WHO Patient Safety Curriculum Guide for Medical Schools: Implementation Study

Interim report from the evaluation team at the University of Aberdeen (Dr R Patey, Prof R Flin, Dr J Cleland, Dr S Ross, Ms S Parker, Dr J Jackson, Dr A Thomson)

Overview
The WHO Patient Safety Curriculum Guide for Medical Schools was published in February 2009. A group from the University of Aberdeen were commissioned to develop a suite of evaluation tools to accompany the curriculum. Subsequently this same group were commissioned to facilitate and analyse an evaluation study of the first year of implementation of topics from the WHO Patient Safety Curriculum Guide for Medical Schools in all six WHO regions. Both quantitative and qualitative data are being gathered from pilot sites. This is an interim report of the early progress of that evaluation study.

Evaluation tools
Evaluation tools (as detailed below) were developed with the aim of establishing:

1. Can this curricular guide be used to support the implementation of explicit patient safety education across the six WHO regions?
   - Questionnaire providing background demographic information about the university, medical school curriculum structure, and plans for inclusion of topics from the WHO Patient Safety Curricular Guide for Medical Schools.
   - Tutor questionnaire to assess their early views on the experience of delivering topics from the WHO Patient Safety Curricular Guide for Medical Schools (section for each topic delivered).
   - Tutor questionnaire to assess their views on the experience of delivering topic(s) from the WHO Patient Safety Curricular Guide for Medical Schools at the end of the initial pilot study period. Where a focus group is not planned at the end of the initial pilot period, this questionnaire was designed to be completed by tutors at this time.
   - Student questionnaire to assess their views on the experience of the inclusion of topic(s) from the WHO Patient Safety Curricular Guide at the end of the initial pilot study period. Where a focus group is not planned at the end of the initial pilot period, this questionnaire was designed to be completed by a selection of students at this time.
   - A guide for a focus group, planned for the end of the initial pilot study period, was designed to gather information on tutor views on the appropriateness of material, process of implementation and usefulness of curricular supporting materials.

2. What is the impact of the inclusion of patient safety teaching to the curriculum on student learning, and what are the student views on the implementation of this material to the curriculum.
   - Questionnaire to assess the views of students immediately after working on a patient safety curricular guide topic (Topics 2, 3, 4, 5, 7, 8).
• Pre and post teaching questionnaires to assess students’ attitudes and intentions with respect to patient safety topics. The questionnaires for Topics 6, 9, 10 and 11 were designed using Azjen’s Theory of Planned Behaviour (see Appendix 1 for brief outline). The content and layout of the questionnaires for before and after was the same. These questionnaires are available for the following topics:
  o Topic 1: What is patient safety?
  o Topic 5: Understanding and learning from errors.
  o Topic 6: Understanding and managing clinical risk.
  o Topic 9: Minimizing infection through improved infection control.
  o Topic 10: Patient safety and invasive procedures.
  o Topic 11: Improving medication safety.

• A guide for a focus group, planned for the end of the initial pilot period, was designed to gather information on student and tutor views on perceptions of learning. Where a focus group is not possible then the student assessment of implementation questionnaire should be completed.

It is important to note that validation of most of the evaluation tools was not possible in the time available from the release of the curriculum guide and the implementation study. However both the questionnaires used for Topic 1 ‘What is Patient Safety’ and Topic 5 ‘Understanding and learning from errors’ had been previously developed and tested by the research team\textsuperscript{1,2}.

Implementation study
Approval from the WHO ethical review committee was obtained and 9 medical schools were recruited with at least one from each of the six WHO regions (see table 1). Each school was asked to confirm institutional ethics approval. The schools were asked to implement and evaluate at least three topics during the one year study period. Topic 1: ‘What is patient safety?’ was to be taught by all but the schools were at liberty to pick the additional topics. It has not proved possible for all schools to implement three topics and collect evaluation data during the one year period. At this time data continues to be collected, depending on the academic year in each region. Data collected and topics taught are detailed in Table 1 below.

