cancer (+150%,  $p = 0.193$ ); whilst there were significant increases regarding active surveillance (AS) ( $p = 0.041$ ) and radical prostatectomy (+175%,  $p = 0.024$ ).

Surveys on resident training account for the second largest portion, at 24.4%. Publications over the past 23 years focused mostly on quality of resident education ( $n = 41$ ), satisfaction with resident training ( $n = 21$ ), and well-being of residents ( $n = 7$ ). Among these, the statistically significant increasing

**Table 2.** Statistical analysis of changing trend of surveys in the different areas. Significant results from trend analysis are marked in bold

	Increase	Independent T-Test p-value (95% CI)	Mann-Kendall trend test
Overall number of papers	+312%	<0.001 (-26.147; -9.686)	<0.001
UROLITHIASIS	+371%	<b>0.002</b> (0.901; 3.432)	<b>0.004</b>
Medical management	+200%	0.207 (-0.865; 0.198)	0.276
Surgical treatment	+320%	<b>0.040</b> (-2.599; -0.068)	0.079
OR safety	n/a	<b>0.003</b> (0.187; 0.813)	0.026
RESIDENT TRAINING	+660%	<b>0.003</b> (-8.898; -2.102)	<0.001
Quality of education	+483%	<0.001 (-3.640; -1.194)	<0.001
Satisfaction	+500%	<b>0.005</b> (-2.082; -0.418)	<b>0.001</b>
Wellbeing	+500%	0.103 (-0.925; 0.091)	<b>0.009</b>
MENTAL HEALTH	+650%	<b>0.001</b> (-3.823; -1.177)	<0.001
Disparities	+650%	<b>0.002</b> (-2.070; -0.530)	<b>0.001</b>
Life choices	n/a	<b>0.014</b> (-1.065; -0.135)	<b>0.019</b>
Well-being	+600%	0.074 (-1.264; 0.064)	<b>0.009</b>
URO-ONCOLOGY	+230%	<0.001 (2.013; 5.653)	<0.001
Bladder cancer	+160%	0.099 (-0.137; 1.471)	<b>0.028</b>
Cystectomy	n/a	<b>0.028</b> (0.039; 0.628)	<b>0.005</b>
NMIBC	+50%	0.610 (-0.501; 0.834)	0.222
Kidney cancer	+350%	<b>0.012</b> (0.144; 1.022)	<b>0.050</b>
Renal biopsy	+200%	0.294 (-0.155; 0.488)	0.416
Partial nephrectomy	+400%	0.127 (-0.103; 0.769)	0.137
Prostate cancer	+250%	<b>0.001</b> (0.992; 3.175)	<0.001
Diagnosis	+225%	0.090 (-0.127; 1.627)	0.072
Active surveillance	n/a	<b>0.041</b> (0.022; 0.978)	<b>0.049</b>
Prostatectomy	+175%	<b>0.024</b> (0.086; 1.080)	0.085
Advanced disease	+150%	0.193 (-0.136; 0.636)	0.127

CI – confidence interval; NMIBC – non-muscle invasive bladder cancer; OR – operating room



**Figure 2.** Increasing trend of publication of surveys in the years, with representation of the different topics.

trends in publications on quality of resident education (+483%,  $p < 0.001$ ) and satisfactory of resident training (+500%,  $p = 0.005$ ) were demonstrated by the Mann-Kendall trend test.

Papers reporting on surveys related to urolithiasis and its subsets account for 11.3% of the included studies, comprising 8 articles on surveys related to medical management of urolithiasis, 26 on surgical treatment of urolithiasis, and 6 on operative room safety. There was a significant increase in the number of publications on surveys related to operative room safety ( $p = 0.003$ ) and surgical treatment of urolithiasis (+320%,  $p = 0.040$ ), whilst those on medical management of urolithiasis was not statistically significant ( $p = 0.207$ ).

The largest increase in publications is related to surveys on mental health of urologists (650%,  $p = 0.001$ ). Of the 31 articles, 17 were surveys on gender disparity, 8 on well-being, and 6 on life choices of urologists. Moreover, the 102 included publications (28.9%) encompassed survey topics such as urinary tract infections, ureteric stricture, andrology, lower urinary tract symptoms, benign prostatic enlargement, functional urology, renal

transplants, cost of practices, and the role of laparoscopic and robotic surgery.

