ID Risk-HCC: Identification of Medications and Confounding Risk Factors Associated with Hospital Admission within Island Health Home and Community Care (HCC) Population

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Introduction

- Medication discrepancies increase at transitions of care.[1]
- A best possible medication history (BPMH) decreases medication discrepancies and increases patient medication safety.[1]
- Professionals with expertise and training to conduct an accurate and complete BPMH are a limited resource while client numbers on Vancouver Island increase.
- Identification of specific risk factors, including medications implicated in adverse drug reactions (ADRs), is needed to identify individuals likely to benefit from a BPMH. This is an Accreditation Canada standard for HCC.[2]
- Majority of Home and Community Care (HCC) Clients take one or more medications with potentially high risk ADRs.

Uniqueness of Research

- Medication Safety research has been limited in Vancouver Island HCC providing little support for policy improvement.
- Focus on the Island Health HCC population vs. published data.
- Use of inpatient acute hospitalization admission through the emergency room (ER) as an indirect measurement of ADRs.

Study Objective

To determine if high-risk medications* or other factors can be used to identify clients most likely to benefit from a BPMH.

Primary Outcome: Proportion of clients with an inpatient acute hospital admission 90 days after a HCC referral, prescribed one or more high-risk* medication.
Secondary Outcomes: 1) Incidence of high-risk medication classes taken among the group 2) Average number of medications prescribed 3) Number of clients with delegation of task (DOT).
Delegation of task: Medication administration by a healthcare worker.

*High-risk medications were defined as warfarin, direct acting oral anticoagulants (DOACs), hypoglycemic agents, opioids, diuretics, digoxin, regularly scheduled non-steroidal anti-inflammatory drugs (NSAIDs) and ASA

Methods

Design
- Retrospective Chart Review of BPMHs at HCC sites in Victoria (South Island) and Nanaimo (Center Island).
- Recorded high-risk medications* (individual and total number), total number of medications and DOT status of clients with an inpatient acute admissions 90 days after referral to HCC since January 2015.
- Inpatient acute admission confirmed through PowerChart.

Study population:

Inclusion	Exclusion
• HCC clients 65 years of age and older with a referral for Nursing, a Nurse Practitioner and/or Pharmacy since January 2015 • Acute inpatient hospital admission through ER within 90 days of HCC referral • BPMH completed by a nurse, nurse practitioner or pharmacist following referral available in client's chart • At least one study medication documented on client's BPMH	• Best possible medication history (BMPH) unavailable or met exclusion criteria • All eye drops, nose sprays, creams/ gels/ointments and topicals (unless regularly scheduled HRT) • Study medications only as needed (prns) • All OTCs except regularly scheduled ASA 81mg or NSAIDs • Evidence of planned hospital admissions (within 30 days) • Current cyclical chemotherapy • Immunosuppressive agents if tapering schedule included, prn or fixed duration

Data Collection

Search HCC Services Cube in the Business Intelligence Data Warehouse for MRNs Matching Criteria:
HCC referrals for Nursing, Nurse Practitioner and/or Pharmacy, greater or equal to 65 years of age with an ER hospital admission within 90 days of HCC referral and non-hospitalized controls.

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Inpatient Acute Admission Status Confirmed in PowerChart

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Paper Charts Acquired by MRN and BPMH Located → Exclusions **N=206**

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Data Collected
Age, gender, delegation of task (DOT), high risk medication use, total number of high risk medications, total number of medications as defined by protocol. **N=332**

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Entered into Computer Database

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Statistical Analysis

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Data Analysis

Reasons for Exclusion:

• No BPMH	**64**
• No BPMH within study time frame or missing info (date/frequency)	**55**
• BPMH after hospital admission	**23**
•No medications meeting criteria	**23**
•Chemotherapy	**4**
•Other	**37**

