

## REVIEW



# Modern preoperative evaluation in ambulatory surgery – who, where and how?

Mark G. Filipovic<sup>a</sup>, Aline Schwenter<sup>a</sup>, Markus M. Luedi<sup>a</sup>  
and Richard D. Urman<sup>b</sup>

## Purpose of review

Ambulatory surgery is increasingly performed in medically complex patients. This dynamic environment requires new approaches to ensure cost-effective, efficient, and ultimately safe preoperative evaluation of the patient. This review investigates recent advances in the assessment of ambulatory patients, with a special focus on patient screening, digital communication, and multidisciplinary team evaluation.

## Recent findings

Identifying suitable candidates for ambulatory surgery relies on a variety of medical, surgical, and institutional factors. Identification of high-risk patients and optimization of their treatment can be achieved through multidisciplinary protocols specific to the local institution and in line with current guidelines. Virtual assessment may be sufficient for most patients and provide an efficient evaluation strategy and high patient satisfaction. Prescreening can be supported by preoperative nursing teams.

## Summary

The increasing complexity of treatment provided in day surgery offers a unique opportunity to highlight the importance of anesthesiology staff as perioperative caregivers. Preoperative evaluation serves as a central junction to integrate a variety of surgical, medical, and institutional factors to provide safe, satisfactory, and efficient care for patients. Implementing technological innovation to streamline and facilitate this process is paramount.

## Keywords

ambulatory surgery, day-case surgery, preoperative assessment, preoperative evaluation

## INTRODUCTION

Preoperative evaluation is an essential part of perioperative care. According to the “Helsinki Declaration on Patient Safety in Anaesthesiology” initiated in 2010, it is a principal requirement for any institution to improve patient safety [1]. To ensure safe and effective care, preoperative assessment should optimally prepare the patient for upcoming surgery by collecting information as well as identifying and modifying risk factors [2]. While most interventions can be performed safely with minimal additional investigation, it is paramount for the perioperative team to identify those patients who are in need of a more detailed evaluation, in order to ensure a safe procedure [3].

Structured risk assessment evaluates surgical urgency, surgical risk and patient-specific risk factors, which may lead to additional preoperative testing and optimization of clinical management [4<sup>■</sup>]. In light of the trend towards shorter lengths of stay and an increasing volume of ambulatory

interventions, even in medically complex patients, the significance, conditions and challenges of pre-anesthetic visits are currently being redefined. This environment demands new approaches to ensure effective, cost-efficient, and ultimately safe preoperative assessment of the patient [5<sup>■</sup>]. While the overall benefit of preoperative visits has been challenged, especially in prescreened patients [6<sup>■</sup>], recent advances in artificial intelligence, computer sciences and technology have provided us with new

<sup>a</sup>Department of Anaesthesiology and Pain Medicine, Inselspital, Bern University Hospital, University of Bern, Bern, Switzerland and <sup>b</sup>Department of Anesthesiology, Perioperative, and Pain Medicine, Brigham and Women's Hospital, Boston, MA, USA

Correspondence to Richard D. Urman, MD, MBA, Department of Anesthesiology, Perioperative, and Pain Medicine, Brigham and Women's Hospital, Boston, MA, USA. Tel: +1 617-525-7300; e-mail: rurman@bwh.harvard.edu

**Curr Opin Anesthesiol** 2022, 33:000–000

DOI:10.1097/ACO.0000000000001192

## KEY POINTS

- Preoperative evaluation is key to integrating a variety of surgical, medical, and institutional factors, with the goal of providing safe, satisfactory, and efficient care for our patients.
- The dynamic and growing field of ambulatory surgery is increasingly seen in the treatment of complex patients, and it demands new approaches to ensure efficient, cost-effective, and ultimately safe preoperative evaluation.
- A multidisciplinary approach tailored to specific settings is paramount to assess and optimize treatment of the complex ambulatory patient.
- The utilization of technological advances, especially in the form of virtual visits, is probably adequate for most patients, but data on specific risk assessment and reliable guidelines remain scarce.

ways of communicating and ultimately raised the question of who still must be actively evaluated in the clinic. This tendency towards remote counseling was additionally accelerated by the demands of the COVID-19 pandemic [7<sup>■</sup>].

