

# Mapping Telemedicine in German Private Practice Urological Care: Implications for Transitioning beyond the COVID-19 Pandemic

Severin Rodler<sup>a, b</sup> Julius M. Schütz<sup>a</sup> Amelie Styn<sup>a</sup> Philipp Weinhold<sup>a</sup>  
Jozefina Casucelli<sup>a</sup> Lennert Eismann<sup>a</sup> Ricarda M. Bauer<sup>a</sup> Michael Staehler<sup>a</sup>  
Christian Stief<sup>a</sup> Alexander Buchner<sup>a, b</sup> Jan-Niclas Mumm<sup>a, b</sup>

<sup>a</sup>Klinik und Poliklinik für Urologie, Klinikum der Universität München, Munich, Germany; <sup>b</sup>Arbeitsgruppe für Anwendung von Künstlicher Intelligenz und digitalen Gesundheits-anwendungen in der Urologie, Klinikum der Universität München, Munich, Germany

## Keywords

Telehealth · Telemedicine · Urology · Guidelines

## Abstract

**Background:** There are limited data on the use and concern of telemedicine among German urologists, and thus, there are no established guidelines for telemedical diagnosis, treatment, and prevention of urological indications. **Methods:** An anonymized survey was conducted among German private practice urologists during the 2019 coronavirus disease (COVID-19) pandemic. The  $\chi^2$  test, Mann-Whitney U-test, and Kruskal-Wallis test were used for statistical analysis. **Results:** 257 urologists were included in the final analysis. Thirty-five (14.0%) of urologists had used telemedicine as part of their consultation, and 221 (86.0%) had not used telemedicine. There was no difference between telemedicine adoption rates between rural and urban settings. Telemedicine users were significantly more satisfied with the information they had received regarding telemedicine issues. Users saw the greatest barrier to telemedicine that patients do not take up the offer of telemedicine. Nonusers were most concerned with unclear indications for telemedicine followed by lesser reimbursements during telemedicine than in-person visitations. Users were significantly more likely to use telemedicine beyond the COVID-19 pandemic. Urologists,

who wanted to use the service in the future, wanted an active support by the German society of urology and guidelines for telemedicine. Last, users and nonusers preferred telemedicine for non-acute chronic diseases and follow-up visitations. **Conclusion:** Despite the COVID-19 pandemic, telemedicine remains a rarely used service among German private practice urologists. Ultimately, to overcome the current challenges, urologists require an active support for the service through the German Society of Urology and telemedical guidelines.

© 2021 S. Karger AG, Basel

## Introduction

Telemedicine is increasingly impacting the way health care is delivered [1]. Therefore, telemedicine can be performed between 2 physicians (teleconsultations), between a patient and physician (televisitation), or between a patient and mobile health technology via audio or video communication software, smartphone applications, or wearable devices, like smartwatches [2]. Originally, telemedicine was used as a tool to provide health care for hard-to-reach rural areas [3]. Thus, it has seen adoption mostly in countries with large rural areas, such as the USA or Australia [4, 5]. However, driven by technological

progress, telemedicine has also been adopted in urbanized areas to close care gaps, ease access, and reduce costs [2]. In Germany, implementation of telemedicine was slowed down by regulatory and reimbursement issues. In 2015, the German Ministry of Health started to support German telemedicine adoption through e-Health laws, explicitly allowing reimbursements for telemedical services [6]. However, the adoption rate among physicians remained low compared to that in other European countries [7].

In urology, telemedical implementations include patient monitoring, rounding, consultations, and televisitations [8]. In previous years, urological telemedicine has experienced varying levels of success but has remained a niche tool in Europe and seldom moved beyond feasibility studies [9, 10]. The 2019 coronavirus disease (COVID-19) pandemic moved telemedicine from a niche tool to a tool capable of protecting patients at risk of COVID-19, especially vulnerable patient cohorts such as uro-oncology patients [11, 12]. Half of these uro-oncology patients are willing to engage in televisitations but not in all scenarios [12]. However, robust data, especially long-term risk and efficacy assessment, are lacking until today [13]. This is reflected in a lack of telemedical recommendations in urology guidelines apart from recommendations for the acute COVID-19 pandemic [14] and thereby leaves urologists without clear guidance in routine care. In this study, we aim to map the integration of telemedicine, from the telemedicine adoption rate to the perceived barriers of German private practice urologists, and seek to reveal preferred urologic indications for implementation of telemedicine.

