


A Patient-Centric Smartphone App For Monitoring Vascular And Endovascular Procedures: What Does It Measure And How Is It Helpful?

Todd R. Vogel, MD, MPH, FACS
 Chief of Vascular and Endovascular Surgery
 Vice-Chair of Health Services Research
 Professor of Vascular and Endovascular Surgery
 University of Missouri Health—Heart & Vascular Center
 Columbia, MO USA

Disclosures

Funding from: **TRIUMPH Grant**
 (Translational Research Informing Useful and Meaningful Precision Health)

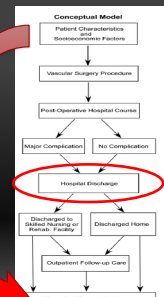
Table 2. Highest Rates of Rehospitalization and Most Frequent Reasons for Rehospitalization, according to Conditional Condition or Index Challenge

30-Day Rehospitalization Rate	Proportion of All Rehospitalizations
Major hip or knee surgery	23.9
Other vascular surgery	13.4
Major bowel surgery	18.6
Other hip or femur surgery	17.9

Rehospitalizations among Patients in the Medicare Fee-for-Service Program
 Stephen F. Jencks, M.D., M.P.H., Mark V. Williams, M.D., and Eric A. Coleman, M.D., M.P.H.

Developing strategies for predicting and preventing readmissions in vascular surgery

Benjamin S. Brooks, MD, PhD¹, Ronald R. Di Martino, MD, MS², Michal Gavetti, MD,³ Justin B. Deane, MD, MPH⁴ and Philip P. Conway, MD, MS⁵, Lefteris, NY, and John Aron, BS⁶



Predictive factors of 30-day unplanned readmission after lower extremity bypass

James T. McPhee, MD¹, Neal R. Borsook, MD, MPH², Karen J. Ho, MD³, Arin Madenci, MS, MPH,⁴ C. Keith Ozaki, MD⁵, Louis L. Nguyen, MD, MBA, MPH⁶ and Michael Berlin, MD⁷, Boston, Mass, and Houston, Tex

- ❖ A retrospective analysis from an institutional registry
- ❖ 1,516 lower extremity bypasses analyzed:
 - 349 (23.0%) were unplanned readmission

Detail	Number (%)
Patients	1516 (100)
Thirty-day readmission	
Not readmitted	1127 (74.3)
Planned readmission	41 (2.7)
Unplanned readmission	349 (23.0)
Reason for planned readmission (n = 41)	
Wound related (skin graft, etc)	28 (68.3)
Unrelated medical/surgical	12 (29.3)
Graft related	1 (2.4)
Reason for unplanned readmission (n = 349)	
Wound related (skin graft, etc)	220 (62.9)
Unrelated medical/surgical	96 (27.4)
Graft related	34 (9.7)

Original Article

A qualitative study evaluating the discharge process for vascular surgery patients to identify significant themes for organizational improvement

Vascular
2022, Vol. 6(5) 1-13
© The Author(s) 2022
Article reuse guidelines:
sagepub.com/journalsPermissions.nav
DOI: 10.1177/10785383221132343
journals.sagepub.com/home/vas
SAGE

Todd R. Vogel, MD, MPH¹, Robin L. Kruse, PhD¹, Chase Schlesselman, MPH¹, Elizabeth Doss, MEd, CRNP², Maraya Camazine, MD¹ and Lori L. Popejoy, PhD²

** TRIUMPH Grant 2021 (Translational Research Informing Useful and Meaningful Precision Health)

Cloud Qualitative Analysis

- Transcript analyses identified facilitators and barriers
- Themes were identified from the qualitative analysis

Thematic targets for Discharge Improvement

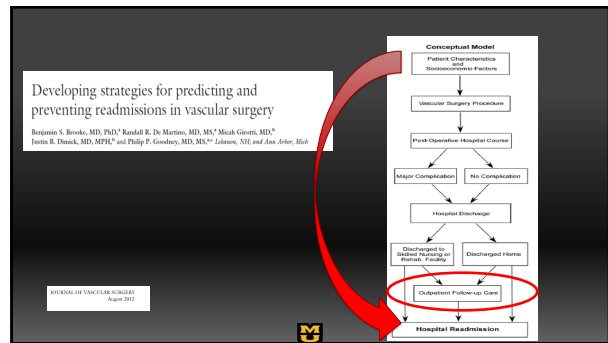
Original Article: **Vascular**
 A qualitative study evaluating the discharge process for vascular surgery patients to identify significant themes for organizational improvement

- Patient health literacy
 - Patient understanding
 - Complex discharge instructions
- Increased planning, organization, & communication
 - Multiple comorbidities
 - Extensive medications
 - Complex ancillary services at discharge
 - Wound VAC example
- Integral use of APPs
 - Education reinforcement
 - Increased coordination

