Emergency Department Escalation in Theory and Practice: A Mixed-Methods Study Using a Model of Organizational Resilience

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Study objective: Escalation policies are used by emergency departments (EDs) when responding to an increase in demand (eg, a sudden inflow of patients) or a reduction in capacity (eg, a lack of beds to admit patients). The policies aim to maintain the ability to deliver patient care, without compromising safety, by modifying "normal" processes. The study objective is to examine escalation policies in theory and practice.

Methods: This was a mixed-method study involving a conceptual analysis of National Health Service escalation policies (n=12) and associated escalation actions (n=92), as well as a detailed ethnographic study of escalation in situ during a 16-month period in a large UK ED (n=30 observations).

Results: The conceptual analysis of National Health Service escalation policies found that their use requires the ability to dynamically reconfigure resources (staff and equipment), change work flow, and relocate patients. In practice, it was discovered that when the ED is under pressure, these prerequisites cannot always be attained. Instead, escalation processes were adapted to manage pressures informally. This adaptive need ("work as done") was found to be incompletely specified in policies ("work as imagined").

Conclusion: Formal escalation actions and their implementation in practice differed and varied in their effectiveness. Monitoring how escalation works in practice is essential in understanding whether and how escalation policies help to manage workload. [Ann Emerg Med. 2017;70:659-671.]

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INTRODUCTION

The management of demand and capacity is a problem for hospital emergency departments (EDs) worldwide.[1] Inexorable increases in the demand for emergency care combined with resource pressures place stress on the system. Crowding caused by a surge in patient numbers, "exit block" resulting from bottlenecks within hospitals, or difficulties planning discharge can increase the risk of patient safety incidents.[2,3] Indeed, there is increasing evidence that long waiting times in EDs are associated with negative patient outcomes, including increased mortality.[4,5] Ensuring efficient flow through the department is therefore a crucial goal for all managers, administrators, and clinicians for reasons of safety, resource efficiency, and compliance with government targets.

There is a lack of evidence for implementing and understanding interventions aimed at reducing demand, managing throughput, and expediting output.[6] Input solutions aim to filter out "inappropriate users," but some question the premise that patients use emergency services unnecessarily.[7] Throughput solutions are dominated by identifying inefficient processes (eg, triage[8,9]) and encourage the introduction of engineering approaches that help redesign systems (eg, streaming[10]). Output solutions aim to reduce delays in discharging patients (eg, the use of discharge lounges[11,12]). However, there is a lack of detail on how throughput and output interventions are adjusted and adapted in practice to make them work, which leads to difficulties when they are widely implemented.[6]

In the United Kingdom, National Health Service (NHS) policy responses to these problems have focused on

Editor's Capsule Summary

What is already known on this topic

Care delivery organizations commonly develop "escalation policies" for managing crowding and surges in emergency department (ED) demand. The effectiveness of these policies has seldom been studied.

What questions this study addressed

This study used mixed methods to identify common patterns in escalation policies in UK EDs and to evaluate how well they performed in practice.

What this study adds to our knowledge

Formal escalation policies often presumed the availability of resources that were missing or degraded when escalation was needed. Consequently, the actual practice of managing crowding deviated from that inscribed in policy.

How this is relevant to clinical practice

Recognizing and monitoring the gap between formal policies and actual practice should help in the development of more realistic and useful escalation policies.

the introduction of "access targets" and the provision of extra resources during winter to deal with increased demand. One target is that patients must be treated and discharged, or admitted, within 4 hours.[13] Hospitals failing to meet this target for 95% of patients can incur financial penalties, but despite these serious consequences, recent reports show that each year more hospitals fail to reach this target, especially during winter.[13]

Managing patient flow is challenging, and although daily and weekly peak times can be predicted, unexpected demands or an unexpected reduction in capacity can occur at any time. The imposition of waiting-time targets as a measure of performance creates an additional pressure. In response, the majority of hospitals in the United Kingdom now have "escalation" policies. Escalation is the process of identifying when the department is under increased pressure and an intensification of effort is required to maintain patient flow. Escalation policies specify thresholds for action and the responses required. This is the major codified organizational response that is designed to enable EDs to remain resilient against unexpected variability in demand and capacity, and continue to meet external and internal targets and standards of care.[14] Yet despite the ubiquity of escalation policies, there has been relatively little investigation of the actions they contain for aligning demand and capacity, or of how effectively they work in practice. Although escalation is a common feature of ED practices, there have been no studies that we are aware of that investigate how escalation works in practice.

Resilient Health Care

Resilient health care is a coherent set of principles for understanding how complex adaptive systems such as health care operate. Resilience can be defined as "the intrinsic ability of a health care system (a clinic, ward, a hospital, a country) to adjust its functioning prior to, during, or following events (changes, disturbances and opportunities), and thereby sustain required operations under both expected and unexpected conditions."[15] The core concepts of resilience direct attention to the importance of studying how work is carried out in practice because clinical work does not always fit prespecified policies and protocols. Staff manage pressures and problems by making in situ adaptations and goal trade-offs to achieve good outcomes, and by studying these processes and learning from how success is achieved, we can strengthen good practice. Resilient health care studies have shown that health care work is characterized by variability and unpredictability,[16] and this is especially the case in emergency care. Within the ED, resilience studies have explored the need for adaptation, given inherent uncertainty and ambiguity,[17] by exploring processes such as informal patient handovers[18] and managing the risks associated with patient boarding.[19] There is little guidance available about how to apply the concepts of resilient health care in practice. The Concepts for Applying Resilience Engineering (CARE) model of resilient health care[20,21] was used in this study to guide the data collection and analysis phases. Briefly, the CARE model shows that misalignments between demand and capacity (such as missing equipment, short staffing, and rapidly deteriorating condition of patients) create the need for staff to adapt their activities so that positive outcomes can still be achieved despite the pressures.

