Author's response to reviews

**Title:** Copy-Paste of Lifestyle Counseling Documentation and Provider Billing

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**Author's response to reviews:** see over
Dear Dr. Pafitis,

We would like to thank the editor and reviewers for the extensive and instructive comments detailed in your letter from May 8, 2013. We have incorporated the editors' and reviewers’ suggestions in the manuscript. Below we will detail, item by item, our response to their recommendations.

EDITOR'S COMMENTS:

Abstract / Methods
"to assess whether copied documentation of lifestyle (diet, exercise and weight loss) counseling for patients with diabetes mellitus is associated with higher evaluation and management (E&M) charges compared to encounters with no documented counseling."
Suggest rewording along the lines of "to assess the relationship between the method of lifestyle counseling (diet, exercise and weight loss) documentation (none, copied, or distinct) and the levels of evaluation and management (E&M) charges."

We have rephrased the abstract as recommended by the Editor.

Abstract / Methods
Authors note model specification (multinomial logit) but not dependent variable.

We clarified in the Abstract that the E&M charge level served as the primary outcome variable.

Methods / Study Cohort
"Patients who had more than one encounter with an endocrinologist during the study period were excluded in order to ensure a single source of diabetes care for the study."
This doesn't make sense to me. The study could accommodate multiple observations for an individual patient.

We agree with the Editor that the analysis could (and did) accommodate multiple observations for an individual patient. We have clarified in the Methods section that what we really were aiming to do was to exclude patients who treated by an endocrinologist to make sure that the results were applicable to treatment of diabetes in the primary care setting, where most patients
with diabetes are treated. This is the approach we have generally used in many of our studies; in the past studies, inclusion of endocrinologists in these analyses did not significantly alter the results. For patients included in the study, all available encounters (typically multiple encounters per patient) were used in the analysis as recommended by the Editor.

**Study measurements**

"Notes that were dictated (and therefore could not contain any copied documentation) and notes not likely to represent a face-to-face encounter with a physician (e.g. notes with subjects like "medication refill", "influenza vaccine") were excluded from consideration." Appendix should include documentation of excluded notes.

We have included information about excluded notes in the Appendix as recommended by the Editor.

"Documentation of lifestyle counseling was computationally abstracted from the notes, including direct, (e.g. "encouraged daily walking") and inferred (e.g. "weight has increased since last visit")" "A single hyperglycemic period served as the unit of analysis for the evaluation of the relationship between copied lifestyle counseling and glycemic control." Two points: There was no prior mention that the study would test the relationship between copied lifestyle documentation and glycemic control. Second, the theory that copied lifestyle documentation would be related to glycemic control seems weak to me, and a distraction from the central question related to billing.

We have removed the description of the analysis of the relationship between copied lifestyle counseling and glycemic control from the manuscript as advised by the Editor.

**Statistical analysis**

There's no need to say that you calculated summary stats.

We have removed the sentence describing calculation of summary statistics as recommended by the Editor.

"To determine the association between the presence of copied counseling documentation and the E&M charge level"? Although it was mentioned several times, you have not yet defined the dependent variable (E&M charge level), how there are 5 levels related to the intensity of evaluation and management, what the differences in payment are for the different levels, etc. I suggest you add a "Study Outcome" heading with this information.

We have included a Study Outcome heading that describes the dependent variable in more detail in the Methods section as advised by the Editor.

"This model adjusted for ... length of the note, documentation of time spent on counseling and an interaction term between type of counseling documentation and documentation of time spent on counseling." I am concerned that these adjustments are controlling for a mechanism through which cutting and pasting would be associated with charges. Conceptually, cutting and pasting would increase charges but easily adding information in
a note that would increase E&M charges. This would add to the length of the note. Also, the time spent on counseling could be part of the pasted information. I would like to see the analysis done without these adjustments. In addition, the use of interaction terms in nonlinear models creates interpretation problems (see Norton et al. (2004). Computing interaction terms in logit and probit models). The whole analysis hinges on the correct calculation of these marginal effects.

We appreciate the Editor's inquiry. We would like to clarify that according to the prevalent billing regulations, it is impossible to increase the E&M charge level based on documentation of lifestyle counseling alone. It is also necessary to document the time spent on counseling the patient (we have included this information in the Study Outcome section). Otherwise – if either counseling itself or time spent on it are not documented – E&M charge code is determined based on completely different criteria that involve number of organ systems that have been examined and had review of systems documented. Therefore documentation of time spent on counseling the patient does not represent the mechanism through which increased charges for lifestyle counseling could be obtained but rather one of two independent components both of which are required to be able to use lifestyle counseling as the basis for E&M codes. A co-dependency like this is best represented in a regression model by an interaction term².

