Australian Government
Department of Health and Ageing

Medical Services Advisory Committee

Public Summary Document

Application 1129 – Second-generation contrast agents for use in patients with suboptimal echocardiograms

Applicant: **Lantheus Medical Imaging Australia Pty Ltd**
Date of MSAC consideration: **29-30 March 2010**
27 July 2011 (revisit of economic analysis)

1. Purpose of application

The application was submitted on 28 April 2008 by Lantheus Medical Imaging Australia Pty Ltd.

Echocardiography, or cardiac ultrasound using second-generation contrast agents, is a non-invasive imaging procedure that provides information on the heart's morphology and function. The technique involves the use of an instrument called a transducer that transmits high-frequency sound waves towards the heart. The transducer picks up the echoes of the sound waves and transmits them as electrical impulses which are converted by the echocardiography machine into moving pictures of the heart. The picture is then displayed on a computer screen. No radiation is involved. The second-generation contrast agents consist of microbubbles of high-molecular weight gases (e.g. perfluorocarbons) with shells made of either albumin or phospholipids. These contrast agents are injected intravenously in a continuous or bolus dose during the procedure. They are used to enhance the image of the heart, which can be suboptimal in some patients, due to obesity, lung disease, previous heart surgery or increasing age.

This is a follow-up to the first MSAC assessment of second-generation contrast agents for any indication.

The medical conditions being addressed by the proposed intervention are:

- patients requiring assessment of ventricular function, ventricular morphology or intracardiac mass;
- patients being assessed for ischaemic heart disease using stress echocardiography; and
- patients requiring Doppler evaluation of the left side of the heart.

2. Background

In March 2010, MSAC considered the Assessment Report for second generation contrast agents for use in patients with suboptimal echocardiograms. Based on the evidence available, MSAC made the following recommendation:

> "On the strength of the evidence available evidence for safety, effectiveness and cost-effectiveness:
>
> - MSAC supports the public funding for the use of a second generation intravenous recirculating contrast agent in a patient undergoing a standard echocardiogram which is suboptimal because: two or more myocardial segments are poorly visualised or assessment of structure and function require higher image quality to improve left ventricular endocardial border delineation. (Indications 1 and 2)
> - MSAC does not support public funding for the use of second generation contrast agents for Doppler evaluation on the left heart. (Indication 3)

MSAC requested feedback from the Department after any implementation of this advice in order to verify the modelling assumptions used in this assessment."

The key modelling assumptions referred to in MSAC's recommendation involved the estimates of cost offsets in the cost-minimisation analyses of second-generation contrast agents. At the time of making its recommendation, MSAC considered there was considerable uncertainty around the estimates of cost offsets due to uncertainty around some assumptions made in conducting the cost-minimisation analyses. Cost-offsets were assumed to arise from the avoidance of downstream investigations that would otherwise be conducted. These assumptions were based upon a number of assumptions about the proportions of patients who would have downstream investigations in the absence of second-generation contrast agents (e.g. the proportion of patients who would undergo contrast echocardiography). MSAC therefore asked the Department to verify the assumptions applied in the cost analysis.

In response to MSAC's request, the Department conducted some analyses of MBS utilisation data and provided advice indicating that specific claimed cost offsets from avoiding these downstream investigations were likely to be considerably less in practice than had been assumed in the cost analyses.

The MSAC Secretariat commissioned a report to determine the cause of the discrepancy between conclusions in regard to whether contrast echocardiography was cost-saving overall compared with non-contrast echocardiography as projected by the Assessment Report and as re-estimated by the Department.

The key uncertainty that leads to the discrepancies between the estimates of cost offsets in the Assessment Report and the Department's advice is uncertainty around the proportion of patients for whom suboptimal images on echocardiogram result in utilisation of downstream investigations (specifically gated cardiac blood pool studies and myocardial perfusion studies). Importantly, the Department conducted some external validity checks of the assumptions made in the economic evaluation presented in the Assessment Report. These external validity checks indicated that at least one assumption (the proportion of patients with suboptimal echocardiograms who proceed to have gated cardiac blood pool studies conducted) in the economic evaluation presented in the Assessment Report was invalid. This is because the estimate of the number of gated cardiac blood pool studies averted should contrast echocardiography be made available, as presented to MSAC, exceeded the actual total number of gated cardiac blood pool studies performed for all indications.

