

## Profile of Patients Admitted in the University of the Philippines - Philippine General Hospital Alfredo T. Ramirez Burn Center From August 2013 to July 2015

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**Objective:** This study aimed to describe the demographic profile of patients admitted at the UP-PGH ATR Burn Center from August 2013 - July 2015, and correlate it with outcomes of burn injury.

**Methods:** A retrospective study of patients admitted at the UP-PGH ATR Burn Center from August 2013 to July 2015 was conducted, using the data in the Integrated Surgical Information System. Descriptive statistics was used to summarize the clinical characteristics of patients. Logistic regression analysis determined the significant predictors of mortality. STATA 12.0 was used for data analysis.

**Results:** The age groups most commonly involved were: <1 year (24%), 2 to 14 years (25%) and 25 to 44 years (25%), majority (71%) of whom were males. The most common etiology was scald burns (43%), and most patients were burned in their homes (71%). Majority (89%) were admitted within 24 hours from injury. Half underwent operative management (>1 operation). Ninety-one percent (91%) of the admitted burn patients improved; 9% of the patients died. The most common cause of death was multiple organ dysfunction syndrome (40%). Significant factors associated with mortality included: 1) percent total body surface area, 2) inhalational injury and 3) involvement of the head, lower extremities and perineum.

**Conclusion:** Burns continue to be a big burden to developing countries. To confront the burden of burns especially in developing countries like the Philippines, key primary preventive measures should be implemented and be a priority for public health advocates.

**Key words:** Burns, demography

Burn injury is a persistent global public health concern, and is a significant cause of morbidity and mortality

worldwide.<sup>1,2,3,4</sup> It is a distinct form of trauma considered to be one of the most severe injuries that can happen to an individual, and is an extremely stressful experience for both the burn victim and his/her family. In spite of the extraordinary advances in the management of burns, the profound impact of burn injuries to a patient's physical, social, psychological and emotional well-being cannot be overemphasized. Burns physically disfigure, inflict pain, and limit function and activities of daily living among patients. It is one of the worst tragedies a person can suffer and endure. The social and economic consequences on the victim and his/her family may be devastating and life-changing.

The Global Burden of Disease 2004 Update of the World Health Organization reports 186 million fire-related deaths (female-male ratio 7:1); and 6.6 million disability-adjusted life years lost due to fires in low and middle income countries in South East Asia alone.<sup>1</sup> Ninety-five percent of all fatal fire-related burns occurred in low and middle income countries. South East Asia also accounts for just over one-half (53%) of the total number of fire-related burn deaths worldwide and for more than 50% of total number of disability-adjusted life years lost to fire-related burns.<sup>2,3,4</sup> Strategies in disaster prevention, health and hospital policies put burn-related injuries at the bottom priority for most developing countries. There is paucity of epidemiologic data available in the local setting to allow lawmakers and health policy practitioners

to come up with reasonable recommendations regarding burn care and management.

In the Philippines, there are only five hospitals with burn units, Philippine General Hospital, Jose Reyes Memorial Medical Center, East Avenue Medical Center, Quirino Memorial Medical Center and Southern Philippines Medical Center in Davao City.<sup>5</sup> It means that there are approximately 40-45 beds for more than 100 million Filipino patients.

The Alfredo T. Ramirez (ATR) Burn Center of the Philippine General Hospital (PGH), established in 1967, is currently at the forefront of burn care in the country. A primary referral burn center in the country, it has been a pioneer in the comprehensive and multidisciplinary care for patients suffering from burn injuries. As a center of excellence in burn treatment, the Center caters to both adult and pediatric cases, with around 300 admissions, 2,000 outpatient consults, and 300 operations a year. From an original two-bed facility, it has evolved and expanded into a 12-bed center serving the country.<sup>8,9</sup>

In the UP-PGH ATR Burn Center, burn patients are admitted based on the American Burn Association Classification (Figure 1), which includes the following: all acute burn patients classified with moderate and major injuries, those less than 2 years of age regardless of percent total body surface area (% TBSA), those with injuries to the hands, face, feet, and perineum, all patients with electrical and chemical burns, and those with smoke inhalational injury, other associated medical illnesses, or with multiple trauma.<sup>8,10</sup> Comprehensive and multidisciplinary care is provided to patients by highly-trained staff and personnel.

