

Improving Vocational Outcomes for Persons with TBI

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Vocation Diversity
Infrastructure
Mental health
Information access
Transportation
Youth opportunities
Substance abuse Mental health Modernization
Workforce development
Housing **Healthcare**
Food access
Cultural understanding
Modernization Education access
Food security Trade skills
orkforce development
Broadband **Life skills**
Family relationships
Poverty Transportation
Living wages
Agricultural training
Housing
Inclusion
Diversity
Food access
Mental health

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of farmers and
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disabilities**

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Missouri Model Brain Injury System



Missouri AgrAbility

Determines Eligibility for Agency Services
Conducts On-the-Farm Assessments
Recommends Safe and Effective Solutions
Provides Educational Resources
Connects Peer Support Networks

Missouri Model Brain Injury System: 1998-2002



MOMBIS

MOMBIS Missouri Division of Vocational Rehabilitation (DVR) Project

MU and MO-DVR followed every state DVR client with a TBI over a 3-year period who completed DVR services.



Financial Costs Associated with TBI

Based on NIH estimates that 70,000 – 90,000 persons have persisting TBI related deficits each year, it is estimated that there is:

- \$642,961,200 in lost income per year**
- \$96,443,900 in lost tax income per year**
- \$353,665,200 increase in public assistance per year**

Financial Costs Associated with TBI slide 2

MOMBIS Participants Followed from Date of Injury until 1 Year Post Injury

Employment

- 69% to 31% (decreased 55%)

Unemployment

- 11% to 49% (increased 425%)

Income

- declined 51% (\$1,491/mos to \$726/mos)

Public Assistance

- increased 275% (\$153/mos to \$421/mos)

VR Services in the US

1995

- **State VR Programs provided services to 1.2 million individuals with disabilities**

2004

- **609,095 persons requested services**
- **491,988 were eligible for services**
- **213,431 were successfully employed**
- **95% were competitively employed**

General Findings of the Missouri Model Brain Injury System State Vocational Rehabilitation Project



Demographic Characteristics

- **Gender: 71% male; 29% female**
- **Race: 82% Caucasian**
 - **14% African American**
 - **4% Other**
- **Average age = 36.7 (10.8)**
- **Average education = 11.8 years (2.2)**
- **History of Substance Abuse = 25%**
- **History of Learning Disability = 17%**

Participant TBI Severity

- **66% hospitalized following TBI**
- **56% reported loss of consciousness**
- **37% reported PTA**
- **Average time since injury = 9.2 years**

“Typical” Missouri VR Client

- **Relatively young, white male**
- **Limited education**
- **Fairly significant TBI**
- **Low average intelligence/memory**
- **Neuropsychological weaknesses in reasoning, speed, and divided attention**
- **Many years since TBI**

Question

How successful are VR clients with TBI in obtaining employment with the assistance of DVR?

VR Status at Case Closure

- **Closed, successful** 17%
- **Closed, unsuccessful** 10%
- **Closed, services interrupted** 13%
- **Closed, no services provided** 60%

Jobs for Successfully Employed

- **Industrial jobs** 50%
- **Service (i.e., fast food)** 14%
- **Sheltered workshops** 14%
- **Clerical position** 7%
- **Professional position** 7%
- **Unavailable** 7%

Predictors of Successful Employment

- **Injury severity (loss of consciousness, post-traumatic amnesia, hospitalization)**
- **Demographics (age, education, race)**
- **Neuropsychological test scores**
- **VR services provided (e.g., job placement, on-the-job training, etc.)**

Findings

Stepwise logistic regression indicated that the only significant predictors ($p < .0001$) of successful employment were:

- Vocational guidance & counseling**
- On-the-job training**

Odds Ratio

- **The odds of having successful closure was 14.12 higher if counseling/guidance were provided.**
- **The odds of having successful closure was 15.70 times higher if on-the-job training was provided.**

Conclusions

The provision of *specific VR services* appear to be more important in determining vocational outcomes than demographic variables and indices of injury severity (i.e., medical and neuropsychological).

DVR Subgroups

What are the employment outcomes for different subgroups of VR clients with TBI?

- **Rural/urban status**
- **Race**
- **Age**
- **Gender**
- **Multiple disability status**

Vocational Outcomes for MO-DVR Clients by Urban/Rural Status



Injury Severity Table

Demographic and Injury Severity Data by Urban/Rural Status.

