

**XXXVIII**  
**SABATO DELL'ANDROLOGIA**

**COLLOQUI IN PMA**  
**TRA GINECOLOGI,**  
**BIOLOGI E ANDROLOGI**

**17 FEBBRAIO 2018**  
**PADERNO DUGNANO**

Clinica San Carlo - Via Ospedale, 21  
(Auditorium del Nuovo Ospedale)

CON IL PATROCINIO DI S.I.R.U.



# *Outcome delle gravidanze e dei nati da PMA: un update*

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# Oggetto della relazione

- *Tecniche di Procreazione Medicalmente Assistita (PMA): risultati*
- *Outcome ostetrico della gravidanza ottenuta con tecniche di PMA omologa*
- *Outcome neonatale da gravidanza ottenuta con tecniche di PMA omologa*
- *Outcome dei nati da gravidanza ottenuta con tecniche di PMA omologa*
- *Outcome delle gravidanze e dei nati da PMA eterologa*
- *Take home messages,,*

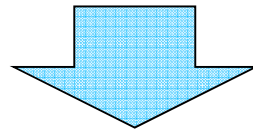
# Tecniche di PMA: risultati

La raccolta e l'analisi dei risultati delle tecniche di procreazione medicalmente assistita (PMA) è resa possibile dall'istituzione di registri nazionali e internazionali.



# Tecniche di PMA di II livello

Oggettiva difficoltà nella lettura dei risultati della  
PMA



End-point primario = gravidanza = bimbo in braccio



End-point secondari

*Tecniche di PMA di 11 livello:  
risultati*

# Risultati in Europa

Human Reproduction, Vol.32, No.10 pp. 1957–1973, 2017

Advanced Access publication on August 28, 2017 doi:10.1093/humrep/dex264

human  
reproduction

ESHRE PAGES

## Assisted reproductive technology in Europe, 2013: results generated from European registers by ESHRE<sup>†</sup>

The European IVF-monitoring Consortium (EIM)<sup>‡</sup> for the European Society of Human Reproduction and Embryology (ESHRE)

C. Calhaz-Jorge<sup>1,2</sup>, C. De Geyter<sup>2,3</sup>, M.S. Kupka<sup>2,4</sup>, J. de Mouzon<sup>2,5</sup>,  
K. Erb<sup>2,6</sup>, E. Mocanu<sup>2,7</sup>, T. Motrenko<sup>2,8</sup>, G. Scaravelli<sup>2,9</sup>, C. Wyns<sup>2,10</sup>,  
and V. Goossens<sup>2</sup>

**XVII pubblicazione dell'European Society of Human Reproduction and Embryology (ESHRE) sui dati europei della PMA.**

Risultati relativi all'anno 2013 ed a 38 Paesi europei analizzati.

# Risultati in Europa

## Impiego delle tecniche di PMA

Trend di crescita dei cicli totali iniziati con induzione della crescita follicolare multipla (ICFM):

year	countries	clinics	cycles	cycle-increase (%)	ART infants
1997	18	482	203,225		35,314 *
1998	18	521	232,225	+ 14.3	21,433 *
1999	21	537	249,624	+ 7.5	26,212 *
2000	22	569	275,187	+ 10.2	17,887 *
2001	23	579	289,690	+ 5.3	24,963 *
2002	25	631	324,238	+ 11.9	24,283*
2003	28	725	365,103	+ 12.6	68,931
2004	29	785	367,056	+ 0.5	67,973
2005	30	923	419,037	+ 14.2	72,184
2006	32	998	458,759	+ 9.5	87,705
2007	33	1029	493,420	+ 7.6	96,690
2008	36	1051	532,260	+ 7.9	107,383
2009	34	1005	537,463	+ 1.0	109,239
2010	31	991	550,296	+ 2.4	120,676
2011	33	1,314	609,973	+ 11.3	134,106
2012	34	1,354	640,144	+ 4.9	143,844
2013	38	1,169	686,271	+ 7.2	149,466
<b>total</b>			<b>7 233,971</b>		<b>1 308,289</b>

