How changes to the Medicare Benefits Schedule could improve the practice of cardiology and save taxpayer money

"taxpayers could have saved $233.5 million and private health insurance companies $139.8 million in 2013–14"

Summary

- Rising health care costs above inflation are placing serious strains on the sustainability of the Australian Medicare system in its current structure.
- The Medicare Benefits Schedule (MBS), which lists rebates payable to patients for private medical services provided on a fee-for-service basis, is the cornerstone of the Australian health care system. Introduced in the 1980s, the MBS has changed little despite major advances in the evidence base for the practice of cardiology.
- We outline how we believe sensible changes to the MBS listings for four cardiac services — invasive coronary angiography, computed tomography coronary angiography, stress testing and percutaneous coronary intervention — would improve the clinical practice of cardiology and save substantial amounts of taxpayer money.

The Australian Medicare system is a government-funded fee-for-service system that is highly regarded by the general public. A major advantage of the system is that low-income non-insured patients have ready access to approved ambulatory medical services at little or no cost to them, with public inhospital care provided at no charge. However, a disadvantage is the potential for over servicing. This may occur when new technology or new knowledge lessens or eliminates the indications for a test, without such a development being reflected by a change in the criteria for the particular Medicare Benefits Schedule (MBS) item number. In these circumstances, a medical practitioner may disregard advances in the medical evidence base and continue to practice in the same way, particularly if it is financially advantageous to do so. The examples we discuss in this article reflect this phenomenon. Computed tomography coronary angiography (CTCA), a new, safer and much less expensive technology, should replace invasive coronary angiography (ICA) for the diagnosis of coronary artery disease (CAD), but based on Medicare item reports for 2010–2014,[1] this is happening only slowly. Measurement of the fractional flow reserve (FFR) clearly improves the practice of percutaneous coronary intervention (PCI) and saves both money and lives; however, the uptake in Australia has been slow.[1] A nuclear stress test has a high radiation burden and is 3.4 times more expensive than a stress echocardiogram,[2] yet under the current MBS system it can be ordered by any medical practitioner who may or may not be aware of the cost or the radiation risk.

Invasive coronary angiography

ICA is an expensive procedure ($5187–$6289 per procedure; Appendix 1), with substantial cost to the taxpayer (Box 1). It carries a small risk of serious complications and a radiation burden (5–7 mSv).[3] It is a guideline-recommended investigation for patients presenting with troponin-positive acute coronary syndrome.[4] In these circumstances, ICA and PCI, if necessary, should be performed by an interventional cardiologist at the same sitting.

ICA is also indicated in symptomatic patients with known stable CAD or with a high probability of CAD who have evidence of myocardial ischaemia of sufficient severity to justify revascularisation with PCI or coronary artery bypass grafting.[5] In these circumstances, initial ICA is often performed by a non-interventional cardiologist, and a second ICA and a PCI, if indicated, is then carried out by an interventional cardiologist. This practice is inefficient; the patient and the Medicare system will be billed for two ICAs and a PCI, whereas if the initial ICA had been performed by an interventional cardiologist, only one ICA (and one PCI) would have been charged. Further, in most cases, the decision of a non-interventional cardiologist to refer a patient for PCI after the baseline ICA will be made on visual (anatomical) assessment of the coronary lesion(s), whereas it should be guided by both anatomical and functional assessment.[6] The diagnostic accuracy of ICA based on diameter stenosis alone to predict functionally significant coronary artery stenosis (ie, lesions causing ischaemia) is poor.[7,8] In the FAME (Fractional flow reserve versus Angiography for Multivessel Evaluation) study, 35% and 80% of coronary lesions seen on ICA with diameter stenosis between 50%–70% and 70%–90%, respectively, were functionally significant by FFR measurement.[8] The implication of these findings is that if a patient with stable CAD undergoes ICA for the purpose of assessing suitability for revascularisation, the operator should be capable of performing FFR measurement. As FFR measurement involves instrumentation of the coronary artery with a pressure wire, interventional training is required for its safe performance. This lends further support that ICA is best performed by an interventional cardiologist.

ICA is no longer an appropriate test for the diagnosis of CAD, because it is associated with a low rate of obstructive CAD warranting intervention, even when preceded by an abnormal stress test result.[9] It accurately examines the lumen of the coronary artery but does not detect non-obstructive atherosclerotic lesions in the coronary wall that could be a nidus for future coronary events.[10] That is, a "normal" ICA finding does not always exclude coronary atherosclerosis.

