An Ambulatory Surgery Perioperative Surgical Home in Kaiser Permanente Settings: Practice and Outcomes

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BACKGROUND: The aim of this study is to describe the design, implementation, and associated outcome changes of a Perioperative Surgical Home (PSH) for patients undergoing ambulatory laparoscopic cholecystectomy in a Kaiser Permanente practice model.

METHODS: A multidisciplinary planning committee of 15 individuals developed and implemented a new PSH program. A total of 878 subjects were included in the preimplementation period (T-fast), and 1082 patients were included in the postimplementation period (PSH) based on the date of their surgery. The primary goal of this report was to assess the changes in patient outcomes associated with this new PSH implementation on variables such as total length of stay and unplanned hospital admission (UHA).

RESULTS: Patients assigned to the PSH model had a significantly shorter mean length of stay compared with patients in the T-fast group (162 ± 308 vs 369 ± 790 minutes, $P = .00005$). UHA was significantly higher in the T-fast group as compared with the PSH group (8.5% [95% CI 6.6–10.4] vs 1.7% [0.9–2.5], $P < .00005$). There was no difference in the 7 days readmission rates between patients managed in the T-fast track and the PSH track (5.4% [3.8–7.0] vs 5.0% [3.6–6.3], $P = .066$).

CONCLUSIONS: Introduction of the PSH into a Kaiser Permanente model of care was associated with a simultaneous decrease of length of stay and UHA for laparoscopic cholecystectomy patients. (Anesth Analg 2016;XXX:00–00)

Health care industry in the United States is currently undergoing significant changes as a result of the 2010 Affordable Care Act and other ongoing forces in this area. Accordingly, health care reimbursement is shifting from a model that predominantly rewards volume to one that rewards value.[1,2] Moreover, the definition of health care quality and value itself are also under significant modification to now include patient care experience and beyond.[3,4] Even though the exact elements of patient care experiences are debatable,[4,5] it is assumed to be continuum that is individualized and tailored passing the delineation of clinical outcome, patient's health status, and patient satisfaction data.[5,6]

The ambulatory surgery practice model was introduced over 20 years ago and has been held as an achievement of advanced practice model in medical management and efficiency.[7] This practice model, however, is clustered with practice "silos" and unsynchronized care that predominantly manifests in care variability.[7–9] The Perioperative Surgical Home (PSH) was previously proposed as a viable practice model that aims to overcome the practice "silos" to enhance perioperative care and to improve the care experience of an individual patient.[10–12] The PSH is a patient-centered, physician-led health care model of care aimed at optimizing patient optimization before surgery, enhancing patient care experience, improving clinical outcomes, and reducing the cost of care. To date, the PSH care delivery model was studied in a limited number of institutions with patients undergoing inpatient surgery; although it has been reported to improve multiple outcomes,[10–12] there are still many barriers impeding the wider adoption of this model. Considering the multitude of challenges in the current ambulatory surgery practice, the PSH practice model seems to be an alternative model of care in those settings as well. To the best of our knowledge, however, implementation of PSH in an ambulatory care setting was not reported in the peer review literature.[13,14]

Kaiser Permanente (KP) is the largest cohesive and fully integrated care system in the United States, and it consists of 3 distinct yet fully integrated entities: Kaiser Foundation Health Plan (insurance), Kaiser Foundation Hospitals (hospitals), and Permanente Medical Groups (physicians). Because these entities are bound together both financially and operationally, it is vital for each to synergistically align with the others to provide the highest possible quality of care. We submit that the unique structure of the KP model provides an ideal environment for the introduction of a PSH model, and we have recently reported on the success of this model for patients undergoing total knee arthroplasty surgery.[12] The purpose of this article is to describe the extension of this model to outpatient surgery as well. As such, in this report, we aim to describe the design, implementation,

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and changes in patient outcomes associated with of a PSH model for patients undergoing ambulatory laparoscopic cholecystectomy (LC).

