AWARD NUMBER: W81XWH-18-1-0806

TITLE: Assistive Technology and Functional Outcomes Following Spinal Cord Injury

PRINCIPAL INVESTIGATOR: Kimberley Monden, PhD

CONTRACTING ORGANIZATION: University of Minnesota (UMN), Minneapolis, MN

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Fort Detrick, Maryland 21702-5012

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4. TITLE AND SUBTITLE
Assistive Technology and Functional Outcomes Following Spinal Cord Injury

6. AUTHOR(S)
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5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

AND ADDRESS(ES)

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8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

U.S. Army Medical Research and Development Command
Fort Detrick, Maryland 21702-5012

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Approved for Public Release; Distribution Unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

The activities accomplished in Year 3 include transfer of award from Craig Hospital to University of Minnesota (UMN), obtaining UMN IRB and HRPO approval, completed qualitative analysis, developed Aim 1 manuscript draft, quantitative questionnaires piloted, finalized and IRB approved, quantitative web-based database developed and tested, quantitative data collection commenced, first individual enrolled, request for a no-cost-extension submitted and approved. In this final year, we will finish quantitative data collection, data entry, and statistical analyses. Manuscripts of our qualitative and quantitative findings will be submitted.

15. SUBJECT TERMS
Spinal cord injury, assistive technology, qualitative, barriers, facilitators

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a.NAME OF RESPONSIBLE PERSON USAMRMC
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. TELEPHONE NUMBER *(include area code)*
Unclassified	Unclassified	Unclassified	Unclassified	12	

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1. INTRODUCTION:

Assistive technology (AT) for individuals with SCI, specifically computer and smartphone equipment and the hardware and software devices that make these more usable, is routinely prescribed in multidisciplinary rehabilitation programs and its use has been well documented in the literature. However, evidence regarding the impact of AT on functional (e.g., employment, social participation) and/or psychosocial (e.g., self-efficacy, quality of life) outcomes after tetraplegia is limited. The primary goals of this study are to (1) qualitatively examine barriers and facilitators to AT access and utilization after tetraplegia, (2) assess for variation of AT use across insurance providers, (2) assess the relationship between AT use and productivity, and (3) assess the relationship between AT use and psychosocial outcomes to inform clinical practice, inform future policy, and influence reimbursement standards for AT.

2. KEYWORDS:

spinal cord injury, assistive technology, qualitative, barriers, facilitators

3. ACCOMPLISHMENTS:

What were the major goals of the project?

Major Task 1: Obtain IRB and HRPO approval, establish team meeting teleconferences.

- Craig Hospital received IRB approval on 9/14/2018, which was before the target date of 10/31/18.
- LSCVAMC received IRB approval on 2/14/2019, which was two months behind the target date of 12/30/18.
- HRPO approval was anticipated by the end of March 2019, but was not received until 8/14/19.
- All research staff were hired by the target date of December 2018.

Major Task 2: **Conduct focus groups/interviews.**

- Three focus groups were completed at each site. Focus groups were conducted from November 2019 to January 2020.

Major Task 3: Analyze qualitative data.

- All focus group transcripts have been transcribed.
- All focus group transcripts have been coded using Dedoose 8.
- The codebook of coding criteria and thematic codes is complete.
- Data analysis is complete and themes have been identified.
- Data management is currently taking place in Dedoose for formal analysis.

Major Task 4: Conduct quantitative data collection

- Qualitative analysis complete
- Qualitative manuscript drafted
- Quantitative questionnaires piloted and finalized
- IRB approval of quantitative data collection forms (UMN - 8/20/2021; LSCVAMC 10/8/2021)
- Web-based database created and tested
- UMN recruitment materials distributed on 9/9/2021
- First participant enrolled on 9/9/2021

What was accomplished under these goals?

Major activities for this reporting period include:

- UMN IRB protocol approval; HRPO acknowledged
- Completed qualitative data analysis
- Qualitative manuscript drafted and being prepared for submission
- Quantitative questionnaires piloted and finalized
- Quantitative questionnaires IRB approved
- Quantitative web-based database developed and tested
- Quantitative recruitment commenced
- First individual enrolled
- Request for a no-cost-extension was submitted and approved

What opportunities for training and professional development has the project provided?

Nothing to report.

How were the results disseminated to communities of interest?

An abstract titled "Barriers and Facilitators to Assistive Technology Use among Civilians and Veterans with Tetraplegia" was submitted and accepted for poster presentation at the 2022 Rehabilitation Psychology Conference in Louisville, KY.

What do you plan to do during the next reporting period to accomplish the goals?
If this is the final report, state "Nothing to Report."

Major task 4: Quantitative data collection

- Collect data
- Complete data entry

Major task 5: Analyze quantitative data

- Complete statistical analysis

Additionally, we will submit manuscripts of our qualitative and quantitative findings.

4. **IMPACT:**

What was the impact on the development of the principal discipline(s) of the project?

Nothing to report.

What was the impact on other disciplines?

Nothing to report.

What was the impact on technology transfer?

Nothing to report.

What was the impact on society beyond science and technology?

Nothing to report.

5. CHANGES/PROBLEMS:

Changes in approach and reasons for change

Nothing to report.

Actual or anticipated problems or delays and actions or plans to resolve them

Quantitative data collection was delayed due to the transfer of the award from Craig Hospital to UMN as well as a personnel change at UMN (Study Coordinator). Both have since been resolved. A request for a no-cost-extension was submitted and approved.

Changes that had a significant impact on expenditures

As described above, quantitative data collection was delayed due to staff turnover and delayed award transfer from Craig to UMN.

