Appendix C: Technical note

Abbreviations	
ABS	Australian Bureau of Statistics
ART	Assisted reproductive technology
CHERE	Centre for Health Economics Research and Evaluation
CPI	Consumer Price Index
CT	Computed tomography
EMSN	Extended Medicare Safety Net
FTB(A)	Family Tax Benefit Part A
IVF	In vitro fertilisation
MBS	Medicare Benefits Schedule
MRI	Magnetic resonance imaging
OOP	Out of pocket
SEIFA	Socioeconomic Index for Areas (see below for more details)
UTS	University of Technology, Sydney
ART cycle type	
ART episode	The occurrence of Planning and Management (Item 13209) and where at least one ART related item was claimed within a 30 day period.
Artificial insemination cycle	Based on the Department's recommendation: this cycle consists of Planning and Management (Item 13209), Ovulation monitoring services (Item 13203) and Preparation of semen (Item 13221). A person using ART services with Item 13203 within an ART episode is assumed to have an artificial insemination cycle. Item 13203 is unique to this cycle in the sense that it is not typically used in other types of ART cycles.
Implantation of frozen embryo cycle (Frozen/donated embryo cycle)	Based on the Department's recommendation: this cycle consists of Planning and Management (Item 13209) and Preparation of frozen embryos (Item 13218). A person using ART services with Item 13218 within an ART episode is assumed to have an artificial insemination cycle. Item 13218 is unique to this cycle in the sense that it is not typically used in other types of ART cycles.
Non-stimulated cycle	Based on the Department's recommendation: this cycle consists of Planning and Management (Item 13209), ART treatment cycle (Item 13206), Oocyte retrieval (Item 13212), Preparation of semen (Item 13221) and Transfer of embryos (Item 13215). A person using ART services with Item 13206 within an ART episode is assumed to have a non-stimulated cycle. Item 13206 is unique to this cycle in the sense that it is not typically used in other types of ART cycles.
Stimulated A cycle	Based on the Department's recommendation, this cycle consists of Planning and Management (Item 13209), ART superovulated treatment cycle (Item 13200 or 13201), Oocyte retrieval (Item 13212), Preparation of semen (Item 13221) and Transfer of embryos (Item 13215). A person using ART services with Items 13200 or 13201 within an ART episode is assumed to have a stimulated A cycle. These items are unique to this cycle, in the sense that they are not typically used in other types of ART cycles.
Stimulated B cycle	Based on the Department's recommendation, this cycle consists of Planning and Management (Item 13209), Oocyte retrieval (Item 13212), Preparation of semen (Item 13221) and Transfer of embryos (Item 13215) and Intracytoplasmic sperm injection (Item 13251). ART superovulated treatment cycle (Item 13200 or 13201) may also be present. A person using ART services with Item 13251 within an ART episode is assumed to have a stimulated B cycle. This item is unique to this cycle, in the sense that they are not typically used in other types of ART cycles.

Data analysis	
Autoregressive moving average time-series regression	The regression model for each outcome included the value of the outcome for the previous time period (or lag) as a predictor to adjust for any existing time trend in the data that was unrelated to the EMSN policy changes. The model also included the residuals from the regression lagged by 12 time periods to adjust for the annual seasonality observed in the data. The effect of the EMSN over time and the introduction of the EMSN cap could then be estimated independent of any underlying trends or seasonality.
Cumulative density	See Ordered Statistics. All ordered observations are assigned to equal probability, 1/N, where N is the total number of observations. The cumulative density is the sum of these probabilities up to a particular value of the variable of interest, according to which we sorted the observations. In other words, it sums the probability of observations with lower values of the sorting variable. For example, the variable of interest may be Fees. The cumulative density for Fee $A is the sum of probabilities of observations with Fees lower than $A. Similarly we can find the Fee level associated with a cumulative density of B (e.g. 0.25 or 25 per cent), which corresponds to the P25 level of Fee.
Fee cut-offs	The *k*th percentile fee below which *k* per cent of observations have fees less than that amount. In the review, *k* can be 10, 25, 50, 75 and 90. See P10, P25, P50, P75 and P90 (see percentiles).
