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Traumatic Brain Injury

Facts and Figures

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The Traumatic Brain Injury Model Systems National Data Center

TBI Model System Focus on Violence

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Violence, or intentional injury, in the United States is a significant social and public health concern that has resulted in a national epidemic.[1, 2, 3] Violence is a major contributor to premature death, injury and disability.[4 5] Within the Traumatic Brain Injury Model Systems (TBIMS) project, violence has been the second leading cause of injury for study participants. The National Institute on Disability and Rehabilitation Research (NIDRR) announced a new priority of research for the 1997 – 2002 grant cycle -- "to examine the implications of violence as a cause of TBI on treatment interventions, rehabilitation costs, and long-term outcomes."

In response to this priority, as well as the need for research in this particular area, a number of studies examining the impact of violence on various aspects of TBI have been published in the last few years. A review of the TBIMS Research Registry (*www.tbindc.org*) revealed a number of studies investigating the risk factors for violent TBI, the role of substance abuse and violent TBI, and outcomes related to violent TBI. In addition, there are a number of prospective studies currently being carried out that address other functional, psychological, and medical issues related to violent TBI. For this article, only the studies currently published will be reviewed. Studies focusing on violence and TBI through the TBMIS project that are ongoing, and therefore not yet published, can be found through the Research Registry's listing of current TBIMS projects (*www.tbindc.org*).

In 1998, Harrison-Felix et al published an article evaluating the predisposing factors to violent TBI, as well as the effect of violent etiology on outcomes. This was a preliminary study that utilized data from four of the original five TBI Model Systems Centers (Wayne State University/Rehabilitation Institute of Michigan, Detroit, MI; The Institute for Rehabilitation and Research, Houston, TX; Medical College of Virginia, Richmond, VA; and Santa Clara Valley Medical Center, San Jose, CA), and included subjects enrolled in the TBI Model System project from March, 1989, to September, 1996. Data from 812 participants were evaluated with respect to the effects of violent etiology on the Functional Independence Measure (FIM), the Alcohol Quantity Frequency Variability Index, and the Community Integration Questionnaire (CIQ). The results of this preliminary study revealed a "profile" of an individual who was at risk for sustaining a violent TBI. This individual tended to be male, non-white, single, living alone, less educated, and unemployed at the time of injury. In comparison to TBI participants that sustained a non-violent TBI, those with a violence-related injury experienced a less severe brain injury and better motor scores, as measured by the motor scores on the FIM at time of inpatient rehabilitation admission. At one-year follow-up, the differences in motor scores on the FIM were no longer evident. Those with violent injuries scored lower on the CIQ than their non-violent counterparts, however. In general, etiology of injury, whether it was violent or non-violent, did not appear to affect functional outcome, but those with violent injuries had poorer community integration. The relationship, however, was weakened when socioeconomic factors were considered.

The relationship between violent etiology of injury and outcomes has been further examined by Zafonte et al, in a series of articles evaluating outcome with respect to violent injuries in

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NIDRR

The Rocky Mountain Regional Brain Injury System
Craig Hospital, Englewood, Colorado

What makes for a top-notch rehabilitation program — one that, like Craig Hospital, has been named 12 times in as many years as one of the US News & Report's "best rehabilitation hospitals"?

- Not just its age — though Craig Hospital, located just south of Denver, has treated more than 3400 people with traumatic brain injuries and 20,000 with spinal cord injuries (SCI) in its 40 year history as a free-standing, not-for-profit rehabilitation hospital. Prior to that — almost a century ago — Craig got its start as a tent colony and TB sanitarium, for easterners trying to escape the ravages of tuberculosis.
- Not just its size, though at 93 inpatient beds, it is by no means small. Add to that another 53 apartment units in three on-campus buildings (soon to be consolidated in a brand, new, accessible, family-oriented apartment unit), as well as growing outpatient program that each year serves more than 235 persons with TBI and 1300 with SCI, and Craig clearly ranks up with the country's larger comprehensive rehabilitation programs.
- Not how quickly it moves its patients through its in- and out-patient programs. Craig Hospital lengths of stays are typically longer than the national averages, due at least in part to the comprehensiveness of Craig's programs. Lengthier outpatient stays are common, and many patients then continue in ongoing relationships with Craig's community-based activities. Indeed, more than 97% rate their overall experience at Craig Hospital as "good" or "excellent" on Craig's patient satisfaction survey.
- Not its research programs, though Craig's participation in government-funded spinal cord and brain injury research programs spans more than 25 years. Craig is unique and exceptional in its ability to gain both National Institute of Disability and Rehabilitation Research (NIDRR) and Centers for Disease Control and Prevention (CDC) funding despite the fact that it is not directly affiliated with any university or teaching hospital. It has been a NIDRR-funded SCI Model System continuously since 1974 and has been a TBI Model System since 1998. Over the years, Craig has been funded as a NIDRR Rehabilitation Research and Training Center, and has successfully obtained and completed several NIDRR field initiated projects in addition to various CDC projects addressing both SCI and TBI concerns. Particular ongoing research strengths are outcomes following TBI, the cost of living with a disability, and the long-term follow-up of population based samples of people with SCI and TBI. Recently, Craig has broadened some of its research efforts, exploring the issues of handicap, social participation, and the impact of environmental barriers on the lives of all persons with disabilities.

