

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Who teaches medical billing? A national cross-sectional survey of Australian medical education stakeholders
AUTHORS	Faux, Margaret; Wardle, Jonathan; Thompson-Butel, Angelica; Adams, Jon

VERSION 1 – REVIEW

REVIEWER	Stephen Duckett Grattan Institute, Australia
REVIEW RETURNED	13-Dec-2017

GENERAL COMMENTS	<p>This is an interesting and unique paper arguing the importance of education about Medicare (Australia) billing. My major concern is that the paper hasn't articulated clearly what problem improved billing education is designed to solve. How big is that problem (relative to the number of bills submitted, or some other metric)? And, will education about Medicare billing solve that problem, and is it the best solution to that problem? An example of the complex rules for medical billing might also be useful as context.</p> <p>Other issues to be addressed:</p> <p>Page 5, Introductory paragraph: No particular reason to refer to 'WHO member states'. Why not just 'countries'? Is the statement in the last sentence of that paragraph true? What about countries where the predominant mode of reimbursement is salary or capitation?</p> <p>--- second paragraph: No evidence has been adduced that complexity of billing hinders accountability to patients. Even if it does, other strategies, such as requiring a descriptor on a bill, rather than simply an item number, may be an effective and cheap solution. From a patient's perspective, I think the critical issue will be the size of any out-of-pocket costs, regardless of what the bills look like in terms of item numbers.</p> <p>Page 8, last paragraph: the term 'vocational education' has a specific meaning, which is not as used here. Perhaps Colleges and other post-graduate training providers? Similar point page 11, 1st main paragraph and page 13, 1st paragraph.</p> <p>---: This paragraph cites results (e.g. 59% course duration < two hours). A table with these results should be included as an on-line appendix.</p> <p>Page 9, 3rd paragraph: there is a discussion here of 'respondents who did not think a course was required'. There are only five of these and I think analysis of their views is probably not worth it.</p> <p>---, 1st paragraph of discussion: 'there appears to be no consensus ...' My reading is that 24/29 respondents who think billing education should be done, and who offered suggestions, think Medicare should do it, or 24/34 total respondents to this question. I think that is pretty close to a consensus.</p>
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	<p>Page 11, 1st main paragraph: Reference to 6000 items is irrelevant. Most practitioners would only use a very small subset of these.</p> <p>Page 12, 1st main paragraph: reference to defence of ignorance. Has this ever been successful? I thought there was a legal principle that precluded that defence?</p> <p>---, 2nd paragraph: maybe suggest that all doctors do a compulsory on-line billing tutorial, with a built in test, run by Medicare, before they can bill patients.</p>
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REVIEWER	Matthew Varacallo, MD Drexel University , USA
REVIEW RETURNED	19-Jan-2018

GENERAL COMMENTS	<p>This is an excellent and timely topic to be investigating. I do have some suggestions for revision:</p> <p>Abstract: (i)Conclusion: This is a bit of a bold statement for the opening sentence. I would recommend softening it a bit by aligning it with your first bullet point under the "strengths and limitations of this study".</p> <p>There have been papers published in recent years that have explored these pathways before. Specifically, there are national surveys in the United States which have noted discrepancies in residents' lack of education in medical billing, coding, and understanding of medicare fraud and respective program directors' desire for its implementation into the training curriculum. Furthermore, the legality has been commented on in many of these studies as we as physicians are expected to be accurate coders for procedures and clinical office visits yet we are never taught on those concepts - this is concerning given that we can go to jail for fraudulent coding (as you have mentioned).</p> <p>Discussion: On page 12 - While I agree with this point in your last paragraph, I would use caution when asking medicare to intervene in medical education. I know in the United States the expectations are similar, but I would be hesitant to make an aggressive call to action. I would consider re-wording this to putting it in the hands of the educational institutions. In the United States my push has been to incorporate it as an ACGME milestone for resident training.</p> <p>Limitations: Can you comment on why the number of stakeholders was reduced? Was this an attempt to reduce costs in medical education?</p> <p>Methods/Limitations: Please elaborate on exclusion criteria. This should also be added to the Methods section. Please be more specific in the stakeholders in medical education that your group targeted in the survey.</p>
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REVIEWER	Margie C Andrae, M.D. University of Michigan Medical School, Ann Arbor, Michigan, United States
REVIEW RETURNED	24-Jan-2018

GENERAL COMMENTS	This study highlights the importance of physician knowledge of coding conventions and payment rules within the payment structure
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under which they are held accountable. The authors examine the current state of educating physicians on this topic and the perceptions of those involved in physician education and payment policies in Australia. Their findings of scarce structured educational opportunities and the perception that someone else should own this is worthy of publication.

The authors provide background information to support interest in this topic and their objective. The Introduction section could be more concise. The methods are well described and straightforward. The authors might want to consider including a copy of their survey questions. The results are clear and the conclusions are supported by their results.

I offer the following suggestions for revision to strengthen the manuscript.

1. The authors clarify that the scope of their study is limited to formal education in the Introduction and they should do the same in the abstract where currently it states “This study attempts to systematically map all avenues of medical practitioner...”

2. The authors interchangeably use different terms for physician payment. Payment and reimbursement are not synonymous and the authors should clarify the appropriate term. Reimbursement is a term used to pay someone for an expense that they covered up-front. For example, a physician who purchases vaccines would expect to be reimbursed for the cost of the vaccines when used. However, when a physician performs a service, they would be paid for the service, not reimbursed. Payment is a hypernym of reimbursement. Standard use of terminology is important in research and education. It’s possible that physicians prefer the term reimbursement over payment because of their conflict with the moral ground of being paid for their services.

3. Similarly, the authors should be careful with the terms code, bill, and claim. Physician involvement in the payment process typically focuses on coding. Coding is translating the work performed into a code that can be used for payment. Billing is taking the code and reporting on a claim form to the appropriate entity responsible for payment and then monitoring the payment (e.g. determining the split between the patient’s responsibility and the insurer’s). Most physicians do not get involved with understanding the rules for the claim form (e.g. how to enter multiple units of a service on the form). The authors may want to clarify their terms used because billing and claiming predominate whereas they may have intended coding instead.

4. The authors make the assumption that physician education should be in the form of structured courses though they do not do a good job of justifying this assumption. Many aspects of medical training such as performing procedures are done ‘on the job’ with skills passed from one physician to another. Do we know that this is not the preferred method for coding education?

