Implementation Analysis of a Patient Safety Program in a Pediatric Perioperative Unit in Guatemala

by

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Thesis submitted in partial fulfillment of
the requirements for the degree of
Master of Science in the Duke Global Health Institute
in the Graduate School of Duke University

2019

ABSTRACT

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Abstract

Background: Patient safety is critical to prevent medical errors and to improve clinical outcomes. The need to implement programs in patient safety is increasingly recognized as a prime component of healthcare delivery in low- and middle- income countries (LMICs). The goal for our study is to assess the implementation of a patient safety program in Guatemala.

Methods: We used a mixed-methods approach to assess implementation of a patient safety program in the pediatric perioperative unit in Hospital Roosevelt, Guatemala. We collected data from unit staff respondents (n=16) using a qualitative *de novo* survey, the Evidence-Based Practice Attitude Scale-36 (EBPAS-36) survey, and a semi-structured interview. Interviews and surveys were conducted in Spanish, translated, and analyzed in English using NVivo v12. Quantitative data were analyzed to compare average scores from each of the 12-survey domains. Data were triangulated, with final analysis guided by the Consolidated Framework for Implementation Research (CFIR). Data were collected over a 10-day period in July 2018.

Results: Responses representing the Inner Setting and Characteristics of Individuals CFIR domains indicated a gap in knowledge of patient safety programs and positive attitude towards the use of evidence-based patient safety programs. Though respondents expressed an openness and willingness to adopt patient safety practices, few existing practices are in place to prevent medical errors.

Conclusions: The main determinants which affect the implementation of an evidence-based patient safety program in the pediatric perioperative unit in Guatemala appear to be related to the internal structure and culture of the unit, and not to external factors or the intervention itself. Attitudes and knowledge of patient safety practices are insufficient to overcome the challenges

towards implementation. A framework for future implementation should include education and communication programs, adaptation of existing practices to increase leadership engagement, and use of tools to create a strong culture of safety.

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1. Introduction

1.1 Medical Error

The occurrence of medical harm is tied to the history and practice of medicine itself. Medical errors pose a significant public health concern and represent a critical threat to the safety of a patient in a hospital environment. A medical error is defined as the failure of a planned action to be completed as intended or an "act that does not achieve its intended outcome" (La Pietra et al., 2005). This includes the possibility of commission (doing something wrong) or omission (failing to do the right thing) that can expose a patient to a harmful situation or outcome (Leape, 1994). Related terms include "adverse event," which is defined as an injury caused by medical management leading to the prolonged hospitalization of a patient and/or producing a disability at the time of discharge (AHRQ Patient Safety Network). A "near miss" is defined as a case that could have resulted in an adverse event but by early detection, action, or luck, did not result in an adverse outcome (AHRQ Patient Safety Network).

The Institute of Medicine in 2000 defined four categories of "Types of Error" in its seminal report "To Err is Human: Building a Safer Health System (Kohn et al., 2000). These categories are "Diagnostic," "Treatment," "Preventative," and "Other," classifying types of error as mistakes or delays in diagnosis (diagnostic), error in the administering of treatment or drug (treatment), inadequate monitoring of follow-up treatment (preventative), and equipment or system failure (other) amongst other examples. In addition, the total cost to the health system, hospital, and patient in additional care has been estimated at nearly $29 billion per year in hospitals across the United States (Kohn et al., 2000). In a report published in 2017, the World Health Organization (WHO)

reported that the most common adverse safety incidents are related to surgical procedures (27%), medication errors (18.3%), and health care-associated infections (12.2%). These types of adverse incidents can be attributed to both human and system factors. Medical errors create divisions in the psychosocial factors of healthcare access from the patient perspective, such as a lack of trust in provider relations or dissatisfaction with the hospital or health system. As well, errors create stress on health care providers, who become increasingly burdened with low morale, poor outcome results, and stigma or fear in the discussion of errors (Abd Elwahab et al., 2014).

Medical errors are the third leading cause of death in the United States, and in the United Kingdom there is one reported incident of patient harm every 35 seconds (Lancet, 2016). Medical errors are particularly challenging in low- and middle-income countries (LMICs), where the risks of death or complications following surgery can reach 100 times those in high-income countries (HICs) (Weiser & Gawande, 2015). Errors are even more stressful on health care systems in LMICs, where care is already challenged by understaffing, lack of health care instruments, basic equipment shortage, and poor hygiene (Makary et al., 2016; Shanafelt et al., 2017).

There are many potential reasons for the increased rates of medical errors in LMICs, although clear data are lacking. The WHO has attributed the increased burden of unsafe patient care in LMICs to a weak safety and quality culture, disinterested leadership teams, and inconsistent and flawed care processes that further weaken the ability of health systems to ensure patient safety (WHO, 2017). Although an increasing number of studies are confirming a high burden of medical errors in LMICs, there is a significant lack of knowledge, tools, and programs to mitigate the risks of medical errors.

1.2 Programs to Reduce Medical Error and Improve Patient Safety

In recent years, steps to improve patient safety have advanced within the global health agenda, including several large international and multilateral programs to promote health education and to modify hospital processes. International organizations have promoted several individual safety tools, including the WHO Patient Safety Curriculum Guides (Ginsburg et al, 2017), Surgical Safety Checklist (Hurtado et al., 2012), and the Safe Childbirth Checklist**.**

Despite enthusiasm within international global health agencies to address patient safety, the understanding of how to successfully implement programs to reduce medical errors in LMICs remains poorly understood. In an implementation analysis of the WHO Surgical Safety Checklist in Ethiopia, Bashford et al. (2014) noted that lessons learned from the implementation of patient safety programs in high-income countries (HICs) could not be applied to LMICs, where budgetary constraints, institutional hierarchies, and clinical workload interfere with quality improvement (QI) initiatives. Cultural norms and operational work flow have been reported to interfere with compliance of the Surgical Safety checklist in Thailand (Kasatpibal et al., 2012). Although few studies have been conducted to analyze implementation challenges towards patient safety in Latin America, Weiss et al. (2015) identified understaffing, overcrowding, and insufficient financial reimbursement as barriers to care delivery in Mexico. Additionally, Rice et al. (2018) reported successful deployment of a health culture survey in Guatemala, although with limitations including organizational hierarchy and resistance to healthcare change.

Successful implementation of individual safety practices faces many limitations in low-resource settings due to available financial resources, health system capacity,

workforce resources, and within cultural and systemic contexts (Merchant et al., 2015; Lindfield et al., 2015). In a 2016 study involving over 40 WHO member states, the majority of countries were considering the implementation of or in the planning stages of a patient safety program, while less than 10% of respondent countries had a patient safety curriculum in the health education process (Ginsburg et al., 2017). Implementation challenges included a lack of leadership engagement in patient safety curriculum, a lack of governmental commitment to the patient safety curriculum, and insufficient training of faculty to implement such curriculum to students.

These implementation challenges were echoed by Aveling et al. (2013) in a comparison of the use of the WHO Surgical Safety Checklist in LMICs and HICs. Although compliance of the checklist was high in the UK, implementation was supported by a robust health system and established structures and communication systems. However, hierarchical structures and resource constraints made compliance to the checklist in LMICs inconsistent. This hierarchy threatened to introduce unintended risks in staff interactions like damaging career prospects for lower-level hospital workers, while resource shortages causing patient deaths led to threats of physical harm and legal battles for hospital staff. These findings identify limitations to the implementation of a patient safety program without regard for cultural and organizational structures.

Over recent years, health care systems in many HICs have adopted safety processes from external organizations and industries that emphasize provision of a strong "safety culture"—an environment that promotes safety through quality and collaboration (Nieva et al., 2003). Interventions to build a strong safety culture are based on accurate assessment of staff perceptions and views towards patient safety. Systems that can build a

safety culture have the potential to dramatically improve the quality of care in many low resource settings, although the use of such programs in LMICs has been limited (Huang et al., 2007; Sexton et al., 2011). To advance patient safety, improved understanding of the challenges to implementation of programs to support a safety culture is required. The tools of implementation science allow for precise definition of barriers to adoption of these safety programs.

1.3 Implementation Analysis and Frameworks

Implementation analysis refers to the use of "strategies to integrate and promote the uptake of research findings and other Evidence-Based Practices (EBPs) into routine practice to improve the quality and effectiveness of health services" (Nilsen, 2015). Several organizational, cultural, or social domains delineate what is or can be expected for successful health program implementation. As noted by Dane and Schneider (1998), the primary aspects of implementation include: fidelity to the originally intended program, the intervention strength (or dosage) relative to the original program, quality of the conduction of program's components, participant responsiveness to the intervention, and program uniqueness when compared to other programs. Additional elements which impact the implementation of health programs include comparison conditions, program scope, and adaptations made to the original program in the process of implementation.

Implementation analysis is critical to ensure the success of any health care intervention. Without formal understanding of what affects successful implementation of an intervention, it is difficult to determine how outcome data should be interpreted or the extent of improvement (Proctor et al., 2009). Implementation assessment is also important to evaluate the internal and external validity of interventions as well as the

dependency of outcomes on what elements of the intervention were delivered and how they were conducted (Durlak et al., 2008). Implementation research allows for the acknowledgement, observation, and analysis of intended and unintended outcomes of an intervention and considers if an innovation was implemented sufficiently or if the innovation put in practice deviated from the original program. Implementation analysis also assures that problems with health program deployment can be corrected to ensure a favorable outcome.

The practice of implementation analysis is guided by several distinct frameworks, and precise use of these frameworks is essential to characterize the implementation process (Albers et al., 2017). The Consolidated Framework for Implementation Research (CFIR) was designed to unify the many existing implementation frameworks and their derivatives, consolidate essential implementation constructs, and support theory development and verification (Albers et al., 2017). The CFIR was published in 2009 by researchers of the Veterans Affairs Diabetes Quality Enhancement Research Initiative, who were focused on improving the healthcare quality for Veterans (Breimaier et al., 2015). In acknowledging the overlap and gaps between established implementation frameworks, Damschroder et al. (2009) established the CFIR based on common constructs from existing implementation frameworks.

The CFIR involves five major domains: intervention characteristics, outer setting, inner setting, characteristics of the individuals involved, and the process of implementation (Fig 1). Within each domain are construct sub-domains: eight constructs related to the intervention, four related to the outer setting, twelve related to individual characteristics, and eight related to the implementation process. The CFIR is a

comprehensive model that allows researchers the ability to assess all domains and sub-domains to understand the multi-level and dynamic factors that impact program implementation.

