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Telemedicine and Telerehabilitation in Polytrauma

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Conflicts of Interest

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Outline

- Telemedicine: general concepts
- The evidence: chronic disease management
- Rehabilitation, trauma and telemedicine
- The UW and partners' experience (TBI, SCI, Burns, mental health)

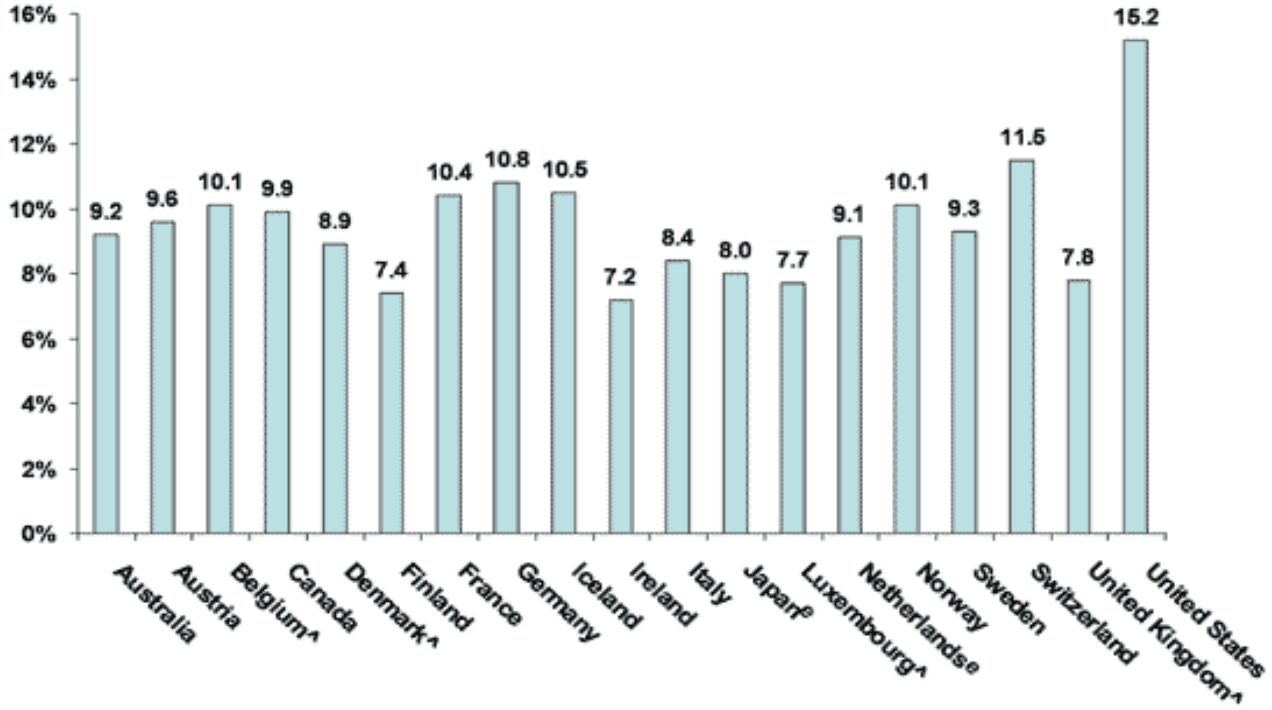
What is Telemedicine?

- Broadly defined as the use of electronic technology for patient care, monitoring, and education
  - The transfer of medical information via telecommunication technologies for the purpose of consulting or for remote medical procedures or examinations
  - The use of telecommunications technology to provide, enhance, or expedite health care services

Drivers for the Adoption of Telemedicine Technologies

- Economics
- Access to care
- Available technology

Total Health Expenditures as a Share of GDP, U.S. and Selected Countries, 2003



- Source: Organisation for Economic Co-operation and Development. *OECD Health Data 2006*, from the OECD Internet subscription database updated October 10, 2006.

Length of Stay, Effectiveness, and Efficiency in Each Impairment Group, 1994-2001

Table 6. Length of Stay, Effectiveness, and Efficiency in Each Impairment Group, 1994-2001

Year and Variables*	Stroke (n = 48 055)	Brain Dysfunction (n = 13 275)	Spinal Cord Dysfunction (n = 11 042)	Neurologic Conditions (n = 8871)	Orthopedic Conditions (n = 67 564)	Total (N = 148 807)
1994						
LOS	24 (16-35)	24 (15-40)	21 (13-38)	20 (13-28)	16 (11-23)	20 (13-29)
Effectiveness	26.0 (14.3)	31.0 (20.1)	25.4 (15.3)	21.3 (13.3)	23.5 (10.3)	24.9 (13.5)
Efficiency	1.2 (0.9)	1.3 (0.09)	1.3 (1.2)	1.1 (0.9)	1.6 (1.0)	1.4 (0.9)
1995						
LOS	23 (15-33)	22 (14-35)	21 (11-34)	20 (13-28)	15 (10-22)	19 (12-28)
Effectiveness	25.4 (13.6)	31.8 (19.5)	24.6 (13.6)	22.1 (14.2)	24.2 (10.1)	25.1 (13.1)
Efficiency	1.2 (0.8)	1.5 (1.0)	1.4 (1.2)	1.2 (1.1)	1.8 (1.8)	1.5 (1.1)
1996						
LOS	21 (14-30)	20 (13-33)	19 (11-31)	18 (12-27)	13 (9-19)	16 (10-25)
Effectiveness	25.0 (13.0)	30.7 (19.1)	24.2 (12.8)	21.6 (12.8)	23.7 (9.8)	24.6 (12.4)
Efficiency	1.3 (1.0)	1.6 (1.1)	1.5 (1.3)	1.3 (1.0)	2.0 (1.3)	1.7 (1.2)
1997						
LOS	21 (13-29)	20 (12-30)	18 (11-30)	18 (12-26)	12 (8-18)	15 (10-25)
Effectiveness	24.1 (13.6)	31.9 (20.8)	23.5 (13.9)	20.5 (13.3)	23.6 (10.3)	24.2 (13.4)
Efficiency	1.4 (1.1)	1.6 (1.3)	1.6 (1.5)	1.3 (1.0)	2.3 (1.9)	1.8 (1.6)
1998						
LOS	18 (12-17)	18 (11-29)	15 (9-28)	15 (10-23)	10 (7-14)	13 (8-20)
Effectiveness	24.2 (13.2)	30.8 (19.3)	23.4 (13.8)	21.0 (13.6)	22.9 (9.3)	24.0 (12.6)
Efficiency	1.5 (1.4)	1.8 (1.7)	1.7 (1.6)	1.5 (1.5)	2.6 (1.8)	2.0 (1.8)
1999						
LOS	17 (11-25)	17 (10-28)	16 (9-29)	14 (9-22)	9 (6-14)	13 (8-20)
Effectiveness	24.0 (13.5)	29.8 (18.8)	23.3 (13.6)	21.2 (13.6)	22.7 (9.5)	23.7 (12.6)
Efficiency	1.6 (1.5)	1.9 (1.5)	1.8 (1.8)	1.6 (1.4)	2.7 (1.9)	2.2 (1.8)
2000						
LOS	17 (11-25)	16 (11-28)	16 (9-29)	15 (9-22)	10 (7-14)	13 (8-20)
Effectiveness	24.2 (13.4)	29.8 (18.8)	24.3 (14.3)	21.2 (13.5)	23.9 (9.5)	24.5 (12.7)
Efficiency	1.6 (1.4)	1.9 (1.6)	1.8 (1.6)	1.6 (1.4)	2.8 (1.9)	2.2 (1.8)
2001						
LOS	16 (11-24)	15 (10-24)	14 (9-27)	14 (8-20)	9 (6-13)	12 (7-19)
Effectiveness	24.3 (13.4)	29.3 (17.5)	24.5 (13.7)	21.3 (12.8)	24.2 (9.4)	24.5 (12.1)
Efficiency	1.7 (1.4)	2.0 (1.7)	2.1 (1.9)	1.7 (1.5)	2.9 (1.8)	2.4 (1.8)
Comparisons across years†						
LOS						
F statistic	49.4	39.7	16.9	26.0	141.0	67.8
P value	<.001	<.001	<.001	<.001	<.001	<.001
Effectiveness						
F statistic	4.4	3.9	2.0	1.3	4.8	3.3
P value	.01	.02	.04	.23	.01	.03
Efficiency						
F statistic	66.5	32.6	21.4	27.9	91.4	52.3
P value	<.001	<.001	<.001	<.001	<.001	<.001

Abbreviation: FIM, Functional Independence Measure.
*Length of stay (LOS) is reported as median (interquartile range) in days. Effectiveness = FIM discharge score − FIM admission score. Efficiency = FIM change/length of stay. Effectiveness and efficiency scores are mean (SD).
†Results of quasi-likelihood analysis included the following covariates: age, marital status, sex, race/ethnicity, whom living with, payment source, and comorbidities. Length of stay and admission FIM scores were included as covariates in the models when effectiveness and efficiency were dependent variables.

