

# Evaluation of a Newly Developed Day-Case Trauma Pathway in a Rural District General Hospital

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## Abstract

According to the recommendations by The British Association of Day Surgery, a day case trauma pathway was formulated in Wthybush hospital, a rural district hospital in west Wales. This pathway underwent multiple Plan-Do-Study-Act (PDSA) cycles to which lead to appropriate beneficial changes to it through implementation, revision, and reimplementation. In a

retrospective analysis, a same-day discharge rate of 52% was found. The most common reasons for overstay were identified as patient post-operative health-related issues which mainly included postoperative pain, nausea and vomiting, and inability to carry out activities of daily living. We plan to take further steps improve the efficiency of this pathway.

**Keywords:** Day Surgery, Orthopaedics, Quality improvement.

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## Introduction

Day surgery is gaining popularity in the modern-day hospital setting. The British Association of Day Surgery (BADs) suggests that emergency surgical cases (including trauma) should ideally be performed in a Day Surgery setting [1]. It improves patient experience (shorter length of hospital stay), ensures bed availability for other sick patients, simultaneously being economically beneficial for the hospital.

Wthybush hospital is a district general hospital situated in the coastal town of Haverfordwest. It caters to a population of approximately 375,000 in Pembrokeshire, Carmarthenshire, and Ceredigion (Hywel Dda University Health Board) in west Wales. This figure is greatly increased during the summer months due to the area being popular with tourists.

This 195 bedded hospital has four operating theatres including an emergency theatre. The self-contained Day Surgery Unit comprises two post-operative bays with 11 patient spaces. There are two theatres (one for cases under general anaesthesia, with an anaesthetic room, and another for cases under local anaesthesia only). It contains three 1st stage recovery bays as well.

Given the benefits of day surgery, a new day case trauma pathway was developed in Wthybush hospital in July 2017. The pathway went through multiple PDSA (Plan-Study-Do-Act) cycles which lead to appropriate beneficial changes to it through implementation, revision, and reimplementation.

The current pathway is implemented as the following flowchart suggests. (Figure 1). The need for surgery is assessed by a doctor when a patient attends an orthopaedic outpatient clinic or fracture clinic. The assessing doctor completes the patient pathway for trauma admission (Figure 2). These patients are screened by a nurse for suitability as a day case procedure. A pre-operative health screen questionnaire is filled in which includes the patient's current physiological status, past medical history, medications, allergies, smoking history, and history of Cruetzfeldt-Jacob disease (Figure 3). If suitable, the patient is booked for a procedure after liaising with the day surgical unit. An information leaflet is provided to the patient and fasting instructions are given. Otherwise, the patient is admitted as an

inpatient for surgery after liaising with the assessing doctor and the bed manager.

We aim to evaluate this newly developed day-case trauma pathway in terms of patient demographics, compliance, and its limitations. We expect that results from the evaluation will bring about suitable changes in the pathway. This will make the pathway more efficient and improve our quality of care.

## Methods

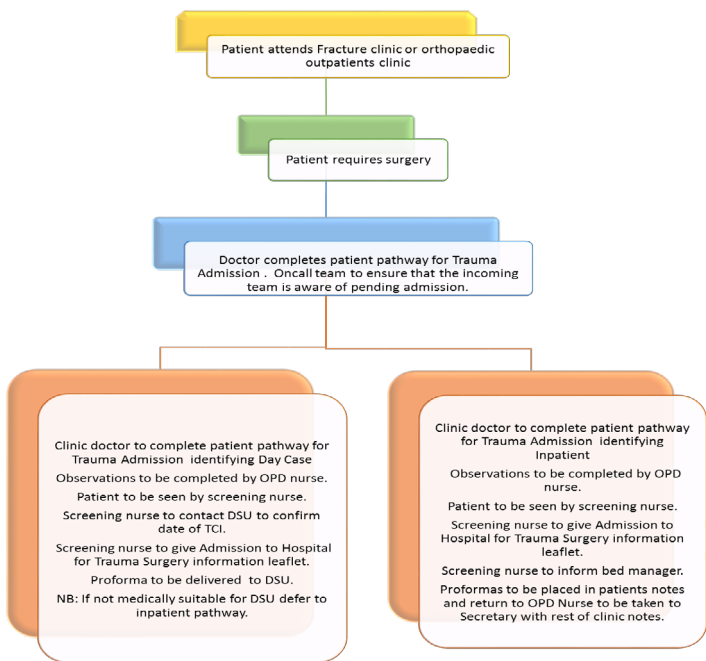
We conducted a retrospective analysis to assess the number of successful emergency trauma patients treated on a day case basis. All the patients who underwent day-case surgery with the orthopaedics department from July 2017 to December 2019 were included. Patients' notes were collected from the hospital's case notes library. Demographic details (age and gender) and type of injury sustained (upper limb injury/ lower limb injury/ upper limb fracture / lower limb fracture) were noted. Outcomes were recorded as to whether the patient was discharged on the same day of admission and surgery, or not. The reasons for the overstay of patients were noted from doctors' and nurses' documentation. Patients with incomplete documentation were not excluded from the analysis.

