Evaluation of a Residential Care Diabetes Management Preprinted Order Set

Keri Mann, BScPharm; Ann Lightfoot, BScPharm; Donna Buna, BScPharm, PharmD.

VANCOUVER ISLAND health authority

Introduction

It is estimated that 12.7% of persons ages 70 and older suffer from diabetes mellitus. Both oral hypoglycemics and insulin can cause patient harm if used in error. This is of even more concern in the elderly population, where advanced age and multiple comorbidities put these patients at an increased risk of hypoglycemia.

Currently, in Vancouver Island Health Authority (VIHA) long-term care facilities, the chart location and record of insulin and oral hypoglycemic orders and diabetes blood glucose monitoring forms is variable and changes from one site to another. This inconsistency has the potential to lead to errors in prescribing, interpreting, and administering diabetic therapies. When patterns of care vary, clinical outcomes and patient safety may be compromised.

One way to improve patient safety in regards to such high-risk medication is through physician order standardization. Standardized, preprinted physician order sets have been shown to improve medication ordering, decrease medication errors, and improve patient outcomes. They are also advantageous over traditional handwritten chart orders because they are legible, can reduce transcription errors, and thereby reduce medication errors. In addition, all healthcare team members treating the patient know where to look for specific orders. Evidence based guidelines and best practices can be incorporated into order sets and thus, can result in enhanced patient care.

This study examines the effect of a residential care diabetes management preprinted order set. In this era of patient safety, standardizing diabetes orders may be very valuable in terms of decreasing adverse events and improving safety.

Objectives

To determine the effects of implementing a residential care diabetes management preprinted order set on the incidence of:

Primary objective:
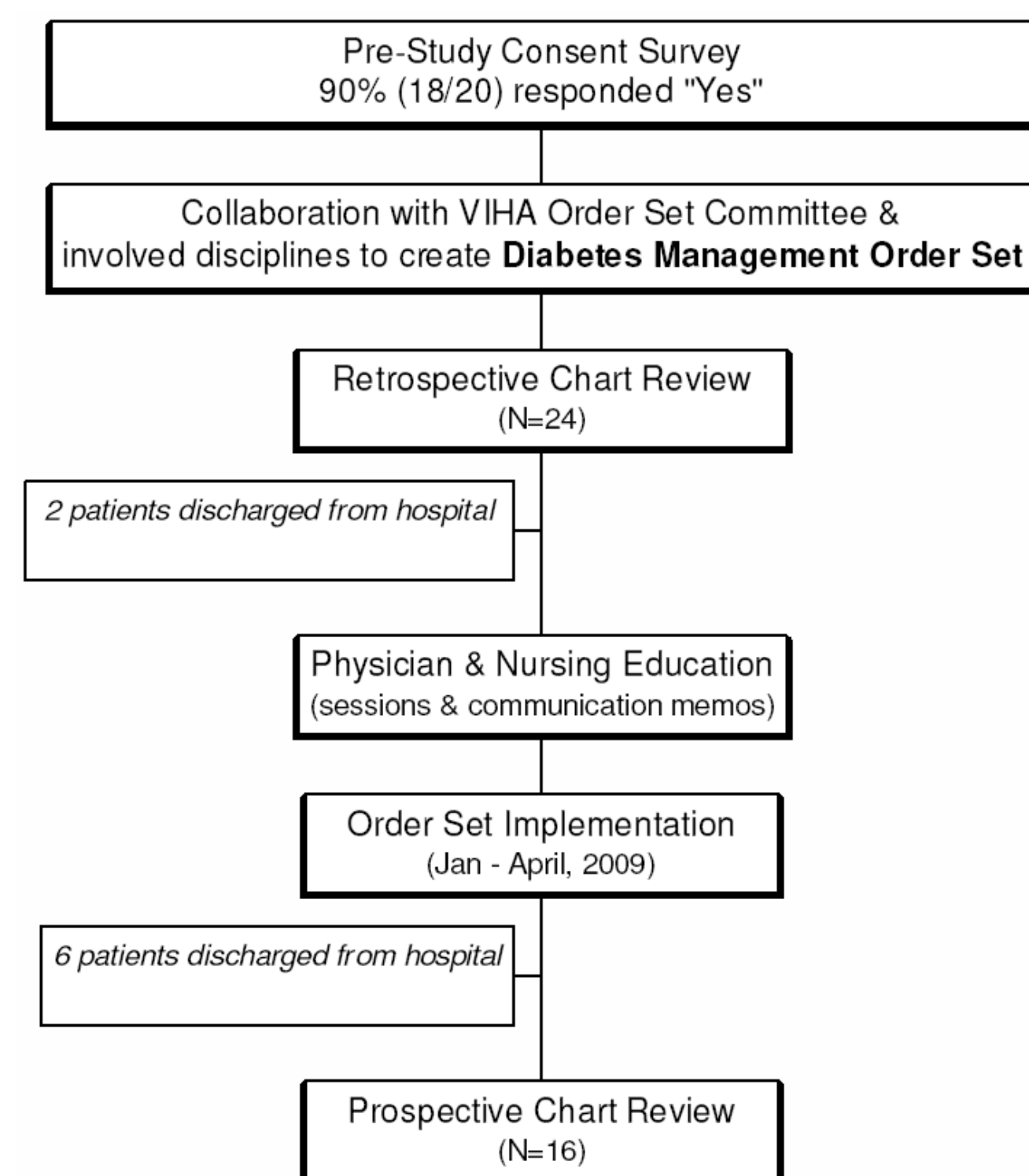- Hypoglycemia (blood glucose <5mmol/L)