No, what has given Craig its reputation for excellence is its philosophy and commitment to quality care.

The Model System Program:

How does all this translate to a TBI model system? To a very great extent, it is these values that have made Craig Hospital and its collaborators a "model system" of care. Those collaborating acute care facilities at St. Anthony-Centura Hospital and Swedish HealthONE Medical Center, and a host of vocational, educational, social and other community-based post-rehabilitation partners strive to provide a continuum of care that puts the patient and family first, spanning "coma to community."

We feel that this has enhanced our success as a model system program. Eligibility criteria for our research — projects include National Database participation — is limited to regional patients with whom we can realistically maintain ongoing involvement and follow-up. Even with this limitation, 168 patients have been successfully enrolled — more than 86% of those who were eligible. The integration of research with care has enhanced continuing participation. Clinical neuropsychologists integrate their testing with their treatment, using data to guide treatment and educate patients and families. Research assistants who meet families face-to-face to obtain informed consent and enroll patients, stay in touch throughout the rehabilitation stay, and themselves conduct annual follow-up interviews. Educational materials, information about needed resources, and a financial honorarium serve to maintain participants' interest in commitment to the research program. The result: an annual rate of successful follow-up of 96%.

Who are model system patients? Their mean age is 30 years. Seventy-three percent are males and 85% are white. Twenty-three percent are married at the time of injury, 65% have never been married, and 13% are divorced. All are living at home at the time of injury and approximately 90% return to a private residence following discharge. Seventy percent are competitively employed at the time of injury, while another 22% are full time students. Seventy percent have completed high school at the time of injury; 78% have at least some college.

In addition to participating in the Model System National Database, these participants also are involved in our separate yet complementary research projects. For many of these projects, our collaboration with the Colorado Department of Public Health and Environment's CDC funded Traumatic Brain Injury Registry and Follow-up System adds an additional dimension: the ability to make comparisons with geographically comparable, population-based sample, and to identify “control” cases for some of our studies. Our complementary projects include those that:

- examine the effectiveness of specific vocational and back-to-work interventions;
- study relationships between insurance coverage and outcomes
- explore the impact of the different types or “pathways” individuals follow after acute hospitalization and rehabilitation
- investigate the roles of violence, as well as the roles of environmental barriers on patient outcomes.
- examine the efficacy of a pharmacological intervention for severe persistent amnesia in TBI
- compare the usefulness and predictive value of various Magnetic Resonance Imaging sequences
- develop computer software for pinpointing the emergence from post-traumatic amnesia is

Dissemination efforts include presentations at professional organizations, publications in refereed journals, a newsletter and webpage specifically targeting consumers and their family members (www.craighospital.org), and aggressive community educational efforts targeting caregivers and professionals. One project targeted the clergy, an often overlooked group involved in supporting people with TBI and their families. First, more than 1400 educational booklets were mailed to the state's clergy. This was followed by a seminar at Craig Hospital. With almost 100 attendees, topics included mechanisms of closed head injury and understanding the acute medical crisis; neurosurgical interventions and their prognostic abilities; cognitive deficits; family issues and needs; long-term outcome issues and counseling: balancing hope and realism. Response was overwhelmingly positive.

Though our research and dissemination history at Craig Hospital is a long and diverse one, it is secondary to what we do best. In fact, Craig's very research success is driven by the institution's and individual staff's commitment to patients and families first — to the consumers we serve and observe over their lifetimes as each one recovers from, adjusts to, and succeeds in, life with a disability.

Ohio Regional Traumatic Brain Injury Model System
The Ohio State University
Columbus, Ohio

The Ohio Regional Traumatic Brain Injury Model System is housed in the Department of Physical Medicine and Rehabilitation at Ohio State University (OSU). It is a program of the Ohio Valley Center for Brain Injury Prevention and Rehabilitation, an umbrella for our research and program development in traumatic brain injury (TBI).

The Ohio Valley Center provides an organizational structure, the core of which is a 35-member Advisory Council that reviews and prioritizes issues facing persons with long-term consequences of TBI. Membership is drawn primarily from Ohio, Indiana, West Virginia and Virginia, but includes representatives from national organizations, as well as other neighboring states. A majority of the members have experienced TBI as either a primary or secondary consumer. In addition, we have sought persons involved at the statewide level, either as advocates or in state government. In doing so, we have

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Ohio Regional Traumatic Brain Injury Model System, The Ohio State University

relied heavily on our relationships with the state chapters of the Brain Injury Association of America.

