

No-Shows in Primary Care as a Predictor of Increased Hospital Admissions for Patients with Chronic Disease

Jonathan St. Onge, FMRII; Melissa Nicholls, FMRII; Barinder Brar, FMRII;
Jason Hosain, MD, CCFP; Shari McKay, MA
Department of Academic Family Medicine, University of Saskatchewan

ABSTRACT

Background: Missed appointments in the primary care setting negatively impact both patients and healthcare professionals. This study explores whether or not patients with a chronic disease who miss primary care visits (no-shows), are admitted to hospital more often than a comparable patient population who attend their appointments (control).

Research Question: Are patients with a chronic disease (coronary artery disease (CAD), heart failure (CHF), diabetes (DM), or COPD), who miss primary care appointments more likely than a comparable population, who attend their appointments, to be hospitalized?

Methods/Methodology: This retrospective cohort study consisted of an EMR chart review of 187 patients between the ages of 18-65 who attended West Winds Primary Health Clinic between January 1, 2013 and December 31, 2015 and had one of CAD, CHF, DM, or COPD. IBM SPSS v.23 was used for descriptive statistics, and Chi square and Pearson correlations ($p < 0.5$) were used to compare hospital admission numbers for chronic disease patients that had clinic no shows to a similar patient population that did not miss a primary care appointment. Further comparisons were made within chronic disease groups.

Results: Overall, there was a no-show rate of 6.5% (191/2957). Out of 197 patients, 41.17% had at least one missed visit. There was a small but statistically significant correlation between no-shows and hospitalizations in the overall chronic disease group (0.278, $p=0.014$) and for DMII patients (0.284, $p=0.034$) but not for hospitalizations specifically for their chronic disease. There was no statistically significant relationship between no-shows and hospitalizations for DMI, CAD, CHF or COPD.

Discussion: No-show behavior is associated with an increased number of hospitalizations in diabetics, and therefore could be approached as an easily identifiable risk factor. Limitations of study include small sample sizes, especially for patients with CHF, CAD and COPD, and reliance on proper documentation and coding in the EMR.

Conclusions: Diabetic patients who miss clinic appointments, specifically those that miss more than 2 appointments, are more likely to be hospitalized for any reason. Patients with DM, and specifically those who exhibit no-show behavior could be targeted to implement strategies to improve appointment compliance which would potentially improve health outcomes.

Recommendation: Further studies are needed to determine if these results are generalizable to patients with chronic disease over the age of 65 and patients with more than one chronic disease.

References:

1. Ciechanowshi P, Russo J, Katon W, Simon G, Lundman E, Von Korff M. Where is the patient? The association of psychosocial factors and missed primary care appointments in patients with diabetes. *Gen Hosp Psychiatry*. 2006;28(1):9-17.
2. Henderson R. Encouraging attendance at outpatient appointments: can we do more? *Scott Med J*. 2008 Feb;53(1):9-12.
3. Karter A, Parker M, Moffet H, Ahmed A, Ferrara A, Liu J. Missed appointments and poor glycemic control: an opportunity to identify high-risk diabetic patients. *Med Care*. 2004;42(2):110-5.
4. Martin C, Perfect T, Mantle G. Non-attendance in primary care: the views of patients and practices on its causes, impact and solutions. *Fam Pract*. 2005 Dec;22(6):638-43.
5. Parikh A, Gupta K, Wilson AC, Fields K, Cosgrove NM, Kostis JB. The effectiveness of outpatient appointment reminder systems in reducing no-show rates. *Am J Med*. 2010 Jun;123(6):542-8.
6. Stubbs ND, Geraci SA, Stephenson PL, Jones DB, Sanders S. Methods to reduce outpatient non-attendance. *Am J Med Sci*. 2012 Sep;344(3):211-9.
7. Zailinawati AH, Ng CJ, Nik-Sherina H. Why do patients with chronic illnesses fail to keep their appointments? A telephone interview. *Asia Pac J Public Health*. 2006;18(1):10-5.
8. Neal RD, Hussain-Gambles M, Allgar VL, Lawlor DA, Dempsey O. Reasons for and consequences of missed appointments in general practice in the UK: questionnaire survey and prospective review of medical records. *BMC Fam Pract*. 2005 Nov 7;6(1):1.
9. Nguyen DL, Dejesus RS, Wieland ML. Missed appointments in resident continuity clinic: patient characteristics and health care outcomes. *J Grad Med Educ*. 2011 Sep;3(3):350-5.
10. Nuti LA, Lawley M, Turkcan A, Tian Z, Zhang L, Chang K, Willis DR, Sands LP. No-shows to primary care appointments: subsequent acute care utilization among diabetic patients. *BMC Health Serv Res*. 2012 Sep 6;12(1):304-.
11. Cashman SB, Savageau JA, Lemay CA, Ferguson W. Patient health status and appointment keeping in an urban community health center. *J Health Care Poor Underserved*. 2004 Aug;15(3):474-88.
12. Kaplan-Lewis E, Percac-Lima S. No-show to primary care appointments: why patients do not come. *J Prim Care Community Health*. 2013 Oct;4(4):251-5.
13. Neal RD, Lawlor DA, Allgar V, Colledge M, Ali S, Hassey A, Portz C, Wilson A. Missed appointments in general practice: retrospective data analysis from four practices. *Br J Gen Pract*. 2001 Oct;51(471):830-2.
14. George A, Rubin G. Non-attendance in general practice: a systematic review and its implications for access to primary health care. *Fam Pract*. 2003 Apr;20(2):178-84.
15. Giunta D, Briatore A, Baum A, Luna D, Waisman G, de Quiros FG. Factors associated with nonattendance at clinical medicine scheduled outpatient appointments in a university general hospital. *Patient Prefer Adherence*. 2013 Nov 8;7:1163-70.
16. Ellis DA, Jenkins R. Weekday affects attendance rate for medical appointments: Large-scale data analysis and implications. *PLoS One*. 2012;7(12):e51365.
17. Lacy NL, Paulman A, Reuter MD, Lovejoy B. Why we don't come: patient perceptions on no-shows. *Ann Fam Med*. 2004 Nov/Dec;2(6):541-5.
18. Guedes R, Leite I, Baptista A. Dermatology missed appointments: an analysis of outpatient non-attendance in a general hospital's population. *Int J Dermatol*. 2014 Jan;53(1):39-42.

19. DuMontier C, Rindfleisch K, Pruszyński J, Frey JJ, 3rd. A multi-method intervention to reduce no-shows in an urban residency clinic. *Fam Med*. 2013 Oct;45(9):634-41.
20. Akter S, Doran F, Avila C, Nancarrow S. A qualitative study of staff perspectives of patient non-attendance in a regional primary healthcare setting. *Australas Med J*. 2014 May 31;7(5):218-26.
21. Chariatte V, Berchtold A, Akre C, Michaud PA, Suris JC. Missed appointments in an outpatient clinic for adolescents, an approach to predict the risk of missing. *J Adolesc Health*. 2008 Jul;43(1):38-45.
22. Perron NJ, Dao MD, Kossovsky MP, Miserez V, Chuard C, Calmy A, Gaspoz JM. Reduction of missed appointments at an urban primary care clinic: a randomised controlled study. *BMC Fam Pract*. 2010 Oct 25;11(1):79.

Physician Understanding and Application of Evidence-Based Risk Communication

Ryck Schielke, FMRII; Matt Kushneriuk, FMRII; Amit Motwani, FMRII;
Jason Hosain, MD, CFPC; Shari McKay, MA
Department of Academic Family Medicine, University of Saskatchewan

ABSTRACT

Background: When the physician truly understands the risk of a procedure he or she can more confidently, accurately and reliably convey this risk assessment to patients and their families. Although several studies have assessed the use of evidence-based risk communication tools in the patient population, there is limited research as to whether or not educating medical residents on risk assessment can improve their appreciation and understanding of risk.

Research Questions: How do medical residents present risk in their practice? Does attendance at a seminar describing methods of evidence-based risk communication change how they plan to deliver this information?

Methods/Methodology: A survey was created to assess what risk estimation tools medical residents currently used. This was followed by an educational presentation on evidence-based risk communication techniques. Medical residents then completed a post-educational survey.

Results: All participants felt that physician-patient communication was very important, and 89% (17/19) of respondents indicated that accurately conveying information about risks and benefits was also very important. All residents indicated that the seminar on evidence-based risk communication improved their understanding around the topic, and that they would be inclined to change how they present this information to their patients. After the seminar, 68% (13/19) of respondents indicated that they would use absolute risk figures in their practice, compared to 32% (6/19) prior to the seminar ($p = 0.025$).

Discussion: The participants intended to use more appropriate methods of risk assessment after the seminar than they had used before, including increased use of simple frequencies, graphic display and absolute risk.

Conclusion: Results showed that the seminar successfully conveyed information about evidence-based risk assessment tools to medical residents which would potentially change practice.

Recommendation: It would be appropriate to deliver this seminar in the first year of residency, providing residents more time to develop their skill in communicating risk.

References:

1. Oxford Dictionary. Risk [Internet]. Oxford, UK: Oxford University Press; 2014 [cited 2014 Oct 4]. Available from: <http://www.oxforddictionaries.com/definition/english/risk>
2. Edwards A, Prior L. Communication about risk--dilemmas for general practitioners. The Department of General Practice Working Group, University of Wales College of Medicine. *Br J Gen Pract*. 1997 Nov;47(424):739-42.
3. Kalet A, Roberts J, Fletcher R. How do physicians talk with their patients about risks? *J Gen Intern Med*. 1994 Jul;9(7):402-4.
4. Zipkin DA, Umscheid CA, Keating NL, Allen E, Aung K, Beyth R, Kaatz S, Mann DM, Sussman JB, Korenstein D, Schardt C, Nagi A, Sloane R, Feldstein DA. Evidence-based risk communication. *Ann Intern Med*. 2014 Aug 19;161(4):270-80.
5. Trevena LJ, Zikmund-Fisher BJ, Edwards A, Gaissmaier W, Galesic M, Han PK, King J, Lawson ML, Linder SK, Lipkus I, Ozanne E, Peters E, Timmermans D, Woloshin S. Presenting quantitative information about decision outcomes: a risk communication primer for patient decision aid developers. *BMC Med*. 2013;13(Suppl 2):S7.
6. Burklewicz J, Vesta K, Hume A. Improving effectiveness in communication risk to patients. *Consult Pharm*. 2008 Jan;23(1):37-43.
7. Fagerlin A, Zikmund-Fisher B, Ubel P. Helping patients decide: ten steps to better risk communication. *J Natl Cancer Inst*. 2011;103(19):1436-43.
8. Trevena L, Davey H, Barratt A, Butow P, Caldwell P. A systematic review on communicating with patients about evidence. *J Eval Clin Pract*. 2006 Feb; 12(1):13-23.
9. Man-Son-Hing M, O'Connor A, Drake E, Biggs J, Hum V, Laupacis A. The effect of qualitative vs. quantitative presentation of probability estimates on patient decision-making: a randomized trial. *Health Expect*. 2002 Sep; 5(3):246-55.
10. Ghosh A, Ghosh K. Translating evidence-based information into effective risk communication: current challenges and opportunities. *J Lab Clin Med*. 2005 Apr; 145(4):171-80.
11. Schwartz L, Woloshin S, Welch H. Risk communication in clinical practice: putting cancer in context. *J Natl Cancer Inst Monogr*. 1999;25(1):124-33.
12. Sheridan L, Pignone M, Lewis C. A randomized comparison of patients' understanding of number needed to treat and other common risk reduction formats. *J Gen Intern Med*. 2003 Nov;18(11):884-92.
13. Sorensen L, Gyrd-Hansen D, Kristiansen IS, Nexøe J, Nielsen JB. Laypersons' understanding of relative risk reductions: randomised cross-sectional study. *BMC Med Inform Decis Mak*. 2008 Jul 17;8(31):1-7.
14. Timmermans D, Molewijk B, Stiggelbout A, Kievit J. Different formats for communicating surgical risks to patients and the effect on choice of treatment. *Patient Educ Couns*. 2004 Sep 1;54(1):255-63.

Sports Injuries and Illnesses at the 2014 Regina North American Indigenous Games

Danielle R. Frost, FMRII; Tyler Gorman, FMRII;
Martin Heroux, MD, CCFP; Kelechi Eguzo, MD, MPH
Department of Academic Family Medicine, University of Saskatchewan

ABSTRACT

Background: Injury surveillance at sporting events provides important epidemiological data on injuries and illnesses both between and within sports. This helps in identifying risk factors and instituting preventative measures in order to improve the health and safety of athletes. This research project aims to provide evidence of the incidence of injuries and illnesses at the 2014 North American Indigenous Games (NAIG) held in Regina, Saskatchewan.

Research Questions: What was the incidence of injuries and illnesses at the 2014 NAIG?

Methods/Methodology: This was a retrospective cross-sectional study of the injuries and illnesses occurring in all registered athletes ($n = 3,060$) at the 2014 NAIG. Data collected included: athlete demographics; sports/event; nature and details of index illness/injury; place of initial assessment; and, mode of transportation. Data was analyzed using descriptive statistics.

Results and Discussion: Clinical incidence (CI) was 171 per 1,000 registered athletes for injuries, and 27 per 1,000 registered athletes for illnesses. Muscle strains were the most common injury (30.5%, 160/542) and the knee injuries were the most commonly injured joint (15.6%, 82/524). Most injuries occurred with soccer (CI 334 injuries per 1,000 registered athletes), while rifle shooting had the lowest injury incidence (CI 190 per 1,000 registered athletes). Infectious etiology accounted for 35.2% (25/71) of all acute onset illness; the neurological system was the most commonly affected (35.3%, 9/82). Thirty-three percent (27/82) of illnesses presented with pain/ache/soreness. The majority of the injuries/illnesses were new (83%). The NAIG medical team performed 66% (400/606) of the initial assessments at the polyclinic. Injuries were more common with contact sports e.g. soccer; therefore, the NAIG-sponsored medical van was an effective means of transportation for injured/sick athletes.

Conclusions: Injuries were more common than illnesses at the 2014 NAIG. Soccer was most frequently associated with injuries compared to other sports; infections were the most common cause of illness. The results from this study provided a baseline for planning and evaluating injuries and illnesses at future NAIG.