5. The authors cite a US report on Medicare improper payments (ref # 3) in their Introduction as support for the need to improve physician education on these payments. This may be misleading because as the Medicare statement suggests, the vast majority of those errors are for Medicare Part A payments to facilities. Physicians are typically not involved in these transactions (unless they are the executive of the facility) and would not be penalized for these errors.

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

a. *This is an interesting and unique paper arguing the importance of education about Medicare (Australia) billing. My major concern is that the paper hasn't articulated clearly what problem improved billing education is designed to solve. How big is that problem (relative to the number of bills submitted, or some other metric)? And, will education about Medicare billing solve that problem, and is it the best solution to that problem? An example of the complex rules for medical billing might also be useful as context.*

Response: These are valid and important questions. Whilst we did provide details specific to each of these issues throughout the text, we acknowledge that a clear statement of the link between the size of the problem and education as a solution was not included. Therefore, we have made this more overt in the abstract, strengths and limitations section and the concluding paragraph of the introduction. As follows:

Abstract (page 3, first paragraph)

“Importance: Billing errors and healthcare fraud have been described by the World Health Organization as ‘the last great unaddressed health-care cost’. Current estimates suggest 7% of total global health expenditure, or \$487 billion (USD) is wasted as a result of this phenomenon. Irrespective of whether healthcare systems are mature or emerging, fee-for-service or other payment types, challenges exist at the interface of medical billing and medical practice across the globe. Medical billing education has been cited as an important and effective preventative strategy in multiple jurisdictions, with targeted education saving \$250 million in Australia in one year from an estimated \$1-3 billion in incorrect claims.”

Strengths and Limitations (page 4)

“Despite medical billing errors and fraud being a significant problem, and education having been proven as an effective preventative strategy, to our knowledge this is the first study which has attempted to systematically map medical billing education of Australian medical practitioners.”

Introduction (page 9, first paragraph)

“There is increasing pressure on medical practitioners in relation to billing compliance internationally^{4,10}. It has also been identified as an issue in Australia,^{12,23} where the medical billing system is divorced from clinical designations (such as the ICD), and a single medical service can be the subject of over 30 different fees, rules and penalties⁷. There have been suggestions education may improve billing literacy,⁹ yet there has been scant research attention on training medical practitioners regarding correct medical billing. In response to the dearth of research in this area, this study attempts to systematically map all avenues of medical practitioner education on Medicare billing and compliance in Australia and explores the perceptions of medical education

stakeholders on the teaching of medical billing in Australia, to inform appropriate policy and regulatory initiatives. “

Other issues to be addressed:

b. *Page 5, Introductory paragraph: No particular reason to refer to ‘WHO member states’. Why not just ‘countries’?*

Response: We agree and thank the reviewer for this suggestion which we have incorporated into the paper.

(page 6, 1st paragraph) now reads, “The funding arrangements in the majority of countries, which facilitate reimbursements to medical practitioners, employ some form of classification system which directly or indirectly links payments and resource allocation to patient interactions.”

c. Is the statement in the last sentence of that paragraph true? What about countries where the predominant mode of reimbursement is salary or capitation?

Response: The point we are trying to make in the statement ‘Irrespective of the structure and design of the healthcare system...’ is that health services are never “free”, even when patient services are not individually accounted. Payments are either direct or indirect and even in countries where the predominant model is salary or capitation, many still require practitioners to code services to facilitate future planning and allocation of health budgets. However, we realise this is a longer discussion than is appropriate for the length of the article and too difficult to discuss in depth, so we have simplified the sentence to make clear we are describing facilitation of reimbursement directly to medical practitioners.

(Page 6, 1st paragraph) We have deleted the phrase ‘Irrespective of the structure and design of the healthcare system...’ and the sentence now reads: “The funding arrangements in the majority of countries which facilitate reimbursements to medical practitioners, employ some form of classification system which directly or indirectly links payments and resource allocation to patient interactions.”¹

d. second paragraph: No evidence has been adduced that complexity of billing hinders accountability to patients. Even if it does, other strategies, such as requiring a descriptor on a bill, rather than simply an item number, may be an effective and cheap solution. From a patient’s perspective, I think the critical issue will be the size of any out-of-pocket costs, regardless of what the bills look like in terms of item numbers.

Response: The complexity we refer to is the complexity of healthcare delivery itself, which then feeds into billing complexity. This complexity is largely the result of the information asymmetry observed in health itself. We have made this more overt by adding content to this paragraph referencing the well-established body of literature regarding information asymmetry in health, including in relation to the costs of providing care and medical bills (see Page 6, 2nd paragraph).

“The complexity of health classification systems, such as the international classification of diseases (ICD), while necessary to facilitate funding arrangements, may be a contributing factor to information asymmetries in the health care market. Whilst some initiatives and recommendations have attempted to minimise the specific impact of financial information asymmetry on healthcare costs, it remains a significant problem.”^{2,3} Most patients do not understand the clinical descriptions of services itemised on their medical bills...”

AND (same paragraph)

“Patients have little option other than to trust medical practitioners will not only render clinically appropriate services and treatments, but also know how to correctly itemize those services on the relevant bills and claims for reimbursement, because all decisions regarding the contents of medical bills are made unilaterally by the medical practitioner, in accordance with her determination of clinical need.”

We hope this makes our intention clearer for readers. The contents of medical bills are an extension of information asymmetry in the health market. More specifically, we have also made the point clearer that it is the practitioner who ultimately chooses – or at least heavily influences – the contents of a medical bill due to this knowledge asymmetry, unlike any other area of our lives. We would, for example, question our electricity bill if it included a line item describing something unknown to us which was not in our service contract. Patients are completely reliant on medical practitioners to choose every aspect of the contents of medical bills and must trust that each item was clinically appropriate and relevant. Even if they can read it (and understand the out-of-pocket itemisation, etc.) they will often be unable to understand or question it.

In relation to the reviewers' comment regarding descriptors, these are already legally required on bills in most jurisdictions and certainly in Australia. However, we do acknowledge the reviewers point that out-of-pocket (OOP) expenses are of major concern to consumers and thank the reviewer for this comment.

