TELEHEALTH AND MEDICINE TODAY

ORIGINAL RESEARCH

Development and Implementation of a Value-Based Care Telehealth Emergency Medicine Program: Triage and Care Alignment in an Integrated Health System

Austin T. Smith, MD[1]; Julie K. Martinez, MSN[2]; Joel R. Taylor, MD[3]; Kelcie A. Douglas, MHA[4]; and Joseph R. Bledsoe, MD[5]

[1]Emergency Medicine, Intermountain Health, Park City, Utah, USA; [2]TeleHealth Services, Intermountain Health, Murray, Utah, USA; [3]Utah Emergency Physicians, TeleHealth Services, Intermountain Health, Murray, Utah, USA; [4]Connect Care Pro, TeleHealth Services, Intermountain Health, Murray, Utah, USA; [5]Urgent Care, Intermountain Health, Murray, Utah, USA

Corresponding Author: Austin T. Smith; Email: Austin.Smith@imail.org

DOI: https://doi.org/10.30953/thmt.v9.512

Keywords: emergency medicine, health outcomes, healthcare cost, telehealth, urgent care, value-based care

Abstract

Background: Acute unscheduled episodic care is an area of potential cost savings, given the high frequency and cost of unnecessary emergency department (ED) utilization.
Methods: We developed a provider-assisted patient navigation program using a telehealth platform designed to decrease ED utilization and reduce costs while providing exceptional patient satisfaction.
Results: Urgent care (UC) visits were analyzed from July 1, 2022, to June 30, 2023. The "ED comparison" group (n = 68,320) consisted of patients discharged to home after receiving care in the ED. The "avoided ED visits" group included patients (n = 7,430) who received care in a lower-acuity setting and did not require emergency services within 48 hours. The calculated overall medical expense savings comparing the costs between the ED vs. lower-acuity settings revealed that 50% (n = 450) of consultations were managed as outpatients, avoiding ED visits. Evaluation of distribution by source revealed that 67% of ConnectCare consults resulted in admission, 48% for UC, while 36% of patients were service center consults. Conversely, 31% of consultations resulted in recommendations to go to the ED, and 16% of these were assisted transfers where the Telehealth Emergency Medicine (TeleEM) clinician communicated with the receiving ED. Among the 280 patients directed to the ED, 243 were sent because of immediate clinical acuity, 28 were because of logistical or scheduling issues, three for non-qualifying insurance for outpatient workup, and six were redirected to the ED following diagnostic results. Our analysis suggests an estimated average avoided medical expense of $1,701 per case to insurers and patients if an ED visit was avoided.
Conclusion: Implementing a TeleEM program to assist with triage and resource alignment, as well as identification and outpatient management of patients while avoiding an ED visit, is feasible within an integrated health system. Our TeleEM program may be a model for other integrated health systems.

Plain Language Summary

We developed a telehealth program, Telehealth Emergency Medicine, with the novel concept of "provider-assisted patient navigation." This program is available at the request of caregivers to all patients who present with acute, unscheduled episodic care. Our program has resulted in decreased emergency department utilization, allowing us to reduce costs to the patient and organization.

Received: June 29, 2024; Accepted: September 19, 2024; Published: October 31, 2024

As healthcare costs rise without a commensurate improvement in outcomes,[1] value-based care, defined by the Centers for Medicare & Medicaid Services as "designing care so that it focuses on quality, provider performance, and the patient experience,"[2] is increasingly being regarded as a method of decreasing healthcare costs and improving outcomes. Previous research reveals that organizations experiencing success in value-based care started by identifying and understanding a segment of patients with a consistent set of needs.[3] Acute unscheduled episodic care (AUEC) represents an area with significant variability and potential for person-centered quality care and cost reduction.[4,5]

