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Wrong drug administration errors amongst anaesthetists in a South African teaching hospital

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Abstract: A confidential, self-reporting survey was sent out to all 65 anaesthetists (25 specialists and 40 registrars) in the Department of Anaesthesia at the University of Cape Town with the aim of determining the incidence and possible causes of “wrong drug” administrations. The response rate was 95%. 93.5 % of respondents admitted to having administered the wrong drug at some stage of their anaesthetic career. 19/62 (30.6%) have injected the wrong drug or the correct drug into the wrong site on at least three occasions. 56.9 % of incidents involved muscle relaxants with suxamethonium chloride administered instead of fentanyl accounting for nearly a third of cases. 17.6 % of reported incidents were classified as being dangerous, with the potential to cause either severe haemodynamic instability and / or neurological damage or seizures.

Key words: Anesthesiology; Safety; Standards; Drug labeling; Medication errors

Introduction
Studies from New Zealand, Australia and Canada suggest that the majority of anaesthetists will administer the wrong drug at some stage during their career.1,2,3 Although the majority of wrong drug administrations does not result in harm to patients, a significant minority of incidents results in morbidity or death.4 This study set out to investigate the incidence, nature and possible causes of wrong drug administration amongst anaesthetists at the University of Cape Town.

Methods
A confidential self-reporting survey was sent out to all members in the department in which details were sought of incidents of wrong drug administrations. See Addendum.

Results
62/65 anaesthetists completed the questionnaire (40 Registrars and 22 Specialists). 93.5% of respondents admitted to having administered a wrong drug or the right drug into the wrong site at some stage during their anaesthetic career. 17/65 anaesthetists have done so on at least three occasions. Altogether 103 wrong drug administrations were made. The drugs most commonly administered erroneously are shown in Figure 1. The syringe swap of suxamethonium chloride for fentanyl was the single commonest error, occurring in 30% of incidents. 17.5%18 of errors were classified as dangerous with the potential to cause serious haemodynamic or neurological damage. Two patients suffered harm after receiving adrenaline in error. One suffered a myocardial infarction and developed pulmonary oedema, while a second developed ventricular fibrillation requiring defibrillation.

Factors blamed for the errors are shown in Figure 2. These included fatigue (23.5%), syringe labelling errors (28.4%), similar looking drug ampoules (11.8%) and other factors (20%). The latter group of incidents.
dom.8 South African anaesthetists travel between many hospitals and
been adopted by the USA, Australasia, Canada and the United King-
8
belling is therefore important and for this reason South Africa should
frequently obtain locum positions overseas. Standardization of la-
development of both a National and International standard for colour
coding of syringe labels.5,6,7 A new colour coding system has since
included inattentiveness, pressure from impatient surgeons and an-
aesthetic consultants, poor lighting and distraction.
70% of respondents were of the opinion that colour coded labels
for syringes in theatre helped to minimize drug administration er-
errors. Approximately 70% of respondents were unaware of the exist-
ence of either a National or International Standard for syringe labels
in theatre.

Discussion
The incidence of wrong drug administration by anaesthetists in South
Africa has not been documented previously. This survey demonstrated
that the incidence of such errors by anaesthetists at our institution is
similar to that in other first world countries.1,2 Although the majority
of errors did not result in patient harm, the incidence of potentially
dangerous errors is concerning. Fatigue featured as an important con-
tributory cause. The causes of fatigue include sleep deprivation, bore-
dom, work overload, physical exhaustion and alterations in circa-
dian rhythm. The relationship between fatigue and pharmacological
errors and the increased risk of such errors between midnight and
06h00 has been well documented, supporting the need for fatigue
alleviation strategies and the need to limit surgery to emergency cases
only after midnight.4

In 1985, Prof. Pat Foster from Tygerberg Hospital pioneered the
development of both a National and International standard for colour
coding of syringe labels.5,6,7 A new colour coding system has since
been adopted by the USA, Australasia, Canada and the United King-
dom.8 South African anaesthetists travel between many hospitals and
frequently obtain locum positions overseas. Standardization of la-
belling is therefore important and for this reason South Africa should
consider adopting the new international standard.

Our study confirms that ‘syringe swaps’ are a frequent cause of
drug error. In the study by Currie et al, 63 % of syringe swap errors
occurred with correctly labeled syringes.3 Colour coding of syringe
labels according to drug class must therefore be regarded as an im-
portant secondary cue to correctly identify syringes in theatre. They
can never replace careful reading of the label. Anaesthetists need to
be aware of the tendency of the human brain to identify words by
pattern recognition rather than by reading the letters.

Poor labelling of ampoules was identified as another important
cause of drug errors. Strategies described to prevent such errors in-
clude improved labelling with clear fonts that emphasize the generic
name rather than the proprietary name6, using a two-person check
when drawing up drugs, and the introduction of bar-coded ampoules
with a computer that speaks the name of the drug after it has been
scanned before being drawn up.9 At present there is no colour code to
identify ampoules according to drug class. The adoption of the inter-
national code for colour coding of syringe labels for labelling am-
poules by drug manufacturers, would readily identify the class of
drug. It would not eliminate the risk of incorrectly administering
drugs of similar class such as phenylephrine for ephedrine. To avoid
such errors, hospitals should be persuaded to purchase prefilled sy-
ringes of drugs such as ephedrine.

The storage and presentation of drugs in theatres probably influ-
ences the likelihood of drug errors. Drug drawers are frequently hap-
lessly packed with drugs with radically different actions next to
each other. Webster et al have suggested that compartments in the
drug trolley be colour coded for class of drugs.10

Conclusion
Most anaesthetists will administer a wrong drug at some time. An
important minority of such incidents may cause significant patient
morbidity or death. Anaesthetists and administrators need to be aware
of the problem. Mechanisms for reporting such incidents should be
in place to identify possible causes and implement measures to pre-
vent further incidents. Prospective, randomized studies investigating
strategies to decrease the incidences of wrong drug administration
are needed. The SA Society of Anaesthesiologists should be involved
with the pharmaceutical industry to improve and standardize am-
poule and syringe labels.

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