Michigan Emergency Department Leader Attitudes Toward and Experiences With Clinical Pathways to Guide Admission Decisions: A Mixed-methods Study

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ABSTRACT

Objectives: The objective was to characterize emergency department (ED) leader's attitudes toward potentially avoidable admissions and experiences with the use of clinical pathways to guide admission decisions, including the challenges and successes with implementation of these pathways.

Methods: A mixed-methods study of Michigan ED leaders was conducted. First, a cross-sectional Web-based survey was distributed via e-mail to all 135 hospital-based EDs in the state. Descriptive statistics were calculated. Survey participants who provided contact information were considered eligible for follow-up. Semistructured interviews were conducted by telephone until thematic saturation was reached. Interviews were recorded, transcribed verbatim, reviewed for accuracy, and thematically coded. Representative quotes were extracted for reporting.

Results: Survey responses were received from 64 ED leaders (48% eligible response rate). Semistructured interviews were conducted with a purposeful sample of 11 of the 29 representatives willing to be contacted. Eight sites implemented clinical care pathways as a strategy to reduce avoidable admissions. Pathways were developed for high-frequency conditions. Many pathways were multidisciplinary, incorporating case managers and outpatient care providers, which was thought to improve acceptability. Five models of care emerged 1) standardized care, 2) observation medicine, 3) enhanced follow-up, 4) care coordination, and 5) comprehensive programs. We identified barriers to and facilitators of discharging a patient from the ED when an admission otherwise could be avoided. Barriers included limited access to follow-up, lack of care coordination, and lack of trust in patient's ability to provide self-care or navigate the system. Facilitators included strong relationships with outpatient providers, care coordination, and shared decision making.

Conclusions: Potential solutions to help avoid hospitalization from the ED include multidisciplinary clinical care pathways. Successful pathways emerged from bringing stakeholders from the ED, hospital, and health care community together. Additionally, emergency providers need systems and supports in place to help their patients navigate follow-up care in a timely fashion.

Admissions from the emergency department (ED) make up over half of all inpatient hospitalizations,[1] which accounts for one-third of the $3 trillion that the United States spends on health care annually.[2] In addition to being costly, inpatient stays put patients at risk for medical errors, falls, hospital-acquired infections, and development of antibiotic resistance.[3–6] The decision to admit from the ED is complex and a multitude of factors creates wide variation in admission rates across providers, hospitals, and clinical conditions[7–9] with recent reports estimating anywhere from 13% to 26% of all hospitalizations being potentially avoidable.[10,11]

One potential strategy to reduce variation in ED admission practices is with the implementation of clinical pathways.[12] Clinical pathways are evidence-based protocols for specific conditions that aid providers in their treatment decisions.[13] Quantitative analyses have demonstrated that EDs can reduce avoidable admissions by employing clinical pathways.[14,15] Studies have also found that the success of these pathways is increased with an multidisciplinary team approach.[16]

The barriers to and facilitators of successful implementation of clinical pathways in the ED have not been fully elucidated. We therefore designed a mixed-methods study utilizing data obtained from a diverse sample of ED leaders throughout the state of Michigan to understand their opinions of clinical pathways to avoid admission as well as challenges and success with implementation of these pathways.

METHODS

We conducted a mixed-methods study of Michigan ED leaders to understand the scope of the problem related to avoidable admissions and the use of clinical pathways to guide admission decisions. This investigation was performed by the coordinating center of the Michigan Emergency Department Improvement Collaborative (MEDIC) as a needs assessment and environmental scan to inform future work under the Program on Alternatives to Hospitalization (PATH). MEDIC is physician-led and supported through a partnership with Blue Cross Blue Shield of Michigan and Blue Care Network. The collaborative measures

performance relative to evidence-based, consensus-driven, quality goals across several domains to improve outcomes. MEDIC-PATH is a unique quality initiative focused on facilitating alternatives to admission from the ED. MEDIC-PATH partners with hospitals and providers throughout Michigan to support the development, implementation, and evaluation of clinical pathways designed to improve the quality and value of admission decisions made in the ED.

