

No Pain Labor & Delivery: A Global Health Initiative's Impact on Clinical Outcomes in China

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The availability of labor analgesia is highly variable in the People's Republic of China. There are widespread misconceptions, by both parturients and health care providers, that labor epidural analgesia is harmful to mother and baby. Meanwhile, China has one of the highest cesarean delivery rates in the world, exceeding 50%. The goal of the nongovernmental No Pain Labor & Delivery (NPLD) is to facilitate sustainable increases in vaginal delivery rates by increasing access to safe neuraxial labor analgesia, thereby decreasing the cesarean delivery rate. NPLD was launched in 2008 with the stated goal of improving labor outcome in China by increasing the absolute labor epidural analgesia rate by 10%. NPLD established 10 training centers over a 10-year period. We hypothesized that increased availability of labor analgesia would result in reduced requests for cesarean delivery and better labor outcomes for mother and baby. Multidisciplinary teams of Western clinicians and support staff traveled to China for 8 to 10 days once a year. The approach involved establishing 24/7 obstetric anesthesia coverage in Chinese hospitals through education and modeling multidisciplinary approaches, including problem-based learning discussions, bedside teaching, daily debriefings, simulation training drills, and weekend conferences. As of November 2015, NPLD has engaged with 31 hospitals. At 24 of these sites, 24/7 obstetric anesthesia coverage has been established and labor epidural analgesia rates have exceeded 50%. Lower rates of cesarean delivery, episiotomy, postpartum blood transfusion, and better neonatal outcomes were documented in 3 impact studies comprising approximately 55,000 deliveries. Changes in practice guidelines, medical policy, and billing codes have been implemented in conjunction with the modernization of perinatal practice that has occurred concurrently in China since the first NPLD trip in 2008. (Anesth Analg 2016;122:1931–8)

Neuraxial labor analgesia is commonly available in high-income countries. These techniques have been shown to be safe and effective for alleviating labor pain.¹ In 2008, 68% of parturients in the United States² and 33% in the United Kingdom³ received neuraxial labor analgesia. Neuraxial analgesia is associated with improved maternal and neonatal outcomes³ and has been recommended by American College of Obstetricians and Gynecologists

(ACOG) as a proactive approach for high-risk parturient safety during labor.⁴ In contrast, a 2007 study reported that neuraxial labor analgesia was used by <1% of parturients in China.⁵ The infrequent use of neuraxial analgesia has been attributed to concerns about its effects on the progress of labor, the incidence of operative vaginal deliveries, the risk of injury to the newborn, and adverse maternal well-being.⁶

In 2006, 20% of all cesarean deliveries in southeastern China were performed on maternal request.^{7,8} Unnecessary cesarean deliveries result in excess maternal morbidity and mortality, with costs equivalent to billions of US dollars per year⁹ and are associated with increased morbidity and infant mortality.^{9–12} For example, using Canadian perinatal surveillance data, Liu et al.¹³ identified higher rates of severe maternal morbidity in planned low-risk cesarean delivery compared with planned vaginal delivery at term.

In 2010, China had one of the highest cesarean delivery rates in the world, estimated at greater than half of the 16.4 million deliveries per year. At least 12% of these cesarean deliveries were not performed for medical indications (e.g., preeclampsia, advanced maternal age, and pregnancy resulting from assisted reproduction techniques).¹⁴ The World Health Organization reported that China has the highest rate of cesarean delivery by maternal request.¹⁴

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⁹Health and Social Care Information Centre: NHS Maternity Statistics, England, 2010–2011. <http://www.hscic.gov.uk/pubs/maternity1011>. Published December 01, 2011. Accessed December 9, 2015.

¹⁴WHO Health Report: More health for the money at http://www.who.int/whr/2010/10_chap04_en.pdf. Accessed December 9, 2015.