Recommendation: Develop, implement and train the medical team to use a standardized reporting system for medical cases at future NAIG.

References:

1. North American Indigenous Games 2014. Raising the Bar [Internet]. Regina, SK: North American Indigenous Games 2014. 2014 [cited 2016 May 9]. Available from: <http://regina2014naig.com/home/>.
2. Van Mechelen M, Hlobil H, Kemper HC. Incidence, severity, aetiology and prevention of sports injuries: a review of concepts. *Sports Med.* 1992;14(2):82-99.
3. Junge A, Engebretsen L, Alonso JM, Mountjoy M, Aubry M, Dvorak J. Injury surveillance in multi-sport events: the International Olympic Committee approach. *Br J Sports Med.* 2008;42(6):413-21.
4. Engebretsen L, Soligard T, Steffen K, Alonso JM, Aubry M, Budgett R, Dvorak J, Jegathesan M, Meeuwisse WH, Mountjoy M, Palmer-Green D, Vanhegan I, Renstrom PA. Sports injuries and illnesses during the London Summer Olympic Games 2012. *Br J Sports Med.* 2013;47(7):407-14.
5. Engebretsen L, Steffen K, Alonso JM, Aubry M, Dvorak J, Junge A, Meeuwisse W, Mountjoy M, Renstrom P, Wilkinson M. Sports injuries and illnesses during the Winter Olympic Games 2010. *Br J Sports Med.* 2010;44(11):772-80.
6. Dvorak J, Junge A, Derman W, Schwellnus M. Injuries and illnesses of football players during the 2010 FIFA World Cup. *Br J Sports Med.* 2011;45(8):626-30.
7. Alonso JM, Tscholl PM, Engebretsen L, Mountjoy M, Dvorak J, Junge A. Occurrence of injuries and illnesses during the 2009 IAAF World Athletics Championships. *Br J Sports Med.* 2010;44(15):1100-5.
8. Timpka T, Alonso JM, Jacobsson J, Junge A, Branco P, Clarsen B, Kowalski J, Mountjoy M, Nilsson S, Pluim B, Renstrom P, Ronsen O, Steffen K, Edouard P. Injury and illness definitions and data collection procedures for use in epidemiological studies in athletics (track and field): consensus statement. *Br J Sports Med.* 2014;48(7):483-90.
9. Knowles S, Marshall S, Giskiewicz K. Issues in estimating risks and rates in sports injury research. *J Athl Train.* 2006;41(2):207-15.

A Retrospective Application of the HEART Score on Patients Evacuated from Northern Saskatchewan Communities due to Chest Pain: A First Step in Assessing the Utility of Point of Care Troponins for Outpost Nursing Stations

Julia Fox, FMRII; Ankit Kapur, FMRII; Kevin Sawchuk, FMRII; Jeff Irvine, MD, MPH, CCFP
Department of Academic Family Medicine, University of Saskatchewan

ABSTRACT

Background: In the face of the challenging clinical environment for diagnosing an NSTEMI, a landmark Dutch study in 2008 developed the HEART score. This scoring system codified the clinical gestalt used by many physicians with zero-to-two points assigned to five criteria (History, ECG, Age, Risk Factors, Troponin I). Notably, from the emergency medicine perspective, this scoring provided a prognostic tool that assisted in making disposition planning. The HEART score has been largely applied as a tool in urban emergency rooms, but for the purposes of our study, the use of a truncated HEART score, minus the troponin data (HEAR score) was used to mimic the clinical decision making process by which physicians from our rural northern hospital in La Ronge, Saskatchewan make evacuation decisions regarding patients presenting with chest pain at one of four outpost nursing clinics (Pinehouse, Southend, Wollaston Lake, and Stanley Mission). These outpost nursing stations have no onsite physician, and no ability to obtain any troponin data. In light of this clinical complexity, the purpose of this study was to determine if there was any utility in conducting PoC troponins in nursing outposts served by La Ronge.

Research Question: How would a troponin result affect the potential evacuation of patients with chest pain from nursing outpost clinics?

Methods/Methodology: Using the La Ronge Regional electronic medical record (MedAccess version 4.8), a search for all patients for whom outpost nurses had called an on-call physician to discuss symptoms of acute coronary syndrome between January 1, 2011 & December 31, 2015 was performed. After a retrospective chart review, the HEAR and HEART scores were calculated for each individual presentation of chest pain meeting the inclusion and exclusion criteria.

Results/Findings: From the patient's HEART score before evacuation (ie: without the troponin) and with the troponin data, it was determined that in 87% of cases (74/85), patients would require evacuation regardless of the troponin values due to a HEART score ≥ 4 . In 13% (11/85) of cases the patients who were evacuated had a HEART score of ≤ 3 and in no case did the troponin data increase this score.

Discussion: Our hypothesis that most of the patients who were currently being evacuated would continue to be evacuated regardless of the result of their PoC troponin and due to already elevated HEAR scores was supported. With regard to the utility of PoC troponins in evacuation reduction, it could be argued that 11 patients (13% of all included events) over five years could have avoided evacuation if a PoC troponin had been available at the nursing outpost.

Conclusions: Almost all evacuations currently taking place are appropriate in the context of using the HEART score as a prognostic tool, and the few incidences in which a point-of-care (PoC) troponin might have removed the necessity for evacuation are rare enough that any net financial savings would likely be minimal.

Recommendations: At this time, we would not recommend the use of PoC troponins as a cost saving measure for the reduction in evacuation of patients with chest pain from the nursing stations served by the La Ronge Hospital.

References:

1. Canadian Agency for Drugs and Technologies in Health. Point-of-care versus central laboratory troponin testing for diagnosis of acute coronary syndrome in acute care settings: a review of the clinical and economic evidence. Ottawa, ON: Canadian Agency for Drugs and Technologies in Health; 2012 Oct 18 [cited 2016 Jan 5]. Available from: <https://www.cadth.ca/point-care-versus-central-laboratory-troponin-testing-diagnosis-acute-coronary-syndrome-acute-care>.
2. Yang Z, Min Zhou D. Cardiac markers and their point-of-care testing for diagnosis of acute myocardial infarction. *Clin Biochem*. 2006 Aug;39(8):771–80.
3. Bingisser R, Cairns C, Christ M, Hausfater P, Lindahl B, Mair J, Panteghini M, Price C, Venge P. Cardiac troponin: a critical review of the case for point-of-care testing in the ED. *Am J Emerg Med*. 2012 Oct;30(8):1639–49.
4. Friess U, Stark M. Cardiac markers: a clear cause for point-of-care testing. *Anal Bioanal Chem*. 2009 Mar;393(5):1453–62.
5. Six AJ, Backus BE, Kelder JC. Chest pain in the emergency room: value of the HEART score. *Neth Heart J*. 2008;16(6):191–6.
6. Straface AL, Myers JH, Kirchick HJ, Blick KE. A Rapid Point-of-Care Cardiac Marker Testing Strategy Facilitates the Rapid Diagnosis and Management of Chest Pain Patients in the Emergency Department. *Am J Clin Pathol*. 2008 May;129(5):788–795.
7. Ryan RJ, Lindsell CJ, Hollander JE, O'Neil B, Jackson R, Schreiber D, Christenson R, Gibler WB. A multicenter randomized controlled trial comparing central laboratory and point-of-care cardiac marker testing strategies: the Disposition Impacted by Serial Point of Care Markers in Acute Coronary Syndromes (DISPO-ACS) Trial. *Ann Emerg Med*. 2009 Mar;53(3):321–8.
8. McDonnell B, Hearty S, Leonard P, O'Kennedy R. Cardiac biomarkers and the case for point-of-care testing. *Clin Biochem*. 2009 May;42(7-8):549–61.
9. Palamalai V, Murakami MM, Apple FS. Diagnostic performance of four point of care cardiac troponin I assays to rule in and rule out acute myocardial infarction. *Clin Biochem*. 2013 Nov;46(16-17):1631–5.
10. Bruins Slot MHE, van der Heijden GJMG, Stelpstra SD, Hoes AW, Rutten FH. Point-of-care tests in suspected acute myocardial infarction: a systematic review. *Int J Cardiol*. 2013 Oct;168(6):5355–62.
11. Kost GJ, Kost LE, Suwanyangyuen A, Cheema SK, Curtis C, Sumner S, Yu J, Louie RF. Emergency cardiac biomarkers and point-of-care testing: optimizing acute coronary syndrome care using small-world networks in rural settings. *Point Care*. 2010 Jun;9(2):53–64.
12. Diercks DB, Peacock WF, Hollander JE, Singer AJ, Birkhahn R, Shapiro N, Glynn T, Nowack R, Safdar B, Miller CD, Lewandrowski E, Nagurney JT. Diagnostic accuracy of a point-of-care troponin I assay for acute myocardial infarction within 3 hours after presentation in early presenters to the emergency department with chest pain. *Am Heart J*. 2012 Jan;163(1):74–80.e4.
13. Reichlin T, Twerenbold R, Wildi K, Gimenez MR, Bergsma N, Haaf P, Druey S, Puelacher C, Moehring B, Freese M, et al. Prospective validation of a 1-hour algorithm to rule-out and rule-in acute myocardial infarction using a high-sensitivity cardiac troponin T assay. *Can Med Assoc J*. 2015;187(8):E243–E252.
14. Backus B., Six A., Kelder J., Gibler W., Moll F., Doevendans P. Risk scores for patients with chest pain: evaluation in the emergency department. *Curr Cardiol Rev*. 2011 Feb;7(1):2–8.
15. Backus BE, Six AJ, Kelder JC, Bosschaert M a. R, Mast EG, Mosterd A, Veldkamp RF, Wardeh AJ, Tio R, Braam R, Monnick SHJ, van Tooren R, Mast TP, van den Akker F, Cramer MJM, Poldervaart JM, Hoes AW, Doevendans PA. A prospective validation of the HEART score for chest pain patients at the emergency department. *Int J Cardiol*. 2013 Oct 3;168(3):2153–8.
16. Census of Canada. Saskatchewan population report 2011 [Internet]. Ottawa, ON: Government of Canada; 2012 Feb [cited 2016 Jan 5]. Available from: chrome-

extension://oemmnndcbldboiebfnladdacbfmadadm/http://www.stats.gov.sk.ca/stats/population/Censuspop2011.pdf.

17. Blattner K, Nixon G, Dovey S, Jaye C, Wigglesworth J. Changes in clinical practice and patient disposition following the introduction of point-of-care testing in a rural hospital. *Health Policy*. 2010 Jun;96(1):7–12.
18. Kost GJ, Vansith K, Tuntideelert M. Critical care and point-of-care testing in Cambodia and Vietnam. *Point Care*. 2006;5(4):193–8.
19. Kulrattanamaneepon S, Tuntideelert M, Kost GJ. Using telemedicine with point-of-care testing to optimize health care delivery in Thailand. *Point Care*. 2006;5(4):160–3.
20. Rathore S, Knowles P, Mann APS, Dodds PA. Is it safe to discharge patients from accident and emergency using a rapid point of care Triple Cardiac Marker test to rule out acute coronary syndrome in low to intermediate risk patients presenting with chest pain? *Eur J Intern Med*. 2008 Nov;19(7):537–40.
21. Venturini JM, Stake CE, Cichon ME. Prehospital point-of-care testing for Troponin: are the results reliable? *Prehosp Emerg Care*. 2013 Jan;17(1):88–91.
22. Goodacre SW, Bradburn M, Cross E, Collinson P, Gray A, Hall AS, on behalf of the RATPAC Research Team. The Randomised Assessment of Treatment using Panel Assay of Cardiac Markers (RATPAC) trial: a randomised controlled trial of point-of-care cardiac markers in the emergency department. *Heart*. 2011 Feb 1;97(3):190–6.

**Analysis of Test-Ordering Patterns by Rural Primary Care Physicians
specific to the Periodic Health Examination (PHE): An Action Research Project**

Robert Haver, FMRII; Brenton Janzen FMRII; Volker Rininsland, MD, CCFP;
Vivian R Ramsden, RN, PhD; Kelechi Eguzo, MD, MPH
Department of Academic Family Medicine, University of Saskatchewan

ABSTRACT

Background: The Periodic Health Examination (PHE) is a common clinical event that seeks to monitor current illness, screen for potential illness, and advice on lifestyle to optimize health. There is a tendency for over-investigating as current guidelines/evidence may not support some of the tests requested during a PHE. This research seeks to explore the PHE practice pattern of family physicians in Moose Jaw, Saskatchewan.

Research Questions:

1. What laboratory tests are routinely ordered following a PHE; are they consistent with the patient's age, sex, and medical history?
2. Do physicians order tests the same way each time or are there differences?

Methods/Methodology: This was a mixed methods, action research study, involving four family physicians practicing at two clinics. Retrospective data about PHEs conducted between January 1 and December 31, 2014 were gathered from the EMR. Analysis involved descriptive statistics, chi-square and t-tests. Results were returned to the physicians for discussion during a Focus Group.

Results/Findings: A total of 366 patients were included in the analysis, with average age as 53 (± 16) years. One thousand and thirty-nine tests were ordered with an average of five tests per patient. Only 63.3% of patients aged >35 years had a lipid profile done. Significant differences existed in the pattern of glucose studies for patients aged >45 years ($p < 0.01$). *"There may be an element of automatic testing, as a common practice is to have patients use the same labs as what was done a year prior"*.

Discussion: Results showed a significant variation in the test ordering pattern amongst the physicians involved, which could be due to differences in guidelines. One limitation of this study is that data was collected using four physicians practicing at two clinics in a city of approximately 50,000 residents. Participants expressed a willingness to improve their practice related to PHEs.

Conclusions: As evidence continues to evolve, it is important for clinicians to improve their practice in order to reduce the number of unnecessary tests ordered. PHE patterns appeared to be related to habit and a desire to avoid missed diagnoses.

Recommendation: There is a need to develop an evidence-informed intervention that could improve the test-ordering pattern of physicians.

