The Future of Births via Medically Assisted Reproduction in Italy: Scenarios to 2050

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Abstract

In low and late-fertility countries, such as Italy, Medically Assisted Reproduction (MAR) is set to play a growing demographic and social role and is increasingly considered as part of pronatalist policies. In this contribution we project the prevalence of births resulting from medically assisted reproduction (MAR) in Italy up to 2050. We rely on population-based projections combining age-specific fertility rates and MAR-specific birth shares using administrative data and cohort-component methodology. In 2023, 4.3% of live births in Italy were conceived through MAR, rising sharply with maternal age (17.2% for mothers ≥40). Under nine projection scenarios combining three assumptions for mean maternal age at childbirth (MAC) and age-specific MAR prevalence, MAR births could reach 11–12% of all births by mid-century and potentially exceed 15% under sustained trends. Population ageing alone has minimal impact, while delayed childbearing and increased MAR uptake contribute roughly equally to projected increases. While providing opportunities for couples to achieve desired family size, increased MAR use reflects persistent barriers to earlier childbearing. Policies should balance MAR provision with interventions targeting youth economic security, housing, and work–family reconciliation to support sustainable fertility trajectories.

Keywords: medically assisted reproduction, fertility postponement, Italy, population projections, birth outcomes.

Introduction

Delayed reproduction is increasingly common worldwide, particularly in Europe and notably in Italy [1–3]. Extended education [4], high youth unemployment [5], and uncertainties related to income, gender roles, and couple stability [6–7] contribute to postponed childbearing. While some intend to "catch up" later [8–9], biological constraints, including declining fecundity [10–11] and increased pregnancy-related risks [12–14], limit this recovery.

In this context, medically assisted reproduction (MAR) now plays a pivotal role and policies offering access to MAR at reduced cost are becoming more common, both at state level and at corporate level [15]. MAR encompasses assisted reproduction treatments (ART), including IVF, ICSI, preimplantation genetic testing, cryopreservation, as well as insemination and hormonal stimulation [16]. MAR can help couples achieve desired family size but may also encourage further postponement, creating an ambivalent effect [17].

Most research focuses on ART [18–21], examining past trends, current prevalence, and group differences [22–23], with fewer studies projecting future MAR births [24–26]. This study extends previous work by providing projections of all MAR births in Italy to 2050, based on recent administrative data and Istat (the Italian national institute of statistics) population and fertility projections.

Notably, infertility was recognized as a medical condition in Italy in 2024, and from 2025, MAR treatments are included in national essential care (LEA), improving access and affordability [2]. Legal and practical constraints remain: MAR under LEA is limited to heterosexual co-residing couples, women under 47, and mostly homologous fertilization (~€300 fee). Heterologous fertilization costs ~€1,500 under LEA versus ~€5,000 privately. While these reforms are expected to boost MAR uptake, the magnitude is uncertain.

Materials and Methods

Data Sources

Data are drawn from the Certificate of Delivery Care Registry (Ministry of Health) and Istat sources on live births and population by age and sex [2]. Age-specific fertility rates ($f_{x,t}$) were calculated separately for MAR and naturally conceived births. MAR contributed 3.9% to Italy's TFR in 2023, up from 2.1% in 2013. Among women ≥40 years, MAR births reached 17.2% in 2023 (8.6% in 2013). Mean age at first MAR birth rose from 36.0 to 37.7 years between 2013 and 2023, versus 30.4 to 31.4 years for natural births.

Projection Method

Population and births were projected to 2050 using the cohort-component method [27]. Age- and sex-specific survival and migration were reconstructed using standard schedules [28–29]. Age-specific fertility distributions were reconstructed via Brass' method [30], as Istat only provides total fertility projections (TFR 1.21 to 1.37 from 2025 to 2049).

Nine scenarios were constructed combining three variants for maternal mean age at childbirth (MAC) and three for age-specific MAR shares (%MAR):

MAC hypotheses:

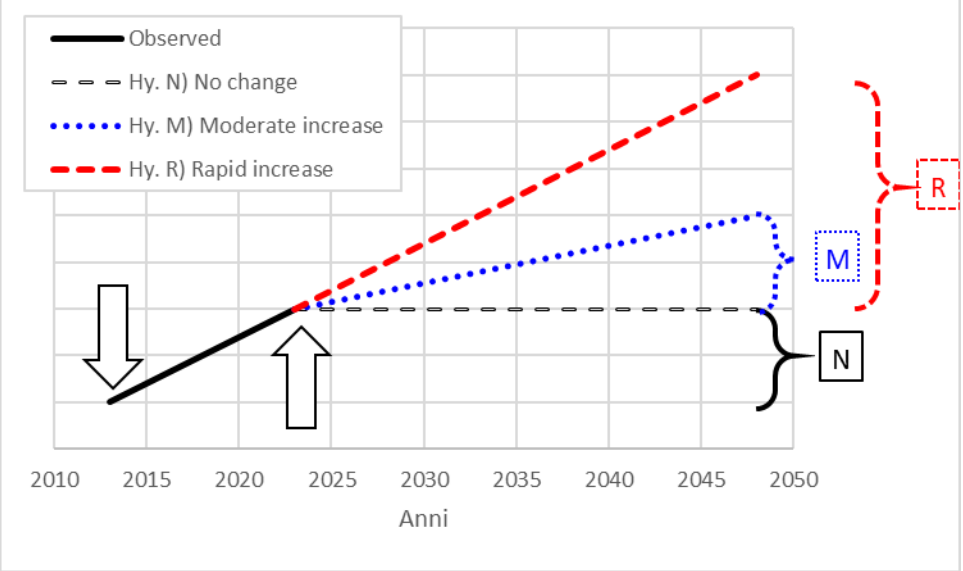
- N: No change (MAC fixed at 2023 levels, 32.5 years)
- M: Moderate increase (MAC rises to 33.5 years by 2045–2049)
- R: Rapid increase (MAC rises to 35.0 years)