The UP-PGH ATR Burn Center adheres to the guidelines recommended by the Philippine Society of Burn Injuries and International Society of Burn Injuries. Initial assessment and stabilization are conducted based on the ABC's of burn injury (airway, breathing, circulation / C-spine / compartment syndrome, disability / deficits, exposure). Immediate and comprehensive evaluation of burn patients using systematic primary and secondary survey is key to appropriate management. Appropriate fluid resuscitation, wound care, and surgical management, if needed, are instituted in a timely and organized manner.<sup>10,11</sup> The Parkland Formula is used to resuscitate acutely-burned patients; and early tangential excision

and skin grafting is being practiced in the institution as part of the definitive management for the burn injuries.

Published studies regarding the profile of burn injuries in the Philippines are inadequate and this study aimed to document the current trend and profile among admissions in the UP-PGH ATR Burn Unit from August 2013 to July 2015. Specifically, this study aimed to describe the profile of patients admitted to the UP-PGH ATR Burn Center from August 2013 to July 2015, in terms of age, gender, percent total body surface area (% TBSA), severity, anatomic involvement, etiology of burn, place of injury, length of time prior to consult, number of operations, length of stay, morbidity and mortality. This investigation also aimed to correlate clinical epidemiologic data with outcomes of burn injury.

The general objectives of this study were: 1) to describe the epidemiologic profile of burn patients admitted at the UP-PGH ATR Burn Center for the last 2 years, and 2) to determine the relationship of identified clinical variables with mortality.

## Methods

A retrospective cross-sectional study on burn patients admitted at the UP-PGH ATR Burn Center from August 2013 to July 2015 was conducted, using the data encoded in the Integrated Surgical Information System (ISIS), a computerized registry of the patients of the Department of Surgery in the PGH.

All charity/pay, adult/pediatric, male/female patients admitted at the UP-PGH ATR Burn Center were included. Admission criteria adhered to the prescribed standards of the American Burn Association.<sup>8,10</sup> (Table 1)

### *Definition of Terms:*

1. Age was grouped based on the tertiary / 3rd level of detail for use of health services from the Provisional Guidelines on Standard International Age Classifications. The age subsets were as follows: ≤1, 2-14, 15-24, 25-44, 45-64, 65+.<sup>12</sup> (Table 2)
2. Gender was either male or female (M/F).
3. % TBSA was computed using the Lund and Browder Chart upon admission, and severity was classified into minor, moderate and major based on the

American Burn Association Classification.<sup>8</sup> (Figure 1, Table 1)

4. Anatomic involvement was segmented into major sections of the body - anterior and posterior portions of the head, torso, legs, arms and perineum as depicted also in the Lund and Browder Chart.<sup>8</sup> (Figure 1)
5. Etiology of the burn was categorized as scald, flame, electrical, contact or chemical.
6. Place of injury was domestic in origin or work-related.
7. Time of consult was measured by the expired time between injury and presentation in the PGH Acute Care Unit. Early consult was defined as  $\leq 24$  hours from burn, while late consult as  $> 24$  hours from burn.
8. Number of operations referred to the number of surgeries the patient underwent; operations referred to: escharotomy, fasciotomy, debridement, amputation (below-elbow, above-elbow, below-knee, above-knee, ray amputation), tangential excision, fascial excision, split thickness skin grafting.
9. Length of hospital stay was the time elapsed from date of admission to date of discharge, and was grouped as follows:  $< 7$  days,  $7 - < 14$  days,  $14 - < 30$  days,  $\geq 30$  days.

The admission census log of the Burn Unit covering the period of August 2013 to July 2015 was extracted

from Integrated Surgical Information System database. Records of eligible patients were reviewed and the pertinent data were collected. All epidemiologic data - age, gender, % TBSA, severity, anatomic involvement, etiology of burn, place of injury, length of time prior to consult, number of operations, length of stay, morbidity and mortality - were analyzed using the STATA 12.0 and values were presented as a number (%) for categorical variables, and as mean  $\pm$  standard deviation for quantitative parameters.