The high rate of cesarean delivery in China can be attributed to many factors.⁶ Low household income does not appear to play a primary role, because affluent, educated Chinese women often prefer cesarean rather than vaginal delivery, believing that cesarean delivery is safer when planning a single birth, as permitted under China's one-child policy.^{15,16} Many women opt for cesarean delivery to avoid the pain, anxiety, and distress associated with vaginal delivery without analgesia.^{17,18} In addition, the medical reimbursement system in China, similar to many other countries, provides greater reimbursement for cesarean than for vaginal delivery.¹⁹

The nongovernmental No Pain Labor & Delivery (NPLD), established and designed to educate Chinese women and their health care providers about the safe and effective use of labor analgesia, was developed at the Northwestern University Feinberg School of Medicine. Launched in 2008, NPLD's goals were to improve maternal and neonatal clinical outcomes by increasing the rate of labor epidural analgesia by 10% and to promote *sustained* change in obstetric anesthesia care, with measurable improvements in outcome. NPLD features a series of stepwise, progressive educational projects to ensure both uniformity and continuity at each site and over time. Benchmarks were created and implemented to measure these outcomes.

Over the past 8 years, NPLD has expanded to include not only clinicians from major academic institutions but also individual private practice clinicians from several North American and European countries. Funding for NPLD has been provided by the Departments of Anesthesiology at Northwestern University Feinberg School of Medicine, Harvard Medical School at Beth Israel Deaconess Medical Center, Johns Hopkins University School of Medicine, and Mount Sinai St. Luke's Hospital in New York City. The project has also received funding from the Massachusetts General Hospital Center for Global Health Travel Awards, the Society for Obstetric Anesthesia and Perinatology (SOAP)/Kybele International Outreach Grant, and funds from the participating hospitals in China. Finally, participating individuals and several international and Chinese commercial educational funds have provided support for NPLD.

The training NPLD provides to Chinese labor ward clinicians is protocol-driven, following evidence-based practice and employing safety checklists.²⁰ During 8 years of NPLD implementation in China, we continuously measured clinical outcomes to evaluate the effectiveness of our efforts to implement program goals.

PROJECT STRUCTURE

The NPLD program consists of 3 multidisciplinary projects. The first 2 are basic obstetric projects: the Obstetric Anesthesia Infrastructure Development (OAID) Project and the Obstetric Anesthesia Support (OAS) Project. The third is the Advanced Obstetric Anesthesia 1 + 2 + 3 Project (AOA123), offered to programs that participated in the OAID project as a "next step" in sustaining improvements in obstetric anesthesia care.

Obstetric Anesthesia Infrastructure Development Project

The OAID project was launched in 2008 at the Women's Hospital of Zhejiang University School of Medicine. It

Table 1. NPLD OAID Site Screening Assessment

1. Adequate anesthesia manpower for 24/7 obstetric anesthesia coverage.
2. Multidisciplinary incentives for labor analgesia.^a
3. Financial and administrative support from hospital administration.

NPLD = No Pain Labor & Delivery; OAID = Obstetric Anesthesia Infrastructure Development Project.

^aIt is very common in Chinese hospitals to use workload and performance to calculate health care providers' monthly bonuses.

has since been implemented at 24 additional hospitals. The OAID project involves a week-long, hands-on session offered by an interdisciplinary team from the United States, Canada, and Europe. The program is offered at 1 to 6 sites per year, depending on the number of volunteers and available resources. OAID is offered only to sites that meet specific screening requirements (Table 1).

Multiple teams travel to China during a 1-week period once a year. A typical team consists of 2 obstetric anesthesiology attending physicians, 2 anesthesiology residents, 1 or 2 obstetricians, 2 labor and delivery nurses, 1 neonatologist or neonatal intensive care nurse, and 2 interpreters. The team leader is typically a Chinese-born obstetric anesthesiologist practicing in the United States. The team leader is thus fluent in both Mandarin and English and familiar with Western standards of obstetric care.

