PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Are trends in billing for high-intensity emergency care explained by changes in services provided in the emergency department? An observational study among US Medicare beneficiaries
AUTHORS	Burke, Laura; Wild, Robert; Orav, E. John; Hsia, Renee Y.

VERSION 1 – REVIEW

REVIEWER	Erin Murphy Colligan Centers for Medicare and Medicaid Services, USA
REVIEW RETURNED	26-Sep-2017

GENERAL COMMENTS	This is a very interesting study and I think this paper could make an important contribution to the literature on emergency department utilization. My main concern is that you looked at many different variables and it is overwhelming to follow the paper at points. This manuscript could benefit from a conceptual model that illustrates your hypothesized relationships among variables and some work on tying together the loose ends into a cohesive message. I especially think the multilevel model deserves more attention and it should be more explicitly stated what the relative contribution of each set of independent variables is to the uptick in high-intensity service billing. Page 3: Objective could be more clearly stated. The first part of it is clear but the second part is vague. I'm confused as to why you mention inpatient services because the rest of the abstract focus on outpatient ED visits. Page 5, Line 13: This is the first mention of admission rate as a variable in your analysis. It seems like an important factor in assessing the intensity of visits and should be in the abstract. Page 5 Lines 25-35: I'm not clear as to why the number of services provided is a reflection of practice patterns. That link needs to be me made more explicit, and it seems like hospital admission should be included here. Page 6, Introduction: This is the first mention of EHRs and their potential to cause upcoding. If that is a central motivation for conducting this study, it should be mentioned in the abstract. Page 8, Line 13: I think CPD code is supposed to be plural. Page 8, Line 22-25: Do you have a citation to justify your categorization of high-intensity visits? Page 8, Line 27-30: I'm still not clear about the relationship among the variables of high-intensity visits, hospital admission rate, ICU rate, and number and type of procedures per visit, and your focus at least in the abstract seems to be only on the first and last variables.

	It would be helpful to have an explanation and even a conceptual model detailing how you see these factors interacting and being related to the main outcome of high-intensity visits, as well as how patient-level factors influence the outcome. My sense is that you are trying to parse out the relative contribution of each factor to the overall trends in high-intensity visits but it's not cohesively brought together in the paper. Page 8, Lines 44-48: It seems redundant and adds to the confusion to discuss hospital admission and ICU admission here again. Page 9, Line 6: Should add the word "status" after teaching Page 9, Line 25: I assume you mean clustering for multiple observations from the same patients but this should be stated more explicitly Page 11, Lines 20-22: By "inpatient" I assume you mean hospital admission and ICU admission? This model seems to correspond to the secondary outcomes discussed on page 8 Lines 27-49. The original discussion should be more clearly labelled so that the reader can understand the different levels of variables (inpatient, outpatient, and physician services). Page 12, Lines 34-49: It seems like if there was an increase in visits to teaching, for-profit, and trauma centers, those factors could likely account for more high-intensity billing. How do you account for this in your analysis? You don't discuss using these factors in the any of the models described in the previous section. Page 15, Line 46: Page 16 Line 16: It seems like this multilevel regression model should be the crux of your analysis but it's barely discussed and the results are relegated to the appendix. Page 16, Lines 22-27: You should include the rate of high intensity visits in 2006 as a comparison. Page 17, Lines 13-23: You haven't established this finding yet in the article so it seems out of place in the discussion Page 19, Line 30: missing the word "on" before total cost of care

REVIEWER	Ge Bai The Johns Hopkins Carey Business School
REVIEW RETURNED	06-Oct-2017

GENERAL COMMENTS	This paper examines the trends in high-intensity billing in emergency care. Using a Medicare data in 2006, 2009, and 2012, the authors found evidence that the billing for high-intensity emergency has increased and at the same time the services provided in emergency department also increased. This study addresses an important topic and is well written. The method is rigorous and the results are appropriately interpreted. I only have two minor comments. 1. The title is confusing. Trends and increase are both used here, which did not make sense to me. 2. In the abstract, the change in high-intensity visits was 45.5% to 57.7%. I did not find corresponding numbers in the text.