The mission of the Ohio Valley Center for Brain Injury Prevention and Rehabilitation is "to conduct research, provide education and develop programs to improve the quality of life of persons who experience traumatic brain injury." This mission is carried out in the context of five guiding principles:

1. Persons who have experienced brain injury and their families should be the pivotal agents in directing rehabilitation efforts.
2. The emphasis of service delivery should be on communities rather than facilities.
3. State government is a critical focal point for supporting new or more responsive methods of service delivery.
4. Individuals with brain injury, their families, advocates, policy-makers, and professionals need to communicate and collaborate to create positive changes.
5. Valid and meaningful information improves the decisions made by all stakeholders.

A Comprehensive System of Services

The Ohio Regional TBI Model System serves a 21-county area in central and southern Ohio that is home to approximately 2.4 million people. The population served includes both urban and rural areas, and closely matches many national demographic characteristics.

The service system is a collaborative effort of the OSU Medical Center and the trauma programs of two other hospital systems serving Central Ohio—the OhioHealth Regional Trauma Program and Children's Hospital of Columbus. Services begin with state-of-the-art rapid air medical transport provided by MedFlight, which is jointly owned by OhioHealth and the OSU Medical Center. Five helicopters supported by six Mobile Intensive Care Units are strategically located throughout central and southern Ohio to allow rapid transport to trauma centers in the system. The OSU Medical Center, the OhioHealth Regional Trauma Program, and Children's Hospital operate the only American College of Surgeons Level I Trauma Centers serving the greater Central Ohio region.

Brain injury rehabilitation at OSU is provided in the 24-bed, CARF-accredited, specialized Brain Injury Unit in the Department of Physical Medicine and Rehabilitation. Established in 1983, it was one of the first programs in the state to be accredited for specialized brain injury rehabilitation and remains the only program so accredited serving central and southern Ohio. All local hospitals refer patients with severe TBI's to the Brain Injury Unit at OSU. Continuity from trauma service to inpatient rehabilitation admission is guaranteed by the involvement of OSU Physical Medicine and Rehabilitation residents from the first days of trauma care through admission to rehabilitation.

In 1997, we initiated "Team Brain Injury" to provide consultation, education, and proactive resource and service coordination for up to two years following discharge from the hospital. The Team helps the individual and family to manage community integration based on a holistic view of a person's needs and using a coordinated team approach. Team Brain Injury improves access to existing services that may not be accessible to those without previous experience in the health care and/or human service systems. The program has become a highly valued asset of our model system and serves more than 100 new clients each year.

Improving access to service frequently requires significant changes to existing community-based service systems. Beginning in 2001, staff of Team Brain Injury began a joint venture with the Brain Injury Association of Ohio to improve Central Ohio's healthcare, human services and social supports for persons with TBI. Called Community Capacity Building, the goal of the project is to demonstrate the effectiveness of integrating public information, professional education, systems advocacy, and resource and service coordination for preventing secondary complications of TBI.

Innovation in Clinical Care and Research

The Ohio Regional TBI Model System has provided leadership in two areas of clinical care: substance abuse and agitation. We believe that developmental work currently occurring in a third area, resource and service coordination, will in time also prove to have broad significance.

Substance Abuse. The work of the Ohio Regional TBI Model System has built on our prior interests in this topic. We have extended examination of the construct to include the role of violence versus substance abuse as mediating factors in outcomes, screening for substance abuse among persons with TBI, and early versus late treatment. Our dissemination efforts have also emphasized substance abuse, with training sessions provided for communities, states and provinces considering service delivery changes to better serve persons with this dual diagnosis.

Agitation. Our Model System grant has built on existing interest in this topic, as well. A Model System project shed new light on the long-observed relationship between acute agitation and longer-term outcomes, and a second project provides preliminary data for extending research into the issues of treatment prior to entering rehabilitation. A multi-center clinical trial of two pharmacological approaches to treatment of agitation was funded as a TBI Model System Collaborative Research project.

For more information send e-mail to Lamb-Hart.1@osu.edu, call (614) 293-3802, or on the web at www.OhioValley.org.

TBI Model System of Mississippi
Methodist Rehabilitation Center/
University of Mississippi Medical Center
Jackson, Mississippi

The TBI Model System of Mississippi (TBIMSM) is a collaborative program of the Methodist Rehabilitation Center (MRC) and the University of Mississippi Medical Center (UMC). MRC is a private not-for-profit rehabilitation hospital that is located on the campus of UMC. Founded in 1975, MRC is the only freestanding rehabilitation hospital in Mississippi. The 124 bed facility is accredited by JCAHO and CARF. MRC provides comprehensive medical rehabilitation programs for people with traumatic brain injuries, spinal cord injuries, stroke, and other neurological and orthopedic disorders. Patients from all of Mississippi's 82 counties and from neighboring states receive services at MRC. MRC is the only hospital in Mississippi to ever be listed by *U. S. News* and *World Report* as one of America's best hospitals.

