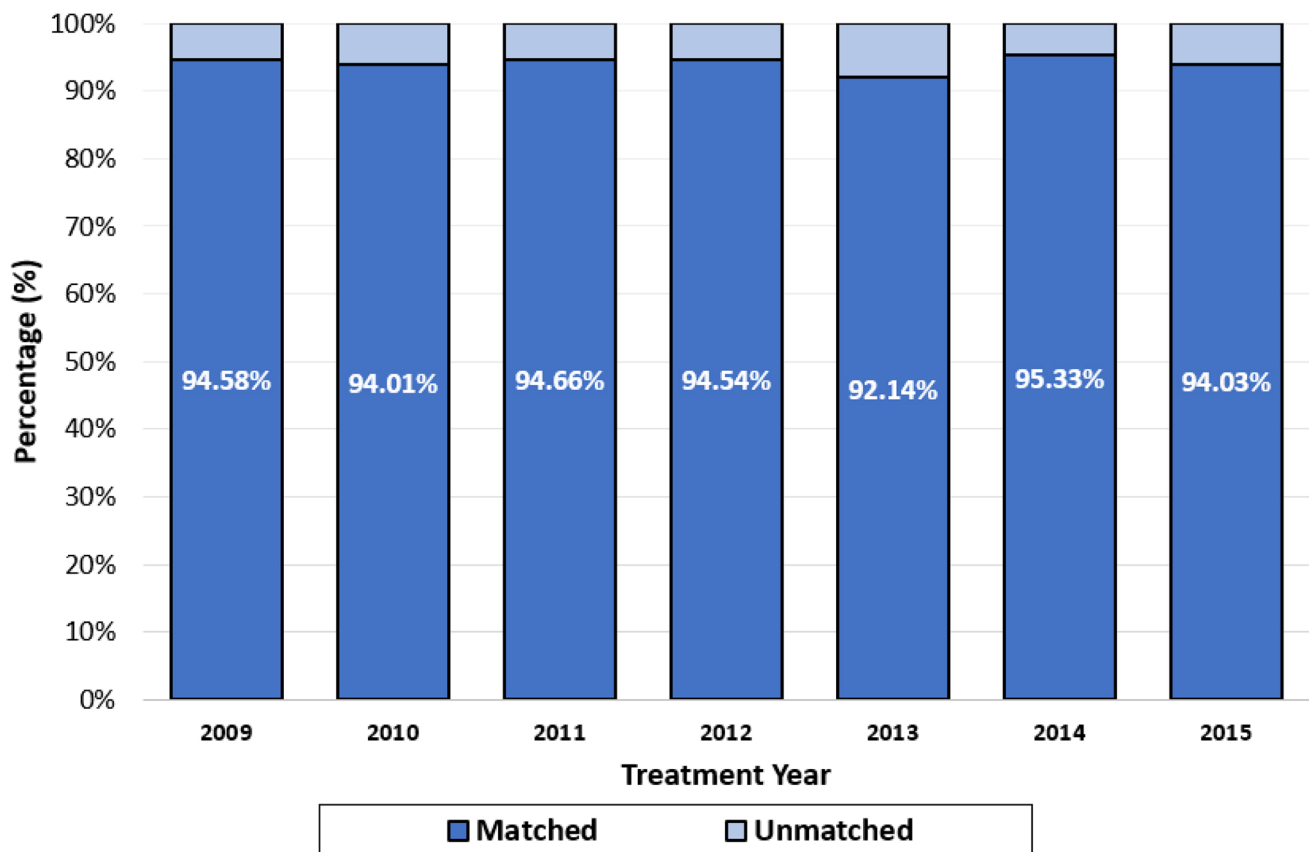


Supplementary Appendix

Figure S1: Overall concordance rate¹ between ANZARD and New South Wales (NSW) and Australian Capital Territory (ACT) perinatal data collection data for the final linked data of the the medically assisted reproduction (MAR) data linkage for New South Wales (NSW) residents², by treatment year, 2009–2015³



ANZARD = Australia and New Zealand Assisted Reproduction Database

¹The data concordance rate was calculated as a total number of births in agreement between ANZARD and PDC data divided by a total number of ANZARD treatment records from NSW residents with an ANZARD birth recorded or without an ANZARD birth recorded due to loss of follow-up.

²This agreement analysis is only conducted for births resulting from ART treatment by NSW residents and birthing in NSW or ACT. The ACT PDC data only covers births delivered in ACT public hospitals; thus, births to women residing in the ACT and who gave birth in a private hospital are missing from the ACT PDC, estimated to be about 20-25% of ACT births.

³To assess the concordance rate between ANZARD and the PDC, the cohort was restricted to ANZARD's cycles performed between 2009 and 2015 (rather than 2016) because ACT PDC data was only available up to December 31, 2016, and one year of follow-up after an ART cycle was needed to capture birth in the PDCs.



