La nature et le poids des problèmes de sécurité des patients recevant des services à domicile au Canada

Données obtenues du Système de déclaration RAI-HC de trois provinces et un territoire

13 mai 2009

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Remerciements

Nous tenons à exprimer toute notre reconnaissance à l'Institut canadien pour la sécurité des patients qui a subventionné cette recherche. Nous voulons aussi souligner la contribution de Nancy White, gestionnaire, Services à domicile et soins de longue durée de l'Institut canadien pour l'information en santé. Les opinions, conclusions et résultats de cette étude sont ceux des auteurs et ne reflètent en rien ceux de l'agence subventionnaire.

Messages Principaux

Objectif :

Cette étude avait pour objectif d'évaluer le poids des problèmes de sécurité pour les patients recevant des soins à domicile au Canada.

Méthodologie:

La méthodologie utilisée faisait appel à une analyse secondaire de données recueillies par le système de déclaration des services à domicile qui utilise l'outil d'évaluation RAI-HC©. L'échantillon comprenait tous les clients des services à domicile qui étaient admissibles à une évaluation RAI-HC en Ontario, en Nouvelle-Écosse, à l'Office régional de la santé de Winnipeg et au Yukon, pendant la période de déclaration 2003 -2007.

Découvertes clés :

La majorité des clients des services à domicile sont des femmes de plus de 75 ans vivant avec une autre personne et dont les facultés cognitives sont intactes. Les taux d'incidence suivants ont été observés : nouvelles chutes, 11 %; perte de poids involontaire, 10 %; nouvelles visites aux services d'urgence 8,3 %; nouvelles visites à l'hôpital, 7,7 %; déclin des facultés cognitives, 5,7 %; infection des voies urinaires, 1,9 %; détérioration d'une plaie de pression, 1,8 %; nouvelles plaies de pression 1,7 %; pneumonie, 0,9 %; nouveau problème intestinal, 0,8 %; déshydratation, 0,7 %; et déclin de l'aidant[1] naturel, 3,3 %.

Les clients des services à domicile présentent de multiples facteurs de risque, comme la poplypharmacie, la solitude et le manque de suivi médical, pour mettre à jour les prescriptions par exemple. Ces facteurs de risque sont liés, à divers degrés, à des événements indésirables

[1] Le masculin est utilisé dans le présent document sans aucune discrimination et uniquement dans le but d'alléger le texte.

potentiels. Les probabilités de visite à l'urgence augmentent quand un patient a fait une ou deux chutes (OR=1,2), quand il reçoit un diagnostic de cancer (OR=1,2), quand il prend des anxiolytiques (OR=1,2), quand il prend des antidépresseurs (OR=1,4), et quand il prend plusieurs médicaments à la fois (OR=1,5). Ces probabilités diminuent dans le cas de la perte d'autonomie (OR=0,9) et des activités de la vie de tous les jours (0,8).

Conclusion:

L'outil d'évaluation RAI-HC© fournit de l'information utile sur les événements indésirables et les facteurs de risque des clients des services à domicile au Canada. Les nouvelles chutes et les visites aux services d'urgence sont les événements indésirables les plus fréquents. Un grand nombre de facteurs de risque sont modifiables, mais cela requiert des changements dans le comportement des clients et des intervenants en santé, ainsi que dans les politiques des systèmes de santé. Il faut rédiger des politiques qui encouragent l'adoption de pratiques exemplaires en matière d'atténuation des risques.

Sommaire

Dans « La nature et le poids des problèmes de sécurité des patients recevant des services à domicile au Canada », les chercheurs se basent sur de la recherche récente portant sur divers aspects de la sécurité des patients et sur les préoccupations croissantes du milieu au sujet de la nature et du poids des problèmes de sécurité des patients à domicile. Les découvertes de la présente étude permettent de mieux comprendre l'ampleur de ces problèmes de sécurité au Canada. D[re] Doran et ses collègues s'étaient donné pour objectifs : 1) d'étudier et de déterminer la nature et la prévalence de ces problèmes parmi les patients recevant des services à domicile en se servant de l'outil d'évaluation RAI-HC; et 2) de développer des indicateurs de sécurité comparatifs pour les patients recevant des services à domicile.

La méthodologie utilisée faisait appel à une analyse secondaire de données recueillies par le système de déclaration des services à domicile qui utilise l'outil d'évaluation RAI-HC©. L'échantillon comprenait tous les clients des services à domicile qui étaient admissibles à une évaluation RAI-HC en Ontario, en Nouvelle-Écosse, à l'Office régional de la santé de Winnipeg et au Yukon, pendant la période de déclaration 2003 -2007. Les clients des services à domicile qui sont susceptibles de recevoir des services pendant 60 jours ou plus sont soumis à une évaluation RAI-HC. Il y avait au total 238 958 cas à analyser; 205 953 de l'Ontario, 26 751 de la Nouvelle-Écosse et 6 254 de l'Office régional de la santé de Winnipeg.

Le facteur de risque le plus prévalent était la polypharmacie, suivie par le déclin des fonctions physiques et les visites aux services d'urgence. Il y a d'importantes disparités régionales dans la prévalence des risques de sécurité. Pour les clients des services à domicile, les facteurs de risque les plus prévalents étaient : la polypharmacie, le déclin des fonctions

physiques, le déclin des facultés cognitives et les chutes. Pour les proches des maladies ou les aidants occasionnels, le risque de sécurité le plus important est la cohabitation avec une personne qui manifeste des comportements agressifs et l'exposition à la fumée secondaire. Les résultats varient d'une région à l'autre.