## Methods

We surveyed German private practice urologists through a questionnaire. The inclusion criteria consisted of age, gender, employment type, office type, and use of telemedicine. Urologists who failed to provide all inclusion criteria were excluded.

### Setting

The survey was conducted after the German public lockdown in spring 2020 and following the reopening of the public and private healthcare sector in summer 2020. At the time of the survey, almost all restrictions for medical services had been removed. Therefore, private practice urologists were assumed to have returned to almost routine work.

### Questionnaire

Baseline characteristics such as age, sex, employment status, and practice location were questioned through free-text questions and single-choice questions. A 10-item Likert scale was used to assess physician satisfaction with the level of telemedical information they receive, likeliness to use telemedicine after the COVID-19 pandemic, endorsement of the Deutsche Gesellschaft für

Urologie (DGU), and support for guidelines. Multiple-choice questions were used to evaluate the source of telemedical information, preferred indications for telemedicine, and barriers to telemedicine. The users' telemedicine providers were determined through a free-text answer (see online suppl. Table 3; for all online suppl. material, see [www.karger.com/doi/10.1159/000515982](http://www.karger.com/doi/10.1159/000515982)).

### Statistical Analysis

For statistical analysis, the  $\chi^2$  test, Mann-Whitney U-test, and Kruskal-Wallis test were used. All calculations were performed using Prism 8 (GraphPad Software, San Diego, CA, USA).

