"No Diversion": A Qualitative Study of Emergency Medicine Leaders in Boston, MA, and the Effects of a Statewide Diversion Ban Policy

Shannon D. O'Keefe, MD; Salma Bibi, MPH; Julia E. Rubin-Smith, MSPH; James Feldman, MD, MPH*

*Corresponding Author. E-mail: jfeldma@bu.edu.

Study objective: We examine the attitudes of emergency department (ED) key informants about the perceived effects of a statewide ban on ambulance diversion on patients, providers, and working relationships in a large urban emergency medical system.

Methods: We performed a qualitative study to examine the effects of a diversion ban on Boston area hospitals. Key informants at each site completed semistructured interviews that explored relevant domains pre- and postban. Interviews were deidentified, transcribed, coded, and analyzed with grounded theory for emerging themes. We identified important themes focused on patient safety, quality of care, and relationships before and after implementation of the diversion ban.

Results: Nine of 9 eligible sites participated. Eighteen interviews were completed: 7 MD ED directors, 2 MD designees, and 9 registered nurse leaders. Although most participants had negative opinions about diversion, some had considered diversion a useful procedure. Key themes associated with diversion were adverse effects on patient care quality, patient satisfaction, and a source of conflict among ED staff and with emergency medical services (EMS). All key informants described some positive effect of the ban, including those who reported that the ban had no direct effect on their individual hospital. Although the period preceding the ban was reported to be a source of apprehension about its effects, most key informants believed the ban had improved quality of care and relationships between hospital staff and EMS.

Conclusion: Key informants considered the diversion ban to have had a favorable effect on emergency medical care in Boston. These results may inform the discussion in other states considering a diversion ban. [Ann Emerg Med. 2014;63:589-597.]

Please see page 590 for the Editor's Capsule Summary of this article.

A **feedback** survey is available with each research article published on the Web at www.annemergmed.com.
A **podcast** for this article is available at www.annemergmed.com.

SEE EDITORIAL, P. 598.

INTRODUCTION

Background

Since its initiation in the early 1980s, ambulance diversion has been used with increasing frequency nationwide. The American Hospital Association indicated that half of all hospitals and almost 70% of urban hospitals used ambulance diversion in 2004.[1] Emergency departments (EDs) in Boston, MA, mirrored this nationwide trend, collectively spending 2,855 hours on diversion in 2007 (a 6-fold increase in the number of hours spent on diversion in 1997).[2] During a 2-hour period, only trauma patients, those who refused to be diverted, and those deemed too unstable to divert were delivered by ambulance while "on diversion." The rules governing diversion in Boston have been described.[3,4]

A coalition developed a series of initiatives to address ambulance diversion and ED crowding in Massachusetts, beginning in the 1990s. In 2002, all hospitals were required to submit a plan with a "Code Help" policy that included procedures to deal with ED diversion and crowding (Appendix E1, available online at http://www.annemergmed.com). After limited results from years of effort, emergency physicians and the Massachusetts Department of Public Health pursued an initiative to end ambulance diversion statewide.

On January 1, 2009, the Massachusetts Department of Public Health initiated a directive effectively banning the practice of ambulance diversion, making it the first state in the country to enact such a policy. Although some areas of Massachusetts had implemented a voluntary ban on ambulance diversion before the statewide policy, and the city of Boston conducted a 2-week experiment prohibiting ambulance

Editor's Capsule Summary

What is already known on this topic

Hospitals often consider emergency department (ED) diversion to manage demand/resource mismatch, but some regions limit that ability because of concerns about overall patient safety.

What question this study addressed

What happens to care and interactions when a region limits ED diversions?

What this study adds to our knowledge

Using a structured, qualitative study design with key personnel from 9 Boston EDs, the authors noted that participants perceived improvements in care, safety, and emergency medical services to ED interactions after institution of a diversion limitation policy. Despite some antecedent fears, no consistent themes of site or patient harm were voiced.

How this is relevant to clinical practice

Key personnel at these hospitals believe that limiting ED diversion improved care without harm to hospitals or patients.

diversion in 2006,[3] before the ban, diversion had remained a common practice.

Importance

Several recent studies suggest that not only is the practice of ambulance diversion not useful in alleviating the crowded conditions it was intended to mitigate but also it adversely affects patients with time-sensitive needs such as acute myocardial infarction and trauma.[5,6] The Institute of Medicine suggested that ambulance diversion "should be eliminated except in the most extreme circumstances, such as a community mass-casualty event."[7]

To our knowledge, ours is the first study that investigates the attitudes and beliefs surrounding this landmark event.

Goals of This Investigation

We examined the attitudes of ED leaders about the perceived effects of ambulance diversion and the ban on patients, providers, and key relationships (hospital staff, hospitals, and emergency medical services [EMS]).

MATERIALS AND METHODS

Study Design

This is a qualitative study guided by the principles of grounded theory, using key informant interviews to explore how ED leadership (MD, RN) viewed ambulance diversion and the ban. We developed a semistructured interview guide that included questions about ambulance diversion, preparation for the ban, and the expected effects of the diversion ban (Appendix E2, available online at http://www.annemergmed.com). The interview guide was piloted for content and comprehension. The Boston University Medical Center institutional review board approved the protocol and all participants provided written informed consent.

Setting

We studied a single large metropolitan area in Massachusetts. Eligible sites were selected from among the members of the Conference of Boston Teaching Hospitals, which is a coalition of 14 Boston-area teaching hospitals that represents the largest emergency services system of care in Massachusetts and the region in which ambulance diversion was most prevalent before the ban. All hospitals in Boston that receive 911 transports are teaching hospitals and were included (Table 1).

Selection of Participants and Data Collection and Processing

ED directors/chairs and ED nurse managers were eligible for the study. Selected key informants were allowed to designate an alternate individual who had participated in the implementation of the ban in a leadership role. We conducted interviews in person between February and May of 2011.

Primary Data Analysis

Interviews were transcribed, coded, and analyzed with NVivo (version 9.2).[8] All identifying data were redacted from the transcripts. Thematic content analysis consistent with grounded theory was used to identify key themes.[9] The constant comparative method was used to generate theory from the data

Table 1. Study site characteristics 2009.*

Out-of-Hospital Care Provider:Boston Emergency Medical Services	
Catchment area	45.7 square miles
Population	589,000 residents
	1,000,000 daytime
911 calls	100,000/year
Responses	140,000/year
Transports	78,000

911 Receiving hospitals	Outpatient ED volume 2009[†]
Beth Israel Medical Center East Campus	27,901
Boston Medical Center	106,937
Brigham and Women's	37,517
Caritas Carney	24,453
Children's	48,889
Faulkner	20,289
Massachusetts General Hospital	63,414
Tufts Medical Center	32,336
Caritas St. Elizabeth's	21,176

*Region: City of Boston.
[†]Bureau of Health Care Safety and Quality, Massachusetts Department of Public Health.

and to ensure that the thematic analysis represented all perspectives[9] (Appendix E3, available online at http://www.annemergmed.com). We organized our analysis into periods: diversion, preparing for the ban, and after the diversion ban.

RESULTS

We conducted a total of 18 interviews (9 MD and 9 RN leaders) with all eligible sites participating. One site did not have an RN leader at the ban, and one site indicated that 2 RN leaders had served in leadership roles during the implementation of the diversion ban. Seven of the MD leaders were physician directors, whereas 2 were designees. We analyzed key informants' observations about the attitudes of other members of their institutions toward diversion and the ban (eg, hospital administration, members of the medical staff) and the key informant's own recommendations for other systems or states that might consider implementing a diversion ban policy.

