



Original Investigation | Emergency Medicine

Telemedicine Consultation for Pediatric Trauma in Community ED Visits and Parent Experience of Care

A Stepped-Wedge Cluster-Randomized Clinical Trial

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Abstract

IMPORTANCE Telephone consultations for acutely injured children receiving care in emergency departments (EDs) in nonpediatric trauma centers frequently exclude direct communication and informed decision-making with parents. The use of telemedicine to facilitate real-time expert consultation and parental communication with pediatric trauma specialists is underexplored and may improve family experience and support clinical decision-making.

OBJECTIVE To examine the impact of telemedicine on parent experience of care, parent distress, and transfer frequency for acutely injured children presenting to EDs in nonpediatric trauma centers.

DESIGN, SETTING, AND PARTICIPANTS This stepped-wedge cluster-randomized clinical trial recruited patients between November 30, 2020, and November 27, 2022. Participants included families of children younger than 18 years with acute physical trauma presenting to 1 of 10 nonpediatric trauma centers in northern California. Analyses were conducted between June 2023 and March 2026.

INTERVENTIONS EDs were randomized to use telemedicine following a standard telephone consultation or the standard of care (telephone consultation only) when consulting with pediatric trauma physicians.

MAIN OUTCOMES AND MEASURES Primary outcomes were parent experience of care and parent distress measured 3 days or more following the child's injury. Experience of care was measured using ED Consumer Assessment of Healthcare Providers and Systems (CAHPS) questions. Distress was measured using the State-Trait Anxiety Inventory Form Y survey. Modified intention-to-treat analyses were performed to evaluate outcomes.

RESULTS The study included 595 children with acute physical trauma with a mean (SD) age of 7.6 (5.1) years, of whom 369 (62.0%) were assigned to telemedicine and 226 (38.0%) to standard of care. Summary scores for parent experience of care 3 days post injury were similar between cohorts (adjusted mean difference [AMD], 0.041 [95% CI, -0.008 to 0.090; $P = .10$]), as were parent distress summary scores (AMD, -0.031 [95% CI, -0.297 to 0.235; $P = .82$]). The adjusted odds ratio for transfer of patients assigned to telemedicine was 0.59 (95% CI, 0.16 to 2.16; $P = .43$). Subscale analyses found significantly higher parental ED discharge and/or transfer experience ratings for patients assigned to telemedicine (AMD, 0.104 [95% CI, 0.023 to 0.186; $P = .01$]).

(continued)

Key Points

Question Is the use of telemedicine for pediatric trauma consultations associated with improved parent experience of care and parental distress compared with consultations conducted using the telephone?

Findings In this randomized clinical trial of 595 injured children presenting to 10 community emergency departments, the use of telemedicine resulted in similar overall summary scores for parents' experience of care and distress. There was no significant difference in transfer rates, but subscale analysis found statistically higher parental discharge and/or transfer experience ratings for patients assigned to telemedicine.

Meaning This study's findings suggest that telemedicine consultations for pediatric trauma do not improve parent experience of care or distress compared with standard telephone consultation.

+ Invited Commentary

+ Supplemental content

Author affiliations and article information are listed at the end of this article.

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Abstract (continued)

CONCLUSIONS AND RELEVANCE In this randomized clinical trial, telemedicine consultations did not differ statistically significantly from standard care with respect to parent experience of care, distress, and transfer rates. Subscale analyses suggested a potential improvement with telemedicine consultations in parent experience related to ED discharge and interfacility transfers, highlighting a potential benefit in communication and preparation during care transitions.

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Introduction

The regionalization of pediatric trauma care has improved the quality and efficiency of care for injured children; however, it has also introduced disparities in timely access to trauma services for acutely injured children in underserved and rural communities.¹⁻³ In the United States, more than 41 million children have inadequate access to trauma care, living more than 30 miles from a designated level I pediatric trauma center.⁴ In these settings, physicians in emergency departments (EDs) at non-level I pediatric trauma centers rely on telephone consultations with pediatric trauma experts. While valuable, these consultations frequently exclude direct communication and informed decision-making with parents, contributing to parental confusion, anxiety, and distress,⁵⁻⁹ and often result in precautionary transfers of children to regionalized pediatric trauma centers.⁸ These precautionary transfers can sometimes impose substantial burdens related to transportation, work, childcare issues, and parental worries related to their child's injuries.⁹

To increase access to pediatric trauma expertise and improve family engagement in their child's care, many clinicians and researchers advocate for the use of telemedicine.¹⁰⁻¹³ The Virtual Pediatric Trauma Center model includes the use of telemedicine to connect patients, families, and clinicians from referring EDs with pediatric trauma specialists, and enables expert consultation at the bedside of injured children regardless of location.^{12,14} By facilitating real-time collaboration among clinicians and families, telemedicine has the potential to enhance the overall care experience for parents and decrease the transfer of children who do not require a higher level of care.