Ottenbacher, K. J. et al. JAMA 2004;292:1687-1695.

Potential Effects of Reduced Length of Stay for Patients with Moderate-Severe TBI

HOSPITAL

- ***Less time for information transfer***
- Families often in denial or overwhelmed
- Patient's behavior responds to structure

HOME

- Don't remember or never learned (DC still in PTA)
- Begin to experience the consequences of injury
- Behavior changes with neurological recovery and environmental stressors

In addition to shorter lengths of stay

- Diminished access to outpatient services
- Fragmentation of care
- Lack of insurance funding for long term follow up or any funding at all

Geographic factors

- Lack of transportation
- Distance from TBI (or other) expertise

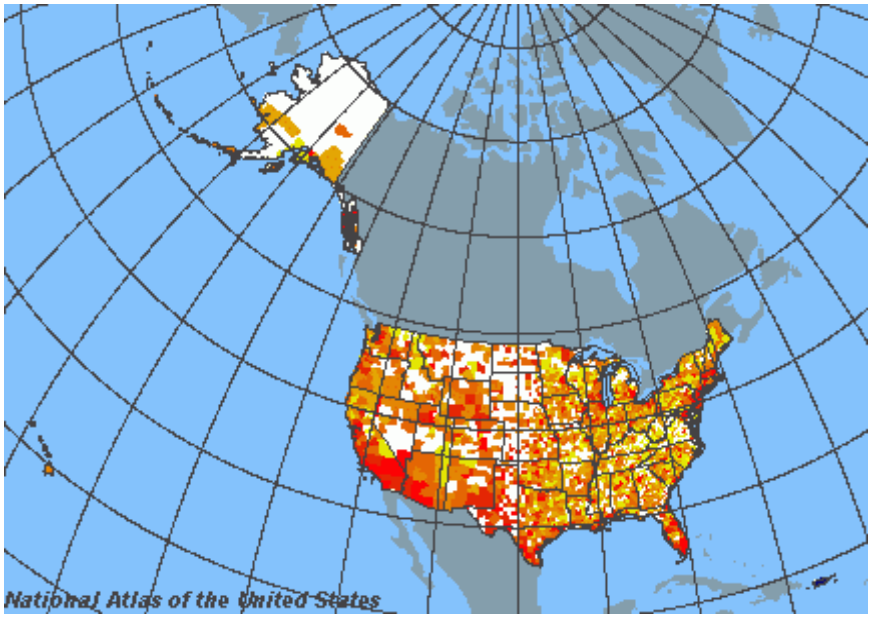
Military and Veteran Populations

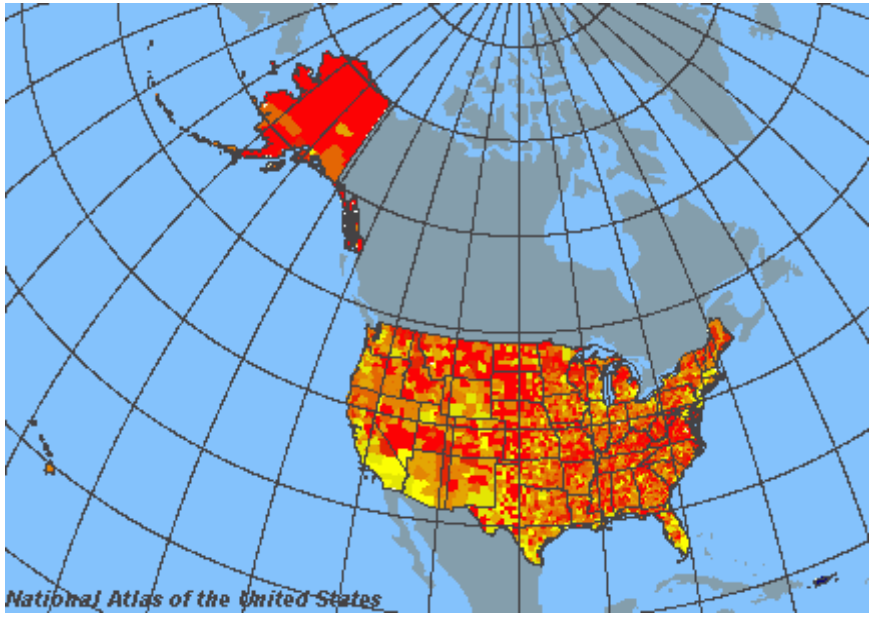
- Return to home communities
- Distant expertise (4 major polytrauma centers in VA)
- Transient military population
- For mental health issues:
  - Stigma of attending clinics or receiving treatment

Access to Care

- Washington Rural Population
  - Overall 23.6%
    - King county 8%
    - Chelan 55%
    - Mason 75%
- Wyoming 35%
- Alaska 32.5%
- Montana 47.5%
- Idaho 42.6%

Urban dwellers vs. Rural dwellers
US Census 2000





Resources for persons with TBI

- Wyoming
  - 2 acute rehabilitation centers
- Alaska
  - Juneau – no adult speech pathologist
  - Anchorage only rehabilitation units (only 1 physiatrist seeing in-patients)
- Washington state
  - Specialized TBI programs - 1

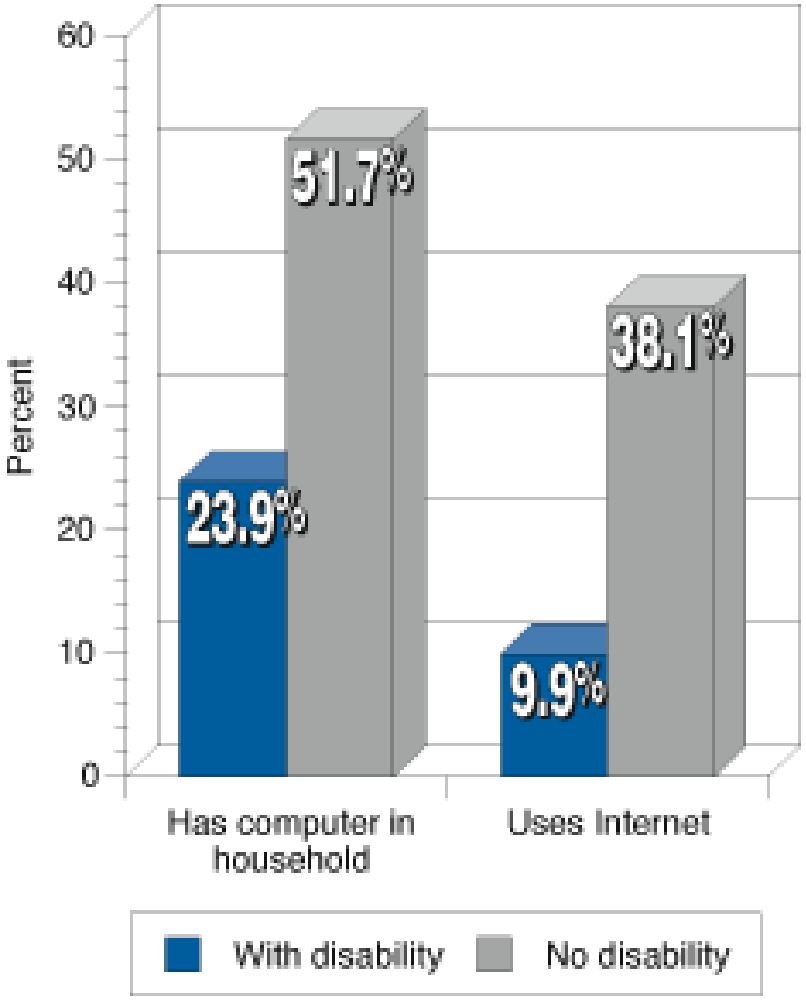
Availability of New Technology

Access to Telephone and Internet in the United States

- 1997: Virtually everyone has telephone access
- 2003 data: 61.8% of all households in the United States have computers and 87.6% of those are Internet accessible (Department of Commerce data)
  - 2000 data: 51% of households owned computers and a 42% of those had Internet access
- Broadband connections continue to be more prevalent in urban areas versus rural areas (Mississippi still <50%)
  - Wireless ISP