Patient sample	In Sections 5.4 and 5.5, some of the analysis is based on a sample of de-identified patients selected from the Medicare Australia claims data. Patients were selected on the basis of making claims for specific items in either June or October in each year examined. In the case of ART, patients were selected if they used at least one other ART item in the 30 days following the use of an ART planning and management Item (see ART cycle type for more details). In the case of obstetrics, patients were selected if they claimed a private confinement item (see pregnancy episode below for details) which occurred in June or October. Obstetric patients who had used ART services were dropped from the sample.
Seasonally-smoothed series	Adjustment was made to the original time series to remove recurring patterns every season (quarter). The adjusted (seasonally-smoothed) series therefore reflects the general trend over time. This was constructed by applying the one-sided Moving Average of order 4 smoother, which replaces the original series with the averages of the last four quarters values. Specifically, let y(t) be the original series value at quarter t. The seasonally-smoothed series for this period is given by: y*(t) = 0.25 y(t-1) + 0.25 y(t-2) + 0.25 y(t-3) + 0.25 y(t-4). Due to the use of past values, the seasonally-smoothed series for the first four time periods are not computed. For instance, for quarterly data that begin in 2000, the first seasonally-smoothed series will be for the first quarter of 2001.
Time series	Data that are ordered by time of observation.
Graph explanations	
Box and whisker plot	A type of graph that provides information about P25, P50, P75 and extreme values. Differences between the P25 and P75 (sometimes called the interquartile range) values are depicted by the width of the box. The P50 is indicated by a horizontal line inside the box. The whisker indicates observations with values that are 1.5 times the interquartile range below the P25 and above the P75. Observations with values smaller or greater than the span of the whiskers are considered as extreme values and indicated by a plot of individual data points.
Cumulative density plot	See Cumulative density. The cumulative density plot relates the cumulative density (vertical (y) axis) and the values of the sorting variable (horizontal (x) axis). A point on the plot (x, y) indicates the sample proportion (y) with lower values of the sorting variables than A (x). Observations with identical sorting

	values (tie) are assigned the same cumulative density so that they appear as a horizontal line in the plot. The cumulative density for the next value will account for this, as indicated by a jump in cumulative density.
Modified box and whisker plot	See Box and whisker plot. The whiskers are specified to reflect P10 and P90. Extreme values are not plotted, but the horizontal axis covers all possible values. The estimate for the average value is also plotted.
Medicare related terms	
EMSN cap	For capped MBS items, there is a maximum limit on the amount of EMSN benefit to which a patient is entitled. If 80 per cent of the OOP cost is less than the cap, then the patient receives the full EMSN benefit. Otherwise the patient receives an EMSN benefit equal to the cap. At the time of writing (May 2011) there are 81 capped items (out of around 5700 MBS items). Under legislative arrangements, any new caps need to be approved by each House of the Parliament before they can have legal effect.
EMSN threshold	Before a family or single qualify for the EMSN, they must incur a certain amount in out of hospital OOP costs relating to Medicare services. The amount they have to reach is called the EMSN threshold. There are two thresholds; lower and general. Commonwealth concession cardholders and/or recipients of FTB(A) are eligible for the lower threshold. All other Medicare eligible families and singles are eligible for the general threshold. Thresholds are adjusted by the CPI each year and were increased in 2005 following a policy change. See Table 2.1 for the EMSN threshold amounts in each year.
Item	Corresponds to a Medicare Benefit Schedule item.
MBS fee	Government determined fee for each item listed in the Medicare Benefits Schedule.
Medicare benefit	Is the amount of benefit that is claimed by patients. It is comprised of the Medicare rebate as well as benefits paid under the original Medicare Safety Net and the Extended Medicare Safety Net.
Medicare rebate	The basic entitlement for a patient making a claim for an MBS item. Usually, the Medicare rebate is equal to 85 per cent of the MBS fee if the service was provided out of hospital. Since 2005, the Medicare rebate for all primary care items (non-referred) has been equal to 100 per cent of the MBS fee. There is also a maximum limit on the size of the gap between 85 per cent and 100 per cent. For the purpose of this review, the Medicare rebate also includes any money paid by the government through the original Medicare Safety Net.