Descriptive statistics was used to summarize the clinical characteristics of the patients. Frequency and proportion was used for nominal variables, median and range for ordinal variables, and mean and SD for interval/ratio variables. Logistic regression analysis was used to determine the significant predictors of mortality. All valid data were included in the analysis. Missing variables were neither replaced nor estimated. STATA 12.0 was used for data analysis.

This study was subjected to the technical review and approval of the Research Committee of the Department of Surgery and underwent ethical review of the Expanded Hospital Research Office Ethics Board of the PGH. This study was conducted following the principles of the Declaration of Helsinki and Good Clinical Practice. All patient data and records were kept strictly confidential. Only anonymous data generated from the ISIS database were collected and analyzed.

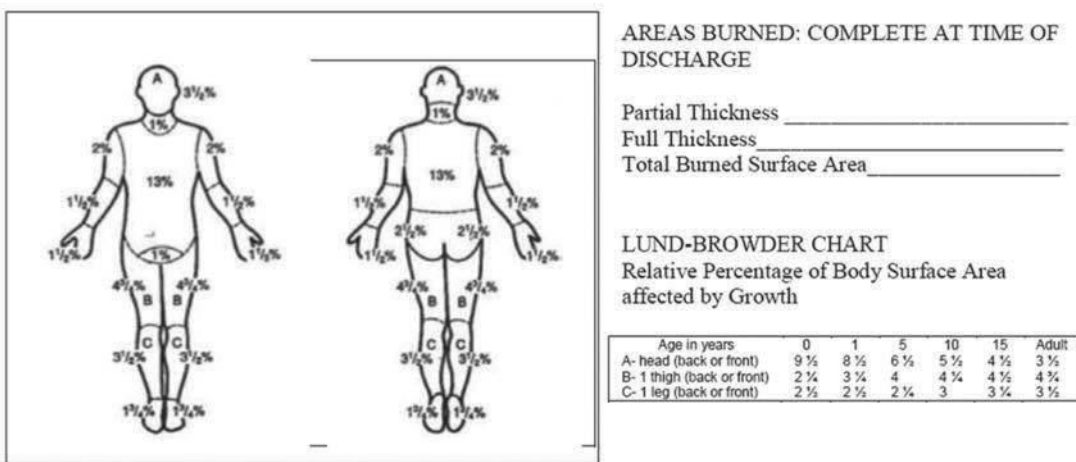


Figure 1. Lund and browder chart.

**Table 1.** American Burn Association classification of burns.

	Minor	Moderate	Severe
<b>Children</b>			
Partial Thickness Burn	≤ 10%	> 10% to < 20%	> 20%
Full Thickness Burn	≤ 2%	> 2 % to < 10%	> 10%
<b>Adults</b>			
Partial Thickness Burn	≤ 15%	> 15 to < 25%	> 25%
Full Thickness Burn	≤ 2%	>2% to < 10%	> 10%
Age		Patients < 2 years old with minor injury	Patients < 2 years old with moderate injury
Involvement of the hands, face, feet and perineum	(-)	(-)	(+)
Electrical Injury	(-)	(-)	(+)
Chemical Injury	(-)	(-)	(+)
Inhalational Injury	(-)	(-)	(+)
Major Associated Medical Illness	(-)	(-)	(+)
Associated Fractures, Multiple Trauma	(-)	(-)	(+)

**Table 2.** Provisional guidelines on standard international age classifications.

Subject Area	Level of Detail		
	1 - Highest	2 - Medium	3 - Lowest
Health, Health Services and Nutrition			
1. Morbidity and Handicaps	u 1; s.y. 1-24; 5 y.gr. 25-54; s.y. 55-74; 5 y.gr. 75-84; 85+	u 1; 1-4; 10 y.gr. 5-74; 75+	U 1; 1-14; 15-24; 45-64; 65+
2. Usage of Health Services	u 1; s.y. 1-24; 5 y.gr. 25-54; s.y. 55-74; 5 y.gr. 75-84; 85+	u 1; 1-4; 10 y.gr. 5-74; 75+	U 1; 1-14; 15-24; 45-64; 65+
3. Food Consumption	u 1; s.y. 1-24; 5 y.gr. 25-54; s.y. 55-74; 5 y.gr. 75-84; 85+	u 1; 1-4; 10 y.gr. 5-74; 75+	U 1; 1-14; 15-24; 45-64; 65+
4. Malnutrition	u 1; s.y. 1-24; 5 y.gr. 25-54; s.y. 55-74; 5 y.gr. 75-84; 85+	u 1; 1-4; 10 y.gr. 5-74; 75+	U 1; 1-14; 15-24; 45-64; 65+