## DISCUSSION

### Trends of surveys in endourology

Endourology as a subspecialty is one of the fastest growing fields in recent years partly attributed to increasing advancements in technology, better awareness, training, and a deeper understanding of the pros and cons of surgical and non-surgical interventions. The most commonly debated topic is urolithiasis management, which has radically changed over the last 20 years, as shown by the radical shift in its guidelines [1]. As is known, this has allowed us the opportunity to move ahead in creating a tailored and personalised approach because it is well known that one size does not fit all.

The first surveys regarding urolithiasis compared practitioners' preferences for stone treatment, noting differences between metropolitan or countryside hospitals, geographic location, surgical experience, and percentage of managed-care patients in a urol-



ogist's practice regarding treatment of large renal stones or ureteral stones [2]. Another investigated field was the ideal treatment of renal colic, discussing the pros and cons of different analgesic drugs, an aspect recently researched in another survey across the whole of Europe. Local educational attitudes and awareness towards radioprotection and use of fluoroscopy were also investigated: this topic has particular importance for all endourologists but is often not considered enough in residency programs nor recognised by hospital administrations [3]. Percutaneous nephrolithotomy, with the different practice patterns, trends, and technologies, was the next main focus [4]. Lastly, stone analysis, endoscopic recognition of stone composition, and some debatable fields of urolithiasis management were included.

With the increasing burden of benign prostate hyperplasia (BPH), intervention technology surveys aimed at how different sizes and shapes of prostate could be intervened, in the perceptions of both patients and clinicians, and some surveys demonstrated that the opinions were generally concordant, while other had discording results [5]. These surveys underline that there are unexplored potential areas of focus such as patient-urologist communication. Insights into the surveys reveal that BPH worries patients symptomatically and psychologically at all stages. This again highlights the need to consider proactively using PROMS [6] as an investigational or interventional tool. As a surgical tool, survey trends have shown a definitive move from resection to enucleation as well as the defining of, and barriers to, the adoption of minimally invasive surgical therapies (MIST) and enucleation procedures.

### The rising role of surveys in uro-oncology

The management of uro-oncology patients adheres to structured guidelines and multidisciplinary team decisions [7]. Nevertheless, in the field of oncology, patient management is in a constant progression and evolution. There has been a notable upswing trend with a 230% surge in onco-surveys since 2000. This is particularly pronounced in the fields of bladder, prostate, and renal cancer. Again, this reflects how precision medicine in the modern era of evidence-based medicine drives innovation and technical advancements, which need awareness and acceptability that are achievable via surveys, as informative broadcasting and interactive tools. Our review highlights that in most of the cross-sectional surveys non-muscle invasive (NMIBC) and locally advanced bladder cancer are the 2 main

focus points with surveys questioning all aspects from treatment options, selection bias and inconsistencies, variable practices regionally and internationally, as well as the loopholes in being compliant to guidelines. The quality of routine techniques employed during trans-urethral resection of bladder tumours, such as white light cystoscopy, is being challenged, with attempts to fill the current gaps in its utility [8]. Several surveys have also primarily focused on addressing the lack of consensus or variations in postoperative recovery practices and optimal follow-up after cystectomy. Others have investigated the role of enhanced recovery (ERAS) protocols for post-cystectomy patients [9], underscoring the variations of practices among urologists. The absence of uniformity in post-cystectomy surveillance and the lack of adherence to a predetermined follow-up schedule resulting from these analyses also need to be highlighted, raising awareness on the importance of consistent follow-up [10].

Within the realms of prostate cancer, it is noteworthy to observe the changes in trends of defining low-risk prostate cancer patients who can be offered AS. When the concept of AS was in its early phases, many urologists seemed to be in support of this approach, but there was a lack of established consensus regarding optimal intervals of follow-up biopsies [11]. Over the years, the trend in surveys on AS has demonstrably gone into greater detail – exploring specific markers that are now readily employed and may be predictors of re-classification (PSA doubling time, biopsy methods, number of positive cores on biopsy, magnetic resonance imaging findings). Apart from management principles, diagnostic advances in prostatic biopsy methods – from magnetic resonance imaging (MRI)-guided fusion biopsies to saturation biopsies are also actively surveyed on a regular basis, reaffirming the continued support in the routine use of image-guided prostatic biopsy. The growing evidence for PSMA-PET radioligand-based imaging as an adjunct in prostate cancer staging has also seen its cross-sectional impact [12].