We developed a conceptual model that organized the key informants' observations and experiences with ambulance diversion and attitudes toward the effect of the ban by time periods (Figure). The model captures the construct that key informants' opinions about the effects of the ban were framed by his/her experiences with diversion and preparation for the ban on patients, safety and inter and intra-hospital relationships and that the ban also affected these domains. A more complex model (Figure E1, available online at http://www.annemergmed.com) captures the complex web of relationships (ED, hospital, EMS, inter-hospital etc) linked by thematic coding. Illustrative quotes for each major theme that was identified for each of these periods are presented in Table 2, whereas more complete quotations that supported the thematic coding and detailed recommendations for other states considering a ban are in Appendix E4, available online at http://www.annemergmed.com.

Two participants reported that their site had never gone on diversion unless there was a "code black" (site disaster). A minority of key informants reported positive attitudes toward the use of diversion, indicating that period when an ED was on

diversion could function as a safety valve in the setting of an influx of high-acuity patients. However, the majority of key informants indicated that ambulance diversion was not considered to be an effective strategy for managing crowded conditions in the ED. We identified several major themes that indicated that key informants thought diversion adversely affected patients, was a source of conflict among many emergency care providers, contributed to provider dissatisfaction and turnover, and was used mainly as a "psychological crutch."

Participants vividly captured the conflict that ambulance diversion caused, particularly between ED providers and EMS staff, between emergency physicians and nurses, and between hospitals. Some informants indicated that ED staff viewed not going on diversion as a "badge of honor" and exemplary of their hard work, whereas others perceived going on diversion as a "failure." The most commonly recognized disagreement occurred between physicians and nurses in the ED, surrounding the decision of when to go on diversion. Both RN and MD leaders identified the ED nurses as more frequently requesting diversion, whereas the physicians viewed going on diversion as less favorable. Key informants also noted a sense of anger and frustration from ED staff when EMS would bring a patient to an ED that was on diversion, and that was sometimes communicated to EMS providers through unpleasant interactions such as "glares and the daggers," resulting in "the poor patient sitting on the stretcher not really sure, should I be happy to be here or not?" Many key informants noted that there was an interaction between hospitals within the city that was described as a form of "gamesmanship," in which requesting diversion was "like a pawn" placed to prevent one site from being overwhelmed or to force other institutions to have to come off diversion. Multiple key informants commented about their perception of use patterns and that there tended to be certain hospitals that used diversion more frequently than others (Table 2).

One of the major observations about key informants' attitudes toward diversion was that they did not consider it to be an effective strategy. It was more of a "psychological crutch" that was used during periods of crowding, though it had little effect on patient flow. They commented that during times of heavy volume in the ED, some staff would begin asking to go on diversion because they believed it would give them time to regroup and break the cycle of ambulance arrivals. Paradoxically, most participants believed that it prevented the arrival of only a very narrow subset of patients during the 2-hour period that each hospital was allotted. Yet many reported calling diversion in times of crowded conditions because there was a sense that it was the only thing that was left to do to try to improve the situation or reassure stressed staff that everything had been done to try to ameliorate the situation (see Appendix E4, available online at http://www.annemergmed.com).

Despite its widespread use, the majority of participants thought that the use of diversion was demoralizing and that turning away patients fundamentally opposed the principles of emergency care: "to take care of anybody who comes through the door." Key informants indicated that this caused higher staff turnover, low morale, and dissatisfaction among all providers,
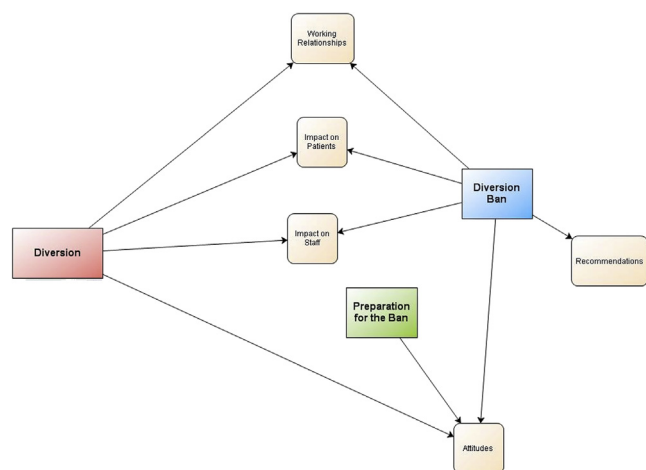

Figure. Model of overarching themes.

Table 2. Summary of major themes within the 3 distinct periods: diversion, prediversion ban, diversion ban.

Factor	Explanation	Exemplary quote
Diversion period		
Low provider morale/guilt	Providers felt bad about inability to provide quality care and having to turn patients away	They hated it. They hated going on diversion. I mean I think the mentality of any emergency department is that your doors are open—you want to take care of anybody who comes through the door, and the fact that you would shut your doors and turn people away is just abhorred by everybody. It's a tragedy. It's a travesty. It's terrible.
Provider turnover	Low morale contributed to significant staff turnover, and diversion was sometimes used to try to alleviate	If you torture your nurses sufficiently, then they leave. If your nurses leave, your problem exacerbates. Frankly, the long-term effect was protecting nurses so they stayed at their posts…so their morale wasn't totally destroyed.
Psychological crutch	Diversion not actually effective at alleviating crowding but thought to be a last-ditch effort; effects were mostly psychological	It would sort of give people that sense that, OK, we were on diversion, we've done all we can…but it didn't really have a tremendous impact other than sort of psychologically.
Breather	Sense that going on diversion gave people a chance to catch up	It's giving us a break. They feel a relief that we've got a break for an hour and we can catch up. I think that was the biggest part of the mentality of diversion.
Stress	Other hospitals going on diversion caused increased stress because people knew it would be getting busy	It would increase your stress. It would increase your anxiety. You know, you would just begin to feel that tension because you knew what was going to happen. You knew that you'd be running around.
Conflict	Disagreement and arguments on many levels arising from decisions surrounding diversion (ED staff, EMS, administration)	[There was] animosity between the ED staff and EMS, which didn't need to happen. The patient coming through, and the glares and the daggers of "don't you know we're on diversion?" And the poor patient sitting on the stretcher not really sure, should I be happy to be here or not?
Dissatisfaction	Patients did not like ending up at the wrong medical home or advocating heavily to be taken to an ED that was on diversion	Well, I think that diversion, even having it happen in just a personal sense, is very disconcerting. People worry about whether they'll get the right records if they can't go to the hospital they're used to. I think they're worried about time, if they had to go out of their way, whether they needed it or not.… So I think diversion is certainly a dissatisfier from the patient's point of view.
Safety	Adverse outcomes associated with diversion	I remember one case. It was a patient at…one of our community centers. He was having an acute MI. They called an ambulance and said, "We are going to send to you [name redacted]," and they said "Oh, [it] is on diversion," and he said, "I don't care. I am going to walk out of here." He drove in his car to the parking lot and came into triage and said, "I am having an acute MI and here is my EKG." That is a true story.
Wrong medical home	Patients (particularly with complex medical histories) who ended up at a different facility than where their medical records and physicians were	I mean from the patients who may be known patients to other facilities or other institutions that needed to come here simply because their hospital couldn't take them, it was definitely a dissatisfier. Their level of comfort was very different, their providers aren't here…and they're already in an emergent situation so their anxiety level is already up. It made for a worse experience because they…didn't want to come here. And the same for probably our patients who were sent to other institutions, and I think medical records [are] a huge part of that. Especially if people were coming in without family, or were unable to give their full histories or medications…that was just a very scary thing for people to go through.

Table 2. Continued.