Didactic sessions include fundamental concepts of neuraxial analgesia and resources necessary for safe and effective care. The team uses detailed bilingual protocols for education and practice. The training is typically "hands-on," with the NPLD team supervising neuraxial analgesia/anesthesia administered by Chinese physicians. Each day is organized around a theme (Table 2). Additional training is provided using simulation drills of various obstetric emergencies.^{21,22} In these simulation drills, NPLD team members typically offer an initial example of appropriate response, which is then practiced by the Chinese providers. The simulation drills emphasize safety, communication, and various technical and managerial skills.

Daily multidisciplinary debriefings are held at the end of each day to address the knowledge gained and lessons learned. The end-of-day debriefings increase the number of doctors, nurses, and administrative staff who learn from the NPLD teams. Questions range well beyond anesthesia topics, often including optimal maternal and perinatal care. To the extent possible, answers are based on the best available evidence. Debriefings also provide an opportunity to discuss deviations from safe practices observed by the NPLD team and explore opportunities for improving care.

Obstetric Anesthesia Support Project

The OAS Project was established in 2014 as an alternative to OAID for hospitals that only partially met the screening metrics for OAID (Table 1). Typically, this is intended for hospitals that lacked the necessary administration support. Rather than a 1-week visit by a NPLD team, the labor ward professionals from these hospitals are invited to OAID sites during the NPLD training week to observe educational activities. The goal of OAS is to maximize the NPLD's impact in hospitals with limited resources, especially personnel, and for the visiting Chinese professionals to take the knowledge acquired during the NPLD training sessions back to their own hospitals and implement it locally.

Table 2. Daily Themes in Obstetric Anesthesia Infrastructure Development Project

Day	Daily theme	Examples of content
Sunday	Orientation day	<ul style="list-style-type: none"> Anesthesiologists: their responsibilities, preanesthetic evaluation, analgesia record, postpartum follow-up Nurses: their responsibilities, obstetric flow sheet, postpartum care Obstetricians: admission record
Monday	Mother safety day	<ul style="list-style-type: none"> Preanesthetic assessment: IV access, monitors, left uterine displacement NPO status, aspiration risk Anesthesia cart Epidural test dose Vasopressors Lipid emulsion resuscitation for local anesthetic systemic toxicity Coagulopathy High-risk obstetric patients
Tuesday	Baby safety day	<ul style="list-style-type: none"> Intrauterine resuscitation, hypotension, uterine tachysystole, opioids Fetal heart rate monitoring Preterm, newborn resuscitation Breastfeeding
Wednesday	No pain day	<ul style="list-style-type: none"> Labor analgesia in early labor Initial neuraxial dose, epidural pumps, maintenance of epidural labor analgesia Treatment options for breakthrough pain Labor analgesia for second-stage labor Management of failed epidural for cesarean delivery Anesthesia for cesarean delivery, postpartum pain control
Thursday	Satisfaction day	<ul style="list-style-type: none"> Neurological complications Low back pain Nausea/vomiting Fever Headache
Friday	Crash day	<ul style="list-style-type: none"> Emergency cesarean delivery Cannot intubate and cannot ventilate, difficult airway Massive postpartum hemorrhage Maternal advanced cardiac life support
Saturday	Conference day	Topic coverage varied based on local needs and availability of experts on the team

Advanced Obstetric Anesthesia 1 + 2 + 3 Project

In 2013, the AOA123 was established as a follow-up program for hospitals that participated in the OAID project. The goal of the AOA123 project is to further promote labor analgesia and vaginal delivery in high-risk patients and to provide additional training in the management of obstetric emergencies.

To participate in the AOA123 program, hospitals first undergo a follow-up assessment to monitor the sustained effects of the OAID week (Table 3). The assessment occurs at least 1 year after the primary visit. The follow-up measures, initiated after 2012, were introduced after observing that some hospitals failed to sustain the agreed upon improved anesthesia protocols. The assessment includes appropriate

Table 3. NPLD AOA123 Site Screening Assessment

- Existing 24/7 obstetric anesthesia coverage
- Neuraxial labor analgesia rate over 50%
- Weekly multidisciplinary debriefing meetings with hospital administration present

AOA123 = Advanced Obstetric Anesthesia 1 + 2 + 3 Project; NPLD = No Pain Labor & Delivery.

