

Working together in emergency care? How professional boundaries influence integration efforts and operational performance

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Abstract

Purpose – Emergency care delivery is a process requiring input from various healthcare professionals within the hospital. To deliver efficient and effective emergency care, professionals must integrate rapidly at multiple interfaces, working across functional, spatial and professional boundaries. Yet, the interdisciplinary nature of emergency care presents a challenge to the optimization of patient flow, as specialization and functional differentiation restrict integration efforts. This study aims to question what boundaries exist at the level of professionals and explores how these boundaries may come to influence integration and operational performance.

Design/methodology/approach – To provide a more holistic understanding of the inherent challenges to integration at the level of professionals and in contexts where professionals play a key role in determining operational performance, the authors carried out an in-depth case study at a busy, Level 1 trauma center in The Netherlands. In total, 28 interviews were conducted over an 18-month period.

Findings – The authors reveal the existence of structural, relational and cultural barriers between (medical) professionals from different disciplines. The study findings demonstrate how relational and cultural boundaries between professionals interrupt flows and delay service processes.

Originality/value – This study highlights the importance of interpersonal and cultural dynamics for internal integration and operational performance in emergency care processes. The authors unveil how the presence of



professional boundaries creates opportunity for conflict and delays at important interfaces within the emergency care process, and can ultimately accumulate, disrupting patient flow and increasing lead times.

Keywords Service operations, Case study, Organizational structure, Healthcare sector

Paper type Research paper

Introduction

Delays in the emergency care process can cause significant disruption to patient flows in, through and out of the emergency department (ED) (van der Veen *et al.*, 2018). Even small delays throughout the process can accumulate, significantly increasing lead times and lead to crowding. ED crowding is an ongoing and increasing challenge across many countries (Gaakeer *et al.*, 2018), with serious consequences for both health systems and patients. Crowding disrupts processes of care necessary to effectively treat patients with urgent and emergent conditions and is linked to patient mortality, medical errors and complications, increased length of stay and high costs (Sun *et al.*, 2013). Yet, the interdependent and interdisciplinary nature of emergency care presents a persistent challenge to flow optimization and timeliness of care as structural differentiation and specialization continue to severely restrict collaboration (Thijssen *et al.*, 2013; Meijboom *et al.*, 2011) and integration efforts in healthcare (Drupsteen *et al.*, 2016; Finn, 2008). Studies indicate that poor coordination of care when multiple specialists are involved and delays in consultations and decision-making are key factors responsible for prolonged time to completion on the ED (>4 h) (Driesen *et al.*, 2018; van der Veen *et al.*, 2018; Vegting *et al.*, 2015).

To overcome ongoing integration challenges, many healthcare systems are incorporating insights from operations management (Dobrzykowski *et al.*, 2014; Nugus *et al.*, 2014). However, with the bulk of operations management (OM) research derived from the manufacturing environment, traditional approaches to the study of internal integration often overlook crucial factors that contribute to the enhancement of performance in healthcare operations. Hospital operations, for instance, differ from manufacturing operations in many ways (Chen *et al.*, 2013; Dobrzykowski *et al.*, 2016; Dobrzykowski, 2019), including their knowledge intensity and reliance on professional actors who have high autonomy (Mintzberg, 1993) and play a central and influential role in supply selection and delivery (Abdulsalam *et al.*, 2018; Chen *et al.*, 2013). In emergency care, there is the added element of urgency where care is a more *ad hoc* process and focuses on a “here and now” timeframe (Lillrank, 2012). Due to uncontrollable demand, the use of standardization and planning tools are limited (Lillrank *et al.*, 2010), and teams are “fluid” (Arrow and McGrath, 1995), making them highly variable and limiting the development of long-term orientation needed for integration (Leuschner *et al.*, 2013).

In the current study, we utilize data from an in-depth case study to critically examine the integration challenges between professionals mutually responsible for the acute care process in the hospital (i.e. from arrival at the ED to admission/discharge). In addition to the literature on internal integration, we draw upon insights from the sociological literature that explicate the central role of social interactions and negotiations between actors (Abbot, 1988) in determining a patient’s trajectory (Nugus *et al.*, 2010) in the care process. Prior work has demonstrated that, despite the need for integration, medical professionals work largely independently within specialty silos (Hewett *et al.*, 2009) forming, maintaining and defending professional boundaries as part of their everyday work (Powell and Davies, 2012; Nancarrow and Borthwick, 2005). As Wright *et al.* note, “this can seed conflict in communication, coordination, and jurisdictional responsibilities (Hewett *et al.*, 2009) as specialists perform interdependent routines within organizational practices (Spee *et al.*, 2016)” (2017, p. 203).

We, therefore, question *what boundaries exist at the level of professionals* and explore *how these boundaries influence integration efforts and operational performance* as professionals

work at multiple interfaces to move patients swiftly through the emergency care process. We offer new insights by examining internal integration between different medical disciplines or specialties, defining internal integration in this context as “the process of interaction and collaboration in which medical professionals from different disciplines work together in a cooperative manner to arrive at mutually acceptable outcomes for their healthcare organization and patients” (adapted from Pagell, 2004). We focus on interactions and collaboration between physicians across departments and specialties that all are (at least partially) responsible for the emergency care process. Data were collected in a busy, Level 1, trauma center that recently reconfigured the ED to improve ED flow. The focus of our research was not on the (success of the) reconfiguration itself, but rather it provided an opportunity to have medical professionals reflect upon organizational influences in emergency care processes.

With the present study, we make the following contributions to the field of operations management. First, our research highlights the importance of revisiting our notion of internal integration to assess its applicability when considering interactions and collaboration between professionals. By focusing attention on the importance of professional relations, we add to and expand the growing body of literature on internal integration (Leuschner *et al.*, 2013; Pagell *et al.*, 2004) and on professional service operations more generally (Balthu and Clegg, 2021; Harvey *et al.*, 2016; Lewis and Brown, 2012) and support the need for more research on antecedents of integration (Turkulainen *et al.*, 2017). Secondly, we take up the call to increase our understanding of interprofessional interfaces and their effects on operational outcomes (Harvey, 2016). Within operations management, there is recognition that the studying of interpersonal and team dynamics become increasingly important as knowledge work becomes more salient in operational processes (Edmonson and Nembhard, 2009; Huckman *et al.*, 2009; Huckman and Staats, 2011). Importantly, our study highlights the importance of giving more attention to relational and cultural dynamics in operations management (see also Chen *et al.*, 2013) by showing how these dynamics influence the achievement of internal integration (Pagell, 2004) and ultimately, operational performance (e.g. lead times, patient flow) in professional service contexts (Driesen *et al.*, 2018).