\* Data only from countries reporting 100% coverage of ART activity

**Table II Results after ART in 2013.**

Country	Initiated cycles IVF + ICSI	IVF			ICSI			FER			ART infants (IUI excluded)	ART infants per national births (%)
		Aspirations	Pregnancies per aspiration (%)	Deliveries per aspiration (%)	Aspirations	Pregnancies per aspiration (%)	Deliveries per aspiration (%)	Thawings	Pregnancies per thawing (%)	Deliveries per thawing (%)		
Albania	91				91	48.4	37.4	32	40.6	34.4	64	0.2
Austria		916	31.4		4905	32.5		1352	33.7			
Belarus	2245	1345	42.5	31.4	874	35.9	26.4	175	21.7	12.0	930	0.8
Belgium	20 295	3587	28.2	20.6	13 742	26.6	19.2	10001	22.9	14.2	5805	4.6
Bulgaria	4186	446	23.8	17.0	3616	22.8	16.8	890	37.4	28.9	1285	1.9
Croatia	4309	1616	29.3	14.2	2228	22.9	15.8	466	28.3	20.6	784	
Cyprus	1151	187	38.0	34.2	914	30.1	26.1	330	46.4	30.9		
Czech Republic	12 980	1877	15.9	12.5	10 745	31.2	21.6				6137	5.7
Denmark	11 584	6155	22.7	19.7	5065	26.1	23.7	3166	19.5	16.6	3477	6.2
Estonia	1824	639	25.7	20.2	1167	26.6	19.9	884	13.0	7.4	558	4.0
Finland	4561	2359	28.6	21.6	1981	24.5	18.8				3371	5.8
France		21 205	23.6	19.3	39 136	23.5	20.0				18041	2.2
Germany	55 966	12 531	29.4	19.7	43 435	27.6	19.4	20 456	22.1	14.6	16 916	
Greece	12 207	2270	32.2	17.6	9382	31.4	13.7	2024	35.9	16.1	4129	4.4
Hungary	5500	1249	28.7		4178	28.3						
Iceland		222	22.5	14.9	173	20.8	16.8	260	23.1	16.9	157	3.6
Ireland	1195	519	40.3	33.9	498	31.7	26.5	371	28.3	20.8	442	0.6
<b>Italy</b>	<b>55 049</b>	<b>7008</b>	<b>24.1</b>	<b>16.9</b>	<b>43 165</b>	<b>20.9</b>	<b>13.8</b>	<b>7428</b>	<b>23.7</b>	<b>15.7</b>	<b>10021</b>	<b>1.9</b>
Kazakhstan	3288	1575	36.7	25.1	1698	43.2	32.6				1151	0.4
Latvia	441	109	26.6	2.8	252	24.2	13.1	124	19.4	8.9	59	0.3
Lithuania	343	190	38.4	18.9	148	33.1	9.5				66	0.2
Macedonia		305	41.0	11.1	1241	42.0	24.4				431	
Malta	100				100	28.0	28.0				31	0.7
Moldova	866	392	39.3	35.5	444	39.9	36.3				355	0.9
Montenegro	453				453	36.9	30.7	22	18.2	18.2	174	2.3
Norway	5849	2884	31.3	25.5	2720	31.1	25.0					
Poland	13 409	865	29.6	20.5	12 411	33.1	22.0	6151	28.2	16.7	4844	1.3
Portugal	5595	1940	33.8	25.6	3255	28.6	21.0	1334	27.9	17.5	1847	2.3
Romania	1839	960	40.1	26.6	780	36.2	27.7	538	37.7	16.7	734	0.4
Russia	51 010	23 663	33.8	24.6	25 631	30.5	21.3	11 879	31.4	18.4	17951	0.9
Serbia	2720	550	32.7		2170	35.5					908	
Slovenia	3671	1064	31.5	25.4	2450	29.7	23.5	1039	31.4	25.1	1247	6.0
Spain	38 591	3976	30.2	18.2	30 386	28.2	18.1	14255	30.9	18.0	17807	4.2
Sweden	11 611	5307	31.0	24.8	5615	28.4	23.2	6063	27.8	22.0	4280	3.8
Switzerland	5420	739	22.5	16.8	4157	22.0	16.0	4134	20.1	14.4	1598	1.9
The Netherlands	15 165	6346	30.0	21.4	7310	31.5	22.9					
Ukraine	10 971	2862	38.5	27.4	7588	34.8	27.6	3404	37.4	28.7	4838	1.0
UK	45 402	19 021	31.5	27.3	23 928	33.6	28.7	12 198	28.4	24.8	19 028	2.4
<b>All*</b>	<b>409 887</b>	<b>136 879</b>	<b>29.6</b>	<b>22.2</b>	<b>318 082</b>	<b>27.8</b>	<b>20.1</b>	<b>108 976</b>	<b>27.0</b>	<b>18.0</b>	<b>149 466</b>	<b>2.2</b>