REVIEWER	Vivian Ho Department of Economics and Baker Institute, Rice University; Department of Medicine, Baylor College of Medicine. United States
REVIEW RETURNED	07-Oct-2017

GENERAL COMMENTS	This study analyzes Medicare fee-for-service claims for emergency department visits for the years 2006, 2009, and 2012 to measure trends in high-intensity emergency care, as well as provision of specific services and subsequent hospital admission. As the authors note, the study is significant, because emergency care is a significant portion of U.S. health expenditures. Greater high-intensity ED care may save money in the long run by avoiding even more expensive hospitalizations. On the other hand, increases in high-intensity ED care could merely reflect upcoding by healthcare providers that raises reimbursements, without improving patient care. The data source for the analysis is comprehensive and useful for measuring changes over time in care and expenditures. The methodology is appropriately detailed, particularly the breakdowns of changes in visit rates by diagnoses and the measurement of services provided during each visit. Following are my comments: 1. My main concern is that the discussion of the results may be overly optimistic in ruling out the potential for upcoding (p.17, line 25): “Our study of ED visits is consistent with other studies suggesting that the fear of upcoding due to EHRs may not be fully warranted.” The fact that increases in the rate of high-intensity visits that occurred over time were accompanied by the provision of more services does not rule out the possibility that upcoding could have occurred simultaneously. Because the authors’ dataset is so large and detailed, I would recommend a different analysis. Estimate the logistic regression in Model 4 in Appendix 6 (regression of the high intensity indicator on patient characteristics, comorbidities, and services) separately for each year of the sample. This approach allows for the most flexibility in how each patient characteristic or service predicts the probability of a high-intensity visit in each year. Then take the sample of patients admitted in 2006 and predict their probability of a high-intensity visit using each of the 3 equations (2006, 2009, and 2012). If these patients have substantially higher predicted rates of high-intensity visits using the 2006 versus the 2012 coefficients, then one cannot rule out the possibility that significant upcoding is occurring. If the predicted rates using coefficients from equations estimated for any of the 3 years are similar, then not much upcoding must have happened. This approach is a much more rigorous test for the presence of upcoding. 2. p.7, line 37. The authors state that the Medicare recipients do not have private insurance. Please be more specific. Many FFS Medicare beneficiaries purchase Medigap insurance from private insurers. The plans differ in the amount of coverage they provide towards deductibles and copays for ED care. 3. p.9, line 25. Clarify that you are adjusting for the clustering of standard errors at the level of the ED. I found it in the appendix, but the level of clustering should also be mentioned in the body of the manuscript.

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1
Reviewer Name: Erin Murphy Colligan
Institution and Country: Centers for Medicare and Medicaid Services, USA
Please state any competing interests: None declared

Please leave your comments for the authors below

Comment: This is a very interesting study and I think this paper could make an important contribution to the literature on emergency department utilization. My main concern is that you looked at many different variables and it is overwhelming to follow the paper at points. This manuscript could benefit from a conceptual model that illustrates your hypothesized relationships among variables and some work on tying together the loose ends into a cohesive message. I especially think the multilevel model deserves more attention and it should be more explicitly stated what the relative contribution of each set of independent variables is to the uptick in high-intensity service billing.

Response: Thank you for your feedback. We agree that changes were needed to improve the clarity of the manuscript and to better delineate the conceptual model. In the introduction, we have clarified the concepts of high-intensity billing and the potential mechanisms for the rise in billing for high-intensity care. In the Methods section, we have changed the "Outcomes" subsection to "Conceptual Model and Outcomes." Here we explain in greater detail the relationship among the variables examined and their theoretical relationship to high-intensity service billing.