Factor	Explanation	Exemplary quote
Not effective	Idea that diversion was really just a temporary solution for the real issues of boarding and crowding and affected only a narrow subset of patient arrivals to the ED	We all knew that boarding was really the issue, that ambulance diversion was really just a Band-Aid, just a symptom of the underlying problem.
Gamesmanship	Hospitals would frequently ask for diversion to protect themselves from becoming too busy or to make other hospitals come off diversion	It was gamesmanship. I think other hospitals would go on diversion to prevent the influx of patients they might get if they were open, or basically as a chess game in a lot of instances. You were putting a pawn out to protect your institution from getting bombarded with patients.
Lack of staffing control	Diversion made patient flow within the city unpredictable, and it was difficult to have adequate physician and nursing staffing to manage the influx	When other hospitals were going on divert, it would impact us because we would start getting boluses of patients. So our best efforts to manage flow and capacity weren't within our normal controls…. [It] would impact us greatly with staffing numbers and staffing patterns.
Lack of support from hospital administration	Hospital administrators did not like diversion; however, they frequently took little ownership of ED crowding as a hospital issue	I think, perversely, having diversion sort of allowed the rest of the hospital to believe that they didn't really have to solve the overcrowding problem because they said, "Well, just go on diversion. If we're at 105% capacity, the ED just goes on diversion and that will solve the problem."
Prediversion ban period		
Feared loss of safety valve	Fears that already crowded EDs would be overwhelmed by patients seeking care but would be unable to "turn off the faucet"	But, you know, [there was] just that thought that you couldn't do it anymore, unless there was a code black, unless there was an internal disaster. That was just an anxiety-provoking thing, you know: what were we going to do with these patients; we can't go on diversion; oh my God, we're really overwhelmed.
Feared loss of volume	Fears that EDs that depended on volume getting diverted from other hospitals would lose volume when diversion stopped	I mean for us I think we weren't using it [ambulance diversion] that much, and we were benefiting from it from a volume perspective, so I think for us…the only reason we were nervous about it going away was because it meant a drop in volume for us. I have colleagues at other institutions in the city, and I know their fear was more overcrowding than they were already experiencing.
Diversion ban period		
Improved patient satisfaction	Patients experienced greater satisfaction when diversion was no longer an option	It's nice to have the right patient to the right facilities: a patient whose care is followed at [X hospital] to have them be able to come to [X hospital]. There were times that it made absolutely no sense. So you'd be diverting, and an [X hospital] patient would come to [Y hospital] and a [Y hospital] patient would go to [X hospital], and you're, like, why couldn't we just match them correctly? That's just the right thing to do for the patient. Patients who were aware of diversion have commented that…it's nice not to have to worry about that.
Less distraction	Decisions of whether to go on diversion took up a significant amount of provider time that is now dedicated to patient care	Staff focus on what's happening in the moment as opposed to worrying about when we are going on diversion…shouldn't we be on diversion, are we going on, are we on yet…; that really didn't do anything. We're really more looking at what we do and we need to do now to care for the patients that are here and needed care. So it's more immediate…. [I]t was a distraction.
Improved working relationships	Conflict over diversion was no longer present, and there was an improved sense of collaboration between ED staff, hospital staff, administrators, and EMS	So I think in some ways it has built greater partnerships, and I think with EMS…. I think we're all working better as a community and I'm not sure if you'll hear that from other people you interview, but it feels that way to us, and especially with EMS.

Table 2. Continued.

Factor	Explanation	Exemplary quote
Staffing control	No diversion minimized the unexpected surges of patients, and appropriate volume-based staffing patterns could be more easily identified	One of the things we did from an operations standpoint is just adjusting our staffing levels and really building formulas, and looking at acuity, and looking at the positions we would need, and spacing our staffing.
Hospital ownership of flow	Hospitals recognized that ambulance diversion was not only about volume in the ED and took a more proactive role in improving flow throughout the hospital	It sort of got the rest of the hospital and administration thinking about hospital capacity issues in broader terms than "Let's just go on diversion, turn off the spigot, and that will solve the problem."
No wrong medical home	Patients were less frequently separated from their medical home	It's made a difference for those patients who were circling, looking for a place to land, or landing in the place that wasn't the best for them, you know absolutely; those things are a thing of the past.
Improved interhospital communication	Hospitals identified the need to collaborate among themselves rather than "game" the system	Well, there's not the resentment and blame from hospital to hospital.
"Right thing to do"	The prevailing sense that the ambulance diversion was a favorable policy change	I also think that the abolishment of diversion is good for patients. There is no doubt about it.
Fears not realized	Despite many initial fears of poor outcomes and volume changes associated with the ban, no one actually felt that any of these came to fruition	People I think were a little panicked, like, "We can't go on diversion?" And it's actually so much better.
Recommendations		
Early planning	Important to start planning for a diversion ban early and get all the appropriate people involved from the start	It [diversion ban] will come. And I don't think it's a bad thing. But I do think it's a bad thing if you haven't prepared for it.
Code Help	Most hospitals prepared for the ban by developing Code Help policies to help decompress in situations in which the ED is reaching critical capacity	Work on a Code Help, practice it, and have hospital administration schooled on it so that when this does go into effect, they know that they can't just leave the patients in the ED.
Address underlying issues	Banning ambulance diversion is not a panacea; the underlying issues still exist, and it is important to address those in conjunction with a diversion ban	Ambulance diversion is really just a symptom of the underlying problem of crowding and so [you have] to think about that. OK, so ambulance diversion goes away, but what are you doing about crowding?

although they unanimously thought that the nursing staff was more severely affected. They noted that staff members frequently felt guilty that they were unable to provide quality care for all patients arriving to the ED, and there was a substantial amount of stress among staff because of their perceived inability to provide the standard of care they believed they should be able to provide and because of the tension and anxiety that arose when other hospitals would begin diversion.

Participants also reported that ambulance diversion negatively affected patients in a variety of ways, including satisfaction, safety, and the overall quality of their medical care. The majority of key informants believed that ambulance diversion negatively affected patient satisfaction. Though many key informants commented about crowded conditions in the ED and the effect on patients, the most salient theme to emerge related to diversion is the construct that we called the "wrong medical home." These patients, usually with complex medical issues, multiple physicians, test results, and documentation at one institution, would be brought to a different facility, causing numerous downstream effects on the patient, their families, and providers. Patients underwent additional testing and had longer waits as providers sought outside records, all while in a foreign setting and anxiety-provoking situation. Additionally, patients and their

families were unfamiliar with the hospital, and logistics including parking and transportation were more complicated.

Another concern key informants thought contributed to patient dissatisfaction was the need for patients to advocate for themselves if they wanted to go to their home hospital despite its being on diversion. Most patients were not aware that they could demand transport to a specific hospital; however, patients who were aware were put in an awkward situation of having to be adamant. Multiple key informants commented that this was essentially a "no-win" situation for them.

There was some disagreement among key informants about the extent to which diversion itself affected safety as opposed to the complicating factors surrounding ED crowding. It was difficult to separate these issues because they frequently coexisted in the same ED. Some key informants thought that diversion itself did not have any effect on patient safety, indicating that the same problems that led to diversion (eg, boarding, increased nursing and physician to patient ratios, crowded conditions within the ED) also led to adverse outcomes. Others identified that there was a perceived lack of patient safety or that the care was undesirable as a direct result of ambulance diversion, though they had no specific examples of poor patient outcomes. However, one key informant described a case in which a patient

drove to the ED from a community health center with an acute myocardial infarction to circumvent diversion and arrived in triage and said "I am having an acute MI [myocardial infarction]." Other key informants thought that the length of time associated with increased transport time could ultimately affect patient safety, although they believed that in Boston the proximity of hospitals limited this phenomenon. Some key informants reported that the quality of patient care suffered as a result of both diversion and ED crowding. Key informants also believed that the amount of time dedicated to the decision of when to pursue diversion distracted providers from patient care and that the discussion about going on diversion "could kind of take precedent over just getting patients in and caring for them."

