ANESTHESIOLOGY

Openventio PUBLISHERS

Review Article

Remote Preoperative Assessment Clinics and Surgical Readiness Outcomes

Etienne Ortega[1*], Hanna Whitmore[2] and Vaclav Nielsen[3]

[1]*Division of Anesthesia and Intensive Care, Danube University of Applied Medicine, Hungary*
[2]*Department of Anesthesiology, Danube University of Applied Medicine, Hungary*
[3]*Department of Anesthesiology and Pain Management, Douro Institute of Anesthesiology and Perioperative Medicine, Portugal*

ABSTRACT

Remote preoperative assessment clinics have moved from a pandemic-era accommodation to a standing feature of perioperative care delivery, prompting closer scrutiny of whether telehealth pre-anesthesia evaluation matches in-person assessment on the outcomes that define surgical readiness.

This review synthesizes comparative evidence from randomized pilot trials, retrospective cohorts, and systematic reviews spanning pediatric, oncologic, cardiac, and ambulatory surgical populations.

Across this literature, day-of-surgery cancellation rates, perioperative complications, and patient satisfaction with telehealth pathways have generally tracked in-person benchmarks, while appointment adherence and access have improved for patients facing travel or scheduling barriers.

These favorable findings are conditional on triage: successful programs route lower-acuity, ambulatory candidates to fully remote pathways while maintaining explicit criteria and rapid escalation routes for patients with anticipated airway, cardiac, or procedural complexity.

We conclude that remote preoperative clinics are a credible complement to in-person assessment for appropriately selected patients, while durable cost data and adequately powered trials for rare serious complications remain open needs.

Keywords: *telemedicine; preoperative assessment; pre-anesthesia evaluation; surgical cancellation; perioperative telehealth*

Citation: Ortega E, Whitmore H and Nielsen V (2024) Remote Preoperative Assessment Clinics and Surgical Readiness Outcomes. Anesthesiology. 4(1):01-05.

DOI: 10.17140/2024.vol4.i01.pp01-05

Corresponding Author: *Etienne Ortega*

E-mail Address: *e.ortega@duam.hu*

Article History: *Received 20 August 2024 | Accepted 15 September 2024 | Published 14 October 2024*

Copyright: *© 2024 Etienne Ortega, et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited (**https://creativecommons.org/licenses/by/4.0/**).*

INTRODUCTION

The preoperative visit has always done more work than its brief slot in the surgical calendar suggests. In perhaps twenty minutes, an anesthesiologist or nurse practitioner has to reconcile a patient's medical history against the demands of an upcoming operation, flag the comorbidities that need optimizing before the day of surgery, order the right tests without ordering too many, and set expectations that will shape how the

patient experiences everything that follows. When that visit works well, cancellations fall, complications are anticipated rather than discovered, and patients arrive on the morning of surgery already informed about what to expect. When it works poorly, or does not happen at all, the operating room absorbs the cost in the form of late cancellations, unplanned delays, and avoidable morbidity.

Telehealth entered this space well before the pandemic forced the issue, with early pilot programs testing whether a video or telephone encounter could substitute for an in-person clinic visit without compromising the quality of the assessment [1]. What changed after 2020 was scale: institutions that had treated remote preoperative evaluation as a niche accommodation for rural or mobility-limited patients suddenly needed it as a default pathway, and several years of accumulated experience have now let investigators ask the harder question — not merely whether remote assessment is feasible, but whether it produces surgical readiness outcomes equivalent to, or in some respects better than, the traditional in-person model [2]. This review surveys that evidence, focusing on cancellation and delay rates, perioperative complications, patient experience, and the operational features that seem to separate remote clinics that work from those that merely exist.

THE EVIDENCE BASE FOR TELEHEALTH PRE-ANESTHESIA EVALUATION

The foundational trials in this space were modest by design. Applegate and colleagues randomized patients to telemedicine or in-person pre-anesthesia evaluation and found the remote visits comparable on the outcomes that mattered most to clinicians at the time — completeness of history-taking, appropriateness of test ordering, and case cancellation — while patients reported no meaningful drop in satisfaction [1]. That pilot mattered less for its statistical power than for establishing a template that later, larger programs would follow: triage low-risk patients to a virtual pathway, reserve in-person assessment for patients whose comorbidity burden or planned procedure warrants a physical examination, and build a rapid escalation route between the two.