Secondary objectives:
- Hyperglycemia (blood glucose 11-20mmol/L)
- Severe hyperglycemia (blood glucose >20mmol/L)
- Hemoglobin (Hb) A1c
- The average number of missed doses and dosing errors per patient
- The frequency of use of the ISMP prohibited abbreviation, "U," versus "Units"

Methods

Design
- Ambispective (retrospective & prospective), multicenter cohort study Oct 2008 – April 2009.

Pre-Study Consent Survey
90% (18/20) responded "Yes"

Collaboration with VIHA Order Set Committee & involved disciplines to create **Diabetes Management Order Set**

Retrospective Chart Review (N=24)

2 patients discharged from hospital

Physician & Nursing Education (sessions & communication memos)

Order Set Implementation (Jan - April, 2009)

6 patients discharged from hospital

Prospective Chart Review (N=16)

Inclusion Criteria
- Long-term care patient of Aberdeen or Mount Tolmie Hospital
- Type 1 or 2 diabetes mellitus requiring insulin and/or oral hypoglycemic therapy
- Continued residence in study hospitals from October 2008 to April 2009

Exclusion Criteria
- Diabetic patients who did not remain at study centers during the required time frame

Data Analysis
- Pre and post-intervention outcomes were assessed for statistical significance using paired t-tests (α=0.05)

Order Set

Figure 1: Diabetes Management Preprinted Order Set

Results

Table 1: Diabetes Therapy Summary (N=16)

Group	Insulin (%)	Oral Hypoglycemics (%)	Both (%)
Pre and Post-Intervention	8 (50)	5 (31.25)	3 (18.75)