We agree that the multivariable model deserves greater attention and have moved the results from the Appendix to the main tables and figures (now Table 3). We have also now described in greater detail in the Results section the relative contribution of each variable to the model's explanatory power for high-intensity billing. Finally, we also included an additional logistic regression model approach suggested by Dr. Ho in which we perform two separate logistic regression models for each year, apply the coefficients from 2009 and 2012 to the data in 2006 and then compare the observed and expected number of high-intensity visits using this approach.

Page 3: Objective could be more clearly stated. The first part of it is clear but the second part is vague. I'm confused as to why you mention inpatient services because the rest of the abstract focus on outpatient ED visits.

Response: We agree and have changed the objective to read the following:

"To characterize the trends in billing for high-intensity emergency care among Medicare beneficiaries and to examine the degree to which trends in high-intensity billing are explained by changes in patient characteristics and services provided in the ED."

Page 5, Line 13: This is the first mention of admission rate as a variable in your analysis. It seems like an important factor in assessing the intensity of visits and should be in the abstract.

Response: Thank you for this suggestion. We have now mentioned the calculation of admission rate trends in both the methods and the results sections of the abstract.

Page 5 Lines 25-35: I'm not clear as to why the number of services provided is a reflection of practice patterns. That link needs to be me made more explicit, and it seems like hospital admission should be included here.

Response: We appreciate the opportunity to clarify this. We have added an explanation in the preceding paragraph indicating that “services” include laboratory, radiology, and other diagnostic tests, as well as clinical procedures that are considered to represent the intensity of work performed during a visit. Additionally, as mentioned above, we have added further explanation in the introduction and methods sections to clarify the conceptual model.

With respect to hospital admission, we performed our multivariable modeling stratified by whether the visit resulted in admission or discharge. We did this because the detail of services provided in the ED varies substantially based on patient disposition from the ED. We have substantially greater detail regarding laboratory and radiology testing for discharged patients (mean of 8.6 services per visit in 2012) compared to admitted patients (1.41 services per entire hospitalization). We have now added the following sentence to the end of that paragraph for further clarification.

“This was performed for visits overall and stratified by patient disposition (admitted versus discharged).”

Page 6, Introduction: This is the first mention of EHRs and their potential to cause upcoding. If that is a central motivation for conducting this study, it should be mentioned in the abstract.

Response: We agree and have changed the “Objective” portion of the abstract to read as follows:

“There has been concern that an increase in billing for high-intensity emergency care is due to changes in coding practices facilitated by electronic health records. We sought to characterize the trends in billing for high-intensity emergency care among Medicare beneficiaries and to examine the degree to which trends in high-intensity billing are explained by changes in patient characteristics and services provided in the ED.”

Page 8, Line 13: I think CPD code is supposed to be plural.

Response: This has been corrected.

Page 8, Line 22-25: Do you have a citation to justify your categorization of high-intensity visits?

Response: Yes. We have amended this section to read as indicated below and have also pasted the relevant references below.

“While prior studies have used 99285 alone to define high-intensity ED visits,19 20 we chose to also define ED visits with critical care billing as high intensity as these were available in our dataset and have been evaluated in prior research on ED visit acuity.21 Thus, we created a binary intensity outcome variable, categorizing visits with codes 99281-99284 as low-intensity and those with codes 99285, 99291, and 99292 as high-intensity.”

19. Kaskie B, Obrizan M, Cook EA, et al. Defining emergency department episodes by severity and intensity: A 15-year study of Medicare beneficiaries. BMC Health Serv Res 2010;10:173. doi: 10.1186/1472-6963-10-173
20. Herring AA, Johnson B, Ginde AA, et al. High-intensity emergency department visits increased in California, 2002-09. Health affairs 2013;32(10):1811-9. doi: 10.1377/hlthaff.2013.0397
21. Wiler JL, Poirier RF, Farley H, et al. Emergency severity index triage system correlation with emergency department evaluation and management billing codes and total professional charges. Acad Emerg Med 2011;18(11):1161-6. doi: 10.1111/j.1553-2712.2011.01203.x

Page 8, Line 27-30: I'm still not clear about the relationship among the variables of high-intensity visits, hospital admission rate, ICU rate, and number and type of procedures per visit, and your focus at least in the abstract seems to be only on the first and last variables. It would be helpful to have an explanation and even a conceptual model detailing how you see these factors interacting and being related to the main outcome of high-intensity visits, as well as how patient-level factors influence the outcome. My sense is that you are trying to parse out the relative contribution of each factor to the overall trends in high-intensity visits but it's not cohesively brought together in the paper.

