Updating the Christchurch Fresh Gas Flow Data

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Background
At Christchurch Hospital in Aotearoa New Zealand we have been tracking fresh gas flows (FGF) during volatile anesthesia since we first installed machines with electronic flow control, nearly 22 years ago. Among the unique features of our data series is that we have always included the entire case. We recently demostrated that high FGF during the early, induction, phase of anesthesia can account for a significant proportion of the total vapor consumption during a case. (1). This time period is excluded from many published datasets.
With increasing use of TIVA (as TCI) there is some concern that trainees may not be profiucent in low-flow voaltile anesthesia.

Aims
In this poster we update our data series, include data on the use of TIVA, briefly discuss the FGF changes we saw with the introduction of automated end-tidal vapor control when we replaced Datex-ADU with GE Aysis in 2011 and explore differences between in and out of hours as a marker for trainee use of FGF during volatile anesthesia.

Methods
Since 2018 we have used GE Insights to collect this data. Between 2001 and 2017 we used a variety methods, described elsewhere. (1). Our current data incorporates data from 20 OR used for a wide variety of surgery, and includes cardiac, neurosurgical, and dedicated pediatric rooms.

Results
The Figure shows our mean FGF at intervals since 2001. TIVA (TCI) is used in 60% of cases.
For 2022, to the end of October, our overall mean FGF was 780ml/min with a mean sevoflurane consumption of 13.1ml [median 11.2, IQR 7.1-17.1ml] representing a mean CO2 equiv footprint of 2.6kg per case.
Aysis with ET-control was introduced in 2011 and was followed by an increase in mean FGF to 1.5 l/min in June 2011. At that time automated control was used for 30% of the time vapor was in use. By Nov 2013 use of automated control had increased to 85% of case time and mean FGF had decreased to 1.1 l/min.
From two OR used for upper and lower G/I non-elective proceedures, there were 394 volatile cases during the “working week” and 315 “out of hours” with similar mean duration (83 v 84min). The mean FGF was significantly lower out-of-hours (747ml/min v 822ml/min, p=0.03)

Comments and Conclusions
Our overall FGF remains low despite the increasing use of TIVA. Our data that suggests that trainees use slightly lower FGF than more senior staff despite the increasing use of TIVA.
Our experience of the effect of the proportion of time automated vapor control is used on overall FGF may be useful in guiding the introduction of this technology into markets, such as the US, that are new to this technology.

Reference
1. Kennedy, R. R., French, R. A.,et al. The effect of fresh gas flow during induction of anaesthesia on sevoflurane usage: A quality improvement study. Anaesthesia. 2019;74:875-882

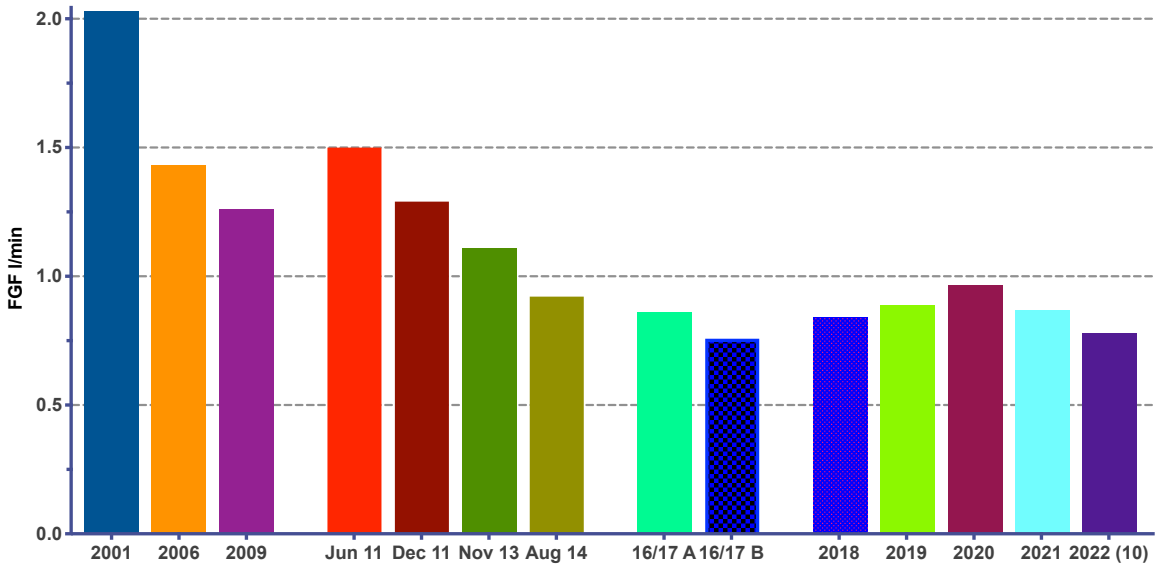

Figure: Mean time weighted FGF 2001 – 2022. Data prior to 2010 from Datex ADU.
GE Aisys introduced 2010. Data for 2016 from Insights devolvement project. 2018 onwards commercial version of Insights (GE Healthcare).