In addition to tailoring preoperative investigations to the specific patient and surgery, the modern anesthesia provider must nowadays choose from an array of assessment modalities. Support and simplification can be provided by trained nursing personnel, and even technological devices. In this review we assess the recent advances in the preoperative evaluation of ambulatory patients, with a special focus on patient screening, digital communication, and nurse-led visits.

## WHY DO WE ASSESS RISK – WHO NEEDS WHAT?

Identifying suitable candidates for ambulatory surgery is complex, and not only dependent on patients' characteristics but also on a wide range of considerations including the clinical staff experience, surgical approach, and the type of institution [8<sup>■</sup>], as well as the ability to handle unexpected emergencies [9<sup>■</sup>]. In addition to a safe procedure, patients should be sure to receive adequate management postoperatively, including nausea/vomiting treatment and pain control after discharge [10<sup>■</sup>].

The daily challenge for the anesthesia provider in this setting is to identify the high-risk ambulatory patient and establish a perioperative plan that considers the variety of previously mentioned parameters. As an example of the spectrum of ambulatory interventions, older patients

undergoing cataract surgery often present with significant comorbidities [11<sup>■</sup>]. Still, this surgery can be safely performed in most patients by implementing topical or regional anesthesia, even without preoperative anesthesiologic evaluation [6<sup>■</sup>]. Likewise, even major surgeries such as colectomies can be handled on an ambulatory basis after careful patient selection [12]. Here, enhanced recovery pathways may offer a basis for handling the complex ambulatory patient, but rely on a well-functioning multidisciplinary approach [13<sup>■</sup>,14]. Unplanned admissions after ambulatory surgery are still frequent and attributed to surgical complications and medical reasons, but also to organizational concerns [15<sup>■</sup>]. Increased risk was especially identified for patients older than 50 years, with greater American Society of Anesthesiologists physical status, and undergoing general anesthesia [15<sup>■</sup>,16]. Thus, advances in regional anesthesia have contributed to an improved management of ambulatory patients [17,18]. On the other hand, postoperative pain especially after regional techniques remains an issue [19] and injection of anesthesia into a regional nerve was found to be a major cause of legal claims after ambulatory surgery [5<sup>■</sup>]. Risk prediction models for rehospitalization have been advocated [20], but generalizability among different institutions and settings remains a concern.

In some cases, the lack of good quality evidence can be attributed to the fact that the decision-making process depends on a variety of medical, surgical and institutional factors. Subsequently, we will explore different approaches to preoperative evaluation in the ambulatory setting, with a special emphasis on location and modality.

## DO WE HAVE TO SEE THE PATIENT IN PERSON?

Traditional preoperative evaluation includes an on-site assessment and face-to-face interaction between the anesthesia provider and the patient. Visits to a preoperative evaluation clinic have been associated with decreased risk of in-hospital postoperative mortality [3]. Careful management of a preoperative anesthesia clinic helped avoid cancellation of surgeries due to insufficient preoperative anesthetic evaluation, while on the other hand, overall cancellation rates remained unchanged [21<sup>■</sup>]. This approach was increasingly challenged, as one study showed that outcomes were unchanged even when all preoperative testing was omitted [22].

Well defined guidelines for noncardiac surgery have been developed by different medical societies, especially for the preoperative evaluation of perioperative cardiac risk [23,24]. In principle, risk

assessment and potential further testing depends on surgical risk, patient-specific risk factors and functional capacity. In those guidelines, surgical procedures and patient-related major risk factors are comprehensively classified and characterized [25], thus a brief study of the patient's medical history combined with a brief questionnaire can give sufficient evidence on who must be more extensively evaluated.

While a multitude of risk assessment models and guidelines for other individual patient specific conditions or specific interventions exist, concrete handling of the ambulatory patient is rarely included. Overall, functional health status of a patient seems to be the driving factor when evaluating fitness for surgery [26]. Even patients with chronic conditions, obesity or obstructive sleep apnea can be managed safely in an ambulatory setting. In their review, Okocha *et al.* provide an approach to patients with medical conditions such as heart failure, ischemic heart disease and older patients in the ambulatory setting [2]. In the absence of reliable guidelines for whom to include, there is consensus that patients with unstable disease should be excluded from ambulatory / outpatient day-case surgery [26].

