

# NIDRR Model Systems for Burn Injury Rehabilitation

## Child Facts, Figures and Selected Outcomes

University of Washington, University of Texas Southwestern, Johns Hopkins University, Galveston Shriners Burns Hospital  
 Prepared by: University of Colorado Health Sciences Center

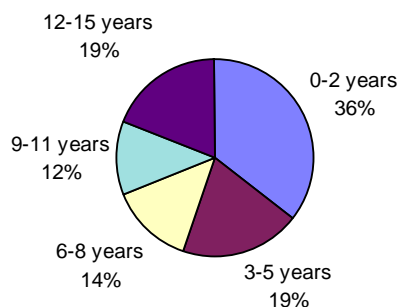
Since May of 1994, five burn centers have participated as Model Systems for Burn Injury Rehabilitation funded by the National Institute of Disability and Rehabilitation Research (NIDRR) in the Department of Education. Four Model Systems are currently collecting data and the University of Colorado Health Sciences Center also contributed data from 1994 to 1997. Each center currently collects data on both adults and children. Data on children have been collected by the group since 1997 and the largest contributor of subjects under 16 is the Galveston Shriners Burn Hospital. Data presented here were collected through **August 2005** and **include 1602 children** who visited one of the four current Burn Model Systems clinical centers. To be eligible for the study, Model Systems patients must consent to follow-up for at least two years, and must meet the American Burn Association criteria for treatment at a Burn Center.

### Demographics

#### Age

Of the total combined burn population, 66% are adults (16 and older), and 34% are children (under 16). The mean age at injury for children is 6.4 years. The breakdown of subjects by age group is shown below in Figure 1.

Figure 1: Age at Injury



#### Gender

Sixty-five percent of all child subjects in the model systems are male.

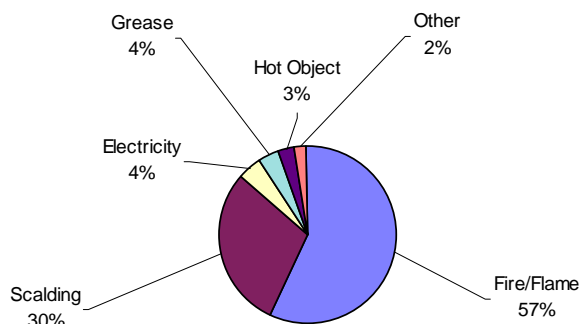
#### Risk Factors

Data on several risk factors in the burn patients' family environments are collected by the Model Systems. Involvement of Child Protection Services is summarized in Figure 2 below. Only 4% of patients or their families indicated that substance abuse was a problem in the family environment, and in 2% of cases substance abuse in the family was suspected by a health care professional. Five percent of burn patients or their families indicated that psychiatric illness existed within the family environment. In 1% of cases, psychiatric illness was suspected by the health care professional.

### Primary Etiology of Injury

The most common burn etiologies are shown in Figure 3. The category labeled 'Other' in the figure consists of flash burns, tar burns, chemical burns, UV light, frostbite, skin disease, abrasions, and other causes.

Figure 3: Primary Etiology



### Severity of Injury

When measuring the severity of a burn injury, one needs to consider factors such as total body surface area burned (TBSA), whether or not skin grafting was required, and whether an inhalation injury occurred. The mean TBSA for all patients under 16 is 30%, and of all burn etiologies, skin disease had the highest mean TBSA (53%). Table 1 lists the mean and standard deviation for TBSA by burn etiology. Seventy-four percent of children in the Model Systems required grafting on some area of their body (this calculation excludes patients who survived fewer than 3 days). Burn patients who sustain inhalation injuries have a significantly reduced chance of survival. Eighteen percent of the Model Systems patients under 16 suffered an inhalation injury.

### Total Body Surface Burned

Burn Etiology	Mean
All Burns	30%±22
Fire/Flame	35%±23
Electricity	32%±22
Scald	23%±16
Grease	21%±19
Flash	16%±8
UV light	11% (n=1)
Chemical	10%±6
Contact with Hot Object	9%±9
Skin Disease	53%±27
Tar	5% (n=1)
Abrasion	6% (n=2)
Frostbite/Cold	2.50% (n=1)
Other	14%±7

**Physical Functioning** (as measured by the Wee-FIM®)

**A Pediatric Functional Independence Measure to Predict Longitudinal Recovery in Pediatric Burned Patients**

M. Serghiou, OTR; M. Rose, PsyD; Ph.D.; F. Pidcock, MD; P. Esselman, MD; L. Engrav, MD; Kowalske, MD; D.L. Lezotte, Ph.D (submitted)

**Introduction:** Burns create a myriad of complications that affect the child’s developmental, functional, and aesthetic status. The WeeFIM® is a standardized measure of functional performance developed for use in children 6-months to 8-years of age but with application through adolescence. It includes 18 domains of performance which are scored on a 7 point scale from “total assistance” to “complete independence.” In this study, the WeeFIM® was used to evaluate the influence of burn size on functional independence and on time to recovery.

