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Title	Homecare utilization and costs in colorectal cancer by stage of disease
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Reviewer 1	Ruth Hall PhD
Institution	Ontario Stroke Network, and Institute for Clinical Evaluative Sciences, Toronto, Ont.
General comments	Major comments: 1. Control group should be reconsidered to be only patients that receive homecare but did not have cancer OR another disease group as mentioned in the discussion. Do you need a control group at all? Interesting to present the home care costs associated with colon cancer by staging. 2. Consideration to put the non-staged (missing) into a staged group with similar characteristics. 3. Rationale using and explanation of the RUBs is needed. Minor comments: 1. Homecare costs really are nursing and Homemaking/Personal support work therefore may want to collapse other services into i) allied health services ii) others then provide a legend to define what services are included under those headings.
Reviewer 2	Claire de Oliveira MA PhD
Institution	Support, Systems and Outcomes Division, Toronto General Hospital , University Health Network, Toronto, Ont.
General comments	Overall comments: This is a very interesting paper, which focuses on an important issue concerning the care of cancer patients. Given the move towards increasing home care by the Ministry of Health and Long-term Care in Ontario, this paper is timely. It also fills in a gap in the current literature around costing studies using administrative data from Canada. Below are a few suggestions that could help improve the clarity of the paper and strengthen the analysis. Major revisions: <u>Methods</u> I think it would be useful to include more information on the patients included in this study. For example, the authors could provide the age range (all adults? 18+ 19+). Were all incident cases diagnosed from Jan 1st 2005 to Dec 31st 2009 in Ontario included? Were there any exclusions? Also, it may be worthwhile to mention how many patients died and perhaps details regarding survival. This information will likely provide context on utilization patterns of home care and the types of services used (for example, the use of respite care for the last year before death for patients whose death we observe). Perhaps state that the controls were obtained from the Registered Persons Database for readers not familiar with this. How was the length of the initial and terminal phases of care defined? This was mentioned later on in the manuscript; however, I think it would make more sense to include it in the methods section. Also, it is not clear how the length of these phases was determined. Why was 6 months chosen for the terminal phase? Other work, such as Yabroff et al. (2008), have used 12 months. The authors could also point out how they expect costs will behave (this is minor). For example, for total costs of care, it has been found that the initial and terminal phases of care exhibit higher costs. Can we expect this for home care as well? The authors examine utilization and cost patterns for home care from Jan 1st 2005 to Dec 31st 2009. In the manuscript, it is stated that unit costs were in 2009 Canadian dollars. Were these unit costs used to value all home care utilization from year 2005 to 2009? Or were unit costs for other years used as well and then all costs were inflated to 2009 dollars? Both approaches are different and would lead to different results. This is not clear in the manuscript. On the last page of the methods section, the authors mentioned that the following hierarchy was used but did not clarify for what; it was likely used for the allocation of patient time to phases. The authors could also mention the rationale behind using this hierarchy (why terminal phase of care first and then initial phase of care).

	Were there any zeros in the data? If so, a multivariate linear regression model is not suited to model expenditure/cost data. A two-part model would be more appropriate to model expenditure data. Also, the authors should include a bit more information about the model, such as the dependent variable (30-day costs), the independent variables in this section (some of this is mentioned but only later on). Discussion The authors state that individuals from higher income neighbourhoods used fewer publicly or government funded home care services because they may access privately funded home care services. This may also be because they are healthier (health-income relationship). Did these individuals have less advances disease than those from lower income neighbourhoods? Page 16, line 6 "Population-based studies for other disease site cohorts are required to examine…" It is not clear why these references were included here. Were they included to highlight some work that has already been done? Do the authors mean more research is required for disease sites beyond what already exists in the literature? In the limitations section, the authors start by talking about disease stage and then move on and later come back to this topic. It would be easier to read if stage of disease was discussed all at once. Tables The authors should state that costs are in 2009 dollars in all tables Table 4 – It is not clear what the difference is between individuals (n) and number of cases. Should it be "all cases" and the "number of cases receiving home care"? Table 5 – The author should include the R^2 from the regressions. Minor revisions: Introduction Page 7, line 1 – a reference would be useful. Perhaps add some additional rationale as to why you have decided to examine this particular health care service (why not impatient hospitalizations, for example?) Results The authors could perhaps make reference to the quality of the matching between cases and controls; this would help strengthen the results. Table 1 includes a lot of information but little is mentioned in the text. The authors could highlight the age and (neighbourhood) income gradient (which is important) gradient in utilization, as well as regional disparities (LHIN A exhibits very low costs compared to the other ones). The author mentioned that visiting nursing and homemaking/personal care are the services that contribute the most to utilization (Table 3); is this the case for costs as well? Discussion Page 15, line 5 – The author's name is misspelt. The results from this study (reference 18) were for the 12 months post-diagnosis (and hence this was the only stage examined besides the pre-diagnosis period); the results in this paper are only comparable to results from the initial phase of care The authors state that the phases are artificially defined; this may be too strong of a statement as there is some rationale behind them (based on clinical data, cost data). The authors mention an annual provincial cost of $61 million if all colorectal cancer patients were to receive home care. Is this in 2009 dollars? The authors could perhaps emphasize a bit more the usefulness/utility of their findings to research/policy. Tables Could potentially combine Tables 1 and 2; instead of having just "rural," the author could state "rural location."