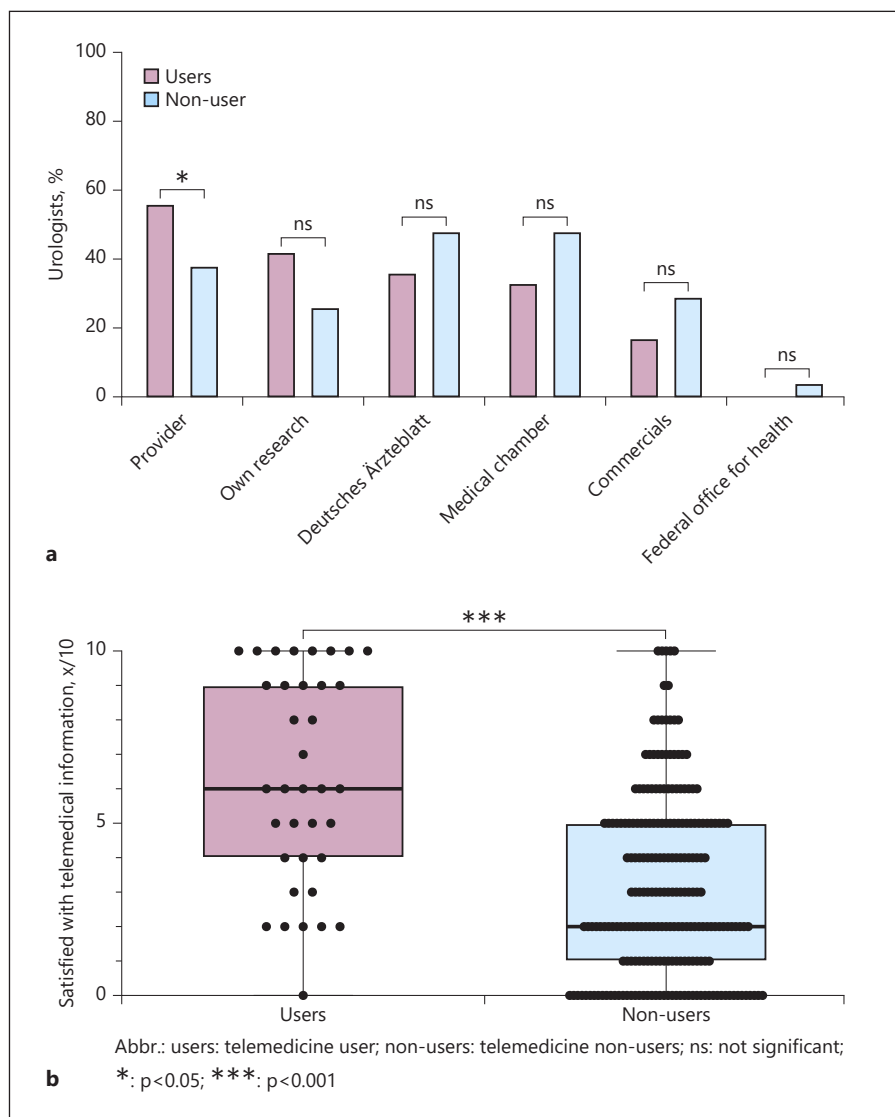
## Results

1,627 urologists were asked to fill out the questionnaire. 260 urologists (16.0%) completed the questionnaire, of which 3 questionnaires failed the inclusion criteria. Of the 257 included urologists, 36 (14.0%) urologists had used telemedicine (users) and 221 (86.0%) had not used telemedicine (nonusers). The median age of the users was 52.5 (range 36–76) years and 55 years for the nonusers (range 36–74,  $p = 0.250$ ).

The employment status or type of office was not significantly different between both groups. However, both groups were significantly different for gender distribution (22.2% female in the users, 10.0% female in the nonusers,  $p = 0.034$ ) (online suppl. Table 1).

Among the users, information on telemedicine, including offers and legal advice, was mainly attained by telemedical providers (55.6%) and self-research (41.7%). The nonusers, however, attained less information from telemedical providers (38.0%,  $p = 0.047$ ). They received most of their information through public sources such as the German medical chamber (48.0%) and the “Deutsche Ärzteblatt” journal (47.5%). The overall level of satisfaction with the information was significantly higher among the users (median: 6, range: 0–10) than among the nonusers (median: 2.5, range: 0–10,  $p < 0.001$ ) (Fig. 1). The telemedicine users relied on a variety of telemedicine providers, Clickdoc being the most common (online suppl. Table 2).

With respect to perceived concerns and barriers of telemedicine, 50.0% of the users stated that patients do not use telemedical offers, while 15.8% of nonusers saw this as a barrier ( $p < 0.001$ ); 25.6% of the nonusers were concerned with uncertainty in regard to indications for telemedicine versus 3.1% of users ( $p = 0.004$ ). Both groups were equally concerned about losing reimbursements (vs. in-person visits; users 15.9% vs. nonusers 23.2%) and unattractive reimbursement options (users 21.9% nonusers 11.3%). The likeliness to use telemedicine after the pan-



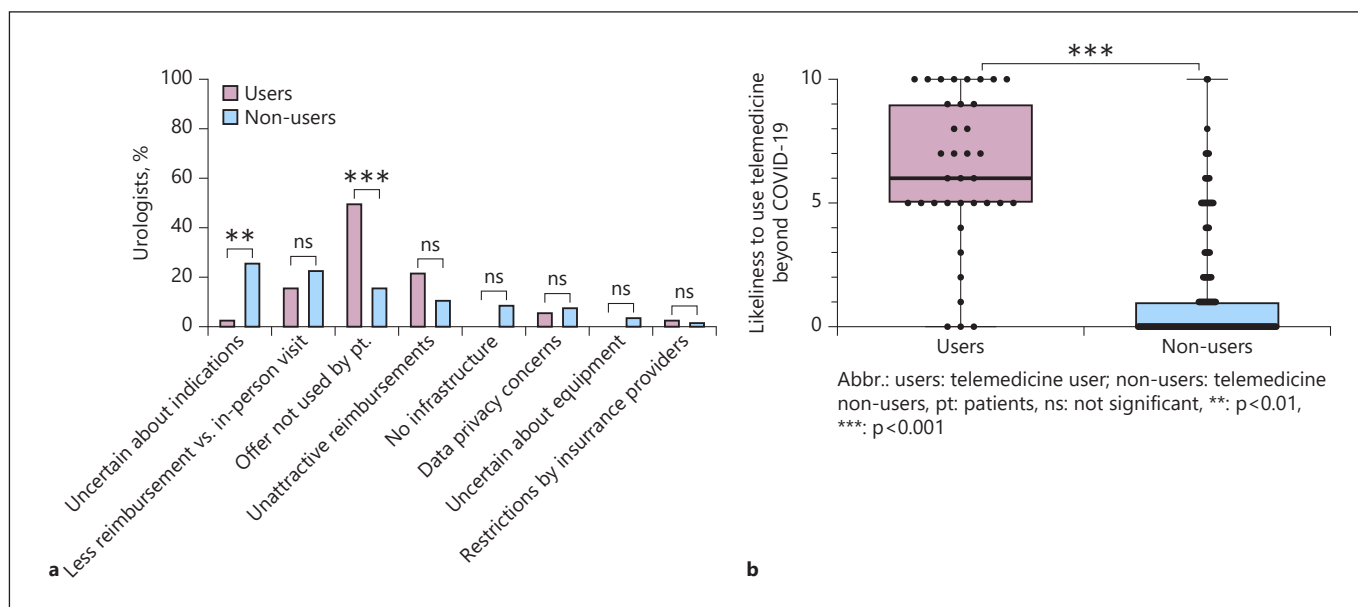
**Fig. 1. a** The source of information on telemedicine was analyzed whether urologist are using telemedicine (users; red) or not (non-users; blue). **b** Satisfaction with the received information was analyzed on a 10-item Likert scale and distinguished between users and non-users.

