

# Challenging the barriers to accessing surgery in low-resource settings: Lessons learned from burns

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SURGERY IS A NEGLECTED COMPONENT OF PRIMARY HEALTH CARE in many parts of the world, with more than 2 billion people lacking access to essential surgical services.<sup>1</sup> Yet few international initiatives are working to promote surgery as a public health good or to fund capacity building, and even fewer are developing simple, cost-effective models to extend surgical coverage outside capital cities and beyond a limited range of indications. Factors contributing to this neglect range from pragmatic challenges, such as a lack of basic materials and infrastructure and insufficient numbers of trained surgeons,<sup>2</sup> to misconceptions<sup>3</sup> which feed the false notion that these challenges are, practically speaking, insurmountable.

Médecins Sans Frontières (MSF) is an international humanitarian organization that provides medical care in crisis situations, including conflict, natural disasters, epidemics, and failed health systems. Surgical services are deployed typically during the initial response to an emergency, such as an earthquake or violent conflict. If they are maintained after the immediate crisis has eased—a step sometimes taken in contexts with an acute lack of local capacity—then road traffic and domestic accidents, particularly burns, often come to dominate case etiologies. Surgical management of burns

remains among the most neglected areas of surgery, and here, too, myths and misperceptions impede efforts to develop sustained capacity for managing this devastating, common injury.

The experience of MSF offering surgical care in low-resource settings (LRS) has shown that burn management and other surgical services seen as “specialized” (and therefore as more difficult to provide) depend on the same fundamental hospital activities and capacities as do general and orthopedic surgery. In this article, we draw upon the work of MSF in burn care<sup>4</sup> to illustrate these parallels and to examine the hurdles encountered and skills required in setting up surgical services in LRS. We also examine some of the misperceptions that impede development of critically needed capacity and describe how we are working to build a burn care model that is efficacious and transferable in settings where we operate. Our approach draws on lessons learned from developing other types of surgical programs and should help inform efforts to expand both the geographical reach and the range of surgical services in LRS.

## BURN SURGERY WITHIN MSF

MSF has always encountered a significant volume of burn patients in its surgical projects and usually accepts burns referrals from what exists of public systems. This influx is to be expected when we are the only surgical care provider, but surprisingly it also occurs in settings with other public and private providers present, where our projects focus on offering a broader array of care. In evaluating local options for burns patients, we realized that burns are a neglected area nearly everywhere we work and that the few existing burn units are usually of poor quality.

For these reasons, MSF assumed the challenge of developing competence in burns management.

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Our approach to adopting new surgical areas is relatively standardized: (1) partner with experts; (2) invest up-front, within an existing project, to develop protocols and technical approaches; and (3) identify ways to simplify these practices for local settings, staff, and infrastructure constraints, so they can be implemented more broadly (here, as standardized burns practice in nonspecialized surgical projects).

For MSF's Operational Center Paris (MSF-OCP; 1 of 5 MSF operational centers), this process began in 2006–2007 with our first burn unit within the surgical program at Trinity Hospital in Port-au-Prince, Haiti. Currently MSF-OCP treats acute burns in 9 projects in 7 countries (Haiti, South Sudan, Democratic Republic of Congo, Central African Republic, Pakistan, Yemen, and Syria). In the first quarter of 2014, we performed nearly 5,000 burn-related procedures—double the volume of Q1 2013.

#### COMMON MYTHS VERSUS REALITIES OF BURN SURGERY PROGRAMMING IN LRS

In working with local and national stakeholders to establish these programs, we encountered many misconceptions about the potential challenges involved; for the most part, they echoed oft-cited rationales for failure to invest more generally in surgical programs. Here we discuss these perceptions and contrast them with the experiences of MSF in burn projects.