Other factors affecting Internet Access

- 54% of Hispanics own their own computers compared to 67% of non-Hispanic users
- 58% black, lower income
- Disabled (2000 statistics)



- UCSF Disability Statistics Center

Internet Literacy

- No high school: 29% Internet users.
- High school graduates: 57%
- Some college: 79%
- College graduates: 89% (Pew Internet & American Life Project, 2005)

- High speed cable and wireless availability
- Web cams and inexpensive teleconferencing
- Cell phone technology
  - Inexpensive basic cell phones
  - Smart phones
  - Networking

Offers the Potential for Positive Enhancements for Patient Care

Learning theory

- Learning specific skills is more effective for most skills over learning generalized skills
  - Repetition reinforces learning

Chronic Disease Management

Two examples

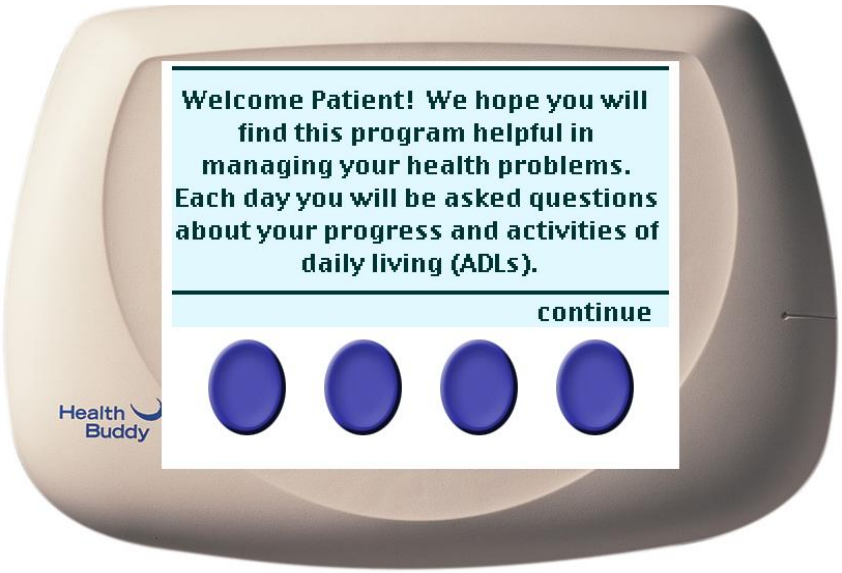
- Diabetes mellitus
  - Depression

The VA Experience

- National home telehealth program, Care Coordination/Home Telehealth (CCHT)
  - 2003-2007
  - Systematic implementation of health informatics, home telehealth, and disease management technologies
  - Population served 2,000 (in 2003) to 31,570 (in 2007)
  - Cost per patient is $1600 per annum

Diabetes Mellitus: Chronic Disease Management

- Intervention: Health Buddy home messaging device connected by analog telephone line



- Experimental group answered questions daily about diabetes symptoms and health status
- Care coordinators monitored this
  - Call patient for FU
  - Refer to patient's MD
  - Consult with MD and alter meds
  - Assist with med management
  - Schedule new appointments

Chumbler NR et al: J Telemedicine and Telecare 2009: 15: 98-101

Results

- Intervention group 387
- Retrospective matched control group 387
- Intervention group
  - More outpatient visits
  - Fewer deaths
  - Improved survival time

Telephone Counseling in Depression

- Group Health Cooperative: Simon et al
  - BMJ 2000;320:550-554 compared monitoring and feedback to doctors to FU and care management by telephone
    - Significant improvement in telephone group in effective medication use, and improvement of depression
    - Incremental cost of $80 per patient
    - No difference in outpatient visits

Telephone counseling in depression

- JAMA 2004;292(8);935-942
  - 3 groups: usual primary care vs. telephone care management vs. telephone care management and telephone psychotherapy
  - both intervention groups had better outcomes; BUT the telephone care management and psychotherapy group did best in depression outcome

Telephone counseling and mental health

- Reese, Conley, Brossart 2002:J Counseling Psychol;49;233-242
  - 30 minute sessions
  - Solution-focused therapy
  - Clients rated counselors the same as face-to-face group
  - Clients self-ratings: significantly improved

Telemedicine and Depression

- Improves compliance with antidepressant use
- Improves outcomes
- Allows for management by PCPs with consultation by psychiatric experts
- Extends care to underserved populations

Providing care by telephone/telemedicine

- Chronic disease management
  - Arthritis, diabetes, anticoagulation management
- Behavioral change
  - Smoking cessation
- Acute disease management
  - Postoperative care
  - Medication management after hospital discharge
  - Adjust risks/ lifestyles after MI

General Telerehabilitation

- Mostly at the level of feasibility studies or small pilot studies or no studies at all

Examples of Recent Telephone based Therapies

- Treatment of stuttering by telephone (O'Brien J Speech Lang Hear Res. 2008 Feb;51(1):184-95)
- Problem-solving Training for Family Caregivers of Persons with Traumatic Brain Injuries: A Randomized Controlled Trial (Rivera, et al. Arch PMR. 2008 May;89:931-41)
- The effects of cognitive teletherapy on reported everyday memory behaviours of persons with chronic traumatic brain injury. (Bourgeois et al, Brain Inj. 2008 May; 21 (12);1245-1257)

Internet and Web-based interventions

- Expertise sharing in the VA Telehealth Network (Darkins, Arch Phys Med Rehabil. 2008 Jan;89(1):182-7, Girard, J Rehabil Res Dev. 2007;44(7):1017-26)
- Email for qualitative interviewing, training for Internet use
- Standardized speech pathology assessments and assessment of motor speech disorders
- Cognitive tasks
- Family training for pediatric patients

Motor Rehabilitation

- Jerusalem TeleRehabilitation System – haptic approach
- The Rutgers Arm
- KMI Hand Mentor
  - Constraint induced movement
- And others…

- Telerehabilitation would allow the therapist to provide instructions, and adjust robot via sensors and performance feedback

Challenges for this

- Hardware
  - Expensive, requires set-up and adjustment, safety
- Sensors
- Software
  - Constantly changing

UW and Partner Research Traumatic Injuries and Telemedicine

Scheduled Telephone Counseling for Persons with TBI

- Bell et al, Arch PMR 2005:86: 851-856
  - Single-site study enrolling subjects via the TBI Model System
  - Randomized 2-group design
  - Blinded outcome assessment

Study Design

- Scheduled telephone contact with subject (S) and significant other (SO)
  - 2, 4 weeks, 2,3,5,7,9 months
- Focus on S/SO identified concerns
- Problem-solving, motivation for change, information, referrals for assistance

Study Design

- Study Interventions
  - 1. Telephone based interventions
    - Information
    - Mentoring, modeling problem-solving
    - Reassurance
  - 2. Referral to resources in local community
  - 3. Referral to resources in specialized center
  - 4. Emergency or urgent referrals

Study Results

- Total: 171 subjects randomized
- Treatment as usual: 78 completed
- Telephone intervention: 79

- Level 1 interventions: 84%
- Level 2 interventions: 7%
- Level 3 interventions: 8%
- Level 4 interventions: <.5%

Study Results

Significantly better for intervention group in these areas

- Primary global outcome – composite statistic
- Perceived Quality of Life
- Overal Functional Status composite

The Effect of Telephone Counseling on Reducing Post-traumatic Symptoms after Mild Traumatic Brain Injury: A Randomized Trial