Table 4. Advanced Obstetric Anesthesia 1 + 2 + 3 Project

- Proactive approach in high-risk parturients
 - Obstetric Anesthesia Preoperative Clinic/consultation
- Rapid response teams
 - In situ, 5-minute emergency cesarean delivery simulation drills
 - Postpartum hemorrhage protocol
- Care for high-risk pregnant women
 - External cephalic version for breech presentation
 - Trial of labor after cesarean delivery
 - Preeclampsia

Table 5. NPLD Documents

- Guidelines
- Obstetric Anesthesia Responsibilities
 - Midwife/L&D Nurse Responsibilities
 - Obstetric Anesthesia Protocols
- Documentation Forms
- Anesthesia
- Antepartum Anesthesia Evaluation Form
 - Neuraxial Analgesia Record
 - Postpartum Follow-up Form
- Nurse and Midwife
- Intrapartum Progress Form
- Obstetric
- Obstetric Admission Record
- Equipment Checklist
- Mobile Anesthesia Cart Par Level Checklist

NPLD = No Pain Labor & Delivery.

allocation of both time and resources, and the documentation of the site’s commitment to the success of the project.

Table 4 lists the goals of the AOA123 project. Chinese providers commonly consider high-risk conditions a contraindication to vaginal delivery and neuraxial labor analgesia. In the AOA123 program, 2 or 3 NPLD team members visit the hospitals at 1- to 2-year intervals after the primary OAID week to evaluate if progress has been sustained and to further expand labor analgesia to high-risk parturients. The teams teach methods of care for parturients with preeclampsia, parturients undergoing trial of labor after cesarean delivery, and the anesthetic options for external cephalic version with breech presentation.

EDUCATIONAL MATERIALS

Documents and Protocols

To facilitate education, the NPLD team created 9 bilingual labor analgesia documents and epidural analgesia protocols (Table 5) based primarily on practice standards used at the Prentice Women’s Hospital, Northwestern University Feinberg School of Medicine, Chicago. All resources were reviewed and endorsed by NPLD members from multiple academic institutions and affiliated hospitals. Protocols were revised annually through discussion with NPLD participants to reflect current practice standards and adapt to changes at local hospitals in China.

The 9 bilingual documents for peripartum care include several guidelines and forms created to serve as templates for practice. Some deviation from the protocols was expected and allowed (e.g., because of local drug availability), as long as patient safety and quality of care were not compromised. The “Mobile Cart Par Level Checklist” was provided to emphasize the importance of standardization of anesthesia carts for 24/7 labor analgesia service. The protocols provided to the hospitals include obstetric anesthesia protocols for anesthesia care and professional responsibility protocols for anesthesia service and nursing care.

Professional Books and Book Chapters

The NPLD team has edited and translated a number of medical textbooks into Chinese to provide updated knowledge in the field to Chinese professionals. These include Lee Fleisher’s “Evidence-Based Practice of Anesthesiology” (first edition published in 2007²³ and second edition published in 2010²⁴) and “Chestnut’s Obstetric Anesthesia: Principles and Practice” (fourth edition published in 2013²⁵ and fifth edition in press²⁶).

“Obstetric Anesthesia: Principles and Clinical Perspectives”²⁷ is an original book written by core team members in 2012. In May 2016, NPLD will publish “Textbook of Establishing a Modern Labor & Delivery Suite.”²⁸ Many book chapters and journal articles written by the NPLD core members have been published in China as well.

Patient Education Books and Lectures

As in many cultures, Chinese women are often expected to “suffer” for their babies’ well-being.²⁹ Parturients are encouraged to bear labor pain and avoid systemic medications they believe detrimental to their unborn child. Few Chinese women are aware of neuraxial analgesia as a safe option. In addition, cesarean delivery is perceived by most Chinese women as safer and easier than vaginal delivery. Because of this perception, cesarean delivery is commonly performed without medical indication.

