

Ministerial Taskforce on Emergency Care 2011/12 Project Grants Project Final Report

Project name: **Emergency PEARLS – Paediatric Emergency Accessible for Remote Learning Site
The Children’s Hospital at Westmead, Sydney Children’s Hospitals Network**

1. Overview of the project

Education in paediatric emergencies is important for all types of emergency departments to increase knowledge and familiarity in managing children who present with complex acute paediatric problems. Case based teaching is particularly valuable as it relates to real life examples with individual characteristics and the case aids memory. The case based teaching program at The Children’s Hospital at Westmead was developed into education modules each with a quiz available on the internet called Emergency PEARLS.

The modules are of five different types mirroring the different levels and foci of education delivered in the Emergency Department. They are designed to be worked through as a group teaching session or as individual learning. The modules are:

- Common acute paediatrics –using a case to illustrate a common condition
- Managing paediatric emergencies – discussing management options for a particular conditions
- Challenging cases –exploring the options available to manage a challenging case
- Clinical Reasoning – using a case to think through the science and art of the care we deliver
- Xray of the month – showing a radiology image with learning points
- Paediatric cases – cases illustrative of common conditions under development with the Univ Sydney.

A needs analysis was carried out with nursing and medical staff working in emergency departments at three locations –rural (Orange Base Hospital), large metropolitan (Liverpool Hospital) and tertiary paediatric emergency departments (The Children’s Hospital at Westmead). These groups tested the content and design and importantly the availability they need for educational material. They participated in focus groups after a group teaching session and online surveys after completing modules individually.

Sustainability of the program was an important part of design. The modules are designed as a template, so they can be easily updated with new content from the education program at The Children’s Hospital at Westmead. This will allow new cases to be available regularly to the participants.

The program is amenable to expansion easily to include further types of modules. The interaction with the University of Sydney to develop cases directed to students is already underway. It could also be extended to include adult content along similar lines through collaboration with an adult emergency department.

Delivery of the educational material depends on availability and awareness the educational material. The focus groups identified the need to access educational material at work through hospital systems and at home via the internet. Therefore the modules are currently available on line on the website www.emergencypearls.com . Awareness of their availability is best developed through a large state-wide site already delivering content to this population. Emergency Care Institute (ECI) is clearly the most appropriate. Discussions are underway to make them available through their website to a broad emergency department audience via their site.

2. Objectives of the project - achieved.

- a. To increase the availability of paediatric emergency medicine education based on real cases in NSW from 10 sessions to 10 staff each fortnight to 10 sessions to 100 staff each fortnight.
- b. To measure the value of this education in terms of content, mode of delivery, perceived value for practice and to quantify access.
- c. To create an educational resource which is sustainable in terms of workload and up-to-date content.

3. Scope of the project

The project fulfilled the scope originally envisaged and did not exceed the scope. Specifically:

- The website and five educational module templates were developed.
- These were tested in three different emergency department environments –in metropolitan, regional and tertiary paediatric facilities. A fourth site as an outer metropolitan site was unable to be included for testing.
- Relevance of content to clinicians practice was assessed.
- Ease of navigation and enticement to complete modules was assessed also.
- Access needs for educational modules for emergency department staff were assessed. Both access within LHD hospital computer networks and via internet would be useful for this population.
- Expansion potential with university students was explored.

4. Methodology used in the project

The project was divided into four stages:

1. Development of the educational modules

An educationist (masters student) with expertise in on line education and web development using Adobe Dreamweaver[®] joined the project team. His role was to ensure educational theory was incorporated into the development of the modules and that simple interaction with learners was included. Modules which had been effective when delivered face to face were chosen as the pilot modules. Templates were built around this educational material.

2. Testing of educational modules

A lead clinician at each testing site was involved in the plans for the project and gave approval for testing to be carried out on their site. Two of the project team (senior doctor and educationalist) travelled to each of the testing sites. Available nursing and medical staff with differing levels of experience were gathered in a tutorial setting as a focus group. Consent was obtained from all participants detailing the amount of communication they would receive and the responses requested. Email addresses were then volunteered for communication. Participants were assured these addresses would be deleted at the conclusion of the study.

One of the online modules was delivered as a tutorial. The focus group then discussed the relevance and value of the content and design of the modules.

Participants were then emailed the link to a second module to review with an attached on line survey for feedback.

3. Refinement of educational modules

Feedback from focus groups and from on-line surveys was incorporated into the modules. The modules were grouped into the 5 types noted above. Colour and style elements of each type of module were developed. Focus groups were emailed again with further modules and further feedback was requested.

4. Analysis of delivery of educational modules to suit learner's needs

Learner's needs in regards to the mode of delivery of the educational modules were explored in the focus groups. These needs were analysed to determine the most effective way of reaching the learner audience. Various options for delivery were then compared with these needs to choose the most effective.

5. Measures of success of the project -The objectives of the project were:

1. *To increase the availability of paediatric emergency medicine education based on real cases in NSW from 10 sessions to 10 staff each fortnight to 10 sessions to 100 staff each fortnight.*

Close to 100 staff were exposed to the study and there were 45 staff responses in the surveys as it covered two rotations of junior medical staff and nursing staff across three sites. Across NSW many times that number could in the future access Emergency PEARLS. The project was designed with templates for the 5 types of modules to make the delivery of new modules sustainable so frequent new sessions can be available. Access through a site used across the state assessed.