However, billing errors can affect OOPs for the consumer and are actually an important part of the same financial information asymmetry continuum, because it is still the doctor who chooses the items on the bill which will ultimately determine whether there is an OOP and the charge involved. If doctors are more accurate in determining billing item numbers, it is therefore likely that there will be a positive flow on affect to consumers in regards OOPs.

For example, if a specialist undertakes a complex consultation (in Australia this is item 132) there will be a higher charge (and a much higher rebate) than for a standard consultation (item 110), but from the consumer's point of view, it is the same – the bill will be described as a 'specialist consultation' - but the OOPs for the consumer will be completely different depending on which item the doctor decides to insert on the bill, and the consumer will have no ability to question that decision.

We have inserted a sentence in the discussion indicating the consumer impact as follows:

(page 14, 1st paragraph)

"Lack of formal medical billing education for those who have already been found to have breached Medicare's requirements may increase the potential for recidivism. Further, the impact of incorrect medical billing on consumers in relation to out-of-pocket expenses (OOP) may be significant, because correct billing itemisation not only affects government expenditure, but may also determine whether consumers will be required to pay an OOP and the amount."

e. Page 8, last paragraph: the term 'vocational education' has a specific meaning, which is not as used here. Perhaps Colleges and other post-graduate training providers? Similar point page 11, 1st main paragraph and page 13, 1st paragraph.

Response: We thank the reviewer for pointing this out and have added a definition of vocational education in the strengths and limitations section to avoid confusion (see page 4, paragraph 2, point 3) which now reads:

- "Since this study, federal government initiatives in relation to the medical education of General Practitioners (GP) has reduced the number of GP post-graduate training providers (referred to in Australia as vocational education providers) from the 17 stakeholders included in our study to 11 stakeholders."

f. ---: This paragraph cites results (e.g. 59% course duration < two hours). A table with these results should be included as an on-line appendix.

Response: We agree and have added a new third table to the paper. (See table 2, page 19).

ALSO (page 10, paragraph 3) we have added a sentence as follows:

"These results are presented in table 2."

g. Page 9, 3rd paragraph: there is a discussion here of 'respondents who did not think a course was required'. There are only five of these and I think analysis of their views is probably not worth it.

Response: We thank the reviewer for pointing this out. We have made changes to Table 2, which was unclear concerning the number of respondents who did not think a course was required. We believe our amendments have now rectified this ambiguity.

We have also made changes throughout the paper to more clearly represent the results and thank the reviewer for bringing this to our attention. See the following:

Abstract (page 3)

“Results: The majority of stakeholders (70%, n=40) did not offer/have never offered, a medical billing course. 89% of stakeholders thought that medical billing should be taught to doctors, including 30% (n=17) who were already teaching it. There was no consensus on where, when and how medical billing education should occur.”

AND (page 11, 2nd paragraph)

“Perceptions on who should provide medical billing education

Table 3 shows stakeholder perceptions regarding medical billing courses. 89% of stakeholders thought that medical billing should be taught to medical practitioners, including 30% (n=17) who were already teaching it.”

AND (Page 20, Table 3)

Suggested providers of medical billing courses	<u>Those not teaching medical billing (n=40) who felt it should be taught (n=29) suggested the following stakeholders should teach it</u>	<u>Those not teaching medical billing who felt it should not be taught (n=11). 15% of these respondents (n=5) still suggested who should teach it</u>	Total who responded (n=34)
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In relation to the five respondents, we have retained that sentence and added an important new point in paragraph 3 of the discussion concerning the opposite views held by Australia and the Netherlands, the latter of which has adopted the view that medical billing should fall within the teaching remit of university medical schools and specialist colleges. As our results directly conflict with the views of another country on this topic, we thought an overt reference was suitable. See the following:

(Page 12, 2nd paragraph)

“Undergraduate university medical schools and postgraduate specialist medical colleges were the major category of respondents who did not think that a specific course on medical billing was required. This finding directly contrasts with international views. The opposite view appears to be held by these two stakeholder groups in The Netherlands for example, where university medical schools and postgraduate specialist medical colleges have been tasked with providing training on medical billing and the costs of providing care to medical practitioners in that country.¹⁰”

h. ---, 1st paragraph of discussion: ‘there appears to be no consensus ...’ My reading is that 24/29 respondents who think billing education should be done, and who offered suggestions, think Medicare should do it, or 24/34 total respondents to this question. I think that is pretty close to a consensus.

Response: This was an oversight in the Abstract and we thank the reviewer for pointing it out. The body of the paper clearly stated that there was no consensus, not in regard to who should teach medical billing, but on ‘where, when or how’ medical billing should be taught. We have now amended the abstract to ensure the two references to this issue are aligned as follows:

Abstract (page 3, Results paragraph)

“Results: The majority of stakeholders (70%, n=40) did not offer/have never offered, a medical billing course. 89% of stakeholders thought that medical billing should be taught to doctors, including 30% (n=17) who were already teaching it. There was no consensus on where, when and how medical billing education should occur.”

This is now consistent with the content in the discussion (page 11, 1st paragraph of discussion) which remains unchanged as follows

“Our study identified broad agreement amongst medical education stakeholders that medical billing should be taught to medical practitioners at some point in their careers. However, there appears to be no consensus amongst the stakeholders on where, when or how this should occur.”

i. Page 11, 1st main paragraph: Reference to 6000 items is irrelevant. Most practitioners would only use a very small subset of these.

Response: We believe that the total number of services in the Medicare scheme should be included to provide context. However, we agree with the reviewer that most practitioners would bill only a small subset of these items. However, the number of items billed has no nexus to the accuracy of billing, as practitioners may still be billing their small subset of services incorrectly, particularly given a single item number in Australia can be subject to over 30 different rates, multiple rules and a myriad of administrative permutations with severe penalties for non-compliance. We have referred to a criminal prosecution to make this point clearer (the practitioner who was found guilty of fraud was billing only a small number of items but still fell afoul of the legislation. In that case, three senior members of the judiciary did not agree on the definition of a single item number), We have also referenced an earlier article by the authors (reference no.7 throughout) which included the table of over 30 fees for one Medicare item.