The study began with a cross-sectional Web-based survey that was first distributed in July 2016 via e-mail to the medical director or their designee at all 135 hospital-based EDs in the state of Michigan. The 14-question survey was developed by a team of emergency physicians and health services researchers. Questions explored the use of clinical pathways and protocols for ED care, factors contributing to the decision to admit a patient from the ED, hospital and community resources available to avoid hospitalization, and hospital characteristics including annual ED visits and number of ED beds. Questions were structured with fixed-choice responses and a free-text option for "other" responses and pilot tested for question clarity. The survey remained open for 8 weeks and up to three requests for participation were made to EDs that did not respond to earlier requests to complete the survey. Survey participants were given the option of providing their contact information if they were willing to complete a brief, in-depth follow-up interview. Descriptive statistics were calculated.

For the qualitative aspect of the study, the research team developed a semistructured interview guide with the goal of understanding the perspectives of ED leaders on admissions from the ED and the use of clinical pathways. The interview guide covered the following topics: awareness of avoidable admissions, internal and external influences on the decision to admit a patient from the ED, the status of work related to clinical pathways at their own hospital, and measurement of outcomes for ED care. The semistructured interviews were conducted in fall 2016 via phone by a study investigator (MKZ). Interviewees were identified from a sample of the 29 ED leaders who had indicated in the survey they were willing to be contacted for follow-up. We used purposive sampling to identify

sites to contact for interviews and continued recruitment until thematic saturation was reached.[17] With purposive sampling we sought to ensure a diversity of perspectives from leaders who had indicated on the survey that 1) their site had no clinical pathways, 2) they were unsure of their pathway status, and 3) pathways were in use. We also recruited ED leaders from different regions across the state (e.g., urban, suburban, rural) and with different patient populations (e.g., adult-only, pediatric-only, mixed). We continued to conduct interviews until thematic saturation was reached and no new information was revealed in response to the interview prompts regarding the definition of avoidable admissions, the factors influencing the decision to admit a patient from the ED, and the measurement of outcomes for ED care. Interviews were recorded, transcribed verbatim, and reviewed for accuracy. Transcripts were uploaded into Dedoose Version 7.0.23 and thematically coded.[18] Two members of the study team (MKZ, MLM) reviewed data from the initial interviews to develop a set of preliminary codes. The initial codes were applied to two of the interview transcripts and then reviewed by a six-member team for refinement. Transcripts were then coded by three investigators (MZ, JH, MLM). The larger team met to review the coded transcripts to identify themes and subthemes. Representative quotes of the themes and subthemes were extracted for presentation in the results. This study was considered not regulated as human subjects research by the University of Michigan Institutional Review Board.

RESULTS

Survey Results

Surveys were distributed to leaders of 131 of the 135 hospital-based EDs in Michigan. We were unable to identify a leader to whom we could distribute the survey at four hospitals. The survey was initiated by 64 ED leaders. One respondent was ineligible as their site was not a hospital-affiliated or free-standing ED. The eligible response rate was 48%. Surveys were completed by 54 of the 63 eligible respondents who began the survey (86% completion rate). Respondents were from throughout the state. Ten sites were members or have since become members of the MEDIC collaborative.

Overall site characteristics as obtained through the survey are presented in Table 1. Summary statistics for responses to survey questions about ED admission

Table 1
Characteristics of Surveyed Hospital-based EDs

	Overall		Interview Sites	
	n = 54	%	*n* = 11	%
Annual number of ED visits				
<10,000	11	20	1	10
10,001–40,000	10	19	2	18
40,001–60,000	6	11	4	36
>60,000	6	11	4	36
Unsure/no response	21	39	0	—
Physician employment model				
Hospital employee	11	20	2	18
Physician group	36	67	9	82
Missing	7	13	0	—

decision making are presented in Table 2. There were 31 respondents that indicated "yes" their site had "pathways and protocols to guide admission decisions for specific conditions or specific patient populations," 18 indicated "no," and five were unsure.