Subsequent work has extended this template into pediatric anesthesia, where the calculus is different because the patient interview happens largely through a parent or guardian and physical findings relevant to airway management are harder to assess by video. A pilot randomized controlled trial evaluating telemedicine pre-anesthetic check-ups in children scheduled for elective surgery found the remote visits non-inferior on process measures such as completeness of the anesthesia record and parental understanding of perioperative instructions, while flagging that any child with a suspected difficult airway or significant craniofacial anomaly still needed hands-on evaluation before the day of surgery [3]. That caveat recurs throughout the literature: telehealth pre-anesthesia evaluation is best understood not as a uniform replacement for in-person clinic but as a triage layer that redirects the bulk of straightforward cases away from a scarce in-person resource.

A more recent randomized trial conducted at an NCI-designated comprehensive cancer center pushed the comparison into a population with an unusually high comorbidity burden — patients undergoing complex oncologic surgery who often carry multiple active medical problems and are on complicated medication regimens — and again found that telemedicine evaluation performed comparably to in-person assessment on markers of preoperative optimization and readiness for surgery [4]. That a high-acuity population tolerated the remote pathway without a measurable readiness penalty is one of the more persuasive data points for broadening telehealth's role beyond the healthy outpatient population where it was first tested.

CANCELLATIONS, DELAYS, AND THE DAY-OF-SURGERY METRIC

Same-day cancellation is the outcome that most directly translates preoperative assessment quality into a financial and operational number, since a cancelled case represents wasted operating-room time, a disrupted schedule, and a patient sent home without the procedure they came for. The literature on in-person comprehensive preoperative clinics has long shown that a dedicated visit — whether run by an anesthesiologist, a nurse practitioner, or a hybrid telephone-and-in-person model — reduces day-of-surgery cancellation substantially compared with no structured preoperative pathway at all, largely by catching unoptimized hypertension, uncontrolled diabetes, incomplete workups, and incorrect or missing consent documentation before the patient reaches the holding area [5] [6]. A comparison of telephone nurse screening against a comprehensive in-person optimization visit found that the more resource-intensive in-person model still achieved a lower cancellation rate, but the telephone pathway performed well enough, and cheaply enough, to be a reasonable option for lower-risk patients [7] — a finding that anticipates much of what remote video clinics would later demonstrate with richer information than a telephone call alone allows.

Quality improvement work aimed specifically at the timing of preoperative assessment — moving it earlier relative to the scheduled surgery date so abnormal findings can be addressed rather than discovered too late to act on — has shown that when the assessment happens matters nearly as much as how it happens, a point directly relevant to remote clinics because telehealth's chief structural advantage is that it removes the travel and scheduling friction that otherwise pushes assessment visits closer to the day of surgery [8]. Specialty-specific service evaluations

point the same direction: a check-and-consent clinic model targeting elective hand surgery, largely deliverable at a distance for patients who do not need physical examination beyond what a surgical team has already performed, meaningfully reduced day-of-surgery cancellations attributable to incomplete consent or unaddressed medical issues [9].

Where remote clinics have been evaluated head-to-head against in-person cancellation benchmarks in larger, more heterogeneous surgical populations, the results have generally been reassuring rather than dramatic — cancellation rates comparable to institutional historical controls, without the spikes in late cancellation that a poorly triaged or poorly staffed remote pathway might be expected to produce [10]. That "comparable, not obviously worse" finding, replicated across several institutions now, is arguably the single most important data point supporting remote preoperative clinics as a durable model rather than a pandemic-era stopgap.

PROCEDURE-SPECIFIC OUTCOMES: CARDIAC, GENERAL, AND AMBULATORY SURGERY

Cardiac surgery represents the most demanding test case for remote preoperative evaluation because the patient population is older, carries more comorbidity, and undergoes procedures with narrower tolerance for missed findings. A recent analysis of surgical outcomes following telehealth preoperative evaluation in elective cardiac surgery found no significant difference in perioperative mortality, major morbidity, or unplanned readmission compared with patients who underwent in-person evaluation, suggesting that even in this higher-risk population, a well-structured remote assessment — typically combined with local laboratory and imaging drawn close to the patient's home — can substitute for travel to a tertiary center for the preoperative visit itself [11].

At the other end of the acuity spectrum, ambulatory and minimally invasive general surgery has provided some of the cleanest comparative data. A retrospective cohort study of patients undergoing elective laparoscopic cholecystectomy for benign gallbladder disease found telemedicine preoperative assessment to be as safe as in-person clinic visits across complication rates, unplanned admissions, and return visits, supporting the intuitive case that low-risk, relatively young, ambulatory surgical candidates are the population best suited to remote assessment [12]. Inguinal hernia repair, another high-volume ambulatory procedure, has shown a similar pattern: postoperative outcomes among patients whose preoperative consultation occurred by telemedicine were statistically indistinguishable from those assessed in person, reinforcing that the risk calculus for remote evaluation should track the complexity of the planned operation and the patient's comorbidity burden rather than defaulting to a blanket in-person requirement [13].