MATERIALS AND METHODS

Data presented in this report include 1960 consecutive patients who underwent ambulatory LC in our institution. Institutional review board of KP Southern California approved this study, and because this study was initiated as a quality improvement project, it is reported following the Standards for Quality Improvement Reporting Excellence (SQUIRE guidelines).[15] The retrospective data collection did not contain patient-identifiable information, and individual patient's consent was not obtained.

Setting

Kaiser Permanent Baldwin Park (KPBP) is a hospital located in the greater Los Angeles area with approximately 75,000 emergency department visits per year, 13,000 hospital admissions per year, more than 3500 inpatient surgeries per year, and 9000 outpatient surgeries per year. The Department of Anesthesiology at KPBP is a physician-only group practice and is a part of the multispecialty Southern California Permanente Medical Group that consists of more than 6000 physicians.

Planning the Intervention. A steering committee for LC was assembled and included anesthesiologists, hospital administrators, surgeons, operating room nurses and technicians, surgical schedulers, perioperative nurses, quality improvement specialists, and other individuals (Figure 1). The team assembled and examined all elements of the perioperative care for patients undergoing LC by using data from Kaiser Permanente HealthConnect (KPHC).[16] The KPHC is a comprehensive KP electronic medical record system that is a comprehensive source of both clinical data as well as operational metrics. Although each of the disciplines included on the steering committee was responsible for developing their own best evidenced practice guidelines, the group worked as a coordinated entity. For example, our previous patient flow model (T-fast) indicated that patients receiving general anesthesia would uniformly have minimal stays in both a postanesthesia care unit (PACU) and a phase 2 unit where patients went after getting discharge from the PACU. In the newly developed LC-PSH pathway, however, anesthesiologists were highly encouraged to tailor anesthetics for rapid recovery so patients could meet criteria to bypass the PACU and go directly to the phase 2 unit. Also, the minority of patients who were admitted to the PACU and recovered rapidly could be discharged home directly without an obligatory stay in the phase 2 unit. Because we could not predict a priori how many patients would end up in the PACU or phase 2 unit, we adopted a flexible nurse staffing system with dynamic staff reassignments that broke the traditional boundary of preoperative and postoperative nursing practice. Additional elements of the PSH implementation are shown in Table 1.

Extensive training for all providers was conducted through assigned champions from each discipline. For example, the Department of Anesthesiology held numerous educational meetings and designed and distributed guidelines and protocols to every member of the department. The Department of Surgery educated all providers on the new protocols, including