Characteristics of Sites Completing Interviews Based on Survey Results

We conducted 11 telephone interviews from the 29 ED leaders who provided their contact information. Eight sites declined interviews and 10 were not contacted. We stopped recruitment when thematic saturation was reached. Nine of the interview participants were physicians in leadership roles (e.g., medical director, service chief) and two were nurse managers. These individuals represented EDs in urban (*n* = 5), suburban (*n* = 3), and rural (*n* = 3) areas. Two of the sites were pediatric EDs. Characteristics of the 11 study sites are presented in Table 3. Sites participating in interviews were more likely to be participating in the MEDIC collaborative at the time of the interviews (six of 11) than sites that declined participation (zero of eight).

Eight sites had indicated in survey responses that they had pathways and protocols to guide admission decisions, two sites did not, and one was unsure. The most common condition-specific pathways were for chest pain, asthma, and cellulitis, which were present at four to five EDs. Pyelonephritis, chronic obstructive pulmonary disease, dehydration, bronchiolitis, and headache pathways were present at two to three EDs. The following condition-specific pathways were in use at one of the EDs: sepsis, pneumonia, atrial fibrillation, deep venous thrombosis (DVT), sickle cell pain, head injury, and hyperemesis.

Table 2
Overall Survey Responses Related to Admission Decision Making

	Overall		Interview Sites	
	n = 54	%	n = 11	%
Groups that influence an emergency provider's admission decision all the time or frequently*				
Care manager	10	18	2	18
Utilization review	18	33	5	46
Social worker	13	24	3	27
Physical therapist	2	4	1	9
ED-based pharmacist	2	4	1	9
PCP	24	44	4	36
Specialist (including hospitalist)	24	44	6	55
Pathways or protocols to guide admission decisions				
Yes	31	58	8	72
No	18	33	2	18
Unsure	5	9	1	9
Admission criteria				
Interqual	37	69	8	72
Milliman	0	—	0	—
Hospital developed	6	11	1	9
Other/unsure	11	20	2	18
Presence of programs or services designed to reduce avoidable inpatient hospital admissions	48	89	11	100
Barriers to connecting ED patients with outpatient services that could obviate the need for inpatient admission*				
Patient/family preference	35	65	9	82
Lack of social support	42	78	9	82
Primary care preferences	23	43	6	55
Specialty provider preferences	34	63	8	73
Time required for service coordination	40	74	10	91
Lack of support for ED discharge planning	34	63	10	91
Lack of timely outpatient primary care follow-up	39	72	10	91
Lack of timely outpatient specialty care follow-up	45	83	10	91
Limitations to home care service availability	17	31	5	45
Lack of nursing home capacity	22	41	4	36

PCP = primary care physician.
*Percentages do not total to 100 because respondents could select all that apply to these question.

Roughly half of respondents indicated that emergency care providers at their site always or frequently involved specialists (n = 6) and primary care providers (PCPs; n = 4) when making an admission decision. Other health care workers involved in admission decision making included utilization review specialists (n = 5), social workers (n = 3), care managers (n = 2), pharmacists (n = 1), and physical therapists (n = 1). However, available resources varied across EDs with two EDs reporting use of none of these resources when making the decision to admit a patient.

The majority of respondents (n = 10) selected four reasons for admitting a patient who could otherwise be discharged: 1) time required for service coordination, 2) lack of support for ED discharge planning, 3)

lack of timely outpatient PCP follow-up, and 4) lack of timely outpatient specialty care. Preference for admission from family or other health care providers and lack of social support for the patient were also cited as factors contributing to avoidable hospitalizations (n = 9 for both). Limited home care service availability and lack of nursing home capacity were thought of as barriers to some EDs but not the majority (n = 5 and n = 4, respectively).

