



## SUSQI PROJECT REPORT

# Improving Sustainable Value of Paediatric Buckle Fracture Care and improving awareness of Wessex Healthier Together

**Start date of Project:** June 2024

**Date of Report:** September 2024

### Team Members:

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### Background:

2018-2019 saw 24.8 million UK attendances to emergency departments (ED), a 21% increase from 2009-2010, Proportionately, paediatric patients tend to be higher users. In 2015-2016, 425 of 1000 attendances were children. Locally we have also noticed a disproportionate increase in this groups attendances. There is a focus on reducing avoidable adult attendances to ED. but not so much for children. In the UK, the most common presentations to UK paediatric EDs are injuries(2). An audit in our District General Hospital (DGH) demonstrated we receive around 2,500 paediatric attendances per month, 400 of which are minor upper limb (UL) injuries.

#### 1) **Improving care for buckle fractures, implementation of the force protocol**

The most common injury presenting is buckle fractures (3). 28.8% (115) of attendances to our DGH for arm injury were buckle fractures in July 2023, similar to the national average (3). Currently there is no set standard for management of buckle fractures and treatment ranges from splint immobilisation and discharge to cast immobilisation, follow up and repeat x-ray. Growing evidence suggests that less is more as evidenced by The Forearm Fracture Recovery in Children Evaluation (FORCE) study carried out in the UK(4). This study showed that there was no significant difference in managing buckle fractures with a bandage vs splint or cast and follow up. This study has now been endorsed by several trusts, implemented regionally and is shaping the future of Buckle fracture management.

As such the FORCE study recommends using a bandage as a protocol for managing buckle fractures. Despite national encouragement to use the FORCE protocol, many hospitals are not following the protocol. Audit at our DGH showed that prior to this project, only 20% of clinicians at our DGH were aware of the FORCE protocol, and that 0% of buckle fractures were managed with a bandage. They were managed with a splint or cast. We thus set out to create awareness of the FORCE protocol in a quest to improve and standardise care and to reduce resource use and environmental harm whilst maintaining patient care.



## 2) **Preventing attendance through parent and caregiver empowerment**

Whilst analysing attendances for buckle fractures, we identified that many other attendances with upper limb injuries did not require interventions and could have been prevented with appropriate guidance at home. This was made clearer after conducting a caregiver specific survey on their perception of their attendance. Our survey showed that 63.9% of caregivers think that, retrospectively, their attendance could have been avoided if they had more information on managing injuries and illnesses at home. Moreover, 60% believed an online resource with appropriate information on medical problems could have avoided their attendance, helping them to feel more confident in managing at home and helping them to understand when to worry and who to contact. Such online resources already exist with 42.9% of caregivers surveyed had heard of it. We thus set out to improve awareness of such resource, Wessex Healthier Together amongst caregivers. Our aim is to empower caregivers, thus reducing attendances and the subsequent pressure, waiting times, suboptimal treatment, resource misuse and making reaching Net Zero goals closer.

Wessex Healthier Together is a website and app that offers resources that aim to improve quality of care for pregnant women, children and young people. Resources have been developed between parents and healthcare professionals and provide clear information on common illnesses, including advice on red flag signs to look for, where to seek help if required, what you should do to keep comfortable and how long symptoms are likely to last. It thus allows caregivers to become empowered about medical problems.

### **Specific Aims:**

- 1) Increase awareness and usage of the FORCE protocol amongst clinicians from 0% attendances being managed via the FORCE protocol pre intervention, to 50% within 1 month of starting interventions.
- 2) Increase awareness and usage of Wessex Healthier Together injury and illness guidelines amongst caregivers, which has potential to empower caregivers and reduce low value attendances to the ED.

### **Methods:**

#### *Improving care for buckle fractures with use of FORCE protocol*

Studying the system:

We set out to understand how our department managed buckle fractures and how aware health care providers were of the FORCE Protocol. We conducted a survey amongst doctors, emergency medicine nurses and physician associates which showed that only 20% of healthcare providers were aware of the FORCE protocol and that none were using it in their practice, opting for a splint or cast instead of recommended bandage.

We audited upper limb injuries and found that 28.8% (115) of all upper limb attendances were for buckle fractures. Findings supported our staff survey. 96.3% of buckle fractures were managed with a splint and 3.7% were managed with a cast and follow up. 0% used the recommended bandage.