**Results**

A total of 400 patients were recorded in the burn registry and included in this study (Table 3). The mean age of the patients was 16 years, and more than 20% of the patients were noted to be in the age groups of 1 year and below (24%), 2 to 14 years (25%) and 25 to 44 years (25%). Majority (71%) of the patients were males and a high

percentage of burns were assessed to be major burns (84%). In terms of % TBSA burns, 37% of the population had 10-20% TBSA burns. The most reported anatomic structures affected included the anterior upper extremity (74%), anterior torso (68%), anterior lower extremity (60%) and posterior upper extremity (60%). The etiology was mostly scald (43%), followed by flame (34%) and electrical (22%). Most patients were burned in their

homes (71%). Majority (89%) were able to consult and be admitted in the burn unit within 24 hours from the injury. Half underwent operative management (at least one operation), while the other half were treated conservatively. Ninety-one percent (91%) of these patients recovered from their burns, and 9% died. The most common cause of death was multiple organ failure

or multiple organ dysfunction syndrome (40%). Burn wound infection comprised of less than six percent of the total population's cause of death (2 patients). The most commonly reported comorbidities in the studied burn population were fall (18%), inhalational injury (13%) and compartment syndrome (10%).

**Table 3.** Demographic and clinical profile of burn patients recorded in the UP-PGH ATR Burn Center registry, August 2013 to July 2015 (n=400).

	Frequency (%); Mean + SD; Median (Range)
<u>Age</u>	16 (3 days to 88 years old)
1 year old and below	97 (24.25)
2 to 14 years old	101 (25.25)
15 to 24 years old	51 (12.75)
25 to 44 years old	98 (24.50)
45 to 64 years old	40 (10)
65 years old and above	13 (3.25)
<u>Sex</u>	
Male	283 (70.75)
Female	117 (29.25)
<u>% Total Body Surface Area</u>	14 (1 to 90)
<10%	124 (31)
10-20%	148 (37)
21-40%	85 (21.25)
>40%	43 (10.75)
<u>Severity of Burn</u>	
Moderate	65 (16.25)
Major	335 (83.75)
<u>Anatomical Structures Affected*</u>	
Anterior Head	173 (43.25)
Anterior Torso	270 (67.50)
Anterior Upper Extremity	295 (73.75)
Anterior Lower Extremity	239 (59.75)
Anterior Perineum	34 (8.50)
Posterior Head	16 (4)
Posterior Torso	143 (35.75)
Posterior Upper Extremity	237 (59.25)
Posterior Lower Extremity	179 (44.75)
Posterior Perineum	26 (6.50)
<u>Nature of Burn*</u>	
Scald	173 (43.25)
Electric	87 (21.75)
Flame	134 (33.50)
Contact	15 (3.75)
Chemical	3 (0.75)