Theoretical framework

Patient flows in emergency care

Our focus in this research is on a specific process and patient flow within the hospital, a patient’s journey through the ED. In this patient journey, there are several process steps that a patient must go through to be assessed, diagnosed, receive interventions and, ultimately, be discharged from the ED (see Nugus *et al.*, 2014, for a detailed depiction of this non-linear process). Discharge can occur either via admission to the hospital, discharge home or to an external provider (see Figure 1 for flow chart). Importantly, there are several key decision moments throughout this process when professionals from different specialties, departments and functions must integrate rapidly to determine the trajectory of a patient’s journey through and, ultimately, out of the ED. As patient care becomes increasingly complex, and

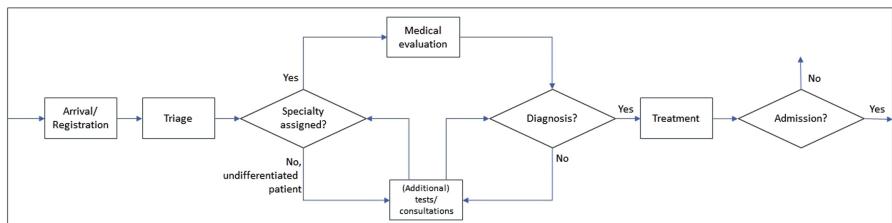


Figure 1.
ED process

patients suffer from multiple morbidities, the process becomes even more complicated (e.g. more decision-making moments, ambiguity and need for consultation) and time consuming (see also Mintzberg, 1993) as the prevalence of interdisciplinary interfaces increases. However, literature has shown that the involvement of multiple specialists and delays in consultations and slow decision-making are key factors in long lead times (Driesen *et al.*, 2018; Vegting *et al.*, 2015).

The particular challenge of these interdisciplinary interfaces in emergency care is that they are often *ad hoc* and dependent upon specific patient needs (pathology, comorbidities and emergent symptoms) and specialist's availability. *Ad hoc* teams are characterized by “*rapid formation, an abbreviated lifespan and often limited experience working together previously*” (Weaver *et al.*, 2014, p. 363), which are factors that can create barriers to integration. Complications at these interfaces can create delays that impact lead times (e.g. by increasing time to treatment or consultant signoff) and can contribute to crowding (Morley *et al.*, 2018). While literature on professional service operations emphasizes the importance of knowledge exchanges and collaboration between actors (Lewis and Brown, 2012; Ellram *et al.*, 2004), our theorizing often falls short of considering the unique nature of interprofessional interactions and interfaces, leaving us “blind to leverage points where the right pressure, adroitly applied at the right time and place, could bring about desired change” (Harvey *et al.*, 2016, p. 7). In such knowledge-intensive operational processes, it is, therefore, important that we give more attention to this level of interaction (see also Frangeskou *et al.*, 2020), as it is precisely these “human” processes that contribute to the level of complexity involved (Ellram *et al.*, 2004).

A focus on professional integration

Research has shown that integration between professionals is particularly difficult to achieve due to specialization and organizational compartmentalization (Ferlie *et al.*, 2005; Hewett *et al.*, 2009; Wright *et al.*, 2017), which can create “professional inward-directedness” (Saltman *et al.*, 2006) that restricts integration. Hospital organizations remain, for the most part, functionally and structurally differentiated, forming “pragmatic boundaries” (Carlile, 2002) between professional groups and sub-disciplines (specialties). Differentiation and specialization function to provide a valuable division of labor and can promote efficiency (Lillrank, 2012), yet they also encourage the creation and reinforcement of boundaries between professionals and require integrative strategies to overcome fragmentation, break down functional barriers (Zhao *et al.*, 2011) and optimize flow (Drupsteen *et al.*, 2013).

In this study, we focus on internal integration between medical professionals, defining internal integration in this context as “the process of interaction and collaboration in which medical professionals from different disciplines work together in a cooperative manner to arrive at mutually acceptable outcomes for their healthcare organization” (adapted from Pagell, 2004). Following Leuschner *et al.* (2013), we view integration as multi-dimensional, requiring the fostering of trusting relationships (relational integration), sharing of information and knowledge (information integration) and joint working (operational integration). We apply these dimensions to the level of individual interactions between professionals, whereas they are normally studied at the level of departments (e.g. purchasing, manufacturing) or organizations (e.g. external). While each dimension is often tested separately in the literature, scholars have argued that all dimensions are highly interrelated and play a key part in determining performance (Leuschner *et al.*, 2013) and should, therefore, be considered together (Van der Vaart and van Donk, 2008). For instance, studies have shown that the interpersonal elements are a key part of ensuring information flow (Power, 2005), and that communication and clarity about roles and responsibilities enable joint coordination of actions and decisions (Meijboom *et al.*, 2011).

In knowledge-intense interactions, professionals work jointly at different parts of the process and in different ways, to share their tacit knowledge and expertise. The relational elements in such interactions can play an important role in speeding up flow, or in the willingness to share information and expertise. In healthcare, professionals are interdependent and rely on one another to support the patient journey (Senot *et al.*, 2016). Integration in healthcare is critical because poor integration across providers can lead to delays, resulting in poor quality and unsafe care (Meijboom *et al.*, 2011), and research shows that as a result of poor coordination, medical errors are higher for patients who are treated by multiple doctors (Schoen *et al.*, 2007). The necessity and importance of interdisciplinary consultation is only increasing as patient care has become more complex (e.g. patients with co- or multi-morbidities) (Nolte and McKee, 2008), and lead times for these patients increase (Sampalli *et al.*, 2015), making integration essential. Patient complexity creates situations of ambiguity, e.g. what specialty the patient belongs to, or can create the need for more consultation or diagnostic use to determine a course of action for patients, increasing the potential for delays and requiring a high level of integration across all dimensions of integration. To deliver safe, efficient and effective care, medical professionals need to communicate and share information about patients' symptoms and diagnosis (information integration) (Hewett *et al.*, 2009), coordinate care processes and make joint decisions about treatment (e.g. whether to admit or discharge a patient) (operational integration) and foster and maintain relationship attributes like trust and commitment (relational integration) (Leuschner *et al.*, 2013; see Table 1).

Challenging integration and performance: the role of professional boundaries

Despite the importance of integration in healthcare processes, the current division of labor and organization of care delivery continues to form and reinforce boundaries between groups (Lilrank, 2012; Carlile, 2002). "Boundaries" are defined as demarcations that help to distinguish groups from one another (Comeau-vallee and Langley, 2019) and act as tools "by which individuals and groups struggle over and come to agree upon definitions of reality"

Professional integration: Dimensions	Information	Operational	Relational
Definition	Coordination of information and knowledge transfer, collaborative communication and supporting technology among <i>professionals</i>	The collaborative joint activity development, goal alignment, work processes and coordinated decision-making among <i>professionals</i>	Strategic connections between interdependent <i>professionals</i> characterized by trust, commitment and respect
Examples emergency care	-Sharing expert knowledge and information (consultation) -Communicating directly with other professionals (collaborative communication)	-Specialists across departments coordinating their work processes with ED demand -Multidisciplinary consultations -Linking ED and specialist resources to coordinate patient transfers	-Trust between ED staff and specialists -Commitment to the ED and ED process improvement -Respect of knowledge and competencies

Table 1.
Dimensions of professional integration

Source(s): Adapted from Leuschner *et al.* (2013)

(Lamont and Molnar, 2002, p. 168). However, boundaries are not self-sustaining; they exist within and emerge from interactions (Giddens, 1984) and are supported by organizational and individual efforts (Comeau-Vallee and Langley, 2019). Prior empirical work has shown that medical professionals experience and work to establish, maintain and defend professional boundaries as part of daily work (Nancarrow and Borthwick, 2005; Powell and Davies, 2012).