# Risultati in Europa

## Gravidanze cliniche

- 29,6% di gravidanze cliniche/PO con la FIVET (29,4% nel 2012)
- 27,8% di gravidanze cliniche/PO con la ICSI (la stessa del 2012)
- 27% di gravidanze cliniche/ciclo di scongelamento di embrioni crioconservati (23% nel 2012)

## Parto

- 22,2% di parti/PO con la FIVET (21,9% nel 2012)
- 20,1% di parti/PO con la ICSI (20,1% nel 2012)
- 18% di parti/ciclo di scongelamento di embrioni crioconservati (16% nel 2012)



# Tecniche di PMA di II livello: risultati



*Ministero della Salute*

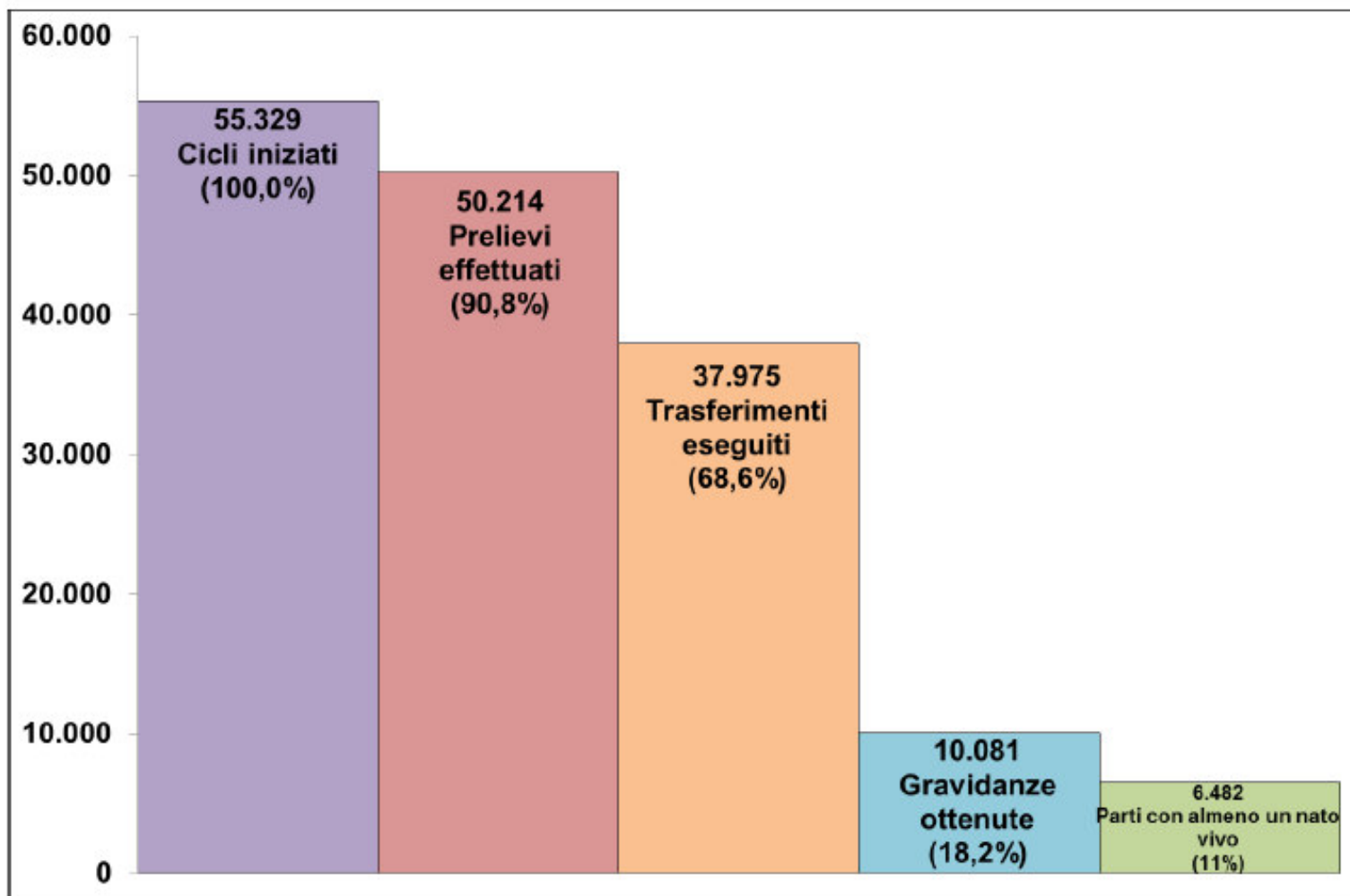
**RELAZIONE DEL MINISTRO DELLA SALUTE AL PARLAMENTO  
SULLO STATO DI ATTUAZIONE DELLA LEGGE CONTENENTE NORME  
IN MATERIA DI PROCREAZIONE MEDICALMENTE ASSISTITA  
(LEGGE 19 FEBBRAIO 2004, N. 40, ARTICOLO 15)**