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1 Cost to the taxpayer of unnecessary invasive coronary angiography (ICA), 2013–2014

	ICA to revascularisation ratio	No. of unnecessary cases	Cost per unnecessary case	Cost per year
Public inpatient	2.3 : 1	23 060	$5773	$133.13m
Private in public	2.7 : 1	2986	$4964	$14.82m
Private inpatient	3.1 : 1	38 259	$2199	$84.13m
Non-insured outpatient	2.4 : 1	1871	$759	$1.42m
Total cost				$233.5m

We suggest that the item numbers for ICA should only be payable if the procedure is performed by an accredited interventional cardiologist in a hospital with accredited PCI facilities.

In cardiology, there is already a precedent for a procedural item number to be available only to an accredited cardiologist. For example, the item number for extraction of a permanent pacemaker lead is only available to cardiologists accredited for that procedure on the advice of the Cardiac Society for Australia and New Zealand. To our knowledge, all public and private hospitals performing PCI have an accreditation process to allow cardiologists to carry out the procedure in their hospital. For new applications, accreditation approval in these hospitals requires evidence that the candidate has undergone specialised training in interventional cardiology and is regarded as competent by his or her supervisors. We suggest that all interventional cardiologists currently accredited to perform PCI be allowed to charge the item numbers for ICA, and that new applications for accreditation be vetted by the Cardiac Society for Australia and New Zealand.

Operator compliance with the indications for ICA could be monitored by examination of an individual cardiologist's Medicare statistics or, alternatively, by a national cardiac procedures registry. For example, if ICA was only being performed in the setting of troponin-positive acute coronary syndrome or for patients with known CAD and objective evidence of ischaemia not sufficiently controlled with medical therapy, one would expect most patients to require a revascularisation procedure such as PCI or coronary artery bypass grafting. On this basis, the ratio of ICA to revascularisation should be at least less than 2.0 : 1 and preferably in the order of 1.5 : 1. If an individual cardiologist's statistics fall well outside this range (eg, greater than 2 SDs from that of his or her peers), that cardiologist could be asked to justify the discrepancy.

Computed tomography coronary angiography

Compared with ICA, CTCA is a safer, less invasive and less expensive (the cost to the taxpayer is $622 per angiogram) outpatient investigation and carries a lower radiation burden. The costs of equipping and running a CTCA service in terms of equipment and personnel are far less than those for a cardiac catheterisation laboratory. In regional hospitals without cardiac catheterisation and PCI facilities, the presence and appropriate use of CTCA would allow many patients to be treated locally without the need for transfer to larger centres.

CTCA should be considered as a logical first-line investigation in patients with suspected CAD.[11-13] There are three possible outcomes to a CTCA investigation. First, the angiogram may show completely normal results. In such a patient, the likelihood of a coronary event occurring within the next 5 years is extremely low.[14,15] Second, the angiogram may show non-obstructive coronary atherosclerosis. In this instance, the patient's symptoms are unlikely to be caused by myocardial ischaemia. Nevertheless, such patients are at increased risk of future cardiovascular events and require lifestyle advice and possibly anti-atherosclerotic therapy.[14,16,17] Third, the angiogram may show obstructive intramural coronary atherosclerotic lesions (or non-evaluable segments as a result of heavy calcifications). Symptomatic patients with these lesions require lifelong anti-atherosclerotic therapy and may benefit from a stress test to determine the presence of ischaemia. CTCA alone is of little or no diagnostic value in patients with pre-existing CAD, because with current technology, routine CTCA is not capable of reliably detecting ischaemia.[18]

We suggest that the item number for CTCA be payable only if performed in patients without known CAD. For patients whose initial CTCA results are normal, a second CTCA investigation should only be rebatable if it is performed at least 5 years after the first. The imposition of these restrictions would undoubtedly reduce over servicing and help stem the dramatic rise in the use of CTCA.

Stress testing

Stress testing (electrocardiogram based, echocardiogram based or nuclear based) is the non-invasive test of choice for detection of myocardial ischaemia but is a less suitable test for the diagnosis of CAD.[19] A standard electrocardiogram stress test is less accurate than either a nuclear stress test or a stress echocardiogram to determine the site and extent of ischaemia. A stress echocardiogram and a nuclear stress test have similar sensitivity for detecting ischaemia but the former has a higher specificity.[20] Stress echocardiography is not associated with any radiation exposure but may be technically difficult in patients with unfavourable body habitus. On the other hand, a stress nuclear test is 3.4 times more expensive ($756 v $222) and carries an average radiation burden of 9–11 mSv.[3] For these reasons, we suggest that the item number for a nuclear stress test be payable only if ordered by a physician and only if a stress echocardiogram is considered unsuitable for technical reasons.

