BRAIN INJURY AS A CHRONIC CONDITION: IMPROVING OUTCOMES THROUGH PROACTIVE MANAGEMENT

2009 Institute of Medicine Report
Gulf War and Health Volume 7: Long-Term Consequences of Traumatic Brain Injury

Traumatic Brain Injury: A Disease Process, Not an Event
Sweert E. Masei and Douglas S. Delitto

ACRM Archives of Physical Medicine and Rehabilitation
SPECIAL COMMUNICATION
Traumatic Brain Injury as a Chronic Health Condition
John D. Corrigan, PhD; Flora M. Hammond, MD
"Injury to the brain can evolve into a lifelong health condition termed chronic brain injury (CBI). CBI impairs the brain and other organ systems and may persist or progress over an individual’s life span."

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Change in Glasgow Outcome Scale (GOS-E)
Corrigan JD & Hammond FM Arch Phys Med Rehabil 2013
Five-year outcomes of persons with TBI

- Died: 22%
- Became Worse: 30%
- Stayed Same: 22%
- Improved: 26%

*Data are US population estimates based on the TBIMS National Database. Data refer to people 16 years of age and older who received inpatient rehabilitation services for a primary diagnosis of TBI.


U.S. Estimates at 5 Years After Acute Rehab for TBI

- Died: 4%
- Declined: 3%
- 1%
- 3%
- 7%
- 12%
- 15%
- 21%
- 30%
- 49%

*October 1, 2001 and December 31, 2007

Age at Injury

TBIMS Evidence for Chronic Brain Injury: TBI has Significant Long-term Negative Effects

- Police: 50 times more likely
- Driving: 5 times more likely
- Infections: 9 times more likely
- Premature death: 6 times more likely

In addition, people with moderate to severe TBI typically face a variety of chronic health problems. These issues add costs and burden to people with TBI, their families, and society. Among those still alive 5 years after injury:

- 57% are moderately or severely disabled.
- 53% do not have a job (but were employed at the time of their injury).
- 58% return to a hospital at least once.
- 33% rely on others for help with everyday activities.
- 29% are not satisfied with life.
- 29% use illicit drugs or misuse alcohol.
- 17% reside in nursing homes or other institutions.
Current state of care with brain injury?

- Sparse data on aging with TBI & interventions
- Lack consistent self-management & CM
- Not risk-based
- Lack of markers, infrequent use of measures, diagnostic challenges
- Many don’t connect symptoms to BI
- Lack access (awareness, expertise, $, providers)
- Inconsistent & different approaches
- Incorrect information, beliefs, & lack expertise: self-limiting outcomes
- Fractured care: Disconnected with PCP
- Lack full integration of health care, policy, self-management, and community living into a strategy to improve outcomes

Infrastructure for optimal living long-term

Vision for Chronic Brain Injury

2012 Galveston Brain Injury Conference

Brain injury will be identified and proactively managed as a life-long chronic disease that will result in improvements in longevity, level of disability, expense to society, and quality of life. This will be achieved through modification of our medical and psychosocial health care delivery systems, health care education curricula, research agenda, and legislative/health care policy.

Could a chronic disease management approach help reach this vision?

Chronic Disease Management Programs

- People with chronic conditions generally use more health care services
- Health plans, employers, & government wanting ways to reduce health care use & costs have designed structured disease management for chronically ill to:
  - Improve health
  - Reduce health care service:
    - avoiding complications, ED visits & hospitalizations
  - Reduce costs of caring for chronically ill
  - Long-term impacts of chronic disease models not known
### 21 CMS-recognized Chronic Conditions

1. Alcohol Abuse
2. Alzheimer's Disease and Related Dementia
3. Arthritis (Osteoarthritis and Rheumatoid)
4. Asthma
5. Atrial Fibrillation
6. Autism Spectrum Disorders
7. Cancer (Breast, Colorectal, Lung, and Prostate)
8. Chronic Kidney Disease
9. Chronic Obstructive Pulmonary Disease
10. Depression
11. Diabetes
12. Drug Abuse/Substance Abuse
13. Heart Failure
14. Hepatitis (Chronic Viral B & C)
15. HIV/AIDS
16. Hyperlipidemia (High cholesterol)
17. Hypertension (High blood pressure)
18. Ischemic Heart Disease
19. Osteoporosis
20. Schizophrenia & Other Psychotic Disorders
21. Stroke