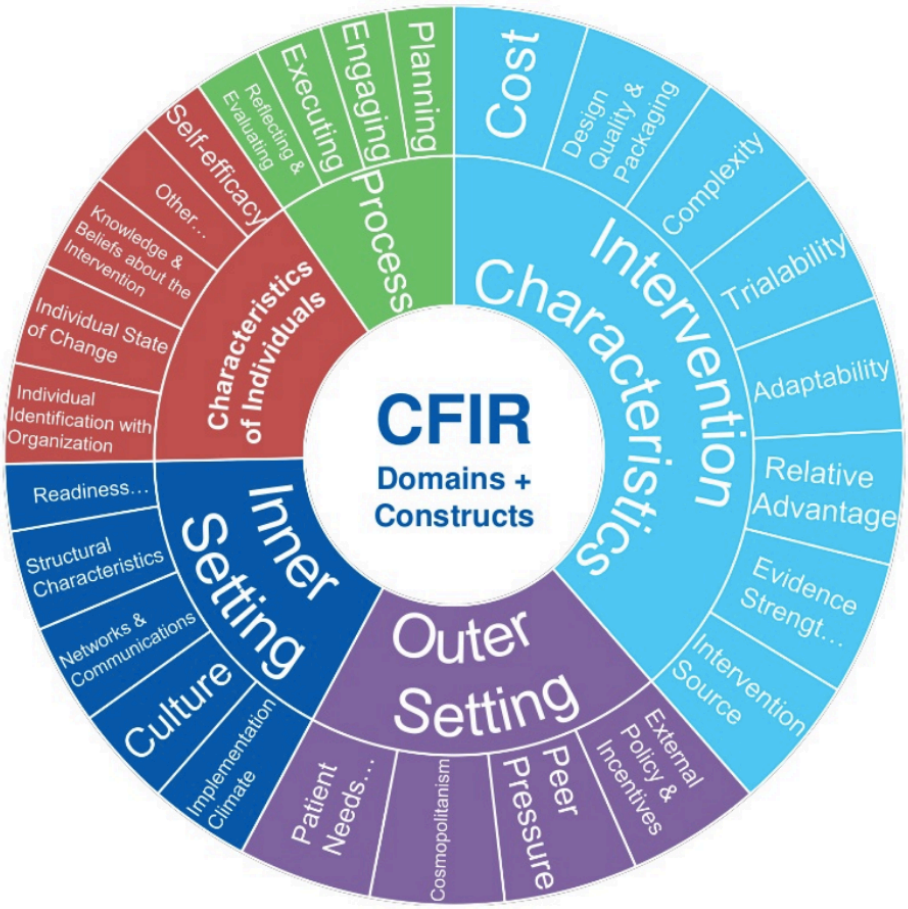

Figure 1. CFIR domains + constructs

1.4 Specific Aims

The growing importance of patient safety in global health has been well-documented in recent research, calls to action, and the promotion of WHO standardized protocols. However, there is a lack of attention on how to successfully implement patient safety programs in LIMCs. The aims of this study are two-fold. First, to identify the determinants which impact the implementation of a comprehensive patient safety program in a pediatric perioperative unit in Guatemala. Second, to establish a framework for the implementation of patient safety programs based on the determinants of implementation and the attitudes towards the use of evidence-based practices. Identifying the barriers to implementation of patient safety programs is a critical step towards adoption of sustained patient safety interventions to prevent medical errors and help create a strong culture of patient safety in Guatemala.

2. Methods

2.1 Overview

This study is an implementation analysis designed to assess the barriers and facilitators to implementation of a comprehensive patient safety program in the pediatric perioperative unit at Hospital Roosevelt in Guatemala City, Guatemala. We used a mixed-methods approach that included qualitative semi-structured key-stakeholder interviews and two quantitative surveys, the Evidenced-Based Practice Attitude Scale-36 (EBPAS-36) and a six question *de novo* cross-sectional survey. All data were triangulated, with our final analysis summarized using the Consolidated Framework for Implementation Research (CFIR). Data were collected over a 10-day period in July 2018.

2.2 Research Tools

The quantitative portion of this study used the Evidence-Based Practice Attitude Scale-36 (EBPAS-36), which is a standardized, validated survey used to assess attitudes towards implementation of evidence-based practices across various health fields (Rye et.al, 2017). As well, we used a semi-structured *de novo* survey tool to assess attitudes towards patient safety.

The EBPAS-36 was originally developed to address implementation challenges within mental health, in which health providers would administer treatments and interventions but lacked the knowledge of the efficacy or evidence-base of these interventions. The tool has 12 subscales: appeal, requirements, openness, divergence, limitations, fit, monitoring, balance, burden, job security, organizational support, and feedback (Rye et.al, 2017).

The EPBAS-36 scale has been used to assess health care implementation across high-income settings. This tool has tremendous potential to assess implementation challenges in global health, although contextualizing the tool to cultural and language constraints in specific LMICs is necessary. As well, given the focus of the EPBAS for use in mental health, we modified the language and context of the survey towards implementation challenges in patient safety. Prior to survey use, copyright privileges were obtained by the survey author to translate and administer the EBPAS (Appendix A).

The semi-structured *de novo* survey contained both quantitative and qualitative portions (Appendix B). The quantitative portion was designed to assess attitudes towards indicators of teamwork (communication, leadership, workload) and patient safety program incentives. As well, we asked responders to indicate their professional role and number of years in practice. This survey contained 6-questions that were analyzed through quantitative analysis and 16 qualitative areas that were guided by semi-structured questions. For our final analysis, we triangulated all data from quantitative and qualitative tools using a mixed method approach to construct a comprehensive framework to address implantation challenges within the CFIR.

2.3 Framework

We chose to use the Consolidated Framework for Implementation Research (CFIR) for our theoretical framework (Breimaier et al., 2015), as this framework is the most commonly used and well-developed framework to guide a systematic assessment of multilevel implementation challenges within a global health context.

For our qualitative survey, we designed the questions using five major domains of the CFIR framework which most closely measure challenges in implementation of a

patient safety program (Table 1). These domains are intervention characteristics, inner settings, outer setting, characteristics of the individual, and the implementation process. Within these domains, five sub-domains were emphasized for relevancy in patient safety:

- Intervention characteristics: adaptability, intervention source
- Inner settings: structural characteristics, readiness for implementation, networks and communication, culture, implementation climate
- Outer settings: patient needs & resources, external policy and incentives
- Individual characteristics: knowledge & beliefs about the intervention, self-efficacy
- Implementation process: champions

These sub-domains were applied towards patient safety to produce a 16-question interview guide (Appendix C). Prior to participation, study participants were instructed to read a one-page WHO Patient Safety guide, which is an informational handout which summarizes a brief overview of core concepts in patient safety as defined by the WHO (Appendix D). This informational material included a model of system-wide responsibility for errors involving patient safety and terminology associated with patient safety culture.

Table 1. CFIR Domains and Constructs with Short Definitions used in this study

Topic/Description	Short Description
I. Intervention Characteristics	
A. Intervention Source	Perception of key stakeholders about whether the intervention is externally or internally developed.
B. Adaptability	The degree to which an intervention can be adapted, tailored, refined, or reinvented to meet local needs.
II. Outer Setting	
A. Patient Needs & Resources	The extent to which patient needs, as well as barriers and facilitators to meet those needs are accurately known and prioritized by the organization.
B. External Policy & Incentives	A broad construct that includes external strategies to spread interventions including policy and regulations (governmental or other central entity), external mandates, recommendations and guidelines, pay-for-performance, collaboratives, and public or benchmark reporting.
III. Inner Setting	
A. Structural Characteristics	The social architecture, age, maturity, and size of an organization.
B. Networks & Communications	The nature and quality of webs of social networks and the nature and quality of formal and informal communications within an organization.
C. Culture	Norms, values, and basic assumptions of a given organization.
D. Implementation Climate	The absorptive capacity for change, shared receptivity of involved individuals to an intervention and the extent to which use of that intervention will be rewarded, supported, and expected within their organization.
E. Readiness for Implementation	Tangible and immediate indicators of organizational commitment to its decision to implement an intervention.
1. Leadership Engagement	Commitment, involvement, and accountability of leaders and managers with the implementation.
IV. Characteristics of Individuals	
A. Knowledge & Beliefs about the Intervention	Individuals' attitudes toward and value placed on the intervention as well as familiarity with facts, truths, and principles related to the intervention.
B. Self-efficacy	Individual belief in their own capabilities to execute courses of action to achieve implementation goals.
V. Implementation Process	
A. Engaging	Attracting and involving appropriate individuals in the implementation and use of the intervention through a combined strategy of social marketing, education, role modeling, training, and other similar activities.
1. Champions	"Individuals who dedicate themselves to supporting, marketing, and 'driving through' an [implementation]" [101](p. 182), overcoming indifference or resistance that the intervention may provoke in an organization.

2.4 Setting

This study was conducted in the pediatric perioperative unit of Hospital Roosevelt in Guatemala City, Guatemala. Guatemala has a population of 16.5 million with over ten million residing in Guatemala City, the country's capital. Two public tertiary hospitals service the population of Guatemala City and the country as a whole: Hospital Roosevelt and Hospital San Juan de Dios. Hospital Roosevelt is the largest tertiary hospital in the country and is located in Zone 11 of Guatemala City's 25 zones with close proximity to the medical education campus of Universidad de San Carlos, the country's largest public institution for medical education.

Hospital Roosevelt is comprised of inpatient and outpatient services. The Pediatric Department contains 12 units with a staff of over 600 physicians, nurses, and clinical and administrative support staff, and 300 patient beds. Services are provided free of charge through the Guatemalan government's public health system comprised of the Ministry of Public Health and Social Welfare (MSPAS), the Guatemalan Social Security Institute (IGSS), San Carlos University, and the health services associated with the Ministries of Defense and Government. Private hospitals, nursing homes, and clinics authorized by the MSPAS serve the private sector. The MSPAS is the country's largest, most comprehensive steering body in health measures and leads the government's healthcare related policies, regulation, and management (Guatemala Health System Assessment 2015).

The pediatric perioperative unit is comprised of the operating rooms and pre-and post-operative services. Sixty-one part-time and full-time staff members (surgeons,

anesthesiologists, residents, nurses, nursing assistants, technicians, and administrative and maintenance staff) service this unit. The perioperative unit has 6 operating rooms and conducts operations three times per week (Monday, Wednesday, Friday) with outpatient and pre-and post-operative services twice per week (Tuesday, Thursday).

2.5 Participants

We collected data from 16 staff members from various roles within pediatric surgical unit of Hospital Roosevelt, representing over 25% of the unit's total staff (n=61, Table 2). Participants were selected from staff in the operating room and pre-and post-operative unit areas. Eligible staff members for participation were those that worked exclusively in the surgical unit and were representative of the diverse experiences and years in specialty in the unit relative to their position.

Prior to the start of this study, participation was encouraged from physician leaders in the unit, with all unit staff members informed of this study in a group setting. Study participants were chosen to represent leadership amongst the range of roles in the unit to provide broad insight to safety attitudes. The 16-interviews were comprised of 2 nurses, 2 chief nurses, 8 physician surgeons (including 1-unit chief), 2 physician anesthesiologists, 1 nursing assistant, and 1 administrative support staff.

2.6 Translation

The EBPAS-36 and *de novo* survey were first written in English and then translated into Spanish according to the WHO "Process of translation and adaptation of instruments" (WHO | Process of translation). Each tool was first translated into Spanish by a local Guatemalan physician familiar in patient safety. This translation step included

cultural adaptation to reflect the context of patient safety within Hospital Roosevelt (Version 1). The translation and cultural adaptation were confirmed by an additional non-native Spanish-speaker (Version 2). Back-translation was completed by one native and one non-native Spanish speaker (Version 3). Pre-testing and cognitive interviewing were completed with a medical-student and two physicians in Guatemala. Changes suggested from each translation step were integrated into the final versions of each survey tool (Versions 4 and 5 (Appendix A)).

The WHO Patient Safety Information handout did not undergo any additional translation process, as it had already been translated into Spanish by the WHO (Appendix E).

2.7 Procedures

All subject interviews were conducted individually in a private office outside of the perioperative unit, in which study participants were asked to meet with the research staff at a pre-determined time or when completed with their duties during their shift. A Spanish-speaking research assistant introduced the research team and described the study in detail to the participant including the multiple areas of participation across the unit and their role-specific participation as a key stakeholder. The research assistant presented the participant-focused study tools (EBPAS-36, *de novo* survey, WHO Patient Safety Information handout) to each participant.

We obtained oral consent in participation in the quantitative survey and qualitative semi-structured interview. Consent to record the interview for analysis was then obtained. The research assistant informed the participant of risk of involvement in

the study, steps taken by the study to ensure anonymity, and a brief analysis plan involving the audio-recorded data. The study would continue only if the participant provided oral consent to participation and audio-recording. The participant was asked if they had any prior knowledge of patient safety, respondents were then directed to read the WHO Patient Safety information handout in Spanish before any further data was collected.

The interviewee was directed to complete the EBPAS-36 and the quantitative portion of the *de novo* survey prior to the start of the qualitative interview. As respondents completed the questionnaires, each person was assigned an identification code of "RV#_periop" to ensure anonymity.