The advantages of a preoperative evaluation may include rapid access to advanced testing. Still, routine testing is rarely indicated, is high in cost and may delay surgery [27]. It only has a place when results may alter the course of treatment, the perioperative plan, or it could lead to measures which improve the patient's risk profile. Recent evidence suggests, however, that routine lab testing is still performed in a variety of perioperative settings despite contradictory guidelines [28]. In such scenarios, streamlining preoperative workflow can reduce the number of routine lab tests and imaging procedures performed, without a significant increase in case cancellations, length of stay, or readmission [29]. Hence, to guarantee safety, solid knowledge of current guidelines is a prerequisite for focused testing in the ambulatory setting [30].

This raises the question of whether most patients must be physically evaluated before ambulatory surgery. Sparked by the recent COVID-19 pandemic, teleconsultations have gained increasing popularity and have the focus of research within the anesthesiology community. Likewise, costs could potentially be avoided by patients who are required to visit specialized healthcare centers far from their home [31<sup>11</sup>,32]. Waiting times can be significantly shortened in virtual meetings and patient satisfaction is high [33]. During the COVID-19 pandemic, teleconsultations were able to reduce the transmission risk posed by on-site visits [34].

Aronson and colleagues have comprehensively outlined how institution-specific algorithms can be implemented to determine the patient's appropriate visit type, relying on existing patient data and a series of yes or no questions. Of note, they provide a model for a multidisciplinary preoperative clinic which might be adapted to local circumstances [35].

Still, there also remain a few caveats for teleconsultation. First, from a technical perspective, identification of both sides, authentication, data access and most important data security must be ensured [25]. Second, from a medical perspective, subtle irregularities in a patient's appearance or hints providing relevant clinical information may be missed in the outpatient setting, which would otherwise have been evident to the trained anesthesiologist's eye. Third, a physical examination or additional testing cannot be performed.

Overall, there is accumulating evidence that virtual preoperative visits are sufficient for most patients. Telemedicine can improve access to and effectiveness of preoperative consultations as well as patient satisfaction – highlighting an opportunity for both patients and healthcare providers [36]. Further, advantages of technological innovation are not only limited to preoperative interactions. For example, mobile phone reminders reduced the number of “no-shows” in a preoperative clinic [37], and there is evidence that electronic preanesthesia evaluation forms may increase information accuracy [38]. Thus, mobile applications have the potential to add benefits at various stages of the perioperative workflow [39<sup>11</sup>].

## EVALUATING THE COMPLEX PATIENT – WHO CAN DO IT?

Nurse-led preanesthetic assessment has increasingly gained popularity in ambulatory surgery, where patient turnover is very high and preoperative visits can be organized within defined pathways. There is evidence to suggest that nurse-led preoperative assessment can be as effective as physician-guided evaluation [40]. Recent data of a nurse-run, consultant anesthetist supervised preoperative assessment clinic also reveal good patient satisfaction [41<sup>11</sup>]. Information on a patient's current condition, medical history, and functional health can be gained through specifically trained nursing staff who can identify patients in need of additional testing or those who should be seen by an anesthesiologist [42]. However, the role of the nurse in the preoperative evaluation clinic is not limited to modern pretriage. In addition, nurses can improve patient care and flow as coordinators, educators and reliable contacts [43]. Connecting the above advantages

with technological innovation and structured electronic questionnaires can further optimize the preoperative visit by providing additional accurate information and significantly reducing nurse assessment time without affecting patient satisfaction [44,45,46]. However, local laws may restrict the assignment of trained nursing staff in the preoperative setting, especially when informed consent is required.

