

# Are you surgically current? Lessons from aviation for returning to non-urgent surgery following COVID-19

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## Abstract

The COVID-19 crisis has caused many issues across healthcare. In surgery, many operations have been cancelled with some surgeons losing their regular operating lists. During this time, technical expertise and decision making can deteriorate. In aviation after a prolonged period of absence from flying, this deficit in keeping skills and thinking up to date is known as being “out of currency” or “not current”. Although aviation and healthcare cannot be compared, numerous human factors concepts are applicable to both. In this article, we explore the likely impact of potentially prolonged absences in operating on surgical skills and psyche, and introduce the concept of a Surgical Skills Currency Barometer. We also discuss a “task-o-meter” thought experiment, and suggest practices which could be adopted to help protect surgeon workload from exceeding surgical capability when returning to operating following a period of prolonged absence.

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## Introduction

Planning return to non-urgent surgery following the COVID-19 pandemic peak will involve patient factors, system factors and surgeon factors. All are important when reducing medical surgical error, and should not be underestimated. After an unparalleled period of not performing complex non-urgent surgery during, surgeons may experience skills fade. Both technical and non-technical skills may have been affected by the effects of COVID. In aviation this deficit in keeping skills current is known as being “out of currency” or “not current”.

Fatal and serious events in operating theatres have led to attempts from healthcare services to follow the success

that human factors (HF) training has achieved in the airline industry.<sup>1</sup> This is a challenge as while commercial air transport operations lend themselves well to high levels of regulation, they cannot be translated literally to healthcare, with its associated unknowns and variables.

General Aviation, is defined by the International Civil Aviation Organisation (ICAO) as “all civil aviation operations other than scheduled air services and non-scheduled air transport operations for remuneration or hire”. This includes personal and recreational flying, has a wider scope, more variables, and higher risks than the commercial airline industry, and may therefore be more analogous to healthcare. There are also fewer available high-fidelity simulations suites available for general aviation than for the airlines.

Recreational flying via a private pilot’s licence (PPL) was re-introduced in the UK on 13th May 2020, with strict social-distancing terms, following the prohibition of non-essential flying activity due to COVID-19.<sup>1</sup> Key UK safety organisa-

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tions recognised that this was likely to have been the longest period without flying that many pilots will have experienced. In response, the Civil Aviation Authority (CAA) and General Aviation Safety Council (GASCo) issued documents with tools and recommendations addressing human factors.<sup>2,3</sup>

### The Personal Skills Currency Concept

In aviation, periods of pilot layoff are more common than in surgery. These may be due to aircraft serviceability, weather, formal flying restrictions, or financial factors. In this context, and as a high-stakes field, terms have been developed to describe a pilot's status to fly an aircraft safely. They must be current, legal, and fit to fly.

A “current” pilot has demonstrated their skills recently. Currency is usually considered what is recorded in the pilot logbook. A “legal” pilot may have a legally valid pilot's licence, but they may not be current. In healthcare, a surgeon may be “legal” by having revalidated with the General Medical Council (GMC) 5 years ago, however, they may not be current, having not performed the procedure in question during that time.

A “fit” pilot has a valid medical, is not unwell, under the influence of drugs or alcohol, and not experiencing fatigue.

The measurement of currency is not universal. It may vary according to the type of operation or environment, or be an insurance requirement. Civilian flying clubs, for example, often have an insurance requirement that a member must have flown within 40 days to hire an aircraft solo. A flight with an instructor may be required to regain this 40-day currency. The Royal Air Force Elementary Flying Training (EFT) syllabus has strict requirements that a pilot must have demonstrated a full checklist of skills to an instructor within as little time as seven days before flying solo.

Pilot owners of aircraft may not have the same hard organisational currency restrictions. For their own awareness and safety, however, tools such as the “personal currency checklist” have been developed, outlining specific skills which should be practiced regularly.<sup>4</sup> At this period in time, we do not advocate a formal documented system of currency for surgeons. Instead, we suggest ways in which the concept could be used for improving safety and reducing error when returning to surgical practice.

#### *The impact of surgical layoff on surgeon currency during COVID-19*

Globally, an estimated 82% of benign surgery, 38% of cancer surgery, and 25% of elective Caesarean sections have been cancelled or postponed during the 12-week peak of COVID-19.<sup>5</sup> The overall burden of the entire pandemic period will of course be significantly greater than this.