Interviews were conducted using a semi-structured set of questions and consisted of 16 open ended questions about their experience of safety programs, patient needs, national policies, characteristics of the unit, leaders, staff, and perceived support towards the implementation of patient safety programs in their unit (Appendix C). All interviews were recorded on a password-protected audio recorded device. Thirteen surveys and interviews were conducted entirely in Spanish, while three interviews were conducted in English with Spanish surveys. Participants did not receive compensation for their participation. Following the completion of the interview, the respondent was thanked for their participation.

2.8 Measures

2.8.1 Demographics

Two questions in the EBPAS-36 and *de novo* survey about participant demographics inquired about the occupational position of the participant in their unit and the number of years they have worked in that role.

2.8.2 EBPAS-36

The EBPAS-36 survey tool asks 36 questions which measure implementation challenges across 12 subscales: appeal, program requirements, openness, divergence, limitations, fit, monitoring, balance, burden, job security, organizational support, and feedback. Participants use two scales in answering these questions: for 27 questions, respondents answer using a 5-point Likert scale indicating levels of agreement from "Disagree Strongly," "Disagree Slightly," "Neutral," "Agree Slightly," and "Agree Strongly," with an additional "Not Applicable" option. Nine questions in this survey ask participants to indicate levels of agreement across 5-levels from "Not at all," "Slight extent," "Moderate Extent," "Great extent," and "Very great extent."

2.8.3 *De Novo* Survey

The *de novo* survey was a semi-structured survey composed of two parts: a 6-question quantitative portion asked participants to respond to questions regarding communication improvement, leadership engagement, workload, and patient safety program incentives. Participants used a 5-point Likert scale indicating levels of

agreement from “Disagree Strongly,” “Disagree Slightly,” “Neutral,” “Agree Slightly,” and “Agree Strongly,” with an additional “Not Applicable” option.

The qualitative section of the *de novo* survey consisted of 16-questions developed to probe respondents along the five primary domains of the CFIR framework. These domains included intervention characteristics, inner settings, outer setting, characteristics of the individual, and the implementation process.

2.9 Analysis

2.9.1 Qualitative Analysis

Interview recordings were transcribed by a team of medical students from the University of San Carlos of Guatemala (USAC) and translated by research staff at Duke University. Following translation and transcription of interviews, transcripts were imported into NVivo version 12 and analyzed using a thematic analysis approach (Vaismoradi et al., 2013). Interviews were coded for emergent themes under categories that were identified *a priori, which were developed into* a codebook. These codes were guided by the CFIR framework, with CFIR domains and constructs applied to specific questions of the interview guide. These categories included: local leadership, teamwork, safety climate, general barriers and facilitators to patient safety program implementation, adherence, importance, innovation characteristics, outer setting, inner setting, and characteristics of individuals. Emergent themes of the determinants of implementation were identified through an iterative process and broadened to apply to the domains of the CFIR.

Representative quotations were chosen to illustrate each of the comprehensive themes and to identify the theme within and across CFIR. Interview transcripts were revisited in order to provide context to the quotations.

2.9.2 Quantitative Analysis

Survey data were entered into a Research Electronic Data Capture (REDCap) database. Quantitative survey data was analyzed using author-guided scoring methods. Each of the 12 subscales in the EBPAS was scored by computing the mean score for each set of questions that load on a subscale. After including reverse scoring, mean scale scores were calculated for the total EBPAS-36 Item Score. Descriptive statistics (SD, Confidence interval) were found for each question and Cronbach Alpha was calculated for each subscale to determine reliability. Similar analysis was completing for the quantitative portion of the *de novo* survey tool.

2.9.3 Triangulation

Triangulation between the qualitative (interview data) and descriptive quantitative (EBPAS-36, *de novo* survey) data was performed to identify dimensions of the barriers towards the implementation of a patient safety program. First, themes identified in qualitative data as 'barriers' and 'facilitators' were identified and correlated with similar themes as identified by high mean scores across domains of the EBPAS and the *de novo* survey. Qualitative data was used to complement and clarify quantitative findings to define intersecting variables by which safety culture and practice are most significant in the implementation process. Qualitative themes identified as barriers and facilitators were then coded according to CFIR guidelines using the *a priori* codebook. These themes were

matched to the scaled EBPAS domain and *de novo* survey scores indicating positive and negative attitudes. Quantitative domains and qualitative themes without a match were identified as non-intersecting domains and themes.

These findings can be further addressed as quality improvement interventions. This analysis disclosed areas of intersection between attitudes towards implementation change and barriers and facilitators towards implementation.

2. 10 Ethics approval

All study procedures were exempt by the ethical review boards at Duke University. As Guatemala and affiliated local universities do not have a formalized ethical review procedure, study procedures were development and adapted with research and medical leaders familiar with Guatemalan research practices.

3. Results

3.1 Description of Sample

The 16 participants in this sample belonged to five role designations: physician (n=10, 62.5%), chief nurse (n=2, 12.5%), nurse assistant (n=2, 12.5%), nurse (n=1, 6.25%), and administrative support (n=1, 6.25%). This sample collectively represented 26% of the total pediatric perioperative health workforce (n=61). The years in specialty/role varied in participants from 1-2 years (n=1, nursing assistant) to over 21 years (4 physicians, 2 chief nurses, 1 nurse assistant, 1 nurse).

Table 2. Sample demographics and characteristics

Role	n	Years in Specialty
Physician	n=10	
	4	21 years +
	4	11-20 years
	1	5-10 years
	1	3-4 years
Chief nurse	n=2	
	2	21 years +
Nurse assistant	n=2	
	1	21 years +
	1	1-2 years
Nurse	n=1	
	1	21 years +
Administrative support	n=1	
	1	5-10 years
Total	**n=16**	

3.2 Qualitative Results

Qualitative results were derived from the 16 semi-structured key stakeholder interviews. Results represented the CFIR Inner setting and Characteristics of Individuals domains. The Intervention Characteristics, Outer Setting, and Implementation Process domains were not widely or consistently represented in participant responses and were excluded in final analysis. Thematic determinants were derived following the coding process of all interviews and the identification of overlapping themes across respondents (Table 3).

3.2.1 Determinants towards Implementation in the Inner Setting

Four of the five CFIR Inner Setting constructs were represented in respondent interviews: readiness for implementation: leadership engagement; structural characteristics; implementation climate; and culture. Themes identified within in the Inner Setting domain were classified as obstacles and enablers towards implementation.

Barriers towards Implementation in the Inner Setting

Three barriers to implementation were identified: limited leadership engagement, a lack of patient safety data collection/reporting channels, and the overburden of healthcare workers. These barriers represented two constructs within the Inner Setting domain: leadership engagement and structural characteristics.

Limited leadership engagement

Respondents commented on limited leadership engagement primarily in four secondary themes: hierarchical leadership structure, limited capacity for program

leadership, lack of physical leadership presence, and a communication strain between leadership and the team.

Hierarchical leadership structure

Respondents commented on the leadership structure that exists within the perioperative unit which impacts safety practices, and that physicians and medical directors are considered at the head. Leadership was identified as physicians, even if the respondent was not a physician or did not directly report to a physician. One participant reported a gender-biased leadership hierarchy in a comment regarding the "hormones" of female physicians. Some respondents reported a system of management in which information or requests must pass through and the need to be included in open communication with leadership.

> *Int: ¿Can you tell me who these persons are?*
> *Resp: Here it is... This is a system in "cascade", I call it. Ok. In which if the order is accepted, if the system obviously, adopts the need for this protocol, then obviously then the head (main boss) will make everything else (attending, residents) works properly and at the end the program will be possible implemented. (Participant RV12_periop)*

Limited capacity for program leadership

Some respondents reported that there is a limited capacity for leadership of patient safety programs. As clarified by the interviewer, one respondent noted that due to salary and time constraints, there potentially could be hesitation for someone to take leadership of a new program. In addition, respondents suggested that there would not be a leader for a department to address patient safety within the hospital.

> *Int: And do you believe that if talking about this salary insufficiency right, you believe that this would affect that someone other than the leaders*

could improve this program for the time this you are really referring to right, for the time?
Resp: Yes for the time
Int: For the time it is difficult for someone else to dedicate a little more to this.
Resp: mhm (Participant RV08_periop)

I mean, no one is interested. I'm not sure if there is a department inside the hospital, about taking care of all this stuff. I'm not sure. [Talks to someone else] I don't think we have that. I mean, who is going to be in charge of that? No one is going to be in charge of that. It's just your personal interest.
(Participant RV04_periop)

Lack of physical leadership presence

Respondents commented on the lack of leadership presence as a barrier to use of standardized protocols. Practice at the Hospital Roosevelt is for attendings physician to only be on-site during the mornings, as they commonly attend private clinics during the afternoons. As such, resident trainees perform operations with little supervision during the afternoons or evenings, resulting in a lack of on-site leadership to encourage consistent safety practices This practice leads to a difficulty in consistent implementation of safety programs.

Int: "Now with respect to the intervention right, why you consider or why do you believe that a patient safety program should be implemented in your area of work?
Resp: Because these norms would help us as a foundation to start a safety program. Having this norms on a paper will help us as a guide, so with any concern at anytime, the team can look on it and consult and answer their question. The team could say "ah well the protocol says this, this and this then we will follow, because they do not have supervision twenty-four hours a day. I'm with them from seven to three in the afternoon, the rest of the hours and night they are alone" (Participant RV09_periop)

Communication strain between leadership and team

Many respondents commented on the need for improved communication between unit leadership and members of the surgical team or clinical/non-clinical support staff. Participants expressed interest in being involved in decision making for unit-wide interventions though noted that this need that was not being addressed by current unit leaders.

> *"What do I need? That our leaders meet with us, that we are part of their community. That we do not live in a separate world, in which they should join us in a meeting and talk to us, to announce the protocol. To share the idea with us, so that we say together "we are going to take care of the patient and we are going to do it in this way." The biosafety regulations. We will work on it together but without exhaustion on one's part, because "I want you to do it" but I'm not going to do it, it's not not like that, but let's work together. (Participant RV09_periop)*

Lack of patient safety data collection and reporting channels

Some respondents discussed the lack of known patient safety metrics (morbidity or mortality rates, infection rates, adverse events, etc.) or data collecting practices. Collection of this data is standard practice across high income healthcare settings, and are often used to guide QI in hospitals ("Guide to Inpatient Quality Indicators: Quality of Care in Hospitals – Volume, Mortality, and Utilization"). One respondent commented on the low rate of surgical infection within the unit, although no practice is in place to track this statistic. This comment is then also reflective of a need to embellish current safety practices and a confirmation of a lack of structured data collection regarding infections. Another respondent noted that the lack of data collection procedures limits the perceived impact of how much a patient safety program may be necessary.

> *It worth a lot in terms of patient safety how translated into numbers pitifully we do not have our numbers in terms of morbidity. Yes, we carry monthly the cases that are bad and of mortality, but we do not have in the long term the impact that this causes in the patients. And to see that reflected in numbers regarding changing small things of, of patient safety makes changes as soon as we have better results, in the reception of patient treatment and morbidity and mortality, also only by improving the surgical wound infections I think we all would dedicate 5 more minutes to read the safety sheet and reduce the infection rates we have. (Participant RV07_periop)*

Similarly, several respondents cited a lack of safety reporting channels. Some respondents noted that there are no official channels to discuss, record, or report adverse events but instead workers informally, and in confidence, discuss events among their colleagues. The "honor code" indicated below describes a comradery formed between colleagues in which procedures and actions are talked about and colleagues support and help each other process a mistake and consequences of such action. However, these such discussions do not allow for external or formal review by others or leadership in the unit to ensure the event is not performed again.