We agree with the Editor that the length of the note could be partially influenced by copying and pasting of lifestyle counseling. We conducted a sensitivity analysis that did not include the length of the note as an explanatory variable, and found that removal of the variable did not substantially change the results.

We appreciate the Editor's thoughtful comments concerning the use of interaction terms. We would like to clarify that the paper by Norton et al. (2004) demonstrates that interpretation of the marginal effects for models with interaction terms is difficult because of a complex dependence of predicted probability on independent variables due to the predictor term Xb being not linear, but a second order polynomial of independent variables. Norton et al. specifically consider logistic regression models with an interaction term for two binary variables similar to the one used in our analysis. They pointed out that the interpretation of the interaction term itself as log odds ratio is not correct and that the odd ratios should be reported separately by constant levels of one of the variables. This is exactly how we presented the findings from our analysis in the Results section: odds ratios for the E&M charge level outcome variable are presented separately for encounters with vs. without documented time spent on counseling. This is accomplished in SAS software (proc GLIMMIX) by using CONTRAST or ESTIMATE statements involving main and interaction effects with proper coefficients (L-matrix).

Results
I don't understand the endocrinologist exclusion.

We would like to clarify that the reason we excluded patients who were treated by an endocrinologist to make sure that the results were applicable to treatment of diabetes in the primary care setting, where most patients with diabetes are treated. This is the approach we have generally used in many of our studies; in the past studies, inclusion of endocrinologists in these studies did not significantly alter the results¹.
"In multivariable analysis copied counseling was associated with longer time to achievement of target A1c level compared to distinct counseling (hazard ratio (HR), 0.77; p = .03)." Where is this analysis shown?

We have removed the description of the analysis of the relationship of copied counseling and glycemic control from the manuscript as recommended by the Editor (see also our response to the Editor's second comment on page 2 of this response).

"Encounters with copied documentation of counseling had the highest fraction of level 4 E&M codes at 71.9% (Table 3). Encounters with distinct documentation of counseling had the highest fraction of level 5 codes at 9.6%." This is important: unadjusted analysis shows that copied lifestyle documentation is associated with a much higher proportion of level 4 E&M billing compared to distinct and no counseling documentation, but that level 5 billing is somewhat more common for distinct documentation. For context, it is important to know the approximate differences in payment across the levels.

We have included information on the approximate differences in payment across the levels under the Study Outcome heading in the Methods section as recommended by the Editor.

Table 4 needs to be redone. First, the authors show "Estimates" but in the text appear to be describing odds ratios. As per my previous comment, I would prefer to see marginal effects calculated. This is straightforward in Stata using the "margins" post-estimation command.

We would like to clarify that Table 4 has estimates (logarithms of odds ratios) while the text, in fact, refers to the odds ratios (exponents of the estimates) – in part so as not to directly repeat the information already found in the table.

We did not include marginal effects in Table 4 because in the multivariable mixed cumulative logistic model for E&M charge level we included 23 potential confounders (13 binary, 10 continuous) and accounted for clustering within patients by including random intercepts for patient nested within provider effects. Our goal was to account for patient/encounter characteristics, and to evaluate effect of provider counseling documentation behavior on E&M charge level, rather than to estimate its marginal effects on billing of different patient subgroups or average marginal effects for the total patient population. Also the presentation of marginal effects for 5 levels of the outcome variable even just for some of significant (10) binary confounder combinations would take a large amount of space. This would erase all the convenience of the cumulative logistic model used in the analysis in summarizing the effect of documentation of counseling in a few pairwise statistics – confounder adjusted differences in cumulative odds between different levels of the counseling variable.

This sentence is unclear and needs to be rewritten: "In multivariable analysis adjusted for patient and encounter characteristics, the cumulative odds of a higher E&M charge level were higher by 6.2% for encounters with copied documentation of counseling as compared
with encounters with distinct counseling documentation (p=0.020) when there was no
documentation of time spent on counseling (Table 4)."

We have removed the above sentence from the manuscript as it is detracting from the main focus
of the analysis as pointed out by the Editor.

"When time spent on counseling was recorded, the odds of a higher E&M charge level for
encounters with copied counseling documentation were 70.5% lower than for encounters
with distinct counseling documentation, and 46.1% lower than for encounters with no
counseling documentation (p < 0.0001) (Table 4).?"

See my previous comment about calculating marginal effects and interpreting coefficients
from interaction terms in nonlinear models. Also, I am suspicious of this finding for the
reason I mentioned before, namely that by controlling for whether time spent on counseling
was recorded, you may be controlling for one of the key mechanisms through which
pasting affects billing levels.

