CIED Clinic Optimization: Data to Support Staffing for Clinical and Economic Value

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A recently published Medtronic-sponsored time and motion study sought to fill this knowledge gap by characterizing the CIED device clinic staff time required to manage patients with CIEDs, including detail by specific tasks, device type, and staffing roles.[1]

Background

Cardiac implantable electronic device (CIED) clinics have long struggled to identify optimal staffing models, as there are currently no guidelines from professional societies or publications addressing the resource needs of CIED patient management. Without data to support the need, clinic managers may struggle to obtain optimal resources for device clinic staff, contributing to staff burnout, high turnover, and in worst-case scenarios, suboptimal patient care.

A recently published Medtronic-sponsored time and motion study sought to fill this knowledge gap by characterizing the CIED device clinic staff time required to manage patients with CIEDs, including detail by specific tasks, device type, and staffing roles.[1] This article will illustrate how this data can be leveraged to improve CIED clinic operations, including estimation of optimal staffing and realization of clinical and economic value.

Study Overview

A time and motion workflow evaluation was performed in 11 CIED clinics: 6 in the U.S. and 5 in Europe (UK, France, Germany). This article will focus specifically on the findings from the U.S. clinics. Third-party observers from Deloitte Consulting observed and repeatedly timed every step in the CIED patient management process, including both clinical and administrative (eg, scheduling, documentation) tasks related to in-person and remote device checks, as well as other miscellaneous patient management tasks (fielding patient calls, troubleshooting device connectivity, identifying loss to follow-up, and triaging of patients and device transmissions). Data collection occurred over one business week (5 days) of observation at each clinic. All device models and manufacturers were included in the evaluation. Mean staff time required per remote monitoring (RM) check and per in-person clinic visit were calculated and then extrapolated to estimate the annual staff time per CIED patient.

A total of 276 in-person clinic visits and 2,173 RM activities were observed over 11 business weeks. Mean staff time required per device check ranged from 11.9-13.5 minutes for remote transmissions and 43.4-51.0 minutes for in-person visits, depending on device type. After multiplying by the average number of annual remote and in-person device checks for CIED patients, the estimated annual time to manage one patient was 2.1-2.4 hours for therapeutic devices (pacemaker, ICD, or CRT) and 9.3 hours for insertable cardiac monitors (ICMs). Further, the staff time associated with other patient management activities (defined above) was found to be 31.9 hours per week — 1,659.2 hours annually — across an average participating clinic size of 5,758 patients. Finally, subanalyses revealed that use of vendor-neutral patient management software and tablet-based programmers were associated with time savings for clinics.

Table 1. Assumptions for illustrative remote monitoring adoption economic analysis.

Patient Population Assumptions	
Total # of ICD patients	500
ICD patients remotely monitored at baseline (61%)	305
ICD patients remotely monitored at goal (90%)	450
Staffing Time Assumptions	
# Annual remote monitoring staff time required per ICD patient (hours)*	1.0
Remote Monitoring Revenue Assumptions	
# Annual ICD Remote Monitoring Billing Periods Per Example Clinic Protocol	4
Reimbursement rate per ICD Remote Monitoring Period** 2021 Medicare National Average Physician Payment Rate[9] for: *CPT® 93296: Interrogation device evaluation(s); single, dual, or multiple lead implantable defibrillator system (remote)* ***(technical component)****, up to 90 days* *$25* *CPT® 93296: interrogation device evaluation(s); single, dual, or multiple lead implantable defibrillator system (remote)* ***(professional component)****, up to 90 days* *$36*	$61

Sourced from Table 1 in Seiler et al (1.0 hours annually) and inflated for a 20% productivity loss [1.0(100%/80%) = 1.25 hours].

**This information does not replace seeking coding advice from the payer and/or your own coding staff. The ultimate responsibility for correct coding lies with the provider of services. All diagnosis and procedure codes must be supported by clear documentation within the medical record.