Response: Thank you for calling attention to this. We have substantially revised the introduction to better explain the potential mechanisms for the increase in high-intensity billing as well as the rationale for our study design. Additionally, as mentioned above, we have changed the "Outcomes" subsection of Methods to "Conceptual Model and Outcomes" and have explained in detail each variable's relationship to the outcome of high-intensity billing.

Page 8, Lines 44-48: It seems redundant and adds to the confusion to discuss hospital admission and ICU admission here again.

Response: The redundant reference to hospital and ICU admission rates was eliminated in our reorganization of the methods section as described above.

Page 9, Line 6: Should add the word "status" after teaching

Response: We have added the word "status" after teaching and moved this reference up to the end of "Study Setting and Design" section.

Page 9, Line 25: I assume you mean clustering for multiple observations from the same patients but this should be stated more explicitly

Response: Thank you for the opportunity to clarify this. We did not cluster for multiple observations from the same patient. GEE software in SAS does not allow two different sources of clustering in the same model, and we thought the outcome was more likely to be driven by the ED in which the patient was treated rather than the individual patient when accounting for other patient characteristics. Thus, we chose to cluster at the level of the ED rather than the patient. Additionally, with nearly 2 million ED visits, it would be practically challenging to cluster by patient and still get the software to run.

Page 11, Lines 20-22: By "inpatient" I assume you mean hospital admission and ICU admission? This model seems to correspond to the secondary outcomes discussed on page 8 Lines 27-49. The original discussion should be more clearly labelled so that the reader can understand the different levels of variables (inpatient, outpatient, and physician services).

Response: Thank you for calling attention to this. We have amended the "Conceptual Model and Outcomes" section as indicated below to make it clear that inpatient services refers to ICD9 procedures from inpatient facility claims for ED visits and the subsequent hospitalization. "Outpatient services" refers to CPT procedure codes from facility claims for ED visits among discharged patients. Physician services are CPT procedure codes for non-evaluation and management services billed separately from the facility claim for all visits.

“As such, we determined the mean number of services provided per visit according to the ED facility claims. For discharged patients, we identified all services on outpatient ED facility claims (outpatient services) such as laboratory and radiology tests and clinical procedures that occurred in the ED. For admitted patients, services from inpatient facility claims (inpatient services) may have been provided at any time during that hospitalization, including during treatment in the ED, as we could not readily distinguish the location of services provided for admitted patients in this dataset. We also determined the mean number of physician professional claims for services other than evaluation and management for all visits (physician services).”

Page 12, Lines 34-49: It seems like if there was an increase in visits to teaching, for-profit, and trauma centers, those factors could likely account for more high-intensity billing. How do you account for this in your analysis? You don’t discuss using these factors in the any of the models described in the previous section.

Response: Our GEE model clustered patients within EDs using an exchangeable correlation structure which, to a large extent, makes the analysis behave like a within-ED analysis. In essence, a time trend is estimated within each ED and then those time trends are aggregated across all EDs. Shifting patients from one sort of ED to another will have minimal impact on our results.

To further assure ourselves that shifts between EDs are not the source of the increases in intensity, we also examined if particular types of hospitals had substantial differences in proportion of high-intensity visits or differential trends over time. As shown in the table in the accompanying response letter document, trauma centers had a similar proportion of high-intensity visits and a smaller increase over time relative to non-trauma centers. If patients had shifted to trauma centers, we would have seen a slightly smaller, not larger, increase over time. There were small differences by profit and teaching status that seem unlikely to account for the time trend in our sample.