3. Prerequisites to implementation of any funding advice

Second-generation contrast agents are required to be TGA approved.

4. Proposal for public funding

There are no restrictions to patients with specific clinical indications. The three indications assessed in the report (see Point 1) are the main clinical applications for this technology.

Second-generation contrast agents should not be administered to patients with known hypersensitivity to octafluoropropane (OFP) or in patients with known cardiac shunts.

Echocardiographs are primarily ordered by cardiologists or by referring general practitioners.

MSAC agreed with ESC that there was a lack of clear support for the ability of all providers to be able to perform a contrast echocardiograph.

5. Consumer Impact Statement

For a patient, a referral from a general practitioner to a specialist cardiac centre for testing for an underlying cardiac condition can be a stressful event. Ideally, a successful diagnosis simply confirms the absence of a cardiac condition. In such circumstances, the patient would prefer to hear this positive news as soon as possible. Alternatively, the more quickly a test can lead to a diagnosis, the sooner the patient can begin their treatment regime and achieve a positive health outcome.

Although there are some risks associated with the use of second-generation contrast agents, these are relatively minor and are likely to present within 30 minutes of contrast administration, while the patient is still in the diagnostic department. The most severe adverse event as a result of contrast is an allergic reaction, which occurs in approximately 1 in 10,000 patients. From a patient perspective, this procedure is more accurate and more acceptable.

6. Proposed intervention's place in clinical management

It is postulated that, where a second generation contrast echocardiogram is used, alternative procedures may be avoided. The Advisory Panel noted that the following alternative procedures are the most common in the Australian setting:

- assessment of ventricular function — gated heart pool scan
- assessment for ischaemic heart disease — nuclear myocardial perfusion scan
- assessment of ventricular morphology — MRI
- assessment of intracardiac mass — MRI
- assessment of cardiac haemodynamics via Doppler echocardiogram (which is a standard echocardiogram, usually transoesophageal, with an additional Doppler evaluation performed at the same time)

MSAC noted that the Evaluation Sub-committee (ESC) considered the MBS data subsequently provided by the Department challenged the primary cost offset claims with reference to two specific substitutions: perfusion study following suboptimal stress echocardiograph and gated cardiac blood pool study after suboptimal rest echocardiography. These were pivotal in the cost-minimisation analysis, but were not clearly identified in the clinical management algorithm presented in the original Assessment Report. MSAC also noted ESC's advice that the MBS data did not re-examine any other uncertainties about cost offsets from other possible substitutions relating to the original assessment.

7. Comparator to the proposed intervention

MSAC noted that two comparators for the three indications were chosen:

(i) Echocardiogram with contrast (decision to administer contrast made during the echo procedure) compared with echocardiography without contrast.

(ii) Echocardiography with contrast compared with alternative investigations, such as nuclear imaging (decision to give contrast made after echocardiography)

The MSAC-accepted comparators are available in hospital (public/private) or on the MBS, as follows:

(i) Gated heart pool scan (assumed to occur only after an indeterminate rest echocardiogram): MBS item available, performed in both inpatient and outpatient settings;

(ii) Nuclear myocardial perfusion scan (assumed to occur only after an indeterminate stress echocardiogram): MBS item available, performed in both inpatient and outpatient settings;

(iii) MRI: – no MBS item, performed in both inpatient and outpatient settings but more often in the inpatient setting;

(iv) Transoesophageal echocardiography: MBS item available, performed in both inpatient and outpatient settings.

The MBS item numbers for the MSAC-accepted comparators are as follows:

MBS Item Number	Descriptor	Fees and benefit
55113	M-MODE and 2 DIMENSIONAL REAL TIME ECHOCARDIOGRAPHIC EXAMINATION of the heart from at least 2 acoustic windows, with measurement of blood flow velocities across the cardiac valves using pulsed wave and continuous wave Doppler techniques, and real time colour flow mapping from at least 2 acoustic windows, with recordings on video tape or digital medium, not being a service associated with a service to which an item in Subgroups 1 (with the exception of item 55054) or 3, or another item in this Subgroup (with the exception of items 55118 and 55130), applies, for the investigation of symptoms or signs of cardiac failure, or suspected or known ventricular hypertrophy or dysfunction, or chest pain (R).	Fee: $230.65 Benefit: 75% = $173.00 85% = $196.10
55114	M-MODE and 2 DIMENSIONAL REAL TIME ECHOCARDIOGRAPHIC EXAMINATION of the heart from at least 2 acoustic windows, with measurement of blood flow velocities across the cardiac valves using pulsed wave and continuous wave Doppler techniques, and real time colour flow mapping from at least 2 acoustic windows, with recordings on video tape or digital medium, not being a service associated with a service to which an item in Subgroups 1 (with the exception of item 55054) or 3, or another item in this Subgroup (with the exception of items 55118 and 55130), applies, for the investigation of suspected or known acquired valvular, aortic, pericardial, thrombotic, or embolic disease, or heart tumour (R).	Fee: $230.65 Benefit: 75% = $173.00 85% = $196.10
55115	M-MODE and 2 DIMENSIONAL REAL TIME ECHOCARDIOGRAPHIC EXAMINATION of the heart from at least 2 acoustic windows, with measurement of blood flow velocities across the cardiac valves using pulsed wave and continuous wave Doppler techniques, and real time colour flow mapping from at least 2 acoustic windows, with recordings on video tape or digital medium, not being a service associated with a service to which an item in Subgroups 1 (with the exception of item 55054) or 3, or another item in this Subgroup (with the exception of items 55118 and 55130), applies, for the investigation of symptoms or signs of congenital heart disease (R).	Fee: $230.65 Benefit: 75% = $173.00 85% = $196.10
55116	EXERCISE STRESS ECHOCARDIOGRAPHY performed in conjunction with item 11712, with two-dimensional recordings before exercise (baseline) from at least three acoustic windows and matching recordings from the same windows at, or immediately after, peak exercise, not being a service associated with a service to which an item in Subgroups 1 (with the exception of item 55054) or 3, or another item in this Subgroup applies (with the exception of items 55118 and 55130). Recordings must be made on digital media with equipment permitting display of baseline and matching peak images on the same screen (R).	Fee: $261.65 Benefit: 75% = $196.25 85% = $222.45 *Plus cost of 11712* Fee: $140.50 Benefit: 75% = $103.05 85% = $116.75
55117	PHARMACOLOGICAL STRESS ECHOCARDIOGRAPHY performed in conjunction with item 11712, with two-dimensional recordings before drug infusion (baseline) from at least three acoustic windows and matching recordings from the same windows at least twice during drug infusion, including a recording at the peak drug dose not being a service associated with a service to which an item in Subgroups 1 (with the exception of item 55054) or 3, or another item in this Subgroup, applies (with the exception of items 55118 and 55130). Recordings must be made on digital media with equipment permitting display of baseline and matching peak images on the same screen (R)	Fee: $261.65 Benefit: 75% = $196.25 85% = $222.45 *Plus cost of 11712* Fee: $137.35 Benefit: 75% = $103.05 85% = $116.75

Twenty seven studies met the inclusion criteria for safety data. All studies identified were for contrast echocardiography compared with non-contrast echocardiography. The levels of studies were not identified in the Assessment Report.

The results show that echocardiography with contrast is not associated with severe adverse events.

MSAC in its original assessment noted that echocardiography appears safe based on the evidence available; it did not make a conclusion about the relative safety of clinical management with or without the intervention.

8. Comparative effectiveness

For the comparison of echocardiography with contrast against echocardiography without contrast:

- Thirteen studies met the inclusion criteria for effectiveness data for indication 1 (Patients requiring assessment of ventricular function, ventricular morphology or intracardiac mass). Most of these studies were level IV evidence, while one study was level III-1.
- Twelve studies met the inclusion criteria for effectiveness data for indication 2 (Patients undergoing stress echocardiography for the assessment of ischaemia). Most studies were prospective level III-2, while five studies were level IV studies.
- No studies met the inclusion criteria for effectiveness data for indication 3 (Patients undergoing rest echocardiography for Doppler evaluation of the left heart).
- For the comparison of echocardiography with contrast against alternative investigations:
    - No studies met the inclusion criteria for effectiveness data for indication 1 (Patients requiring assessment of ventricular function, ventricular morphology or intracardiac mass).
    - Two level III-2 studies met the inclusion criteria for effectiveness data for indication 2 (Patients undergoing stress echocardiography for the assessment of ischaemia).
    - No studies met the inclusion criteria for effectiveness data for indication 3 (Patients undergoing rest echocardiography for Doppler evaluation of the left heart).

