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## EDUCATION AND TRAINING

## Impact of a low-technology simulation-based obstetric and newborn care training scheme on non-emergency delivery practices in Guatemala

Anna Walton<sup>a</sup>, Edgar Kestler<sup>b</sup>, Julia C. Dettinger<sup>c,\*</sup>, Sarah Zelek<sup>c</sup>, Francesca Holme<sup>c</sup>, Dilys Walker<sup>d</sup><sup>a</sup> School of Medicine, University of Washington, Seattle, WA, USA<sup>b</sup> Epidemiological Research Center in Sexual and Reproductive Health, Guatemala City, Guatemala<sup>c</sup> Department of Global Health, University of Washington, Seattle, WA, USA<sup>d</sup> Department of Obstetrics and Gynecology and Global Health Sciences, University of California, San Francisco, San Francisco, CA, USA

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## ABSTRACT

**Objective:** To assess the effect of a low-technology simulation-based training scheme for obstetric and perinatal emergency management (PRONTO; Programa de Rescate Obstétrico y Neonatal: Tratamiento Óptimo y Oportuno) on non-emergency delivery practices at primary level clinics in Guatemala. **Methods:** A paired cross-sectional birth observation study was conducted with a convenience sample of 18 clinics (nine pairs of intervention and control clinics) from June 28 to August 7, 2013. Outcomes included implementation of practices known to decrease maternal and/or neonatal mortality and improve patient care. **Results:** Overall, 25 and 17 births occurred in intervention and control clinics, respectively. Active management of the third stage of labor was appropriately performed by 20 (83%) of 24 intervention teams versus 7 (50%) of 14 control teams ( $P = 0.015$ ). Intervention teams implemented more practices to decrease neonatal mortality than did control teams ( $P < 0.001$ ). Intervention teams ensured patient privacy in 23 (92%) of 25 births versus 11 (65%) of 17 births for control teams ( $P = 0.014$ ). All 15 applicable intervention teams kept patients informed versus 6 (55%) of 11 control teams ( $P = 0.001$ ). Differences were also noted in teamwork; in particular, skill-based tools were used more often at intervention sites than control sites ( $P = 0.012$ ). **Conclusion:** Use of PRONTO enhanced non-emergency delivery care by increasing evidence-based practice, patient-centered care, and teamwork.

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## 1. Introduction

The maternal mortality ratio (MMR) in Guatemala is one of the highest in Latin America at 120 maternal deaths per 100 000 live births [1]. Furthermore, indigenous women living in rural Guatemalan communities face the possibility of a substantially elevated MMR [2]. This situation is highlighted in the so-called “corridor of death,” a geographic area comprising four departments with large rural and indigenous populations and some of the highest MMRs in the country: Huehuetenango (MMR 226 per 100 000 live births), Alta Verapaz (MMR 207 per 100 000 live births), Quiché (MMR 196 per 100 000 live births), and San Marcos (MMR 106 per 100 000 live births) [2]. In 2010, the Guatemalan government passed the Law for Healthy Motherhood (decree 32-2010) to ensure access to safe labor and delivery care. Nonetheless, despite interventions that aim to increase institutional births, meeting Millennium Development Goal 5 (to decrease maternal mortality) remains a distant hope for these four departments owing to multilevel barriers, including poor-quality obstetric care [3–5].

The PRONTO (Programa de Rescate Obstétrico y Neonatal: Tratamiento Óptimo y Oportuno) scheme is a highly realistic, low-technology, in situ, simulation-based obstetric and perinatal emergency training program for multidisciplinary teams in low-resource settings, which has been successfully piloted and implemented in Mexico [6]. This program aims to decrease maternal and perinatal mortality through training to improve responses to the most frequent obstetric and neonatal emergencies and in the use of evidence-based practices for uncomplicated birth. The training curriculum is based on WHO standards in accordance with the Guatemalan Ministry of Health action plan [7–10]. PRONTO training comprises two modules [6]. Module I (16 hours; six simulations) covers teamwork, evidence-based practices for uncomplicated birth, obstetric hemorrhage, and neonatal resuscitation. Module II (8 hours; three simulations) occurs 2–3 months later and covers pre-eclampsia, eclampsia, chorioamnionitis, and shoulder dystocia. Institutional sustainability and understanding traditional birth practices were added to the PRONTO curriculum specifically for use in Guatemala [11].

The aim of the present study was to assess the effect of PRONTO training on three domains of clinical action during uncomplicated delivery: use of evidence-based practices, provision of culturally sensitive and patient-centered care, and use of communication and teamwork skills.

\* Corresponding author at: Department of Global Health, University of Washington, 325 9th Ave, Box 359931, Seattle, WA 98104, USA. Tel.: +1 206 221 1041; fax: +1 206 744 3693. E-mail address: jcdettin@uw.edu (J.C. Dettinger).

## 2. Materials and methods

The present cross-sectional birth observation study was conducted to assess the effect of the PRONTO component of a package of community- and facility-level interventions on provider practices during non-emergency delivery. The package included PRONTO training, a social marketing campaign, and professional midwives serving as liaisons between clinics and their communities. The impact of the package as a whole was assessed as part of a pair-matched, cluster-randomized trial, which was implemented in 2012 in 30 primary-care clinics in Alta Verapaz, Huehuetenango, Quiché, and San Marcos. Full details of the protocol have been published previously [12]. PRONTO training began on July 30, 2012, with collection of follow-up data completed by September 1, 2013.