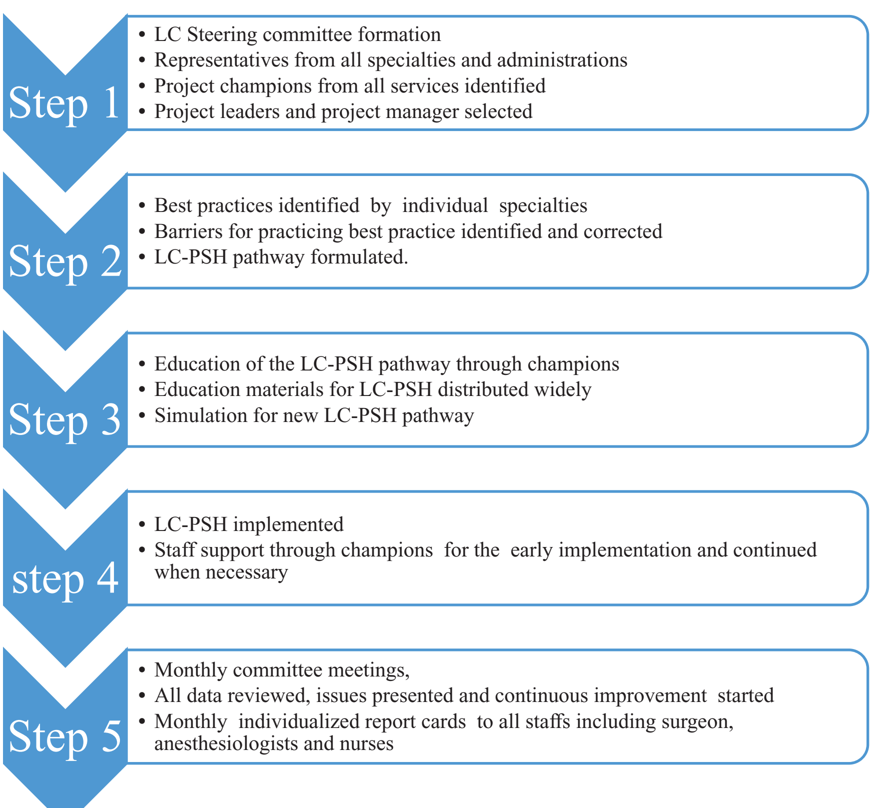

Figure 1. LC-PSH planning and implementation process. LC, laparoscopic cholecystectomy; PSH, perioperative surgical home.

Table 1. The Process for LC-PSH

	Process Redesign and Human Factors Engineering					
Before surgery						
	Standardize case time to 90 minutes	Batch laparoscopic cases when possible	Real time feedback on scheduling changes	Release block time early to promote easy rescheduling	Accurate time of surgery for patient transportation
Surgical preparation	Education and expectation management regarding the outpatient surgery	Discharge information provided—including the requirement of a discharge ride with accompanying adult	Infection prevention strategies discussed with patient. Chlorhexidine wipes with instructions given	Surgeon enters admission order by 5:00 PM the day before surgery	Schedule a postsurgery appointment or arrange for a postsurgery phone call
Anesthesia preparation	Anesthesia preop 1–14 days before surgery	Medication reconciliation and medical optimization	Lifestyle modification including diet, activity, smoking cessation	Multimodal analgesia and PONV prevention	Postdischarge pain and PONV prevention and management
Communication	Barrier-free direct communication among providers	Team member and leader identification and care participation in preop, intraop, and postop	Anesthesia tech assigned to help set up case, extra IV access, and anesthesia turnover	Transporter prepares gurney for patient transport before the end of case	EVS, OR tech, and nurse to start cleaning and set up OR jointly as soon as incision is closed
Day of surgery					
Instruments	Equipment and instrument standardization between surgeons	Minimal numbers of trays necessary to avoid the need for processing between cases	All trays verified to be complete and in working order for the day	Preference cards up to date, process in place. No changes or minimum on the day of surgery	Open case conversion trays available in room
Preop	Surgeon completes interval note in preop in a timely fashion	Anesthesiologist seeing patient and activate multimodal pain and PONV protocol	Hair clipping, only when necessary, to be done in preop	Patient receives a BP cuff in preop that stays throughout LOS	Circulator RN goes directly to preop to prepare patient
Intraop	Scanning system used to aid data input	Surgeon notified as patient enters OR	Intraop timeout/briefing led by surgeon per HRST process	Patient allergies discussed (all allergies, including dyes)	Final verification performed before incision. Debriefing at the end of procedure
	Glitch book utilized if necessary	Utilize in-and-out catheter as needed, do not use Foley catheter	Open suction irrigator only on an as needed basis	Skin prep—chlorhexidine (recommended by CDC)	Avoid using staples (option for postop phone appointments)
	Local injection given at beginning of case, before incision	Staff changes should not take place at critical patient care activities	OR doors to remain closed with minimal traffic for infection control	Initial count performed before incision	Final count performed toward end of case, reconcile with initial count
	General anesthesia with minimum narcotics	Multimodal and preemptive analgesia	Multimodal PONV prophylaxis	Hand off preparation Next case preparation	
Postop	Quick hand-off to anesthesiologist OR manager and PACU nurse	Anesthesiologist timely attend PACU complications and discharge readiness	Nurse provides PACU care and facilitates discharge process	Patient is discharged when discharge criteria are met	Prescription pain med for home: preference preop or in postop discharge orders
Next case readiness	Minimum of one EVS attendant is immediately available upon incision closing	OR tech brought next case cart into room upon EVS exit and start setup	Surgeon completes interval note in preop timely	Real time patient status update, timely inform the team with potential delays	Circulator RN and anesthesiologist go to preop holding for next patient—assess and transport to OR
Post discharge					
Quality improvement	Postop phone follow-ups and clinical visit	Track ER/urgent care returns and cause	Unexpected hospital admission	Monthly Lap Chole Committee reviews	Feedback to stakeholders for improvement