We appreciate the Editor's concerns. As we also discussed in the response to the earlier
comments by the Editor, we agree that – as pointed out by Norton et al. – interpretation of
marginal effects in models with interaction terms can be challenging. This is one of the reasons
why we chose not to use marginal effects in our analysis, where interaction terms play a central
role by representing the co-dependence of lifestyle counseling documentation and documentation
of time spent on counseling that are both required in order to justify an E&M charge level based
on counseling provided to the patient.

We agree with the Editor that multiple variables that represent different components of a
sequential chain of events that leads to the primary outcome (e.g. elevated cholesterol and
myocardial infarction when analyzing the primary outcome of cardiovascular death) should not
be included in the same model (either as standalone explanatory variables or interaction terms).
However, co-dependence (as opposed to sequential interaction) of several variables with respect
to the outcome is best reflected by an interaction term. Importantly, utilization of an interaction
term has allowed us to distinguish whether the effect of copied lifestyle counseling is different
when documentation of time spent on counseling is vs. is not present. On the other hand,
lumping both of these scenarios together would have made correct interpretation of our data
impossible.

**REVIEWER 1**

Pg. 8: It’s not clear why periods that reflected transient A1c elevations, as well as periods in
which no medication information was available would be excluded from analysis. Please
make this clearer.

We have removed the analysis that utilized hyperglycemic periods from the manuscript as
recommended by the Editor.
There is a rich literature concerning diabetes management. It would be helpful to make some nod to this literature.

We have added references to the literature on lifestyle counseling in patients with diabetes as recommended by the Reviewer.

Many of the limitations are mentioned, but then dismissed through further discourse. One such limitation is that the results might not generalize to private practices. The authors state that since primary practices in medical centers have incentives to increase productivity, so documentation behaviors will transfer to the private practice setting. This is not a strong enough rationale for believing that these results would generalize to a private practice setting. Further research would be needed to support this claim.

We agree with the Reviewer that the extent to which productivity incentives make documentation behavior in academic medical centers similar to that in private practices is uncertain. We have rephrased our discussion of this limitation to make this uncertainty clear.

In the abstract, the authors state: “This finding is most consistent with both counseling and time spent on counseling having been copied, while submitted E&M charges reflected the care actually provided.” The authors need to make a better rationale for why E&M charges would necessarily reflect the care actually provided.

We have removed this phrase from the abstract as recommended by the Reviewer.

The authors mention a previous study they conducted which informs the current study. It’s not clear to the reader whether this is an identical sample to the previously cited study. Please clarify.

We have clarified in the manuscript that the previous study used a smaller dataset from the same EMR.

The authors very briefly address the potential advantages of EMRs. While I understand a comprehensive review of the literature and efficacy of EMRs is not possible given this article length, there could be a slightly more thorough introduction. Namely, a few cites on EHRs potential to improve the quality of care would be useful to contextualize the research. Examples include Health Affairs paper by Ryan et al., 2013.

We have added the citation of the paper by Ryan et al. to our discussion of the EMR potential to improve quality of care as recommended by the Reviewer.

I wonder why the authors chose to use the term “copy-paste” rather than cloning, and why they neglected the term “upcoding”? Other readers might wonder this as well so it might be helpful to add some discussion of this decision.
We would like to clarify that the term "cloning" may include methods other than copy-paste – for example, the use of templates. Our study was focused on copy-paste and therefore we used this term throughout the manuscript. We have clarified in the Introduction section of the manuscript that an inappropriate increase in the E&M charges could also be called "upcoding" as recommended by the Reviewer.

It’s unclear why the authors chose lifestyle documentation as the subject of analysis. Is this speculated as a big source of cloning and/or fraud?

We have chosen lifestyle documentation as the subject of analysis because it has been shown (in our previous work) to have been copied in electronic notes, and also could conceivably be used to inflate E&M charge codes.

It would be helpful to have more background on the relevance of E&M charges. Potential readers may not be familiar with the different levels of reimbursement and what unintended consequences copy and pasting might have on health care providers. In addition, the authors state that cloning can be dangerous for a number of reasons, but another underlying reason is that it could increase healthcare costs in a global sense. Brief mention of this in the discussion would strengthen the paper.

We have added a sub-section "Study Outcome" in the Methods section that provides a detailed description of E&M charges and how they are used in the United States.

Pg. 13: The authors point out, in reference #24, that higher-level billing by a small number of physicians nationwide costs a lot of money (so in other words, there are a few bad eggs who are misusing the system). The current study design will not identify the bad eggs.

We agree with the Reviewer that our study design would not identify behaviors carried out by a small number of users. We have added this information to the Limitation section of the manuscript.

