

**ORIGINAL ARTICLE**

# Global Health: Burn Outreach Program

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The objective of this article is to outline the elements of an international burn care outreach program in a resource-constrained country. The program has grown from a collaborative effort with Ukrainian physicians and healthcare officials. With this collaboration, a multipronged approach has been developed to address the gaps in burn care as discovered by years of interaction with the medical community in Ukraine. Contact was initiated with the burn unit of a single municipal hospital in Lviv, Ukraine. Patients with burn injuries were screened and selected patients were comanaged over a 3-year period by American and Ukrainian physicians. This comanagement included repeated evaluation both by telemedicine conferencing as well as annual trips with physicians from Boston, Massachusetts, traveling to Ukraine to assess patients in an outreach clinic and perform surgical procedures. In our first trip in 2011 we assessed 22 patients and operated on 5. In 2012, 38 patients were evaluated and 12 had combined surgical intervention. In our 2013 trip, 63 patients were evaluated and we operated on 22 of these patients. Multiple clinical research projects related to burn prevention and improving perioperative care have been initiated, presented at national meetings, and submitted for publication in peer-reviewed journals. Our outreach program in Lviv, Ukraine, strives to improve overall burn care by a multilayered approach. These elements can serve as a possible template for additional international burn outreach plans as they can be customized for both large and small interventions. (J Burn Care Res 2014;XXX:00–00)

According to the World Health Organization, burns are the 11th leading cause of death among children and the fifth leading cause of nonfatal childhood injury.<sup>1</sup> In the country of Ukraine, burn injuries affect more than 50,000 adults and 10,000 children annually. Burn injury patients in Ukraine can suffer from inhalational injury, infection, blood loss, and extensive scarring. Because of the scarring and subsequent disability, patients often require multiple corrective and reconstructive surgeries during their lifetime. In resource-constrained environments, burn injury patients may not receive the surgical interventions required to improve their quality of life.

Outreach programs attempt to address the lack of care by spreading expertise into areas of the world

with limited access to specialized medicine.<sup>2–5</sup> Surgical outreach programs present the unique challenges of not only seeing and assessing patients, but also arranging and conducting procedures and ensuring proper postoperative care and rehabilitation. Some surgical outreach programs approach this challenge by assessing patients in remote areas and then conducting procedures abroad at their home institutions.<sup>6</sup> Unfortunately, there are financial limitations to this approach, as only small numbers of patients can be flown to the United States for treatment.

Doctors Collaborating to Help Children is a nonprofit corporation that partners with multiple organizations including Massachusetts General Hospital and Shriners Hospital for Children in Boston, Massachusetts, which has established an Outreach Program with Ukrainian physicians to improve the care of patients with burn injuries.<sup>7</sup> The goal of the program is to establish a sustainable and increasingly productive collaboration to treat burn patients in a resource-constrained environment.

Here we describe the methods we have used to initiate this program that allows us to safely provide patient care, educate local physicians, gather data for

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research and track the results of interventions, while functioning within the existing infrastructure and culture of another country.

## METHODS

Patients with burn injuries were screened by physicians in Lviv, taking into account the medical history, extent of injury, and functional status, as well as the potential interventions required. This information was then discussed with physicians in Boston, via telemedicine conferencing in the months preceding the conduction of the Outreach Clinic. The Outreach Clinic and all surgeries were conducted in Municipal Hospital #8, Lviv, Ukraine. Potential patients were interviewed and examined in person by a committee consisting of an American anesthesiologist and plastic surgeon as well as Ukrainian physicians.

Patients who scheduled to undergo surgery were admitted to City Hospital #8 in Lviv the day before surgery and were reassessed by both the surgical and anesthetic teams on the morning of surgery. Patients were postoperatively cared for in accordance with the local hospital protocol and routine. Patients who remained in-house for dressing changes or further care were evaluated twice daily. After discharge, patients were routinely evaluated by Ukrainian physicians who remained in ongoing communication with the Boston physicians via telemedicine conferences. This work was approved by the Partners Human research committee in Boston, and by the Chief of Burn service in Lviv.

## RESULTS

During three successive annual mission trips a total of 123 patients, ranging in age from 1 to 44 years, were seen and evaluated by the surgical and anesthetic teams (Table 1). Nearly half of the patients were under 10 years of age (55 of 123; 44%). The majority of the burns were caused by scald injury (76 of 123; 62%); the next most common form of injury was flame (29 of 123; 24%). There were seven patients with electrical injuries. The remaining 11 patients did not suffer from burn injuries but had complex medical histories in addition to traumatic or congenital conditions requiring possible surgical intervention.

