Evaluating the Budgetary Impact of the LifeVest® Wearable Cardioverter Defibrillator Service for Patients at Risk of Sudden Cardiac Death in the United Kingdom

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1. Objectives

The objective of this study is to evaluate the budgetary impact of implementing the LifeVest® wearable cardioverter defibrillator (WCD) service (Zoll Medical) in the English National Health Service (NHS) from the payer's perspective.

2. Methods

The Budget Impact Model (BIM) was developed in accordance with ISPOR and UK best practice guidelines[1], utilizing a system of deterministic decision trees for each subpopulation that aligns with subpopulation-specific treatment pathways within the NHS system. The model evaluates three patient populations at high risk of sudden cardiac death (SCD) following acute myocardial infarction (AMI): (1) revascularized patients, (2) non-revascularized patients, and (3) patients with a predetermined SCD risk who clinically require implantable cardioverter-defibrillator (ICD) explanations. The intervention, comprising the UK standard guideline-directed medical therapy (GDMT) plus the WCD, was compared to the UK GDMT alone, with a time horizon of one year. Input data include incidence, mortality, treatment complications, resource use, costs, and sustainability metrics. These inputs and assumptions were informed by systematic reviews of relevant clinical and health economic literature, real-world data from Hospital Episode Statistics, and UK-specific treatment guidelines. Sensitivity analyses were conducted to address uncertainties, and the BIM was validated.

3. Results

The model projects that implementing WCD alongside GDMT results in a total cost of £16,534 per patient annually, compared to £16,802 for GDMT alone, yielding a total budget impact of -£268 per patient annually.

Results for group (1) revascularized patients show a cost difference of £3 group (2) non-revascularized patients and group £1 less or patients using WCD when compared to GDMT alone. For group (3) patients with a predetermined SCD risk who clinically require ICD explanations a saving of £263 for WCD patients.

Additionally, the use of WCD reduces CO2 emissions by 1,165 kg per patient compared to GDMT alone (944 kg vs. 2,109 kg), contributing to environmental sustainability goals. The biggest difference is observed in revascularized patients, with approximately 900 kg of CO_2 emissions averted, and in non-revascularized patients, with around 200 kg of CO_2 emissions averted.

Potential savings for the NHS budget are projected to be £28,445,520 annually.

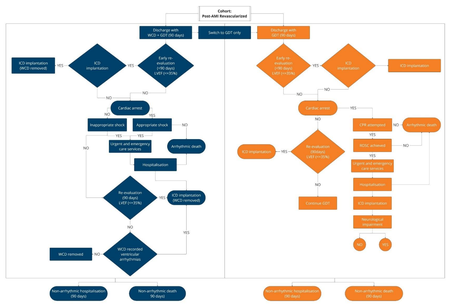

Figure 1. Modeled clinical pathway: post-AMI revascularized cohort [simmilar for post-AMI revascularized cohort]

Legend: AMI – Acute Myocardial Infarction, ICD – Implantable Cardioverter Defibrillator, WCD – Wearable Cardioverter Defibrillator, GDT – Guideline-Directed Therapy, GDMT – Guideline-Directed Medical Therapy, LVEF – Left Ventricular Ejection Fraction, CPR – Cardiopulmonary Resuscitation, ROSC – Return of Spontaneous Circulation, NHS – National Health Service.

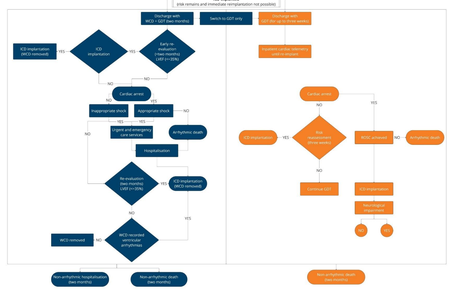

Figure 2. Modelled clinical pathway: ICD explanted

Legend: AMI – Acute Myocardial Infarction, ICD – Implantable Cardioverter Defibrillator, WCD – Wearable Cardioverter Defibrillator, GDT – Guideline-Directed Therapy, GDMT – Guideline-Directed Medical Therapy, LVEF – Left Ventricular Ejection Fraction, CPR – Cardiopulmonary Resuscitation, ROSC – Return of Spontaneous Circulation, NHS – National Health Service.

Table 1. Results for implementing WCD plus GDMT compared to GDMT alone per patient annually

WCD + GDMT	GDMT alone	Incremental Difference	NHS Budget Impact (savings)
£ 16,534	£ 16,802	£ -268	£28,445,520 annually
944 kg	2,109 kg	-1,165	

Legend: WCD – Wearable Cardioverter Defibrillator, GDMT – Guideline-Directed Medical Therapy, NHS – National Health Service (UK)

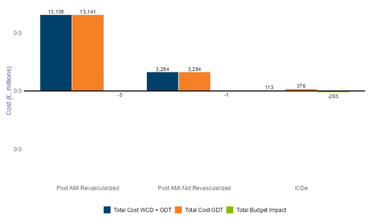

Figure 3. Results: Cost breakdown per cohort

Legend: WCD – Wearable Cardioverter Defibrillator, GDT – Guideline-Directed Therapy, GDMT – Guideline-Directed Medical Therapy, AMI – Acute Myocardial Infarction, ICD – Implantable Cardioverter Defibrillator, ICDe – ICD explantation