> *Resp: when I tell you, we have an honor code--*
> *It is for example if my patient dies my colleagues ask me "what happened"?*
> *Then look at this step and the other, another patient with the same pathology dies again my colleagues tell me "Stop," or "they didn't have to die, but it simply is complicated"*
> *Int: Of course*
> *Resp: "What happened?" So, I cannot lie to them.*
> *Int: Of course*
> *Resp: I have to tell them "look I could not do it" such and such, then it is done. [They say] "But look, why did you program it like that?, we could have helped you" We have had that code since the attendings of a long time ago. (Participant RV08_periop)*

Overburden of healthcare workers

Many respondents discussed challenges regarding the high burden of hospital workers in regard to the number of patients, operations, and responsibilities. Respondents commented that the high patient volume limits the time given to care for an individual patient. In addition, one respondent noted that the burden of patients leads to a high number of operations and little time for breaks time between procedures, which can lead to mistakes or adverse events. This theme is supported by the CFIR inner setting structural characteristics construct.

> *The truth is that if we are going to look at how many patients we have, it is too much. There is a lot of demand for so little nursing staff, that is, or that is— we would like to give more of what we want and can, but it is too much, and we cannot give individual care or—security if we try to give it, but an individual cannot to each patient. (Participant RV02_periop)*

> *I don't think they follow these protocols, especially from 3 o'clock pm to the next day.*
> *Int: So in the afternoon is when attendings—*
> *Resp: We work only from 7 o'clock to 11 or noon, and then the residents and the fellows are in charge of the patients, so I'm not sure if they follow-*
> *Int: It's more difficult for them to follow the protocols?*
> *Resp: Yes, because they must do a lot of surgeries, sometimes they have no time to eat or drink some coffee—so they don't follow the instructions as they could do it. They are rushing all the time. (Participant RV04_periop)*

Facilitators towards Implementation in the Inner Setting

Two primary facilitators towards implementation of a safety program within the CFIR Inner Setting domain were identified: agreeance to the adaptation of a patient safety program to the unit and enthusiasm for improving patient outcomes. These enablers represented two constructs within the Inner Setting domain: implementation climate and culture.

Agreeance to the adaptation of a patient safety program to the unit

Respondents generally agreed that patient safety interventions must be adapted to address the needs and structure of the unit. This general theme was underscored by two secondary themes: knowledge to the process of creating change in the unit and Interest in shared responsibility of intervention amongst all unit roles. These themes were representative of the Culture CFIR construct.

Knowledge to the process of creating change in the unit

Many respondents indicated a need for processes to implement safety interventions in the unit by approaching unit leadership. This facilitating theme addresses the barrier of hierarchical leadership. Respondents that can navigate this leadership structure may be targets for championing safety interventions in the unit.

> *I think the most important thing is to develop the protocol, establish and adapt it to the level of local needs, ask the higher authorities, and then after this, do educational workshops do education and incentives so that this can be implemented and bring change. (Participant RV12_periop)*

Interest in shared responsibility of intervention

Respondents noted a shared interest in involving roles outside of unit leaders and all levels of healthcare workers within the unit in contributing to the intervention. Comments included the need to include the diverse unit workforce to adapt safety programs through education, continued certification, and preoperative discussions.

> *Int: What kind of local, departmental, or national policies may influence the decision to implement a safety program?*
> *Resp: I think we need a course and make meetings of Congress to reach all the people. And re-certificate every one-year or every two years, re-certificate the patient security program. But we need to make a meeting of capacitation to all the people: nurse, doctors, the people to clean—*

> *because they are close to attending every emergency. All the people that work in this unit. (Participant RV05_periop)*

> *Yes, I think what we need is to make the discussion involving the rest of the team that will be there, like anesthesia, nursing, so that we are in the same agreement at the time of treatment. (Participant RV07_periop)*

Enthusiasm for improving patient outcomes

Overall, respondents expressed enthusiasm and interest in improving patient outcomes. This theme was underscored by two secondary themes: Readiness to strengthen/organize existing patient safety protocols and resilience. These themes were representative of the Implementation climate CFIR construct.

Readiness to strengthen/organize existing patient safety protocols

Many respondents indicated the informal and inconsistent use of checklists in the unit, and some saw this practice as an opportunity to enhance and enforce its use. Others commented on the need for improvement and increased number of handwashing stations within the unit. This facilitator responds to the barrier of a limited use of evidence-based practice of patient safety, as respondents expressed an interest in formalizing and structuring informal patient safety practices.

> *Int: In your unit, are there programs or instruments to prevent harm to patients?*
> *Resp: There exist a sheet of [an] initial checklist in the operating room but the truth is that only the infirmary and anesthesia mark it, the only thing they do is sign it as a hospital requirement, but they do not give it importance neither do [they] make adequate use of it. I think this would be the ideal way to start the program [inaudible], to have better results in terms of patient safety, we are making sure that the patient is, the type of surgery that [they] are going to do and have everything that is going to be needed during the surgical process. (Participant RV07)*

Resilience

Many respondents expressed strong positive views towards staff resilience for caring for patients, despite a high burden of patients or other barriers that exist within the unit. Respondents noted strong religious reasons and feelings of value of working with families as reasons to optimally perform in their role and ensure the safety of the patient.

> *Look, I come every day to demand the same, to demand care for children, that's our attitude so we don't negatively affect our patients when we all come in with problems from the streets. I even tell my residents "the problems you all bring from the street stay on the ramp, when you leave." That is, it should not affect anything. We must be here with the best attitude. (Participant RV03_periop)*

> *I love my work. I love the patients, I owe it to patients and the moment I get bitter or I turn to embittered, as you could say depressed or whatever, it would not come. I´m still excited and I continue to transmit to the young people, that we aren´t well but that we are going to leave hope, the time will come when we will be able to. (Participant RV08_periop)*

3.2.2 Determinants towards Implementation from Characteristics of Individuals

One CFIR Characteristics of Individuals construct was strongly represented in respondent interviews: knowledge and beliefs about the intervention. Themes identified within in the Characteristics of Individuals domain are classified as obstacles towards implementation. Two barriers towards implementation were identified: Limited formal education on patient safety and a limited use of evidence-based practice of patient safety.

Limited formal education on patient safety

Several respondents stressed a lack of education, training, and knowledge of patient safety. When asked to consider changes that would need to be made to successfully implement a patient safety program, the need for education was frequently mentioned. Educating higher level unit-leadership (physicians) was emphasized largely

due to a physician's assumed role of leadership through example. Although respondents acknowledged the use of informal practices of patient safety protocol, many respondents recognized that those not involved in these practices or those that did not know these practices were in place, do not have any formal knowledge of patient safety programs.

> *Int: what do you know about a patient safety program or its implementation?*
> *Resp: I do not know much, because there are no such programs here. The only thing that there is is the "checklist" and we fill it in. That is, we look. (Participant RV03_periop)*

> *I think that increases the, the waiting time between each surgery for us. In terms of the safety sheet that is not made, I think the main setback that [you] have is that [you] have no real knowledge of everything, I believe it would be worthwhile to do a review by the medical staff to be able to propose the best way to use it [the program] and things that would be necessary and useful for ourselves to, to have regarding the patient. (Participant RV07_periop)*

Limited use of evidence-based practice of patient safety

Several respondents indicated a knowledge or awareness of patient safety programs or formalized protocols, although they mentioned that these practices are not commonly or formally used in their unit. Some respondents commented on the informal use of checklists or that a checklist system is in place, although other respondents noted that this is not widely known or utilized throughout the unit and thus indicates a limited use of the practice. Respondents indicated that although programs like safety checklists may be used in the unit, they were of limited scope and did not include most surgical team members. One respondent noted that there are no formal programs that exist and that a clinician may take steps to address patient safety or reduce patient harm through their own experience or interest to do so.

Int: Are there any programs in your unit that are used to prevent harm to patients?
Resp: Not written.
Int: Not written? Ok, so more informal?
Resp: We do not have protocols.
Int: But there are informal programs that you do?
Resp: Yeah, but in our minds.
Int: Is that developed through experience?
Resp: Yes. (Participant RV04_periop)

Resp: Maybe…a checklist?
Int: Yes!
Resp: No, we don't have a checklist. (Participant RV05_periop)

Table 3. Summary of Determinants towards Implementation

CFIR domain	CFIR construct	Determinant towards Implementation
Barriers		
Characteristics of Individuals	Knowledge & Beliefs about the intervention	Limited formal education on patient safety
		Limited use of evidence-based practice of patient safety
Inner setting	Leadership engagement	Hierarchical leadership structure
		Limited capacity for program leadership
		Lack of physical leadership presence
		Communication strain between leadership and team
	Structural characteristics	High patient volume
		Lack of patient safety indicators
Facilitators		
Inner setting	Culture	Knowledge to the process of creating change in the unit
		Interest in shared responsibility of intervention amongst all unit roles
	Implementation climate	Readiness to strengthen/organize existing patient safety protocols
		Resilience

3.3 Quantitative Results

3.3.1 Evidence Based Practice Attitudes Scale-36 (EBPAS-36)

Respondents to the EBPAS-36 were the same respondents as the qualitative portion of this study. Sample size per scale ranged from 13 to 16 participants due to missing data to some answers in three surveys.

Participants attitudes were generally positive with a mean (±SD) EBPAS-36 score of 2.84 (±0.62) out of a possible score from 0 (Disagree Strongly) to 4 (Strongly Agree), with a higher score indicating a more positive attitude towards the adoption of EBPs. Of the 12 scales of the EBPAS-36 (requirements, appeal, openness, divergence, limitations, fit, monitoring, balance, burden, organizational support, feedback), the highest mean scale was 3.88 for "openness" indicating a positive attitude towards the extent to which a respondent is generally open to trying new interventions and willing to try or use new types of EBP in a clinical environment (Aarons, 2004). The "balance" scale showed a mean score of 1.58 indicating a strongly negative attitude towards the low use of EBPs, and thus a positive attitude overall. The questions tested in the "balance" scale had participants respond to the perception that EBP is a balance between art and science, to which respondents answered negatively. The 10 other EBPAS-36 scales reported mean scores ranged from 2.10 to 3.31 indicating positive attitudes towards EBP (Table 5).

Cronbach's alpha scores, indicating the internal consistency of the three questions in each scale of the EBPAS-36, showed high internal consistency among respondent answers. Cronbach's alpha scores theoretically fall between 0 and 1, with a

score of 0 indicating little to no internal consistency, 0.60-0.70+ suggesting high internal consistency, and 1 indicating redundancy (Tavakol & Dennick, 2011). The mean Cronbach's alpha score for all respondents in this sample was 0.67 indicating high internal validity. Within the EBPAS-36 scales, "limitations" had the lowest score of 0.19 and "job security" had the highest score of 0.91. These extreme values can indicate a perceived variation or similarity in the questions and can be due to the small sample size of respondents. The 10 other EBPAS-36 scales reported Cronbach's alpha scores ranging from 0.56 to 0.88 indicating high internal consistency (Table 5).