In addition to the Brain Injury, Spinal Cord Injury, Stroke, Orthopedic, and Rehabilitation Surgery inpatient rehabilitation programs, MRC provides comprehensive outpatient therapy services, the Quest Program, and comprehensive prosthetics and orthotics services. The Quest Program is the only community integration program for persons with brain injuries in Mississippi. MRC staff, Dr. Stuart A. Yablon and Dr. Mark Sherer, also serve as consultants to the UMC Neurorestorative Center which provides Mississippi's only residential program for persons with brain injuries. Recently, MRC, in collaboration with the U.S. Department of Housing and Urban Development (HUD), opened Webb Park, a 19 unit apartment complex for the physically disabled.

Major research programs at MRC are the TBIMSM and the Center for Neuroscience and Neurological Recovery (CNNR) which includes the Motion Analysis and Human Performance Laboratory. The CNNR provides state of the art neurophysiology and motion analysis facilities for research on neurological recovery and new therapies to improve mobility after brain injury and spinal cord injury. The MRC Wilson Foundation provides start up funding for research programs at MRC and UMC.

UMC provides the only medical school in the state of Mississippi. The University Hospitals (University Hospital, Winfred L. Wiser Hospital for Women & Infants, and Blair E. Batson Hospital for Children) operate a total of 665 beds. Approximately 26,000 inpatients are served annually with an additional 360,000 outpatient and emergency visits every year. UMC provides the only Level I Trauma Center in Mississippi. The University of Mississippi School of Medicine has a medical student enrollment of about 400 and offers residencies in 25 areas of specialty practice. Education and training are also available in nursing, dentistry, physical therapy, occupational therapy, clinical psychology, and other allied health professions.

Activities of the TBIMSM

Dr. Mark Sherer is the Project Director for the TBIMSM while Dr. Stuart A. Yablon serves as Project Medical Director and Dr. Risa Nakase Thompson serves as Data Coordinator. The TBIMSM is funded by three grants from the National Institute on Disability and Rehabilitation Research (NIDRR). The TBIMSM is the primary site for one of the sixteen TBI Model Systems program funded by NIDRR. The TBIMSM is the primary site for one of the NIDRR TBI Model Systems collaborative studies and serves as a secondary site for another project in this program. NIDRR funds only four TBI Model Systems collaborative study programs. Ongoing research projects of the TBIMSM address: (1) Extended case management after postacute brain injury rehabilitation, (2) Post-traumatic seizure disorder, (3) Innovative treatment for spasticity, (4) Impact of rural vs. urban residence on outcome after TBI, (5) Electrophysiologic indicators of outcome after TBI, (6) Impaired self-awareness after TBI, (7) Screening techniques for deep vein thrombosis, (8) Confusional state after TBI, (9) Impact of intentional vs. non-intentional injury on outcome after TBI, and (10) Family adjustment after TBI.

In addition to ongoing research programs, the TBIMSM is actively involved in improving rehabilitation services to persons with TBI in Mississippi. The TBIMSM has provided a conference on real world issues for persons with TBI and their families. Information about TBI is published quarterly in a newsletter as a collaborative project with the Brain Injury Association of Mississippi. Additional information is available on the MRC web site. TBIMSM staff have provided numerous work shops and in-services to persons with TBI, family members, and other healthcare professionals. Activities of the TBIMSM are guided by an advisory board that includes persons with TBI and family members as well as representatives from the Brain Injury Association of Mississippi, the Coalition for Citizens with Disabilities, and the Mississippi Department of Rehabilitative Services.

Recent Accomplishments of the TBIMSM and TBIMSM Staff.

In 2002, the TBIMSM recruited 47 new TBI Model Systems subjects exceeding our yearly goal by 7 subjects. Since the beginning of the TBIMSM in 1998, TBIMSM staff have published or have "in press" 22 papers or chapters on TBI. An additional 34 abstracts regarding our work have been published and over 50 presentations have been given at professional meetings. In the past year, Dr. Sherer was elected fellow of the American Psychological Association and the National Academy of Neuropsychology in recognition of his contributions to neuropsychology.

TBI Model Systems Expands Dissemination to Professionals and Consumers

The mission of the TBI Model Systems program is to "improve the lives of persons who experience traumatic brain injury, their families and their communities by creating and disseminating new knowledge about the course, treatment and outcomes relating to their condition." To have impact, new research findings must be disseminated in a timely, concise manner to a broad range of audiences so it will translate into changes in the knowledge base and practices of professionals to improve outcomes for those we serve. To achieve that end, the TBIMS uses a variety of dissemination vehicles, such as:

1) publications in scientific journals;
2) presentations at scientific and consumer-oriented conferences;
3) publications of newsletters such as *Facts and Figures*;
4) use of the internet through websites which reflect the activities of the TBIMS program.