State Medicaid mgt programs with some evidence of improved care quality & cost-savings

CMS has conducted series of mgt programs for Medicare beneficiaries with chronic conditions in traditional (fee-for-service) Medicare

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### Integrated Care

**Wagner Chronic Care Model**

- Community
- Public Policy & Resources
- Supportive Environment
- Self-management Support
- Delivery System
- Clinical Information Systems
- Decision Support

Informed, activated patient + prepared, proactive practice team

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### Components of Chronic Care Management

- 6 core skills:
  1. problem solving
  2. decision making
  3. communication
  4. patient provider partnering
  5. service planning
  6. self-management

- Informed, activated patient + prepared, proactive practice team
Systematic Review of Integrated Care Models

- 157 studies reviewed
- Most studies showed improved professional & patient outcomes
- Elements included:
  - Self Management (45.8%)
  - Delivery System Designs (22.6%)
  - Decision Support (21.3%)
  - Clinical Information Systems (8.9%)
  - Health Care Organization (1.9%)
  - Community Resources (0.6%)

Self-Management

- Given the usual limited time with health professionals, ... need to provide infrastructure, activate, empower, & build self efficacy
- Intensive, individualized, performed away from healthcare contacts
- Education, activation, goal setting & support, action plans for health-promoting activity, self-monitoring
- Based on a patient-perceived problem
- Improves self-efficacy and thus health thru: goal attainment, vicarious experiences, verbal persuasion, activity linked to physiological & emotional status
- 6 core skills: Problem solving; decision making; resource utilization; patient-provider partnership; action planning (goals & plans); & self-tailoring
- Models exist for some issues encountered after brain injury
- e.g., depression, pain, substance & alcohol use

Common Elements of Chronic Disease Models
details of the management depend on condition

- Evidence-based
- Specific screening
- Comprehensive work up
- Clear treatment priorities
- Established goals
- Written care plans
- Protocol driven care
- Stepped care
- Active & defined follow up schedule
- Specific target measures with defined adjustments in response to measures
- Assessment of adherence to treatment
- Collaborative care
- Pt goals & values
- Tailored education
- Supported self management
- Risk stratified
Designing a “Disease Management” approach to Chronic Brain Injury

1. Which brain injuries increase risk for negative outcomes?

CDC estimates for annual rates of TBI in the United States*

- 55,927 Deaths
- 281,610 Hospitalizations
- 2,460,420 Emergency Department Visits
- ??? Receiving Other Medical Care or No Care


At least 2.8 million TBIs occur in the United States each year (based on 2013)
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Colorado Adults: Relative Prevalence of Activity Limitations and Poor Physical Health

Compared to those with no injuries after controlling for age, gender, race and treatment received (i.e., hospital, ED, office, none)

Ohio Adults: Adjusted Odds* of Disability by Severity of Worst Lifetime TBI

*Compared to Ohioans with no TBI with loss of consciousness, adjusted for age, gender and race/ethnicity
Designing a “Disease Management” approach to Chronic Brain Injury

1. Which brain injuries increase risk for negative outcomes?
2. What pre-existing conditions require management?
3. What conditions develop post-injury that could be prevented or detected early?
Hypertension Ever & FIM Motor

Significant differences for Year 1 and Year 2 only

Myocardial Infarction Ever & FIM Motor

Significant differences at Year 10 only

Depression Ever & FIM Motor

Significant differences for Year 5 and Year 10 only
Depression Ever & FIM Cognitive

Significant differences for Years 1, 2, 5 and Year 10

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**Designing a “Disease Management” approach to Chronic Brain Injury**

1. Which brain injuries increase risk for negative outcomes?
2. What pre-existing conditions require management?
3. What conditions develop post-injury that could be prevented or detected early?
4. How can the individual participate in their self-management?