The number of elective-type procedures and techniques performed by any particular surgeon will have been severely attenuated over recent months. This will clearly

result in lower surgeon currency. Surgeons are likely to have concerns about their first list back at work while not current. Requests from managers may be to prioritise complex cancer operations that are likely to require fine-motor skills, or difficult reconstructive (such as free flap surgery) necessitating complex decision making, rather than more routine procedures.

A 2014 GMC review of the impact of layoff in safety critical industries concluded there was substantial evidence that time out of practice impacts on the individual's skills. The exact period of time and nature of this has been studied particularly in military literature, but is less substantial in medical literature.

Such a level of surgeon layoff is unparalleled at the consultant and SAS grade level in modern times. The impact is more evidenced earlier in the surgical career pathway, during training.

After one-year away from surgery for research, trainees perceived a larger decline in complex technical skills, such as bowel anastomosis, than for more routine operations such as hernia repairs.<sup>6</sup> Six months following laparoscopic training, instrument and tissue-handling skills deteriorated more than speed, particularly fine motor skills.<sup>7</sup> In addition to technical skills reduction, trainees taking time out for research also perceived a reduction in their clinical judgment.<sup>8</sup>

#### *Factors for returning to non-urgent surgery following COVID-19*

Proposed models for return to work have to date not examined the personal currency of the surgeon, and its important potential impact on patient safety when returning to non-urgent surgery.

We suggest that surgeons should explicitly plan their lists considering their own personal currency. This will be in a challenging context of a highly complex planning operation, with multiple stakeholders, and little robust published evidence or guidance. A recent literature review<sup>9</sup> found no “universal framework for planning of surgical services” from any governing organisation, although some models for returning to surgery have been published by individual services.

One model for non-urgent aesthetic plastic surgery emphasises reducing the risk by addressing “patient factors”, including virus transmission, and risk stratification encompassing patient selection, duration of procedure, and type of anaesthesia.<sup>10</sup> Another study explored public healthcare systems in India, and highlighted dynamic planning on a systems level, sufficient personal protective equipment (PPE) and theatre equipment, patient and staff screening programmes, reduction in aerosol generating procedures (AGPs) and careful patient informed consent, considering the new risks related to COVID-19.<sup>11</sup>

These models tend to address patient and system factors. Personal tools adapted from the aviation sector may be invaluable