- 366 of 389 eligible subjects age 16 or older with MTBI were enrolled in the emergency department with an 85% follow-up completion rate at 6 months outcome

- Intervention:
  - 4-5 telephone calls
  - Focus on individualized patient concerns and scripted to address education, reassurance, and reactivation
- Outcome measure 6 months

Results for Mild TBI

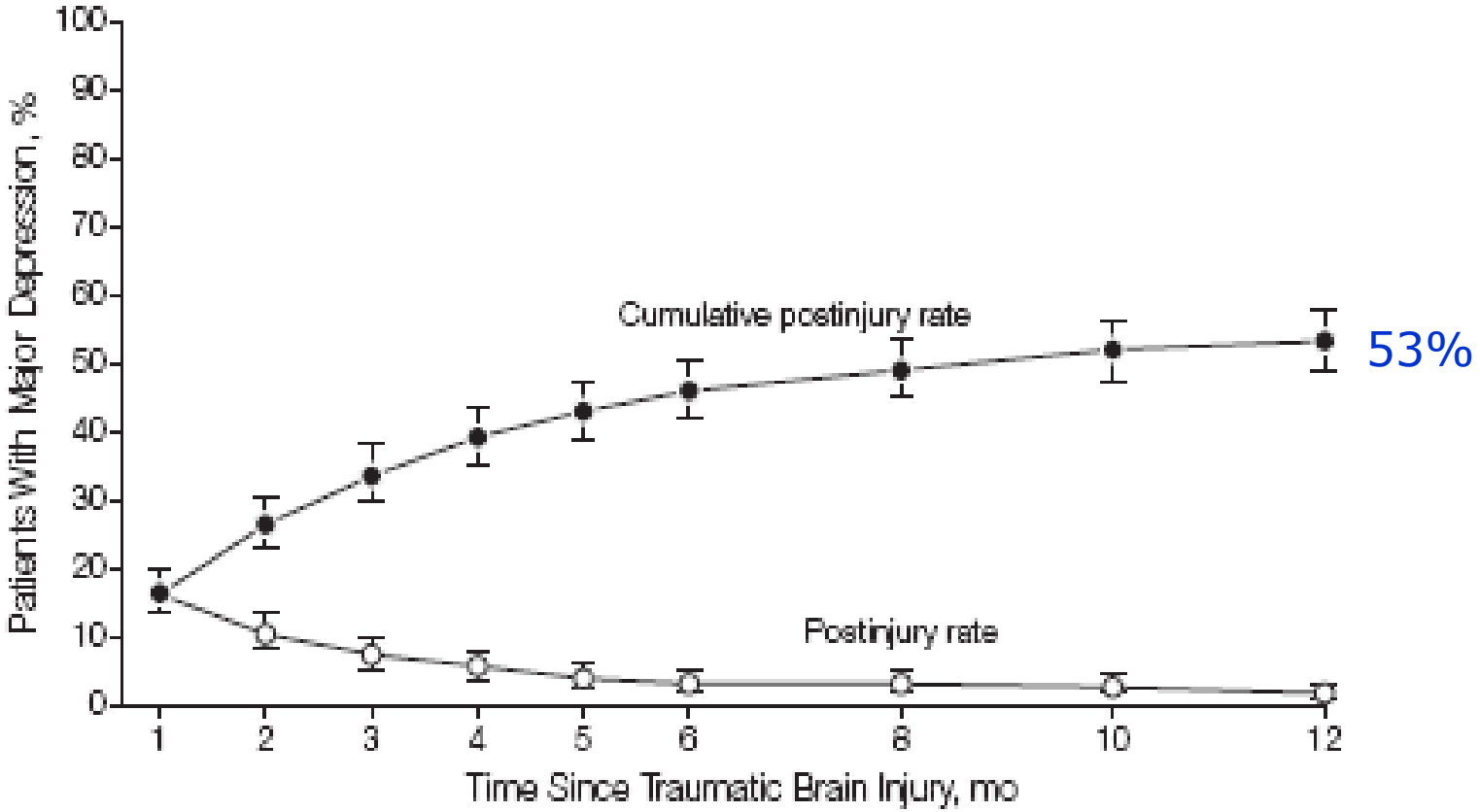
- Better outcome for symptoms
- Fewer in the treatment group had symptoms at a level that negatively impacted on daily living
  - Work, leisure, memory and concentration, and financial independence

The Efficacy of a Scheduled Telephone Intervention for Ameliorating Depressive Symptoms During the First Year After Traumatic Brain Injury

Charles H. Bombardier, PhD; Kathleen R. Bell, MD; Nancy R. Temkin, PhD; Jesse R. Fann, MD, MPH; Jeanne Hoffman, PhD; Sureyya Dikmen, PhD

Journal of Head Trauma Rehabilitation 2009;24: 230–238

Rates Of Major Depression After TBI



Postinjury rate is the proportion of cases ascertained with major depressive disorder for the first time after traumatic brain injury at each assessment. The values underestimate the true rates because not all participants were assessed at each time. Error bars indicate 95% confidence intervals.