Author response	Reviewer: Dr. Ruth Hall Comments to the Author Major Comments Comment 1: Control group should be reconsidered to be only patients that receive homecare but did not have cancer OR another disease group as mentioned in the discussion. Do you need a control group at all? [Editor's note: control group not necessary] Interesting to present the home care costs associated with colon cancer by staging. •Response 1: The control group has been deleted from the manuscript. Comment 2: Consideration to put the non-staged (missing) into a staged group with similar characteristics. •Response 2: We thank the reviewer for the suggestion. The authors discussed the possibility of pooling the non-staged group with another stage. However, upon review, it was noted that the non-staged group would not easily fit into any of the groups with staging information. Giving the difficulty of pooling, we left the non-staged group as is. Comment 3: Rationale using and explanation of the RUBs is needed. [Editor's note: explanation not required if control group is not included] •Response 3: The control group has been deleted from the manuscript. Minor Comment 4: Homecare costs really are nursing and Homemaking/Personal support work therefore may want to collapse other services into i) allied health services ii) others then provide a legend to define what services are included under those headings. •Response 4: The other services have been aggregated into larger appropriate categories as suggested. Reviewer: Claire de Oliveira, M.A., PhD Comments to the Author This is a very interesting paper, which focuses on an important issue concerning the care of cancer patients. Given the move towards increasing home care by the Ministry of Health and Long-term Care in Ontario, this paper is timely. It also fills in a gap in the current literature around costing studies using administrative data from Canada. Below are a few suggestions that could help improve the clarity of the paper and strengthen the analysis. Major revisions Methods Comment 1: I think it would be useful to include more information on the patients included in this study. For example, the authors could provide the age range (all adults? 18+ 19+). •Response 1: Table 1 provides the mean, standard deviation, median and interquartile range. Comment 1a: Were all incident cases diagnosed from Jan 1st 2005 to Dec 31st 2009 in Ontario included? Were there any exclusions? •Response 1a: All incident cases were included. Only those without a valid health card number were excluded. This is discussed in the methods section. Comment 1b: Also, it may be worthwhile to mention how many patients died and perhaps details regarding survival. This information will likely provide context on utilization patterns of home care and the types of services used (for example, the use of respite care for the last year before death for patients whose death we observe). Response 1b: We agree with the reviewer, death rates would be interesting. While a relatively simple request, for practical reasons, this may result in a delay getting the

	numbers to the journal. Our analysts recently went on a maternity leave and we are working with a new analyst who is now just getting up to speed with our work. As such, we may be in for an extended delay in order to address this rather simple question. We leave it to the editor to decide on which way to proceed. Comment 1c. Perhaps state that the controls were obtained from the Registered Persons Database for readers not familiar with this. •Response 1c: The control group has been deleted from the manuscript as suggested. Comment 2. How was the length of the initial and terminal phases of care defined? This was mentioned later on in the manuscript; however, I think it would make more sense to include it in the methods section. Also, it is not clear how the length of these phases was determined. Why was 6 months chosen for the terminal phase? Other work, such as Yabroff et al. (2008), have used 12 months. The authors could also point out how they expect costs will behave (this is minor). For example, for total costs of care, it has been found that the initial and terminal phases of care exhibit higher costs. Can we expect this for home care as well? •Response 2: The length of the initial and terminal care phases (6 months) was based on clinical management expertise indicating that homecare would be initiated 6 months after a diagnosis and would follow procedures. An explanation has been added to the manuscript. Comment 3: The authors examine utilization and cost patterns for home care from Jan 1st 2005 to Dec 31st 2009. In the manuscript, it is stated that unit costs were in 2009 Canadian dollars. Were these unit costs used to value all home care utilization from year 2005 to 2009? Or were unit costs for other years used as well and then all costs were inflated to 2009 dollars? Both approaches are different and would lead to different results. This is not clear in the manuscript. •Response 3: 2009 Canadian dollars were applied to all years of analysis. This description has been updated in the manuscript. Comment 4: On the last page of the methods section, the authors mentioned that the following hierarchy was used but did not clarify for what; it was likely used for the allocation of patient time to phases. The authors could also mention the rationale behind using this hierarchy (why terminal phase of care first and then initial phase of care). •Response 4: The following sentence has been added. A 180 day time frame was used because it was hypothesized that exposure to homecare would occur during this time horizon. The following hierarchy of time frames was used: terminal care > initial care > continuing care such that all phases were mutually exclusive. Terminal care was considered first as resources in the 180 days prior to death would likely be attributed to care prior death. Comment 5: Were there any zeros in the data? If so, a multivariate linear regression model is not suited to model expenditure/cost data. A two-part model would be more appropriate to model expenditure data. Also, the authors should include a bit more information about the model, such as the dependent variable (30-day costs), the independent variables in this section (some of this is mentioned but only later on). •Response 5: There are no zeros in the multivariate linear regression. We excluded patients without any homecare visits and patients without homecare visits in the phase of cancer care. Only individuals with breast cancer who received homecare were included in the model and all had demographic factors included in the model. Comment 6: The authors state that individuals from higher income neighbourhoods used fewer publicly or government funded home care services because they may access privately funded home care services. This may also be because they are healthier (health-income relationship). Did these individuals have less advances disease than those from lower income neighbourhoods? •Response 6: This analysis was stratified by stage of disease and thus we found a relationship between homecare utilization and costs. We did not stratify the results by income level as it was beyond the scope of our analysis. Comment 7. Page 16, line 6 "Population-based studies for other disease site cohorts are required to examine…" It is not clear why these references were included here. Were they included to highlight some work that has already been done? Do the authors mean more research is required for disease sites beyond what already exists in the literature? •Response 7: The sentence has been clarified. It now reads, "Population-based studies in other disease site cohorts are required to compare similarities and differences in utilization and associated costs.".