There is limited research comparing the use of telemedicine to the current standard as it relates to parent experience and distress, and frequency of interfacility transfers.¹⁵⁻¹⁸ Therefore, this study aimed to compare these 2 models of consultative care to evaluate differences in parental experience and distress, and the frequency of unnecessary patient transfers from a non-pediatric trauma center to a pediatric trauma center. We hypothesized that, compared with standard care, parents whose children were assigned to the telemedicine model of care would report better experience of care and lower distress. We also hypothesized that the frequency of transfers would be lower among those assigned to the telemedicine model of care compared with those assigned to standard care by reducing the frequency of potentially avoidable transfers.

Methods

This stepped-wedge cluster-randomized clinical trial received institutional review board approval from the University of California, Davis. We followed the Consolidated Standards of Reporting Trials (CONSORT) reporting guideline.^{21,22} Informed consent was waived because both models of care are accepted standards (comparative effectiveness trial) and because patients' data were deidentified.¹⁹

Study Setting and Design

The protocol and the study design, including patient, parent, and stakeholder involvement, has been previously published ([Supplement 1](#)).¹⁹ A single level I pediatric trauma center within a quaternary university hospital (UC Davis Children's Hospital [UCDCH]) served as the regional virtual pediatric trauma center. Eleven additional hospitals in northern California participated in this study. This network of 10 affiliated EDs included 2 adult-designated level II trauma centers, 3 adult-designated level III trauma centers, and 5 hospitals without trauma designation. Two level II trauma centers were located in urban communities, and 3 level III trauma centers were located in rural communities.²⁰ Of the 5 nondesignated centers, 3 were located in rural communities and 2 were located in urban communities.²⁰

Following a stepped-wedge design, participating EDs began using the standard of care telephone model, then individually transitioned to the telemedicine model at randomly assigned, consecutive staggered 8-week intervals according to the senior biostatistician on the trial. To ensure balanced representation of hospitals with different trauma center designations in switching to the telemedicine model of care, hospitals were stratified into 2 blocks, each containing 1 level II trauma center, 1 level III trauma center, and 3 non-designated centers. Individual hospitals were only informed of their switch date with approximately 2 weeks' notice. Study coordinators were not blinded to the intervention that patient-parent dyads were assigned as they were involved in monitoring the adherence to the protocol intervention.

Participants and Interventions

All children (<18 years) presenting to participating EDs with acute injuries during the study period who received a consultation from a UCDCH trauma specialist (pediatric surgery, pediatric orthopedic surgery, or pediatric neurosurgery) were eligible for inclusion. Consultations were initiated after a physician at a participating community ED contacted the UCDCH transfer center to request a specialist consultation and/or an interfacility transfer for an injured child. For EDs assigned to the telephone model of care, the telephone call (or calls) constituted the entirety of the consultation. For EDs assigned to the telemedicine model of care, the initial telephone call was followed by a live telemedicine connection from the child's bedside at the remote site.

The initial study design specified that the designated pediatric trauma specialists would conduct the telemedicine consultations for those encounters assigned to the telemedicine model of care. However, the COVID-19 pandemic disrupted existing pediatric trauma coverage models and the planned workflow of physicians managing telemedicine consultations. Therefore, we changed the consultative role to include more guidance and support for families and transitioned the telemedicine model to rely primarily on trauma nurse practitioners (NPs) for the telemedicine consultations immediately following the trauma specialist's receipt of the telephone call. While this limited the opportunities for further physician-directed clinical management of children during the telemedicine consultation, the NPs were more available to explain the transfer process, understand the family's social and logistical needs, and provide more tailored discharge and/or transfer guidance.