Abbreviations: BP, blood pressures; CDC, Centers for Disease Control and Prevention; ER, emergency room; HRST, health risk screening tool; Lap Chol, laparoscopic cholecystectomy; LOS, length of stay; med, medication; OR, operating room; PACU, postanesthesia care unit; PONV, postoperative nausea and vomiting; RN, registered nurse.

the intraoperative administration of local anesthetics, and implemented new computer order sets with multimodal analgesic regimens. Perioperative nurses were educated about new pain protocols and about their roles and responsibilities in personalized patient care. Finally, before launching the program, we simulated a patient undergoing the LC-PSH process with the participation of all stakeholders from admission to discharge. This allowed us to collectively better understand and refine the entire spectrum of care before formal implementation. Furthermore, we monitored all aspects of care during PSH implementation, with champions closely following each patient to ensure compliance. A personalized report card was provided to anesthesiologists, surgeons, and PACU nurses on a monthly basis, which included provider-specific data on the services they provided. The latter was used for quality improvement at both the individual and system levels.

Clinical Pathways
Anesthesiologists were involved throughout the integral processes of the perioperative course such as preoperative evaluation and laboratory testing, optimization of preoperative medical conditions in consultation with primary care physicians or medical specialists, surgical scheduling, Surgical Care Improvement Project compliance, medication reconciliation, and so on. Anesthesiologists also spearheaded the design and implementation of comprehensive pain and rehabilitation protocols for home care settings (Table 2). Although the overarching concepts such as patient-centric care and preemptive, multimodal analgesia were similar to inpatient PSH programs that we were operating in parallel, the specific protocols and pathways were tailored to be appropriate for patients undergoing ambulatory surgery (Tables 2 and 3).

Evaluation of the Intervention
A retrospective study design was used, and we compared data of 24 months before the intervention to 24 months after the intervention. To guarantee that data acquisition was the same in the 2 time periods, data collection variables were decided on the basis of SQUIRE guidelines [15] Data for this study were extracted from KPHC.[16] KPHC is an integrated electronic medical record that contains both clinical data as well as operational data.

Outcome Variables
The primary outcome variable of this study was length of stay (LOS), which was defined as the time spent in the hospital from admission to discharge. Preoperative waiting time was defined as the time spent before entry to the operating room (OR) and postoperative recovery time was defined as the interval of time from admission to the PACU until discharge home. We also recorded unplanned hospital admission (UHA), which was defined as additional hospital stay because of any reason. Other outcome measures included pain scores and the incidence of postoperative nausea and vomiting (PONV) in PACU and postdischarge emergency department (ED) visits within 7 days. Pain in the PACU was assessed at 2 time points, 1 on PACU admission and 1 on discharge to home. If a patient had a pain score of 4 or above analgesics were given until the patient's pain was assessed again at 30 minutes. Postanesthesia Score System (PASS) was applied during the study period and a PASS score of 12 or above was used as minimal standard for home discharge. Postoperative survey was administrated by a physician assistant and a nurse project manager who were not a part of the research project.

