

Communication

# MSF Hospital in Tabarre, Haiti: Why a Field General Surgery Fellowship Is Necessary

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**Abstract:** Recently, the Hospital at Tabarre in Port-au-Prince Haiti was reopened by the Operational Center of Paris—Médecins Sans Frontières (MSF). This hospital is now purely a Trauma Center staffed by five national general surgeons and five orthopedic surgeons. MSF hopes that the new trauma focus of Tabarre Hospital and the presence of a full complement of experienced national surgeons can enable this site to become one of the training sites for expatriate surgeons on their first humanitarian mission with MSF. The general surgical case charts from the first 3 months after the reopening of the hospital were retrospectively reviewed. All procedures done by the general surgical department in the operating room theatre were registered and short and long-term results analyzed. The Hospital at Tabarre has a very high rate of penetrating traumas compared to other MSF hospitals, and seems ideally suited to train expatriate surgeons during their first missions in the field with MSF because of the experience of the National surgical staff. Additionally, it is felt that a longer Field General Surgery fellowship can and should be developed within MSF to ensure that the next generation of general surgeons can continue to provide the type of surgical care that is still needed in the field.

**Keywords:** penetrating trauma; blunt trauma; humanitarian missions; Doctors Without Borders; Médecins Sans Frontières; MSF; Field General Surgery fellowship



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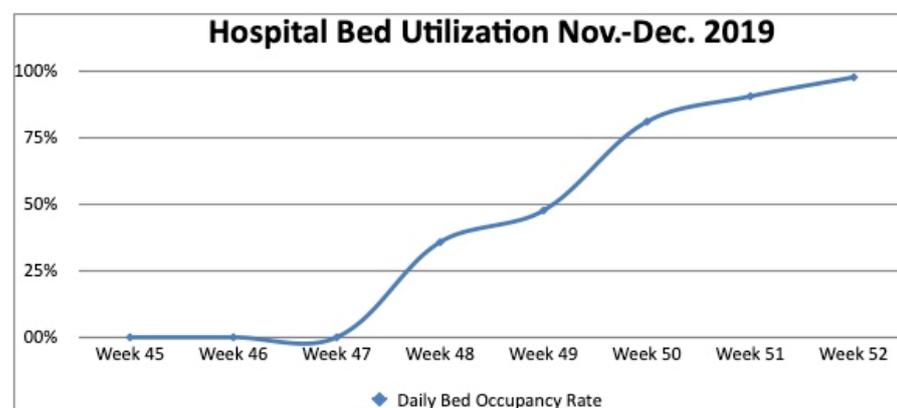
## 1. Introduction

Médecins Sans Frontières (MSF) Operational Center of Paris (OCP) was intervening at a hospital in Port-au-Prince, Haiti when a devastating 7.0 magnitude earthquake in the Haitian capital on 12 January 2010 destroyed it [1,2]. That day MSF lost 12 colleagues and Haiti lost 60% of its Healthcare system. In the aftermath a field hospital was built on a football field by OCP and then moved to the borough of Drouillard where a container hospital was set-up to treat traumas. Ultimately, the Hospital at Drouillard was turned into a Burn Hospital and a Trauma hospital, Nap Kenbé Hospital, set-up in the Port-au-Prince commune of Tabarre by the Operational Center of Brussels (OCB). This hospital opened on 14 February 2012 and treated 35,800 patients in the first 10 months of its opening alone; however, it was closed in June 2019 due to a ballooning budget. Its management was transferred to the OCP and reopened on 25 November 2019. Currently one expatriate general surgeon is assigned to assist the national general surgeons at Tabarre Hospital. Due to the fact that the initial admission criteria were very strict, a review of the cases during the first three months in the general surgical department at Tabarre Hospital was done to better understand the type of injuries that present to this Trauma Center.

Haiti was born during the French Revolution and led by the first black general of the French army, Toussaint Louverture, who was a former slave. During the Haitian revolution, Toussaint's successor defeated Napoleon's army and became the first independent nation of Latin America and the second republic in the Americas after the United States. Even more impressively, it became the first nation to abolish slavery and to date it is the only country in the world created after a revolution of former slaves. Due to this past Haiti has been plagued by questionable outside influences from its former occupiers that has only stagnated efforts to stamp out its own internal corruption. As a result, MSF finds itself navigating a densely populated capital rife with gang violence in a country that currently does not have a Prime Minister or parliament, and since 13 January 2020 the President has been governing by order.