Interview Results

Four main themes were identified in the analysis of the transcribed interviews: 1) a common definition of avoidable admissions, 2) ED-based pathways and protocols can be used to avoid hospitalization, 3)

navigating outpatient care as a barrier to avoiding admission, and 4) ED data tracking—time is of the essence. Within the "pathways and protocols" theme we identified five subthemes around different models of care used to avoid hospitalization: 1) standardized care, 2) observation medicine, 3) enhanced outpatient follow-up, 4) care coordination, and 5) comprehensive programs. Analyses of barriers and facilitators revealed six subthemes that are described below in detail.

Definition of Avoidable Admissions

The interviews began by asking participants to define avoidable admissions and it was readily apparent that respondents shared common definitions. One participant noted, "an avoidable admission would be where you could accomplish the goals for that patient's medical condition outside of the hospital." Other participants similarly defined an avoidable admission as a "patient who could've been safely treated outside of the hospital." Addressing ways to decrease avoidable admissions was universally thought of as being very important. Reasons given were that "the hospital's certainly not the safest place to be," "our inpatient capacity is constrained and limited," and "it's an expensive resource." When asked for examples of an avoidable admission, many participants described a situation in which the resources needed to treat the patient exist in an outpatient setting but could not be reliably obtained. Emergency care providers are hesitant to discharge a patient who they feel is unlikely to obtain a follow-up appointment. Additionally, while access to an outpatient provider is crucial, equally important is the timeliness of the follow-up appointment.

Table 3
Site Characteristics by Survey Responses

Number of ED Beds	Setting Patient Population	Annual Visits (Adult/Child)	Clinical Pathways	Programs to Prevent Avoidable Admissions	ED-based Observation Beds
87	Suburban Adult	77,582/0	Hyperemesis, pneumonia, asthma, atrial fibrillation, cellulitis, chest pain, pyelonephritis	Community paramedicine, home health care, observation unit(s), extended care facility	0
60	Urban Mixed	65,000/37,000	Asthma, bronchiolitis, cellulitis, chest pain, COPD, dehydration, pyelonephritis	Wound care, home health care, observation unit(s), extended care facility	12
60	Urban Adult	84,300/0	Chest pain	ED follow-up clinic observation unit(s)	27
50	Urban Children's	1,900/84,900	Other: sickle cell pain	Observation units, rapid subspecialist consultant follow-up program, other: telemedicine capabilities (not used)	0
45	Urban Adult	43,000/300	Other: DVT	Home health care, observation unit(s), other: rapid follow-up with OB/GYN and neurology only	16
42	Rural/suburban Mixed	47,000/10,000	None	Wound care, home health care, observation unit(s), extended care facility, same day/next day access to primary care	20
34	Rural/suburban Mixed	42,551/7,129	Asthma, cellulitis, chest pain, COPD, dehydration, headache, pyelonephritis	Wound care, home health care, observation unit(s), extended care facility, ED-based procedures (e.g., infusions, PICC line placement)	6
33	Suburban Children's	0/26,827	Asthma, bronchiolitis, cellulitis, dehydration, head injury, headache, pyelonephritis	Community paramedicine, home health care, observation unit(s)	0
32	Urban/suburban Mixed	50,000/8,000	Asthma, chest pain, COPD, other: sepsis	Home health care, observation unit(s), same-day/next-day access to primary care	0
13	Rural Mixed	8,610/1,505	None	Wound care, home health care, extended care facility	0
5	Rural Mixed	4,200/1,750	None	Observation unit(s)	0

Pathways and Protocols to Avoid Hospitalization

Respondents were also asked to share information about the use of pathways and protocols in their ED to guide admission decisions for specific conditions or specific patient populations. We also explored ED leader's awareness of local or community-based efforts to facilitate care outside of the hospital. Efficiency was emphasized as important by many leaders who worked at sites with standardized processes of care. One participant shared: "In the ED, it's all about time, tryin' to get people through quick. When the nurse triages the patient, they can do the protocol … Sometimes, by the time the doctor gets in the room, the lab and x-rays and stuff are already done."