In 2010, with the goal of educating Chinese parturients and their family members about modern labor analgesia/anesthesia and Western obstetric advancements, Ling-Qun Hu, MD, translated “Easy Labor,” by William Camann³⁰ into Chinese. In 2012, this was supplemented by “Painless Childbirth: You Must Know Your Side of the Story,”³¹ a collection of birth stories from Chinese women who delivered both inside and outside of China. These 2 books, intended for the lay public, were provided as an adjunct to childbirth lectures specifically created for expectant mothers at NPLD sites. The lectures allowed women and their families a chance to meet anesthesiologists and discuss their concerns regarding labor analgesia/anesthesia in the antepartum period.

World Wide Web Resources

Social media, both in China and in the United States, played a role in promoting NPLD and educating health care providers throughout the year. We established an official NPLD website that provides all the educational protocols and resources. We also have an NPLD WeChat group on China’s most popular group chat platform.^c NPLD members have presented articles on WeChat and answered questions about

clinical practice several times a week since November 2014. Professional forums are also held on www.dxy.cn, China’s largest biomedical blog. A monthly webinar called “Modern L&D Virtual Lecture Hall” is also provided via YY Voice, a Chinese Web-based education application.

IMPACT

Between 2008 and 2015, >371 volunteers participated in NPLD from the United States, Belgium, Canada, Germany, Israel, and China. These individuals include physician anesthesiologists, obstetricians (including maternal-fetal medicine specialists), neonatologists, midwives, labor and delivery nurses, senior anesthesiology residents/fellows, interpreters, and other volunteers.

More than 200 lectures have been given as part of NPLD’s educational program. Participants of NPLD-cohosted weekend conferences have increased from <100 in 2008 to just under 3000 in 2015 (6 conference sites). In recent years, NPLD members have participated in up to 15 obstetric and obstetric anesthesia conferences annually. Approximately 300 attendees participate each month in each Modern L&D Virtual Lecture Hall.

The 31 participating hospitals (Table 6) care for a parturient population of approximately 500,000 annually. The OAS project was initiated at 25 hospitals in 22 cities from 2008 to 2015. The annual number of hospital sites visited increased from 1 in 2008 to 6 in 2015. Since 2014, 6 additional hospitals have participated in the OAS project.

Only 2 of the participating hospitals offered routine obstetric anesthesia service before NPLD. At these 2 hospitals, the baseline rate of epidural anesthesia was >50%. As summarized in Table 6, 24 of the 31 NPLD-engaged hospitals (77%) achieved epidural labor analgesia rates >50%. Ten of the 11 NPLD-engaged hospitals that participated in the follow-up AOA123 project advanced from providing simple labor epidural analgesia service to the full scope of obstetric anesthesia coverage.

Three impact studies have been completed. The first was conducted using data from the Shijiazhuang Obstetrics and Gynecology Hospital (2009–2011). This is a large urban maternity hospital in Hebei Province.¹⁸ As neuraxial labor analgesia rates increased from 0% to 33.5% of total deliveries with NPLD involvement, cesarean deliveries decreased from 41% to 34% ($P = 0.002$), the episiotomy rate decreased from 71% to 47% ($P = 0.002$), and the operative vaginal delivery rates remained unchanged ($P = 0.92$). The incidence of Apgar scores ≤ 3 decreased from 1.5% to 0.9% ($P = 0.007$). There were no in-hospital maternal deaths during

Table 6. Neuraxial Labor Analgesia Rates After NPLD visit in Chinese Hospitals

NPLD project	Year started	Number of hospitals	Hospitals with labor epidural rates >50%, n (%)	
			Before NPLD	After NPLD
Obstetric Anesthesia Infrastructure Development	2008	25	2 (8)	20 (80)
Obstetric Anesthesia Support	2014	6	0 (0)	4 (67)
Total		31	2 (6)	24 (77)

NPLD = No Pain Labor & Delivery.