Supplementary Table 1: Details for each data sources in the medically assisted reproduction (MAR) data linkage, by New South Wales and Australian capital territory

Dataset	Jurisdiction	Women/mothers/ babies/siblings	Description	Key measures
Australia and New Zealand Assisted Reproduction Database (ANZARD)	Australia + overseas	Women	The ANZARD is a regional registry of all ART cycles performed in female patients who attended 90 Australian fertility clinics between 1 st January, 2009 and 31 st December, 2016. The ANZARD data contains cycle records from both Australian patients and patients from overseas.	female patient and their partner: the treatment and laboratory techniques performed, infertility information, treatment outcomes (pregnancy and birth), and infant perinatal outcomes.
NSW and ACT Perinatal Data Collection (PDC)¹	NSW + ACT	Mothers, babies, siblings ²	PDC encompasses all live births and stillbirths of at least 20 weeks gestation or at least 400 grams birth weight. For each birth, the attending midwife or medical practitioner completes a form (or its electronic equivalent), giving socio-demographic, pregnancy-related risk, medical and obstetric information on the mother, and information on the labour, delivery, and condition, and birth outcome of the infant.	Socio-demographic, pregnancy-related risk, medical and obstetric information on the mother, and information on the labour, delivery, and condition, and birth outcome of the infant
NSW Admitted Patient Data Collection (APDC) and ACT Admitted Patient Care (APC)¹	NSW + ACT	Mothers, babies, siblings ²	The APDC/APC encompass all inpatient separations (discharges, transfers, and deaths) from all public, private, psychiatric and repatriation hospitals in NSW or ACT, as well as public multi-purpose services, private day procedure centres and public nursing homes.	Date of admission and separation, diagnosis, procedure performed, length of stay, etc.
NSW and ACT Registry of Births, Deaths and Marriages (RBDM) Birth Registry¹	NSW + ACT	Babies, siblings ²	The RBDM birth registry encompasses all birth registrations for all births born in NSW and ACT.	Baby's sex, date of birth, Mother's Aboriginal status, plurality, and age of other parent, etc.
NSW and ACT RBDM Death Registry and Cause of Death Unit Record File (COD-URF) Registry¹	NSW + ACT	Babies, siblings ²	The RBDM death registry encompass all deaths that were certified by a registered medical practitioner and COD-URF registry contains the cause of death that the coroner registered after an inquiry into the death circumstances. This data source contains the age of death (in months and years) of the infants and their underlying and contributing cause.	Age of death (in months and years) of the infants and their underlying and contributing cause and the corresponding diagnostic codes

Supplementary Table 1: (Continued)

Dataset	Jurisdiction	Women/mothers/ babies/siblings	Description	Key measures
The NSW Register of Congenital Conditions (RoCC) Registry	NSW	Babies	The RoCC Registry is a population-based surveillance system established to monitor congenital conditions detected during pregnancy or at birth, or diagnosed in infants up to one year of age under the NSW Public Health Act in 1991.	Month and year of date of birth of baby, the month and year of date of birth of mother, congenital condition, and the corresponding diagnostic code
Pharmaceutical Benefits Scheme (PBS)¹	NSW + ACT	Mothers	The PBS encompasses all drug dispensing records that qualify for a benefit under the National Health Act 1953.	Date of prescription and supply, prescription drug code (Anatomical Therapeutic Chemical code and PBS item code), patient category, quantity, dose, drug name, benefit paid by the Australia government, etc
Medicare Benefits Schedule (MBS)¹	NSW + ACT	Mothers	The MBS encompasses all clinically relevant medical services subsidised by the Australian Government.	Item codes for fertility-related procedure, service date, fee charges, benefit paid, etc.

NSW = New South Wales; ACT = Australian Capital Territory.

¹All ACT linked data only covers births delivered in ACT public hospitals.

²We are currently requesting the siblings' data (who were born before 1st January, 2009) to add in the MAR data linkage.



Supplementary Table 1: Details for each data sources in the medically assisted reproduction (MAR) data linkage, by New South Wales and Australian capital territory (Cont'd)