Table 4. Attitudes about the use of Evidence-Based Practice

EBPAS-36 Scales	n	M	SD	Confidence Interval (a=.05)	Cronbach Alpha (α)
1. Requirements	**15**	**3.24**			0.68
Supervisor required		3.33	0.72	(2.97, 3.70)	
Agency required		3.47	0.64	(3.14, 3.79)	
State required		2.93	1.03	(2.41, 3.46)	
2. Appeal	**15**	**3.49**			0.56
Makes sense		3.47	0.64	(3.14, 3.79)	
Colleagues happy with intervention		3.40	0.63	(3.08, 3.72)	
Get enough training to use		3.60	0.51	(3.34, 3.86)	
3. Openness	**16**	**3.88**			0.82
Will follow a treatment manual		3.88	0.50	(3.51, 4.12)	
Like new intervention types		3.94	0.29	(3,80, 4.08)	
Intervention developed by researchers		3.81	0.39	(3.62, 4.00)	
4. Divergence	**15**	**2.84**			0.75
Research based treatments not useful		2.87	1.46	(2.13, 3.60)	
Will not use manualized therapy		2.47	1.68	(1.61, 3.32)	
Clinical experience more important		3.20	1.37	(2.51, 3.89)	
5. Limitations	**16**	**2.10**			0.19
Patients with multiple problems		2.88	1.59	(2.10, 3.65)	
Not individualized treatment		2.38	1.54	(1.62, 3.13)	
Too narrowly focused		1.06	1.34	(0.41, 1.72)	
6. Fit	**16**	**3.58**			0.72
Right for your patients		3.56	1.09	(3.03, 4.10)	
Had a say in how to use the EBP		3.56	0.29	(3.42, 3.70)	
Fit with your clinical approach		3.63	0.39	(3.43, 3.82)	
7. Monitoring	**16**	**3.46**			0.62
Work without oversight		3.44	0.96	(2.97, 3.91)	
Looking over my shoulder		3.63	0.89	(3.19, 4.06)	
My work does not need to be monitored		3.31	1.25	(2.70, 3.92)	
8. Balance	**16**	**1.58**			0.61
Positive outcome is an art		2.38	1.45	(1.66, 3.09)	
Therapy is an art and a science		0.63	0.96	(0.16, 1.09)	
Overall competence is more important		1.75	1.39	(1.07, 2.43)	
9. Burden	**16**	**2.52**			0.70

Don't have time to learn anything new		2.50	1.59	(1.72, 3.28)	
Can't meet other obligations		2.81	1.52	(2.07, 3.55)	
How to fit EBP in		2.25	1.69	(1.42, 3.08)	
10. Job Security	**15**	**2.31**			0.91
Help me keep my job		2.27	1.33	(1.59, 2.94)	
Help me get a new job		2.13	1.60	(1.32, 2.94)	
Make it easier to find work		2.53	1.46	(1.80, 3.27)	
11. Organizational Support	**15**	**2.82**			0.88
Continuing education credits provided		2.07	1.71	(1.20, 2.93)	
Training provided		3.27	1.80	(2.62, 3.91)	
Ongoing support provided		3.13	1.30	(2.47, 3.79)	
12. Feedback	**13**	**3.31**			0.66
Enjoy feedback on performance		3.77	0.60	(3.44, 4.09)	
Feedback helps me to be better		3.62	0.96	(3.09, 4.14)	
Supervision helps me to be better		2.54	1.71	(1.61, 3.47)	
EBPAS Total		**2.84**	**0.62**	**(2.22, 3.46)**	

Note. EBPAS-36 total, subscale, and item mean scores range from 0 (Disagree Strongly) to 4 (Strongly Agree). Sample size ranges from 13 to 16 due to missing data.

3.3.2 *De novo* survey

The six-question quantitative portion of the *de novo* survey had respondents record two questions regarding demographic information (position, years in specialty) as well as 4 questions regarding overall attitudes towards patient safety, including physician engagement in patient safety, workload burden, communication, incentives towards improving patient safety. The mean score for all four patient safety attitudes questions was 3.28, indicating strongly positive attitudes about attitudes towards patient safety. The highest mean of an individual question was in regard to the improvement of communication, to which respondents indicated high levels of agreement with a value of 3.53. In constant, participant belief that physician leaders want to improve patient safety had the lowest mean of 3.13 (Table 6).

Table 5. Summary of Quantitative De Novo survey

In this work setting …	**n**	**M**	**SD**	**Confidence interval (a=.05)**	**Cronbach's Alpha(α)**
… I believe our physician leaders want to improve patient safety.	16	3.13	1.45	(2.41, 3.84)	_____
… my heavy workload can lead to mistakes.	16	3.25	1.15	(2.70, 3.80)	_____
… communication could be improved.	15	3.53	1.06	(3.00, 4.07)	_____
… incentives to improve patient safety would be well received by hospital staff.	16	3.19	1.17	(2.62, 3.76)	_____
Total		**3.28**			**0.61**

3.4 Triangulation Results

3.4.1 Areas of Intersection

Data was triangulated from qualitative interviews and the scores from the EBPAS-36 to identify areas of overlap. An openness towards safety interventions was mirrored in high scoring values for the EBPAS "openness" domain and in qualitative interviews, with most respondents commenting on the need for and interest in education programs on patient safety and an enthusiasm for improving patient care. Dissonance in attitude and practice exists as qualitative interviews document that no patient safety education or formal programs are currently in place, despite positive attitudes towards the concepts.

Respondents indicated a negative attitude towards such oversight by supervisors. Although most respondents generally described good relations with unit leaders, limited leadership engagement was widely discussed. In addition, respondents identified a lack of communication between leaders and team members. Some acknowledged the lack of leadership presence on the unit and little feedback or discussion of work performance especially in relation to adverse events or near misses.

In addition, respondents have a high interest in receiving positive feedback. Although respondents want to be included in discussions and decisions made by unit leaders, they do not feel that their work should be monitored, do not have positive attitudes to leadership oversight, but want to receive feedback on their work performance. This indicates that communication within the unit can be improved through feedback channels, though such communication channels should not include monitoring or oversight of an individual's work.

Participants have an openness to adopting a new practice if required by an employer in the EBPAS. Despite the hierarchical leadership structure identified by qualitative interviews, respondents appear to adhere to employee requirements. This indicates that hierarchical structure may not be a formidable barrier to implementation if unit-level policies and expectations are in place for all health workers. The hierarchical structure can be utilized for implementation if leaders are engaged in adhering to such requirements as respondents believe that leaders are interested in improving patient safety.

Respondents recognized a lack of organizational support which can be attributed to the limited leadership engagement through the "organizational support" EBPAS domain. In interviews, respondents described the need to involve unit members of all roles to adapt patient safety programs, which can improve the attitudes towards organizational support within the unit. The lack of organization support could also be attributed to the overburden felt by respondents, reflective of the strained health system especially in a public hospital. Respondents do not feel support by the hospital organization as a whole though want to foster in-unit organization support through collaboration and implementation adaptation.

Respondents' showed a strong resilience towards caring for their patients, in which providers indicated in qualitative interviews was their primary priority despite high patient volume and systemic obstacles. This mirrored high attitude scores reflecting that that evidence-based patient safety practices can fit the values and needs of the patient and provider. Respondents also do not perceive the implementation of patient safety programs

to be an additional burden to their clinical and administrative duties. In addition, respondents had a generally negative attitude towards the inability of EBPs to address patient need, and thus a positive attitude overall. The implementation of new practices, then, does not contribute to the overburden felt by health workers—and must not contribute to this overburden in future intervention.

3.4.2 Non-intersecting Themes

Two areas of interest from the qualitative and quantitative portion of the *de novo* survey could not be triangulated with the EBPAS-36. The "lack of patient safety indicators" and any mention of attitudes towards incentivizing the adoption of a patient safety program derived from qualitative interviews did not have any overlap with EBPAS domains and represent distinct subjects of the *de novo* survey.

Similarly, three EBPAS domains could not be triangulated as they were not reflected in results from the *de novo* survey. These domains were: divergence, balance, and job security. The divergence domains assess respondent's attitudes towards whether interventions are not clinically useful; balance assesses respondents' perceptions that interventions require a balance between art and science; job security assesses the likelihood of job security or professional marketability through the use of EBP. Interview questions created from CFIR guidelines did not address these topics. Scores of 2.84 (Divergence), 1.58 (Balance), and 2.31 (Job Security) indicate that respondents had negative attitudes towards the exclusive use of clinical experience to guide their practice, the relevance of art in EBP, and the likelihood of increased job security through

evidence-based patient safety programs. These attitudes were only captured in responses to the EBPAS-36 survey (Fig 2).

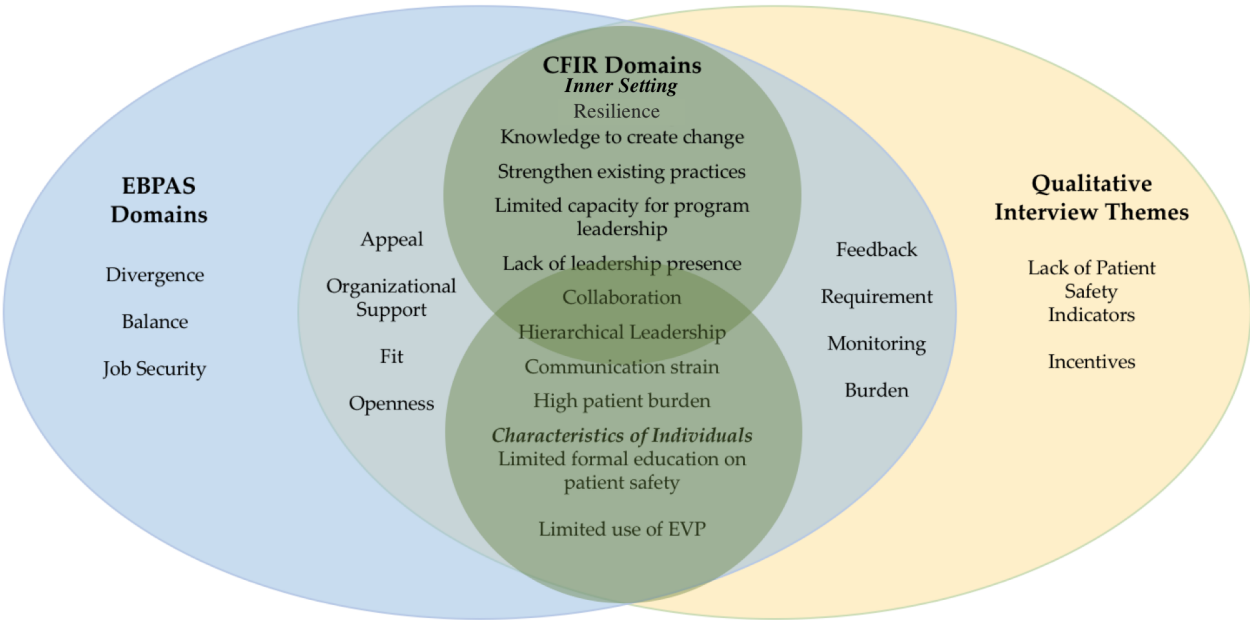

Figure 2. Summary of Triangulation

3.5 Emergent Themes

Participant responses from the EBPAS-36 and *de novo* survey underscored two emergent thematic facilitators to implementation of a safety program: agreeance to the adaptation of a patient safety program to the unit and enthusiasm for improving patient outcomes. Participant responses also demonstrated five emergent thematic barriers towards implementation: limited formal education on patient safety, a limited use of patient safety EBP, limited leadership engagement, limited effective communication throughout the unit, and an overburden of healthcare workers. These themes indicate a gap in knowledge and practice of patient safety programs and the attitude towards the use of evidence-based patient safety programs. Though many respondents expressed an

openness and willingness to adopt patient safety practices or requirements, there is little evidence of these attitudes in practice in relation to patient safety.

4. Discussion

Results of our study identified several barriers and facilitators towards the implementation of an evidence-based patient safety program within the pediatric perioperative unit at Hospital Roosevelt, Guatemala's largest public hospital. The main barriers to implementation are related to CFIR Inner Setting and Characteristics of Individuals domains rather than the intervention itself. Despite positive attitudes towards change and implementation and a knowledge of the importance of patient safety practices, little is done currently to promote patient safety protocols in the pediatric perioperative unit. This suggests that positive attitudes and knowledge are not sufficient to overcome the barriers of implementation.

Both qualitative and quantitative data confirmed several barriers and facilitators to implementation of safety programs, many of which have been identified in the existing literature. These include a lack of leadership engagement in patient safety and insufficient training and/or education programs for faculty and staff on patient safety curriculum (Ginsburg, et al., 2017). Similar attitudes towards patient safety have been reported by Latin American medical students who received patient safety training (Mira et al., 2015). Similarly, the hierarchical leadership structure, poor communication between leaders and surgical teams, and overburden described by respondents have been recognized as challenges in surgical units in LMICs (Aveling et al., 2013; Mazzocco et al., 2009). Prior studies focused on patient safety programs found that senior leadership engagement and accountability are the keys to an organization's development of a culture of safety (Sammer et al., 2010). However, obstacles such as the lack of consistent on-site

leadership in Guatemala emphasize the need for established protocols. The informal safety practices within the perioperative unit at Hospital Roosevelt are starting points for implementation, particularly if coupled with strong positive views towards organizational leadership and the resilience to care for their patients. These findings enforce the use of the CFIR model for this implementation analysis as primary obstacles and enablers stemmed from the addressing changes within the unit itself.

