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Who teaches medical billing? A national cross-sectional survey of Australian medical education stakeholders

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ABSTRACT

Importance Billing errors and healthcare fraud have been described by the WHO as 'the last great unreduced health-care cost'. Estimates suggest that 7% of global health expenditure (US$487 billion) is wasted from this phenomenon. Irrespective of different payment models, challenges exist at the interface of medical billing and medical practice across the globe. Medical billing education has been cited as an effective preventative strategy, with targeted education saving $A250 million in Australia in 1 year from an estimated $A1–3 billion of waste.

Objective This study attempts to systematically map all avenues of medical practitioner education on medical billing in Australia and explores the perceptions of medical education stakeholders on this topic.

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

Participants All stakeholders who educate medical practitioners regarding clinical practice (n=66). 86% responded.

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 US 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.

Strengths and limitations of this study

- ► 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.
- ► Multiple data collection methods (telephone, mail and email) may have elicited some response bias among participants, though this is likely to be negligible.
- ► Since this study, federal government initiatives in relation to the medical education of general practitioners (GPs) has reduced the number of GP postgraduate training providers (referred to in this study as vocational education providers) from the 17 stakeholders included in our study to 11 stakeholders.
- ► Our study excluded divisions, faculties and chapters which exist under the umbrellas of the specialist medical colleges who were invited to participate; however, any impact on our results is likely to be minimal.
- ► This study reports findings from one country with a mixed public–private health system and a primarily fee-for-service reimbursement model and may therefore not be completely generalisable to other settings.

INTRODUCTION

Reimbursement is a component of every encounter between a medical practitioner and a patient. From their first day of internship, medical practitioners have simultaneous and inextricably linked clinical and administrative responsibilities which form the basis on which the licence to practice medicine exists. 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]

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 healthcare market. While 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, are not in a position to question the accuracy of procedural services performed on them while they were under general anaesthesia or unconscious in an intensive care unit, and will typically have no knowledge or understanding of ICD and billing codes which may operate in their jurisdictions. This places medical practitioners in a rare position of privilege when compared with other professionals and service providers with whom consumers may exercise more discernment and question anomalies on their bills. 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 itemise 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.

In 2014, measurable average losses caused by fraud and incorrect payments in the world's healthcare systems was estimated at 7% of total global health expenditure, or US$487 billion,[4] and the WHO has identified financial leakage as one of the 10 leading causes of healthcare system waste globally.[1] In Australia, some commentators have suggested that incorrect billing and fraud costs Australia's tax payer funded healthcare system (Medicare) 10%–15% of the scheme's total cost annually ($A2–3 billion).[5] 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 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]

Medical billing education has been recognised as an effective measure to improve compliance, reduce incorrect claiming and improve programme integrity of health systems,[8 9] with countries such as the Netherlands recently introducing a requirement that universities and medical specialist training colleges provide education to medical practitioners in relation to medical billing and the costs of providing care.[10] 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, postpayment audit activity, recovery action and punitive measures, which may include disqualification from funding schemes and custodial sentences for providers.[4 6 11–13]

In both the USA and Australia, evidence suggests that the medical profession itself takes a harsh view of colleagues who bill incorrectly.[8 14] One US study of 2300 paediatric graduates highlighted an 'acute and pervasive perception' that medical billing training was inadequate[15] and the medical student participants of another US 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%).[16] Australian medical practitioners have also been highly critical of colleagues who bill incorrectly,[14] and the Medical Board of Australia recognises the importance of medical billing compliance by requiring certain medical practitioners to sign a legally binding declaration confirming the practitioner has taught key aspects of the operation of Australia's Medicare system, including funding arrangements, to colleagues, it thus being a requirement that assumes prior learning of the Medicare system by medical practitioners.[17] However, in Australia we currently do not know how, when or where this learning occurs.

The US federal government has adopted a view that publications produced by Medicare Administrative Contractors, the Centres for Medicare and Medicaid Services and Explanation of Benefits Remittance Statements are adequate education for physicians.[18] However, a small body of international research on the topic (mostly undertaken in the USA) suggests medical billing literacy among physicians is low.[15 19] This may provide some explanation as to why the financial cost of healthcare system misuse continues to be a pressing challenge in many countries.[1 4]

US 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.[19] Australian literature reveals no formal medical billing curriculum and, with the exception of a relatively small, rudimentary and non-mandatory selection of brief online learning materials,[20] only one government approved certificate course regarding medical billing exists.[21] However, this course is not designed for medical practitioners, but for medical receptionists, who are not legally responsible for the bills they submit on behalf of medical practitioners.[22]