<table>
<thead>
<tr>
<th>WHO Region</th>
<th>Schools</th>
<th>School type</th>
<th>Class size</th>
<th>Topics taught during study period</th>
<th>Immediate Evaluation Data status</th>
<th>Follow up evaluation data status</th>
</tr>
</thead>
<tbody>
<tr>
<td>EURO</td>
<td>University of Aberdeen, UK</td>
<td>Mixed entry, established medical curriculum</td>
<td>~180 students / year</td>
<td>1, 2, 5, 7</td>
<td>Complete</td>
<td>Follow up focus groups scheduled</td>
</tr>
<tr>
<td>EURO</td>
<td>Sackler medical school, Tel Aviv University, Israel</td>
<td>Established medical curriculum</td>
<td>~ 40 students / year</td>
<td>1 - 11</td>
<td>Being collected</td>
<td>Follow up evaluation in process of being planned</td>
</tr>
<tr>
<td>AFRO</td>
<td>Gondar University, Ethiopia</td>
<td>Established medical curriculum</td>
<td>~ 80 students / year</td>
<td>1</td>
<td>Complete</td>
<td>Follow up evaluation in process of</td>
</tr>
<tr>
<td>Region</td>
<td>Institution</td>
<td>Type</td>
<td>Medical Curriculum Status</td>
<td>Number of Students / Year</td>
<td>Evaluation Status</td>
<td></td>
</tr>
<tr>
<td>--------</td>
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<td></td>
</tr>
<tr>
<td>AFRO</td>
<td>Hawassa University, Ethiopia</td>
<td>Established medical curriculum</td>
<td>Not known at this time</td>
<td>Information incomplete</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AFRO</td>
<td>Mekelle University, Ethiopia</td>
<td>Established medical curriculum</td>
<td>1</td>
<td>Being collected</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AFRO</td>
<td>Ethiopia</td>
<td>Established medical curriculum</td>
<td>Not known at this time</td>
<td>Information incomplete</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEARO</td>
<td>MAMC, New Dehli, India</td>
<td>Established medical curriculum</td>
<td>180 students / year</td>
<td>1, 9, 10</td>
<td>Being collected</td>
<td></td>
</tr>
<tr>
<td>SEARO</td>
<td>The Patan Academy of Health Sciences, Kathmandu, Nepal</td>
<td>New medical school</td>
<td>50 students / year</td>
<td>1, 2, 5.</td>
<td>Being collected</td>
<td></td>
</tr>
<tr>
<td>PAHO</td>
<td>University of Central Florida</td>
<td>Postgraduate New medical school</td>
<td>~ 40 / year</td>
<td>1, 9</td>
<td>Complete</td>
<td></td>
</tr>
<tr>
<td>PAHO</td>
<td>El Salvador University, Buenos Aires, Argentina</td>
<td>Established medical curriculum</td>
<td>~ 60 students / year</td>
<td>1, 2, 9, 11.</td>
<td>Complete</td>
<td></td>
</tr>
<tr>
<td>WPRO</td>
<td>The Sydney Medical School, University of Sydney, Australia</td>
<td>Established medical curriculum</td>
<td>~ 240 students / year</td>
<td>1 - 11</td>
<td>Complete</td>
<td></td>
</tr>
<tr>
<td>EMRO</td>
<td>King Saud bin Abdulaziz University for Health Sciences, Riyadh, Kingdom of Saudi Arabia</td>
<td>Established medical curriculum</td>
<td>~ 40 students / year</td>
<td>1, 2, 4, 5,</td>
<td>Complete</td>
<td></td>
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</tbody>
</table>
Interim analysis

Quantitative Data
At this time there has been an interim analysis of quantitative before and after questionnaire data from two patient safety topics:

- Topic 1: What is patient safety?
- Topic 9: Minimizing Infection through Improved Infection Control

The before questionnaires were administered immediately before the teaching and the after questionnaires were administered between one and four months after the episode of teaching.