(See page 13, 2nd paragraph) which now reads:

“Whilst these efforts are commendable, the average course length of less than two hours is unlikely to achieve the high level of legal and administrative literacy that is expected of medical practitioners working within a complex system of nearly 6000 reimbursement items, over 900 A4 pages of service descriptions, complex cross-referencing, administrative permutations and rules. Whilst many medical practitioners may use only a small subset of these items, some have nevertheless been found guilty of fraud in relation to the billing of even these small subsets.⁶ Others may be unaware of the myriad legal obligations applicable to each claim, particularly when even a single medical service in Australia can be the subject of more than 30 payment rates, multiple rules, and strict penalties for non-compliance.⁷”

j. Page 12, 1st main paragraph: reference to defence of ignorance. Has this ever been successful? I thought there was a legal principle that precluded that defence?

Response: This is a good point and we have clarified the content of the relevant paragraph. Our findings from this study suggest that there may be some veracity in claims by medical practitioners under investigation for incorrect billing who state that they didn't know that what they were doing was wrong, particularly given it is a topic many are never taught.

In response to the reviewer's comment regarding a 'legal principle' - there are numerous penalties under the legislative framework, both civil and criminal. Amongst the criminal offences there are a handful of strict liability offences, however serious criminal matters are usually prosecuted under the Criminal Code Act, where the criminal burden of proof applies – beyond reasonable doubt. An example is the criminal case referenced in the article (reference no.6) and referred to above.

(Page 14, 2nd paragraph) which now reads:

“Examining the knowledge and educational needs of medical practitioners around medical billing is also important because medical practitioners may be investigated for incorrect billing in both civil and criminal jurisdictions, and relevant determinations in both settings reveal that medical practitioners under investigation will often state that they did not know the conduct for which they stand accused was wrong.^{6,15,30} Whilst the defence of ignorance has been unsuccessful in preventing conviction both in Australia and the U.S.,^{6,30} the findings of our study suggest there may sometimes be veracity in such submissions, as the majority of Australian medical practitioners have never been taught how to bill correctly or at all. Until such time as governments can confidently assert and demonstrate that medical practitioners are fully cognizant of their medical billing responsibilities, procedural fairness for

medical practitioners under investigation may be denied, and the defence of ignorance will always remain – at least theoretically – open.”

k. ---, 2nd paragraph: maybe suggest that all doctors do a compulsory on-line billing tutorial, with a built in test, run by Medicare, before they can bill patients.

We acknowledge the reviewer’s view but have stated in this paragraph that it is not the legislated role of Medicare to teach medical billing. Medicare’s role as a provider of payments and services is set out in the Human Services (Medicare) Act. It is primarily a payer and cannot therefore also be the educator and prosecutor, due to inherent conflicts of interest.

In addition, Medicare has no role or knowledge over the operation of the Private Health Insurance Act and Regulations, which jurisdiction deals with the most complex medical billing in Australia (part subsidised by Medicare), affecting approximately 45% of the population.

We have made substantial amendments to this paragraph which we hope will address these complexities, including adding an analogy with the Australian Tax Office which we hope may provide clarity for readers globally.

(see page 15, 1st paragraph) which now reads

“The Department of Human Services (the administrator of Medicare payments in Australia) does have risk management responsibilities in order to protect the integrity of government payments, and under this component of its remit Medicare can and has already has adopted successful educational strategies as part of the departments’ broader compliance initiatives.^{9,12,23} However, Medicare cannot act as regulator, educator and prosecutor simultaneously due to inherent conflicts of interests, and in addition, it has specific legal obligations to conduct its activities within the parameters of the legislative scheme.³¹ These obligations do not give Medicare responsibility for training medical practitioners. Rather, these are similar arrangements to those that exist with the Australian Taxation Office (ATO) in relation to tax law, where the ATO may provide support and advice in relation to taxation and also manages risk, but actual teaching of tax law and tax accounting is undertaken by external experts, typically inside academic institutions. A further unique feature of Australia’s blended public/private health financing arrangements provides that Medicare has no jurisdiction over Australia’s private health insurance schemes, (which affect approximately 45% of the population) where many of the most complex medical billing laws and rules are found.”

Reviewer: 2

a. Abstract:

(i)Conclusion: This is a bit of a bold statement for the opening sentence. I would recommend softening it a bit by aligning it with your first bullet point under the "strengths and limitations of this study".

Response: We thank the reviewer for this comment and have softened the language in the abstract conclusion, and in the conclusion section of the paper as follows:

Abstract (page 3, last paragraph) now reads:

“Conclusions: To our knowledge, this original research reports the first attempt of any country to map the ways doctors obtain understanding of the complex legal and...”

(page 17, 2nd paragraph)

“Conclusion

Our study suggests that very little proactive education aimed at improving medical billing compliance by medical practitioners is currently occurring or has ever occurred in Australia, and available medical billing education may be highly variable...”

b. There have been papers published in recent years that have explored these pathways before. Specifically, there are national surveys in the United States which have noted discrepancies in residents' lack of education in medical billing, coding, and understanding of medicare fraud and respective program directors' desire for its implementation into the training curriculum. Furthermore, the legality has been commented on in many of these studies as we as physicians are expected to be accurate coders for procedures and clinical office visits yet we are never taught on those concepts - this is concerning given that we can go to jail for fraudulent coding (as you have mentioned).

Response: We agree with the reviewer and have noted many of these important works: initially in the outcomes and measures section of the abstract, on numerous occasions throughout the paper and then again when referring to criminal prosecutions in the discussion. Many of the references are important U.S studies and cases on this issue and we have therefore included them where relevant. We have also highlighted the fact that medical billing compliance research is more advanced in the U.S than other countries. (see page 8, 3rd paragraph) which commences with:

"U.S research on the topic of medical practitioner knowledge of correct medical billing is generally more mature than other jurisdictions, and has resulted in suggestions that medical billing training should be viewed as a core competency of medical training, and a national medical billing curriculum should be developed.¹⁸"

c. Discussion:

On page 12 - While I agree with this point in your last paragraph, I would use caution when asking medicare to intervene in medical education. I know in the United States the expectations are similar, but I would be hesitant to make an aggressive call to action. I would consider re-wording this to putting it in the hands of the educational institutions. In the United States my push has been to incorporate it as an ACGME milestone for resident training.

Response: This is a good point. We did not intend to imply that Medicare should intervene. We agree with the reviewer and do not think it is Medicare's role to provide medical billing education noting that Medicare cannot act as regulator, educator and prosecutor, due to inherent conflicts of interest. We have made substantial changes to that paragraph to make this clear.