References:

1. Duerksen A, Dubey V, Iglar K. Annual adult health checkup. *Can Fam Physician*. 2012;58(1):43-7.
2. Goodyear-Smith F. Government's plans for universal health checks for people aged 40-75. *BMJ*. 2013;347:f4788.
3. Howard-Tripp M. Should we abandon the periodic health examination? *Can Fam Physician*. 2011;57(2):158-60.
4. MacAuley D. The value of conducting periodic health checks. *BMJ* [Internet]. 2012 [cited 2016 Jan 15];345:e7775. Available from: <http://www.bmj.com/content/345/bmj.e7775>
5. Mavriplis CA. Should we abandon the periodic health examination? *Can Fam Physician*. 2011; 57(2):159-61.
6. Bunting PS, Walraven CV. Effect of a controlled feedback intervention on laboratory test ordering by community physicians. *Clin Chem*. 2004;50(2):321-6.
7. Chacko KM, Feinberg LE. Laboratory screening at preventive health exams: trend of testing, 1978–2004. *Am J Prev Med*. 2007;32(1):59–62.
8. Verstappen WH, Weijden TV, Sijbrandij J, Smeele I, Hermsen J, Grimshaw J, Grol RP. Effect of a practice-based strategy on test ordering performance of primary care physicians: a randomized trial. *JAMA*. 2016;289(18):2407-12.
9. Baum F, MacDougall C, Smith D. Participatory action research. *J Epidemiol Community Health*. 2006;60(10):854-7.
10. American Diabetes Association. Standards of medical care in diabetes - 2014. *Diabetes Care*. 2014;37(Suppl 1):S82-S90.
11. Allan GM, Lindblad AJ, Comeau A, Coppola J, Hudson B, Mannarino M, McMinis C, Padwal R, Schelstraete C, Zarnke K et al. Simplified lipid guidelines. *Can Fam Physician*. 2015; 61(10):857-67.

What factors influence physicians' choice of intravenous fluids perioperatively in adults?

Dana F. Hamm, FMRII; Edward Krickan, FMRII;
Breanna Davis, MD, CCFP; Shari McKay, MA
Department of Academic Family Medicine, University of Saskatchewan

ABSTRACT

Background: Physicians' choice of intravenous fluids (IV) in adults perioperatively has been an ongoing debate for decades. The current studies available focus on the individualization of therapy, the side effects of therapy, and the wide variation in prescribing practices among physicians. The purpose of this research was to further assess the subjective factors behind the choice of IV fluids, in addition to other factors such as the influence of preoperative labwork.

Research Question: What factors influence physicians' choice of IV fluids perioperatively in adults?

Methods: Ethical approval was obtained from the University of Saskatchewan Biomedical Research Ethics Board (Bio-REB). An original 10-question questionnaire was distributed to physicians at the Prince Albert Victoria Hospital. Questionnaires were collected anonymously, and the data was analyzed using IBM SPSSv.23.

Results: Of the 27 questionnaires distributed, 19 were returned (Response Rate=70.4%). Ringer's Lactate (RL) was the predominant fluid chosen by 73.7% (14/19) of the physicians. The main factors influencing this choice were "Prior Experience" (63.2%, 12/19), "Habit" (47.4%, 9/19), "Preoperative Labs/Electrolytes" (47.4%, 9/19), "Other" (36.8%, 7/19), and "Standardized Guidelines" (10.0%, 2/19). Only 47.4% (9/19) of physicians "Always" checked preoperative labs/electrolytes. Although 72.7% (13/18) of physicians responded that they were not using a standardized guideline, 88.2% (15/17) indicated that they would like to see an evidence-based, practical guideline implemented. The central theme identified in the qualitative data was the perceived need for a perioperative fluid guideline, co-existing with the idea that "guidelines are suggestions for good practice, not rules of engagement"; Individual patient factors, including preoperative labs and electrolytes, need to be considered in each case.

Discussion: Almost three quarters of the physicians used RL, which is in keeping with the literature. Interestingly, only one physician considered cost. A standardized guideline could be beneficial to all physicians, and especially trainees.

Conclusions: As expected, there were not a wide variety of IV fluids chosen by physicians, with numerous factors affecting this choice. Very few physicians were using a standardized guideline, as none have been established in Canada. This illustrates the need for an evidence-based guideline upon which future practice may be based.

Recommendation: Further research is needed to develop a standardized guideline for perioperative fluid prescribing.

References:

1. Yeager M, Spence B. Perioperative fluid management: current consensus and controversies. *Semin Dial.* 2006;19(6):472-9.
2. Peng Z-Y, Kellum J. Perioperative fluids: a clear road ahead? *Curr Opin Crit Care.* 2013;19(4):353-8.
3. Pearse R, Ackland G. Perioperative fluid therapy. *BMJ* [Internet]. 2012 apr 26 [cited 2016 Jan 5]; 344:e2865. Available from: <http://www.bmj.com/content/344/bmj.e2865>.
4. Walsh S, Cook E, Bentley R, Farooq N, Gardner-Thorpe J, Tang T, et al. Perioperative fluid management: prospective audit. *Int J Clin Pract.* 2007;62(3):492-7.
5. Chong P, Greco E, Stothart D, Maziak D, Sundaresan S, Shamji F, et al. Substantial variation of both opinions and practice regarding perioperative fluid resuscitation. *Can J Surg.* 2009;52(3):207-14.
6. Shields C. Towards a new standard of perioperative fluid management. *Ther Clin Risk Manag.* 2008;4(2):569-71.
7. Chappell D, Jacob M, Hoffman-Kiefer K, Conzen P, Rehm M. A rational approach to perioperative fluid management. *Anesthesiol.* 2008;109(4):723-40.
8. Sands Canada. I.V. Supplies [Internet]. Brockville, ON: Sands Canada; 2015 [cited 2016 Jan 5]. Available from: <http://www.sands.ca/doctor-dental/iv-supplies>

Patterns of Alcohol Abuse Related Disorders and Thiamine Administration in a Canadian Prairie Emergency Department: A Retrospective Chart Review

Kaelyn Humber, FMRII; Bradley Joss, FMRII; Sarah Liskowich, MD, CCFP;
Randy Radford, MD, CCFP(EM); Kelechi Eguzo, MD, MPH
Department of Academic Family Medicine, University of Saskatchewan

ABSTRACT

Background:

Alcohol abuse is a problem in Saskatchewan with about 14% of residents self-reported as 'heavy drinkers'. There is need to ensure that people presenting with alcohol abuse disorders (AAD) receive adequate administration of thiamine to prevent Wernicke's encephalopathy (WE), a potentially fatal consequence of alcohol abuse. In the absence of a widely accepted North American thiamine administration guideline, this research sought to compare thiamine administration patterns in a prairie Emergency Department against the Royal College of Physicians' 2002 Report on Alcohol Guideline (Thiamine 500mg IV 3 times daily for ≥ 3 days).

Research Questions:

1. What were the physicians' practice pattern regarding thiamine administration for patients visiting a prairie Emergency Rooms?
2. How does this compare with the British guidelines for thiamine administration in alcohol abuse?

Methods: A retrospective chart review of 211 consecutive patients managed for AAD. Data included: demographics; medical and social history; as well as, details of thiamine administration (route, dose, frequency). Patients were divided into low- and high-risk categories as per the guideline. Data was analyzed using descriptive statistics, Chi-square and t-tests.

Results and Discussion: Most patients were male (64%, 135/211), middle-aged (36-54 years, 44.1%, 93/211), and resided in an urban underserved community (28%, 59/211). Most patients (80.6%, 170/211) abused only alcohol. Alcohol intoxication was the most common diagnosis (45%, 95/211) followed by alcohol abuse (22.7%). Almost 82% (172/211) of the patients were 'high-risk' and homeless ($p=0.001$). Only 29% (61/211) of patients received thiamine but none of them met the British Guideline. Most patients received intravenous thiamine, but 45.9% of them had oral doses. Most patients who received thiamine were given 100mg once only. Significantly fewer homeless patients received thiamine when compared to those with addresses ($p=0.022$).

Conclusions: Physicians in a Canadian prairie Emergency Department did not meet the British Thiamine Administration Guidelines for high-risk patients. Homelessness was identified as a contributing factor to alcohol abuse.

Recommendation: Explore interventions that could improve physicians' practice pattern regarding thiamine administration for patients presenting with alcohol abuse.

References:

1. Thomson AD, Cook CC, Touquet R, Henry JA. Royal College of Physicians, London. The royal college of physicians report on alcohol: guidelines for managing Wernicke's encephalopathy in the accident and emergency department. *Alcohol Alcohol*. 2002 Nov-Dec;37(6):513-21.
2. Thomson AD, Baker H, Leevy CH. Pattern of 35-thiamine hydrochloride absorption in the malnourished alcoholic patient. *J Lab Clin Med*. 1970;76:34-45.
3. Day E, Bentham PW, Callaghan R, Kuruvilla T, George S. Thiamine for prevention and treatment of Wernicke-Korsakoff syndrome in people who abuse alcohol. *Cochrane Database Syst Rev*. 2013 Jul 1;7(7):004033.
4. Thomson AD, Marshall EJ. The treatment of patients at risk of developing Wernicke's encephalopathy in the community. *Alcohol Alcohol*. 2006 Mar-Apr;41(2):159-67.
5. Herve C, Beyne P, Letteron Ph, Delacoux E. Comparison of erythrocyte transketolase activity with thiamine and thiamine phosphate ester levels in chronic alcoholic patients. *Clin Chim Acta*. 1995 Jan;234(1-2):91-100.
6. Thomson AD, Guerrini I, Marshall EJ. Wernicke's encephalopathy: role of thiamine. *Pract Gastroenterol*. 2009;75:21-30.
7. Statistics Canada. Heavy drinking, by sex, provinces and territories [Internet]. Ottawa, ON: Statistics Canada;2014 [cited 2014 Dec 13]. Available from: <http://www.statcan.gc.ca.cyber.usask.ca/tables-tableaux/sum-som/l01/cst01/health80a-eng.htm>.
8. Statistics Canada. Heavy drinking 2009/2010 by health region [Internet]. Ottawa, ON: Statistics Canada; 2014 [cited 2014 Dec 13]. Available from: <http://www.statcan.gc.ca.cyber.usask.ca/pub/82-583-x/2011001/article/11570-eng.pdf>
9. Harper C, Fornes P, Duyckaerts C, Lecomte D, Hauw JJ. An international perspective on the prevalence of the Wernicke-Korsakoff syndrome. *Metab Brain Dis*. 1995 Mar;10(1):17-24.
10. Torvik A, Lindboe C, Rogde S. Brain lesions in alcoholics: a neuropathological study with clinical correlations. *J Neurol Sci*. 1982 Nov;56(2-3):233-48.
11. Pfefferbaum A, Adalsteinsson E, Bell RL, Sullivan EV. Development and resolution of brain lesions caused by pyridoxamine- and dietary-induced thiamine deficiency and alcohol exposure in the alcohol-preferring rat: a longitudinal magnetic resonance imaging and spectroscopy study. *Neuropsychopharmacology*. 2007 May;32(5):1159-77.
12. Thomson AD, Marshall EJ. The natural history and pathophysiology of Wernicke's encephalopathy and Korsakoff's psychosis. *Alcohol Alcohol*. 2006 Mar-Apr;41(2):151-8.
13. Martin PR, Singleton CK, Hiller-Sturmhofel S. The role of thiamine deficiency in alcoholic brain disease. *Alcohol Res Health*. 2003;27(2):134-42.
14. Thomson AD. Mechanisms of vitamin deficiency in chronic alcohol misusers and the development of the Wernicke-Korsakoff syndrome. *Alcohol Alcohol*. 2000 May-Jun;35(Suppl 1):2-7.
15. Lough ME. Wernicke's encephalopathy: expanding the diagnostic toolbox. *Neuropsychol Rev*. 2012 Jun;22(2):181-94.
16. Cresce ND, MacManus KA, Sifri CD, Wilson BB. The clinical picture: Encephalopathy despite thiamine repletion during alcohol withdrawal. *Clev Clin J Med*. 2014;81(6):350-2.
17. Victor MV, Adams RC, Collins GH. The Wernicke-Korsakoff syndrome and related neurologic disorders due to alcoholism and malnutrition. Contemporary neurology series. 2nd ed. Philadelphia, PA: F.A.Davis Company;1989.231 p.

18. Thomson AD, Baker H, Leevy CH. Pattern of 35-thiamine hydrochloride absorption in the malnourished alcoholic patient. *J Lab Clin Med.* 1970;76:34-45.
19. Thomson AD, Cook CC, Touquet R, Henry JA. Royal College of Physicians, London. The royal college of physicians report on alcohol: guidelines for managing Wernicke's encephalopathy in the accident and emergency department. *Alcohol Alcohol.* 2002 Nov-Dec;37(6):513-21.
20. Latt N, Dore G. Thiamine in the treatment of Wernicke encephalopathy in patients with alcohol use disorders. *Int Med J.* 2014 Sept;44(9):911-5.
21. Nilsson M, Sonne C. Diagnostics and treatment of Wernicke-Korsakoff syndrome patients with an alcohol abuse. *Ugeskr Laeger.* 2013 Apr 1;175(14):942-4.
22. Meier S, Daepfen JB. Prevalence, prophylaxis and treatment of Wernicke encephalopathy. Thiamine, how much and how do we give it?. *Rev Med Suisse.* 2005 Jun 29;1(26):1740-4.
23. Damsgaard L, Ulrichsen J, Nielsen MK. Wernicke's encephalopathy in patients with alcohol withdrawal symptoms. *Ugeskr Laeger.* 2010 Jul 12;172(28):2054-8.
24. Ambrose M, Bowden S, Whelan G. Thiamin treatment and working memory function of alcohol-dependent people: preliminary findings. *Alcohol Clin Exp Res.* 2001 Jan;25(1):112-6.
25. So Y. Wernicke Encephalopathy UptoDate [Internet]. Alphen aan den Rijn, NL: Wolters Kluwer Health; 2014 [cited 2014 Dec 5]. Available from: <http://www.uptodate.com/contents/wernicke-encephalopathy>
26. Cook CC, Hallwood PM, Thomson AD. B-vitamin deficiency and neuro-psychiatric syndromes in alcohol misuse. *Alcohol Alcohol.* 1998;33(4):317-36.
27. No authors listed. Alcohol withdrawal syndrome: how to predict, prevent, diagnose and treat it. *Prescrire Int.* 2007 Feb;16(87):24-31.
28. Thomson AD, Cook CC. Parenteral thiamine and Wernicke's encephalopathy: The balance of risks and perception of concern. *Alcohol Alcohol.* 1997 May-Jun;32(3):207-9.
29. Isenberg-Grzeda E, Chabon B, Nicolson SE. Prescribing thiamine to inpatients with alcohol use disorders: how well are we doing?. *J Addict Med.* 2014 Jan-Feb;8(1):1-5.
30. Centerwall BS, Criqui CM. Prevention of the Wernicke-Korsakoff syndrome: a cost-benefit analysis. *NEJM.* 1978;299(6):285-9.