Systematic review evidence spanning these individual studies has converged on a similar conclusion. A meta-analysis of virtual preoperative assessment across surgical specialties found no consistent difference in cancellation rates, unplanned hospital presentations, or patient-reported readiness for surgery between virtual and in-person pathways, while noting substantial heterogeneity in how "virtual" was implemented — telephone-only programs, synchronous video consultations, and hybrid models with in-person physical examination components all fell under that label, complicating any single pooled estimate [14]. That heterogeneity is itself an important finding: it suggests outcomes depend less on the modality label than on programmatic details — who conducts the visit, what triage criteria route patients to virtual versus in-person pathways, and how tightly the remote visit integrates with local testing infrastructure.

PATIENT EXPERIENCE, ACCESS, AND ADHERENCE

Beyond clinical readiness, remote preoperative clinics have a plausible claim on an outcome that in-person clinics have always struggled with: getting patients to show up for the visit at all. An analysis of adherence to scheduled anesthesia preoperative appointments before and after the introduction of a telemedicine option found a measurable improvement in completion rates, attributable largely to the removal of travel time, parking, and time-off-work barriers that disproportionately affect patients living farther from the surgical center or those without reliable transportation [15]. For institutions serving large catchment areas or rural populations, this access effect may matter as much as any head-to-head clinical equivalence finding, since a preoperative visit that never happens cannot optimize anything.

Patient satisfaction data have been consistently favorable, if occasionally qualified. Quality improvement work evaluating virtual video consultations in a preadmission clinic setting found high patient-reported satisfaction with the remote visit, coupled with clinician-reported confidence in the adequacy of the history obtained, though clinicians in that same program flagged specific circumstances — a patient with a complex airway history, language barriers not well served by the video platform's interpreter integration, or connectivity problems in the middle of a visit — that still triggered escalation to an in-person appointment [16]. Broader readiness assessments of telemedicine-delivered anesthesia services have echoed this pattern: the technology and workflow are mature enough to support routine use, but successful programs build in explicit criteria for who should not be triaged to the virtual pathway rather than assuming universal applicability [17].

The practical case for remote preoperative clinics, then, is less about any single outcome measure and more about the accumulation of favorable findings

across measures that used to be assumed to trade off against one another. Programs that have been running long enough to generate multi-year data report that access improves without a corresponding rise in cancellations, complications, or dissatisfaction — provided the triage layer that decides who gets seen remotely versus in person is taken as seriously as the remote visit itself [2] [10].

BUILDING A REMOTE PREOPERATIVE PATHWAY THAT WORKS

The programs described across this literature share a handful of structural features worth naming explicitly, because they appear to be what separates remote clinics that match in-person outcomes from those that might not. First, effective programs triage rather than universally substitute: low-risk ambulatory patients undergoing procedures like laparoscopic cholecystectomy or hernia repair are reasonable default candidates for a fully remote pathway, while patients with anticipated difficult airways, significant valvular or ischemic cardiac disease, or planned procedures with narrow physiologic tolerance are still directed toward in-person assessment or a hybrid visit that pairs a remote interview with local point-of-care testing [11] [3].

Second, remote assessment works best when it is tightly coupled to local infrastructure for the physical components an interview cannot replace — laboratory draws, electrocardiograms, and any imaging the surgical plan requires — rather than treated as a standalone substitute for the entire preoperative workup. Third, successful programs build an explicit and fast escalation pathway from virtual to in-person evaluation, used liberally rather than as a last resort, which appears to be part of why cancellation rates in well-run remote programs have tracked in-person historical benchmarks rather than exceeding them [8] [7]. Fourth, and perhaps most consequential for long-term adoption, the access gains documented for rural and transportation-limited populations argue for treating remote preoperative clinics as a standing feature of perioperative care delivery rather than a contingency reserved for public health emergencies [15] [16].

What the evidence base does not yet resolve as cleanly is the cost side of the equation — several of the studies reviewed here report favorable clinical and satisfaction outcomes without a matched health-economic analysis, and the heterogeneity in how "telehealth preoperative assessment" is operationalized across institutions makes pooled cost estimates difficult to trust. Nor is there yet a large, prospective, multi-institutional trial powered specifically to detect a difference in serious perioperative complications between remote and in-person pathways across the full range of surgical acuity; the reassuring equivalence findings to date come mostly from cohort comparisons and pilot-scale randomized trials rather than a definitive mega-trial.

