Evaluation of the WHO Multi-Professional Patient Safety Curriculum Guide

Patient Safety Programme
World Health Organization

Dr Donna Farley[1], Dr Hao Zheng[2], Ms Eirini Rousi[2], Dr Agnès Leotsakos[2]

[1]Evaluation Consultant, USA
[2] Patient Safety Programme, World Health Organization, Switzerland

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Executive Summary

The World Health Organization (WHO) developed the Multi-professional Patient Safety Curriculum Guide for patient safety education in the fields of dentistry, midwifery, nursing, pharmacy, and other related health-care professions. The Multi-professional Curriculum Guide is an updated edition of the Curriculum Guide for Medical Schools, published by WHO in 2009.

This Multi-professional edition is a guide for implementation of patient safety education in health-care schools/universities worldwide. The Curriculum Guide is intended to help to build a foundation of knowledge, skills and attitudes for health-care students that will better prepare them for clinical practice and thus advance efficiency of health-care delivery by means of improved patient safety.

The Curriculum Guide is used to implement patient safety education in health-care educational institutions worldwide consisting of two parts. Part A is a teacher's guide, which assists teachers to implement the Curriculum Guide. Part B provides a comprehensive, ready-to-teach, topic-based patient safety programme that can be implemented either as a whole or on a per topic basis.

An evaluation of the WHO Curriculum Guide was performed to assess its effectiveness as a resource for teaching patient safety to undergraduate and graduate university students. The evaluation is designed to address the following questions:

A. Does the Curriculum Guide contain the necessary and sufficient information and topics to allow its effective use in undergraduate training of health-care professionals?

B. What is the impact upon student learning of the inclusion of patient safety teaching in the curriculum?

C. In what ways can this Curriculum Guide be used to support the widespread implementation of explicit patient safety education globally?

D. How could the Curriculum Guide be modified in the future to best support teaching of patient safety to students in different environments?

Evaluation methods

The evaluation of the Curriculum Guide is designed to generate formative information on the experiences of working with the Guide, for use in future implementation of the Guide, and as well as summative information on the impacts of use of the Guide. The evaluation used a combined prospective/retrospective design in which data were gathered on the experiences of schools that participated in testing of the Curriculum Guide, soon after each school started teaching their course modules and again after they completed these courses. The field test and evaluation timelines are shown in Figure 2.1.

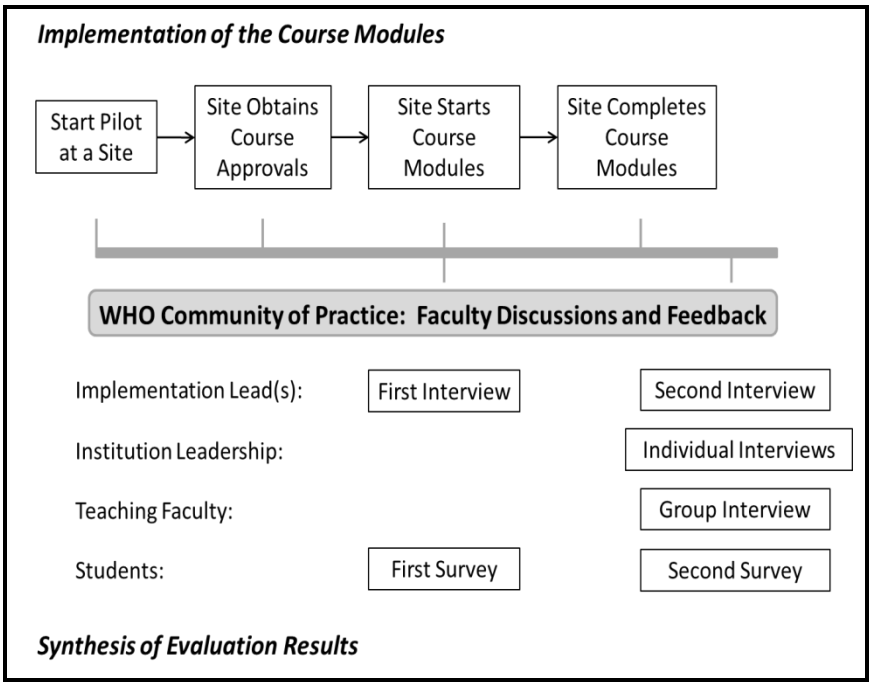

Figure S.1 Diagram of the of the steps of the Curriculum Guide evaluation

It is well understood that different groups of people may experience the same activity or programme quite differently, so this evaluation was designed to collect data from each of the following four stakeholder groups:

- Executives in the schools participating in the field test of the Curriculum Guide;
- University staff/educators who lead the introduction and implementation of students' curricula based on the Curriculum Guide;
- Faculty educators who teach the patient safety courses;
- Students in the universities/schools who take the courses.

Formative Evaluation. The experiences of the schools in using the Curriculum Guide were assessed, to provide feedback to WHO regarding capacity building, implementation issues and suggestions for improvements to the Guide, as well as to generate guidance for other schools that might use the Guide in the future.

Summative Evaluation. The effectiveness of the Curriculum Guide was assessed, to address all except one of the goals for the evaluation (which is addressed by the formative evaluation). The summative evaluation used both retrospective data from interviews and prospective data from pre-and-post surveys of students taught the courses. The student surveys collected data to assess changes in their patient safety knowledge and attitudes.

WHO identified the universities and schools to participate in the evaluation of the multi-professional Patient Safety Curriculum Guide by end of June 2011. Each school was asked to select the patient safety topics in the Curriculum Guide that they planned to teach, and they were allowed flexibility in how they integrated these courses into their overall curricula. A total of 14 schools, two or three from each of the six WHO regions, were initially selected to participate, however only 12 remained as pilot sites during the entire duration of this global study. The two

pilot sites withdrew due to academic scheduling difficulties. The remaining 12 pilot sites were evenly distributed geographically, with two schools located in each of the six WHO Regions. Four of the 12 schools used the Curriculum Guide to teach a combination of nursing and midwifery students, three taught just nursing students, five taught dentistry students, and one taught pharmacy students.

A combination of qualitative and quantitative methods were used to analyze the data collected in the evaluation. For the formative evaluation, an analysis was performed of interview responses from the implementation leads about the experiences of their schools in implementing the Curriculum Guide. For the summative evaluation, qualitative and quantitative data were used together to assess effectiveness of the Curriculum Guide from the perspectives of different stakeholder groups. The central organizing structure for the analysis was the set of four questions to be answered by the evaluation, and results are presented according to that structure.

Only four complementary sites submitted data from their self-evaluation processes. Although they had collected data as defined in the WHO instructions, the data they submitted were not integrated into the formal evaluation because of limitations related to absence of the external quality control oversight that WHO had applied for the official pilot sites. Therefore, the formal evaluation results presented in this report are limited to those for the 12 participating pilot sites. However, the complementary sites tested the Guide in several different teaching formats and settings, which extended beyond the design of the formal evaluation and offered an opportunity to explore the adaptability of the Guide beyond its original design and audiences.

The integrity of the data generated in the evaluation is estimated to be quite high because of both the design of the data collection instruments and the diligence of WHO staff in collecting and coding of data from interviews and the student surveys. The risk of self-report bias was reduced by findings of strong consistency in responses to questions across multiple stakeholder groups. The quality of the collection and coding of survey data was protected by provision of clear instructions to the sites on how to administer the survey, on-going support to the sites by the WHO staff, and coding of survey results by the WHO staff using structured coding schemes. The completeness of responses on the surveys varied somewhat across sites, however, with surveys from a few sites having a great deal of missing data.

Integrity of the Curriculum Guide

The stakeholders interviewed were positive, overall, regarding the effectiveness of the Curriculum Guide, and they highlighted how the Guide supported their patient safety teaching efforts. Several sites observed that the Curriculum Guide gives credibility and creates a focus on patient safety, which brings the subject to the eye of the academic community. They felt that the Guide emphasizes important patient safety topics and shows how to organize them for teaching. All the sites reported that the topics covered are important patient safety priorities in their countries, and several of them noted that the issues were universal ones for all Member States.

All the sites reported that the Guide contents are culturally appropriate for their countries, including specific items such as simulations, group discussion, case studies, and role playing. Several of them also noted that they adjusted some of the contents to make them more applicable to their situations. Most of them reported that the Guide could be adapted easily when needed.

The section on supporting teaching (Part A)

The majority of the sites found the Guide was helpful or useful for supporting the teaching of patient safety and the integration of patient safety into both their curricula and day-to-day practice. One site stated that Part A is about capacity building for teaching faculty, and it was noted that the Guide gives them great potential to develop the skills and knowledge base of teaching faculty. Some sites established separate courses or modules on patient safety, at least initially; many of them had plans to eventually integrate the topics into their curricula. Others preferred to keep the patient safety courses separate to enhance their visibility.

The sites understood that it would take time to fully develop the capability to teach patient safety effectively. It was suggested that skills at designing and implementing curricula will improve as the Guide is more widely used and knowledge on specific topic areas increases. They also were aware that they might require more information because, as the Guide makes clear, achieving patient safety involves the total machinery of different disciplines, working together.

For the sites that responded more cautiously about Part A, one concern was that although the Guide gives educators some basic knowledge, further access to other resources would be required to tailor the learning to specific student groups. Another concern was that the Guide alone might not be sufficient for faculty who do not know anything about patient safety; that they need more direct exposure to information through workshops or teleconferences.

The students also reported a generally high level of satisfaction regarding teaching effectiveness at the participating universities/schools. Overall, 82.8% of the students gave the patient safety teaching a 4 or 5 score on a 5-point scale.

The patient safety topics (Part B)

The patient safety topics in Part B of the Guide were well received by the participating universities/schools, and they actively put them to work. They were enthusiastic about the content of the topics, although each of them tended to highlight different aspects of those contents. More mixed reactions were found, however, regarding the teaching tools provided in Part B. Most sites were pleased with the tools, and they observed the value and importance of establishing goals and performance objectives, although some acknowledged difficulty in doing so. The two tools of greatest value to the faculties were the teaching slides and the case studies. Some suggestions were offered for improvement of these tools.

The dentistry schools highlighted a particular issue with the suitability of the Part B contents for teaching dentistry students. Most dental students go into private practice, and dental students start practicing on patients early to develop their skills. Therefore, many safety issues in dentistry differ from those in medicine and the hospital setting, which are the focus of the Guide. The dentistry schools needed more specific patient safety examples applicable to dentistry, which they had to develop themselves.

The students taught at the participating schools were positive about the effectiveness of the contents of their courses. An overall 93.3% of the students gave the topics a 4 or 5 score for effectiveness on a 5-point scale.

Impact on student learning

The teaching faculty in the participating universities/schools were cautiously optimistic that the courses taught using the Curriculum Guide had positive effects on their students' patient safety knowledge, which students would put to work in their clinical practices. The results of the student surveys, highlighted below, corroborate these perceptions by offering strong evidence that the teaching of patient safety topics had clear and strong effects on both the perceptions and attitudes of students about patient safety and their knowledge of relevant issues and practices.

- At baseline, only small percentages of the students had any previous courses in patient safety, which is reflected in their self-reported estimates of their knowledge as well as their generally low scores on the knowledge questions in the pre-teaching survey.
- Students also tended to have low to moderate perceptions of the safety of the health-care system at baseline, and in their ability to influence safety, although they tended to rate highly their personal attitudes about safety.
- The ratings given by students for three of the four perception/attitudes domains increased substantially in the post-teaching survey. The lack of change in the personal attitudes domain is likely because these ratings had little space to increase further because they already were high at baseline.
- It is also clear that the students' knowledge of patient safety improved substantially by the time their courses were completed, which coupled with their perception/attitude changes, indicates that the students' had beneficial experiences with the courses based on the Curriculum Guide.

As the teaching faculty cautioned in their interviews, however, it was too early at the end of the courses to estimate how much effect this training would have on subsequent clinical practices of these students. This impact must await additional assessment at a more distant time, after the students complete their training and enter the workplace as health-care professionals.

Implementation experiences

The experiences of the participating universities/schools in implementing the Curriculum Guide are being used by the schools already to improve their future teaching of patient safety, and WHO also can use this information to guide expansion of use of the Guide to support organizations' patient safety education activities. The leadership of all the participating sites said they placed a high priority on the field test and on implementing the Curriculum Guide. Some of their faculties were somewhat more cautious initially, but as their awareness and understanding of patient safety increased, many reported a growing sense of priority.

The majority of the sites reported that use of the Curriculum Guide was clearly a positive educational investment. Benefits included expansion of patient safety knowledge for students and educators, motivation of health-care providers to care about safety in their work, and production of more knowledgeable graduates entering into health-care delivery. The sites expect that benefits will expand as they increase the number of topics they teach. On the cost side of the value equation, sites reported low costs for teaching the topics because the curriculum is provided in the Guide, and most teaching materials are online and downloadable. Thus, their costs are limited to the time of teaching faculty, students' time, and supplies.

The sites took different approaches for deciding whether to use the Guide and which topics to teach, but all of their processes involved forging agreements among deans, implementation leads, and the faculty members who would be teaching the patient safety topics. Whatever the decision process, the sites highlighted that it is important for the Dean to trust and approve use of the Guide, and to make the Guide visible by sharing information on how well it is working. Decisions on whether to integrate the patient safety teaching within their existing curricula, or to teach the topics separately, were guided by the backgrounds of the educators who are teaching patient safety, the nature of topics in the existing curricula, and school-year level of the students being taught.

The topics the sites chose to teach were based on relevancy to the needs of their students and the capabilities of the schools. Choices also considered the appropriateness of patient safety topics for each level of training for students, as well as what already was being taught.

The faculty at most sites modified the curricula for teaching the topics in the Guide by including local examples, case studies, or other local experiences. In particular, dentistry schools added local examples relevant to dentistry, because patient safety issues in dental practices are quite different from those in medicine and hospital-based care.

The sites reported that one of their greatest successes in working with the Guide was the strongly positive reception by their students to the patient safety training and the substantial benefits to the students. An important challenge the sites faced was the short timeframe for the field test, and its timing near the end of academic years, which required them to prepare quickly. Other implementation challenges were the difficulty of changing culture to be patient safety oriented, lack of knowledge of faculty members about patient safety, designing and implementing the teaching, student reactions, and achieving sustainability of what the students learned.

As they continued to use patient safety education, many sites had a goal to eventually teach all eleven topics in the Guide and to integrate them appropriately with the larger curricula. Several of them planned several adaptations to enhance students' patient safety lessons, such as teaching some topics in clinical settings so students can learn about clinical risks and patient safety from the real practice.

The participating sites stated their concern about lack of knowledge of patient safety in health-care organizations, and they saw a strong need to expand use of the Curriculum Guide to improve the safety of health-care practices. Several of them already had begun outreach to share their experiences with others and encourage them to use the Guide to teach patient safety.

When asked to offer advice regarding expansion of patient safety teaching, the sites emphasized that every clinical school (medical, dental, nursing and pharmacy) should include patient safety teaching in their curricula. In this context, they supported use of the WHO Curriculum Guide to develop and implement these trainings. They also offered several specific pieces of advice to help others manage the process of implementing the teaching as effectively as possible.

Improving the Curriculum Guide

To identify opportunities to improve the contents of the Curriculum Guide, the stakeholders interviewed were asked to provide feedback on its usability, and its strengths and weaknesses. Then they were asked for suggestions on how the Guide might be improved, including general suggestions as well as suggestions for improvements specifically to Part A and Part B of the

Guide. The responses of the teaching faculty, implementation leads, and school executives were considered in the analysis of these interview results. Because the teaching faculty had the most direct experience with many of these issues, their responses were considered a primary source of information.

The usability of the Guide was assessed by examining the ability to adapt the Guide contents to local cultural situation and needs, use of tools and related issues, ease of understanding the language of the Guide, and the use-friendliness of the Guide contents. The sites indicated, in general, that they could readily adapt the Guide contents to their local needs, and most of them reported using the tools provided in the Guide, which they often modified and expanded upon as part of that adaptation process. There was virtually unanimous agreement that the Guide was user-friendly in a format that was nicely presented, easy to follow, and readily adaptable to their learning outcomes.

The faculty also reported that use of English in the Guide was easy for most of them to understand, although there was a request for translation of the Guide into Spanish. In addition, they felt that the level of language in the Guide was simple enough to be readily understood by both faculty and students, although some students in lower-level grades might have some trouble with it.

The sites varied regarding which the tools from the Guide the teaching faculty used, depending on their local needs and preferences and on the available time to apply them in the courses they taught. Several wanted their students to use the articles and references provided within each topic in the Guide, but they reported challenges in accessing references due to difficulties in downloading some resources and a lack of availability of some textbooks and articles because they were overseas.

In general, the sites had a positive response to the Guide, and they highlighted its greatest strengths to its comprehensiveness, effective organization, and patient safety topics addressed. For weaknesses identified, the focus tended to be on the need to adapt the contents to local situations and specialties.

Although the sites cited general satisfaction with the Curriculum Guide, they did offer a number of suggestions for improvements to Part A to strengthen guidance to educators. They also suggested several additional topics to include in Part B, while stating that none of the topics currently in Part B should be deleted or downgraded.

Summary and conclusions

Formative evaluation. Information from the formative evaluation provides feedback to WHO regarding capacity building, implementation issues and suggestions for improvements to the Guide. These findings also generate guidance for other schools that could be using the Curriculum Guide in the future.

- The Curriculum Guide is a readily usable resource that the participating schools implemented readily, although with the need to make some modifications to best adapt its contents to their local circumstances.
- Full implementation of teaching using the Guide requires several years of effort, as schools gradually train faculty on patient safety, add topics to their curricula, and refine their teaching skills and methods.

- The participating schools felt strongly that patient safety is an important issue, and because the Guide is such a strong resource, its use should be expanded to all other schools teaching health-care professionals, as well as other health-care organizations.

Summative evaluation. In the summative evaluation, the impacts on stakeholders from use of the Curriculum Guide are examined, as a measure of the effectiveness of this resource for teaching patient safety.

- Many of the participating schools had not previously defined patient safety as a priority in their curricula, and introduction of the Guide elevated the schools' commitment to address patient safety, including actions to expand this teaching more broadly.
- Before introduction of the Guide, the teaching faculty at participating schools had limited patient safety knowledge, and the training that schools provided their faculty to prepare them for teaching these topics increased their patient safety awareness and knowledge.
- The participating schools gained additional benefits from use of the Guide, including motivation of health-care practitioners to care about health-care safety and production of more knowledgeable graduates into delivery of quality and safe health care.
- The teaching of patient safety by the participating universities/schools substantially strengthened students' understanding of patient safety, including improved knowledge of the patient safety topics they were taught and elevation of students' perceptions and attitudes toward the importance of patient safety and their ability to influence it.
- The experiences of the complementary sites, which tested use of the Guide in a variety of additional settings, mirrored those of the pilot sites, suggesting the potential for successful application of the Guide in a variety of disciplines and settings.

With the information generated by the field test and evaluation, WHO should be well positioned to refine the contents of the Curriculum and move forward to encourage use of the Guide for organizations to teach patient safety across the world.

Acknowledgements

This field test of the Multi-professional Patient Safety Curriculum Guide achieved its aims because of the willing and enthusiastic participation of the twelve universities/schools that served as pilot sites to test use of the Curriculum Guide for teaching patient safety topics to their students, as well as many others that implemented the Guide as complementary test sites. Their commitment to applying the Curriculum Guide to their local situations and educational curricula, and to participating in the evaluation, is acknowledged and deeply appreciated. The evaluation depended on, and received, both the time and candor of participants at the pilot sites in responding to the questions asked of them during the interviews and student surveys, which yielded invaluable information for the evaluation.

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1. Introduction

The World Health Organization (WHO) developed the Multi-professional Patient Safety Curriculum Guide for patient safety education in the fields of dentistry, medicine, midwifery, nursing and pharmacy, and other related health-care professions. The Multi-professional Curriculum Guide is an updated edition of the Curriculum Guide for Medical Schools, published by WHO in 2009.

This Multi-professional edition is a guide for implementation of patient safety education in health-care schools/universities worldwide. It contains information for all levels of faculty, staff and lays the foundation for capacity building in the essential patient safety principles and concepts. The Curriculum Guide is intended to help to build a foundation of knowledge, skills and attitudes for health-care students that will better prepare them for clinical practice and thus advance efficiency of health-care delivery by means of improved patient safety.

The development of the Multi-professional Curriculum Guide began in January 2010. An Expert Working Group comprising experts from international professional associations in dentistry, medicine, midwifery, nursing and pharmacy, as well as from the WHO regions were brought together to review the Curriculum Guide for Medical Schools, discuss its evaluation outcomes and contribute towards the development of a multi-professional edition by adding the perspectives of dentists, midwives, nurses and pharmacists. The Expert Working Group introduced the available multi-professional scientific evidence, presented discipline-specific patient safety content, included recent, discipline-specific resources, and provided case studies from their professional areas to support inter-professional education. More than 50 international experts contributed to preparing this document.

The following aims were established for the Curriculum Guide:

1. Support patient safety education by creating and disseminating curriculum resources worldwide to facilitate training of health-care students and prepare them for safe practice in the workplace.
2. Provide a Curriculum Guide that can be easily adapted to suit the educational needs in patient safety of health-care students and educators.
3. Empower health-care schools and universities to build capacity in teaching patient safety.
4. Ensure the Curriculum Guide is at all times culturally sensitive to the needs of all Member States and applicable to different health education systems.
5. Raise awareness and engage commitment of the need for patient safety teaching and learning.