Table 4 summarizes the five models of care that emerged from the interviews. Standardized care was most commonly referenced across sites in all settings and patient populations. Standardized care was frequently tied to specific conditions such as chest pain. Scoring systems were viewed as helpful to providers, "I've not had feedback from any of my providers that they feel their hands are tied because of these … more than anything it provides them coverage that if they follow these and there's an unexpected outcome" but recognized as having limitations, "We're working with radiology now about who needs scans for possible P.E.s and just using grading scales with the knowledge that they're not foolproof."

Most sites have been thinking beyond protocols that facilitate the completion of tests and many participants noted that their institution had successfully implemented clinical care pathways as a strategy to reduce the number of avoidable admissions with favorable outcomes. Observation medicine and observation unit care was the second model, also present in EDs

Table 4
Models for Avoiding Admissions from the ED

Models	Description	Setting Patient Population(s)
Standardized care	Protocols with standardized care plans and evidence-based guidance for providers. Examples include protocols for rapid rule out of myocardial infarction—including Heart Scores, TIMI scores. Grading scales to determine appropriate patients to scan for possible PE were being developed by ED providers with input from radiologists.	Urban, suburban Adult, children's, mixed
Observation medicine	Observation medicine and observation protocols were used to standardize care in patients whom ED providers are not comfortable discharging immediately. The vast majority of these patients can be safely discharged in 18–23 hr. One site provides "amenity packs" with personal care items for patients and families to make their stay more comfortable.	Urban, suburban Adult, children's, mixed
Enhance outpatient follow-up	One site had a policy in place that all outpatient faculty members who take call agree to see patients from the ED at least once. Another site had a grant-funded "Gateway Clinic" within the ED. This clinic provided a safety net for patients who do not have an outpatient provider. One site placed a phone in its lobby that dials directly to the call center so that patients can coordinate follow-up appointments, without having to waste minutes on their prepaid cell phones being placed on hold. Rapid follow-up programs for surgery (gallbladder disease, kidney stones) and direct scheduling of follow-up appointments by ED providers for subspecialty clinics (concussion clinic, neurology clinic, GI clinic) were in place at two sites.	Urban, rural Adult, mixed
Care coordination	Two sites made mention of the PACE program for complex care management. One site utilized a visiting nurse program for chronic disease management among patients with asthma. The health system at one site owned a home care agency owned and hired a dedicated, master's-trained nurse who targeted efforts toward assisting individuals who have more than 10 ED visits in 1 month. This site also had a communication process in place to reduce ED utilization among patients who were enrolled in hospice.	Suburban Adult, children's, mixed
Comprehensive programs	Two sites had developed protocols for DVT patients with goals of avoiding "observation admissions" by initiating oral anticoagulants. One site filled a 30-day prescription for the patient but this services was only available only when the outpatient pharmacy was open. One site had implemented protocol driven management of atrial fibrillation with follow-up in dedicated clinic spots reserved for ED patients so that the patients can be discharged rather than admitted. One site had recently established a pulmonary rehabilitation program for COPD patients discharged from the hospital. This program includes frequent calls to check on patients after discharge. During the calls, patients are encouraged to be compliant with medications and follow-up visits. This program is being considered for ED patients.	Urban, suburban Adult, mixed

COPD = chronic obstructive pulmonary disease; DVT = deep venous thrombosis; PE = pulmonary embolism; TIMI = Thrombosis in Myocardial Infarction.