Goals of This Investigation

The aim of the study was to examine escalation policy in theory and practice, using resilient health care principles to identify opportunities for improving the way escalation is planned and managed. Specific objectives were to identify and categorize the types of escalation activities proposed within a range of formal escalation policy documents; observe escalation in context to study resilient practice, eg, whether there was a gap between formal escalation protocol

and observed adaptations; and compare and contrast formal and observed escalation activities to identify wider implications for service managers and senior clinicians for policy, system learning, and improvement.

MATERIALS AND METHODS

This study is part of a wider project, for which there is a published protocol,[20] that is among the first worldwide to systematically apply principles in resilient health care for improvement purposes. The study involved 2 phases: a structured thematic analysis of a range of escalation policies, and a longitudinal observation of escalation actions being carried out. Both phases took place in the United Kingdom's NHS between May 2014 and September 2015.

Policies were purposively selected to provide a range of actions across different organizational conditions. We first identified EDs of various sizes, using NHS data,[22] according to yearly attendance for 2014 to 2015 (large >150,000, medium 100,000 to 125,000, and small 50,000 to 75,000 patients/year).

Further inclusion criteria were 4-fold: a formal escalation policy was published and available through the hospital or NHS Trust Web site; the policy had been updated or authored within the last 5 years (2010 to 2015); there was a dedicated policy section for the ED, outlining at least 5 escalation actions; and policy actions had demand triggers for action (such as patient waiting time or the number of patients occupying specific areas of the ED).

Twenty escalation policies were found that matched the criteria. Eight were excluded from further analysis because they did not provide specific detail on escalation actions to allow extraction and coding of formal responses. The final 12 policies were from Imperial College Healthcare, University Hospitals of Leicester, Brighton and Sussex, and Guy's and St Thomas' (large); Gloucestershire Hospitals, Norfolk and Norwich University Hospitals, Royal Devon and Exeter, and South Devon Healthcare (medium); and Royal Cornwall Hospitals, Royal United Hospital Bath, Gateshead Health, and East Cheshire (small).

Primary Data Analysis

The selected policies were analyzed to identify their high-level goals (eg, to reduce waiting times, to garner extra staff) and the types of escalation actions they contained (eg, to divert ambulance arrivals, to ask on-call physicians to attend the ED). Similar actions were grouped together under a general description of the action. This initial grouping was performed by a researcher (J.B., safety scientist). Actions were then grouped thematically into categories, using a process of aggregation and iterative testing of the coherence of the categories. This was performed by the researcher (J.B.), an ED consultant (P.J.), and an ED service manager. The free-marginal multirater κ calculation[23] was used to measure observer agreement for the categorical data.

The study of escalation in practice drew on a subset of the data collected during a large study of resilience as a quality improvement method. For the larger study, data were collected on all aspects of ED operations. For this study of escalation, we selected data recording escalation actions.

After analysis of policies, the second phase of the work involved detailed observations of escalation actions in St Thomas' Hospital ED, a large department with more than 150,000 patients attending per year (2014 to 2015). The hospital is part of Guy's and St Thomas' NHS Foundation Trust, comprising several hospitals, and is a member of one of the UK's Academic Health Science Centres.

The observational study was conducted by 2 researchers (J.B. and M.D.D.) during 16 months (May 2014 to September 2015). Each observation lasted between 2 and 8 hours, and there were 30 observational episodes (15 per researcher; 104 hours in total). The study took place predominantly within the Majors area of the ED, which is intended for patients with serious illnesses or injuries. Majors is where the majority of escalation actions are discussed and coordinated. Staff who consented to the study were shadowed as they performed their normal duties, with participants coming into contact with a range of colleagues during their work. Staff responsible for managing patient flow and executing escalation actions were purposively selected to participate, including the physician in charge, the nurse in charge, and the patient flow coordinator.

Nonparticipant observations[24] took place at or close to the central desk area, where many patient flow management issues are discussed. The aim was to obtain a rich description of the patient flow pressures that the ED was under, and how escalation actions were used to help address these pressures. Open-ended, informal interviews were performed during the shadowing process.[25] Researcher and participant discussed events and processes at opportune moments to avoid compromising care or interfering with escalation actions. This was important because routine actions might be taken for granted by the participants[25]; thus, opportune questions allowed illumination of the decisionmaking processes involved when escalation actions were executed.

Times and days for observations were selected to maximize the chances of there being a busy department (based on historic occupancy and arrivals data), thus increasing the likelihood that escalation actions would be

needed. Historical data suggested that the departmental occupancy levels were at their highest from noon to 2 PM, with Monday being the busiest day of the week. Consultants within the department identified that the shift handover period 6 PM to 8 PM was when staff experienced high workload that could affect the management of patient flow issues. Our observation schedule was designed to capture these periods, but we also observed at other times to enable comparisons.