**Topic 1: What is patient safety?**
This questionnaire was structured into five sections (Copy of questionnaire provided with this report):

1. Error and Patient Safety
2. Safety of the Healthcare System
3. Personal Influence over Safety
4. Personal Attitudes to Patient Safety
5. Safety at the Workplace

Interim analysis of data from three universities is available at this time. The students from these universities had different background experience as detailed in table 2, but were all from economically wealthy countries.

The analysis of this data reveals that even though they had different backgrounds, these learners’ perception of their knowledge of patient safety issues (questionnaire section 1) increased significantly after the curriculum intervention both within each university and when the data from all three universities is pooled (see Figure 1).

As with the previous published work using this questionnaire, these interim results indicate that students report medium low levels of knowledge of error and patient safety issues before patient safety teaching (questionnaire section 1), and that these levels of knowledge are even lower with regard to the role of healthcare organisations (questionnaire section 2) in reporting error\(^3\). Only the learners’ perception of their knowledge of patient safety issues increased significantly after the teaching.

The learner reports of medium low levels of knowledge in the first two sections contrasts with responses to questionnaire section 3, considering Safety of the Healthcare System, where a majority of students agreed that most health care workers make errors, that there is a safe system of healthcare in their country and that medical error, including drug error is common. The responses indicate that a majority of students expect that healthcare staff receive training in patient safety and that the prevalence rate of adverse events is about 10%. Students’ responses indicate that they are less clear about their personal influence over safety although more felt that completing reporting forms will help improve patient safety and that they could talk about their own errors. The responses in section 4, ‘Personal Attitudes to Patient Safety’, were very positive

In the last section of the questionnaire, ‘Safety at the Workplace’, student responses were less positive. In particular a majority of student disagreed with the statements that ‘nurses’ and ‘doctors will not criticise them for making mistakes’.
Table 2: Demographic data for pilot sites completing Topic 1

<table>
<thead>
<tr>
<th>Pilot site</th>
<th>Programme type</th>
<th>Year of study</th>
<th>Curriculum status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mixed undergraduate (~70%) / postgraduate (~30%)</td>
<td>1</td>
<td>Major curriculum review on going</td>
</tr>
<tr>
<td>2</td>
<td>postgraduate</td>
<td>1</td>
<td>New curriculum</td>
</tr>
<tr>
<td>3</td>
<td>undergraduate</td>
<td>3</td>
<td>No major curriculum review in place</td>
</tr>
</tbody>
</table>

**Topic 9: Minimizing infection through infection control**

Evaluation of this topic used a questionnaire administered before and between 1 – 4 months after the teaching episode (copy of questionnaire provided with this report). The questionnaire was developed using Azjen’s Theory of Planned Behaviour which proposes a model which proposes a model about how human action is guided. Intentions are the precursors to behaviour and the theory predicts that three variables (Attitudes, Subjective Norms and Perceived Behavioural Control) predict intentions to behaviour\(^1\). An appropriately designed questionnaire can be used to assess an individual or a group's intentions with regard to particular behaviours. In this case the behaviours being addressed were appropriate hand hygiene when taking a blood sample and challenging a peer on hand hygiene behaviour.

Interim analysis of questionnaires from two pilot sites is reported for this topic. There were no significant differences before and after teaching for any of the TPB constructs for the section of the questionnaire considering appropriate hand hygiene when taking a blood sample. However the students reported high intention to comply with good practice both before and after the teaching.
In the second section of the questionnaire, which considered challenging a peer on poor hand hygiene behaviour, there were differences between the before and after cohort. There was a significant difference reported in the 'Know How' to do challenge a peer (question 102) between the before and after cohorts ($F(1,140)=14.395$, $p<.001$). There was also a significant difference between 'Subjective Norms' of the before and after cohorts. ($F(1,141)=7.826$, $p<.006$). The results were approaching significance for both 'Self Efficacy' in the before and after cohorts ($F(1,140)=3.748$, $p<.056$) and for 'Control Strength Belief' ($F(1,138)$, $p<.069$).