^cAvailable at: <http://t.cn/R4zozBL>. Accessed December 9, 2015.

the study period. The popularity of the program spread quickly through the local population and the monthly delivery volume increased from 757 at the beginning of the study in 2009 to 1056 at the end of the study in 2011, despite the fact that analgesia care is an out-of-pocket expense.

Similar increases in neuraxial labor analgesia use were documented in the second impact study, which included 15,415 deliveries from January 2009 to June 2011 at the Second Hospital of Wenzhou Medical University in Zhejiang Province.³² This hospital saw an increase in its monthly neuraxial anesthesia rate from 0% before the NPLD to 57% after the NPLD visit. In addition, significant decreases were observed in the overall rate of cesarean delivery (44.6%–42.5%), nonmedically indicated cesarean deliveries (13%–2.7%), and traumatic vaginal deliveries (including episiotomy and perineal laceration). Similar to the Shijiazhuang study,¹⁸ rates of operative vaginal deliveries and intrapartum cesarean deliveries remained unchanged.³³ Increases in clinic visits, obstetric admissions, and total deliveries after NPLD suggest improved efficiency in clinical practice.¹⁹ A comparison of data from the first 3 months to the last 3 months of the post-NPLD period indicates that³³ the initial improved clinical outcomes were sustained.

At the Weixian Renmin Hospital, a large general hospital in a rural area of Hebei Province, data from 19,577 deliveries were collected from June 2013 to April 2015. Based on our preliminary analysis, trends in this study are similar to those identified in the 2 previous studies. Monthly neuraxial analgesia rates increased from 5% in the first month of data collection to 83% by the final month in the study period. The monthly cesarean delivery and episiotomy rates decreased from 52% to 35% and 61% to 30%, respectively, during the same period. Introduction by the NPLD team of the revised ACOG guideline regarding the definitions of arrest of labor in the second stage in the presence of epidural analgesia³⁴ was associated with decreases in the monthly rates of intrapartum cesarean delivery, as well as neonatal intensive care unit admissions (Fig. 1).

Tables 7 and 8 summarize these results from the impact studies conducted at 3 different types of hospitals (academic, municipal, and rural), based on data from approximately 55,000 parturients.

DISCUSSION

The most important lesson of NPLD is that a well-organized program can make a sustained impact on clinical practice and outcomes on a large scale. Successful global health initiatives, such as Unite for Sight,^d Operation Smile,^e and Operation Walk,^f impact communities through direct help. Health care providers involved with these initiatives bring expertise, passion, and selflessness to their sites. Leveraging the lessons of international volunteerism,³⁵ new global health initiatives, such as the Kybele Inc. initiative in Ghana³⁶ and the NPLD, focus on affecting community practice and improving clinical outcomes. The concept of teaching the community “to fish” instead

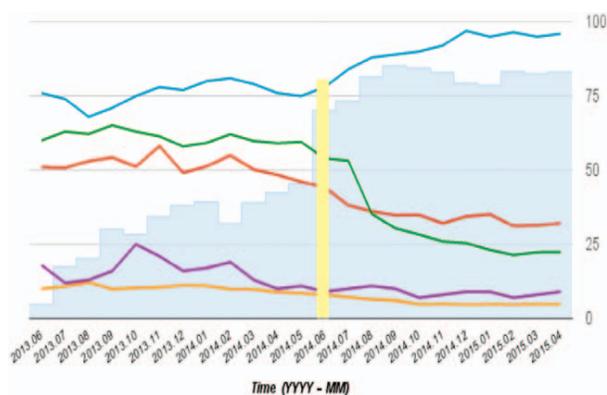


Figure 1. Clinical outcome changes before–after No Pain Labor & Delivery (NPLD) visit in Weixian Renmin Hospital. — Neuraxial Analgesia Rates (%); — Cesarean Delivery Rates (%); — Intrapartum Cesarean Delivery Rates (%); — Episiotomy Rates (%); — NICU Admission Rates (%); — Parturient Satisfaction Rates (%) (a routine survey for patient satisfaction is conducted after discharging with a “yes”–“no” question). The yellow bar at June 2014 represents a week of the NPLD visit. NPLD started remote consultant-based work with L&D care providers in June 2013.

of “giving them a fish” can create sustained change. This approach can achieve success only when the recipient community has the motivation, resources, and expertise to sustain the new protocols.