In addition, a unique situation arises in Australia where Medicare has no role or knowledge over the operation of the Private Health Insurance Act and Regulations, which jurisdiction deals with our most complex medical billing (part subsidised by Medicare), affecting approximately 45% of the population.

(see page 15, 1st paragraph) which now reads

"The Department of Human Services (the administrator of Medicare payments in Australia) does have risk management responsibilities in order to protect the integrity of government payments, and under this component of its remit Medicare can and has already has adopted successful educational strategies as part of the departments' broader compliance initiatives.^{9,12,23} However, Medicare cannot act as regulator, educator and prosecutor simultaneously due to inherent conflicts of interests, and in addition, it has specific legal obligations to conduct its activities within the parameters of the legislative scheme.³¹ These obligations do not give Medicare responsibility for training medical practitioners. Rather, these are similar arrangements to those that exist with the Australian Taxation Office (ATO) in relation to tax law, where the ATO may provide support and advice in relation to taxation and also manages risk, but actual teaching of tax law and tax accounting is undertaken by external experts, typically inside academic institutions. A further unique feature of Australia's blended public/private health financing arrangements provides that Medicare has no jurisdiction over Australia's private health insurance schemes, (which affect approximately 45% of the population) where many of the most complex medical billing laws and rules are found."

d. Limitations:

Can you comment on why the number of stakeholders was reduced? Was this an attempt to reduce costs in medical education?

Response: Yes. In 2015 the federal government reduced the number of vocational education providers (VEPs) for GPs as part of its broader cost cutting measures in the health budget. The number of VEPs has actually increased again to 11, which we have changed in the paper. The

reduction was due to circumstances which reduced the number of eligible organisations between our study design and study implementation, rather than being due to our application of inclusion/exclusion criteria.

We have added a comment regarding this in the Strengths and Limitations section of the paper (page 16, 1st paragraph) which now reads:

“Also, since this study, cost saving initiatives by the federal government in relation to the medical education of GP’s has reduced the number of vocational education providers from the 17 stakeholders included in our study to 11 stakeholders.”

e. Methods/Limitations:

Please elaborate on exclusion criteria. This should also be added to the Methods section. Please be more specific in the stakeholders in medical education that your group targeted in the survey.

Response: Thank you for this suggestion. We have amended the methods section to be more specific both in relation to the inclusion and exclusion criteria.

We have removed the word ‘major’ from the opening sentence of the methods section and added more specificity in the first sentence concerning inclusion criteria.

At the end of the same paragraph we have added more detail concerning exclusion criteria. Some professional stakeholders were Australasian in nature, so we excluded those that focused primarily on NZ which has a different health system.

(page 9, 1st paragraph and continuing to beginning of page 10)

“Methods

A national cross-sectional survey of all Australian organizational stakeholders (n=66) who play a role in the education of medical practitioners from their first day as medical students through to the end of their careers, in relation to clinical practice, was undertaken between April 2014 and June 2015.”

AND

“Our study excluded divisions, faculties and chapters which exist under the umbrellas of the specialist medical colleges who were invited to participate. Some professional stakeholders were Australasian in nature (Australasia is a term for Australia, New Zealand and occasionally the Pacific Islands) and we excluded those organisations focussed primarily on New Zealand.”

Reviewer: 3

a. The authors provide background information to support interest in this topic and their objective. The Introduction section could be more concise. The methods are well described and straightforward. The authors might want to consider including a copy of their survey questions. The results are clear and the conclusions are supported by their results.

Response: Thank you for these initial comments. We have reviewed the opening for brevity, however the reviewer comments have necessitated changes which have left the introduction at about the same length.

We have uploaded the survey questions as an appendix.

I offer the following suggestions for revision to strengthen the manuscript.

1. . The authors clarify that the scope of their study is limited to formal education in the Introduction and they should do the same in the abstract where currently it states “This study attempts to systematically map all avenues of medical practitioner...”

Response: We thank the reviewer for pointing this out. We have removed the word ‘formal’ throughout the paper, as we attempted to map all avenues of medical practitioner education on medical billing, no matter how informal.

2. *The authors interchangeably use different terms for physician payment. Payment and reimbursement are not synonymous and the authors should clarify the appropriate term. Reimbursement is a term used to pay someone for an expense that they covered up-front. For example, a physician who purchases vaccines would expect to be reimbursed for the cost of the vaccines when used. However, when a physician performs a service, they would be paid for the service, not reimbursed. Payment is a hypernym of reimbursement. Standard use of terminology is important in research and education. It’s possible that physicians prefer the term reimbursement over payment because of their conflict with the moral ground of being paid for their services.*

Response: This is an important point which deserves further discussion. We agree that reimbursement is the preferred terminology, however in Australia, most doctors will be paid directly for their professional services, and will also claim reimbursements for professional services, during the course of their daily work. They can choose how they wish to bill with every patient who walks through their door. Patients may also pay doctors and then claim reimbursements from Medicare or their private insurers. This is all dependant on the claiming method chosen at the time of service delivery. We note that reimbursement methods and payment systems are different in many countries and we have therefore reviewed the paper and made amendments to use more consistent terminology throughout. We have retained the terms reimbursement and claim only where the meaning is clear, and have otherwise used the term ‘billing’ throughout.

We would be happy to add a footnote to the paper if the Editor deems it appropriate to clarify this distinction for readers.

3. *Similarly, the authors should be careful with the terms code, bill, and claim. Physician involvement in the payment process typically focuses on coding. Coding is translating the work performed into a code that can be used for payment. Billing is taking the code and reporting on a claim form to the appropriate entity responsible for payment and then monitoring the payment (e.g. determining the split between the patient’s responsibility and the insurer’s). Most physicians do not get involved with understanding the rules for the claim form (e.g. how to enter multiple units of a service on the form). The authors may want to clarify their terms used because billing and claiming predominate whereas they may have intended coding instead.*

Response: We had attempted to describe medical billing in a suitably generic manner such that the operation of different medical billing systems in different countries would not need further clarification. However, we accept this is not the case, so we have added content in the methods section pointing to Australia’s unique medical billing system which has no relationship to ICD codes. This is then linked to reference 24 which explains that Australia’s Medicare system was first introduced in 1975, does not use ICD codes, has no relationship to CPT or any other codes and there is no nexus between the work of Australian clinical coders and doctor billing. We note that 15 countries have adopted the Australian clinical coding framework to date and introducing the distinctions in the different operation of coding and billing systems around the world is therefore timely. The U.K, Canada and Singapore have also adapted their systems for local use. That said, the difficulties for medical practitioners around the world, in linking clinical encounters to administrative datasets, irrespective of which codes are in use, is similar, and the lessons learnt from other countries are therefore relevant and transferable.