There is an error in spelling out encounter and management (E&M) charges in the text (pg. 5). It should be “evaluation and management” charges.

We have made the correction as pointed out by the Reviewer.

Pg. 13, the authors state “our EMR”. It would be more appropriate to say “the EMR in this study”.

We have made the correction recommended by the Reviewer.

REVIEWER 2

A more detailed description of the EMR would be useful. For example, does it have structured fields (i.e. check boxes, drop-down menus, etc.) that could be used to justify higher E & M charges?
We have clarified (in the Study Environment sub-section of the Methods section) that LMR does not have any check boxes or drop-down menus that could be used to justify higher E&M charge levels.

**How do the notes relate to charges?** A description of the process by which charges are derived would be very helpful. For example, is documentation of the encounter reviewed and coded by staff that handle billing?

We have clarified (in the Study Environment sub-section of the Methods section) that in most practices included in the study physicians submit the E&M charge level at the time of the patient encounter.

**Page 5: The study cohort excluded patients who had more than one encounter with an endocrinologist. Is it possible that some study participants saw physicians not affiliated with BWH or MGH?**

It is possible that some study participants saw physicians not affiliated with BWH or MGH. We have included this as a limitation of the study as recommended by the Reviewer.

**Page 9: How was time spent on counseling defined?** For example, was it simply the number of minutes, or was it a binary indicator reflecting whether it was long enough for higher E & M charges (in conjunction with lifestyle counseling)?

We would like to clarify that the regulatory requirement is that the actual number of minutes spent on counseling has to be documented.

**The use of average measurements for missing values is noted on page 9.** This should be explained in much more detail. How many observations were missing for each variable? Were there indications that the pattern of missingness was systematic (significant estimates were found for “BP imputed” in Table 4)?

We have clarified that the number of patients who had missing data is included in Table 1 (number of patients with imputed data). We have included the indicator of imputation in the model in order to correct for the fact that the data were missing. Generally, the effects of hemoglobin A1c, LDL cholesterol and blood pressure levels on the E&M charge level were small. Therefore it is likely that the larger effects associated with imputation of these variables reflect the effect of the underlying reasons why the information was missing rather than the actual fact that it was lacking.

**It would be helpful to divide Table 1 in a way such that it shows differences between patients/encounters with “copy and paste” and those without indications if it.**

We have divided Table 1 to show patients with vs. without encounters with copy and paste separately as advised by the Reviewer.
A table and discussion of physician characteristics would be informative. For example, did treatment patterns among physicians who were more likely to use the copy and paste function differ from those of other physicians? Were there other differences in the characteristics of physicians such as age, experience, etc?

We agree with the Reviewer that it would be helpful to provide more information on physician characteristics. Regretfully, we do not have access to physician information in our dataset.

Related to the comment above, how were physicians compensated? Those not on salary may have had a stronger incentive to justify higher E & M charges. Also, since there are multiple payers, a sub-analysis with a group covered by an insurer that has higher reimbursements for E & M would be informative (e.g. Medicare FFS). For example, there may be a lack of a financial incentive to inflate charges if a patient is covered by a managed care plan.

We have clarified (in the Study Environment sub-section of the Methods section) that some physicians were salary-based and others based on their E&M charge levels. Most physicians who received a salary had an incentive bonus that was based on the E&M charges they submitted. Physician remuneration was not dependent on the their patients' insurance / insurance payments.

It’s noted on page 10 that 51.1% of encounters were billed at “level 4 E & M charges.” This should be defined (e.g. Is level 4 the highest payment category? Do all payers use this coding?).

We have clarified (in the Study Outcome sub-section of the Methods section) that the highest E&M charge level is level 5 and that all study physicians used this coding.

The unit of analysis is described on page 6, and again on page 8. This is a bit confusing. I would recommend taking out the description on page 6.

We have removed the duplicate reference to the unit of analysis as recommended by the Reviewer.

The description of the analysis for time to glycemic control should be discussed earlier in the paper. There’s no mention of it until page 8. The abstract and introduction only indicate an examination of the association between “copy and paste” and E & M charges.

We have removed the analysis of time to glycemic control from the manuscript as advised by the Editor.

I would recommend dropping “Following the Money” from the title.

We have dropped "Following the Money" from the title as recommended by the Reviewer.

Middle of page 8: I would recommend spelling out “3SD” for clarity instead of abbreviating it.
We have removed reference to "3SD" completely because the description of analysis that included it was deleted from the manuscript based on the Editor's recommendation.

Please do not hesitate to contact us should you have any questions about this manuscript.

Yours sincerely,

Alexander Turchin, MD, MS

REFERENCES
