

Award Number:

Contract Number W81XWH-09-1-0092

TITLE:

Telepharmacy Robotic Medicine Delivery Unit "TRMDU" Assessment

PRINCIPAL INVESTIGATOR:

Daniel Touchette, Pharm.D. MA
CONTRACTING ORGANIZATION:

INRange Systems, Inc., Altoona, PA 16602

REPORT DATE:

December 2011

TYPE OF REPORT:

Final

PREPARED FOR: U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

DISTRIBUTION STATEMENT:

Approved for public release; distribution unlimited

The views, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy or decision unless so designated by other documentation.

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. **PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.**

1. REPORT DATE (DD-MM-YYYY) 08-12-2010		2. REPORT TYPE Final		3. DATES COVERED (From - To) 27.11.10 - 26.11.11	
4. TITLE AND SUBTITLE TelePharmacy Robotic Medication Delivery Unit				5a. CONTRACT NUMBER W81XWH-09-1-0092	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Daniel Touchette, PI, Jill Winters, Co PI, Gus Revolorio, Program Mgr.				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) INRange Systems Inc. 115 Union Ave. Altoona PA 16602				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army Medical Research and Materiel Command Telemedicine and Advanced Technology Research Center				10. SPONSOR/MONITOR'S ACRONYM(S) USAMRMC	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT The military has an increasing number of patients with combat-related impairments that contribute to suboptimal medication self-management. These impairments include TBI, PTSD, poly-trauma, and mental health issues. A significant number of these patients are in transitional care outpatient settings, lacking adequate clinical staff to provide the necessary pharmacy services. The objective of this study is to evaluate whether the use of a TelePharmacy robotic remote medication dispensing unit (TRMDU), in addition to medication review in patients assigned to WTUs, VA hospitals, and similar units, leads to improved outcomes and reduced health care costs for patients when compared with medication review alone. This study will use a prospective non-randomized repeated measures design with two sites using a control condition for 12 weeks, followed by a 12-week TRMDU intervention condition. The third site will serve as intervention only.					
15. SUBJECT TERMS NONE					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT UU	18. NUMBER OF PAGES 6	19a. NAME OF RESPONSIBLE PERSON
a. REPORT U	b. ABSTRACT U	c. THIS PAGE U			19b. TELEPHONE NUMBER (include area code)

Table of Contents

Introduction.....	4
Body.....	4
Key Research Accomplishments.....	5
Reportable Outcomes.....	5
Conclusion.....	5
References.....	6
Appendices.....	None

INTRODUCTION

This study involves a FDA cleared remote medication management device, 21 CFR 880.6315, which provides unit dose delivery of medications across the continuum of care. The Telepharmacy Robotic Medication Dispensing Unit (TRMDU), developed by INRange® Systems, Inc., is a Class II medical device, located in the home, outpatient setting, or in the field, and consists of a medication delivery unit and two-way communication software that allows a health care professional to remotely manage prescriptions stored and released by the patient-operated delivery unit. The delivery unit is approximately the size of a bread box, and it plugs into a standard power outlet.

We have continued to develop the protocol that will assess this TRMDU unit in subjects with traumatic brain injury (TBI), post-traumatic stress disorder (PTSD), multiple traumatic brain injury (MTBI), or Polytrauma. The objective of this study is to evaluate whether use of a TRMDU, in addition to medication review in patients assigned to WTUs, VA hospitals, and similar units, leads to improved outcomes and reduced health care costs for patients when compared with medication review alone.

BODY

IRB Preparation and Application (Jan 2011 – Oct 2011)

The study was approved by institutional IRB's at the University of Illinois at Chicago on March 25, 2010 and Columbia College of Nursing on October 25, 2010. It was submitted for review to the IRB at NMSCD for the Camp Pendleton site on September 16, 2010. The IRB voted to approve the study in or around May 2011. The study was disapproved by RDML Faison, Commander of Navy Medicine West on May 25, 2011. Re-engagement to prepare an IRB with Fort Knox was begun in June. However, due to significant changes occurring to the WTU housing and population, and changes in personnel, the IRB submission has not yet been completed as of October 2011.

Ongoing Study Site Recruitment, Visits, and Development (Jan 2011 – Oct 2011)

With the disapproval of the study by RDML Faison, it is anticipated that the program implementation and evaluation will now be conducted at two sites: 1) James A. Haley VA Hospital and Polytrauma Facility in Tampa Bay, Florida (Tampa VA); 2) Ireland Army Community Hospital, Fort Knox, Kentucky (Fort Knox).

Protocol

No significant changes were made to the protocol during the period Dec 26, 2010 – Oct 25, 2011. A copy of the current study protocol is appended to this report.

DIACAP Preparation and Submission

INRange commenced preparation of a comprehensive DIACAP C&A package Q2/2009. At the present time, the following items, artifacts and activities have been submitted and are being reviewed by the Navy Information Assurance team:

- System Identification Profile (SIP)
- DITSCAP baseline documentation
- Navy POA&M (Plan of Action and Milestones)
- Continuity of Operations Plan (COOP)

- Disaster Recovery “Table Top” exercise
- Enclave and system diagrams
- All servers have been locked down to STIG compliance and scanned with Retina
- Remediation of CAT 1 and Cat 2 Retina scan findings
- All required artifacts have been submitted
- Data Center On-site Audit completed
- Incident Response Plan (made available to auditor)

To date, INRange Systems has received no correspondence regarding the status of the ATO. We were informed by the Navy that the web based ATO is a new certification. In addition, we were informed that there are approximately 10 applications for this type of certification in the queue. No forecast of approval date has been provided.