The following is an update on some of the new dissemination activities of the TBI Model Systems.

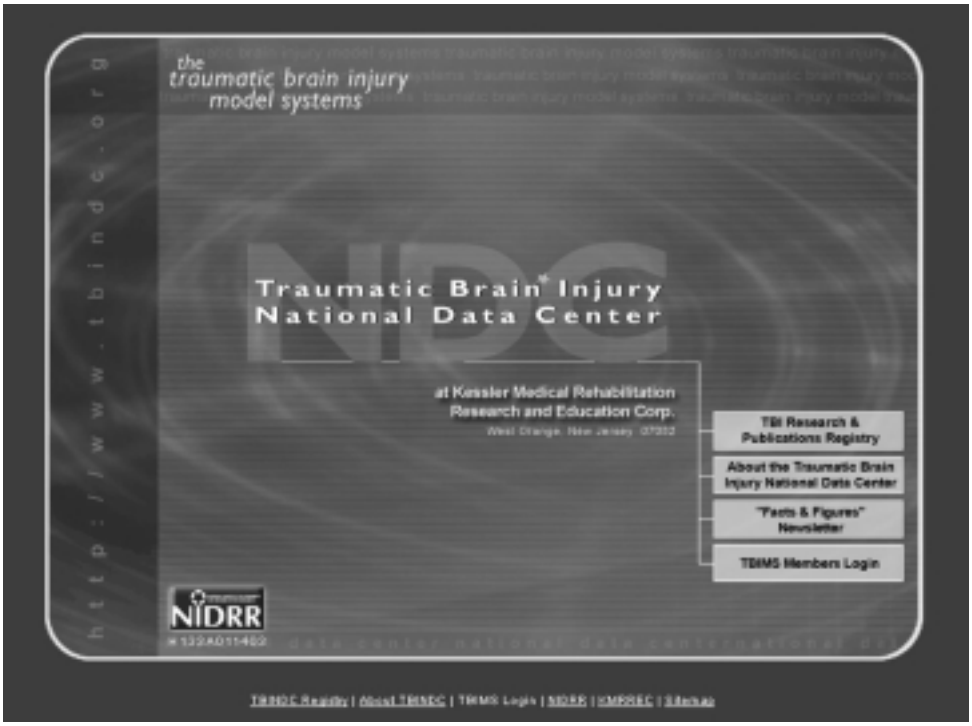
New Website Debuts for TBI Model Systems

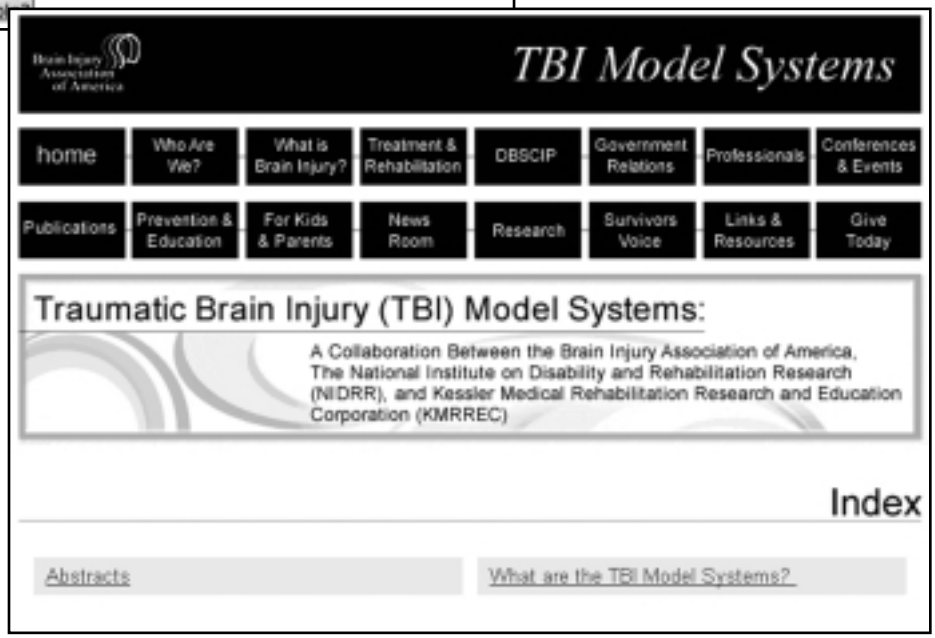
With the advent of a new grant cycle, the official website of the TBI Model Systems program has shifted from www.tbims.org to *www.tbindc.org*. This shift enables a consolidation of basic information about the TBI Model Systems program itself with the newly developed TBI Research and Publication Registry (see below). The former site was managed by Jerry Wright, M.S. at Santa Clara Valley Medical Center, which will continue to manage the Center for Outcome Measurement in Traumatic Brain Injury, *www.tbims.org/combi/* which is a popular site for detailed information about functional assessment measures used in traumatic brain injury research. The new site is managed by John Andrews, M.S. and his Information Systems and Technology staff, at Kessler Medical Rehabilitation Research and Education Corporation.