In practice, boundaries are multilayered, and may result from [and be reinforced by] status differences, socialization processes (Finn, 2008), functional differentiation, diverse approaches to work and localized norms and values (Hewett *et al.*, 2009). For example, a large body of OM literature has focused on the challenges of internal integration between functional departments such as purchasing, manufacturing, operations and sales (e.g. Ellegaard and Koch, 2012) due to boundaries between these groups. In healthcare, medical professionals undergo a long educational and socialization process that institutionalizes divisions and hierarchical relations between roles (Finn, 2008) and within professional groups (Powell and Davies, 2012). These divisions are further enforced at the organizational level as physicians are spatially separated and organized into specialty departments, working in specialty silos (Spee *et al.*, 2016), with limited coordination between providers (Ferlie *et al.*, 2005; Thijssen *et al.*, 2013). Such a scenario can create significant barriers to improving internal integration as “the tendency is towards conflict and contestation to the detriment of professional integration” (Finn, 2008, p. 108).

To manage cross-boundary connections, actors may engage in attempts to “close” (e.g. reinforce distinctions) or “open” (e.g. expand, redraw) boundaries (Cregard, 2018), inhibiting or enabling integration. Such shifts are most likely to occur when prompted through organizational change (Hernes, 2004). This makes our current context an interesting case in which to view how boundaries come to be negotiated, shifted or created as the result of efforts to improve care processes, and to examine the resilience of boundaries at important interfaces in the patient care process. To demonstrate how interprofessional dynamics can influence important operational outcomes, we explore the influence of professional boundaries on integration and operational performance, defined here as flow and speed.

In acute settings, performance concerns the speed in which a patient is seen, assessed and a treatment pathway is determined and executed. Integration plays a key role in improving care processes and may lead to shorter lead times and better service to the customer (Power, 2005), better care and improved patient flow (Meijboom *et al.*, 2011). Yet, the task of integrating disparate professionals remains an ongoing challenge for healthcare systems worldwide, and there remains a lack of attention to the individual level in the general OM literature (Dai and Tayur, 2020). We suggest that a focus on the factors at the professional level that impede or support integration (i.e. boundaries) may help us to offer insights that may be overlooked, with a focus at the level of firms or functions, and allow us to attend to the unique challenges facing integration in professional service contexts.

Methodology

Since little is known about the antecedents to integration at the professional level, and the translation of operation management practices to healthcare settings is still debated, we conducted an instrumental, single case study (Stake *et al.*, 1995). While we used *a priori* constructs (internal integration, patient flow) to help guide our study (Eisenhardt, 1989), our research was primarily exploratory and conducted in line with a grounded theory approach (Strauss and Corbin, 1998). Case study research is particularly suited for the topic of interest for two reasons. First, it allows us to explore the unique dynamics of integration in the professional service context (Baxter and Jack, 2008), and to provide rich descriptions and insights (Gioia *et al.*, 2012) into the specific mechanisms and barriers that exist between professionals within the care process. Secondly, a case study approach allows us to unravel

previously underexplored mechanisms and in areas where prior theory is largely missing. While most studies focus on integration between organizations or firms, or between subunits and departments, missing from our theorizing is a deeper conceptualization of how integration plays out at the professional level and the consequences of this for operational performance.

Case selection and setting

We purposively selected our case organization (Stake, 1995) based on its ongoing efforts to improve acute care performance and a high demand for services. Haaglanden Medical Center (HMC) is an inner-city, Level 1 trauma center in The Netherlands. The ED at HMC is one of the busiest in The Netherlands, with over 50,000 patients visiting annually and a 20% admission rate (van der Linden *et al.*, 2018). During the study period, HMC was trialing a six-month reconfiguration (October 2017–March 2018) to co-locate medical specialists from five key specialties (cardiology, neurology, surgery, internal medicine, radiology) to the ED. While the reconfiguration is not the focus of the present study, this context provided a rare opportunity to examine how structural changes influence integration over time. During the trial period, specialists were physically located in the ED during peak hours (12–8 pm) and worked alongside emergency physicians (EPs) and residents.

Our unit of analysis is professional dyads involved in emergency care delivery (i.e. the interactions between professionals), although in a final stage of analysis, we also aggregate findings to consider insights and make comparisons at the group level (i.e. medical specialists versus EPs, specialty groups). We were provided with a list of internal contacts from the fourth author and management involved with the ED interventions. Contacts were invited in the first and third round via email, and in the second round, in addition to email invitations, a researcher (first author) was onsite for observations and introduced the morning meeting held between specialists and EPs. In place of scheduling, physicians could stop by the researcher's designated room on the ED for interviews at a convenient moment before, during or after a shift, reducing the burden on respondents. Specialists were selected to represent a variety of opinions toward ED involvement and level of experience, and we only sampled specialists from specialties who have frequent interactions with and responsibility for the ED and ED patients. We sampled from the entire pool of EPs ($N = 12$) to get a variety of views, and we selected respondents across levels of experience, age and gender. The study was granted ethical approval by the internal review board of the faculty of *redacted for blind peer review*.

Data collection

Interviews were conducted at three time points (at the beginning, during and after the colocation trial period) to see if and how professional dynamics and boundaries shifted over time and in response to structural change. Two rounds of interviews were conducted during the trial period from November 2017–March 2018, and follow-up interviews with a small subset of participants were conducted in October 2019. In total, 28 in-depth interviews were conducted onsite and were recorded, transcribed and coded by two researchers (see Table 2 for a list of interviewees). In total, 25 interviews were conducted with EPs and specialists from the key specialties that interact most frequently with the ED. One emergency nurse practitioner and two managers were also interviewed for context. Interviews lasted between 30 and 60 min, and respondents gave verbal permission to be audio recorded. Respondents voluntarily engaged in interviews and provided informed consent. Respondents were informed that identifying information would be anonymized, so they could speak openly.

In line with an inductive approach, we used a semi-structured interview guide. We asked respondents about their work and collaboration with other professionals in the ED, their responsibility for emergency care and to reflect upon care delivery processes. We also gave

Table 2.
List of interviewees

Phase 1 November 17–January 18		Phase 2 January 18–March 18		Phase 3 October 19–December 19	
1	Project manager	11	Cardiologist	23	Neurologist
2	Surgeon	12	ENP	24	Radiologist
3	Intensivist	13	Surgeon	25	Surgeon
4	Internist	14	Neurologist	26	Cardiologist
5	Surgeon	15	Surgeon	27	EP
6	Neurologist	16	EP	28	EP
7	EP	17	Internist		
8	EP	18	Cardiologist		
9	EP	19	Internist		
10	Radiologist	20	Care manager		
		21	EP		
		22	EP		

respondents space to reflect upon how they felt collaboration functioned before, during and after the reconfiguration, and discussed ongoing challenges and suggestions for improvement. Key issues discussed included the sharing of knowledge (e.g. consults, supervision), making diagnostic and treatment decisions, and relational dynamics between specialists and between specialists and EPs, such as the quality of their interactions and collaborations. In the final part of interviews (if it had not emerged naturally), we asked respondents to comment on how their collaboration with other professionals impacted performance specific to the ED, namely, patient flow and speed.