Outcome Measurement
Since KP is a fully integrated health care system, patients had almost all their care delivered within the organization. This coupled with a fully functional electronic medical record facilitates the collection of complete clinical data. Once a LC case was entered into the database described above, it was possible to search for postoperative adverse events, including return to the ER within the immediate perioperative period. In the rare cases where patients present for care outside KP facilities, an active repatriation program is in existence to bring patients back to KP facilities as soon as they are medically stable, facilitating consistent treatment by KP standards and protocols, and also capturing diagnosis codes for tracking of complications.

Statistical Analysis. The primary goal of this study was to assess the changes in patient outcomes associated with the LC-PSH implementation on facility LOS compared with the T-fast protocol. In addition to a direct Student t test for comparison of the primary outcome, a linear regression using LOS as the dependent variable and using time period (pre-/post-PSH), ASA class, age, sex, body mass index, admit time, case start time, specific surgeon, and individual comorbidities (diabetes mellitus, hypertension,

Table 2. Anesthesia-Specific Practice Changes in LC-PSH

Preoperative
- Combined surgery and anesthesia preoperative clinic visit. This visit includes labs, medication optimization (HTN, DM, OSA, etc), and lifestyle modification (smoking cessation, obesity, etc)
- Patient is encouraged to drink water 2 hours before the arrival at facility
- Activate multimodal analgesia protocol, including Acetaminophen 1000 mg and meloxicam 15 mg PO on arrival

Intraoperative
- Multimodal analgesia protocol to reduce intraoperative narcotic usage, drug selections include ketamine 0.2 mg/kg, ketorolac 30 mg IV, and preincision local anesthetics (0.5% bupivacaine 10 mL)
- Multimodal antiemetic, drug selections include Decadron 8 mg IV and Zofran 4 mg IV
- Minimal neuromuscular blockers as necessary as indicated
- Direct communication among surgeon, preoperative staff, OR staff and PACU/ phase 2 recovery unit staff, and OR manager on progress status and changes
- Goal is to have patient awake, extubated and ready to bypass PACU, and proceed directly to phase 2 recovery unit

Postoperative
- OR anesthesiologist conduct quick hand-off to the admitting nurses in PACU or phase 2 recovery unit.
- PACU anesthesiologist addresses pain, PONV, and other postoperative complications in a timely manner and according to the medication protocol in PACU:
  - Pain score: 1–3: hydromorphone 0.2 mg IV every 10 minutes, X4 PRN
  - Pain score: 4–6: hydromorphone 0.4 mg IV every 10 minutes, X4 PRN
  - Pain score: 7–10: fentanyl 50 μg IV every 3 minutes, X4 dose, PRN

Ondansetron 4 mg IV and/or dexamethasone 4–8 mg IV
- PACU nurse and PACU anesthesiologist provide ongoing evaluation on home readiness. PASS score >13 as discharge home criteria

Abbreviations: DM, diabetes mellitus; HTN, hypertension; LC, laparoscopic cholecystectomy; OR, operating room; PACU, postanesthesia care unit; PO, by mouth; PONV, postoperative nausea and vomiting; PSH, perioperative surgical home.

coronary artery disease, congestive heart failure, chronic obstructive pulmonary disease, end-stage renal disease) as independent factors was used to assess group differences in LOS in the presence of these other factors. Variance of LOS in the T-fast and LC-PSH were compared using an F-test.

Because pain scores are ordinal in nature and not expected to be normally distributed, they are reported as median and quartiles and were compared using Mann-Whitney *U* test. Comparisons between groups for ordinal data (ASA scores) were made with Kendall Tau-b, and comparisons of proportions between groups were with Pearson χ^2.

The α-level was set at 0.05 for the primary outcome, with significance criterion of $P < .05$ and confidence intervals reported at 95%. For all secondary comparisons, a pooled α-level of .05 was set using Bonferroni correction, meaning that, for our 10 reported secondary outcomes (including the model), individual α was set to .005 and significance level of $P < .005$. Confidence intervals are reported at the 99.5% level on secondary outcomes. All analyses were performed with R (www.r-project.org) and SPSS 21.0.0.0 (IBM, Armonk, NY).