The use of these contrast agents has been shown to increase the reproducibility of echocardiographic studies, improve endocardial border visualisation or delineation, and reduce the need for further more invasive diagnostic investigations, such as trans-oesophageal echocardiography or nuclear imaging. In addition, the use of these contrast agents may be particularly useful in patients who are critically ill and are receiving ventilatory care, in which standard echocardiographic imaging is often unyielding. Less than 1 per cent of contrast echocardiography studies are used primarily for Doppler evaluation and due to a lack of studies on this indication, it was not possible to evaluate the effectiveness of second-generation contrast agents in patients requiring Doppler evaluation of the left heart.

Low-level evidence suggests that contrast echocardiography changes clinical management. There are no data showing change in patient outcome.

9. Economic evaluation

Cost-minimisation analyses were presented in the initial report, and the follow-up report from the Department re-analysed the data in a series of cost-consequence analyses (as the use of second-generation contrast agents would no longer be cost-saving if the proposed new MBS item was listed).

The Department's re-analysis tested the clinical expert assumption in the initial report that, in the absence of second generation contrast agents, 15% of patients currently require further investigations (by perfusion study for suboptimal stress echocardiography, and by gated cardiac blood pool study for suboptimal rest echocardiography). As shown in the January 2011 report (especially the Diagnostic Services Branch Costings Comments dated 29 October 2010 in its Attachment 2), the Department's re-analysis of MBS data indicated that, on average over the five years to the end of June 2010, 2.2% of stress echocardiography was followed by a myocardial perfusion study, and 0.22% of rest echocardiography was followed by a gated cardiac blood pool study.

As detailed in the April 2011 report, the total incremental costs on a per patient basis, including MBS fees and co-payments, were estimated in the review as follows:

- <u>Original Assessment Report estimates based on expert opinion:</u>
    - Stress echocardiography (15% of all echocardiograms) = -$136.20 per patient *(net saving)*
    - Rest echocardiography (85% of all echocardiograms) = -$54.68 per patient *(net saving)*

- Adjusted for MBS data (still assuming a 50% reduction following addition of contrast):
  - Stress echocardiography = -$1.24 per patient *(net saving)*
  - Rest echocardiography = $20.16 per patient *(net cost)*
- Sensitivity analysis assuming 75% of echocardiograms result in contrast echocardiography:
  - Stress echocardiography = $86.57 per patient *(net cost)*
  - Rest echocardiography = $105.24 per patient *(net cost)*
- Sensitivity analysis assuming 10% of contrast echocardiograms require return visit:
  - Stress echocardiography = $3.89 per patient *(net cost)*
  - Rest echocardiography = $24.84 per patient *(net cost)*

The applicant proposed that the fee for contrast echocardiography should be equivalent to the cost of the echocardiograph, plus the cost of the contrast agent. Alternately, it proposed that a modifying item, as per Item 63491, Subgroup 22 for Magnetic Resonance Imaging, be included within the Schedule with the fee set at the cost of contrast. One vial of DEFINITY, the proposed contrast medium, is required for testing, with the proposed price per vial $90.00.

In the assessment report, 15 per cent was added to the MBS fee for rest and stress echocardiography and their respective co-payments. The average co-payment for the financial year 2008-09 was then added to this.

10. Financial/budgetary impacts

The likely volume of use of the proposed intervention per year is as follows:

- Contrast echocardiography used in 15% of stress and rest echocardiographies: 116,058
- Contrast echocardiography used in 75% of stress and rest echocardiographies: 580,290

No safety net impacts were identified.

11. MSAC's key issues

In reviewing its previous advice (March 2010), MSAC confirmed its prior assessment that there was strong evidence to suggest that the use of second generation (intravenous recirculating) contrast agents with echocardiograms is safe, despite a small risk of anaphylaxis. If the use of contrast with echocardiograms prevents the need for further investigations that expose the patient to radiation, the use of contrast is comparatively safer.

MSAC confirmed its 2010 assessment that the strength of the evidence for the clinical effectiveness of second generation contrast agents was satisfactory for Indication 1 (assessment of ventricular function, ventricular morphology and intra-cardiac masses using rest echocardiography) and Indication 2 (assessment of risk for ischaemic heart disease using stress echocardiography), but that there was no evidence to support Indication 3 (Doppler evaluation of the left heart).