## 2. Methods

The Hospital at Tabarre is manned by 5 full-time general surgeons and 5 full-time orthopedic surgeons from Haiti and, unlike its previous iteration by OCB, it has different admission criteria. It is also blessed to have a 6-bed intensive care unit, 2 isolation rooms and has 2 operating rooms and 1 minor procedure room used for complex dressing changes and smaller procedures. Furthermore, in addition to X-rays and fluoroscopy, the surgeons have access to a small blood bank, sonography, microbiology and limited blood chemistries. When the hospital re-opened in 2019 it originally opened the first week only for referrals from the OCB Advanced Medical Post of Martissant and then for external admissions with a 25-bed capacity but doubled to 50 beds in only 4 weeks (Figure 1). Built with containers (Figure 2), the hospital complex has the ability to have around 120–130 beds, which is approximately what it had at its peak with OCB running the show. Notably, at that time the operating budget was 25 million dollars annually, but the new project had an initial budget of 6 million Euros for OCP and 1 million Euros for OCB for 2020.



**Average bed occupancy rate for the month of December 2019= 79.2%**

**Figure 1.** Hospital Bed Occupancy Rate from the Opening day at Tabarre Hospital. Average bed occupancy rate for the month of December 2019 = 79.2%. (Nov.=November, Dec.=December).

The hospital is currently limited to treating patients suffering from trauma (Figure 3). Admission criteria include penetrating and blunt trauma to the body, but currently only open fractures can be treated at the hospital. Exclusion criteria include, cranial and vertebra fractures, injuries of the hands and feet and facial trauma unless the patient is suffering from respiratory distress. The other goal of this hospital is to accept Haitian Surgical Residents, in addition to surgeons doing their first missions with MSF. Although the local and expatriate staff would also like to open the hospital up to non-traumatic cases, budget concerns have limited its implementation for now.



**Figure 2.** Central courtyard of the Médecins Sans Frontières Operational Center of Paris Hospital Nap Kenbe Referral center for trauma at Tabarre, Port-au-Prince, Haiti.



**Figure 3.** Main entrance of the Médecins Sans Frontières Operational Center of Paris Hospital Nap Kenbe referral center for trauma in the commune of Tabarre in Port-au-Prince, Haiti.

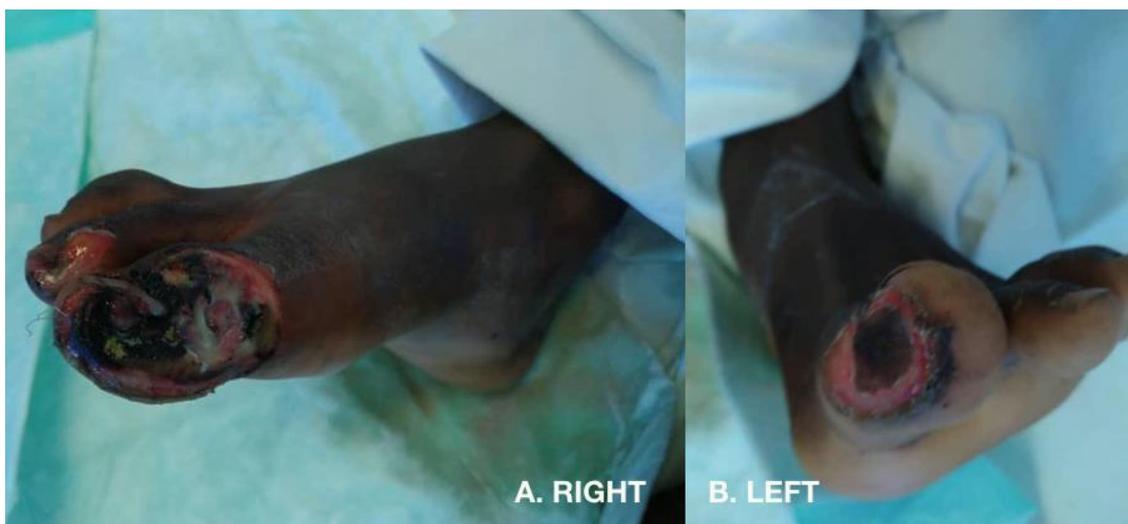
The general surgical case charts from the reopening of the hospital on 25 November 2019 until 16 February 2020 were retrospectively reviewed. This 12-week period was used to identify trends in traumatic injuries in Port-au-Prince, Haiti and types of procedures performed. All procedures done by the general surgical department in the operating room theatre were analyzed and morbidity and mortality recorded. Although additional procedures such as peripheral vascular procedures, skin grafts, tracheostomies and debridements were recorded, there was an emphasis made on recording and analyzing all intra-abdominal and abdominal procedures.

