Uniting emergency and inpatient clinicians across the ED-inpatient interface: the last frontier?

ABSTRACT

Unwell patients in the emergency department requiring inpatient admission must negotiate the interface between the emergency department and inpatient wards. Despite its importance and scale, this emergency department-inpatient interface (EDii) is poorly characterised.

The aim of this paper is to clearly define the EDii and to describe its importance to the:

- **Patient:** delays to admission and errors in communication across the EDii can increase adverse outcomes
- **Hospital:** poor EDii function reduces hospital efficiency and effectiveness
- **Healthcare system:** half of all hospital inpatient admissions occur via the EDii and so EDii affects system wide performance.

The EDii can be defined as the dynamic, transitional phase of patient care in which responsibility for, and delivery of care, is shared between ED and inpatient hospital services. The EDii is characterised by a complex interplay of patient, hospital and system factors.

A clear definition of the EDii and an understanding of its importance will assist future research and interventions to improve patient outcomes.

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INTRODUCTION

Access to emergency hospital care is essential. However, the emergency healthcare system is currently facing considerable challenges due to system wide congestion and growing demand. Providing emergency care is challenging due to the high acuity, undifferentiated casemix and the highly skilled, resource-rich environments needed to deliver this care effectively.

Patients requiring inpatient admission are often particularly complex and it is these patients who must negotiate the transition from the Emergency Department (ED) to hospital inpatient care. This ED-inpatient interface (EDii) is a poorly defined yet critical operating system for the patient, the hospital and the healthcare system.

A patient is subject to the EDii from the ED decision to admit until they are under the care of the inpatient team and located in their destination ward. The EDii involves the transition between ED and inpatient care and has been identified as a period when errors in communication and confused accountability may lead to missed care or clinical errors.^{1, 2} In addition, the EDii is physically indistinct as patients at the interface may often be located in transitory spaces such as corridors or waiting areas which may be less well serviced with clinical equipment and facilities.^{3, 4}

The challenge may be compounded by cultural and attitudinal differences. ED teams are traditionally focussed on the initiation of appropriate care and timeliness of admission given their need to manage patient flow and to meet government time targets. Inpatient teams have competing priorities including scheduled admissions and fixed commitments such as clinics and operating lists. Inpatient teams may be understandably disengaged from ED time pressures and place greater emphasis on comprehensive formulation of a definitive diagnosis and management plan. These differing goals can create tension across the EDii and distract from patient care.^{1, 2}

The EDii has not been previously clearly and consistently defined in the literature. Partial definitions of the ED-inpatient interface have been published as listed in Table 1. Most of these definitions have transit or handover as their core principles and do not fully encapsulate the process of emergency admission to hospital as an example of a complex adaptive system.^{2, 5} The term “ED-inpatient interface” (EDii) attempts to take account of the inherent complexity of the system. Figure 1 illustrates the dynamic transitions of patient location, governance and other factors which occur at the EDii.

Research into the EDii has traditionally been separated by discipline: with ED research and redesign centred around ED overcrowding³ and ED efficiency⁶, and inpatient research

centred around disease specific models of care.^{7, 8} Because prior research has not been guided by a clear definition of EDii, the profiling of issues between ED and inpatient teams and whole of hospital reform is difficult.

The aims of this paper are to define and describe the importance of the EDii for both emergency and inpatient physicians. The EDii can be defined as the dynamic, transitional phase of patient care in which responsibility for, and delivery of care, is shared between ED and inpatient hospital services. The EDii is characterised by a complex interplay of patient, hospital and system factors.

It is proposed that this understanding can inform further research and clinical redesign to improve outcomes for patients, hospitals and the healthcare system.

The EDii is important for the patient

Admitted emergency patient mortality and the EDii

Patients requiring emergency admission to hospital are at approximately 6-fold higher risk of death in hospital than patients undertaking elective admission.⁹⁻¹² There is significant observational evidence that delayed transfer to inpatient wards for patients requiring emergency admission is associated with an estimated 20-30% increase in inpatient mortality.^{3, 4, 13-16}

Further, the main beneficiaries of improved EDii efficiency appear to be elderly patients and those with acute cardiac and respiratory disease.¹⁷ However, the overly rapid transfer of these patients into an inpatient space while still requiring emergency care can also be hazardous¹⁸.

Unexpected deterioration of admitted emergency patients and the EDii

There is also evidence that improving the efficiency of patients' transit across the EDii can be associated with other improved patient outcomes such as fewer episodes of acute in-hospital deterioration and fewer ED re-presentations.⁸⁻¹²

The EDii is important for hospital function

An efficient EDii facilitating high quality, safe care is essential for a well-functioning acute care hospital. Patients presenting to the EDii require unscheduled care that competes with other scheduled hospital activities such as elective surgery and outpatient departments.

Measuring EDii performance

Performance in regards to emergency access to hospital has traditionally been monitored using time-based ED process measures⁶. The relationship of these measures to the EDii is depicted in Figure 2.