Figure 2: Paired t-test Results for the Incidence of Hypoglycemia, Hyperglycemia and Severe Hyperglycemia
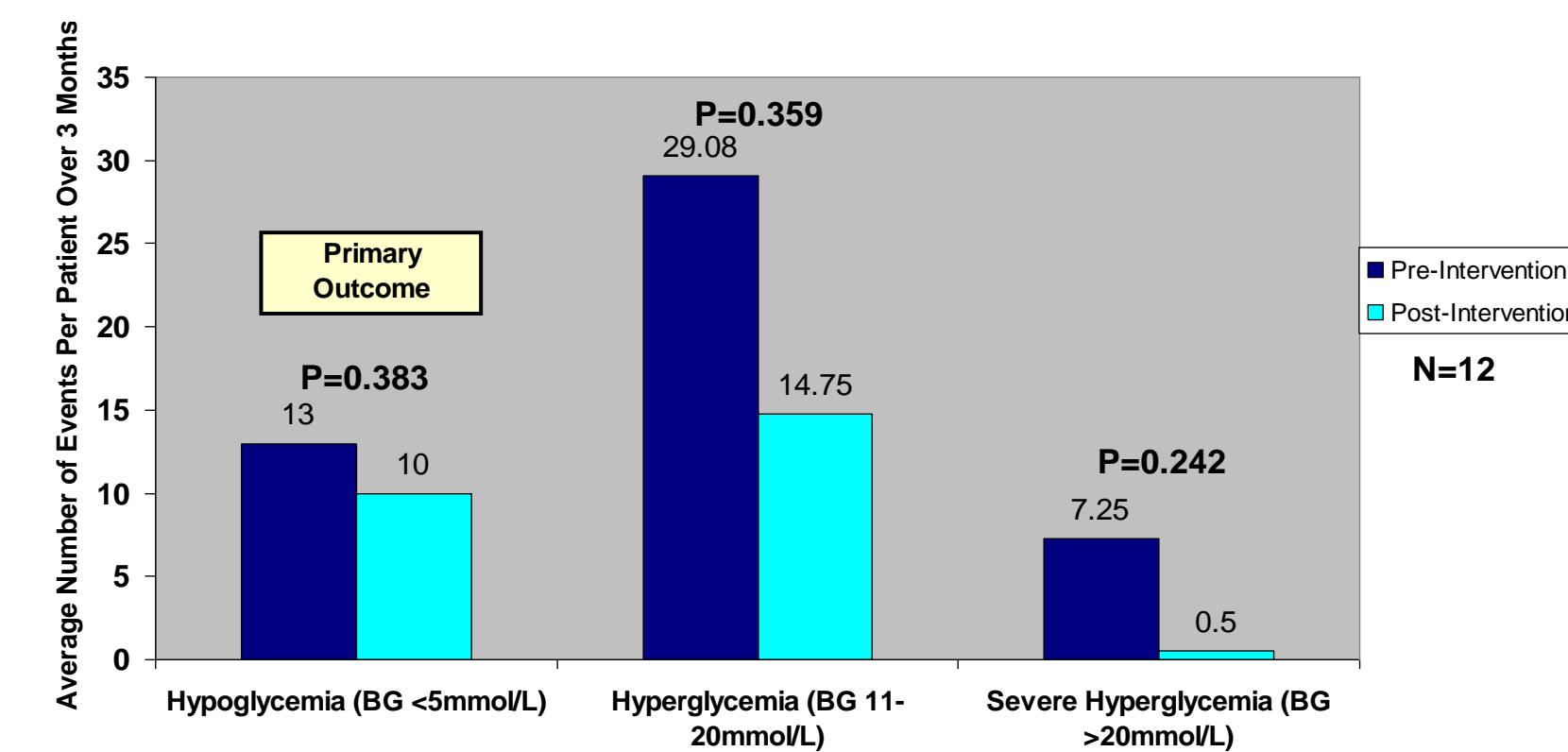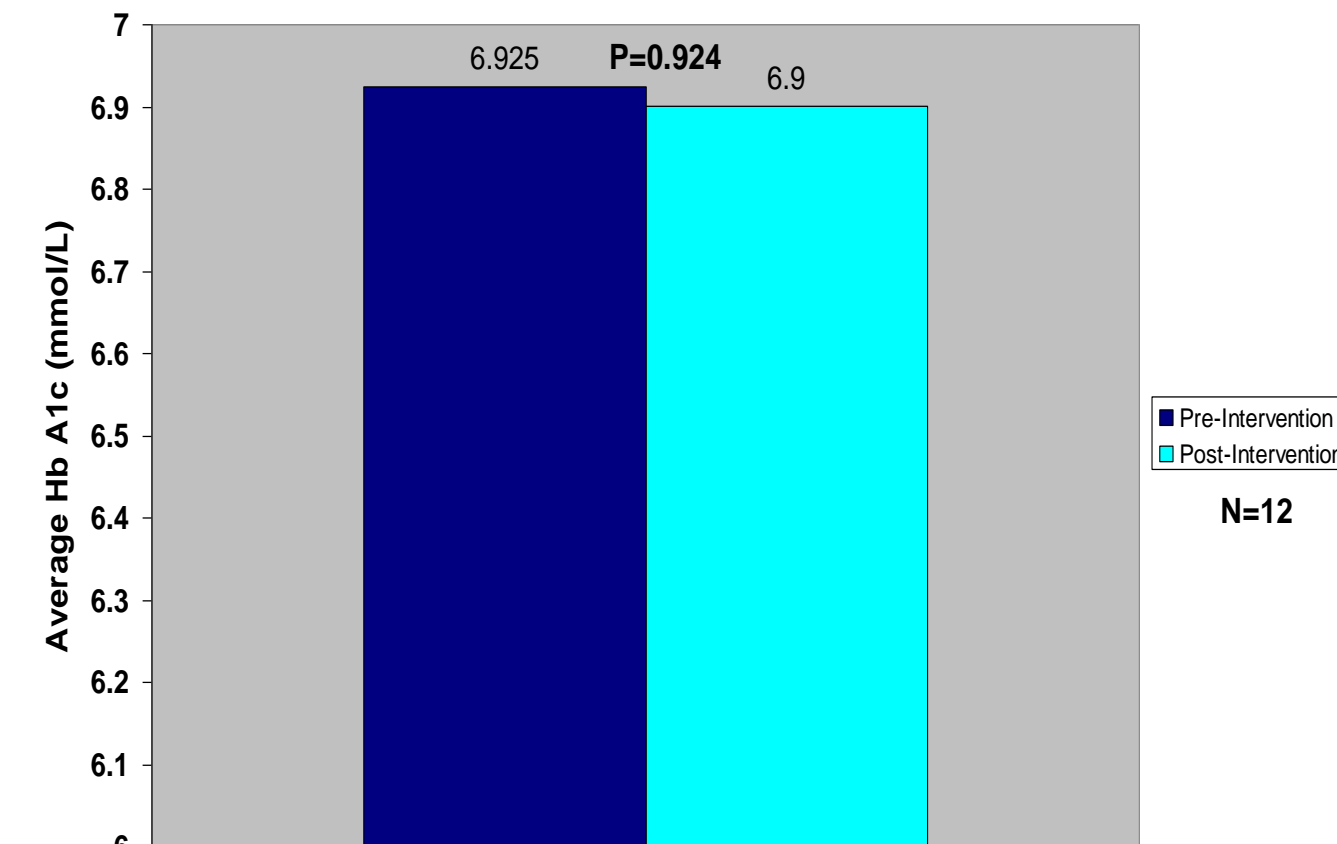