Page 15, Line 46: Page 16 Line 16: It seems like this multilevel regression model should be the crux of your analysis but it’s barely discussed and the results are relegated to the appendix.

Response: We agree that the multivariable regression results should receive greater attention. The results of the regression sequentially incorporating patient characteristics have been moved from the Appendix to Table 3. We have expanded our discussion of these results to emphasize the relative contribution of each factor to the model explanatory power as described above. Also, we performed an additional regression analysis applying the coefficients from later years to the 2006 data to compare observed versus expected high-intensity visits to further quantify how much of the variation remains unexplained after accounting for changes in patient factors and services provided.

Page 16, Lines 22-27: You should include the rate of high intensity visits in 2006 as a comparison.

Response: This line has been changed as follows:

“In our study of elderly Medicare beneficiaries, we found that ED visits are increasingly billed at the highest levels of intensity, with nearly 60% of ED visits in our sample coded at a level 5 or as critical care in 2012, up from 46% in 2006.”

Page 17, Lines 13-23: You haven’t established this finding yet in the article so it seems out of place in the discussion

Response: We agree that while our findings suggest that moderate acuity conditions saw greater changes over time, we did not specifically explore whether this phenomenon explains the decline in admission rate. Therefore, this sentence has been changed to better reflect our study's limitations and has been moved to the subsequent paragraph, which discusses the idea that higher-intensity emergency care may facilitate the trend toward greater reliance on outpatient care.

"ED visits in the U.S. have continued to rise10 32-34 despite health insurance expansion and cost control efforts that were predicted to reduce ED utilization. The role of emergency medicine in the acute care landscape has also expanded,35 with EDs assuming greater responsibility for managing complex problems while reserving limited and costly hospital capacity for those truly requiring inpatient care. With the growth of alternative payment models, reducing admissions for ED patients with moderate severity problems has been proposed as a strategy to reduce costs.36 Our findings are consistent with this new model of emergency care. We found an increase in services while admission rates fell, even after accounting for the growth in observation stays. We found the greatest increases in high-intensity billing and services among conditions with moderate baseline intensity such as pneumonia and intestinal infections, for which the decision to admit likely involves greater provider discretion relative to higher acuity conditions. While our study was not designed to assess the relationship between intensity of emergency care and admission rate, it is possible that doing more for patients in the ED may have allowed a greater number to be safely discharged. The rise in number of services, including critical care procedures, provided during hospital admission suggests that the average acuity of patients who ultimately are admitted may be increasing over time."

Page 19, Line 30: missing the word "on" before total cost of care

Response: This has been corrected. Thank you.

Reviewer: 2
Reviewer Name: Ge Bai
Institution and Country: The Johns Hopkins Carey Business School
Please state any competing interests: None

Please leave your comments for the authors below

This paper examines the trends in high-intensity billing in emergency care. Using a Medicare data in 2006, 2009, and 2012, the authors found evidence that the billing for high-intensity emergency has increased and at the same time the services provided in emergency department also increased.

This study addresses an important topic and is well written. The method is rigorous and the results are appropriately interpreted. I only have two minor comments.

1. The is confusing. Trends and increase are both used here, which did not make sense to me.

Response: Thank you for the suggestion. We have changed the title as indicated below to be consistent with the preferred journal format and to improve clarity.

"Are trends in billing for high-intensity emergency care explained by changes in services provided in the emergency department? An observational study among US Medicare beneficiaries"

2. In the abstract, the change in high-intensity visits was 45.5% to 57.7%. I did not find corresponding numbers in the text.

Response: Thank you for this feedback. We have moved the following sentence to the beginning of the “Trends in Practice Intensity” section of results and corrected the abstract to include the corresponding results.

“High-intensity visits overall rose from 45.8% in 2006 to 57.8% in 2012 (+2.0% per year [95% CI, 1.97% to 2.03%]; p<.001; Figure 1).”