There is increasing pressure on medical practitioners in relation to billing compliance internationally.[1 4 10 11] 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 penalties.[7] There have been suggestions that 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

Table 1 Characteristics and details of providers of medical billing course (MBC) in Australia

Stakeholder description	Invited	Responded	Offer MBC (% of respondents)	Do not offer MBC
Undergraduate education (university medical schools)	18	17	1 (6)	16
Postgraduate general practitioner education (vocational education providers)	17	15	12 (80)	3
Postgraduate specialist education (specialist medical colleges)	16	14	2 (14)	12
Representative professional organisations (state and territory branches of the Australian Medical Association (AMA))	8	5	0 (0)	5
Medical defence organisations (also known as medical indemnity insurers)	4	4	2 (50)	2
Government agencies and departments (Australian Health Practitioner Regulation Agency, Professional Services Review Agency and Medicare)	3	2	0 (0)	2
Total	n=66	n=57 (86%)	n=17 (30%)	n=40 (70%)

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

METHODS

A national cross-sectional survey of all Australian organisational 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. A copy of the survey is included as an online supplementary file. 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.[i] The questions focused on course availability, as well as views on whether the topic should be taught and who should be responsible for delivery, the duration of courses offered, the qualifications of relevant teachers, whether courses were voluntary or mandatory, free or paid, and methods of assessment with regard to certification. Participants responded to a maximum of 15 questions with the final question being reserved for the government stakeholder group. This final question asked where medical practitioners who have been found to have breached Medicare's requirements are directed to learn how to bill correctly. The survey was designed as a telephone survey; however, the majority of stakeholders requested an emailed copy prior to agreeing to participate. 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 focused primarily on New Zealand. Descriptive statistics via frequency distributions were used to analyse the data.

Patient and public involvement

No patients or members of the public were involved in this study.

RESULTS

The response rate was 86% (n=57), with 32 respondents (who represented stakeholder organisations) choosing to complete the survey manually by mail and email, and 25 were completed by telephone. Characteristics of the stakeholders are presented in table 1, together with the details of providers of medical billing courses in Australia.

Medical billing course delivery and content

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),

[i]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 in 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 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 Current Procedural Terminology (CPT), Healthcare Common Procedure Coding System (HCPCS), Systematized Nomenclature of Medicine (SNOMED), Logical Observation Identifiers Names and Codes (LOINC) or any other codes, and operates under its own legislative framework, separate to that which regulates clinical coding using ICD 10th Revision, Australian Modification in Australia.

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 programme (76%, n=13). Most course providers reported a course duration of less than 2 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.

Two government agencies responded to question 15, which asked where medical practitioners who have been found to have breached Medicare's requirements are directed to learn how to bill correctly for their services. One stated that no direction is given to medical practitioners who have been found to have breached Medicare's requirements, and the other stated that medical practitioners who have been found to have breached Medicare's requirements would be referred to Medicare to further their learning in the area.

Perceptions on who should provide medical billing education

Table 3 shows stakeholder perceptions regarding medical billing courses. Eighty-nine per cent 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).

DISCUSSION

Our study identified broad agreement among 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 among the stakeholders on when this should occur.

Although most Australian medical education stakeholders in our study perceived the topic as important, most do not believe medical billing education falls within the scope of their own organisational responsibilities with respect to educating medical practitioners. All respondents suggested other parties should be responsible for delivering medical billing courses to medical practitioners. However, the stakeholder organisations who were nominated by other stakeholders as having responsibility for teaching medical billing to medical practitioners did not necessarily agree that this responsibility should fall with them. For example, the Australian Medical Association and the specialist colleges were among those most commonly selected to deliver courses, yet the nominated organisations themselves did not agree that this fell within their scope.

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] University stakeholders reported a general consensus that Medicare billing was of no immediate relevance to undergraduate students, citing crowded curriculums and the need to prioritise clinical content over content concerning reimbursement after graduates join the workforce. Some specific postgraduate specialist colleges stated that any Medicare billing education should occur informally on an ad hoc basis during internship whenever relevant learning opportunities arise. However, we found that some postgraduate specialist colleges describe 'questionable' medical billing as unethical behaviour in their professionalism training modules,[24] yet training provided to their members may not include specific content on how to bill correctly.