dem is significantly higher among the users (median: 6, range: 0–10) than among the nonusers (median: 0, range: 0–10,  $p < 0.001$ ). Of the nonusers, 85.6% responded with  $\leq 3/10$  points and are unlikely to use telemedicine after the pandemic (Fig. 2).

Urologists were categorized based on their response to their likeliness to use telemedicine into unlikely (0–3/10,  $n = 24$ ), undecided (4–6/10,  $n = 35$ ), and likely future users (7–10/10,  $n = 178$ ) (Fig. 3). The suggestion to involve the German Society of Urology (DGU) was most supported by likely future users (median: 10/10, range: 0–10), followed by undecided users (median: 7, range: 0–10), and least by unlikely users (median: 2, range: 0–10). Further, the suggestion to implement telemedical guidelines had 39.1% of likely users completely agree. Likely and un-

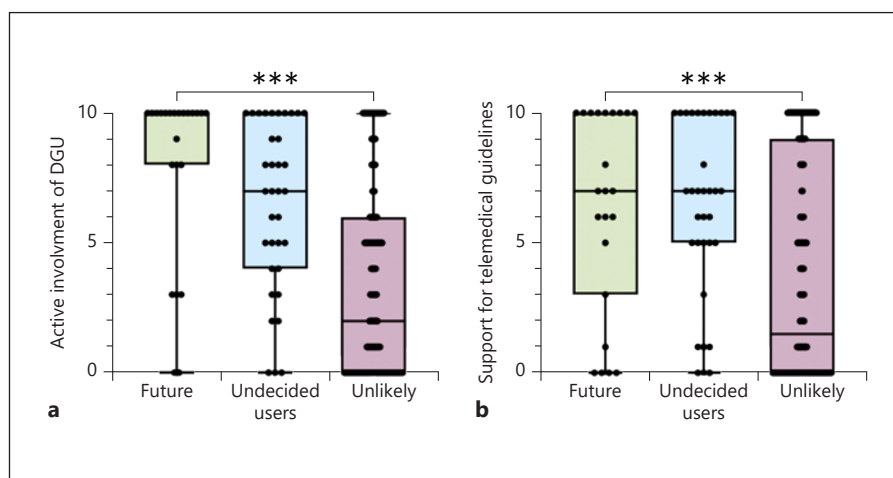
decided users supported guidelines similarly (both median: 7, range: 0–10) but significantly more than unlikely users (median: 1.5, range: 0–10,  $p < 0.001$ , Fig. 3). Approval for both conditions was age-dependent, with low preference rates among urologists aged 50–54 years (median for both: 0, range 0–10, active involvement = 0.004 and guideline < 0.001, online suppl. Fig. 1).

The users and nonusers responded very similarly for which diseases telemedicine should be used for. Only the follow-up of andrological patients had more users in favor of telemedicine (63.9 vs. 45.3%,  $p = 0.038$ ). The users and nonusers saw telemedicine most indicated for follow-up visitations for patients with benign prostate hyperplasia (BPH, 61.1 vs. 48.9%,  $p = 0.173$ ), incontinence (52.8 vs. 52.0%,  $p = 0.934$ ) and andrological diseases (63.9 vs.