Les risques de sécurité ont un impact sur les préjudices possibles aux patients, sans toutefois indiquer si un événement est survenu ou non. Les résultats de la présente étude ont indiqué que les événements indésirables les plus prévalents parmi les clients des services à domicile étaient les nouvelles chutes, la perte de poids, les nouvelles visites aux services d'urgence et à l'hôpital. Pour les proches et les aidants occasionnels, l'événement indésirable potentiel le plus prévalent était le déclin de leur état de santé.

Avant de pouvoir répondre à la question de la prévalence des événements indésirables parmi les clients des services à domicile au Canada, de nouvelles études et validations seront nécessaires pour confirmer si la survenue de ces événements indésirables est attribuable à la gestion des soins. Une fois cela fait, il pourrait être intéressant d'appliquer la même méthodologie de recherche aux établissements de soins de longue durée et de mettre en oeuvre des interventions dans ces deux secteurs. Les interventions sont importantes en sécurité des patients, mais, si on veut améliorer la sécurité et la qualité des services à domicile, on doit accorder autant d'importance à la surveillance et à l'atténuation des risques. Des stratégies de transmission du savoir sur les façons de diminuer les risques seront bénéfiques pour tous les clients des services à domicile.

Context *(Description of Problem and/or Purpose of Research)*

Background

Concern about *patient safety* has captured the attention of health care decision makers in their efforts to provide high quality care. Problems of patient safety have been well documented in hospitals. However, we have very limited data about patient safety problems among home care clients, where care differs from the hospital setting in terms of the nature of formal service provision, the role of family members, and the characteristics of the individuals receiving care[1]. A large proportion of care in the home is provided by family members or informal caregivers. The amount of daily contact between home-care staff and a client is substantially shorter than in the hospital setting. Furthermore, it has been established that community-based individuals are more likely to receive services from multiple agencies[1], which complicates the efforts to study this population. An environmental scan of patient-safety issues among Canadian home-care clients identified the following unique challenges associated with safety in home care[2]: i) the family is the unit of care and as a result, the safety of the client, family, caregiver and provider are inextricably linked; ii) the setting of individual homes is unregulated and uncontrolled in contrast to the hospital setting; iii) there are multiple dimensions of safety in home care, including physical, emotional, social, and functional safety; iv) there is greater autonomy and choice for clients, families, and caregivers than what is experienced in hospital settings; and v) a large percentage of clients receiving home care support are elderly and live alone.

We have only recently begun to develop an understanding of patient safety problems among home care clients. A 1999 US study investigated patient safety problems among 3,013,287 homecare clients, using the OASIS data. The results indicated that 13% of all

homecare clients had experienced an adverse event[3]. Clients who experienced such events were generally older. The types of adverse events experienced were unexpected death, urinary tract infection, fall or accident at home, wound deterioration, unexpected nursing home admission, increase in the number of pressure ulcers, improper medication administration or side effects, and hypo/hyper-glycemia. The results of a recent consensus conference suggest that Canada experiences a similar range of patient safety problems among the homecare population[4].

One of the first Canadian studies found a 5.5% incidence rate of adverse events in a sample of 279 Winnipeg HC clients, of which injurious falls accounted for nearly half (46%), followed by medication related events (23%), non-injurious falls (15%), pressure ulcers (3.8%), and mental harm/injury (3.8%)[5]. More recently, Sears (2008) collected data on adverse events in a stratified, random sample of patients who had received home care nursing services and were discharged in 2004/05 from three Ontario home care programs. When adjustments were made for sampling methodology, she found the adverse event rate was 13.2 per 100 patients[6]. Thirty-three percent of the adverse events were rated as having more than a 50% probability of preventability. This rate was remarkably similar to the American study. Eight significant predictors of the occurrence of an adverse event were identified: the presence of Parkinson's disease, the use of psychotropic medications, being left alone for short or long periods, dependent for locomotion outside of the home, history of falls, and dependent for the management of housework. Braining storming among experts, Masotti et al. found that factors that contribute to adverse events in HC included: communication problems, formal provider skill mix, client complexity, home environment, medical procedures, and service delays[4].

Our study builds on this recent research to expand understanding of the nature and burden of safety problems among Canadian homecare clients. We focus on the prevalence of key safety risks and adverse events among HC clients with the goal of determining the magnitude of the problem of client safety in home care, to discern important patterns and to identify key variables.

The **purpose** of this exploratory study was to identify the nature and prevalence of patient safety problems among Canadian homecare (HC) clients, using data collected through the RAI-HC© assessment instrument. A second aim of the study was to propose a framework for identifying measurable patient safety indicators.

Eight jurisdictions in Canada have implemented, or are in the process of implementing, the RAI-HC© assessment instrument. These assessments, which are, or will soon be submitted to the Canadian Institute for Health Information's (CIHI) Home Care Reporting System, provide a comprehensive profile of Canadian home care clients, their environment, services and outcomes[7]. This project focused on analyzing the RAI-HC© data currently available from Yukon Territory, Winnipeg Regional Health Authority, Ontario and Nova Scotia, to generate valuable information about the nature and burden of safety problems among Canadian HC clients.

The specific objectives of this study were to:

1. Explore the nature and prevalence of patient safety risks and outcomes among Canadian homecare clients;
2. Explore how these patient safety risks/outcomes vary by factors such as geographic region, urban/rural setting, and population characteristics;
3. Propose a conceptual framework for home care safety indicators;
4. Propose potential safety outcomes that could be developed into a set of indicators for performance monitoring, reporting, and benchmarking across Canada.