Telehealth programs have expanded as a result of the COVID-19 pandemic, with an astounding 63-fold increase seen in Medicare fee-for-service beneficiaries in 2020![6] Within emergency medicine, telehealth programs have been used to support clinician-to-clinician communication and collaboration[7] by providing remote prehospital consultations, triage, forwarding patient data to emergency departments (EDs),[8] and providing sub-specialty support,[9] among other benefits. These applications of telehealth in emergency medicine are reportedly effective, cost-saving,[5] and patient-centered with similar or improved outcomes.[5,7–11]

In an integrated health system focused on value-based care, cost savings related to avoidable ED utilization can benefit patients, as well as the institution. We identified the need for better alignment among all the entry points of AUEC and patients. For this reason, we created a Telehealth Emergency Medicine (TeleEM) program to assist with navigation of the healthcare system, thereby enhancing patient care and reducing resource utilization, which is in alignment with value-based care.

The foundation of our TeleEM structure is the concept of "provider-assisted patient navigation," which leverages telehealth technology to break through traditional care silos that inhibit effective communication and coordination between the different components of our AUEC care system. The provider-assisted patient navigation provided by TeleEM effectively creates a networked system out of previously unconnected care venues. The model described here was designed to facilitate more cost-effective patient management and better aligned care through connections, coordination, and communication between the varied patient entry points of AUEC. This program and preliminary value-based outcomes are described here.

Methods

Intermountain Health is an integrated health system based in Salt Lake City, Utah, USA. Patients served in their geographic areas are highlighted in Figure 1. "Helping people live the healthiest lives possible" is the mission statement of Intermountain Health, with a vision of "being a model health system by providing extraordinary care and superior service at an affordable cost."

The Intermountain Health TeleEM was created with Intermountain Health's mission and value-based care vision in mind. Because of the high cost and often

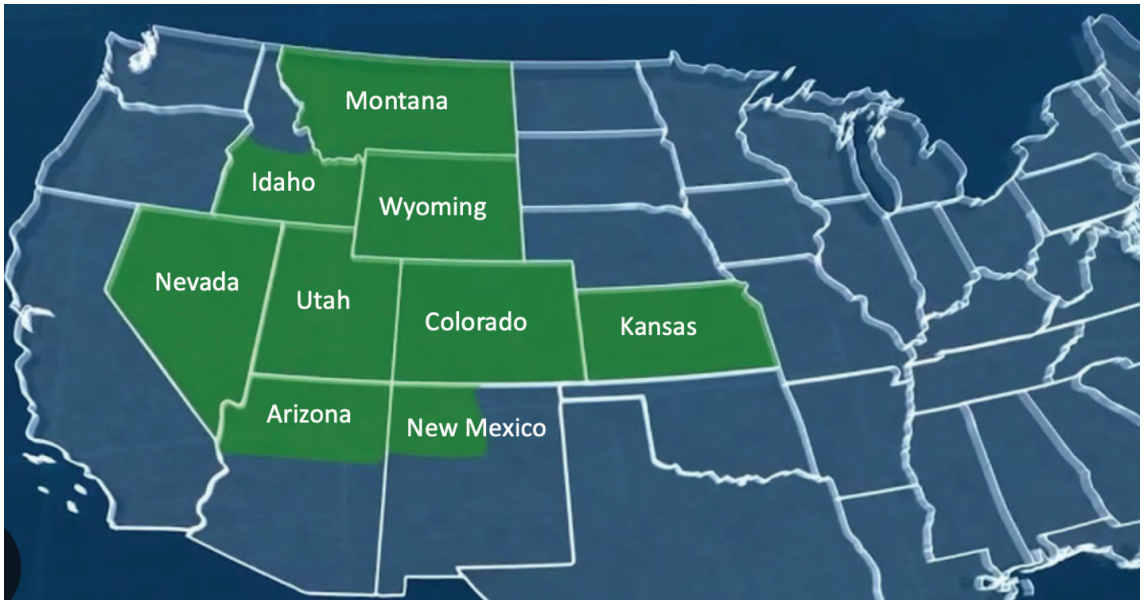

Fig. 1. Geographic areas served by Intermountain Health: an integrated health system based in Salt Lake City, Utah, USA. The long-term vision for Intermountain Health TeleEM is to be integrated throughout the entire multi-state Intermountain Health System. Note: Currently, the initial iteration of this program is operational within the state of Utah. Intermountain Health no longer provides services to the state of Kansas. However, at the time of the development of this program, it had operations there. Source: BYU Universe https://youtu.be/TvFFaB2ajO4.