**Fig. 2. a** Barriers to use telemedicine were analyzed and again urologists who have used telemedicine during the pandemic (red) and urologists who have not (blue) were compared. **b** The likelihood to use telemedicine after the pandemic was analyzed. Users, telemedicine users; nonusers, telemedicine nonusers; ns, not significant; \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

**Fig. 3.** Preferred involvement of National Society of Urology and guideline implementation for telemedicine urologists categorized according to their response in **b** into urologists with unlikely (0–3/10, red), undecided (4–6/10, blue), and likely (7–10/10, green) intend to be users. **a** Urologists were asked whether the German Association of Urology (DGU) should be actively involved in telemedicine. Answers are ranked from 0 (no) to 10 (yes). **b** All urologists were asked whether guidelines should be developed for the application of telemedicine. Answers are ranked from 0 (no) to 10 (yes). DGU, Deutsche Gesellschaft für Urologie (German Society for Urology). \*\*\*  $p < 0.001$ .

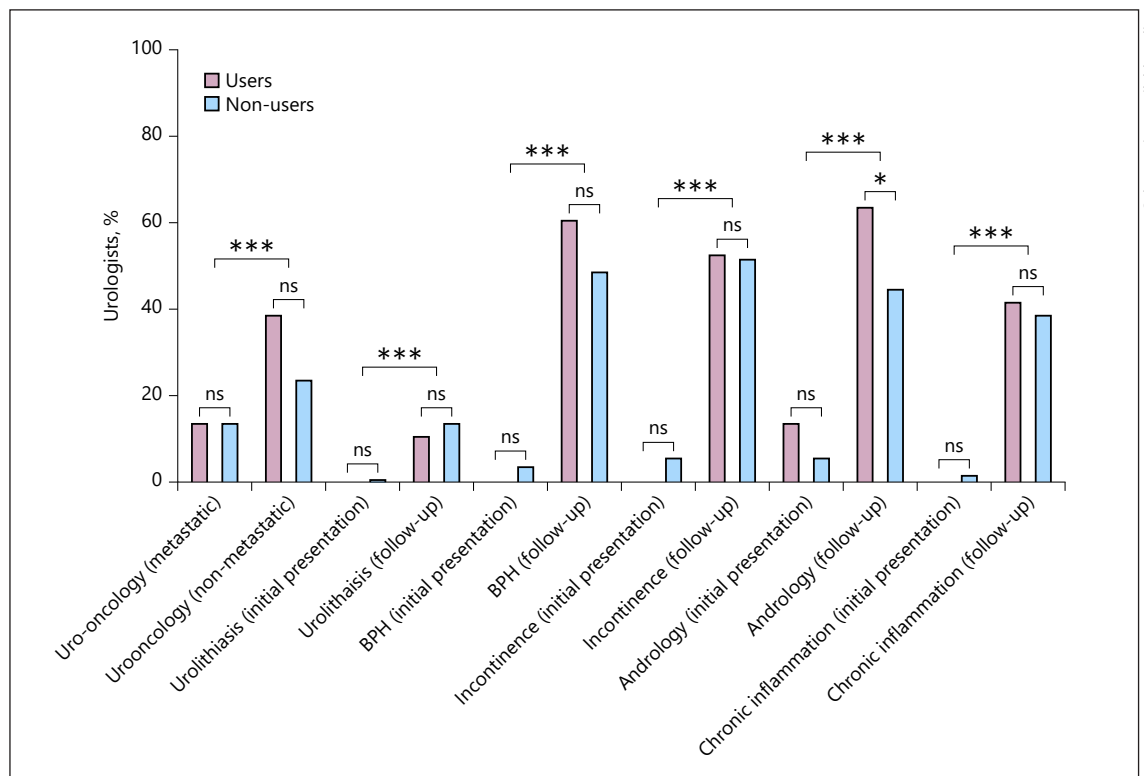


45.2%,  $p = 0.038$ ). Both groups perceived telemedicine to be more suitable for follow-up visitations, regardless of indication ( $p < 0.001$ ) (Fig. 4).

### Discussion

We mapped the current adoption of telemedicine among private practice urologists after the initial COVID-19 lockdown to understand the status quo. From the

6,230 urologists working in Germany, 3,249 worked in ambulatory settings, either employed or self-employed [15]. Thus, our survey included 7.9% of German urologists in private practice care in our final analysis. While a minority of urologists use telemedical services during the current COVID-19 pandemic, a majority of urologists who plan to use telemedicine in the future recommend an active involvement of the National Society of Urology and implementation of telemedicine into guidelines.