The Chinese hospitals visited by NPLD program were ready for change. System-wide changes at the national level in China have occurred in the field of peripartum medicine since the first NPLD visit (June 2008), likely spurred by the global initiative of the World Health Organization to improve maternal health (Millennium Development Goal 5).⁸ In 2011, a Chinese national mandate called for decreasing the cesarean delivery rate.^h In 2012, a breakthrough occurred with the establishment of a national billing code for labor analgesia by the National Development and Reform Commission (Number: 2012 4134).ⁱ The Chinese Obstetric Anesthesia Practice Guidelines, first created in 2008, were revised in 2012.^j

In 2013, the standard procedures referenced in the Chinese National Medical Textbook Series were updated to fit definitions presented in the 2003 ACOG Practice Bulletin Number 49 (e.g., the definition of arrest of second-stage labor).³⁷ In September 2014, Chinese obstetric practice guidelines were updated to reflect the ACOG Obstetric Care Consensus Series Number 1: Safe Prevention of the Primary Cesarean Delivery—March 2014.³⁴ In September 2014, the “China Labor and Delivery Study” was initiated. It was headed by Jun Zhang, MD, PhD, well known for his work on the evaluation of labor progress for the US National Health Service.³⁸ The study was designed to create labor curves specifically for Chinese parturients, who may labor at a different rate than parturients in the West.³⁹

⁸Available at: <http://www.un.org/millenniumgoals/maternal.shtml>. Accessed April 16, 2016.

^hAvailable at: <http://society.people.com.cn/GB/97734/16047126.html>. Accessed December 9, 2015.

ⁱAvailable at: http://www.ndrc.gov.cn/fzgggz/jggj/zcfg/201301/t20130108_522535.html. Accessed December 9, 2015.

^jAvailable at: http://www.tlmzw.com/article_show.asp?id=474&m_id=16&pid=15. Accessed December 9, 2015.

^dAvailable at: <http://www.uniteforsight.org/>. Accessed December 9, 2015.

^eAvailable at: <http://www.operationssmile.org/>. Accessed December 9, 2015.

^fAvailable at: <http://www.opwalkusa.com/>. Accessed December 9, 2015.

Table 7. Three Impact Studies by NPLD at Different Types of Hospitals in China

Names of hospital	Type of hospitals	Labor analgesia before 2008	Study period	NPLD team visit	24/7 labor analgesia services during the baseline phase	Methods of NPLD education	Numbers of parturients
Shijiazhuang Obstetrics and Gynecology Hospital	Municipal women's hospital	None	August 2009 to August 2011	June 2014	None	Remote consultation ^a	19,938
The 2nd Affiliated Hospital of Wenzhou Medical University	Academic general hospital	None	January 2009 to June 2011	June 2010	None	Physical NPLD visit	15,415
Weixian Renmin Hospital	Rural general hospital	None	June 2013 to May 2015	June 2014	Service with remote NPLD consultation ^a	Physical NPLD visit	19,577

NPLD = No Pain Labor & Delivery.

^aNPLD consultation: NPLD protocols and documents were provided and monthly phone conversations were made for questions from local hospital.

Table 8. Clinical Outcomes of 3 NPLD Impact Studies

Hospitals Outcomes	Shijiazhuang Obstetrics and Gynecology Hospital		The Second Affiliated Hospital of Wenzhou Medical University		Weixian Renmin Hospital	
	Baseline (%)	Practice (%)	Baseline (%)	Practice (%)	Baseline (%)	Practice (%)
Neuraxial labor analgesia rate	0	34 ^a	0	57 ^b	31 ^b	81
Cesarean delivery rate	41	34	45	41	52	35
Intrapartum cesarean delivery rate	—	—	14	13	10	5.3
Episiotomy rate	71	47	55	49	61	30
Instrumental vaginal delivery rate	6.7	5.8	2.9	2.9	—	—
5-min Apgar score \leq 3	1.5	0.9	0.18	0.10	—	—
NICU admission rate	—	—	13	15	3.4	1.3
7-day neonatal mortality rate	0.29	0.14	0.18	0.08	—	—

— = lack of data; NPLD = No Pain Labor & Delivery; NICU = neonatal intensive care unit.