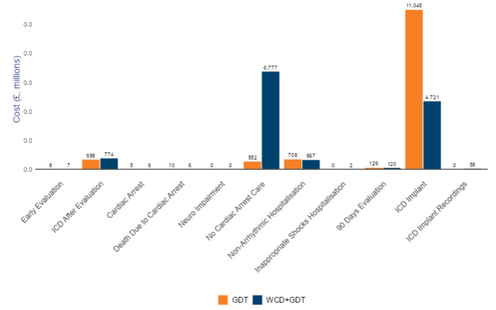

Figure 4. Results for Post-AMI Revascularized cohort: GDT vs WCD Breakdown

Legend: GDT – Guideline-Directed Therapy, WCD – Wearable Cardioverter Defibrillator, ICD – Implantable Cardioverter Defibrillator.

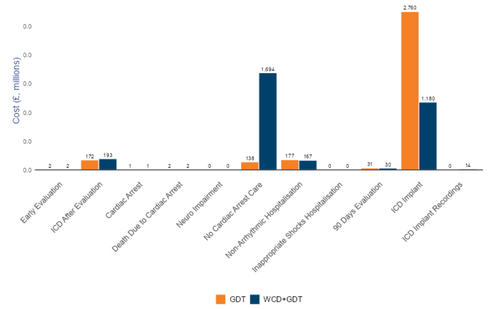

Figure 5. Results for Post-AMI Non-Revascularized cohort: GDT vs WCD Breakdown

Legend: GDT – Guideline-Directed Therapy, WCD – Wearable Cardioverter Defibrillator, ICD – Implantable Cardioverter Defibrillator

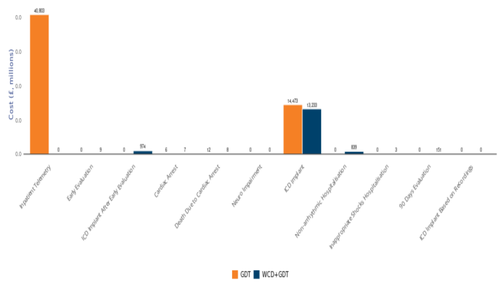

Figure 6. Results for ICD Explanted cohort: GDT vs WCD Breakdown

Legend: GDT – Guideline-Directed Therapy, WCD – Wearable Cardioverter Defibrillator, ICD – Implantable

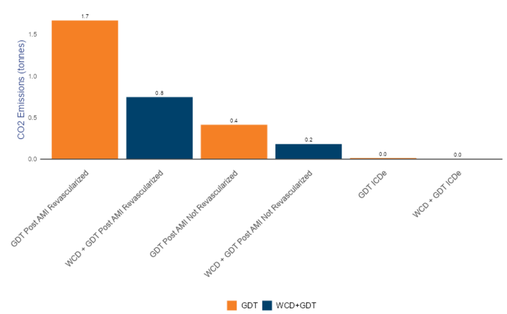

Figure 7. Results: ICD Explanted: GDT vs WCD Breakdown

Legend: GDT – Guideline-Directed Therapy, WCD – Wearable Cardioverter Defibrillator, AMI – Acute Myocardial Infarction, ICDe – ICD Explantation.

4. Disscusion

The budget impact analysis suggests that integrating WCD into the UK healthcare system can be justified from both a clinical and economic standpoint. Our findings align with prior studies indicating WCD use is cost-effective in high-risk post–myocardial infarction patients in England[2]. Similarly, U.S. analyses and several other EU HTA authorities including Germany [3] and France [4] have reported WCDs to be economically attractive in the early post-MI period, reinforcing the value of WCDs across different healthcare systems[5]. These economic findings carry important policy implications: if WCDs reliably prevent arrhythmic sudden cardiac death (SCD) during transient high-risk periods, payers like the NHS may consider funding WCD use as a bridge to implantable ICDs or recovery. Notably, current clinical guidelines prohibit ICD implantation within 40 days post-MI, leaving a gap in protection that WCDs can fill. Policymakers should weigh the upfront device costs against potential savings from avoided inpatient monitoring and SCD events. Strategically investing in WCDs could improve patient outcomes while remaining within budget constraints, informing future NICE guidance and hospital funding decisions.

Healthcare sustainability considerations emerged as a minor but noteworthy aspect of this analysis. Enabling high-risk cardiac patients to be monitored at home with WCDs, rather than staying in hospital, could modestly reduce resource use and associated carbon emissions

5. Conclusions

According to projections from this model, the LifeVest® WCD can range from cost-neutral to cost-saving for the NHS. While the results are cost-neutral in revascularized and non-revascularized post-AMI patients, the ICD explanation subpopulation demonstrates substantial cost-saving outcomes.

6. References

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4. Rodrigue Garcia et al. Wearable cardioverter-defibrillator in patients with a transient risk of sudden cardiac death: the WEARIT-France cohort study. EP Europace, Volume 23, Issue 1, January 2021, Pages 73–81
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