Figure 3: HbA1c Paired t-test Results

Figure 4: Missed Doses and Dosing Errors Paired t-test Results
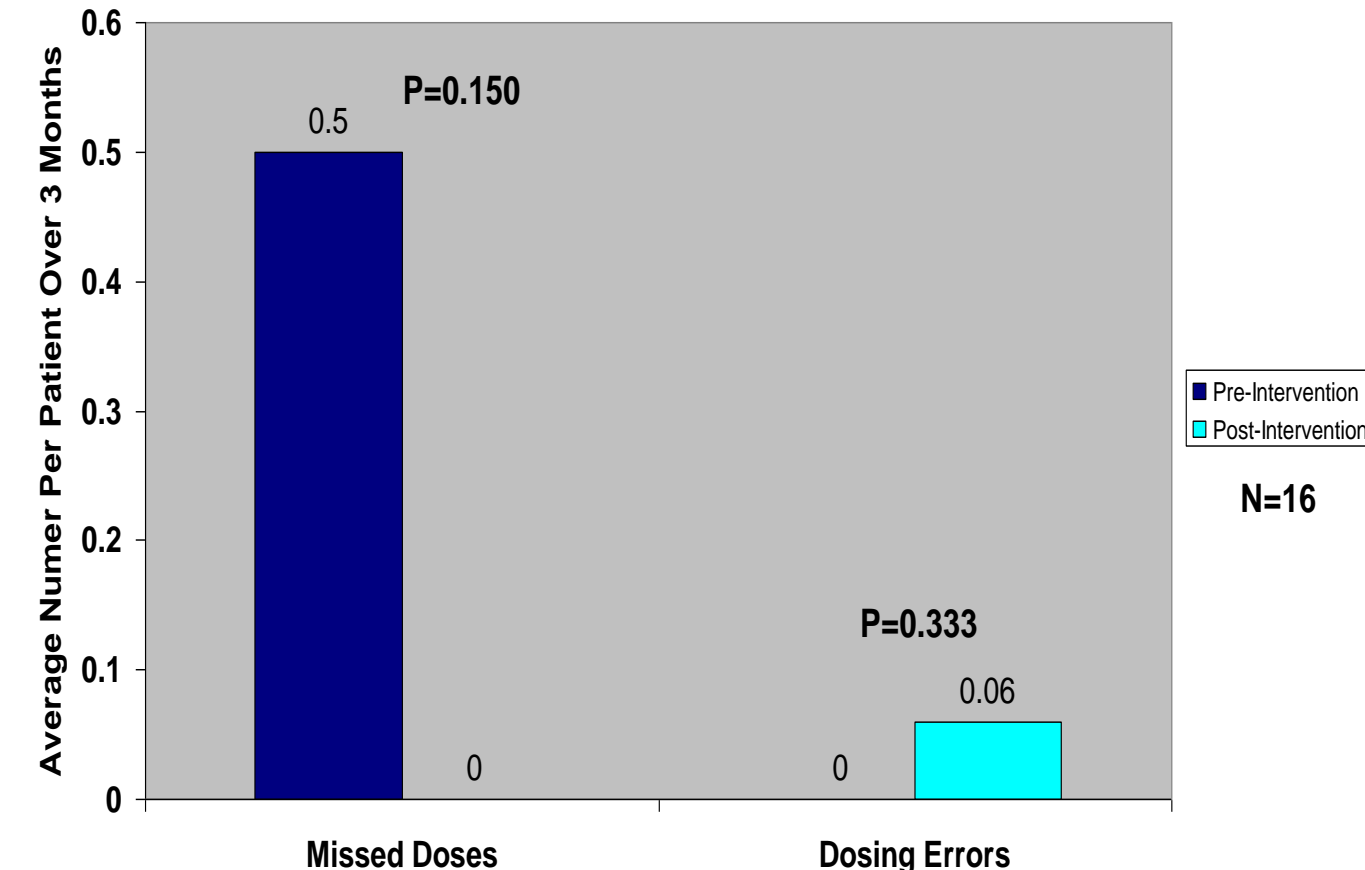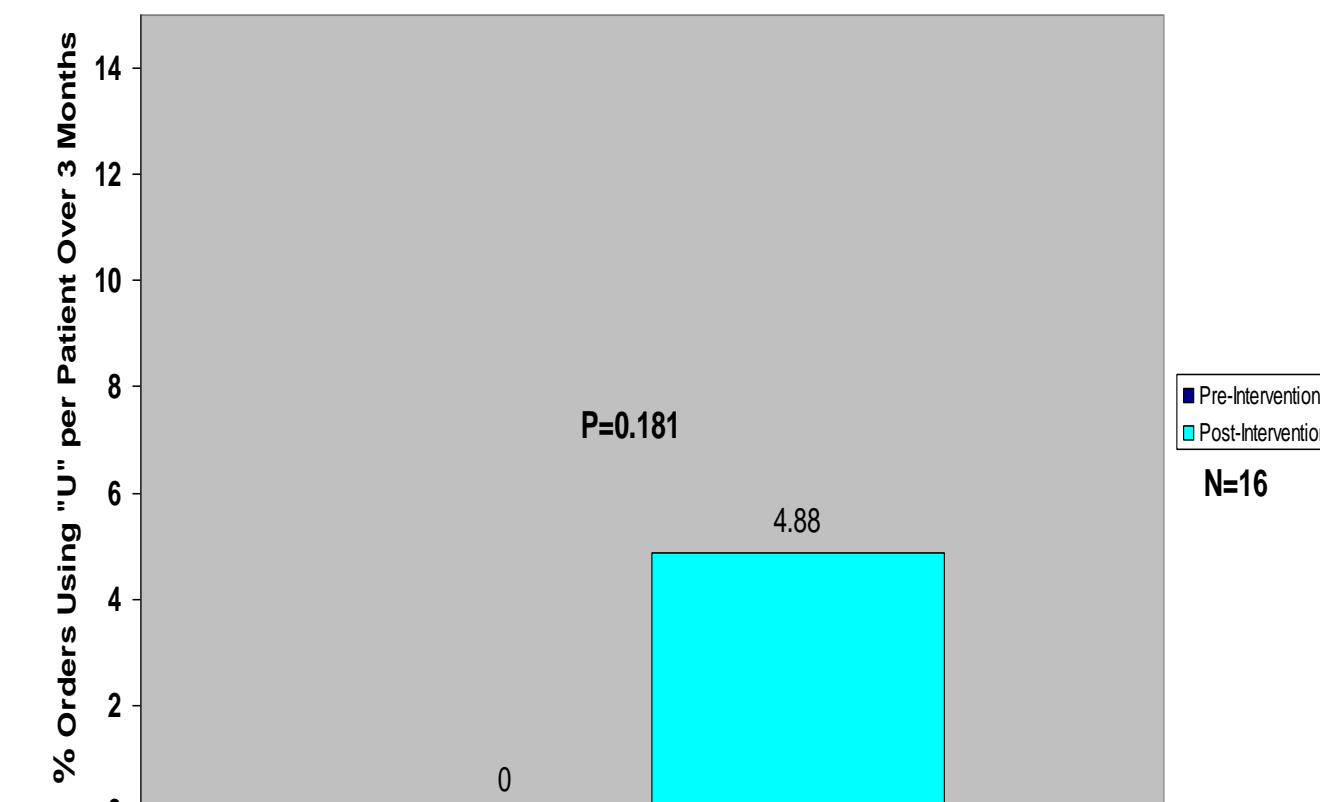