Design and contents of the Curriculum Guide

The Multi-professional Patient Safety Curriculum Guide was designed to be used for educating undergraduate and postgraduate health-care professionals in patient safety. The patient safety topics are designed to be embedded within existing education programmes, rather than requiring allocated blocks of valuable education programme time. The Guide was written with a global audience in mind, to be applicable to different cultures and contexts and using easily-understood language.

The Curriculum Guide contents can be adapted and incorporated, in part or in whole, into existing university curricula. This approach takes into account the different requirements of varying health-care professions' undergraduate curricula, national and culture-specific context and available resources. The topic-based approach facilitates inclusion in health-care education programmes of varying duration, and allows local institutions to decide which topics require greatest attention for each health-care profession in their area.

The Curriculum Guide is a comprehensive programme for the implementation of patient safety education in health-care educational institutions worldwide consisting of two parts. Part A is a teacher's guide, which has been designed to assist teachers to implement the Curriculum Guide. This part lays the foundations for capacity-building in patient safety education. Part B provides a comprehensive, ready-to-teach, topic-based patient safety programme that can be implemented either as a whole or on a per topic basis.

The contents of the Teacher's Guide (Part A) are listed in Table 1.1. The 11 patient safety topics (in Part B), which are stand-alone modules, are listed in Table 1.2.

The Curriculum Guide is posted on the WHO Patient Safety website for easy access by users (http://www.who.int/patientsafety/education/curriculum/tools-download/en/index.html). To support teaching of the topics in the Guide, WHO also has posted several tools on its website, including handouts on patient safety topics, teaching slides, information notes, promotional materials, and a reproduction and adaptation guide http://www.who.int/patientsafety/education/curriculum/Curriculum_Tools/en/index.html)

Table 1.1 The contents of the Teacher's Guide (Part A) of the Curriculum Guide

Section	Title
1	Background
2	How were the Curriculum Guide topics selected?
3	Aims of the Curriculum Guide
4	Structure of the Curriculum Guide
5	Implementing the Curriculum Guide
6	How to integrate patient safety learning into your curriculum
7	Educational principles essential for patient safety teaching and learning
8	Activities to assist patient safety understanding
9	How to assess patient safety
10	How to evaluate patient safety curricula
11	Web-based tools and resources
12	How to foster an international approach to patient safety education

Table 1.2 The Patient Safety Topics (Part B) of the Curriculum Guide

Topic	Title
1	What is patient safety?
2	Why applying human factors is important for patient safety
3	Understanding systems and the effect of complexity on patient care
4	Being an effective team player
5	Learning from errors to prevent harm
6	Understanding and managing clinical risk
7	Using quality-improvement methods to improve care
8	Engaging with patients and caregivers
9	Infection prevention and control
10	Patient safety and invasive procedures
11	Improving medication safety

Purpose and goals of the evaluation

The purpose of the evaluation of the WHO Curriculum Guide is to assess its effectiveness as a resource for teaching patient safety to undergraduate and graduate university students. The evaluation was designed to assess the performance of the Curriculum Guide relative to Aims 2 through 5.(See page 1) For Aim 2, the evaluation focuses on the effectiveness of the Curriculum Guide as an educational resource to prepare health-care students for safe care. For Aim 3 the evaluation tests the effectiveness of Part A of the Curriculum Guide is in building capacity of educators/teachers in patient safety, as well as effects on students' knowledge and attitudes about patient safety. For Aims 4 and 5, the evaluation assesses the relevance and effectiveness of the curriculum for universities located in both developed and developing Member States in all six of the WHO regions. This allows assessment of differences across Member States' development status, cultural requirements, and types of health education systems.

This evaluation study does not address Aim 1 because it is limited to examining experiences in this early test of the curriculum. Aim 1 addresses the impact of the curriculum when fully disseminated and applied, following completion of this test and evaluation.

The evaluation is designed to address the following questions:

A. Does the Curriculum Guide contain the necessary and sufficient information and topics to allow its effective use in undergraduate training of health-care professionals?

B. What is the impact upon student learning of the inclusion of patient safety teaching in the curriculum?

C. In what ways can this Curriculum Guide be used to support the widespread implementation of explicit patient safety education globally?

D. How could the Curriculum Guide be modified in the future to best support teaching of patient safety to students in different environments?

These questions were addressed in the 2009-2010 evaluation study of the Patient Safety Curriculum Guide for Medical Schools. With the updating of this Curriculum Guide into the Multi-professional edition comes the need to pursue the same questions through multi-professional institutions. The evaluation of the Multi-professional edition will develop information on the following specific aspects of use of the Curriculum Guide by universities/schools:

- The introduction and acceptability of the topics of the Curriculum Guide by universities and schools teaching dentistry, nursing, midwifery and pharmacy;
- The usability of the Curriculum Guide as an education tool for health education in universities and schools;
- The value of the Curriculum Guide to students;
- The impact/effect of the Curriculum Guide on students' knowledge of patient safety;
- Successes and challenges experienced by the schools in implementing the Curriculum Guide;
- Differences in experiences with the Curriculum Guide related to economic or cultural factors;
- Any improvements that could be made to the Curriculum Guide, from both students and staff perspectives.

Organization of this report

The remainder of this report is organized based on the four evaluation questions defined in this section. In Section 2, the evaluation methods are documented, including the basic evaluation design, the sample of 12 participating universities/schools, data collection methods, and analyses performed. Section 3 presents the evaluation findings regarding the integrity of the Curriculum guide (Question A), and Section 4 presents findings regarding impacts of the Guide (Question B). In Section 5, information is presented from the formative evaluation on the implementation experiences of the participating schools (Question C). Section 6 contains lessons regarding the usability of the curriculum and suggestions made by participants for changes to improve the Guide for future use (Question D). Finally, Section 7 is a summary of the evaluation findings and conclusions, which draws upon the results presented in Sections 3 through 6.

2. Evaluation methods

The methods used to conduct the evaluation of the Curriculum Guide are described in this section, including the basic design of the evaluation, the sample of participating universities/schools that tested the Curriculum Guide, and the methods used for data collection and analysis. The evaluation is designed to generate formative information on the experiences of working with the Guide, for use in future implementation of the Guide, and also to generate summative information on the impacts of the use of the Guide.

Evaluation design

The evaluation had a combined prospective/retrospective design in which data were gathered on the experiences of schools that participated in testing of the Curriculum Guide, both soon after each school started teaching their course modules and after they completed these courses. The field test and evaluation timelines are shown in Figure 2.1. On the top row of the diagram, above the timeline, are shown the steps involved in carrying out the pilot testing of the curricula at the participating universities/schools. The components of the evaluation data collection are presented below the timeline in the figure.

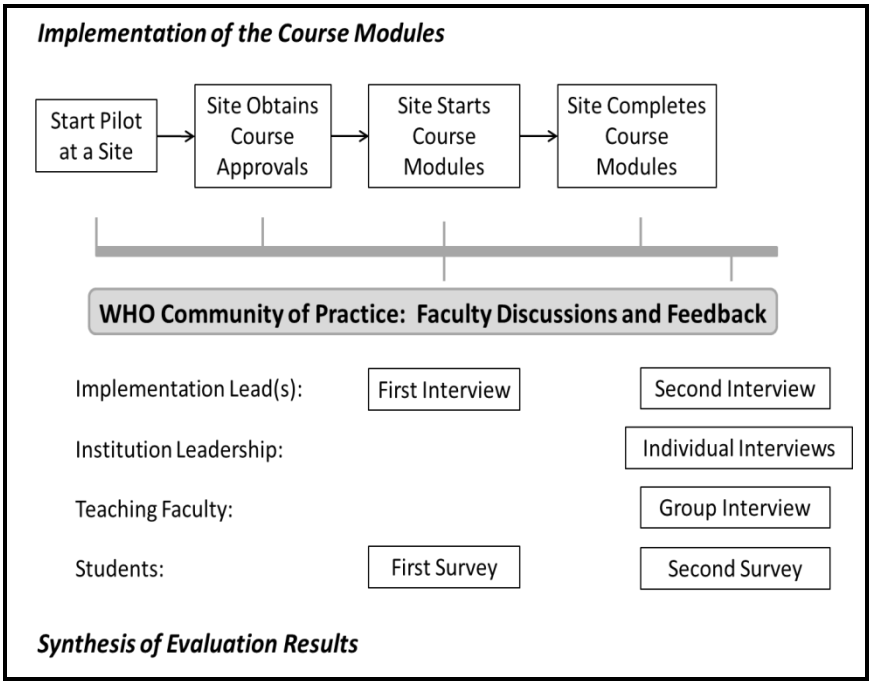

Figure 2.1 Diagram of the of the steps of the Curriculum Guide evaluation

It is well understood that different groups of people (called stakeholders) experience the same activity or programme quite differently, depending on their perspectives and how they may be affected by it. It will be important to capture the perspectives of the key stakeholder groups. This evaluation is designed to collect data from each of the following four groups:

- Executives in the schools participating in the field test of the Curriculum Guide;

- University staff/educators who lead the introduction and implementation of students' curricula based on the Curriculum Guide;
- Faculty educators who teach the patient safety courses;
- Students in the universities/schools who take the courses.

This approach was taken to fulfill the information needs of both formative and summative aspects of the evaluation.

Formative evaluation. The experiences of the schools in using the Curriculum Guide were assessed, specifically to provide feedback to WHO regarding capacity building, implementation issues and suggestions for improvements to the Guide, as well as to generate guidance for other schools that could be using the Curriculum Guide in the future. The stakeholders' perspectives are primarily those of the implementation leads and teaching faculty, who had the responsibility to spearhead the implementation of the Guide at each of their schools, and some data also were obtained from the student surveys. The implementation leads were interviewed at the beginning and the end of the course timelines, to allow us to identify changes in implementation experiences over time.

Summative evaluation. The effectiveness of the Curriculum Guide was assessed, specifically to address Aim 2 through to Aim 5, and all except one of the goals for the evaluation (which is addressed by the formative evaluation). The stakeholder perspectives are those of the school executives, faculty members who taught, and students who took the courses.

The summative evaluation used both retrospective data from interviews conducted at the end of the courses, with executives of the schools and with the faculty who taught the courses, and prospective data from pre-and-post surveys of students taught the courses. The student surveys were administered as they started taking the courses (baseline) and again at the end of the courses, to assess changes in their patient safety knowledge and attitudes. The surveys at the end of the courses also elicited students' feedback on the effectiveness of the courses.

Implementation and evaluation schedule

WHO identified the universities and schools to participate in the evaluation of the multi-professional Patient Safety Curriculum Guide by end of June 2011. Each school was asked to select the patient safety topics in the Curriculum Guide that they planned to teach, and they were allowed flexibility in how they integrated these courses into their overall curricula.

A total of 14 schools, two or three from each of the six WHO regions, were initially selected to participate, however only 12 remained as pilot sites during the entire duration of this global study. The two pilot sites withdrew due to academic scheduling difficulties.

As shown in Table 2.1, the 12 schools were evenly distributed geographically, with two schools located in each of the six WHO Regions. Four of the 12 schools used the Curriculum Guide to teach a combination of nursing and midwifery students, three taught just nursing students, five taught dentistry students, and one taught pharmacy students.

These universities/schools commenced teaching their selected topics from September 2011, with the various schools teaching on different timelines. Therefore, the evaluation timeline at each university/school was linked directly to when it commenced teaching selected topics from the

Curriculum Guide to their students. To the extent possible, the evaluation data collection at each participating university/school:

- began as close as possible to the first week of teaching the courses;
- ended within 3 weeks to two months after the completion of the courses, depending on the availability of faculty and executives for interviews.

This approach enabled collection of data at the same times *relative to start dates* for all the schools, allowing generation of consistent data across schools for descriptive and comparative analyses. Because schools started their courses at different times, the total evaluation started when the first school started its courses and ended after the last school finished its courses.

Table 2.1 Universities/Schools that participated in the Curriculum Guide field test and evaluation

Region and University/School	Disciplines of Students Taught Using the Guide				Total Sites
	Nursing	Midwifery	Dentistry	Pharmacy	
African region					2
Ethiopia: Gondar University	X				
University of Zimbabwe			X		
Eastern Mediterranean region					2
Egypt: Cairo University			X		
Jordan University for Sciences and Technology	X	X			
European region					2
Greece: University of Athens			X		
University of the West of Scotland	X	X			
Pan American region					2
Argentina: University of Del Salvador	X				
Nat'l University of Mexico			X		
South East Asian region					2
India: All India Institute of Medical Sciences (AIIMS)			X		
Sri Lanka: University of Peradeniya	X				
Western-Pacific region					2
University of the Philippines	X	X			
Malaysia: United Nations University	X			X	
Total Disciplines	7	3	5	1	

Ethics approvals

A proposal to implement the global evaluation study of the Multi-professional Patient Safety Curriculum Guide was submitted to WHO Ethics Review Committee (ERC) following peer review of the proposal by international experts. The proposal was approved by ERC in October 2011. Thereafter links with potential pilot sites were initiated and upon their agreement, consent forms to participate in the global study were obtained from all participating stakeholders. As the study took longer to implement than the anticipated completion date of November 2012, a request for continuing approval to the ERC was submitted and was granted until November 2013. Throughout the duration of the global study there has been no deviation from the approved ERC proposal.

Data collection methods

As summarized in Figure 2.1, two basic data collection methods were used for the evaluation of the Curriculum guide. The first was telephone interviews with each of three key stakeholder groups: the implementation leads, teaching faculty, and executives at the participating universities/schools. The second was pre-teaching and post-teaching surveys of the students taught the patient safety topics at those sites. The contents of the interview protocols and student surveys were designed to gather data to answer the four research questions defined for the evaluation, as well as to enable comparisons to be made with data collected for the evaluation of the Patient Safety Curriculum Guide for Medical Schools.

Data from stakeholder interviews

Written protocols were developed for the interviews with the three stakeholder groups. These protocols were used to guide the interviews themselves as well as to serve as the framework for recording the interview notes in a consistent format, to allow ready compilation and comparisons of data across interviews. The first step in this process was development of a master list of questions to be used in the interviews, which ensured that all the salient evaluation topics would be addressed in the interviews.

Working with this master list, a matrix was developed that identified which of the stakeholder groups would be asked each of the listed questions. (See Appendix A for this matrix.) Then a separate protocol was prepared for interviews with each stakeholder group. For the implementation leads, two protocols were prepared – one for interviews conducted early in the course implementation process and the other for interviews conducted after course completion.

All of the interviews were conducted by telephone, with the exception of a few that were received as written comments from the interviewees. These exceptions were due to limited availability of respondents and some language problems. The interviews for all sets of interviews were scheduled and conducted using the same methods, for consistency across interviews with different stakeholder groups.

The interviews were scheduled via email, at the times specified in the evaluation design (Figure 2.1). The relevant interview protocol was shared with the respondents during the scheduling process, before they were interviewed. This approach gave the respondents time to consider the questions to be covered before actually participating in the interviews.

One interviewer conducted each interview.[1] Consent forms were received from respondents prior to conducting the interviews. The interviews were recorded, and the interviewers used the recording to prepare the written notes from the interviews. They entered these interview data into a standard format established for the interview protocol. These notes were shared with the respondents for comments and feedback.

A summary table was completed at the top of each set of interview notes, which documented the university/school represented, who was interviewed, and how the interview was conducted (telephone versus written notes). Any comments or feedback received from the respondent also were recorded in this table.

Implementation lead interviews. The implementation lead at each university/school was interviewed twice during the evaluation. The first interview was conducted in the first week after a school had started teaching its selected course(s), and the second interview was conducted in the second week following completion of the course(s). These interviews focused on gathering data on the expectations, development of educators' capacity and actual teaching experiences, as educators initiate and conduct the course(s).

As stated above, these interviews were the source of data for the formative evaluation. Some of the data from these interviews also were used in the summative evaluation to compare perceptions across stakeholders regarding the effectiveness of the Curriculum Guide, how it might be improved, and suggestions for future applications.

Course faculty interviews. The post-teaching interviews with the teaching faculty at each university/school were conducted after the school had completed teaching its selected patient safety course(s). Most of these interviews were conducted two to three weeks, or even longer, after completion of the courses, due to challenges in scheduling the interviews. In most of the pilot sites, only one or two faculty participated in the patient safety teaching, with the result that these interviews were individual interviews, rather than the group interviews that had been anticipated at the start of the evaluation.

University/School executive interviews. The post-interview with the school executive at each university/school also was conducted after the school had completed teaching its selected patient safety course(s). These were individual interviews conducted two to three weeks, or even longer after the teaching finished, also due to scheduling challenges, as described above for the faculty interviews.

For some sites, the school executive served as the implementation lead. These individuals were interviewed in both capacities using the longer protocol designed for the interview with the implementation lead. Their responses for the subset of questions directed for the executive were duplicated in the written notes for the executive interviews. As a result, the findings regarding perspectives of these two groups were quite similar.

Data from student surveys

The questionnaire for the post-teaching student survey, which contains all of the sets asked of the students, is presented in Appendix B. To measure changes in the patient safety perceptions, attitudes, and knowledge of students taught the Curriculum guide topics, two sets of questions

[1] In one exception to this process, the pre-teaching interview with the implementation lead at one site was conducted with three staff participating. One staff person served as the lead interviewer.

were included in both the pre-teaching and post-teaching surveys: (1) students' perceptions and attitudes about patient safety and (2) their knowledge of patient safety facts and processes. A third set of questions is included in the post-teaching survey to obtain students' feedback on the patient safety topics they were taught.

The survey section on *students' perceptions and attitudes* contained a total of 23 questions, all of which were taken from a student survey used in the evaluation of the Curriculum Guide for Medical Schools. These questions were grouped in four domains:

- Patient safety knowledge;
- Health-care system safety;
- Personal influence over safety;
- Personal attitudes about safety.

The *patient safety knowledge questions* were developed by WHO staff and reviewed by the lead developer of the Curriculum Guide. A set of two to four questions was written for each of the patient safety topics in the Guide, drawing upon the Guide contents on each topic. Draft questions were also reviewed by the WHO patient safety education team and revised as needed. The correct answer to each of the questions also was determined via the same review process. The surveys for students at each university/school contained the knowledge questions only for the Guide topics that the school had selected to teach.

The post-teaching survey also contained a third set of questions that elicited students' *feedback on the content and teaching* of the courses they had just completed. The feedback questions consisted of 16 questions in two domains: effectiveness of the topics (eight questions) and effectiveness of teaching (eight questions). All but a few of these questions also were drawn from a student survey used in the evaluation of the Curriculum Guide for Medical School, and the additional questions were written by the WHO patient safety education team.

The participating universities/schools administered the student surveys to the students they taught the patient safety topics, following instructions provided by the WHO team. The schools then sent the completed student surveys to the WHO team for data entry.

A team of five WHO personnel entered the data from the student surveys into excel spreadsheets using a standard template for entry cells and coding of the data. Data entry personnel were trained in these methods and participated in debriefings to ensure consistency in data entry. The data were audited to check completeness of survey entries and to avoid duplicate entries, as well as to check the accuracy of the data entered into the spreadsheets.

Samples for the pre-teaching and post-teaching surveys

All of the students being taught the Curriculum Guide topics by the participating universities/schools were asked to complete both the pre-teaching and post-teaching surveys. Informed consent language was provided at the start of each survey, which included a statement that they could choose not to complete the survey if they so wished.

As shown in Table 2.2, the total sample for the pre-teaching surveys was 1410 students in the 12 participating schools; the total sample for the post-teaching survey was a smaller 1036 students. The distribution of students by region, school, and discipline, also shown in this table, differed

slightly for the pre-teaching and post-teaching surveys, but were consistent enough to allow for valid analysis of changes in students' perceptions and knowledge between these two times.

Within the nursing category, some schools taught nursing or midwifery students (either only or separately) and others taught these two groups of students together. This variation in disciplinary categories is reflected in Table 2.2; collectively, the students in nursing or midwifery disciplines comprised the largest group of students taught during the Curriculum guide field test.

Table 2.2 Students in the Survey Samples for the Pre- and Post-Teaching Surveys, by Region, School, and Discipline

Year of Study	Pre-Teaching		Post-Teaching	
	Number	Percentage	Number	Percentage
Total – all Students	1,410	100.0	1,036	100.0
By Region:				
African	97	6.9	76	7.3
Eastern Mediterranean	303	21.5	186	18.0
European	149	10.6	99	9.6
Pan American	288	20.4	161	15.5
South East Asia	249	17.7	182	17.6
West Pacific	324	23.0	332	32.1
By Discipline				
Dentistry	565	40.1	336	32.4
Midwifery only	30	2.1	14	1.4
Nurse/Midwifery	410	29.1	187	18.1
Nursing only	198	14.0	310	29.9
Pharmacy	207	14.7	189	18.2
By University/School				
Cairo University	45	3.2	28	2.7
University of Del Salvador	41	2.9	29	2.8
All India Institute of Medical Sciences	215	15.3	149	14.4
Jordan University of Science and Technology	258	18.3	158	15.3
Nat'l University of Mexico	247	17.5	132	12.7
United Nations University	213	15.1	213	20.6
University of Athens	58	4.1	27	2.6
University of Gondar	60	4.3	57	5.5
University of Peradeniya	34	2.4	33	3.2
University of Zimbabwe	37	2.6	19	1.8
Univ. of the Philippines	111	7.9	119	11.5
Univ. of the W. of Scotland	91	6.5	72	7.0

By region, the smallest shares of students completing surveys were from schools in the African and European regions, and by discipline, the smallest shares were in pharmacy. Conversely, the largest shares of the students are those at Jordan University of Science and Technology, National

University of Mexico, All India Institute of Medical Sciences, and United Nations University (Table 2.2).