In the tradition of ethnographic studies, our aim was to capture a deep understanding of the subtleties and nuances of the culture of the work system. All relevant aspects of the environment were captured, along with researchers' questions and thoughts about what was happening. Researchers used resilience engineering theory to focus on how workers decided on actions, what actions were undertaken, and the effect of those actions.

J.B., a safety scientist, and M.D.D., an organizational psychologist, collected all the data. Extensive field notes of observations, discussions, and personal reflections were made. A pro forma method was designed and used by the 2 researchers (J.B. and M.D.D.) to capture when escalation actions were proposed, how they were implemented (if implemented), and any associated outcomes in terms of the envisaged action. Field notes were transcribed and analyzed in NVivo (version 10; QSR International Pty Ltd, Doncaster, Victoria, Australia), using a combined deductive and inductive thematic analysis. The deductive framework included concepts from resilience engineering and the CARE model,[20,21] with a focus on adjustments and adaptations that occurred in relation to escalation actions. Major themes that were coded were demands, capacities, misalignments between demand and capacity, adaptations and outcomes, and the categories used to classify escalation actions in the policy analysis (see "Results" section). Actions planned and implemented by staff and outcomes were analyzed inductively. Emerging insights from the analysis were discussed extensively with the wider research team, which included ED clinicians (physicians and nurses), governance staff, and quality improvement researchers. Results were also presented and discussed at ED meetings and resilience health care conferences, and with nurse colleagues, to test the credibility[26] and trustworthiness of the emerging interpretations.

RESULTS

Analysis of Escalation Policies

Escalation policies can be understood in terms of the resources that EDs need to mobilize and deploy to maintain acceptable levels of performance and patient safety. Internal escalation actions can be performed with existing resources within the department, whereas external escalation actions require resources that are not currently available within the department and have to be garnered elsewhere. Table 1 presents the range of internal and external escalation actions that were found by analyzing the 12 NHS escalation policy documents. Interrater reliability was considered outstanding[23] (κ=0.80; P<.001). A range of actions was identified that aimed to reduce demand and increase both capacity and efficiency. The implicit rationale was that executing these actions would allow patient flow bottlenecks to be avoided or better managed. Three high-level goals of escalation policies were thematically identified, together with action types to achieve these goals. First was the goal of increasing capacity to allow more patients to be assessed or treated. Action types codified to achieve this goal were relocating patients who were occupying areas that did not have capacity to less busy areas within the ED, additional staffing, and change of equipment use, including beds, trolleys, and cubicles. Second was the goal of reducing demand on the ED. Action types codified to achieve this goal were relocating patients to other areas within the hospital (leaving the ED) and adjusting processes to divert incoming patients to other hospitals or health care services. Third was the goal of increasing efficiency. Action types codified to achieve this goal were adjusting processes to facilitate early decisionmaking and avoid unnecessary investigations, and flexing staffing by changing staff roles and responsibilities within the ED to manage patient flow bottlenecks (for example, moving a nurse from Majors to front-of-house assessment).

Table 1 shows the thematic analysis of all codified escalation actions (n=92), categorized by the 3 high-level goals and by action type. The number in brackets represents the number of policies in which a specific action was proposed.

The conceptual analysis of NHS escalation policies found that their use requires the ability to dynamically reconfigure resources (staff and equipment), change normal work flow by adjusting processes, and relocate patients to other departments or areas within the ED. All the escalation policies we reviewed were similar in regard to the detailing of actions involving the flexing of staffing. The concept of using staff where most needed was prevalent. Only the larger hospitals detailed processes that were to be adjusted. The use of relocating patient and equipment actions was dependent on the size of the ED floor and whether short-stay or admission wards were available for negotiated use. Some escalation policies were more prescriptive in terms of what demands triggered an

Table 1. Thematic analysis of codified escalation actions.

	Aim		
Action Type	**Increase Capacity**	**Reduce Demand**	**Increase Efficiency**
Relocating patients	[4] Move lower-acuity patients who are currently occupying cubicles or trolleys to seats [1] Move patients to nonclinical areas within the ED to free cubicles	[7] Consider direct referrals/fast-tracking of patients to specialty wards [6] Maximize use of protocols to stream patients straight to admitting wards [4] Move patients on admitting wards to specialty wards to ease ED exit block [2] Streaming nurse to turn patients away (if appropriate)	[2] Specialist areas to organize collection of patients directly from ED
Adjusting processes or equipment use	[3] Beds throughout the hospital reviewed to identify spare capacity [3] Operational issues explored to identify reduced capacity, eg, equipment failure [2] Use Resus and Minors spaces for Majors patients [1] Empty trolley space to ensure ambulances are offloaded [1] Consider converting 4-bed bays to 6-bed bays within Majors [1] Compromise on the single-sex principle for bays will be considered [1] Compromise on infection control will be considered for any closed (infected) areas	[4] Ambulance divert to be considered as a last resort mechanism [2] Patients should be assessed by specialty team within 30 min [2] Staff to use expedited discharge protocol across ED area [1] Ensure staff are not requesting inappropriate investigations (laboratory tests)	[2] Site nurse practitioner to support ED with patient flow/discharge [2] Staff to use rapid assessment protocols to ensure early decisionmaking [1] Ensure transfer checklist is completed and only essential tasks undertaken [1] Ensure that investigations are ordered for patients who are waiting
Additional staffing or flexing staffing	[5] Allocate additional patient transfer staff (nurses and porters) [4] Additional locum/bank/agency staff to be requested (physicians and nurses) [3] Consider using emergency physicians and ED nurses from administration roles and practice development [3] External specialty team staffing reviewed to identify spare capacity [3] Make additional diagnostic staff available in laboratories/radiology [1] Service managers ED and acute medicine to come to shop floor to assist [1] Consultant on call to attend the ED and consider calling in a second consultant [1] Additional phleb/IV access capacity to be deployed to the ED [1] Consultants to ensure specialist physicians with decisionmaking capability attend ED	[4] Additional review of patients by specialty to identify those who may be discharged	[5] Staffing across all ED areas reviewed to identify underused staff [3] Emergency physicians and ED nurses redeployed where this will best improve patient flow [2] Consider making registrar physician available to work with rapid assessment team [2] Site nurse practitioner to support ED with patient flow/discharge [1] Consider redeploying staff to coordinate front-of-house assessments [1] Consider redeploying staff to coordinate ambulance handovers [1] Assign designated treatment nurse in Urgent Care Center