### 3. Results

Eighty-seven percent of patients requiring a general surgical intervention were for penetrating trauma (Table 1). Specifically, 45 patients suffered penetrating trauma compared to 7 who suffered blunt trauma. Gunshot wounds (GSW) accounted for the vast majority of cases 36 patients (69%) and 9 patients (17%) sustained a knife wound. Motor vehicle accidents occurred in six patients (11%) and one (2%) patient suffered a fall associated with electrocution. Notably, two patients presented with a mixed picture, they were both riding on motorcycles while one patient sustained a GSW and the other was stabbed. This last patient was then transported by motorcycle taxi to the hospital. He sustained blunt traumas to both of his feet as his limbs dragged helplessly on the ground during transport as he went in and out of consciousness (Figure 4A,B). His stab wound to the chest was treated with tube thoracostomy. No thoracotomies were done during this 12-week period.

**Table 1.** Penetrating vs. blunt trauma primary laparotomy first 12 weeks.

Penetrating (87%)	n (Percentage)	Blunt (13%)	n (Percentage)	Total
GSW	36 (69%)	MVA	6 (11%)	
Knife Wound	9 (17%)	Fall	1 (2%)	
Total	45		7	52



**Figure 4.** Bilateral blunt lower extremity trauma sustained while patient was urgently transported to the hospital on a motorcycle taxi semi-conscious after being stabbed in the chest: (A) right foot, (B) left foot.

In the first 12 weeks a total of 73 exploratory laparotomies were done, of which 52 (71%) were for the primary trauma and 21 were secondary laparotomies (29%) (Tables 1 and 2). When laparotomies are compared to other procedures, 48% of patients underwent abdominal explorations, six patients underwent urgent vascular repairs (4%) and the remaining 48% of patients underwent either debridements in the operating room, skin grafting, fasciotomy followed by fasciotomy closure and tracheostomy. Most vascular reconstructions were primary repairs of the artery and venous ligation. Two patients required vascular bypass with saphenous vein graft.

Debridements in the operating room are the second most common procedure after exploratory laparotomy. Although difficult to quantify and analyze, they are a significant economic strain on any trauma center and can be morally difficult to manage for the surgical and operating room staff. Due to difficulties in properly training the local staff in the use of the V.A.C. ULTA™ system (Acelity, San Antonio, TX, USA), we used non-commercial products to achieve the same negative pressure wound therapy (NPWT)

benefits, specifically abdominal packs, two 16 Fr. nasogastric tubes, occlusive bandages and a portable suction machine (Figure 5A). One victim of a motor vehicle accident sustained an open-book pelvic fracture that required external fixation; she also had a deep right groin injury that necessitated the formation of an end colostomy (Figure 5B). Ultimately her right buttocks including her entire gluteus maximus had to be excised. This resulted in the posterior surface of her entire rectum becoming exposed (Figure 5C). She is currently the second patient being treated with non-commercial NPWT.

**Table 2.** Tabarre Hospital General Surgical cases in operating room in the initial 12 weeks (25 November 2019–16 February 2020).