Ultimately, key informants reported that diversion was simply an ineffective method of managing volume. Multiple key informants commented that although some staff and administrators viewed it as a panacea to deal with crowded EDs, it really functioned more as a "Band-Aid" for the real problems of boarding and other ED output bottlenecks.

Several of the key informants described their response to the policy initiative to end ambulance diversion in terms of core values and beliefs about emergency medical care. Multiple participants stated with the same phrase that the ban was the "right thing to do," whereas others indicated that there was a consensus about the ban as appropriate to implement as a public health policy within the city of Boston.

The overriding theme was key informants' apprehension about the ban's unpredictable effects on ED volume and patient safety. Reported concerns ranged from the potential effect on patient volume (gaining or losing at their site) to loss of a safety valve when things get really "crazy" (Table 2). Many hospitals were able to reference their experiences with the 2-week diversion ban trial as a way to mitigate these fears, and most key informants also reported substantial hospital leadership involvement as they prepared for this policy change. Some key informants reported playing a major role as advocates within their institution in support of the policy.

All of the key informants reported favorable aspects of the ban at the ED, institutional, or citywide level, including the key informants who had reported that their institution had never diverted ambulances unless there was a code black situation.

Most of the participants discussed the effects of the ban on patient care quality, satisfaction, or safety. Most reported that the ban had led to improvements in these domains, although several reported that it had no effect within their own departments. Among those who indicated that the ban had improved patient care quality, safety, or satisfaction, several noted that it had effectively ended the problem of patients being cared for in the "wrong medical home." One key informant noted that "it's much less common now to be taking care of a patient who really should be at another hospital."

Several participants reported that the ban had also improved patient care quality and satisfaction within their ED and that the perceived improvements were either because ED staff or the hospital appeared to be more focused on patient care quality after the ban was implemented, eliminating a "distraction" in which staff were more focused on diversion than caring for the patients in the ED. Others reported that institutional changes such as implementation of procedures for periods of high volume that were associated with the ban had contributed to improvements in patient care quality or safety.

Several key informants did not think that the ban had affected patient care quality or safety within their departments. One noted that the ban was coincidental to moving to a larger facility, whereas another reported that procedures unrelated to the ban, such as modifications in screening procedures, had more directly affected patient satisfaction, length of stay, and the left without being seen rate.

Multiple participants commented on the effect of the ban on the ED or hospital staff. As noted previously, one indicated that the ban removed diversion as a distraction and undesired focus of attention for ED staff. Some reported that the ban had affected inpatient hospital staff directly by "pushing the limits" of the floor in a way that had not happened before the ban. Several of the participants reported that there was no perceived effect of the ban directly on staff and that the major problem of caring for boarding patients remained. Participants indicated that the ED staff either positively viewed the diversion ban because it was associated with a perceived increase in the volume at their site or just adapted to the new policy, stating that ED staff "really didn't think about it; if you asked them, they probably didn't even know we were on no diversion."

Key informants reported that the ban positively affected many different relationships and alleviated much of the conflict noted before the ban. Among the most prevalent comments were the reported effects of the ban on interactions with out-of-hospital providers, the relationship between hospital administration and ED leadership, and the relationships between hospitals and among physicians and nurses within the ED.

Most of the participants who described an effect of the ban on ED-EMS relationships at their institution indicated that it had either eliminated or modified the antagonism toward EMS providers that was associated with ambulance diversion. Several stated that the ban had ended a hostile reception for out-of-hospital patients and providers. One participant who had characterized the response to EMS arrival with a patient when their institution was on diversion as "staring daggers" reported that after implementation of the ban, "that doesn't exist anymore, and just taking diversion away has kind of leveled the flow of patients," whereas another stated that "now I think it's much more the sense that we're on the same page…." Several participants also commented that the diversion ban served as a catalyst to cultivate a more positive relationship with out-of-hospital providers in a competitive health care marketplace.

Several of the key informants reported that the diversion ban had eliminated a source of conflict among ED staff. One key informant noted that the "biggest impact no diversion has had has been probably on the collegial relationships among the staff…. [T]he fact that it [diversion] wasn't there was almost like a relief; it was kind of like, great…they can do their work and not be at each other's throats."

All of the participants who commented on the effects of the ban on relationships between hospitals reported that it had improved these relationships and the functioning of the system in terms of its delivery of emergency medical care. Key informants reported that the ban had created a closer partnership between institutions and eliminated "resentment and blame" from hospital to hospital. One participant reported that the ban had ended a domino-like effect of diversion and patient surge.

A few of the participants discussed the effects of the ban on other relationships with state agencies or with the community served by their ED. Two participants reported that they had made specific efforts to have increased communication with their communities. One reported working to build relationships with physicians and community referrals, whereas another commented that because of his experience with high-acuity events that had stressed his capacity and diversion was not an option that "there is a lot of communication that goes out prior to the events so we know it's going to happen."

Despite initial trepidation about the ban, most informants noted that their initial fears of significant volume fluctuations and adverse outcomes had not been realized, mostly because of operational changes made at individual hospitals in anticipation of the ban. Some hospitals used the mandated Code Help policy as a platform for alternative resource allocation to help decompress the ED in times of critical capacity. Others opened "surge pods" or adjusted their staffing models to accommodate flow of patients (Appendix E4, available online at http://www.annemergmed.com).

Implementing some variant of Code Help policies mandated for every hospital and putting in place strategies to handle the volume, specifically, adjusting staffing levels, emerged as the 2 most common themes in months leading up to the diversion ban. Across most key informants, these strategies were not only deemed successful but also were recommended for other states considering implementing a similar policy.

LIMITATIONS

We chose ED leaders because we believed they would be the most knowledgeable and would be able to provide the most global perspective on the ban; however, it is unknown whether physicians and nurses not in leadership positions would have different opinions. Funding and practical considerations precluded an evaluation of other important constituents. The sampling timeframe and the post hoc experience with the effects of the ban could have affected respondents' attitudes about the ban and introduced hindsight bias, depending on when key informants were interviewed and whether the ban had been a policy failure (or disaster). The validity of our conceptual model that describes the complex web of effects of ambulance diversion within and between hospitals should be validated in other EMS systems. Finally, this study was conducted in a region that includes 9 receiving hospitals, including 4 Level I trauma centers (2009). These results may not be generalizable to other regions or states.

DISCUSSION

The first statewide ambulance diversion ban that was implemented in Massachusetts affords a unique opportunity to examine the effects of a major health care policy change on the delivery of emergency medical care. The benefits of eliminating ambulance diversion have been postulated in previous research,[10,11] as well as in policy statements and position papers from governing bodies in emergency medicine and beyond; however, to our knowledge no study has evaluated the outcomes of such a large-scale ambulance diversion ban.