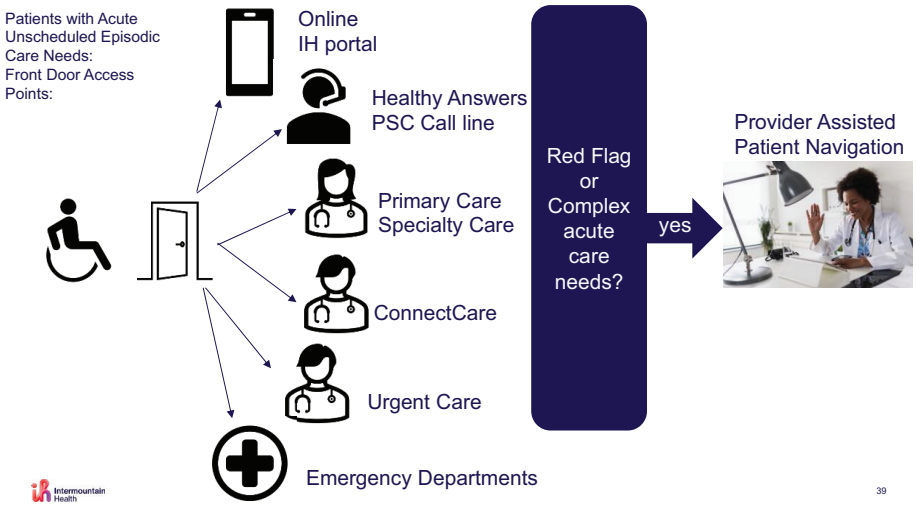

Fig. 2. The primary entry points for TeleEM. The first point of contact for patients presenting with AUEC can occur through several separate entities. Each entity can contact TeleEM if they detect any "red flags" or complex acute care needs. TeleEM can assist the patient through a provider-assisted patient navigation process. IH: Intermountain Health; PSC: Patient Service Center; TeleEM: Telehealth Emergency Medicine; AUEC: acute unscheduled episodic care.

avoidable[4] need for patients to receive AUEC in the ED, AUEC represents an area of potential cost savings and reduced burden for busy EDs. Although the long-term vision for Intermountain TeleEM is integration throughout the entire multi-state Intermountain Health system, the initial iteration of the program is currently operational only within the state of Utah, which includes 23 hospitals, 27 urgent cares (UC), and nearly 200 clinics.

The TeleEM team is based out of Intermountain Health's "Virtual Hospital," a central location that houses all of Intermountain Health's other telehealth teams. The treating physician and nurse have access to electronic health records (EHRs) allowing immediate access to patient data and information from any of the AEUC referring services or clinics. The treating team can immediately access the tracking boards in all the referring clinics and the tracking boards of all the system EDs.

The primary AUEC entry points (Figure 2) in our TeleEM program include Intermountain Health's virtual UC program (ConnectCare), traditional UC clinics (InstaCare and KidsCare), the Patient Service Center (PSC), and Health Answers. The PSC is the call-receiving center for patients seeking an appointment with their primary care clinician. It is staffed by patient service representatives and nurses that evaluate a patient's reason for calling and then triage patients to an appropriate care venue. Health Answers performs after-hours triage for patients and post-discharge related calls within episodic care management.