IV, Intravenous.

action (eg, waiting times, departmental occupancy) than others.

Although codified actions were specified by the policies, these were devised as a way of behaving in response to a predicted situation, established before the event, and can be considered action-oriented rules.[27] These types of action responses have advantages such as saving time and effort in "reinventing the wheel" in known situations, and aim to increase capacity, reduce demand, or increase efficiency through predictability in response across staff. However, it has also been suggested that they may cause blindness to new situations, may cause resentment at a loss of freedom (possibly resulting in violations), and place higher demand on the system for rule supervision.[27] Our study of how escalation works in practice investigated how codified actions are implemented.

Observation of Escalation in Practice

The first task in observation of escalation in practice and understanding the landscape of escalation was to understand the important local context within which ED escalation takes place in the study hospital (Figure). Patients arriving by ambulance should be assessed within 15 minutes by the rapid assessment team or be taken directly to the resuscitation area (in the case of life-threatening illnesses or injuries). All other arrivals had to undergo front-of-house assessment, where they might be encouraged to visit a general practitioner surgery or specialist clinic instead. Patients still wishing to be treated were given a ticket, which started the visit timer, and were required to register at reception. After registration, patients waited until a nurse was available for triage. Once triage was complete, a patient was discharged home or directed to the urgent care center (low acuity); in some cases a handover to Majors (where serious illnesses or injuries are treated) was required. When patients arrive in Majors, where the majority of those arriving by ambulance are treated, the aim is to begin treating before the 1-hour treatment target (patients should begin treatment by a clinician within 1 hour of arrival). The study hospital had an Emergency Medical Unit (short-stay ward) in which patients who required additional diagnostics or treatment could be sent, distributing workload within the department and circumventing the 4-hour throughput rule.

Decisions to escalate were discussed at a meeting that was scheduled every 2 hours and attended by representatives who managed the different ED areas (Figure). This primarily occurred between 8 AM and 6 PM

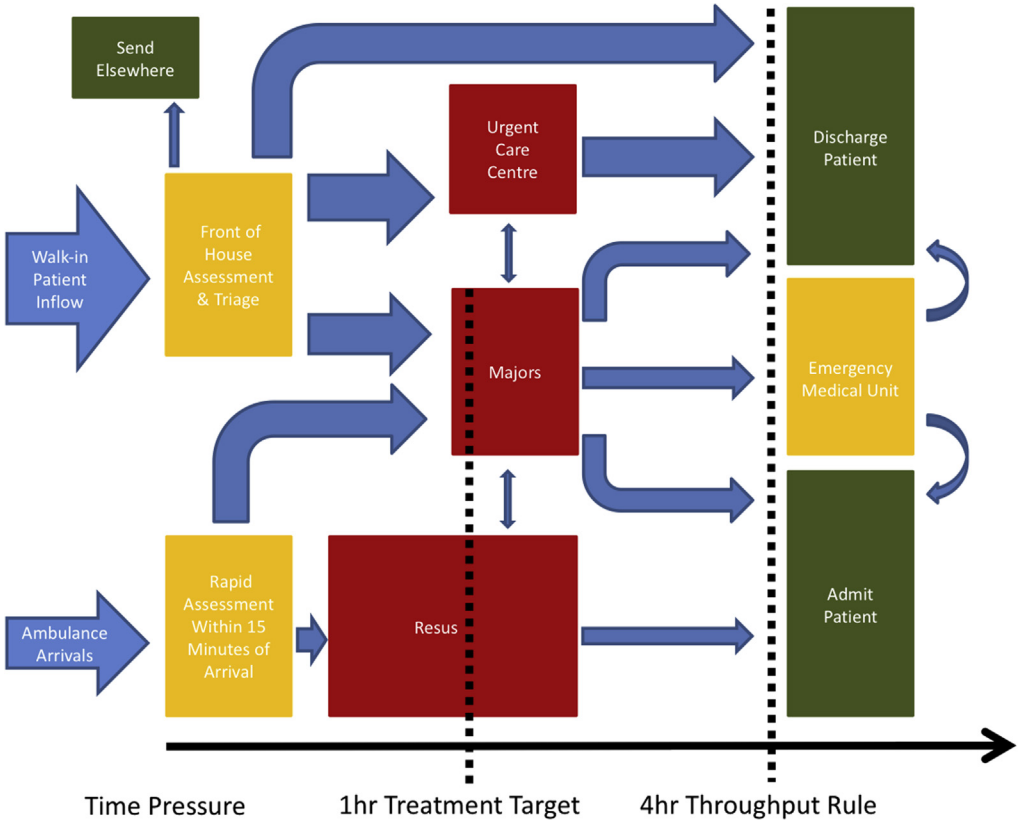

Figure. Simplified model of patient flow within the study hospital's ED.