Preliminary statewide data[12] and subsequent regional studies have suggested that the ambulance diversion ban in Massachusetts was not associated with adverse effects and may have been perceived by emergency care providers favorably. Burke et al[13] determined that the ban did not affect ED length of stay and EMS offloading times in Boston, and Rathlev et al[14] reported that the statewide ban was not associated with significant changes in throughput measures in Western Massachusetts. A small anonymous Web-based survey 1 year after the diversion ban of members of EMS committees and participants (physicians, nurses, and administrators) from a single hospital site found that only 12% of participants did not view the ban favorably.[15]

We used a qualitative approach to gain unique insight into the use of diversion and the effect of the ban on the emergency medical system in the largest metropolitan region in the state. This method allowed a more comprehensive evaluation of the experience that cannot be captured by quantitative analyses and may be able to provide a construct for exploration in other systems in which diversion is still practiced.[16]

Ultimately, we found that all ED leaders interviewed supported the ban, even those who believed that diversion had occasionally been useful. Most notably, the ban was reported to be a catalyst for improved working relationships between the ED and hospital staff, hospital administrators, and EMS, as well as positively affecting patient satisfaction and decreasing conflict. The most salient effect on patients was that they no longer regularly end up at the wrong medical home, and this improved their satisfaction and quality of care. Though all supported the ban, most noted that it is not a panacea, and the underlying issues of boarding and crowding still exist.

Perhaps our most important findings were the creation of a conceptual model indicating that ambulance diversion was associated with a complex web of interactions in the ED, within and between hospitals and other providers, and that emergency medicine leaders reported that a diversion ban did not cause adverse outcomes. We identified areas of potential adverse effects of ambulance diversion that have not previously been studied that should be examined in systems in which ambulance diversion is still practiced. Among these potential harms are the adverse effects associated with delivering patients to the wrong medical home and whether ambulance diversion is a source of relationship conflicts in other systems. A systematic review also noted the lack of data about the effects of diversion on many important outcomes.[17]

ED leadership in Boston indicated that a statewide ban on ambulance diversion has improved many aspects of emergency medical care within their own hospital and in the delivery of emergency medical care. The ban brought to an end a practice that most leaders regarded as ineffective and which served as a source of conflict between and among many of the members of the health care delivery system. These results may inform other emergency medical systems that consider implementing a ban on ambulance diversion.

REFERENCES

1. Burt CW, McCaig LF, Valverde RH. Analysis of ambulance transports and diversions among US emergency departments. *Ann Emerg Med.* 2006;47:317-326.
2. Massachusetts Department of Public Health. Monthly diversion statistics. Total hours on diversion in Massachusetts hospitals—EMS region by month (July 1, 2002 to November 30, 2008). Available at: http://www.mass.gov/eohhs/gov/departments/dph/programs/hcq/healthcare-quality/health-care-facilities/hospitals/ambulance-diversion/monthly-diversion-statistics.html. Accessed June 17, 2013.
3. Friedman FD, Rathlev NK, White L, et al. Trial to end ambulance diversion in Boston: report from the conference of the Boston Teaching Hospitals Consortium. *Prehosp Disaster Med.* 2011;26:122-126.
4. Feldman J. A call to action on emergency department overload and diversion. Letter to the editor. *Acad Emerg Med.* 2002;9:866-867.
5. Shen YC, Hsia RY. Association between ambulance diversion and survival among patients with acute myocardial infarction. *JAMA.* 2011;305:2440-2447.
6. Begley CE, Chang Y, Wood RC, et al. Emergency department diversion and trauma mortality: evidence from Houston, Texas. *J Trauma.* 2004;57:1260-1265.
7. Institute of Medicine. *Hospital-Based Emergency Care: At the Breaking Point*. Washington, DC: National Academies Press; 2007. Available at http://www.iom.edu/Reports/2006/Hospital-Based-Emergency-Care-At-the-Breaking-Point.aspx, Accessed June 16, 2013.
8. NVivo. *NVivo Qualitative Data Analysis Software, QSR International Pty Ltd. Version 8.2*, 2010.
9. Strauss A, Glaser B. *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Chicago, IL: Aldine Publishing Company; 1967.
10. Brennan J, Allin D, Calkins A, et al. Guidelines for ambulance diversion. Emergency Medicine Services Committee of the American College of Emergency Physicians. 1999. Available at: http://www.acep.org/practres.aspx?id=30038. Accessed Sept. 18, 2013.
11. Institute of Medicine. IOM report: the future of emergency care in the United States health system. *Acad Emerg Med.* 2006;13:1081-1085.
12. Kowalczyk L. State's ER policy passes check-up. *Boston Globe*, December 14, 2009.
13. Burke LG, Joyce N, Baker WE, et al. The effect of an ambulance diversion ban on emergency department length of stay and ambulance turnaround time. *Ann Emerg Med.* 2013;61:303-331.
14. Rathlev NK, Blank F, Osborne B, et al. No diversion in Western Massachusetts. *J Emerg Med.* 2013;44:313-320.
15. King A. Life without diversion—experience from a Boston teaching hospital. Abstract presented at: ENA Leadership Conference; February 15, 2012; Chicago, IL.
16. Cunningham PJ, Felland LE, Ginsburg PB, et al. Qualitative methods: a crucial tool for understanding changes in health systems and health care delivery. *Med Care Res Rev.* 2011;68:34-40.
17. Pham JC, Patel R, Millin MG, et al. The effects of ambulance diversion: a comprehensive review. *Acad Emerg Med.* 2006;13:1220-1227.

APPENDIX E1.

Koh H, Hollander R. Massachusetts Department of Public Health Letter 12/18/2002 implementing Saturation/Gridlock and Code Help policy. Massachusetts Department of Public Health Circular Letter DHCQ 08-07-494, "Changes to Ambulance Diversion Policy."

APPENDIX E2.

"No diversion" key informant interview protocol.

WELCOME/PREAMBLE

Thank you for agreeing to participate in this interview. My name is _____; I am a researcher at Boston Medical Center and am working with the Massachusetts Department of Public Health on this study.

The purpose of this research project is to better understand the effect of the statewide "no diversion" policy implemented on January 1, 2009. By speaking to members of ED leadership, we hope to learn more about staff perceptions of the effects of the diversion ban. You were selected to participate today because you serve a leadership role in the ED at [insert name of hospital]. We are interested in learning about your thoughts and opinions, so there are no right or wrong answers to the questions I will ask you. As we discussed in the consent, only I and the transcriptionist will be able to see what you have said in today's interview. Please feel comfortable talking about your thoughts, opinions, and experiences openly because your responses will be kept confidential.

INTERVIEW

I'd like to talk a bit about what working in the ED at [insert name of hospital] was like before the diversion ban.

1) Tell me about your experience working at the [insert name of hospital] ED before January 1, 2009.
   a. Probe on patient care quality, safety, efficiency, crowding
   b. If participant brings up crowding or inefficiency: What do you think were the causes of the crowding/inefficiency? How did you handle these problems before the diversion ban? What solutions were the most effective? The least effective?
2) Talk to me about your experiences with ambulance diversion at [insert name of hospital] before the diversion ban was implemented.
   a. Probe on diversion's effect (if any) on patients
   b. Was the hospital administration (specifically senior management) aware of the practice of ambulance diversion? [If participant mentions any problems related to diversion: Were they aware of the conditions in the ED that you have described?]
3) Ambulance diversion has historically been used as a tool to deal with ED crowding. How useful a tool do you think that diversion was at your hospital?

Now I'd like to talk a bit about what working in the ED at [insert name of hospital] has been like since the diversion ban started.

4) Hospitals in Massachusetts took many different approaches to preparing for the implementation of the diversion ban. Can you tell me about what [insert name of hospital] did in response to the directive from DPH to end ambulance diversion?
   a. Probe on institutional action: conversations with clinical and nonclinical staff, formal meetings, policy changes, etc.
5) Tell me more about your own response to the directive [in addition to the institutional response].
   a. Probe on actions taken by participant: conversations with clinical and nonclinical staff, formal meetings, policy changes, etc.
6) How do you feel your response or the response of [insert name of hospital] to the directive compares with the actions taken by other hospitals/ED leadership in Massachusetts?
7) Tell me about your experience working in the ED since the diversion ban.
   a. Probe on patient care quality, safety, efficiency, crowding
8) Do you think that anything has changed since the directive? Tell me more about that.
   a. Probe on effects on staff, patients, patient safety
9) If you had it to do over again, how would you respond to the diversion ban?