**The burden of burns is limited, so there is little need to expand burn care.** *Myth.* Burns are extremely common and considered a “serious public health problem” by the World Health Organization. They cause an estimated 265,000 deaths yearly, 95% of them in low- and middle-income countries<sup>5</sup>—a geographic disparity related to factors such as use of open cooking fires, lack of fire safety measures, and crowded living conditions.<sup>6</sup> Burns are also a major cause of disability-adjusted life-years lost in low- and middle-income countries. Children younger than age 5 years are by far the most affected group, and women are also at increased risk.<sup>5,7</sup>

These figures, however, come from estimates and models; few concrete data exist on the burden and typology of burns and burns-related surgical need in LRS and even less on provision of care and outcomes. This speaks to a wider problem: the paucity of medical- and surgery-related data from LRS—a critical gap for policy makers, because quantifying need is key to determining public health priorities and resources. Nevertheless, the experience of MSF is consistent with these high

estimates: half of all MSF-OCP surgical activity is related to trauma, half of which are burns (partly reflecting a focus of our projects, but consistent with the literature) (Supplementary Fig).

**Treating burns requires modern burn unit technology and infrastructure that is beyond reach for low-income settings.** *Myth.* at least in terms of physical infrastructure; what matters more is managing the hospital systems of patient flow and components of care (emergency room—intensive care unit—operating theater—ward). The experience of MSF in Haiti illustrates this point. Immediately after the earthquake, we constructed a 350-bed hospital, with operating theater block, in an inflatable tent.<sup>8</sup> After the emergency phase, when bed needs decreased, we moved to semi-permanent structures but maintained the burn unit, given the strong ongoing need. The inflatable structures were retained to facilitate optimal patient flow, with early isolation and a dedicated burn intensive care unit and operating theater block. As patients progressed with treatment, they were moved into shared rooms.

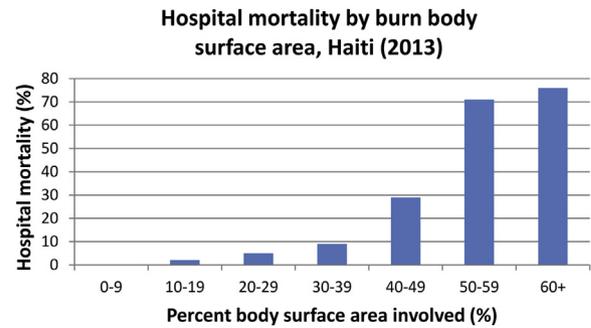
This experience reinforced a key lesson, one that also applies to other areas of surgery: the surgical act comprises only a fraction of patient care. Although discussions on expanding access to surgery typically devote most attention to the operating theater, the larger challenge has been in hygiene practices, infection control, laboratory and blood bank services, anesthesia, and postoperative care, to name a few; for large burns and some other surgical indications, including trauma, long physical and/or psychological rehabilitation is also critical. Broadly speaking, these services require well-coordinated clinical strategy (protocols, appropriate human resources, equipment, and drugs), rigorous quality control, and dedicated hospital management (although finding experienced hospital managers is a significant challenge in most MSF project contexts).

Collectively, these measures are paying off: implementation of MSF protocols adapted from burn centers plus ongoing integration of more advanced techniques have resulted in improved burn care and patient satisfaction, and fewer complications. For example, performing many dressing changes on the ward during the acute phase has reduced the necessity for operating theater visits every 2 days, which in turn reduces exposure to anesthetic agents and nosocomial infections and eliminates the need for repeated transfers and fasting. The positive impact on patients' nutritional state, physical rehabilitation, and psychological well-being has been striking.