<u>Place of Burn</u>	
Home	282 (70.50)
Workplace	103 (25.75)
Others	15 (3.75)
<u>Duration from time of injury to time of consult (hours)</u>	
≤ 24 hours	355 (88.75)
> 24 hours	45 (11.25)
<u>Outcome</u>	
Recovered	357 (89.25)
Morbidity	7 (1.75)
Dead	36 (9)
<u>Morbidity</u>	
Fall	21 (18.10)
Inhalational Injury	15 (12.93)
Compartment Syndrome	12 (10.34)
Methamphetamine Use	9 (7.76)
Ecthyma Gangrenosum	7 (6.03)
Hospital Acquired Pneumonia	7 (6.03)
Hypertension	4 (3.45)
Graft Loss	3 (2.59)
Type 2 DM	2 (1.72)
Others	34 (31.03)
<u>Causes of Death*</u>	
Multiple organ dysfunction syndrome/multiple organ failure	14 (40)
Septic Shock	4 (11.43)
Burn Shock	4 (11.43)
Acute Respiratory Failure	2 (5.71)
Pulmonary Embolism	2 (5.71)
Burn Wound Infection	5 (14.29)
Others	
<u>Number of Operations</u>	
No operation	202 (50.5)
At least 1 operation	198 (49.5)
<u>Operations Done (n=495)</u>	
Debridement	133 (26.87)
Tangential Excision	186 (37.58)
Split Thickness Skin Grafting	233 (47.07)
Disarticulations / Ray Amputations	11 (2.22)
Below Knee Amputation	7 (1.41)
Above Knee Amputation	2 (0.40)
Below Elbow Amputation	12 (2.42)
Above Elbow Amputation	1 (0.20)
Change of Dressings	76 (15.35)
Application of Negative Pressure Wound Therapy	18 (3.64)
Fascial Excision	11 (2.22)
Graft Site Opening	57 (11.52)
Flaps	1 (0.20)
Others	66 (13.33)
<u>Length of Hospital Stay (days)</u>	
< 7 days	10 (1 to 97)
7 - 14 days	133 (33.25)
15 - 30 days	171 (42.75)
> 30 days	54 (13.5)
	42 (10.5)

\* Multiple answers per patient

To determine predictors for mortality, we conducted binary logistic regression. In this initial model, the following factors were statistically significant: percentage of body surface area burnt, involvement of the head or perineum, and electrical burn etiology. However, the overall model only explains 51.74% in the variability of mortality (p value = 0.000, R<sup>2</sup>=51.74%) (Table 4). For the final model, the authors included % of total body surface area burnt and location of burn and nature of burn as predictors. In this model, every unit increase in % body surface area

burnt increases the odds of mortality (OR 1.05, 95% CI 1.03-1.09, p = 0.000). For the location of burns, patients with burnt head have increased the odds of dying (OR 23.98, 95% CI 6.53-88.04, p value = 0.000), as well as those with burnt lower extremity (OR 9.69, 95% CI 2.12-44.20, p-value = 0.003) and burnt perineum (OR 11.60, 95% CI 4.15-32.43, p-value = 0.000). However, the final model only explains 43.63% in the variability of mortality among the patients (p value = 0.000, R<sup>2</sup> = 43.63%) (Table 5).

**Table 4.** Factors that are associated with mortality (n=400).

	Expired (n=36) Frequency (%); Median (Range)	Alive (n=364) Frequency (%); Median (Range)	Odds Ratio (95% CI)	P-Value
<b>Age</b>				
1 year old and below	6 (16.67)	91 (25)	(reference)	-
2 to 14 years old	9 (25)	92 (25.27)	0.36 (0.07 to 1.95)	0.234
15 to 24 years old	4 (11.11)	47 (12.91)	0.25 (0.02 to 2.60)	0.246
25 to 44 years old	10 (27.78)	88 (24.18)	0.36 (0.06 to 2.16)	0.265
45 to 64 years old	5 (13.89)	35 (9.62)	1.92 (0.20 to 18.11)	0.568
65 years old and above	2 (5.56)	11 (3.02)	14.94 (0.58 to 387.63)	0.104
<b>Female</b>				
% TBSA	13 (36.11)	104 (28.57)	2.23 (0.68 to 7.35)	0.188
	46.5 (11 to 90)	13 (1 to 75)	1.09 (1.04 to 1.14)	0.000
<b>Severity of Burn</b>				
Moderate	0	65 (17.86)	-	-
Major	36 (100)	299 (82.14)	(reference)	-
<b>Location of Burn</b>				
Head	38 (90.48)	162 (41.22)	24.95 (5.37 to 116.02)	0.000
Torso	41 (97.62)	275 (69.97)	8.52 (0.83 to 87.13)	0.071
Upper Extremity	40 (95.24)	293 (74.55)	0.54 (0.09 to 3.35)	0.507
Lower Extremity	40 (95.24)	233 (59.29)	7.08 (1.40 to 35.90)	0.018
Perineum	20 (47.62)	49 (12.47)	16.48 (5.11 to 53.17)	0.000
Anterior Region	42 (100)	378 (96.18)	-	-
Posterior Region	41 (97.62)	314 (79.90)	3.33 (0.32 to 34.24)	0.312
<b>Nature of Burn</b>				
Scald	8 (22.22)	165 (45.33)	0.19 (0.02 to 1.78)	0.144
Electric	9 (25)	78 (21.43)	0.08 (0.01 to 1.08)	0.057
Flame	19 (52.78)	115 (31.59)	0.24 (0.02 to 2.54)	0.238
<b>Duration from time of injury to time of consult (hours)</b>				
With inhalation injury	6 (0.5 to 48)	6 (0.5 to 264)	0.98 (0.94 to 1.02)	0.360
	10 (23.81)	8 (2.04)	2.58 (0.53 to 12.62)	0.242

