Mobile and Digital Health: Opportunities for Impacting Diabetes Among Native Communities

Sheana Bull, PhD, MPH

Colorado School of
PUBLIC HEALTH

mHealthImpact
CREATING AND CURATING
DIGITAL HEALTH SOLUTIONS

Objectives

- Consider the evidence for:
    - mobile and digital solutions for diabetes prevention and self-management
    - using mobile solutions for health promotion more broadly among diverse Native communities
- Where are the gaps and opportunities?
- What are key considerations in addressing gaps and pursuing opportunities?

References

Krebs, P., Prochaska, J.O. and Rossi, J.S., 2010. A meta-analysis of computer-tailored interventions for health behavior change. Preventive medicine, 51(3-4), pp.214-221. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2939185/

Maher, C., Lewis, L., Ferrar, K., Marshall, S., De Bourdeauhuij, I., Vandelanotte, C. 2014. Are health behavior change interventions that use online social networks effective? A systematic review. JMIR. 16(2) e40. http://www.jmir.org/2014/2/e40/ (Links to an external site.)

Laranjo, L., Arguel, A., Neves, A., Gallagher, A., Kaplan, R., Mortimer, N., Mendes, G., Lau, A. 2015. The influence of social networking sites on health behavior change: a systematic review and meta-analysis. J Am Med Inform Assoc. 22:243-256. doi: 10.1136/amiajnl-2014-002841 https://academic.oup.com/jamia/article/22/1/243/article

Elaheebocus, S.M.R.A. et al., 2018. Peer-Based Social Media Features in Behavior Change Interventions: Systematic Review. Journal of medical Internet research, 20(2), p.e20. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5843796/

Flores Mateo, G., Granado-Font, E., Ferré-Grau, C., & Montaña-Carreras, X. (2015). Mobile Phone Apps to Promote Weight Loss and Increase Physical Activity: A Systematic Review and Meta-Analysis. Journal of Medical Internet Research, 17(11), E253. Link to article: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4704965/?report=reader

Whitehead, L., & Seaton, P. (2016). The Effectiveness of Self-Management Mobile Phone and Tablet Apps in Long-term Condition Management: A Systematic Review. Journal of Medical Internet Research, 18(5), E97. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4886099/

Garabedian, L., Ross-Degnan, F., & Wharam, D. (2015). Mobile Phone and Smartphone Technologies for Diabetes Care and Self-Management. Current Diabetes Reports, 15(12), 1-9. https://link.springer.com/article/10.1007/s11892-015-0680-8

Weber-Buchholz, S., Wilber, J., Ingram, D., Fogg, L. 2013. Physical Activity Text Messaging Interventions in Adults: A Systematic Review. Worldviews on Evidence-Based Nursing. 103:163-173 http://onlinelibrary.wiley.com/doi/10.1111/wvn.12002/epdf

deJongh, T., Gurol-Urganci, I., Vodopivec-Jamsek, V., Car, J., Atun, R. 2012. Mobile phone messaging for facilitating self-management of long-term illness. Cochrane Database of Systematic Reviews. 12 Art No. CD007459. DOI : 10.1002/14651858.CD007459.pub2 http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD007459.pub2/full

What does the evidence show?

Factor	Web	SMS/Text	Social Media	Apps
Antecedent to behavior change	✓	✓	✓	
Behavior Change	✓	✓	✓	✓
Biomedical outcome	✓	✓	✓	✓
Research Synthesis/Meta-Analysis	✓	✓	✓	✓
Impacts disparities		✓		

What does the evidence show?

Factor	Sensors	Virtual Reality	Artificial Intelligence	Machine Learning
Antecedent to behavior change	✓	✓		✓
Behavior Change	✓	✓		
Biomedical outcome				
Research Synthesis/Meta-Analysis				
Impacts disparities				

What are barriers to mHealth among Native Populations?