	Rural (n=28)	Urban (n=50)
Age (years)	37.1 (10.1)	36.1 (11.9)
Education (years)	12.0 (2.2)	11.5 (2.2)
Time Since Injury (years)	8.3 (9.7)	10.8 (9.2)
LOC (hours)	241.4 (385.7)	96.0 (174.3)
PTA (days)	53.1 (147.3)	25.2 (18.3)
Hospitalization (days)	53.2 (83.1)	32.9 (37.4)

Vocational Services Provided by Urban/Rural Status

Percentage of Urban and Rural Missourians Receiving Specific MO-DVR Services.

MO-DVR Service	Rural Missourians Receiving Services	Urban Missourians Receiving Services
Assessment	82.1%	90.0%
Vocational Counseling and Guidance	21.4%	40.0%
Maintenance	21.4%	46.0% *
Transportation	10.7%	36.0% *
On-the-Job Training	7.1%	28.0% *
Post-Secondary Training	7.1%	4.0%
Job Placement	3.6%	10.0%
Personal/Vocational Adjustment	3.6%	6.0%
Job Referral	0.0%	0.0%
Other Services	14.29%	12.0%

Vocational Status at Closure by Urban/Rural Status

Vocational Status at Closure by Residency.

Vocational Status	Rural Missourians	Urban Missourians
Closed after referral to DVR, but before case was accepted	7.1%	12.0%
Closed after acceptance by DVR, but before services were initiated	78.6%	52.0%
Services initiated by DVR, but were unsuccessful	7.1%	12.0%
<i>Closed successfully</i>	<i>7.1%</i>	<i>24.0%</i>

Rural/Urban Summary

Rural and Urban DVR clients differ in terms of:

- **DVR services offered (more to urban)**
- **Successful employment outcomes (better in urban)**

Rural/Urban Summary continued

Rural clients may receive less DVR services and have poorer outcomes because of environmental factors including:

- Limited job opportunities in rural areas**
- Limited access to rehabilitation services/professionals**
- Other environmental factors (e.g., limited transportation opportunities, etc.)**

Vocational Outcomes for MO-DVR Clients by Gender



Demographic and Injury Severity Data by Gender

Demographic and Injury Severity Data by Gender.

	Female (n=23)	Male (n=55)
Age (years)	38.1 (11.2)	36.1 (10.6)
Education (years)	12.3 (2.0)	11.6 (2.2)
Time Since Injury (years)	10.0 (11.2)	8.9 (8.8)
LOC (hours)	259.4 (453.0)	120.4 (235.3)
PTA (days)	85.6 (202.0)	13.0 (16.1)
Hospitalization (days)	57.1 (51.4)	46.5 (81.8)

Vocational Services Provided by Gender

□ **Table 5: Percentage of Females and Males Receiving Specific MO-DVR Services.**

□

□ MO-DVR Service	Percent of Females Receiving the Service	Percent of Males Receiving the Service
□ Assessment	82.6%	89.1%
□ Counseling and Guidance	26.1%	36.4%
□ Maintenance	21.7%	43.6%*
□ Transportation	17.4%	30.9%
□ On-the-Job Training	8.7%	25.5%
□ Post-Secondary Training	8.7%	3.6%
□ Job Placement	0.0%	10.9%
□ Personal/Vocational Adjustment	0.0%	7.3%
□ Job Referral	0.0%	0.0%
□ Other Services	8.7%	14.6%

□ * = $p < .05$

Vocational Status at Closure by Gender

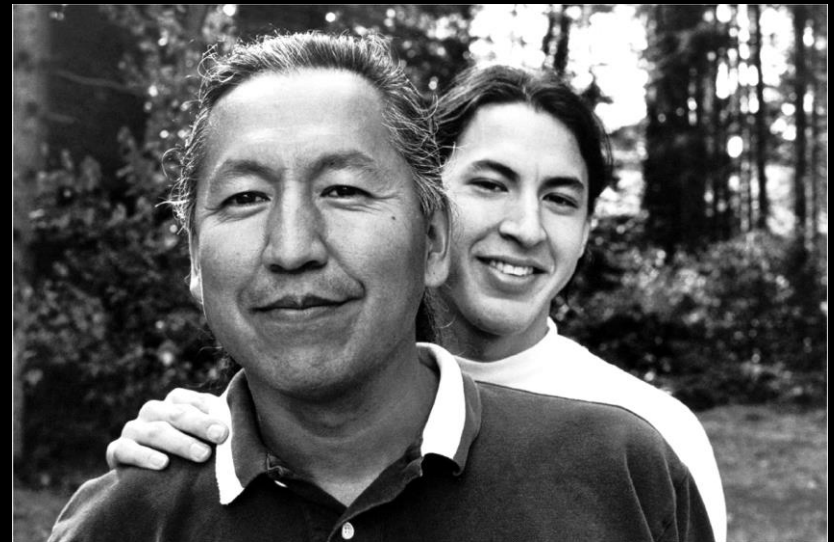
Vocational Status at Closure by Gender.