P-Value = 0.000; R<sup>2</sup> = 51.74%

**Table 5.** Final model of predictors of mortality among burn patients (n=400)

	Odds Ratio	95% Confidence Interval	P-Value
% Total Body Surface Area	1.0521	1.0238 to 1.0812	0.000
Location of burn			
Head	19.0380	5.8035 to 62.4529	0.000
Lower Extremity	7.0793	1.5582 to 32.1634	0.011
Perineum	9.8489	3.8798 to 25.0016	0.000
Inhalation Injury	4.2395	1.1953 to 15.0359	0.025

P-Value = 0.000; R<sup>2</sup> = 43.63%

## Discussion

The first and third decades of life show the highest prevalence; this study reveals that most of the burn patients were the children (1-14 yo) (50%) and the working age group (25-44 yo) (25%). For the minors, most of the accidents were attributed to poor family support, inattentiveness of caregivers and exposure to unsafe environments (obtained from interviews with caregivers during history taking). For the working age group, majority of the burn incidents were work-related, mostly in the construction setting (painters, construction workers, electricians, linemen, etc.). This study also revealed that males are almost thrice as frequently affected as females (71% for males and 29% for females). In terms of percent total body surface area affected, many patients had 10-20% TBSA burns (37%). Most patients admitted to the burn unit were classified to have major burns (85%). This is because the UP-PGH ATR Burn Center's criteria for admission would include patients with moderate and major burns, especially prioritizing heavily-burned and critical patients in the 12-bed capacity burn unit.

With regard to anatomic structures involved, the most reported sites of injury included the anterior upper extremity (74%), anterior torso (68%), anterior lower extremity (60%) and posterior upper extremity (60%). Majority (43%) of the patient population suffered from scald burns - burns caused by hot liquids most commonly hot water, soups, and sauces. Most of the patients experienced their injuries at home (71%) as compared to

their workplace (26%). These results may indicate poor living conditions in their neighborhoods that expose the residents to dangerous situations, putting them at a high risk for burn injuries. Work-related injuries may reflect poor occupational hazard measures; patients revealed that work safety measures were haphazardly implemented, with appropriate attire, gears and training sorely lacking.

Most of the patients admitted in the UP-PGH ATR Burn Center came in within the first 24 hours since the time of injury (89%). Ideally patients are admitted to the intensive care unit within 24 hours from the time of burn to avoid contamination and infection within the center. Burn patients that consult a day after injury are often accommodated in the regular wards of the hospital.

Half of the admitted patients underwent at least one operation (49.5%), while the other half (50.5%) were managed conservatively with wound care. Debridement (27%), tangential excision (38%), split thickness skin grafting (47%) comprised of the top three surgical procedures done. Early tangential excision and skin grafting (4th to 7th post-burn day) is being practiced in the UP-PGH ATR Burn Center, owing to its fulfillment of the following burn principles - preservation of tissue, prevention of wound infection, decreased hospital stay, maintenance of function and early wound closure.<sup>10,13</sup>