On our first trip in 2011, we assessed 22 patients; 5 had reconstructive surgery. In 2012, 38 patients were evaluated and 12 underwent surgical intervention. In 2013, 63 patients were evaluated and 22 had surgical procedures.

**Table 1.** Patient demographics and disposition for Outreach in Lviv, Ukraine

	2011	2012	2013
Type of burn			
Flame	6	9	14
Scald	14	23	39
Electric	2	1	4
Other conditions	0	5	6
Shriners patients follow-up visit	4	2	10
Surgical procedures during trip	5	12	22
Type of surgical procedure			
Z-plasty	4	7	14
Tissue expander placement	1	2	1
Full- and partial-thickness skin grafts	0	3	5
Pedicle flap	0	0	1
Liposuction	0	0	1
Referred for further treatment to Boston	0	5	4
Referred for follow-up next year	8	22	46
Total	22	38	63

Patients treated at Shriners Hospital for Children in Boston were seen during follow-up visits in Ukraine on our missions: 4 patients in 2011, 2 patients in 2012, and 10 patients in 2013. In complex situations, patients were referred to Shriners Hospital for treatment: no patients in 2011, five patients in 2012, and four patients in 2013.

The surgical procedures performed during the mission trips to Ukraine included: multiple Z-plasty procedures, full- and partial-thickness skin grafts, pedicle flaps, liposuction, and tissue expander placements with further management of the expanders to be completed by Ukrainian physicians in close communication with the American team. There were no short-term complications with the surgery or the anesthesia in 123 cases during this 3-year period. The one long-term complication was a failure of a full-thickness skin graft to a burn patient with bilateral hand injuries. This patient required additional split-thickness skin grafts to small areas of both hands; the grafting was completed by a local Ukrainian physician 2 weeks after the mission trip. This patient had a good outcome after the additional surgery was completed (Table 1).

## DISCUSSION

Our Outreach Program in Lviv, serves as part of a larger project to improve burn care overall in Ukraine through physician collaboration, telemedicine consultation, outreach clinics, education, and research programs (Figure 1).

Before the first mission trip we took steps to lay the groundwork for education, research, and patient



**Figure 1.** Elements of Outreach Program.

care in Ukraine. We communicated extensively with physicians, hospital administrators and health-care officials to establish a working relationship and define the goals of the collaboration. We established a new telemedicine conference center at the primary Trauma/Burn hospital in Lviv for consultation with pediatric and burn/plastic surgeons in Boston. The telemedicine conferences have worked as a triage system, allowing children who need care in excess of what can be provided in Ukraine to be flown to the United States for further management.<sup>8</sup> The conferences also served educational and research purposes, with frequent lectures, teaching sessions, and research meetings being conducted before the mission trips.

As a next step, a medical team traveled to Ukraine from Boston to provide consultation and follow-up with patients who underwent telemedicine consults. We were also able to invite for follow-up current patients from Ukraine who were treated at Shriners Hospital. For many families, this prevented an unnecessary and costly trip to the United States for a routine follow-up visit.

Possible options for patients seen in the Outreach Clinic included: 1) follow-up at a future outreach clinic when no intervention was needed at the time of the visit, 2) surgery during the mission trip in Ukraine for uncomplicated patients with a normal airway examination, without comorbidity factors and the absence of acute illness, or 3) treatment recommended at Shriners Hospital for Children in Boston, for patients with complex medical/surgical history and those who required specialized procedures or extensive rehabilitation. These criteria were established by mixed perioperative teams of American and Ukrainian physicians and discussed for each

patient. Our collaborative work encouraged discussion among surgeons and anesthesiologists alike, and debriefings sessions were held multiple times per day with all teams.

Performing procedures and providing perioperative care in a resource-constrained environment proved to be very challenging in a variety of ways. There were significant differences in the approach to patient care and burn management because of differences in medical education and training. We had to adapt our practices to fit in with the local regulations and protocols for patient care. In addition to differences in practice style, we found ourselves without the standard tools used for routine cases in the United States. The hospital lacked some basic surgical equipment, back-up oxygen supplies, and patient-safety monitors such as pulse-oximetry for postoperative care. There was also no dedicated postoperative care unit, nor were protocols for postoperative care in place. We worked with medical equipment corporations in the United States to obtain the supplies we needed as donations; this included operating tables, operating room lights, sterilizing equipment, pulse-oximeters, electrocautery equipment, a Zimmer Dermatome skin-grafting system, tissue expanders, surgical and anesthesia supplies. We trained the medical staff in Lviv to use the donated equipment to facilitate our procedures and safely manage patients in the perioperative period.