from each setting and patient population. Providers made a distinction between observation medicine, 18 to 23 hours of care delivered in the ED, and "observation admissions" that often utilized inpatient resources. ED leaders identified systems to enhance outpatient follow-up as a mechanism to avoid unnecessary admissions, providing examples of a range of services in place to assist patients in ensuring timely outpatient follow-up. Care coordination models included more active management of patients with chronic or complex medical conditions in the outpatient setting with mechanisms to minimize reliance on the ED. Finally, two site leaders briefly mentioned their experience with more comprehensive programs, one for patients with DVT and one for patients with atrial fibrillation. These comprehensive programs included identification of patient needs in the ED, connections to prescription medications, and follow-up in specific subspecialty clinic slots set aside for ED patients. Care coordination and comprehensive programs in EDs were limited by access resources (e.g., case managers, pharmacists). For example, care coordinators were "available 8:00 to 5:00 and Monday through Friday. They're great when they're available, but most of the patients we see, and most complex-care patients, don't come in 8:00 to 5:00." As another example, a comprehensive DVT protocol to ensure patients could be discharged with a 30-day supply of oral anticoagulant medication was not accessible to all patients, "We're only able to do it when the pharmacy's open. It's basically extended banker hours."

Two site leaders spoke about pathways and protocols that were still being developed and cited difficulty obtaining complete buy in from all the stakeholders necessary to implement a new pathway. One site was considering the adaptation and adoption of a pulmonary rehabilitation program that was currently accessible only to chronic obstructive pulmonary disease patients who were admitted to the hospital. Participants mentioned the need for support from a variety of perspectives to create a successful pathway. Stakeholders included the ED providers, nurses, administrators, surgery consultants, radiologists, other specialists, pharmacists, and social workers. Some EDs found success using a multidisciplinary approach in creating the pathways while other EDs created the pathway themselves and then relayed the information to the other disciplines involved. Determining what support is needed is dictated by the specific clinical care pathway and the resources available to the ED and institution.

Barriers and Facilitators for Avoiding Admission

An avoidable admission is composed of individual patient and provider factors; "Each patient is different, and each provider has their own limits, too." There were three subthemes that emerged as barriers to discharging patients from the ED when admission could be avoidable: 1) inadequate follow-up with PCPs and subspecialists; 2) lack of coordination of care; and 3) lack of trust in patient's ability to provide self-care or navigate the system, including concerns for patient safety (Table 5). Facilitators for avoiding admissions included 1) strong relationships between the ED and PCPs or subspecialists, 2) mechanisms for care coordination, and 3) shared decision making (Table 5). Most respondents expressed sentiments that patients coming to the ED cannot wait weeks for a follow-up appointment. To combat this issue, some EDs have developed relationships with local PCPs and specialists. Other EDs have partnered with home health care programs such as Visiting Nurses to ensure adequate follow-up.

Participants expressed concerns that arise from trying to navigate their patients through the complex health care system. To help clinicians and patients with care coordination, some EDs employed case managers. Case managers are knowledgeable about health care alternatives that can keep patients out of the hospital. They also may have more time available than emergency clinicians to ensure that proper follow-up appointments are made. By including case managers in the decision-making process, some EDs have been able to decrease the number of avoidable admissions.

Another factor that participants commonly said weighs into their admission decision making is the social situation of their patients. This includes components such as transportation, family support, and education status. The patient's family context played an especially big role in both pediatric and elderly populations. One participant noted, "we will frequently admit people who—very commonly, elderly patients that live by themselves."

ED Data Tracking: Time Is of the Essence

Few sites were tracking ED data that related to avoidable admissions. This lack of measurement of avoidable admissions may hinder progress in this arena. Only one site reported a measure related to avoidable admissions: "We do look at one-day length of stays as potentially avoidable and have looked at that group

Table 5
Barriers Contributing to Avoidable Admissions and Facilitators of ED Discharge