Mann-Whitney-U test of statistical significance was used to compare median age differences between same-day discharged and non-discharged patients. Chi-Square test of statistical significance was used to compare the patient gender, and type of injury sustained, to their discharge outcome, respectively. P values of less than 0.05 for associations were considered to indicate statistical significance.

## Results

From July 2017 to December 2019, 240 patients were identified with Trauma & Orthopaedics department, suitable as emergency day surgery cases.

52.5% of patients were female (126/240). The median (range) age of all patients was 48.5 (15-92) years. 124 (51.7%) patients were admitted with upper limb fractures and 44 (18.3%) patients were



**Figure 1** Day Surgery Trauma Admission Pathway from Fracture Clinic and Orthopaedic Clinic.

**HYWEL DDA UNIVERSITY HEALTH BOARD  
WITHYBUSH GENERAL HOSPITAL**

**PATIENT PATHWAY FOR TRAUMA ADMISSION**

This form should be completed for all patients where surgery is proposed

**SURGEON TO COMPLETE RED AREAS**

ADDRESSOGRAPH \_\_\_\_\_ Date of outpatient appointment \_\_\_\_\_

Consultant \_\_\_\_\_

Seen By \_\_\_\_\_

Date of Surgery if known \_\_\_\_\_

Telephone Numbers (Home) \_\_\_\_\_ (Work) \_\_\_\_\_ (Mobile) \_\_\_\_\_

PROPOSED SURGERY/ DIAGNOSIS \_\_\_\_\_ LA / GA / REGIONAL / SEDATION

Date to be treated by \_\_\_\_\_ Suitable to be treated on elective list Yes / No

CONSULTANT/ DR Signature \_\_\_\_\_

**OBSERVATIONS**

Weight \_\_\_\_\_ Height \_\_\_\_\_ BMI \_\_\_\_\_

Pulse \_\_\_\_\_

Blood pressure \_\_\_\_\_ BP 2<sup>nd</sup> reading if raised \_\_\_\_\_

Nurse signature \_\_\_\_\_

Lower Limb injuries only VTE Risk Assessment completed by DR YES NO (if not why? \_\_\_\_\_)

Special requirements (please state) \_\_\_\_\_

Equipment required: (please state) \_\_\_\_\_

Company rep: to be present? \_\_\_\_\_

Is the procedure categorized as: Day Case (Main Theatre)  Inpatient

REASON FOR ADMISSION AS INPATIENT (If procedure categorized as Day Case) \_\_\_\_\_

NURSE TO COMPLETE ASSESSMENT ON BACK TO CONFIRM PATHWAY

**Figure 2** Patient pathway for trauma admission.

admitted with other upper limb injuries. 38 (15.8%) patients had lower limb fractures and 24(14.2%) patients had other lower limb injuries on admission (Figure 4). 48 % (115/240) of total cases could not be discharged on the same day.

The Median (range) age of non-discharged patients was 53 (17-92) years.

**PRE –OPERATIVE HEALTH SCREEN QUESTIONNAIRE**  
Please answer the questions by ticking (✓) your answer

- Do you take any Medicines, Tablets or Inhalers **Yes / No**  
If yes, please list them below (include oral contraceptives and HRT)
- How far can you normally walk without stopping?  
  - More than one flight of stairs
  - One flight of stairs
  - Half a flight of stairs
  - Around the house
- What stops you going further?  
  - Joint pain
  - Chest pain
  - Shortness of breath
  - Something else. Specify.....
- Do you get chest pain?  
  - No
  - When in a hurry
  - In cold or windy weather
  - After food
  - At other times. Specify.....
- Do you get short of breath when you  
  - Lie flat
  - Walk on the flat
  - Walk up a flight of stairs
  - None of these
- Have you ever had or have any of the following? **Yes / No**
  - Heart attack
  - Heart surgery
  - Hypertension
  - Stroke / Mini stroke
  - Asthma / COPD
  - Diabetes
  - Blackouts / Fits
  - Chemotherapy / Radiotherapy
  - Anticoagulation treatment such as Warfarin, Aspirin, Clopidogril (plavix) Dipyridamole (persantin / asasantin)