Criteria for Selecting Safety Indicators

Hermann and Palmer suggested that three criteria are useful for selecting outcome indicators for performance monitoring[8]. The first considers whether the outcome is *meaningful*; specifically, is it clinically important, does it meet stakeholder needs, is it based on high-quality evidence, and is it valid for the intended purpose. The second criterion considers whether the outcome is *feasible*; specifically, is there a precise definition of the outcome concept, are data on the outcome available or affordably collectible, can the data be collected reliably, and is it possible to case-mix adjust for the purpose of quality monitoring and benchmarking. The third criterion considers whether the outcome is *actionable* as evidenced by whether the results are comprehensible, under the user's control, modifiable, and interpretable. These criteria informed the methodology for identifying and validating HC safety indicators.

Implications *(Impact, Risks, Potential benefit to patient safety)*

The findings from this study have implications for home care managers and health policy makers. First, many of the safety risks identified in this study are modifiable but require client behaviour change, health provider behaviour change, and health system policy change. At a health system or health care organization level, policies could be developed to support best practice related to risk mitigation. An understanding of the risk factors that contribute to variation in safety outcomes should also enable health policy makers to make informed decisions about service priorities at the regional level.

Approach, Methodology, Rationale, Assumptions

Methodology

The study methodology involved a secondary analysis of data collected through the CIHI Home Care Reporting System and the Ontario HC reporting system. Agreement was obtained from CIHI for access to the data. The study received ethical approval from the University of Toronto Research Ethics Review Board.

Sample

The study sample consisted of all home care clients who qualified to receive a RAI-HC assessment from three provinces and one territory (Ontario, Nova Scotia, Manitoba (Winnipeg Regional Health Authority), and Yukon). Only those who are expected to receive services for 60 days or longer receive the RAI-HC assessment. Therefore, short-stay clients were not included in the study sample. The study sample was created using RAI-HC data from the three provinces and one territory for 2003 -2007 reporting period.

The safety risk analyses used intake assessments from all 4 jurisdictions, while the adverse event/unsafe care analyses used pairs of the intake assessment and the subsequent assessment, which is why the sample size in Table 1 is smaller for the adverse event sample than the safety risk sample. The Yukon Territory was not included in the adverse event analysis because of a very small sample of cases from this territory. Four types of eligible home-care clients were included: long-stay clients (on service ≥ 30 days), clients who were post-hospital discharge, clients with identified mental health concerns, and palliative clients. Table 1 presents the sample size for the three provinces and territory.

Table 1: Number of Clients in the Study Sample for Each Region

	Ontario	Nova Scotia	Winnipeg	Yukon
Safety risk	205,953	26,751	6,254	53
Adverse events	76,767	10,507	1,749	

Study Variables and Definitions

Two types of safety indicators were studied: safety risk and adverse events. These two indicators are related but conceptually distinct. *Safety risks* are defined as characteristics of the client or the living situation that place a client at risk for adverse outcome. The safety risks were largely based on what was identified in the previous literature[3 4 6], and on data collected in the RAI-HC assessment instrument. Examples include a history of two or more falls over the past three months prior to admission for HC services, or polypharmacy (defined as 5 or more medications) combined with cognitive impairment. We believe safety risks are important to monitor for several reasons. First, they provide health care organizations and regional health authorities with important information about the profile of their client population. Such information needs to be considered when allocating resources and setting priorities for service provision. Second, they provide frontline clinicians with information about individual clients that should be considered when planning health care intervention. Third, in the context of chronic disease management, they provide individual clients (patients) with valuable information for self-care management. *Adverse event* is defined as an unintended injury or complication that results in disability, death, or increased use of health care resources and is caused by health care management[9]. *Prevalence* is defined as the occurrence of a safety risk that is determined at the time of initial RAI-HC assessment. *Incidence* is defined as a deterioration in a safety risk (or

occurrence of an adverse event) between intake and follow-up assessments (intervals between assessments range 120-160 days)[1].

The operational definitions of safety risk and adverse event were provided in a publication by Doran et al.[10]

Analytic Strategy

Descriptive statistics were conducted to describe the population characteristics based on gender, age, living arrangement, and intake RAI-HC assessment data. Prevalence rates were calculated for each indicator by region. Chi square tests were used to assess for significant variation in rates between regions. Logistic regression analysis was used to examine the relationships between safety risk factors and adverse outcomes.

Stakeholder Validation of the Indicators

The findings of the exploratory analyses were presented at the annual conference of the Ontario Association of Community Care Access Centres. Participants (n=20) who attended the session were invited to complete a survey soliciting their feedback on the preliminary list of safety indicators. They were asked to rate each indicator for importance on a scale of 1 to 9, where 1 was low importance and 9 was high importance.

Results, Conclusions *(Findings)*

Results

The first set of results, presented in Table 2, describes the study sample. The majority of HC clients were in the 75+ age range, female, living with someone else, and cognitively intact.

The characteristics of the study sample were very similar across the health regions with two exceptions. There were higher proportions of clients with functional impairment in the Ontario and Nova Scotia sample and there were higher proportions of clients with possible depression in the Ontario and Yukon Territory sample.

Table 2: Study Sample Characteristics by Region

	Ontario	Nova Scotia	Winnipeg	Yukon
Characteristic	n=205,953	n=26,751	n=6,254	n=53
	%	%	%	%
Age				
<65	17.1	16.2	15.2	20.8
65-74	17.0	18.1	15.5	24.5
75-84	39.7	37	40.8	39.6
85+	26.0	28.8	28.4	15.1
Female	63.3	64.1	63.4	62.3
Living alone	32.6	38.8	49.5	45.3
Cognitively impaired	32.3	36.8	30.5	39.6
Functional impairment	20.2	34.5	17	9.4
Possible depression	14.9	9.6	8.6	18.9

Safety Risks

This section presents the findings concerning prevalence of safety risks among home care clients. Prevalence was based on data from the client's intake assessment. Because there were significant differences in rates across regions of the country, the rates are presented separately for the three provinces and territory. These differences were statistically significant for all but one of the safety risks ($p<.0001$). The one exception described below was family caregivers caring for a client who has morbid obesity and requires weight bearing assistance for transfer.