Initially, the development of our TeleEM model required a focused effort to identify resources that exist in the current system and could be utilized to care for patients in our model. Through this process, we sought to identify and fully understand the extent of a range of parameters (Table 1).

Table 1. Existing resources in the current system that are available to care for patients in the Telehealth Emergency Medicine (TeleEM) model.

Resources	Application
• Entry points	Determine patient care facilities, services, and resources that act as entry points into the system (as described in Figure 2) for patients seeking acute, unscheduled episodic care.
• Local diagnostic resources	Explore laboratory and imaging services within our system, including identification resources available at each hospital, clinic, and urgent care facility, as well as newer mobile lab and imaging resources.
• Outpatient treatment resources	Identify resources available for patients, including in-home treatment options, infusion centers, medical supply resources, and e-prescription processes, among others.
• Patient follow-up resources	Find care management services (primary and specialty care) available, including the best way to refer patients, coordinate care, and access these services.
• Critical ancillary resources	Partner with the administrative teams that support patient care, including administrative leaders and teams, clinic managers, registration, finance, billing, EHR, computer support, and data management teams.
• Value-based care resources	Collaborate with organizations such as Castell (a population health subsidiary) and Tellica Imaging (an outpatient imaging center), which are Intermountain Health's value-based care-focused subsidiaries.

EHR: emergency health record.

These resources were organized and cataloged in an accessible format for efficient real-time utilization. In the spirit of a learning health system, ongoing data acquisition and iteration of the program based on these resources is an integral part of the program's development and maintenance.

Each AUEC entry point included in our system receives patients seeking care for an acute medical concern. If there is any immediate concern from caregivers within the AUEC entry points, our service allows them to contact TeleEM and discuss potential management options or turn over ongoing patient management to the TeleEM service.

The goal of the TeleEM program is to identify patient scenarios that have traditionally required ED evaluation because of a lack of effective care alignment or need for time-sensitive diagnostic testing. The TeleEM team consists of a TeleEM nurse coordinator and TeleEM board-certified emergency physician working side-by-side at telehealth-capable workstations at our virtual hospital.

When TeleEM receives a referral, the emergency medicine physician consults via phone or a Health Insurance Portability and Accountability Act of 1996 (HIPAA)-compliant messaging portal, either with the referring provider from UC or ConnectCare, or directly with the patient from PSC's or Health Answers. Following this initial conversation, if deemed necessary, the TeleEM physician performs a video consultation with the patient. The video consultation takes place on a TeleEM tablet, which is present in each UC unit. For those patients who are not physically present, we found that most patients have smartphones capable of accessing these video interactions. Patients who do not have phone, tablet, or computer technology capable of a video visit, or who are unable to operate their device to allow this level of interaction, are not eligible for further telehealth services. Because of safety and liability concerns, we determined that video visit capability is the minimum requirement to allow TeleEM patient management.

During the evaluation, the TeleEM physician determines the need for ED transfer or develops an outpatient plan of care. For patients who require ED transfer, TeleEM can also coordinate and facilitate important transfer details with the receiving facility. These include ensuring the potentially needed specialty coverage is available, the receiving facility is not on critical census, and conveying any person-centered care needs identified on the video visit encounter. When a specific specialty is needed, the TeleEM physician can speak directly with that consultant to assist in management of that patient, whether that be an ED consultation or outpatient follow-up.

When TeleEM can formulate a viable outpatient evaluation and management option, patients are "admitted" to the TeleEM service and followed by the TeleEM team for a minimum of 48 hours. This time was felt to be adequate to complete an outpatient evaluation and address any concerns or questions. Included in this process, TeleEM arranges outpatient labs and imaging when necessary, and interprets and communicates these results with the patient. TeleEM maintains contact with these patients at least daily, and patients can also contact TeleEM directly with questions. The TeleEM team then makes downstream connections to further care venues as appropriate through partnerships with a care navigator, virtual primary care, and other specialty teams. This includes addressing social determinants of health, such as food insecurity. The decision to "discharge" a patient is made when it is felt there are no further concerns from the physician or patient, and there is a low likelihood of the patient returning to an ED. If any concerns exist at the 48-hour mark, the physician performs a repeat video assessment before extending that patient's service for an additional 48 hours.

