



# Stop Waiting for the Right Time to Innovate: Transforming the Delivery of Epilepsy Care during a Critical Staffing Crisis

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**BACKGROUND:** Electroencephalography (EEG) is a test used for diagnosing brain conditions, like epilepsy. Current state, patients undergoing a multiday, inpatient EEG are continuously monitored by on-site neurodiagnostic technologists. A staffing ratio of one technologist per four patients is the industry standard set forth by the American Medical Association<sup>1</sup>. Given the national shortage of neurodiagnostic technologists and increased competition in the labor market<sup>2</sup>, staffing in the Epilepsy Monitoring Unit (EMU) at Mayo Clinic Rochester reached critical levels, as low as 50%, from 2021 to 2022. During this time, the Department of Neurology successfully deployed a series of pilots to advance the service line toward its strategic vision of building an EMU at home, while restoring technologist staffing levels to 92%.

**OBJECTIVE:** To ensure patients are seen in the right setting with the right provider through effective resource allocation; the pilots were designed to test and refine processes, procedures, and technologies across the continuum of epilepsy care and aimed to:

- Reduce unnecessary admissions and tests
- Stabilize internal technologist staffing workforce
- Improve patient experience by offering more convenient, affordable options to care
- Improve financial positioning through service line growth and a more cost-effective staffing model
- Advance department toward its strategic vision and identify opportunities to expand expertise nationally

**PLANNING:** Neurology leadership performed a comprehensive review of the epilepsy service line to gain an in-depth understanding of the current state and future goals. While actively working to address the immediate critical staffing need, the team prioritized key initiatives for the next three years that were deemed critical for achieving its strategic vision and would promote sustainable staffing solutions. Driven by the needs of patients and staff, the Department established relationships with third-party vendors to accelerate the timeline toward implementation and enable the team to test and measure the impact of the pilots with great agility.

**IMPLEMENTATION METHODS:** For each pilot, patients were evaluated based on clinical need, location, and social determinants of health. Neurology leadership defined rigid service expectations with selected external partners and identified internal physician and allied health leaders responsible for overseeing the quality of services provided. Utilizing agile methodologies, pilots were rapidly implemented every two months; sequencing was determined based on the scope of the service provided and patient care needs.

**RESULTS:** From September 2021 to December 2022, the Department of Neurology successfully maintained patient care volumes and financial performance while also improving staffing levels by 84% (an increase from 50% staffed to 92%). After onboarding new staff, the Department continued to leverage the three piloted services and shifted internal resources to the growth of new service lines and on-site access to diagnostic tests. Additional pilot results:

Pilot	Overview	Goal	Timeline	Pilot Results
In-Home EEGs	- Patients referred by Mayo provider to a third-party vendor	- Reserve inpatient beds & resources for most acute patients	September 2021 – December 2022	- 122 unnecessary EMU admissions avoided
	- Vendor conducted in-home study	- Improve affordability and convenience of care		- In-home tests performed in 35 different states
	- Mayo neurologist interpreted results and followed up with patient	- Scale epilepsy expertise nationally		- 350 patient days monitored in-home; 7% total annual EMU volumes 8,375 technologist hours saved
Rapid Response EEG Device	- Vended device deployed in ICUs to provide a rapid, point-of-care EEG	- Prevent unnecessary admissions and tests	November 2021 – April 2022	- 25 studies performed during pilot; 125 studies completed post-pilot December 2022 YTD
	- Device is non-invasive, provides real-time results, and does not require technologist resources	- Reduce time to treatment		- Improved time to treatment; 95% studies led to a clinical decision in under two hours
		- Decrease ICU average length of stay		- 71% avoided subsequent prolonged EEG monitoring
Remote EEG Technologist Monitoring Model	- Third-party company providing remote EEG monitoring of on-site patients	- Promote sustainable staffing solutions	January 2022 – December 2022	- 1,100 hours remote monitored; 48% cost savings compared to an internal tech receiving overtime pay and 54% compared to an on-site contract worker
	- Used in compliment to internal, on-site workforce	- Expand recruitment pipeline		- Improved staffing to workload from 50% to >90%
		- Promote future opportunities for service line growth		- Technologist staff satisfaction improved 12%

**LESSONS LEARNED:** Setting a strong vision can help create a unified culture within an organization, provide clarity when making difficult decisions, and ensure effective use of resources. Leaders must maintain a keen focus on driving the organization’s vision and continuously work to find innovative solutions to meet the needs of patients and staff, both today and in the future. For the Department of Neurology, the staffing crisis that presented from 2021 to 2022 lent itself to driving a momentum of change across the continuum of epilepsy care and viewing strategic partnerships as an accelerant to achieving goals.

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