Changes implemented

In order to change this we decided to increase awareness of the FORCE protocol. We engaged with our ED Consultants to get the message spread as well as our Trust Communication team in order to get visual supports/reminders approved for clinical environments.



This was done through a variety of channels:

1. Surveys - the surveys itself became a source of awareness for the protocol.
2. Infographics - posters reminding clinicians about the protocol were placed on relevant places
3. Reminders - emails and messages were sent to clinicians to remind them of the protocol.
4. Education - The protocol was discussed during handovers as part of the 'Top 10 tips' initiative during August and September.
5. Senior leadership: We liaised with divisional leaders in order to introduce the protocol from a top down approach and ensure it was approved by the relevant stakeholders (emergency department and Orthopaedic team).

Clinicians were then resurveyed in September to assess their awareness of the protocol and whether they were using the protocol to manage buckle fractures. Attendances with buckle fractures post intervention were audited to see how many fractures were being managed as per the force protocol after intervention.

#### *Preventing attendance through parent and caregiver empowerment*

Studying the system:

During our audit of buckle fractures it was identified that a lot of attendances to the emergency department could be avoided. We surveyed caregiver and patients to understand their perception of their illnesses and attendance to the emergency department. Our caregiver focus survey showed that:

- 30.7% of caregivers were not confident in managing an injury at home
- 76.9% believed that an electronic resource could make them feel confident or extremely confident in managing an injury at home.
- 57.1% of caregiver had never heard of Wessex Healthier Together
- 63.9% responding that in retrospect, more information on managing injuries could have avoided them attending the emergency department on that occasion.
- 100% responded having a resource with information on injuries would be helpful

#### Changes implemented

Once our survey highlighted the lack of awareness and the potential benefit for families of utilising Wessex healthier together advice guidelines, we started to create ways to increase awareness of the guidelines, aiming to encourage caregivers and families to use the Wessex healthier Together app. This was done through a variety of channels:

1. Infographics: posters displaying information about Wessex Healthier Together were displayed around our paediatric emergency department to create awareness. Big QR codes encouraging parents to scan and download the app were also placed.
2. Word of mouth - Clinicians were asked to signposts caregivers Wessex Healthier Together resources and stress the importance of its use.

Ongoing changes:

Communication has been started with other primary care providers and health services in order to disseminate awareness of Wessex Healthier Together in order to increase carer awareness and



engagement with the platform. We are engaging with our CHAT team (community nurses) who provide community education and also review children discharged from the hospital as part of our strategy to avoid admissions. As part of the new co-located Urgent Treatment Centre opening shortly, we plan to further advertise this resource.

#### Measurement:

##### *Patient outcomes:*

###### *Improving care for buckle fractures with use of FORCE protocol*

No patients were managed under the protocol pre-intervention. We measured staff awareness of the protocol and the number of buckle fractures managed using the FORCE Protocol during mid September to mid October following our intervention.

The FORCE study suggests equal patient outcomes when comparing management of buckle fractures with bandage vs other (4). Thus, we didn't focus on trying to investigate this further. As we introduce the protocol and gather more information, we can monitor any changes in re-attendances or incident reports but do not anticipate any issues.

###### *Preventing attendance through parent and caregiver empowerment*

We are measuring the number of attendances to the ED for injuries and hope after our interventions we will see a reduction in attendance numbers however given the new pathways for minor injuries locally, it may not be possible to measure this. We need to re survey parents to understand whether awareness has increased – it was not feasible within the time constraints of the project to demonstrate an impact.

##### *Population outcomes:*

While not possible to measure in the scope of the project, there are some potential benefits to the wider population, as detailed in the results section.

##### *Environmental sustainability:*

A process-based life cycle assessment was used to estimate the carbon footprint of the splint and the bandage. For both items, the analysis included GHG emissions associated with raw material extraction, packaging raw materials, transport and disposal. Item and packaging materials were weighed by the team and converted into GHG emissions using emission factors taken from the UK Government Greenhouse Gas Reporting Conversion Factors 2024 database and Ecoinvent v3 database. Supply chain and transportation distances were projected based on manufacturing location and transport emission factors were taken from the UK Government Greenhouse Gas Reporting Conversion Factors 2024 database.