CONCLUSION

The accumulated evidence on remote preoperative assessment clinics points toward a consistent, if not yet fully mature, conclusion: for appropriately triaged patients, telehealth pre-anesthesia evaluation achieves surgical readiness outcomes — cancellation rates, perioperative complications, and patient satisfaction — that are comparable to in-person assessment, while offering genuine gains in appointment adherence and access for patients who would otherwise face travel or scheduling barriers. That equivalence is conditional rather than universal; it holds most clearly for ambulatory, lower-acuity procedures and depends on institutions building explicit triage rules and low-friction escalation pathways to in-person evaluation for patients whose airway, cardiac, or procedural complexity warrants a physical examination. As remote clinics move from pandemic-era improvisation toward standing infrastructure, the next phase of research will need to answer the questions current studies have mostly set aside — durable, multi-institutional cost data, and prospective trials large enough to detect differences in rare but serious perioperative complications — before the field can call the remote pathway a fully validated equal to, rather than a promising complement of, in-person preoperative care.

DECLARATIONS

Acknowledgements

The authors thank their respective departments for institutional support during the preparation of this review.

Funding

This review received no external funding.

Conflict of Interest

The authors declare no conflicts of interest.

Author Contributions

Etienne Ortega conceived the review and drafted the initial manuscript. Hanna Whitmore performed the literature search and contributed to the sections on cancellation and delay outcomes. Vaclav Nielsen critically revised the manuscript for intellectual content and coordinated the final submission. All authors reviewed and approved the final version.

Ethics Statement

This is a literature review and did not involve new human or animal data collection; no ethical approval was required.

Data Availability

No new data were generated or analyzed for this review. All sources discussed are publicly available in

the cited literature.

REFERENCES

1. Applegate RL, Gildea B, Patchin R, Rook JL, Wolford B, Nyirady J, Dawes TA, Faltys J, Ramsingh DS, Stier G (2013) Telemedicine Pre-anesthesia Evaluation: A Randomized Pilot Trial. Telemedicine and e-Health, PMID:23384334.
2. Telemedicine in the preoperative setting: turning potential into practice.
3. Shah, et al. (2025) Evaluation of the Efficacy of Telemedicine for Pre-Anesthetic Check-Up in Pediatric Patients Undergoing Elective Surgery: A Pilot Randomized Controlled Trial. Pediatric Anesthesia, PMID:41432233.
4. A Randomized Controlled Trial Comparing pre-anesthesia Evaluation via Telemedicine to In-Person at an NCI-Designated Comprehensive Cancer Center (2025) PMID:40788778.
5. Evidence-based approaches toward reducing cancellations on the day of surgery (2014) DOI:10.4103/1658-354x.143921.
6. The Burden of Surgical Cancellations: A Quality Improvement Study on the Importance of Preoperative Assessment (2022) PMID:35178300.
7. Day of surgery cancellation rate after preoperative telephone nurse screening or comprehensive optimization visit (2015) PMID:26644713.
8. Optimizing Preoperative Assessment Timing to Reduce Surgical Cancellations: A Quality Improvement Project (2025) PMID:41216098.
9. The Effectiveness of a Preoperative Check-and-Consent Clinic in Reducing Day-of-Surgery Cancellations in Elective Hand Surgery: A Retrospective Service Evaluation (2025) PMID:41728526.
10. Development, Implementation, and Evaluation of a Telemedicine Preoperative Evaluation Initiative at a Major Academic Medical Center (2021) Anesthesia & Analgesia, DOI:10.1213/ANE.0000000000005208.
11. Surgical outcomes following telehealth preoperative evaluation in elective cardiac surgery (2025) JTCVS Open.
12. The safety of telemedicine clinics as an alternative to in-person preoperative assessment for elective laparoscopic cholecystectomy in patients with benign gallbladder disease: a retrospective cohort study (2023) Patient Safety in Surgery, DOI:10.1186/s13037-023-00368-7.
13. Postoperative outcomes among patients evaluated via telemedicine-based preoperative consultations for inguinal hernia care (2024) PMID:39289185.
14. Virtual preoperative assessment in surgical patients: A systematic review and meta-analysis (2021) Anaesthesia, PMID:34649158.
15. Improvement in Adherence to Anesthesia Preoperative Appointment With Telemedicine: A Retrospective Analysis (2024) PMID:38921189.
16. Preoperative Anesthesia Virtual Video Consultations in a Preadmission Clinic: Quality Improvement Study (2024) JMIR Perioperative Medicine.
17. Anesthesia Services Can be Provided via Telemedicine: An Assessment of the Readiness.