Subtheme	Representative Quote
Barriers	
Inadequate access to outpatient providers	I think [relationships with PCPs are] vital … the [ED] physicians don't like to send patients out into the abyss. If they have somebody, at least a lifeline, that they know will follow up, it certainly decreases their angst.
	… if I can contact a physician, and he can get an outpatient stress test done the next day, or very shortly done, versus if he doesn't have one, then most physicians will admit to the hospital to have it done during that stay.
Lack of coordination of care	I think the thing that constrains us the most is outpatient follow-up … it's both outpatient follow-up and somebody shepherding the patient's care as an outpatient … even when there is a PCP … it's just very difficult … to coordinate the care of the patient.
Lack of trust in patient's ability to manage self-care or navigate the system	I guess refer to the patient's track record, if you will. If they seem to have poor insight into their health conditions or the importance of follow-up, or maybe they've already proven that they can't follow up. … I would be less likely to let that person go home … cause they obviously couldn't figure it out … whether it's lack of understanding, or motivation or access.
	A lot of [reasons to admit] are going to be an ability to care for a spouse or whatever at home, just overwhelmed with their type of care that they're going to need.
Facilitators	
Multidisciplinary teams	We'll take it to our system ED meeting … Then that goes through patient safety and quality … if there's any pharmacy or nutrition info on there, then it goes through them. If there's any other pieces, like if it's a stroke protocol, it'll also go to neuroscience PI. Many hands and eyes are on it before it actually gets placed.
	Care coordinators and case workers in the ED to help save us from potential unavoidable admissions, where we can ensure prompt follow-up.
Strong relationships with outpatient providers—PCPs and subspecialists	We have the backdoor number. When patients come the ED, and were discharged, we make sure they all have a PCP and they all have an appointment.
	We have a great situation here with the [heart failure] clinic that they, number one, are taking care of patients before they come to the ED. Then, number two, if they end up here and we can augment, give a little extra Lasix. Then they have a very fine, defined follow-up … It's very regimented and very dependable, A lot of these people that we used to admit for some IV diuretics overnight sometimes just need a little reassurance, need a little assistance, and then a real strong follow-up.
Shared decision making	Depending upon what the presentation is, if you are planning either admission or a discharge, we always involve that particular subspecialty and then in consultation with them how we make a decision all together—we, the E.D., family and subspecialty attending and decide, okay, does the child need to be admitted? Or he or she can go home?
	I think we need to be able to know who needs to be admitted, not just do the shot gun. Say, "Hey, you're not feeling good. Let's get you admitted to the hospital." "Well, maybe [putting you in the hospital is] not the best thing to be doing for this." Many times, I'm tellin' people, "You don't wanna be here. You could get sick being here." Things like that.

several times to see if there are some common things that we think we might be able to do." The data that were tracked in EDs primarily focused on efficiency of care. Specific data elements that were tracked across sites included length of stay; time of treatment for conditions such as stroke, myocardial infarction, and long-bone fractures; and return visits with and without admission. One site also mentioned patient satisfaction as a data point that is tracked.

DISCUSSION

Decreasing avoidable admissions has the potential to greatly improve patient safety and decrease health care costs. One strategy EDs are using to address this problem is the implementation of clinical care pathways. In the context of this study, clinical care pathways were defined as formalized care pathways or protocols that support emergency care providers to discharge patients home when they otherwise would have been admitted. Out of the discussion of pathways and protocols, five models of care emerged. ED leaders who were interviewed for this study had generally favorable views of the potential benefit to successfully implemented pathways. From analysis of these interviews, we found key elements that can be used to guide pathway development. First, ED leaders should identify patient populations whose health care needs can be managed with available outpatient resources. Second, successful pathways emerge from bringing stakeholders from ED, hospital, and the health care community together. Third, emergency providers need systems and supports to help their patients navigate follow-up care in a timely fashion. Fourth, the tracking of data related to

pathway use will resonate with current metrics if it includes a time element but should also ensure patient safety.