Despite the focus on these ED time measures, clinically meaningful EDii patient outcomes such as unexpected deterioration on the ward, cardiac arrests and deaths are not widely reported or met with the same public scrutiny.⁶

Clinical handover across the EDii

Whitt found that a patient being admitted to hospital via the ED had contact with between 17 and 28 health professionals, highlighting extent of involvement of different clinicians in care at the EDii and the critical need for accurate and timely transfer of clinical information at the EDii.¹⁹

Handover (handoff) is the process whereby a patient's clinical governance and details are transferred from one treating clinician to another.^{1, 20} Factors such as physical location of the patient, trust, and methods of communication can influence the effectiveness of handover.^{1, 21}

It is clear that handovers at the EDii are difficult for several reasons: 1) their unscheduled nature interrupting scheduled inpatient activities; 2) clinical uncertainty; 3) delays of uncertain duration; 4) confusion over clinical ownership; and 5) a high risk of adverse clinical outcomes. These factors increase the professional tensions that can impair efficiency and safety at the EDii.^{1, 8, 22}

EDii dysfunction and hospital efficiency

EDii dysfunction, manifesting as increased wait times and large numbers of boarding patients in the ED awaiting inpatient beds, creates difficulties for the emergency department (in terms of overcrowding and delivery of ongoing care), and for the inpatient teams (in terms of patient visibility and impaired ability to provide definitive inpatient care).

These difficulties impact on the quality and efficiency of care across the whole hospital.^{13, 23-28}

Conversely, the pressure to expedite transit through ED can sometimes lead to clinically unstable and inadequately worked-up patients being too hastily transferred to inpatient wards which may also be unsuitable to care for specific types of patient.¹⁸

Lack of integration between the ED and inpatient systems of care have made quality improvement and clinical redesign across the interface difficult. Cultural issues such as distrust between units, separate data collection systems and the pursuit of time targets relating to isolated steps in such a complex process can hinder improvement efforts.²⁹

The EDii is important for the healthcare system

The EDii is a central component of the acute healthcare system and, as such, is influenced by a complex interplay of multiple factors that can facilitate or inhibit its function and resultant outcomes.

Scale of the EDii

The scale of the EDii worldwide is significant with approximately half of all inpatient admissions to hospital in developed countries occurring via the EDii.^{13, 30-33} In many smaller hospitals, the majority of patients entering hospital do so via the EDii³². The number of patients negotiating the EDii is growing in excess of population growth.³²⁻³⁴ Factors contributing to this growth include demographic factors (such as an ageing population), public expectations of ED care and organisational culture and policy. Growth in emergency admissions to hospitals and subsequent issues with accessing inpatient care appear to be worse in larger hospitals looking after more complex, and sicker, patients.^{13, 34}

The scale of the EDii means that even small interventions and alterations in the quality, efficiency and cost of EDii can have a significant impact. Interventions that fail to appreciate the complexity of the EDii could result in unintended, negative consequences.¹⁸

The political significance of the EDii

The EDii is a politically sensitive interface in that ED overcrowding and ramping of ambulances quickly draw public concern. This has resulted in political and bureaucratic pressure on hospitals to increase the efficiency of emergency care provision.

Despite the lack of robust, peer reviewed research in this area or even a clear definition, the EDii is one of the very few areas where governments have imposed time targets for clinical care. In the USA, ED accreditation and reimbursement is affected by nationally reportable data on median ED boarding time.¹³ In the UK, the National Health Service (NHS) introduced the Four Hour Rule for emergency departments in 2000.³⁵ In Australia, the National Emergency Access Target (NEAT) was introduced in 2011⁶ and devolved to the states in 2016. Constant media interest ensures that the EDii remains very topical and a target for ongoing political and bureaucratic debate and intervention.

Defining the EDii is important

We propose that evidence of EDii dysfunction, disruptions in inpatient and elective activity caused by EDii processes, and the lack of integration between ED and inpatient systems are manifestations of a lack of understanding of the importance and complexity of the EDii. With a clearer definition of the EDii in hand, research on how to improve the EDii to improve patient care and hospital performance will be able to proceed more systematically.

Interventions that fail to appreciate the complexity of the EDii could result in unintended, negative consequences. Because prior research has not been guided by a clear definition of the EDii, it is not surprising that only a subset of EDii-related factors has been examined and that their effects on patient outcomes are only partially understood.

Areas of future research that may be assisted by a clear definition of the EDii include the development of alternative acute admission pathways such as clinical decision units and ED avoidance strategies, development of quality and performance indicators relating to emergency care and digital transformation of acute hospital care.

CONCLUSION

The EDii is a critical operating system for patients, hospitals and our increasingly strained healthcare system. The EDii is traditionally fragmented because it involves two or more very different clinical groups with differing work styles, priorities and cultures and so is hard to reform.

The EDii can be defined as the dynamic, transitional phase of patient care in which responsibility for, and delivery of care, is shared between ED and inpatient hospital services. The EDii is characterised by a complex interplay of patient, hospital and system factors.

EDii dysfunction may manifest as suboptimal process outcomes, patient outcomes, or a combination of both. A focus on patient outcomes is required to complement the existing suite of process measures relating to EDii.

By defining EDii for both ED and inpatient teams, we hope to instil a common understanding of its complexity and importance and to motivate and support patient-centred health system reform.

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