Figure 1: Data Collection Flowchart

Results

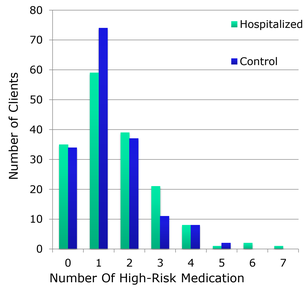

Figure 2: Total Number of High Risk Medications Taken

Table 1: Baseline Demographics

	Hospitalized	Control
Mean Age	80-84	80-84
Median Age	85+	85+
Female	58%	60%

Table 2: Total Number of High Risk Medications

Population	Mean	95% CI	Std. Dev
Hospitalized	1.57	1.38-1.77	1.344
Control	1.34	1.18-1.51	1.097

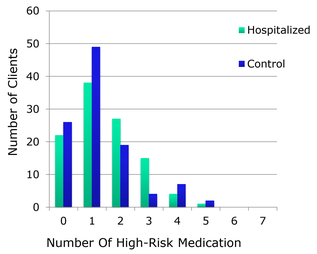

Figure 3: Number of High Risk Medications in Victoria Population

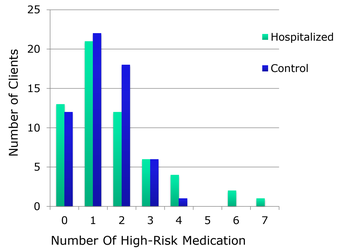

Figure 4: Number of High Risk Medications in Nanaimo Population

Results

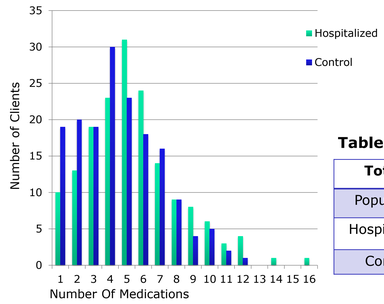

Table 3: Total Number of Medications

Total Number of Medications Taken			
Population	Mean	95% CI	Std. Dev
Hospitalized	5.37	4.95-5.79	2.856
Control	4.59	4.22-4.96	2.494

Figure 5: Total Number of Medications

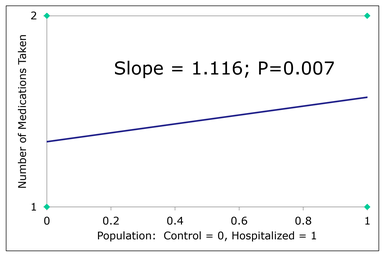

Figure 6: Linear Regression Plot Risk of Hospitalization vs. Number of Medications Taken

Discussion

Findings
- Trend towards increasing number of medications and an increased risk hospitalization of 1.116 (p=0.007) for each additional medication taken (Figure 6).
- No significant correlation between the number of high risk medications* and increased hospitalization observed (Figure 2 and Table 2).
- A trend suggesting inter-site variability observed and regional differences (Figure 3 and 4).
- Diuretics, hypoglycemics and opioids appeared to correlate with hospitalization at both sites although a larger sample size is required (data not shown).
- Subgroup analysis suggests inter-site variability in the correlation of certain high-risk medications and hospitalization. This may limit pooling of Island-wide data.
- The incidence of DOT was higher in patients with a higher number of total medications and a hospitalization.

Limitations
- Insufficient power to show a statistically significant difference.
- Confounding factors including disease states (i.e. congestive heart failure and diuretic use) may have resulted in hospital admission vs. ADRs.
- Data quality was dependent on the thoroughness of the BPMH.
- HCC Clients often had prior referrals, thus unnecessary or inappropriate medications may have been eliminated earlier in care.

Conclusion

- Given the sample size, conclusive data cannot be drawn from this pilot study. Further studies are needed to determine if high-risk medications or DOT may be used to identify Island Health HCC clients most likely to benefit most from a BPMH.
- There was a statistically significant increase in hospitalization and the number of medications taken. This could be a focus for future studies.
- Regional differences between certain high-risk medications was observed. Data pooling between geographic island wide locations should be approached with caution in future studies.

References available on request