In 2010, MSAC concluded that the use of contrast with echocardiograms produces a considerably clearer image than suboptimal echocardiograms without contrast when assessing ventricular function, ventricular morphology and intracardiac masses. It is also effective for assessing ischaemia in conjunction with stress echocardiography. However, there were no studies identified that evaluated its effectiveness for use with Doppler evaluation of the left heart. A non-contrast echocardiogram should produce an adequate image in the majority of cases, so contrast should only be used if a non-contrast echocardiogram produces a suboptimal image – in approximately 12-15% of cases due to obesity, lung disease, previous heart surgery or advanced age.

MSAC also noted its previous conclusion that the impact of suboptimal imaging could include incorrect diagnosis or additional flow-on investigations such as nuclear imaging. Therefore, MSAC noted the claims that optimisation of echocardiography may potentially deliver additional health benefits to patients.

MSAC's previous advice had found it likely that contrast echocardiograms would obviate the need for more expensive downstream investigations, such as nuclear medicine imaging, resulting in cost offsets, but that there was uncertainty as to what proportion of suboptimal echocardiograms would have further investigations. MSAC also found the net cost saving result was most sensitive to the likelihood of a patient with a suboptimal image receiving a further diagnostic investigation.

MSAC's original conclusion was that as long as the proportion of patients who would avert downstream investigations exceeds five per cent, the use of contrast is cost saving overall. This conclusion was based on published studies evaluating the changes in downstream investigations and management with access to contrast echocardiograms and expert opinion in the original Assessment Report that, in the absence of availability of second-generation contrast agents for contrast echocardiography, 15% of patients having rest echocardiography performed subsequently would also have gated cardiac blood pool studies and that 15% of patients having stress echocardiography performed subsequently would also have myocardial perfusion studies performed.

In the context of the 2011 review of the assumptions in the original review in light of the availability of additional Australian utilisation data derived from Medicare claims, MSAC is now of the view that the estimated rates of downstream reductions in diagnostic investigations by clinical experts on the Advisory Panel may have reflected a teaching hospital environment rather than community cardiology.

MSAC accepted ESC's advice that, in light of the supplementary Medicare data, using second generation contrast agents in echocardiography is unlikely to avoid sufficient downstream investigations to achieve net cost saving overall, even when the image generated is optimal, which would mean that use of these agents would tend to increase overall costs, not reduce them.

MSAC also noted advice from ESC that examination of MBS data suggests that the proportions in downstream investigations in actual clinical practice are currently 0.22% for gated blood pool studies after rest echocardiography and 2.2% for myocardial perfusion studies after stress echocardiography, so the previous assumption of 15% in each case was not supported by Medicare data. More profoundly, the number of gated blood pool scans that was estimated to be avoided following public funding of second-generation contrast agents was in fact greater than the number actually recorded as having occurred without them, casting doubt on the reliability of this particular aspect of the estimates of cost offsets based on expert opinion from the Advisory Panel.

MSAC noted the updated review of the total incremental costs on a per patient basis, including MBS fees and co-payments, as follows:

- Original Assessment Report estimates based on expert opinion:
    - Stress echocardiography (15% of all echocardiograms) = -$136.20 per patient *(net saving)*
    - Rest echocardiography (85% of all echocardiograms) = -$54.68 per patient *(net saving)*
- Adjusted for MBS data (still assuming a 50% reduction following addition of contrast):
    - Stress echocardiography = -$1.24 per patient *(net saving)*
    - Rest echocardiography = $20.16 per patient *(net cost)*
- Sensitivity analysis assuming 75% of echocardiograms result in contrast echocardiography:
    - Stress echocardiography = $86.57 per patient *(net cost)*
    - Rest echocardiography = $105.24 per patient *(net cost)*
- Sensitivity analysis assuming 10% of contrast echocardiograms require return visit:
    - Stress echocardiography = $3.89 per patient *(net cost)*
    - Rest echocardiography = $24.84 per patient *(net cost)*

MSAC accepted ESC advice that the re-analyses that have been conducted are valid and that no other new uncertainties had been identified. MSAC considered and rejected the possibility of these re-analyses being invalidated by other investigations being used instead and not being captured by the analysis of Medicare data, such as cardiac MRI, cardiac CT or transoesophageal echocardiography following a sub-optimal rest echocardiogram or coronary artery CT or cardiac catheterisation following a sub-optimal stress echocardiogram. Whilst it was likely that other investigations were being conducted downstream, MSAC concluded that it was unlikely that this would offset the additional costs of contrast echocardiograms.