- **Attività anno 2015 centri procreazione medicalmente assistita**
- **Utilizzo dei finanziamenti (artt. 2 e 18) anno 2016**

### **Tecniche a fresco (FIVET, ICSI)**

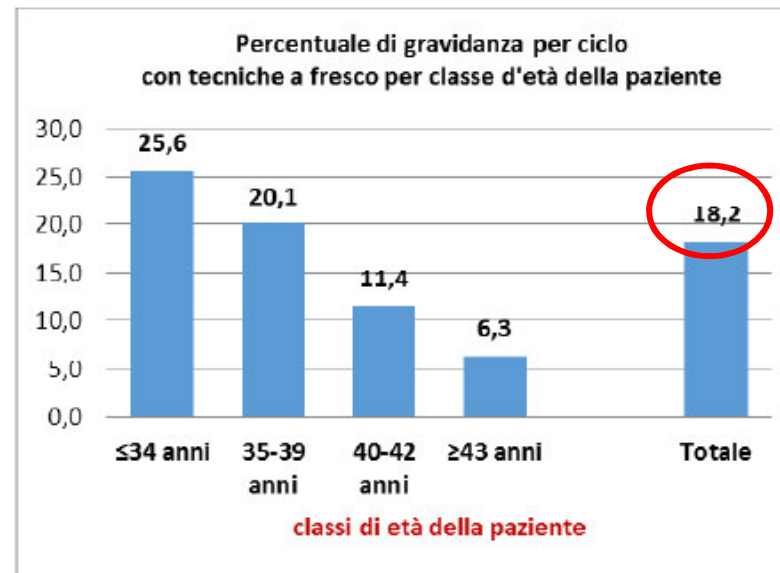
- **202 centri attivi** di cui **178** con accesso di almeno 1 coppia
- **45.689 coppie** trattate
- **età media delle pazienti: 36,7**
- **55.329 cicli** di trattamento iniziati
- **10.081 gravidanze ottenute**
- **18,2** percentuale di gravidanze su cicli iniziati per le tecniche a fresco
- **13,1** percentuale di gravidanze perse al follow-up
- **6.498 parti**
- **7.695 bambini nati vivi**

**Figura 2: Cicli iniziati, prelievi effettuati, trasferimenti eseguiti e gravidanze ottenute, su tecniche a fresco di II e III livello (FIVET e ICSI) senza donazione di gameti nel 2015.**

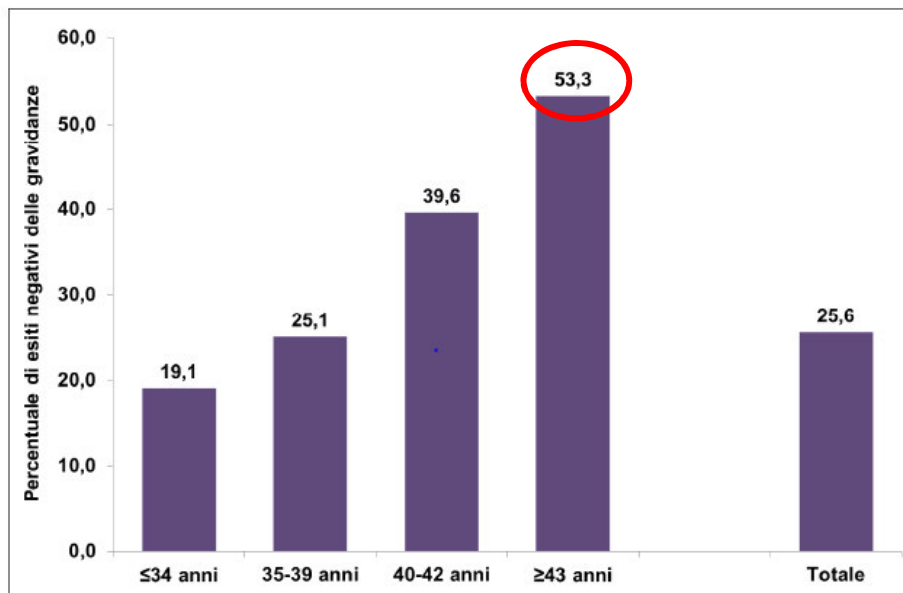


# PMA OMOLOGA

Distribuzione delle percentuali di gravidanza calcolate su ciclo iniziato senza donazione di gameti, secondo le classi di età della paziente nell'anno 2015.