- Gaps in informed consent

- Challenges to data management (data confidentiality, participant privacy, data sharing)

- Social implications

- Failure to appropriately adapt for diverse groups

- Failure to consider appropriate technology

Colorado School of
PUBLIC HEALTH

mHealthImpact
CREATING AND CURATING
DIGITAL HEALTH SOLUTIONS

Notable examples of mobile and digital solutions with Native populations

- TXTTaofiTapaa
  - Samoa and smoking cessation
  - Iterative evaluative process
  - Messages theory based
  - Linguistic and cultural nuances

| Article | Cited By (0) | Tweetations (6) | Metrics |

📄 Original Paper

Assessing the Cross-Cultural Adaptation and Translation of a Text-Based Mobile Smoking Cessation Program in Samoa (TXTTaofiTapaa): Pilot Study

Judith McCool[1], PhD, MPH ; Helen Tanielu[2], MA ; Elaine Umali[1], MA, MPH ; Robyn Whittaker[3,4], MD, PhD

[1]Department of Epidemiology and Biostatistics, School of Population Health, University of Auckland, Auckland, New Zealand
[2]Department of Sociology, National University of Samoa, Apia, Samoa
[3]National Institute for Health Innovation, School of Population Health, University of Auckland, Auckland, New Zealand
[4]Institute for Health Innovation and Improvement (i3), Waitemata District Health Board, Auckland, New Zealand

Corresponding Author:
Judith McCool, PhD, MPH
Department of Epidemiology and Biostatistics
School of Population Health
University of Auckland
Private Bag 92019
Auckland, 1141
New Zealand
Phone: 64 09 373 7599 ext 82372
Fax:64 9 3035932

Colorado School of
PUBLIC HEALTH

mHealthImpact
CREATING AND CURATING
DIGITAL HEALTH SOLUTIONS

Notable examples of mobile and digital solutions with Native populations

- Texting 4 Sexual Health
  - NW Portland Area Indian Health Board and OHSU with We R Native
  - 24 test messages on sexual health
  - Showed increases in condom use
- CRC Screening
  - Southcentral Foundation in Anchorage Alaska—Tribally owned primary care
  - 3 text messages up to 1 month apart
  - Showed increases in CRC Screening

Colorado School of
PUBLIC HEALTH

mHealthImpact
CREATING AND CURATING
DIGITAL HEALTH SOLUTIONS

Notable examples of mobile and digital solutions with Native populations

Review

Online social networking services in the management of patients with diabetes mellitus: Systematic review and meta-analysis of randomised controlled trials

Tania Toma, Thanos Athanasiou, Leanne Harling, Ara Darzi, Hutan Ashrafian*

The Department of Surgery and Cancer, Imperial College London, 10th Floor, Queen Elizabeth the Queen Mother (QEQM) Building, St Mary's Hospital, Praed Street, London W2 1NY, UK

- Meta-analysis of Social Networking Sites

- Included online only versus hybrid

- The hybrid programs produced the greatest effects
  - Consistent declines in HbA1c for Type II Diabetes
  - Exposing patients to online support groups

Colorado School of
PUBLIC HEALTH

mHealthImpact
CREATING AND CURATING
DIGITAL HEALTH SOLUTIONS
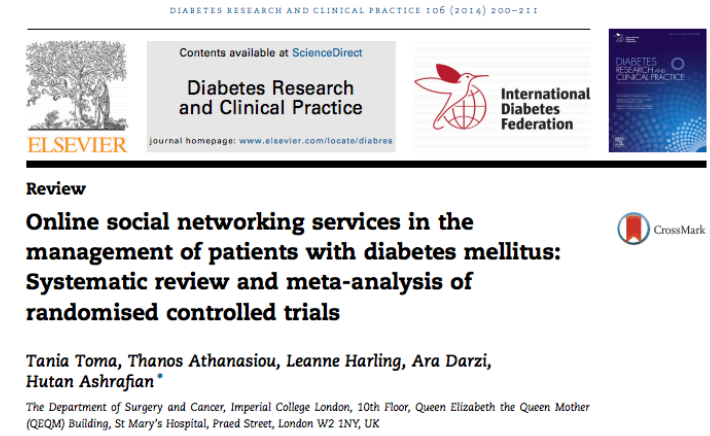
Opportunities for impact on Diabetes among Native populations with mobile solutions

- What do we know about what works for Diabetes Self-Management in particular using mobile solutions?
  - Reminders for blood glucose measurement
  - Medication reminders
  - Physical Activity
  - Weight management
- Where are the gaps? Adaptations and tailoring for Native communities…
  - SMS?
  - Social Media?
  - Apps?
  - Sensors?