**Qualitative Data**
At this time feedback on the process of implementing the patient safety curriculum during this evaluation is available from the project leads from three universities detailed in table 2. They were asked to comment on the curriculum guide itself, the challenges and successes implementing the curriculum, what they would change for the next time and what their plans were for the future. They were also asked about tutor recruitment and changing, what additional support or resource might be helpful and for any final comments. A summary of the key points arising from the three interviews is provided in Table 3 below.

<table>
<thead>
<tr>
<th>Area of interest</th>
<th>University 1</th>
<th>University 2</th>
<th>University 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient Safety Curriculum Guide</strong></td>
<td>Very helpful and unlike other such documents as doesn't just tell us what to teach but also teaches us how to teach.</td>
<td>An excellent resource.</td>
<td>Very helpful layout and clear structure to curriculum guide.</td>
</tr>
<tr>
<td></td>
<td>Very nice examples helped explain concepts and make links with local situation / experience.</td>
<td>Really appreciated the clear layout into sections and in particular the teaching tips as new to this subject matter.</td>
<td>Excellent range of examples and ideas for teaching and further resources.</td>
</tr>
<tr>
<td></td>
<td>Good to keep lots of examples to help with the different economic / cultural difference encountered in different areas.</td>
<td>Reading the examples and suggestions sparked thoughts and ideas for local adaptation.</td>
<td>No topics missing from the guide</td>
</tr>
<tr>
<td></td>
<td>No topics missing from the guide</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Challenges in implementation</strong></td>
<td>Human Factors was the most challenging topic as so new to the instructor. It was difficult to be sure that you understood it absolutely.</td>
<td>When trying to convince others for time in the curriculum it would be helpful to have a one page overview of what the guide was about. It was hard to explain and then show them</td>
<td>Recruiting and training tutors is the biggest challenge. This is a challenge for implementing discrete topics initially and then is an ongoing challenge when</td>
</tr>
</tbody>
</table>

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such a complete document.

Such a one page overview would also be a really helpful starting point for any reader to give a skeleton or framework in your head to allow you to hang further information on as you read.

It is a challenge to bargain for time and also to choose the right time to teach the various topics.

Making the topics pertinent to the local circumstance (student stage and experience, healthcare system etc) is important trying to integrate the concepts and material into all parts of the curriculum, including clinical activities. There are so many people to reach.

| Successes in implementation | Students very positive, lots of personal feedback from the students about the topics | Students are very positive – I have been stopped in the corridor by a student asking when they will get more of this teaching | Student evaluation of the first topic (error in healthcare) was extremely positive. Students reported that they didn’t get to talk about these things elsewhere. This was helpful in persuading others in the process of introducing further teaching. |
| Changes for the next time | Going to involve local psychologists to help with the Human Factors teaching | Choosing when to teach topics can be important for success. One topic was taught immediately before major exams on different subject matter and this was a real distraction for the students. Will move this next year | Timing of topics to make links with other parts of the curriculum important and trying to avoid exam time |
### Plans for the future

- Have started introducing the material through one medical speciality and now working to influence other disciplines and slowly spread the material across the curriculum.
- Introducing further topics next year – both into year 1 and throughout the rest of the curriculum. Looking at areas where there are good links with other teaching. Recruiting other ‘champions’ to take on some of the teaching.
- Working to move from some ‘stand alone’ topics to making all tutors aware of the teaching and encouraging links with these and patient safety concepts in general to be drawn where appropriate in other teaching.

### Tutor recruitment

- Started with people who could easily be brought on board. For the future going to approach those most likely to take on board the concepts first and then gradually spread outwards from there. The success of the first run is very helpful information to help persuade the next wave.
- Have one or two people lined up to help. Not sure if they are all the right people but working with enthusiasts helpful.
- A key area for development.