### **MEETING PATIENTS' EXPECTATIONS – WHAT DO THEY NEED?**

With evolving medical procedures and interventions in an increasingly aging, frail and multimorbid surgical population, developing a medical care plan adapted to the true needs and individual wishes of the patient seems increasingly important. Shared decision making plays a key role as part of a thorough preoperative assessment and individualized perioperative treatment. Besides promoting patient-centered care it may further improve clinical outcome and reduce resource overuse [47,48]. As a multidisciplinary process, shared decision-making implies a discussion between the patient and their healthcare providers, including surgeons and anesthesiologists [49]. After carefully evaluating all medical and surgical treatment options including scientific evidence, advantages, disadvantages, prognosis, risks and benefits, an individualized care plan is customized for each patient according to his physical condition, goals, and expectations [48]. This plan includes maximal goal-directed preoperative optimization and an outlined perioperative management plan, demanding a close cooperation between partner clinics, as outlined in a recent review providing recommendations for cardiac surgery [48]. This complex and simultaneous involvement of several healthcare providers remains to be both the great advantage and an “Achilles heel” of the process: according to Sturges *et al.*, lack of time is the most frequently mentioned obstacle to shared decision-making [50].

In line with the concept of shared decision making, patient satisfaction itself is an essential dimension of good perioperative care and is strongly influenced by patients' expectations [51]. In order to improve perioperative care, a multitude of tools have been developed to evaluate patients' experience and identify dissatisfaction [51,52]. Again, higher patient satisfaction was associated with better clinical outcomes – and in return, satisfaction is efficiently ameliorated by improved communication skills and sufficient information [52]. An

empathic attitude and continuous care can even reduce preoperative anxiety [53].

Considering the exceptional importance of communication skills and emotional care for patient satisfaction and outcome, it remains to be seen whether strictly virtual preoperative visits can provide sufficient support in this dimension.

### **CONCLUSION**

The increasing complexity of ambulatory patients provides a unique opportunity to highlight the importance of anesthesiology in perioperative care. Preoperative evaluation of patients is key to integrating a variety of patient and procedure derived factors to provide safe, satisfactory, and efficient care for our patients. Integrating technological innovation and nursing care to streamline and facilitate this process is essential. Still, patient safety remains the ultimate goal of a preanesthetic visit. While virtual preoperative visits seem to offer convenience and safety for most patients, it is crucial to identify those who need additional evaluation, testing, and optimization. Continuous adaptation to include up-to-date guidelines and emerging data is paramount for prudent patient selection and tailored preoperative assessment. Nurse-led triage and electronic questionnaires may help to recognize patients at risk, but reliable data remains scarce. Despite many advantages, electronic aids may also not be suitable for all patients, especially for those patients who are incapable of using them due to physical or mental limitations. An exclusively electronic assessment could also harm the human and emotional dimension of anesthetic care and have an impact on patient satisfaction and anxiety. Additionally, technology bears its own risks, such as data safety or general accessibility. Future research and especially practical guidelines are needed to estimate risk in the complex patient, taking into account the type of surgery as well as anesthesia, and to assess fitness for ambulatory surgery.

### **Acknowledgements**

*The authors thank Jeannie Wurz, Medical Editor, Department of Anaesthesiology and Pain Medicine, Bern University Hospital, University of Bern, for careful editing of the manuscript.*

### **Financial support and sponsorship**

*RDU reports unrelated fees/funding from AcelRx, Pfizer, Merck, and Medtronic. The authors have no funding relevant to this article to report.*

**Conflicts of interest**

There are no conflicts of interest.

**REFERENCES AND RECOMMENDED READING**

Papers of particular interest, published within the annual period of review, have been highlighted as:

- of special interest
- of outstanding interest

1. Mellin-Olsen J, Staender S, Whitaker DK, *et al.* The Helsinki Declaration on Patient safety in anaesthesiology. *Eur J Anaesthesiol* 2010; 27:592–597.
2. Okocha O, Gerlach RM, Sweitzer B. Preoperative evaluation for ambulatory anesthesia: what, when, and how? *Anesthesiol Clin* 2019; 37:195–213.
3. Blitz JD, Kendale SM, Jain SK, *et al.* Preoperative evaluation clinic visit is associated with decreased risk of in-hospital postoperative mortality. *Anesthesiology* 2016; 125:280–294.
4. Bierle DM, Raslau D, Regan DW, *et al.* Preoperative evaluation before ■ noncardiac surgery. *Mayo Clin Proc* 2020; 95:807–822.