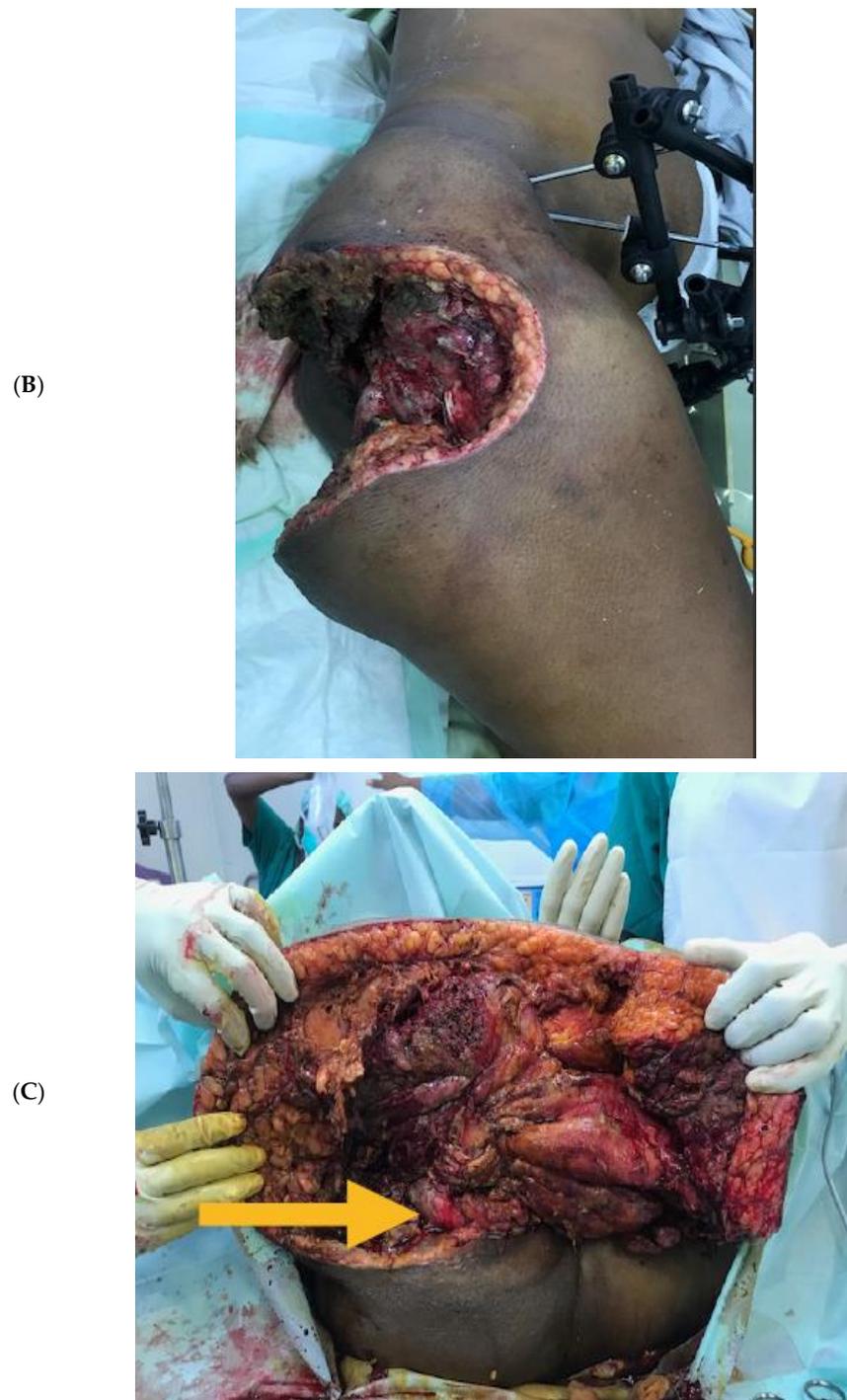
Exploratory Laparotomies (48%)		<i>n</i>	Vascular Reconstruction (4%)	<i>n</i>	Other (48%)	<i>n</i>	All
Primary (71%)	Positive	48	Primary arterial repair	4	Debridements	61	
	Negative	4	Primary Venous repair	2	Skin Grafts	6	
Secondary (29%)		21	Bypass with SVG	2	Fasciotomy Closure	2	
	Depacking	15			Fasciotomy	2	
	Repacking	3			Tracheostomy	1	
	Abscess Drainage	2			Amputation	1	
	Intussusception	1					
Total		73		6		73	152

The hospital initially had a policy of only recording the three main operations done per patient. Unfortunately, due to the poly-traumatic nature of these patients presenting to Tabarre Hospital, sometimes patients who required concomitant orthopedic procedures did not have the general surgical portion of their surgeries recorded in the main registry, and only in the charts. As a result, a more detailed record of all general surgical procedures performed was created (see above). Hollow-viscus injuries occurred most commonly in approximately 44% of cases, compared to 38% of cases with solid organ injuries (Table 3). The remaining injuries were structural injuries including, injuries to the diaphragm, mesentery and abdominal wall (18%). Aside from the 73 laparotomies, an additional 122 intra-abdominal procedures were performed.