In addition to interviews, a day of observation with staff was conducted in the first phase of interviews, and a week of observation was conducted at the ED by the principal researcher during the second phase of interviews. Observations provided us with a visual representation and map of the site, and provided insights into the layout and daily functioning of the ED for better context. We were able to observe the pace of flow at the ED, the location of physicians throughout shifts and communication exchanges. This helped to inform interviews and provided a cross-check for findings. For example, it was observed that while medical specialists had a dedicated room, EPs were often sat in a separate back room in their own discussions. This showed that while co-location put specialists on the ED, simply placing them there did not guarantee increased interaction. Additional archival data sources were utilized for triangulation and to inform our interview guide. Sources reviewed included news articles, reports concerning the pilot and intervention outcomes, professional association reports, EP curriculum, governmental reports and regulatory monitors.

Analysis

We employed an inductive analysis approach (Gioia *et al.*, 2012), and the analysis was iterative throughout the research process. As data were collected, ideas and themes were identified and refined through group discussion in the research team and based on feedback from organizational insiders. In line with our interview approach, three distinct phases of analysis can be determined. During the first phase of interviews, analysis was largely focused on deepening our understanding of the dynamics and interfaces in the emergency care process, identifying types and forms of integration and collaboration, and gaining insights and reflections of professionals on their collaboration and its effects on care processes and outcomes (e.g. lead times). Questions driving this first phase of analysis (during the first ten interviews) included what are the barriers to integration? How do groups work together? How

does the presence of medical specialists influence collaboration? What impact does collaboration have on outcomes such as patient flow and speed?

Codes began largely descriptive, as we mapped out the organizational context and gained insights into the dynamics and nuances of the care process itself. Summaries of each interview and of emergent themes were shared and evaluated between the first interviewer in Stage 1 and the first author. Ongoing discussions of emergent themes and codes continued throughout data collection to abstract codes from a descriptive level (barriers to integration, work processes, roles) to a second level of abstraction, identifying categories of barriers such as relational aspects (e.g. familiarity, trust) and cultural aspects (e.g. approach to work, educational background) and to begin connecting between the level of individual interactions and outcomes, such as patient flow. After we completed and analyzed the initial round of interviews (January 2018), a data summary was shared with the organization, and a meeting was arranged with the ED management, a medical manager and the first and fourth author to discuss emergent themes. The emergent themes were congruent with what organizational members had seen “on the ground,” and we agreed collectively to carry on with the research without modifying the interview protocol.

As we carried on interviewing in phase two, and participants had more experience with co-location, the boundaries between groups became clearer. For example, we recognized that what we had previously categorized as change resistance was actually the presence of more persistent boundaries that existed between groups. We began to trace and see patterns across our former codes that indicated several types of boundaries. We then revisited the literature to consider how our *a priori* constructs fit the emergent themes, revising our approach as needed. Ultimately, what we saw was that our findings were in line with the literature on the antecedents for integration, but that the emphasis on relational and cultural aspects was much greater and more nuanced than we found in the literature. It emerged that respondents perceived these aspects as exhibiting a strong influence on the operational performance, for example, by increasing time to treatment or stalling discharge decisions.

Building on our findings in the first phase, we saw that there was a clear divide between EPs and medical specialists, and therefore, we incorporated a constant comparison between these groups into our analysis. In this second stage, codes from Phase 1 were merged and grouped into higher levels to represent types of professional boundaries as we demonstrate here. To address our second research question, we then revisited how each boundary was perceived to influence integration efforts and patient flow (Table 4) and essentially “worked backwards” from demonstrating the existence of boundaries to exploring the effects. Following the completion of the second phase of interviews (March 2018) and analysis, we again fed back our findings to the organization via an informal report and management summary. Feedback from organizational insiders highlighted the accuracy and novelty of our findings from an organizational perspective.

After being informed that co-location would become standard practice, follow-up interviews were conducted with a small subset of participants ($N = 6$) 18 months later, in October 2019, to see how dynamics had shifted over time. We used these interviews to probe respondents on how boundaries may have shifted and in regards to perceived process improvement. In this final phase of analysis, we first coded the six follow-up interviews independently, using the existing coding structure as well as open codes, and then paired them down and compared with findings from phase two. The follow-up interviews offered us the ability to see how boundaries shifted (or not) over time and helped to account for any potential “growing pains” that may have come through in the early phases of reconfiguration, providing further validation of our initial findings (see Table 3 for a coding tree). Archival sources were further integrated during this final stage of analysis to further validate and prompt critical reflection of our coding structure.

Table 3.
The existence of boundaries within the supply chain

First order	Second order	Themes
Specialists on-call for ED but not available	Dual roles	Structural boundaries
Competing interests		
Specialists not always available/reachable	Resource constraints	
Limited amount of specialists		
Specialists in the operating theatre (OR)		
Indirect communication	Spatial separation	
Specialists hard to reach		
MS not all acute hearted	Commitment	Interpersonal boundaries
ED something on the side		
ED tasks de-prioritized		
EPs not specialists	Trust	
MS must have final say		
Assumptions		
Poor interpersonal relations	Familiarity	
Thresholds of communication		
Unfriendly on the phone		
Lack of awareness for ED protocol and process	Understanding	
MS not trained in ED		
Lack of oversight		
ED prioritizes speed	Approach to work	Cultural boundaries
Diagnostic use on ED by MS		
MS not proactive		
Discharge/admit decision	Goals	
Get patients off ED quickly		
MS will not take patients without full diagnosis		
Patient ownership		
Power dynamics	Status	
EPs not real specialists		
EPs in back office		
Resistance to EP expansion		
EP educational track	Education	
EP training broad but not deep		

Setting

Emergency care in The Netherlands

ED is a hospital department designed to treat patients with acute and emergent illnesses. ED is open 24 h a day for patients with acute complaints and works to stabilize, treat and discharge patients in a rapid manner. Upon arrival, patients are triaged by a nurse, assigned to a specialty, then seen by a designated specialty resident and/or an EP who will consult a specialist as needed (Figure 1). Unlike other wards, which are typically organized by specialty, the ED is a shared space in which patients for all specialties enter the hospital, and for which, all specialties maintain [partial] responsibility. While ED staff triage, assess and sometimes treat patients, all patients ultimately “belong” to a specialty, and assessment, treatment and discharge decisions require close collaboration between the ED and specialty department. Once patients are assessed and treated, they are either discharged home, referred to another care facility or admitted as an inpatient into the hospital.

Organization of emergency care delivery

In our study, a reconfiguration was happening, which placed specialists on site at the ED during peak hours. Therefore, in our study, we are able to assess integration challenges based on two alternative configurations of care: (1) “the distance model” and (2) “co-location model.”