The lack of qualified educators in this area is also potentially problematic. Our survey reveals that where medical billing education does exist in Australia, it is provided largely by medical practitioners, rather than educators with qualifications or expertise in the administrative and legal aspects of Medicare. As such, our research suggests the training received by Australian medical practitioners regarding correct medical billing may be highly variable. One possible implication of this variability is that medical practitioners may be exposed to unnecessary risk of inadvertently falling into non-compliance with Medicare's requirements, for which possible sanctions can include criminal liability.[6] This is a finding that mirrors concerns raised in the USA, where research has shown that teaching around medical billing to medical practitioners is highly variable and dependent on the expertise, experience and the confidence of senior mentors, many of whom may themselves have had little training in the area.[19]

Our study reveals some initiatives by independent organisations to create their own learning modules on medical billing for medical practitioners in lieu of more formal education. However, significant gaps exist. For example, many vocational education providers

Table 2 Details of medical billing courses (MBCs) provided in Australia

MBC details	Who is MBC offered to?	When is MBC offered?	Mandatory or voluntary?	How many hours of duration?	How long has MBC been offered?	Qualifications of person delivering MBC	How is MBC examined?	Is MBC free or paid?
Undergraduate education (n=1) (university medical schools)	Medical students	In GP rotation (fourth year)	Mandatory	<4	5–10 years	MQ	Written examination, assignments/group projects	Free
Postgraduate general practitioner education (n=12) (vocational education providers)	GP registrars	(n=9) Component of induction and introduction programme (n=3) plus ongoing review during training	Mandatory	(n=7) <2 (n=3) 2–4 (n=1) >4 (n=1) varies	(n=8) 5–10 years (n=4) >10 years	(n=7) MQ (n=5) MQ plus education qualification	(n=10) Not examined (n=1) Informal quiz (n=1) Partially examined	Free
Postgraduate specialist education (n=2) (specialist medical colleges)	(n=1) Members of our organisation (n=1) Registrars	(n=1) annually in some states and biannually in others (n=1) at annual scientific congress	Voluntary	<2	(n=1) >10 years (n=1) <1 year	MQ	Not examined	(n=1) Pay (n=1) Free
Medical defence organisations (n=2) (also known as medical indemnity insurers)	Members of our organisation	(n=1) Articles in member publications (n=1) ad hoc	Voluntary	(n=1) Free reading (n=1) <2	(n=1) 5–10 years (n=1) <5 years	(n=1) Legal qualification (n=1) MQ	Not examined	Free
Total n=17	n=12 offered to GPs only	n=13 during orientation/induction	n=13 Mandatory	n=10 <2	n=10 5–10 years	(n=16) MQs	(n=14) Not examined	(n=16) Free

GP, general practitioner; MQ, medical qualification.

Table 3 Stakeholder perceptions on who should provide medical billing education*

Suggested providers of medical billing courses	Those not teaching medical billing (n=40) who felt it *should* be taught (n=29) suggested the following stakeholders should teach it	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	Total who responded (n=34)
Medicare	24	4	28
Australian Medical Association	6	1	7
Specialist colleges	5	1	6
Medical boards	4	0	4
Universities	3	0	3
Medical Defence Organisations	3	0	3
Vocational training providers	2	0	2
Private health funds	1	1	2
Total no of suggestions	48	7	55

*Thirty-four stakeholders who did not provide their own medical billing courses responded to this question. They comprise 29 positive responses to the question: "Do you think doctors should be taught medical billing?" and 5 negative responses who went on to suggest training providers. Many chose more than one stakeholder when responding.

described their medical billing courses as being practical 'on-the-job' training programmes delivered during placement in GP practices. Yet such programmes did not include specific curriculum content, learning outcomes or formal assessment of correct Medicare billing. The few courses which were offered by specialist medical colleges consisted of little more than voluntary attendance at a short presentation, and one stakeholder offered only optional reading of articles specific to Medicare billing. While these efforts are commendable, the average course length of less than 2 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. While 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 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]

Our analyses show most medical billing education initiatives tend to focus on general practice and educating GPs. Medical specialists—who represent both the majority of Australian registered medical practitioners[25] and account for the majority of total Medicare expenditure[26]—appear to receive almost no training in this area (with those few specialist organisations who do offer such content to their members offering it exclusively on a voluntary basis). This finding has particular significance given most specialists engage in hospital-based medical billing which, in Australia, has profound complexity.[22 27] It is also noteworthy that our research suggests medical practitioners who are found to have breached Medicare's requirements are given no guidance to help improve their medical billing compliance. One government stakeholder stated that offenders would be referred to Medicare to further their learning in this area, but it is not clear whether Medicare in fact offers remedial medical billing training. 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 (OOPs) 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.

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 14 28] While the defence of ignorance has been unsuccessful in preventing conviction both in Australia and the USA,[6 28] 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.