Both the pre-teaching and post-teaching surveys also asked the students what year of study they were in. the responses, shown in Table 2.3, show that the majority were in years 1 through 4 of study. Not shown in this table, the distributions differ by discipline, with dentistry students tending to be in more advanced years of study than students of other disciplines.

Table 2.3 Number of Years of Study Reported by Students, Pre- and Post-Teaching Surveys

Year of Study	Pre-Teaching		Post-Teaching	
	Number	Percentage	Number	Percentage
1	486	36.8	186	22.5
2	237	17.9	183	22.1
3	230	17.4	163	19.7
4	175	13.2	113	13.7
5	103	7.8	121	14.6
6	79	6.0	59	7.1
7	12	0.9	3	0.4
Total	1,322	100.0	828	100.0

WHO Community of Practice

The faculty members teaching the courses at the participating universities/schools were invited to join a WHO web-based Community of Practice to discuss use of the Curriculum Guide among themselves and provide feedback for the evaluation. The Community of Practice also was intended to be a support mechanism for the schools. These discussions were recorded in a database to contribute to assessment of faculty experiences with the Curriculum Guide. Unfortunately, few participants chose to use this web-based resource to exchange information with each other or with WHO. Therefore, it was found that data on this site was not a useful source of information for the evaluation.

Data analysis

Both qualitative and quantitative methods were used to analyze the data collected in the evaluation. For the formative evaluation, an analysis was performed of interview responses from the implementation leads about the experiences of their schools in implementing the Curriculum Guide, comparing responses given at the start and end of course implementation. For the summative evaluation, qualitative and quantitative data were used together to assess effectiveness of the Curriculum Guide from the perspectives of different stakeholder groups.

The central organizing structure for the evaluation was the set of four questions to be answered by the evaluation. Each of these core evaluation questions encompasses a depth and breadth of sub-topics that were examined and aggregated to achieve a summary assessment for the core question. The approach used to address each of these questions is summarized here.

A. *Does the Curriculum Guide contain sufficient information and topics to allow its effective use in the undergraduate training of health professionals?*

This question encompasses two distinct components: (1) the integrity of the patient safety content of the course modules in the guide and (2) the completeness and clarity of information provided to support universities and schools to implement these courses. Each component was examined separately in the analysis.

- The key sources for assessing the course content were the teaching faculty and the students (though perspectives of the implementation coordinator and institutional executives also were considered).
- The key sources for assessing implementation support were the implementation coordinator and the teaching faculty (although perspectives of the institutional executives also were considered).

B. *What is the impact on student learning of the inclusion of patient safety teaching in the Curriculum Guide?*

This question addresses the key outcome of the use of the patient safety curriculum: that of improved knowledge and practices of students taught using its course modules. Both changes in knowledge and students' reported perceptions regarding safety practices were analyzed to assess progress on these outcomes.

- The key sources for assessing both of these impacts was responses of the students on the student surveys, along with some perspectives from the teaching faculty.

C. *In what ways can this Curriculum Guide be used to support the widespread implementation of explicit patient safety education globally?*

This question encompasses a potentially large number of components, including (but not limited to) consideration of motivation for teaching patient safety, infrastructure needed to support use of the courses, dissemination strategies, and implementation support. For this part of the analysis, the initial focus was on assembling ideas raised in interviews, many of which likely arise as a result of the motivations reported by the pilot sites for implementing these course modules, their experiences in doing so, and how those experiences changed their motivation or perspectives. Recommendations for future strategies were identified, as derived from this information.

- The key sources for assessing future use will be the implementation coordinators, institutional executives, and teaching faculty (although students' views reported in the questionnaires also will be considered).

D. *How could the Curriculum Guide be modified in the future to best support teaching of patient safety to students in different environments?*

The question also encompasses a potentially large number of components, including (but not limited to) consideration of feedback on the integrity and completeness of the course modules and implementation guidance, relevance of the topics to the teaching priorities of each school, and other feedback on the guide contents. For this part of the analysis, the initial focus was on assembling ideas raised in interviews and then assessing the themes that emerge from this feedback. Recommendations for future strategies were identified, as derived from this information.

- The key sources for assessing future use were the implementation coordinators, institutional executives, and teaching faculty (although students' views reported in the surveys also were considered).

Analysis of stakeholder interview data

Because the questions in the interview protocols for each stakeholder group were drawn from the master list of questions, and many of the same questions were asked of more than one group, it was possible to compare their responses during the analysis of data from the interviews.

The first step was to summarize the contents of responses provided by each stakeholder group, to identify common themes as well as areas where views diverged among the respondents within each group. These results then were aggregated further to establish higher-level findings for key components of each evaluation question.

The results for each stakeholder group then were compared across groups, to identify where views were similar across groups and where they differed. For the implementation leads, who were interviewed at the start and end of their teaching periods, responses were compared to identify any changes in their views during the course of the field test regarding their implementation experiences.

Analysis of student survey results

The analysis of changes in students' perceptions and knowledge of patient safety were performed as comparisons of two cross-sectional samples of students – those who completed the pre-teaching survey and those who completed the post-teaching surveys. Although many of the same students were in both samples, it was not attempted to match pre-post responses for the same students. The information of interest was the extent to which any aggregate change occurred in students' perceptions and knowledge related to being taught the Curriculum Guide topics.

Perceptions and attitudes. As discussed above, the survey questions regarding students' perceptions and attitudes were grouped in four domains: patient safety knowledge, health-care system safety, personal influence over safety, and personal attitudes about safety. For each of survey respondent, a score for each of these domains was calculated as the mean of the scores for the survey questions within the domain (on the 1-to-5 scale used in the individual survey questions).

These four domains, and the items contained by each, have a face validity regarding the relevance of each item to its domain. These relationships were tested empirically by estimating the correlations of each item to each of the four domains. The results of these analyses, shown in Table 2.4, show that the items contained in each domain are much more highly correlated with their domains than they are with any of the other three domains. The shaded sections in the table show these strong correlations. One way to interpret these results is that each item is more strongly correlated to the average of the items in its domain than it is to the average of items in any of the other domains.

Table 2.4 Correlations of question topics with the domains containing them, attitude and perception questions on the pre-teaching student survey

Question Topics	Domains of Perceptions or Attitudes			
	Knowledge	System	Influence	Attitudes
Patient Safety Knowledge				
Types of error in health care	0.70	0.14	0.28	0.10
Factors contributing to error	0.73	0.13	0.26	0.10
Factors influencing patient safety	0.73	0.15	0.25	0.10
Ways to speak up about error	0.77	0.15	0.32	-0.03
What should do if error made	0.77	0.15	0.31	0.08
How to report an error	0.80	0.22	0.32	0.01
Role of organization in reporting	0.72	0.23	0.26	0.00
Health-care System Safety				
Health-care workers make errors	0.10	0.41	0.07	0.13
My country has safe health system	0.22	0.55	0.11	-0.03
Medical error is common	0.06	0.41	0.08	0.08
Unusual give patients wrong drug	0.05	0.53	0.14	-0.03
Staff get patient safety training	0.15	0.58	0.14	0.08
Personal Influence Over Safety				
Easy to tell others of my error	0.16	0.18	0.54	0.08
Easier to find someone to blame	0.12	0.04	0.36	0.00
Confident to speak to someone	0.17	0.12	0.55	0.14
Know talk to people who erred	0.29	0.15	0.61	0.11
Able to ensure safety is good	0.29	0.13	0.56	0.17
Believe reporting will help safety	0.15	0.09	0.42	0.34
Able to talk about own errors	0.24	0.11	0.58	0.23
Personal Attitudes To Safety				
Can contribute by knowing causes	0.08	0.06	0.24	0.71
Learn from mistakes to improve	0.07	0.05	0.22	0.77
Deal with my errors as part of job	0.04	0.10	0.19	0.79
Deal with errors in training	0.00	0.08	0.15	0.72

* The correlations shown in the table measure the strength of relationships among the students' responses on the 5-point scale to each question. Mean scores across all students were calculated for each item, as well as for each of the four domains, and pairwise correlations among those means were estimated.

For each student's response to a survey question, a new dichotomous variable, called "top response," also was generated for which top response = 1 if the original response was either 4 or 5 on the 5-point scale, or top response = 0 if the response was 1, 2, or 3. Similarly, a top response score was generated for each student's newly created domain scores, described above. The "top response" measures were used in the analysis because they calibrated observations of score differences on a percentage scale, which is larger than the original 1-5 point scale and therefore changes in scores are more readily observable.

The analysis of these measures consisted of comparisons of the means for the before-and-after scores. Differences in values for the two time periods were tested for statistical significance.

Patient safety knowledge. Because different sets of patient safety knowledge questions were relevant for students at each participating university/school, the measures used to assess changes in knowledge were the percentages of the relevant questions that each student answered correctly. These percentages were calculated for each patient safety topic and also for the aggregate of all topics that were taught in each student's school. The analysis of these knowledge measures consisted of comparisons of the percentages of correct answers given on the pre-teaching and post-teaching surveys. Differences in values for the two time periods were tested for statistical significance.

Aggregation and synthesis of results

The summaries of responses to interviews relevant to each evaluation question were synthesized to generate high level findings for each of these questions. These results are reported for each of the four evaluation questions, respectively, in Sections 3 through 6 of this report. Both formative and summative aspects of the findings were considered in this process. The formative results provide insights regarding experiences and lessons from implementing the curriculum guide, and the summative results provide information regarding what impacts the use of the Curriculum Guide had on the students being taught and the schools participating in this field test. These impacts include the effectiveness of the Guide, the impact of its use on the knowledge and perceptions of students who were taught, and how the Guide might be improved for future use.

Contributions of Complementary Test Sites to the Evaluation

Only four complementary test sites submitted data from their self-evaluation processes. These four had collected their evaluation data as defined in the WHO instructions and using the data collection instruments that WHO staff provided. They also submitted the results of their tests of using the Curriculum Guide in the report format provided by WHO. The quality of the information submitted by the complementary test sites was of limited use for the formal evaluation.

Therefore, the formal evaluation results presented in this report are limited to those for the 12 participating pilot sites. However, the four complementary sites tested use of the Guide in several different, non-traditional teaching formats and settings that extended beyond the design of the formal evaluation. Therefore, the information about their experiences offers an opportunity to explore the adaptability of the Guide contents beyond its original design and audiences. WHO also will be able to draw upon the information they provided in their reports to guide future work on the patient safety training. Highlights from the results for these sites is presented in Section 7 and a table of the participating sites is in Appendix C.

Limitations of the evaluation data

The integrity of the data generated in this evaluation is estimated to be quite high because of both the design of the data collection instruments and the care and thoroughness taken by the WHO staff during the collection and coding of data from interviews and the student surveys. The data from the interviews share the possibility of bias that exists in all self-report data. However, because multiple stakeholder groups were asked the same question, the risk of bias is reduced by

the ability to compare responses across groups, and for the implementation leads, over time. Strong consistency in responses was found in making these comparisons, which increases confidence in findings from the evaluation.

The student surveys were designed to generate before-and-after data on the same sets of survey items, allowing assessment of changes in students' perceptions, attitudes, and knowledge about patient safety. The integrity of the collection and coding of survey data was protected by the provision of clear instructions to the sites on how to administer the survey as well as on-going support to the sites by WHO staff during survey administration. All sites conducted the surveys in a paper-based format, except for one site that developed a web-based survey, with guidance and feedback from WHO staff and approval from the ERC of this survey adaptation.

WHO staff performed the coding of survey results using structured coding schemes and written instructions. Because the sites administered the surveys, however, the completeness of responses on the surveys varied somewhat across sites, in particular leading to a great deal of missing data for some of the sites.

3. Findings for Goal A – Integrity of the Curriculum Guide

Question: Does the Curriculum Guide contain the necessary and sufficient information and topics to allow its effective use in undergraduate training of health-care professionals?

Consideration of the integrity of the Curriculum Guide addresses each of the two major components of the Guide:

- *Part A of the Guide* that contains information to support universities and schools to teach the patient safety topics. The completeness and clarity of this information in Part A is assessed.
- *Part B of the Guide* that contains the content of the eleven patient safety topics and tools that can be used to teach the topics. The integrity of the content of the patient safety course modules in the guide is assessed.

The evaluation results presented in this Section are organized according to these Curriculum Guide components. Presented first is a summary of general feedback obtained on the Curriculum Guide effectiveness. This is followed by specific feedback on Part A of the Guide and then on Part B of the Guide. The section ends with a short summary of the highlights of these findings from the evaluation regarding the integrity of the Guide.

The primary stakeholder groups considered in this assessment was the teaching faculty and students taught, who had the more direct and extensive experience working with the Curriculum Guide. Interview data with teaching faculty were available for eleven of the twelve sites. Their perspectives are presented in some detail. Additional perspectives from the implementation leads and the institutional executives also are reported, as relevant for each issue considered.

General feedback on the Curriculum Guide effectiveness

The stakeholders interviewed were positive, overall, regarding the effectiveness of the Curriculum Guide, and they offered thoughtful perspectives regarding how the Guide supported their patient safety teaching efforts. They also affirmed that the mix of topics was consistent with their countries' patient safety priorities.

Information provided on patient safety issues

Views of the Implementation Leads

The implementation leads at several sites observed that the Curriculum Guide gives credibility and creates a focus on patient safety, which brings the subject to the eye of the academic community. They felt the overall organization of the Guide is quite good. The Guide emphasizes important patient safety topics and shows how to organize them for teaching.

Having a structure to follow allows educators to be more clear on the actual agenda on patient safety as a standalone part of clinical training. Several sites reported that their schools were new to teaching patient safety in a structured way, they were not well organized, and they lacked the

structure to implement the teaching as presented in the Guide. Full implementation of its contents will take some time.

With the content and structure of the Guide, schools can introduce patient safety topics to students earlier in the curriculum, so they can prepare them right from the start of their training. It also is more applicable to students before they enter the clinic, to make them aware of patient safety issues.

It is very important to widely publicize the product (in the local language) and to make it available for more people to get information for patient safety. The Guide is fundamental for mobilizing authorities and faculty members to allocate the time to teach the course. Full advantage of the electronic media should be taken since they are used so extensively nowadays.

Views of the Teaching Faculty

The teaching faculty reported that the Curriculum Guide effectively informs them about patient safety issues and topics, as demonstrated in the following specific observations from the interviews:

- The Guide brings a well-structured systematic approach and teaching tools, to integrate Patient Safety into schools' clinical teaching.
- The WHO Curriculum Guide has been very helpful to teach patient safety because it brings all the key patient safety topics together in one place. Before we had it, many schools took a more piecemeal approach when they thought the topic was necessary.
- The guide sensitizes educators about the patient safety topics and issues, and it shows how they can engage the patients for more effective treatment and to make educated decisions.
- The Guide reinforces the need for schools to play a pivotal role in highlighting key risks within health-care organizations.
- The basic concepts of patient safety that needed to be presented to the students in the first year were of great value.
- The content about medication error and improving medication safety was of particular benefit.
- It was difficult to deliver the topics to the students, but once the topics were introduced to them, they understood them well.
- Especially for people who are less familiar with patient safety, the information and topics in the Guide are useful and comprehensive.
- The key topics highlighted in the guide reflect much of the content that already exists in the undergraduate nursing education curriculum.

Relative Importance of the Topics in the Guide

The implementation leads, institutional executives, and teaching faculty at all of these sites reported consistently that the topics covered in the Guide are important patient safety priorities in their countries, and several of them noted that the issues addressed were universal issues. The following specific perspectives provided by the faculty revealed nuances in differences across participating institutions.

- The topics are consistent in some parts of our country that have academic hospitals with experiences with patient safety and quality care. In other parts of the country, where they do not have nurses or basic safety training, it might need some adaptation to the reality.
- Some of the contents were more for medical procedures rather than for nursing, but we tried to adapt it for nursing.
- For one site, some topics are more relevant to its setting than others are.
- Fragmentation of patient safety teaching in our country is a problem, with it being taught in other courses i.e. in pathology (cardiopathology), general care etc. In the future it would be an important subject to teach in universities.
- Need to add more topics of examples that apply in the community setting. Most examples given in the guide are more hospital-based.

Cultural appropriateness of the Curriculum Guide contents

In general, responses from the implementation leads, institutional executives, and teaching faculty at all of the sites were consistent that the Guide contents are culturally appropriate for their countries, including specific items such as simulations, group discussion, case studies, and role playing. Several of them, however, also noted that they made adjustments to some of the contents to make them more applicable to their situations. They reported that the Guide could be adapted easily when needed.

Many of adaptations were introduction of case studies and working examples from their own countries' health-care areas. Others included changing some terms that did not work well locally, and drawing upon their own experiences as practitioners for communicating with other members of the health-care team.

The following specific comments were offered about the culturally appropriateness of the Guide:

- Handling of mistakes in the use of or in the administration of common drugs typically were compatible within our country's setting.
- For the situation of those of us who work in academic hospitals, it is applicable. But if you go to other parts of the country, it would need to be adapted.
- The Guide is somewhat appropriate, but I think it is a much more advanced type of curriculum. …at the moment, we do not have such an organized and advanced approach to teaching the subject.
- We also added some real local examples. The scenarios provided in the Guide helped us identify some scenarios from our practice so that they are more relevant for students.

Quality of information to support teaching the courses (Part A)

Assessments from the teaching faculty interviews

The teaching faculty generally found that Part A of the Curriculum Guide was helpful for their educators in teaching their students about patient safety. Responses were given regarding how Part A helped faculty both to develop educators' skills and to integrate patient safety into their schools' curricula. They also commented on the appropriateness what the Guide presented regarding assessment strategies.

Helpfulness to develop faculty skills to teach patient safety

Seven of the sites found the Guide to be a helpful or useful resource for supporting their teaching of patient safety to their students. Five sites used the word "helpful" and the remaining two sites used the words "useful" or "valuable" for helping educators to develop the knowledge and skills needed for teaching patient safety. The executive at one site stated that Part A is about capacity building of teaching faculty, and an implementation lead noted that it has great potential to develop the skills and knowledge base of faculty members who teach patient safety. The following specific comments were offered regarding features of the guide:

- The Guide lays out the learning objectives, knowledge requirements, and performance requirements and it also provides teaching slides, case studies, and other web-based tools.
- The curriculum guide has clear presentation of information and guidance for educators to give directly to the students, although these need to be customized by adding local stories, case studies, and examples that attract the attention of the students.
- You can use the Guide alone without any extra references and it is still very helpful. However, when you are a teacher you might want to go to the references as well. We discussed about these concepts and elements before but now it is broader and more effective.
- Some sites notes that they have the 'blame culture' most of time, and use of the Guide helps to change this by raising awareness that when an adverse event happens, the focus should not be on one person. There might be so many factors involved in this adverse event, which is more a system error rather than a personal error.
- It was not possible to use all of what is in the Guide during the field test, but it is very helpful.
- On site used 'Improving Medication Safety' material alongside its core teaching presentation and found that it highlighted and complemented existing resources.

Two sites had somewhat more restrained responses regarding the helpfulness of the Guide, and another two sites reported that they had not yet had sufficient experience working with the Guide to be able to judge how helpful it is to them. One of the sites with a restrained response noted that the Guide gives educators some basic knowledge, but further access to other resources would be required to tailor the learning to specific student groups. The other stated that, although the Guide was helpful to those who already had been trained, it was not clear that it would be useful for faculty who do not know anything about patient safety. They need more direct exposure to the information through workshops or even teleconferences.

Two sites highlighted a particular issue with the suitability of the Guide contents for teaching dentistry students, which was echoed by other dentistry schools. Most dental students go into private practice, which is very different from the hospital setting, so many safety issues in dentistry differ from those in medicine. There is a need for more specific patient safety examples applicable to dentistry, some of which the participating schools developed. Dental students also start practicing on patients early to develop their skills, which is different from medical students.

Effectiveness in integrating patient safety into curricula

The teaching faculty and implementation leads at all of the sites reported that Part A of the Curriculum Guide was an effective tool that helped them integrate patient safety in both their curricula and their day-to-day practice. Many of them reported they used the Guide to help integrate patient safety topics into existing courses, while others established separate courses or modules on patient safety, at least initially. Many sites tended to prefer to integrate the topics into existing curricula for continuity of topics and resource efficiency, while others preferred keeping them separate for visibility. The following specific comments also were offered regarding the how the Guide helped them integrate these courses into existing curricula:

- This time they taught the Guide as a separate course, but they plan to also integrate patient safety topics into their existing curricula.
- The Curriculum Guide has given educators the opportunity to look at their existing curricula and see at what levels (the year of students) they can integrate various topics.
- The Guide allows educators to expand on existing knowledge and resources.
- They took examples/case studies from the Guide and integrated them into lectures and clinical trainings. They did not create a new course of patient safety.
- They sensitized all our health-care workers regarding patient safety in terms of dentistry and it was really an eye opener in many respects.
- They didn't teach patient safety appropriately in the past compared to how they can do it now with the Curriculum Guide

Effectiveness in helping faculty to develop teaching methods

Three topics were addressed in an interview question about how the Guide helped teaching faculty to develop methods to teach patient safety:

- Importance of building supportive environments for teaching patient safety
- How to design and implement patient safety curricula
- The use of inter-disciplinary teaching in patient safety?