The consequence is that MSAC's previous conclusion that the use of second-generation contrast agents is cost saving overall is no longer supported for Indication 1 in the context of rest echocardiography, as it is now clear that listing will incur substantial costs, and there will only be borderline savings for Indication 2 in the context of stress echocardiography, with MSAC not confident that any savings will be realised, including with reference to the sensitivity analyses.

In regards to the second sensitivity analysis, MSAC noted updated advice that most providers would seek to administer the contrast at the same appointment, but that it was possible that the patient would be brought back on another day. This would be either for logistical reasons (eg. contrast not available or patient's appointment was last one scheduled for that day) or because the original centre/operator lacked the expertise to administer contrast or interpret the images. MSAC accepted the estimate in the updated advice that no more than 10% would require a second visit.

MSAC also agreed with ESC advice that, if all myocardial perfusion studies currently performed in patients having stress echocardiograms are avoided (conducted in 2.2% of patients having stress echocardiography), there may be borderline annual savings overall of approximately $150,000. The savings generated in this setting may occur because the costs of myocardial perfusion studies are high compared with the costs of gated cardiac blood pool studies. However, MSAC was not confident that even these small savings would be realised.

MSAC also noted that the potential for leakage from non-contrast to contrast in all echocardiography rather than just sub-optimal echocardiography was more likely in the stress echocardiogram setting, but that the insertion of an IV cannula and extra time required would serve as a disincentive against the use of these agents for stress echocardiography.

MSAC agreed with the new estimates in the overall context of the economic analysis and its uncertainties, which means that MSAC no longer supported its initial advice, given that its rationale was based on a cost-minimisation analysis which is no longer valid. MSAC did not consider that any further re-analysis of the original assessment was warranted as it was unlikely to be able to quantify any incremental health outcome benefits from the use of second-generation contrast agents.

12. Other significant factors

Without the originally estimated extent of downstream cost-offsets (based on expert advice), the net economic impact of listing becomes unfavourable, even with the possibility of modest net savings from reduction in perfusion studies ($150,000 per year). As the estimates of costs supporting the initial decision are now superseded by better evidence of downstream utilisation in the Australian setting, MSAC no longer supports the original application for public funding via the MBS.

MSAC also agreed that there is likely to be an underestimation of increased costs, as many patients would have this procedure done as a second attendance and possibly by a different practitioner, but noted that the Department could ensure that any potential MBS listing would be restricted so that a patient could not claim both an echocardiogram without contrast and an echocardiogram with contrast within a specified period. MSAC therefore suggested that the applicant could reconsider the proposed indications and provide a new application proposing a cost effectiveness argument (and/or a more convincing cost saving argument) for the use of the more expensive procedure in smaller subgroups of patients with particularly high clinical need. Possible examples include

ventilated patients in ICU to assess left ventricular function or to exclude the diagnosis of left ventricular clot in the post-infarct setting.

MSAC also suggested that development of a clinical guideline from an appropriate Australian and/or New Zealand professional body such as the Cardiac Society of Australia and New Zealand (CSANZ) would be useful to guide clinical practitioners.

13. Summary of consideration and rationale for MSAC's advice

At the time of making its recommendation to the Minister following consideration at its 48th meeting (March 2010), MSAC considered there was considerable uncertainty around the estimates of cost offsets due to uncertainty around some assumptions made in conducting the cost-analysis (e.g. proportion of patients who would undergo contrast echocardiography; the degree to which downstream investigations would be averted) and requested feedback from the Department after any implementation of this advice in order to verify the modelling assumptions used in this assessment. The Minister noted MSAC advice and agreed that the MSAC Public Summary Document and the Assessment report be made public. In response to the Minister's direction the Department conducted costing analyses using MBS utilisation data.