CLOSING

10) What would you say to other states that are considering implementing a similar diversion ban?
11) What would you tell ED administrators in other states about your experience with no diversion? What advice would you give them in preparing for a diversion ban?
12) Are there any other things important to your experience before or after the diversion ban that I haven't asked you about? Please feel free to tell me about any additional thoughts or ideas you have.

Thank you so much for helping us with this pivotal health services research study!

Please feel free to contact me at any time if you have questions about the research or if you have additional comments that were not brought up during this interview.

Before we publish any results from this study, we'd like to share our preliminary findings with those of you who took the time to share your opinions with us. Would you like a copy of this preliminary report? [If yes, get e-mail address]

APPENDIX E3.

Detailed coding methods.

The development of the coding was a stepwise process. Two transcripts were randomly selected, reviewed, and coded by 3 members of the research team to ensure consistency of thematic coding and develop a coding scheme and coding dictionary. The coding of remaining interviews was carried out independently by 2 research team members. These were then reviewed as a group for

accuracy and consistency. The research team met to discuss findings and developed a conceptual model that encompassed initial categories and provided insight into major themes.

Consistent with grounded theory and the constant comparative method, codes were refined and additional thematic categories were created during the course of the analysis. To ensure reliability, coding discrepancies were discussed by the team until agreement on appropriate coding was reached. In the final phase of data analysis, categories were reduced to major themes through ongoing discussion between researchers, reviewing coding, recoding, and rereading all transcripts as necessary. In addition, the research team met with experts in qualitative methods to review the thematic structure and coding process. Interrater reliability was established for the coding frame by running a coding comparison query in NVivo.

APPENDIX E4.

Detailed transcripts supporting thematic coding.

DIVERSION

Attitudes of ED and Hospital Staff
Breather:

"It's giving us a break. They feel a relief that we've got a break for an hour and we can catch up. I think that was the biggest part of the mentality of diversion."

Only thing that was left to do to try to improve the situation:

"I think they felt like diversion was, like, you had pulled the cord and you acknowledged it was unsafe, so somehow or other you had done everything you could do…and now you just had to deal with the MASH mentality, but you could live with yourself because you had done everything you could do…. [N]obody ever felt like it did anything. So divert was sort of a last point of control they felt we would have. To me that was what it was for the nurses."

"It would sort of give people that sense that, OK, we were on diversion, we've done all we can…but it didn't really have a tremendous impact other than sort of psychologically."

Demoralizing, opposed the principles of emergency care:

"They hated it. They hated going on diversion. I mean, I think the mentality of any emergency department is that your doors are open—you want to take care of anybody who comes through the door, and the fact that you would shut your doors and turn people away is just abhorred by everybody. It's a tragedy. It's a travesty. It's terrible."

Anxiety when other hospitals would start to go on diversion:

"It would increase your stress. It would increase your anxiety. You know, you would just begin to feel that tension because you knew what was going to happen. You knew that you'd be running around."

Attitudes of Hospital Administration
Administrators were averse to diversion because of immediate and delayed financial losses, as the patient who was diverted and initially:

"They didn't want to be turning patients away…so they're looking at it as 'Well, we've got all these beds upstairs that we want to fill, so we don't want to be going on diversion and turning patients away.' And I think too, they were afraid that if you turn a patient away who's a regular at [this hospital] and they end up at a different hospital, they may not return to this hospital for their care because now they've gone somewhere else, and now they've got a new set of doctors over at that new facility who they're going to follow up with, so the next time they get sick, instead of coming here, they're going to go over there. So from that perspective, from a business perspective, that was how they were looking at it, I'm sure."

Mixed messages:

"I think people saw it as an ED issue, and so here the ED is diverting patients, but in many ways it was a throughput issue in the hospital. So those staff people who were involved with the throughput issues didn't have a sense of urgency of fixing the ED problem. They wouldn't even maybe know this was happening."

Another key informant (KI) (large hospital):

"I think, perversely, having diversion sort of allowed the rest of the hospital to believe that they didn't really have to solve the overcrowding problem because they said, 'Well, just go on diversion. If we're at 105% capacity, the ED just goes on diversion and that will solve the problem.'"

Effect on Patients
Negatively affected patient satisfaction, wrong medical home:

"I mean, from the patients who may be known patients to other facilities or other institutions that needed to come here simply because their hospital couldn't take them, it was definitely a dissatisfier. Their level of comfort was very different, their providers aren't here…and they're already in an emergent situation so their anxiety level is already up. It made for a worse experience because they…didn't want to come here. And the same for probably our patients who were sent to other institutions, and I think medical records [are] a huge part of that. Especially if people were coming in without family, or were unable to give their full histories or medications…that was just a very scary thing for people to go through."

Adverse effect on safety:

"I remember one case. It was a patient at…one of our community centers. He was having an acute MI. They called an ambulance and said, 'We are going to send to you [name redacted],' and they said 'Oh, [it] is on diversion,' and he said, 'I don't care. I am going to walk out of here.'

He drove in his car to the parking lot and came into triage and said, 'I am having an acute MI and here is my EKG.' That is a true story."

Time dedicated to the decision of when to pursue diversion distracted providers from patient care:

"There were times where the discussion of whether you would or wouldn't [go on diversion] could kind of take precedent over just getting patients in and caring for them."

Effect on Working Relationships
ED-RN conflict about diversion:

"[B]efore we had the diversion ban, there was a lot of anxiety about when we should go on diversion or shouldn't go on diversion. It was occasionally a source of conflict between the doctors and the nurses. Occasionally, it would rise up to involve the administrator on call. It was something that people devoted a lot of energy to figuring out when they should be on diversion or not, and it was something that was sort of ever present…. It was always in the back of your mind—when are we on diversion? And not only that, but when are the other hospitals on diversion? It was sort of a continual, ever-present issue."

ED-EMS conflict:

"[T]he animosity between the ED staff and EMS…didn't need to happen. The patient coming through, and the glares and the daggers of 'Don't you know we're on diversion?' And the poor patient sitting on the stretcher not really sure, should I be happy to be here or not?"

Effect on EDs
Created unexpected peak volumes that were undesirable:

"When other hospitals were going on divert, it would impact us because we would start getting boluses of patients. So our best efforts to manage flow and capacity weren't within our normal controls…. [I]t would impact us greatly with staffing numbers and staffing patterns."

Not effective for root cause:

"We all knew that boarding was really the issue, that ambulance diversion was really just a Band-Aid, just a symptom of the underlying problem."

Effect on Interhospital Relationships
Interhospital conflict:

"It was gamesmanship. I think other hospitals would go on diversion to prevent the influx of patients they might get if they were open, or basically as a chess game in a lot of instances. You were putting a pawn out to protect your institution from getting bombarded with patients."

Positive Effect of Diversion
[The 2-hour period really did relieve some of the chaos, and functioned more as] a safety valve:

"Oh, I think [diversion] helped. I mean…unlike other institutions that I think had a lower threshold, we didn't go on diversion unless it was truly overwhelming. And, yeah, back then it did help. There's no question that even a couple of hours of breathing room allowed you to, maybe, not see as many new sick patients, take care of the ones you had, go do the administrative things you needed to get the patients upstairs—so, you know, it definitely helped. Was it the solution? Of course not…but it definitely helped."