on weekdays and less formally outside these times. In total, 60 of these meetings were observed. Formal escalation happened when the number of patients within the ED exceeded planned capacity. We report on examples that explicate these issues, and identify the prerequisites to performing the escalation action types identified in the policy analysis.

Table 2 summarizes actions that were taken to relocate patients and reconfigure the use of beds to align capacity with demand with illustrative excerpts from the data. When the department became busy, the reality of working under sustained pressure limited the extent to which 4-hour breaches could be averted. For example, some physicians in charge devoted their time and attention to patients with the greatest clinical need, meaning they could not always assist with patient flow management (observations 25, 27, and 28), even after being requested (observation 15). One consultant argued that when there is poor skill mix, physicians are motivated by clinical needs and patient safety rather than by adhering to the 4-hour access target (observation 23).

When pressure mounted, there was often a reduction in communication between team members and increased "silo working" on the part of the nurse in charge and physician in charge. These senior clinicians would often become overburdened, leaving the flow coordinator to cope alone, further slowing down patient flow. On a number of occasions, the flow coordinator had to enter "firefighting mode" and was observed looking for missing diagnostic results, finding missing documentation, looking for specialty referrals, and locating missing members of staff as a consequence of clinicians not having the capacity to monitor patient flow (observations 25, 27, and 28). Critically, there was individual variability in how key coordinating roles were performed. This affected the ability of the department to relocate patients. Some physicians in charge maintained the ability to oversee the department and proactively monitored junior physicians, asking them

Table 2. Relocating patients: escalation actions.

Escalation Action and Type	Example From Observational Data	Outcome
Relocating patients by sending them to another service. This attempts to reduce demand.	Occasionally patients were encouraged to consult a general practitioner or attend another health care provider (eg, a sexual health clinic) instead of waiting to be treated.	Conversations were oftentimes consuming and slowed front-of-house assessment (Observations 3, 6).
Relocating patients to a less busy area within the ED. This attempts to increase capacity for waiting patients.	There was very limited scope to relocate patients because of the physical limitations of the space. Capacity could sometimes be increased by reassigning cubicles in Resus for Majors patients undergoing treatment, or creating a chaired area in Majors where patients could sit and await test results instead of occupying cubicles.	When patient occupancy in the ED was high, there was invariably a lack of cubicle space to assess and treat patients. The escalation policy suggested that this could be dealt with by relocating patients within the department (Observations 17, 21).
	A consultant was observed telling a junior physician that although cubicle space was available, it would be unsafe to treat a patient in an area without adequate staffing for monitoring (eg, what happens if the patient unexpectedly deteriorates?).	Relocating patients was rarely straightforward. Reconfiguring the space created extra risks if the area was not fully staffed (Observation 25).
Expediting patient transfers to other areas in the hospital. This attempts to increase efficiency of patient relocation.	Successful expedited transfers required the ability to maintain an awareness of the state of the wider hospital system so that possible admission pathways were identified in anticipation of needs. This also enabled batch referrals, meaning that specialty physicians could review a batch of potential patients when in the ED rather than making multiple trips to see individuals, which reduced overall waiting time.	The ability to expedite transfers during escalation was found to depend on the effectiveness of the team working structure established between the physician in charge, nurse in charge, and patient flow-coordinator roles.
	The patient flow coordinator was a crucial role and helped by integrating data from a variety of sources, including IT systems and verbal updates from clinical staff, to make sense of how the department was functioning. Bottlenecks were preempted by ordering of diagnostic tests in anticipation of need to expedite transfers.	"Exit block" occurred when there was no bed availability or a lack of coordination resulted in the upcoming availability of beds not being monitored (Observations 4, 12, 13, 17, 23, 26).

for case presentations to expedite decisionmaking to enable patients to be relocated (observations 13 and 17). Silo working was observed when the physician in charge did not take an overseer role and escalation actions that were codified were not implemented (observations 25, 27, and 28). However, this was not exclusively a problem associated with the physician-in-charge role. For example, the nurse in charge sometimes helped with the assessment of newly arrived patients, which increased workload for the patient flow coordinator when planning patient transfers. An overburdened flow coordinator was unable to maintain situation awareness, slowing down patient transfers.

Information availability also greatly limited the ability of the team to monitor patient flow. Adaptations were rarely straightforward because of the difficulty of monitoring a patient's journey through the ED and the uncertainty or complexity of patient flow. Despite the presence of an information technology (IT) system that tracks a patient's stay in the department, there was no artifact in use (such as a whiteboard) that could be used to maintain a shared awareness of patient flow. Awareness was maintained mostly by the patient flow coordinator, who was located next to the IT system screen.