Our analysis established a framework to improve the implementation of patient safety programs based on triangulation of the determinants of implementation and the attitudes towards the use of EBP. Triangulation using the CFIR model suggests that a implementation of a patient safety program in the perioperative and other units must include consideration for the culture and behaviors of individuals within the unit (Fig 3). The implementation of a safety intervention is likely to be well-received, although the process of implementation and the intervention itself must not contribute to the high job burden felt by respondents, as this additional burden would threaten the sustainability of the intervention. Programs must be time sensitive and aim to adapt informal programs already in place, or scale-up new programs in small steps.

Efforts to engage all team members must be applied to decisions regarding patient safety to address the limited leadership engagement by leaders. This can be accomplished through improved and consistent communication channels and reporting systems for general work performance and adverse events in relation to patient safety. These changes can lead to increased leadership engagement and collaboration between leaders and all members of the surgical teams. Efforts to improve communication should

be implemented in a supportive and iterative way to address respondents' satisfaction with positive feedback and frustration towards being monitored in their work, in order to foster psychological safety in the discussion of work performance and feedback especially in relation to incidents of medical error.

Implementation of a patient safety program should take advantage of the strong staff resilience and dedication shown towards the care for patients that underscores the day-to-day behavior and work ethic of health workers in this unit. This can be addressed through improved education and training programs for all hospital workers with continuing education consultations and follow-up (Edmunds et al., 2013) to emphasize the potential for patient safety programs to improve clinical outcomes of patient care and establish patient safety as a part of the culture of the unit. When education programs are coupled with existing practices, patient safety indicators can then be created and applied which when utilized, can lead to improved clinical outcomes.

We have summarized our analysis in a framework in line with the CFIR constructs (Fig 3). As seen in our framework, the implementation of a patient safety program requires coordinated education, unit-level communication behavior changes, or the adaptation of practices and protocol to lead to the creation of a patient safety culture and improved healthcare delivery and quality. These components must be aligned across the surgical team to ensure coordinated efforts to improve the safety culture. Bosk et al. (2009) note that safer [patient] care is achieved at the realization of simplicity, feedback on outcomes, and the improvement culture by building expectations of standards into work processes. This was seen in the implementation of the Safe Surgical checklist in

Keystone, Michigan in which operating team members were able to reinforce the efforts towards patient safety of other team members with a shared sense of mission (Bosk et al., 2009).

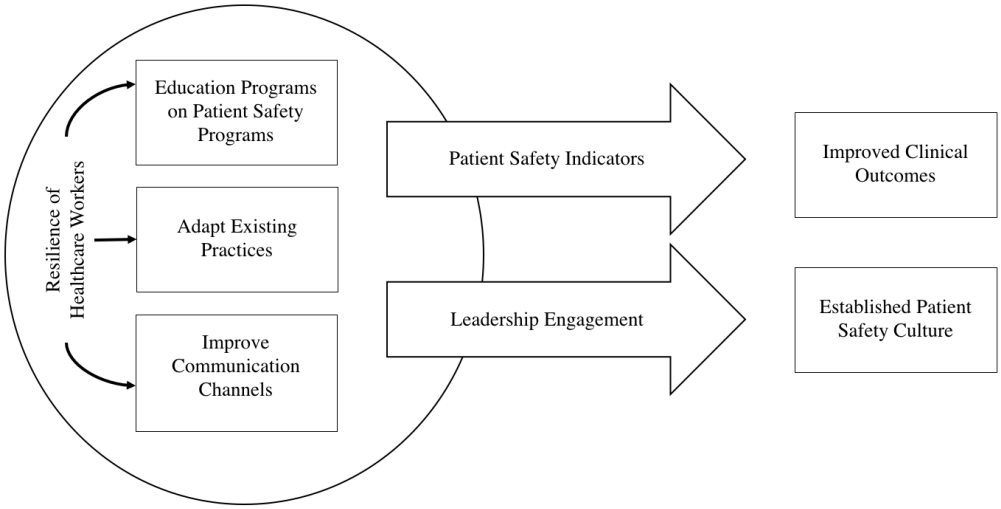

Figure 3. Framework for Implementation of Patient Safety Programs

4.1 Implications for policy and practice

The results obtained in this study identify a number of barriers to the implementation of patient safety programs in hospital units within a global health context. Although literature in the use of standardized and EBP safety interventions, such as the Surgical Safety Checklist, suggests that leadership buy-in and education programs are a critical barrier to the implementation of formalized safety programs (Hurtado et al., 2012). The results obtained here identify a knowledge gap in the consequences of a lack of patient safety protocols derived from a lack of formal education in the field.

In order to address this gap in knowledge, patient safety specific training programs targeting all healthcare providers and hospital workers may be a potentially

feasible intervention. Utilizing the healthcare education system for physicians in Guatemala, an introductory curriculum addressing patient safety models, theories, and standardized protocols can be administered through residency programs for physicians and integrated into nursing programs for nursing and nursing assistant students. Prior studies have shown that patient safety education targeted towards students has increased capacity to recognize and avoid common sources of medical error and/or adverse events; shifted students' prioritization of patient safety; and increased students' sense of awareness (Doyle et al., 2015; Hayes et al., 2014; Mira et al., 2015).

To combat challenges to integrating patient safety curriculum in LMICs like poor educational infrastructure, underfinancing of health education, and limited trained faculty and leaders to teach such education programs (Leotsakos et al., 2014; Nie et al., 2011), hospital leaders should be specifically engaged in the design of a multidisciplinary curriculum design (Walton, 2007) and partner with university collaborators. On-line courses teaching patient safety can be utilized for established health professionals through continuing education programs and coupled with staff accountability or incentives. Web-based online teaching tools can also be disseminated widely and easily to hospital staff outside of the local setting as seen in a course on hospital-acquired infections that saw enrollment success throughout Latin America (Medina-Presentado et al., 2017). Similarly, educational interventions like workshops targeting interdepartmental communication and encouraging multi-level leadership and collaboration can impact the integration of small-scale patient safety programs within an

individual unit and address sociocultural barriers like the hierarchical leadership structure that exists within the unit.

As no national policy regarding patient safety exists in Guatemala, establishing guidelines for standard safety protocols can impact the implementation of patient safety programs within a large, publicly funded hospital setting like Hospital Roosevelt. Barriers identified in this study suggest that adaptation of current safety standards can improve implementation of such a policy. Studies to improve safety culture in US hospitals suggest that policy makers can link regulatory goals to safety improvements by incentivizing patient safety measures and success (McCarthy & Blumenthal, 2006). Policy makers can also support research and education towards hospital organizational and safety culture and create associations between the health workforce, organizational culture, and financial and healthcare quality success (Gelinas & Loh, 2004, Hansen et al., 2003). By adopting safety standards, this policy intervention can be utilized in other hospital units that involve surgical care like women's health and labor and delivery clinics as well as adult-surgical units.

4.2 Implications for further research

Although medical errors have always existed simultaneously with the provision of medical care, addressing patient safety through systematic interventions and through the lens of implementation research can revolutionize our approach to patient safety within a global health context. As evidenced in this study, the use of a single method or study tool poses its limitation towards implementation analysis. In complex and dynamic hospital environments, the use of a single qualitative or quantitative study method may not fully

identify all factors that impact the implementation of new programs (Fig 2). Although mixed-methods are often used in healthcare services research, data may not be integrated to explore complementary findings (Tonkin-Crine et al., 2016). Triangulation of qualitative and quantitative data can reveal findings that need further research and interpretation and areas of dissonance that disclose discrepancies in themes or attitudes in greater detail.

The integration of data utilizing a comprehensive framework creates a larger field to apply research findings. In our study, the EBPAS domains are standardized as the EBPAS-36 is a validated tool with defined interpretation methodology. However, although our interview guide was creating using the CFIR framework, researchers have the ability to tailor qualitative questions to further probe quantitative survey domains if triangulation is involved in the study protocol. The use of mixed-methods in implementation analysis strengthens data and can lead to the creation of a fuller picture by which to determine how to best implement interventions coupling anecdotal experience and objectively-scaled attitudes to identify areas of agreement and discord.

Further research in patient safety in global health may benefit from use of mixed-methods triangulation analysis to compare the barriers to the implementation of patient safety programs. By expanding this study to all hospital units, more generalizable and adaptable programs can be considered for wide-spread intervention in a hospital-setting. This potential research can also yield results that can lead to the development of standardized practices across all LMIC hospitals and low-resource hospital settings.

4.3 Study strengths and limitations

The strengths of this study reside in the broad respondent sample and the mixed-methods analysis as well as the interdisciplinary background of the research team. The sample of this study represented all types of healthcare workers in the perioperative unit and across all specialties that operate within the unit. Given the collective and teamwork nature of perioperative operations, the respondents in this study served as a diverse and multifaceted team of participants to elucidate barriers towards implementation within the multi-unit hospital.

The use of mixed-methods analysis enhanced the responses provided by respondents to the qualitative portion of the study. This quantitative portion proved critical in supporting the qualitative narrative of the challenges to implementation and the attitudes that may underscore the barriers identified. In addition, both Spanish-speaking research assistants who facilitated the qualitative interviews and administered the quantitative surveys were trained physicians with no affiliation to Hospital Roosevelt. The medical education, research focused background, and disconnection to the staff and operations of these research assistants aided the comfort participants felt about answering questions regarding potentially sensitive topics and putting such comments in the context of their units. Similarly, the background of the research assistants allowed for a semi-structured interview flow, by which the research assistants were able to further probe or clarify comments made by respondents.

There are several limitations to our study. First, the purposive sampling of participants targeting key stakeholders in the unit with an emphasis on leaders could bias

results. Second, although this study was conducted over a period of several days to capture diverse participants, earlier participants may have recommended participation to later participants, potentially leading to social bias. Third, although the interview questions for the qualitative portion of this study were created using structures provided by CFIR, some questions may have directed participants to emphasize the importance of topics discussed instead of natural thought. Fourth, though the interview guide was created using CFIR guided question structure and research assistants were trained with how to best probe participants for clarification in semi-structured interviews, questions could be considered leading. In this limitation, participants may have felt prompted to respond to questions and situations that may have not been organic concerns outside of this study. Lastly, although the operations of the perioperative unit involve healthcare workers of different specialties to work together (i.e. anesthesia, surgery, etc.), the factors impacting implementation identified in this unit may not be generalizable to the greater hospital or to other units that are not structured in this way.

5. Conclusions

This study identified multi-dimensional factors impacting the implementation of patient safety programs in the pediatric perioperative unit of Guatemala's largest tertiary public hospital. We found a significant gap between the attitudes and practice of patient safety programs and internal factors that could hinder and enhance the implementation of patient safety interventions in a unit of people passionate and dedicated to the treatment of children. This study yielded rich qualitative and quantitative information in regard to the practices and attitudes in place across unit stakeholders representative of the multi-dimensional perioperative workforce. The factors impacting implementation in this study may be generalizable to hospital units or across LMICs when considering implementation of programs to improve patient safety. This project creates a platform for the development of implementation strategies within Hospital Roosevelt and can be used as a model throughout Guatemala. Programs to improve the safety of pediatric perioperative patients at Hospital Roosevelt must address the culture of the unit itself and engage local leaders in adapting and adopting evidence-based protocols.

Appendix A. Evidence-Based Practice Attitudes Scale-36 (EBPAS-36)

Hospital Roosevelt, Duke University

Encuesta del Práctica Basada en La Evidencia- 36 versión inglés y español

Evidence Based Practice Attitudes Scale-36 Survey Tool- English and Spanish versions

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Las siguientes preguntas son acerca de sus sentimientos en cuanto al uso de nuevas terapias, intervenciones y tratamientos. El Tratameiento Manualizado se refiere a cualquier intervención que tiene guías específicas y/o componentes que están descritos en un manual y/o que deben seguirse en una forma estructurada/predeterminada. Por favor indique que tan de acuerdo está usted con cada ítem utilizando la escala que se encuentra abajo.