Preparation for the Ban
Fear about gaining or losing volume:

"I mean, for us I think we weren't using it [ambulance diversion] that much, and we were benefiting from it from a volume perspective, so I think for us…the only reason we were nervous about it going away was because it meant a drop in volume for us. I have colleagues at other institutions in the city, and I know their fear was more overcrowding than they were already experiencing."

Overwhelmed:

"But, you know, [there was] just that thought that you couldn't do it anymore, unless there was a code black, unless there was an internal disaster. That was just an anxiety-provoking thing, you know: what were we going to do with these patients; we can't go on diversion; oh my God, we're really overwhelmed."

DIVERSION BAN
Attitudes Toward the Diversion Ban
"Right thing to do" and a consensus about the ban as appropriate to implement as a public health policy within the city of Boston:

"In the city itself, I think a majority of the people felt like we should do it."

Another participant indicated this:

"I also think that the abolishment of diversion is good for patients. There is no doubt about it."

Attitudes of ED and Hospital Staff
ED staff either positively viewed the ban or just adapted to the new policy:

"[T]he staff were excited to see volume, and its job security…."

Another KI:

"They [ED staff] really didn't think about it. They really didn't know about it; if you asked them, they probably didn't even know we were on no diversion."

No consistent impression about the perceived attitudes of hospital staff toward the ban:

"… there was more feeling around it in the emergency department because the staff lived with it than really on the floors…. I don't think they [hospital staff] really appreciated, you know, what this change would mean."

"But I know our physicians who have done a lot to have on-call systems and programs; they would do anything not to have diversions, so this was a great thing for them…."

Another KI:

"For the rest of the hospital, it was a bigger deal. It was sort of an educational opportunity, to let them know what diversion was and what it wasn't. So as much as letting people know that diversion no longer exists, it was letting people know that diversion wasn't all that anyway."

Attitudes of Hospital Administration
Differing attitudes toward the ban:

"And who do you think was most unhappy about that? Hospital administration…. We did everything right. But they don't like it. It affects their bottom line."

Another KI indicated:

"[I]t was an opportunity, actually, for improvement across the board anyway, and it just kind of brought it to light for people…. [T]he workings of admissions, and volume, and stuff are very important so they [hospital administration] never want to seem like they couldn't take a patient…."

EFFECT OF THE BAN

Effect on Patients
Eliminated the problem of the wrong medical home:

"[I]t's made a difference for those patients who were circling, looking for a place to land, or landing in the place that wasn't the best for them, you know, absolutely; those things are a thing of the past."

"It's nice to have the right patient to the right facilities: a patient whose care is followed at [X hospital] to have them be able to come to [X hospital]. There were times that it made absolutely no sense. So you'd be diverting, and an [X hospital] patient would come to [Y hospital] and a [Y hospital] patient would go to [X hospital], and you're like why couldn't we just match them correctly? That's just the right thing to do for the patient. Patients who were aware of diversion have commented that…it's nice not to have to worry about that."

"[I]t's much less common now to be taking care of a patient who really should be at another hospital."

Improved patient care quality and satisfaction within their ED either because ED staff or the hospital appeared to be more focused on patient care quality after the ban was implemented:

"Staff focus on what's happening in the moment as opposed to worrying about when we are going on diversion…shouldn't we be on diversion, are we going on, are we on yet…; that really didn't do anything. We're really more looking at what we do and we need to do now to care for the patients that are here and needed care. So it's more immediate…. [I]t was a distraction."

Institutional changes such as implementation of procedures for periods of high volume contributed to improvements in patient care quality or safety:

"It's really drawn attention to the fact that it's not OK to leave patients in an emergency room, and it really is…. [W]e need to do better as an organization to make this happen…. [I]t really engages the entire medical center. It's a commitment from everybody for the patient, and that's what we should have always been doing. So we're happy there's no diversion…."

"[U]ntil the no diversion policy, it was, you admitted patients to the emergency department, made it so the emergency department was no longer operational, made it so that patient satisfaction was down. You could blame the ED for their poor patient satisfaction…."

Several KIs did not believe that the ban had affected patient care quality or safety within their departments:

"[T]his is part of a moving target. As we have implemented our screening process, we've got immediate results from that. We've got a decrease in length of stay and improvement in patient satisfaction, and decrease walkout rate, patients not being seen…. We got all that pretty immediately."

Effect on Staff
The ban removed diversion as a distraction:

"[T]he floor staff felt that there never was an option to say no, and it was going to [cause] more work…. I think in some ways…it meant pushing the limits of the floor in a way we've never done before…."

Another KI reported:

"to be brutally honest…it's about the same. The issue for us continues to be the boarders."

EFFECT ON WORKING RELATIONSHIPS
ED-EMS Relationships
Eliminated or modified the antagonism toward EMS:

"That piece of it is gone. It wasn't either the staff's fault or EMS's fault or the patient, but [the trend was] to kind of

blame somebody for what was happening…. [T]hat doesn't exist anymore, and just taking diversion away has kind of leveled the flow of patients."

Another stated this:

"I think it's better. There was always—this would happen almost every day if you were on diversion and an ambulance came—that the ambulance would get dirty looks: Why are you here, we're on diversion…. [A]nd now I think it's much more the sense that we're on the same page…."

One interviewee summarized it thus:

"So I think in some ways it has built greater partnerships, and I think with EMS…I think we're all working better as a community and I'm not sure if you'll hear that from other people you interview, but it feels that way to us, and especially with EMS."

A catalyst to cultivate a more positive relationship with out-of-hospital providers in a competitive health care marketplace:

"[B]ecause we're in a city with so many options within a couple of miles, there really is a choice on where the patients are brought if they don't have a desired [destination]. EMS does have a choice in where they bring people, and the closest hospital is the first bet, but when you're right across the street from very competitive institutions, we wanted that choice to be us. So we did a lot of work with partnering with EMS…."

Others described working to build relationships with EMS by developing lounges for EMS providers and having staff "ride-along" experiences to "cultivate a relationship with EMS."

ED Leadership and Hospital Administration Relationships
Relationship with hospital administration:

"[I]t sort of got the rest of the hospital and administration thinking about hospital capacity issues in broader terms than 'Let's just go on diversion, turn off the spigot, and that will solve the problem.'"

"I think that they have come to see emergency management, surge, this whole thing in a different light than what was originally intended, so I think this has helped."

Made their role as ED leaders more difficult:

"It's made it a little more difficult because before, when it was ambulance diversion, it was this kind of outside entity that we could use…. Now that this outside kind of thing called ambulance diversion is gone, it's more about us…. [I]t's more personal…, it's about our flow, it's about our infrastructure, it's about our operations, and it's about our priorities. It's not some outside thing; it is all inside."

Interhospital Relationships
Improved these relationships and the functioning of the system:

"And there's a close partnership now with institutions, which I think existed but I think exists stronger now where we may know what's going on at [X hospital]."

Other KI:

"Well, there's not the resentment and blame from hospital to hospital."

Ended a domino-like effect of diversion and patient surge:

"Starting with [hospital X] going on diversion, which would bump up [hospital X's] patients, then they would go on diversion, and some of the outlying hospitals, we would get it. So, again, we would be kind of down the line, and we would get hit with a lot of patients, and that which I've actually seen a decrease in since no diversion."