Type of boundary	Factor	Impact on integration	Impact on flow
Structural	Dual roles	Lack of availability and reachability Lack of information sharing	Consultation delays, lead times
	Spatial separation	Poor and indirect communication, lack of face-to-face contact, no development of long-term orientation	Patient stacking (residents), consultation delays
Interpersonal	Resource constraints	Lack of knowledge sharing, poor communication	Limited efficiency, patient flow suffers
	Low familiarity	Prevents joint decision-making, increased rigidity, poor interpersonal relations, poor communication, low trust	Consultation delays, sequential consults, delays in discharge, admission
	Lack of commitment Lack of trust and understanding	De-prioritization of ED tasks, poor collaboration, lack of responsibility Poor interpersonal relations, restricts formation of informal agreements	Bed blocking, sequential consults Patient boarding, increased lead times, duplication of tasks
Cultural	Educational differences	Limits delegation of tasks and discretion of EPs	Variability across groups, increase of lead times
	Working culture	Misaligned goals	Sequential consults, increased lead times
	Status differences	Independent working Power dynamics create thresholds for communication	Formation of bottlenecks May encourage patient "stacking" (residents). Limits EP autonomy and decision-making

Table 4.
The influence of boundaries on supply chain performance (patient flow, speed)

In the distance model, EPs and specialty residents staff the ED, and medical specialists (senior doctors) are on call for consults. In the co-location model, medical specialists physically staff the ED during peak hours as standard practice; however, outside of peak hours, the distance model resumes, and remains the standard across the country. Therefore, it is important to assess how collaboration can function in both situations and to uncover inherent integration challenges across both configurations to highlight suggestions for best practice. Theoretically, it is interesting to observe how the removal of structural boundaries [via co-location] may alleviate, or create new challenges to integration.

Findings

Drawing upon data from in-depth interviews conducted with medical professionals, we examined what types of boundaries existed for professionals who were mutually responsible for emergency care delivery. We then assessed how these boundaries influence professional integration and the patient flow and speed needed to deliver safe, effective and high-quality care to patients (Table 2). Lastly, we consider how the shift to colocation influenced boundaries and integration between professionals (Table 4).

The distance model: structural boundaries

Distance and dual roles. In the face of multiple roles, EPs felt that specialists tended to prioritize what was "in front of them," such as the outpatient clinics and wards, rather than the ED, leading to delays. The lack of physical interaction with the ED also prevented specialists from maintaining oversight of the ongoing capacity and running of the ED. While

some specialties were used to stopping by the ED to “take a look” during their shifts, others only attended when requested. Such a lack of attention creates barriers to proactive behaviors that could prevent crowding, e.g. specialists expediting patients for discharge or admission before the waiting room fills up. Overall, the physical distance combined with dual roles leads to a different perspective and sense of urgency between those physically on the ED and those at a distance.

Limited interaction and sequential consultation. Because specialists are often staffing a function in their own department while on call for the ED, consultations frequently occur over the phone and may become de-prioritized, increasing lead times. As a result of such siloed working and indirect consultations (via phone), there is also an established lack of face-to-face contact between groups and departments. This leads to lack of interpersonal relations and low familiarity, and restricts the formation of necessary integrative elements such as trust and commitment, limiting the likelihood of joint decision-making. This issue is intensified for complex or undifferentiated patients, when more than one specialty is needed to consult. In these cases, specialists most often engage in what interviewees term *sequential consults*. Specialists consult back and forth indirectly [via their residents], resulting in poor informational and operational integration. This process often leads to duplications (e.g. multiple exams, diagnostics) and significant delays. The following example is illustrative of this issue and is worth citing at length:

For example, an 86-year-old patient fell at home. First, because she fell, we check if she has a fracture. So the EP makes what we call a trauma screen. There is not a fracture, but the patient collapsed, so, the neurologist looks at the patient, makes a CT of the head. The CT of the head is normal. Meanwhile, they made an ECG, a heart film. The heart film is not quite normal, so the cardiologist has to see the patient. We have to check the blood and check markers for the heart to see if they are elevated, if they are elevated in four hours, we need to do the next check. It did not increase, so I do not think there is a large heart problem, but in the meanwhile the patient is 8 hours on the ED. She has seen an EP, neurologist and cardiologist and they checked the lab and say well: the sodium level is too low. Then the patient can't go home, so internal medicine [is needed]. After 8 hours, the internist comes and says: okay the patient can't go home. There are some problems, we do not know what, but she should be admitted to the hospital. But 8 hours are gone. So, that kind of situation that is not unusual. – Internist

The ongoing issue of sequential consults prompted EPs to draw distinctions between their broad scope of knowledge and specialists' narrow focus. EPs purport a benefit to expanding their current role to assess such patient groups, and frame their training as generalists as an appropriate, cost-effective and efficient alternative to the challenge of getting multiple specialists to decide patient ownership. When patients are waiting to be designated to a specialty and are stuck in the sequential process, they create a bottleneck in the ED flow and delay the treatment of patients with potentially emergent conditions. These sequential processes inhibit EPs from freeing up beds and flowing more patients in and out of the ED.

The distance model: interpersonal boundaries

Lack of commitment. The ED represents a shared space for which multiple specialties have [partial] responsibility, but whom all may have contending priorities, interests and resource constraints. While medical specialists receive, in some cases, high volumes of patients from the ED, the ED has historically remained something they “*did on the side*” and attention for the development and quality of the ED was thought to have been left behind.

Yes, the ED is something you did it at the side, it was not your main goal for the day. It is something you always do besides your job. – Radiologist

This sentiment was echoed by management, and manifested in the creation of EPs to help fill the quality gap in EDs that were formerly staffed solely by junior doctors (residents).

However, due to restricted autonomy of EPs and the need for specialists to diagnose, consult, treat and make admission/discharge decisions, all departments maintain responsibility for emergency care. Yet, fostering sustained commitment and accountability for the ED and care processes is a continuing challenge, meaning that processes may not be fully optimized. This lack of commitment stems from structural constraints such as dual roles and capacity but is also related to the functional role and personal preferences of specialists.

For some specialists, yes, there is a lack of commitment to the ED because it's not in their mindset. You always have your favorite places in the hospital. The surgeon his favorite place is the theatre so if you give him a chance to go to the theatre or the ED what do you think he will choose? So, you need the ones that they like their ward, they like their outpatient clinic, but they also like the ED. And if they do not have the commitment with the ED then it's more difficult to work with. – EP

While some physicians with acute specialties expressed commitment to the ED, and to working with EPs to improve care, other physicians prioritized other tasks that were more in line with their own interests and expertise. For example, trauma surgeons play a big part in the ED, while general surgeons preferred to take rotations in the operating theatre.

Trust and mutual understanding

Interviewees named trust as a core element in improving collaboration and emergency care. In the relationship between EPs and specialists, some respondents cited a lack of trust as a reason for delays in ED processes. This lack of trust also extended to the realities of the daily work and demands on the ED. One EP highlights how specialists question if they are *actually* needed to support at the ED when they are asked to come by Eps:

Yes, the availability was a barrier. We experienced a number of times that we call a specialist to say “well it is busy right now for your specialism, you should come and help”. The first thing they would do was to call their own resident to ask if it was busy. Come on man, he is busy. He barely knows that he is alive, so what would he know about his [patient] population? He does not. So, those are things we really hope are changing by this project. – EP

Because EPs have a shorter educational program and are seen as “non-specialists,” they occupy a lower status than specialists. Their expertise is valued by specialists for having a general overview of the patient and the performance of certain tasks such as stabilization, but specialists continued to defend knowledge boundaries to avoid any role blurring and restrict expansion of the EP role into their work domains. This restricts relational integration and inhibits joint working as specialists reinforce hierarchical control. In addition, the introduction of EPs was framed as a form of delegation rather than the creation of a separate domain of practice. Specialists expected EPs to carry out the work they were unable, unwilling or too busy to perform, but specialists maintain end [and overall] responsibility and jurisdiction.