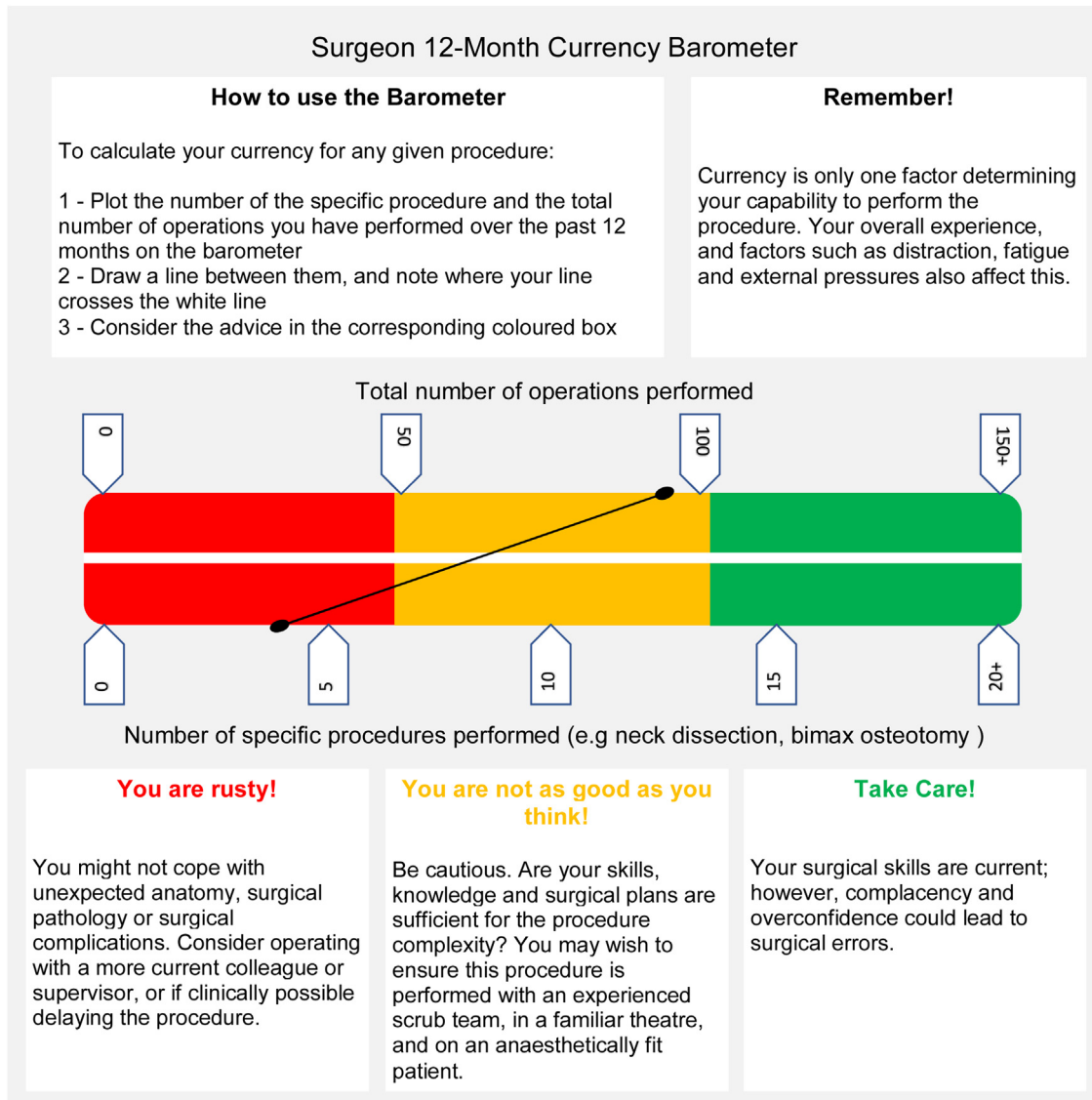


Fig. 1. Surgical Currency Barometer. Adapted by the authors for surgeons from the British Gliding Association (BGA) “Pilot Currency Barometer”.<sup>3</sup>

able to addressing ‘surgeon factors’ when re-starting surgery safely.

### Surgical Skills Currency Barometer

The “currency barometer” was originally conceived by the British Gliding Association (BGA). During COVID-19, it was modified by GASCO to be applicable to pilots returning to powered flight. A modified Surgical Skills Currency Barometer could be used by surgeons to assess their own personal surgical competency when planning return to non-urgent surgery (Fig. 1).

The surgeon should reflect on all surgical procedures performed in the past 12 months, and the number of specific procedures applicable to the operation they are about to undertake (e.g. hemimandibulectomy with fibula free flap

reconstruction). They should then plot a line on the barometer. The advice relevant to the currency category in which the plotted line intersects the central white line should be considered.

### The Task-O-Meter: avoiding overload

Most aviation errors are caused by poor decision making (75%), rather than technical skills deficiency (25%).<sup>3</sup> Fewer than half of surgical errors were attributable to technical skills deficiency errors, even in high risk vascular and general surgery procedures.<sup>12</sup>

Good decision making is affected by both capability and workload. When workload exceeds capability, the risk of errors and making dangerous decisions is high. The ‘Task-o-meter’ (Fig. 2) is a thought tool that could be used to assist with surgical planning. The needle represents surgeon work-

