

## Introduction of 'Anaphylaxis Packs' to improve patient safety in a hospital setting

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### Abstract

Three reported episodes of anaphylaxis, where 1:1000 adrenaline was not immediately obtainable, triggered us to assess its availability on all adult wards. We found adrenaline was unavailable on 50% of audited wards. A questionnaire for doctors and nurses revealed lack of knowledge on both the management of anaphylaxis and location of emergency drugs. Given that anaphylaxis is a treatable but potentially fatal condition, we held a meeting to discuss the situation with senior pharmacists, resuscitation managers, and senior doctors. Our intervention was to advise the production of 'anaphylaxis packs' as part of the crash trolley kit. This was to be added to the laminated crash trolley check list and to include adrenaline, chlorphenamine, hydrocortisone, and the anaphylaxis algorithm. The aim was to improve ward stock, staff knowledge, and create a consistent location for emergency drugs, so minimising human error, and patient harm. With a PDSA approach we trialled the intervention on four pilot wards. The packs have now been dispersed trust-wide. Re-audit at four months showed 100% ward stock of anaphylaxis packs, more consistent drug location and improved staff knowledge. There were 17 coded incidents of anaphylaxis at this hospital in 2011, the actual figure likely being higher. We feel our project has greatly improved patient safety in this area.

### Problem

In the first few months of working in a South London hospital, there were three reported episodes of anaphylaxis where adrenaline was not available on the ward. This included an event where senior nurses had been informed of the lack of stock of adrenaline (during audit) and advised of the importance of having these emergency drugs to hand, and yet no action had been taken. A patient subsequently had an anaphylactic reaction to penicillin where no adrenaline was available. He was transferred to ITU. The main problems were lack of ward stock, the fact that this had not been picked up already, and when it had been highlighted, no action had been taken. The large number of people working in any given area in a hospital and differing shift patterns between team members means information may not always be correctly handed over. The high number of bank staff working means many staff members are practicing in an unfamiliar environment. An intervention therefore had to take these latter two issues into account for it to be sustainable.

### Background

Ward stock is reviewed weekly by the 'top-up technician' who uses a 'top-up' stock list. When common drugs run out in between, nursing staff request further stock from the pharmacy. It is obviously unacceptable to wait for this point in the case of emergency drugs. 1:1000 adrenaline is not kept in the crash trolley with the other emergency drugs partly for fear of confusing it with adrenaline 1:10 000. The crash trolley contents are recorded on a laminated check list which is reviewed by a senior nurse. There are two systems in place. Crash trollies that are locked with easily broken toggles, are checked monthly, and after use, by the ward sister. Crash trollies in areas that are left open at all times are checked daily by a senior nurse. The lack of reported incidences regarding availability of

these crash trolley drugs suggests this system works. It means it becomes a designated person's responsibility to check stock and it is therefore not affected by poor handover, or shift patterns. Keeping drugs in the crash trolley also provides a consistent location throughout all wards so drugs are at hand when required.

### Baseline Measurement

To measure the scale of this problem, stock of 1:1000 adrenaline was checked on all thirty adult wards. This revealed availability on only 50% of wards. Furthermore, the location of the drugs was very inconsistent (fig 1), often hard to find, and at the back of a 'miscellaneous' cupboard which is very unhelpful in an emergency situation. In order to establish if there were any other underlying problems, a questionnaire study was conducted to assess knowledge amongst nurses and junior doctors. This revealed a lack of knowledge on the basic management of anaphylaxis and, unsurprisingly, location of emergency drugs (figs 2 & 3).

See supplementary file: Figures 1 to 6.doc

### Design

We needed to design an intervention that would ensure 100% ward stock, a consistent drug location and improve staff knowledge. A meeting was held with senior pharmacists, resuscitation managers and a consultant anaesthetist, so that we could suggest a few ideas and see which one would be most suitable. Part of our questionnaire included questions regarding opinions on possible interventions to try and establish which would be most acceptable to ward staff.

One of the issues revealed was that nursing staff were concerned that if 1:1000 adrenaline was kept in the crash trolley it may get

confused with the 1:10 000 concentration which would, in itself, be a critical incident. However, the crash trolley seemed the most appropriate place for 1:1000 adrenaline given that it is an emergency drug, and the re-stocking process was already in place. It would therefore need to be stored in a separate pack to solve these issues, and the pack added to the check list. Whilst auditing stock it was also picked up that other drugs were missing. For example, some nurses had asked if we could also re-stock their hydrocortisone. Although this perhaps indicates a wider problem, for this current project it was felt that the pack should contain adrenaline, chlorphenamine and hydrocortisone.

To address the lack of knowledge of staff, the packs were also to include the anaphylaxis algorithm. Any uncertainty during an event could therefore be clarified, mistakes prevented, and knowledge improved. The plan was to implement this initially on four pilot wards and do a 'mini' re-audit, rolling the plan out trust wide if proved effective. A senior pharmacist kindly worked out the cost effectiveness of this implementation.

## Strategy

The packs were initially introduced to four wards and we began our re-audit then. The intervention was very well received, and so, was rapidly implemented trust wide by pharmacy and resuscitation services. This occurred before we had fully assessed any further improvements we might be able to make.

## Post-Measurement

Four months later we re-audited drug stock, location, and staff knowledge. This showed that stock had improved from 50% to 100%. 87% of this was found in the crash trolley, 13% in the controlled drugs cupboard and occasionally in both (fig 4). There was a slight improvement in staff knowledge, which we hope will improve exponentially as the packs are utilised (figs 5 and 6). The presence of the algorithm will help to prevent errors and to improve knowledge.

## Lessons and Limitations

Whilst implementing the project we realised the importance of having senior members of staff on board to help cut through red tape and promote the intervention. Also, the value of asking members of staff involved for their opinions prior to intervention, as you need them on board if it is to be effective.

If we were to repeat the project again we would have more control at the point of implementation, as the packs were rolled out too rapidly for us to make minor improvements. For example, it would be better to have the adrenaline in a pre-packed syringe, if cost allows, rather than a needle, syringe and vial. Of the critical incidents that occurred prior to the audit, fortunately none had resulted in fatality. We hope that this intervention has removed this risk and enhanced patient safety on the wards. A further limitation of this study was the small number of foundation doctors and nurses questioned (23 in each group). However, this was purely to

assess general knowledge and any lack would prompt the insertion of the algorithm into the pack. The pack itself cost £50 which is only marginally extra than the drugs themselves, making it a wholly sustainable intervention.

## Conclusion

A death on a hospital ward due to lack of stock of emergency drugs is unacceptable. This study, triggered by some 'near misses', was aimed at ensuring this will not be the case. The key parts of this intervention were not only to ensure the stock of adrenaline on wards audited, but also to have a consistent location for these emergency drugs. The latter is to avoid delays in stressful situations, and when on-call staff members are unfamiliar with their surroundings. This is a very simple model that could be easily replicated elsewhere, but could perhaps also be extended to encompass other ward equipment if found lacking.

## References

None