Given the background mean LOS of 571 ± 838 minutes and assuming a 20% reduction in LOS is a clinically meaningful goal, we calculated that with an α of 0.05, 838 patients in the T-fast period and 1082 patients in the PSH period, we would have a power 0.85 to detect this difference if present.

RESULTS

Demographics of Patients

There were 878 LC patients in the preimplementation group (T-fast) and 1082 in the postimplementation period (LC-PSH). Demographic data in each group are reported in Table 3. As can be seen from the table, patients in LC-PSH group were on average 2.2 years younger than the patients in T-fast, a small but statistically significant difference. However, there was no correlation between age and length of stay ($r = -0.06$), making this small difference between groups highly unlikely to contribute to any LOS difference.

LC-PSH INTERVENTION AND OUTCOMES

Primary Outcomes

Patients assigned to the PSH pathway had a significantly lower LOS as compared with the T-fast group 125 (96, 167) vs 207 (164, 281) minutes, $P < .001$ (Table 3). Both preoperative waiting time and postoperative recovery time for patients under LC-PSH was shortened significantly as they were compared with the patient under T-fast group ($P < .001$ for both times, Table 3). The OR time was essentially same for both LC-PSH and T-fast ($P = .8$). A significantly higher number of patients in the PSH pathway bypassed the PACU and were admitted directly to the phase 2 unit (63.4% vs 12.3%, $P < .001$; Table 3). Finally, there is no association between the time of the day a surgical case was started and length of stay in the PACU ($R^2 = 0.56$).

Linear regression showed that group (T-fast versus LC-PSH) remains a strongly significant factor ($P < .001$) even in the presence of the other included independent variables. Other significant factors in the model were ASA class ($P < .001$) and specific surgeon ($P < .001$; with one surgeon in particular having an estimated marginal mean admit-to-discharge time of almost 1.5 hours more than the rest of the group). A time series of the pre- and post-PSH implementation is shown in Figure 2. Variance of LOS was also significantly lower in the LC-PSH group (ratio of LC-PSH to T-fast = 0.145, 99.5% CI 0.121–0.174, $P < .001$).

Secondary Outcomes

Median pain experience was lower in the LC-PSH versus the T-fast group (3 [2–4] vs 4 [3–5], $P < .001$). PONV was also significantly less common in LC-PSH compared with T-fast group ($P < .001$, Table 3). Moreover, UHA was also significantly decreased following implementation of PSH, 1.7% (0.9–2.5) in LC-PSH versus 8.5% (6.6–10.4) in T-fast, $P < .001$. Finally, 7-days ER visit because of any reason was same among the 2 groups (5.4% [3.8–7.0] T-fast group versus 5% [3.6–6.3] LC-PSH group, $P = .066$). As can be seen from Table 4, there were no significant differences with regard to the administration of analgesics and antiemetics between the 2 study groups.

DISCUSSION

Under the condition of this report, we have demonstrated that PSH practice for ambulatory LC was associated with a significant decrease in the total length of hospital stay as well as UHA, incidence of PONV, and median levels of pain.