(see page 8, last paragraph)

“There is increasing pressure on medical practitioners in relation to billing compliance internationally^{4,10}. It has also been identified as an issue in Australia,^{12,23} where the medical billing system is divorced from clinical designations (such as the ICD) and...” (page 9, 1st paragraph under methods section)

“Methods

A national cross-sectional survey of all Australian organizational stakeholders (n=66) who play a role in the education of medical practitioners from their first day as medical students through to the end of

their careers, in relation to clinical practice, was undertaken between April 2014 and June 2015. The survey framed questions around the concept of a 'medical billing course', the definition of which was intentionally broad to include any content whatsoever on the specific topic of medical billing and compliance under Australia's unique classification system known as the Medicare Benefits Schedule (MBS), which unlike many other health systems, has no relationship with ICD codes.²⁴

AND (reference 24) which reads:

24. The Medicare Benefits Schedule or MBS as it is known locally, is Australia's unique classification system for professional services provided mostly by medical practitioners, but also by some allied health professionals. It was first introduced on 1 July 1975 (then known as the Medical Benefits Schedule). Unlike the majority of the world's health classification and medical billing systems, the MBS has no relationship with the International Classification of Disease (ICD) codes and therefore there is no nexus at all between the work of Australian clinical coders and those who may process medical bills for Australian doctors. The MBS also has no relationship with CPT, HCPC, SNOMED, LOINC or any other codes, and operates under its own legislative framework, separate to that which regulates clinical coding using ICD-10AM in Australia.

4. The authors make the assumption that physician education should be in the form of structured courses though they do not do a good job of justifying this assumption. Many aspects of medical training such as performing procedures are done 'on the job' with skills passed from one physician to another. Do we know that this is not the preferred method for coding education?

Response: The reviewers comment is noted with thanks. To date there has been no research on the preferred teaching methods of this subject matter and this paper points out that the subject is not yet recognised as something deserving of being taught.

Poor knowledge of medical billing in Australia has been identified through case law, the annual reports of the government regulator, as well as multiple physician submissions to senate committees. Also, our results indicate that doctors themselves are of the view that they are unable to teach this topic having never been taught it themselves, and do not want to teach it. The majority of respondents expressed the view that medical billing should be taught by one of the relevant educational stakeholders, rather than on-the-job, which appears to not be their preferred method.

Further, in Australia, there is no single definitive source of correct information for doctors, or anyone, on the complex web of medical billing legislation. This means that on-the-job-training in Australia is not standardised.

To make this clearer for readers, we have added a sentence at the end of paragraph 3 in the introduction about medical practitioners themselves having stated that the lack of clarity around medical billing legislation and regulation can have significant personal consequences. We have referenced a criminal case (reference no.6) and an earlier paper by the authors (reference no.7) citing numerous senate committee hearings as well as disciplinary proceedings where doctors have actively sought clarity and support in relation to medical billing. (page 7, 1st paragraph)

"However, the precise amount of deliberate versus unintentional misuse of the system has proven impossible to quantify in Australia and as such, the impact of alternative factors for incorrect billing beyond rorting - such as medical practitioners struggling to navigate the complex requirements of the Medicare system or inefficiencies that exist within the system itself – remains unknown. However, the lack of clarity around underpinning legislation and regulation has been identified by many medical practitioners as an important issue, one that often has significant professional consequences."^{6,7}

We would also make the point that, given the accepted amount of non-compliant medical billing in Australia is costing Australian tax payers in the range of \$1-3 billion annually, either there is some degree of confusion in relation to medical billing, or doctors are deliberately billing this amount incorrectly. There is no other explanation. Given there is no evidence to support the view that all non-compliant billing is deliberate, there must therefore be some level of confusion, which in itself suggests that the current status quo of non-standardised, ad-hoc, on-the-job teaching of medical billing is failing.

However, we agree with the reviewer that further research is required in relation to optimal teaching of this subject matter, and have added a final sentence to the paper as follows:

(Page 17, last sentence of conclusion)

“Further research is required to determine the most effective design and delivery of any such curriculum.”

5. *The authors cite a US report on Medicare improper payments (ref # 3) in their Introduction as support for the need to improve physician education on these payments. This may be misleading because as the Medicare statement suggests, the vast majority of those errors are for Medicare Part A payments to facilities. Physicians are typically not involved in these transactions (unless they are the executive of the facility) and would not be penalized for these errors.*

Response: We thank the reviewer for pointing this out. On reflection we concur with the Reviewer and as such we have deleted this sentence and the reference. This reference was simply meant to contextualise the situation for international readers, and we believe the remaining references still appropriately do this.

VERSION 2 – REVIEW

REVIEWER	Stephen Duckett Grattan Institute, Australia
REVIEW RETURNED	07-Apr-2018

GENERAL COMMENTS	<p>The authors have addressed most of my concerns. Residual concerns are:</p> <ul style="list-style-type: none"> • Page 4, line 17. Vocational education in Australia refers to providers of education in the lower tiers (up to 6) of the Australian Qualifications Framework see https://www.aqf.edu.au/. I suggest if you must keep vocational education say it is as referred to in this study rather than in Australia. Alternatively use postgraduate/vocational training which distinguishes it from the official term. • Page 10, lines 29-30: no consensus on where, when or how. Some of this can be deduced from the questionnaire (e.g. when, some suggest postgraduate and some undergraduate) but how do you deduce where or how from your questionnaire? • Page 14, lines 8-11: comments about private health insurance. The questionnaire was about ‘claiming and compliance under the MBS’. The questionnaire did not ask questions as far as I can see about PHI billing rules. In any event, there is a MBS item and rebate for in-hospital medical services which provide a floor for PHI medical payments. <p>The data should be made available publicly</p>
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REVIEWER	Matthew Varacallo Drexel University COM, USA
REVIEW RETURNED	15-Apr-2018

GENERAL COMMENTS	<p>I. Abstract:</p> <p>IA: Although I did not catch this on my first review of the manuscript, I noticed that in the abstract under outcomes and measures you</p>
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basically stated the results and then commented on the consistency with U.S. findings. Only the outcomes of interest as pertinent to your study should be listed here, as opposed to the actual result or conclusion to be made from the RESULTS of the outcomes.