Vocational Status	Percentage of Females	Percentage of Male
Closed after referral to DVR, but before case was accepted	2.0%	10.9%
Closed after acceptance by DVR, but before services were initiated	73.9%	56.4%
Services initiated by DVR, but were unsuccessful	13.0%	9.1%
Closed successfully	4.4%	23.6%

Summary

- **Men and women with TBI receive different VR services and have different vocational outcomes despite having similar injury severity, demographics, and neuropsychological test scores.**
- **Differences may be related to different societal expectations (e.g., primary homemaker, parent), or expectations for different vocational outcomes.**

Vocational Outcomes for MO-DVR Clients by Racial Status



Missouri Model Brain Injury System

Demographic and Injury Severity by Race

Demographic and Injury Severity Data by Race.

	<u>African-American</u>		<u>Caucasian</u>	
	<u>n</u>	<u>Mean (SD)</u>	<u>n</u>	<u>Mean (SD)</u>
Age (years)	13	40.4 (11.1)	62	35.3 (10.3)
Education (years)	13	11.2 (1.8)	61	11.9 (2.1)
Time Since Injury (years)	13	11.4 (9.9)	60	9.0 (9.5)
Time Unemployed (years)	13	5.9 (7.6)	61	2.1 (2.8)*
LOC (hours)	9	237.3 (472.4)	33	198.5 (314.2)
PTA (hours)	5	18.2 (24.7)	22	55.0 (150.2)
Hospitalization (days)	10	38.9 (28.2)	40	51.5 (82.8)

Loss of consciousness (LOC); Post-traumatic amnesia (PTA); Time unemployed = years unemployed before requesting VR services.

*= $p < .01$

Specific DVR Services by Race

Table 4: Percentage of African-Americans and Caucasians Receiving Specific MO-DVR Services

MO-DVR Service	Percent of African-Americans Receiving the Service	Percent of Caucasians Receiving the Service
Assessment	92.3%	87.1%
Vocational Counseling and Guidance	30.8%	30.7%
Maintenance	61.5%	32.3%
Transportation	61.5%	21.0%*
On-the-Job Training	30.8%	19.4%
Post-Secondary Training	0.0%	6.5%
Job Placement	15.4%	6.5%
Personal/Vocational Adjustment	15.4%	3.2%
Job Referral	0.0%	0.0%
Other Services	0.0%	16.1%
Cost per case	\$1,694 (1,432)	\$1,643 (2,344)

* = $p < .01$

Vocational Status by Race

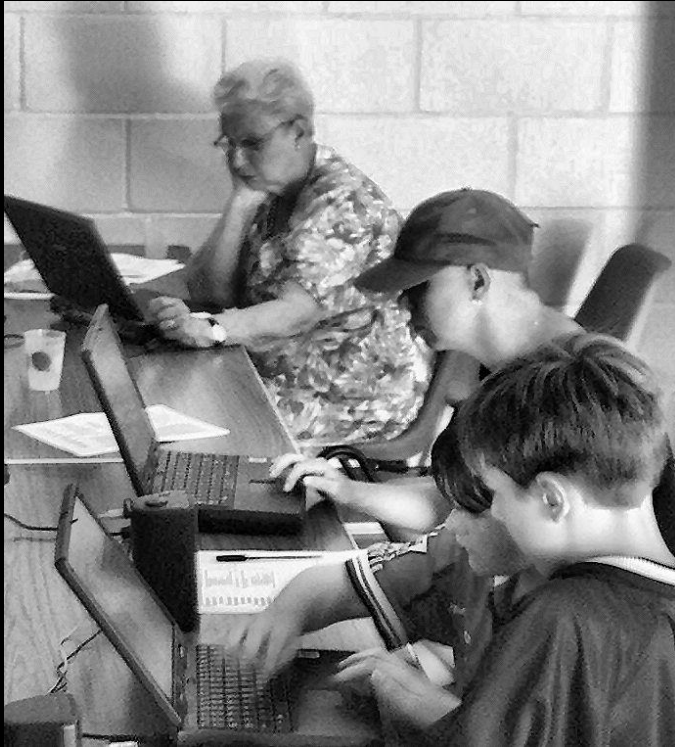
Vocational Status at Closure by Race.