The most prevalent safety risk was polypharmacy, followed by decline in physical function (see Table 3). It is noteworthy that a small proportion of home care clients who had a

decline in physical function also lived alone, potentially placing them at increased risk for an adverse event.

Table 3. Percentage Distribution of Safety Risks Among Home Care Clients at Intake

	Ontario	Nova Scotia	Winnipeg	Yukon Territory	Total
Risk	Freq=205,953	Freq=26,751	Freq=6,254	Freq=53	
	%	%	%	%	Weighted %
Polypharmacy	151,695 73.7	18,365 68.7	4,276 68.4	32 60.3	72.9
Decline in physical function	115,739 56.2	14,627 54.7	3,154 50.4	13 24.53	55.9
Polypharmacy & history of cognitive impairment	19,464 25.4	2,942 28	382 21.8	N/A*	25.6
Decline in physical function and lives alone	37,919 18.4	5,532 20.7	1,547 24.7	5 9.3	18.8
Decline in cognition	34,185 16.6	5,192 19.4	673 10.8	10 18.9	16.8
History of 2 or more falls	33,301 16.2	3,972 14.9	707 11.3	6 11.3	15.9
Social isolation with distress	31,641 15.4	4,911 18.4	820 13.1	N/A	15.6
Hearing deficit	24,560 11.9	3,960 14.8	709 11.3	10 18.9	12.2
Unsafe housing	15,442 7.5	1,646 6.2	385 6.2	12 22.6	7.3
Decline in cognition & lives alone	8,680 4.2	1,673 6.3	283 4.3	6 11.3	4.5
Vision deficit	6,771 3.3	891 3.3	155 2.5	0	3.3
Decline in mental function	5,920 2.9	1,150 4.3	134 2.2	0	3
No medication review	5,829 2.8	1,406 5.3	72 1.2	3 5.7	3.1
Non-adherence to medication	5,829 2.8	489 1.8	180 2.9	9 17	3.1
Substance abuse	3,771	495	131	6	

	Ontario	Nova Scotia	Winnipeg	Yukon Territory	Total
	1.8	1.9	2.1	11.3	1.8
No medication review for clients with polypharmacy and/or history of cognitive impairment	1,435 1.9	481 4.6	22 1.3	N/A	2.2
Smoking and oxygen in the home	984 0.5	35 0.1	14 0.2	0	0.4
Family/caregivers					
Aggressive behaviours	14,760 7.2	2,466 9.2	345 5.5	8 15	7.4
Smoking and others in the home	12,216 5.9	1,462 4.5	211 3.4	4 7.6	5.8
Exposure to HIV or Tuberculosis in	604 0.3	84 0.3	25 0.4	1 1.9	0.3
Caring for client with morbid obesity requires weight bearing assistance for transfer	325 0.2	58 0.2	9 0.1	0	0.2

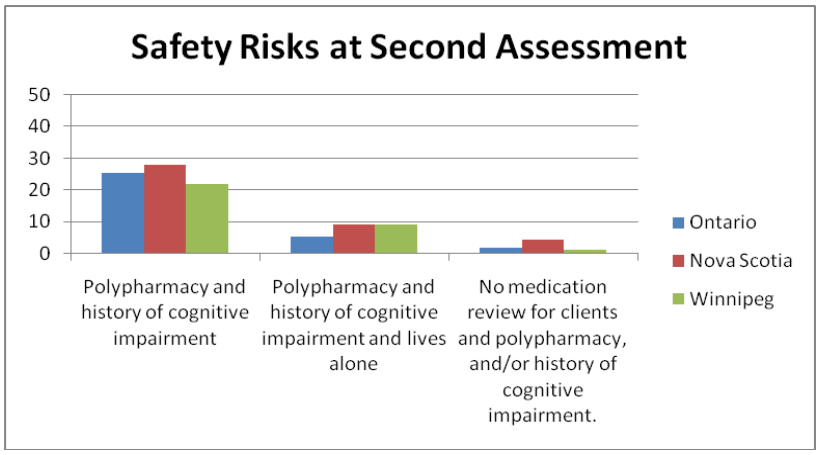
*N/A – data not available

Figure 1 presents the proportion of clients who had a safety risk identified at their second RAI-HC assessment. The RAI-HC assessment is repeated every six months for long stay clients and is also recommended for clients who have had a notable change in their status. It would be important to do more frequent assessments on clients who have patient safety problems. As noted in Figure 1, there were between 22% (Winnipeg) and 28% (Nova Scotia) of the clients identified at their second RAI-HC assessment as having polypharmacy who also were experiencing cognitive decline. Between 1% and 4% of the clients who had a history of polypharmacy and cognitive decline had had no medication review since their previous RAI-HC

assessment. While these safety risks were observed in a very small proportion of the overall sample, they could have potentially serious consequences.

Figure 1: Safety Risks at Second Assessment

Polypharmacy and History of Cognitive Impairment; Polypharmacy, History of Cognitive, and Lives Alone; No Medication Review for Clients with Polypharmacy, and/or History of Cognitive Impairment



Potential Adverse Events

While safety risks predispose patients to possible harm, they do not indicate whether an adverse event occurred. The next set of results presents the findings related to potential adverse events among the Canadian HC clients. We have identified these as potential events because further work is needed to validate that the events were associated with home health care management. Table 4 presents the results concerning potential adverse events among Canadian homecare clients. Yukon Territory was not included in this analysis because of small sample size. The weighted percent, which accounts for regional sample size, is presented in the last column of the table. The most prevalent potential adverse events among home care clients were

new fall (11%), unintended weight loss (10%), new emergency room visit (8.3%), and new hospital visit (7.7%).

