The Veteran Administration National Center for Patient Safety (VCPS) maintains a monthly report of its institutions’ anonymous incident reports (AIRs) (n = 1,426 from December 2012 to March 2017). Critical events were tracked utilizing the Veterans Affairs Surgical Quality Improvement Program’s (VASQIP) quarterly Critical Incident Tracking Notification (CITN). VASQIP defines critical events as: death in operating room (OR), death from hemorrhage within 24 hours, incorrect surgery, retained surgical tool, OR fire, and OR burn. The purpose of our project is to illustrate statistical process control (SPC) as a method to study the progress of critical events as: death in operating room (OR), death from hemorrhage within 24 hours, incorrect surgery, retained surgical tool, OR fire, and OR burn. The idea that healthcare needed to become an adaptive learning industry with low tolerance for error, while incident reporting provided a foundation for most patients to be admitted to a hospital, was a concept whose time had come. Since incident reporting at large has become anonymous, the trend is studied to determine its significance. The natural course of an incident reporting to study the progression of critical events as: death in operating room (OR), death from hemorrhage within 24 hours, incorrect surgery, retained surgical tool, OR fire, and OR burn. The number of AIRs and critical events were found to be negatively inversely related with a Pearson coefficient of -0.4. The first special cause variation (SCV) revealed the growth of the AIR. There was an exponential increase in AIRs in the first fifteen months from 1 report per month to 168 reports in the 9th month (245% increase). The results then plateaued over time (1st year-1017, 2nd year-1634, 3rd year-1938), (common cause variation). A logarithmic regression was performed for progressions of AIRs per month yielding the equation y = –7.613ln(x) + 142.92 R² = 0.55.

The highest number of surgical critical events were observed early in the self-reporting process and significantly decreased over time (1st year-5, 2nd year-2, 3rd year-1, 4th year-1, 5th year-0). The number of AIRs and critical events were found to be negatively inversely related with a Pearson coefficient of -0.4.

Discussion

Establishing and assessing something as complex as situational awareness is challenging. To date, most studies use survey data or observational markers. We introduce statistical process control as a feasible and straightforward method to assess incident reporting.

The utility of mindfulness and situational awareness as vital for organizations to have this field and established the idea that healthcare institutions must become High Reliability Organizations (HRO). SA as a conceptual framework was once again introduced by the aviation industry and defined as “a state of awareness and focus on the task at hand, such that one is always appropriately in control of the environment.”

We observed a significant inverse relationship between the number of AIRs and critical events. By understanding these points which are special cause variations versus common causes, an institution can better understand the efforts needed in increasing reporting. Prior studies have sought to establish event reporting’s efficacy in a similar manner as aviation, nuclear power, petrochemical industry. These studies are ultimately flawed. While incident data serves the greater good of increasing AIRs as these findings differ in complexity of production outcomes. Production of health differs greatly from production outcomes. Prior studies, however, may offer useful information on the importance of situational awareness. By appropriately assessing an incident reporting system, assessment must move away from linear outcomes such as number of reports or fall rate, and instead must survey the greater shared goal of improved situational awareness.

Our approach can be easily implemented by programs in all phases of their reporting culture. In the beginning, many institutions struggle to analyze variance and generate quality output. Further analysis and training must be sustained. These programs in the middle of their journey can use our model to arrive at an estimate number of reports through a similar control chart. They can perform a similar analysis with little statistical training and correlate with similar critical events to assess the progression of their institution’s situational awareness.