Previous work has shown that international outreach programs have been very successful in educating local physicians and this is an important aspect of programs.<sup>9,10</sup> Our relationship with Ukrainian physicians has afforded many educational opportunities as part of our program, including conferences and master classes. Our work has also led to

multiple research projects based on data collected from our collaboration. An extensive database was constructed to track epidemiological and clinical characteristics on the burn patients. On the basis of this database we were able to identify areas of burn care that could be modified to improve patient outcomes, including the high in-hospital infection rates, delayed excision procedures, high rates of blood transfusion with burns less than 20% TBSA and insufficient respiratory care. We are currently addressing these areas of improvement with the Ukrainian burn physicians, working to find the best way to implement changes.

A total of five projects approved by Partners Healthcare System Institutional Review Board have been initiated from our data. Findings from these projects have been presented at international meetings and five articles have been published in peer-reviewed journals.

In collaboration with the Department of Health and multiple organizations in Ukraine, we were able to initiate a project to help prevent burn injury. With the help of the Department of Health, we first accessed hospital admission records to establish baseline epidemiological data on burn injuries. The next step was a questionnaire sent to a very large sample of Ukrainian citizens to assess their knowledge of burn injuries, treatment, and prevention. We have planned a targeted intervention to educate the public in and around Lviv on burn prevention and treatment and will be able to assess the efficacy of the project. Our goal is to contribute to a very significant reduction in the incidence of burn injury in Ukraine.

Our systematic, multilayered collaboration with the burn community in Ukraine has led to a

sustainable and productive program to improve burn care in this resource-constrained environment.

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## REFERENCES

1. Mock C, Peck M, Peden M, Krug E, editors. A WHO plan for burn prevention and care. Geneva, Switzerland: World Health Organization; 2008.
2. Abenavoli FM. A new approach for humanitarian missions. *Plast Reconstr Surg* 2009;124:461e-2e.
3. Zbar RI, Rai SM, Dingman DL. Establishing cleft malformation surgery in developing nations: a model for the new millennium. *Plast Reconstr Surg* 2000;106:886-9; discussion 890-1.
4. Lett R. International surgery: definition, principles and Canadian practice. *Can J Surg* 2003;46:365-72.
5. Engmann C, Olufolabi A, Srofeyoh E, Owen M. Multidisciplinary team partnerships to improve maternal and neonatal outcomes: the Kybele experience. *Int Anesthesiol Clin* 2010;48:109-22.
6. Bernstein M. Surgical outreach clinics in Canada: one neurosurgeon's experience. *Can J Surg* 2004;47:25-8.
7. Fuzaylov G, Driscoll DN, Volfsen I. A plan to improve pediatric burn care in Ukraine. *J Burn Care Res* 2013;34:e119-20.
8. Fuzaylov G, Knittel J, Driscoll DN. Use of telemedicine to improve burn care in Ukraine. *J Burn Care Res* 2013;34:e232-6.
9. Levy ML, Duenas VJ, Hambrecht AC, Hahn EJ, Aryan HE, Jandial R. Pediatric neurosurgery outreach: sustainability appraisal of a targeted teaching model in Kiev, Ukraine. *J Surg Educ* 2012;69:611-6.
10. Hambrecht A, Duenas MJ, Hahn EJ, et al. Strategic design for pediatric neurosurgery missions across the Western Hemisphere. *Surg Neurol Int* 2013;4:62.

## AUTHOR QUERIES

### AUTHOR PLEASE ANSWER ALL QUERIES

AQ1—Please provide departmental affiliation for Daniel N. Driscoll.

AQ2—Please review the edits to the sentence beginning with “This information was then discussed....”

AQ3—Please review the edits to the sentence beginning with “Patients were postoperatively....”

AQ4—Please review the edits to the sentence beginning with “There were no short-term complications...”

AQ5—Please review the edits to the sentence beginning with “Possible options for patients seen in...”

AQ1- Department of Surgery, Devision of Plastic Surgery

AQ2- "This information was discussed with physicians in Boston, via telemedicine conferencing in the months preceding of the Outreach Clinic."

AQ3- "Patients were cared for postoperatively in ....."

AQ4- There were no short-term complication with surgery or the anesthesia in one hundred twenty three cases ...."

AQ5 - Possible options for patients seen in the Outreach Clinic included: 1) follow-up at a future outreach clinic when no intervention was needed at the time of the visit; 2) surgery during the mission trip in Ukraine for uncomplicated patients with a normal airway exam, without co-morbidity factors and the absence of acute illness; or 3) recommend treatment at Shriners Hospital for Children in Boston, Massachusetts for patients with complex medical/ surgical history and those, who required specialized procedures or extensive rehabilitation.