5: Percentuali di esiti negativi delle gravidanze monitorate per tutte le tecniche di PMA omologhe, secondo la classe di età delle pazienti. Anno 2015.



## Tecniche di scongelamento di embrioni e di ovociti (FER, FO)

- **11.975 coppie** trattate
- **14.432 cicli** iniziati
- **3.633 gravidanze** ottenute
- **26,2% gravidanze** ottenute su ciclo iniziato con **embrioni** crioconservati
- **16,6% gravidanze** ottenute su ciclo iniziato con embrioni ottenuti da **ovociti** crioconservati
- **5,6% gravidanze perse** al follow-up
- **2.573 parti**
- **2.802 bambini nati vivi**
- Sono stati formati **111.364** embrioni trasferibili, ne sono stati trasferiti **76.874 (69%)** e ne sono stati crioconservati **34.490** corrispondenti a **31,0%** dei formati e trasferibili totali.

**FIVET  
ICSI  
FER  
FO**

- 2.083 coppie trattate
- età media della paziente ricevente:
  - o 35,3 per donazione di seme,
  - o 41,5 per donazione di ovociti (fresco + crioconservato),
  - o 40,9 per embrioni crioconservati dopo una donazione
- 2.287 cicli iniziati, di cui:
  - o 559 con donazione di seme, di cui
    - 140 con seme da stesso centro PMA italiano,
    - 419 importato
  - o 1.308 con donazione di ovociti, di cui
    - 110 con donazioni ovociti a fresco da stesso centro Pma
    - 61 con donazioni ovociti crioconservati da stesso centro Pma,
    - 1.137 importati
  - o 420 con embrioni crioconservati dopo una donazione di gameti, di cui
    - 61 formati da gameti provenienti da medesimo centro,
    - 359 formati da gameti provenienti da banca estera
- 677 gravidanze ottenute
- 29,3% di gravidanze su cicli iniziati con donazione seme
- 29,1% di gravidanze su cicli iniziati con donazione di ovociti (fresco + crioconservato)
- 31,4% di gravidanze su cicli iniziati con embrioni crioconservati dopo una donazione di gameti
- 15,7% di gravidanze perse al follow up
- 441 parti
- 532 bambini nati vivi

# PMA OMOLOGA

Gravidanze ottenute da tecniche a fresco: 18,2 %  
 Gravidanze ottenute da embrioni congelati: 26,2 %  
 Gravidanze ottenute da ovociti congelati: 16,6 %

Figura 3.2.15: Esiti delle gravidanze monitorate ottenute da tecniche a fresco e da tecniche di scongelamento senza donazione di gameti, nell'anno 2015 (12.190 gravidanze monitorate).