The telemedicine model of care used synchronous audio-video telemedicine communication and included the patient, the patient's parents, caregivers, or family members, and, when available, the referring physician, bedside nurse, respiratory therapist, and other members of the care team. Implementation training at participating EDs involved site visits and basic instructions on where to place the pole-mounted telemedicine unit and how to power up the devices. Additional details regarding the study intervention and protocol are described in a previously published manuscript.¹⁹

Outcome Measures and Data Collection

Primary outcomes were parent experience of care and parent distress measured no earlier than 3 days following the child's injury (see eAppendix in [Supplement 2](#) for survey). Parents were contacted via telephone (text and/or call) or email to obtain consent for participation in the surveys. Recruitment occurred between November 30, 2020, and November 27, 2022.

Parent experience was measured using selected questions from the ED Consumer Assessment of Healthcare Providers and Systems (CAHPS) scores.²³ CAHPS are organized into domains centered on ED arrival, communication with physician and nurses, care during the visit, and ED discharge and/or transfer. Questions were grouped accordingly into assessing parental experience of care and framed as follows: (1) ; and (5) When your child left the emergency department. We also created an overall score representing the sum of the CAHPS questions. In addition, we asked a question, "When deciding whether your child should be transferred, admitted, or discharged home, did you feel like you were a part of the decision-making process?" Analyses compared normalized scores (from 0 to 1) for the overall score and each of the subscale scores. Parental distress was measured using selected questions from the State-Trait Anxiety Inventory (STAI) Form Y survey. In addition to the 3-day surveys (primary outcomes), the STAI was also administered at 30 days (secondary outcome) and at 60 and 90 days (exploratory outcomes). This was assessed because of the potential long-term impact of pediatric trauma transfer on parent distress.

Secondary outcomes also included patient transfer rates from the nonpediatric trauma centers. To compare frequency of interfacility transfers, we identified disposition outcomes for each patient considering whether the patient was discharged or admitted locally to the nonpediatric trauma center hospital vs transferred to the regional pediatric trauma center. Transfer data were obtained from the UCDCH electronic health record.

Sample Size and Power Calculation

As detailed in the published trial protocol,¹⁹ we used simulated data in SAS (SAS Institute Inc) and accounted for the stepped-wedge cluster-randomized trial design using established methods to adjust for period effects and intracluster correlation.²⁴⁻²⁶ Based on preliminary data, assuming a 50% survey response rate, a target sample of 380 participants was estimated to provide adequate power to detect clinically meaningful differences in primary and secondary outcomes.¹⁹

Statistical Analysis

We conducted modified intention-to-treat analyses using complete case analyses, to reflect implementation in the community setting. Primary and secondary outcomes were analyzed using generalized linear mixed models, accounting for patients nested within referring hospitals. We used random effects for hospitals to account for unmeasured sources of between-unit heterogeneity²⁷⁻²⁹ and robust variance estimators. A within-site time-varying binary indicator (telemedicine vs standard of care) was included in the model to permit estimating the key contrasts of interest. For linear-normal mixed models, effect sizes were reported as adjusted mean differences (AMD). For all regression models, we estimated time point specific contrasts between comparison cohorts by fitting a model that included fixed-effects for time point, study cohort, and their interaction. Additional independent variables included a parsimonious, pre-specified set of patient-level effects expected to improve the precision of contrast of interest by accounting for known sources of heterogeneity.^{28,30,31} To account for potential confounding of the study cohort indicator by calendar time and the influences of the COVID pandemic in our stepped-wedge design,²⁴ we computed each patient's date of enrollment in the study cohort and then entered these data as cubic splines in the model.³² Individual patient characteristics such as race and/or ethnicity (identified in the electronic health record; categories included Hispanic; non-Hispanic, Black; non-Hispanic, not Black and not White; non-Hispanic, White), age, and insurance types were examined for the analysis involving parent experience of care and distress. We categorized injury severity using the Glasgow Coma Scale (GCS) score and calculated the Injury Severity Score (ISS) using the Association for the Advancement of Automotive Medicine's ISS Mapping tool.^{33,34}