Table 4. Potential Adverse Events Amongst Canadian HC Clients: New Fall; Unintended Weight Loss; New Emergency Room Visit; New Hospital Visits

	Ontario	Nova Scotia	Winnipeg	Total
Potential adverse event	Total sample =76,767	Total sample=10,507	Total sample=1,749	
	%	%	%	Weighted %
New fall	8,292 10.8	1,306 12.4	190 10.9	11
Unintended weight loss	8,132 10.6	1,012 9.6	131 7.5	10.4
New emergency room visits	6,507 8.5	778 7.4	92 5.3	8.3
New hospital visits	5,377 7.0	1,327 12.6	117 6.7	7.7
Cognitive performance decline	3,799 5.0	1,130 10.8	117 6.7	5.7
New urinary tract infection	1,309 1.7	352 3.4	25 1.4	1.9
Pressure ulcer deterioration	1,308 1.7	251 2.4	33 1.9	1.8
New pressure ulcer	1,227 1.6	239 2.3	31 1.8	1.7
New pneumonia	644 0.8	155 1.5	10 0.6	0.9
New bowel problem	552 0.7	121 1.2	8 0.5	0.8
New dehydration	515 0.7	69 0.7	5 0.3	0.7
New caregiver decline	2,047 2.7	785 7.5	79 4.5	3.3

New caregiver decline was identified as a potential adverse event/indicator of unsafe care for family/informal caregivers. The data in Table 4 indicate that between 2 and 7% of caregivers experienced new caregiver decline. We identify this as a potential adverse event because it is not

possible to confirm whether the decline was preventable and/or attributable to home health care management.

Significant variations in adverse outcomes were observed between regions of the country. Logistic regression analysis was used in order to investigate the extent to which age explains regional differences in adverse outcomes among Canadian home care clients and to explore the extent to which safety risk factors account for variation in regional rates of adverse outcome, after controlling for age. To do so, the focus is on one particular adverse outcome: emergency room (ER) visits.

ER visits are of interest for two reasons: first, visit to the emergency room was among the most prevalent adverse outcomes for home care clients in our study; and second, the Ontario Ministry of Health and Long Term Care has recently invested $109 Million to reduced wait times in emergency rooms (Ministry of Health and Long Term Care, 2008). If it is possible to identify factors that increase risk of ER visits and intervene to reduce risk it may be feasible to reduce wait times by preventing unnecessary ER utilization by home care clients. The results of the logistic regression analyses are presented in Table 5.

The results of the first logistic regression model presented in Table 5 indicate that Nova Scotia and Ontario home care clients have higher odds ratio for emergency room visits than Winnipeg Regional Health Authority. The results of the second logistic regression model indicate that clients less than 65 years of age had a slightly higher odds of emergency room visits than older clients, and that the regional differences are still significant. The small change in the c-statistic (.52 versus .51) for model two indicates that the age variable contributes very little to improve the model fit. The third model that included the other risk factors produced an improved

model fit as evidenced by a c-statistic of .57, although the regional differences were still significant. The factors that increased risk of emergency room visits by home care clients were: history of two or more falls, polypharmacy (i.e. 5 or more medications), cancer diagnosis, receiving anxiolytic medication, and receiving antidepressant medication. Decreased activities of daily living and lower self-reliance decreased risk of emergency room visits.

Table 5. Logistic Regression Models

		Region only			Region and Age			Region, Age and other variables		
		Odds ratio	Confidence limits		Odds ratio	Confidence limits		Odds ratio	Confidence limits	
Region	NS	2.22	1.43	3.45	2.21	1.42	3.45	2.16	1.39	3.37
	ON	2.51	1.64	3.85	2.50	1.63	3.84	2.44	1.59	3.74
	WRHA	1.00	reference		1.00	reference		1.00	reference	
Age categories	<65				1.16	1.02	1.32	1.09	0.96	1.24
	65-74				1.05	0.93	1.19	0.99	0.88	1.13
	75-84				0.96	0.87	1.06	0.93	0.84	1.02
	85+				1.00	reference		1.00	reference	
Risk Factors										
Patient Characteristics										
Two or more falls								1.20	1.08	1.33
Activities of daily living								0.84	0.78	0.92
Cancer diagnosis								1.16	1.03	1.32
Self reliance index								0.88	0.80	0.98
Health Care Management										
Received anxiolytic medication								1.17	1.05	1.30
Received antidepressant medication								1.14	1.04	1.26
Polypharmacy								1.50	1.34	1.69
c-statistic		0.512			0.524			0.570		

Objectives 3 and 4 were addressed by engaging approximately 20 HC stakeholders who attended the Ontario Association for Community Care Access Centres' annual conference, in a consensus workshop for the purpose of soliciting stakeholder feedback about the proposed list of safety risks and adverse events. Participants were presented with the results of the data analysis of RAI-HC safety and adverse event indicators. They had the opportunity to engage in discussion for the purpose of clarifying the types of issues/indicators that represent safety risk, contrast these with quality indicators, propose criteria/rules that could guide the determination of measurable safety indicators, and propose potential safety outcomes that could be developed into a set of indicators for performance monitoring and reporting. Participants also rated the importance of each safety indicator on a scale ranging from 1 (low) to 9 (high). The results of the participants' ratings are summarized in Table 6. It is important to note that the list of safety risks and adverse events in Table 6 does not reflect all of the indicators investigated in this study because we included additional indicators for analysis following the feedback from the stakeholders and based on new evidence that emerged in the literature. In general, the participants' ratings reflect high perceived importance for most indicators. Indicators that received low ratings (≤6) were: possible depression and tobacco use.

