

# How to Plan Burn Services

Suggestions for planning burn services  
in countries with poor socio-economical development



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One out of 200 persons, in a given community, will endure a thermal injury per year, this calculations lead us to some 5,000 burn injuries per million population. Following this arithmetic line one should designed one specialized burn bed per every 30 thousand users in an influence area of any given hospital. This considerations are general and valid for countries with poor socio-economical development who share common burn risk factors. The risk factor variables and vulnerability to accidents in poor developed countries are not well known, this fact makes very difficult to calculate the real needs of burn services in a given health service.

Therefore, the preliminary point for planning and developing burn units should be based on real burn demographics. incidence of burn injuries, risk factors and cultural burn determinants of a specific country. Poor and low income people suffer the immense majority of burn injuries, thus, government is responsible for planning and supporting burn services in public hospitals.

Twenty seven percent of the admissions to the Pearl F. Ort Burn Unit in the Dominican Republic is due to electrical burns, while world wide medical literature reports 4 to 8% admissions for the same cause; this is a world record, which we do not feel proud of, but culturally determined because of illegal electrical connections. This *sui generis* situation forced us to “dominicanized” our burn service. The concept of “latinizing” burn services is valid for any country. The rational is simple, each society develops it own risk factors and vulnerabilities for accidents, even if they are developed countries.



Burn ICU at Pearl F. Ort, Hosp. Dr. Luis E Aybar

What makes the conception of a burn unit really difficult, and at the same time interesting, is the extreme complexity of architectural, clinical, and economical resources criteria apply to the planning process.

These criteria and resources increase exponentially once the point of admitting patients begins. The premises are shocking, overwhelming and non traditional, in terms of common medical knowledge; I advice to forsake all previous traditional clinical and medical knowledge. Thus, as long as we consider a burn patient as an ordinary patient, we will lose the real context of this extraordinary lesion.

I do not fear to err when affirming that treating a patient with severe burn injury demand learning, a new medicine from each one on us. These reflections are not axiomatic, but deriving from the experience gained during eleven years caring for critical burn injuries and leading a burn team in a high complexity burn service with 2054 admissions of patients we an average percentage TBSA burn and 20 thousand treated in our out patient clinic.



Tub room at Pearl F. Ort Burn Unit  
Hospital Dr. Luis E. Aybar

## Planning

Planning a burn service and operating it afterwards does not accept any assumption. Burn services are necessary, essential and the only guarantee of surviving that a patient with severe burns has. In other words, planning a burn unit does not admit arguments leading to justify its own existence. In a country with 8 million population, for example, 38 thousand people will sustain burn every year (5,000 cases per million inhabitants). Ten percent of those burns will have a level of severity that demand the usage of some medical resource. Some 800 patients will be classified ranging from severe to critical burns and some 80 to 200 will die. With this somber and inevitable reality burn units are planned at different levels of service complexity

There are different levels of service complexity. By definition, a minimal complexity service is reserved for those burn treatment carried out within a general surgery or trauma department with a given number of assigned beds not constituting a differentiated unit or service, and sharing operating rooms and resources from a general hospital. Does not have especial infrastructures and at least one burn surgeon. Its influence area is local.

Services of medium complexity work inside or with the support of a general hospital and it should count with: a) **human resources** specialized and in sufficient number for its capacity. b) **Physical infrastructure**: exclusive area for hospitalization and treatment, own or shared external clinics, auxiliary dependences and c) **activity**: multidisciplinary team for treating moderate to severe burns.



Intensive Care Burn Room in the Pearl F. Ort Burn Unit  
Cuidad Sanitaria Dr. Luis E. Aybar, Dominican Republic

If its resources allows it, they will also stabilize severe burns or proceed with emergency treatment in order to derive the patient to a higher complexity burn facility. In critical burns, only emergency treatment and further transfer to a higher severity burn facility. Also, medical education is offered. If resources allow, it can also produce some clinical and/or statistical investigations. Its influence area is also local

The high complexity centers work affiliate to a general hospital using its central support services. Should count with: human resources, specialized and in sufficient number, medical facility with equipment to allow for progressive burn care in critical cases, it also should allow intensive care as well as progressive and self care.

Also having areas, such as outpatient clinic, special environment control, auxiliary departments, etc. It should be planned for treating severe and critical burns in addition to other types of burn severity, scientific research, medical and general health education. It serves a regional area.

Once the service complexity level and its area of influence is established, decisions regarding the number and type of beds must be done. For planning a national net, one bed for every 30 thousand population must be calculated. Of that total, 60% of beds should be destined for adults and 40% for children. It is world wide accepted that 60% of all burns occur in adults and 40% in patients under 14 years of age.

A burn centre dedicated for adults should be planned in an adult general hospital and one for children should operate, preferably, in a pediatric hospital. Under these premises, converting any given hospital's, already operating polyvalent, ICU into a burn unit is unacceptable. This supposition reflects a lack of knowledge about burn care. In fact, a high complexity burn service is a differentiated and isolated ICU by itself.

## Infrastructures

The first misconception is supposing that a previously built structure could be transformed into a burn unit by the simple action of changing doors, adding walls or admitting burn patients in such a place; nothing more alike to a caricature. The criteria for architecturally designing a burn service are numerous, mandatory and complex. Designers should plan the physical structure, based, I'll say, without being too simple, as designs and devices for strict infection control; summing up, effective infection control barriers. A restroom, can not be designed, for example, next to the post anesthesia recovery room.