Data for TeleEM patients are collected and managed using the REDCap database, which is hosted at Intermountain Health.[12,13] TeleEM nurse coordinators enter basic patient information, referral source, consult details, interventions, outcomes, contribution of the encounter to an avoided ED visit, reason for ED referral, and time spent with each patient. This allows us to capture real-time patient care data, pair it with our EHR data, and develop a powerful dashboard tool that facilitates monitoring of key program metrics.

To estimate medical expense savings for value-based care patients, we conducted a preliminary analysis comparing the cost of care in the ED with that in lower-acuity settings such as UC or virtual emergency medicine services. This analysis primarily focused on UC visits, as these were the vast majority of encounters, as the analysis was conducted before the full expansion of the TeleEM program. The analysis covered a period from July 1, 2022, to June 30, 2023.

Patients who received high-acuity imaging (e.g., computed tomography, magnetic resonance imaging, ultrasound) or specific cardiac-related lab tests (e.g., D-dimer, troponin, or brain natriuretic protein) were included. The "ED comparison" group consisted of 68,320 patients discharged to home after receiving care in the ED, while the "avoided ED visits" group included 7,430 patients who received care in a lower-acuity setting and did not require emergency services within 48 hours. Although case matching was rudimentary, the comparison provided estimates of cost differences. We calculated the overall medical expense savings by comparing the costs between the ED and lower-acuity settings.

Results

The TeleEM program currently handles just over 100 requests per month and has screened nearly 1,000 requests

in its first year. Demographics, including payer type, are presented in Table 2. Entry point referrals are depicted in Figure 3.

In the first year, 910 patients consulted a clinician; 62% were seen via video. The distribution varied by request source: 88% of ConnectCare patients are seen via video, compared to 58% of UC and 48% of PSC patients. The remaining requests were handled through "curbside" audio-only telehealth. The median length of stay for TeleEM patients was 2.2 days—just over the minimum 48 hours.

Regarding consultations, 50% (n = 450) were managed as outpatients (Figure 4), avoiding ED visits. Distribution by source reveals that 67% of ConnectCare consults resulted in admission, followed by 48% of UC and 36% of PSC consults.

Conversely, 31% of consultations resulted in recommendations to go to the ED (Figure 4), and 16% of these were assisted transfers where the TeleEM clinician communicated with the receiving ED. Of the 280 patients directed to the ED, 243 were sent because of immediate clinical acuity. Among the rest, 28 were because of logistical or scheduling issues, three for non-qualifying insurance for outpatient workup, and six were redirected to the ED following diagnostic results.

Table 2. Demographic data on Telehealth Emergency Medicine (TeleEM) patients.

Parameter	Demographics
Age	45.5 (range 0–93)
Gender	56% (female)
Ethnicity	
White	87%
Hispanic or Latino	19%
Asian	2%
Black	2%
Pacific Islander	1%
Other	<1%
Primary language	
English	90%
Spanish	8%
Other	2%
Payer type	
Value-based care	77%
Fee-for-service	16%
Self-pay	7%

Discussion

TeleEM has had a positive fiscal impact for both patients and Intermountain Health. The program continues to see rapid growth with continued education and alignment of incentives across internal teams. Our preliminary analysis suggests an estimated average avoided medical expense of $1,701 per case to insurers and patients, if an ED visit was avoided. This represents savings primarily to the insurer and the patient, who avoid the costs of an ED visit. Additionally, patients benefit from reduced travel expenses, shorter wait times, less time away from work or family, expert guidance, and peace of mind.