Table 3. Demographic and Outcomes of LC Under T-Fast and PSH Programs

	T-fast n = 878	PSH n = 1082	P Value
ASA Score			
1	17%	14%	.868
2	72%	78%	
3	11%	8.0%	
4	0.0%	0.1%	
Female	77%	77%	.973
BMI	30.4 ± 6.6	30.7 ± 6.6	.51
Age	51.6 ± 15.9	49.4 ± 16.2	.004
Preoperative wait time (min)	121 [1002, 189]	80 [60, 139]	<.001
Surgical case length (min)	59 [51, 67]	59 [52, 66]	.8
Postoperative recovery time (min)	193 [151, 327]	124 [95, 221]	<.001
Unplanned hospital admission (%)	8.5% (5.8–11)	1.7% (0.6–2.8)	<.001
PONV in PACU/phase 2 unit (%)	22% (18–26)	12% (9.2–14.8)	<.001
7-day ER visit	5.4% (3.2–7.6)	5.0% (3.1–6.9)	.066
Bypass rate (%)			
PACU	12% (8.9–15)	64% (60–68)	<.001
Phase 2 unit	7.8% (5.2–10)	3.5% (1.9–5.1)	<.001

Tests of significance by: Kendall Tau-b for ASA scores, 2-sample test for equality of proportions with continuity correction for proportions, and by *t* test or Mann-Whitney *U* test for continuous variables depending on normality. Data are reported as mean ± standard deviation, median [25th, 75th], or proportion % (99.5% confidence interval).

There was a statistically significant difference in baseline ages between groups, with the post group being younger. There is no correlation between age and primary outcome length of stay, however ($r = -0.06$).

Abbreviations: ER, emergency room; LC, laparoscopic cholecystectomy; OR, operating room; PACU, postanesthesia care unit; PONV, postoperative nausea and vomiting; PSH, perioperative surgical home.

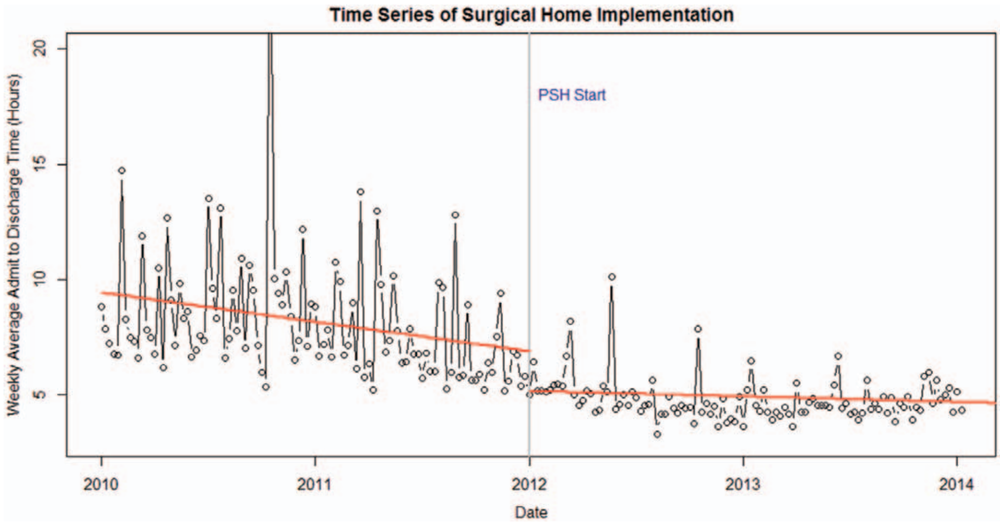

Figure 2. Time series of pre- and post-PSH implementation. Vertical line represents PSH implementation. Sloped lines overlaying graph show the regression lines for the weekly mean LOS during both the T-fast and LC-PSH periods. Although there was already a downtrend in LOS before implementation, the weekly mean LOS drops further following the start of PSH. More significantly, the weekly variance drops significantly in the LC-PSH period (ratio of LC-PSH to T-fast = 0.145). LC indicates laparoscopic cholecystectomy; LOS, length of stay; PSH, perioperative surgical home.

Table 4. Recovery Room Medications and Pain Scores

	T-fast	PSH	*P* Value
Fentanyl (mcg)	50 [50, 50]	50 [50, 50]	.64
Hydromorphone (mg)	0.6 [0.4, 0.9]	0.6 [0.4, 0.7]	.83
Dexamethasone (mg)	4 [4, 8]	4 [4, 8]	.35
Ondansetron (mg)	4 [4, 4]	4 [4, 4]	.95
Median Pain Score	4 [3, 5]	3 [2, 4]	<.001

Results reported as median [25th, 75th] percentiles. *P* value is for Mann-Whitney *U* test.

