Foreword

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This year is a year of jubilees. It is the Queen's platinum jubilee, and, here at SHOT, our silver jubilee. While Her Majesty's platinum jubilee represents a seeming eternity of service, it is also true that a silver jubilee is a significant milestone. Twenty-five years is a long time, particularly in the world of transfusion safety. SHOT is the world's pre-eminent haemovigilance scheme, and, although there are other models and systems for haemovigilance, the lessons SHOT has learned have in most cases either been mirrored or directly adopted in other countries.

The very early years of SHOT, and the first Annual SHOT Report, addressed a very high rate of transfusion error. Much of this error related to ABO-incompatibility. Both the number of incidents, and severity of outcomes, was high. Introduction of a reporting scheme, with systems for learning from incidents and disseminating this information, led to a rapid and substantial reduction in the number and severity of incidents, with a shift towards near misses and unmasking of more complex problems. However, for many years, there has been a low but persistent, fluctuating level of both errors and near misses, which has steadfastly refused to go away. So, where do we go from here?

We often draw parallels with the aviation industry and aviation safety. The first aviation fatality occurred only 4 years after the beginning of flight. On the 17th of September 1908, Orville Wright was demonstrating an aircraft to the American army. The aircraft was piloted by Wright, and his passenger was one Thomas Selfridge. In the ensuing crash, Orville Wright was seriously injured, and Thomas Selfridge killed, becoming aviation's first fatality. As more aircraft were built, and more pilots tried to push the boundaries, the number of aviation accidents increased rapidly. This led to the creation of the Bureau of Air Commerce in 1926, in the United States of America, and the first formal accident inquiry in 1931, following the fatal crash of a TWA flight. This enquiry was a landmark which introduced the concept that the causes of accidents should not be a secret. It also marked the starting point for the use of engineering principles, in aircraft design and construction, as a key to reducing the risk of accidents.

A major collision over the Grand Canyon in 1956 led to a further shakeup, with most aviation regulation in the United States falling under the umbrella of the Federal Aviation Administration (FAA), in a joined-up and systematic way. Importantly, however, investigation of accidents remained independent: there are parallels with SHOT today.

Most of the structures were now in place to investigate and manage aviation safety incidents. The next major change came in 1967, with the introduction of the cockpit voice recorder. For the first time, the emphasis in accident investigation shifted from describing what had happened, to describing how and why it happened. It was very soon evident that in a number of accidents, there were common factors, and that all resources available were not utilised to prevent these. This led to the rapid development of 'crew resource management' (CRM), which looked in detail at human factors, interactions, and the best way of utilising all available resources. Within a very short period, the number of aviation accidents reduced dramatically. The greatest number of aviation fatalities was in 1972, just short of 3500. Since then, the number of passenger miles has increased dramatically, but the number of fatalities have fallen. For every trillion passenger kilometres, in 1970, there were just over 3000 fatalities. This has reduced exponentially, falling below 500 in 1999, and is now consistently well under 100.

This begs the question, how has this been achieved in aviation, and how has that industry managed to sustain its improvements, on a logarithmic scale? How can we learn from that approach?

In recent SHOT symposia, there have been several presentations on human factors, and on safety management systems. However, throughout the NHS, the most commonly used tool for investigating accidents remains 'root cause analysis'. Unfortunately, the final output of many such investigations is around improved staff training, or retraining, and in some cases around disciplinary action or replacing staff. This has not been an approach adopted by SHOT, but one which poses a cultural barrier to progress.

Many of us are familiar with the work of the Danish safety guru, Professor Erik Hollnagel, who has for many years promoted the concept of 'Safety-II', which focuses on systems resilience. Nancy Leveson is professor of aeronautical and aerospace safety at the Massachusetts Institute of Technology. She and her group have, for many years, researched and applied a 'Safety–III' approach across a wide range of safety critical industries. Safety-III is based on the assumption that losses result from inadequate control of hazards.

Her recent article on Safety-III is not only a critical dissection of Hollnagel's ideas, which makes interesting reading, but lays out how implementation of safety systems at every level (Safety-III, or systems safety) is the most effective and consistent way forward (Leveson 2020).

As an example of this, I would like to quote from aviation safety expert, Professor David Newman. Professor Newman is medically qualified and served as an officer in the Royal Australian Air Force for many years. An expert in human factors, he has taken part in many air accident enquiries. The important question he poses is this: could the same accident have happened, at another place, or at another time, with a different crew, or if the crew had been replaced or undergone remedial training? Often, the answer is yes. He discusses the truths and misconceptions around human error, but emphasises that ultimately, human error cannot be eliminated. Rather, it can be understood, minimised, and controlled, so as to mitigate its consequences. He goes on to talk about two categories of error:

(1) Active errors, often committed by frontline operators, such as pilots, doctors, air traffic controllers (and by extrapolation in our world, laboratory staff and clinical bedside staff). These errors are very common, and may or may not lead to accidents or incidents; and

(2) Latent conditions or failures (errors), including poor systems design, poor procedure design, poor decision-making by managers/supervisors etc. These may lay dormant in a system for a long time and can potentially cause accidents without an active error.

So, where does this leave us? Through SHOT, we have learned a huge amount about transfusion incidents, both accidents and near misses. We have developed great experience in collecting and collating data, analysing patterns of error, and investigating the ways in which systems and systems design contribute to these. In other words, in Professor Newman's terms, we have progressed to a recognition of both active and latent errors. In aviation, through integrated agencies such as the FAA, this understanding has been implemented in a mandatory, industrywide way. In healthcare, and particularly in the NHS, we still face a disjointed approach and significant cultural barriers to implementing what we have learned. And this is likely to be the greatest challenge SHOT faces in the coming years. But in this year, SHOT congratulates Her Majesty on her platinum jubilee.

References

Leveson N. Safety III: A Systems Approach to Safety and Resilience (2020). http://sunnyday.mit.edu/safety-3.pdf [accessed 26 April 2022].