The following questions ask about your feelings about using new types of therapy, interventions, or treatments. Manualized treatment refers to any intervention that has specific guidelines and/or components that are outlined in a manual and/or that are to be followed in a structured/ predetermined way. Please indicate the extent to which you agree with each item using the below scale.

Preguntas 1-6: Según la escala que se presenta en cada oración, circule el grado con el que usted está de acuerdo. *For questions 1-6: Circle the number indicating the extent to which you agree with each item using the following scale.*	**Muy en desacuerdo** *Disagree strongly*	**Un poco en desacuerdo** *Disagree slightly*	**Neutral** *Neutral*	**Un poco de acuerdo** *Agree slightly*	**Muy de acuerdo** *Agree strongly*	**No aplica** *Not applicable*
1. Me gusta utilizar nuevos tipos de intervenciones para ayudar a mis pacientes…. *I like to use new types of interventions to help my clients…*	○	○	○	○	○	○
2. Estoy dispuesto a probar nuevos tipos de intervenciones aún si tengo que seguir un manual de tratamiento o protocolo… *I am willing to try new types of interventions even if I have to follow a treatment manual…*	○	○	○	○	○	○
3. Estoy dispuesto a probar nuevos y diferentes tipos de intervenciones desarrollados por investigadores… *I am willing to use new and different types of interventions developed by researchers…*	○	○	○	○	○	○
4. Las intervenciones basadas en la investigación no son útiles en la práctica clínica… *Research based interventions are not clinically useful…*	○	○	○	○	○	○
5. La experiencia clínica es más importante que el uso de tratamientos establecidos en guías o protocolos… *Clinical experience is more important than using manualized treatment...*	○	○	○	○	○	○
6. Las intervenciones basadas en la investigación no son útiles en la práctica clínica… *I would not use manualized interventions…*	○	○	○	○	○	○

Preguntas 7-12: Si Ud. recibiera entrenamiento para una nueva intervención o tratamiento, qué tan dispuesto estaría a implementarla si… *For questions 7-12: If you received training in an intervention or treatment that was new to you, how likely would you be to adopt it if:*	**Totalmente Desacuerdo** *Not at all*	**En desacuerdo** *Slight extent*	**Moderadamente acuerdo** *Moderate extent*	**De acuerdo** *Great extent*	**Totalmente de Acuerdo** *Very great extent*
7. ...Tuviera sentido para usted? *… it "made sense" to you?*	○	○	○	○	○
8. ...fuera requerida por su supervisor? *…it was required by your supervisor?*	○	○	○	○	○
9. ...fuera requerida por la entidad para la que trabaja? *…it was required by your agency?*	○	○	○	○	○
10. ...fuera requerida por las autoridades del departamento de Guatemala *…it was required by your state?*	○	○	○	○	○
11. ...estuviera siendo utilizada por colegas que están contentos con el uso de esta nueva intervención o tratamiento? *…it was being used by colleagues who were happy with it?*	○	○	○	○	○
12. …usted sintiera que tiene la formación suficiente como para llevarla a cabo *correctamente?* *…you felt you had enough training to use it correctly?*	○	○	○	○	○

Preguntas 13-15: Si recibiera entrenamiento para un tratamiento o intervención nueva, cuál es la probabilidad que la adoptara si…. *For questions 13-15: If you received training in a treatment or intervention that was new to you, how likely would you be to adopt it if:*	**Totalmente Desacuerdo** *Not at all*	**En desacuerdo** *Slight extent*	**Moderadamente acuerdo** *Moderate extent*	**De acuerdo** *Great extent*	**Totalmente de Acuerdo** *Very great extent*
13. …supiera que es beneficiosa para sus pacientes? *…you knew it was right for your patients?*	○	○	○	○	○
14. ...pudiera opinar sobre cómo usarla? *…you had a say in how you would use it?*	○	○	○	○	○
15. ...encajara con su perspectiva clínica? *…it fit with your clinical approach?*	○	○	○	○	○

Preguntas 16-36: Según la escala que se presenta en cada oración, circule el grado con el que usted está de acuerdo. *For questions 16-36: Circle the number indicating the extent to which you agree with each item using the following scale.*	**Muy en desacuerdo** *Disagree strongly*	**Un poco en desacuerdo** *Disagree slightly*	**Neutral** *Neutral*	**Un poco de acuerdo** *Slightly agree*	**Muy de acuerdo** *Strongly agree*	**No aplica** *Not applicable*
16. La práctica basada en la evidencia no es útil para pacientes con múltiples problemas médicos. *Evidence-based practice is not useful for patients with multiple medical problems.*	○	○	○	○	○	○
17. La práctica basada en la evidencia no es un tratamiento individualizado *Evidence-based practice is not individualized treatment.*	○	○	○	○	○	○
18. La práctica basada en la evidencia es muy específica. *Evidence-based practice is too narrowly focused.*	○	○	○	○	○	○
19. Prefiero trabajar solo/a, sin supervisión. *I prefer to work on my own without oversight.*	○	○	○	○	○	○
20. No quiero que nadie me vigile mientras llevo a cabo una intervención/tratamiento. *I do not want anyone looking over my shoulder while I provide an intervention/treatment.*	○	○	○	○	○	○
21. Mi trabajo no necesita ser supervisado. *My work does not need to be monitored.*	○	○	○	○	○	○
22. Un resultado positivo en el cuidado del paciente es más "arte" que "ciencia". *A positive outcome in patient care is an art more than a science.*	○	○	○	○	○	○
23. El cuidado del paciente es tanto un "arte" como una "ciencia". *Patient care is both an art and a science.*	○	○	○	○	○	○
24. Mi capacidad como trabajador es más importante que un enfoque determinado. *My overall competence as a worker is more important than a particular approach.*	○	○	○	○	○	○
25. No tengo mucho tiempo para aprender algo nuevo. *I don't have time to learn anything new.*	○	○	○	○	○	○

Preguntas 26-36: Según la escala que se presenta en cada oración, circule el grado con el que usted está de acuerdo. *For questions 26-36: Circle the number indicating the extent to which you agree with each item using the following scale.*	**Muy en desacuerdo** *Disagree strongly*	**Un poco en desacuerdo** *Disagree slightly*	**Neutral** *Neutral*	**Un poco de acuerdo** *Slightly agree*	**Muy de acuerdo** *Strongly agree*	**No aplica** *Not applicable*
26. No puedo cumplir mis otras obligaciones. *I can't meet my other obligations.*	○	○	○	○	○	○
27. No sé cómo implementar la práctica basada en la evidencia en mi trabajo administrativo. *I don't know how to fit evidence-based practice into my administrative work.*	○	○	○	○	○	○
28. Aprender una práctica basada en la evidencia me ayudaría a mantener mi puesto de trabajo. *Learning an evidence-based practice will help me keep my job.*	○	○	○	○	○	○
29. Aprender una práctica basada en la evidencia me ayudaría a conseguir un nuevo puesto de trabajo. *Learning an evidence-based practice will help me get a new job.*	○	○	○	○	○	○
30. Aprender una práctica basada en la evidencia facilitaría encontrar trabajo. *Learning an evidence-based practice will make it easier to find work.*	○	○	○	○	○	○
31. Yo aprendería una práctica basada en la evidencia si se ganaran créditos en la educación continua. *I would learn an evidence-based practice if continuing education credits were provided.*	○	○	○	○	○	○
32. Yo aprendería una práctica basada en la evidencia si se brindara entrenamiento. *I would learn an evidence-based practice if training were provided.*	○	○	○	○	○	○
33. Yo aprendería una práctica basada en la evidencia si se proporcionara apoyo continuo. *I would learn an evidence-based practice if ongoing support was provided.*	○	○	○	○	○	○
34. Me gusta recibir críticas constructivas sobre mi rendimiento. *I enjoy getting feedback on my job performance.*	○	○	○	○	○	○
35. Recibir críticas constructivas sobre mi rendimiento me ayuda a ser un mejor trabajador. *Getting feedback helps me to be a better worker.*	○	○	○	○	○	○

36. Ser supervisado me ayuda a ser un mejor trabajador. *Getting supervision helps me to be a better worker.*	○	○	○	○	○	○

Posición (marque solamente una) / Position (mark only one):

- ○ Director/a Médico *Medical Director, Unit Director, or Hospital administrator*
- ○ Médico/a *Physician*
- ○ Residente *Resident*
- ○ Enfermero/a *Nurse*
- ○ Enfermera auxiliar *Nursing Assistant*
- ○ Jefa de la enfermería *Nursing Director, Chief Nurse, or Assistant Chief Nurse*
- ○ Nutricionista/dietista *Nutritionist/dietician*
- ○ Auxiliar de hospital o de paciente *Hospital/Patient Assistant*
- ○ Psicólogo/a *Psychologist*
- ○ Fisioterapeuta *Physical Therapist*
- ○ Trabajador/a social *Social Worker*
- ○ Técnico/a (de diálisis, respiratorio, o anethsiology, banco de leche *Technician (Dialysis, Respiratory, Anesthesiology, or Milk Bank)*
- ○ Farmacéutico/a *Pharmacist*
- ○ Servicios administrativos (secretaria, recepcionista, jefa de administración, coordinador/a de la logística.) *Admin Support (secretary, receptionist, coordinator)*
- ○ Servicios de mantenimiento/Limpieza *Technical, maintenance, cleaning services, housekeeper*
- ○ Cocinero/a *Cook*
- ○ Otro *Other*

Si otro, explica: _____

Numero de cuestionario Questionnaire Number: _____

Appendix B. *De Novo* survey- Quantitative

Duke University, Hospital Roosevelt

Cuestionario para la seguridad del hospital

Hospital safety questionnaire

Numero de cuestionario Questionnaire Number: _____

Fecha de entrevista (MM/DD/AA) Date of interview (MM/DD/YY): _____

Hora de entrevista Time of interview**:** _____

Entrevistador Interviewer**:** _____

Posición (marque sólo una) / Position (mark only one):

- ◯ Director/a Médico *Medical Director*
- ◯ Médico/a *Physician*
- ◯ Enfermero/a *Nurse*
- ◯ Asistente de enfermería *Nursing Assistant*
- ◯ Jefa de la enfermería *Nursing Chief*
- ◯ Nutricionista/dietista *Nutritionist/dietician*
- ◯ Psicólogo/a *Psychologist*
- ◯ Fisioterapeuta *Physical Therapist*
- ◯ Trabajador/a social *Social Worker*
- ◯ Técnico (de diálisis, respiratorio, anestesia, o banco de leche) *Dialysis, Respiratory, Anesthesiology, or Milk Bank Technician*
- ◯ Auxiliar de hospital *Hospital/Patient Assistant*
- ◯ Farmacéutico/a *Pharmacist*
- ◯ Jefa del inventario y farmacéuticos *Pharmacy and inventory manager*
- ◯ Servicios administrativos (secretaria, recepcionista, jefa de administración, coordinador/a de la logística) *Admin Support (inc. secretary, receptionist, logistics coordinator)*
- ◯ Servicios de mantenimiento/limpieza *Technical maintenance, cleaning services*
- ◯ Cocinero/a *Cook*
- ◯ Otro *Other*
  Si otro, especifíque: _____

Años en la especialidad Years in Specialty

- ◯ < 6 meses *months*
- ◯ 6 – 11 meses
- ◯ 1-2 años *years*
- ◯ 3-4 años
- ◯ 5-10 años
- ◯ 11-20 años
- ◯ 21 años o más

I. Encuesta cuantitativa
I. Quantitative survey

Favor de responder las siguientes frases en base a su área clínica o unidad específica. Seleccione sus respuestas usando la siguiente escala :
Please answer the following items with respect to your specific unit or clinical area. Choose your responses using the scale below:

En este entorno laboral, ... *In this work setting ...*	**Muy en desacuerdo** *Disagree strongly*	**Un poco en desacuerdo** *Disagree slightly*	**Neutral** *Neutral*	**Un poco de acuerdo** *Agree slightly*	**Muy de acuerdo** *Agree strongly*	**No aplica** *Not applicable*
... creo que nuestros líderes médicos quieren mejorar la seguridad de los pacientes. *... I believe our physician leaders want to improve patient safety.*	◯	◯	◯	◯	◯	◯
... la carga pesada de mi trabajo me puede llevar a cometer errores. *... my heavy workload can lead to mistakes.*	◯	◯	◯	◯	◯	◯
... la comunicación podría mejorar *... communication could be improved.*	◯	◯	◯	◯	◯	◯
... los incentivos para mejorar la seguridad de los pacientes serían bien recibidos por el personal del hospital. *... incentives to improve patient safety would be well received by hospital staff.*	◯	◯	◯	◯	◯	◯

Appendix C. ***De Novo survey*****- Qualitative Interview Guide**

II. Entrevista Cualitativa
II. Qualitative Interview

En su unidad, ¿Qué piensa del cuidado que el personal del hospital brinda a los pacientes? ¿Cómo aseguran ellos la seguridad del paciente?
In your unit, what do you think about the care the hospital staff gives to the patients? How do they ensure the safety of the patient?