Significant changes in use or care of human subjects, vertebrate animals, biohazards, and/or select agents

Significant changes in use or care of human subjects

Nothing to report.

Significant changes in use or care of vertebrate animals

Not applicable.

Significant changes in use of biohazards and/or select agents

Not applicable.

6. PRODUCTS:

- **Publications, conference papers, and presentations**

Journal publications.

Nothing to report.

Books or other non-periodical, one-time publications.

Nothing to report.

Other publications, conference papers and presentations.

Nothing to report.

- **Website(s) or other Internet site(s)**

Nothing to report.

- **Technologies or techniques**

Nothing to report.

- **Inventions, patent applications, and/or licenses**

Nothing to report.

- **Other Products**

Nothing to report.

7. PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS

What individuals have worked on the project?

Name:	Kimberley Monden, PhD
Project Role:	Co-PI
Researcher Identifier:	https://orcid.org/0000-0002-5207-0452
Nearest person-month worked:	2.52
Contribution to Project:	
Name:	Angela Philippus, MS
Project Role:	Study Coordinator
Research Identifier:	
Nearest person-month worked:	6.0
Contribution to Project:	New Personnel
Name:	James Hasselbrink
Project Role:	Study Coordinator
Research Identifier:	
Nearest person-month worked:	4.68
Contribution to Project:	New Personnel
Name:	Susan Charlifue, PhD
Project Role:	Co-PI
Researcher Identifier:	https://orcid.org/0000-0001-6032-1154
Nearest person-month worked:	0.60
Contribution to Project:	No change
Name:	Martin Kilbane, PT, DPT, OCS
Project Role:	Site PI
Researcher Identifier:	
Nearest person-month worked:	1.25
Contribution to Project:	No change
Name:	Emily Johnson
Project Role:	Research Assistant
Researcher Identifier:	
Nearest person-month worked:	1.25
Contribution to Project:	No change

Has there been a change in the active other support of the PD/PI(s) or senior/key personnel since the last reporting period?

Kimberley Monden, PhD

- Title: Minnesota Regional Spinal Cord Injury Model System
  Agency: National Institute on Disability, Independent Living, and Rehabilitation Research
  Effort: 0.48 CM paid, 0.72 CM cost-shared
  Dates: 9/1/2021 – 8/31/2026
  Funding: total

- Title: Adaptation and Dissemination of the Spinal Cord Injury Physical Activity Guidelines
  Agency: Paralyzed Veterans of America Education Foundation
  Effort: 1.2 CM
  Dates: 6/1/2021 – 5/31/2022
  Funding: total

- Title: The Impact of Injustice Appraisals on Psychosocial Outcomes Following Spinal Cord Injury: A Longitudinal Study
  Agency: Department of Defense, CDMRP, SCIRP (SCP200102)
  Effort: 2.4 CM
  Dates: 7/1/2021 – 6/30/2024
  Funding: total

What other organizations were involved as partners?

Organization Name:	Craig Hospital
Location of Organization:	Englewood, CO
Partner's contribution to the project:	Collaboration
Organization Name:	Louis Stokes Cleveland VAMC
Location of Organization:	Cleveland, OH
Partner's contribution to the project:	Collaboration

8. SPECIAL REPORTING REQUIREMENTS

COLLABORATIVE AWARDS: Not applicable.

QUAD CHARTS: See below.

9. APPENDICES: Not applicable.

Assistive Technology and Functional Outcomes Following Spinal Cord Injury

Log Number: SC170159

Award Number: W81XWH-81-1-0806

PI: Kimberley Monden, PhD **Org:** University of Minnesota **Award Amount:** $638,083

Study/Product Aim(s)

Aim 1 (Qualitative): To examine perceived barriers to or facilitators of AT access and utilization and the impact on functional and psychosocial outcomes after tetraplegia.

Aim 2 (Quantitative): To assess for variations in use of AT among individuals with tetraplegia across insurance providers and socioeconomic status in veterans and civilians with tetraplegia.

Aim 3a (Quantitative): To assess the relationship between AT use and productivity (employment/school) in veterans and civilians with tetraplegia.

Aim 3b (Quantitative): To assess the relationship between AT and psychosocial outcomes (e.g., mood, self-efficacy) in Veterans and civilians with tetraplegia.

Approach

Mixed methods design with qualitative focus group interviews and quantitative surveys conducted at two study sites (civilian and veteran).

Timeline and Cost

Activities FY	18-19	19-20	20-21
IRB, identify subjects, conduct focus groups			
Analyze qualitative data and conduct quantitative data collection			
Analyze quantitative data and prepare manuscript/presentations			
Estimated Budget ($K)	**$200,764**	**$213,366**	**$223,955**

Achievements: Qualitative data analysis complete, manuscript underway. Award transfer to UMN complete. UMN IRB and HRPO approval have been obtained. Quantitative questionnaires piloted and finalized. Web-based database developed. Recruitment materials distributed. Data collection commenced; first participant enrolled.

Goals/Milestones

FY18-19 Goal – Conduct focus groups

✓ Obtain IRB/HRPO approval at both study sites

✓ Conduct focus groups

FY19-20 Goals – Qualitative analysis and quantitative data collection

✓ Analyze qualitative data and develop additional survey items

☐ Conduct quantitative data collection

FY20-21 Goal – Analysis and reporting

☐ Analyze quantitative data and prepare reports/presentations

☐ Develop plans/proposals for future investigations of AT use for veterans and civilians with SCI

Comments/Challenges/Issues/Concerns

A request for a no-cost-extension was submitted and approved.

Budget Expenditure to Date

Projected Expenditure: $216,781

Actual Expenditure: $421,302