2. *To measure the value of this education in terms of content, mode of delivery, perceived value for practice and to quantify access.*

The focus groups covered all levels of medical and nursing staff working in emergency departments. 89% were less than 35 years of age. They spend a median of 1 hour on line at work and 5 hours on line at home per week. They have access to a computer at home as well as work and most had a smart phone. 90% of them felt comfortable interacting with on-line education by themselves although only about 50% described themselves as information technology savvy.

In regards to educational content the following percentages agreed with the statements:

	Common acute paedes	Managing paedes emergencies	Challenging cases	Clinical Reasoning
Trust information	93%	90%	87%	92%
Format helps me learn	79%	60%	75%	83%
Material helps me learn	93%	80%	75%	83%
Relevance to practice	93%	90%	100%	100%
Satisfied with quality	86%	80%	75%	92%

The following percentages of the focus groups agreed with the statements:

Design provides clear sense of orientation to surf through website	75%
Design helps me find information easily	75%
Design is user-friendly	75%
Design is visually appealing	87%
Design helped me organise my study	62%

They provided comments which shaped the design of the modules including: ‘easy to use’, ‘liked ability to rewind’, ‘liked access at any time to suit’, ‘based on real cases’, good to see a senior viewpoint’. They raised concerns with: ‘speed of download’, ‘good to fill in answers yourself first’, ‘asked for answers to questions don’t just pose them’. They asked for: ‘5 minute modules’ and a host of other acute paediatric topics.

3. *To create an educational resource which is sustainable in terms of workload and up-to-date content.*

The workload and the sustainability of developing further templates for the modules following a set of design elements will make the ongoing time commitment more manageable. Clinicians transform face to face educational material into a template and upload it on line.

Communication –Education is only effective if learners know about it, can access it and want to access it. On review of multiple on-line options the ECI website is the most effective as it is targeted to the audience, available via the internet and has a communication strategy so the audience will hear about it.

6. Discussion

The Emergency Pearls project was successful and a number of lessons were learnt for the successful completion of such a project. The objectives were defined and the project plan was precise from the beginning thanks to input from across the Sydney Children's Hospitals Network and from MTEC. The consultation team had a broad range of expertise. Further consultation with other stakeholders and specialists such as Emergency Care Institute (ECI) and information technology specialists also provided expertise in an area new to the project team.

The involvement of an educationalist with on-line education expertise opened a whole new field of knowledge and theory to the project. Specifically we explored the role of graphics and pictures with text as a mode of pedagogy. Multimedia principles of education identify words and pictures helping to engage learners actively as they make connections between them and enable a deeper cognitive processing. Graphics can also organise a topic for learners and show the relationships between different components. Animations such as comments seen on rolling over text can show deeper concepts behind each educational point. Questions were asked of learners at multiple stages to encourage reflection. Learners were also asked to work through examples to support transfer of knowledge¹.

Modules were personalised using a conversational style with pictures of presenters to enhance engagement and trust of the learners. Navigational aids such as table of contents were included and learners were allowed to control the pace of the module when self-delivered. We avoided gimmicks and complicated computer graphics without specific purpose. This follows the coherence principles of avoiding extraneous components in education¹.

This model of delivery of education has the following advantages –accessible by a large audience at sites throughout the state and new content able to be uploaded by the clinicians. The downsides are the need for some technical skills in uploading the content and keeping the website design and content current.

Expansion potential is significant as the project specifically designed a model which could carry other content to the emergency department staff audience. Adult content would be an ideal next step. Also other audiences for similar educational modules are being explored at present with the University of Sydney giving students access to modules designed for their level of training.

There are several other online resources in acute paediatrics available. In reviewing these we identified that educational textbook information is delivered well by PEMSoft (available on CIAP). 'learnpaediatrics' (from Sydney Children's Hospital Emergency Department) delivers an excellent initial course in paediatrics for junior staff. The focus of PEARLS was on delivery of case based teaching in which the real life nuances of cases are explored along with the decision making required of staff. There are some other websites carrying similar information. We identified the need for control of quality so misinformation does not creep into presentations. The use of images, permission for published images and consent from families for online publication was also identified as an issue requiring strict governance.

1. e-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning by Ruth Colvin Clark and Richard E. Mayer Pfeiffer: 2003

7. Conclusion

We plan for this project to be the start of a role for Emergency PEARLS in education of emergency department staff across NSW. The next steps involve:

- Discussions with Emergency Care Institute about linking the education modules onto their website and potentially hosting them.
- Development of a series of modules from the educational material shortly after it is presented face to face.
- Raise awareness of clinicians across NSW of Emergency PEARLS.
- Discussion on further expansion of Emergency PEARLS starting with the University of Sydney (currently underway) and then considering a partner in adult emergency medicine.

The project team would like to thank the nurses and doctors and the senior clinicians at the testing emergency departments; the consulting team – Dr Fenton O’Leary, Dr Arjun Rao, and Ms Jenny Major; Ms Karen Scott from the CHW Clinical School of the University of Sydney and the Emergency Care Institute (ECI) for their support and interest in the project.

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Chief Executive sign off on project final report

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