

## Top Gun, Sabermetrics, the GAA and Surgery – Details Matter

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Dear Editor,

Data science and deliberative repeated practice have been applied to many environments. During the Vietnam War decreasing kills per engagement and air-to-air accuracy indexes prompted the creation of the United States Navy Strike Fighter Tactics Instructor program; commonly known as *Top Gun*<sup>1</sup>. Aviators adopted focused deliberative practice techniques under expert guidance from instructors, receiving specific feedback in response to key data metrics. This emphasis on data and deliberative practice markedly improved naval aviators' performance in the air war, with a six-fold increase in ratio of enemy aircraft killed for every US fighter plane lost<sup>1</sup>.

Intensive deliberative practice and data analytics use is not limited to high-stakes environments. Sabermetrics describes analysis of baseball using objective quantifiable data. Metrics of acceleration, drag, and handling exist in Formula-1. Given the correlation with performance, a requirement has emerged for baseball and Formula-1 CEOs to understand these phenomena. The Irish rugby, Limerick hurling and Dublin football teams have attained success and dominance in their respective domains. The reasons are myriad – including gifted 'generational' players. However, it is important to note the dedication required by each of these 'generational' players using focused deliberative practice to train typically for over a decade and a half before intercounty or international selection. Teams employ data analysis of breakdowns, turnover percentages, and shot accuracy to make these elite performers even more proficient.

Medicine and surgery are practiced in a high-stakes environment. Poor surgeon performance is indicative of poor patient outcomes<sup>2</sup>. Macro-data such as morbidity, mortality, and length of stay can identify outliers from the mean. Transitioning from purposeful training to reflective deliberative repeated practice techniques and tailored feedback can transform an individual's performance from being the worst in a medical field to equalling the best<sup>3</sup>.

Surgery is unique among medical specialities. It requires a composite skill set, including technical proficiency. Novel technologies are emerging which capture hand movements, ergonomics, and decision making in open and laparoscopic surgery<sup>4</sup>. Robotic surgery has introduced measurable kinematic data such as instrument path length, instrument velocity,

and master work area usage to clinical practice. Kinematic data is indicative of surgeon performance. It can be used by experts to objectively identify and develop areas of inferior performance amongst trainees. This is likely to become an increasingly important focus for surgical trainers in the near future. Indeed, in time it may form a component of the credentialing process for successful completion of a training scheme.

Universal practice of these principles at scale across the healthcare industry can increase the performance of the entire surgical field, with resultant improvement in patient outcomes. Red Bull and Limerick's respective peers have begun to adopt their competitor's strategy, the discipline of surgery must too.

**Declarations of Conflicts of Interest:**

None declared.

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