Table 6: Home Care Stakeholder Ratings of Safety Risk and Adverse Event Indicators

Safety Indicator	Importance
Safety Risks	mean (sd)
≥2 falls in last 90 days OR since last assessment	8.23 (0.83)
Polypharmacy/ cognitive impairment and no medication oversight	7.92 (0.64)
Aggressive behavior	7.85 (0.99)
Cognitive impairment (CPS2+)	7.67 (1.07)
No caregiver (was present before)	7.67 (1.07)
Client smoke and dangerous use (O2, high CPS)	7.64 (1.57)
Unsafe housing, lighting status	7.45 (1.75)
Cognitive or physical decline	7.15 (1.34)

No medication review in last 180 days	7.08 (1.66)
Medication adherence less than 80% of time	7.00 (1.41)
Morbid obesity and requires weight bearing help for transfer	6.83 (1.99)
Polypharmacy (5 or more medications)	6.79 (2.01)
Functional impairment (ADL hierarchy 2+)	6.67 (1.78)
Caregiver exposure to Tuberculosis or HIV	6.36 (1.96)
Social isolation with distress	6.23 (1.79)
Possible depression (DRS 3+)	5.83 (1.90)
Tobacco use	4.78 (1.64)
Adverse Events	
New caregiver decline	7.31 (1.80)
New wound/pressure ulcer	6.69 (1.44)
New pneumonia	6.23 (1.54)
New hospitalization	6.15 (1.82)
New urinary tract infection	6.08 (1.68)

Discussion

Limitations

One limitation of this study was that it was not possible to validate the actual occurrence of an adverse event identified through the RAI-HC reporting system. There are several steps that would need to be pursued in order to validate the indicators we have identified. First it would be helpful to validate the indicators with a larger sample of HC stakeholders in order to confirm the importance of the adverse event and safety risk indicators and to identify where there are gaps. Second, to be consistent with our definition of adverse events, it is important to confirm that the adverse events identified were attributable to health care management. In order to do this it would be necessary to conduct a chart audit for the purpose of identifying true positive cases. It would also be helpful to link the cases identified through the RAI-HC reporting system to the hospital discharge administrative database in order to identify reasons for re-hospitalization or reasons for visits to the emergency department (ED). This would enable determination of

whether the return visit to the hospital or ED could have been prevented and was associated with home health care management.

Another limitation is the possibility that some adverse events are not documented on the RAI-HC assessment tool. Furthermore, because assessments are completed on average every six months, it is possible that an adverse event could occur and be missed if it was reconciled and not noted by the client or family caregiver at the time of the follow-up RAI-HC assessment. A third limitation is that not all home care clients are represented in the database because only long-stay clients qualify for a RAI-HC assessment. Thus the study findings are only generalizable to long-stay clients. This may change over time as provinces/territories move toward the use of the interRAI Contact Assessment as the screening methodology for home care intake. That instrument will be used to support decision making related to the need for RAI-HC assessments in all home care intakes, not only for long stay clients.

Related Literature

The findings in this study are consistent with the results of some of the previous research. For example, the study by Madigan and Fortinsky (1999) identified unexpected deaths, falls, accidents, and wound deterioration as the most frequent adverse events in their sample of US home care clients[3]. The study of Winnipeg HC clients identified injurious falls, medication related events, pressure ulcers, and mental harm as the most frequent adverse events[5]. Sears's (2008) study of Ontario HC clients identified the following types of adverse events: falls with injury, medication error, pressure ulcer, general decline, delayed healing, infection, etc. The potential adverse events we identified in our study are similar to those identified in this past research. New fall (11%), unintended weight loss (9%), new ER visits (7%), and new hospital

visits (8%) were the most prevalent potential adverse events identified in our study. A small proportion of the HC clients were identified as experiencing a new urinary tract infection (2%). There are some adverse events identified in previous literature, such as wound deterioration (with the exception of pressure ulcer), medication events, unexpected death, which are not identified through the RAI-HC assessment.

The methodology in this study did not enable confirmation of whether the injuries resulting from these potential adverse events were preventable. It is also not possible to know whether the rates we observed were an under-representation of adverse events/outcomes in community clients or whether they were an over-estimation. If we compare our rates to those reported by Sears, for instance, there is some indication that our rates are lower for events such as ED visit (7% versus 33%) or patient complications (e.g., CVA) (2% versus 11%). On the other hand, our rates are a little higher than the rates reported by Madigan and Fortinsky for UTI (2% versus 1%). These differences in rates could be a function of a number of factors such as differences in operational definitions for adverse events, in approach for data collection, sample sizes, variations in service provided between programs, and in HC client population.

Our study has made a contribution to the home care safety literature by providing data for the first time on safety risk indicators. Safety risks are potentially amenable to health care intervention and, for this reason, provide health care organizations and providers with valuable information for care planning. Failure to address safety risks could constitute poor quality care and thus provide a basis for quality improvement initiatives.

The most prevalent safety risks we identified were 1) polypharmacy, 2) decline in physical function, 3) decline in cognitive function, 4) history of two or more falls, and 5) social

isolation with distress. It was noteworthy that some clients had a combination of two or more safety risks, rendering them potentially at further vulnerability for poor outcome. For example, there were clients who experienced a decline in physical function (or cognitive function) who also lived alone. There were also clients with polypharmacy, a history of cognitive decline, who lived alone. Future research needs to explore the extent to which these combinations of risk factors increase the client's vulnerability to poor outcome.

Some safety risks and some of the potential adverse events occurred in a small percentage of the home care population included in this study. We elected to include these indicators in recognition that some indicators will have low rates but are still important to consider because at the individual level they are important from both a patient and staff safety point of view.