Applying the Data to Optimal Staffing

A hypothetical clinic scenario is helpful in applying these results to design an optimal staffing model. Assume a clinic manages 2,500 CIED patients with the following device type breakdown: 50% pacemaker (PPM), 20% implantable cardiac defibrillator (ICD), 20% cardiac resynchronization therapy (CRT), and 10% insertable cardiac monitor (ICM, otherwise known as implantable loop recorder). Seiler et al reported annual clinic staff time required per patient for CIED management (including remote monitoring and in-person visits) by device type as: PPM 2.1 hours; ICD 2.4 hours; CRT 2.4 hours; ICM 9.3 hours. Additionally, 0.29 hours per patient were required for other patient management tasks such

Table 2. Results of illustrative remote monitoring adoption economic analysis.

Patient Population Assumptions	Annual Staff Hours Required for RM	Potential Medicare Reimbursement Revenue Opportunity
305 ICD patients remotely monitored at baseline (61%)	381	$74,420
450 ICD patients remotely monitored at goal (90%)	563	$109,800
Difference	**181**	**$35,380**

as patient calls, troubleshooting device connectivity issues, identifying patient loss to follow-up, and triaging of patients/transmissions.

Based on extrapolation of these results, the hypothetical 2,500-patient clinic requires 8,071 active staff hours annually to manage its patient population. However, given that this study was observing *active patient care time*, or time in which a provider is engaged in patient care-related tasks, this could underestimate staffing requirements. For instance, it did not account for paid time off and inevitable interruptions such as questions and conversations, task switching, planned breaks, training/continuing education, and other distractions.

While the authors are unaware of studies specifically examining productivity in CIED clinics, a study of charting hospitalists found that 20% of total staffing time is spent on task switching and collaboration, in addition to active patient care time.[2] Applying this additional 20% to the 8,071 active staff hours calculated above, 10,089 total annual staffing hours would be necessary to manage 2,500 CIED patients [8,071*(100%/80%)]. While this estimate may not represent all sources of productivity loss, we applied it as a conservative adjustment to inform clinic staffing.

CIED patient management requires a variety of skillsets and subject matter expertise, which contribute to a complex staffing model. For instance, Seiler et al observed a two-level remote transmission review process in which significant time is associated with preliminary review, triage, and documentation of transmissions by nurses or device techs, with transmissions requiring further review being escalated to an advanced provider. The time required for the aforementioned tasks are included in the time per remote transmission review reported in Table 1 of Seiler et al, while the staff time associated with each specific task is reported in Multimedia Appendices 3-5.[1] Finally, the overall proportion of time spent by various clinic staff roles to manage the clinic was presented in Table 2 of the manuscript,[1] as observed in the participating clinics. While this is only an example from a small sample of clinics, it can be helpful data to evaluate how workload is being distributed and ensuring that staff are performing at the 'top of their license'. For example, nursing and device technician/medical assistant (MA) time is well-distributed for in-person visits (24% and 29%, respectively). However, remote transmission review time was more heavily weighted on nursing (53%) than techs/MAs (10%).

Regardless of the staffing types included, the number of total staff needed to manage the 2,500-patient CIED clinic can be estimated by dividing the total number of needed annual staffing hours by the staffing hours provided by a given employee. For example, a 40-hour/week full-time employee with 5 weeks of paid time off (inclusive of sick time and holidays) works 1,880 staff hours annually.[3] Based on the estimated 10,089 total annual staffing hours needed, 5.4 full-time equivalent employees (FTEs) are required to cover device management of 2,500 CIED patients (10,089/1,880).

Note that this calculation is largely specific to the CIED management workflow observed in the 6 participating sites. Therefore, clinics may need to consider any unique requirements they have to determine total staffing needs.