Reviewer: 3
Reviewer Name: Vivian Ho
Institution and Country: Department of Economics and Baker Institute, Rice University; Department of Medicine, Baylor College of Medicine. United States
Please state any competing interests: None declared

Please leave your comments for the authors below

This study analyzes Medicare fee-for-service claims for emergency department visits for the years 2006, 2009, and 2012 to measure trends in high-intensity emergency care, as well as provision of specific services and subsequent hospital admission. As the authors note, the study is significant, because emergency care is a significant portion of U.S. health expenditures. Greater high-intensity ED care may save money in the long run by avoiding even more expensive hospitalizations. On the other hand, increases in high-intensity ED care could merely reflect upcoding by healthcare providers that raises reimbursements, without improving patient care.

The data source for the analysis is comprehensive and useful for measuring changes over time in care and expenditures. The methodology is appropriately detailed, particularly the breakdowns of changes in visit rates by diagnoses and the measurement of services provided during each visit. Following are my comments:

1. My main concern is that the discussion of the results may be overly optimistic in ruling out the potential for upcoding (p.17, line 25): “Our study of ED visits is consistent with other studies suggesting that the fear of upcoding due to EHRs may not be fully warranted.” The fact that increases in the rate of high-intensity visits that occurred over time were accompanied by the provision of more services does not rule out the possibility that upcoding could have occurred simultaneously.

Response: Thank you for this feedback. We agree and have edited the corresponding paragraph of the discussion to better reflect our findings as shown below.

“While prior studies have suggested that the fears of upcoding due to EHRs may not be fully warranted,14 there has been concern that the trend in billing for high-intensity emergency care may represent trends in coding rather than actual changes in practice. Using multivariable modeling, we found that observable factors such as patient characteristics and numbers of services and procedures moderately explained, but did not fully account for, the trends in high-intensity billing for outpatient visits. It is possible that part of the residual trend could be attributed to upcoding; our study, however, is unable to identify conclusively whether this is the case.”

Comment: Because the authors' dataset is so large and detailed, I would recommend a different analysis. Estimate the logistic regression in Model 4 in Appendix 6 (regression of the high intensity indicator on patient characteristics, comorbidities, and services) separately for each year of the sample. This approach allows for the most flexibility in how each patient characteristic or service predicts the probability of a high-intensity visit in each year. Then take the sample of patients admitted in 2006 and predict their probability of a high-intensity visit using each of the 3 equations (2006, 2009, and 2012). If these patients have substantially higher predicted rates of high-intensity visits using the 2006 versus the 2012 coefficients, then one cannot rule out the possibility that significant upcoding is occurring. If the predicted rates using coefficients from equations estimated for any of the 3 years are similar, then not much upcoding must have happened. This approach is a much more rigorous test for the presence of upcoding.

Response: Thank you for this recommendation. We have performed this analysis as recommended and added the following sentences to the methods section.

"As a complementary analysis to examine the degree to which trends in coding are explained by the variables in our model, we ran two logistic regression models separately for 2009 and 2012 and obtained the coefficients for each variable in the model for those years. We then applied those coefficients to ED visits in 2006 to obtain an expected number of visits in 2006 using 2009 and 2012 coefficients. The difference between the observed and predicted number of visits billed as high-intensity in 2006 using coefficients from the later years represents the degree to which high-intensity billing has changed in ways that cannot be explained by the variables in our model. We performed this analysis for outpatient and inpatient visits separately."

We added the following sentences the results section and added Appendix 8 which is included below:

"Additionally, we calculated the predicted number of high-intensity visits that would have occurred in 2006 using coefficients for the variables in our models from 2009 and 2012. We calculated the difference between the predicted and observed number of high-intensity visits in 2006. For inpatient ED visits, this difference revealed an additional 24,819 visits that would have been classified as high-intensity using 2009 coefficients (9.5% of all inpatient visits; Appendix 8) and 35,504 inpatient visits (13.6%) that would have been classified as high-intensity using 2012 coefficients. For outpatient visits, this difference revealed an additional 1,101 visits (0.3%) that would have been classified as high-intensity using 2009 coefficients, and 16,905 (4.1%) would have been classified as high-intensity using 2012 coefficients."