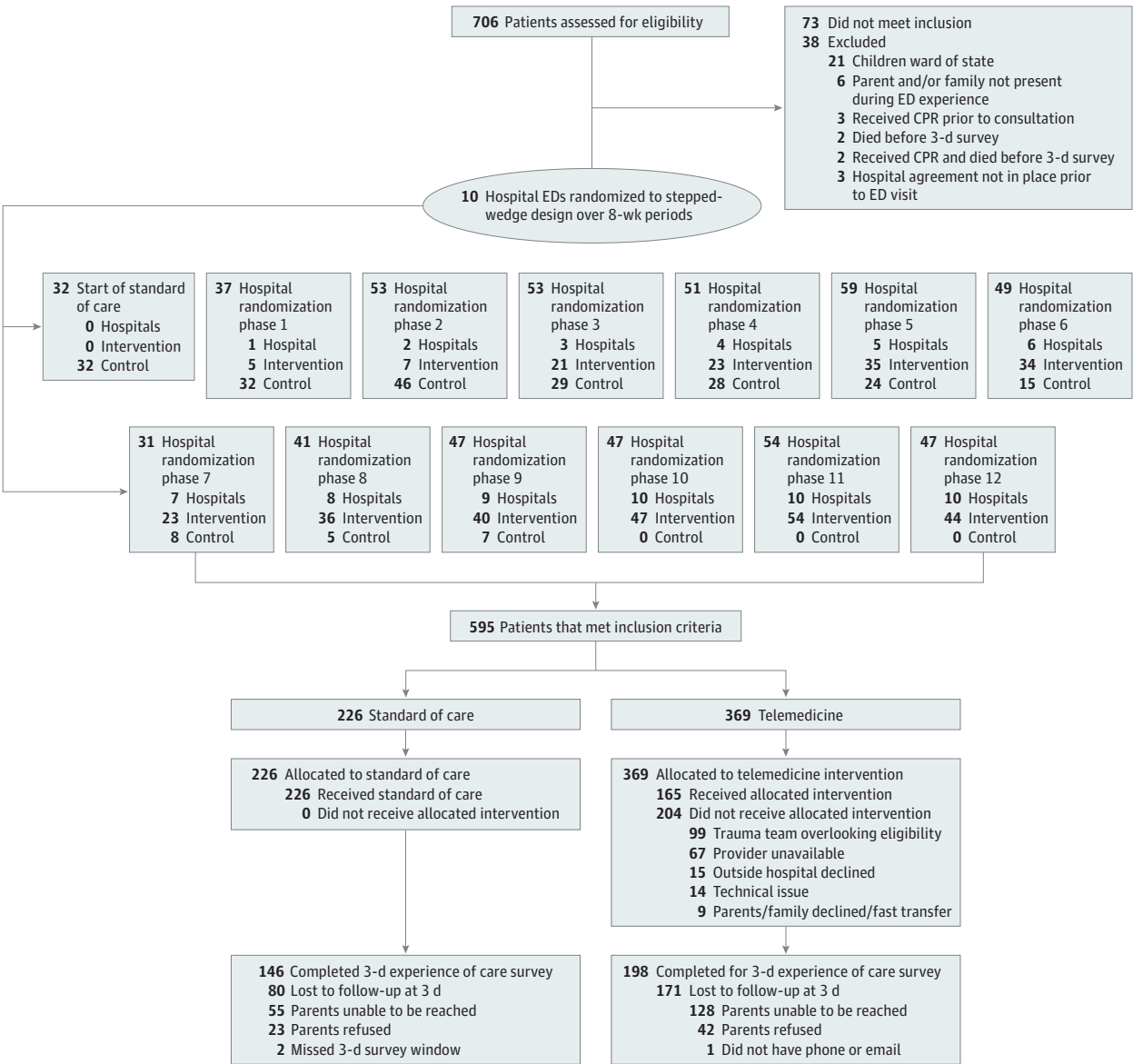
Distance from hospital and neighborhood level social determinants of health (using the Healthy Places Index) were compared between patients in the telemedicine and standard model of care groups. Prespecified subgroup analyses assessed heterogeneity of treatment effects by including interaction terms between subgroup variables and the time-varying telemedicine indicator. The final

list of independent variables included sex, age, insurance category, distance from level I pediatric trauma center, GCS score, and ISS. No adjustments were made for multiple comparisons. We performed sensitivity analysis using multiple imputation (with regression-based imputation in 50 imputed datasets) for our primary outcomes with statistically significant results. Two-sided $P < .05$ was considered statistically significant. Further details on specific data management, sample size calculations, handling of missing data, and sensitivity analyses were previously published.¹⁹ Analyses were conducted between June 2023 and March 2026 using SAS version 9.4 (SAS Institute).

