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Streamlining pathways for minor injuries in Emergency Departments through radiographer-led discharge

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Abstract
Diagnostic imaging services are essential to the diagnosis pathway for many patients arriving at hospital emergency departments with a suspected fracture. Commonly, these patients need to be seen again by a doctor or emergency nurse practitioner after an X-Ray image has been taken in order finalise the diagnosis and determine the next stage in the patients’ pathway. Here, significant waiting times can accrue for these follow-up consultations after radiographic imaging although the vast majority of patients are discharged. Research evidence from pilot studies suggests that patients with minor appendicular injuries could be safely discharged by a suitably qualified radiographer directly after imaging thereby avoiding queues for repeated consultation. In this study, we model patient pathways through an emergency department (ED) at a hospital in the South West of England using process mapping, interviews with ED staff and discrete event simulation (DES). The DES model allowed us to compare the current practice at the hospital with scenarios using radiographer-led discharge of patients directly after imaging and assess the reduction in patients’ length of stay in ED. We also quantified trade-offs between the provision of radiographer-led discharge and its effects, i.e. reduction in waiting times and ED workload. Finally, we discuss how this decision support tool can be used to support understanding for patients and members of staff.

Keywords: Emergency department, early discharge, discrete event simulation, case study

1. Introduction
The increasing demands on emergency departments (ED) in the United Kingdom (UK) are putting pressure on acute trusts and their staff, with some reports describing the pressures placed on staff and hospitals as being unsustainable \cite{1}. Waiting times in EDs have increased and patients are being encouraged to use these services mindfully to try to reduce the pressure, with staff and resources frequently being stretched beyond capacity \cite{2}. However, hospitals also need to assess the most appropriate methods for utilising staff effectively and streamlining the patient pathways to improve productivity. The current minor injuries (MI) pathway in ED is generally led by emergency-nurse practitioners (ENP), with additional medical support as necessary. Usually, around 60% of ED attendances require medical imaging, which is usually projection radiography (X-Ray). These images are most commonly interpreted within the ED by either junior doctors or

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