Regarding renal tumours, the sustained concept of nephron-sparing surgery, and aspect of minimally invasive renal surgery has also consistently been surveyed. Survey trends explore the intricacies of optimising pre-surgical planning, and the role of mixed reality simulation has also been specifically questioned pertaining to its relevance for real-life anatomical precision during surgery [13]. To better replicate the operative process, a radiologically assisted generation of 3D models for pre-operative planning prior to partial nephrectomy have been tested and assessed with regards to its impact

on the actual surgery as well. Artificial intelligence (AI) and its role in streamlining minimally invasive nephrectomies has gained centre stage in modern surveys.

### Surveys investigating disparities among urologists

The proportion of women in medicine and surgery has increased steadily over the last few decades. However, there is a significant contrast when it comes to the number of female surgeons, including those in urology [14]. This issue has been addressed by several surveys over the last 10 years, demonstrating how this topic has gained much attention among the academic urological community. As shown in our study, the increase has been exponential in the last decade, with most of the surveys published since 2015. There is a definite and concrete focus towards identifying and minimising gender disparity in urology.

Typically, these articles were published by teams from countries that historically pay more attention to these issues: the USA, Germany, the UK, Canada, and Australia. Interestingly we see that, although the proportion of female urologists has increased in the last decade, relatively few women have leadership positions [15]. There is still huge gender imbalance in urology meetings, where males dominate the attendance and participation. The reasons behind this disparity could be multifactorial, with some suggested reasons being family responsibilities, part-time work, insufficient mentorship, or sheer gender bias [16]. Despite coming a long way in smoothing gender disparities, there is still room to encourage the recruitment of women in urology and to support them in their careers. As emerges from the analysed surveys in our review, support for maternity leave, mentorship, and prioritisation for women's urology leadership initiatives need more momentum and initiation of more women to take on a career in urology, and this may ease the gender disparity.

### The role of well-being as reported by urologist-based surveys

Increasing interest in evaluating psychological and physical aspects among urologists, with particular awareness shown by the United States towards mental-health, was notably highlighted in recent surveys [17]. Since 2013, there has been a steady trend regarding the number of published papers, and an exponential increase by 36.4% in recent years highlights the importance of this subject.

Some authors [18] specifically addressed urologists' mental health, analysing phenomena that can negatively affect both their professional and personal lives, such as depression, anxiety, stress, burnout, and impostor phenomenon. Burnout – an occupational syndrome resulting from persistent work-related stress – has become a hot topic since data revealed an increase among urologists from 41% in 2011 to 64% in 2014, with urology gaining a notoriously bad reputation in the list of medical specialties with the highest rates of burn-out in a Medscape survey [19]. In line with this evidence, a high rate of burnout was reported among urology trainees as well, with a pivotal role played by a lack of proper and formal mentorship, access to mental health services, and of course personality traits. More recently, due to the acceleration and intensification of work processes and digitalisation, the relationships between technostress, burnout, work engagement, and job satisfaction have been explored among urologists working in inpatient clinics [17]. Impostor phenomenon, a condition where the individual fails to believe that their achievements are deserved and continuously questions their skills and abilities, was also investigated with surveys because it sadly appears to be more and more frequent among young urologists [20].

Other studies evaluated more practical challenges that are potentially able to affect urologists' performance and skills, and as a detrimental consequence, compromise surgical patients' outcomes. Potential distractions in the urology operating room and physical health among robotic surgeons in terms of prevalence of musculoskeletal disorders due to posture discomfort were described as potentially impacting daily surgical activity. More recently, the impact of several stressors on the perceived demands of surgeons during endourologic procedures was assessed [21]. Psychological aspects and career choice among urologists were also the subject of surveys, with analysis of variables affecting young urologists' productivity and academic career choice, including the impact of sexual health education and mentorship on future specialty and subspecialty selection.

### Impact of COVID-19 on residency programs

The COVID-19 pandemic has significantly impacted various societal domains, with profound effects on medical education and training, especially for residents and fellows in surgical fields. The pandemic necessitated substantial modifications in education and training methodologies, leading to far-reaching implications for resident well-being [22].

The crisis has not only affected clinical activities but also demonstrated to have detrimental effects on scientific, academic, and educational pursuits. Senior urologists have experienced reduced attendance at professional meetings, and in South Wales, trainees perceived potential impacts on cancer diagnostics and overall training proficiency.

