

Carpal Tunnel Surgery – The Lean, Green, More Efficient Surgical Pathway

Betsi Cadwaladr University Health Board

Value Proposition:

Orthopaedic services in Wales face growing pressure, with long waits and limited theatre capacity delaying routine procedures like carpal tunnel surgery (CTS). This cost-effective model uses outpatient-based minor ops rooms, cutting procedure costs by 65%, clinical waste by 66%, and carbon emissions by 80%, while freeing up theatre time for complex cases. Successfully piloted for CTS, it offers a scalable solution for other routine surgeries, improving access, efficiency, and sustainability without compromising the quality of care.

Why Change is Needed:

The pressure on orthopaedic services across Wales continues to grow. CTS, the most common surgical procedure in the UK, with over 80,000 cases annually, is increasingly affected by long waiting lists, a lack of main theatre availability, and the high cost of traditional surgical delivery. Main theatre time is a scarce and expensive resource, with staffing, space, and scheduling constraints limiting the ability to meet demand for routine procedures. Without alternative approaches, these pressures are likely to worsen, delaying treatment, increasing costs, and further exacerbating the backlog in planned care.

At the same time, the environmental impact of health care is substantial. The NHS produces 4% of the UK's emissions (NHS England, 2020), with surgical theatres generating 20–30% of hospital waste (Kwakye et al., 2011). Most of this waste comes from packaging and consumables, much of it unused or improperly recycled (Lee and Mears, 2012). Sustainable alternatives are urgently needed to reduce both care delays and the sector's carbon footprint.

The Opportunity - A Lean, Green, Surgical CTS Pathway:

The proposed solution uses minor ops rooms, smaller drapes, and streamlined surgical kits, to deliver CTS, shifting this minor procedure out of main theatre. This frees up day case and laminar flow capacity for more complex surgeries. In Wrexham Maelor and Ysbyty Gwynedd, over 300 minor hand surgeries have been delivered through this “lean and green” model, cutting carbon emissions by 80%, costs by 65%, and clinical waste by 66%.

This approach halves CTS procedure time, reduces resource use and hospital visits, and supports faster patient turnover. Now adopted across all three BCUHB sites and by private providers, it offers a scalable, cost-effective, and sustainable pathway, that aligns with Wales' planned care recovery and net-zero goals.

Impact and Outcomes:

Clinical and Operational:

- Procedure times and appointments reduced by 50%, with no complications and quicker patient turnaround. Fewer visits improve patient experience and free up system capacity for better care.

- Staffing reduced to one third – theatre team of 2 instead of 6.
- The minor ops room eases pressure on day case wards and main theatres.

Economic:

- £1,120 reduced resource utilisation per CTS.
- £37.42 per CTS procedure reduced costs due to smaller drapes and less equipment used (£11,226 to date with 300 procedures performed).

Environmental:

- Each procedure generates 22.14 kg less CO², an 80% carbon reduction per case.

Breakdown of Costs and Return on Investment:

- The model makes use of existing outpatient staff and uses existing outpatient clinic rooms.
- There may be an initial outlay to ensure the identified minor ops room is fully compliant. In Wrexham the cost to adjust minor ops rooms in line with IPC standards was £6950 +VAT.
- £37.42 per CTS procedure reduced costs due to smaller drapes and less equipment used.
- £1,120 reduced resource utilisation per CTS as demonstrated in the diagram below which provides a cost comparison between the old and new way of working.

	Main theatre pathway		Open surgery in MOPS pathway
Pre-op	Two clinic appointments Cost £130	Pre-op	One Clinic appointment Cost £65
Ward admission	Pasteur (3 staff) Cost £270	Ward admission	Clinic waiting area Cost £65
Theatre	Main theatre Cost £1200	Theatre	MOPS Cost £350
Post-op	Two follow up visits Cost £200	Post-op	Follow up visits Cost £200
Total	Cost £1800	Total	Cost £680

Strategic Alignment:

The lean green CTS pathway supports **NHS Wales Decarbonisation Strategic Delivery Plan (2021 - 2030)** by delivering efficient, low-carbon, high-throughput surgery outside main theatres. By accelerating treatment, reducing costs, reducing waiting lists and times, optimising theatre use, and expanding day-case capacity, it meets goals in the **Programme for Transforming and Modernising**

Planned Care (2022), the Welsh Innovation Strategy (2023), and NHS Wales Technical Planning Guidance (2025–2028).

Implementation Milestones and Available Support:

Phase	Key Milestones	Timeline
Phase 1: Engagement & Planning	Engage critical stakeholders (clinical and service leads, support staff, management), review existing resources and additional requirements. Identify pilot-ready sites. Secure any additional resources required.	1-3 months
Phase 2: Workforce & Infrastructure	Adapt minor ops rooms as required. Provide staff training on model and protocols.	3-6 months
Phase 3: Pilot Rollout	Implement new pathway. Monitor patient outcomes and resource impact.	6-12 months
Phase 4: Evaluation & Long-Term Sustainability	Conduct comprehensive evaluation with Value-Based Health Care teams. Confirm ROI, patient experience, and system efficiencies. Embed service into strategic planning.	12-18 months

Supporting resources include: Evaluation report, case for change, service presentation and SOP.

Call to Action: Adoption of the Lean, Green CTS Model:

Health boards across Wales have a key opportunity to lead in sustainable, efficient, patient centred care. The lean green carpal tunnel surgery pathway delivers:

- 80% carbon footprint reduction per procedure.
- 65% reduction in resource utilisation.
- Direct cost savings with reduced spend on surgical equipment.
- Increased theatre capacity for complex cases.
- Shorter procedures and fewer hospital visits.
- Reduced waiting lists through streamlined delivery.

This proven, low-resource model aligns with NHS Wales’ decarbonisation and value-based care goals and is ready for national rollout.

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