The Department conducted some external validity checks of the assumptions made in the economic evaluation presented in the Assessment Report. The external validity checks indicated that at least one assumption (the proportion of patients with suboptimal echocardiograms who proceed to have gated cardiac blood pool studies conducted) in the economic evaluation presented in the Assessment Report was invalid. The estimate of gated cardiac blood pool studies averted should contrast echocardiography be made available would exceed the actual total number of gated cardiac blood pool studies currently performed for all indications.

The MSAC Secretariat commissioned a report from Deakin University on the review of discrepancies between the costing and modelling relied upon by MSAC in its contracted Assessment Report and that subsequently undertaken by the Department following the MSAC advice to support public funding.

MSAC subsequently re-considered its previous advice in light of the additional information supplied and agreed that, due to the lower than previously anticipated averted subsequent investigations following suboptimal contrast echocardiograms, the revised economic analyses indicate that, when compared to echocardiography without contrast, rest echocardiography with contrast is no longer cost saving overall for the assessment of ventricular function, ventricular morphology and intracardiac masses following a sub-optimal study without contrast, and stress echocardiography with contrast is only marginally cost saving overall for the assessment of ischaemia following a sub-optimal study without contrast. Given other uncertainties, such as the additional costs of a second appointment to administer the contrast in up to 10% of cases, even the net cost saving conclusion in the context of stress echocardiography was uncertain.

MSAC also noted that the data to support an improvement in the effectiveness of overall clinical management of eligible patients in the Australian context were not established in a way that MSAC would require for an intervention that is not cost saving overall.

Therefore, MSAC withdrew its previous support for public funding for Indications 1 and 2 (assessment of ventricular function, ventricular morphology and intra-cardiac masses; and assessment of risk for ischaemic heart disease using stress echo). MSAC's previous finding to not support public funding for Indication 3 (Doppler evaluation of the left heart), on the basis there was no evidence to demonstrate the diagnostic effectiveness of this service, remained unchanged.

14. MSAC's advice to the Minister

On the strength of the available evidence for safety, effectiveness and cost-effectiveness, MSAC does not support public funding for the use of a second generation intravenous recirculating contrast agent in a patient undergoing a standard echocardiogram or stress echocardiogram which is suboptimal to assess ventricular function, ventricular morphology and intra-cardiac masses (Indication 1) and assess risk for ischaemic heart disease using stress echo (Indication 2), or for Doppler evaluation of the left heart (Indication 3).

MSAC also suggested that development of a clinical guideline from an appropriate Australian and/or New Zealand professional body such as the Cardiac Society of Australia and New Zealand (CSANZ) would be useful to guide clinical practitioners. For example, it may be sensible to identify smaller subgroups of patients with particularly high clinical need, such as ventilated patients in ICU to assess left ventricular function or to exclude the diagnosis of left ventricular clot in the post-infarct setting. MSAC also noted that new data would be needed to support any claim for an improvement in the effectiveness of overall clinical management of eligible patients in the Australian context given the conclusion that the intervention is not cost saving overall.

15. Context for decision

This advice was made under the MSAC Terms of Reference.

MSAC is to:

- Advise the Minister for Health and Ageing on medical services that involve new or emerging technologies and procedures and, where relevant, amendment to existing MBS items, in relation to:
  - the strength of evidence in relation to the comparative safety, effectiveness, cost-effectiveness and total cost of the medical service;
  - whether public funding should be supported for the medical service and, if so, the circumstances under which public funding should be supported;
  - the proposed Medicare Benefits Schedule (MBS) item descriptor and fee for the service where funding through the MBS is supported;
  - the circumstances, where there is uncertainty in relation to the clinical or cost-effectiveness of a service, under which interim public funding of a service should be supported for a specified period, during which defined data collections under agreed clinical protocols would be collected to inform a re-assessment of the service by MSAC at the conclusion of that period;
  - other matters related to the public funding of health services referred by the Minister.
- Advise the Australian Health Ministers' Advisory Council (AHMAC) on health technology assessments referred under AHMAC arrangements.

MSAC may also establish sub-committees to assist MSAC to effectively undertake its role. MSAC may delegate some of its functions to its Executive sub-committee.

16. Linkages to other documents

MSAC's processes are detailed on the MSAC Website at: www.msac.gov.au.

The MSAC Assessment Report is available at
http://www.msac.gov.au/internet/msac/publishing.nsf/Content/app1129-1