Results

Of the 706 patients assessed for eligibility, 633 met inclusion criteria and an additional 38 were excluded, leaving a study sample of 595 (Figure). Mean (SD) age was 7.6 (5.1) years; and 223 (37.5%)

Figure. CONSORT Flow Diagram



CONSORT indicates Consolidated Standards of Reporting Trials; CPR, cardiopulmonary resuscitation; ED, emergency department.

were female and 372 (62.5%) were male. Of these, 369 were assigned to the telemedicine model of care and 226 were assigned to the standard telephone model of care. At the start of the study, 1 rural hospital withdrew from the study following randomization because of a change in hospital leadership; the hospital was immediately replaced by a similar sized, rural, nondesignated trauma center. **Table 1** shows demographic data for the study population. Of the patients assigned to the telemedicine model, 165 (44.7%) received the telemedicine intervention. Reasons for not receiving the telemedicine model of care included the trauma physicians overlooking eligibility (n = 99), neither the physician nor NP being available (n = 67), the referring ED declining the telemedicine intervention (n = 15), technical issues with telemedicine (n = 14), and the patient being transferred before the trauma team could connect over telemedicine (n = 9). All 226 (100%) assigned to the standard of care received the assigned intervention.

Parent Experience of Care

Overall, 344 (57.8%) of the 595 parents completed the 3-day CAHPS survey; 198 (53.7%) of those assigned to the telemedicine model of care completed the survey and 146 (64.6%) of those assigned

Table 1. Study Population Demographics

Variable	Assigned telemedicine (n = 369)	Assigned telephone (standard care) (n = 226)
Received telemedicine model of care, No. (%)	165 (44.7)	0
Sex, No. (%)		
Female	142 (38.5)	81 (35.8)
Male	227 (61.5)	145 (64.2)
Age, mean (SD), y	8.1 (5.2)	8.0 (5.1)
Age <24 mo, No. (%)	52 (14.1)	35 (15.5)
Race and ethnicity, No. (%)		
Hispanic	125 (33.9)	74 (32.7)
Non-Hispanic, Black	27 (7.3)	18 (8.0)
Non-Hispanic, not Black, not White	47 (12.7)	25 (11.1)
Non-Hispanic, White	170 (46.1)	109 (48.2)
Insurance type, No. (%)		
Commercial	129 (35.0)	82 (36.3)
Medicaid	240 (65.0)	144 (63.7)
Language, No. (%)		
English	331 (89.7)	208 (92.0)
Spanish	23 (6.2)	15 (6.6)
Other/missing	15 (4.1)	3 (1.3)
Injury severity score, mean (SD)	5.7 (5.3)	5.9 (5.4)
Injury severity score, No. (%)		
0-18	290 (78.6)	159 (70.4)
9-15	55 (14.9)	52 (23.0)
≥16	24 (6.5)	15 (6.6)
Glasgow Coma Scale score, mean (SD)	14.8 (0.9)	14.9 (0.5)
Glasgow Coma Scale score, No. (%)		
3-14	24 (6.5)	18 (8.0)
15	345 (93.4)	208 (92.0)
Weekend, Friday 5 PM to Monday 8 AM, No. (%)	155 (42.0)	108 (47.8)
Distance from outlying hospital, mi, mean (SD)	38.2 (36.3)	48.8 (52.4)
Distance from outlying hospital, mi median (IQR)	25 (14-45)	37 (8-45)
≥50 miles from outlying hospital, n (%)	37 (10.0)	45 (19.9)
Healthy Places Index ^a		
No.	334	206
Mean (SD)	-0.175 (0.432)	-0.148 (0.454)

^a Healthy Places Index reported as z-score with a higher score indicating more resourced/advantaged communities, a mean centered at 0, and approximates a normal curve.

to the standard care model completed the survey. As shown in **Table 2**, overall parent experience of care 3-day post-injury was similar between the 2 cohorts, with an AMD of 0.041 (95% CI, −0.008 to 0.090; $P = .10$) in the complete case analysis. There were no significant differences in CAHPS domain scores related to different aspects of the ED visit including “when your child was admitted to the hospital,” “your experience with the nurses,” “your experience with doctors,” and “your experience with providers.” Parents randomized to the telemedicine model of care reported significantly higher satisfaction related to their discharge and/or transfer experience, “When your child left the emergency department,” with an AMD of 0.104 (95% CI, 0.023 to 0.186; $P = .01$). For this domain score, the sensitivity analysis using multiple imputation (with regression-based imputation in 50 imputed datasets) resulted in an AMD of 0.102 (95% CI, 0.023 to 0.181; $P = .01$).