The present cross-sectional study focused on the effect of the PRONTO component of the intervention on uptake of specific practices during uncomplicated deliveries. Consequently, a 6-week study was conducted with a convenience sample of the intervention and control clinics between June 28 and August 7, 2013. Approval was obtained

from both the Guatemalan Ministry of Health, Guatemala City, and the institutional review board of the University of Washington, Seattle (41922-E/K). The original randomized study, which included PRONTO training, was registered at clinicaltrials.gov (NCT01653626) [12].

Owing to data collection time constraints, only 18 of the original 30 clinics were selected for inclusion in the present study. The goal was to observe three to five births within a period of 1–5 days in each clinic. The final nine clinic pairs were selected to balance the need for high delivery volume and low expected travel time between facilities, ensuring equal representation from each of the four departments (two clinic pairs per department). Additionally, a third clinic pair was selected from Alta Verapaz because a large proportion of the sites recruited in the original study was from this department to reflect both its large population and large geographic area.

On arrival at each clinic, fieldworkers (including A.W.) met with the director to describe the project and obtain consent. An information sheet written in Spanish about the proposed research activities was provided to both staff and patients. Only pregnant women who spoke Spanish or a native language shared by staff attending the birth were

**Table 1**  
Variables included in the birth observation form.

Variable	Definition
<b>Evidence-based practices [7–9]</b>	
Skin-to-skin contact between mother and newborn	Newborn is placed on the mother's bare skin immediately following delivery and before cutting of the umbilical cord. Drying and covering of the newborn might occur while it is laid on the mother.
Drying and covering the newborn	Wiping the newborn with a towel and swaddling within 30 s of delivery.
Examination of the placenta	Primary provider examines the placenta for completeness and to ensure that no remnants were left in the uterus.
Introduction to the breast within 1 h of birth	The mother and newborn are left together and encouraged to initiate breastfeeding.
Delayed cord clamping	Waiting at least 1 min after delivery before clamping and cutting the umbilical cord.
Active management of the third stage of labor	Composite variable. Providers must complete all three of the following items: (1) Intramuscular injection of 10 IU of oxytocin administered to the mother within 1 min of giving birth; (2) Controlled traction on the umbilical cord for delivery of the placenta with suprapubic countertraction; (3) Uterine massage after delivery of the placenta.
Time to oxytocin injection	Time (min) elapsed between delivery to intramuscular injection of oxytocin.
<b>Culturally sensitive and patient-centered care [11]</b>	
Provider refers to the patient by her name	Provider asks the patient what she would like to be called; uses the patient's name at least half of the time instead of using generic terms such as "Miss."
Provider gives the patient all information requested	If the patient asks questions, the team members respond with an appropriate answer. Mark the form as "NA" if the patient did not ask anything.
Provider allows the patient freedom of movement or delivery position	Providers either ask the patient whether she has a preference for the position in which she would like to deliver or they allow the patient to move. Mark the form as "No" if providers blatantly restricted patient movement.
Provider ensures patient privacy	Providers ensure curtains or doors are closed and/or that the patient is covered. Mark the form as "No" if the patient was left exposed in the triage and/or waiting rooms.
Team acknowledges at least one request from the patient and/or her companion(s)	Providers allow patients and their families to bring in blankets, prepare tea etc. if requested. Mark the form as "NA" if the patients and/or companion(s) did not request anything.
Positive verbal and non-verbal communication	Providers use encouraging words or phrases (e.g. "You can do it," "You are almost there," or "You are doing great"); kind tone; eye contact; and/or supportive touch.
Negative verbal and non-verbal communication	Providers use demeaning or disrespectful words or phrases (e.g. "Stop crying" or "You are taking forever"); condescending tone; are dismissive; ignore the patient; make judgmental statements about the patient within hearing distance; do not make eye contact with the patient; and/or throw items at the patient.
<b>Teamwork, leadership, and communication [13,14]</b>	
Situation–background–assessment–recommendation	Structured communication tool for hand-off between providers.
Check backs	Closed-loop communication between at least two providers. One provider requests or states something, the receiving provider repeats it, and the original provider confirms or corrects it.
Thinking out loud	All team members vocalize thought process behind actions immediately before or during actions.
Team communicates with the patient	Providers keep the patient updated and informed of what they are doing and why they are doing it.
Team members report the patient's health status to each other	Providers constantly update the rest of the team about any new findings or updates, such as blood pressure, contractions, cervical dilation, or fetal heart rate.
Team members interact with each other about their work	Providers communicate openly about their actions and give constructive feedback to each other when appropriate.
Team members ask for help	Providers openly and proactively request assistance from others when needed.
Team members assist each other	Team members proactively identify team needs and act accordingly to meet those needs.
Team members identify errors	If errors occur, providers acknowledge them immediately and openly and do not deny or blame others. Mark the form as "NA" if no errors were observed.
Leader guides the team's work	If a team leader is identified, he or she clearly guides the activities and sets priorities of the team. Mark the form as "NA" if no clear leader identified.
Leader delegates tasks	If a team leader is identified, he or she confidently and appropriately delegates tasks to capable team members. Mark the form as "NA" if no clear leader identified.
Leader fosters an environment in which members express themselves	Team members freely express concerns, questions, ideas, and suggestions without fear of reprisal or judgment. Mark the form as "NA" if no clear leader identified.

Abbreviation: NA, not applicable.

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