Studies have also shown that residents, particularly in Italy, experienced a significant reduction or complete cessation in training exposure during the COVID-19 lockdown period. This reduction was faced worldwide, affecting regions like South America, where academic training was affected in a substantial proportion of trainees. Many residency programs implemented restrictions for residents with high-risk comorbidities or in-person interactions with COVID-19 patients. In 2020, the median projected detriment to urological training scored 6.0 on a 0 to 10 scale, indicating a pronounced impact as foreseen by senior residents [23]. The uncertainties associated with the pandemic, changes in training protocols, and potential impacts on future job opportunities contributed to increased stress and anxiety among residents. This, in turn, led to various health and lifestyle alterations, including weight gain, decreased physical activity, increased alcohol and cigarette consumption, and experiences of sadness or depression.

Despite these challenges, there were some positive aspects. The Copenhagen Burnout Inventory scores indicated a significant reduction in the risk of burnout across various dimensions (personal, professional, and relational). Residents in Europe, the United States, and India reported a good to excellent quality of life during the pandemic, finding time to engage in research projects and theoretical knowledge acquisition [24]. The pandemic compelled residents to support resilience and adaptability skills. Pre-recorded videos and interactive webinars emerged as effective modalities for smart learning, especially for guidelines and surgical videos [25]. The use of platforms like YouTube and the American Urological Association for video content became prevalent.

Efforts were made to introduce innovative training models, such as the Urology Intern Boot Camp and augmented reality training for prostate biopsy. Tele-mentoring gained popularity as a favoured solution among trainees and specialists, with virtual education being perceived as more accessible than in-person teaching [26]. While virtual platforms showed potential, controversies arose: some respondents disagreed that online education models contribute to stress and anxiety, while others believed they could facilitate new collaborations. However,

concerns were raised about the lack of guidance on the professional use of social media and the limitations of tele-mentoring, including information flow distortions and legal risks.

Resident attitudes, especially regarding digitalisation and the use of the internet and social media, have been a focus of scientific studies, which reported a high usage of the internet, apps, and social media among urology residents. However, there was a lack of guidance on the professional use of social media, particularly among senior trainees [27].

In conclusion, the COVID-19 pandemic has brought significant challenges to urology residency programs, impacting training, well-being, and future opportunities. While virtual platforms and innovative training models have been introduced to mitigate this impact, concerns and controversies persist. The evolving landscape of urology education requires ongoing attention to address the diverse needs and challenges faced by residents.

### Resident-reported quality of training

Not all topics are uniformly addressed in urology training programs across different schools. Surveys revealed that certain topics like erectile dysfunction, urological trauma, and paediatric urology are under-represented [28]. Moreover, at the end of residency, trainees feel comfortable with emergencies, general urological procedures, and research/audit management but unprepared for educational and leadership/management functions.

Andrology constitutes a significant component of the urology specialisation training program, but its prioritisation varies across educational institutions. Residents' comfort with the physical examination, an essential skill, differed between age groups, with older doctors relying more on routine digital rectal examinations and younger ones on PSA screening [29]. In endourology, an evaluation of radiation safety practices of residents at their workplace revealed a lack of compliance with safety measures. Concerns were raised about the lack of formal learning about fluoroscopic radiation safety. Competency in interpreting genitourinary imaging is crucial for urologists, but this is poorly addressed during training. Residents were least comfortable interpreting Doppler ultrasound but more comfortable with non-contrast computed tomography scans and retrograde pyelography [30].

Surveys evaluating residents' experiences on various training-related topics have grown exponentially, with a focus on satisfaction, perceived usefulness, practice patterns, and educational aspirations.

## CONCLUSIONS

Surveys have been demonstrated as effective and useful tools to investigate different aspects of urological practice. Through reviews, current practice patterns and urologists' treatment preferences can be investigated, to better adjust and shape the future of urology. An important role is also played in terms of well-being improvement, with the capacity of surveys to highlight distress situations and trigger positive actions. The utility of surveys during and after the pandemic shows how resilient the urological community is in adapting newer training and educational methods. With better tools to evaluate question-

naires, and by using AI, surveys are definitely going to become part of the urologist's armamentarium to address and evaluate not only clinical practices, but also emotional challenges, training needs, and inequalities that hinder progress in urology.

### CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

### FUNDING

This research received no external funding.

### ETHICS APPROVAL STATEMENT

The ethical approval was not required.

## APPENDIX 1

Full list of included  papers

- Abdelshehid CS, Eichel L, Lee D, et al. Current trends in urologic laparoscopic surgery. *J Endourol.* 2005; 19: 15-20.
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