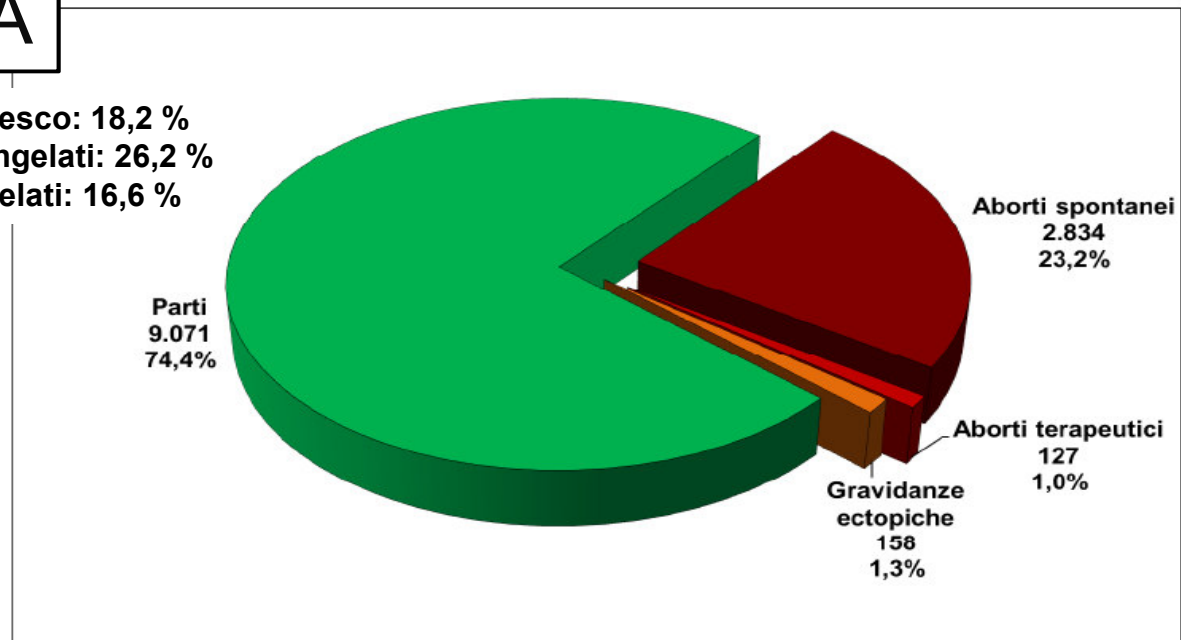
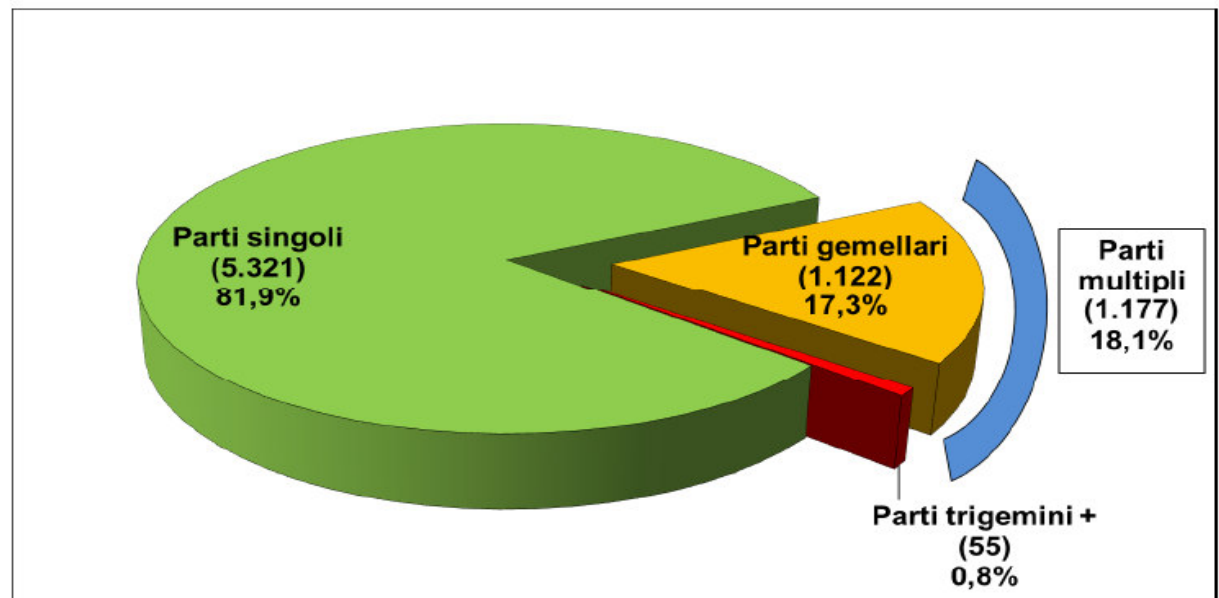