Faculty at the sites varied widely in both their understanding of these three topics and the progress they made in using the guide to guide their teaching methods. There was a general understanding and satisfaction with the resources provided in Part A of the guide, as discussed above. However, there appeared to be less understanding of the Guide addresses each of these three items specifically. For example, one site gave a generally stated response of "I agree that all those approaches are good to use in teaching," but it was not clear how much its faculty had used the Guide to help internalize the topics. Specific responses that were given for each of the three topics are summarized below.

Importance of building supportive environments. The responses of faculty interviewed were relatively sparse regarding what the Guide offered regarding the importance of building supportive environments. However, those who did respond were positive about the Guide's value in this area. One respondent stated that "We could learn new things from the Curriculum Guide, for example, the importance of avoiding use of a 'blame culture" and highlighted that students from medical, dentistry, and pharmacy schools all need this knowledge and skills to work with patients together. The faculty at another site reported that the Guide clearly informed

the educators that just teaching of patient safety will not change the behavior; we need to augment the environment for health-care workers to make the effective change.

Faculty at one site were less positive about the Guide's approach in this area, believing instead that approaches for teaching about building supportive environments would be very dependent on the individual educator, and that students should be actively encouraged to discuss possible experiences within their health-care environments, which can often be very negative.

Design and implement curricula. Those faculty that offered responses regarding how the Guide supported them in designing and implementing curricula generally felt that the design of information presented in the Guide was effective and powerpoint presentations were helpful. At the same time, they understood it would take time for them to fully develop this capability. One respondent suggested that skills at designing and implementing curricula will improve as the Guide is more widely used and knowledge on specific topic areas increases. Another respondent suggested that more information might be required because, as the Guide makes clear, achieving patient safety involves the total machinery of different disciplines, working together. Another site's faculty stated that their education methods still use a very traditional, teacher-centered approach. They would like more participation and group discussion, as recommended in the Guide, but could not achieve that during the field test because of the short time available.

Use of multi-professional teaching. The interviewees supported use of multi-professional education, but few of them reported they actually had implemented it. Most of the sites felt that the contents in the Guide on use of multi-professional teaching was a positive feature. Several stated that they planned to use it when they moved forward with use of multi-professional teaching, but that it is not easy to achieve. Given the focus of the sites on their limited use of multi-professional teaching, few of them offered specific feedback on the effectiveness of the Guide in this area.

The faculty at two sites, on the other hand, reported that, even before the Curriculum Guide, they had applied a multi-professional educational approach in teaching, which included doctors, pharmacologists and other health-care professionals. They planned to extend this multi-professional educational approach to teaching patient safety in these different settings as well.

Appropriateness of the assessment strategies

Mixed responses were obtained from the sites' faculties regarding the appropriateness of the assessment strategies presented in the Guide, given the resources and teaching environments in their countries. Several of them simply stated that they thought the assessments were useful and appropriate, and that they were linked to the curricula content, including theory and practice. Faculty at other sites expressed reservations about the assessments, while faculty at three sites said that it was too early to address assessment, which they had not yet completed.

Those who expressed reservations about the assessment strategies in the Guide offered the following are specific comments about its limitations:

- The assessment strategies provided are appropriate for our school, but may not be so in other parts of the country.
- The assessment has to be adapted by the institution to local teaching and assessment needs.
- The Guide talks about modified essay questions, the MCQ, the OSCE and the short answer types and they are appropriate for my country. However, it sometimes is difficult to arrange

a OSCE because to make an OSCE you really need to have an in depth knowledge about things.

- The assessment in this country for this particular topic could be both summative and formative. The formative assessment could be assessing the students for a few days in the clinic to see how they are actually working and how they are taking care in safety or not. The summative assessment could be a modified essay or short answer questions.
- The assessment strategies were found to be appropriate but they also formulated their own evaluation/assessment questions, incorporating some of the assessment questions from the evaluation into their examination.
- The assessment strategy in the Curriculum Guide is not very appropriate for assessing knowledge of dental students.
- The assessment strategies are not completely appropriate for one university. Most of their assessments are done by exams, although this is gradually being changed.

Students' assessments of the teaching methods

In the post-teaching survey, the students being taught patient safety topics in the Curriculum Guide were asked for their feedback on how well the topics were taught, including a total of eight dimension of teaching effectiveness. The survey results, shown in Table 3.1, reveal a generally high level of satisfaction by students regarding teaching effectiveness. Overall for the domain, 82.8% of the students gave the teaching a 4 or 5 score, averaged across the eight items in the domain.

The highest ratings were given specifically to the instructors helping understanding (85.2%) and culturally appropriate presentation (83.6%). The lowest ratings were given to assignments helped understanding (69.2%) and sufficient time for topic (70.0%), suggesting that future attention should be given to strengthening these aspects of guidance in Part A of the Guide.

Table 3.1 Percentage of Top Responses by Students Regarding the Effectiveness of Teaching the Courses in the Curriculum Guide, Post-Teaching Survey [+]

Effectiveness of Teaching	Number of Responses	Percentage of Top	95% Confidence Interval Lower	Upper
Total teaching effectiveness	495	82.8	79.5	86.2
Teaching style helped learning	785	78.2	75.3	81.1
Instructors helped understanding	783	85.2	82.7	87.7
Culturally appropriate presentation	775	83.6	81.0	86.2
Teaching aids added to session	726	76.2	73.1	79.3
Assignments helped understanding	526	69.2	65.2	73.2
Sufficient time for topic	776	70.0	66.7	73.2
Assessment methods effective	748	71.8	68.6	75.0
Appropriate time in curriculum	737	75.7	72.6	78.8

[+] Top responses = responses of either 4 or 5 on a 5-point scale

The integrity of the patient safety topics in the Guide (Part B)

Assessments from the Stakeholder Interviews

The contents of Part B of the Guide were well received by the teaching faculty at the participating universities/schools, and they actively put them to work. They were enthusiastic about the content of the Guide topics, although each of them tended to highlight different aspects of those contents. More mixed reactions were found, however, regarding the teaching tools provided in Part B. The faculties at most sites were pleased with the tools. In particular, they observed the value and importance of establishing goals and performance objectives, although some acknowledged difficulty in doing so. The two tools of greatest value to the faculties were the teaching slides and the case studies. Some suggestions were offered for improvement of these tools.

Helpfulness of the Curriculum Guide topics for teaching

The faculties and implementation leads at all the sites unanimously felt that the course content in Part B of the Guide was extremely helpful and comprehensive. Many of them also shared information about which aspects of the content stood out for them and how they used the material. A statement by one site faculty perhaps articulates these points succinctly: "If you only gave us the topics without the content, it would be more difficult for us to put the information together." On the other hand, another site stated that it is not known whether the content is helpful for people with no previous experience with patient safety.

The following are the positive features of the Part B content highlighted by respondents:

- Comprehensive content for each topic, more so than a single school could do alone;
- The Guide content allows users to think about topics in a structured manner;
- Topics were easy to deliver using curriculum as a guideline;
- The topic 11 provided by the Guide was sufficient to prepare for teaching;
- Provision of references (mostly free) and other resources for further information;
- Supplemented the Guide content with other relevant literature and their own experiences.

Helpfulness of the tools/resources provided for teaching

For each topic covered in Part B of the Guide, several tools are offered to assist in teaching of the topic. These include the learning objectives, knowledge requirements, performance requirements, and teaching slides. All but a few of the site faculties reported favorably about the tools and resources provided in Part B of the Guide. Several commented how useful it was for everyone to know exactly what the objectives were, as well as the knowledge and performance requirements, to help keep them on the same track. Several of them involved the students in working with these objectives. One respondent commented that the Part B materials provide a shortcut when you need to prepare and plan the course. Another was pleased that students can access some resources on their own.

Several of the sites commented on the teaching slides, all of them offering favorable feedback. They thought the slides were clear, explained the topics well, and were useful for students. One site stated that the teaching slides were the main teaching tools they have. Another thought the

slides were very basic but could easily be adapted, and another indicated they would modify the contents of the slides by leaving out some material or rephrasing them in a different way.

The case studies were received favorably by the teaching faculties, but they also were most subject to tailoring to the schools' specific situations. The faculties reported that the case studies provide practical clinical examples and are good for students to learn the concepts better. One site reported using local examples and case studies a great deal, reinforced by the experiences of their educators to support teaching the topics.

A few of the sites suggested that the tools relevant to specific specialties be expanded because they had to work hard to make the tools complete for their specialties. This was a particular issue for dentistry because it is so different from medicine, and it is community based, which required development of specific case studies and examples for dentistry. Two sites specifically identified the need to expand materials in infection control to emphasize hand washing and instrument sterilization. Another site expressed the need for improvement in the tools but did not provide any detail regarding the types of improvement needed.

Three sites noted that their situations limited their use of the teaching tools. Two of them reported that they still use traditional methods in teaching, which do not work with performance requirements and objectives. One indicated that they were slowly moving in a direction toward what the Guide specifies; the other did not indicate they were making such changes. The third site reported that they already had their own learning outcomes, and the assessment material in the Guide is fairly congruent with what they had in place.

Students' assessments of the topics

The students being taught patient safety topics were asked in the post-teaching survey for their feedback on the topics in the Curriculum Guide, including a total of eight dimension of the effectiveness of the topics. As shown in the survey results in Table 3.2, the students thought the contents of the patient safety topics were highly effective, with 93.3% of the students giving the topics a 4 or 5 score, averaged across the eight items in the domain. All of the individual dimensions had "top responses" of 85% or higher, indicating that the students felt the content of the teaching was relevant and useful for them and would help in their future practices.

Table 3.2 Percentage of top responses by students on perceptions of patient safety topics, post-teaching survey [+]

Effectiveness of Patient Safety Topics	Number of Responses	Percentage of Top	95% Confidence Interval Lower	Upper
Total topics effectiveness	760	93.3	91.5	95.1
Aims of topic were clear to me	795	86.9	84.6	89.3
Patient safety training in curricula	796	90.2	88.1	92.3
Improved my knowledge/skills	794	86.6	84.3	89.0
Acquired new knowledge/skills	795	88.1	85.8	90.3
Able to apply knowledge taught	794	84.6	82.1	87.1
Understand more of importance	799	89.6	87.5	91.7
More knowledge of practices	783	85.1	82.6	92.2
Training increased my motivation	779	90.1	88.0	92.2

[+] Top responses = responses of either 4 or 5 on a 5-point scale

Summary of findings: integrity of the Curriculum Guide

The stakeholders interviewed were positive, overall, regarding the effectiveness of the Curriculum Guide, and they highlighted how the Guide supported their patient safety teaching efforts. Several sites observed that the Curriculum Guide gives credibility and creates a focus on patient safety, which brings the subject to the eye of the academic community. They felt that the Guide emphasizes important patient safety topics and shows how to organize them for teaching. All the sites reported that the topics covered are important patient safety priorities in their countries, and several of them noted that the issues were universal ones for all WHO Member States.

All the sites reported that the Guide contents are culturally appropriate for their countries, including specific items such as simulations, group discussion, case studies, and role playing. Several of them also noted that they adjusted some of the contents to make them more applicable to their situations. Most of them reported that the Guide could be adapted easily when needed.

The section on supporting teaching (Part A)

The majority of the sites found the Guide was helpful or useful for supporting the teaching of patient safety and the integration of patient safety into both their curricula and day-to-day practice. One site stated that Part A is about capacity building for teaching faculty, and it was noted that the Guide gives them great potential to develop the skills and knowledge base of teaching faculty. Some sites established separate courses or modules on patient safety, at least initially; many of them had plans to eventually integrate the topics into their curricula. Others preferred to keep the patient safety courses separate to enhance their visibility.

The sites understood that it would take time to fully develop the capability to teach patient safety effectively. It was suggested that skills at designing and implementing curricula will improve as the Guide is more widely used and knowledge on specific topic areas increases. They also were aware that they might require more information because, as the Guide makes clear, achieving patient safety involves the total machinery of different disciplines, working together.

For the sites that responded more cautiously about Part A, one concern was that although the Guide gives educators some basic knowledge, further access to other resources would be required to tailor the learning to specific student groups. Another concern was that the Guide alone might not be sufficient for faculty who do not know anything about patient safety; that they need more direct exposure to information through workshops or teleconferences.

The students also reported a generally high level of satisfaction regarding teaching effectiveness at the participating universities/schools. Overall, 82.8% of the students gave the patient safety teaching a 4 or 5 score on a 5-point scale.

The Patient Safety Topics (Part B)

The patient safety topics in Part B of the Guide were well received by the participating universities/schools, and they actively put them to work. They were enthusiastic about the content of the topics, although each of them tended to highlight different aspects of those contents. More mixed reactions were found, however, regarding the teaching tools provided in

Part B. Most sites were pleased with the tools, and they observed the value and importance of establishing goals and performance objectives, although some acknowledged difficulty in doing so. The two tools of greatest value to the faculties were the teaching slides and the case studies. Some suggestions were offered for improvement of these tools.

The dentistry schools highlighted a particular issue with the suitability of the Part B contents for teaching dentistry students. Most dental students go into private practice, and dental students start practicing on patients early to develop their skills. Therefore, many safety issues in dentistry differ from those in medicine and the hospital setting, which are the focus of the Guide. The dentistry schools needed more specific patient safety examples applicable to dentistry, which they had to develop themselves.

The students taught at the participating schools were positive about the effectiveness of the contents of their courses. An overall 93.3% of the students gave the topics a 4 or 5 score for effectiveness on a 5-point scale.

4. Findings for Goal B – Impacts on Student Learning

Question: What is the impact upon student learning of the inclusion of patient safety teaching in the curriculum?

The potential impacts on student learning that were considered in this evaluation included both perceptions of the teaching faculty and results of the student surveys regarding student perceptions regarding various aspects of patient safety and their factual knowledge of patient safety issues and practices. Information on the faculty perceptions was obtained in the post-teaching interviews with them. Changes in students' perceptions and knowledge were measured by comparing responses on the student survey collected at baseline (the start of teaching) and at the end of the courses taught at the participating universities/schools.

In this section, baseline information is summarized regarding previously exposures students had to patient safety courses before this field test, and then results are reported regarding faculty perceptions of impact on students, followed by results on changes in students' patient safety perceptions and factual knowledge.

Previous exposure of students to patient safety training

When asked about the extent to which their institutions already had been teaching patient safety, only two the implementation leads reported that they had taught safety topic modules, and seven of them reported that some topics had been taught only as part of specific courses. Responses are shown in Table 4.1. One site said it taught safety only in the clinical practice phase of training, and two sites said they had not taught patient safety before becoming involved in this field test of the Curriculum guide.

Table 4.1 Previous teaching of patient safety reported by the Implementation Leads

Response	Number	Comments
Yes, courses taught	2	Being taught in undergraduate programmes using topic modules. Some topics in the Guide are being taught, including teamwork, human factors, and medication management.
Part of other courses	7	Taught in various courses, but not usually highlighted as patient safety or taught in an organized or comprehensive way as arranged in the Curriculum Guide.
In work only	1	Patient safety not taught in course curricula but is taught to students in clinical practice while working with patients.
None taught	2	Patient safety is a new subject for these schools; covered in conferences and efforts being made to increase awareness.

According to the students' responses on the pre-teaching survey, many of the participating universities/schools at which they were taught had previously taught patient safety topics in their

health curricula, as shown in Table 4.2. However, only 20.4% of the students reported that they had previously had a patient safety course. Further, the percentages of students with previous patient safety education varied across the schools, ranging from a low of 1.8% at the University of Gondar to 73.7% at the University of Athens (Table 4.2). Therefore, for many of the students, the patient safety education they received using the Curriculum Guide topics was the first time they had received focused training in these topics.

Variations in previous teaching and learning of patient safety, by WHO regions, are shown in Figure 4.1. These variations reflect the differences across participating schools reported in Table 4.1. In particular, the largest percentages of students who had previously had patient safety courses were for students in the European (44%) and Eastern Mediterranean (34%) regions.

Table 4.2 Previous experience of students with patient safety courses, total and by school, pre-teaching survey

School or Region	Patient Safety Previously Taught		Student Previously Had a Patient Safety Course	
	Number	Percentage	Number	Percentage
Total – all students (N=1,326)	927	69.4	267	20.4
By University/School:				
Cairo University	13	30.2	3	7.0
Del Salvador University	41	100.0	7	18.4
All India Institute of Medical Sciences	129	62.6	36	17.9
Jordan University of Science and Technology	165	77.5	83	39.2
National University of Mexico	193	78.8	25	10.2
United Nations University	122	58.4	29	14.0
University of Athens	40	69.0	42	73.7
University of Gondar	31	56.4	1	1.8
University of Peradeniya	18	56.3	1	2.9
University of Zimbabwe	20	58.8	4	11.4
University of the Phillipines	81	73.6	14	12.8
University of W of Scotland	74	82.2	22	25.3

Faculty perspectives regarding impacts on student learning

Although the teaching faculty were enthusiastic about the value that the Curriculum Guide offers them, they were cautious about estimating the early impacts of the Guide on the patient safety practices of the students they taught. They believed that their students' knowledge of patient safety issues and practices has grown, but many of them stated that it was too early to assess the impact of that knowledge on the students' subsequent practices.

Contribution to knowledge required by students

The teaching faculty were asked to estimate how courses based on the Curriculum Guide contributed to giving students the patient safety knowledge they need for their professional

training. The faculty at all of the sites stated clearly that the Guide offered substantial value to both educators and students at their institutions. They reported that the Guide provides very complete basic knowledge of patient safety, which is very important for students for their professional training. They also stated that the Guide contents are clear for both teaching and applying principles in clinical practice, thus providing a good approach for students to be sensitized to and learn about patient safety and to apply it later in practice.

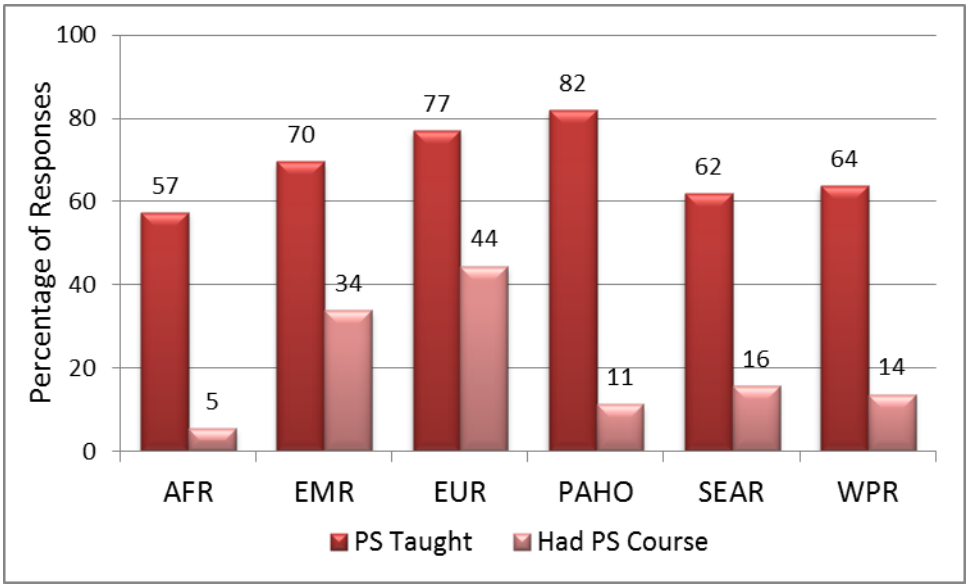

Figure 4.1 Previous experience of students with patient safety courses, by WHO region, pre-teaching survey

The Guide uses common terms in promoting patient safety, such as handoff, callout, safe surgical checklists and etc., which will contribute to their future professional practice, whether they are going to practice locally or abroad. One faculty member noted that the topics in the Guide broaden students' knowledge to recognize that any single issue (e.g., medication safety) is just one part of a more comprehensive patient safety, extending their overall knowledge on these issues.

The faculty reported that their students' believed that they received a very high-value package because no one has ever taught them like that before, e.g., no one had ever mentioned that things can go wrong, what to do when things go wrong, and how are you going to manage it if things go wrong. The students also better understood the importance of incidence reporting after the course, which they had not realized previously due to a "blame culture."

Impacts on current student safety performance

About half of the faculty at the sites reported that they could not yet make any judgment on the impact of the patient safety courses on their students' clinical performance, because at the time of the interviews, it was still too early to tell. They readily reported that students' knowledge of patient safety had been developed, but faculty at some sites did not know whether this knowledge had indeed led to proper patient safety practices in the clinical setting. Faculty at one

site was confident that, with more use of the whole contents of the Guide, and more time to teach it in an organized way, there would be an impact on students subsequent practices.

Faculty at some sites were confident that their students had learned what actions were needed to prevent errors in specific patient safety areas (e.g., hand hygiene, medication safety). Two sites indicated that the training had influenced their students' patient safety skills, which they observed in assessments in clinical practice. One of these sites reported that their students in the operating room were more conscious of patient safety, and they depended on their teachers to check them, as well as checking themselves on patient safety performance.