Practical review on preoperative evaluation. It includes an overview of preoperative risk assessment tools and strategies for focused testing.

5. Ranum D, Beverly A, Shapiro FE, *et al.* Leading causes of anesthesia-related ■ liability claims in ambulatory surgery centers. *J Patient Saf* 2021; 17:513–521.

In this study, the most common anesthesia procedures resulting in liability claims were regional nerve blocks.

6. Duroi Q, Baudet J-M, Bigoteau M, *et al.* Ambulatory cataract surgery centre ■ without perioperative anaesthesia care: a prospective cohort study. *Sci Rep* 2021; 11:8311.

This study describes how ambulatory low-risk surgery (cataract) can be safely performed even without perioperative anaesthesia care.

7. Srivastava D, Solanki SL, Ambasta S, *et al.* Tele-Preanesthetic check-ups ■ (TelePAC) during COVID-19: apprehensions and possibilities. *J Anaesthesiol Clin Pharmacol* 2020; 36:415–417.

This article outlines approaches to tele-check ups including a proposed plan of procedure.

8. Rajan N, Rosero EB, Joshi GP. Patient selection for adult ambulatory surgery: ■ a narrative review. *Anesth Analg* 2021; 133:1415–1430.

Comprehensive review on current best evidence regarding patient selection for surgical procedures in an ambulatory setting.

9. Karlsson E, Jakobsson JG. Emergencies in freestanding ambulatory surgery ■ centre. *Curr Opin Anaesthesiol* 2021; 34:690–694.

This review identifies emergencies in ambulatory surgery and outlines steps for their prevention and management.

10. Raeder J. Procedure-specific and patient-specific pain management for ■ ambulatory surgery with emphasis on the opioid crisis. *Curr Opin Anaesthesiol* 2020; 33:753–759.

A practical review on how to handle postoperative pain in ambulatory patients.

11. Sweitzer B, Rajan N, Schell D, *et al.* Preoperative care for cataract surgery: the ■ society for ambulatory anesthesia position statement. *Anesth Analg* 2021; 133:1431–1436.

Position statement for ambulatory anesthesia in cataract surgery.

12. Bourgouin S, Monchal T, Schlienger G, *et al.* Eligibility criteria for ambulatory colectomy. *J Visc Surg* 2022; 159:21–30.
13. Joshi GP. Enhanced recovery pathways for ambulatory surgery. *Curr Opin Anaesthesiol* 2020; 33:711–717.

This review highlights enhanced recovery protocols for ambulatory surgery - a possible strategy for handling complex patients in a day surgery setting.

14. Afonso AM, McCormick PJ, Assel MJ, *et al.* Enhanced recovery programs in an ambulatory surgical oncology center. *Anesth Analg* 2021; 133: 1391–1401.
15. Cabaton J, Thy M, Sciard D, *et al.* Unplanned admission after ambulatory ■ anaesthesia in France: analysis of a database of 36,584 patients. *Anesth Crit Care Pain Med* 2021; 40:100794.

This large study identifies reasons for unplanned admissions after day surgery. Age > 60 years, ASA status > 2, general anaesthesia and a number of specific procedures were identified as risk factors.

16. Melton MS, Li Y-J, Pollard R, *et al.* Admission non planifiée à l'hôpital après une chirurgie ambulatoire une étude rétrospective de cohorte unique. *Can J Anaesth* 2021; 68:30–41.
17. Shariat A, Marcus B, Latmore M. High turnover for ambulatory orthopedic surgery. *Curr Opin Anaesthesiol* 2021; 34:659–665.
18. Teunkens A, Vermeulen K, Belmans A, *et al.* Patient satisfaction with intravenous regional anaesthesia or an axillary block for minor ambulatory hand surgery: a randomised controlled study. *Eur J Anaesthesiol* 2020; 37:847–856.
19. Barry GS, Bailey JG, Sardinha J, *et al.* Factors associated with rebound pain after peripheral nerve block for ambulatory surgery. *Br J Anaesth* 2021; 126:862–871.