Barriers Emphasized by PATIENTS in the Vascular Surgery Population

vRED Components

- Discharge Instructions: "I do think that it [the written discharge plan] can be an overwhelming packet of paperwork" (Patient Advisory Board).
- The impact of COVID-19: "It didn't help that with COVID nobody was allowed to come in, anyway, but you know having somebody who's actually hearing the same thing" (Patient Advisory Board).
- Obtaining help After Discharge: (Patient): "If it's just the clinic number what's going to happen is you're going to get that voicemail that says, you know, we've got your message ...but that happens to be a Friday, then that's not going to be until Monday." (FG 1)





VASDA VASCULAR SURGERY DISCHARGE APPLICATION

- A patient-centric smartphone application (app), VASDA, was developed from vRED.
 - Increase patient satisfaction
 - Improve communication
 - Lower unnecessary hospital readmission


** TRIUMPH Grant 2021 (Translational Research Informing Useful and Meaningful Precision Health)


Background: Description of App and Content

VASDA
VASCULAR SURGERY DISCHARGE APPLICATION


- Feasibility & implementation study evaluating the VASDA smartphone app
- At discharge, patients who underwent LEB were enrolled in the VASDA app
- App Evaluates:
 - Mobility, pain, overall health, wounds, follow up appointments
 - "Open chat" function, and wound photography
 - Questionnaires with scores
 - "Real-time" patient alerts



Methods: Data Collected from App Collected in 

Participant	Demographics	Hospital Course	Pre-Discharge Surveys	Day of Discharge	Discharge Day 1	Discharge Day 2	Discharge Day 3	Discharge Day 4	Discharge Day 5	Discharge Day 6	Discharge Day 7	Discharge Day 14	Discharge Day 30	Quantitative Results
1
2
3
4
5
6
7
8
9
10

Results:



Demographic Category	Number of Patients	Percentage of Patients
Age Groups		
Under 25	1	6%
51-59	10	50%
62-69	5	31%
72-76	3	13%
Gender		
Male	12	50%
Female	8	50%
Marital Status		
Never Married	4	25%
Married/Partnered	9	56%
Divorced/Separated	3	18%
Widowed	0	0%
Total Number	16	100%

- Patients undergoing LEB were enrolled
 - 75% patients utilized the app for 30-days after discharge
- Mean age was 62 years
 - Males 64.7%
 - White 88.2%
- "Real-Time" Patient alerts from surveys:
 - Pain, Wounds, Medications

** REDCap, © 2011. IP Address Report. (Privacy, Confidentiality, and Security)

Results: Wound photography and Chat




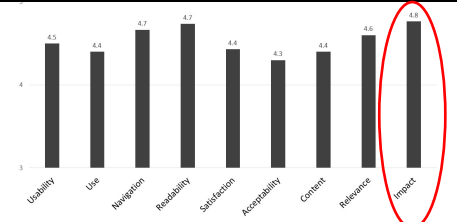

Shannon has some new swelling in the groin area near the crease of his leg. This has started since he became more active at work. The swelling is gone by morning but returns the next day. Is this to be expected?



Just an update regarding Dan's rash, it has completely cleared up within a few days of changing medication. he is definitely allergic to the placebo. thank you for your help, and sorry i didn't get back to you sooner, I just wanted to make sure that it wasn't going to come back.

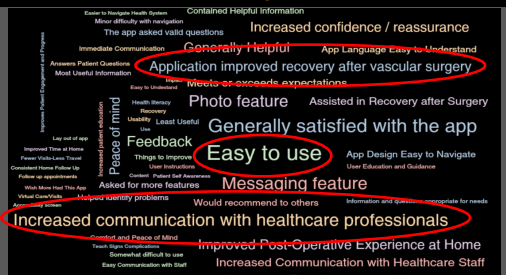
User Experience Ratings







** Mobile Application Rating Scale (MARS), the System Usability Scale (SUS), and Likert Scale, 1 lowest to 5 highest

Cloud Qualitative Analysis

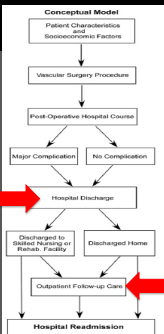





Conclusions:

- VASDA app is feasible to implement with 75% utilization
- Generates high usability, acceptability, and impact scores
- Effective in identifying problems at home
 - "Real-time" questionnaires, wound surveys
 - Wound photography
 - Alerts prompted early clinic appointment for evaluation for 53.3%.
- Improved:
 - Patient communication
 - Patient satisfaction
- May assist in lowering unplanned hospital readmissions
 - Facilitates early patient evaluation
 - Enrollment Continuing.....

How to Lower Vascular Surgery Readmission....




Surgical Center for Outcomes Research and Effectiveness