KEY RESEARCH ACCOMPLISHMENTS

To date, the following has been completed:

- Protocol
- Identification of the participating sites
- Obtaining required approvals and contracts for Naval Hospital Camp Pendleton
- Gaining IRB approval at University of Illinois at Chicago and Columbia College of Nursing

To date, we have made considerable progress in the following:

- Preparation and submission of the IRB documents to Walter Reed IRB, for the Ireland Army Community Hospital
- Preparation of IRB documents for Fort Detrick submission

REPORTABLE OUTCOMES

We are currently pursuing approval to begin the study. At present there are no reportable outcomes. We expect that, when completed, this study will generate at least one manuscript on the effectiveness of the TRMDU on adherence and outcomes assessed in this study for this population. Publication of these manuscripts will be pursued in major, peer-reviewed medical journals.

CONCLUSION

Findings from several studies have shown that better medication adherence leads to better outcomes, fewer hospitalizations and emergency department visits, and greater QOL. Use of the TRMDU may improve medication adherence; reduce DRPs; and positively impact pain, psychological, and QOL measures for veterans with TBI, PTSD, and/or polytrauma. In addition, health care costs and hospitalizations may be reduced. If findings from this study support the hypotheses, use of the TRMDU may be a valuable intervention and lay the groundwork for applications of the TRMDU with this population in both the Warrior Transition Units and in community settings. In addition, those individuals in rural settings with limited access to major medical centers and other populations with documented difficulty with medication adherence may benefit from such a device. This study will serve to lay the groundwork for additional funding to assess the effectiveness of the TRMDU in these settings.

REFERENCES

- Bates, D. W. (2007). "Preventing medication errors: a summary." *Am J Health Syst Pharm* **64**(14 Suppl 9): S3-9; quiz S24-6.
- Cantor, J. B., T. Ashman, et al. (2008). "Fatigue after traumatic brain injury and its impact on participation and quality of life." *J Head Trauma Rehabil* **23**(1): 41-51.
- Ernst, F. R. and A. J. Grizzle (2001). "Drug-related morbidity and mortality: updating the cost-of-illness model." *J Am Pharm Assoc (Wash)* **41**(2): 192-9.
- Folstein, M. F., S. E. Folstein, et al. (1975). "'Mini-mental state'. A practical method for grading the cognitive state of patients for the clinician." *J Psychiatr Res* **12**(3): 189-98.
- Hoge, C. W., C. A. Castro, et al. (2004). "Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care." *N Engl J Med* **351**(1): 13-22.
- Institute for Healthcare Improvement. (2009). "Prevent adverse drug events (medication reconciliation)." Retrieved June 22, 2009, from <http://www.ihl.org/IHI/Programs/Campaign/ADEsMedReconciliation.htm>.
- Institute of Medicine (2007). *Preventing medication errors: quality chasm series*. Washington, DC, National Academy Press.
- Krousel-Wood, M., T. Islam, et al. (2009). "New medication adherence scale versus pharmacy fill rates in seniors with hypertension." *Am J Manag Care* **15**(1): 59-66.
- Lee, J. K., K. A. Grace, et al. (2006). "Effect of a pharmacy care program on medication adherence and persistence, blood pressure, and low-density lipoprotein cholesterol: a randomized controlled trial." *JAMA* **296**(21): 2563-71.
- McDonald, H. P., A. X. Garg, et al. (2002). "Interventions to enhance patient adherence to medication prescriptions: scientific review." *JAMA* **288**(22): 2868-79.
- McNair, D., M. Lorr, et al. (1992). *POMS Manual*. North Tonawanda, New York, MHS.
- Melzack, R. (1987). "The short-form McGill Pain Questionnaire." *Pain* **30**(2): 191-7.
- Morisky, D. E., A. Ang, et al. (2008). "Predictive validity of a medication adherence measure in an outpatient setting." *J Clin Hypertens (Greenwich)* **10**(5): 348-54.
- Nathan, A., L. Goodyer, et al. (1999). "'Brown bag' medication reviews as a means of optimizing patients' use of medication and of identifying potential clinical problems." *Fam Pract* **16**(3): 278-82.
- National Council on Patient Information and Education. (2008). "Public policy & adherence." Retrieved July 20, 2008, from http://www.talkaboutrx.org/documents/enhancing_prescription_medicine_adherence.pdf.
- O'Connor, P. J. (2006). "Improving medication adherence: challenges for physicians, payers, and policy makers." *Arch Intern Med* **166**(17): 1802-4.
- Osterberg, L. and T. Blaschke (2005). "Adherence to medication." *N Engl J Med* **353**(5): 487-97.
- Sakthong, P., R. Chabunthom, et al. (2009). "Psychometric properties of the Thai version of the 8-item Morisky Medication Adherence Scale in patients with type 2 diabetes." *Ann Pharmacother* **43**(5): 950-7.
- Svarstad, B. L., B. A. Chewning, et al. (1999). "The Brief Medication Questionnaire: a tool for screening patient adherence and barriers to adherence." *Patient Educ Couns* **37**(2): 113-24.
- Touchette, D. R., A. L. Burns, et al. (2006). "Survey of medication therapy management programs under Medicare part D." *J Am Pharm Assoc (2003)* **46**(6): 683-91.
- van Mil, J. W., L. O. Westerlund, et al. (2004). "Drug-related problem classification systems." *Ann Pharmacother* **38**(5): 859-67.
- Vasterling, J. J., S. P. Proctor, et al. (2006). "Neuropsychological outcomes of army personnel following deployment to the Iraq war." *JAMA* **296**(5): 519-29.
- Ware, J. E., K. K. Snow, et al. (1993). *SF36 health survey: Manual and interpretation guide*. Boston, MA, New England Medical Center.
- World Health Organization (2003). *Adherence to long-term therapies: evidence for action*. Geneva, Switzerland, WHO.