This temporal association of the intervention with drop in median LOS can be seen graphically in Figure 2 along with the drop in variance. We submit that this decrease in LOS can increase the capacity to admit more patients per defined time period to either the preoperative holding or PACU area.[17–19]

Every year, more than 500,000 patients in the United States undergo laparoscopic cholecystectomy, and most of them are operated on in ambulatory surgery settings. Even though the safety and efficiency of ambulatory laparoscopic cholecystectomy has been well documented,[9,20,21] clinical advances in the field have been slow. Different surgical techniques and devices, various anesthesia techniques, and numerous combinations of pain therapies have failed to demonstrate any outcome differences or further cost reductions.[22] The seemingly ceiling effect, especially in the developed countries, represents a new opportunity for the practice of PSH. As the PSH protocol reduced both the incidence of PONV by 50% and the maximal pain levels that were experienced, this model clearly represents a potential opportunity in ambulatory surgery.

The creation and implementation of flexible and dynamic staffing for our perioperative nurses was an important part of LC-PSH success. By breaking the artificial boundary between the preoperative and postoperative nursing, the PACU and phase 2 unit for nurse and LC patients, we were able to deliver high-quality care that was both patient centered and personalized. For example, by paring LC patient with his or her admitting nurse postoperatively, we limited the need of lengthening postoperative handoffs and time to build a new rapport between patients and our staff. This practice allowed our nurse to establish an individualized care plan at the time of admission and performed the plan as soon as the patient reached the PACU.

Quality improvement and historical-prospective studies are inherently limited because they are not randomized or controlled, and they reduce the ability to make a causal connection between the intervention and the change in outcome. Another limitation may be in the reporting of postoperative outcomes that could differ between the historical and the prospective groups. We did collect data retrospectively but used the same data collection methodology in both the historical and in the prospective groups. In addition, the primary outcome was an objective measurement of the hospital LOS. Furthermore, we used the KPHC and the Anesthesia Information Management System (AIMS) to standardize the way postoperative complications were reported. In terms of the association between group and LOS (even with the additional factors included in the linear regression), it is possible there are other factors that may explain the association but were not considered here. Finally, the readmission rate in the T-fast group (8.5%) was somewhat higher than the national benchmark, which may make our reduction in readmissions from this protocol less applicable to other centers with lower baseline readmission rates. One has to recognize, however, that calculation of the national benchmark is somewhat problematic because many patients may be readmitted to different hospitals than where the surgery was performed. Because the Kaiser system is an integrated care system, readmission data are highly accurate.

Although the implementation of PSH was achieved without additional staff members or additional monetary incentives, there were real costs for the project, mainly in the form of allocation of existing resources that could have arguably been used for other purposes. Also, although the steering committee of the PSH program sought patient input, no patient was a member of the steering committee. Because PSH is a patient-centric model, this would be rectified for any future PSH pathway design. All patients were told that they were expected to go home after surgery and certainty affected their motivation. That said, because KP is an integrated care system, the patients did not have any financial incentive in this matter.

This report represents the early adoption of PSH practice for ambulatory surgery in the largest HMO system in the United States. The results of the present study not only demonstrate the associated improvements of a PSH practice on clinical and financial outcomes but also indicate that the scope of anesthesiology can be far broader than what has been commonly practiced, especially in the area of reengineering the structure and culture of perioperative patient care.

DISCLOSURES

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Conflict of Interest: Chunyuan Qiu reported no conflicts of interest.
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Conflict of Interest: Joseph Rinehart consulted for Edwards Lifesciences, consulted for Masimo, and reported a conflict of interest with Sironis.
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