During the first year of operation, we estimate that the program contributed to overall health plan system cost savings of over $720,000. This estimate reflects the early impact of shifting care to lower-acuity settings under value-based care arrangements. As the program has matured, we are now conducting a more detailed analysis to further refine these savings estimates and better capture the full impact.

The American College of Emergency Physicians defines emergency telehealth as "a core domain of EM, and is inclusive of remotely providing all types of care for acute conditions of any kind requiring expeditious care irrespective of any prior relationship."[14] Telehealth has been used in several novel ways in the ED. The roles of telehealth have ranged from consultations in rural EDs,[15,16] sub-specialty evaluation,[17] supervision of younger physicians,[18] training,[18] among many other uses. To our knowledge, tele-emergency medicine programs aligned with value-based care do not exist.

Our TeleEM program successfully reduced ED utilization and removed barriers for patients seeking AUEC. In an organization with an increasing focus on value-based

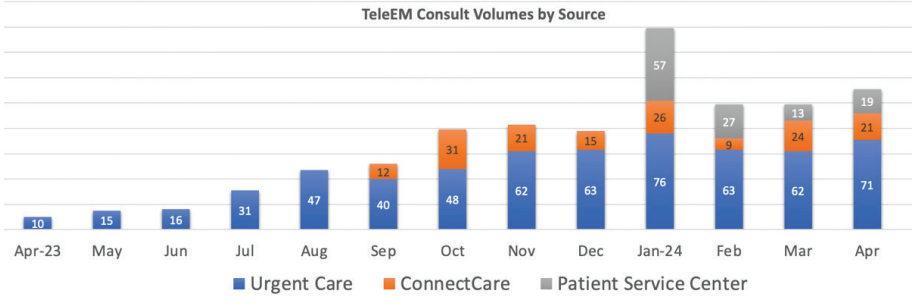

Fig. 3. Entry point referrals to Telehealth Emergency Medicine (TeleEM).

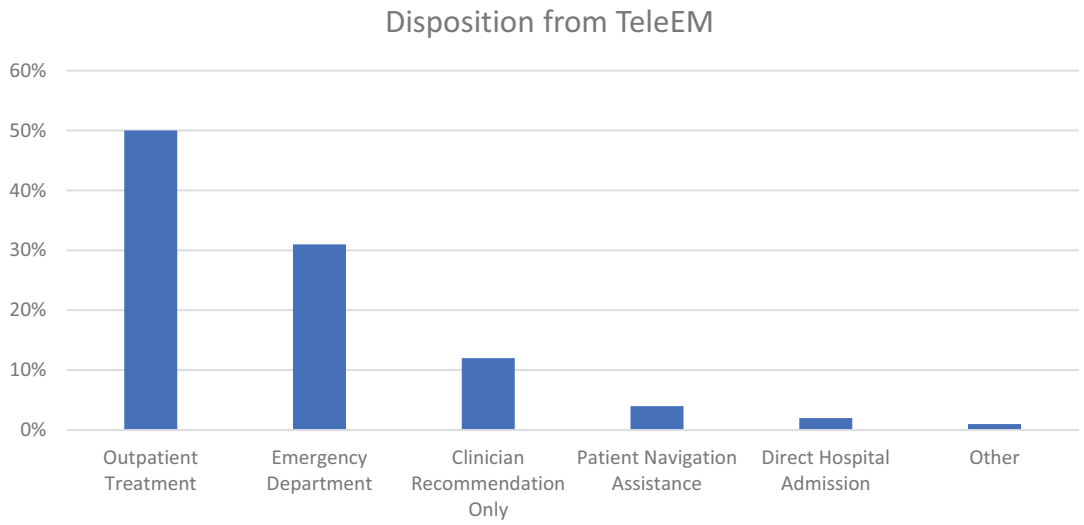

Fig. 4. Disposition of Telehealth Emergency Medicine (TeleEM) patients.

care, TeleEM provides multiple benefits. In addition to cost reduction, tele-emergency medicine can reduce unnecessary ED visits thereby reducing waiting times, boarding, and delays, all with a high level of patient satisfaction.[19] This includes addressing social determinants of health including food insecurity.