A Comparison of Hand Hygiene Rates Through Direct and Indirect Observation in a Small Community Hospital

Jonathan Starr, FMRII; Isa Saidu, FMRII; Hong Tran, FMRII; Irene Lam, FMRII;
Aaron Prystupa, MD, CCFP; Shari McKay, MA
Department of Academic Family Medicine, University of Saskatchewan

ABSTRACT

Background: Hospital-associated infections (HAIs) impact patient morbidity, mortality, and health care costs. Proper hand hygiene is an integral part of preventing HAIs, but most of the current data on hand hygiene practices is confounded by the Hawthorne effect, whereby hand washing behavior is modified in response to being observed. Thus, current data may inaccurately represent real world practices. Research that addresses this incongruence will provide information that will support better hand hygiene and a reduction in HAIs.

Hypothesis/Research Questions: The purpose of this research was to determine the rate of proper hand hygiene when individuals were not directly observed and compare it to the local direct observed hand washing rate. Institutional hand washing rates are often reported as those before and after patient contact. In this health region, the average of the before and after events was 89%. We postulated that hand hygiene rates would decline when individuals were being indirectly observed.

Methods/Methodology: This non-participant observational study was conducted at a small city hospital. The observed were healthcare workers (HCW) and non-healthcare workers (nHCW) in the ED and a 10 bed patient floor of the hospital. Hand hygiene compliance was defined as using alcohol gel before and after entering a patient room. Indirect observations were made by unmarked Family Medicine residents.

Results/Findings: Over three days 954 events were collected in the ED and a medical floor. The overall hand hygiene rate was 31.2% (298/954). The hand hygiene rate for nHCW of 7.3% (13/175) was significantly lower than the rate of 36.7% (285/776) for HCW ($p=.000$) and the HCW rate was 2.43 times lower than the health region observed hand hygiene rate of 89%.

Discussion: The low hand hygiene rate for nHCW workers was in part explained by the inclusion of non-health care hospital staff, many of whom did wear gloves but did not practice hand hygiene as they moved from room to room. The lower rate for HCW relative to health region statistics suggests that current data collection methods need adjustment, and indicates a need to better understand and address barriers that prevent good hand hygiene.

Conclusions: Hand hygiene rates decreased when there was no knowledge of being observed. Therefore, current means of data collection using direct observation may not reflect hand hygiene rates accurately.

Recommendation: Hand hygiene practices for non-medical personnel need to be addressed, as do alternative methods of hand hygiene data collection.

References:

1. Plowman R, Graves N, Griffin MAS, Roberts JA, Swan AV, Cookson B, Taylor L. The rate and cost of hospital-acquired infections occurring in patients admitted to selected specialties of a district general hospital in England and the national burden imposed. *J Hosp Infect.* 2001 March;47(3): 198-209.
2. Public Health Agencies of Canada. The Chief Public Health Officer's Report on the State of Public Health in Canada 2013: Infectious Disease – the Never-ending Threat [Internet]. Ottawa, ON: Public Health Agencies of Canada; 2013 [updated 2013 Oct 23; cited 2014 Oct 6]. <http://www.phac-aspc.gc.ca/cphorsphc-respcacsp/2013/infections-eng.php>
3. Gravel D, Taylor G, Ofner M, Johnston L. Point prevalence survey for healthcare-associated infections within Canadian adult acute-care hospitals. *J Hosp Infect.* 2007;66(3):243-8.
4. Lee GC, Boyd NK, Frei CR. The rise in *Clostridium difficile* infection incidence among hospitalized adults in the United States: 2001-2010. *Am J Infect Control.* 2014 Oct;42(10):1028-32.
5. World Alliance for Patient Safety. WHO guidelines on hand hygiene in healthcare [Internet]. Geneva, CH: World Health Organization; 2009 May [cited 2009 Jun 24]. Available from: http://whqlibdoc.who.int/publications/2009/9789241597906_eng.pdf
6. Provincial Infectious Diseases Advisory Committee. Best practices for infection prevention and control programs in Ontario in all healthcare settings [Internet]. Toronto, ON: Ontario Ministry of Health and Long-Term Care; 2008 [cited 2008 Nov 24]. Available from: http://www.health.gov.on.ca/english/providers/program/infectious/diseases/ic_ipcp.html
7. Filho MA, Marra AR, Magnus TP, Rodrigues RD, Prado M, de Souza Santini TR, et al. Comparison of human and electronic observation for the measurement of compliance with hand hygiene. *Am J Infect Control.* 2014 Sep 15;42(11):1188-92.
8. Hinz KL, McGee HM, Huitema BE, Dickinson AM, Van Enk RA. Observer accuracy and behavior analysis: data collection procedures on hand hygiene compliance in a neurovascular unit. *Am J Infect Control.* 2014 Oct;42(10):1067-73.
9. Walker JL, Sistrunk WW, Higginbotham MA, Burks K, Halford L, Goddard L, et al. Hospital hand hygiene compliance improves with increased monitoring and immediate feedback. *Am J Infect Control.* 2014 Oct;42(10): 1074-8.
10. Haessler S. The Hawthorne effect in measurements of hand hygiene compliance: a definite problem, but also an opportunity. *BMJ Qual Saf.* 2014;23(12):965-7.
11. Provincial Infectious Diseases Advisory Committee. Best practices for cleaning, disinfection and sterilization in all healthcare settings [Internet]. Toronto, ON; Ontario Ministry of Health and Long-Term Care; 2007 Apr [Updated 2010 Feb; cited 2010 May 1]. Available from: http://www.publichealthontario.ca/en/eRepository/PIDAC_Cleaning_Disinfection_and_Sterilization_2013.pdf.
12. British Columbia Ministry of Health. Best practices for hand hygiene in all healthcare settings and programs [Internet]. Victoria, BC: British Colombia Ministry of Health; 2012 Jul [cited 2016 Jan 5]. Available from: <http://www.health.gov.bc.ca/library/publications/year/2012/best-practice-guidelines-handhygiene.pdf>.

13. Anderson J, Gosbee LL, Bessesen M, Williams L. Using human factors engineering to improve the effectiveness of infection prevention and control. Crit Care Med. 2010 Aug;38(8 Suppl):S269-S281.
14. Kilpatrick C, Hosie L, Berkshire R, Storr J. Hand hygiene – when and how should it be done? Nurs Times.2012;109(38):16-8. <http://www.nursingtimes.net/hand-hygiene-when-and-how-should-it-be-done/5063463.article>.

Informed consent in a teaching clinic: Do patients understand who provided their care?

Matthew R Johnson, FMRII; Archie N Robertson, FMRII; Desiree C Rouleau, FMRII;
Breanna Davis, MD, CCFP; Shari McKay, MA
Department of Academic Family Medicine, University of Saskatchewan

ABSTRACT

Background: Distributed medical education (DME) is a model in which medical learners spend time working outside of academic centers. In these circumstances patients may not be familiar with medical learners or their level of training. In addition, there may not be policies in place to inform them about who is providing their care.

Research Questions: After being seen in a Prince Albert medical clinic were patients aware that they received medical care from a family medicine resident (FMR)? If so, were they informed when they booked the appointment or when they arrived? If given the option, would patients choose to see a resident for their care? We hypothesized that a substantive portion of patients would be unaware that a family medicine resident (FMR) provided their care.

Methods/Methodology: Patients over the age 18 who had received care from a FMR received a survey after leaving the exam room. Completed surveys were collected and stored securely and anonymously. Clinic staff were unaware of the survey content. IBM SPSS v.23 was used for the descriptive analysis.

Results: Out of 111 patients, 79 surveys were completed, resulting in a response rate of 74.5%. Ninety two percent of the respondents (73/79) were aware that they had received care from a resident. Of those who were aware, 56.2% (41/73) were informed when they booked their appointment, and 67.1% (47/70) were informed when they arrived. If given the option, 95.7% (66/69) indicated that they would choose to see a resident.

Discussion: In this clinic, patients were aware when they were under the care of a FMR. They may have been informed by the receptionist, Medical Office Assistant, signs, or the resident themselves. Regardless of when patients were informed, they appeared satisfied with their care.

Conclusions: Most patients seen by residents in this study were aware that they received care from a Family Medicine Resident. These patients were not always aware of this until they arrived at their appointment. This is a well-established training site, in which patients appear to be habituated to the presence of medical residents. A study in a less established DME site may be useful to determine if these findings are typical for all sites.

References:

1. Pallin DJ, Harris R, Johnson CI, Giraldez E. Is consent "informed" when patients receive care from medical trainees? *Acad Emerg Med.* 2008;15(12):1304-8.
2. Graber M, Pierre J, Charlton M. Patient opinions and attitudes toward medical student procedures in the emergency department. *Acad Emerg Med.* 2003;10(12):1329-33.
3. Silver-Isenstadt A, Ubel P. Erosion in medical students' attitudes about telling patients they are students. *J Gen Intern Med.* 1999;14:481-7.
4. Mora-Pinzon M, Lal A, Edquist S, Francescatti A, Hughes T, Hayden D, Brand M, Saclarides T. What do patients think of medical students during their hospitalization? One institution's experience. *Am Surg.* 2013;79(12):1235-7.
5. Gress TW, Flynn JA, Rubin HR, Simonson L, Sisson S, Thompson T, Brancati FL. Effect of student involvement on patient perceptions of ambulatory care visits. *J Gen Intern Med.* 2002;17(6):420-7.
6. Santen SA, Hemphill RR, Prough EE, Perlowski AA. Do patients understand their physician's level of training? A survey of emergency department patients. *Acad Med.* 2004;79(2):139-43.
7. Hemphill RR, Santen SA, Rountree CB, Szmit AR. Patients' understanding of the roles of interns, residents, and attending physicians in the emergency department. *Acad Emerg Med.* 1999;6(4):339-43.
8. Malcolm CE, Wong KK, Elwood-Martin R. Patients' perceptions and experiences of family medicine residents in the office. *Can Fam Physician.* 2008;54(4):570-6.

The Prevalence of Coronary Artery Disease in a Saskatchewan Family Medicine Clinic

Natasha Desjardins, FMRII; Kristine Pederson, FMRII;
Kevin Wasko BA, MA, MD, CCFP; Kelechi Eguzo, MD, MPH
Department of Academic Family Medicine, University of Saskatchewan

ABSTRACT

Background: There is limited information on the prevalence of coronary artery disease (CAD) and its risk factors in southwest Saskatchewan. The unique population characteristics of Cypress Health Region (CHR) are that two-thirds of the population is older than 45 years, 14% are Aboriginal, 6% are Hutterites and it is largely rural which makes it important to better understand the context of CAD in this region.

Research Question: What is the prevalence of CAD among the patients receiving ongoing primary care at the Associate Family Physicians Clinic (AFPC)?

Methods/Methodology: A retrospective chart review of all patients aged 40 years of age or older and who received ongoing care at AFPC between January 1, 2013 and December 31, 2014 (n=2373). Data collected included diagnosis of CAD and its risk factors inclusive of hypertension, hyperlipidemia, age, sex, diabetes mellitus, family history, active smoking status, body mass index, and residence (rural/urban). Data was analyzed using descriptive statistics.

Results and Discussion: A total of 357 patients were diagnosed with CAD during this time, with a prevalence of 15% (357/2373). The average patient with CAD was 71 (± 11) years old with average BMI of 29.8 (± 5.8) kg/m². Up to 257 patients (71.9%; 257/357) had at least three risk factors. Hypertension was the most commonly identified risk factor (n=310), followed by hyperlipidemia (n=307), while active smoking was the least common (n=43). Each patient attended an average of 11 (± 6) clinic visits during the time frame. Individuals who resided in the urban center (Swift Current) had a significantly higher clinic attendance when compared with patients from rural areas (p=0.02), but this did not significantly affect their outcome (alive or deceased; p=1.0).

Conclusions: There was a high prevalence of CAD risk factors especially hyperlipidemia and hypertension. Given the unique populations, it is important that clinicians be diligent in screening at-risk individuals.

Recommendation: Further research is required to study the distribution of CAD and its risk factors among specific population groups.

References:

1. Brunt JH, Reeder B, Stephenson P. A comparison of physical and laboratory measures between two Hutterite leute and the rural Saskatchewan population. *Can J Public Health*. 1994;85(5):299-302.
2. Cypress Health Region. 2013-2014 Annual Report to the Minister of Health. Swift Current (SK): Cypress Regional Hospital; 2014. 110 p.
3. Statistics Canada. Leading causes of death, by sex [Internet]. Ottawa (ON): Government of Canada; [updated 2014 Jan 28; cited 2014 Dec 15]. Available from: <http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/hlth36a-eng.htm>.
4. Bielak LF, Yu P, Ryan KA, Rumberger JA, Sheedy PFI, Turner ST, et al. Differences in prevalence and severity of coronary artery calcification between two non-hispanic white populations with diverse lifestyles. *Atherosclerosis*. 2008;196(2):888-95.
5. Vanasse A, Courteau J, Cohen AA, Orzanco MG, Drouin C. Rural-urban disparities in the management and health issues of chronic diseases in Quebec (Canada) in the early 2000s. *Rural Remote Health*. 2010 Oct 27;10(1548):1-15.
6. Mamudu HM, Paul T, Veeranki, SP, Wang L, et al. Subclinical atherosclerosis and relationship with risk factors of coronary artery disease in a rural population. *Am J Med Sci*. 2015;350(4):257-62.
7. Canadian Institute for Health Information. How healthy are rural Canadians? An assessment of their health status and it's determinants. Ottawa (ON): Canadian Institute for Health Information; 2006.
8. Mozaffarian D, Benjamin EJ, Go AS, et al. Heart Disease and Stroke Statistics- 2015 update: a report from the American Heart Association. *Circulation*. 2015 Jan 27;131(4):e29-e322.