%MAR hypotheses:

- N: No increase (same as 2023)
- M: Moderate increase (+1.8 percentage points per decade)
- R: Rapid increase (continuation of observed decade trend; 8.4% by 2045–2049)

Figures 1, which holds for both variables, illustrates the rationale of the three hypotheses.

Figure 1. Schematic representation of the evolution observed between 2013 and 2023 and foreseen in the future, up to 2045–2049, according to three hypotheses on two variables, MAC and %MAR



Note: Arrows represent observed years, 2013 (downwards) and 2023 (upwards). Hypotheses are: N) No change; M) Moderate increase; R) Rapid increase. In all three cases, and for both variables, the change is hypothesized to be (practically) linear over the next 25 years. MAC: mothers' mean age at childbirth; %MAR: share of MAR births on total births by mother's age.

Results

Table 1 summarizes projected shares of MAR births under the nine scenarios. Population ageing alone has negligible effect: under N/N scenario, the MAR share remains at 4.3% by 2045–2049.

Table 1. Share of MAR births among total births projected in 2045–2049 (Italy)

		%MAR (Hypotheses)		
		No increase	Moderate increase	Rapid increase
(Hypotheses)	MAC	3.9%	5.7%	8.4%
No increase	32.5	4.3%	6.2%	9.1%
Moderate increase	33.5	5.7%	8.0%	11.3%
Rapid increase	35.0	8.2%	11.1%	15.2%

Note: MAC = mean age at childbirth, in years. %MAR = proportion of fertility (TFR) attributable to medically assisted reproduction. Invariant = same as in 2023; Moderate = moderate increase (same increase in the next 25 years as in the past 10); Strong = strong increase (same increase per year as observed in the past decade).
Source: Own calculations based on Istat and Ministry of Health data.

Population ageing alone contributes little; delayed childbearing and increased MAR uptake are primary drivers. Combined moderate trends yield ~8% MAR births; rapid trends could exceed 15%. MAR births continue to be concentrated among older mothers, especially 38–50 years, with minimal effect on mean maternal age.

Discussion

Our projections are robust to variations in mortality, fertility, and migration assumptions. Mortality deviations from the assumed path would affect Istat population projections especially at older ages, with negligible impact on MAR births. Alternative fertility scenarios primarily influence the number of younger women projected to live in Italy up to 2050, and these women rarely use MAR. Finally, migration too is expected to affect MAR prevalence only marginally, as immigrants tend to use MAR less than natives.

Key drivers are ongoing postponement of childbearing and MAR uptake. Historical trends show persistent increases in MAC and %MAR, consistently with ongoing international trends [1, 3, 10–11]. Additional elements expected to boost uptake are the increase in MAR success rates, which have doubled from ~16% in 2005 to ~33% in 2022 [30], and the increase in the number of specialized centers from 169 to 333 in the same period.

Policy implications are significant: MAR costs (~€5,000 per intervention, often three cycles needed) will increase substantially. Public budgets are constrained, potentially limiting subsidies. Delayed childbearing carries modest but real increases in maternal and neonatal risks (Table 2).

Table 2. Approximate risks for selected outcomes by maternal age

Maternal age	Down syndrome	Stillbirth (≥20w)	Preterm (<37w)	Low birth weight (<2500g)
20–24	0.07%	0.551%	10–11%	7–8%
25–29	0.08%	0.507%	9–10%	7%
30–34	0.14%	0.515%	10–11%	7–8%
35–39	0.37%	0.586%	11–12%	8–9%
40–44	1.0%	0.836%	14–15%	9–10%
45+	≥2.0%	1.325%	18–20%	11–12%

Sources: Down syndrome risk [22]; Stillbirth [31]; Preterm birth [25]; Italy (Lombardy) [14]; Canada [13]; Low birth weight [12, 25].

Investing in policies promoting earlier childbearing (youth economic independence, housing, work–family reconciliation) may better sustain fertility than exclusive MAR subsidies [33–34].

Conclusions

The prevalence of MAR births in Italy is projected to increase sharply. Population ageing alone has little effect; the combination of continued delayed childbearing and rising MAR uptake could raise the share from 4.3% (2023) to 11–12% by mid-century, potentially exceeding 15%.
MAR's demographic and social significance is growing. While it helps couples achieve family goals, it reflects structural barriers to earlier childbearing. Health system planning must consider costs, access, and capacity. Policies should combine MAR provision with measures addressing the drivers of delayed fertility to support a sustainable reproductive trajectory.

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