N =559; Bombardier et al 2010 JAMA;303:1938-45

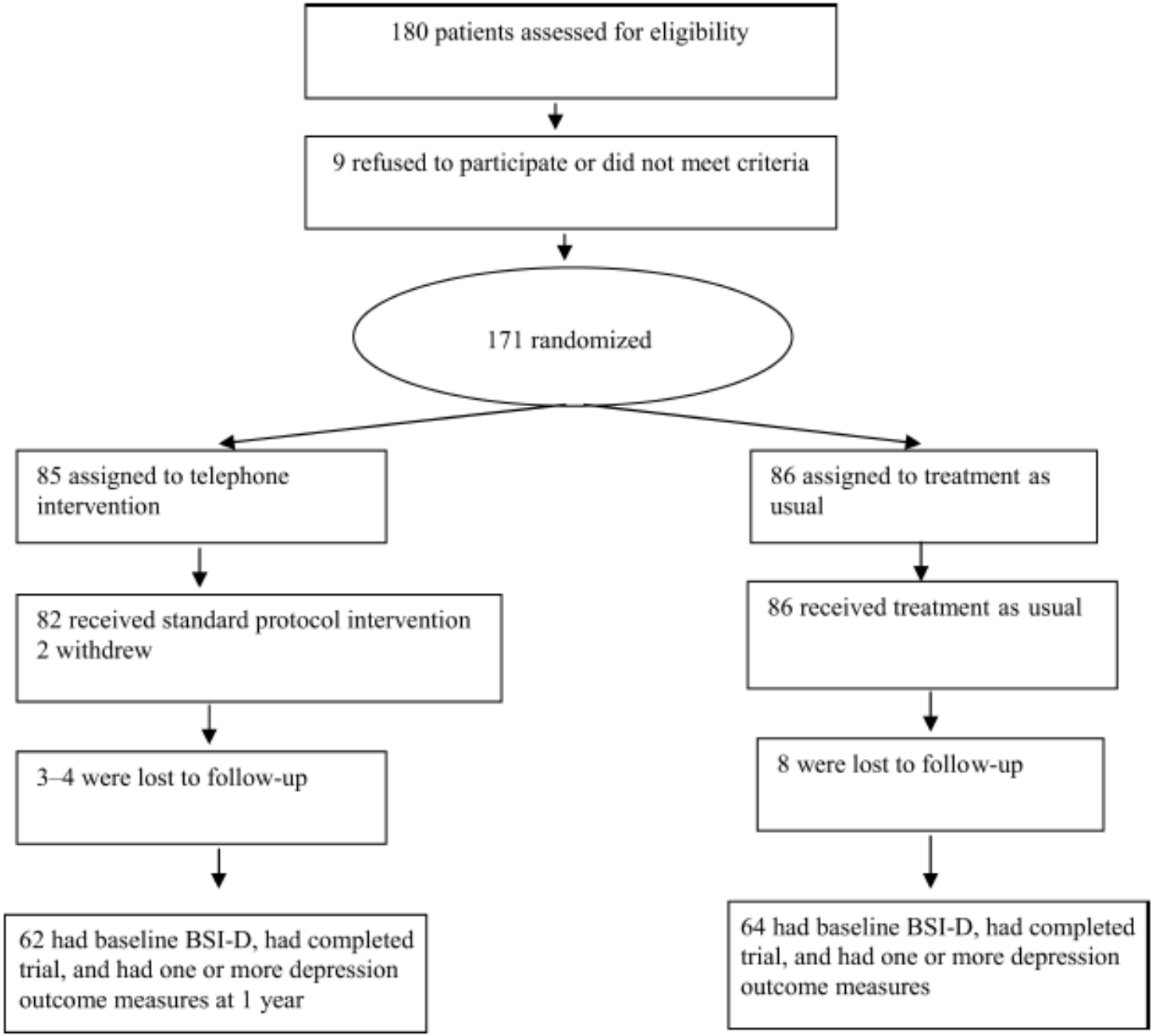
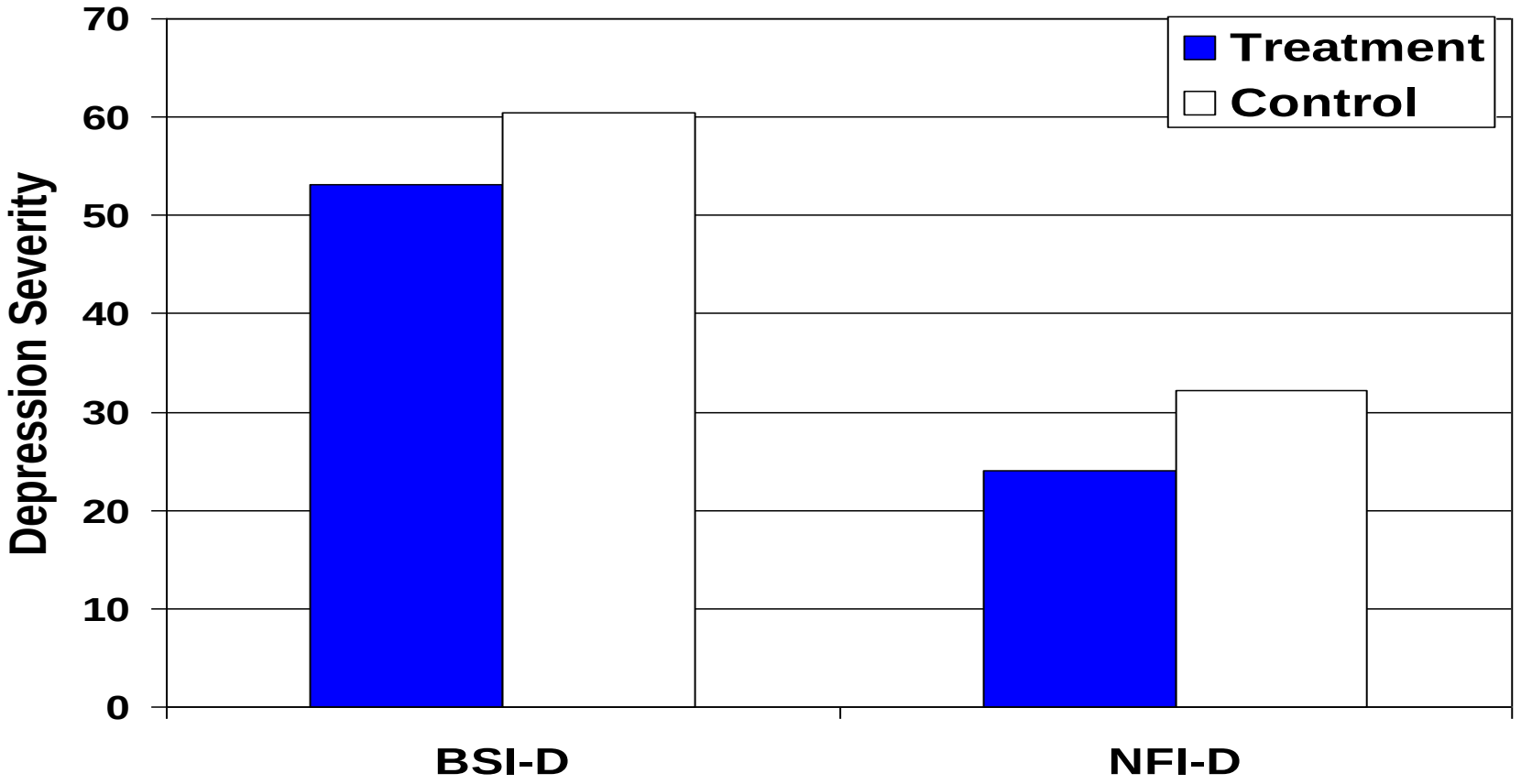


Figure 1. Consort. BSI-D indicates Brief Symptom Inventory-Depression.

Participant Characteristics

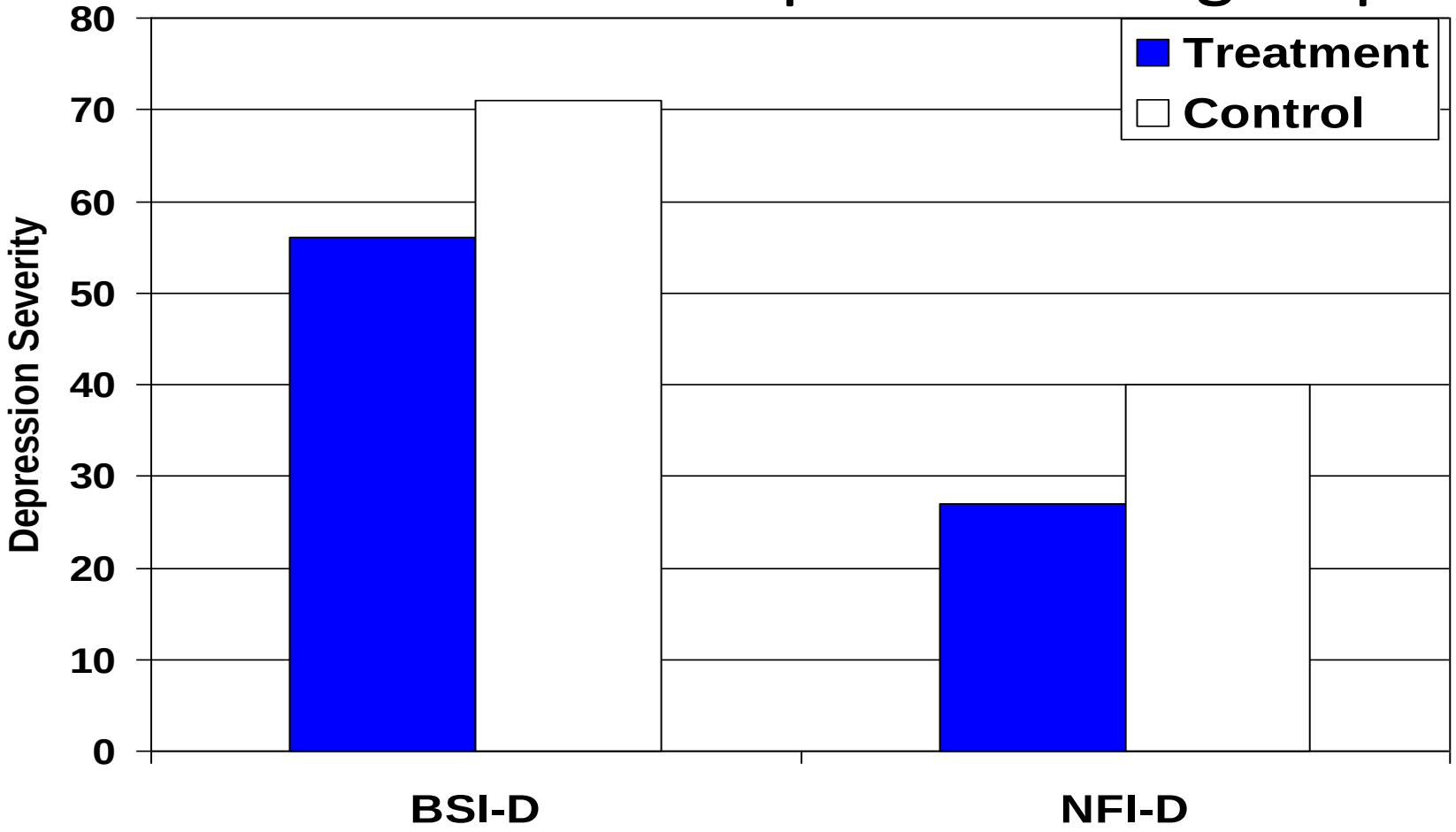
Variable	*n*	Control	*n*	Telephone	*P* value
Full Sample	64		62		
Age	64	37.1 ± 15.6	62	34.5 ± 13.9	.336
Men	64	43 (67%)	62	51 (82%)	.066
White	64	48 (75%)	62	49 (79%)	.674
Lowest GCS score	61	9.3 ± 3.1	62	9.3 ± 3.0	.990
Severe TBI (3–8)		21 (34%)		19 (30%)	.920
Moderate TBI (9–12)		27 (44%)		28 (44%)	
Mild TBI (13–15)		13 (21%)		15 (24%)	
Baseline BSI-D (raw)	64	0.58 ± 0.66	62	0.35 ± 0.52	.030
Baseline BSI-D (*T* score)	64	56.0 ± 10.1	62	51.6 ± 10.1	.019

