

Correlates of a “do not hospitalize” designation

In a sample of frail nursing home residents in Vancouver

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ABSTRACT

OBJECTIVE To explore what nursing home resident demographic, clinical, functional, and health services utilization characteristics influence a “do not hospitalize” designation.

DESIGN Historical cohort study.

SETTING Vancouver, BC.

PARTICIPANTS Extended care residents in 2 hospital-based and 4 free-standing nursing homes who died between 2001 and 2007.

MAIN OUTCOME MEASURES The designation of “do not hospitalize” on a resident’s chart.

RESULTS Continuity of family physician care from admission to death (adjusted hazard ratio [AHR] 2.16, 95% confidence interval [CI] 1.33 to 3.49), a sudden and unexpected death (AHR 0.43, 95% CI 0.25 to 0.73), and age (AHR 1.02, 95% CI 1.01 to 1.02) were independently associated with a “do not hospitalize” designation.

CONCLUSION The greater than 2-fold positive association of continuity of family physician care with a “do not hospitalize” designation is an interesting addition to the literature on how continuity of physician care matters.

EDITOR'S KEY POINTS

- In British Columbia, nursing home residents have designated degrees of intervention, indicating how aggressively they will be treated in the event of acute illnesses.
- The goal of this study was to determine which factors (ie, demographic, clinical, and functional characteristics, as well as use of hospital services) influence a “do not hospitalize” designation among a sample of highly debilitated nursing home residents.
- This study found an association between the continuity of family physician care and a “do not hospitalize” designation; this suggests that policies promoting continuity of physician care in nursing home settings are likely to support decreased rates of hospitalization and dying in hospital.

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Corrélat de l'indication « ne pas hospitaliser »

chez un échantillon de résidents à risque d'un centre d'hébergement de Vancouver

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RÉSUMÉ

OBJECTIF Déterminer, chez des résidents de centres d'hébergement, quelles caractéristiques démographiques, cliniques, fonctionnelles et relatives à l'utilisation des services de santé influencent l'inscription « ne pas hospitaliser » au dossier.

TYPE D'ÉTUDE Étude de cohorte historique.

CONTEXTE Vancouver, C.-B.

PARTICIPANTS Résidents en soins prolongés de 2 centres d'hébergement intra-hospitaliers et 4 extra-hospitaliers, qui sont décédés entre 2001 et 2007.

PRINCIPAL PARAMÈTRE À L'ÉTUDE L'inscription « ne pas hospitaliser » au dossier du résident.

RÉSULTATS La mention « ne pas hospitaliser » était associée, de façon indépendante, à la continuité des soins du médecin de famille entre l'admission et le décès (rapport de risque ajusté [RRA] 2,16, intervalle de confiance [IC] à 95% 1,33 – 3,49), à un décès soudain et inattendu (RRA 0,43, IC à 95% 0,25-0,73) et à l'âge (RRA 1,02, IC à 95% 1,01-1,02).

CONCLUSION Cette corrélation positive par un facteur supérieur à 2 entre la continuité des soins du médecin de famille et la mention « ne pas hospitaliser » contribue de façon intéressante à la littérature sur l'importance de la continuité des soins du médecin.

POINTS DE REPÈRE DU RÉDACTEUR

- Dans les dossiers des résidents des centres d'hébergement de la Colombie-Britannique, on inscrit le degré d'intervention, c'est-à-dire le degré d'agressivité du traitement en cas de maladie aiguë.
- Le but de cette étude était de déterminer quels facteurs (caractéristiques démographiques, cliniques et fonctionnelles) influencent la décision d'inscrire « ne pas hospitaliser » dans les dossiers d'un échantillon de résidents particulièrement fragiles de centres d'hébergement.
- Cette étude a montré une association entre le fait d'inscrire « ne pas hospitaliser » et les soins continus d'un médecin de famille; cela suggère que les politiques qui encouragent la poursuite des soins du médecin dans les maisons d'hébergement sont susceptibles de résulter en un moindre taux d'hospitalisation et de décès à l'hôpital.