^aAmong all deliveries including vaginal and cesarean deliveries.

^bAmong all vaginal deliveries and intrapartum cesarean deliveries.

NPLD is a goal-oriented, protocol-driven, and evidence-based educational program. The vision of NPLD is to sustain improved clinical outcomes. While all education tools have their applications and limitations, NPLD was careful to select scenarios and tools appropriate to the local setting. For example, obstetric anesthesia lectures, a commonly used teaching modality, may not be an effective method of teaching in a community with only limited access to obstetric anesthesia. Because Chinese anesthesiologists are skilled at neuraxial anesthesia (most cesarean deliveries in China are performed with epidural or spinal anesthesia), NPLD focuses on the acquisition of in-depth knowledge of applications and effectiveness of epidural labor analgesia in both low- and high-risk parturients. Similarly, the use of simulation training, crisis drills, and debriefings to strengthen teamwork skills, rather than lectures on protocols and regulations have proven to be very productive. We believe that customizing educational tools to enhance the obstetric anesthesia capabilities available at each hospital greatly influenced the success of NPLD.

Communities in which global health initiatives have been initiated often have logical safety concerns about advanced medical interventions introduced into their environments. Understandably, Chinese medical societies have concerns regarding safety of neuraxial labor analgesia in the Chinese community. Validating the acceptance and dissemination of updated clinical knowledge, concepts, and interventions within Chinese medical communities is one of the most important tasks of the NPLD. Thus, one of the primary milestones for NPLD was the publication of the first impact study data in 2012, which specifically addressed safety concerns from

local Chinese health care professionals and provided evidence regarding certain “hot topics” in perinatal medicine.¹⁸

SUMMARY AND FUTURE

In October 2015, the Chinese “one-child policy” ended abruptly after 35 years. This created a new challenge for the obstetric care of Chinese women. Women who previously underwent cesarean delivery may now elect to have a second child with the increased risk of peripartum uterine rupture or multiple cesarean deliveries.⁴⁰ This new era of “second child” policy creates additional urgency for the local medical community to establish 24/7 obstetric anesthesia coverage to cope with the likely increase in women undergoing trial of labor after cesarean delivery.

The NPLD program has brought labor analgesia and better perinatal care to over 500,000 Chinese parturients since 2008. Once a critical number of sites progress through the AOA123 program, we believe that improved standards for obstetric anesthesia will become the Chinese standard of care and hence will be self-sustaining. Should that happen, NPLD will venture to other places in the world where women will benefit from improved obstetric and obstetric anesthesia care. ■■

DISCLOSURES

Name: Ling-Qun Hu, MD.

Contribution: This author helped design the study, conduct the study, analyze the data, write the manuscript, and is the founder and executive director of NPLD.

Conflicts: Ling-Qun Hu reported no conflicts of interest.

Attestation: Ling-Qun Hu approved the final manuscript.

Name: Pamela Flood, MD.

Contribution: This author helped conduct the study, analyze the data, write the manuscript, and has participated in NPLD since 2012.

Conflicts: Pamela Flood is married to Dr. Steven Shafer.

Attestation: Pamela Flood approved the final manuscript.

Name: Yunping Li, MD.

Contribution: This author helped conduct the study, analyze the data, write the manuscript, and has been one of NPLD directors since 2010.

Conflicts: Yunping Li reported no conflicts of interest.

Attestation: Yunping Li approved the final manuscript.

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Attestation: Weike Tao approved the final manuscript.

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