### Additional support / resources

- Perhaps more background on the Human Factors area.
- Found the links and networking possible with other pilot sites very helpful. An electronic notice board would be a really helpful resource to bounce ideas with others and share experience. Email contact is helpful but the communication tends to be around one question or topic area.
- Keeping the examples / resources in the curriculum guide up to date will be a challenge but new resources, updated examples can be so helpful.

### Discussion

These are early results and clearly only an interim analysis has been performed. However, it is impressive that, in the 18 month period since publication of the WHO Patient Safety Curriculum Guide, 10 medical schools have been able to implement at least some of the topics from the patient safety curriculum guide and perform evaluation. Most schools have delivered more than one topic and some have implemented all 11 topics. Eighteen months is a short timescale for such significant
curriculum change in an area which is so new and unfamiliar to both those with overall responsibility for the curriculum and for the faculty delivering the teaching.

The reports from the three project leads in this analysis indicate that the WHO Patient Safety Curriculum Guide is highly valued with a clear structure and excellent content. The sections providing advice on how to teach patient safety and the examples and suggested resources are particularly helpful. This group did not feel that any topic was missing from the curriculum guide, but there were suggestions that further background information for tutors on Human Factors would be helpful and a succinct overview of the WHO Patient Safety Curriculum Guide would be useful both as an illustration for others and as an initial framework before reading the whole document. All three project leads reported on the value of building on early success and how this helps with further implementation.

Considering the Topic 1 ‘What is Patient Safety’, it is interesting that the levels of knowledge and the attitudes to patient safety reported from the three universities here (from different countries, teaching the topic at different stages in the curriculum) are very similar to those previously reported from one UK medical school[3]. Considering the five sections in this questionnaire only knowledge of error and patient safety increased significantly after teaching, but further analysis is required on individual questions in other sections before conclusions can be drawn.

The questionnaire used in the evaluation of topic 9 ‘Minimizing infection through improved infection control’ was designed using Azjen’s Theory of Planned Behaviour[1]. It is important to note that these questionnaires have not been previously validated and were designed in the short time available before the implementation study began. At this stage of the analysis there the data set is small and it is difficult to draw conclusions. However there are significant differences after teaching in this cohort with regard to knowing how to challenge a peer engaging in poor behaviour with regard to hand hygiene and in the subjective norms (influence of others in a social environment on intentions to behave).

The ‘after’ questionnaires were administered between 1 and 4 months after teaching for both of these topics. Clearly it is not possible to say if the changes in knowledge and in the subjective norms in ‘Minimizing infection through improved infection control’ will be sustained beyond this time. This would require further follow up. The fact that all three of these universities are planning to sustain and further develop their teaching on patient safety will be important in sustaining and enhancing these early positive changes.

References

Appendix one

Ultimately the outcomes of interest are what actually happens in the workplace – does the student or trainee behave as those who designed the curriculum intended. While evaluation of behaviour at this stage would be most desirable, this is not always practical. In addition it can be difficult to link behaviours months or sometimes years later with a particular curricular intervention.

Azjen’s Theory of Planned Behaviour proposes a model about how human action is guided. It can be used to determine the effectiveness of implementation interventions where there is not a readily available measure of behaviour. The theory suggests that three variables (Attitudes, Subjective Norms and Perceived Behavioural Control) will predict the intention to perform a behaviour (see diagram one below). Intentions are precursors to behaviour. Administration of a questionnaire based on the Theory of Planned Behaviour around the time of a curricular intervention offers a means to perform an assessment of an individual’s or a group’s intentions regarding particular behaviours (i.e. measurement of the precursor to behaviour). Where the questionnaires are administered before and sometime after a particular curricular intervention there may be more certainty in the influence of the educational experience with any change in intentions.