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Nursing homes (long-term care facilities) provide residential care to frail elders no longer able to care for themselves or live independently. Many nursing home residents are at the end of their lives, and the average length of stay for extended care residents (ie, the most functionally dependent residents) in one Canadian province was reported to be approximately 18 months.¹ Advanced directives, or some form of a written statement providing a caregiver with an indication of how aggressively an individual wishes to be treated at the end of life, have been associated with both a higher frequency of death outside of hospital² and a lower frequency of hospital admissions.^{3,4} Given that avoidance of unwanted life support was found to be one important element related to high-quality end-of-life care among seriously ill patients and their family members,⁵ the presence of advanced directives in frail nursing home populations is especially relevant. Research in this area has shown mixed results as to whether individual demographic (eg, age, sex, ethnicity) and health status (eg, mental capacity, severity of illness) factors are associated with variation in advanced directives^{6,7} and ultimate place of death (in the nursing home vs in hospital).⁶

Background

In British Columbia, most (70%) nursing homes are publicly funded, non-profit institutions, and virtually the entire resident population is long-stay.⁸ One in 5 of the province’s approximately 300 nursing homes is either physically or administratively attached to a hospital (hospital-based) and the rest are free-standing facilities.⁸ From the time of admission to facilities, residents have designated degrees of intervention on their charts to indicate how aggressively they should be medically treated if they become ill. Degrees of intervention are a series of predefined choices that are less individualized

than advanced directives: Degree 1 directs caregivers to manage illness with palliation on-site. Degree 2 directs caregivers to manage illness with curative medical treatment within the confines of the nursing home. Degree 3 indicates hospitalization for acute illness without cardiopulmonary resuscitation, and degree 4 indicates hospitalization with full cardiopulmonary resuscitation (Table 1). Degrees of intervention are updated on a yearly basis by the family physician in consultation with the resident and his or her family.

Our study question asked the following: “Among a cohort of decedent nursing home residents at the frailest (extended) level of care, what demographic, clinical, functional, and health services utilization characteristics were associated with a ‘do not hospitalize’ (degrees of intervention 1 or 2) designation on the chart?”

METHODS

Study population

This was a historical cohort study of extended level of care nursing home residents who died between 2001 and 2007. Charts were reviewed from a convenience sample of 2 hospital-based and 4 free-standing publicly funded, non-profit facilities in Vancouver, BC. Sample size calculations were based on finding a difference in effect size of 40% versus 55% between the 2 facility groups at 5% 2-sided significance and 80% power. In the hospital-based facilities, extended care status was a requirement of admission. In free-standing facilities, residents might have been admitted to the facility at a higher functional level (intermediate care). After experiencing further functional decline, these residents would then be re-classified at an extended care functional level. We selected the charts of extended care residents only, as we wanted

Table 1. Degrees of intervention

DEGREES OF INTERVENTION	EXPLANATION
“Do not hospitalize” designation	
• 1	Supportive care—such as nursing care, relief of pain, control of fever, administration of oral fluids or intermittent oxygen, and continued management of standing chronic conditions—within the facility No transfer to hospital unless adequate comfort measures cannot be provided at the facility No CPR
• 2	Degree 1 plus therapeutic measures and medications to manage acute conditions within the limits of the facility No transfer to hospital unless adequate comfort measures cannot be provided at the facility No CPR
“Hospitalize” designation	
• 3	Degree 2 plus admission to an acute care hospital for medical or surgical treatment as indicated No referral to intensive care No CPR
• 4	Maximum therapeutic effort (as degree 3) including referral to intensive care and use of CPR if indicated

CPR—cardiopulmonary resuscitation.

to compare residents at similar functional levels. We counted these residents as being "admitted" to extended care on the date they were deemed by the public funder to be at an extended level of care. Documentation for this was found in the clinical chart notes, and because a higher level of funding is attached to extended care status, this date was generally well recorded.

Chart reviews were performed by 3 individuals using a common data collection instrument, and regular inter-rater reliability evaluation demonstrated greater than 90% agreement among the individuals. Ethics approval was obtained from the University of British Columbia Clinical Research Ethics Board and the relevant Vancouver Coastal Health Authority acute and community ethical review boards.