En su unidad, ¿Existen programas o instrumentos que previenen el daño al pacientes? Si los hay, ¿Qué clase de programas o herramientas utilizan para este propósito?
In your unit, are there programs or instruments to prevent harm to patients? If so, what sort of programs or tools do you have for that purpose?

¿El personal se adhiere a lo establecido en estos programas de seguridad?
Are these programs always adhered by the staff?

¿Por qué cree que debería implementarse un programa de seguridad en su área de trabajo?
Why should a safety program be implemented in your unit?

¿Qué es lo que sabe acerca de un programa de seguridad al paciente o su implementación? What do you know about a patient safety program or its implementation?

En su área de trabajo, ¿Qué tipo de cambios cree que son necesarios para que los programas de seguridad sean implementados efectivamente?
What kinds of changes do you think are necessary in order to effectively implement a safety program in your unit?

¿Cómo la infraestructura de su organización (recursos, arquitectura social, edad, tamaño o la distribución física) afectará la implementación de un programa de seguridad? ¿Cómo trabajará usted alrededor de estos desafíos estructurales?
How will the infrastructure of your organization (resources, social architecture, age, size, or physical layout) affect the implementation of a safety program? How will you work around the structural challenges?

¿Qué tipo de apoyo puede usted esperar de los líderes de su organización para ayudar a tener una implementación exitosa? ¿Quiénes son estos líderes? ¿Qué tipos de barreras pueden ellos crear? What kind of support can you expect from leaders in your organization to help make implementation successful? Who are these leaders? What types of barriers might they create?

¿Qué tanto cree que un programa de seguridad para el paciente satisfará las necesidades de sus pacientes? How well do you think a patient safety program will meet the needs of your patients?

¿Qué clase de políticas locales, departamentales, nacionales pueden influenciar la decisión de implementar un programa de seguridad? ¿Cómo la implementación de un programa de seguridad, afectará el cumplimiento de estas políticas en su organización? What kind of local, departmental, or national policies may influence the decision to implement a safety program? How will the

implementation of a safety program affect your organization's ability to meet these policies?
¿Puede describir su relación laboral con sus líderes? Can you describe your work relationship with your leaders?

¿En qué medida, las nuevas ideas, pueden ser adoptadas y usadas para hacer mejoras en su unidad? ¿Puede describir un ejemplo? To what extent are new ideas embraced and used to make improvements in your unit? Can you describe an example?

¿Cuál es el nivel general de receptividad en su organización para implementar un programa de seguridad al paciente? ¿Por qué? What is the general level of receptivity in your organization to implementing a patient safety program? Why?

¿Qué tan seguro está de que su equipo será capaz de implementar exitosamente el programa de seguridad al paciente? How confident are you that your team will be able to successfully implement a patient safety program?

Además de la implementación a los líderes, ¿Existen personas en su organización que puedan innovar (llevar más allá de lo esperado) la intervención? Other than the implementation leaders, are there people in your organization who are likely to champion (go beyond what might be expected) the intervention?

[Resuma los puntos claves.]
[Summarize key points.]

Appendix D. WHO Patient Safety Guide (English)

What is patient safety?

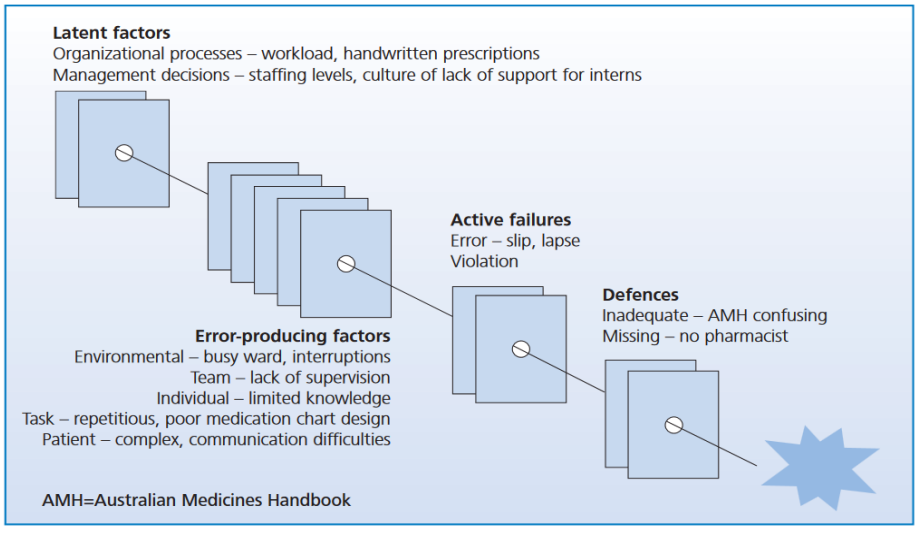
As many as **1 in 10 patients** are harmed while receiving health care.

There is now overwhelming evidence that significant numbers of patients are harmed from health care, resulting in permanent injury, hospital admissions, increased lengths of stay in hospital and even death. Over the last decade, we have learned that adverse events occur not because people intentionally hurt patients, but rather due to the complexity of health-care systems today, where the successful treatment and outcome for each patient depend on a range of factors, in addition to the competence of each individual health-care provider.

Patient safety is an issue in all countries that deliver health services, whether these services are privately commissioned or funded by the government. For example, failing to adequately check the identity of a patient or prescribing antibiotics without regard for the patient's underlying condition or administering multiple drugs without paying attention to the potential for adverse drug reactions can lead to patient injury. Patients are not only harmed by the misuse of technology. They can also be harmed by poor communication between different health-care providers, or delays in receiving treatment.

Many of the features of patient safety programs do not involve financial resources, but rather the commitment of individuals to practice safely. Individual health-care providers can improve patient safety by engaging with patients and their families in a manner that shows respect, checking procedures, learning from errors, and communicating effectively with other members of the health-care team. Such activities can also help minimize costs as they minimize the harm caused to patients.

Figure B.1.1. Swiss cheese model: steps and factors associated with adverse events 7



The diagram shows that a fault in one layer of the organization is usually not enough to cause an accident. Bad outcomes in the real world usually occur when a number of faults occur in a number of different layers (e.g. rule violations, inadequate resources, inadequate supervision and inexperience) and momentarily line up to permit a trajectory of accident opportunity.

Source: Coombes ID et al. Why do interns make prescribing errors? A qualitative study. *Medical Journal of Australia*, 2008 (Adapted from Reason's model of accident causation) [41].

Information belongs to WHO. 2011. Geneva : World Health Organization. WHO/IER/PSP/2010.3.

Appendix E. WHO Patient Safety Guide (Spanish)

¿Qué es la seguridad del paciente?

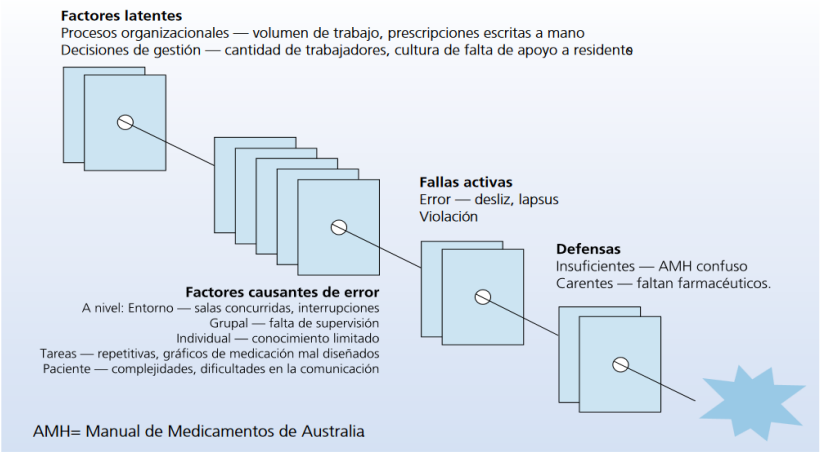
Hasta **1 de cada 10 pacientes** son dañados mientras reciben atención médica.

En la actualidad, es arrolladora la evidencia de que cantidades significativas de paientes sufren daños originados en la atención clínica. Estos daños traen como consecuencia lesiones permanentes, hospitalizaciones, períodos prolongados de internación e incluso la muerte. Durante la última década, hemos aprendido que los eventos adversos no suceden porque la gente intencionalmente dañe a los pacientes, sino que surgen debido a la complejidad que presentan los sistemas de atención clínica en la actualidad, en los que el éxito de los tratamientos y sus resultados en cada paciente dependen de varios factores, además de la competencia de cada prestador de atención clínica.

La seguridad del paciente es un asunto de importancia en todos los países que prestan servicios de salud, ya sea a través de entidades privadas o con financiación del estado. Por ejemplo, no chequear con adecuada suficiencia la identidad de un paciente, o recetar antibióticos sin importar el estado subyacente del paciente, o administrar múltiples drogas sin prestar atención al potencial de reacciones adversas de drogas puede conducir a que se produzcan lesiones en los pacientes, quienes se ven afectados no solo por el uso incorrecto de la tecnología sino también por deficiencias en la comunicación entre los prestadores de atención clínica o por demoras en recibir tratamientos.

Muchos programas sobre seguridad del paciente no incluyen recursos económicos, sino el compromiso de particulares de realizar las prácticas en forma segura. Los prestadores individuales de atención clínica pueden mejorar la seguridad del paciente tratando con respeto a los pacientes y sus familiares, chequeando procedimientos, aprendiendo de los errores y comunicándose eficazmente con otros miembros del equipo de atención clínica. Esto también puede ayudar a minimizar costos, dado que se reduce al mínimo el daño ocasionado a los pacientes.

Gráfico B.1.1. Modelo del queso suizo: etapas y factores asociados a los eventos adversos



Fuente: Coombes ID et al "Why do interns make prescribing errors? A qualitative study" ["¿Por qué los residentes cometen errores de prescripción? Un estudio cualitativo"]. *Medical Journal of Australia*, 2008. (Adaptado del modelo de Reason sobre las causas de accidentes) [41].

El diagrama muestra que una falla en una capa de la organización no es suficiente, en general, para provocar un accidente. Los resultados desfavorables del mundo real suelen darse cuando surgen varias fallas en varias capas distintas (por ejemplo, violaciones a normas, recursos insuficientes, supervisión inacabada e inexperiencia) y momentáneamente se alinean para permitir el trazado de un potencial accidente.

WHO. 2011. Geneva : World Health Organization. WHO/IER/PSP/2010.3

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