Perceptions of students on patient safety domains

Substantial and statistically significant changes were observed in the perceptions and attitudes of students regarding patient safety, from baseline to post-teaching of the Curriculum Guide topics. For both the pre-teaching and post-teaching surveys, mean values for the "top responses" by students were calculated for each of the four domains: patient safety knowledge, health-care system safety, personal influence over safety, and personal attitudes of safety. Mean values for each of the items within each domain also were calculated and compared. The statistical significance of differences in all of the means for all of these measures were tested. [2]

For the first of the four domains – knowledge of patient safety – students were asked to score their level of knowledge for each of seven items, using a 5-point scale. Large increases were found in the percentage of students who estimated their knowledge at a 4 or 5 of this scale. For the domain overall, the percentage of students giving these top responses increased from 19.2% to 56.3%, as shown in Table 4.3. Large increases also were found for each of the seven items comprising the domain. All of these increases were significant at a level of $p < 0.001$.

Table 4.3 Percentage of top responses by students on their knowledge of patient safety, pre and post teaching [+]

Patient Safety Knowledge Domain	Pre-Teaching		Post-Teaching	
	Percentage	Std Dev	Percentage	Std Dev
Total knowledge domain	19.2 ***	39.4	56.3 ***	49.6
Types of error in health care	20.3 ***	40.3	51.1 ***	50.0
Factors contributing to error	28.9 ***	45.3	57.2 ***	49.5
Factors influencing patient safety	35.4 ***	47.8	62.5 ***	48.4
Ways to speak up about error	19.1 ***	39.2	47.1 ***	49.9
What should do if error made	27.0 ***	44.4	57.1 ***	49.5
How to report an error	21.4 ***	41.0	49.2 ***	50.0
Role of organization in reporting	23.8 ***	42.6	52.5 ***	50.0

[+] Top responses = responses of either 4 or 5 on a 5-point scale

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

[2] For a few of the measures, the significance of pre-post differences in scores differed for the top responses versus original 5-point scales, which reflected the distributions of responses. In some cases, changes in perceptions appeared to be larger at the lower values of the 5-point scale (a phenomenon of bringing up the bottom scores). These differences, however, did not affect the overall evaluation results.

For the second domain – health-care system safety – students were asked to score their level of agreement with each of five statements, using a 5-point scale. For the domain overall, the percentage of students giving these top responses increased substantially from 28.0% to 41.0% ($p < 0.001$), as shown in Table 4.4. Statistically significant increases ($p < 0.001$) also were found for three of the five statements comprising the domain. The two statements for which significant changes were not found were "it is unusual to give patients wrong drugs" and "staff get patient safety training".

Table 4.4 Percentage of top responses by students on the safety of the health-care system, pre and post teaching [+]

Health-care System Safety	Pre-Teaching		Post-Teaching	
	Percentage	Std Dev	Percentage	Std Dev
Total system safety domain	28.0 ***	44.9	41.0 ***	51.8
Health-care workers make errors	41.9 ***	49.4	56.4 ***	49.6
My country has safe health system	37.7 ***	48.5	45.0 ***	49.8
Medical error is common	48.3 ***	48.5	56.6 ***	49.6
Unusual give patients wrong drug	35.8	48.0	37.2	48.4
Staff get patient safety training	56.4	49.6	59.8	51.8

[+] Top responses = responses of either 4 or 5 on a 5-point scale

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

For the third domain – personal influence over safety – students were asked to score their level of agreement with each of seven statements, using a 5-point scale. For the domain overall, the percentage of students giving these top responses increased substantially from 28.0% to 55.9% ($p < 0.001$), as shown in Table 4.5. Statistically significant increases ($p < 0.001$) also were found for six of the seven statements comprising the domain, but the sizes of increases and their levels of significance varied across the statements, ranging from $p < 0.05$ to $p < 0.001$. The statement for which a significant increase was not found was "it is easier to find someone to blame."

Table 4.5 Percentage of top responses by students on their personal influence over safety, pre and post teaching [+]

Personal Influence Over Safety Domain	Pre-Teaching		Post-Teaching	
	Percentage	Std Dev	Percentage	Std Dev
Total personal influence domain	38.0 ***	48.6	55.9 ***	49.7
Easy to tell others of my error	42.3 **	49.4	49.0 **	50.0
Easier to find someone to blame	34.1	47.4	38.1	48.6
Confident to speak to someone	50.5 ***	50.0	61.5 ***	48.7
Know talk to people who erred	39.8 ***	49.0	57.4 ***	49.5
Able to ensure safety is good	45.4 ***	49.8	55.8 ***	49.7
Believe reporting will help safety	75.8 *	42.8	80.0 *	40.0
Able to talk about own errors	68.8 ***	46.3	77.1 ***	42.0

[+] Top responses = responses of either 4 or 5 on a 5-point scale

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

For the fourth domain – personal attitudes of safety – students were asked to score their level of agreement with each of four statements, using a 5-point scale. For the domain overall, a large 93.9% of students gave these top responses baseline, and the percentage did not increase significantly in the post-teaching survey, as shown in Table 4.6. Although significant increases were found for three of the individual statements ($p < 0.01$), those increases were small in size.

Table 4.6 Percentage of top responses by students on personal attitudes of safety, pre and post teaching [+]

Personal Attitudes of Safety	Pre-Teaching		Post-Teaching	
	Percentage	Std Dev	Percentage	Std Dev
Total attitudes of safety domain	93.9	23.9	95.3	21.2
Can contribute by knowing causes	84.0 **	36.7	88.0 **	32.5
Learn from mistakes to improve	87.0 **	33.6	89.5 **	30.6
Deal with my errors part of job	88.3 **	32.1	92.1 **	26.9
Learn to deal with errors in training	90.7	29.0	92.6	26.2

[+] Top responses = responses of either 4 or 5 on a 5-point scale

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Changes in students' knowledge regarding patient safety

The results of the analysis of changes in students' knowledge of patient safety issues and practices are summarized in Table 4.7. These include changes in knowledge for each patient safety topic taught and overall changes for all the topics that students at each school were taught (i.e., those for which they were tested in the survey). In general, the percentage of questions that students answered correctly were quite low in the pre-teaching survey, which is consistent with feedback received from the participating universities/schools that the knowledge questions were quite difficult.

Despite the difficulty of the questions, the results show clear increases in patient safety knowledge by the students. The percentage of correct answers doubled overall (from 10.7% to 20.8%) between the pre-teaching and post-teaching surveys, and even larger increases were found for some of the specific patient safety topics. As highlighted with light shading in the table, students had the largest improvement in knowledge for the two topics of *infection control* (from 11.9% to 46.9% correct) and *invasive procedures* (from 15.6% to 38.1% correct).

In contrast, student knowledge appeared to decline between the pre-teaching and post-teaching surveys for the topic *Learning from error* (from 12.1% to 7.1% correct), which is highlighted in a darker shade in Table 4.7. It is noted that no data were available for Quality Improvement Methods (Topic 7) because it was not taught at any of the participating schools.

Summary of findings: impacts on student learning

The teaching faculty in the participating universities/schools were cautiously optimistic that the courses taught using the Curriculum Guide had positive effects on their students' patient safety knowledge, which students would put to work in their clinical practices. The results of the student surveys, highlighted below, corroborate these perceptions by offering strong evidence

that the teaching of patient safety topics had clear and strong effects on both the perceptions and attitudes of students about patient safety and their knowledge of relevant issues and practices.

- At baseline, only small percentages of the students had any previous courses in patient safety, which is reflected in their self-reported estimates of their knowledge as well as their generally low scores on the knowledge questions in the pre-teaching survey.
- Students also tended to have low to moderate perceptions of the safety of the health-care system at baseline, and in their ability to influence safety, although they tended to rate highly their personal attitudes about safety.
- The ratings given by students for three of the four perception/attitudes domains increased substantially in the post-teaching survey. The lack of change in the personal attitudes domain is likely because these ratings had little space to increase further because they already were high at baseline.
- It is also clear that the students' knowledge of patient safety improved substantially by the time their courses were completed, which coupled with their perception/attitude changes, indicates that the students' had beneficial experiences with the courses based on the Curriculum Guide.

As the teaching faculty cautioned in their interviews, however, it was too early at the end of the courses to estimate how much effect this training would have on subsequent clinical practices of these students. This impact must await additional assessment at a more distant time, after the students complete their training and enter the workplace as health-care professionals.

Table 4.7 Differences in students' knowledge of patient safety, before and after teaching

Topic	Pre-Teaching Correct Answers				Post-Teaching Correct Answers			
		Mean	95% Confidence Interval			Mean	95% Confidence Interval	
	Number	Percent +	Lower	Upper	Number	Percent +	Lower	Upper
1. Patient Safety *	508	11.5	9.6	13.5	424	22.4	19.7	25.1
2. Human Factors *	45	1.5	-0.6	3.6	116	9.2	5.9	12.5
3. Systems Effects *	37	5.4	-0.2	11.0	19	29.8	13.0	46. 7
4. Teamwork *	324	10.2	8.2	12.2	176	20.6	17.1	24.2
5. Learn from Error *	226	12.1	9.6	14.6	156	7.1	4.6	9.5
6. Clinical Risk	138	30.0	28.0	31.9	131	27.7	25.6	29.9
7. QI Methods		NA				NA		
8. Engage Patients *	103	0.5	-0.5	1.5	74	10.1	4.4	15.9
9. Infection Control *	268	11.9	9.4	14.4	179	46.9	42.2	51.6
10. Invasive Procedures *	307	15.6	12.7	18.5	231	38.1	33.4	42.8
11. Medication Safety *	325	7.7	6.1	9.3	290	14.1	12.1	16.0
All possible answers *	1,074	10.7	9.8	11.6	904	20.8	19.4	22.3

+ The mean percent is the mean of the percentage of possible answers that each student answered correctly, measured for each topic in the Curriculum Guide and overall for all possible topics (those taught by each school).

* Statistically significance difference (at $p < 0.05$ level) in mean percent correct answers between pre-teaching and post-teaching student surveys, as measured by comparisons of the 95% confidence interval thresholds. Improvement is significant when the lower threshold for post-teaching survey is higher than the upper threshold for the pre-teaching survey (i.e., the two confidence interval do not overlap).

Note: Two topics – *infection control* and *invasive procedures* – are highlighted in light shade because they have the largest improvement in student knowledge between the pre-teaching and post-teaching surveys. One topic – *learn from error* – is highlighted in a darker shade because student knowledge declined significantly from the pre-teaching and post-teaching surveys.

5. Findings: Goal C Support Global Implementation of Patient Safety Education

Question: In what ways can this Curriculum Guide be used to support the widespread implementation of explicit patient safety education globally?

The implementation leads and teaching faculty at the participating universities/schools provided feedback about their experiences working with the Curriculum Guide, how they changed their approaches based on those experiences, and their thoughts regarding how use of the Guide could be expanded to reach other health-related organizations. These interview responses generated valuable information that WHO can use for future expansion of patient safety education and use of the Guide to support organizations' teaching activities.

Importance as an educational investment

When examining the value of an investment, it is necessary to look at both the benefits reaped and the costs required to yield those benefits. According to the majority of the executives and implementation leads at the sites, use of the Curriculum Guide yielded several benefits, and they anticipate benefits to expand as they expand the number of topics they teach. Benefits cited included expansion of patient safety knowledge for students and educators, motivation of health-care providers to care about safety in their work, and production of more knowledgeable graduates who deliver excellent health care. As one school executive stated, "With proper training, the academics will be equipped with standardized knowledge to teach the students based on the information provided in the Guide."

Perhaps the sentiment of the sites is best captured by one of the implementation leads who stated that "… the reason of our profession is to provide safe care to patients." Another noted that "As a patient of the future I expect that the health-care professional who is going to be looking after me will be well aware of patient safety issues."

On the cost side, several sites stated that teaching the topics in the Guide requires limited resources for teaching faculty time, students' time, and some supplies. The curriculum is already provided by the Guide, and most of teaching materials are online and downloadable.

Experiences in implementing the guide

The sites were asked about a variety of aspects of their experiences in implementing use of the Guide to teach patient safety to their students. The information they provided offers insights that can be used by other organizations globally to expand patient safety education with the support of the Curriculum Guide. A clear example of the potential for growth in patient safety education were the responses that highlighted that many of the institutions had given a low priority to patient safety before being introduced to the Guide, which quickly became stronger as they started to work with the guide.

Getting started

Making the decision to teach the topics

The sites used a variety of decision-making processes regarding whether to use the Guide and the choice of topics to be taught. Several sites stated that the topics and timings for teaching were chosen to match them with existing curricula. They saw the Guide as complementary to their continuous programmes. In some sites, such well developed, structured, patient safety programmes are new for the department and the university.

These decision processes shared some common features, in that agreements were forged among deans, implementation leads, and the faculty members who would be teaching the patient safety topics. However, the nature of involvement of each of these parties varied across sites. At some sites, the Dean made decisions and then persuaded or informed faculty; at others, the decisions were in the hands of the faculty with review and approval by their Deans or other higher authorities. At one site, the implementation lead submitted a proposal for an internal grant to introduce Patient Safety as a core value of the clinical training the school offers, which was funded.

Several sites highlighted that, regardless of how these decisions were made, it was important for the Dean to trust and approve use of the Guide, and also to make the Guide more visible by sharing information on how well it is working. One site stated explicitly that an important role of school leadership is to help make known the success of implementing the Guide and to distribute the Guide throughout the school. In addition, successful teaching the patient safety curriculum by an influential member of faculty can make later success more possible.

Several of the sites made a point to share information with their students about the patient safety teaching and the Guide. Broad announcements and notices on the website for the students were used to disseminate the information. One site sought and received their students' agreement to participate in the field test. The higher level students are an important audience because the patient safety training will help them be more employable, so they are very willing to learn.

Obtaining agreements and approval to teach the topics

Most of the sites had formal approval structures in place through which this new patient safety curriculum had to be processed, but the specifics of these structures and processes differed widely. Although the processes inevitably took some weeks of time, most of the sites also reported that it was not difficult to get the needed approvals from the institutions.

Based on reports from the implementation leads, it appears that approvals tended to be easy to obtain because the institutions saw the importance of adding or strengthening patient safety in their curricula. There also was a lot of enthusiasm among their teaching faculties, although there was some tension related to added workload for the faculty members who already had a full load of courses to teach. A minority of the sites reported that they did not need to get approvals, or they used a loose arrangement.

Some observations relevant to the specific specialties were made by the implementation leads. In dentistry, the concept of patient safety is still quite new and education on safety had been very limited previously. In addition, most of the faculty at some dental schools are private practitioners, and it was difficult to get them on board. On the other hand, the leaders and clinical coordinators were enthused about introducing patient safety, in part because it extended existing

experience and teaching on infection control issues. In addition, dental students had a positive attitude about the patient safety topics.

One site reported that they had two different experiences with nursing and pharmacy. The nursing department was very enthusiastic about participating, but the pharmacy department initially was reluctant to become involved, citing workload challenges for faculty and students. After a series of discussions, pharmacy eventually did agree to teach the topics.

Priority given to teaching patient safety topics

All of the institutional executives and implementation leads said that they placed a high priority on implementing use of the Curriculum Guide to teach patient safety, and on participating in the field test. Along with this was support from faculty organizations, who also saw the importance of introducing the curriculum. Some expressed disappointment that the timing of the field test prevented them from teaching all the topics, and many of them plan to do so later as time permits.

The faculty responses about the priority given to teaching patient safety with the Guide varied from clear high priority to limited priority. Some faculty focused on how the introduction of the Guide increased their awareness and learning about patient safety, thereby growing into a high priority for the institution. These responses are summarized below.

Clear statement of high priority. The faculty at eight of the sites reported that their institution considered the teaching of patient safety and use of the Guide to be a high priority. Some sites stated that they had early strong support for this work, with recognition that it is important to sensitize health-care workers to patient safety, and one site reported they had a gap in the existing curricula that the patient safety curriculum filled.

Learning from the Guide and becoming aware. The authorities at one of the schools were very supportive with the patient safety teaching, but the faculty at this site reported that they are just beginning to teach the Guide. Although the faculty are very interested, they do not yet know about the Guide well, and the site is in the process of educating them about the Guide.

The faculty at another site reported that the health-care providers and university faculty have historical interest in patient safety, and the introduction of the Guide provided a structured approach and identified some areas where they lacked information. They felt that when the faculty and authorities started to discuss the Guide, the greatest impact was their recognition that they needed to commit to a culture of safety, which had not been structured previously.

At a third site, it was reported that senior staff appreciate the importance of patient safety and already are teaching it in other health-care disciplines. With introduction to the Guide, however, they found that it was important to change the way they teach patient safety, and the Guide assisted in the change by helping them integrate patient safety courses into the curricula.

Limited priority. The faculty at two sites indicated that, although there was some support for teaching patient safety from the senior leaders, it tended to be limited or passive. At one of these sites, the teaching faculty were authorized to teach using the Guide, but there were no expectations for performance or active follow-up to check on progress. At another site, the faculty reported good support and moderate action to increase attention to patient safety.

Faculty responses to the field test of the Guide

Virtually all of the faculty and implementation leads at the sites reported that their faculty were enthusiastic about the Guide and the patient safety topics it contains. Several of the sites indicated that their faculty were very supportive of teaching patient safety using the Guide, and that they thought teaching it was a good idea. Some of the sites also noted the value of the structured materials in the Guide, which helps them address the full scope of what is involved in patient safety.

The faculty at two sites offered more restrained feedback, in large part because they had begun their work with the Guide on a small scale, and many of their other faculty members are not yet familiar with it. One of these sites indicated that there was no negative response from their other faculty, just lack of familiarity. The other site was confident that more of its faculty will teach with the Guide in the future, once they have the time to learn more about it.

Topics selected to teach

Several of the participating universities/schools reported that they chose to use the Curriculum Guide because it was a product from WHO that is seen as valid and having prominence. They varied in which topics they chose to teach for the field test of the Guide. As shown in Table 5.1, all of the topics were selected by at least one school. Only one school chose to teach Topic 7. By contrast, many schools taught Topics 1, 4, 9, 10 and 11. All of the sites chose Topic 1, which had been recommended by WHO, and eight of them chose Topic 4, which WHO also had recommended.

Table 5.1 Number of Participating Universities/Schools That Taught Each Topic

Topic	Title	Number of Sites
1	What is patient safety?	12
2	Why applying human factors is important for patient safety	3
3	Understanding systems and the effect of complexity on patient care	1
4	Being an effective team player	8
5	Learning from errors to prevent harm	4
6	Understanding and managing clinical risk	4
7	Using quality-improvement methods to improve care	1
8	Engaging with patients and caregivers	2
9	Infection prevention and control	7
10	Patient safety and invasive procedures	6
11	Improving medication safety	8

The implementation leads and executives reported that the topics they chose were based on relevancy to the needs of their students and the capabilities of the schools. In many cases, relevancy involved the need for some basic education on patient safety, along with topics that are important for delivery of clinical care to patients. Choices also considered the appropriateness of

patient safety topics for each level of training for students, as well as what already was being taught to build upon it. Further, three of the sites reported that they eventually plan to teach all of the topics.

Three sites later dropped one or two of the courses they originally had selected. Reasons for doing this included workload demands, unavailability of faculty to teach them, required for training faculty who were not familiar with patient safety topics and issues, and problems with timing of the field study relative to their school year.

Integration into clinical curricula

In implementing the Curriculum Guide, the sites had to decide whether to integrate patient safety teaching within their existing curricula or to teach it separately. The sites tended to consider one or more of the following factors in their choices of when and how to include patient safety training in their curricula:

- What is taught already by the educators who are teaching patient safety, and in which particular fields they specialize, recognizing that the patient safety problems are different according to discipline;
- The nature of the topics in existing curricula, for example including teaching of medication safety in the curriculum for medication;
- The level of learning of the students, such as first year versus fourth year students receiving different topics for patient safety training or different ways of teaching it.

Use of local experiences or materials in teaching the topics

The faculty at seven sites reported that they used local examples, case studies, or other local experiences as they taught the topics in the Guide. They varied in how they used local material, however, with some sites simply adding local cases, personal stories, or experiences to their lectures, while others used more highly structured approaches. For example, the faculty at one site stated that they included slides in their lectures showing real-life scenarios and they also conducted simulation and role-playing using cases based on local examples.

At another site, which teaches dental students, the faculty added local examples on safe prescription relevant to dentistry, which is an important issue because medications prescribed in dentistry are mostly over-the-counter drugs. They also have plans to implement a system for students to report adverse events.

Two sites reported not adding local examples or cases, for two distinct reasons. One of them reported that they used scenarios presented in the Guide, which were appropriate for the topics they were teaching. The other site said that they did not have time to add local examples in this first round of teaching from the Guide, but they plan to do so the next time they teach these patient safety topics.

Assessment of students' learning

The responses of the faculty at the sites revealed a variety of approaches to assessing learning, including administration of tests, qualitative assessment methods, and combinations of methods. One site reported they could not answer this question because they had not yet done the

assessment, and another site stated simply that they tested the students with no further explanation.

Three sites reported that they used pre-post tests, and two of them said they used the student questionnaires from the WHO evaluation. Both of the latter sites indicated that they planned to expand their assessment methods in future courses, when they have more time to prepare them.

One site reported that a student assessment took place after each topic was finished. They indicated that they did not use the responses from the assessment towards grading the student in the school's exams.

The faculty at another site reported that they already had included patient safety in their performance evaluation tools before introducing the Guide to their curriculum. Therefore, they did not see the need to develop new assessment tools, but they did add questions in the theory part from the Guide topics.

At four sites, the faculty used qualitative, interactive methods to assess students' understanding of patient safety. One site used on-line discussion forums and group work. At another site, the faculty asked the students a few questions after the lecture, and then did a full assessment together with the integrated courses. At a third site, the faculty assessed the students after each topic by asking them questions and engaging them in interactive discussion. The faculty at a fourth site said they assessed the students informally during the lecture to see what they learned and how they comprehended the material.