(A)



**Figure 5.** Cont.



**Figure 5.** Massive soft tissue loss and open book pelvic fracture after a motor vehicle accident: (A) make-shift negative pressure wound therapy (NPWT) made with abdominal packs, two 16 Fr. nasogastric tubes, occlusive bandages and a portable suction machine, (B) lateral view status post external pelvic fixation and extensive debridement of necrotic right gluteus maximus with NPWT removed, (C) posterior view showing exposed rectum (arrow).

Repair of the small bowel was necessary in 23 instances, with 11 requiring formal small bowel resection and anastomosis and 12 requiring only primary small bowel repair. Injury to the colon was the next most common hollow-viscus injury requiring formal colectomy in eight patients and primary repair in nine instances. Hepatic injury required a total of 35 procedures including peri-hepatic packing in 11 patients, repacking in 3 patients,

packing removal in 14 patients and hepatorraphy in 7 patients. Interestingly, splenectomy was a relatively rare event with only two splenectomies necessary in this 12-week period. Peri-splenic packing resulted in the preservation of four spleens but is not recommended in adults due to the risk of splenic abscess and resultant need for delayed splenectomy. Pancreatic injuries were all managed with peri-pancreatic drainage and no pancreatic resections were required.

**Table 3.** Intra-abdominal injuries requiring laparotomy and surgical procedures required.

Type	Injury	n	Procedure	n
Hollow-Viscus (44%)	Small Bowel Injury	19	Enterectomy	11
			Enterorrhaphy	12
	Large Bowel Injury	15	Colectomy	8
			Colorraphy	9
	Gastric Injury	7	Gastrorraphy	6
Bladder Injury	2	Gastrectomy	0	
		Cystorraphy	2	
Total		43		48
Solid Organ (38%)	Hepatic Injury	26	Hepatic Packing	11
			Depacking	14
			Repacking	3
			Hepatorraphy	7
	Splenic Injury	6	Packing	4
			Depacking	4
			Splenectomy	2
	Pancreatic Injury	4	Peri-pancreatic drainage	4
			Peri-pancreatic Packing	1
			Pancreatectomy	0
Kidney Injury	2	Nephrorraphy	1	
		Nephrectomy	2	
Total		38		44
Other (18%)	Diaphragmatic Injury	7	Repair of Diaphragm	7
	Mesenteric Injury	6	Repair of Mesentery	6
	Evisceration	5	Repair of Evisceration	5
			Partial Omentectomy	3
Total		18		21
All		99		122

A total of 21 cases required re-laparotomy, the majority of which were for either pack removal or repacking. Of the three patients that did not undergo a programmed second-look operation three patients had intra-abdominal infections that required drainage. The third patient presented as an outpatient 2 weeks after surgery and was found to have an intussusception that was reduced and did not require bowel resection. Mortality occurred in three (2%) patients and was influenced by the complexities of obtaining blood bank certification in two instances. A third patient died due to an extensive hepatic injury complicated by a high-volume biliary fistula that became infected resulting in sepsis and multiple organ dysfunction and death. No intra-operative mortalities were recorded.

#### 4. Discussion

In 2015 a retrospective review of all procedures done at MSF facilities across 17 countries was undertaken with 79,715 procedures done with 35,756 (45%) procedures done for trauma [3]. When trauma centers were excluded from this study, the rate of trauma-related surgery was still 29.4%. Tabarre Hospital was included in that study, but as mentioned is now exclusively a trauma center. Approximately a third of patients sent to Tabarre

Hospital are first seen at an emergency room in the Martissant area of Port-au-Prince, and the majority are external admissions [4]. Due to limitations of travel in Port-au-Prince patient transfers can take several hours. As a result, the concept of the “golden hour” is less relevant. Nonetheless, to see what the Haitian general surgeons could accomplish from the management of complex hepato-biliary injuries and pancreatic fractures to complex vascular surgery and skin grafting without things that can be taken for granted like CT scanners, endoscopy or basic laparoscopy is inspiring.

As opposed to this global study, 87% of all general surgical cases were due to penetrating trauma with only 13 cases due to blunt trauma; this is in direct contrast to the finding that the most common mechanism of operative trauma in the global study by Wong et al. was for motor vehicle accidents and accounted for only 29.9% of cases [3]. All penetrating trauma was managed non-operatively with tube thoracotomy. This is not dissimilar to that noted in the study by Wong et al., where only 38 thoracotomies were performed which accounted for 0.1% of all procedures done.