Our study findings have implications for health policy and health care intervention. For example, we need to begin to develop evidence about best practices for ameliorating safety risk. Ultimately this is the most important direction for future work because monitoring risk on its own will not result in improvements in the safety and quality of health care. Monitoring needs to be linked with best practices so that meaningful improvements in the quality of health care can be attained. Doran and Sidani described this approach to quality improvement as "outcomes focused knowledge translations"[11]. Outcomes-focused knowledge translation aims at achieving continuous improvement of patient care through the uptake of research evidence and feedback data about patient outcomes. Best practice evidence exists for intervening in several of the safety risks identified in this study, such as patient falls, pressure ulcers, depression, and decline in cognitive function. Future research could start by targeting practices where the evidence is strong

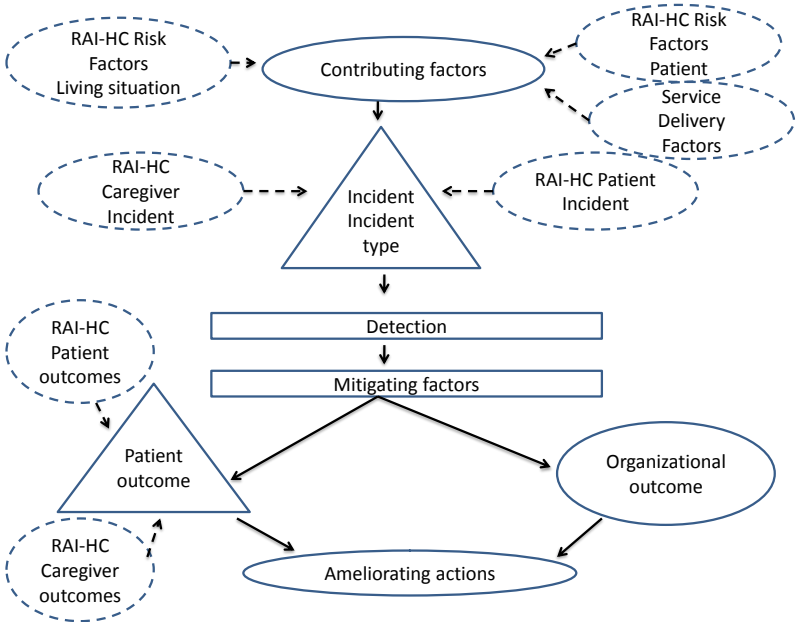
to develop and evaluate knowledge translation strategies for risk modification among homecare clients.

Conceptual Framework for Home Care Safety Indicators

The third and fourth objectives of our research were to propose a conceptual framework for home care safety indicators and to propose potential safety outcomes that could be developed into a set of indicators for performance monitoring, reporting, and benchmarking across Canada. In developing a conceptual framework for home care patient safety indicators it is useful to consider what already exists in the literature, such as the conceptual framework for the international classification for patient safety proposed by the World Health Organization[12]. The WHO framework starts with the identification of contributing factors/hazards that result in a patient safety incident. A contributing factor is a "circumstance, action or influence (such as poor rostering or task allocation) which is thought to have played a part in the origin or development of an incident" (p.7). A patient safety incident is defined as "an event or circumstance which could have resulted, or did result, in unnecessary harm to a patient" (p.7). The WHO framework categorizes patient safety incidents into 15 types. An incident type is classified by type of process error (e.g., handover, waiting list, referral) and by type of problem, such as: not performed when indicated, incomplete, unavailable, wrong patient, wrong process. Each incident type is also described by patient characteristics (e.g., age, gender, primary diagnosis) and incident characteristics (e.g., care setting, treatment status, discipline involved). The conceptual framework includes consideration of whether the incident was detected, mitigating factors, patient outcomes and organization outcomes. The framework concludes with the identification of ameliorating actions.

Our modification of the WHO conceptual framework is presented in Figure 2. We also indicate within the figure where RAI-HC data could inform the identification of patient safety incidents, contributing factors, and outcomes. The RAI-HC instrument provides quite a lot of information about client's risk factors as well as contributing factors associated with the client's living situation. Of the fifteen types of patient safety incidents identified in the WHO conceptual framework, the RAI-HC instrument yields data primarily on two: falls and patient behaviour (e.g., substance abuse). In our study we proposed a third incident type not identified in the WHO conceptual framework, namely, family/caregiver adverse event. The RAI-HC instrument also provides comprehensive data on patient and family/caregiver outcomes.

Figure 2: Modification of the WHO Conceptual Framework, Incorporating RAI Data Elements



WHO Classification for Patient Safety Reprinted with permission of the WHO. url1: http://www.who.int/patientsafety/taxonomy/en/

The RAI-HC instrument is primarily designed to provide data on client outcomes, although it also contains some information about service provider and health service utilization. There are incident types that were defined by WHO that are not captured by the RAI-HC instrument. Examples include lack of data on clinical administration, clinical process, infrastructure, and resources/organization management. Also absent is information about organizational outcomes and ameliorating actions. Within Canada there are other home care data sources for indicators identified in the WHO framework that are not obtainable through the RAI-HC instrument. For example, the Home Care Database (HCDB) in Ontario is a relational database that captures key service components of Community Care Access Centres (CCAC) and their interactions with clients[13]. It includes information such as client demographics, diagnosis, surgical procedure, episode number, living arrangement, client grouping by service goals, care-product category (e.g., nursing, PT, OT), service setting, type and dollar cost of service delivered, discharge date, and discharge disposition. Further research is needed to clarify the extent to which this database and home care databases in other provinces and territories are able to provide information on clinical processes and administrative processes that contribute to our understanding of adverse events in home care setting.