Trends in Hospital Utilization for Residents of Long-term Care Facilities in Swift Current, SK

Omar Said, FMRII; Jelisia Kamel, FMRII;
Tara Lee, MD, CCFP; Kelechi Eguzo, MD, MPH
Department of Academic Family Medicine, University of Saskatchewan

ABSTRACT

Background: About 35% of all hospitalizations in Canada were for persons >75 years, 10% of whom were transferred from long-term care (LTC) facilities. It is assumed that some of these cases could have been managed by Registered and/or Licensed Practical Nurses at LTC facilities. This study aims to understand the trends in hospitalization of LTC residents, and to estimate the burden of potentially avoidable hospitalizations.

Research Question: What is the trend in hospital admissions for residents of LTC facilities in Swift Current between January 1, 2014 and December 31, 2015, in terms of diagnosis, patients' profile and care provided?

Methods/Methodology:

This was a retrospective chart review involving all residents of LTC facilities, aged >18 years who were transferred to the Cypress Regional Hospital during January 1, 2014 and December 31, 2015. Data collected included: demographics; diagnosis; care provided; duration of hospitalization; and, an assessment of treatability at LTC facility. Data analysis involved descriptive statistics, Chi-squares and t-tests.

Results and Discussion: A total of 149 patients met the inclusion criteria. The average age was 83 (± 10) years, and 56.1% (83/148) of them were female. The three top diagnoses involved the musculoskeletal (26.2%, 39/149), respiratory (15.4%, 23/149) and urogenital (14.1%, 21/149) systems. Most patients (75.8%, 113/149) required no procedures while 34.9% (52/149) received antibiotics. Half of the patients spent one day at the hospital (range 0-65 days). There was no significant seasonal variation in the presentation of these illnesses ($p=0.085$).

Patients with a respiratory illness stayed significantly longer than those with urogenital complaints (9 vs 5 days, $p=0.005$). Eighty percent (120/149) of cases were not treatable at the LTC facility, especially those with respiratory illnesses. Most patients were elderly and required complex care.

Conclusion: Musculoskeletal and respiratory system complaints were the most common reasons for seeking care, and only 20% of the cases could be classified as potentially not requiring hospitalization.

Recommendation: Improve the capacity in LTC facilities to treat and manage patients at the LTC facility.

References:

1. Kane RA. Long term care and a good quality of life: bringing them closer together. *Gerontologist*. 2001;41(3):293–304.
2. Shi L, Singh D. *Delivering health care in America: a systems approach*. 2nd ed. Gaithersburg, MD: Aspen Publishers; 2001.
3. Brodsky J, Habib J, Hirschfeld MJ. *Key policy issues in long-term care*. Geneva, CH: World Health Organization; 2003.
4. Gruneir A, Bell CM, Bronskill SE, Schull M, Anderson GM, Rochon PA. Frequency and pattern of emergency department visits by long-term care residents—a population-based study [Internet]. *J Am Geriatr Soc*. 2010 Mar;58(3):510-7. doi: 10.1111/j.1532-5415.2010.02736.x.
5. Government of Saskatchewan. *eHealth Saskatchewan: Covered Population 2015: Province of Saskatchewan* [Internet]. Regina, SK: Government of Saskatchewan; 2015 [cited 2016 Jan 5]. Available from: <http://population.health.gov.sk.ca/skpop.htm>.

Methadone and Palliative Pain Management: Physicians' Perceptions of the Barriers to Prescribing Methadone in Saskatchewan

Lisa Harasen, FMRII; Jared Oberkirsch, FMRII;
Jennifer Kuzmich, MD, CCFP, FCFP; Kelechi Eguzo, MD, MPH
Department of Academic Family Medicine, University of Saskatchewan

ABSTRACT

Background:

Effective pain management is an essential component of palliative care. Opioid analgesics are widely utilized in this setting. Methadone is less commonly prescribed despite research that demonstrates its efficacy, favourable side effect profile, and cost effectiveness when compared with other opioids. Canadian physicians require special authorization/exemption to prescribe methadone for analgesia. This research aims to explore the perceptions of family physicians in Saskatchewan regarding use of methadone for pain management in palliative care.

Research Questions: What are the practice patterns/attitudes of family physicians in Saskatchewan regarding use of methadone for analgesia in palliative care?

Methods/Methodology: This was a cross-sectional, mixed methods study involving a survey with open-ended questions. Data collected include demographics, methadone prescribing awareness, practice and perception, as well as potential barriers encountered. At least 600 family physicians across Saskatchewan were invited to participate in the online and mail-based survey.

Results and Discussion: The response rate was 17.8% (107/600). Most respondents (55.6%, 55/99) practiced in the urban centers, and half of them had practiced independently for at least eight (range 1-45) years. Up to 83% (88/107) of respondents were involved in some level of palliative care while 15% (16/107) had the methadone prescription exemption. The most common reasons for not possessing the exemption were 'lack of time' and the perception that 'it was not relevant to their current practice'. There were concerns that prescribing methadone 'would attract drug seeking patients to their practice and increase the demand for their involvement in addictions medicine'. Most respondents (72%, 44/61) were interested in more training on the subject, especially as 'self-directed learning'.

Conclusions: Most family physicians in Saskatchewan have practices that involve palliative care, but do not hold a methadone prescription exemption. Concerns about the time required for training were among the reasons for not holding the exemption.

Recommendation: Create an online, self-directed learning course related to methadone use for palliative pain management.

References:

1. Wootton M. Morphine is not the only analgesic in palliative care: literature review. *J Adv Nurs*. 2004 Mar;45(5):527-32.
2. Health Canada. Methadone program. Ottawa, ON: Health Canada; 2011 Jun 10[cited 2016 Jan 5]. Available from: <http://www.hc-sc.gc.ca/hc-ps/substancontrol/exemptions/methadone-eng.php>.
3. Soares LG. Methadone for cancer pain: what have we learned from clinical studies? *Am J Hosp Palliat Care*. 2005 May-Jun;22(3):223-7.
4. Shaiova L, Sperber KT, Hord ED. Methadone for refractory cancer pain. *J Pain Symptom Manage*. 2002 Mar;23(3):178-80.
5. Morley JS, Watt JW, Wells JC, Miles JB, Finnegan MJ, Leng G. Methadone in pain uncontrolled by morphine. *Lancet*. 1993 Nov 13;342(8881):1243.
6. Salpeter SR, Buckley JS, Bruera E. The use of very-low-dose methadone for palliative pain control and the prevention of opioid hyperalgesia. *J Palliat Med*. 2013 Jun;16(6):616-22.
7. Gazelle G, Fine PG. Methadone for pain: no. 75. *J Palliat Med*. 2004 Apr;7(2):303-4.
8. Good P, Afsharimani B, Movva R, Haywood A, Khan S, Hardy J. Therapeutic challenges in cancer pain management: a systematic review of methadone. *J Pain Palliat Care Pharmacother*. 2014;28(3):197-205.
9. Cruciani RA, Sekine R, Homel P, Lussier D, Yap Y, Suzuki Y, Schweitzer P, Yancovitz SR, Lapin JA, Shaiova L, Sheu RG, Portenoy RK. Measurement of QTc in patients receiving chronic methadone therapy. *J Pain Symptom Manage*. 2005 Apr;29(4):385-91.
10. Von Roenn JH, Cleeland CS, Gonin R, Hatfield AK, Pandya KJ. Physician attitudes and practice in cancer pain management: a survey from the eastern cooperative oncology group. *Ann Intern Med*. 1993 Jul 15;119(2):121-6.
11. Breuer B, Cruciani R, Portenoy RK. Pain management by primary care physicians, pain physicians, chiropractors, and acupuncturists: a national survey. *South Med J*. 2010 Aug;103(8):738-47.
12. Scanlon MN, Chugh U. Exploring physicians' comfort level with opioids for chronic noncancer pain. *Pain Res Manag*. 2004;9(4):195-201.
13. Mercadante S, Valle A, Agnelotti C, Caruselli A. The poor use of methadone in Italian hospices. *Supp Care Cancer*. 2013 Aug;21(8):2225-8.
14. Hawley P, Liebscher R, Wilford J. Continuing methadone for pain in palliative care. *Pain Res Manag*. 2013 Mar-Apr;18(2):83-6.
15. Thorpe C, Ryan B, McLean SL, Burt A, Stewart M, Brown JB, et al. How to obtain excellent response rates when surveying physicians. *Family Practice*. 2009. 26(1): 65-8.
16. Bruera E, Palmer JL, Bosnjak S, Rico MA, Moyano J, Sweeney C, Strasser F, Willey J, Bertolino M, Mathias C, Spruyt O, Fisch MJ. Methadone versus morphine as a first-line strong opioid for cancer pain: a randomized, double-blind study. *J Clin Oncol*. 2004 Jan 1;22(1):185-92.
17. Bruera E, Sweeney C. Methadone use in cancer patients with pain: a review. *J Palliat Med*. 2002 Feb;5(1):127-38.
18. Bruera ED, Hanson J, Lawlor PG, Turner KS. Dose ratio between morphine and methadone in patients with cancer pain: a retrospective study. *Cancer*. 1998 Mar 18;82(6):1167-73.

19. Gallagher R. Methadone: An effective, safe drug of first choice for pain management in frail older adults. *Pain Med.* 2009 Mar;10(2):319-26.
20. Howard R, Howard P. What GPs need to know about palliative-care drugs: methadone. *Prescriber.* 2012 Oct 9;23(18):34-8.
21. Manfredonia JF. Prescribing methadone for pain management in end-of-life care. *J Am Osteopath Assoc.* 2005 Mar;105(3 Suppl 1):S18-S21.
22. Marlowe KF, Geiler R. Pharmacist's role in dispensing opioids for acute and chronic pain. *J Pharm Pract.* 2012 Oct 1;25(5):497-502.
23. Oneschuk D, Bruera E. Respiratory depression during methadone rotation in a patient with advanced cancer. *J Palliat Care.* 2000;16(2):50-4.
24. Parsons HA, de la Cruz M, El Osta B, Li Z, Calderon B, Palmer JL, Bruera E. Methadone initiation and rotation in the outpatient setting for patients with cancer pain. *Cancer.* 2010 Jan 15;116(2):520-8.
25. Pereira J, Lawlor P, Vigano A, Dorgan M, Bruera E. Equianalgesic dose ratios for opioids: a critical review and proposals for long-term dosing. *J Pain Symptom Manage.* 2001 Aug;22(2):672-87.
26. Porteous A, Robson P, Lee M. End-of-life management of patients who have been established on oral methadone for pain control. *J Palliat Med.* 2013 Aug;16(8):820.
27. Shaiova L. The role of methadone in the treatment of moderate to severe cancer pain. *Support Cancer Ther.* 2005 Apr;2(3):176-80.
28. Vigano A, Fan D, Bruera E. Individualized use of methadone and opioid rotation in the comprehensive management of cancer pain associated with poor prognostic indicators. *Pain.* 1996 Sept;67(1):115-9.
29. Weschules DJ, McMath JA, Gallagher R, Alt CJ, Knowlton CH. Methadone and the hospice patient: prescribing trends in the home-care setting. *Pain Med.* 2003 Sep;4(3):269-76.
30. Supreme Court of Canada. *Carter v. Canada (Attorney General)*, 2015 SCC 5 [Internet]. Ottawa, ON:Supreme Court of Canada. 2015 Feb 6 [cited 2016 Jan 5]. Available from: https://d3n8a8pro7vhmx.cloudfront.net/dwdcanada/pages/53/attachments/original/1449527225/carter_v._canada_-_decision.pdf?1449527225.
31. Canadian Association for Community Living, Council of Canadians with Disabilities, National Pensioners Federation, Congress of Union Retirees of Canada, Canadian Society of Palliative Care Physicians, Wasylenko, Eric. (Clinical Lecturer, Division of Palliative Medicine, Department of Oncology, University of Calgary; Clinical Lecturer, John Dossetor Health Ethics Centre, University of Alberta, MD CCFP BSc MHSc (bioethics)), Simon Dr. Jessica. (Associate Professor, Division Head Palliative Medicine, Oncology, MD, FRCPC), Frank, Gary E. (Nurse Consultant Palliative Care), Fergusson, Jean (Nurse Consultant Palliative Care), Mayo, Patrick R. (Clinical Practice Leader- palliative care, pharmacology, MD). Open Letter to: Honourable Justin Trudeau (Prime Minister of Canada), Honourable Jody Wilson-Raybould (Minister of Justice and the Attorney General of Canada), Honourable Dr. Jane Philpott (Minister of Health). 2016 Apr 13 [cited 2016 May 10]. 3 leafs. Available from: <http://www.cspcp.ca/wp-content/uploads/2016/04/open-letter-palliative-care.pdf>.

Effectiveness of Transdermal Nitroglycerine Patch for Treatment of Tendinopathy in Primary Care

Elizabeth Machnee, FMRII; Lucas Zahorski, FMRII;
Martin Heroux, MD, CCFP; Kelechi Eguzo, MD, MPH
Department of Academic Family Medicine, University of Saskatchewan

ABSTRACT

Background:

Tendinopathies involving the rotator cuff, elbow, knee and heel are common musculoskeletal problems in family practice. Previous clinical trials on the efficacy of transdermal nitroglycerin patch (GTN-P) on tendinopathy yielded equivocal findings, in terms of pain relief, range of motion and muscle strength. This study aimed to explore the effectiveness of GTN-P for management of tendinopathy in a primary care setting.

Research Question:

Is the use of GTN-P effective in managing tendinopathy in the primary care setting?

Methods/Methodology:

This was a retrospective chart review of 70 consecutive patients with a diagnosis of tendinopathy in a primary care setting. Some patients (n=25) were exposed to GTN-P while others (n=45) received conventional treatment (physiotherapy or analgesia). The outcomes studied were self-reported pain, range of motion (ROM) and muscle strength; measured at baseline, 6, 12 and 24 week follow-up visits. Data analysis involved descriptive statistics, Chi-square, Mann-Whitney U and t-tests.