The discussion has been updated as follows:

"Finally, using multivariable modeling, we found that trends in patient characteristics as well as in services provided during the visit moderately accounted for the increase in practice intensity for outpatient ED visits. If the process for determining high-intensity visits in 2012 were applied to visits in 2006, we would have seen an additional 4.1% of outpatient visits and 13.6% of inpatient visits coded as high-intensity. In other words, those additional increases were unexplained in our model, and could potentially represent secular changes such as upcoding."

2. p.7, line 37. The authors state that the Medicare recipients do not have private insurance. Please be more specific. Many FFS Medicare beneficiaries purchase Medigap insurance from private insurers. The plans differ in the amount of coverage they provide towards deductibles and copays for ED care.

Response: Thank you for this feedback. We have updated the manuscript as indicated below to make it clear that we included only ED visits among beneficiaries of traditional Medicare (not Medicare advantage).

“We examined ED visits by beneficiaries age 65 and older who were continuously-enrolled in traditional Medicare and presented to nonfederal acute care hospitals.”

3. p.9, line 25. Clarify that you are adjusting for the clustering of standard errors at the level of the ED. I found it in the appendix, but the level of clustering should also be mentioned in the body of the manuscript.

Response: Thank you for this suggestion. We have added the following sentence to the “Trend in High-Intensity Billing” portion of the Analysis section:

“Generalized estimating equations were used to account for patient clustering at the level of the emergency department."

VERSION 2 – REVIEW

REVIEWER	Erin Murphy Colligan Social Science Research Analyst, Centers for Medicare and Medicaid Services, USA
REVIEW RETURNED	16-Nov-2017

GENERAL COMMENTS	The authors have sufficiently addressed the concerns I expressed with the first draft. I still don't believe they have provided an actual conceptual model and would steer away from using that term, but the independent and dependent variables are more clearly explained as are the hypothesized relationships among them.

REVIEWER	Ge Bai The Johns Hopkins Carey Business School
REVIEW RETURNED	15-Nov-2017

GENERAL COMMENTS	Accept

REVIEWER	Vivian Ho Rice University, United States
REVIEW RETURNED	13-Nov-2017

GENERAL COMMENTS	I am satisfied with the revisions that the authors made to the manuscript. With the rapid increase in healthcare costs in the U.S., particularly in emergency room care, this paper is timely and informative. It is an important contribution to the literature.

VERSION 2 – AUTHOR RESPONSE

Reviewer: 1
Reviewer Name: Erin Murphy Colligan
Institution and Country: Social Science Research Analyst, Centers for Medicare and Medicaid Services, USA
Please state any competing interests: None declared

Please leave your comments for the authors below

Comment: The authors have sufficiently addressed the concerns I expressed with the first draft. I still don't believe they have provided an actual conceptual model and would steer away from using that term, but the independent and dependent variables are more clearly explained as are the hypothesized relationships among them.

Response: Thank you for this recommendation. We have changed the title from “Conceptual Model and Outcomes” to “Outcomes” to better represent our work.

Reviewer: 2
Reviewer Name: Ge Bai
Institution and Country: The Johns Hopkins Carey Business School
Please state any competing interests: None declared

Please leave your comments for the authors below

Comment: Accept

Response: Thank you for reviewing our work.

Reviewer: 3
Reviewer Name: Vivian Ho
Institution and Country: Rice University, United States
Please state any competing interests: None declared

Please leave your comments for the authors below

Comment: I am satisfied with the revisions that the authors made to the manuscript. With the rapid increase in healthcare costs in the U.S., particularly in emergency room care, this paper is timely and informative. It is an important contribution to the literature.

Response: Thank you for the encouraging words and thoughtful review.