

Introduction & Background:

The issue of residual anaesthetic drugs in IV lines getting flushed into patients' circulation at a later time and causing serious morbidity (including cardio respiratory arrest) has been on the safety agenda for more than 5 years. There was an initial [NPSA signal](#) alert in 2009, a mention in the [RCoA SALG safety notice](#) in March 2012 and a further [NPSA patient safety alert](#) in April 2014. It was also the subject of an [APA survey](#) in 2013 followed by an [editorial](#) in Anaesthesia in the same year.

Together these resources point to a problem that is likely to be under reported. Only one third of the 19 events reported in 2013 survey were reported to the national reporting and learning service (NRLS). Half of the 72 consultants present at the 2012 SALG meeting were aware of an incident.

There is a suggestion that the problem has become more common since the demise of the ported cannula has necessitated the use of IV extension lines with a greater dead space than a ported cannula alone.

All of the above publications place the responsibility for the prevention of these incidents with the attending anaesthetist and make recommendations that formal processes be put in place to ensure prevention. These include:

- Witnessed or challenged flushing in the recovery room
- Documentation
- Use of the WHO sign out process
- Mandatory replacement of all IV extension lines at the end of anaesthesia.

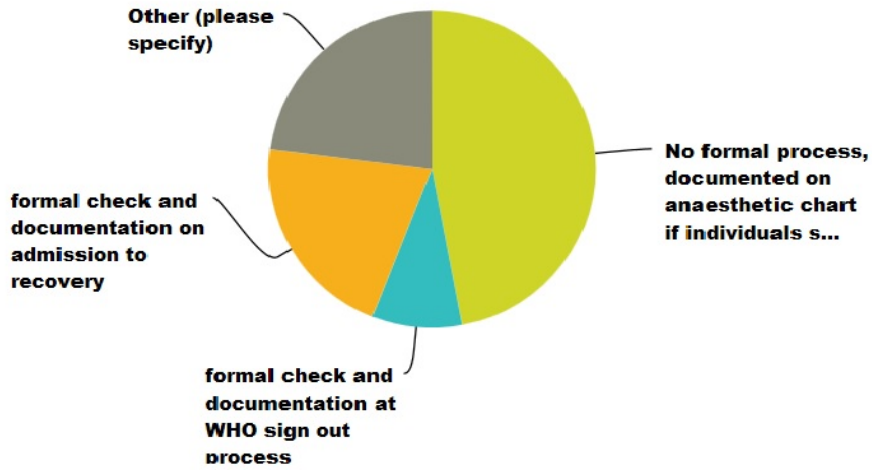
So how are we doing in 2015? The results presented here to our single question poll represent the first 100 responses.

Poll Results:

The [responses](#) are in figure one. Analysing the 'Other responses' it was possible to classify most of them into one of the three presented options giving the final responses shown in table 1.

How is canulae flushing documented in your trust?

Answered: 100 Skipped: 0



Answer Choices	Responses
▼ No formal process, documented on anaesthetic chart if individuals so wish	47.00% 47
▼ formal check and documentation at WHO sign out process	9.00% 9
▼ formal check and documentation on admission to recovery	21.00% 21
▼ Other (please specify) Responses	23.00% 23
Total	100

Figure 1

Table 1

No formal process, documented on anaesthetic chart if individuals so wish	51%
formal check and documentation at WHO sign out process	10%
formal check and documentation on admission to recovery	32%
Other (please specify)	7%

The 23 free text responses revealed the following practices:

- Use of a prompt at the end of an electronic record
- Tick box on a paper anaesthetic chart
- A sticker entered into the anaesthetic chart or recovery record on admission to recovery detailing all IV access sites
- A green sticker 'flushed' stuck to the cannula sites (no documentation in the records)
- Verbal checks with recovery staff

Perhaps the most revealing comments related to the presence of a culture allowing recovery staff to challenge the anaesthetist to confirm that flushing has been done, or of witnessed flushing. Some quotes:

- Also recovery staff have been trained to challenge and ask if lines have been flushed on receiving the patients in the PACU
- If anaesthetist can't remember then they reflush in front of the recovery staff.
- The patient will not be accepted back onto the ward if it has not been signed
- Ward and recovery nurses encouraged to challenge anaesthetist but rarely do. Ongoing discussions as to whether all anaesthetists should flush in the presence of the recovery nurse
- Child not supposed to be discharged from recovery unless it has been documented

Conclusions

Less than half of the responses to this poll indicate the presence of a formal process. Like any rare event the key to prevention of this lies in a system that contains multiple barriers to the error occurring and the fostering of a safety culture. In such a system it takes the unlikely alignment of multiple failures to allow the error - the lining up of the holes in James Reason's swiss cheese. A system that relies on a single person (the anaesthetist) remembering to complete a task at time of high cognitive demand and one prone to interruption (the end of any anaesthetic) is inherently error prone.

My own institution uses a sticker system (figure 2) and has a well-established challenge culture - it is impossible to get out of recovery without flushing the lines and signing the sticker.

Line Flush Protocol. Process performed & witnessed on all venous lines listed with no adverse event

<u>Anaesthetist</u>	<u>Recovery</u>
Name: _____	Name: _____
Sign: _____	Sign: _____
<u>Recovery</u>	<u>Ward</u>
Name: _____	Name: _____
Sign: _____	Sign: _____

Venous Lines: List all site / gauge

Periph 1: _____ / _____	Periph 3: _____ / _____
Periph 2: _____ / _____	Periph 4: _____ / _____
Central 1: _____ / _____	Central 2: _____ / _____

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Figure 2

When I joined the institution I found this irksome. However I quickly got used to it and now accept it as normal. More than that it is comforting to know I work within a culture where my colleagues will not allow my patients to fall victim to my human frailty. When I work in other environments without this process I miss it, but I still flush the lines (again) in recovery and document it.

One final quote from the free text comments bares mention:

“Oh, not another form. Disseminate this information by all means, warn people that it may happen, but please don't start yet another industry. Of course I flush the cannula. But I don't document it.”

I can empathise with this attitude, after all it is not dissimilar to my own a few years ago. However the harsh reality is that one day this individual, like any one of us, could forget to flush a line used at induction but not since. The line contains muscle relaxant. In the absence of sufficient barriers this could make it to the ward and the patient will be at risk of serious harm. I feel sorry for those colleagues & patients working in institutions incapable of protecting them from this.

I therefore encourage you all to implement a formal process suitable for your local environment that includes routine challenge of yourselves by recovery staff. I make no apology for promoting “yet another [safety] industry”.

Dr Andrew Blevin
 Consultant Paediatric Anaesthetist
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References

NPSA signal alert 2009. <http://www.nrls.npsa.nhs.uk/resources/type/signals/?entryid45=65333&p=+2&entryid45=65333&q=0%acResidual%ac>

RCOA SALG safety notice 2012

<http://www.aagbi.org/sites/default/files/images/PATIENT%20SAFETY%20UPDATE%20-%20Mar%202012.pdf>

NPSA Patient Safety Alert 2014 <http://www.apagbi.org.uk/sites/default/files/images/psa-residual-anaesthetic-drugs.pdf>

APA survey report 2013 <http://www.apagbi.org.uk/sites/default/files/images/IV%20flushing.pdf>

Bowman, S., Raghavan, K. and Walker, I. A. (2013), [Residual anaesthesia drugs in intravenous lines – a silent threat?](#). *Anaesthesia*, 68: 557–561. doi: 10.1111/anae.12287