Reason for taking \_\_\_\_\_

Have you ever been informed are at risk/or have had CJD YES/NO \_\_\_\_\_

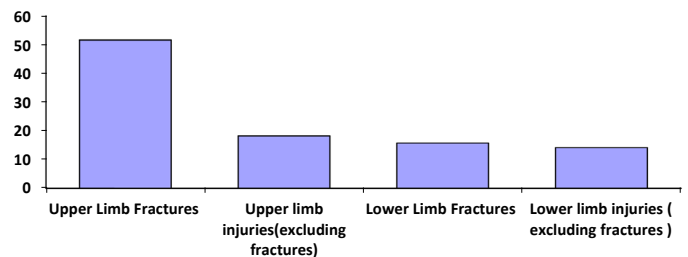
Any other health reasons patient is seeing a different Consultant /GP \_\_\_\_\_

Allergies...and...Sensitivities...including LATEX..... \_\_\_\_\_

Smoker Yes / No How many per day \_\_\_\_\_ Ref to smoking cessation nurse YES Declined Information given \_\_\_\_\_

**Day Surgery Patients Only**  
MRSA swabs taken **YES NO N/A**

**Figure 3** Pre-operative health screen questionnaire.



**Figure 4** Types of injuries in admitted patients.

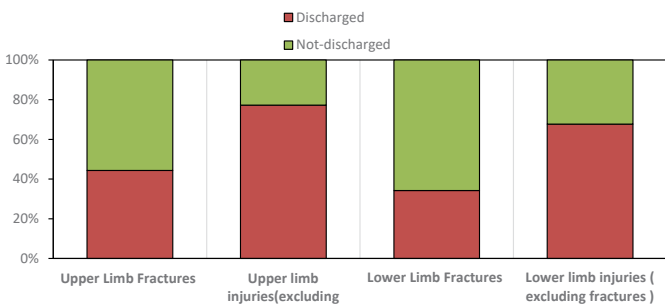
There was a significant difference in the median age of non-discharged patients (53) and discharged patients (42) [ $z=-2.8$ ,  $p<.01$ , Mann-Whitney-U test of statistical significance].

60% (69/115) of non-discharged patients were females. A chi-square test of independence showed that there was a significant association between gender and discharge outcome [ $X^2(1, N = 240) = 4.98$ ,  $p = .02$ ] (Table 1).

**Table 1** Chi-square test results:Association between gender of patients and their discharge outcome.

Gender	Discharged Observed/ expected/ $\chi^2$	Not discharged Observed/ Expected/ $\chi^2$	Row Totals
Male	68 (59.38) [1.25]	46 (54.62) [1.36]	114
Female	57 (65.62) [1.13]	69 (60.38) [1.23]	126
Column Totals	125	115	240

The discharge rate for patients with lower limb fractures was the lowest (65.8% [25/38] patients staying overnight). This was followed by patients with upper limb fractures where 55.6% [69/124] of patients stayed overnight. 32.4% [11/34] and 22.7% [10/44] of patients, with lower limb injuries and upper limb injuries, respectively, stayed overnight (Figure 5). A chi-square test of independence was performed to examine the relation between the type of injury and the discharge outcome. The relation between these variables was significant.  $[X^2 (dF=3, N = 240) = 22.3, p < .01]$  (Table 2).

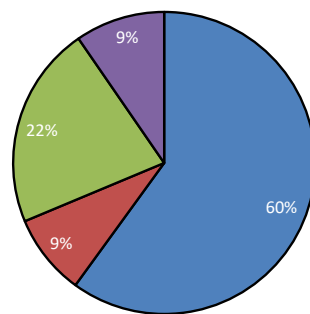


**Figure 5** Types of injuries in patients and their discharge outcomes.

**Table 2** Chi-square test results: Association between gender of patients and their discharge outcome.

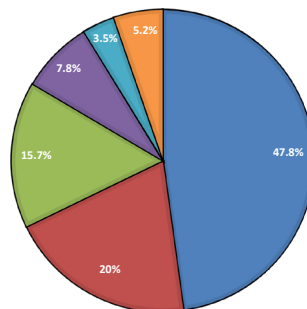
Type of Injury	Discharged Observed/ expected/chi <sup>2</sup>	Not discharged Observed/ Expected/Chi <sup>2</sup>	Row Totals
Upper limb injuries	34 (22.92) [5.36]	10 (21.08) [5.83]	44
Upper limb fractures	55 (64.58) [1.42]	69 (59.42) [1.55]	124
Lower limb injuries	23 (17.71) [1.58]	11 (16.29) [1.72]	34
Lower limb fractures	13 (19.79) [2.33]	25 (18.21) [2.53]	38
<b>Column Totals</b>	<b>125</b>	<b>115</b>	<b>240</b>