Faculty at the remaining three sites reported that they used combinations of methods to assess the patient safety knowledge, skills, and practices of their students. Two of the sites used a examinations to check students' knowledge, use of skills checklists to check students' skills, and performance evaluations in clinical areas. The third site used a combination of simulation-based exercises and small group discussions with the students, with a focus on assessing how well they were sensitized to this patient safety teaching and new knowledge.

Successes and Challenges

Greatest successes. The faculty at the sites identified many different items as their greatest successes, chief among them being the very positive reception from their students to the patient safety training and the substantial benefits the students received from it. Other successes identified involved aspects of the Guide contents itself, impacts on educators, and impacts on health-care practitioners.

Successes related to the Guide contents

- Helpfulness of the topics in the Guide to define the scope of patient safety;
- Ability to apply the Guide to all levels of students, with adaptations for each level;
- Effectiveness of Topic 4 on "Being an effective team player" to empower students to see that they could make a significant difference in tackling unsafe care;
- The novelty of the patient safety topics, which made them successful.

Successes related to teaching patient safety

- Support from authorities for incorporating patient safety into our curricula;

- Enthusiasm and active participation by faculty members in preparation for teaching, with many of them attending the workshops to introduce the Guide and participating in the implementation;
- Greater awareness and interest in patient safety among educators, leading to greater discussion about patient safety issues and practices;
- Achieving an emphasis on a "system" approach to teaching, which helped the students to understand a culture that views safety as a system issue, making them very proactive;
- Working effectively as a team to create a great learning experience;
- Introduction of the logbook;
- Decision to expand to teach all eleven topics.

Successes related to students' experiences

- Increased thinking by students about ethical issues in treatment and research;
- Students enjoyment in learning patient safety and desire to engage with it
- Greater appreciation by students that patient safety is an important issue, and that all health professionals have to be aware of the mistakes they can make;
- Realization by students of their vital role in patient safety;
- Ability of students to integrate what they learned about patient safety into practice;
- Requests by the students for more information and materials about these topics, especially the students in the advanced level who will be moving into clinical practice.

Successes related to health-care safety practices

- Sensitization of health-care workers towards patient safety;
- Greater awareness and openness toward error reporting for health-care workers and students;
- Initiation by the Nursing Service Department at one hospital of a patient safety program among its administrators, and asking students to check nurses periodically on how well they performed from a patient safety perspective.

Greatest challenges. None of the sites identified challenges in the contents of the Guide itself. The challenges they reported related to their processes of implementing the training as part of their curricula, and the faculty at three sites reported that they had experienced no challenges.

The faculty at four sites noted that the short timeframe of the Guide field test was a challenge because it required them to prepare quickly to teach. One site had to start teaching the topics at the end of the semester, which was difficult for both faculty and students. Another site noted that having to adjust the curriculum to fit in the patient safety topics increased work for the faculty.

The remainder of the challenges related to the difficulty of changing culture to be patient safety oriented, lack of knowledge of faculty members about patient safety, issues related to designing and implementing the teaching, student reactions, and achieving sustainability of what the students learned.

- ***Changing culture***. The faculty and implementation leads at two sites commented on this issue. They said that changing old attitudes to a more patient-safety oriented mind set was a challenge for them. One site noted in particular that it had an immature culture of patient safety that lacked focus on integrating effective communication, teamwork, and reporting errors into clinical practice.
- ***Faculty knowledge of patient safety***. Four sites commented on this issue, all of which had had educators and health-care professionals with little or no knowledge of patient safety and its importance. This required them to conduct training for the faculty before they could proceed with teaching the patient safety topics in the Guide. This challenge also will affect their future ability to expand the topics taught.
- ***Designing and implementing teaching***. Three types of challenges were identified by the sites related to preparing to teach the patient safety courses. One was the need to train educators on how to teach patient safety, and a second one was difficulty in incorporating patient safety topics into pre-existing curricula that already were full. This led some sites to a strategy in which they selected the most important topics in the Guide first with plans to incorporate the rest of the topics over time. The third challenge was the need to make the patient safety training pertinent to the students by using carefully selected case studies and materials to highlight real working examples from local practice areas.

  Many of the implementation leads highlighted the importance of the issue of competing workloads. This issue affected the initial introduction of the courses and sites report that it will continue to be a challenge in the future as they expand the number of topics they teach.
- ***Student reactions***. One site noted that its students were not prepared and did not understand why they were teaching patient safety; some were even reluctant to participate. Another site had problems retaining student interest in the patient safety topics.
- ***Sustainability of students' knowledge***. One site reported that they received feedback from students that after their patient safety training, the students expected to practice it in clinical settings, but they found that other health-care professionals failed to use proper patient safety practices. Thus, the faculty had the challenge to clarify to students the safety standards that they should follow, regardless of what else they might observe.

Changes made to address implementation issues

The faculty and implementation leads at the participating schools provided similar feedback regarding changes they made during implementation of the courses. Faculty at five of the sites reported that they did not make any changes to the topics in the Guide. One of them stated explicitly that the material in the Guide fitted fairly well within its learning outcomes for existing courses, and this also was implicit in the statements made by the others. One site did not answer this question because they were still too early in implementing their teaching using the Guide.

The remaining seven sites all stated that they had added local examples and learning experiences to increase interest for the students and help them remember what they learned. Some of these sites identified the following additional changes made.

- Selected a subset of topics that could be done in courses at this time, leaving others for adding later when they could be fit into the available time;
- Changed the approach to using the logbook;

- Made some changes to the dentistry curriculum;
- Expanded on particular areas and used some additional resources;
- Made new slides.

One of the implementation leads noted that in the future, they probably will not change the training, but rather will change the policies of the institution. This will become more possible when they have more time to plan and to change the institution's culture of patient safety. These policy changes will be made parallel with issues related to patient rights and institutional policies for dealing with patients.

Future plans for teaching approach

The faculty at the sites were quite thoughtful about their future plans for teaching patient safety, reflecting their recent experiences with using the Guide for teaching. In particular, one site focused on the desire to raise awareness about patient safety among authorities and faculty and to move toward a culture of patient safety. They noted that their faculty needs to know about patient safety and be able to teach it, which will be a big challenge because they have 500 faculty teaching in their clinics.

At another site, the faculty stated that both medical and nursing students should learn about patient safety before they go into their practice. The topics should be included in subjects from the very beginning of their career and continue when they work as professionals in practice.

Consistent with responses to other questions in the interviews, the faculty at several sites stated, in a variety of ways, that they would make more use of local case studies, real-life settings, group discussions, and simulations in future teaching of patient safety using the Guide. Some of these noted that such local adaptations were especially useful for the clinical topics, to make them relevant to local practices.

The faculty at several sites noted that they were satisfied with the topics and contents provided in the Guide, and that they planned to expand their use of these materials is a variety of ways, as summarized in the following items.

- Integrate all eleven topics from the Guide in the curricula and create time in the teaching schedule to be able to fit them in appropriately.
- Teach some topics in clinical settings with clinical teachers in hospitals teaching some topics, students can learn about clinical risks and patient safety from the real practice.
- Have a workshop for some topics, especially the ones that are better suited for the 4th year level students and possibly the clinical students.
- Adopt a problem based learning approach using the material in the Guide along with more discussion/reflection, which was particularly positive in some of the topic areas.
- Supplement the contents of the Guide with teaching materials relevant to dentistry, especially infection control.
- Learn more about students' feedback and assess what they have gained from these courses, especially after they finish teaching all topics.

The faculty at two sites did not offer any ideas about future changes to the way they would use the Guide for teaching patient safety. However, one of them stated that they will continue

teaching the topics, and the other noted that the topics in the Guide were very useful and the Guide is important to the university.

Possible future use of the guide in different environments

The implementation leads and teaching faculty at the sites were asked for their thoughts about how the Curriculum Guide has influenced their patient safety capacity, as well as their ideas about what additional capacity they would like to add for patient safety education within their own institutions, beyond what they have done thus far in the field test. In addition, they were asked how use of the Guide might be extended beyond their institutions to other organization, and they were asked to share any advice they might have for others embarking on teaching patient safety using the Guide.

Effects on the institutions' patient safety capacity

Before participating in the field test of the Curriculum Guide, almost all of the sites had only taught patient safety in limited ways, largely by incorporating specific issues into other curricula. They had not had a comprehensive approach for teaching these topics. This changed with the availability of the Guide, which enabled them to highlight patient safety and to use a more structured approach to teaching it.

Prior to having the Guide available, the sites reported that, in general, patient safety topics were taught in either a fragmented or limited way. At many sites, patient safety topics were part of other modules, with only limited time dedicated to them. Some sites indicated that they taught some of the topics (e.g., infection control, medication safety, patient falls), but they were not identified explicitly as patient safety issues.

All of the sites stated that, with the availability of the Guide, they have been able to highlight patient safety more readily. Along with this visibility, they have been able to take a more comprehensive and structured approach to teaching the patient safety topics included in the Guide. One site noted that use of the tools given in the Guide helped their students to better understand the topics and issues. Many of them cautioned, however, that their work has just begun and full integration of a large number of patient safety topics is still a work in progress.

Additional patient safety capacity desired

The participating universities/schools reported a variety of goals for expansion of patient safety education using the Guide within their universities. These goals tended to reflect their current level of maturity in teaching these topics for their students. For example, two sites had just started teaching patient safety with use of the Guide, and they hoped for continued support from their institutions to continue teaching these topics. A third site reported that it was in a transition period as it moved toward a new curriculum, and they were pleased to have the Guide in hand ready to include patient safety in those changes.

The remainder of the sites had made some progress in their recent work with the Guide, and they identified the following ideas as ways they thought they could build on those achievements:

- Include more patient safety topics into the curricula of Nursing and Medical Schools.
- Strengthen and adapt the curricula to be more applicable for the dentistry schools.

- Have a champion for patient safety who should try to include these topics in the curriculum, review it, and move it forward. This champion must be convinced about the importance of patient safety and able to act as an advocate for it.
- Strengthen patient safety culture by including other colleges or disciplines in patient safety teaching.
- Reach more educators with the Guide contents to increase their knowledge on patient safety and their involvement in teaching patient safety to their students, so that patient safety becomes an important part of all curricula.
- Provide more training programs and seminars for teaching faculty on patient safety issues, methods for teaching it, and quality improvement, to expand the number of trained faculty, including use of a 'Train-the-Trainers' approach.
- Increase involvement of the university authorities in patient safety training and issues.
- Extend the patient safety training to managers and to clinicians in non-hospital settings.
- Provide updates to the Guide to keep schools informed on changes in patient safety, which schools can on a webpage for both faculty and students to access.

Other potential uses of the Guide

When the participating universities/schools were asked their views regarding how use of the Guide could be expanded by introducing it to other organizations, it was clear from their responses that they already had thought about such expansion. In fact, several of them had begun outreach to share their experiences with other organizations and encourage them to use the Guide to teach patient safety. Their responses indicate that they are concerned about lack of knowledge of patient safety in health-care organizations, and they see a strong need to improve the safety of their health-care practices. The following items summarize the ideas for expansion that they identified.

- Expand training about patient safety to other teaching faculties within each university.
- Offer continuing professional development modules on patient safety to health practitioners.
- University faculty give lectures and seminars on patient safety to other organizations and people in the community.
- Spread the education on patient safety to in-service health professionals across each country in which an institution is located, bringing it to hospitals, clinics, and other settings, via collaborative efforts between universities and professional organizations.
- Conduct seminars, workshops and professional conferences on the Guide with other organizations that train health-care professionals, to disseminate patient safety training to other health professionals, including those who already are working.
- Involvement by faculty members in community activities or health services for the general public, sharing patient safety topics with the public.
- Incorporate the contents of the Guide into intranet/internet sites operated by organizations or health authorities, to provide on-line refreshers for clinical staff.
- Educate patients and their families/caregivers, as well as patient organizations or support groups, on patient safety, using an adaptation of the contents of the Guide to target this audience.

Advice to other institutions for use of the Curriculum Guide

The participating universities/schools offered a range of advice for other institutions regarding teaching patient safety using the Curriculum Guide. Perhaps the strongest advice was that every clinical school (medical, dental, nursing and pharmacy) should include patient safety teaching in their curricula, and many of them emphasized that it should be integrated into their other clinical courses (rather than taught separately). In this context, they supported use of the WHO Curriculum Guide to develop and implement these trainings.

One site specifically stated that patient safety training should be given to students at the interface of pre-clinical and clinical training, shortly before the students go into the clinical setting, so they are exposed to patient safety materials before they go to practice. Another site suggested that these patient safety courses should be mandatory for everyone coming for an ethics examination at the undergraduate or postgraduate level.

The sites offered the following specific advice for use of the Guide in patient safety training:

- A school should use the material offered in the Guide to support its patient safety training because the Guide addresses the key points in patient safety in most WHO Member States.
- When starting out, a school should first conduct an orientation and training on the Guide, so they have the information needed to know how to integrate patient safety topics into their curricula, and to develop their instructional design.
- Have a patient safety champion who is in charge of the training, to ensure it is being implemented effectively, and who also will actively promote patient safety in the country.
- Strive to create a patient safety culture throughout the organization.
- Make the training pertinent to the student audience; use real examples to keep it relevant, interesting and meaningful, to hold their engagement in the training.
- Use an inter-professional approach to teaching patient safety.
- In training the faculty, use a format that allows faculty to share experiences and discuss new ideas, to strengthen their skills and confidence levels.
- Networking is important.

One site highlighted that it is important to follow up with the training, so students hear it emphasized again and again throughout the year and in their various courses. They stated that this is necessary to help students learn the topics and issues better. Another site stated that, as well as conducting patient safety training, reporting of incidents should be mandatory.

One of the sites (a dental school) was preparing to take on a proactive role in disseminating the message about the Guide and the importance of teaching patient safety, and is developing the leadership and structure to support this role. As part of this work, they plan to shape some recommendations for all dental schools which are interested in using the Guide. They also plan to deliver invited lectures at other schools, continue training for faculty and create a Train-the-Trainer programme. They will share their experiences, training materials and case studies with institutions which are interested in using the Guide, including arranging of workshops for interested institutions.

Summary of findings: implementation experiences

The experiences of the participating universities/schools in implementing the Curriculum Guide are being used by the schools already to improve their future teaching of patient safety, and WHO also can use this information to guide expansion of use of the Guide to support organizations' patient safety education activities. The leadership of all the participating sites said they placed a high priority on the field test and on implementing the Curriculum Guide. Some of their faculties were somewhat more cautious initially, but as their awareness and understanding of patient safety increased, many reported a growing sense of priority.

The majority of the sites reported that use of the Curriculum Guide was clearly a positive educational investment. Benefits included expansion of patient safety knowledge for students and educators, motivation of health-care providers to care about safety in their work, and production of more knowledgeable graduates entering into health-care delivery. The sites expect that benefits will expand as they increase the number of topics they teach. On the cost side of the value equation, sites reported low costs for teaching the topics because the curriculum is provided in the Guide, and most teaching materials are online and downloadable.. Thus, their costs are limited to the time of teaching faculty, students' time, and supplies.

The sites took different approaches for deciding whether to use the Guide and which topics to teach, but all of their processes involved forging agreements among deans, implementation leads, and the faculty members who would be teaching the patient safety topics. Whatever the decision process, the sites highlighted that it is important for the Dean to trust and approve use of the Guide, and to make the Guide visible by sharing information on how well it is working. Decisions on whether to integrate the patient safety teaching within their existing curricula, or to teach the topics separately, were guided by the backgrounds of the educators who are teaching patient safety, the nature of topics in the existing curricula, and school-year level of the students being taught.

The topics the sites chose to teach were based on relevancy to the needs of their students and the capabilities of the schools. Choices also considered the appropriateness of patient safety topics for each level of training for students, as well as what already was being taught.

The faculty at most sites modified the curricula for teaching the topics in the Guide by including local examples, case studies, or other local experiences. In particular, dentistry schools added local examples relevant to dentistry, because patient safety issues in dental practices are quite different from those in medicine and hospital-based care.

The sites reported that one of their greatest successes in working with the Guide was the strongly positive reception by their students to the patient safety training and the substantial benefits to the students. An important challenge the sites faced was the short timeframe for the field test, and its timing near the end of academic years, which required them to prepare quickly. Other implementation challenges were the difficulty of changing culture to be patient safety oriented, lack of knowledge of faculty members about patient safety, designing and implementing the teaching, student reactions, and achieving sustainability of what the students learned.

As they continued to use patient safety education, many sites had a goal to eventually teach all eleven topics in the Guide and to integrate them appropriately with the larger curricula. Several of them planned several adaptations to enhance students' patient safety lessons, such as teaching

some topics in clinical settings so students can learn about clinical risks and patient safety from the real practice.

The participating sites stated their concern about lack of knowledge of patient safety in health-care organizations, and they saw a strong need to expand use of the Curriculum Guide to improve the safety of health-care practices. Several of them already had begun outreach to share their experiences with others and encourage them to use the Guide to teach patient safety.

When asked to offer advice regarding expansion of patient safety teaching, the sites emphasized that every clinical school (medical, dental, nursing, midwifery, and pharmacy) should include patient safety teaching in their curricula. In this context, they supported use of the WHO Curriculum Guide to develop and implement these trainings. They also offered several specific pieces of advice to help others manage the process of implementing the teaching as effectively as possible.

6. Findings: Goal D Improvements to the Curriculum Guide

Question. How could the Curriculum Guide be modified in the future to best support teaching of patient safety to students in different environments?

Several interview questions sought feedback from the sites on different aspects of the Guide itself, to provide guidance to WHO for possible revisions or additions. The stakeholders were asked their views about the usability and acceptability of the Guide. They also were asked for any suggestions they might have to improve the Guide overall, as well as for specific changes to the Guide section on Support for Educators (Part A) and the patient safety topics covered in the Guide (Part B).

Suggestions from the site faculties for these topics, presented below, represent the various perspectives of the teaching faculty, implementation leads, and school executives. Any differences in perspectives among these groups are mentioned in the summaries.

Usability of the curriculum

The assessment of usability of the Guide examined the ability to adapt the Guide contents to local cultural situation and needs, use of tools and related issues, ease of understanding the language of the Guide, and the use-friendliness of the Guide contents.

All of the sites, except one, felt that the Guide topics were presented in a user-friendly format that was nicely presented, easy to follow, and readily adaptable to their learning outcomes. One site noted in particular that having the materials available in electronic form made it easy for them to use them in their lectures, although it was suggested that the slides are difficult to adapt because of the pdf file format. The site with a more critical view felt that the contents were not difficult to understand but it seems to be a bit dry, and the tables are a bit complicated and not easy to understand at first look.

All of the sites reported that they were able to adapt the Guide content to their local cultural needs. Many of them stated that they had no problems doing so; others noted some factors that influenced this process for them. One site observed that the Guide is culturally neutral, and they could tailor contents by adding case studies and examples that were relevant to their local situation. Other sites noted that having the PowerPoint slides makes it easy to adapt content to local contexts. One site stated that the adaptation could be done easily but that it can be very time consuming to do.

Use of the tools provided

The sites varied regarding which the tools from the Guide the teaching faculty used, depending on their local needs and preferences and on the available time to apply them in the courses they taught. A total of nine faculty respondents said they used at least one tool. A summary of the number of teaching faculty that reported using each of the identified tools is given in Table 6.1. It can be seen that the slides were heavily used tools – 7 of the 9 sites that used the tools reported they used the slides. The remaining tools were used by about half of the sites that used the tools.

Three faculties said they did not use the tools, one because they had knowledge of the topics and the other two because of time pressures they faced.

Table 6.1 Use of Curriculum Guide tools reported by the teaching faculty

Tools in Guide	Number Used (of 9 total)
Slides	7
Links	4
Articles and references	5
Case studies	4
Videos	4

Two of the site faculties expanded upon the tools in the Guide. One site elaborated upon the slides provided in the Guide, as well as upon the teaching materials by making new handouts, holding small group discussions, use of role playing, and a developing final summary of all that had been taught in the course session. Another site uploaded local examples to its website and used social networks to disseminate these materials to students via smart phones; they plan to develop and disseminate all educational materials electronically.

Several of the sites commented that they wanted their students to use the articles and references provided in the Guide. Some of them, however, had problems doing so. They reported having challenges in accessing references due to difficulties in downloading some resources and a lack of availability of some textbooks and articles because they were overseas. These problems were exacerbated by the short time frame they had to complete the field test.

Accessibility of the language used

There was close to unanimous feedback from the sites that the language used in the Guide was easy for them to understand. They indicated that the level of language is simple and all the information is related to medical themes. One site indicated that they were not familiar with a few of the technical terms, but that their understanding should grow as they use it more and share the materials with other institutions. Another site reported that some parts of the Curriculum Guide were very difficult and educators had to invest effort and time to understand the topics and how to teach them. Two sites commented that the Guide being written in English was not a problem for most users, but one of these sites stated that a Spanish version also is needed (and has since been developed by WHO).

Most of the teaching faculty also felt the Guide was easy for their students to understand and use, while others felt that this depended on the level of the students and the difficulty of the topics being learned. At some sites, educators tried to simplify the topics to teach the students, using local examples to make students appreciate and understand the patient safety issues.

Strengths and weaknesses of the curriculum

When identifying the strengths and weaknesses of the Guide, many of the responses focused on the contents of the Guide itself; others addressed considerations for use of the Guide in the teaching process. In general, the sites had a positive response to the Guide, identifying its

importance and comprehensiveness in particular. For weaknesses identified, the focus tended to be on the need to adapt the contents to local situations and specialties.