Results and Discussion:

Of the 70 patients studied, 27.1% (19/70) had lateral epicondylitis; 24.3% (17/70) had medial epicondylitis; 4.3% (3/70) had patellar tendonitis; 2.9% (2/70) achilles tendinopathy; and, 41.4% (29/70) had rotator cuff tendinopathy. There was no significant difference in average pain scores at six weeks ($p=0.309$). Patients exposed to GTN-P had significantly better muscle strength at six weeks ($p=0.036$). Loss to follow up rate at six weeks was 70% (49/70), and 87.1% (61/70) at 12 weeks. There was no significant difference in ROM at six weeks ($p=0.58$). Headache was the most common side effect associated with GTN-P. Patients exposed to GTN-P used fewer adjuvant treatments.

Results were similar to that reported in the literature; however, the high loss of follow up limited the generalizability of the findings.

Conclusion:

Rotator cuff was the most common site of tendinopathy in the practice. GTN-P did not significantly change pain scores but improved muscle strength. This study could not ascertain if GTN-P was effective in managing tendinopathy in the primary care setting due to high loss of follow up rates.

Recommendation:

Further studies are needed to evaluate the effectiveness of GTN-P in managing tendinopathy in a primary care setting.

References:

1. Andres BM, Murrell GA. Treatment of tendinopathy: what works, what does not, and what is on the horizon. *Clin Orthop Relat Res.* 2008;466(7):1539-54.
2. Nirschl RP. Patterns of failed healing in tendon injury. In: Leadbetter WB, Buckwalter JA, Gordon SL, editors. *Sports-induced inflammation: clinical and basic science concepts.* San Diego, CA: American Academy of Orthopaedic Surgeons;1990. 577 p.
3. Steunebrink M, Zwerver J, Brandsema R, et al. Topical glyceryl trinitrate treatment of chronic patellar tendinopathy: a randomised, double-blind, placebo-controlled clinical trial. *Br J Sports Med.* 2013;47(1):34-9.
4. Paoloni JA, Appleyard RC, Nelson J, Murrell GA. Topical nitric oxide application in the treatment of chronic extensor tendinosis at the elbow: a randomized, double-blinded, placebo-controlled clinical trial. *Am J Sports Med.* 2003;31(6):915-20.
5. Kane TP, Ismail M, Calder JD. Topical glyceryl trinitrate and noninsertional Achilles tendinopathy: a clinical and cellular investigation. *Am J Sports Med* 2008;36(6):1160-3.
6. Paoloni JA, Appleyard RC, Nelson J, Murrell GA. Topical glyceryl trinitrate treatment of chronic noninsertional achilles tendinopathy: a randomized, double-blind, placebo-controlled trial. *J Bone Joint Surg Am.* 2004;86(5):916-22.
7. Paoloni JA, Appleyard RC, Nelson J, Murrell GA. Topical glyceryl trinitrate application in the treatment of chronic supraspinatus tendinopathy: a randomized, double-blinded, placebo-controlled clinical trial. *Am J Sports Med.* 2005;33(6):806-13.

Informed Decision Making About Maternal Serum Screening in Pregnancy

Kiran Greywall, FMRII; Aileen Hamilton, FMRII; Jenna Hayden, FMRII;
Susan Hayton, MD, FRCSC, JD; Shari McKay, MA
Department of Academic Family Medicine, University of Saskatchewan

ABSTRACT

Background: This chart review was an investigation of maternal serum screening (MSS), informed consent and screening uptake at the West Winds Primary Health Centre (WWHPC).

Research Questions: 1) Are physicians providing information/counselling to all patients regarding MSS? 2) What patient characteristics affect the decision to undergo screening? 3) What do WWHPC physicians document regarding their MSS discussions? 4) Is a formal documented physician/patient discussion associated with that patient's decision to undergo MSS? 5) Relative to the 2011 and 2014 SOGC guidelines for prenatal screening are the screening practices appropriate? 6) Relative to results in the literature, are we providing sufficient information and discussion on MSS?

Methods/Methodology: Charts were selected using filters in the electronic medical record and excluded if not prenatal or if the patient had a termination or a miscarriage before 11 weeks gestation. Data collected included patient age, parity, record of MSS in a previous pregnancy, gestational age at first prenatal visit, screening tests undertaken, documented screening counselling and whether the most responsible physician was one who held obstetric privileges. The data was entered into IBM SPSS v.23 for analysis. The Chi-squared test was used to compare groups and to compare the results with similar studies in the literature.

Results: Of the 320/677 identified charts reviewed, 113 were discarded, resulting in an n of 207 for all proportions. MSS screening uptake was 32.7%. The age distribution of patients was 88.7% <35 and 11.3% >35. Women >35 had greater uptake of MSS than women <35 (65% vs. 28.7%). Having a physician with obstetric privileges resulted in less MSS uptake (28.9% vs. 37.5%). Documentation of MSS counselling (DMSSC) was present in 29.6% of patients who did not undergo MSS. For those with MSS results in the laboratory section of their chart, 50% had DMSSC in their clinic visit and 54.3% had DMSSC in their prenatal record sheet. For patients with no MSS results in their chart, 90.4% had no DMSSC in their clinic visit or prenatal record sheet.

Discussion: There was insufficient data to conclude that physician counselling had an effect on uptake of MSS in the WWHPC population.

Conclusions: The WWHPC patient electronic medical records are lacking adequate documentation of maternal serum screening discussions, decisions and patient experiences. This documentation has not only legal importance, but is also important for patient care.

Recommendation: For future research: Do prenatal patients feel they had enough information to make a decision regarding prenatal screening? Which types of educational information would patients find most helpful?

References:

1. Barrett J. Prenatal screening [Internet]. Ottawa, ON: The Society of Obstetricians and Gynaecologists of Canada (SOGC); 2014, Sep [cited 2014 Sep 28]. Available from: <http://sogc.org/publications/prenatal-screening/English and French>.
2. Carson G, Martel MJ, Mytopher K, Suchet I. Aneuploidy screening program for Saskatchewan: information for healthcare providers. Saskatoon, SK: Saskatchewan Ministry of Health; 2010. 1 p.
3. Spencer K. Screening for Down's Syndrome. *Scand J Clin Lab Invest Suppl.* 2014; 244:41-7.
4. Hunt LM, de Voogd KB, Castañeda H. The routine and the traumatic in prenatal genetic diagnosis: does clinical information inform patient decision-making? *Patient Educ Couns.* 2005;56(3):302-12.
5. Saskatchewan Ministry of Health. A blood test for pregnant women. Prenatal screening. [Internet]. Regina, SK: Saskatchewan Ministry of Health; 2010 [cited 2014 Dec 11]. Available from: <http://www.health.gov.sk.ca/adx/asp/adxGetMedia.aspx?DocID=6efd1029-a5ff-43ba-a4cc-2ee5d9e631f1&MediaID=4610&Filename=prenatal-screening-blood-test-for-pregnant-women.pdf&l=English>.
6. Saskatchewan Ministry of Health. A blood test for pregnant women. Prenatal screening (low literacy) [Internet]. Regina, SK: Saskatchewan Ministry of Health; 2010 [cited 2014 Dec 11]. Available from: <http://www.health.gov.sk.ca/adx/asp/adxGetMedia.aspx?DocID=b15ba429-7814-40c5-b94a-79369ca369b3&MediaID=5558&Filename=prenatal-screening-low-literacy-jul-2010.pdf&l=English>.
7. Halliday JV, Messerlian GM, Palomaki GE. Patient information: should I have a screening test for Down Syndrome during pregnancy? (Beyond the basics) [Internet]. Alphen aan den Rijn, NL: Walters Kluwer Health, Inc. 2013 [Updated 2013 Nov 5; cited 2014 Nov 28]. Available from: <http://www.uptodate.com/contents/should-i-have-a-screening-test-for-down-syndrome-during-pregnancy-beyond-the-basics>.
8. Burn J, Fairgrieve S, Franks, P, White, D. Audit of maternal serum screening strategies to augment counseling in response to women's views. *Eur J Hum Genet.* 1996; 4(2):108-12.
9. Van Den Berg M, Timmermans DRM, Ten K. LP, Van Vugt JMG, Van Der Wal G. Are pregnant women making informed choices about prenatal screening? *Genet Med.* 2005 May/Jun;7(5):332-8.
10. Carroll JC, Brown JB, Reid AJ, Pugh P. Women's experience of maternal serum screening. *Can Fam Physician.* 2000 Mar;46:614-20.
11. Thornton JG, Hewison J, Lilford RJ, Vail A. A randomised trial of three methods of giving information about prenatal testing. *BMJ.* 1995 Oct ;311(7013):1127-31.
12. University of Saskatchewan. Ethics [Internet]. Saskatoon, SK: University of Saskatchewan; 2014 [cited 2014 Dec 17]. Available from: <http://research.usask.ca/for-researchers/ethics/>
13. Maple Tech. Sample size calculator [Internet]. Maple Tech; 2008 [cited 2014 Dec 17]. Available from: <http://www.calculator.net/sample-size-calculator.html>.

14. Government of Saskatchewan. Health Information Protection Act (HIPA) [Internet]. Regina, SK: Government of Saskatchewan; 2014 Apr 1 [cited 2014 Dec 17]. Available from www.health.gov.sk.ca/hipa.
15. Kuppermann M, Pena S, Bishop JT. et al. Effect of enhanced information, values clarification and removal of financial barriers on use of prenatal testing. A randomized trial. *JAMA*. 2014; 312(12):1210-21.
16. Hofer J, Thompson K, Hosain J, McKay S. Knowledge and practice regarding peri-conceptional folic acid supplementation and prenatal screening for aneuploidy and open neural tube defects (ONTDs) among family physicians in Saskatoon Saskatchewan. Saskatoon, SK: University of Saskatchewan. 2010.
17. Chitayat D, Langlois S, Wilson, RD et al. Prenatal screening for fetal aneuploidy in Singleton pregnancies. *JOGC* 2011 Jul;33(7):736-44.
18. Hayeems RZ, Campitelli M, Ma X, et al. Rates of prenatal screening across health care regions in Ontario, Canada; a retrospective cohort study. *CMAJO*. 2015; 3(2), E236-E243.
19. Stangroom J. Chi-square calculator [Internet]. London, EN: Social Science Statistics; 2015 [cited 2015 May 8]. Available from: <http://www.socscistatistics.com/tests/chisquare/Default2.aspx>.

Impact of Group B Streptococcus (GBS) Screening on Neonatal Hospitalization following Caesarean Section and Vaginal Delivery

Heather Konkin, FMRII; Amanda Waldner, FMRII; Brad Thorpe, MBBCh, CCFP;
Cheryl Waldner, DVM, PhD; Kelechi Eguzo, MD, MPH
Department of Academic Family Medicine, University of Saskatchewan

ABSTRACT

Background: Group B streptococcus (GBS) is a leading cause of neonatal mortality and morbidity. There is limited research on the importance of GBS screening for women with planned Caesarean section compared to a vaginal delivery on neonatal outcomes.

Research Question: Is failure to screen for GBS associated with increased duration of neonatal hospital stay, clinical suspicion of neonatal sepsis and transfer to a neonatal intensive care unit (NICU) after Caesarean and vaginal deliveries?

Methods/Methodology: A retrospective chart review of 688 intrapartum patients admitted from July, 2013 to June, 2015 was conducted in Moose Jaw, Saskatchewan. Inclusion criteria included births of ≥ 36 gestational weeks and singleton gestations resulting in a live birth. Logistic regression was used to examine the association between GBS screening, pertinent risk factors, and birth outcomes including extended neonatal stay, suspicion of neonatal sepsis, and transfer to a NICU.

Results: Lack of GBS screening (OR = 1.71, CI = 1.05-2.80, $p = 0.032$), low parity ($p < 0.001$) and male sex ($p = 0.006$) were associated with an extended neonatal stay. Lack of GBS screening was not associated ($p = 0.73$) with suspicion of neonatal sepsis, but failure to screen the mother for GBS (OR = 3.55, CI = 1.05-12.1, $p = 0.042$) and low 5-minute APGAR score ($p < 0.001$) were associated with transfer of the baby to NICU.

Discussion: The findings support the importance of screening for GBS in planned vaginal and Caesarean deliveries to attempt to reduce the length of newborn hospital stays and minimize transfer to the NICU. To our knowledge, no prior studies have looked at the association between a failure to screen for maternal GBS colonization, and increased neonatal hospital stay and NICU transfer.

Conclusions: Failure to screen for maternal GBS colonization was associated with increased duration of neonatal hospital stay after Caesarean Section and vaginal deliveries in babies delivered ≥ 36 weeks gestation and with increased likelihood of transfer of the neonate to a NICU.

Recommendation: Based on the results, all pregnancies should be screened for GBS between 35-37 weeks, regardless of planned method of delivery.