60% (69/115) of non-discharged patients had upper limb fractures. 21.7% (25/115), 9.6% (11/115), and 8.7% (10/115) of the non-discharged patients had lower limb fractures, lower limb injuries, and upper limb injuries, respectively (Figure 6). The most common of reasons (47.8%, 55/115) for overstay were patients' postoperative health related issues which majorly included postoperative pain, nausea and vomiting, and inability to carry out activities of daily living. 20% (23/115) of patients had a late return from theatre, preventing same-day discharge. 15.7% (18/115) of patients were delayed because of hospital issues (unavailability of beds, prioritization of sick patients for surgery). 7.8% (9/115) of patients had combined patients' postoperative health-related and hospital-related issues. 3.5% (4/115) of patients had social issues impeding discharge. Reasons were not specified in patients' case notes for 5.2% (6/115) of non-discharged patients (Figure 7).



**Figure 6** Types of injuries in non-discharged patients.

- Upper Limb Fractures
- Upper Limb Injuries (excluding fractures)
- Lower limb fractures
- Lower limb injuries (excluding fractures)



**Figure 7** Reasons for delayed discharge of patients.

- Patients' postoperative health related reasons
- Late return from the theatre
- Hospital related issues
- Combined patients' postoperative health and hospital related issues
- Patients' social issues
- Reasons not specified in patient notes

## Discussion

In a small district hospital, a day surgery pathway can have several benefits. Improvement in the pathway leads to lower costs to the health board as the patient stay is reduced. As the hospital caters to the geographical area which attracts tourists due to its landscape and natural terrain, there is an increased number of patients who require orthopaedic admission due to their injuries. This pathway assists in managing the inpatient beds by 'freeing them up' and utilizing the day surgery.

Since the start of the day surgery pathway, there has been significant improvement in the discharge rate over this period in comparison to our previously published results. For the initial 11 months after the pathway was implemented, the discharge rate of 5.2% (1 discharged out of 19 patients admitted for day surgery) was noted [2]. An increment of 42.8% in discharges signifies that the patient care via this pathway is improving. A reason for this can be increased awareness about the pathway amongst healthcare workers who are part of the day surgery unit, and rising confidence amongst surgeons to deal with patients as a day surgery case. Notably, one of the keys to the success of this pilot project is the function of the pre-assessment services leasing with the day surgery unit, liaising with the orthopaedic surgeons, and scheduling patients appropriately.

There are certain limitations to this pathway in our hospital. Unlike in larger hospitals, we only have a small on-call trauma team consisting of a consultant, a registrar, and a senior house officer/foundation year doctor. With a rigid schedule and commitment of senior doctors to clinics, perfect implementation of the pathway is impaired.

Also, as the trauma lists run only in the afternoons of weekdays (excluding Thursdays), this leads to the cancellations of cases, as the major trauma cases take priority. This is a compelling argument for a dedicated day case trauma list.

The limited number of operating surgeons and anaesthetists, along with the number of theatres and capacity of DSU limits the good implementation of the pathway as well.

As changes take time to occur in a slowly evolving system, effective and continued communication can help in the continued success of this pathway which has become established within the department. Our recommendations for improvement of this pathway includes a dedicated day case trauma list and organization of regular sessions for the education of the involved new and established staff to ensure full utilization of this pathway and better optimization of patients' conditions. A focus on meticulous pre-assessment of patients may limit delayed discharges due to social reasons. Lastly, we also plan to improve patient notes documentation and record-keeping to limit missing data.

In the current situation with COVID-19, we are unable to treat patients within the day surgery unit. However, the pathway is still

functioning within the pre-assessment service delegating all patients through the inpatient pathway regardless of their status as day case or inpatient. Hence, currently, the day surgery unit remains non-functional. When the situation changes, we aim to increase our discharge rate, without compromising on the quality of care and patient satisfaction, with the help of the clinical personnel involved. We plan to re-audit after we have placed these measures for further development of the pathway.

## References

1. BADS Directory of Procedures. National Dataset (Calendar Year 2015). British Association of Day Surgery. London: 2016
2. Deshmukh N, Belfield F. Developing a day surgery trauma pathway in a rural district general hospital. *Ambulatory Surgery* 2017;**23.4**:64-67.