Figure 5: Use of "U" vs. Units Paired t-test Results

Discussion

- The pre-study consent survey was conducted as recommended by Research & Ethics due to the retrospective nature of the study and to test the willingness of participation in the proposed subject population. Twenty randomly selected patients were asked if they would consent to have their medical records looked at if they were, hypothetically, to be in this study.

- A priori sample size calculation indicated a cohort of 61 patients with α=0.05 and 1-β=80%. This was not feasible (see limitations).

- Although no outcomes were statistically significant, there was a trend towards a decrease in the incidence of hypoglycemia, hyperglycemia and severe hyperglycemia.

- 16 patients were followed, however N=12 for analysis of blood glucose readings and HbA1c. Four study patients did not have their blood glucose monitored, unless signs or symptoms indicated such a measurement. Thus, they were excluded from the analysis.

Limitations

Although both primary and secondary outcomes were not statistically significant, there were multiple limitations that could potentially have influenced study results.

Current Practice
- This was VIHA's first order set in residential care: confusion and hesitation as to its purpose and use was encountered.
- Increased work load to implement order set and difficulty with altering day-to-day practice to accommodate the order set.
- Limited routine blood glucose monitoring in long-term care patients, unless signs and symptoms indicated it.

Time
- Order set implementation time period of 3 months.
- VIHA's residential care patients have a full medication review every 6 months, where new orders may be generated. Otherwise, unless there is an issue, new orders in the interim are not generated.
- Time frame of 3 months may have been too short to capture enough new orders.
- Time constraints prevented study from taking place at >2 centers. Therefore, the calculated sample size was not reached.

Educational
- Variety of staff working part-time and at varying hours. Difficulty educating all staff regarding diabetes management order set.

Statistical
- T-tests are designed for samples <30. However, variables may be skewed and correction with transformation is difficult with a small sample size.

Conclusion

- A diabetes management preprinted order set may have the potential to improve patient care and safety in a long-term care setting.

- Use of the order set did prompt physicians to evaluate current diabetes therapy and its management.

- Recommendations:
  - Future education for both nursing and physicians.
  - Continued use of order set with further data collection and analysis of primary and secondary outcomes for a longer duration, with a larger population.
  - Survey nursing and physician staff on their satisfaction with the order set and suggestions for changes.
  - Modification of Diabetes Management order set based on feedback.
  - Roll out order set at other residential care sites in VIHA.
  - Order set to remain on the Open Source Order Sets (OSOS) Network repository for other health authorities to use for idea and hypothesis generation.

- The trending results of this research follow that of previous studies which show a benefit of order sets. However, a larger study in residential care with a longer duration and larger sample size is recommended.

References available on request