There were concerns expressed by specialists about the competencies of EPs to treat patients beyond basic care and determine an appropriate path for the patient, e.g. making discharge or admission decisions. This also relates to end-responsibility of specialists, who take on liability for patient safety. For EPs, this lack of discretion was a source of tension and frustration, especially when coupled with low availability or reachability of specialists. EPs expressed that, in some cases, they should be able to make admission decisions and their judgment should be trusted. Eps' lack of discretionary power can lead to long delays, particularly for groups with limited availability:

I'm all done with my work and I just need to get the “amen” from the gastroenterologists and that can take hours. – EP

This lack of discretion is a result of the formal system that does not grant discretion to EPs to manage their own patients. When specialists placed trust in EPs, there was more

flexibility, and informal systems were created to enable quicker decision-making and improve outflow. Informal agreements prove to be an efficient workaround of rigidity in the system, and allow increased discretion of EPs. Such agreements were fostered by relational work, and in spite of structural constraints and cultural boundaries at a more macro level. Yet, workarounds also introduce variability across specialists and specialty groups, creating discrepancies in shared understandings of roles and responsibilities more globally.

The distance model: cultural boundaries

Approach to work and goal misalignment. Organized into functional silos, medical specialists carry out their tasks within their own specialty department, staffing and seeing patients at the outpatient clinic and on the specialty ward. Patients are admitted directly by referral or based on consultation. However, working in the ED requires a different approach that necessitates proactivity and multidisciplinary work. For some specialists, this adjustment came naturally, but for other specialists, the transition was somewhat unnatural. Misalignment of goals and working styles between specialists and EPs also impeded collaboration and mutual agreement. EPs want to make quick decisions and move patients through the ED as efficiently as possible,

The patient does not come with guide notes. You have to find the diagnosis at the ED, or sometimes not, [but] you just have to find the reason to admit the patient yes or no. – EP

Contrarily, it was noted that some specialties take a slower approach, using more diagnostics and tests, e.g. to make a decision about inpatient admission.

They [specialists] should all have the mindset, “okay it’s acute and what are we doing here” is it decided if the patient is going to the hospital, does he have to stay? And that is the main question on the ED, does my patient have to stay at the hospital or can he go home? That’s the most important [thing]. – EP

The issue is prominent for EPs as patients remain “boarded” (held) in the ED while they await diagnostic results, consultations or sign-offs. Yet, because specialists have higher status and final say, their approach often wins out, undermining integration with EPs, and in spite of the potential negative effects on ED performance. These small differences in working styles can result in disagreement and collaborative tension, as each group carries out mutually interdependent tasks informed by a different approach (speed and timely admission decision versus full diagnosis). This significantly limits operational integration, as decisions are made independently and without mutual agreement.

The co-location model: exploring the impact of care organization

It was clear that by putting specialists directly on the ED, capacity increased and the potential for significant consultation delays decreased. By having specialists physically present on the ED, the sequential chain is reduced, improving information and operational integration. Additionally, members of both groups expressed that interpersonal relationships grew stronger, and face-to-face contact enabled more trust and understanding, particularly between specialists and EPs. However, in the new model of care, roles and responsibilities were not always immediately clear. In particular, the role of the EP became more ambiguous and debated, unearthing tensions between medical specialists and EPs. In particular, cultural issues were heightened due to misaligned goals and working culture. Continued investment in devising new protocols and establishing new ways of working are needed to overcome current boundaries.

The co-location model: structural boundaries

Removing dual roles and reducing thresholds for communication. By increasing physical proximity, co-location significantly reduced structural boundaries. The most impactful was the removal of dual roles for specialists, allowing them to be dedicated to the ED during peak hours. In addition, the physical proximity allowed for increased face-to-face contact, lowered thresholds for communication (improved information integration) and increased direct consultations (improved operational integration), improving lead times. The increased face-to-face contact also had a knock-on effect by improving interpersonal relations and familiarity, building trust and promoting relational integration. However, we found that with the reduction of structural boundaries, reinforcement of interpersonal boundaries occurred in the initial phases of reconfiguration, e.g. reinforcement of specialists' expertise knowledge and skills to differentiate and draw clear technical and knowledge boundaries between Eps and specialists.

Specialists across groups also found that they gained familiarity with other specialties, and this enabled them to more quickly and easily discuss and consult on patient matters and make requests. In this way, the threshold lowered not only between EPs and specialists but also between specialties themselves. Logistically, sharing the same space and the opportunity for face-to-face discussions simply made consultations much more efficient and effective, improving operational and informational integration:

What happens now if I need to see a patient and it's debatable if I have to see them or the internal doctor, I walk to the internal doctor and we discuss it, and then we decide well should I or should you see the patient? "Oh no I will see." And that makes a difference of more than one hour. Because in the old situation [it was sequential] and now we decide it in five minutes. – Trauma surgeon

Yet, particularly for patients requiring the input of multiple specialists, integration between specialists was still not optimized. Respondents cited historic ways of working, incentive systems and fragmentation between specializations as contributing factors:

In the moment at the bedside, if we have a critical patient we say okay I want to talk to the neurologist and cardiologist now and figure it out. But the patient I just described, the old person who falls down, that would still be sequential most likely because everybody wants their time to do their own physical exam. – EP

This statement illustrates multiple issues, including contributing factors to increased time on the ED and duplication of efforts, leading to decreased efficiency. Additionally, it was clear that currently, there is still ambiguity on who takes the lead. When multiple specialists are working in the same space, having clear guidelines may foster better operational integration and reduce overlaps so that throughput times can further be reduced.

If you do not have a captain on the ship you just float in the middle of the sea, you do not go anywhere. So, if you put three doctors next to a sick patient and none of them decides to be a captain the risk is that you are all just waiting for the other one to decide. – EP

Despite the reconfiguration, it became clear that old ways of working still dominate the patient process. This includes the desire of specialists to continue to conduct their own exams for the benefit of residents' education and potentially due to perverse incentive structures (e.g. fee-for-service) that reward providers for production (e.g. conducting individual consultations) over efficiency (reducing throughput times, eliminating duplication). This inhibits informational and operational integration as it limits direct communication and joint decision-making about patient care as specialties continue independently assessing patients and increases throughput times significantly (i.e. sequential consults).

The co-location model: interpersonal boundaries

Getting to know each other and building understanding. Because specialists are now physically, on the ED, their awareness of the issues facing EPs and ED staff and of ED processes has increased. Importantly, the interpersonal relationships between EPs and specialists, and between specialists, were significantly improved. Due to having face-to-face contact and sharing the same space, physicians became familiar with one another, building friendly and personal relations. Respondents viewed this as a key factor in increasing trust, where e.g. specialists could see Eps carrying out their work and working at a high level. Such interpersonal familiarity improved relational integration, which made it easier to ask for consultations and to communicate indirectly (e.g. out of hours consultations) and in a daily working situation.