The carbon footprint for an x-ray was taken from McAlister et al 2022. We used the factor for a chest x-ray as this will be closest to an arm x-ray. As the study was conducted in Australia, we replaced the electricity factor with a UK factor for a more suitable emission factor per x-ray.

The emission factor for an ED attendance was taken from the Care pathways guidance on appraising sustainability (Sustainable Development Unit, 2015)



Item	Carbon footprint per item (kgCO2e)
Splint	0.3535
Bandage	0.1852
X-ray	0.75 kgCO2e
One ED attendance	13.8 kg CO2e

#### *Economic sustainability:*

Moving from rigid immobilisation to bandage is expected to save £12.55 per buckle fracture (5). The costs of an ED attendance, follow up appointment and arm x-ray were provided by the Trust finance team:

- ED attendance: £94 for a patient that does not require management or investigations
- Follow up appointment: £74 for a single professional trauma and orthopaedic appointment.
- Arm x-ray: £33.75

#### *Social sustainability:*

We were able to gain some insight into social impacts from families through our surveys. We have detailed potential outcomes on staff in the results section.

#### **Results:**

##### *Patient outcomes:*

##### *Improving care for buckle fractures with use of FORCE protocol*

Following interventions, the number of buckle fractures managed via the force protocol has increased from 0 to 57%. 64% of clinicians are now aware of the need to use the force protocol for buckle fractures as opposed to 20.8 % prior to any intervention.

We hope that use of the force protocol results in a psychosocial impact for management of buckle fractures on patients whilst maintaining or improving level of care (4). By moving away from casts and introducing bandages, there is a quicker return to normality amongst the population leading to less muscle atrophy and a positive reinforcement that not all injuries require an immediate attendance to hospital. Awareness of the protocol also reduces variability in practice. Standardised practice often translates to better patient outcomes.

##### *Preventing attendance through parent and caregiver empowerment*

We expect that longer term, this project will create a more confident and knowledgeable patient/caregiver population. In the short term, our efforts did not lead to any change in the number of attendances to the emergency department. Wessex Healthier Together advice guidelines cover an extensive range of paediatric conditions and so there is potential for the project to impact not only confidence to care for minor injury, but a whole host of conditions. It will empower patients/caregivers in line with the principles of sustainable clinical practice.

### *Population outcomes:*

Use of the FORCE protocol will streamline care in the ED with benefits across service delivery and patient care.

Building awareness of the Wessex Healthier Together app can bring long term population benefits. This app contains knowledge on when to seek medical care, who to contact, when to worry and how to monitor illnesses amongst others. Having reputable information at their fingertips will improve confidence and ensure appropriate medical care decisions are made by caregivers.

The app provides a free, accessible way to get medical advice and has the potential to reduce health inequalities among the paediatric population (7) by addressing financial, cultural, and/or informational barriers, offering confidence to caregivers, and simplifying complex medical information to help users make informed decisions and seek professional care when necessary.

### *Environmental and economic sustainability:*

#### *Improving care for buckle fractures with use of FORCE protocol*

During mid-September to mid-October there were 120 buckle fractures. 57% (68.3) were treated with a bandage instead of a splint. This is a saving of 11.5 kgCO<sub>2</sub>e and £857.17 per month. Projected across a year we will save 138 kgCO<sub>2</sub>e and £10,286.

While the majority of patients were previously managed with a splint and did not require any follow up or further xrays. 4 patients in mid-September to October were treated with a cast and follow up. Avoiding this method of treatment would save an additional 14.55 kgCO<sub>2</sub>e and £107.65 per patient.

#### *Preventing attendance through parent and caregiver empowerment*

In our survey, 63.9% caregivers responded that in retrospect, more information on managing injuries could have avoided them attending the emergency department on that occasion. Based on our findings we can conservatively assume that 5-10% of our 2,500 attendances for illnesses and injury could have been avoided by increasing caregivers' engagement with the Wessex Healthier Together advice and app. This could potentially mean 125 less attendances per month. Conservatively, 125 less attendances per month is a saving of 1,725 kgCO<sub>2</sub>e and £11,750. Projected across a year, this is equivalent to 20,700 kgCO<sub>2</sub>e and £141,000.