References:

1. Davies HD, LeBlanc J, Bortolussi R, McGeer A, PICNIC. The Pediatric Investigators Collaborative Network on Infections in Canada (PICNIC) study of neonatal group B Streptococcal infections in Canada. *Paediatr Child Health*. 1999;4(4):257-63.
2. Pettersson K. Perinatal infection with group B streptococci. *Semin Fetal Neonatal Med*. 2007 Jun;12(3):193-7.
3. Tudela CM, Stewart RD, Roberts SW, Wendel GD Jr, Stafford IA, McIntire DD et al. Intrapartum evidence of early-onset group B streptococcus. *Obstet Gynecol*. 2012 Mar;119(3):626-9.
4. Kessous R, Weintraub AY, Sergienko R, Lazer T, Press F, Wiznitzer A, Sheiner E. Bacteruria with group-B streptococcus: is it a risk factor for adverse pregnancy outcomes? *J Matern Fetal Neonatal Med*. 2012;25(10):1983-6.
5. Kim DD, Page SM, McKenna DS, Kim CM. Neonatal group B streptococcus sepsis after negative screen in a patient taking oral antibiotics. *Obstet Gynecol*. 2005;105(5):1259-61.
6. Winn HN. Group B streptococcus infection in pregnancy. *Clin Perinatol*. 2007;34(1):387-92.
7. Yudin MH, Shah V, Ohlsson A, Farine D. Are we using the optimal strategy for GBS management in pregnancy? *J Obstet Gynaecol Can*. 2006;28(6):499-500.
8. Law KSK, Parmar P, Gregora M, Abbott J. A comparative study assessing the efficacy and acceptability of anorectal swabs for antenatal GBS screening. *J Med Screen*. 2013;20(1):46-8.
9. Franciosi RA, Knostman JD, Zimmerman RA. Group B streptococcal neonatal and infant infections. *J Pediatr*. 1973;82(1):707-18.
10. Adair C, Kowalsky L, Quon H, Ma D, Stoffman J, McGeer A, et al. Risk factors for early-onset group B streptococcal disease in neonates: a population-based case-control study. *CMAJ*. 2003;169(1):198-203.
11. Canadian Task Force on Preventive Health Care. Prevention of group B streptococcal infection in newborns: recommendation statement from the Canadian Task Force on Preventive Health Care. *CMAJ*. 2002;166(7):928-30.
12. Schuchat A, Zywicki SS, Dinsmoore MJ, Mercer B, Romaguera J, O'Sullivan MJ, et al. Risk factors and opportunities for prevention of early-onset neonatal sepsis: a multi-center case control study. *Pediatrics*. 2000;105(1):21-6.
13. Valkenburg-van den Berg AW, Houtman-Roelofsen RL, Oostvogel PM, Dekker FW, Dorr PJ, Sprij AJ. Timing of group B streptococcus screening in pregnancy: a systematic review. *Gynec Obstet Invest*. 2010;69(1):174-83.
14. Berger MB, Xu X, Williams JA, Van de Van CJM, Mozurkewich EL. Early hospital discharge of infants born to group B streptococci-positive mothers: a decision analysis. *BJOG*. 2012;119:439-48.
15. Stoll BJ, Hansen NI, Sanchez PJ, Faix RG, Poindexter BB, Van Meurs KP, et al. Early onset neonatal sepsis: the burden of group B streptococcal and E. coli disease continues. *Pediatrics*. 2011;127(5):817-26.
16. Melin P. Neonatal group B streptococcal disease: from pathogenesis to preventive strategies. *Clin Microbiol Infect*. 2011;17(1):1294-303.
17. Paes BA. Group B Streptococcus: is it time for a screening program? *Can Fam Physician*. 1995;41(1):273-85.

18. Angstetra D, Ferguson J, Giles WB. Institution of universal screening for group B streptococcus (GBS) from a management protocol results in reduction of early-onset GBS disease in a tertiary obstetric unit. *Aust N Z J Obstet Gynaecol.* 2007;47(1):378-82.
19. American Academy of Pediatrics. Policy statement - recommendations for the prevention of perinatal group B streptococcal (GBS) disease. *Pediatrics.* 2011;128(3):611-6.
20. Rodriguez E, Raker CA, Paglia MJ, Anderson BL. Compliance with group B streptococcus testing prior to labour and delivery. *Am J Perinatol.* 2010;27(6):475-9.
21. Van Dyke MK, Phares CR, Lynfield R, Thomas AR, Arnold KE, Craig AS et al. Evaluation of universal antenatal screening for group B streptococcus. *N Engl J Med.* 2009 Jun 18;360(25):2626-36.
22. Verani JR, Spina NL, Lynfield R, Schaffner W, Harrison LH, Holst A et al. Early onset group B Streptococcal disease in the United States: potential for further reduction. *Obstet Gynecol.* 2014;123(4):828-37.
23. Goins WP, Talbot TR, Schaffner W, Edwards KM, Craig AS, Schrag SJ et al. Adherence to Perinatal Group B Streptococcal Prevention Guidelines. *Obstet Gynecol.* 2010;155(6):1217-24.
24. Ghanim N, Alchyib O, Morrish D, Tompkins D, Julliard MA, Visconti E, Hoskins IA. Maternal-neonatal outcome with Staphylococcus aureus rectovaginal colonization. *J Reprod Med.* 2011;56(9-10):421-4.
25. Hughes RG, Brocklehurst P, Heath P, Stenson B. Prevention of early onset neonatal group B streptococcal disease [Internet]. 2nd ed. London, UK:Royal College of Obstetricians and Gynaecologists; 2012 [cited 2016 Jan 5]. Available from: https://www.rcog.org.uk/globalassets/documents/guidelines/gtg_36.pdf
26. Rochetti TT, Marconi C, Rall VLM, Borges VTM, Corrente JE, de Silva MG. Group B streptococci colonization in pregnant women: risk factors and evaluation of the vaginal flora. *Arch Gynecol Obstet.* 2011;283(1):717-21.
27. Verani JR, McGee L, Schrag SJ. Prevention of perinatal group B streptococcal disease: revised guidelines from the CDC, 2010 [Internet]. Atlanta, GA: Center for Disease Control and Prevention; 2010 Nov 19 [cited 2016 Jan 5];59(10):1-31. Available from: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5910a1.htm>
28. Konrad G, Katz A. Epidemiology of early-onset neonatal group B streptococcus infection: implications for screening. *Can Fam Physician.* 2007;53(1):1054-61.
29. Weiss ME, Adkinson NF. Immediate hypersensitivity reactions to penicillin and related antibiotics. *Clin Allergy.* 1988;18(1):515-40.
30. Morales WJ, Dickey SS, Bornick P, Lim DV. Change in antibiotic resistance of group B streptococcus: impact on intrapartum management. *Am J Obstet Gynecol.* 1999;181(2):310-4.
31. Towers CV, Carr MH, Padilla G, Asrat T. Potential consequences of widespread antepartum use of ampicillin. *Am J Obstet Gynecol.* 1998;179(1):879-83.
32. Money D, Allen VM. Society of Obstetricians and Gynaecologists of Canada. The prevention of early-onset neonatal group B streptococcal disease. *J Obstet Gynaecol Can.* 2013;35(10):939-48.
33. Colombo DF, Lew JL, Pedersen CA, Johnson JR, Fan-Havard P. Optimal timing of ampicillin administration to pregnant women for establishing bactericidal levels in the prophylaxis of group B streptococcus. *Am J Obstet Gynecol.* 2006;194(1):466-70.

34. Davies HD, Adair CE, Schuchat A, Low DE, Sauve RS, McGeer A, et al. Physicians' prevention practices and incidence of neonatal group B streptococcal disease in 2 Canadian regions. *CMAJ*. 2001;164(4):479-85.
35. Berardi A, Rossi K, Pizzi C, Baronciani D, Venturelli C, Ferrari F, Facchinetti. Absence of neonatal streptococcal colonization after planned caesarean section. *Acta Obstetrica et Gynecologica*. 2006;85(1):1012-13.
36. Desa DJ, Trevenen CL. Intrauterine infections with group B beta-haemolytic streptococci. *Br J Obstet Gynaecol*. 1984;91(1):237-9.
37. Katz V, Bowes WA, Jr. Perinatal group B streptococcal infections across intact amniotic membranes. *J Reprod Med*. 1988;33(1):445-9.
38. Lijoi D, Di Capua E, Ferrero S, Mistrangelo E, Giannattasio A, Morano S, Ragni N. The efficacy of 2002 CDC guidelines in preventing perinatal group B *Streptococcus* vertical transmission: a prospective study. *Arch Gynecol Obstet*. 2007;275(1):373-9.
39. Newman TB, Puopolo KM, Wi S, Draper D, Escobar GJ. Interpreting complete blood counts soon after birth in newborns at risk for sepsis. *Pediatrics*. 2010;126(5):903-9.
40. Dohoo I, Martin W, Stryhyn H. *Methods in epidemiologic research*. Charlottetown, PE: VER; 2012. 890p.
41. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP, STROBE Initiative. The strengthening the reporting of observational studies in epidemiology (STROBE)statement: guidelines for reporting observational studies. *J Clin Epidemiol*. 2008;61(4):344-9.
42. Kazemier BM, Schneeberger C, De Miranda E, Van Wassenae A, Bossuyt PM, Vogelvang TE, et al. Costs and effects of screening and treating low risk women with a singleton pregnancy for asymptomatic bacteriuria, the ASB study. *BMC Pregnancy Childbirth*. 2012;12(1):52.
43. Mullaney D. Group B streptococcal infections in newborns. *J Obstet Gynecol Neonatal Nurs*. 2001;30(6):649-58.
44. Schuchat A, Wenger JD. Epidemiology of group B streptococcal disease. Risk factors, prevention strategies, and vaccine development. *Epidemiol Rev*. 1994;16(2):374-402.
45. Moran CF, Holt VL, Martin DP. What do women want to know after childbirth? *Birth* 1997;24(1):27-34.
46. Polin RA; Committee on Fetus and Newborn. Management of neonates with suspected or proven early-onset bacterial sepsis. *Pediatrics*. 2012;129(5):1006-15.
47. Franklin RR, Desmond MM, Rudolph AJ, Alexander JA, Green BQ. Clinical behaviour of the newly born: III. The term infant with a low Apgar score. *Obstet Gynecol*. 1964;23(1):28-36.
48. Li F, Wu T, Lei X, Zhang H, Mao M, Zhang J. The Apgar score and infant mortality. *PLoS One*. 2013;8(7):e69072.
49. Hamada S, Vearncombe M, McGeer A, Shah PS. Neonatal group B streptococcal disease: incidence, presentation, and mortality. *J Matern Fetal Neonatal Med*. 2008;21(1):53-7.

Retrospective Chart Review: Contraceptive Use Prior to Termination of Pregnancy (TOP) in a Canadian Urban Centre

Eve Marie Johnson, FMRII; Harmonie Aito, FMRII; Megan Clark, FMRII; Kelechi Eguzo, MD, MPH; Jean-Francois Rostoker, MD, CCFP, FCFP; Sarah Liskowich, MD, CCFP
Department of Academic Family Medicine, University of Saskatchewan

ABSTRACT

Background:

Evidence shows that 45 to 62% of women presenting for termination of pregnancy (TOP) used some method of contraception. Low socioeconomic status, non-Caucasian ethnicity, younger age and cohabitation have been associated with repeat abortion and contraceptive failure.

Research Questions:

1. What were the methods of contraception used by women who have undergone TOP at the Women's Health Center (WHC)?
2. Is there a relationship between TOP and self-reported contraceptive use or socio-demographic characteristics?

Methods/Methodology:

This was a retrospective chart review of 382 women who accessed TOP at the WHC from October, 2014 through to March, 2015. Data included demographics, methods of contraception and medical history. Data were analyzed using descriptive statistics and chi-square testing.

Results and Discussion:

The average age was 25 (± 6) years, with 60.7% (232/382) being multiparous. About 33% (127/382) of clients were from outside of the urban centre. Sixteen percent (61/382) were married. Although 64.6% (244/382) were not using any form of contraception prior to the TOP; barrier (15%, 60/278) and hormonal (17.7%, 67/278) were the most common methods of contraception used. Thirty-seven percent (142/382) had one or more previous TOPs. There was no significant relationship between method of contraception and residential area ($p=0.14$), relationship with partner ($p=0.14$) or age group ($p=0.36$).

Conclusion:

There was no relationship between TOP and contraceptive use in terms of age, parity, previous TOPs or residential area.

Recommendation:

Improve awareness about and access to contraceptives.

References:

1. Canadian Institute for Health Information. Induced abortions reported in Canada in 2012 [Internet]. Ottawa, ON: Canadian Institute of Health Information; 2014 [cited 2016 Jan 5]. Available from: https://www.cihi.ca/en/ta_11_alldatatables20140221_en.pdf
2. Women's Health Centre, Regina General Hospital, Regina, SK. Descriptive statistics, Women's Health Centre, 2004-2015. 2015 Jun 10. 1 page. Located at: Health Records, Regina General Hospital
3. Black A, Guilbert E, Hassan F, Chatziheoflou I, Trussell J, Lowin J. The cost of unintended pregnancies in Canada: estimating direct cost, role of imperfect adherence, and the potential impact of increased use of long-acting reversible contraceptives. *J Obstet Gynaecol Can.* 2015; 37(12):1086-97.
4. Berger C, Gold D, Andres D, Gillett P, Kinch R. Repeat abortion: is it a problem?. *Fam Plann Perspect.* 1984 Mar/Apr;16(2):70-5.
5. Jones RK, Darroch JE, Henshaw SK. Contraceptive use among U.S. women having abortions in 2000-2001. *Perspect Sex Reprod Health.* 2002 Nov/Dec;34(6):294-303.
6. Rose SB, Wei Z, Cooper AJ, Lawton BA. Peri-abortion contraceptive choices of migrant Chinese women: a retrospective review of medical records. *PLoS ONE* [Internet]. 2012 [cited 2014 Jan 5];7(6):e40103. Available from: <http://sfx.usask.ca/usask?sid=OVID:medline&isbn=&issn=1932-6203&volume=7&issue=6&pages=e40103&date=2012&atitle=Peri-abortion+contraceptive+choices+of+migrant+Chinese+women%3A+a+retrospective+review+of+medical+records.&title=PLoS+ONE+%5BElectronic+Resource%5D&aulast=Rose+SB&spage=e40103&epage=&pid=AN:22768231>
7. Serrano I, Doval JL, Lete I, Arbat A, Coll C, Martinez-Salmean J, Bermejo R, Perez-Campos E, Duenas JL. Contraceptive practices of women requesting induced abortion in Spain: a cross-sectional multi-centre study. *Eur J Contracept Reprod Health Care* [Internet]. 2012 Jun [cited 2014 Oct 16];17(3):205-11. Available from: <http://sfx.usask.ca/usask?sid=OVID:medline&isbn=&issn=1362-5187&volume=17&issue=3&pages=205-11&date=2012&atitle=Contraceptive+practices+of+women+requesting+induced+abortion+in+Spain%3A+a+cross-sectional+multicentre+study.&title=European+Journal+of+Contraception+%26+Reproductive+Health+Care&aulast=Serrano+I&spage=205&epage=11&pid=AN:22559258>
8. Palanivelu LM, Oswal A. Contraceptive practices in women with repeat termination of pregnancies. *J Obstet Gynaecol.* 2007 Nov;27(8):832-4.
9. Fu H, Darroch JE, Haas T, Ranjit N. Contraceptive failure rates: new estimates from the 1995 national survey of family growth. *Fam Plann Perspect.* 1999 Mar/Apr;31(2):56-63.
10. Kost K, Singh S, Vaughan B, Trussell J, Bankole A. Estimates of contraceptive failure from the 2002 national survey of family growth. *Contraception.* 2008 Jan;77(1):10-21.
11. Canadian Institute for Health Information. Data brief: exploring urban environments and inequalities in health: Regina census metropolitan area [Internet]. Ottawa, ON: Canadian Institute for Health Information. 2010[cited 2016 Jan 5]. Available from: https://www.cihi.ca/en/pdf_databrief_regina_en.pdf

12. Ames C, Norman W. Preventing repeat abortion in Canada: is the immediate insertion of intrauterine devices postabortion a cost-effective option associated with fewer repeat abortions? *Contraception*. 2012;85(1):51-5.
13. Goodman S, Hendlish S, Reeves M, Foster-Rosales A. Impact of immediate postabortal insertion of intrauterine contraception on repeat abortion. *Contraception*. 2008;78(2):143-8.
14. Finer L, Zolna M. Declines in unintended pregnancy in the United States, 2008-2011. *N Engl J Med*. 2016;374(9):843-52.