ED Staff Relationships (physician-nurse)
Ended ED physician-nurse conflict:

"And I think the, probably to me the biggest impact no diversion has had has been probably on the collegial relationships among the staff, because when you could divert people would be saying, like, you know, 'We don't have anyplace to put that intubated patient; you should divert,' and the doctor was trying to be macho, and he'd say, like, 'No, I'm too embarrassed. We're going to, you know, stay open,' and then people would be calling, like, me or the chief at home, saying, 'We have like 65 patients more than the monitored beds and so-and-so-won't make the call.'[I]t was all of this back-and-forth stuff, so the fact that it wasn't there was almost like a relief. It was kind of, like, great…they can do their work and not be at each other's throats."

Other Relationships
Efforts of Massachusetts Department of Public Health to end ED boarding after the implementation of the diversion ban:

"[T]hat would have a huge impact on the way we would have to respond to something like that…across the hospital."

Significant effect on hospitals and their financial feasibility:

"[I]f a line was drawn in the sand…"

Increased communication with their communities:

"…where it was more of a 'Just say yes; just say yes to everybody and the rest will come.'"

Another KI:

"[N]ow when we have these events, we're better prepared for them and there is a lot of communication that goes out prior to the events so we know it's going to happen; we know what the plan will be if it does happen and what nursing can do, what the physicians can do."

Outcomes of Initial Fears
Anticipation of the ban:

"The only thing we really changed is, we sort of had, instead of diversion we developed this code yellow policy, which was really 3 stages. Um, one, kind of the precode yellow, saying, we're going to be really in trouble if there's not more intensified efforts to get people discharged, move people out of the ICUs, to be more efficient. And then the second level's, the real level's, is that we developed a policy where we could bring into the command center in 5 to 10 minutes almost every senior person in the hospital. And they had to come. And to discuss, all right, what are we going to do to be able to handle these beds, to move patients? And then the third level, which we've really never gone to, to my recollection, is the highest level of code yellow is, OK, every bed is full, we're not going to be able to move people, we have got to open up more areas."

"One of the things we did from an operations standpoint is just adjusting our staffing levels and really building formulas, and looking at acuity, and looking at the positions we would need, and spacing our staffing."

"[W]e did change physician coverage of the medical boarders. So now the medical doctors, inpatient doctors, have to cover their boarders in the ED, so the ED doc would be free to see the increased volume from, um, from the no divert. And that has worked out well."

"We opened up a surge pod. It's a pod that we've had…get bigger and smaller as hospital capacity has changed over time…. I think the surge pod was probably the most tangible and most direct response just in terms of when it happened and how we were able to mobilize the administration around that need…."

RECOMMENDATIONS FOR OTHER STATES
Early Planning

"It [diversion ban] will come. And I don't think it's a bad thing. But I do think it's a bad thing if you haven't prepared for it."

Using a trial period and getting the "right people" on board, including internal leadership, EMS, and other hospitals:

"I wished we came together as chiefs and directors of our departments and talked about this. You know we all knew it was coming for a year. I think people reached out to those relationships they had built, but I think it would have been great to have a forum where hospitals could come together to talk about what…they [were] worried about. Or how…they solved these problems. Really more information sharing…"

Another KI:

"[I]f your senior management is not bought in, then you're not going to succeed."

Code Help
"Code Help" as an effective strategy:

"Work on a Code Help, practice it, and have hospital administration schooled on it, so that when this does go into effect, they know that they can't just leave the patients in the ED…."

"For us…I mean the code Help, if they had something like that implemented, that would definitely help."

"I think that making sure each hospital has a plan in place before the diversion is probably the best, and that they feel comfortable, that they've drilled it a few times… [for] leeway. [W]e're going to stop diversion as of the end of this year. You need to have a plan in place by September so you can drill it a few times between now and then…."

Address Underlying Issues
Find a solution to the problem of boarding or ED crowding:

"[A]mbulance diversion is really just a symptom of the underlying problem of crowding…so…think about that. OK, so ambulance diversion goes away, but what are you doing about crowding…?"
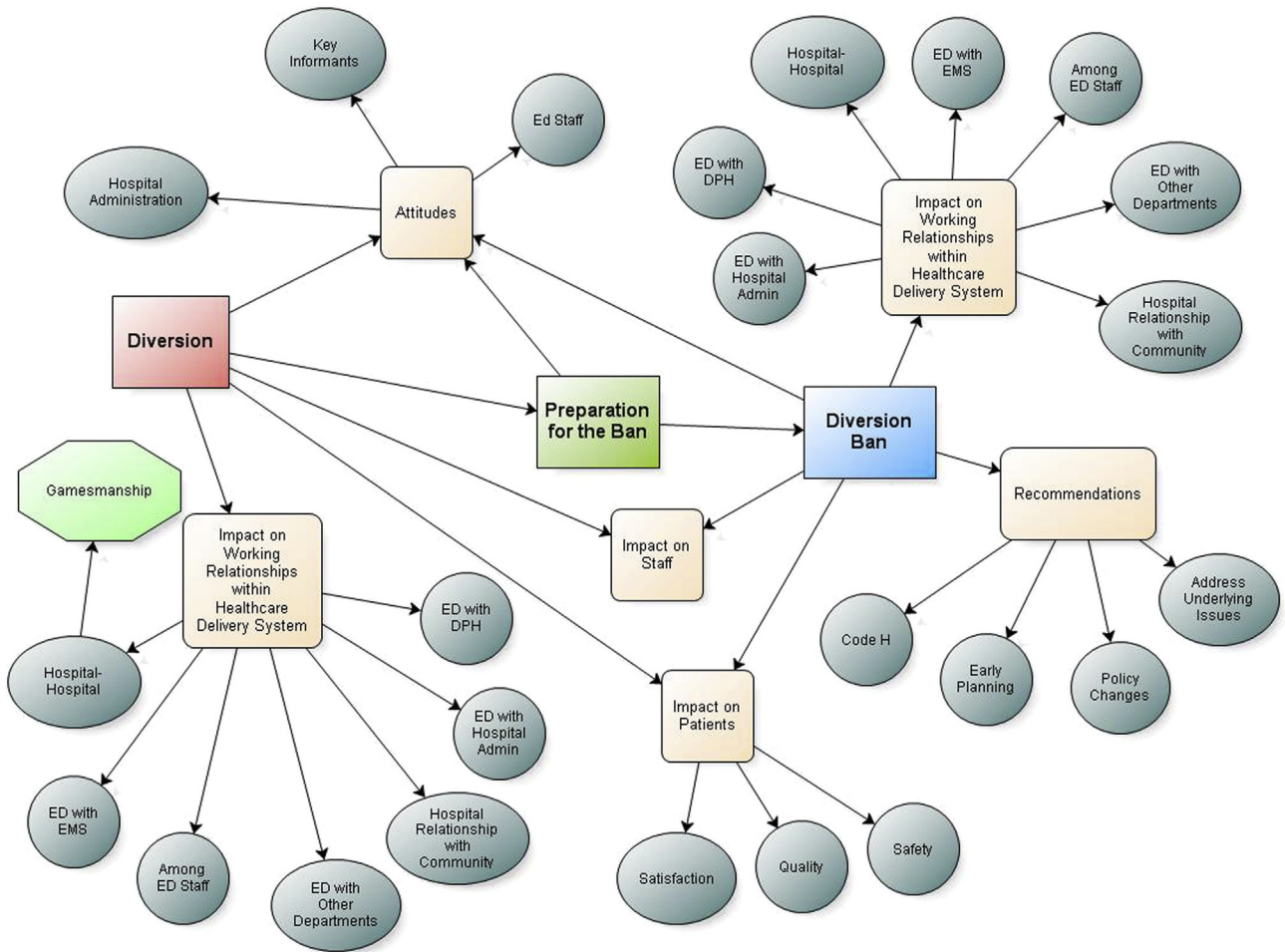
Figure E1. Detailed conceptual model.