Parent Distress

Overall, 335 (56.3%) of the 595 parents and/or families completed the 3-day STAI survey, including 193 (52.3%) parents assigned to the telemedicine model of care and 142 (62.8%) assigned to the standard model of care. As shown in Table 2, distress ratings 3-day post-injury did not differ significantly between the 2 cohorts (AMD, −0.031 [95% CI, −0.297 to 0.235; $P = .82$). We received 325 (54.6%) parent surveys at 30 days, 314 (52.8%) at 60 days, and 319 (53.6%) at 90 days after

Table 2. CAHPS, State-Trait Anxiety, and Transfer Rates Scores (Modified Intention-to-Treat, Complete Case Analyses)

	Unadjusted mean (SD)		Adjusted mean difference (95% CI)	P value
Variable	Telemedicine (n = 369)	Telephone (standard care) (n = 226)		
CAHPS subscales: 3-d ^a				
Surveys completed, No.	198	146		
Overall	0.768 (0.209)	0.775 (0.223)	0.041 (−0.008 to 0.090)	.10
When your child was admitted to this hospital	0.736 (0.335)	0.747 (0.357)	−0.046 (−0.151 to 0.059)	.39
Your experience with nurses	0.878 (0.206)	0.890 (0.214)	0.017 (−0.044 to 0.077)	.58
Your experience with doctors	0.871 (0.230)	0.865 (0.254)	0.048 (−0.062 to 0.157)	.39
Your experience with providers	0.797 (0.245)	0.830 (0.244)	0.031 (−0.069 to 0.132)	.54
When your child left this hospital	0.644 (0.331)	0.632 (0.359)	0.104 (0.023 to 0.186)	.01
Did you feel like you were a part of the decision-making process	0.678 (0.387)	0.775 (0.365)	−0.007 (−0.118 to 0.104)	.90
State-trait anxiety score, No.				
3-d Post-injury	1.774 (0.596)	1.812 (0.620)	−0.035 (−0.304 to 0.234)	.80
No.	190	135		
30-d Post-injury	1.776 (0.647)	1.798 (0.621)	−0.011 (−0.228 to 0.206)	.92
No.	190	124		
60-d Post-injury	1.595 (0.571)	1.662 (0.599)	−0.058 (−0.328 to 0.208)	.67
No.	186	133		
90-d Post-injury	1.671 (0.618)	1.662 (0.588)	0.037 (−0.120 to 0.195)	.64
Transfer rates				
Transferred to level I pediatric trauma center, No. (%)	338 (91.6)	212 (93.8)	0.594 (0.163 to 2.16) ^b	.43
Disposition from level I pediatric trauma center ED, No. (%)				
Discharged home	127 (37.6)	73 (34.4)	[Reference] ^b	
Admitted to the ward	107 (31.7)	71 (33.5)	1.392 (0.779 to 2.487) ^b	.26
Admitted to the intensive care unit	32 (9.5)	32 (15.1)	1.252 (0.543 to 2.885) ^b	.60
Taken to operating room	72 (21.3)	36 (17.0)	1.385 (0.598 to 3.205) ^b	.45

Abbreviations: CAHPS, Consumer Assessment of Healthcare Providers and Systems; ED, emergency department; UCD, University of California-Davis Children's Hospital.

Cells report frequencies and relative frequencies (as percentages), unless otherwise indicated. Relative frequencies for Disposition from UCD ED are computed with respect to total transferred to UCD.

^a Scores normalized.

^b Adjusted odds ratio (95% CI).

enrollment. As shown in Table 2, there were no statistically significant differences in distress ratings between the 2 cohorts at 30 days, 60 days, and 90 days.

Transfer Rates

Among the 369 patients, 338 (91.6%) assigned to the telemedicine model of care were transferred to the level I pediatric trauma center. In comparison, 212 of the 226 patients (93.8%) assigned to the standard care model were transferred. The adjusted difference in interfacility transfer rates between the 2 cohorts was not statistically significant, with an adjusted odds ratio of 0.59 (95% CI, 0.16 to 2.16; $P = .43$) for patients in the telemedicine model of care.

Discussion

In this stepped-wedge cluster randomized trial of 595 encounters involving injured children presenting to 10 EDs at non-level I pediatric trauma centers in northern California, the addition of a telemedicine consultation following the standard telephone consultation was associated with similar parent experience, parent distress, and interfacility transfer rates compared with telephone consultations. However, parents assigned to the telemedicine consultations reported significantly higher experience ratings related to discharge or transfer from the referring ED, suggesting a potential benefit in communication and preparation during care transitions.