Vocational Status	Percentage of African-Americans	Percentage of Caucasians
Closed, no services provided	15.4%	9.7%
Closed, services interrupted	53.9%	62.9%
Closed, unsuccessful	7.7%	9.7%
<i>Closed, successfully</i>	<i>23.1%</i>	<i>17.7%</i>

Racial Status Summary

- **African American and Caucasian VR clients have similar vocational outcomes**
- **African American VR clients received more VR services, possibly related to their primarily urban status.**
- **MO-DVR is doing a good job of serving minority clients.**

MO-DVR Vocational Outcomes by Age

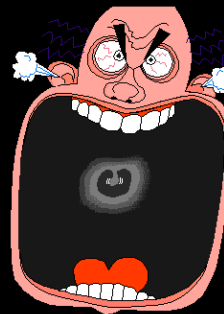


Vocational Status by Age

Percentages of Vocational Status at Closure by Age.

Vocational Status	Age Group		
	<30	30-44	>44
Closed after referral to DVR, but before case was accepted	0.0%	23.3%	4.2%
Closed after acceptance by DVR, but before services were initiated	72.7%	46.7%	75.0%
Services initiated by DVR, but were unsuccessful	13.6%	10.0%	8.3%
Closed successfully	13.6%	20.0%	12.5%

Vocational Outcomes for MO-DVR Clients with Multiple Disabilities



Missouri Model Brain Injury System

Multiple Disability Groups (n = 138)

TBI Only

TBI + Orthopaedic Injury

TBI + Seizure

TBI + Psychological History

TBI + Learning Disability

Vocational Status by Multiple Disability Group

Vocational Status at Case Closure By Group

Status at Case Closure	TBI ONLY (n =39)	TBI & ORTHO (n =26)	TBI & SEIZURE (n =38)	TBI & PSYC (n =18)	TBI & LD (n =25)
Successful	25.6%	23.1%	31.6%	11.1%	8.0%
Unsuccessful	10.2%	11.5%	7.9%	16.7%	24.0%
Services Interrupted	53.9%	65.4%	57.9%	72.2%	60.0%
No Services Provided	10.3%	0.0%	2.6%	0.0%	8.0%

Multiple Disability Summary

- **Persons with TBI and concomitant *psychological/academic disabilities* appear to have significantly worse vocational outcomes than persons with TBI only or TBI and physical disabilities.**

Why?

- It is easier to accommodate physical disabilities (e.g., canes, splints, assistive technologies) versus psychological disabilities.



Future Directions for DVR Programs

- **Improve time from TBI until referral to DVR.**
- **Decrease attrition rate of DVR clients.**
- **Increase emphasis on interventions vs. assessment.**
- **Increase work-site interventions.**
- **Address role of environmental factors (e.g., transportation).**
- **Address role of social expectations**

Future Directions for DVR Programs

continued

- **Consider using new and innovative services (e.g., telehealth, telework opportunities, etc.).**
- **Better address the psychological and academic disabilities co-occurring with TBI.**
- **Address co-occurring substance abuse issues.**
- **Work with state/provincial Disability Determinations programs to determine most appropriate populations with which to work**

Arthritis Employment Outcomes: Missouri Arthritis Rehabilitation Research and Training Center

- **Provided ergonomic interventions at job sites to 89 individuals with osteo- or rheumatoid arthritis**
- **Average age = 50, 87% women, 94% white**
- **2-hour on-site evaluation, 2-hour on-site intervention, 1-hour phone follow-up**
- **Evaluated at baseline, 12 months, 24 months**

MARRTC Findings

VR interventions were associated with:

- **Decreased impact of arthritis-related pain at work**
- **Increased long-term physical functions and less symptoms**

Higher job satisfaction over time

Georgia Model Brain Injury System: Shepherd Center/GVRA Collaboration

Goal: improve the employment outcomes of GVRA clients with TBI

- **N = 120 Shepherd patients with TBI (control group = other TBIMS participants who do not receive in-hospital VR or OJT)**

Intervention = provision of *hospital-based VR services*, transition to/coordination with GVRA, provision of on-site OJT training (client, employer, counselor):

- **2-hour ergonomic assessment**
- **2-hour intervention**
- **1 hour follow-up phone intervention**



MOMBIS TBI Outcomes

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**Brain Injury
Association
of Missouri
supports rural
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brain injury.**



Brain Injury Association of Missouri Highlight Services for Rural Families

Support

Community Resources

Support Groups

Education

Regional Seminars

**Brain Injury
Resource Kit**

Questions?



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