Evaluation of the Use of the NuuDest™ App in Breastfeeding Mothers

Julia Geiger, FMRII; Andrea Bishop-Martin, FMRII;
Breanne Silver, FMRII; Jill Farrukh, MD, CCFP
Department of Academic Family Medicine, University of Saskatchewan

ABSTRACT

Background: Smartphone apps may be beneficial in the early postpartum period to new mothers who are intending to breastfeed. The *NuuDest*™ mobile app was developed to educate and support mothers in breastfeeding and other key areas of early life. The purpose of this study was to pilot an evaluation of the app, and to provide feedback to the developers.

Research Questions: Did mothers use the *NuuDest* app and did they find it useful? If so, which aspects did they find useful? What information was lacking that they would like to see in future revisions of the app?

Methods/Methodology: Mothers who delivered at the Royal University Hospital, Saskatoon in February and March 2016 were recruited. A 21 item questionnaire was emailed to 25 women via <http://fluidsurveys.usask.ca> regarding the *NuuDest* app version 1.3.3. Eighteen of the 25 women were sent the questionnaire at 2, 4 and 8 weeks postpartum. The remainder received questionnaires at 2 and 4 weeks only since data collection ended before their 8th week postpartum. Data analysis was performed using Microsoft Excel 2010.

Results/Findings: A total of 11 participants responded to at least one survey. At two weeks, 10 responded to the survey, and at four weeks, 8 responded. Eight of the 11 women (72%) were primiparous.

Discussion: All 11 respondents would recommend the *NuuDest*™ app to new mothers. All educational aspects relating to the breastfeeding features and the maternal health concerns were accessed by some, as evidenced by the response to the question about their utility.

Conclusions: Despite a small sample size (n=11), reduced response rate and short duration, this study has provided us with some helpful feedback to the developers of the *NuuDest*™ app. Breastfeeding mothers find this app useful and would recommend it to other mothers.

Recommendations: A future evaluation with a much larger sample size and modifications to some of the questions is recommended. In addition, we recommend including maternal demographic details that could influence use of the app and uptake of exclusive breastfeeding.

References:

1. Bonuck K, Stuebe A, Barnett J, Labbok M, Fletcher J, Bernstein P. Effect of primary care intervention on breastfeeding duration and intensity. *Am J Public Health*. 2014 Feb;104(Suppl 1):S119-S127.
2. Nishioka E, Haruna M, Ota E, Matsuzaki M, Murayama R, Yoshimura K, Murashima S. A prospective study of the relationship between breastfeeding and postpartum depressive symptoms appearing at 1-5 months after delivery. *J Affect Disord*. 2011 Oct;133(3):553-9.
3. Black R, Allen L, Bhutta Z, Caulfield L, De Onis M, Ezzati M, Mathers C, Rivera J. Maternal and child undernutrition: global and regional exposures and health consequences. *Lancet*. 2008 Jan 19;371(9608):243-60.
4. Ip S, Chung M, Raman G, Chew P, Magula N, De Vine D, Trikalinos T, Lau J. Breastfeeding and maternal and infant health outcomes in developed countries. *Evid Technol Asses*. 2007 Apr;153:1-186.
5. Beral V, Bull D, Doll R, Peto R, Reeves G. Breast cancer and breastfeeding: collaborative reanalysis of individual data from 47 epidemiological studies in 30 countries, including 50 302 women with breast cancer and 96 973 women without the disease. *Lancet*. 2002 Jul 20;360(9328):187-95.
6. Danforth K, Tworoger S, Hecht J, Rosner B, Colditz G, Hankinson S. Breastfeeding and risk of ovarian cancer in two prospective cohorts. *Cancer Causes Control*. 2007 Jun;18(5):517-23.
7. Blincoe A. The health benefits of breastfeeding for mothers. *Br J Midwifery*. 2005;13(6):398-401.
8. Figueiredo B, Dias C, Brandão S, Canário C, Nunes-Costa R. Breastfeeding and postpartum depression: state of the art review. *J Pediatr (Rio J)*. 2013 Jul;89(4):332-8.
9. Kramer M, Chalmers B, Hodnett E, Sevkovskaya Z, Dzikovich I, Shapiro S, Collet J, Vanilovich I, Mezen I, Ducruet T, Shishko G, Zubovich V, Mknuik D, Gluchanina E, Dombrovskiy V, Ustinovitch A, Kot T, Bogdanovich N, Ovchinikova L, Helsing E. Promotion of breastfeeding intervention trial (PROBIT): A randomized trial in the Republic of Belarus. *JAMA*. 2001 Jan;285(4):413-20.
10. Health Canada: Breastfeeding initiation in Canada: Key Statistics and Graphics (2009-2010)[Internet]. Ottawa,ON: Health Canada; 2012 Jun 27 [cited 2014 Oct 3]; [about 5 screens]. Available from: <http://www.hc-sc.gc.ca/fn-an/surveill/nutrition/commun/prenatal/initiation-eng.php#a3>
11. Fjeldsoe B, Marshall A, Miller Y. Behavior change interventions delivered by mobile telephone short-message service. *Am J Prev Med*. 2009 Feb;36(2):165-73.
12. Dobson K, Hall P. A pilot study examining patient attitudes and intentions to adopt assistive technologies into type 2 diabetes self-management. *J Diabetes Sci Technol*. 2015 Mar;9(2):309-15.
13. McIlhenny C, Guzik B, Knee D, Wendekier C, Demuth B, Roberts J. Using technology to deliver healthcare education to rural patients. *Rural Remote Health*. 2011 Oct;11(4):1798.
14. Klein M, Mogles N, van Wissen A. Intelligent mobile support for therapy adherence and behavior change. *J Biomed Inform*. 2014 Oct;51:137-51.

15. Meedya S, Fahy K, Kable A. Factors that positively influence breastfeeding duration to 6 months: a literature review. *Women Birth*. 2010 Dec;23(4):135-45.
16. Whalen B, Cramton R. Overcoming barriers to breastfeeding continuation and exclusivity. *Curr Opin Pediatr*. 2010 Oct;22(5):655-63.
17. Rossiter D, Adach K. Alberta parents convicted in toddler's meningitis death [Internet]. Calgary, AB: CBCNews Calgary;2016 Apr 26 [updated 2016 Apr 27; cited May 15]. Available from: <http://www.cbc.ca/news/canada/calgary/meningitis-trial-verdict-1.3552941>.

Perceptions of Breast Milk Banking by Health Care Providers in Saskatchewan

Melissa Kuhn, FMRII; Richelle Olson, FMRI; Robyn Tenaski, FMRII;
Shari McKay, MA; Jill Farrukh, MD, CCFP
Department of Academic Family Medicine, Saskatoon, University of Saskatchewan

ABSTRACT

Background: Compelling information about the benefits of breast milk for babies is widely available; however, data on the knowledge and perceptions of physicians around the concept of breast milk banking is lacking. With only four certified milk banks in Canada, none of which reside in Saskatchewan, further investigation into their utility is warranted. Studies have shown that physicians with uncertainties are less likely to encourage the utilization of donor milk. As physicians play a crucial role in the success of breast milk banks, we were interested in their perceptions and support for a breast milk bank in the province.

Research Questions:

1. What is the current level of knowledge and attitude towards breast milk banking and pasteurized donated breast milk (PDBM) amongst Saskatchewan physicians?
2. Would Saskatchewan physicians encourage the mothers of infants to consider the use of PDBM prior to formula?

Methodology: A survey adapted from the Australian National University study was sent to family physicians and obstetricians in Saskatchewan. The survey included three sections: participant demographics, physician knowledge of milk banking and opinions on developing a human milk bank in Saskatchewan. Items were either yes/no or 5-point Likert scales ranging from Strongly Disagree to Strongly Agree.

Results: The response rate was 24.8% (74/299). Combining the Strongly Agree and Agree categories, 28.4% (21/74) of the respondents agreed that infants could contract diseases such as HIV from PDBM, but 86.3% (63/73) agreed that PDBM would not increase the risk of allergies in infants. 56.8% (42/74) of the physicians would encourage mothers to consider donated breast milk over formula, with 52.7% (39/74) recommending it to mothers of term babies, and 79.7% for preterm babies (59/74).

Discussion: Results indicated that the physicians agreed that breast milk is more nutritious than formula and associated low risk with the use of PDBM. Participants disagreed that the costs associated with set up and maintenance of a milk bank would outweigh the benefits, thereby showing support for the future development of a PDBM centre in Saskatchewan.

Conclusions: The Saskatchewan physicians who responded were aware of the numerous advantages of breast milk, believed regulated breast milk donation in Canada is safe and would encourage their patients to use PDBM over formula, all of which are favourable in terms of support for the development of a breast milk bank in the province.

References:

1. Johnston M, Landers S, Noble L, Szucs, Viehmann L. Breastfeeding and the use of human milk: section on breastfeeding. *Pediatrics*. 2012;129(3): 827-41.
2. Greer F, Sicherer S, Burks A. Effects of early nutritional interventions on the development of atopic disease in infants and children: the role of maternal dietary restriction, breastfeeding, timing of introduction of complementary foods, and hydrolyzed formulas. *Pediatrics*. 2008;121(1): 183 –91.
3. Duijts L, Jaddoe V, Hofman A, Moll H. Prolonged and exclusive breastfeeding reduces the risk of infectious diseases in Infancy. *Pediatrics*. 2010;126(1): 18 – 25.
4. Nishimura T, Suzue J, Kaji H. Breastfeeding reduces the severity of respiratory syncytial virus infection among young infants: a multi-center prospective study. *Pediatr Int*. 2009;51(6): 812– 6.
5. Anderson J, Johnstone B, Remley D. Breastfeeding and cognitive development: a meta-analysis. *Am J Clin Nutr*. 1999;70(4):525-35.
6. Metzger M, McDade T. Breastfeeding as obesity prevention in the United States: a sibling difference model. *Am J Hum Biol*. 2010;22(3):291- 6.
7. Furman L, Taylor G, Minich N, Hack M. The effect of maternal milk on neonatal morbidity of very low-birth-weight infants. *Arch Pediatr Adolesc Med*. 2003;157(1):66-71.
8. Vohr B, Poindexter B, Dusick A, McKinley L, Wright L, Langer J, Poole W. Beneficial effects of breast milk in the neonatal intensive care unit on the developmental outcome of extremely low birth weight Infants at 18 months of age. *Pediatrics*. 2006;118(1):115-23.
9. Hoodbhoy, S. Human milk banking; current evidence and future challenges. *Paediatr Child Health*. 2013;23(8):337-41.
10. Kim JH, Unger S; Canadian Pediatric Society, Nutrition and Gastroenterology Committee. Human milk banking. *Paediatr Child Health*. 2010;15(9):595-8.
11. World Health Organization. Child Growth Standards [Internet]. Geneva, CH: World Health Organization; 2010 [cited 2010 Sep 14]. Available from: <http://www.who.int/childgrowth/en/>
12. Kimball ER, Jones E, Lewis ME, Kolb ER. The breast milk bank as a community project. *Pediatrics*. 1955;16:264-9.
13. Simmer K, Hartmann B. The knowns and unknowns of human milk banking. *Early Hum Dev*. 2009; 85(11):701-4.
14. Updegrave K. Human milk banking in the United States. *NAINR*. 2005;5(1):27-33.
15. Human Milk Banking Association of North America. Establish a Milk Bank: Interested in Developing an HMBANA Milk Bank? [Internet]. Fort Worth (TX): Human Milk Banking Association of North America; 2014. [cited 2014 Sep 27]. Available from: <https://www.hmbana.org/establish-milk-bank>
16. Leaf A, Winterson R. Breast milk banking: evidence of benefit. *Paediatr Child Health*. 2009;19(9):395-9.
17. Woo K, Spatz D. Milk donation. *Am J Matern Child Nurs*. 2007 May;32(3):151-5.
18. Lam E, Kecskes Z, Abdel-Latif M. Breast milk banking: current opinion and practice in Australian neonatal intensive care units. *Paediatr Child Health*. 2012;48(9):833-9.
19. Jones F. Milk sharing: how it undermines breastfeeding. *Breastfeed Rev*. 2013 Nov;21(3):21.

20. Keim S, Hogan J, McNamara K, Gudimetla V, Dillon E, Kwiek J, et al. Microbial contamination of human milk purchased via the Internet. *Pediatrics*. 2013 Nov;132(5):1227-35.
21. Selzer E, Ryan A, Blaser J, Selvig A, Mackay S. A breast milk bank for Saskatchewan: what do you think? Saskatoon, SK: University of Saskatchewan Academic Family Medicine 2013. 14p.
22. Lam EY, Kecskes Z, Abdel-Latif ME. Breast milk banking: current opinion and practice in Australian neonatal intensive care units. *J Paediatr Child Health*. 2012;48(9):833-9.
23. Arnold L. The ethics of donor human milk banking. *Breastfeed Med*. 2006;1(1):3-13.
24. Miracle D, Szucs K, Torke A, Helft P. Contemporary ethical issues in human milk-banking in the United States. *Pediatrics*. 2011 Dec;128(6):1186-91.