Table 3 shows escalation actions involving additional staffing with illustrative excerpts from the data. Hospital-wide escalations that attempted to garner staff from elsewhere were sometimes not instituted because of the likelihood of no response, or when they did happen, the intended increase in capacity was compromised by a skill mix problem. Recovery from skill mix problems required further action involving flexing staffing within the department. The most reliable method of obtaining additional staff involved the use of ED staff working in nonclinical roles. However, awareness of the need to avoid fatigue and burnout meant that this response was not relied on if escalations happened frequently.

Table 3. Additional staffing: escalation actions.

Escalation Action and Type	Example From Observational Data	Outcome
Codified escalation involved reassigning senior ED clinicians who were working in nonclinical roles (desk work) to clinical roles. This attempts to increase capacity by using existing known resources.	Occurs relatively frequently and is effective when dealing with a surge in inflow that threatens the overall performance of the ED. If the escalation requires more than 2 h of additional input, then effectiveness degrades because the response is less enthusiastic.	Staff lost time to perform other important activities such as administration, teaching, and developing quality improvement initiatives, to the detriment of the department. It was also in addition to their rostered clinical duties and could contribute to increased levels of burnout and fatigue, both of which are recognized issues (Observations 17, 21, 22).
Codified hospital wide escalation where staff from other areas of the hospital arrived in the department to assist. This attempts to increase capacity by garnering extra staff.	This option, although imagined as a mechanism for increasing capacity, significantly increased the workload for senior staff, who had to assess how many staff arrived and their skill level, and perform handovers to incoming staff.	In one observed situation, coordinating this process took approximately 30 min to complete. The nurse in charge found that 3 of the additional nursing staff were not able (lack of qualifications) or willing (lack of experience) to perform intravenous infusions, necessitating the reallocation of these incoming nurses to other ED areas. An experienced nurse was then seconded from triage (flexing staff) to perform intravenous infusions in the Majors area (Observation 9). Similarly, in 2 other observed situations, extra workload was created for the physician in charge because incoming physicians needed handover and support to understand the work flow before they could contribute to easing the pressure (Observations 12, 25). More often than not, external escalation did not result in additional physicians being sent from other departments. Not knowing the response makes the advanced planning of resources difficult (Observations 9, 21).
Adjusted codified hospital-wide escalations. Often no attempt was made to increase capacity.	External escalations that attempted to garner staff from elsewhere were sometimes not instituted because of the likelihood of no response.	In the evening, there was likely to be a degraded response to escalation from specialties, so the department chose not to formally escalate despite that triggers were met (Observations 17, 24).

Although the escalation policy recommended adjustments to processes in some situations, these were rarely observed. One reason was that physicians in charge were observed to be risk averse and prioritized clinical care over the 4-hour target. One physician in charge instructed his junior physicians to ignore the 4-hour throughput target and said that it was "[his] job to worry about that" (observation 7). This was clearly to take pressure off them and increase their focus on patient care. Similarly, junior physicians were observed being encouraged to be thorough and order the full range of diagnostic tests even when the department was busy (observation 30). Observations showed that the escalation policy was sometimes not invoked even when conditions for escalation were met (observations 7, 9, and 15). During busy periods of the year, it was historically deemed important not to call escalations too frequently because it might result in a degraded response ("crying wolf"). Recent departmental policy encouraged escalations when conditions were met, and a failure to escalate would sometimes result in a reprimand from service managers, especially when targets were not met. Hospital management requires the ED to trigger the escalation policy even when ED staff do not believe that doing so will be beneficial (observation 30).

In situ interviews revealed that the best way of identifying opportunities to adjust processes was to instigate a board round (patient situational review). Board rounds involved a standing meeting of all the physicians who had patients assigned to them in the Majors area (all observations). In one observed situation (observation 9), the ED met the occupancy triggers for an external escalation, but after the board round it was decided that it should remain at internal escalation. Each physician briefly reported on whether his or her patients could be expedited for admission or discharge. This resulted in one third of the patients' being identified as ready to leave the ED, and the specified call for further escalation was averted. It logically follows that if the department is very busy, then there may be no time for opportunistic board rounds. In one observed situation (observation 15), the nurse in charge had lost track of plans made for a number of patients and suggested to the physician in charge that a board round might help clarify the situation. However, the physician in charge was busy managing a complex patient case and was reluctant to interrupt work flow. The lack of a board round at that time had a downstream effect on planning, and at least some 4-hour target breaches might have been avoided if a board round had been held.

Table 4 reports on the flexing staffing escalation action type with illustrative excerpts from the data. Unfortunately, flexible staffing was sometimes difficult to coordinate, leading to a lack of awareness among team members. Actions that were responsive adaptations had consequences that also needed to be anticipated; consideration and ownership of associated risks involved in these adaptations were important. Furthermore, when a staff member had

Table 4. Flexing staffing: escalation actions.