20. Teja B, Raub D, Friedrich S, *et al.* Incidence, prediction, and causes of unplanned 30-day hospital admission after ambulatory procedures. *Anesth Analg* 2020; 131:497–507.
21. Sato M, Ida M, Naito Y, *et al.* The incidence and reasons for canceled surgical cases in an academic medical center: a retrospective analysis before and after the development of a preoperative anesthesia clinic. *J Anesth* 2020; 34:892–897.

In this study, with implementation of a preoperative anesthesia clinic cancellations, due to insufficient preoperative evaluation could be avoided but overall cancellation rates remained unchanged.

22. Chung F, Yuan H, Yin L, *et al.* Elimination of preoperative testing in ambulatory surgery. *Anesth Analg* 2009; 108:467–475.
23. Kristensen SD, Knuuti J, Saraste A, *et al.* 2014 ESC/ESA Guidelines on noncardiac surgery: cardiovascular assessment and management: The Joint Task Force on noncardiac surgery: cardiovascular assessment and management of the European Society of Cardiology (ESC) and the European Society of Anaesthesiology (ESA). *Eur Heart J* 2014; 35: 2383–2431.
24. Zwissler B. Präoperative evaluation erwachsener patienten vor elektiven, nicht herz-thorax-chirurgischen eingriffen gemeinsame empfehlung der deutschen gesellschaft für anästhesiologie und intensivmedizin, der deutschen gesellschaft für chirurgie und der deutschen gesellschaft für innere medizin. *Anaesthesist* 2017; 66:442–458.
25. Velly L, Gayat E, Quintard H, *et al.* Guidelines: anaesthesia in the context of COVID-19 pandemic. *Anaesth Crit Care Pain Med* 2020; 39:395–415.
26. Bailey CR, Ahuja M, Bartholomew K, *et al.* Guidelines for day-case surgery 2019: guidelines from the association of anaesthetists and the British association of day surgery. *Anaesthesia* 2019; 74:778–792.
27. Rajan N. The high-risk patient for ambulatory surgery. *Curr Opin Anaesthesiol* 2020; 33:724–731.
28. Taylor GA, Oresanya LB, Kling SM, *et al.* Rethinking the routine: preoperative laboratory testing among American Society of Anesthesiologists class 1 and 2 patients before low-risk ambulatory surgery in the 2017 National Surgical Quality Improvement Program cohort. *Surgery* 2022; 171:267–274.
29. Nelson SE, Li G, Shi H, *et al.* The impact of reduction of testing at a Preoperative Evaluation Clinic for elective cases: Value added without adverse outcomes. *J Clin Anesth* 2019; 55:92–99.
30. Prabhakar A, Helander E, Chopra N, *et al.* Preoperative assessment for ambulatory surgery. *Curr Pain Headache Rep* 2017; 21:43.
31. Kamdar NV, Huverserian A, Jalilian L, *et al.* Development, implementation, and ■ evaluation of a telemedicine preoperative evaluation initiative at a major academic medical center. *Anesth Analg* 2020; 131:1647–1656.

This study shows that telepreoperative evaluations can be a true alternative to traditional assessments in terms of patient satisfaction, costs and cancellation rates.