**Fig. 4.** Preferred indications for telemedical consultation. Users, telemedicine users; nonusers, telemedicine non-users; BPH, benign prostate hyperplasia; ns, not significant; \*  $p < 0.05$ , \*\*\*  $p < 0.001$ .

#### Mapping the Status Quo of Telemedicine among German Private Practice Urologists Post-COVID-19

With the recent move of telemedicine into Europe and the forced adoption of telemedicine due to the COVID-19 pandemic, we first identified 14.0% of German private practice urologists to be users of telemedicine. Neither employment status or type and location (rural or urban) of practice affected the frequency of telemedicine usage. Female urologists were, however, more inclined to use telemedicine. It has been previously reported that telemedicine is a niche service in Germany, but its adoption has risen substantially from just 1.8% in 2017 [16] to 27.9% in German private practice specialists, likely driven by the COVID-19 pandemic [17]. These data suggest compared to our study, a less wide implementation of telemedicine by urologists has taken place as by the average specialist. This might be due to the extensive in-person diagnostics normally connected to a urological visitation such as a physical examination, ultrasound, and urine analysis. We achieved a high response rate in our study compared to the targeted population in comparable studies among urologists in Germany [18]. However,

when the heads of child urology departments were directly asked for answers regarding telemedicine during the pandemic, high response rates of more than 70% were observed. Physicians of the German Society of Pediatric Surgery provided lower response rates of 10% when queried online [19]. Response rates on telemedical surveys might be high in general as telemedicine is a highly sensitive topic, and physicians are emotionally involved as it is unclear for respondents what the exact impact and extend of this new technology will be in standard urology care.

#### Telemedicine's Barriers and Concerns among Users and Nonusers

Our data reveal that telemedicine is still seen as a niche tool among German urologists, and thus, we further surveyed the urologists about their perceived barriers to and concerns with telemedicine. The users stated the biggest barrier is patients not using telemedical offers, something likely attributed to the presently less technically familiar, older demographics of Germany [20]. We perceive this to change in the next years with a changing demographics to more technology familiar, older patients [21]. Tele-

medicine users and nonusers are still similarly concerned about unattractive and lesser (than in-person visitations) reimbursements for telemedicine. This issue has previously been stated to be a major hurdle to telemedicine's adoption and usage and is still very profound among German urologists [10]. Interestingly, concerns with restrictions by insurance providers, lack of infrastructure, and uncertainty with the required equipment were perceived to be minor issues, issues the 2015 E-Health law tried to clarify [6]. The users were much less uncertain about diseases for which telemedicine is appropriate than the nonusers. Therefore, the nonusers might lack experience and are uninformed about services. The users rarely perceived this as an issue, after all, they have experience with telemedicine and deal with its boundaries. The nonusers might be guided by evidence-based information, like guidelines, about suitable indications for medicine.

#### *Overcoming the Care Gap and Uncertainty through National Societies and Guidelines*

In Germany, there are no urological telemedical guidelines. As mentioned, some of the major barriers could be addressed through targeted information and guidelines. We proposed an active endorsement of the DGU in telemedicine, and our data show that future and undecided future users favor this approach. Furthermore, future and undecided users were also in favor of establishing a guideline for urological telemedicine. Such guidelines could be help in deciding when and how to use telemedical services, especially since the response to the COVID-19 pandemic changed telemedical legal frameworks, allowing a broader application of telemedicine. However, the decision which patient is suitable for the service – and the responsibility – was left up to the physician. Other countries have already established telemedical practice guidelines such as the Australian College of Rural and Remote created telemedical guidelines to support members to establish high-quality telemedical services and to line out limitations of telemedical services [22]. In the USA, the American Telemedical Association (ATA) has published multiple different guidelines on issues like primary and urgent telemedical care, telemedical credentialing for healthcare providers, and how to perform video conferences [23]. The urgent care guideline includes sections such as “Telemedicine Management of the Patient” or “Emergencies,” which covers basic procedural guidelines if physicians encounter an acute emergency during telemedicine [24]. In July 2020, the European Association of Urology released a list of good practice recommendations for telemedicine but does not cover specific indications [25].

#### *Feasibility of Current Telemedicine Visitations for Private Practice Urologists*

Our data show that urologists were aware that telemedicine cannot replace important in-person diagnostics, and thus, they preferred its use for follow-up visitations. Further, they preferred it for nonacute and chronic diseases such as BPH, andrology, and incontinence.