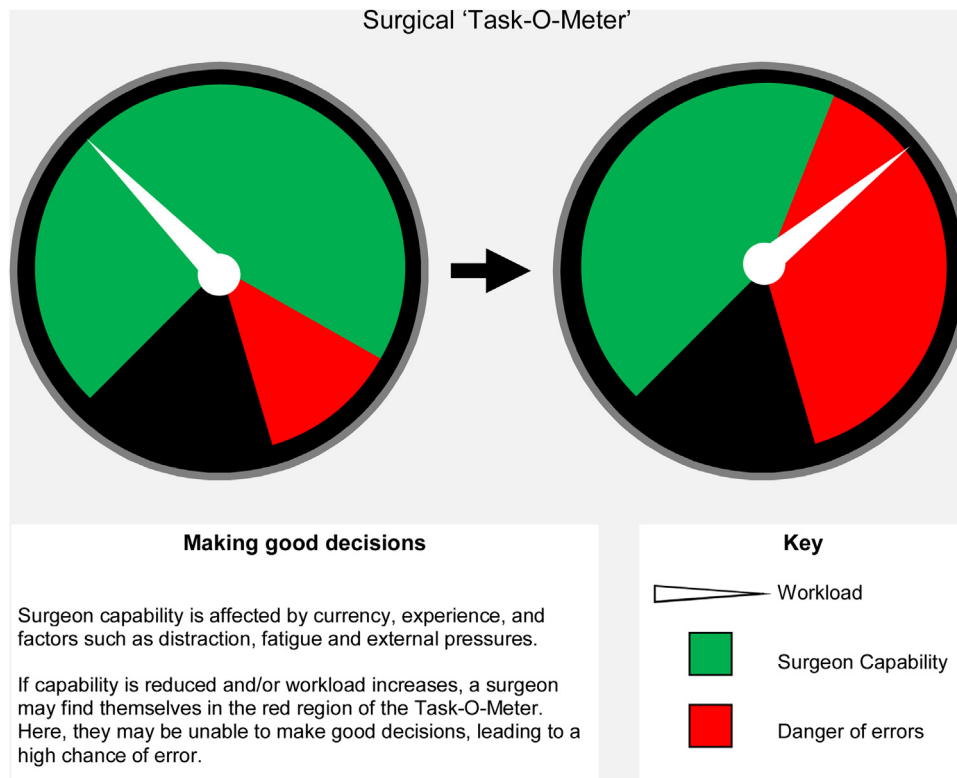


Fig. 2. The Surgical Task-O-Meter. Adapted by the authors for surgeons from General Aviation Safety Council (GASCo) "Return to Flying in the Wake of COVID-19" Course.<sup>3</sup>

load, the green area surgeon capability. Both capability and workload may change dynamically throughout an operation. Both need to be managed to prevent the workload exceeding capability, and poor decisions being made.

Capability may be low due to poor surgical competency or currency. However, given the same currency, an expert surgeon may still have greater overall capability than their trainee, due to competency gained through long-term experience. Capability may reduce throughout an operation or operating list as HF such as fatigue, hunger or stress and anxiety occur. These factors may be magnified during the COVID-19 period, with additional challenges of increased fatigue, reduced communication and additional physical limitations whilst wearing PPE.<sup>13</sup>

Workload both cognitive and physical, may be increased by various factors within the vicinity of the surgical field. In particular, unexpected anatomy or surgical pathology, challenges with surgical approach and dissection, or surgical complications such as accidentally damaging a major blood vessel. Patient body habitus or poorly ergonomic instruments can also increase workload physically as well as cognitively.<sup>14</sup> There may be operative time pressure due to an anaesthetically unwell patient. Workload may be affected by other factors within the operating theatre, such as distraction caused by individuals entering the environment, questions about equipment unfamiliar to the scrub team, or other interruptions such as phone calls or bleeps.<sup>15</sup> When returning

to non-essential operating following the COVID-19 peak, when capability may not be as high as previously, it will be important to find strategies to reduce workload.

Workload may be reduced by careful planning in the days leading up to the procedure. Patient and procedure selection are vital. Surgeons should ensure complex procedures are allocated more time than they might otherwise have been previously. The procedure should ideally be undertaken in the regular operating theatre with correct equipment, familiar anaesthetic colleagues and scrub teams.

Additional distractions should be reduced if possible, for example, by not scheduling complex procedures when the surgeon may have other 'on call' commitments. A pre-planned equipment and implant "shopping list" may be sent to the theatre team to reduce decision making required on the day. Preoperative planning should be thorough, so that fewer intraoperative decisions are required. This may take the form of a written plan, with each step visible in theatre, perhaps written on a white board. Imaging should be used to carefully plan and measure resection margins, or template orthopaedic implant sizes, for example.<sup>16</sup>

On the day of the operation, meticulous attention should be paid to the team brief, and checklists should be completed with due care and attention. Hierarchical gradients should be actively lowered at this stage, such that any team member can challenge another without fear of repercussion, regardless of seniority or profession. Debriefing after a procedure,

particularly if a surgical “crisis” occurred, has been shown to reduce cognitive workload, and improve performance before commencing the next case.<sup>17</sup>

## Conclusions

In the article we have introduced the concept of surgeon currency, the impact reduced operating during the COVID-19 peak will have on this, and explored considerations for returning to non-urgent operating. Tools recently published by aviation safety organisations for return to flying could easily be adapted for surgeons returning to non-urgent operating, improving patient safety and reducing the risk of error and adverse events as well as aiding the wellbeing of both individual surgeons and their teams.

## Conflict of interest

We have no conflicts of interest.

## Ethics statement/confirmation of patients’ permission

Not required.

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