Escalation Action and Type	Example From Observational Data	Outcome
Flexing staffing so that bottlenecks may be avoided was a normal part of managing the variability in patient flow (this included the flexing of physicians, nurses, and administrative staff). This attempts to increase efficiency.	Staff were flexed before the need was raised at the 2-h situational report meeting.	This enabled the department to quickly respond to pressures (Observations 16, 26).
	The ability to flex staff in response to needs does, however, present problems for effective team coordination. During flexing, staff often cannot be contacted easily by colleagues who may need to query an aspect of patient care.	Time wasted locating colleagues, missing notes, and blood samples (Observations 12, 16, 17).
	During escalation, flexing happened more frequently and was often informal.	In one case, a Resus consultant who was flexed to Majors left after reviewing a patient, and a nurse was then unable to locate the consultant to query an outstanding issue (Observation 27).
	The rapid assessment team physician decided to work alongside the triage nurses to expedite the treatment and discharge of low-acuity patients so that the capacity to assess newly arrived patients could be increased. This need had been identified independently of the discussions of escalation.	Although this decision to help in triage was indeed made in coordination with the nurse in charge, the physician was busy with other duties when an ambulance patient handover was required; no one else in the team knew where the physician was and the handover was delayed (Observation 12).

been flexed into a new role, how was the ongoing effect on the system monitored or assessed? When was it time to switch the staff member back to his or her original role? There were no mechanisms in place to help with this type of planning.

Although the escalation policy specified the patient numbers that should trigger an escalation, in practice, skilled practitioners used their expertise to decide when escalation was necessary. Escalation decisions were made at patient flow meetings held every 2 hours and attended by representatives managing the different ED areas, depicted in the Figure. During patient flow meetings, other informal responses to the buildup of patients at crucial waiting areas in the department were decided on and implemented. Codified escalation was rarely discussed and avoided if at all possible.

Invoking escalation often created additional demands at the very time demand was highest and threatened to overwhelm the department's capacity to maintain patient flow. Extra demands were created by the need to plan the escalation, prioritize needed actions, coordinate handover to incoming and reassigned staff, and assess the skills of staff and match these to the areas of need. Many actions were "shop-floor actions" and were successful because escalation is experience based and case reasoned rather than an easily codified process. Without the ability of the system to perform adjusted shop-floor actions, there would be few successful escalation actions. Furthermore, judging the right time to escalate was difficult; staff wanted to avoid unnecessary escalation but needed to take action before it was too late for escalation to be effective. Learning this skill was challenging, and getting it wrong was highly visible throughout the hospital and had serious consequences for the department.

LIMITATIONS

This qualitative study used longitudinal independent observations of escalations across a range of ED locations and functions. In line with quality criteria for qualitative studies,[28] we identified a well-defined research question, clearly described our data collection and analysis methods, and ensured that coding and interpretation of data were discussed within the research team and that coding reliability was tested as appropriate. We used data extracts to illustrate our conclusions and identified implications for health care organizations. However, the study was conducted in a single organization, and although this enabled us to capture and understand the subtle and nuanced everyday work of patient flow management, further studies could investigate how many of these actions may be specific to organizations of a similar type (eg, large site, teaching hospital). The escalation policies that we studied were broadly similar across a range of organizations, and this suggests that the types of adaptations we observed might also be found in other organizations. The classification systems and models we used in this study could be further tested in other studies and used as a resource for individuals interested in further study in this dynamic area. The broader policy analysis covered a range of institutions, and we are confident we have captured broadly the types of escalation actions that are planned, their general goals, and which are the most frequently codified.

DISCUSSION

This study, following a published protocol based on resilient health care theory, involved extracting and classifying escalation actions for EDs found in policy, and observing actual escalations longitudinally in practice. We have described how formal attempts to specify what to do when demand increases or capacity is reduced do not capture the full extent to which the observed ED system adapts to variable and sometimes unexpected demands, and that specific actions may have positive and negative effects, depending on context. We found many examples of successful adaptations implemented by staff when the ED was under pressure, including pre-empting the need for escalation, using efficient practices such as board rounds to expedite flow, and flexing staffing to areas within the department under pressure.

Findings from this study have highlighted that the common codified actions discussed below require in situ adaptation to be successful.

When patients were relocated, the ability to expedite transfers during escalation was found to depend on the effectiveness of the team working structure established between the physician in charge, nurse in charge, and patient flow-coordinator roles. Successful adaptations required the ability to maintain an awareness of the state of the wider hospital system so that possible admission pathways were identified in anticipation of needs, and batch referrals to specialty services could be planned to reduce waiting times.

When extra staff are garnered in an attempt to increase capacity, adaptations and adjustments are required to keep the system functioning while new staff are inducted and tasks are handed over. External escalation could lead to emergent effects that were the opposite of those intended (such as increased workload rather than increased capacity); knowledge of internal staffing resources tends to be higher than that of external staffing resources, which need to be managed with care. Recovery from skill mix problems

required further action involving flexing of known staffing resources within the department.

When processes were adjusted, successfully expedited patient journeys were reliant on getting the delicate balance between continuing with clinical work and interrupting work flow to perform planning activities right. Being sensitive to these pressures highlighted the need for awareness based on experience and expertise to avoid initiating unnecessary escalations based on codified indicators alone.

When staffing was flexed, the ability to anticipate bottlenecks and prioritize actions accordingly was necessary for successful outcomes such as safely managing patient flow and staff workload. However, actions that were responsive adaptations had consequences that also needed to be anticipated, such as communication breakdowns caused by information not being disseminated by a member of staff who had been flexed elsewhere.