Percutaneous coronary intervention

ICA with a view to PCI at the culprit lesion, if technically suitable, is a guideline recommendation for patients with acute coronary syndrome.[4] In stable CAD, the benefit

from PCI with optimal medical therapy is less certain compared with medical therapy alone.[21] Furthermore, stenting of non-ischaemic coronary lesions leads to higher rates of mortality and myocardial infarction.[22] A coronary lesion can be assumed to be causing ischaemia only if there is > 90% stenosis in a major coronary artery or if it is a single lesion in a coronary vessel supplying an area of myocardium identified as ischaemic on stress testing. All other coronary lesions should not be stented in stable CAD unless the FFR is less than 0.8. Use of FFR in this manner has been shown to reduce stent insertions, improve outcomes and lower health costs.[23,24] According to Medicare item reports for 2013–2014,[1] only 16% of cases of PCI were associated with FFR. The implication of this finding is that, in Australia, many patients must be undergoing PCI procedures that are potentially detrimental to their health.

We suggest separate MBS item numbers for PCI for troponin-positive acute coronary syndrome and for PCI for stable CAD, thus allowing easier evaluation of the Medicare statistics of an individual practitioner. The item number for PCI for stable CAD should only be payable if one of three conditions is satisfied: (i) a stenosis > 90% in a coronary vessel > 2 mm in diameter; (ii) a single lesion in a vessel supplying an area of myocardium identified as ischaemic on stress testing; or (iii) a coronary lesion associated with an FFR less than 0.8.

Overall savings resulting from our proposed changes

The overall savings resulting from these changes are summarised in Box 2. Medicare statistics along with data from the Australian Commission on Safety and Quality in Health Care[25] were used to calculate the ratio of ICA to revascularisation and the cost to the taxpayer of unnecessary ICA (defined as in excess of a ratio of 1.5 : 1; Appendix 2). Applying this ratio to the four patient groups discussed, taxpayers could have saved $233.5 million and private health insurance companies $139.8 million in 2013–2014.

If our suggested changes to PCI were to occur, the annual savings to the Australian health budget would be in the order of $4 million.[24] Changes for CTCA would be cost neutral in the short term but would save costs in the long term (Appendix 2).

2 How much money could be saved?

Measure	Potential annual savings
Reducing invasive coronary angiography to revascularisation ratio to 1.5 : 1	$233.5m
Limitations to computed tomography coronary angiography	Cost neutral
Reducing nuclear stress tests	$30.1m
More use of fractional flow reserve	$4.0m
Total	$267.6m

3 How our proposed changes to the Medicare Benefits Schedule could improve cardiology practice

- More judicious use of invasive coronary angiography = less complications, less radiation exposure, less waste of catheter laboratory resources.
- More judicious use of computed tomography coronary angiography = earlier diagnosis of coronary artery disease, better prognostic assessment, lifestyle modifications and medical therapy where appropriate.
- More judicious use of nuclear stress test = less radiation burden.
- Greater use of fractional flow reserve-guided percutaneous coronary intervention = less inappropriate percutaneous coronary intervention and less myocardial infarction and death.

In 2013–2014, 77 564 nuclear stress tests were charged to Medicare (cost per test, $756). It is likely that at least 75% of these patients could have had a less expensive stress echocardiogram (cost per test, $222) as an alternative. Doing so would have saved over $30 million of the Medicare budget.

We believe that these relatively simple changes to the MBS would improve the practice of cardiology (Box 3) and result in substantial savings to the health budget (Box 2). Undoubtedly, some cardiologists will consider the suggested changes to be an unwelcome interference with their practice. The counter argument is that as funders of Medicare, the government has a right and a duty to spend public money prudently.

In 2013–2014, the ratio of ICA to revascularisation was substantially higher in the private compared with the public system (3.1 v 2.3; Appendix 2). The likely explanation relates to the effect of fee-for-service on the provision of ICA.

A potential disadvantage of performing PCI at the same sitting as the initial ICA is that the patient will be denied the opportunity for surgical consultation. However, in light of recent evidence indicating the clear superiority of coronary artery bypass grafting over PCI for patients with complex multivessel disease or with diabetes with multivessel disease,[26,27] we believe the need for multidisciplinary discussion to determine the best revascularisation option will be infrequent. We consider our recommended ratio of ICA to revascularisation of 1.5 : 1 or less to be sufficiently elastic to accommodate this possibility without compromising patient care.

In summary, we believe these relatively simple changes to the MBS would result in improved evidence-based cardiology practice and substantial savings to the health budget in an ever-increasingly constrained fiscal climate.

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