A recent systematic review of Novara et al. [13] has proposed the feasibility of telemedical diagnosis and interventions in standard care settings of uro-oncology, urinary tract infections, urinary incontinence, and urinary stones. In uro-oncology, it seems feasible to follow-up patients after treatment for localized prostate cancer or to perform initial diagnosis of hematuria for instance. For patients with urinary incontinence, initial diagnosis, guidance for pelvic floor training, and follow-up after surgical treatments seems feasible as well. Our data reveal a potentially similar role for the follow-up of BPH and andrology. We believe that guidelines for telemedicine in urology should target these diseases first and establish recommendations how to virtually treat and follow-up patients safely.

Our study is limited by the selected time point of the questionnaire and the generalizability for the post-COVID-19 era. Pandemic care focuses on sustaining (short- and midterm) care while protecting patients from infections through physical distancing [25]. Therefore, it has been proposed to use telemedicine primarily for visitations not requiring in-person diagnostics [25, 26]. Our data specify this view and suggest to focus on follow-up visits in routine care as physicians feel more comfortable to assess patients remotely as they do already now. However, despite many publications concerning urological telemedicine, there is still a lack of evidence with respect to routine telemedical care. Urological societies need to firmly define in guidelines when telemedical care is noninferior or superior to standard in-person visitation, which requires large-scale long-term studies.

#### **Conclusion**

Only a minority of private practice German urologists used telemedicine during the COVID-19 pandemic, and the current nonusers do not wish to implement telemedicine beyond the COVID-19 pandemic. Urologists still perceive reimbursement uncertainties as major hurdles and prefer telemedicine primarily for follow up (tele)visitations and for nonacute chronic diseases. Therefore, we propose confronting the barriers of telemedicine through

evidence-based telemedical guidelines and an active endorsement of telemedicine by national societies. However, further research on efficacy and long-term benefits in urologic indications and routine care settings is required to fill the current knowledge gap.

## Acknowledgments

We thank all urologists who took part in our study. We appreciate their dedication toward this sensitive and controversial topic.

## Statement of Ethics

Before initiation of the study, the local ethics authorities reviewed the project design and approved this study (Reference number: KB20/026).