Research and Publication Registry

In development for over a year, the TBINDC has launched the TBIMS Research and Publication Registry. This searchable website includes detailed listings of over 200 research projects and over 400 publications that have been developed within the TBI Model Systems program.

The Research Projects section of this site enables public access to research projects which have been conducted within the TBIMS during the past five years, including projects which have recently been initiated and those that are planned for the near future. One can search this Registry by TBIMS Center or by Investigator and view an abstract containing key details about the research project, including results (if available) and link to a publication (if applicable).





In the Publications section of the Registry, one can access a complete Publication List of the TBI Model Systems program, which contains over 400 publications which are primarily articles which have appeared in peer-reviewed publications, as well as book chapters and textbooks with TBIMS editors and/or contributors.

Brain Injury Association of America Provides TBIMS Consumer Dissemination

Through a subcontract from the TBINDC at KMRREC to the Brain Injury Association of America (BIAA), research findings are being disseminated directly to the consumer. In their membership periodical, TBI Challenge, specific articles now appear in each issue which summarize focused areas of TBI research, e.g. substance abuse, family functioning following TBI, etc. In addition, a new section of the BIAA website – *www.biausa.org* – is focused on research and has a special section dedicated to the TBI Model Systems.

In this section, consumers can find a description of a listing of the newly funded TBI Model Systems, a description of the TBI Model Systems program and "consumer-friendly" abstracts which translate the technical language of the scientific publications into more straightforward text which provides a brief capsule of the key features of the research study and the critical findings which may be of interest to consumers and their significant others. Though only in its infancy, we are hopeful this partnership will lead to expanded awareness of the TBI Model Systems program to those served by or interested in our Model Systems research and service delivery programs.

Data from the Traumatic Brain Injury Model System

The Traumatic Injury Model Systems (TBIMS) Project is a prospective, longitudinal, multi-center study of the course of recovery and outcomes following traumatic brain injury (TBI). The Model System centers, funded by the National Institute on Disability and Rehabilitation Research, provide coordinated emergency care, acute neurotrauma management, comprehensive inpatient rehabilitation and long-term interdisciplinary follow-up services.

Information contained in the database is collected during initial hospitalization and annually thereafter on the injury. The database contains 425 variables describing the initial hospitalization period, and 474 variables relevant to the follow-up period. The Database Syllabus contains detailed information about the database and is available for purchase from the National Data Center (contact kwood@kmrrec.org).

Presently the database contains 3617 individuals discharged from the TBIMS between March 1989 and September 2002, with annual follow-up information extending, thus far, to twelve years post injury. The Table below summarizes several key characteristics of the TBIMS population, which have been updated from previous issues of TBI Facts and Figures:

Number of Cases	3617
Mean Age in Years	37
% Male	74
% White	63
% African American	25
% Unmarried at Injury	69
% w/o High School Diploma at Injury	38
Mean Lowest Glasgow Coma Scale	7
% Vehicle-related injury	46

Incidence and Prevalence

It is estimated that 1.3 million Americans experience TBI each year: Approximately 5.3 million Americans are living with this condition. *(Figures from CDC's National Center for Injury Prevention and Control data; 1999. All other data obtained from the TBI MS National Database; 2002)*

Employment

At time of injury, approximately 61% of persons with TBI are competitively employed. One year after injury only 30% are competitively employed.

Residence

At time of injury, 97% reside in private residences. One year after injury 91% live in private residences.

Loss of Consciousness (LOC)

98% of persons with TBI in the database experience a loss of consciousness at time of injury. Of those who experienced LOC, the average period of unconsciousness lasted 9.6 days.

Inpatient Length of Stay

TBI patients in the Model Systems database averaged 21 days in acute care and 30 days in an inpatient rehabilitation facility.

Disability Rating Scale (DRS)

Average DRS score upon admission to rehabilitation facility was 12.26 (Severe Disability). Average score at rehab discharge was 5.98 (Moderate Disability). At one and two year post injury, average DRS scores were 2.62 and 2.50 respectively (Partial Disability).

Alcohol Use

Persons with TBI tested positive for alcohol at time of injury in 42% of cases who were tested. Of these, blood alcohol levels of 100 mg/dl were detected in 45% of cases.