Optimal Staffing: Realizing the Clinical and Economic Value of Remote Monitoring

Clinical evidence has long shown the benefits of RM for patients with CIEDs, including decreased time to clinical action, improvement in patient satisfaction, and increased patient survival.[4-6] The 2015 Heart Rhythm Society (HRS) expert consensus statement established RM as a standard of care in CIED patient management. Moreover, remote monitoring appears to be an efficient component of CIED patient management; an in-person visit was found to take significantly more staff time (as much as 75% more time) compared to staff time spent on RM per quarter.[1]

Despite clinical consensus, adoption of RM is not without barriers. Some barriers have been mitigated through technological advancements, such as improved connectivity (cellular networks, Wi-Fi, and Bluetooth), advanced home monitor options (app-based options, simple hardware), and an increasing patient acceptance to digital health. However, one common obstacle that remains is the perception that remote monitoring is not economically viable for device clinics.

Let us consider the economic impact of increasing RM adoption in the hypothetical clinic discussed earlier, from a baseline of 61% of ICD and CRT-D patients remotely monitored (as reported in a real-world study of Medtronic ICD and CRT-D device patients at over 3,000 clinics) to a goal of 90%.[7]

A few assumptions are required: patient population, adoption baseline and goals, RM clinical protocol, staff time required, and reimbursement revenue estimates; these are summarized in Table 1. Frequency of patient management services is based on medical necessity, which is determined by a patient's provider. At both Cone Health in Greensboro, NC, and CentraCare in St. Cloud, MN, the general clinical protocol for CIED RM is quarterly for therapeutic devices (PPM, ICD, CRT) and monthly for ICMs, as supported by HRS guidelines.[8] We will utilize this protocol for our illustrative example, along with size of our ICD and CRT-D device population from the hypothetical clinic, time estimates from Seiler et al, and Medicare national average 2021 reimbursement rates.

Table 2 summarizes the results of this illustrative example. Increasing RM adoption in the 500-patient ICD population from 61% to 90% would require an additional 181 annual hours of staff time and a potential increase in annual reimbursement revenue of $35,380. If the additional staffing hours can be accommodated by clinic investment of less than $195 per hour ($35,380/181 hours), the expansion in RM adoption is economically viable to the clinic, in addition to potential improvements in patient outcomes and clinic efficiency.

The scenario presented here assumes RM adoption is binary (ie, patients are either not remotely monitored or are fully compliant to a RM protocol). This may not best represent real-world practice, as literature reports patient adherence to remote monitoring ranges widely from 49% to 89%.[7,10-12] Patients who are non-adherent to remote monitoring are not receiving the full clinical benefit demonstrated in the clinical literature, but reconnecting monitors and educating patients on the importance of adherence is resource-intensive for clinic staff. Using this data and modeling exercise, clinics can estimate the economic opportunity of improved adherence by assessing how many patients are enrolled in remote monitoring compared to how many are transmitting as required for remote monitoring reimbursement. This exercise may be helpful to justify the staff effort required to improve adherence — a win/win situation with positive impact on patient outcomes and clinic economics.

Conclusion

Management of CIED patients is complicated and has historically been challenged by a lack of published data with which to inform clinic staffing and operations. Seiler et al was the first study to comprehensively characterize the workload needed to manage CIED patients, including in-person and remote device checks, as well as other necessary tasks, such as patient calls and device connectivity troubleshooting.

The present article demonstrates how this data can be leveraged to estimate staffing needs as well as assess the economic viability of increasing remote monitoring adoption in a clinic. However, these select examples represent only two out of the numerous potential ways this data can be leveraged by savvy clinic managers. Future research should examine the efficiency and safety of alternate CIED patient management models, such as virtual visits and exception-based care. ■

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Disclosures: Amber Seiler reports that outside this submitted work, she is an employee of ConeHealth Medical Group, consultant for Medtronic and Biosense Webster, and has received honoraria from Medtronic and Biosense Webster. Laura Van Heel reports that outside this submitted work, she is an employee of Centracare Heart & Vascular Center, consultant for Medtronic and Boston Scientific, and has received honoraria from Medtronic and Boston Scientific; David Lanctin, Sarah Rosemas, and Jessica Kenley report they are employees of Medtronic.

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