II. Introduction:

IIA: Second paragraph: These are all valid points being made. The final sentence of the paragraph is very lengthy I suggest breaking it into two in order to improve the flow.

IIB: third paragraph: drop the comma after financial leakage

IIC: Next page and paragraph -- Again, great ideas that you have delineated but please limit the use of long sentences to improve the flow of your arguments.

IID: Next paragraph -- you need to cite a reference at the end of a sentence that contains "evidence suggests" in the content of the sentence. While you may list them later on in the following paragraph(s), that sentence should have the correlating references cited as well.

IID: other comments:

I know I keep harping on strengthening your argument from US studies and I appreciate the addition of more literature – however, the US is different from other healthcare systems abroad (in terms of its training system, specifically) and I would include a study of attending physicians and/or residents pertinent to this area. This is not a knock on medical students, but the plethora of studies available to cite from the Attending/Resident physician level should be considered. This would help strengthen your argument when pulling in the relevance in Australia and tying it to the parallel situation occurring in the US.

III. Methods:

IIIA: Again, please break up excessively long sentences to improve

	<p>the flow. For example:</p> <p>“The survey framed questions around the concept of a ‘medical billing course’, the definition of which was intentionally broad to include any content whatsoever on the specific topic of medical billing and compliance under Australia’s unique classification system known as the Medicare Benefits Schedule (MBS), which unlike many other health systems, has no relationship with ICD codes.”</p> <p>IV. Results:</p> <p>IVA: In order to state your results in a flowing fashion make sure that you appropriately place the (% , n=) in the most appropriate position. This helps your reader avoid getting distracted with the interchanging general text and numbers.</p> <p>For example...so I can be more specific:</p> <p>under the “medical billing course delivery and content” subtopic:</p> <p>I suggest your second sentence be worded in the following fashion:</p> <p>... Of those stakeholders who did provide courses regarding medical billing for medical practitioners (30%, n=17), the majority (71%, n=12)...</p> <p>V. Discussion/Conclusion:</p> <p>Looks good. I appreciate you incorporating the suggested modifications.</p>
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VERSION 2 – AUTHOR RESPONSE

Reviewer: 1

1. Page 4, line 17. Vocational education in Australia refers to providers of education in the lower tiers (up to 6) of the Australian Qualifications Framework see <https://www.aqf.edu.au/>. I suggest if you

must keep vocational education say it is as referred to in this study rather than in Australia. Alternatively use postgraduate/vocational training which distinguishes it from the official term.

Response:

We have made this change and thank the reviewer for pointing it out.

Strengths and Limitations (page 4), third bullet point now reads:

- Since this study, federal government initiatives in relation to the medical education of General Practitioners (GP) has reduced the number of GP post-graduate training providers (referred to in this study as vocational education providers) from the 17 stakeholders included in our study to 11 stakeholders.

2. Page 10, lines 29-30: no consensus on where, when or how. Some of this can be deduced from the questionnaire (e.g. when, some suggest postgraduate and some undergraduate) but how do you deduce where or how from your questionnaire?

Response: The majority of respondents who chose to do the survey by phone (n=25) offered numerous suggestions concerning where and how a medical billing course could be delivered. However, we agree this cannot be deduced from the current survey results and requires further research. We have therefore removed the words 'when' and 'how' from two sentences of the paper as follows:

(page 3 / Abstract / Results) now reads, "There was no consensus on when medical billing education should occur."

AND

(page 10 / 1st paragraph / Discussion) now reads, "However, there appears to be no consensus amongst the stakeholders on when this should occur."

3. Page 14, lines 8-11: comments about private health insurance. The questionnaire was about 'claiming and compliance under the MBS'. The questionnaire did not ask questions as far as I can see about PHI billing rules. In any event, there is a MBS item and rebate for in-hospital medical services which provide a floor for PHI medical payments.

Response: We thank the reviewer for this comment and have amended the relevant section to make clearer that MBS billing is inextricably linked to PHI medical payments and is the main form of medical billing used by medical specialists. Regulatory changes made from the year 2000 onwards have now rendered the MBS and PHI rules and systems impossible to untangle and disconnect. Further, when using the term 'medical billing' with Australian medical specialists it is understood and accepted that the term incorporates their primary source of remuneration, which for most, is in-hospital billing. There are very few medical specialists who do not undertake in-hospital work, other than dermatologists who represent a very small percentage of the overall number of medical specialists in Australia. It would be futile to offer a medical billing course to Australian medical specialists if it did not include PHI billing. To do so would also offer no benefit to consumers for whom the main concern is out of pocket expenses, which derive for the most part from complex PHI in-hospital billing. The issue is too complex to describe in detail in this particular paper, but we have added contextual comments as well as appropriate references.

4. The data should be made available publicly

Response: We are happy to share data and have provided for this to occur under our data sharing statement on page 2.

Reviewer: 2

Abstract: IA:

Although I did not catch this on my first review of the manuscript, I noticed that in the abstract under outcomes and measures you basically stated the results and then commented on the consistency with U.S. findings. Only the outcomes of interest as pertinent to your study should be listed here, as opposed to the actual result or conclusion to be made from the RESULTS of the outcomes.

Response: We thank the reviewer for pointing this out. We have removed the outcome measures heading completely, because we do not feel it is relevant to this study, which used a descriptive questionnaire. We have also moved some of the text in the abstract under different headings to improve the flow. Changes are as follows:

Design: National cross-sectional survey between April 2014 and June 2015. No patient or public involvement. Data analysis - descriptive statistics via frequency distributions.

Outcome(s) and Measure(s) - deleted

Results: There is little medical billing education occurring in Australia. The majority of stakeholders (70%, n=40) did not offer/have never offered, a medical billing course. 89% thought medical billing should be taught, including 30% (n=17) who were already teaching it. There was no consensus on when medical billing education should occur.