Post Traumatic Amnesia (PTA)

Approximately 97% of patients experience PTA. In these cases, PTA lasts 30 days or longer (extremely severe) in 30% of cases. Post-traumatic amnesia lasts between 8 and 29 days in 33% of cases as well. PTA between 1 and 7 days in duration is seen in 8% of cases.

Hospital Charges

Average acute care costs for treating TBI patients injured were $107,087. Mean costs for inpatient rehabilitation care of these individuals was $42,124 (excluding physician charges).

Functional Independence Measure (FIM)

Mean Total FIM score for patients upon admission to rehabilitation facility is 55.95. Mean score upon rehab discharge is 96.25. Total FIM scores at one and two years post injury are 115.67 and 116.30. The maximum possible score is 126.

Community Integration Questionnaire (CIQ)

At one year post injury, individuals with TBI have an average CIQ self-assessment score of 15.35. Normal control subjects scored 20.5. The maximum possible score is 29.

Cohort Outcome Measures

Measure	n	Rehab Admit	n	Rehab Discharge	n	Year 1	n	Year 2	n	Year 5	n	Year 10
FIM	3129	55.95	3215	96.25	1796	115.57	1146	116.30	402	116.12	132	117.33
DRS	3508	12.26	3520	5.91	1970	2.62	1305	2.50	442	2.57	155	2.3
CIQ (self)		n/a		n/a	1747	15.35	1157	15.83	388	16.05	148	16.50

2003 Traumatic Brain Injury Model Systems National Data Base Syllabus

Please mail this order form to:

Kenneth Wood, Ph.D.
TBIMS Data Center Manager
1199 Pleasant Valley Way
West Orange, New Jersey 07052

2003 Syllabus prices: $100.00 (USA) or $125.00 (International)

1) Payment in U.S. funds must accompany all orders;
2) Checks or Money Orders should be made payable to: **KMRREC**
3) Shipping and handling charges are included in the charge;
4) *Sorry -- we cannot accept credit card or purchase orders.*

Please send me _____ copies of the **2003 TBI Model Systems National Data Base Syllabus.**

Enclosed is my check/money order for $ _____

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Telephone (Area Code) Number Fax (Area Code) Number

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TBI Model System Focus on Violence

general, as well as those with penetrating injuries more specifically. In a preliminary study in 1997, Zafonte, Mann, Millis, Wood, Lee, and Black examined 25 individuals with blunt TBIs and 25 with penetrating injuries, and found no difference in outcome[6]. Zafonte, Wood, Harrison-Felix, Valena, and Black followed this study with an expanded project that included TBIMS data, as well as local data, to prospectively study rehabilitation outcomes secondary to penetrating injuries[7]. Four hundred and forty-two persons with penetrating brain injuries resulting from a gunshot wound that were admitted to a university-affiliated Level I Trauma Center emergency department over a seven year period were included in the study. Of this group, 36% were dead on arrival or expired upon admission to the emergency department. Of those that were admitted to the emergency department, only 59% survived, the majority of which had a severe brain injury (Glasgow Coma Scale score of less than eight). The majority of deaths occurred within the first 48 hours after injury. The survivors were described as mostly young (86% were 40 years old or younger), male (86%), and 78% were African-American. Although there was a high mortality rate in this group, many of the survivors demonstrated good potential for functional recovery. The majority of the survivors were discharged home after acute care (62%), and the remaining 38% were enrolled in post-acute programs such as an inpatient rehabilitation facility. Of those that were transferred to the rehabilitation facility, all of the patients, including those in the severe group (GCS of 3, 4, or 5) showed progress throughout their rehabilitation stay.

Zafonte et al. followed the above-mentioned study with a more focused investigation of outcomes associated with severe penetrating head injury[8]. Twenty-seven individuals with severe penetrating head injury secondary to gunshot wounds were included in the study. On average, these individuals improved 7.6 points on the Disability Rating Scale and had an average FIM gain of 40.2 points from rehabilitation admission to discharge. All of the participants improved to the point that they were able to be discharged home.

These findings indicate that although those with penetrating injuries have a higher degree of mortality, a large percentage of these individuals survive and are admitted to inpatient rehabilitation. Even for those individuals with severe injuries, there is significant functional improvement during rehabilitation and the discharge plans typically involve a residential placement that reflect at least a moderate level of independence, e.g., discharge to home. With respect to violent injuries, there is no difference in outcome for those with penetrating injuries as compared to those individuals with blunt brain injuries.