For EDs planning on implementing care pathways, careful thought is necessary to determine which pathway to create. One potential strategy is to focus efforts on creating pathways that yield the highest number of admissions from the ED. In 2011, asthma caused the greatest number of admissions in the 1- to 17-year-old age group.[19] Among our cohort, asthma, chest pain, and cellulitis were among the most common pathways in use. However, an asthma pathway was present in only one of the two responding pediatric EDs, where it has the potential to make the biggest impact. Data collection specific to avoidable admissions was not common among the sites we interviewed but one ED identified 1-day length of stay admissions as a potential target for pathway development. This approach may prove fruitful at other institutions that are taking first looks at their patient population to determine conditions to target for pathway development.

However, based on interviews, we found the success of a pathway relies heavily on garnering support from stakeholders within and outside of the hospital ED. This includes ED providers, nurses, and administrators, but can also extend to include other disciplines such as pharmacists, social work, and specialists. Although it can take longer to implement a pathway when different health care workers are involved, creating a pathway that uses a multidisciplinary team appears to be a successful strategy. This is evidenced by many of the pathways described by our participants. Examples include an internal partnership with pharmacists in a DVT protocol and the external partnership with cardiologists for a heart failure protocol. Our interviews support the findings of a systemic review that found that multidisciplinary teams are a key component to a successful pathway.[16]

In addition to care pathways, our participants discussed other strategies they use, or would like to use, to help decrease avoidable admissions. The most prominent issue was ensuring follow-up care. This was primarily due to either lack of availability or failure to navigate the health care system. This is similar to the findings of a study with PCPs in which avoidable admissions were most often attributed to system-level causes.[20] One potential solution is the use of case managers. Some of the sites interviewed have already started using them while others mentioned the need for a position that coordinates the patient's follow-up care. Use of

clinical case management has been shown to decrease hospital use and costs.[21,22] Another method to navigate the complex system-level causes of avoidable hospitalization is to partner with outside resources that provide ED follow-up care. Potential partnerships include home health care services, specialists, and PCPs. This solution is a bit more complicated as it requires identifying an external resource willing to join a partnership. However, some of the individuals interviewed had been able to reduce avoidable admissions by successfully using this method in their EDs.

Efforts to create alternatives to hospitalization would be accelerated by access to data that would allow sites to identify populations with greatest potential to safely avoid hospitalization. The tracking of data in EDs was largely based on time to an event and tied to external quality reporting measures such as door-to-thrombolytic time for stroke or door-to-balloon time for ST-elevation myocardial infarction. Few sites were engaged in efforts to define or track appropriateness of admissions or what occurred to patients after they left the ED through discharge home or admission to the hospital.

LIMITATIONS

This study has several limitations. First, the original survey from which the qualitative interview population was derived was subject to a response rate less than 50%, which is not uncommon for surveys of health care professionals but may indicate response bias. Individuals responding to our survey may have strong feelings about the topic of alternatives to hospitalization and the role of the ED in such efforts. Second, our sample size for the interviews is small. However, we ensured a diversity of perspectives from a range of Michigan EDs including those in urban and rural areas across the state as well as children's hospital and general EDs. In addition, we had thematic saturation around the definition of avoidable hospitalizations and challenges with care coordination from the ED. Third, our findings were drawn from a sample of physician and nursing leaders of EDs in Michigan. Their experiences and opinions may not be generalizable to the other providers working in their settings or to other EDs throughout Michigan and the nation. Finally, our study was exploratory and not designed to gather detailed information about each pathway and protocol that was in place at study sites. Future work to gather structured data about pathways and protocols will allow for the creation of templates for more EDs to

implement similar work based on their patient populations and available resources.

CONCLUSIONS

Many commonalities exist between a diverse sample of EDs regarding the definition and causes of avoidable admissions. ED providers have limited capacity to coordinate care beyond the ED and are concerned about the ability of their patients to navigate a fragmented outpatient care system. Potential solutions to help avoid hospitalization from the ED include multidisciplinary clinical care pathways, case management, and defined arrangements for follow-up care with generalists and specialists. By utilizing these methods, EDs may be able to decrease health care costs caused by avoidable admissions without sacrificing patient safety.

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