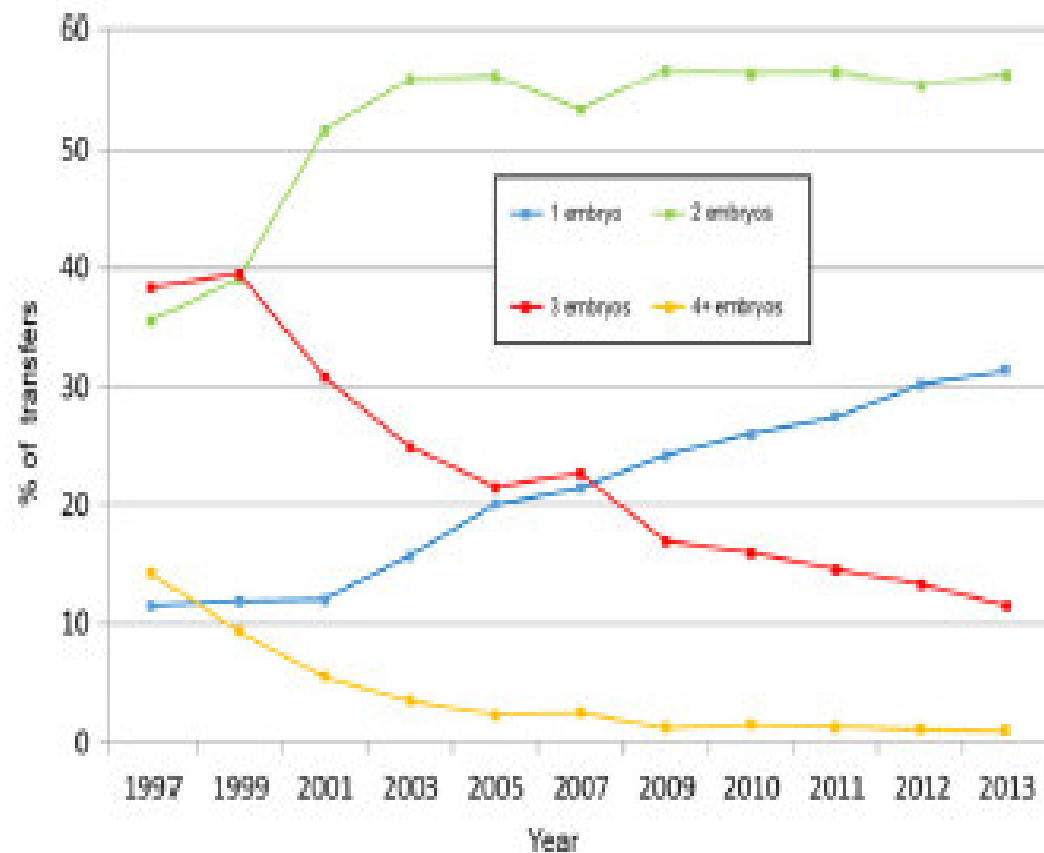
Figura 3.2.16: Percentuale del genere di parto ottenuto con l'applicazione delle sole tecniche a fresco (FIVET-ICSI) senza donazione di gameti nel 2015.