Limitations

This study has several limitations. First, it is important to note that implementation of such a program does not come without significant investment. A critical part of the development of TeleEM included the telehealth infrastructure required to interact with referring providers and care for patients. Before the development of the TeleEM program, Intermountain Health had a robust telehealth infrastructure in place. In addition to those resources, informatics and information technology support was critical to the development of TeleEM. Secondly, as mentioned, the preliminary analysis suggested an estimated average avoided medical expense of $1,701 per case to insurers and patients if an ED visit was avoided. The cost per visit is difficult to calculate due to significant variability, and we acknowledge that our case matching was rudimentary. However, we believe this is a reasonable estimate. Furthermore, the savings are only realized to the health system if the health system is also the payer or if the payer does not make payment.

Future Research

While it is challenging to speculate the cost avoidance accurately to the health system, preliminary findings suggest our program has been successful from a financial, effectiveness, and patient-centered perspective. We aim to further scale this to our entire integrated health system and present the findings compared to our prior care delivery process. We hope our findings may eventually serve as a model for other integrated health systems. As healthcare organizations continue to merge and continue the adoption of telehealth, similar programs aiming to reduce unnecessary costs and assist patients with healthcare navigation are likely to develop. Further studies on cost-effectiveness, safety, and sustainability are warranted.

Conclusion

Implementation of a TeleEM program to assist with triage and resource alignment, as well as identification and outpatient management of patients while avoiding an ED visit, is feasible within an integrated health system. Our TeleEM program may be a model for other integrated health systems with value-based payer contracts that can adopt to assist in navigating patients to the appropriate care venue outside the ED. Future studies may focus on comparative outcomes of costs of care, longitudinal clinical outcomes, and patient experience.

Funding

No grant funding was used for the creation of this article.

Conflicts of Interest

No relevant disclosures.

Contributors

Each author contributed equally to the creation, editing, and reviewing of the manuscript. Drs. Douglas, Martinez, Bledsoe, and Smith created the figures and graphs. Dr. Martinez contributed to the formal analysis. Drs. Douglas, Martinez, Bledsoe, and Taylor contributed to the conceptualization. All authors read and agreed to the published version of the manuscript. Authors are those who have contributed substantially to this work.

Data Availability Statement (DAS), Data Sharing, Reproducibility, and Data Repositories.

Internal quality data were used for the development of this manuscript. No publicly available data were used.

Application of AI-Generated Text or Related Technology

None used.

Acknowledgements

The authors acknowledge Intermountain Health for the support of the TeleEM program and to the patients we have had the honor of serving.