Strengths of the Curriculum

The sites highlighted the comprehensiveness, effective organization, and topics addressed as the greatest strengths of the Guide. They also identified the following specific features that they saw as strengths of the Guide.

- Patient safety is a very important topic, and the Guide is very informative and acceptable to them for teaching patient safety.
- The Guide is comprehensive, providing a package that educators can use and adapt to different approaches for delivering the content.
- The Guide covers all local, national and international key risks within health care today.
- Some of the topics are extremely important, such as the topics on invasive procedures, medications, and clinical risk management.
- The contents of the Guide are well-organized, concrete and easy to understand, and clinical topics are self-explanatory. The contents, together with the knowledge requirements and performance requirements, make each topic complete for the learning objective.

Weaknesses of the Curriculum Guide

Many of the sites had at least one comment regarding a weakness of the Guide, although most of these were relatively minor critiques. The following set of moderate weaknesses that they identified is consistent with their generally enthusiastic responses regarding the strengths of the Guide.

- The contents of topics and examples had to be adapted to local settings (one respondent noted they understood that this is unavoidable because WHO is developing the Guide for use in many Member States).
- Everything had to be self-learned and taught to other faculty, but the day-to-day examples were not in the Guide to make it relevant locally.
- It may be difficult to apply the Guide to teach patient safety in clinics and other resource-limited settings. For example, infection control practices, such as hand hygiene, may be a challenge in remote places where finding soap and clean water or alcohol handrub is difficult.
- Because the Guide is a multi-professional edition, it was necessary to do a lot of cross-referencing to make it relevant to specific disciplines and local health-care workers.
- Some topics were not adequately elaborated, especially the topic " What is patient safety"
- Use of English as the only language for the Guide is a weakness.
- Faculty may not be eager to embrace use of the Guide to teach patient safety because it creates extra work load. It would be helpful if WHO could provide a resource or support to motivate faculty into teaching.
- Some of the terms used in the Guide are not commonly used in some Member States.
- Some web links have expired.

Suggestions for changes to the Guide

Several questions asked the sites to identify changes that they felt should be made to the guide. A variety of suggestions were offered, which are summarized here. General comments are presented first, followed by feedback specific to Part A and Part B of the Guide.

Several of the sites began their comments by highlighting their positive reactions to the Curriculum Guide. In particular, the design and format of the Guide and the terminologies used were noted as strong features. Another favourable feature was having an electronic version of the Guide, which makes it widely accessible. They also noted that the Guide contents were easily adaptable to local or national patient safety strategies and policies.

The suggestion for changes that the sites offered most frequently was to increase the number of case studies and examples (including local examples), which they felt would provide more opportunities for discussion with the students about the issues and problems raised. One site noted that students are more excited when using case studies than just the usual lecturing on the concepts.

At least five sites focused on the need for stronger support for each of the particular disciplinary areas that are target audiences for the Guide by tailoring some examples, case studies, and other tools to each of these specialties. Some sites noted that the case studies in the Guide tend to be more hospital-based, but case studies also are needed for care provided in other settings (such as dental practices, medical practices or pharmacies) and by other health-care professions (such as physiotherapy).

One site identified the need to consider more directly the context within which the patient safety is being taught, in terms of the types of clients to whom the students might later be delivering care. With this perspective, it was suggested that it would be useful to address key populations groups in the teaching guidance, in particular for training students who will be working in community health.

The following specific changes to the Guide were suggested:

- Develop a Spanish version of the Guide, to enhance the accessibility of the Guide contents to both educators and students in the many Spanish-speaking Member States.
- Add more case-based and simulation-based teaching methods to the Guide, as well as other more practical approaches, such as role playing, for use in teaching.
- Increased emphasis on the importance of taking a system approach to care, to move away from the person-centered, blaming approach.
- Improvement of definitions of the terminology involved in patient safety, including references to various terms used in different Member States that mean the same thing as the main term presented in the Guide. For example, the term ‘handoff’, is not widely used in one country.
- Regularly check and update webpage links provided in the Curriculum Guide to be sure they are current (some were found to not be operational).

One site suggested that WHO develop and conduct a briefing that will inform more faculty about the Curriculum Guide and what is involved in teaching patient safety. Similarly, another site suggested that WHO proactively disseminate the Guide to other universities or schools.

Suggestions to improve the Teacher's Guide (Part A)

Many of the sites reported that they were satisfied with Part A of the Guide, stating that it was adequate for supporting educators to teach patient safety medicine, pharmacy, nursing, dentistry and other health-care disciplines. Particular aspects of Part A that were highlighted favourably were the clarity and self-explanatory nature of the contents, the web-based resources, and the knowledge and skills it provided to faculty members. One site noted that it is important to actively train educators to teach patient safety, and Part A of the Guide offers value in providing that education. Another commented that the Part A contents fit with the education strategy of their school.

As discussed in Section 3, the sites developed case studies and examples to reinforce the teaching and help students better relate to the issues. It was suggested that WHO collect these case studies in a database to make them available to universities/schools around the world to support their teaching.

It was noted by several sites that they use the Guide as a starting document, and then expand and adapt course materials relevant to the discipline of the students they are teaching. In particular, dentistry schools noted the importance of doing this because the materials provided in Part A do not adequately address the issues that are unique to dentistry because of its emphasis on medical issues in a hospital setting.

The following specific suggestions were offered for strengthening Part A of the Guide:

- Include more simulation training methods.
- Guidance for training sessions for educators to prepare them to teach patient safety knowledge, including internet-based training.
- Modify the teaching methods and process to use a multi-professional approach.
- Adapt some contents to be used in clinical care settings, with a format of student and mentor working together in clinical care delivery.
- Provide more relevant literature, to help broaden knowledge for both educators and students, and make them more readily available (one site said that they were not able to access some of the references already in the Guide).
- Develop teaching materials and case studies relevant to dentistry; current focus of the Guide is on medical issues.
- Include more information for allied health professions.
- Expand the performance indicators for evaluating students' skills to include not only indicators for knowledge but also indicators to evaluate skills and attitudes.

Suggestions regarding the topics covered in the Guide (Part B)

All of the sites thought that no topics should be deleted from the Guide. A few of them noted, however, that they currently were selecting only some of the topics offered in the Guide for their training curricula, often with the goal of ultimately covering all the topics over time. Two sites suggested that Topic 3 (*Understanding systems and the effect of complexity on patient care*) could be reduced in importance because it was a lower priority than all the other topics, and it ties in with the human factors topic. One site felt that many items were getting repeated over and over again because they are relevant to several topics, for example, references to the patient

being a team member. This may indicate a need to reorganize content or create a new topic that brings together these issues.

Some sites had observations that could lead to possible modifications of existing topics. One site commented that it was difficult to integrate these patient safety teachings into their curricula, and another noted that Topic 1 (*What is Patient Safety*) was important but was long and difficult to teach. By contrast, another site suggested combining topics 1 and 2 as a new *Introduction to Patient Safety* topic. Another site suggested that '*communication*' should be carved out as a separate topic, rather than (or in addition to) being taught within other topics, because of its importance and its influence on all aspects of patient safety management. Several sites reported that the contents of the topics needed to be made more relevant to dentistry, which is a community-based practice. And pharmacy sites wanted expansion of medication safety.

Some sites were satisfied with the set of topics in the Guide, generally feeling that they are relevant and important to patient safety. Others, however, had the following suggestions for possible additional topics.

- An introductory course about overall patient safety issues and definitions, as background for both educators and students;
- Patient safety procedures during transport of patients between institutions and internal transport between units (Patient handovers);
- Patient safety in care of patients with mental health illnesses;
- Safety in non-invasive procedures;
- Safety of blood transfusion and use of blood products;
- Preventing patient falls;
- Ethics and jurist issues, malpractice issues and implications involved in patient safety;
- Leadership in patient safety management;
- Improving communications among health professionals;
- Change management training for managers;
- Preparedness for nurses, which requires training beyond lectures;
- Training for nurses on how to protect themselves;
- Proactive risk assessment and reduction, how we can learn from the errors, proactively assess the errors, and define actions to prevent them in the future;
- Enhancing safety in primary care, outpatient and community settings;
- Use of quality improvement methods to improve patient safety;
- Addressing patient safety in resource-poor Member States with limited resources;
- Methods for working with various types of patients to enhance patient safety;
- Occupational safety and how to handle patient safety issues in industrial setting.

Summary of findings: improving the Curriculum Guide

To identify opportunities to improve the contents of the Curriculum Guide, the stakeholders interviewed were asked to provide feedback on its usability, and its strengths and weaknesses. Then they were asked for suggestions on how the Guide might be improved, including general suggestions as well as suggestions for improvements specifically to Part A and Part B of the

Guide. The responses of the teaching faculty, implementation leads, and school executives were considered in the analysis of these interview results. Because the teaching faculty had the most direct experience with many of these issues, their responses were considered a primary source of information.

The usability of the topics content in the Guide was assessed by examining the ability to adapt the Guide contents to local cultural situation and needs, use of tools and related issues, ease of understanding the language of the Guide, and the use-friendliness of the Guide contents. The sites indicated, in general, that they could readily adapt the Guide contents to their local needs, and most of them reported using the tools provided in the Guide, which they often modified and expanded upon as part of that adaptation process. There was virtually unanimous agreement that the Guide was user-friendly in a format that was nicely presented, easy to follow, and readily adaptable to their learning outcomes.

The faculty also reported that use of English in the Guide was easy for most of them to understand, although there was a request for translation of the Guide into Spanish. In addition, they felt that the level of language in the Guide was simple enough to be readily understood by both faculty and students, although some students in lower-level grades might have some trouble with it.

The sites varied regarding which the tools from the Guide the teaching faculty used, depending on their local needs and preferences and on the available time to apply them in the courses they taught. Several wanted their students to use the articles and references provided in the Guide, but they reported challenges in accessing references due to difficulties in downloading some resources and a lack of availability of some textbooks and articles because they were overseas.

In general, the sites had a positive response to the Guide, and they highlighted its greatest strengths to its comprehensiveness, effective organization, and patient safety topics addressed. For weaknesses identified, the focus tended to be on the need to adapt the contents to local situations and specialties.

Although the sites cited general satisfaction with the Curriculum Guide, they did offer a number of suggestions for improvements to Part A to strengthen guidance to educators. They also suggested several additional topics to include in Part B, while stating that none of the topics currently in Part B should be deleted or downgraded.

7. Summary and Conclusions

In each of the previous four Sections, detailed evaluation results are presented for each of the four questions that guided the evaluation, including a summary of findings for each question. In this section, the key evaluation results are summarized to answer these four questions directly. Then the evaluation is concluded by organizing these findings in another way – to present conclusions regarding lessons learned for the formative and summative evaluations.

Key findings by evaluation goals

A Does the Curriculum Guide contain the necessary and sufficient information and topics to allow its effective use in undergraduate training of health-care professionals?

According to the participating universities/schools, the Curriculum Guide contains the information they need to use it effectively in patient safety training their students. They received the guide enthusiastically because it provides a comprehensive, structured package that schools can use easily to teach patient safety. The topics in the guide are relevant to the patient safety issues in their countries; many sites noted that these issues are universal in almost all Member States. The contents of the guide also are compatible with the cultures of the Member States and schools

It is necessary and desirable for schools to adapt the guide contents to their local situations. The participating schools did this by developing examples and case studies that are relevant to their local situations, which are more able to get the attention of students and reinforce their learning.

The dentistry schools had the greatest trouble with the guide because the Guide contents are aimed at medical care and in-hospital settings, which are very different from community-based dental practices. In addition, dental students start clinical practice early in their training. Therefore the dentistry schools made modifications to the curricula to make them relevant to dentistry, in particular through examples, case studies, and emphasis on relevant topics.

B. What is the impact upon student learning of the inclusion of patient safety teaching in the curriculum?

The teaching of patient safety by the participating universities/schools was found to substantially strengthen students' understanding of patient safety. At the start of the field test, only 20.4% of the students reported they had previously had a patient safety course, and the percentages ranged from a low of 1.8% to a high of 73.7% at individual schools. For many of the students, therefore, this was the first time they received focused training in these patient safety topics.

After taking the courses, the students' knowledge of the patient safety topics they were taught showed substantial and statistically significant improvements. The percentage of correct answers doubled overall (from 10.7% to 20.8%) between the pre-teaching and post-teaching surveys, though were still low due to the difficulty of the questions. The largest improvement found were for the topics of *infection control* (from 11.9% to 46.9% correct) and *invasive procedures* (from 15.6% to 38.1% correct). One topic (*learn from error*) showed a decline in knowledge.

The training also elevated students' perceptions and attitudes toward the importance of patient safety and their ability to influence it. The scores the students gave for three of the domains for perception/attitudes (patient safety knowledge, health-care system safety, personal influence over safety) increased substantially. The lack of change in the fourth domain (personal attitudes domain of safety) was likely because these ratings already were high at baseline and had little space for further increase.

C. In what ways can this Curriculum Guide be used to support the widespread implementation of explicit patient safety education globally?

The experiences of the participating universities/schools in implementing the Guide can inform strategies to move toward global implementation of patient safety education. Before introduction to the Guide, many of the participating schools had not defined patient safety as a priority, but as they worked with the Guide, their commitments quickly grew. The teaching faculties at many schools were found to have limited patient safety knowledge, suggesting that faculty may need more extensive training than the schools originally had expected, to prepare them well to teach these topics. The schools emphasized that this experience was just a start; that it will take several years before they achieve the full scope and quality of patient safety teaching they desire.

Most faculties were enthusiastic, and those who resisted initially were often motivated by workload issues. Integrating the guide into existing curricula helped schools to deal with workload issues, but it lowers the visibility of patient safety. Therefore, in the long run, some schools prefer to teach it as separate course(s). All the sites taught only a few topics, but many of them plan to expand in the future to eventually teach all eleven topics.

The participating schools identified lists of successes and challenges they experienced in implementing the Guide. They also described new strategies they wish to pursue to expand use of the Guide to teach patient safety. By applying these lessons to further work with the Guide, there is strong potential for successful use of the Guide in teaching patient safety globally.

D. How could the Curriculum Guide be modified in the future to best support teaching of patient safety to students in different environments?

When asked about needs for improvements to the Curriculum Guide, the participating universities/schools highlighted that the Guide's greatest strengths are its comprehensiveness, effective organization, and patient safety topics addressed. The weakness mentioned most frequently was the need to adapt the contents to local situations and specialties, although most sites indicated they could readily adapt the Guide contents as needed.

There was virtually unanimous agreement that the Guide was user-friendly and nicely presented, easy to follow, and readily adaptable to the schools' learning outcomes. Using English as the language for the guide was acceptable for most Member States, although those in Spanish-speaking Member States want it translated into Spanish. The level of language was readily understood by both faculty and students, although some students in lower-level grades might have trouble with it.

Particular aspects of Part A that were highlighted favourably were the clarity and self-explanatory nature of the contents, the web-based resources, and the knowledge and skills provided to faculty members. The sites offered a number of suggestions for revisions to Part A.

These included expansion of guidance for training educators on patient safety, adaptation of some contents for use in clinical care settings, and expansion of teaching materials relevant to dentistry.

None of the sites felt that any topics should be deleted from the Guide, but some had suggestions for changes in emphasis or reorganization of topics. Numerous suggestions were offered for addition of new topics, such as an introductory topic that addresses overall patient safety issues, patient safety relevant to specific types of clinical care, and several aspects of patient safety at the leadership and organizational level.

Lessons from the Complementary Test Sites

Only four of the complementary test sites submitted to WHO the reports and survey data analysis from their evaluations of use of the Curriculum Guide. Although these results could not be used in the formal evaluation because of methodological limitations, they offer some useful insights into how broadly the Guide may be applied across different disciplines and teaching settings. The four complementary test sites tested use of the Guide in the following unique applications, and all of them reported successes in introducing the topics and tools it provides:

- Integration of the Guide into an existing quality module of a health and hospital management curriculum for final year health management students and mid-career management professionals;
- A separate course containing all 11 topics in the Guide that was taught by an independent higher education institution, not affiliated with a university;
- Two topics of one lecture each, taught in the nursing management module of the nursing curriculum for final-year nursing students (pre-registration);
- Use of the Guide to structure a separate module of multiple-format simulation instruction at the beginning of clinical placements, for multiple disciplines (nursing, pharmacy, physiotherapy, etc.).

The feedback from these complementary test sites mirrored the experiences of the 12 pilot sites for introducing this new instruction to their existing curricula, as did their feedback with respect to the usefulness and value of the Guide. In particular, all of them highlighted the challenges of changing the attitudes of both faculty and students to understand and accept patient safety principles. They also sought the addition of more case studies and examples in the Guide. There was some sentiment that the Guide did not provide sufficient detail to support faculty who lacked in-depth knowledge of patient safety, which is consistent with the need expressed by the pilot sites for more in-depth training of faculty before they start to teach the topics.

The summary results from the student surveys showed patterns similar to those from the pilot sites (as presented in Section 4). The students who were taught the topics by the complementary sites showed, in general, improved scores on the knowledge questions on the survey, although declines were observed for some topics. These students also showed heightened perceptions and attitudes regarding patient safety, as well as positive experiences with the teaching of the topics.

Conclusions: formative and summative evaluation

Formative evaluation

Information from the formative evaluation provides feedback to WHO regarding capacity building, implementation issues and suggestions for improvements to the Guide. These findings also generate guidance for other schools that could be using the Curriculum Guide in the future.

- The Curriculum Guide is a readily usable resource that the participating schools implemented readily, although with the need to make some modifications to best adapt its contents to their local circumstances.
- Full implementation of teaching using the Guide requires several years of effort, as schools gradually train faculty on patient safety, add topics to their curricula, and refine their teaching skills and methods.
- The participating schools felt strongly that patient safety is an important issue, and because the Guide is such a strong resource, its use should be expanded to all other schools teaching health-care professionals, as well as other health-care organizations.

Summative evaluation

In the summative evaluation, the effectiveness of the Guide is assessed in terms of its impacts on the various stakeholders involved in this field test, including students, teaching faculty, and the institutions themselves.

- Many of the participating schools had not previously defined patient safety as a priority in their curricula, and introduction of the Guide elevated the schools' commitment to address patient safety, including actions to expand this teaching more broadly.
- Before introduction of the Guide, the teaching faculty at participating schools had limited patient safety knowledge, and the training that schools provided their faculty to prepare them for teaching these topics increased their patient safety awareness and knowledge.
- The participating schools gained additional benefits from use of the Guide, including motivation of health-care practitioners to care about health-care safety and production of more knowledgeable graduates into delivery of quality and safe health care.
- The teaching of patient safety by the participating universities/schools substantially strengthened students' understanding of patient safety, including improved knowledge of the patient safety topics they were taught and elevation of students' perceptions and attitudes toward the importance of patient safety and their ability to influence it.
- The experiences of the complementary sites, which tested use of the Guide in a variety of additional settings, mirrored those of the pilot sites, suggesting the potential for successful application of the Guide in a variety of disciplines and settings.

The field test and evaluation of the Curriculum Guide provides useful information that WHO can use productively to refine the contents of the Curriculum and move forward to encourage use of the Guide by organizations across the world to teach patient safety issues and practices.