Data measures

We collected data on the following resident demographic characteristics: age at the time of admission to extended care, sex, and whether the resident was married and his or her partner was alive at the time of death. We collected data on clinical characteristics (ie, individual and sum of Charlson comorbidities⁹; presence or absence of a sudden and unexpected death; and number of prescription medications) and functional characteristics (ie, individual and sum of pressure ulcers; indwelling bladder catheter; wheelchair dependency; dependence on others for feeding; and requiring a mechanical lift for transfers) present at the time of death. We collected data on the residents' use of the following health services: the number of visits to the hospital emergency department (ED) in the 3 months before death; the presence or absence of hospital admissions in the 3 months before death; death in the facility (vs hospital); the number of family physician visits in the 3 months before death; and continuity of family physician care measured by whether it was the same treating physician at the time of admission and at the time of death. Finally, residence in a hospital-based versus free-standing facility was also measured.

The dates, status, and all changes in residents' degrees of intervention were recorded from the time of admission until death. Residents' degrees of intervention were aggregated into "do not hospitalize" (degrees of intervention 1 and 2) versus "hospitalize" (degrees of intervention 3 and 4). We calculated the time period each resident had a "hospitalize" designation on his or her chart from the time of admission into extended care until either death or a change to "do not hospitalize." This time then constituted the time period that each resident was "at risk" of a "do not hospitalize" designation.

Data analyses

We generated descriptive statistics on all collected variables. We also examined associations between "do not hospitalize" designations at the time of death and the

use of health services and the demographic, clinical, and functional variables using 2-way tests of comparison.

We used Cox regression analysis, with "time to 'do not hospitalize'" as our end point, as the aim of this study was to explore the correlates of a "do not hospitalize" designation for nursing home residents. This analysis allowed us to account for the different time periods during which each resident had "the opportunity" to acquire a "do not hospitalize" designation. Death occurring before a "do not hospitalize" designation was a censoring event.

Residents' use of health services and demographic, clinical, and functional variables demonstrating an association with "do not hospitalize" at the time of death of $P \leq .05$ in the 2-way tests of comparison were entered into a univariable Cox regression model. These variables were then assessed in a multivariable Cox regression model using a backward stepwise approach. Standard errors were adjusted for analysis of facility effects within hospital-based and free-standing groups. Variables with an association of $P \leq .05$ were retained in the final model.

In cases where explanatory variables were highly correlated (eg, hospital visit and hospital ED visit), only the variable with the strongest association was considered a candidate variable in the multivariable model. Death within the facility was similarly not included in the model owing to its high degree of correlation with the outcome variable (ie, "do not hospitalize"). The proportional hazards assumption was assessed using log-minus-log graphing for the main effect of interest (hospital-based vs free-standing).

We used SPSS version 16.0 to generate the descriptive statistics and Intercooled Stata version 9.2 for Windows to perform the regression modeling.

RESULTS

We reviewed the charts of 369 decedent extended care residents. The most prevalent Charlson comorbidity among residents was dementia (72%) followed by cerebrovascular disease (42%). The most prevalent debility was wheelchair dependence (86%), and half of all residents (50%) required mechanical lifts for transfers. Forty-two percent of residents required total feeding assistance, approximately one-third (31%) had documentation of bed sores or wounds, and 1 out of 10 residents (10%) had an indwelling bladder catheter.

Although half of residents received "do not hospitalize" designations within 2 weeks of admission (median 2.0 weeks), the interquartile range for time to the "do not hospitalize" designation was 53 weeks. Virtually all residents with "do not hospitalize" designations at the time of death died in the nursing home

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(317 of 321 [98.8%] residents). Approximately one-third (32.4%) of residents were admitted to the hospital or the hospital ED in the 3 months before death. Additional results for the descriptive analyses are presented in **Table 2**.

In the multivariable Cox regression model, continuity of family physician care from admission to death (adjusted hazard ratio [AHR] 2.16, 95% confidence interval [CI] 1.33 to 3.49), a sudden and unexpected death (AHR 0.43, 95% CI 0.25 to 0.73), and age (AHR 1.02, 95% CI 1.01 to 1.02) were independently associated with a “do not hospitalize” designation (**Table 3**). Female sex (HR 1.15, 95% CI 1.05 to 1.25) and residence in a hospital-based facility (HR 1.21, 95% CI 1.01 to 1.45) were positively associated with a “do not hospitalize” designation in the univariable analysis. However, these variables dropped out owing to non-significance in the multivariable model. Finally, the number of physician visits had a very small but statistically significant effect in the adjusted model (AHR 1.01, 95% CI 1.00 to 1.03).