12 Month Outcomes: Total Group



Abbreviations: BSI-D, Brief Symptom Inventory-Depression; NFI-D, Neurobehavioral Functioning Inventory-Depression;
All p-values less than .02 after adjusting for baseline BSI-D.

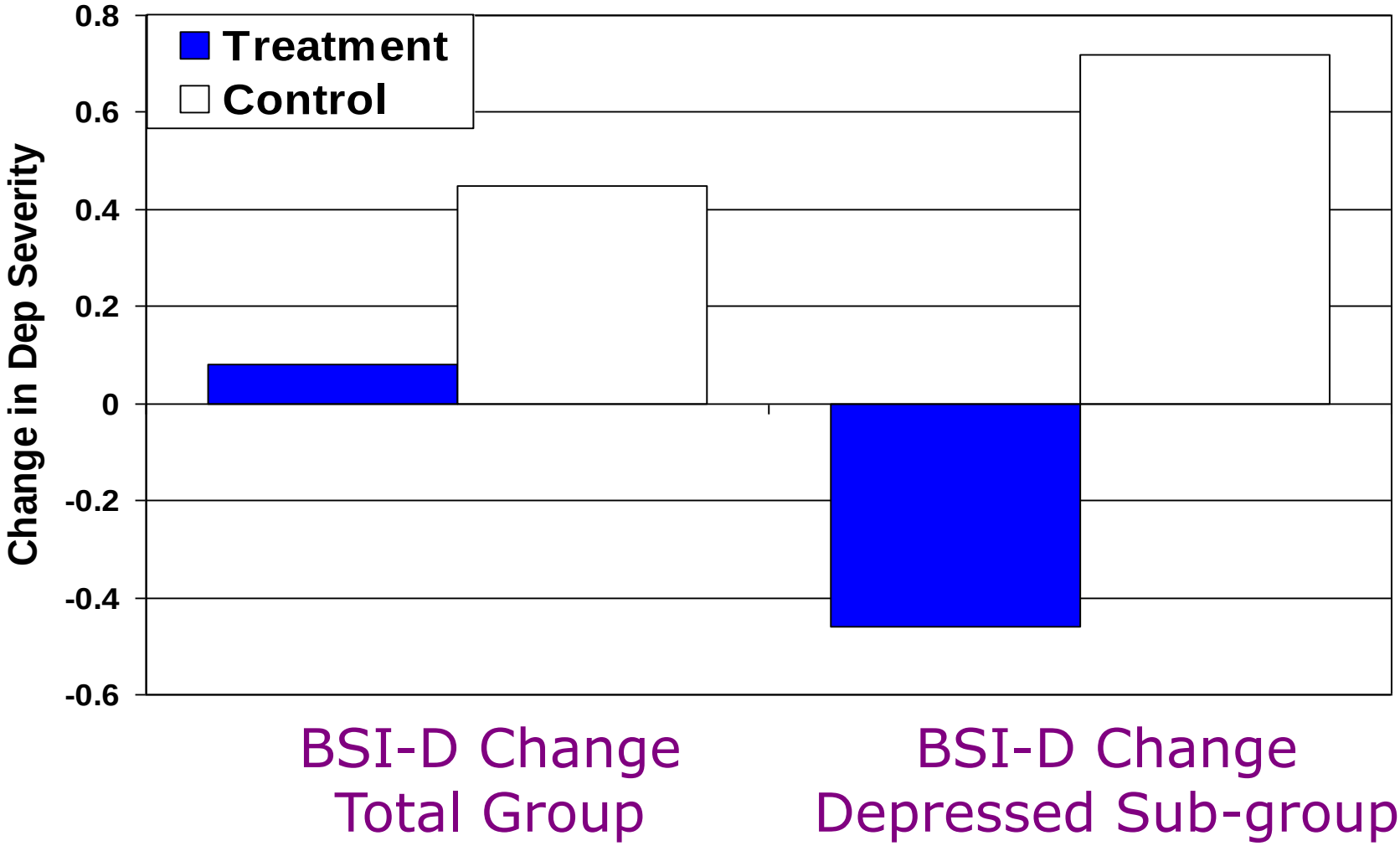
12 Month Outcomes: Depressed Subgroup



Abbreviations: BSI-D, Brief Symptom Inventory-Depression; NFI-D, Neurobehavioral Functioning Inventory-Depression.

All p-values less than .01 after adjusting for baseline BSI-D.

Change in Depression Severity Baseline to 12 Months



BSI-D, Brief Symptom Inventory-Depression; p=.02, p=.004, respectively

Structured Telephone Intervention: Multicenter Study

- Enrollment: 433

  Three state centers

  Baseline measure completion rate: 98% (n=425)
- 1 Year completion rate: 84% (n=343)
- 2 Year completion rate: 83% (n=241)

- Intervention not successful in affecting outcome, return to work, or quality of living
  - Telephone management may not be successful if not targeted or using a specific technique
  - Application of telephone techniques to persons with moderate to severe TBI may need additional modifications
    - “teaching the teacher”, repetition, multimedia support

CONTACT: CONcussion Treatment After Combat Trauma

Overview of Study

- Randomized, prospective trial of individualized scheduled telephone support (ISTS), based on problem-solving treatment (PST), versus usual care and education for service members returning from deployment with definite/probable concussion (with/without PTSD) (420 per group)
- Focus on post-concussion symptoms and distress
- Primary outcome assessment: 6 months
- Study duration: 12 months for each individual, 30 months study total

Primary Aims

1) To compare the effects on post-concussion symptom severity, as measured by the Rivermead Post Concussion Symptoms Questionnaire at 6-month follow up.

2) To compare the effects on symptoms of emotional distress, as measured by the Brief Symptom Inventory Global Severity Index at 6-month follow up.

- Sample population
  - Service member within 3 months of returning from deployment in Afghanistan or Iraq
  - Active duty, National Guard, Reserve
  - Joint Fort Lewis McChord and Fort Bragg
    - Madigan Army Medical Center
    - Womack Army Medical Center

CONTACT Intervention

- *Intervention A*
  - Problem solving training
  - Modules on depression and anxiety that focus on behavioral activation
  - Modules on headache and insomnia
- *Intervention B*
  - Education brochures
- *Both groups*: usual care, instructions on using www.afterdeployment.org

Problem-Solving Theory

- Problem solving training: enhances self-efficacy, teaching a generalizable skill

---

A Assess the problem

B Brainstorm solutions

C Choose a strategy

D Do it!

E Evaluate plan and solution

F Fight on!