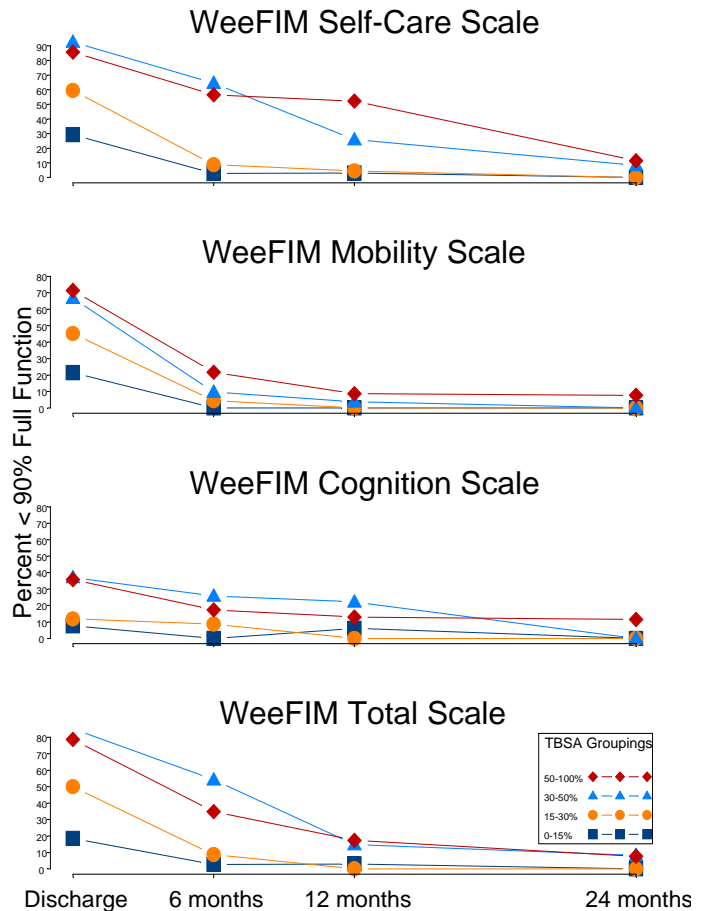
**Methods:** Children, six months to 16 years of age, with total body surface area (TBSA) burns of 10-100% burn injury were recruited for a two-year longitudinal study. Children were evaluated at discharge from acute care, six months, one year and two years after burn injury.

**Findings:** In this analysis, 454 WeeFIM® evaluations from 249 patients were reviewed. While mean WeeFIM® scores varied significantly at discharge based on the size of burn, there were no significant differences in any of the WeeFIM® scales at 24 months post burn. At 24 months, the mean WeeFIM® score for all children, independent of size of their burn, indicated full independence. Hands on assistance was not required for performing activities of daily living (ADL's). The rates of improvement differed statistically by size of burn. Maximum improvement was attained by 6 months for 10-15% TBSA burns, 12 months for 16 to 30% burns, 12 months for 31 to 50% burns, and 24 months for 51 to 100% TBSA.

**Conclusion:** The WeeFIM® can be utilized by burn centers to describe diminished functional capacity at discharge from acute care for severely burn children. The tool can be used to track return to baseline independence after a major burn injury in a pediatric population.

Demographic, Injury, Behavioral and selected prior Health Status Measure Distributions for Pediatric Burn Patients (aged 6 to 16 years of age) at various Follow-up times.

	D/C	6-Mth	12-Mth	24-mth
Characteristic	Mean	Mean	Mean	Mean
N	162	114	106	72
Age	11.6±3	11.5±3	11.6±3	11.3±3
%TBSA	27.7±22	32.7±22	33.3±24	38.1±25
% Grafted	18.2±20	24.8±22	23.1±21	30.5±23
Trips to OR	2.2±3	2.7±3	3.0±4	3.1±3
Male	74.1	73.7	75.5	65.3
Inhalation	10.5	10.5	11.3	21.2
Hand Burn	62.4	69.3	74.5	72.2
Head/neck Burn	54.3	64	67.9	69.4
<b>TBSA Group</b>				
<b>Small</b>	<b>42.5</b>	<b>40.4</b>	<b>27.8</b>	<b>28.0</b>
<b>Medium</b>	<b>24.2</b>	<b>22.1</b>	<b>32.0</b>	<b>23.0</b>
<b>Large</b>	<b>21.6</b>	<b>22.1</b>	<b>27.8</b>	<b>23.0</b>
<b>Severe</b>	<b>11.8</b>	<b>15.4</b>	<b>12.4</b>	<b>26</b>



**National Institute on Disability and Rehabilitation Research**  
*Project Officer:* Theresa SanAgustin, M.D.

**Burn Model Systems/Data Coordinating Center**  
 Department of Preventive Medicine and Biometrics  
 University of Colorado Health Sciences Center, Denver CO  
*Project Director:* Dennis Lezotte, Ph.D.  
*Project Coordinator:* Rebecca Sloan, BA (303) 315-0320

**North Texas Burn Rehabilitation Model System**  
 University of Texas Southwestern Medical Center, Dallas TX  
*Project Director:* Karen Kowalske, M.D.  
*Project Co-Director:* Phala Helm, M.D.  
*Project Coordinator:* Radha Holavanahalli, Ph.D. (214) 648-3654

**University of Washington Burn Injury Rehabilitation Model System**  
 University of Washington, Harborview Medical Center, Seattle WA  
*Project Director:* Loren Engrav, M.D.  
*Project Co-Director:* David Patterson, Ph.D.  
*Project Coordinator:* Gretchen Carrougher, R.N., M.N. (206) 731-2933

**Pediatric Burn Injury Rehabilitation Model System**  
 University of Texas Medical Branch/Shriners Burns Hospital, Galveston TX  
*Project Director:* David Herndon, M.D.  
*Project Co-Director:* Patricia Blakeney, Ph.D.  
*Project Coordinator:* Kathy Epperson, R.N. (409) 770-6573

**Johns Hopkins University Burn Injury Rehabilitation Model System**  
 Johns Hopkins University, Bayview Medical Center, Baltimore MD  
*Project Director:* James Fauerbach, Ph.D.  
*Project Co-Director:* Barbara deLateur, M.D.  
*Project Coordinator:* Melissa Bresnick (410) 550-8161

Supported by grant number H133A020402 from the National Institute on Disability and Rehabilitation Research, U.S. Department of Education, Washington, D.C.