These findings align with prior work demonstrating that telemedicine can enhance communication, patient engagement, and satisfaction.³⁵ Systematic reviews have found that telemedicine was associated with improved perceived quality of care and patient satisfaction, largely through increased access to clinicians and improved communication processes.^{36,37} In pediatric settings, where parental understanding and reassurance are central to the care experience, direct communication and informed decision-making are key drivers of satisfaction and trust.³⁸ In our study, the addition of telemedicine enabled direct communication between pediatric trauma specialists and families, which may explain the observed improvement in parent reported experience during ED discharge and transfer. Prior studies in pediatric emergency care have similarly demonstrated that telemedicine can improve clinical assessment and communication between clinicians and families.^{35,39-41}

Our findings extend this literature by suggesting that the benefits of telemedicine may be most pronounced at critical transition points, such as discharge or interfacility transfer, where uncertainty is high and clear communication is essential. The observed improvement in parent experience related to leaving the ED likely reflects the added value of visual interaction and direct engagement with families, which may enhance understanding, preparedness, and reassurance during these transitions. Despite these improvements in transition-related experience, we did not observe differences in overall experience or parent distress. This may reflect that distress following pediatric injury is driven by multiple factors beyond communication during the ED encounter, including injury severity, uncertainty about recovery, and broader psychosocial stressors. Prior studies of parental distress in acute pediatric settings suggest that distress is multifactorial and may not be substantially altered by communication alone, despite improvements in satisfaction and understanding.

We also did not detect a reduction in interfacility transfer rates. Although telemedicine has been proposed as a strategy to reduce unnecessary transfers by improving remote clinical assessment,⁴² prior studies have shown mixed effects on transfer patterns, with context and implementation playing important roles. In our study, several factors may have attenuated the potential impact of the intervention, including established transfer practices and limited protocol adherence. In addition, constraints on specialist availability and scope of practice for the trauma NPs may have limited the ability of telemedicine consultations to influence transfer decision-making. More broadly, existing literature suggests that system-level factors such as workflow and clinician risk tolerance may influence transfer patterns and limit the effect of telemedicine alone.⁴³

Limitations

This study has several limitations. First, adherence to the telemedicine intervention was incomplete, with fewer than half of patients assigned receiving the intervention, which may have attenuated observed effects. Adherence issues were most commonly related to busy clinicians not having time to prioritize the video encounters as opposed to technical and/or training issues. Second, telemedicine consultations were primarily conducted by trauma NPs rather than pediatric trauma surgeons due to constraints in specialist availability. Although the NPs were trauma-trained and able to engage with clinicians and families, scope of practice limitations may have reduced the ability of the intervention to influence clinical decision-making, affecting our anticipated impact on outcomes, including transfer decisions. Third, high baseline transfer rates and established transfer practices across participating sites may have limited the ability to detect differences in interfacility transfer rates. Fourth, bias could have been introduced by excluding the most severely injured children (those dying within 3 days) and that study coordinators were not blinded to which intervention the encounters were assigned. Fifth, study recruitment occurred between November 2020 and November 2022, immediately following the beginning of the COVID-19 pandemic which could confound the external validity of our findings. Sixth, while we did find statistically significant differences in the parent experience subscale analysis, the clinical significance of this finding is not clear. Finally, survey response rates were moderate and somewhat lower among the telemedicine cohort, which may have introduced response bias.

Conclusions

In this stepped-wedge cluster-randomized trial, the addition of a telemedicine encounter following the standard telephone consultation in the care of injured children was associated with similar parent experience, parent distress, and interfacility transfer rates compared with telephone consultation. However, parents in the telemedicine cohort reported improved experience related to discharge and transfer from the ED, suggesting a potential benefit in communication and preparation during care transitions. Future studies should evaluate telemedicine models that more directly influence clinical decision-making. Studies should also examine implementation strategies to improve intervention uptake and assess outcomes in settings with greater variability in transfer practices, where there may be more opportunity to influence utilization. Finally, future work should explore alternative measures of parental experience and distress that more closely capture real-time responses during acute care encounters.

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SUPPLEMENT 1.

Trial Protocol and Statistical Analysis Plan

SUPPLEMENT 2.

eAppendix.

SUPPLEMENT 3.

Data Sharing Statement