### *Social sustainability:*

Empowering caregivers to manage their child's injury at home through access to reliable information can bring a range of positive social benefits to families. Caregivers can feel more confident and assured in their ability to care for injury and other conditions at home, which may reduce anxiety about making health-related decisions. Practically, this can reduce unnecessary trips to healthcare services and potentially long waits in clinics and emergency departments for conditions that can be managed at home, saving time, reducing stress, and allowing healthcare resources rationalised. Over time, this builds a more self-sufficient and health-literate family unit.

For staff, the implementation of the force protocol has allowed healthcare providers to ensure they provide a standardised best care. By having a guideline that is accessible, healthcare providers can



ensure that best care is consistently provided. Moreover, it builds resilience, reduces stress and improves confidence amongst healthcare providers.

### Discussion:

This project unexpectedly expanded to focus on two areas 1. Implementation of the force protocol and 2. Empowering caregivers to self-care with appropriate signposting.

#### *Improving care for buckle fractures with use of FORCE protocol*

We have successfully increased healthcare provider awareness and usage of the FORCE protocol to standardise care and optimise outcomes while reducing resource use. A 57% uptake of the protocol brings potential annual savings of 138 kgCO<sub>2</sub>e (equivalent to driving 407.5 miles) and £10,286.

There are some limitations to our data and potential savings. Attendance numbers for upper limb injuries will fluctuate throughout the year, and therefore some months will offer higher savings compared to others. We know that admissions for injuries are usually higher in summer months which could lead to an overestimation of savings. However, we have also not been able to fully capture savings from treatment via casts, additional x-rays or follow up appointments that may have been provided, which likely leads to an underestimation of our savings. There is also room for engagement of the protocol to increase beyond 57%, which will increase savings further.

Whilst awareness of the force protocol amongst clinicians has increased from 20.8% to 64% and 57% of buckle fractures were managed with a bandage as opposed to other options post intervention, room still exists for improvement. Savings could increase to 242 kgCO<sub>2</sub>e and £18,072 if 100% patients were treated under the protocol. This does not include additional savings from any additional x-rays and follow up appointments prevented.

There are several reasons for why 100% uptake of the protocol has not been achieved. Some doctors may not consistently work in the paediatric department, or have been on shifts that did not expose them to our changes. It could also be due to friction of change or clinical choice and preference. Importantly, on a survey asking where did clinicians hear about the force protocol, word of mouth was the most common answer hence we can assume with sufficient time, awareness of the force protocol amongst clinicians should continue to improve.

Some of the challenges of implementing the protocol other than creating awareness itself was engaging other stakeholders and ensuring they were happy to proceed with the change. This included liaising with the orthopaedic team, emergency department and nurse practitioners to ensure everyone was happy with the new protocol. While all teams have approved the change, more time is needed to allow the change to be fully embedded. There is also the challenge of a change in practice for caregivers who require reassurance that their child's outcome will not be affected by a splint vs bandage.

#### *Preventing attendance through parent and caregiver empowerment*

Our project has identified that caregivers believe Wessex Healthier together could potentially have



an important role in reducing the number of attendances to the emergency department. Our survey has demonstrated that under half of caregivers are aware of Wessex Healthier Together and those that know about it, don't use it because they either didn't think about it or didn't believe it would be useful. Increasing awareness and usage of Wessex Healthier together could improve patient, economical, sustainability and social outcomes.

Due to the short timeframe of this project, we have focussed on creating awareness of Wessex Healthier Together with patients who are already in the emergency department. While this may support these families long term, they were unlikely to re-attend within our auditing time frame. We have therefore seen no reduction in avoidable attendance during the current project. However, we are continuing to work with other primary care services and the community in order to promote more awareness and engagement with Wessex Healthier Together and will continue to monitor if this supports a reduction in low value attendances. Patient empowerment is a key principle of sustainable clinical practice and so we are motivated to continue to drive this change for optimising care and experience of families.

### Conclusions:

Our work on introducing the FORCE protocol and creating awareness of Wessex Healthier Together in our hospital has shown that this has value in improving patient care and resource usage in our hospital and in the NHS.