The majority of medical education stakeholders in our study expressed the view that Australia's national universal insurer—Medicare—had sole responsibility for

developing a standardised course and teaching correct medical billing to medical practitioners. Currently, this is neither supported by the relevant legislation nor the administrative structure of Medicare.[22 29] 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.[29] 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 limited jurisdiction over Australia's private health insurance schemes[30] where many of the most complex medical billing arrangements are found. These schemes incorporate the entire regulatory framework of the MBS,[31] affect approximately 45% of the Australian population[32] and represent the main form of medical billing for the majority of Australian medical specialists.[33]

Strengths and limitations

To our knowledge, this is the first study which has attempted to systematically map all medical billing education of Australian medical practitioners. However, there are some limitations that need to be considered when interpreting our study findings. Multiple data collection methods (telephone, mail and email) may have elicited some response bias among participants, though this is likely to be negligible given the exploratory and descriptive nature of this study. Also, since this study, cost-saving initiatives by the federal government in relation to the medical education of GPs has reduced the number of vocational education providers from the 17 stakeholders included in our study to 11 stakeholders. Further, our study excluded divisions, faculties and chapters which exist under the umbrellas of the specialist medical colleges who were invited to participate. However, any impact on our results is likely to be minimal due to the small numbers of medical practitioners involved and the focus of such divisions, faculties and chapters on clinical education, policy development and advocacy, rather than the administrative aspects of medical practice.

While this study focused on offerings by medical education stakeholders, further research is also required to explore whether medical practitioners are self-educating or sourcing non-traditional education on Medicare billing and compliance, thereby achieving the high expected levels of medical billing literacy expected of them.

This study reports findings from one country with a mixed public–private health system and a primarily fee-for-service reimbursement model and may therefore not be completely generalisable to other settings. Nevertheless, irrespective of whether healthcare systems are mature or emerging, challenges appear to exist at the interface of medical billing and payment system complexity, and medical practice across multiple health settings. Increasing private sector involvement in the 70-year-old, single public payer, capitation styled National Health Service of the UK has exposed compliance vulnerabilities,[4 34] and in a starkly different healthcare system with multiple, private payers, and a blend of capitation, fee-for-service and salary payment arrangements, the Netherlands has reported similar challenges.[10] Commentary on Indonesia's nascent universal healthcare system BPJS (Baden Penyelenggara Jaminan Sosial Kesehatan), which uses a mixed capitation and fee-for-service model has already described the challenges of medical practitioner compliance under the new scheme,[35] and some commentators have suggested that no healthcare system is exempt from billing errors and fraud.[4] As such, our results may offer insights for regulators, policy-makers and practitioners beyond the Australian setting.

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 and may not deliver the level of expected legal and administrative literacy required to effectively and competently use the national insurance scheme and ensure programme integrity. This is consistent with findings in the USA where it has been suggested that clinicians need to be properly prepared to practise medicine beyond clinical encounters to reduce the incidence of potentially serious administrative errors. In the absence of adequate medical billing and payment system education for medical practitioners, relevant courts in all countries must give due consideration to pleas of ignorance made by medical practitioners facing criminal charges related to incorrect medical billing, which may sometimes be legitimate. Rather than reliance on ad hoc training and education, development of a formal national medical billing curriculum for medical practitioners should be encouraged to improve billing compliance, expedite judicial processes, enhance programme integrity and reduce wasted resources in the health system. Further research is required to determine the most effective design and delivery of any such curriculum.

Contributors MF wrote the firstdraft of the paper in its entirety and has finalised all subsequent draftsincorporating the feedback and suggestions of the other

authors. In addition,she is responsible for the concept and design of the study, conducted allliterature searches and compiled the references, prepared the tables, wasinvolved in the data collection and analysed and interpreted the results. JW isthe principal supervisor for MF's doctorate. JW has made substantialcontributions to this paper at every stage, including having involvement in theproposed concept and design of the study, through to making substantialcontributions to the paper via review, critical analysis, feedback andre-drafting sections of the paper to refine important intellectual content. AGT-Bconducted the majority of the data collection and was also involved in dataanalysis and interpretation. She has made a substantial contribution to thecontent of the discussion section of the paper as a result of her closeassociation with the data. JA is the co-supervisor of MF's doctorate. He hasmade substantial contributions to later drafts of this paper via review andre-drafting of important intellectual content.

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Competing interests MF is the founder and CEO of a medical billing company, and the holder of a patent for a medical billing app. AGT-B received fees from MF for casual work as a research assistant during the data collection phase of this project.

Patient consent Not required.

Ethics approval The study was approved by the Human Research Ethics Committee of the University of Technology, Sydney (HREC 2014000060).

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement We do not see data sharing as relevant to this study; however, the deidentified results are available to researchers having an interest in this area. Please contact the corresponding author by email to make enquiries.

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