Tub rooms should be diametrically placed opposite to the operating rooms. Restricted through traffic, proper biohazard materials deposition and rooms with isolation systems are some of the few circumstances characterizing a burn unit. Each room should be physically isolated, when I mean isolated I mean real walls, curtains are only visual isolators. We also understand that rooms' walls and walls in every critical area are covered with especial antibacterial material, such as Acrovir ®

It doesn't matter how well elaborated a burn unit is, without strict hand washing, not a single system will control cross infections. In our team, the year's best employee is that who washes his/her hands the most. It doesn't make any sense systems, such as, air micro filtration, laminar flow, negative rooms pressures or latest imported technology from NASA, sort or saying, if we do not come back to the good old and effective compulsive hand washing and scrubbing before and after touching a burn patient. Of course, I mean, providing liquid surgical soap and a suitable hand drying system. Currently, gel-alcohol products have unified both equation's variables in one act; washing without water and drying without napkins or hand dryers.

I'm not insisting in commons areas inside a health service facility, such as a pharmacy, storage rooms, clinical nutrition department, etc., but I will insist in the fact that this supporting services should be specialized and exclusive to the burn unit. As much as we accept the concept that a burn patient is not an ordinary patient, we have to admit that support services are not ordinary either. A clinical lab, staffed with exclusive dedicated personnel surely will have a different focus when interpreting test findings and a decisive participation in decision making based on those test findings.

Therefore, additional structures and supporting services are also specialized. It is not advisable to use supporting services outside the burn unit and depending, for example, from the general hospital to which the burn service is affiliated to. It is over and over and clinically proven, that this last alternative supposes an out of phase gear in the assistance machinery that a burn service demands.

The ultimate solution is having all supporting services inside the burn unit, at least the most important ones; dedicated operating rooms, clinical and microbiology labs, maintenance and nutrition departments, pharmacy, outpatient clinic and administrative offices. Specifically, I'm pointing out the sterilization department; electrical skin dermatomes, a paramount instrument in a burn services, can not resist temperatures over 43°C (104.00°F), therefore, an ethylene oxide or any cool sterilization system is a *sine qua non* for an idea burn surgical service performance.



Such professionalism criteria, specialty and commitment are applicable variables for the rest of the personnel, including the administrative ones. (Table 1)

* Specialty	No.
Burn Surgeon	3
Anesthesiology	4
Nutritionist	1
Infectology	1
Rehabilitation	1
Nephrology	1
Psiquiatry	1
Intensivist	1

**Table I.** – Fixed Medical staff, by number, Pearl F. Ort Burn Unit. Dr. Luis E. Aybar Hospital, Santo Domingo, Dominican Republic

### Economical resources

I'm not mistaken stating that the most controversial point for caring burn patients is the allocation of economical resources. There isn't any supposition either, burns are catastrophic and these patients demand a great deal of costly medical supplies, interventions, drugs and rehabilitation services. Of course, you may ask what's my point by making this assertion if during the planning phase of any health service it is obvious that economical resources must be readily available. It is indeed by this "so evident" fact that I make the exposition.

The intra hospital critical burn treatment runs in three inevitable and parallel directions; a lot of medical supplies are required, those medical supplies are expensive, and have to be on hand always and during twenty four hours a day. The average monthly admissions in our burn unit is 14 admissions with ten beds available during de same period. The mean intra hospital stay (IHS) for surviving patients is eleven days. The average percentage of total body surface area burn (%TBSA) for our burn unit is 37%TBSA burn. This data translates to half a day of IHS per percentage of TBSA burn. Nevertheless, for those patients, our burn unit uses up some 10 thousand meters of gauze, 10 thousand pairs of sterile surgical gloves, 30+ double lumen catheters and an average of 140 surgical OR hours with two beds turning per month. Expenses for each of our patients is around some US\$500 per day. This last number, may vary in different countries depending of the local currency to dollar exchange rate, salary wages, and medical supplies market.

One can not pretend medical assistance for critical burn patients based on donations neither charitable acts. Very sick burn patients can not wait for an humanitarian act to provide them dermatomes blades, in order to carry out a mandatory and urgent excision and grafting surgery, for example, Charity and donations may be good for chronic conditions, but not for life threatening conditions, furthermore burn patients with maximum cardiovascular stress, metabolic stress, psychological stress, risk of complications and permanent risk of dying. For example; our service has 36 Pagget Model B dermatomes, I know of countries with only one dermatome in its whole geography, simply, this is no way to provide care for severe or critical burns.

\* Note: These personnel work exclusively for the Burn Unit

All budgetary conceptions directed for a burn service, should be hypertrophied as the sole guarantee of surviving for this patient. If we must use a prefix in every administrative act, this one should be the prefix *mega*; mega-budget, mega-expenses. mega-prices and mega-management. Some costs would never be appropriately estimated but are very high: the family, personal and social costs that a critical burn survivor faces.

Finally, I feel compel to turn my steps back 360 degrees and return relentlessly to the same simplist starting point; it is always a better idea to prevent than treating burns, and is in this prevention concept where really the big costs are generated. Imagine the investments needed for a persistent national public campaign during several years, throughout every advertising mean?. It has being proven that burn prevention campaigns had only lower the severity without influencing the overall incidence of burn injuries. Burn injury is the most devastating lesion that a human being can ever sustain and survive it.

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