Appendix A
Master List of Questions Used in the Stakeholder Interviews

Topics and Questions	Implementation Coordinator Pre-teaching	Implementation Coordinator Post-teaching	Institution Executive	Teaching Faculty
Contents of the Curriculum				
Topics and Approach				
Is patient safety already being taught in your school?	X			
How does the Curriculum Guide inform your organization about the key topics in patient safety?	X	X	X	X
How helpful is the Curriculum Guide for educators to develop capacity and skills to teach patient safety?	X			
Is the mix of topics in the Curriculum Guide consistent with their relative importance as safety issues in your country?	X	X	X	X
What additional topics should be addressed in the Curriculum Guide?	X			X
What topics should be deleted or reduced in importance?	X			X
What suggestions do you have to improve the Patient Safety Topics in the Curriculum Guide?		X	X	X
Support for Educators (Part A)				
Overall, how helpful is the Curriculum Guide for educators to develop capacity and skills to teach patient safety?		X	X	X
How effective is the Curriculum Guide in assisting educators to integrate patient safety learning into their curricula?		X		X
How effective is the Curriculum Guide in informing educators on:				X
Importance of building supportive environments for teaching patient safety				

Topics and Questions	Implementation Coordinator Pre-teaching	Implementation Coordinator Post-teaching	Institution Executive	Teaching Faculty
How to design and implement patient safety curricula				
Using inter-disciplinary teaching in patient safety				
How culturally appropriate for your country are the contents of the Curriculum Guide? (methods, skills and knowledge)		X	X	X
How appropriate are the assessment strategies provided in the curriculum guide for the resources and teaching environment in your country?				X
How appropriate are the evaluation strategies in the Curriculum Guide for evaluating the patient safety courses				
What suggestions do you have to improve the Teacher's Guide?		X		X
Course Content (Part B)				
How helpful to you was the overall content of the Curriculum Guide topics in teaching patient safety to your students?		X		X
How helpful are tools/resources provided for teaching patient safety? Learning objectives Knowledge requirements Performance requirements Teaching slides Patient safety resources				X
Experiences Implementing Curriculum Guide				
Which Curriculum Guide topics were taught at your school? Why were these topics chosen?	X	X	X	
How were decisions made to use the Curriculum Guide for teaching patient safety and for choices of specific topics?	X		X	
Who was involved in making these decisions and how were they involved? *Probe*: institutional leadership, faculty, students, others *Probe*: seminars, meetings, focus groups, surveys of faculty	X			

Topics and Questions	Implementation Coordinator Pre-teaching	Implementation Coordinator Post-teaching	Institution Executive	Teaching Faculty
What priority did the institution's leadership give to this patient safety teaching?			X	
What was your experience in obtaining agreements and approvals to teach the topics as part of the educational curriculum?	X			
How did you introduce the selected patient safety topics? Were they taught as separate course(s), or were they integrated into existing curricula?		X		
What priority did the institution's faculty give to this patient safety teaching?				X
How did you integrate teachings of patient safety topics across different clinical disciplines?				X
Were local experiences, case studies, or literature incorporated in teaching patient safety topics?				X
What methods did you use to assess students' learning?				X
What were your greatest successes in introducing the topics?		X		X
What were your greatest challenges in introducing the topics ?		X		X
What changes did you make during the training to address issues that arose during the implementation of the Curriculum Guide topics?		X		X
Based on your experience with teaching these topics, how might you change your approach to teaching them in the future?		X		X
How did faculty respond to evaluation of the patient safety topics introduced?		X		X
Usability of the Curriculum				
How readily could you integrate the contents of each topic with actual practices and issues involved in professionals' care delivery roles?				
Are you able to adapt the contents of the Curriculum Guide topics easily to local cultural needs and requirements?				X

Topics and Questions	Implementation Coordinator Pre-teaching	Implementation Coordinator Post-teaching	Institution Executive	Teaching Faculty
How sufficient was the evidence-base presented in the topics?				
How well did the content of the topics help students understand how they could use what they learned in future professional practices/actions?				
How easy was it to introduce the Curriculum Guide topics selected into existing curricula?		X	X	
Which tools did you use? For those not used, why did you not use them?				X
How easy is the language which theCurriculum Guide is written: for educators? for students?		X	X	X
Are the Curriculum Guide topics presented in a user-friendly format?		X		X
Acceptance of the Curriculum Guide				
What was the response of colleagues and other educators to the Curriculum Guide? How supportive were they of teaching the Patient Safety topics?		X	X	
For faculty who were critical of the Curriculum Guide, what were the reasons for their criticisms?		X		
What did the faculty see as the strengths of the Curriculum Guide?				X
What did the faculty see as the weaknesses of the Curriculum Guide?				X
Value of Training Provided				
What value does the Curriculum Guide contribute to the 'knowledge base' required by students for their professional training?		X	X	X
Have the patient safety courses had an impact on current student clinical performance in terms of practicing safe care?				X
For advancing patient safety knowledge and practice, which of the topics of the Curriculum Guide content are most valuable?		X		
What of the Curriculum Guide topics are the least valuable?		X		
How important an educational investment is the Curriculum Guide,		X	X	

Topics and Questions	Implementation Coordinator Pre-teaching	Implementation Coordinator Post-teaching	Institution Executive	Teaching Faculty
considering the knowledge value it offers and the resources involved in teaching it?				
Effects on the Institution's Patient Safety Capacity				
Before using the Curriculum Guide, how much had the institution included patient safety topics in its professional training curricula?		X	X	X
How much does the Curriculum Guide contribute to strengthening the institution's capacity to teach about patient safety issues and practices?		X	X	
What additional capacity would the institution like or need to have to strengthen its patient safety capacity further?		X	X	X
Opportunities to Improve the Curriculum Guide				
What changes should be made to strengthen the Curriculum guide?			X	X
Other Potential Applications for the Curriculum				
In what other ways would you like to use the Curriculum Guide at your institution?		X	X	
How can the Curriculum Guide be used by organizations other than universities or schools that train health-care professionals? Which types of organizations?			X	X
What advice about how best to apply the Curriculum Guide would you give to other schools regarding use of the Curriculum Guide?		X		X

Appendix B
Questionnaire for Post-Teaching Student Survey

Attitude Questions on Understanding of Patient Safety WHO Patient Safety Curriculum Guide: Multi-professional Edition

Dear Colleague,

The Multi-professional Patient Safety Curriculum Guide is published by WHO to support education and training in patient safety in health-care universities and schools around the world. This questionnaire is designed to evaluate health-care students' awareness and knowledge of patient safety issues in the healthcare system.

We anticipate it will take around 10-15 minutes to complete the questionnaire. Please respond to the questions honestly, based on your current level of knowledge. If you prefer not to respond to a particular question then just leave it blank. The questionnaire is anonymous and any information you provide will be reported at a group level, not individually.

You are being asked to complete this form as part of a study. This will not form part of your final assessment. Completing it is not compulsory.

Introductory questions

1. What is your current year of study? (Please circle as appropriate)

1st year 2nd year 3rd year 4th year5th year 6th year

2. Has patient safety been taught in your university/school? (Please circle as appropriate)

Yes No

3. Have you previously taken a patient safety course? (Please circle as appropriate)

Yes No

Section 1 Error and Patient safety

For questions in Section 1, please circle the most appropriate number according to a five point scale where: 1= low level of knowledge, 3=moderate level of knowledge, and 5= high level of knowledge.

What is your level of knowledge regarding	Low		Moderate		High
1. Different types of human error in health care?	1	2	3	4	5
2. Factors contributing to human error?	1	2	3	4	5
3. Factors influencing patient safety?	1	2	3	4	5
4. Ways of speaking up about error?	1	2	3	4	5
5. What should happen if an error is made?	1	2	3	4	5
6. How to report an error?	1	2	3	4	5
7. The role of health-care organizations (e.g. hospitals, general practitioners) in error reporting?	1	2	3	4	5

For questions from Section 2 to 4, please circle the most appropriate number according to a five point scale where: 1 = strongly disagree, 2 = disagree, 3 = neutral (neither agree nor disagree), 4 = agree and 5 = strongly agree.

Section 2 Safety of the Healthcare System

Please circle the number that best describes your level of agreement for each statement.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. Most health-care workers make errors.	1	2	3	4	5
2. In my country there is a safe system of healthcare for patients.	1	2	3	4	5
3. Medical error is very common.	1	2	3	4	5
4. It is very unusual for patients to be given the wrong drug.	1	2	3	4	5
5. Health-care staff receive training in patient safety.	1	2	3	4	5

Section 3 Personal Influence over Safety

Thinking about your own ability to influence patient safety, please circle the number that best describes your personal view for each statement.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. Telling others about an error I made would be easy.	1	2	3	4	5
2. It is easier to find someone to blame rather than focus on the causes of error.	1	2	3	4	5
3. I am confident about speaking to someone who is showing a lack of concern for a patient's safety.	1	2	3	4	5
4. I know how to talk to people who have made an error.	1	2	3	4	5
5. I am always able to ensure that patient safety is not compromised.	1	2	3	4	5
6. I believe that filling in reporting forms will help to improve patient safety.	1	2	3	4	5
7. I am able to talk about my own errors.	1	2	3	4	5

Section 4 Personal Attitudes to Patient Safety

Thinking about your personal attitudes with regard to patient safety, please circle the number that best describes your own attitude for each statement.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. By concentrating on the causes of incidents I can contribute to patient safety.	1	2	3	4	5
2. If I keep learning from my mistakes, I can prevent incidents.	1	2	3	4	5
3. Acknowledging and dealing with my errors will be an important part of my job.	1	2	3	4	5
4. It is important for me to learn how best to acknowledge and deal with my errors by the end of medical school.	1	2	3	4	5

Thank you for taking the time to complete the attitude questions

<u>Knowledge Questions</u> on Patient Safety Topics
WHO Patient Safety Curriculum Guide: Multi-professional Edition

You are being asked to complete this form as part of a study. This will not form part of your final assessment. Completing it is not compulsory.

Please circle the number that you think is the right answer for the question. It could be more than one right answer.

Topic 1: What is Patient Safety

A) What multiple factors can lead to the delivery of unsafe care?

1. latent factors: organizational process, high workloads, lack of leadership and etc.
2. research factors: measuring effectiveness of clinical protocol, randomized clinical trial
3. error-producing factors: busy ward, poor procedures and etc.
4. failures: unsupervised junior staff, communication difficulties and etc.
5. defences: missing medical history

B) A doctor fails to practice hand hygiene between patients because they feel they are too busy even if there is a alcohol handrub dispenser in the ward. This is an example of:

1. a patient safety system failure issue
2. a tolerated behavior in the ward
3. a routine violation
4. a lack of supervision issue

Topic 2: Why applying human factors is important for patient safety

A) What human factors predispose health-care workers to errors:

1. limited memory capacity
2. fatigue
3. stress
4. poor training
5. hunger
6. illness
7. culture/language factors
8. hazardous behaviors

B) How should we apply human factors thinking to health-care environment?

1. avoid relying memory
2. make things visible: use of reminders, notes, displays and etc.
3. routinely use checklists/standardize procedures
4. improve personal knowledge and skills
5. decrease reliance on vigilance: awareness of potential errors

C) Sandra had an episiotomy during the delivery process. She consulted her obstetrician due to vaginal smelling 10 days after the delivery. The obstetrician suspected a urinary tract infection and prescribed antibiotics. Sandra retuned to see her obstetrician a week later with the same symptoms. After checking on her delivery notes, the obstetrician found no errors and prescribed an additional course of antibiotics. As the symptoms persisted, Sandra went to see a different obstetrician who found a swab left behind during the packing of the episiotomy wound.

Please nominate human factors that may have contributed to leaving the swab behind:

1. reliance on memory when performing swab count
2. not following the standardized procedure in episiotomy
3. inexperienced health-care workers
4. wrong prescription by the obstetrician
5. fatigue or stress experienced by health-care workers
6. inadequate checking by the second nurse and the obstetrician

Topic 3: Understanding systems and the effect of complexity on patient care

A) What are the elements of a safe health-care delivery system?

1. well trained health-care workers
2. acknowledging the possibility of 'failure'
3. seeking out 'risks' and containing them before they cause harm
4. personal accountability
5. initiating and maintaining a safety culture
6. involving patient in the care

B) Please outline elements of a 'system-thinking' approach to address adverse events:

1. patient and the health-care workers involved
2. technology and tools used
3. related organization policy
4. team communications
5. blame and shame health-care workers
6. organizational factors: workflow, time pressure, workload of health-care workers

C) Which model below best describes the system approach in addressing adverse events in health-care environments.

1. health belief model
2. swiss cheese model
3. stages of change model
4. perfectibility model

Topic 4: Being an effective team player

A) The TeamSTEPPS programme identifies a number of different, but interrelated team types that support and deliver health care. Teams formed for emergency or specific events belong to which type of the team below:

1. core team
2. coordinating team
3. contingency team
4. ancillary service
5. support serve

B) There are four stages in team development. Open communication between team members is established in stage:

1. Forming
2. Storing
3. Norming
4. Performing

C) As a student, you have been invited to observe a knee replacement in an elderly female. The day before the operation, you talked to the patient and remembered being told that trouble with her left knee had made it impossible for her to walk and that she was looking forward to having it fixed. In the operating theatre, you hear the surgeon say to his assistant that they are going to be operating on her right knee.

What should you, as a student, do next?

1. do nothing because you may have confused this patient with another patient.
2. locate and review the medical records to confirm the side for the knee replacement.
3. say nothing because hospitals never make mistakes and the student probably misheard.
4. tell the surgeon that you thought that the patient was having her left knee replaced.
5. keep silent because the surgeon is likely to know what he is doing.

Topic 5: How we understand and learn from errors to prevent harm

A) Wrong diagnosis leads to an inappropriate treatment plan. What type of error is it?

1. skill-based slips and lapses
2. violations
3. rule-based mistakes
4. knowledge-based mistakes

B) A patient was being treated for non-Hodgkin's lymphoma. A Syringe containing vincristine for another patient has been accidently delivered to patient's bedside. The physician administered vincristine via a spinal route, believing it was a different medication. The error was not recognized and the patient died three days later. What are the major factor(s) that caused the error in this case?

1. inexperience
2. poor procedures
3. inadequate checking and patient identification
4. inadequate information

C) What are the best way to learn from errors?

1. criticize the health-care workers involved in the incident
2. establish incident reporting and monitoring system
3. never report near misses as they do not incur any harm
4. limit reporting on adverse events to prevent health-care workers being blamed or published
5. root cause analysis could be used to review sentinel incidents

Topic 6: Understanding and managing clinical risk

A) Baby Edward, a preterm infant with respiratory distress requiring ventilation, was prescribed intravenous gentamicin for a serious infection. The intensive-care nurse and pediatrician were extremely busy. The drug was administered 90 minutes later than prescribed. Fortunately, Edward survived and recovered.

1) Should this incident (near miss) be reported?

1. Yes 2. No

2) If yes, which method should you apply to report the incident?

1. discussed as a standing item at the weekly staff meetings
2. discuss the fact about the incident and follow-up action required is done with the team
3. discussion focusing on attributing blame
4. identify system-related issues involved in the incident

B) How should patient complaints handled?

1. discuss complaints openly with patients and their families
2. health-care workers to who the complaint is directed is blamed and reprimanded
3. necessity of a factual statement related to health-care workers involved with the complaint
4. policy for managing complaints is in place

Topic 7: Using quality-improvement methods to improve care

A) Measurement is an essential component of quality improvement.
What are the main types of measures:

1. outcome measures
2. demographic measures
3. process measures
4. balancing measures

B) Clinical practice improvement (CPI) is used to improve the quality and safety of health care. The success of a CPI project depends on the team covering five phases. In which phase will the team gather as much information about the problem as possible and make the decision on how to measure the improvement?

1. project phase
2. diagnostic phase
3. intervention phase
4. impact and implementation phase
5. sustaining and improvement phase

Topic 8: Engaging with patients and caregivers

A) Which are major phases for gaining an informed consent from patients?

1. disclosure of information by health-care workers
2. competence of health-care workers
3. free and voluntary choice made by patients
4. accountability of health-care workers and the organization
5. time allowed for patient to absorb the information disclosed and consult with family/carers
6. comprehension of the information by the patient

B) Which are the key principles of open disclosure?

1. openness and timeliness of communication
2. support of staff
3. punishment and compensation
4. acknowledgement of the incident
5. confidentiality
6. admission of responsibility

Topic 9: Infection prevention and control

A) List the five key moments to practice hand hygiene.

1. before entering the ward
2. before touching a patient
3. before a clean/aseptic procedure
4. after bodily fluid exposure risk
5. after touching a patient
6. after touching patient surroundings

B) What are the main types of health-care associated infection?

1. urinary tract infections usually associated with catheters
2. surgical infections
3. food related infections
4. blood stream infections associated with the use of an intravascular device
5. pneumonia associated with ventilators

C) What are the main transmission routes for health care-associated infections?

1. transmission through direct and indirect contact
2. transmission through food
3. droplet transmission
4. airborne transmission

D) How do you dispose sharps safely?

1. discard each needle into a sharps' container at the point of use
2. do not overload the bin for 'sharps' if it is full
3. recap, bend or break needles after use
4. do not leave a sharps' bin in the reach of children

Topic 10: Patient safety and invasive procedures

A) List the three main element of the WHO Patient Safety Surgical checklist.

1. before enter operating room
2. before induction of anesthesia
3. before skin incision
4. before patient leaves operation room

B) A male patient was admitted for removal of his right kidney. The operating list stated 'left' by mistake. The patient was not woken from sleep to check the correct side on the preoperative ward round. The side was not checked with the notes or the consent form. The consultant surgeon put the correctly labeled X-rays on the view box back to front. The senior registrar surgeon began to remove the left kidney. A medical student observing the operation suggested to the surgeon that he was removing the wrong kidney, but was ignored. The mistake was not discovered and led to the death of the patient.

Please identify the missing opportunities for checking the site of surgery.

1. patient should NOT be woken up to confirm on the operating side
2. patients' medical documents and consent form should be double checked before operating
3. the consultant surgeon should check X-ray carefully
4. the registrar surgeon should trust the consultant surgeon without a double check on the operating side
5. student's suggestion should be considered

Topic 11: Improving medication safety

A) There are four steps in using medication. The four steps are: prescribing, dispensing, administering and monitoring.

1) Identify factors to prescription errors:

1. considering individual patient factors, such as allergies, pregnancy, co-morbidities, other medications
2. wrong patient, wrong dose, wrong time, wrong drug, wrong route
3. look-a-like and sound-a-like medications
4. Inadequate communication (written, verbal)
5. documentation issues, such as illegible, incomplete, ambiguous
6. mathematical error when calculating dosage

2) Identify factors to monitoring errors?

1. lack of monitoring for side-effects
2. drug not ceased if not working, or course completed
3. wrong patient, wrong dose, wrong time, wrong drug, wrong route
4. drug levels not measured, or not followed up
5. communication failures

B) Which methods below contribute to safer medication use?

1. use trade names for medicine as they are more commonly known by patients
2. encourage patients to be actively involved
3. depends on your memory when prescribing medication
4. tailor prescribing for individual patients
5. communicate clearly
6. never use high-risk medications

C) An old man saw a community doctor for treatment of new onset stable angina. After taking a full past history and medication history, the doctor discovers the patient has been healthy and only takes medication for headaches every day. The doctor assumes it is an analgesic as the patient cannot recall the name of the headache medication. But the medication is actually a beta-blocker. The doctor prescribed aspirin and another beta-blocker for the angina. The new medication leads to bradycardia and postural hypotension of the patient.

What should you do to prevent this error from occurring?

1. make sure to collect complete and accurate medication history
2. never make assumption
2. no need to inform patient about his/her medications
3. trust patient about his/her medication history even without seeing the medication list
5. warn the patient about potential side-effects and what to do if side-effects occur

Thank you for taking the time to complete the knowledge questions

Feedback Questions on the Patient Safety Topic Taught in this Course
WHO Patient Safety Curriculum Guide: Multi-professional Edition

You are being asked to complete this form as part of a study. This will not form part of your final assessment. Completing it is not compulsory.

Introductory questions

Which patient safety topics have you been taught? (Please mark all that apply)

- ☐ What is patient safety?
- ☐ Why applying human factors is important for patient safety
- ☐ Understanding systems and the effect of complexity on patient care
- ☐ Being an effective team player
- ☐ Learning from errors to prevent harm
- ☐ Understanding and managing clinical risk
- ☐ Using quality-improvement methods to improve care
- ☐ Engaging with patients and caregivers
- ☐ Infection prevention and control
- ☐ Patient safety and invasive procedures
- ☐ Improving medication safety

For questions in Section 1 and 2, please circle the most appropriate number according to a five point scale where:

1 = strongly disagree, 2 = disagree, 3 = neutral (neither agree nor disagree),

4 = agree and 5 = strongly agree.

Section 1 Perception about the Patient Safety Topics

Please respond to the following questions regarding your perceptions about the patient safety topic taught in this course.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. The aims of this patient safety topic were clear to me.	1	2	3	4	5
2. It was important to incorporate this patient safety training in the educational curricula.	1	2	3	4	5
3. I have improved my knowledge/skills as a result of this topic.	1	2	3	4	5
4. I acquired new knowledge/skills that will be of value during my career.	1	2	3	4	5
5. I will be able to readily apply the knowledge taught in the Curriculum Guide to actions during my professional work.	1	2	3	4	5
6. My understanding of the importance of patient safety increased as a result of the patient safety training.	1	2	3	4	5
7. My knowledge of patient safety principles and practices increased as a result of the patient safety training.	1	2	3	4	5
8. This training increased my motivation to put patient safety practices to work in my professional roles.	1	2	3	4	5

Section 2 Effectiveness of the Patient Safety Topics

Please respond to the following questions regarding how effectively the patient safety topic was taught in this course.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I found the style of teaching in this topic facilitated my learning.	1	2	3	4	5
2. The Instructors facilitated my understanding.	1	2	3	4	5
3. The presentation of the topic was culturally appropriate.	1	2	3	4	5
4. The teaching aids *(e.g. audiovisual presentations or written materials)* added to the session (please only answer this question if aids were used).	1	2	3	4	5
5. Completion of the assignment(s) facilitated my understanding (please only answer this question if you were given assignments).	1	2	3	4	5
6. The time devoted to the topic was sufficient.	1	2	3	4	5
7. The methods used to assess performance on the topic taught were effective.	1	2	3	4	5
8. This stage in the overall Curriculum Guide is an appropriate time for this particular topic.	1	2	3	4	5

Section 3 Comments on Patient Safety Teaching

Complete the following questions with free text. We value any comments you have about the topic(s). These will be used to further develop teaching in the future.

1. Please indicate any areas that you considered particularly worthwhile in the taught topic(s).

2. Please indicate any areas that you would like changed or improved in the taught topic(s).

3. Any other comments about the taught topics would be most welcome.

Thank you for taking the time to complete this questionnaire

Appendix C
Universities/Schools that served as Complementary Test Sites

Region and University/School	Disciplines of Students Taught Using the Guide					Total Sites
	Nursing	Midwifery	Medical	Hospital and Health Managmnt	Physio-therapy	
Eastern Mediterranean region Jordan: Mutah University	X					1
European region Portugal: University of Algarve Slovenia: Jesenice College of Nursing Spain: Málaga University UK: - Anglia Ruskin University - Kings College London - Manchester Metropolitan University	X (IPE) X X X X	X	X (IPE)		X	6
South East Asian region India: Institute of Health Management Research, Jaipur				X		1
Total Disciplines	6	1	1	1	1	