DISCUSSION

This study examined the individual and health services utilization characteristics associated with a “do not hospitalize” designation, in a sample of debilitated nursing home residents. A key finding was the association of continuity of family physician care with a greater than 2-fold AHR of a “do not hospitalize” designation. Continuity in primary care, defined as the relationship between a single practitioner and a patient extending beyond isolated encounters for episodic illness, has been expressed as “an implicit contract of loyalty by the patient and clinical responsibility by the provider.”¹⁰ Previous research has found that patients highly value a relationship with primary care physicians, particularly in the context of more serious psychological and family issues.¹¹ The value placed on this relationship has been found to increase with extremes of age and number of chronic conditions.¹² In a population of frail institutionalized elders where both these

Table 2. Characteristics of the study population: Mean (SD) age was 82.6 (9.0) years.

CHARACTERISTICS*	TOTAL
Demographic	
• Female sex, n/N (%)	265/369 (72)
• Married and partner alive, n/N (%)	139/369 (38)
Clinical and functional	
• Median (IQR) no. of Charlson comorbidities [†]	3.0 (2.0)
• Sudden and unexpected death, n/N (%)	32/369 (9)
• Median (IQR) no. of medications	4.0 (4.0)
• Median (IQR) no. of debilities [‡]	2.0 (2.0)
Use of health services	
• Visited the hospital ED in the 3 months before death, n/N (%)	103/368 (28)
• Median (IQR) no. of hospital ED visits in the 3 months before death	0.0 (1.0)
• Hospital admission in the 3 months before death, n/N (%)	96/369 (26)
• Death in facility (vs hospital), n/N (%)	341/369 (92)
• Median (IQR) no. of visits by family physician in the 3 months before death	4.0 (5.0)
• Continuity of family physician from admission to death, n/N (%)	287/369 (78)
• Median (IQR) length of stay (in weeks) from admission to extended care until death [§]	56.1 (125.3)
• Median (IQR) no. of weeks “at risk” of “do not hospitalize” designation from admission to extended care	2.0 (53.0)
• Proportion of residents with “do not hospitalize” designation at time of death, n/N (%)	321/367 (87)

SD—standard deviation, ED—emergency department, IQR—interquartile range.

*Characteristics measured at time of death unless stated otherwise.

[†]Sum of coronary artery disease, congestive heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic pulmonary disease, connective tissue disease, ulcer disease or gastrointestinal bleed, liver disease, diabetes, hemiplegia or hemiparesis, renal disease, cancer, metastatic cancer, and AIDS.

[‡]Sum of presence of pressure ulcers, indwelling bladder catheter, wheelchair dependency, dependence on others for feeding, and requiring a mechanical lift for transfers.

[§]Residents of free-standing facilities might have entered the facilities as intermediate care residents, and entrance to extended care might have occurred at a later date.

^{||}The “at risk” period was the number of weeks each resident had a “hospitalize” designation from the time of admission into extended care until death or a change to “do not hospitalize.”

Table 3. Univariable and multivariable regression analyses of factors associated with "do not hospitalize" designations among residents with "hospitalize" designations on admission to extended care (n = 227)

FACTORS*	UNIVARIABLE HAZARD RATIO (95% CI)	MULTIVARIABLE HAZARD RATIO (95% CI)
Demographic		
• Age upon admission to extended care	1.02 (1.01-1.02) [†]	1.02 (1.01-1.02) [†]
• Female sex	1.15 (1.05-1.25) [†]	
• Married and partner alive	1.31 (0.94-1.81)	
Clinical and functional		
• No. of Charlson comorbidities [†]	1.03 (0.96-1.11)	
• Sudden and unexpected death	0.44 (0.20-0.97) [†]	0.43 (0.25-0.73) [†]
• No. of medications	1.01 (0.94-1.09)	
• No. of debilities [§]	0.98 (0.89-1.08)	
• Ulcer or gastrointestinal bleed	0.81 (0.50-1.31)	
Use of health services		
• No. of ED visits in 3 months before death	0.85 (0.61-1.18)	
• No. of visits by family physician in 3 months before death	1.00 (0.99-1.01)	1.01 (1.00-1.03) [†]
• Continuity of family physician from admission to death	2.19 (1.38-3.47) [†]	2.17 (1.33-3.49) [†]
• Hospital-based facility	1.21 (1.01-1.45) [†]	

CI—confidence interval, ED—emergency department.