When the ED is under pressure, normal processes are adapted to manage pressures informally and dynamically. This adaptive capacity (work as done) was found to be incompletely specified in policies (work as imagined). Escalation actions, although enshrined in policy documents, are adapted in practice to maximize patient flow and avoid potential negative adverse effects of escalating. Unlike the imagined action-orientated policy responses, in practice adaptations were more goal oriented.[27] These responses allowed autonomous behavior (eg, toward the goal of efficient throughput) without specifying how such goals should be achieved. At times the escalation policy was triggered without any expectation that it would help. Such policies serve multiple purposes, including satisfying hospital reporting requirements and documenting pressure on the system.

There are a number of implications of the work that we think are useful take-home messages for ED managers and clinicians to consider.

Successful adaptations to policy to achieve key efficiency goals have been observed here in situ, but are not fully specified in policy. Learning from these adjustments is unlikely because investigation and reporting usually takes place only when performance is suboptimal. This is a generic problem in health care[29]; we react to problems rather than learning what is working well and why. Although individual staff and colleagues may of course learn from observing others, systematic organizational-level learning about adaptive capacity in the system is often lacking. This is important because without routine study of what constitutes successful adaptation, it may be simply assumed the policy is the important driver (see below), which is not what our evidence suggests, and the ability to respond to pressures may not be optimal.

Internal performance reports should be encouraged to include informal adaptations undertaken to make the system work under pressure, as well as what these were in response to (eg, surges in attendance or high acuity, staffing shortages, equipment failures, bed availability). This matching of diagnosis and response can give a fuller picture of the "pathways to success" available to managers, some of which may be less than fully understood.[30] Much insight can be gained organizationally from the extent to which clinicians have developed their own adaptive strategies to manage patient flow. Analysis of the relative merits of the opportunistic versus the codified (eg, for board rounds) might help improve efficiency.

The main policy implication is that there should be mindful recognition and consideration of the fact that formal policies do not always match the situations that staff need to respond to; there will always be local contingencies that have to be taken into account in situ. Failure to recognize this could lead to the creation of "secret" policies that reflect the real way to achieve things.[18] The development of underground practices can erode the ability of teams to share and discuss the learning from them, or to reflect on any inherent risks. Understanding the gap between work as imagined and work as done is crucial for improvement efforts, which could involve better alignment between policy and practice, or explicitly supporting in situ adaptations made by teams with expertise in patient flow. Real-world escalation is fundamentally about trading off efficiency and thoroughness goals.[16] Thus, responses to strategies used should be less about whether they were procedural (action oriented) and more about whether they were able to achieve goals while preserving the common conventions of safe, quality patient care.

Kreindler[31] argued that EDs struggle to achieve anything more than small-scale localized gains when attempting to improve patient flow, outlining common design flaws. Furthermore, a lack of evidence on how throughput and output interventions work in practice is said to lead to difficulties in implementation.[6] Our approach to studying what happens in practice provides a basis for understanding the opportunities for improvement and the barriers to more efficient working.

CONCLUSIONS

It is now recognized that health care systems are complex and dynamic and interventions often have multiple components and mechanisms.[32] Developing and evaluating interventions thus requires theorizing to inform intervention design and modeling of mechanisms and

contextual factors likely to come into play.[33] This study was explicitly carried out as a preliminary stage toward codesigning an intervention with hospital partners. Our findings support the view that interventions are unlikely to succeed (or be meaningfully appraised) without at least some understanding of likely barriers and facilitators to improvement. Furthermore, interventions that support the natural capacity in the system for flexible response to goals, as observed here, should be considered alongside the traditional model whereby interventions attempt to specify standard working (for example, through education and training).[34]

Escalation policies outline actions that aim to manage high levels of workload. They do not explicitly outline the prerequisite conditions that are needed to enable a successful escalation. Our findings suggest that escalation actions require careful review to ensure that they are helping to manage workload. Work as done is not completely specified by policies. Indeed, it could be argued that the ability of the ED to make adaptations in situ is critical for patient safety. However, we need to better understand why some adaptations lead to desirable outcomes and others result in failure. Thus, for successful intervention it is critical to capture what adaptations are made, rather than assuming it is the policies that enabled the workload to be managed well or poorly.

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DIAGNOSIS:

Handlebar hernia with bowel perforation. Abdominal CT scan demonstrated an abdominal wall defect with herniation of the small bowel and evidence of perforation (Figures 2 and 3). Laparotomy resulted in resection and primary anastomosis for complete jejunal perforation and repair of the abdominal wall defect (Figure 4).

Handlebar injuries are common in children. Most such injuries are superficial; however, some can be associated with serious injuries.[1] Dimyan et al[2] introduced the term "handlebar hernia" in 1980 to describe a traumatic abdominal wall hernia as a result of handlebar injury. Concomitant internal organ injuries have been reported in up to 70% of cases.[1]

Only 50% of patients with traumatic abdominal wall herniae have cough impulse and reducibility; this may lead to misdiagnosis as an abdominal wall hematoma. Presence of bowel sounds over the swelling, although rarely found, may be a helpful physical finding.[3]

A high degree of suspicion and a low threshold for CT is recommended to overcome diagnostic difficulties and to identify underlying organ damage associated with this condition.[1,3]

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