Original Medicare Safety Net	In place since the inception of Medicare, once patients reach a specified threshold, Medicare benefits increase to 100 per cent of the MBS fee. The original Medicare Safety Net operates concurrently with the EMSN.
Percentiles	
Ordered statistics	These are obtained by sorting observations according to a variable of interest, such as fees and out of pocket costs, from an observation with the lowest value to an observation with the highest value.
P10	See Ordered statistics. P10 is the 10th percentile value at which 10 per cent of observations are below this amount and 90 per cent of observations are above this amount.
P25	See Ordered statistics. P25 is the 25th percentile value at which 25 per cent of observations are below this amount and 75 per cent of observations are above this amount.
P50	See Ordered statistics. P50 is the 50th percentile value or median or mid-point. 50 per cent of observations are below this amount and 50 per cent of observations are above this amount.
P75	See Ordered statistics. P75 is the 75th percentile value at which 75 per cent of

	observations are below this amount and 25 per cent of observations are above this amount.
P90	See Ordered statistics. P90 is the 90th percentile value at which 90 per cent of observations are below this amount and 10 per cent of observations are above this amount.
Pregnancy episode of care	
Data definition of pregnancy episode	The patient sample was selected on the basis of the following MBS item claims: management of vaginal delivery (item 16515), management of labour that results in a transfer to another medical practitioner for delivery (item 16518), management of labour and delivery by any means, including Caesarean section (item 16519), Caesarean section where the patient is transferred by another medical practitioner (item 16520) and management of labour and delivery with complication(s) (item 16522). Antenatal care is defined as use of obstetric services within 10 months (300 days) prior to birth. The following MBS items were used to define antenatal care: 23, 36, 104 and 105, (when provided by an obstetrician), 16400-16514, 55700, 55703-55729.
Complex pregnancy	A person using obstetric services who ever had complications during birth. Complications are identified by Item 16522 (and management of labour and delivery with complication(s)). If the person has multiple births during the entire study period, she will be classified as a complex type, even if she has no complication in her other pregnancy episode(s).
Normal pregnancy	A person using obstetric services who never had complications during birth. See Complex pregnancy.
Regional type	
Remoteness group	Based on the Australian Bureau of Statistics' classification of remoteness. There are five types of regions: major cities, inner regional, outer regional, remote and very remote. The Department of Health and Ageing uses claims data to assign a patient's postcode to one of these regions.
Inner regional	See Remoteness group.
Major cities	See Remoteness group.
Outer regional	See Remoteness group.
Remote	See Remoteness group.
Very remote	See Remoteness group.
Socioeconomic status	
SEIFA	Based on the Australian Bureau of Statistics' SEIFA score of advantage and disadvantage. It measures the relative socio-economic status of geographic areas using information such as income and education from the Census. Areas are then sorted according to their scores and categorised into groups. The Department has used 5 groups: Q1 to Q5. We called them socioeconomic quintiles. The Department of Health and Ageing uses Medicare claims data to assign a patient's postcode to one of the five SEIFA quintiles.
Q1	See SEIFA. Q1 is the least socioeconomically advantaged group. Areas that are assigned with Q1 have SEIFA scores that are among the 20 per cent lowest scores (first quintile).
Q2	See SEIFA. Areas that are assigned with Q2 have SEIFA scores that are between the 20 per cent and 40 per cent lowest scores (second quintile).
Q3	See SEIFA. Areas that are assigned with Q3 have SEIFA scores that are between the 40 per cent and 60 per cent lowest scores (third quintile).
Q4	See SEIFA. Areas that are assigned with Q4 have SEIFA scores that are between the 20 per cent and 40 per cent highest scores (fourth quintile).
Q5	See SEIFA. Q5 is the most socioeconomically advantaged group. Areas that are assigned with Q5 have scores that are among the 20 per cent highest scores (fifth quintile).