

The Canary in the Coal Mine: What a NICU Quality Improvement Project Teaches Us About Personal Discipline

Take a look at two seemingly unrelated charts. One tracks the incidence of severe brain injury (IVH) in extremely preterm infants over several years during the DRIVE IVH to zero Quality Improvement (QI) initiative. The other tracks my resting heart rate over a month of fasting (Ramadan) combined with light exercise.

Though the subjects are entirely different, it's fascinating how similar the graphs are, they tell the whole story, complex hospital system dynamics versus individual human physiology, the curves tell the exact same story about adaptation, discipline, and the hidden warning signs of failure.

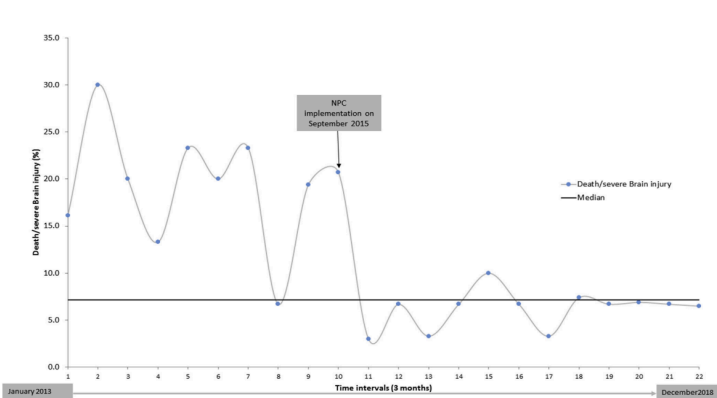
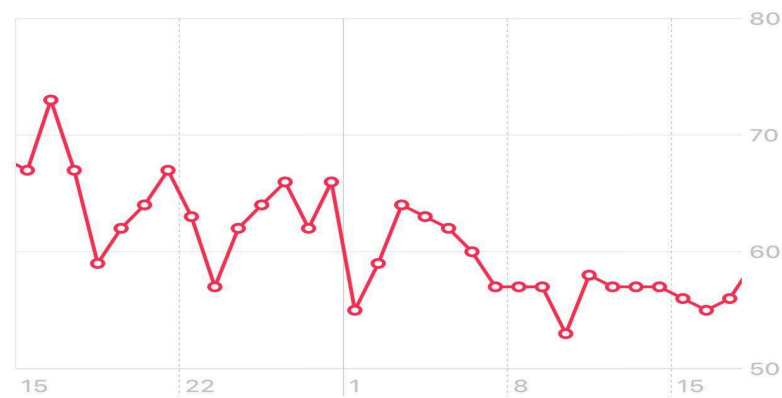


FIGURE 2. Run chart before and after the implementation of the NPC bundle. The color version of this figure is available in the online edition.



1. The Initial Win: A Drop in the Average

In the "Drive to Zero" IVH prevention project at the University of Calgary, a multidisciplinary team introduced a "Neuroprotection Care (NPC) Bundle." This bundle included strict interventions like minimal handling, midline head positioning, and protocolized respiratory management. In the resting heart rate graph, the intervention was a strict regimen of fasting, worship/meditation (reflections, prayers), and daily light exercise.

In both charts, the initial impact is obvious. Almost immediately after the intervention begins, the overall rate drops. The IVH incidence average pulls downward, and the resting heart rate falls into a lower zone. It's easy to celebrate here and think the new system (or the new physiological baseline) has been mastered. But looking closer reveals a different truth.

2. The Adaptation Phase: The Persistence of Fluctuation

Look at the middle of both graphs. While the overall numbers are lower, the lines are erratic. They bounce wildly up and down.

In healthcare QI, this is the reality of human behavior. You can implement an NPC bundle, but true culture change takes time. As the published study notes, achieving this required persistent motivation, continuous education, and "stewards" to constantly correct frontline staff on compliance. During this phase, protocols are followed perfectly one week, and slip the next due to new staff or high unit stress.

In human physiology, this represents the body's struggle to adapt to the shock of fasting and exercise. Hydration levels vary, sleep quality fluctuates, and willpower ebbs and flows. The average is better, but the system is incredibly unstable.

3. True Mastery: The Flatline of Discipline

Notice when both graphs finally smooth out. For the NICU, it wasn't immediately after the September 2015 NPC implementation. The true, stable (almost) flatline, where severe brain injury rates stayed consistently low, didn't occur until intervals 18 through 22. It took months of relentless, iterative refinement (Plan-Do-Study-Act cycles) to build deep, unbreakable compliance.

In my case, this flatline occurs in the final third of the graph, paralleling the last 10 days of Ramadan. By this point, the body has metabolically adapted to the fasting window, the exercise routine is a cemented habit, and spiritual and mental discipline are at their peak. The wild swings vanish. The result is pure, predictable efficiency.

The Core Insight: Fluctuation is the Canary in the Coal Mine

There is a profound lesson hidden in the geometry of these lines. What happens when we lose our grip? What happens when a hospital unit's compliance to the NPC bundle decreases, or when personal discipline begins to fade?

The first thing that comes back is not the high average rate; it is the fluctuation. When self-discipline wanes or system protocols are half-followed, the overall numbers might look "okay" for a while. But the variability returns. Your resting heart rate starts zigzagging days before your weekly average actually rises. A hospital unit starts seeing sporadic spikes in adverse events long before the monthly average triggers an alarm.

Fluctuation is the physical manifestation of inconsistency. Whether you are managing the delicate hemodynamics of a 26-week premature infant or managing your own metabolic health, stability is the ultimate proof of mastery. If you want to know if your discipline or your clinical compliance is slipping, don't just look at the average, look at the swings.

[Neuroprotection Care Bundle Implementation to Decrease Acute Brain Injury in Preterm Infants - PubMed](#)