Our work on the FORCE protocol has shown that its introduction can maintain standard of care whilst being more sustainable and resource conscious. Having said this, the protocol is not yet fully incorporated into practice. In order to achieve this, we need to continue to actively remind health care providers about the protocol as well as use the posters placed in the department to passively remind about the protocol. A key learning point has been the importance of engaging the key decision makers and ensuring they are actively “onboard” with the change in practice. This promotes continuity and slowly allows for change. Moreover it has been noted the importance of word of mouth and the importance of “shopfloor conversations” to change practice and keep healthcare providers up to date. We aim to continue promoting education about the protocol and aim to audit our compliance to see if we have created a sustainable change. We also aim to look into whether there are any changes in patient outcomes like complaints, reattendances or incident reporting.

Our work on promoting Wessex Healthier Together remains the more exciting part given the potential positive impact. Whilst we haven't been able to prove a reduction in attendance post our intervention, our surveys have shown that caregivers feel like more accessible education could avoid their attendance to the emergency department. This elicits the need to focus on patient education as a way of preventing attendances to the emergency department. Promoting Wessex Healthier together thus becomes paramount. As said, during our intervention, our efforts were mainly concentrated on creating awareness amongst patients who presented to our department with limitations in how we measure the impact identified. We hope in the future to be able to communicate more with the broader community and healthcare providers in order to not only





affect patients who come to our department but also our wider population. We have further improvement projects running as part of a longer term strategy to reduce attendances with healthcare providers, there is work to be done through 111, who were identified as sending a proportion of attendances not requiring intervention.

## References and Resources

1. [Non-urgent emergency department attendances in children: a retrospective observational analysis | Emergency Medicine Journal \(bmj.com\)](#)
2. [Microsoft Word - INA Factsheet-ChildhoodInjuriesv3.docx \(durham.gov.uk\)](#)
3. [Pediatric Torus Buckle Fracture - StatPearls - NCBI Bookshelf \(nih.gov\)](#)
4. [Immobilisation of torus fractures of the wrist in children \(FORCE\): a randomised controlled equivalence trial in the UK - The Lancet](#)
5. <https://boneandjoint.org.uk/Article/10.1302/0301-620X.106B6.BJJ-2023-1211.R1> [cost saving of buckle](#)
6. <https://www.pssru.ac.uk/wp-content/uploads/2018/01/uc2016-revision-6.1.pdf> [cost attendance](#)
7. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5512995/> [patient leaflets benefir](#)
8. [The carbon footprint of hospital diagnostic imaging in Australia - The Lancet Regional Health – Western Pacific](#)
9. *Care pathways guidance on appraising sustainability (Sustainable Development Unit, 2015)*  
Available from: [Sustainable Development Unit \(SDU\) carbon footprints of various units of healthcare activity | CSH Networks \(sustainablehealthcare.org.uk\)](#)



Appendices: Poster 1 and 2 were put throughout ED to create awareness of FORCE protocol amongst clinicians.

**THE FORCE PATHWAY**

Is there an **ISOLATED** paediatric wrist fracture? **YES**

**YES** Is the fracture in the **DISTAL 1/3** of the radius? (with/without ulna fracture)

Is the cortex of the radius deformed (**BUCKLED**)? **YES**

**YES** Is the cortex **INTACT** all around the radius? (i.e. no visible gap)

This is a **BUCKLE** fracture; Use the **FORCE** evidence:  
• Offer a bandage • Discharge without follow-up

To see the published evidence and patient materials, go to  
[www.FORCEstudy.org](http://www.FORCEstudy.org)



# THE FORCE STUDY

Co-ordinated by  KADOORIE



**965** Randomised with buckle fractures

**489**

Offered a bandage & immediate discharge



**476**

Offered a splint / cast & routine follow-up



**94%**

completed primary outcome (pain) at 3 days



**Equivalent Pain Scores at every time point**

No Difference in:



Recovery



Complications



Quality of life

Use the force pathway

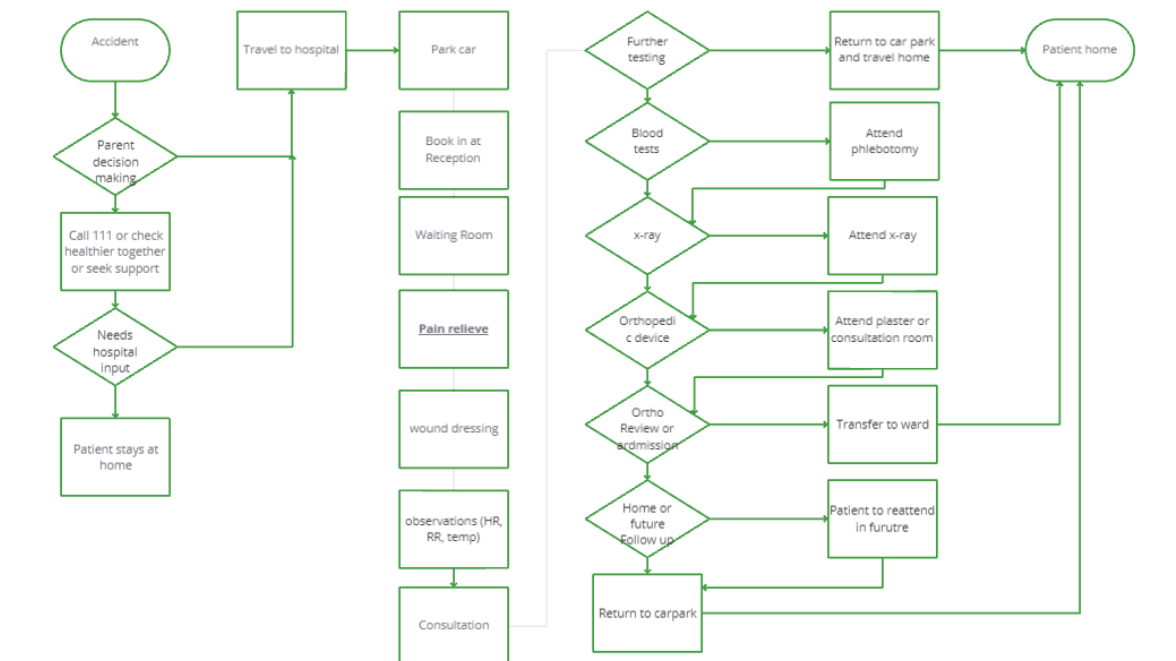
[www.FORCEstudy.org](http://www.FORCEstudy.org)



**NIHR** | National Institute for Health and Care Research



## Patient journey for Buckle Fracture:



## Critical success factors

Please select one or two of the below factors that you believe were most essential to ensure the success of your project changes.

People	Process	Resources	Context
<p><input checked="" type="checkbox"/> Patient involvement and/or appropriate information for patients - to raise awareness and understanding of intervention</p> <p><input checked="" type="checkbox"/> Staff engagement</p> <p><input type="checkbox"/> MDT / Cross-department communication</p> <p><input type="checkbox"/> Skills and capability of staff</p> <p><input type="checkbox"/> Team/service agreement that there is a problem and changes are suitable to trial (Knowledge and understanding of the issue)</p> <p><input checked="" type="checkbox"/> Support from senior organisational or system leaders</p>	<p><input type="checkbox"/> clear guidance / evidence / policy to support the intervention.</p> <p><input type="checkbox"/> Incentivisation of the strategy – e.g., QOF in general practice</p> <p><input type="checkbox"/> systematic and coordinated approach</p> <p><input type="checkbox"/> clear, measurable targets</p> <p><input checked="" type="checkbox"/> long-term strategy for sustaining and embedding change developed in planning phase</p> <p><input checked="" type="checkbox"/> integrating the intervention into the natural workflow, team functions, technology systems, and incentive structures of the team/service/organisation</p>	<p><input type="checkbox"/> Dedicated time</p> <p><input type="checkbox"/> QI training / information resources and organisation process / support</p> <p><input type="checkbox"/> Infrastructure capable of providing teams with information, data and equipment needed</p> <p><input type="checkbox"/> Research / evidence of change successfully implemented elsewhere</p> <p><input type="checkbox"/> Financial investment</p>	<p><input type="checkbox"/> aims aligned with wider service, organisational or system goals.</p> <p><input type="checkbox"/> Links to patient benefits / clinical outcomes</p> <p><input type="checkbox"/> Links to staff benefits</p> <p><input checked="" type="checkbox"/> 'Permission' given through the organisational context, capacity and positive change culture.</p>