	Comment 8: In the limitations section, the authors start by talking about disease stage and then move on and later come back to this topic. It would be easier to read if stage of disease was discussed all at once. •Response 8: The discussion section has been re-organized for clarity. Tables Comment 9: The authors should state that costs are in 2009 dollars in all tables •Response 9: This has been added to each Table. Comment 10: Table 4 – It is not clear what the difference is between individuals (n) and number of cases. Should it be "all cases" and the "number of cases receiving home care"? Response 10: This was confusing. The "individual" row has been deleted. Comment 11: Table 5 – The author should include the R2 from the regressions. •Response 11: The t-values have been added to the table. Minor revisions Introduction Comment 12: Page 7, line 1 – a reference would be useful. •Response 12: this is just a general introductory statement. The reference is in the next sentence. Comment 13: Perhaps add some additional rationale as to why you have decided to examine this particular health care service (why not impatient hospitalizations, for example?) •Response 13: We chose to examine homecare, given the recent focus on community care (new Ministry of Health and Long-term Care budget items to reduce wait-times and improve access). This information has been added to the manuscript. Results Comment 14: The authors could perhaps make reference to the quality of the matching between cases and controls; this would help strengthen the results. •Response 14: The control group has been deleted from the manuscript. Comment 15: Table 1 includes a lot of information but little is mentioned in the text. The authors could highlight the age and (neighbourhood) income gradient (which is important) gradient in utilization, as well as regional disparities (LHIN A exhibits very low costs compared to the other ones). •Response 15: The control group has been deleted from the Table. A few lines on the descriptors of the population (rural and resource utilization) have been added to the results section. Comment 16: The author mentioned that visiting nursing and homemaking/personal care are the services that contribute the most to utilization (Table 3); is this the case for costs as well? •Response 16: Nursing contributed to higher costs. Discussion Comment 17: Page 15, line 5 – The author's name is misspelt. The results from this study (reference 18) were for the 12 months post-diagnosis (and hence this was the only stage examined besides the pre-diagnosis period); the results in this paper are only comparable to results from the initial phase of care •Response 17: The author's name has been corrected. The comparison between the two studies had been clarified. Comment 18: The authors state that the phases are artificially defined; this may be too strong of a statement as there is some rationale behind them (based on clinical data, cost data). •Response 18: The wording has been updated to reflect the rationale. Comment 19: The authors mention an annual provincial cost of $61 million if all colorectal cancer patients were to receive home care. Is this in 2009 dollars? •Response 19: Yes this is based on 2009 Canadian dollars. The total dollar figure increased to $79 million when the cohort size was applied to the average cost per case.

	Comment: 20: The authors could perhaps emphasize a bit more the usefulness/utility of their findings to research/policy. •Response 20: The following sentence has been added to the manuscript to reflect his comment. "From a policy point of view, this work provides us with an estimate of provincially funded homecare used by individuals at various stages of their colorectal cancer. Homecare in more advanced disease is high as well as costs. Decision-makers should take these data into consideration when planning homecare strategies." Comment 21: Could potentially combine Tables 1 and 2; instead of having just "rural," the author could state "rural location." •Response 21: "rural" has been changed to "living in rural location". Tables 1 and 2 have been combined given the deletion of the control group. The Tables have been renumbered in the text.