In an effort to further clarify the relationship between substance abuse, violent TBI, and outcome, Bogner, Corrigan, Mysiw, Clinchot, and Fugate examined the relative contributions of a history of substance abuse to the occurrence of a violent injury, and how these factors impact the prediction of long-term rehabilitation outcomes [9]. Although the occurrence of substance abuse was common to both violent and non-violent TBI, 79% of those with a violent TBI had a history of substance abuse, whereas only 55% of those with non-violent etiology reported such abuse. Further analyses revealed that a violence-related TBI did not have a strong effect on rehabilitation outcome. Rather, outcome, as measured by life satisfaction and productivity at one year post-injury, was most strongly related to a history of substance abuse.

References

The TBIMS has facilitated a number of empirical studies that have described the risk factors for sustaining a violent TBI, as well as help predict the course of recovery and long-term outcomes secondary to such an injury. These studies have also determined ways in which violent TBIs differ from non-violent injuries. Research studies currently underway through the TBIMS project are broadening the scope of understanding regarding patient characteristics, medical complications, and the psychological aspects of violent TBIs in hopes of improving the assessment, treatment, and quality of life of such individuals.

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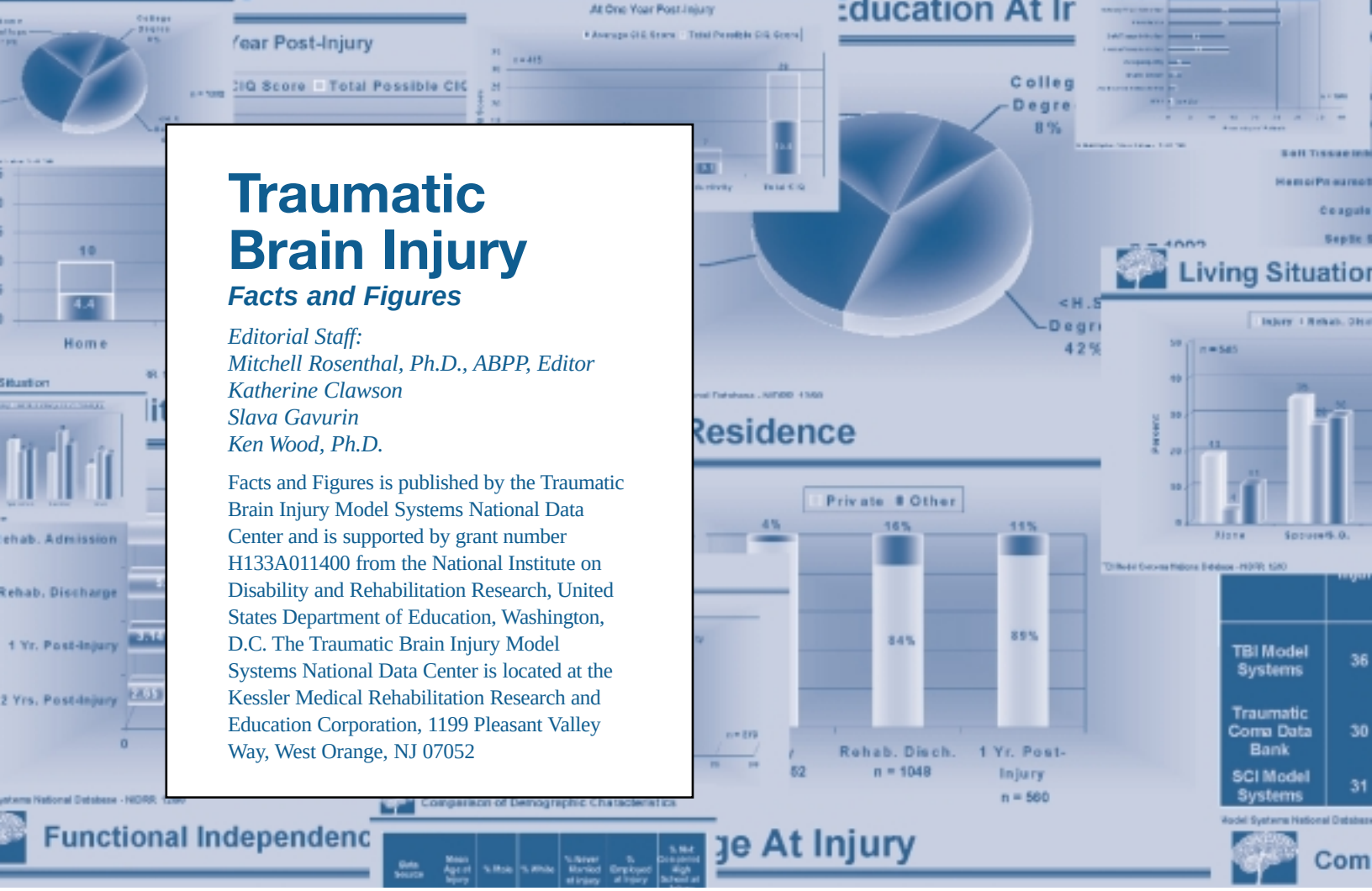

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