The PIRS is currently undergoing change with a view to making it more accessible and interactive and hopefully garnering a renewed interest by perfusionists to submit any incident, be it a near miss or accident.

At the November 2014 ANZCP Annual Scientific Meeting (ASM) in Auckland, feedback on PIRS was sought during the “fireside chat” PIRS session and this is discussed below. However, in the interchange on barriers to reporting, the comment was made that determining if the incident was a near miss or an accident was confusing.

On the submission form we have defined this as *Near miss: an event that could have had bad consequences but did not; Accident: a failure causing damage or disruption to system or patient.* In any event a submitted PIRS report is reviewed by the PIRS editors and any confusion can be resolved at that point. So the message is ascribe your own interpretation of the nature of the incident and submit then this can be clarified in the review process.

As we reinvigorate PIRS it is appropriate to summarise the background to the benefits of changing the culture of our profession to have a natural expectation that near misses and accidents can and will be reported without fear or favour.

To get a good understanding of the management of error there are two essential reference books that perfusion units should have on their shelf. Both are authored by James Reason who is a world expert in this field and they are *Managing the Risks of Organisational Accidents* - Aldershot, UK: Ashgate and *Human Error* - Cambridge University Press, UK. The theory of accidents and human performance that govern our actions is explained in detail.

Accidents in perfusion are more prevalent that in related fields such as anaesthesia[1]. The first successful bypass performed by John Gibbon was almost not successful due to inadequate anticoagulation where clots began to form on the oxygenator screens. This is a far less well known aspect of this historic operation. In looking to leaders in accident prevention the airline industry is held up as the gold standard. And yet despite the sophistication of the checks and balances in aviation as well as the reporting culture, this industry is not without near misses and accidents. The latter can be of spectacular impact such as the ill-fated Canary Islands crash on the Tenerife runway resulting in the death of 538 passengers. While we learn valuable from these accidents, more innocuous near miss data may give us a heads up and indeed prevent an impending catastrophe. Reason discusses how human behaviours control our actions by automatic and conscious mechanisms[2]. The automatic mode controls routine skill-based actions and the conscious mode controls deliberative knowledge-based actions. The former is very fast and can operate in parallel, the latter is for solving novel problems, is very smart but linear and very slow. Resolving a novel problem during cardiopulmonary bypass may be necessary to avoid an accident but time is a critical factor. A mixture of automatic and conscious modes of action are trained for problem solving learnings. Using such rule-based training enables complex and infrequent problems to be managed quickly and effectively.

Errors are skill-based slip-lapse errors, rule-based mistakes or violations. Violations are where the action is intended but the outcome is not and may fall into the categories of routine violations (corner cutting), optimising violations (violating for the thrill of it) or necessary violations (resulting
from organisation failings). Of interest, analysis of the PIRS data shows rule-based mistakes to be the most prevalent (Fig 1).

In this context we should consider whether we are as proficient as we should be in managing rule-based actions (and hence errors) that are best controlled or governed by effective and regular training. Simulation training in medicine, and more especially in perfusion, lags far behind aviation. Annual simulation in aviation is required for credentialing commercial pilots to continue to fly. There is a growing awareness that multidisciplinary simulation human factors training in cardiac surgery is something requiring institutional buy-in and the concept of closing the operation rooms for one day a year devoted to planned team human factors training is a realistic objective. A greater focus on accident theory in perfusion training programmes requires attention.
The frequency of reporting to PIRS has varied over the years (fig 2) and is not a reflection of the frequency of incidents. It more likely reflects the exposure or “marketing” of PIRS through the Gazette or at various symposia.

In 2013 PIRS was given open access having previously been restricted to ANZCP members. The American Society expressed interest in encapsulating PIRS in AMSECT but was overcome in legal quagmire. The Canadian Society has endorsed PIRS although there has been scant activity from that country. In response to a question and answer session at the 2014 ASM PIRS fireside chat session, only 25% of the audience had accessed PIRS in the past year for any reason.

Under reporting of incidents in a voluntary reporting system is common. The PDUC database asks the perfusionist at the end of each procedure, Did a perfusion incident occur? and Was the incident reported to PIRS? While the total number of near misses and accidents reported to have occurred in this prospective database is almost certainly a gross under representation[3], only 40% of these were reported to PIRS.

Disincentives to incident reporting are various. Responses to the reasons at the ANZCP ASM were somewhat muted with only a few offering reasons. To change the culture and increase incident reporting perfusionists need to feel secure that anonymity is guaranteed. The PIRS database is de-identified after the PIRS reviewer has clarified any aspects of the report with the submitter. If the submitter answers “no” to the question Permission to publish edited description in ANZCP Gazette &/or website then no detail or description of the incident is posted on the website. Data of error type such as equipment / management or rule-based/skill-based is included in statistical analysis and graphs. As part of the editing process should a submitter unwittingly include detail that could identify the centre then that detail is edited out. For additional transparency, the PIRS editor is having a confidentiality agreement drawn up that will be signed by the PIRS team members such that they are bound to keep incident detail absolutely confidential. These will appear on the website.
The best incentive to increase reporting is for perfusionist to understand and realise the benefits gained by the free lessons we learn especially from near misses. These may seem innocuous but they occur far more frequently than accidents and provide a qualitative insight on how small defence failures can combine to create disasters. Such information needs to be distributed widely and be readily available.

PIRS identifies incidents as either equipment or management, grouping incidents into categories. Periodic review of the most frequent occurring categories can identify areas of highest risk to which our attention to preventive measures is most warranted. Given the current low numbers of near miss and accidents reported to PIRS on an annual basis, the current year data may be misleading in this respect as it may be influenced by one or two centres that have a low threshold for reporting. Until the number reports substantively increases, reviewing data over the whole reporting period is more representative of regional areas of risk. All the incidents bar one in the database are from Australia or New Zealand and so it can be seen (fig4) that regionally circuit disruption (not surprisingly) is the leading incident category, however drug and medication error is a consistently reported incident type, as is air in circuit. These three category leaders consist primarily of accidents rather than near miss. It is certain that many more near miss incidents of these type occur that would heighten our attention had they been reported and almost certainly prevented accidents of a similar nature.

Figure 4.

To achieve this aim PIRS needs to provide feedback more effectively.
In the first instance we have revised the PIRS website http://www.anzcp.org/pirs/pirs_entry.htm such that as soon as a report with permission to publish has been de-identified and entered into the database, a summary report including what happened and how it was managed with some detail of error type is posted and accessible via the PIRS Reports tab. There is a tab for all reports with permission to publish for the current year and another for archived reports from the previous years. There are additional tabs with data that is periodically updated from the database.

However as only a small number of perfusionists regularly access the PIRS website, we have come up with a plan to make PIRS more dynamic. We have had a positive response to constructing a PIRS mailing list that will operate in a similar manner to PERFLIST. Perfusionists will be invited to subscribe to a group electronic mailing list. Once on the mailing list, members will receive an email when a new incident (that has permission to publish) is posted with the incident category and near-miss/accident and with the link to the PIRS page. The recipient can then choose to open the link and review the incident.

We believe that this will keep perfusionists up to date with incidents as they occur and encourage perfusionists to access PIRS to review what is being reported and indeed encourage contributions.

We very much welcome your feedback and invite you to email us at any time at pirs@anzcp.org

“Without a detailed analysis of mishaps, incidents, near misses, and “free lessons,” we have no way of uncover-ing recurrent error traps or of knowing where the “edge” is until we fall over it. “

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