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**A brain healthy lifestyle!**

- Avoid any more TBIs
- Eat well
- Exercise regularly
- Get at least 7 hours sleep
- Don’t drink alcohol or use illicit drugs
- Stop smoking
- Be engaged with people & projects
- Seek to minimize the stress in your life
- Seek to increase restfulness with relaxation training, meditation or other practices
Designing a “Disease Management” approach to Chronic Brain Injury

1. Which brain injuries increase risk for negative outcomes?
2. What pre-existing conditions require management?
3. What conditions develop post-injury that could be prevented or detected early?
4. How can the individual participate in their self-management?
5. How can access to medical and rehabilitation care be used to reduce negative outcomes?

6. How can community-based resources be accessed to improve function and reduce institutionalization?
Overall goal: Develop chronic disease model for TBI.

Long-term outcomes: decreased mortality and improved health, function, and quality of life for people with TBI through
- prevention and/or reduction in the rates of new onset co-morbid disease and disability after TBI
- extended rehabilitation services that better integrate with community-based supports
- creation of evidence-based recommendations for healthy longevity
Structure & Input

Leads
Steering Committee
Stakeholder Comm
Workgroups

Monthly
Every 2 months
Twice yearly
Once – Twice Monthly

PI & Co-PI
PL Co-PI, TBIMS National Data & Statistical Center, TBIMS co-investigator
PL Co-PI, Stakeholders
PL Co-PI, selected steering & as needed stakeholder committee members

- Principle investigators: Flora Hammond & John Corrigan
- Consultants: Kurt Kroenke, Angelle Sander
- Steering Committee: PIs at 16 TBIMS sites, 1 VA, & NDSC
- Stakeholders:
  - Individuals with TBI, family members, physicians, psychologists, case managers, 3rd party payers, Brain Injury Association and Alliance state & national leaders, National Association of State Head Injury Administrators (NASHA) leaders, Self-Management Resource Center (Kate Lorig), National Council on Aging, Commission on Accreditation of Rehabilitation Facilities, and City, County, State, and Federal civic leaders; public health professionals, implementation scientists, NIDILRR MSKTC.

Project Objectives

1. Develop new knowledge and information about potential characteristics and adaptability of evidence-based CDM models for people with TBI. – literature review
2. Develop a CDM model (BeHEALTHY) designed specifically for TBI based on available evidence and best practices for optimizing long-term outcomes after TBI. – develop a model
3. Develop new knowledge about a TBI CDM model, including its active components, feasibility for implementation, measures of impact, sustainability, and potential for knowledge translation. – feasibility testing
4. Develop new knowledge among people with TBI, care providers, and policy makers about the characteristics of the emerging TBI CDM model. – dissemination

Project Overview: BeHEALTHY Development & Feasibility Plan

- Review evidence-based best practices
- Design subcomponents
- Conduct feasibility studies
- Integrate results
- Final model
- Plan for sustainability
- Self-management
- Clinical issues
- Structural & sustainability issues
- Emotions and iatrogenic harm
- Aggregation of function & recovery
- Promote meaningful engagement
- Support group use
- Informal support
- Proactive referrals
- Monitoring emotional & physical health
- Simplified clinical trial
- Healthcare reimbursement
- Community/medical integration
- Consumer advocacy

- NIDILRR
- ACRP
- JHU NDSL
- Notre Dame
- National Institute on Disability and Rehabilitation Research
- VA
- NDSC
- TBIMS National Data & Statistical Center
- TBIMS Co-Investigator

- BeHEALTHY: Development & Feasibility Plan
Self-directed Management of Chronic Brain Injury

Community
- Public Policy & Resources
- Self-management Support
- Supportive Environment

Healthcare System
- Delivery System
- Decision Support
- Clinical Information Systems

Informed, activated participant + expert, proactive care team

QUESTIONS?

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