We suggest that the most significant contribution of the RAI-HC data is in identification of client risk factors and in providing a comprehensive determination of client outcome status. An understanding of client risk is essential to effective preventative action. The client outcomes, such as return visits to the hospital or emergency department, should be considered flags that signal the need for further investigation. In and of themselves, they do not constitute a patient safety incident because further information is needed about the contributing factors, clinical

processes and problems associated with the outcomes in order to determine whether harm associated with health care management has occurred. Thus we would suggest that the RAI-HC is useful for identifying client risk and for identifying a potential adverse event. The linkage back to the process of care should then become the responsibility of those doing a quality review when an organization has a particularly high rate of adverse events overall or with subgroups.

We suggest two types of indicators be incorporated into a set of indicators for risk screening, performance monitoring, reporting, and benchmarking across Canada. The first involves the client characteristics and situational factors that create increased risk for an adverse event or adverse outcome. These are classified in Table 7 into client physical or cognitive factors, behavioural factors, living situation, and health care management factors.

Table 7: Patient Safety Risk Factors Identified through the RAI-HC Assessment Tool

	Safety Risk Factor
Client characteristic	Decline in physical function Decline in cognitive function Decline in mental function Social isolation with distress Hearing deficit Vision deficit
Client behavioural characteristic	History of 2 or more falls Non-adherence to medication Substance abuse Smoking - and oxygen in the home - and others in the home (second hand smoke) Aggressive behaviours HIV and/or tuberculosis infections - and others in the home Morbid obesity and requiring weight bearing assistance for transfer
Client living situation	Lives alone and decline in physical function Lives alone and decline in cognition Unsafe housing
Health care management factors	Polypharmacy

	Safety Risk Factor
	- and history of cognitive impairment No medication review - for clients with polypharmacy and/or history of cognitive impairment

The second type of patient safety indicator is an event/incident that happened to a home care client or caregiver, which could have resulted, or did result, in unnecessary harm to the client or caregiver. Using the RAI-HC data, we are able to identify three different types of patient safety incidents; fall, increased use of health care resources, and adverse outcome. These are summarized in Table 8. These patient safety incidents could serve as screening criteria; when they are identified further investigation should be undertaken to determine the underlying contributing factors, care processes, and mitigating factors. If investigation establishes the occurrence of an adverse event, it would also be important to document any ameliorating actions taken.

Table 8: Patient Safety Incidents Identified through the RAI-HC Assessment Tool

	Patient Safety Incident
Fall	Fall - fall that results in injury (not currently available)
Increase use of health care resources	New hospital visit New ER visit
Adverse outcome	Unintended weight loss Unexpected cognitive decline New urinary tract infection New caregiver decline New dehydration New bowel problem

Conclusion

The purpose of this study was to identify the nature and prevalence of patient safety problems among Canadian homecare (HC) clients, using data collected through the RAI-HC© assessment instrument. A list of patient safety risks factors was developed based on the previous literature. Analysis of data from the RAI-HC assessment instrument indicated significant variation in risk factors across regions of the country. There were small proportions of home care clients who presented with multiple risk factors. The extent to which these multiple risk factors increase the client's potential for poor outcome requires further research. We suggest that understanding clients' risk profile is foundational to effective patient care management.

The RAI-HC assessment provides data on three types of adverse events: patient fall, increased use of health care resources, and patient adverse outcome. Further investigation is required to confirm whether these adverse events occurred as a result of health care management before it will be possible to answer the question about prevalence of patient safety incidents among Canadian home care clients.

A second aim of the study was to propose a framework for identifying measurable patient safety indicators. The framework advanced in this study is based on the WHO conceptual framework for the international classification of patient safety[12]. We propose two types of indicators: patient safety risk factors and adverse outcomes. The RAI-HC assessment instrument provides data to support risk surveillance and outcomes monitoring. It therefore serves as one component of an overall patient safety performance monitoring and improvement framework. Directions for future research are proposed that will strengthen our ability to achieve a comprehensive strategy for home care patient safety.

Recommendations *(Gaps in Research, Next Steps)*

We have identified the following directions for further research:

Future Research
• Validate the list of adverse event and safety risk indicators with home care stakeholders • Conduct a scoping review of the literature to synthesize evidence on definitions, data collection approaches • Conduct a validation study involving chart audits and linkage with the hospital discharge administrative database and the national ambulatory care reporting system • More thoroughly monitor HC safety problems (e.g. make sure we detect all or most problems) • Research appropriate actions/interventions to reduce safety risks (e.g. by better home follow-up of patient and caregiver condition) • Explore the relationships between safety risks and adverse events/outcomes, for the purpose of validating the safety risks, and determining high risk profiles • Conduct research to identify which safety risks are appropriate for specific home care sub-populations • Focus research on knowledge translation strategies for evidence based practices related to safety risk modification in home care settings • Where an evidence gap exists, focus research to develop best practices for ameliorating safety risk and preventing adverse events among home care clients

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Appendices

Publications Related to the Study

Doran, D.M., Hirdes, J., Poss, J., Jantzi, M., Blais, R., Baker, G.R., & Pickard, J. (accepted) "Identification of Safety Outcomes for Canadian Home Care Clients: Evidence From the RAI-HC Reporting System Concerning Emergency Room Visits. Healthcare Quarterly.

Doran, D.M., Hirdes, J., Blais, R., Baker, G.R., White, N., Pickard, J., & Jantzi, M. (2009) "The nature of safety problems among Canadian home care clients: evidence from the RAI-HC Reporting System." Journal of Nursing Management, 17, 165-174.

Presentations Related to the Study

Doran, D.M., Hirdes, J., Blais, R., Baker, G.R., White, N., Pickard, J., Poss, J., Jantzi, M. Safety Indicators for Canadian Home Care Clients: Evidence From the RAI-HC Instrument. Ontario Association of Community Care Access Centres Annual Conference, June 5, 2009.