Modular Approach to Depression and Anxiety

- Specific modules that incorporate Behavioral Activation treatment
  - Target behaviors that might worsen or maintain depression and anxiety
    - Inertia
    - Avoidance
    - Short-Term

Modular Approach to Headache and Insomnia

- Common physical complaints after concussion
  - Education and hygiene
  - Activation
  - Self-management

Monitoring

- Each session will include short assessment for depression, anxiety, and global distress

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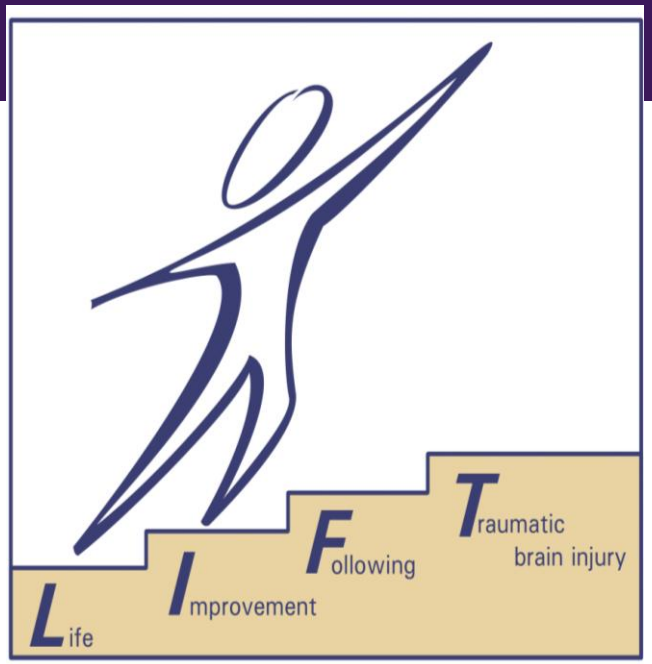
Life Improvement Following Traumatic Brain Injury:

A Trial of Cognitive-Behavioral Therapy for Depression after TBI



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Correlates of Depression in TBI

Depression after TBI is associated with:

- increased aggressive behavior and anxiety

  (Tateno et al., 2003; Jorge et al., 2004; Fann et al., 1995)
- higher rates of suicidal plans (Kishi et al., 2001)
- 8 times more suicide attempts (Silver et al., 2001)
- 3-4 times more completed suicides than in the general population and non-brain injured controls (Teasdale and Engberg, 2001)

Correlates of Depression in TBI

Depression after TBI contributes to:

- Poorer cognitive functioning (Rappoport et al., 2005)
- Lower health status and QOL and greater functional disability (Levin et al 2001; Fann et al., 1995; Hibbard et al., 2004; Bombardier et al, 2010)
- Poorer recovery (Mooney et al., 2005)
- More post-concussive symptoms (Fann et al., 1995; Rapoport et al., 2005)

Inadequate Treatment

- Only 44% of patients with MDD within the first year after TBI received treatment with either antidepressants (41%) or counseling (20%) (Bombardier et al, JAMA 2010)
- Studies of antidepressant efficacy have been inconclusive (Fann et al, J Neurotrauma 2009)
- Most patients with TBI prefer telephone or in-person counseling over antidepressants (Fann et al, J Head Trauma Rehabil 2009)

LIFT Study

Life Improvement following TBI

Funding: NIH & NIDRR (DOE) – 5 years

Sites: UW, and surrounding region Region

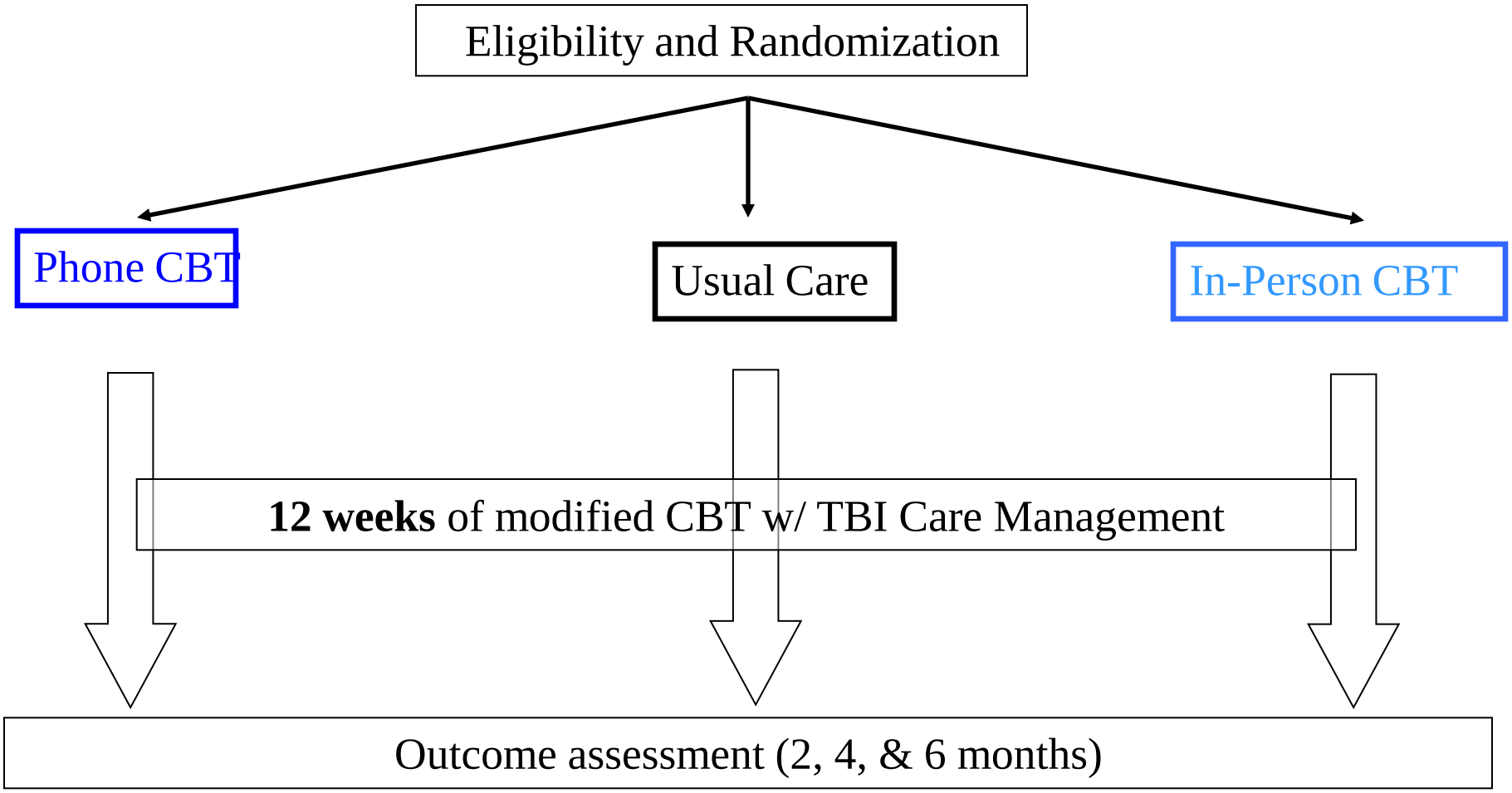
Design: 3-arm RCT (phone CBT, in-person CBT, Usual Care) for MDD w/in 10 years after moderate to severe TBI (N=90)

Randomization: Choice-stratified

Intervention: 12-session modified CBT, TBI Care Management

There are no published RCTs of psychotherapy for MDD after TBI

Study Design



Reason	Accommodations
Slowed information processing & responding	**Present information at slower rate** **Allow client more time to respond** **Provide written summary of session beforehand**
Impaired attention & concentration	**Minimize environmental stimulation and distractions during session** **Focus on one topic at a time, Use shorter sessions** **Avoid need for multi-tasking e.g., no note taking while listening**
Impaired learning & recall	**Provide written summary of session (patient workbook)** **Assign simple written homework** **Provide written educational materials or workbook** **Plan additional practice of CBT skills within session (over-learn skills)**
Impaired verbal abilities	**Minimize emphasis on verbally mediated aspects of CBT** **Emphasize behavioral activation and pleasant events scheduling**
Impaired initiation & generalization	**Include family or friend in treatment planning and homework assignments** **Provide 2 sessions devoted to generalization and relapse prevention at end**
Impaired motivation	**Use motivational interviewing techniques to engage subjects in therapy** **Provide care management activities aimed at return to work, school or other meaningful roles and finding effective rehabilitation resources**