Conclusions: To our knowledge, this is the first attempt of any country to map the ways doctors learn the complex legal and administrative infrastructure in which they work. Consistent with U.S findings, Australian doctors may not have expected legal and administrative literacy. Rather than reliance on ad-hoc training, development of an Australian medical billing curriculum should be encouraged to improve compliance, expedite judicial processes and reduce waste. In the absence of adequate education, disciplinary bodies in all countries must consider pleas of ignorance by doctors under investigation, where appropriate, for incorrect medical billing.

II. Introduction:

IIA: Second paragraph: These are all valid points being made. The final sentence of the paragraph is very lengthy I suggest breaking it into two in order to improve the flow.

Response: Thank you. We have reviewed the manuscript and shortened numerous sentences as follows:

(page 5 / 2nd para) Patients have little option other than to trust medical practitioners will not only render clinically appropriate services and treatments, but also know how to correctly itemize those services on the relevant bills and claims for reimbursement. Ultimately, all decisions regarding the contents of medical bills are made unilaterally by the medical practitioner, in accordance with her determination of clinical need.

AND

(page 6 / 1st para) However, the precise amount of deliberate versus unintentional misuse of the system has proven impossible to quantify in Australia. As such, the impact of alternative factors for incorrect billing beyond routing - such as medical practitioners struggling to navigate the complex requirements of the Medicare system or inefficiencies that exist within the system itself – remains unknown.

AND

(page 6 / 2nd para) However, such initiatives remain uncommon, with much of the available literature on the prevention of healthcare system waste and misuse largely ignoring education as a potentially preventive strategy. Instead, available literature focuses on sophisticated predictive modelling and

data analytics, post-payment audit activity, recovery action and punitive measures, which may include disqualification from funding schemes and custodial sentences for providers.

IIB: third paragraph: drop the comma after financial leakage

Response: Done, thank you.

IIC: Next page and paragraph -- Again, great ideas that you have delineated but please limit the use of long sentences to improve the flow of your arguments.

Response: See above. We have broken up sentences throughout the manuscript.

IID: Next paragraph -- you need to cite a reference at the end of a sentence that contains "evidence suggests" in the content of the sentence. While you may list them later on in the following paragraph(s), that sentence should have the correlating references cited as well.

Response: Thank you. We have added the relevant references on page 6 as follows.

In both the U.S and Australia, evidence suggests that the medical profession itself takes a harsh view of colleagues who bill incorrectly.^{8,15,18,19}

IID: other comments: I know I keep harping on strengthening your argument from US studies and I appreciate the addition of more literature – however, the US is different from other healthcare systems abroad (in terms of its training system, specifically) and I would include a study of attending physicians and/or residents pertinent to this area. This is not a knock on medical students, but the plethora of studies available to cite from the Attending/Resident physician level should be considered. This would help strengthen your argument when pulling in the relevance in Australia and tying it to the parallel situation occurring in the US.

Response: We thank the reviewer for this excellent comment and agree that the paper is strengthened by the addition of a second U.S study, which we have added on page 6 in the last paragraph as follows:

One U.S study of 2300 paediatric graduates highlighted an 'acute and pervasive perception' that medical billing training was adequate¹⁹ and the medical student participants of another U.S study rated illegal billing as the second most egregious of 30 vignettes of misconduct, with substance abuse being reported as the most serious misconduct (86.8%), then illegal billing (69.1%), followed by sexual misconduct (50.0%).¹⁴

III. Methods: IIIA: Again, please break up excessively long sentences to improve the flow. For example: "The survey framed questions around the concept of a 'medical billing course', the definition of which was intentionally broad to include any content whatsoever on the specific topic of medical billing and compliance under Australia's unique classification system known as the Medicare Benefits Schedule (MBS), which unlike many other health systems, has no relationship with ICD codes."

Response: We thank the reviewer and have broken up the sentence as follows:

The survey framed questions around the concept of a 'medical billing course', the definition of which was intentionally broad to include any content whatsoever on the specific topic of medical billing under Australia's unique classification system known as the Medicare Benefits Schedule (MBS). Unlike many other health systems, the MBS has no relationship with ICD codes.²⁴

IV. Results: IVA: In order to state your results in a flowing fashion make sure that you appropriately place the (% , n=) in the most appropriate position. This helps your reader avoid getting distracted with the interchanging general text and numbers. For example...so I can be more specific: under the “medical billing course delivery and content” subtopic: I suggest your second sentence be worded in the following fashion: ... Of those stakeholders who did provide courses regarding medical billing for medical practitioners (30%, n=17), the majority (71%, n=12)... V. Discussion/Conclusion: Looks good. I appreciate you incorporating the suggested modifications.

Response: Thank you for this suggestion. We have revised the entire results section incorporating your suggestions as follows:

The majority of stakeholders (70%, n=40) did not offer, and have never offered, a medical billing course. Of those stakeholders who did provide courses regarding medical billing for medical practitioners (30%, n=17), the majority (71%, n=12) were vocational education providers facilitating postgraduate training exclusively to general practitioners (GPs). The majority of stakeholders who provided courses did so as a mandatory component of an induction and introduction program (76%, n=13). Most course providers reported a course duration of less than two hours (59%, n=10) and almost all providers of medical billing courses stated that the course was delivered by a person with medical qualifications, some of whom also had educational qualifications (94%, n=16). The majority of medical billing course providers did not include assessment as part of their course (82%, n=14) and almost all medical billing course providers provided the course free of charge (94%, n=16). These results are presented in table 2.

AND

Table 3 shows stakeholder perceptions regarding medical billing courses. 89% of stakeholders thought that medical billing should be taught to medical practitioners, including 30% (n=17) who were already teaching it. Of the 40 stakeholders who did not offer a medical billing course, nearly three-quarters thought that someone should provide a medical billing course for medical practitioners (72%, n=29). Five respondents who stated that they did not think a medical billing course for medical practitioners was necessary nevertheless went on to suggest who they thought should deliver a medical billing course. The majority of respondents who did not think that a course was required were from undergraduate university medical schools and postgraduate specialist medical colleges. Most respondents who did not offer a medical billing course offered a view as to who should be responsible for teaching such a course (85%, n=34) and the majority stated Medicare (82% n=28).

VERSION 3 – REVIEW

REVIEWER	Matthew Varacallo Drexel University
REVIEW RETURNED	09-May-2018
GENERAL COMMENTS	Thank you for the corrections