**Burns are too complicated to manage.** *Myth and reality.* Inadequate treatment and rehabilitation often lead to poor outcomes and long-term functional disability. Furthermore, some important advances in burn care in high-income countries have proven difficult to implement in settings where we work—for example, the use of aggressive surgical strategies for patients with large full-thickness burns, which have led to markedly improved patient survival in advanced burn units.<sup>9</sup>

In our experience, it is certainly possible to train general surgeons to assess and manage burn wounds and to take more aggressive surgical approaches, notably early excision and grafting. The bigger challenges, however—and greater opportunities for improving care—involve establishing the required infrastructure and support functions outside the operating theater, as described above. As in other areas of surgery, our approach is therefore to make informed trade-offs in techniques, with the aim of optimizing patient outcomes given the resources and infrastructure in place. In our burn treatment settings, less aggressive surgical strategies—combined with careful attention to burn evolution, infection prevention, and other core components of burn care—can result in relatively low mortality for burns involving up to 40% of total body surface area (TBSA) (Fig), comparing favorably with rates reported from similar settings.<sup>10-13</sup>

**Burn surgery is unsafe in hospital structures in LRS because of the high risk of hospital-acquired infections.** *Myth.* Although bacterial infections—specifically antibiotic-resistant infections—are a substantial threat in burn units and, in LRS, are associated with late deaths from large burns, appropriate hospital practices can reduce this risk and improve outcomes. Although microbiology for individual patient management is not an absolute requirement for providing effective burn care, our experience linking burn units with microbiology services has allowed us to (1) develop active empirical therapies for burn sepsis based on local resistance patterns<sup>14</sup>; (2) identify outbreaks of multidrug-resistant strains; and (3) reduce broad-spectrum antibiotic use. All burn patients showing signs of systemic infection receive early, empirical treatment targeting gram-negative organisms in particular, the most important cause of lethal bacteremia in burn patients; where patient-level microbiology is available, this empirical therapy is adjusted. To reduce the need for systemic antibiotics and to promote wound healing, we also introduced additional, second-line topical agents for burn wound infections. When effective



**Fig.** Routine programmatic data from 224 patients treated for burns during a 6-month period of 2013 at the MSF burn unit in Drouillard Hospital, Port-au-Prince.

therapies are combined with active approaches to infection prevention involving dedicated human resources (nurse hygienist) and hospital support (routine infection control committee), in-hospital mortality for patients with <40% TSBA has been modest, as shown previously.

**Burns are expensive to treat.** *Myth and reality.* There is little published information on the cost of treating burns in LRS. In one of few such reports, a small study in Lagos, Nigeria,<sup>15</sup> the authors estimated the average treatment cost per burn patient as \$US1,398 ± \$518 and average daily cost as US\$58, which is in the same range as other published series. Patient cohorts varied widely, however, in terms of burn injury and treatment received, making it difficult to extrapolate to other burn treatment scenarios. In our programs we see no evidence that managing burns is significantly more expensive than managing other types of trauma, although rigorous data is lacking.

In terms of cost efficacy, for example, as assessed by disability-adjusted life-years, burns become more expensive as the result of factors such as their relatively high rates of complications and mortality. Still, the available data do not justify failure to establish burn treatment based on cost. Cost improvements should be achievable—for example, by improvements that allow more dressing changes to be done at the bedside rather than in the operating theater, as mentioned previously. Furthermore, hospitals with a large volume of burns may achieve economies of scale.

In conclusion, just as local community health posts in many LRS have become HIV diagnosis and treatment facilities by adapting the fundamental skills and composition of a standard outpatient department, our experience has shown that even the most basic hospital structure can be readily

adapted to offer general surgery, and that the scope of general surgery can be expanded to encompass common pathologies—such as burns—that are often thought to require specialized (and therefore unavailable) facilities and staff. Furthermore, the same medical systems and hospital management practices employed in general surgical services also support quality care for “specialized surgery” patients. Lessons from MSF’s burns projects may therefore be valuable for promoting surgical programming as a public health priority in LRS, commensurate with the high global burden of surgical disease and the life- and function-saving impact of quality surgical services. Surgical services are not a luxury that should wait for another time. The needed investments are not exceptional and the infrastructure constraints are not insurmountable.

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#### SUPPLEMENTARY DATA

Supplementary data related to this article can be found online at <http://dx.doi.org/10.1016/j.surg.2015.04.006>.

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