## References

- Hollander JE, Carr BG. Virtually Perfect? Telemedicine for Covid-19. *N Engl J Med*. 2020 Apr 30;382(18):1679–1681.
- Tuckson RV, Edmunds M, Hodgkins ML. Telehealth. *N Engl J Med*. 2017;377(16):1585–92.
- Puskin DS. Opportunities and challenges to telemedicine in rural America. *J Med Syst*. 1995;19(1):59–67.
- Alverson DC, Shannon S, Sullivan E, Prill A, Effertz G, Helitzer D, et al. Telehealth in the trenches: reporting back from the frontlines in rural America. *Telemed J E Health*. 2004; 10(Suppl 2):S–109.
- Scott AC, McDonald A, Roberts T, Martin C, Manns T, Webster M, et al. Cardiovascular telemedicine program in rural Australia. *N Engl J Med*. 2020;383(9):883–4.
- E-Health-Law passed. (2015). Accessed: 05.11.2020: <https://www.bundesgesundheitsministerium.de/ministerium/meldungen/2015/e-health.html>.
- European Commission. Benchmarking Deployment of eHealth among General Practitioners (2018). <https://ec.europa.eu/digital-single-market/en/news/ehealth-adoption-primary-healthcare-eu-rise>. Access on December 22nd, 2020. Accessed.
- Ellimoottil C, Skolarus T, Gettman M, Boxer R, Kutikov A, Lee BR, et al. Telemedicine in urology: state of the art. *Urology*. 2016;94:10–6.
- Privatewaterhouse Coopers (PWC) EU Services: European Hospital Survey: Benchmarking Deployment of e-Health Services (2012–2013). in JRC Scientific and Policy Reports. 2014.
- Brauns H-J, Loos W. Telemedizin in Deutschland. *Bundesgesundheitsbl.* 2015;58(10): 1068–73.
- Liang W, Guan W, Chen R, Wang W, Li J, Xu K, et al. Cancer patients in SARS-CoV-2 infection: a nationwide analysis in China. *Lancet Oncol*. 2020;21(3):335–7.
- Rodler S, Apfelbeck M, Schulz GB, Ivanova T, Buchner A, Staehler M, et al. Telehealth in urooncology beyond the pandemic: toll or lifesaver? *Eur Urol Focus*. 2020 Sep 15;6(5):1097–103.
- Novara G, Checcucci E, Crestani A, Abrate A, Esperto F, Pavan N, et al. Telehealth in urology: a systematic review of the literature. how much can telemedicine be useful during and after the COVID-19 pandemic? *Eur Urol*. 2020 Dec;78(6):786–811.
- Ribal MJ, Cornford P, Briganti A, Knoll T, Gravas S, Babjuk M, et al. European association of urology guidelines office rapid reaction group: an organisation-wide collaborative effort to adapt the european association of urology guidelines recommendations to the coronavirus disease 2019 era. *Eur Urol*. 2020;78(1):21–8.
- Bundesärztekammer. *Ärztstatistik zum 31. Dezember 2019* [accessed 2020 Nov [https://www.bundesaerztekammer.de/fileadmin/user\\_upload/downloads/pdf-Ordner/Statistik2019/Stat19AbbTab.pdf](https://www.bundesaerztekammer.de/fileadmin/user_upload/downloads/pdf-Ordner/Statistik2019/Stat19AbbTab.pdf)].
- Obermann M. *Ärzte im Zukunftsmarkt Gesundheit 2017*. 2017.
- Obermann B, Müller S. *Ärzte im Zukunftsmarkt Gesundheit 2020: Ärztliche Arbeit und Nutzung von Videosprechstunden während der Covid-19-Pandemie*. 2020.
- Paffenholz P, Peine A, Fischer N, Hellmich M, Pfister D, Heidenreich A, et al. Impact of the COVID-19 pandemic on urologists in Germany. *Eur Urol Focus*. 2020;6(5):1111–9.
- Lakshin G, Banek S, Keese D, Rolle U, Schmedding A. Telemedicine in the pediatric surgery in Germany during the COVID-19 pandemic. *Pediatr Surg Int*. 2021;37(3):389–95.
- Bundesamt für Statistik: Internetnutzung von Personen nach Altersgruppen in %. [https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Einkommen-Konsum-Lebensbedingungen/\\_Grafik/\\_Interaktiv/it-nutzung-alter.html](https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Einkommen-Konsum-Lebensbedingungen/_Grafik/_Interaktiv/it-nutzung-alter.html) (last accessed on 02.11.2020). Accessed.
- Rodler S, Buchner A, Stief CG, Heinemann V, Staehler M, Casucelli J. Patients' perspective on digital technologies in advanced genitourinary cancers. *Clin Genitourin Cancer*. 2021 Feb;19(1):76–82.e6.
- Australian College of Rural and Remote Medicine. ACRRM Telehealth Guidelines. 2016.
- Krupinski EA, Bernard J. Standards and guidelines in telemedicine and telehealth. *Healthcare*. 2014;2(1):74–93.
- Gough F, Budhrani S, Cohn E, Dappen A, Leenknecht C, Lewis B, et al. ATA practice guidelines for live, on-demand primary and urgent care. *Telemed J E Health*. 2015;21(3): 233–41.
- Rodriguez Socarrás M, Loeb S, Teoh JY-C, Ribal MJ, Bloemberg J, Catto J, et al. Telemedicine and Smart Working: recommendations of the European association of urology. *Eur Urol*. 2020;78(6):812–9.
- Gadzinski AJ, Ellimoottil C. Telehealth in urology after the COVID-19 pandemic. *Nat Rev Urol*. 2020;17(7):363–4.

## Conflict of Interest Statement

S.R. and J.-N.M. own shares of Rocketlane Medical Ventures GmbH. S.R. is receiving advisory fees from Wellster Healthtech Group.

## Funding Sources

No specific funding was received for this study.

## Author Contribution

Conceptualization: S.R. and J.N.-M.; data curation: S.R., J.S., and A.S.; formal analysis: S.R. and J.N.-M.; investigation: S.R., L.E., and J.N.-M.; methodology: S.R. and J.-N.M.; project administration: S.R., C.S., and J.-N.M.; resources: S.R. and J.N.-M.; supervision: C.S., P.W., and R.B.; validation: S.R. and J.-N.M.; visualization: S.R.; writing – original draft: S.R. and J.N.-M.; and writing – review and editing: M.S. A.B., C.S., J.C., and J.-N.M. All authors have read and agreed to the published version of the manuscript.