*Characteristics measured at time of death unless stated otherwise.

[†]Statistically significant at $P \leq .05$.

[‡]Sum of coronary artery disease, congestive heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic pulmonary disease, connective tissue disease, ulcer disease or gastrointestinal bleed, liver disease, diabetes, hemiplegia or hemiparesis, renal disease, cancer, metastatic cancer, and AIDS.

[§]Sum of presence of pressure ulcers, indwelling bladder catheter, wheelchair dependency, dependence on others for feeding, and requiring a mechanical lift for transfers.

^{||}Ulcer or gastrointestinal bleed was the only Charlson comorbidity associated with the "do not hospitalize" designation at time of death in initial 2-way tests of comparison and therefore was included in Cox regression models.

characteristics are highly prevalent, continuity of the resident-physician relationship is therefore likely to be of value to residents and family. It is possible that with continuity comes greater confidence of the family physician to openly discuss end-of-life issues. It is also possible that residents and their families have greater confidence that a decision to not hospitalize will not imply a decision to stop providing care within the facility. Regardless of the mechanism, the association of continuity of family physician care with a "do not hospitalize" designation suggests that policies promoting continuity of physician care in nursing home settings are likely to support decreased rates of hospitalization and dying in hospital.^{2,13,14}

Sudden and unexpected death was associated with a greater than 2-fold lower AHR of "do not hospitalize." This finding is presumably explained by caregivers being less likely to initiate end-of-life discussions with residents who are not observed to be on obvious trajectories of decline and for whom death is a sudden and unexpected event. While the overall proportion of residents with a sudden and unexpected death was relatively small (8.7%), it nonetheless underscores the need to engage in

such discussions early on, given the clinical frailty of this population.

Although the study found that half of all extended care residents had a relatively short period of time (median 2.0 weeks) during which they had "hospitalize" designations, there was a range of time during which other residents retained their "hospitalize" designations. Furthermore, approximately 1 in 3 residents was transferred to hospital EDs or experienced hospital admissions in the 3 months before death. There is growing literature demonstrating further decline¹⁵ and medical futility¹⁵⁻¹⁷ associated with hospitalization of nursing home populations. There is also evidence that in-place treatment of nursing home residents for conditions like pneumonia actually produces better outcomes.¹⁸ Policies that encourage proactive discussions of end-of-life care between nursing home residents (or their families) and caregivers would therefore seem to be especially important in this setting.

Limitations

A weakness of this study was that we were unable to explore cultural and religious characteristics that might have influenced "do not hospitalize" decisions owing to the poor data quality on these variables. Although the model

adjusted for facility-level effects, we did not measure more precise facility characteristics (regularly scheduled information nights for residents and their families about degrees of intervention, written handouts on the topic, etc) that might have influenced "do not hospitalize" conversations. It should also be noted that the censoring event (death) in the Cox regression analysis was informative (vs noninformative). Furthermore, as with all retrospective studies, missing data and misclassification might have resulted in unintended bias or confounding.

Conclusion

To our knowledge there has been little prior quantitative research in this study population and none that implemented a Cox regression approach with a "do not hospitalize" designation as the end point. Moreover, the finding that continuity of family physician care was positively associated with a "do not hospitalize" designation contributes to the literature on how continuity of physician care "matters" and sheds some light on the factors influencing variation in "do not hospitalize" designations among a sample of frail nursing home residents

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Contributors

Dr McGregor was responsible for the conception and design of the study and initially drafted the manuscript. **Mr Pare** and **Ms Wong** contributed to the acquisition of data. All authors contributed to data interpretation, manuscript revision, and gave final approval of the version to be published.

Competing interests

None declared

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