Colorado School of
PUBLIC HEALTH

mHealthImpact
CREATING AND CURATING
DIGITAL HEALTH SOLUTIONS

Opportunities for impact on Diabetes among Native populations with mobile solutions

- Regardless of modality we need careful consideration of:
  - How to reach people consistently and over time
  - How to engage them once we do connect
  - How/whether to engage others within social/family and community networks

- We have underutilized hybrid programs
  - How might we link a mobile solution to existing or new in person programs?

Colorado School of
PUBLIC HEALTH

mHealth**Impact**
CREATING AND CURATING
DIGITAL HEALTH SOLUTIONS

Opportunities for impact on Diabetes among Native populations with mobile solutions

Opportunities for impact on Diabetes among Native populations with mobile solutions

Opportunities for impact on Diabetes among Native populations with mobile solutions

- How might we build on "what works" in more traditional interventions?

- What are the hallmarks of effective interventions among Native populations?
  - Community-based, community-centric
  - Culturally tailored
  - Narrative
  - Role Models (Peer and Community)

Opportunities for impact on Diabetes among Native populations with mobile solutions

Opportunities for impact on Diabetes among Native populations with mobile solutions

− Curriculum Topics

The current DPP program is a year-long structured intervention in which participants learn how to make lifestyle changes to reduce their risk for type 2 diabetes.
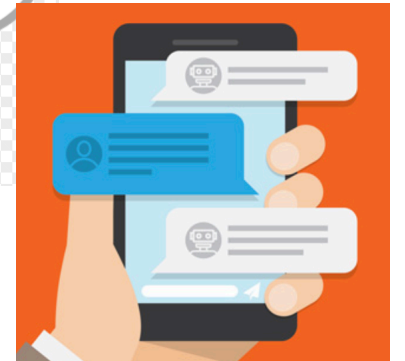
Months 1 – 6

All 16 curriculum topics below should be covered in the first six months.

1. Welcome to the DPP Program
2. Self-Monitoring Weight and Food Intake
3. Eating Less
4. Healthy Eating
5. Introduction to Physical Activity (Move Those Muscles)
6. Overcoming Barriers to Physical Activity (Being Active – A Way of Life)
7. Balancing Calorie Intake and Output
8. Environmental Cues to Eating and Physical Activity
9. Problem Solving
10. Strategies for Healthy Eating Out
11. Reversing Negative Thoughts
12. Dealing with Slips in Lifestyle Change
13. Mixing Up Your Physical Activity: Aerobic Fitness
14. Social Cues
15. Managing Stress
16. Staying Motivated, Program Wrap Up

Months 7 – 12

At least one session should be offered in each of the six remaining months. Programs may elect to offer more sessions to participants needing additional support. Lifestyle coaches can choose which of the following topics to present and can do so in any order they wish.

1. Welcome to the Second Phase of the Program
2. Healthy Eating: Taking It One Meal at a Time
3. Making Active Choices
4. Balance Your Thoughts for Long-Term Maintenance
5. Healthy Eating With Variety and Balance
6. Handling Holidays, Vacations, and Special Events
7. More Volume, Fewer Calories (Adding Water, Vegetables, and Fiber)
8. Dietary Fats
9. Stress and Time Management
10. Healthy Cooking: Tips for Food Preparation and Recipe Modification
11. Physical Activity Barriers
12. Preventing Relapse
13. Heart Health
14. Life With Type 2 Diabetes
15. Looking Back and Looking Forward

Colorado School of **PUBLIC HEALTH**

mHealthImpact
CREATING AND CURATING
DIGITAL HEALTH SOLUTIONS

Opportunities for impact on Diabetes among Native populations with mobile solutions

- Look at your phone
  - What do you use the most?
  - With whom?
  - Why?
  - Under what circumstances?
- How might this translate for interventions?
- Do these ideas suggest stand alone?
- Hybrid?

Colorado School of
PUBLIC HEALTH

mHealthImpact
CREATING AND CURATING
DIGITAL HEALTH SOLUTIONS
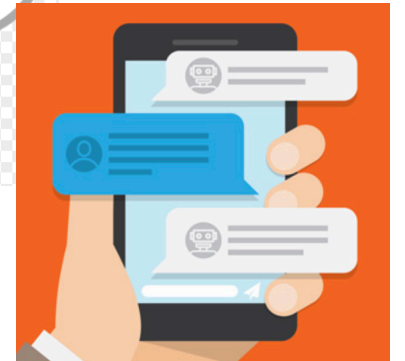
Thank you! Sheana.bull@ucdenver.edu