32. Aldawoodi NN, Muncey AR, Serdiuk AA, *et al.* A Retrospective analysis of patients undergoing telemedicine evaluation in the preanesthesia testing clinic at H. Lee Moffitt Cancer Center. *Cancer Control* 2021; 28:10732748211044347.
33. Bridges KH, McSwain JR. Telemedicine for Anesthesiologists. *Anesthesiol Clin* 2021; 39:583–596.
34. Wienhold J, Mösler L, Rossaint R, *et al.* Teleconsultation for preoperative evaluation during the coronavirus disease 2019 pandemic: a technical and medical feasibility study. *Eur J Anaesthesiol* 2021; 38:1284–1292.
35. Aronson S, Murray S, Martin G, *et al.* Roadmap for transforming preoperative assessment to preoperative optimization. *Anesth Analg* 2020; 130:811–819.
36. Mullen-Fortino M, Rising KL, Duckworth J, *et al.* Presurgical assessment using telemedicine technology: impact on efficiency, effectiveness, and patient experience of care. *Telemed J E Health* 2019; 25:137–142.
37. Compère V, Grogno A, Moriceau J, *et al.* Mobile phone text messaging reminder decreases the rate of nonattendance at a preoperative anaesthesia clinic. *Eur J Anaesthesiol* 2017; 34:566–567.
38. Almeshari M, Khalifa M, El-Metwally A, *et al.* Quality and accuracy of electronic preanesthesia evaluation forms. *Comput Methods Programs Biomed* 2018; 160:51–56.
39. Pan S, Rong LQ. Mobile applications in clinical and perioperative care for ■ anaesthesia: narrative review. *J Med Internet Res* 2021; 23:e25115.

Comprehensive review on how mobile applications could facilitate anesthesiologic workflow.

40. Nicholson A, Coldwell CH, Lewis SR, *et al.* Nurse-led versus doctor-led preoperative assessment for elective surgical patients requiring regional or general anaesthesia. *Cochrane Database Syst Rev* 2013; (11): CD010160.
41. Arun N, Al-Jaham KMA, Alhebail SA, *et al.* Nurse-run preanaesthesia assessment ■ clinics: an initiative towards improving the quality of perioperative care at the ambulatory care centre. *BMJ Open Qual* 2021; 10:e001066.

This paper studies how nurse-run preoperative assessment can provide a safe and satisfactory alternative to traditional preoperative evaluation clinics.

42. Tobias JD. Preoperative anesthesia evaluation. *Semin Pediatr Surg* 2018; 27:67–74.

43. Sau-Man Conny C, Wan-Yim I. The effectiveness of nurse-led preoperative assessment clinics for patients receiving elective orthopaedic surgery: a systematic review. *J Perianesth Nurs* 2016; 31:465–474.
44. Goodhart IM, Andrzejowski JC, Jones GL, *et al.* Patient-completed, preoperative web-based anaesthetic assessment questionnaire (electronic Personal Assessment Questionnaire PreOperative): development and validation. *Eur J Anaesthesiol* 2017; 34:221–228.
45. Osman T, Lew E, Lum EP-M, *et al.* PreAnaesThesia computerized health (PATCH) assessment: development and validation. *BMC Anesthesiol* 2020; 20:286. This article outlines one possible approach to self-administered digitized health assessments.
46. Taylor SK, Andrzejowski JC, Wiles MD, *et al.* A prospective observational study of the impact of an electronic questionnaire (ePAQ-PO) on the duration of nurse-led preoperative assessment and patient satisfaction. *PLoS One* 2018; 13:e0205439.
47. Boss EF, Mehta N, Nagarajan N, *et al.* Shared decision making and choice for elective surgical care: a systematic review. *Otolaryngol Head Neck Surg* 2016; 154:405–420.
48. Mihalj M, Carrel T, Urman RD, *et al.* Recommendations for preoperative assessment and shared decision-making in cardiac surgery. *Curr Anesthesiol Rep* 2020; 10:185–195.
49. Sroka R, Gabriel EM, Al-Hadidi D, *et al.* A novel anesthesiologist-led multidisciplinary model for evaluating high-risk surgical patients at a comprehensive cancer center. *J Healthc Risk Manag* 2019; 38:12–23.
50. Sturgess J, Clapp JT, Fleisher LA. Shared decision-making in perioperative medicine: a narrative review. *Anaesthesia* 2019; 74(Suppl 1):13–19.
51. Black N, Jenkinson C. Measuring patients' experiences and outcomes. *BMJ* 2009; 339:b2495.
52. Trinh LN, Fortier MA, Kain ZN. Primer on adult patient satisfaction in perioperative settings. *Perioper Med (Lond)* 2019; 8:11.
53. Soltner C, Giquello JA, Monrigal-Martin C, *et al.* Continuous care and empathic anaesthesiologist attitude in the preoperative period: impact on patient anxiety and satisfaction. *Br J Anaesth* 2011; 106:680–686.