I think immediately, as soon as you come in and you make a joke and you smile its already a lot better [than before], and that's no work. It's already a lot better than just by phone without knowing someone. So the interpersonal connection is much stronger and the teamwork therefore is much easier and therefore people trust you also more quickly. – EP

Overall, familiarity and understanding helped to increase mutual respect and awareness, building trust and commitment. It prompted specialists to take more initiative. In follow-up interviews, participants noted that because specialists were now more aware of the externally limiting factors on the ED, such as bed availability, they were able and willing to take direct action and work on eliminating these issues and reducing bottlenecks. For example, specialists rounding earlier to discharge patients and free up beds before peak hours.

The co-location model: cultural boundaries

Ways of working and goal misalignment. Physical presence improved workflow by eliminating indirect contact, lowering thresholds for communication and dedicating increased resources to the ED during peak times. Yet, within these improvements, clear difficulties persisted due to heightened cultural boundaries. Specialists take a different clinical view of the patient and treatment process and are not always used, or trained, to work in a fast-paced environment. This leads to continued misalignment with the ED goals of urgency and rapid assessment. EPs expressed a clear misalignment between working styles and priorities, particularly with specialists who are not acute trained, and took a less proactive role to help flow patients through and out of the ED.

The culture is getting better, but you have to actively ask them sometimes, or quite often, to do that. It is not a natural task or a responsibility for them [specialists]. I feel they see it more as a responsibility of the emergency physicians and we come to them “okay it is really busy now, you have to come see patients”. – EP

Like EPs, specialists had access to display screens that show patient flow, capacity and where patients are waiting. Yet, rather than keeping an eye on the screen and immediately going to patients, specialists sometimes waited for EPs or nurses to come to them and notify them of patients. This issue was a frustration for EPs who view the lack of “proactivity” as counterproductive to the intent of having specialists on the ED. Such behavior also reinforced a sense of hierarchy, where EPs felt they were treated like assistants rather than being able to utilize specialists as additional resources.

One of the ideas was that as an emergency physician you would let the other person, the specialist, know if a patient comes for that specialty. But for me it feels like I am an assistant, the person who puts the patient in the treatment room and calls the doctor to say “your patient is ready for you” . . . I think they are all adults they can look to the screen and see a patient coming to the ED with their specialty., I do not have to call them, they just can see themselves. They have the whole day, you can see on the screen if the patient is for you or not. – EP

Additionally, EPs experienced tensions between the rapid way of working on the ED and the tendency of some specialties and specialists to delay admission and discharge decisions while waiting for lengthy diagnostics, or relying on residents to do initial exams and charts instead of expediting the process themselves. Tensions between the ED goals of urgency and rapid pace to get patients out quickly and specialists' focus on more detailed and extensive diagnostic testing inhibited joint decision-making and improvements in workflow. Specialists who had acute backgrounds or work in trauma settings were seen as the exception.

Reinforcing roles and status differences

With co-location, tensions regarding the EP role and its future development became unearthed, leading to uncertainty on both sides about the future. Specialists highlighted the expansion of EPs to supervisory roles, taking on resident education and "moving to the back office" (increased administrative and supervisory roles). They viewed this trend as undermining the EP's primary role to see patients for specialists. This tension was further emphasized in the move toward co-location:

Also, for them [EPs] it is a culture change. They wanted, their ultimate [goal] is their own department. The big chief from the ED and that they can say "that patient is for the surgeon, that patient is for internal medicine" That is the way it works in the US and other countries, but not in Holland at the moment and not in the coming 10–20 years. That is always a question of disturbance.
– Intensivist

In interviews, EPs denied any claims that they wish to take over the ED. Some EPs even spoke directly of a "closed ED" format (used in the USA and Australia) as an especially negative development that would restrict the necessary collaboration and specialist view needed for complex patients. Yet, such tensions and statements highlight that there are unclear and potentially mismatched expectations about the role and future of the EP.

Discussion

Our study contributes to both the growing field of healthcare operations and the burgeoning work on professional service operations (Lewis and Brown, 2012; Harvey *et al.*, 2016), expanding our understanding and knowledge of the intricacies of knowledge-intensive operations contexts such as healthcare (see Dobryzkowski *et al.*, 2016; Dobryzkowski, 2019). Our findings highlight the importance of attending to the interpersonal and cultural aspects of operations (Cao *et al.*, 2015) to achieve integration and improve performance in these contexts. We attend to these aspects by taking a dynamic view of integration, focusing at the level of professionals and providing reasoning as to why structural changes alone may not always produce the quantifiable and desired outcomes.

Two central questions guided our research: what boundaries exist at the level of professionals, and how these boundaries influence integration efforts and operational performance. In our analysis, we identified several types of boundaries and assessed their relationship with integration and operational performance in the emergency care context (flow and speed, see Table 2). In the next sections, we explore the importance of focusing attention on the level of professional interfaces to gain a more complete picture of integration, especially in contexts where professionals play a central role in service delivery.

A focus on professional integration: unveiling unique barriers and antecedents

With this research, we have shown that professional integration necessitates an increased focus on improving attitudes (see Van der Vaart and van Donk, 2008) and breaking down

interpersonal barriers between professionals (Shaw *et al.*, 2017) to achieve high-quality collaboration among professionals that are interdependent but reside across boundaries. A focus on professional interactions, therefore, requires us to expand our current conception of integration (Leuschner *et al.*, 2013), e.g. expanding our current understanding of relational integration to more seriously consider the antecedents to trust development in particular supply contexts. Such antecedents were identified in our study as the need for familiarity between professionals and understanding of each other's skills, roles and work processes. Additionally, considerations of power, status and other interpersonal dynamics are needed to open up our theorizing (Harvey, 2016) and better understand how integration can be fostered or inhibited [also at higher levels] within these interactions. Considering the central role and influence of professional interactions in service operations contexts and healthcare in particular (Lewis and Brown, 2012), it is essential that we begin to consider antecedents of all aspects of integration at lower levels of analysis.

As we have shown, structural, interpersonal and cultural boundaries inhibit collaboration and integration in various ways, including restricting the trust and commitment (relational integration) needed for successful joint working (operational integration) and the availability of expertise and sharing of knowledge (information integration). Boundaries result in different clinical views and approaches to patient care (restricting relational integration) but also lead to particular views about teamwork itself "that must be negotiated through the course of work" (Finn, 2008, p. 108). To work together and achieve integration, medical professionals must constantly negotiate boundaries in their everyday work. Ongoing and historical functional differentiation forms chasms across specialties or departments in terms of their mindset, functions, approach to time (Lawrence and Lorsch, 1967; Jansen *et al.*, 2009) and create "pragmatic boundaries" (Carlile, 2002). This creates clear barriers to cross-functional work, joint working and goal alignment, as each group comes to operate independently within their own cultural and clinical framework over time. However, as we saw in our case, once professionals begin to intermingle and work together outside their subunits, interpersonal boundaries are reduced and integration becomes more likely and performance can improve. Co-location, therefore, provides a good basis for fostering the relational and cultural change needed to truly improve integration.