Dataset	Number of records	Number of persons	Years of Coverage
ANZARD	<u>Australia +overseas</u> : 638,036 records	195,390 women (<u>note</u> : the 195,490 SLKs that includes duplicates)	1 st January, 2009 and 31 st December, 2016
PDC¹	<u>NSW</u> : 1,136,633 records <u>ACT</u> : 45,052 records	<u>NSW</u> : • 581,241 mothers • 874,922 babies (born between 2009-2017; 261,711 siblings of the baby cohort (born before 2009)) <u>ACT</u> : • 27,631 mothers 36,964 babies (born between 2009-2016); 8,088 siblings of the baby cohort (born before 2009)	In the MAR data linkage, a birth cohort compromises all NSW and ACT babies born after 1 st January, 2009 to the date of the latest available data, i.e., 31 st December, 2017, for NSW and 31 st December, 2016 for ACT. The MAR linkage also comprises the birth cohort's siblings from the same biological mothers and siblings were born from 1 st January, 1994, and 1 st January, 1997, to 31 st December, 2008 in NSW and in ACT, respectively.
NSW APDC and ACT APC¹	<u>NSW</u> : 4,180,473 records <u>ACT</u> : 140,911 records	<u>NSW</u> : 579,601 mothers; 862,418 babies <u>ACT</u> : 27,970 mothers; 35,800 babies	The MAR data linkage contains NSW and ACT hospital admission records for mothers between 1 st July, 2001, and 30 th June, 2018; for the babies in the birth cohort between 1 st January, 2009, and 30 th June, 2018; for the siblings of the birth cohort between 1 st January, 2001, and 31 st December, 2010.
NSW and ACT RBDM¹	<u>NSW</u> : 834,702 records <u>ACT</u> : 35,398 records	<u>NSW</u> : 828,084 babies <u>ACT</u> : 35,382 babies	The MAR data linkage contains all birth registration between 1 st January, 1994, and 31 st December, 2017 in NSW between 1 st January, 1997, and 31 st December, 2018, in ACT.
NSW and ACT COD-URF¹	<u>NSW</u> : 3,528 records <u>ACT</u> : 165 records	<u>NSW</u> : 3,511 babies <u>ACT</u> : 165 babies	For NSW, the MAR data linkage contains death records for the babies and their siblings between 1 st January, 1994, and 30 th June, 2018. It includes the cause of death information between 1 st January, 1994, and 31 st December, 2016, for NSW. For ACT, the MAR data linkage also contains death records and cause of death for the babies and their siblings between 1 st January, 1997 and 30 th June, 2018.
NSW RoCC	<u>NSW</u> : 8,098 records	<u>NSW</u> : 8,090 babies	In the MAR data linkage, this data source is only available between 1 st January, 2011, to 31 st December, 2015, because it only allows a five-year data coverage for any linked data.
PBS¹	<u>NSW & ACT</u> : 23,033,842 records	<u>NSW & ACT</u> : 573,045 mothers	In the MAR data linkage, this data source contained all fertility-related drug dispensing for the mothers between 1 st July, 2002 to 31 st December, 2006 and all drug dispensing for mothers between 1 st January, 2007 to 31 st March, 2019.
MBS¹	<u>NSW & ACT</u> : 751,281 records	<u>NSW & ACT</u> : 64,386 mothers	In the MAR data linkage, this data source contained all fertility-related procedures between 1 st July, 2002, to 31 st March, 2019.

NSW = New South Wales; ACT = Australian Capital Territory.

¹All ACT linked data only covers births delivered in ACT public hospitals.²We are currently requesting the siblings' data (who were born before 1st January, 2009) to add in the MAR data linkage.

Supplementary Table 2: Sensitivity analysis of the concordance rate between ANZARD and New South Wales (NSW) and Australian Capital Territory (ACT) perinatal data collection for the final linked data of the medically assisted reproduction (MAR) data linkage, for NSW residents¹

	Grace period for criteria 1 (in days) ²	Grace period for criteria 2 (in days) ²	Total number of ART treatment cycle	Number of direct links between ART Treatment cycles and PDC births	Concordance rate
Main Analysis	16	10	28,937	27,248	94.2%
Scenario #1	16	5	28,937	27,243	94.1%
Scenario #2	16	15	28,937	27,250	94.2%
Scenario #3	5	10	28,937	27,248	94.2%
Scenario #4	5	5	28,937	27,243	94.1%
Scenario #5	5	15	28,937	27,250	94.2%
Scenario #6	31	10	28,937	27,249	94.2%
Scenario #7	31	5	28,937	27,249	94.2%
Scenario #8	31	15	28,937	27,250	94.2%

ANZARD = Australia and New Zealand Assisted Reproduction Database.

¹NSW and ACT residents who have undergone an ART Treatment with a known birth outcome or an unknown birth outcome due to loss to follow-up and an agreement in birth recorded in PDC.

² Details of criteria 1 & 2 can be found in Table 1.

Supplementary Table 3: Concordance of plurality status between ANZARD and PDC data¹, for New South Wales (NSW) residents

		Plurality recorded in PDC		
		1	2	3
Plurality recorded in ANZARD	1	25,758	33	0
	2	27	1,377	<5
	3	0	0	35
	No delivery or Missing	14	<5	0

ANZARD = Australia and New Zealand Assisted Reproduction Database; Perinatal Data Collection.

¹ NSW residents who have undergone an ART Treatment with a known birth outcome or an unknown birth outcome due to loss to follow-up and we were successfully matched the ANZARD birth to a birth in the PDC data. This analysis is only feasible to NSW residents.