Current Studies

- Modular Scheduled Telephone Intervention for Caregivers of Persons with Traumatic Brain Injury: A Randomized Controlled Trial (Powell: Lead Investigator)
  - Randomized, prospective 2-group study of modular intervention utilizing self-management and PST for specific common post-TBI problems over 7-10 calls versus usual care
  - Outcomes at 6 (caregiver and survivor) and 12 months (caregiver)

A project funded by the NIDRR

Progress to Date

- 95 participants randomized

- 3 educational modules covered most often
  - "Getting Things Done"
  - "Emotional Issues of Caregivers"
  - "Coping with Emotional and Behavioral Changes of the TBI Survivor

SCI Link

A Randomized Controlled Trial of Telephone Intervention for Individuals with SCI and their Families

Jeanne M. Hoffman, PhD, Chuck Bombardier, PhD, Barry Goldstein, MD, Steve Burns, MD

Enrollment

- Treatment – N=84
  - 34 paraplegia, 50 tetraplegia
- Control – N=84
  - 35 paraplegia, 50 tetraplegia
- 1 final subject not yet discharged

Types of Issues Being Addressed

- Medical issues (47%)
- Equipment/Caregivers (24%)
- Productive Activity (18%)
- Adjustment issues (11%)

- Majority of calls require no intervention

Outcomes of Interest

- Primary:
  - Health care utilization (reducing emergency visits)
  - Medical complications
- Secondary
  - Adjustment to SCI
  - Including mood, quality of life, health promoting behaviors

Expanded Delivery Model for Burn Injuries

Shelley A. Wiechman, Ph.D.

Primary Investigator

NIDRR Site-Specific Project

Design

- Between groups, randomized control trial.
- The control group will receive standard care
- The experimental group will receive "expanded care services"

Expanded Care Services

- Includes assignment to an expanded care coordinator (ECC) who will call the patient at set intervals (24 hours post discharge, 2, 4, 8, 12 weeks post discharge and 5, 7, 9 months post discharge).
- The ECC is a bachelors-level professional that receives on the job training in motivational interviewing, crisis intervention and solution-focused counseling.

Expanded Care Services

- Assistance in organizing information before and after the clinic visits.
- Coordination with outpatient clinic services.
- Access to a toll free number and an email address for the ECC.

Expanded Care Services

- Patients will receive detailed information on adjunctive services, including the burn support group, peer visitors, the Phoenix Society (including the chat room).
- Coordination of care to local services, such as assistance in finding a PCP, a counselor, a PT/OT, etc.

Enrollment

- 60 person over a 3 year period
- Adults, >15% TBSA OR requires surgery OR burn on the face, hand or over joints
- 84 enrolled thus far

National Center for Telehealth & Technology

Director: Gregory Gahm, Ph.D.
Deputy Director: Mark Reger, Ph.D.
Chief of Staff: Karl (Skip) Moe, Ph.D.

Population and Prevention Programs	Innovative Technology Applications	Clinical Telehealth	Research, Outcomes, Surveillance, Evaluations	Technology Systems
Robert Cuilla, Ph.D.	Greg Reger, Ph.D.	Matt Mishkind, Ph.D.	Mark Reger, Ph.D.	Robert Kayl

Web-Based Telebehavioral Health Care

Web-based Clinical Mental Health Services Program as a way to deliver critical clinical mental health services.

Triage & online counseling via interactive tele- communications systems (e.g., live video chat)

- Improve access to care
  - Outreach to rural and underserved locations; Foster care continuum/ minimize geographical barriers (e.g. National Guard & Reserve)
  - Link users with TRICARE-credentialed providers

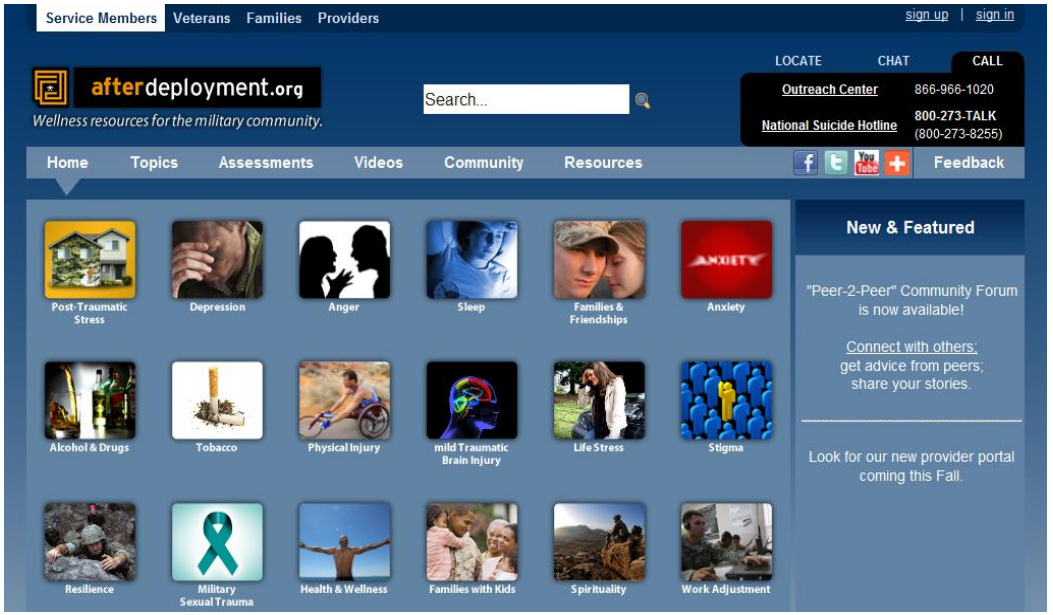
- Reduce stigma

Web-Based Resources

Web-based resources provide self-care tools to assist with a range of adjustment concerns (combat stress, sleep problems, anger management, etc.), with an emphasis on exercise-based interactivity, community support, and multimedia applications.

- Anonymous, portable, 24/7 access.
- Reduces stigma/ barriers to care.
- Assessment, education, and prevention.
- Builds resilience through skills-based exercises.
- Enhances communication via social forums, RSS feeds, blogs, podcasts
- Change strategies and interactive workshops: Self-paced accommodating e-learning paradigms and mobile applications.
- Links to hotlines and resource locators, geolocators.

afterdeployment.org



Mobile Apps

By 2013, mobile phones will overtake PCs as the most common Web access device worldwide. Mobile technologies offer users a 'virtual handheld clinic' providing ready access to topical content enabling self-paced and repeated use of resources over time, in support of a force operating at a high operational tempo.

- Mobile website (*afterdeployment.org)*
- Mobile assessment tools (ATOM, MoodTracker, ThoughtRecord).
- Mobile clinical tools (iBreathe, Hope Box, iStressless).
- Topical podcasts.
- Educational simulations.
- SMS Texting
- Apps series (websites, surveillance, clinical tools, decision aids)

Caring Letters

Suicide prevention outreach program that sends caring letters or e-mails to patients following their discharge from the Madigan Army Medical Center (MAMC) Inpatient Psychiatry Unit.

Evaluation at multiple sites [military hospital, Department of Veterans Affairs (VA), etc.] to determine the effectiveness of the CLP in reducing suicide among high-risk Service Members and Veterans

- Evaluates the military feasibility of one of the only suicide prevention programs shown to reduce suicide rates
- Reaches high-risk individuals that may not choose to continue in care
- Uses simple inexpensive intervention to reduce suicide
- Exploration and integration of other technology based outreach modalities (e.g., telephone, text messaging, etc.)

In-Home Tele-behavioral Health Care Safety Study

Evaluate the safety of an in-home tele-behavioral health model of Behavioral Activation (BA) by comparing it to usual care (in-person treatment) in Service Members and veterans with depression.

- Provides data regarding the safety and feasibility of tele-behavioral health care delivered directly to the homes of Service Members and veterans
- Informs policy decisions regarding deployment of behavioral health care delivered in-home
- Provides care to Service Members in rural and underserved areas

Telerehabilitation

- Rapidly expanding possibilities
- Good acceptance by patients
- Few studies demonstrating effectiveness
- Barriers to physical rehabilitation in areas of cost, rapidly changing tech/software, and safety

Thank you!!

Questions? Comments?