Similar to other studies of humanitarian surgical missions, intra-operative mortality was 2% in our study, compared to 0.2% in an earlier MSF study from 13 countries totaling 17 surgical hospitals by Chu et al. [5]. This slightly increased mortality during this 3-month period is probably due to the higher percentage of penetrating traumas when compared to other missions. Additionally, as mentioned, the absence of a functioning and certified blood bank may have been a factored in two out of the three mortalities. Now that the blood bank is functioning more smoothly, it is believed that these types of mortalities can be mitigated. This will be helped by the continued use of a standardized protocol for systematic therapy with tranexamic acid (TXA) for severe traumas in adults. This practice is standard protocol at all MSF OCs, and has been done at the hospital at Tabarre by OCB since December 2015 and is still being utilized there under OCP [6]. The initial study found that mortality could be reduced by 70% in these patients. The protocol calls for 1 gm of intravenous (IV) TXA within 3 h from severe injury followed by a repeat IV bolus 3 h later [6].

Another interesting trend noted in our study was the dearth of splenectomies ( $n = 2$ ). Unlike many trauma centers, there is no access to CT scanning or interventional radiology. Splenic preservation was performed with peri-splenic packing in four additional cases. This is consistent with the trend towards splenic preservation across both adult and pediatric trauma centers [7–11]. Although intra-abdominal packing for uncontrollable hepatic/retroperitoneal injuries is well described there is a dearth of literature on this topic with only a recent case report presenting the results in a patient with coagulopathy and splenic trauma [12]. This seems the type of topic ideally suited for further research at a center like Tabarre. Notably, only 19 splenectomies were done in all OCP general surgery projects in 2019.

The ability of the local orthopedic surgeons to piece back together broken bones and open book fractures of the pelvis with no CT scans and only external fixators was humbling. Sadly, the high level of care that the local orthopedic surgeons now demonstrate may be one of the only silver-linings after the earthquake of 2010 [1]. It is hard for younger generations to realize that some general surgeons alive today used to deal with fractures routinely, and that orthopedic surgery was not even a specialty in many countries such as France until the 1980's. Interestingly, trauma surgeons in Germany still do both, treating general surgical issues of the traumatized patient, in addition to managing all traumatic bone fractures and orthopedic injuries [2].

For years surgeons have decried the decreased richness of general surgical residencies, a trend greatly exacerbated by the growing number of specialties and fellowships [13]. For years authors have cited international electives and missions as potential avenues for augmenting one's surgical experience, even arguing that humanitarian missions with organizations like MSF could help save general surgery itself [14–16]. Now the problem of the disappearance of general surgery is more critical than ever. As the latest generation of general surgeons retire, organizations like MSF are starting to worry that they will not have surgeons who can manage all of the surgical needs of the field. Tabarre Hospital

is currently being prepared to have the capabilities to act as a training site for surgeons new to MSF, specifically, on their first mission. One month at Tabarre Hospital may allow surgeons to deal with more operative penetrating trauma than they can see during an entire residency. Furthermore, the ability to interact with the orthopedic surgeons can help general surgeons to again be comfortable with managing basic fractures with external fixators and Steinmen pins [14].

Due to the unique opportunities that hospitals run by MSF can provide in today's world, thought has been given to the creation of a 6-month fellowship program to help train modern day general surgeons how to manage the realities of being a surgeon on a mission in the field [14]. In the United States the closest thing to this is known as rural surgery. Fourteen programs on the American College of Surgeons website (<https://www.facs.org/education/resources/residency-search/specialties/rural>) are found that offer this specialty. However, not even rural surgeons in the United States manage fractures; needless to say, other problems require specialties such as neurosurgery, urology, gynecology and pediatric surgery due to the litigious nature of life in America.

## 5. Conclusions

Although there is no doubt that increased specialization has improved outcomes in surgery, this experience at Tabarre Hospital reminds one how well-trained general surgeons can have excellent outcomes and provide an invaluable service to innumerable populations around the world. One only hopes that future generations of surgeons do not forget the value of the original general surgeon, and more importantly, do not lose the ability to provide these invaluable services when needed. Perhaps in the future, surgical missions could act as an alternative means to maintain licensure. This added incentive may allow for a steady stream of competent general surgeons who can become as specialized as they want, but still maintain the ability to treat a broad array of ailments that only a surgeon who is a master of all of the principles of general surgery can address.

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