References

1. Rice T, Rosenau P, Unruh LY, Barnes AJ. United States: health system review. Health Syst Transit. 2020;22(4):1–441.
2. Centers for Medicare and Medicaid Services. Value-based care [Internet]. Available from: https://www.cms.gov/priorities/innovation/key-concepts/value-based-care#:~:text=Value%2D-based%20care%20is%20a,what%20an%20individual%20values%20most [cited 28 June 2024].
3. Teisberg E, Wallace S, O'Hara S. Defining and implementing value-based health care: a strategic framework. Acad Med. 2020;95(5):682–5. https://doi.org/10.1097/ACM.0000000000003122
4. Lane BH, Mallow PJ, Hooker MB, Hooker E. Trends in United States emergency department visits and associated charges from 2010 to 2016. Am J Emerg Med. 2020;38(8):1576–81. https://doi.org/10.1016/j.ajem.2019.158423
5. Potter J, Watson Gans D, Gardner A, O'Neill J, Watkins C, Husain I. Using virtual emergency medicine clinicians as a health system entry point (virtual first): cross-sectional survey study. J Med Internet Res. 2023;25:e42840. https://doi.org/10.2196/42840
6. Samson L, TW, Turrini G, et al. Assistant Secretary for Planning and Evaulation Office of Health Policy. National survey trends in telehealth use in 2021: disparities in utilization and audio vs. video services.
7. Totten A, Womack DM, McDonagh MS, Davis-O'Reilly C, Griffin JC, Blazina I, et al. AHRQ comparative effectiveness reviews. Improving rural health through telehealth-guided provider-to-provider communication. Rockville, MD: Agency for Healthcare Research and Quality (US); 2022.
8. Sarpourian F, Ahmadi Marzaleh M, Fatemi Aghda SA, Zare Z. Application of telemedicine in the ambulance for stroke patients: a systematic review. Prehosp Disaster Med. 2023;38(6):774–9. https://doi.org/10.1017/S1049023X23006519
9. Edwards G, O'Shea JE. Is telemedicine suitable for remotely supporting non-tertiary units in providing emergency care to unwell newborns? Arch Dis Child. 2023;109(1):5–10. https://doi.org/10.1136/archdischild-2022-325057
10. Mohr NM, Schuette AR, Ullrich F, Mack LJ, DeJong K, Camargo CA, Jr., et al. An economic and health outcome evaluation of telehealth in rural sepsis care: a comparative effectiveness study. J Comp Eff Res. 2022;11(10):703–16. https://doi.org/10.2217/cer-2022-0019
11. Alter N, Arif H, Wright DD, Martinez B, Elkbuli A. Telehealth utilization in trauma care: the effects on emergency department length of stay and associated outcomes. Am Surg. 2023;89(11):4826–34. https://doi.org/10.1177/00031348231173944
12. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. J Biomed Inform. 2009;42(2):377–81. https://doi.org/10.1016/j.jbi.2008.08.010
13. Harris PA, Taylor R, Minor BL, Elliott V, Fernandez M, O'Neal L, et al. The REDCap consortium: building an international community of software platform partners. J Biomed Inform. 2019;95:103208. https://doi.org/10.1016/j.jbi.2019.103208
14. Sikka N, Gross H, Joshi AU, Shaheen E, Baker MJ, Ash A, et al. Defining emergency telehealth. J Telemed Telec. 2021;27(8):527–30. https://doi.org/10.1177/1357633X19891653
15. MacKinney AC, Ward MM, Ullrich F, Ayyagari P, Bell AL, Mueller KJ. The business case for tele-emergency. Telemed J E Health. 2015;21(12):1005–11. https://doi.org/10.1089/tmj.2014.0241
16. Tsou C, Robinson S, Boyd J, Jamieson A, Blakeman R, Yeung J, et al. Effectiveness of telehealth in rural and remote emergency departments: systematic review. J Med Internet Res. 2021;23(11):e30632. https://doi.org/10.2196/30632
17. Mouzoon JL, Lloyd-McLennan A, Marcin JP. Emergency medicine physicians' perceptions of pediatric tele-emergency services. Telemed J E Health. 2020;26(7):955–8. https://doi.org/10.1089/tmj.2019.0121
18. Schröder H, Beckers SK, Borgs C, Rossaint R, Felzen M. [Update tele-emergency medicine: status quo and perspectives]. Die Anaesthesiol. 2023;72(7):506–17. https://doi.org/10.1007/s00101-023-01301-4
19. Kruse CS, Krowski N, Rodriguez B, Tran L, Vela J, Brooks M. Telehealth and patient satisfaction: a systematic review and narrative analysis. BMJ Open. 2017;7(8):e016242. https://doi.org/10.1136/bmjopen-2017-016242

Copyright Ownership: This is an open-access article distributed in accordance with the Creative Commons Attribution Non-Commercial (CC BY-NC 4.0) license, which permits others to distribute, adapt, enhance this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, and the use is non-commercial. See http://creativecommons.org/licenses/by-nc/4.0.