About 91% of these patients recovered from their burns, and 9% died. This is comparable with the data of other South East Asian countries.<sup>1,3</sup> The most commonly reported comorbidities in the studied burn population were fall (18%), inhalational injury (13%) and



compartment syndrome (10%). The most common cause of death was multiple organ failure or multiple organ dysfunction syndrome (40%). Burn wound infection would only comprise <6% of the total population's cause of death (2 patients). Because of the burn staff's knowledge and experience in burn resuscitation, only 5 patients (11%) expired due to burn shock/dehydration. The Parkland formula is being utilized in the UP-PGH ATR Burn Center to compute for the fluid requirements of the patients.<sup>8,10</sup>

Comparing this study with a profile of patients admitted in the UP-PGH ATR Burn Center 18 years ago (Nable, et al.),<sup>14</sup> it can be observed that there is similarity in demographics pertaining to number of patients, age, gender distribution, time of consult and length of hospital stay. However, scald burns (43%) have exceeded electrical burns (41%) as the most common cause for burns. Mortality significantly decreased from 1997 to 2015, from 21% to 9% (Table 6).

**Table 6.** Comparison between 1997 Burn Profile Study (Nable, et al.) with current data.

Burn Profile	1997		2013-2015	
Admissions	149/year		400/2 years	
Gender Distribution				
Male	69.80%		70.75%	
Female	30.2%		29.25%	
Age	1-10yo	27.5%	<1yo	24.25%
	21-30	25.5%	2-14yo	25.25%
			25-44yo	24.50%
Severity of Injury				
Major	86.6%		83.75%	
Moderate	13.4%		16.25%	
Time Interval Between Injury and Consult	<6h	31.5%	< 24h	88.97%
	<24 hours	61.1%	> 24 h	11.03%
Average Length of Stay				
<2 weeks	48.3%		42.75%	
>1 mo	28.2%		10.5%	
Etiology				
Electrical	41.6%		21.75%	
Flame	40.3%		33.50%	
Scald	18.1%		43.25%	
Place of Injury				
Home	59.1%		70.50%	
Work	26.8%		26%	
Outdoors	13.4%		4.25%	
Surgery				
Operative	63.7%		49.50%	
Non-operative	36.3%		50.50%	
Mortality	20.8%		9%	

To determine predictors of mortality, a binary logistic regression analysis was conducted and showed that significant factors included: 1) % TBSA of burn, 2) inhalational injury and 3) involvement of the head, lower extremities and perineum (Tables 4 & 5). Percent of TBSA burn and inhalational injury have been proven factors based on previous literature.<sup>15,16,17,18</sup> This study demonstrated that the location of the burns / anatomic involvement is a significant predictor of mortality, specifically involvement of the head, lower extremities and perineum. Burns to the face were associated with inhalational injury and increased severity of burns, while burns to the lower extremities and perineum were associated with deep venous thromboembolism and immobility. It is established in burn literature that facial burns are a risk factor to inhalational injury; and a number of studies correlate inhalational injury with mortality.<sup>19,20</sup> This would explain why facial burns are associated with death among burn patients. Similar investigations would also suggest that increased % TBSA burns would be linked to an increased risk of having venous thromboembolism.<sup>21,22</sup> These factors should be further investigated to help further decrease current mortality rate in the UP-PGH ATR Burn Center.

### Conclusion and Recommendations

Burns continue to be a big burden to developing countries such as the Philippines. To confront the unacceptable burden of burns especially in developing countries, key primary preventive measures should be implemented and be a priority for public health advocates. Issues to be confronted would differ from burn prevention strategies of developed / highly-developed economies<sup>3</sup> (focused on smoke alarms, water heaters and electrical wiring), and would concentrate on the avoidance of the following: use of cooking pots at ground level (that are easily knocked over and can cause scalds, use of kerosene (paraffin) stoves and lamps that are easily knocked over and can then ignite; and handling of inappropriate flammables to build fire while cooking. Proper protective suits and uniforms need to be strictly implemented especially in construction and electrical sites. Companies should ensure safe work environments for all employees.

The Philippine General Hospital is the largest tertiary care center in the country. The patient profile of the UP-PGH ATR Burn Center, therefore, is not an accurate cross-section of all burn cases, but only those severe enough to warrant admission.

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