Through first removing structural constraints and reducing thresholds for interaction, professionals gain exposure to different workflows and processes, and observe others' work and skill. This exposure and interaction, as result of the co-location, may encourage professionals to begin to shift their mindsets, e.g. toward other groups (specialists viewing EPs work as valuable) and processes (gaining awareness of the external issues facing the ED and the importance of urgency). This can help to build both goodwill (EPs gaining confidence in specialists' commitment to ED processes and improvement and working together) and competence-based trust from specialists toward EPs (Sako, 1992) and even potentially shift role boundaries (Niezen and Mathijssen, 2014), increasing the likelihood of integration at all dimensions. However, as our research demonstrates, creating opportunities for connection and building more direct (versus indirect) interfaces simply lays the groundwork for the more in-depth and long-term relational and cultural work that is needed to enable true integration at the individual level (Fawcett *et al.*, 2008; Zhao *et al.*, 2011). It became clear in follow-up interviews that such shifts require long-term, continued investment in cultural change at all levels of the organization, and change agents who champion a clear vision of the future. Redesigns should be planned with this in mind and may use structural change as a basis to incorporate additional strategies to overcome interpersonal and cultural boundaries.

Why integrative efforts fall short: the importance of relational and cultural dynamics

Our findings are in line with previous work that showcases the power of building cross-functional interfaces and connectedness to foster more understanding (Daft and Lengel, 1986),

knowledge exchange and integration (Jansen *et al.*, 2009). However, as we have shown here, implementing integrative roles (e.g. EPs) and creating new linkages between individuals (Vickery *et al.*, 2003) is not enough to overcome the more deeply entrenched interpersonal and cultural boundaries that exist and are continually fostered through specialization and differentiation. While organizational reconfiguration (i.e. co-location) helped to alleviate structural boundaries, it did not help to alleviate the underlying problems of resolving other boundaries between interdependent groups, and proves an expensive [and only partial] solution.

Other scholars have emphasized the fact that structural reforms or system redesign alone does not lead to performance improvement (see also Hyer *et al.*, 2009), and our study shows that despite its ability to potentially improve processes of care (Hyer *et al.*, 2009), co-location is not enough in and of itself to overcome integration challenges. As we have shown, entrenched interpersonal and cultural boundaries continued to induce significant delays in the care process, which have been shown to have potentially negative consequences for both patients, staff and system performance (Morley *et al.*, 2018). As our findings show, creating direct links between professionals (e.g. via co-location) may also work to reinforce boundaries between groups, incidentally undermining integration and performance. This demonstrates the need to go beyond “cross functional and cross firm business processes” (Leuschner *et al.*, 2013) and more seriously consider the importance of interpersonal relationships and their influence on operational performance at a higher level. When we recognize professionals as key linkages in operational processes, we reveal a need for more consideration of interpersonal, psychological and cultural dimensions. We reveal with this study, and encourage other scholars to take up this call, that these dimensions also filter up, and significantly shape outcomes and care processes.

Recommendations for practice/strategies to improve operational performance

In light of our findings, we suggest organizational changes that can be considered by organizations in their efforts to improve lead times and service delivery processes and outcomes. First, hospitals should focus on redesigning processes (see also Hyer *et al.*, 2009) and conduct thorough analyses of where bottlenecks exist within care processes and patient journeys. As we have shown, there are several key decision-making moments within the ED care process. These decisions create interfaces between professionals across disciplines, departments and with diverse levels of experience. While focus is often on other steps in the process where delays are known to occur (e.g. triage, discharge decisions, bed placement), our study shows several key points throughout the process (e.g. determining patient ownership, interdisciplinary consultations) where delays can and do occur. Overlooking these moments leaves organizations unable to appropriately direct resources and improve care processes.

Second, hospitals may consider reworking the process by reconsidering the role of professionals involved in the process. For example, expanding the role of EPs may support a more efficient flow by granting more discretion to individuals closest to and overseeing the patient journey. While granting EPs full autonomy may work to reinforce boundaries, small changes such as providing EPs the autonomy to take more ownership, e.g. by allowing them to admit undifferentiated patients, can help avoid the lengthy delays that result from sequential consults. As other studies have shown, providing ED staff with admit rights can reduce lead times, leading to extra bed availability (Morley *et al.*, 2018). However, structural role expansion will still require attention to relational and cultural dynamics to improve processes on the longer term as the ED remains a shared space that demands constant collaboration.

Third, as Lu *et al.* (2021) highlight in their recent work on sourcing collaboration, informal exchanges and relational dynamics are important and have strong effects on the more formal exchanges that take place. While our focus is different, the notion that we need more attention to informal and “softer” mechanisms is growing across scholars of operations management.

Although formal integration mechanisms are still needed, our findings showcase the need for organizations to focus on more informal and relational mechanisms (see also [Jansen et al., 2009](#)) to achieve integration and reduce instances of crowding, such as the role of boundaries at the interfaces of care delivery ([Nugus et al., 2010](#)). As [Huckman and Staats \(2011\)](#) have shown in their work on fluid teams, team familiarity (members having prior experience working together) may support performance, particularly when members have different levels of experience (in our case, older and younger residents, medical specialists and EPs). Our study indicates that boundaries between EPs and specialists may be lessened by encouraging continued interactions outside of the direct working environment (see also [Huckman and Staats, 2011](#)), e.g. by creating opportunities and tasking both groups to collaborate on solutions for emergency department challenges. Such an effort reinforces the idea of shared responsibility and creates opportunity for meaningful feedback between the groups that may help break down cultural barriers in the workspace (e.g. specialists gaining understanding of the need to work more quickly and beginning to work parallel rather than sequentially) and can support productive interactions and integration between individuals.

Limitations and future research

In this study, we expand current notions of internal integration and bring focus to a lower level of analysis. However, we do not explore how professional integration may come to impact other levels of integration. Taking a multilevel approach to integration would be a particularly fruitful area to explore in future studies and would allow for further consideration of how the more social and cultural aspects of operations actually come to influence integration at multiple levels. Additionally, because we focus on one organization, we did not explore the presence of inter-organizational boundaries and how these may uniquely impact integration and performance. This adds an additional layer of complexity and warrants further attention, also to consider how boundaries transcend organizational borders.

Additionally, while we demonstrate the importance of focusing on the social and cultural aspects of operations, and call for a more dynamic view of integration, our findings are limited to one sector. Healthcare represents a unique professional service context ([Senot et al., 2016](#)) and the emergency care process has unique characteristics that may affect the level of professional integration, e.g. *ad hoc* teams and high variability. While this induces particularities, it may not be entirely dissimilar to the notion of fluid teams ([Arrow and McGrath, 1995](#); [Huckman and Staats, 2011](#)), and therefore, we suggest that other studies work to tease out how particular team characteristics may effect integration efforts and outcomes. Additionally, studies that focus on this level of integration should be conducted across different professional and knowledge-intensive operational contexts (e.g. law firms, engineering made to order, universities) ([Balthu and Clegg, 2021](#)) to further examine the antecedents to integration at the level of professionals more generally.

Conclusion

Combining the work on operations management with the concept of professional boundaries, we hope to provide a more nuanced and complete view of the factors that inhibit operational performance, interrupting or delaying patient flow and leading to emergency department crowding. We highlight the need, and relevance, of more critically examining the roles and perceptions of professionals and examine antecedents to integration and performance at the individual level of analysis. We focus primarily on the integrative work that is required between providers to deliver effective care, and uncover barriers that exist at key interfaces where multiple professionals are required to transcend structural, interpersonal and cultural boundaries to work together. This enables us to tap into the social and cultural elements that

can support internal integration and provide valuable insights into the role of individuals in furthering, or inhibiting, process improvement efforts at a higher level.

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