# Risultati in Europa

## Trasferimento embrionario: n. di embrioni trasferiti

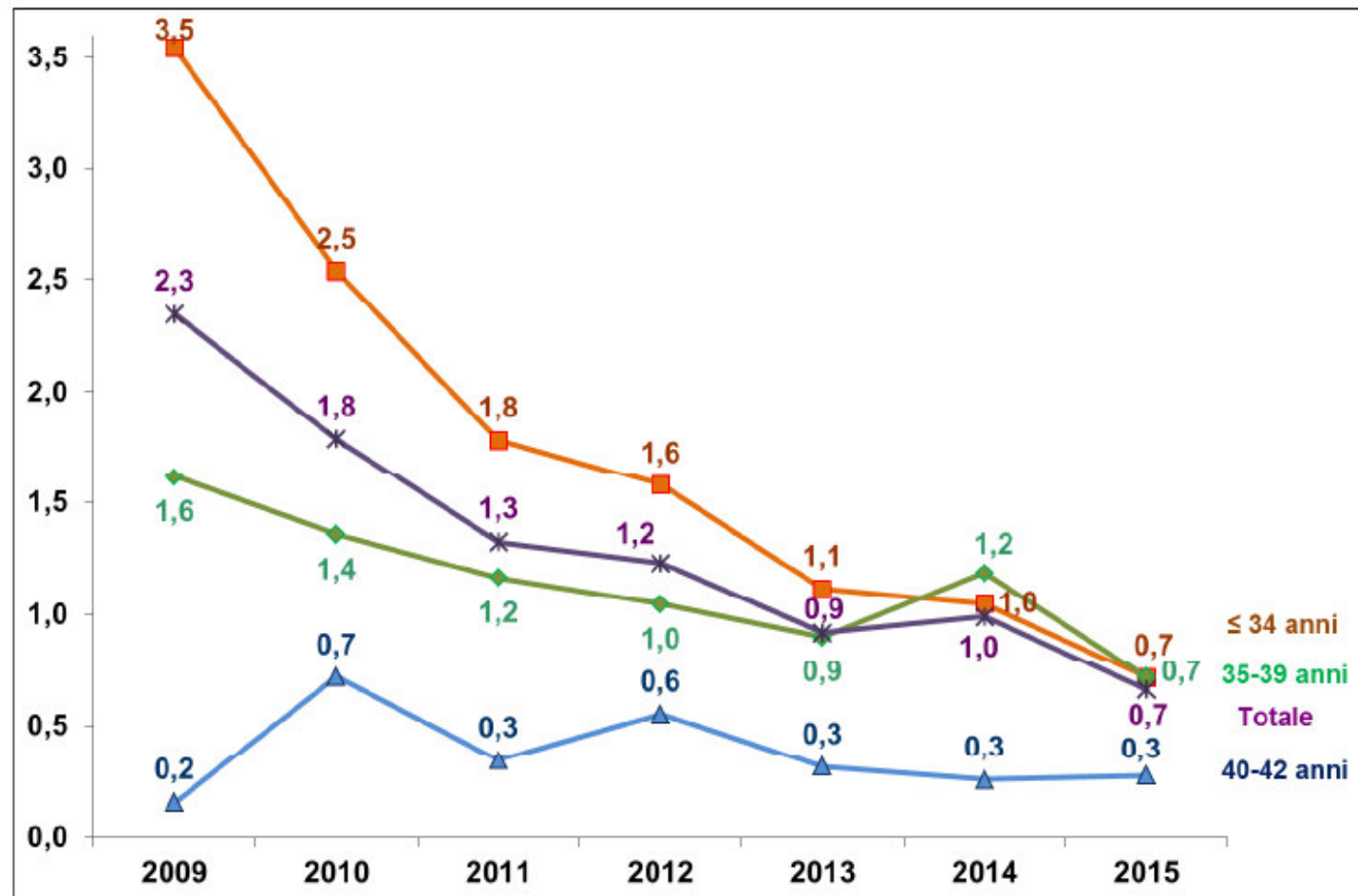


**Figure 3** Number of embryos transferred in IVF/ICSI fresh cycles in Europe | 1997–2013.

## ANDAMENTO PARTI TRIGEMINI NEL TEMPO

Figura 3.2.29: Percentuali di parti trigeni sul totale dei parti ottenuti da tutte le tecniche di II e III livello senza donazione di gameti secondo le classi di età delle pazienti. Anni 2009-2015.

**Diminuzione  
significativa  
nelle  
pazienti con  
età  
compresa  
tra i 35 ed i  
39 anni.**



Tecniche di PMA di II livello: outcome della gravidanza

Ma qual è “l’end point” primario ?

Gravidanza ?

Bimbo in braccio?

Attualmente: mamma **SANA** con  
bimbo **SANO** in braccio





# Outcome ostetrico della gravidanza ottenuta con tecniche di PMA

REVIEW

Open Access



# Risk of adverse pregnancy and perinatal outcomes after high technology infertility treatment: a comprehensive systematic review

Stefano Palomba<sup>1\*</sup>, Roy Homburg<sup>2</sup>, Susanna Santagni<sup>1</sup>, Giovanni Battista La Sala<sup>1,3</sup> and Raoul Orvieto<sup>4,5</sup>

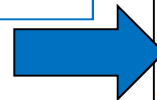
Received: 7 September 2016 Accepted: 26 October 2016

Published online: 04 November 2016

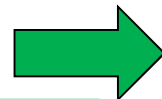
## Conclusion

Subfertile women who conceived after the use of high technology infertility treatments are at increased risk of pregnancy complications, and every single/specific step and/or procedure can play an independent and crucial role. Thus, all infertile patients scheduled for high technology infertility treatments should be clearly informed of that increased obstetric and perinatal risk in case of pregnancy, regardless of multiple pregnancy. A careful preconceptional counselling aimed to optimize the general health status of the pre-pregnant women is needed (to stop smoking, reduce BMI in overweight/obese patients, and so on), identifying and treating modifiable reproductive disorders [11] and, finally, an effort should be made to optimize the infertility treatments (milder stimulation, OHSS prevention, elective SET) in order to prevent or reduce the risk of pregnancy complications in these infertile women. Finally, further large cohort prospective studies are required to clarify the contribution of each single factor on pregnancy and perinatal outcomes.

Riduzione dei fattori di rischio pre-gravidanza

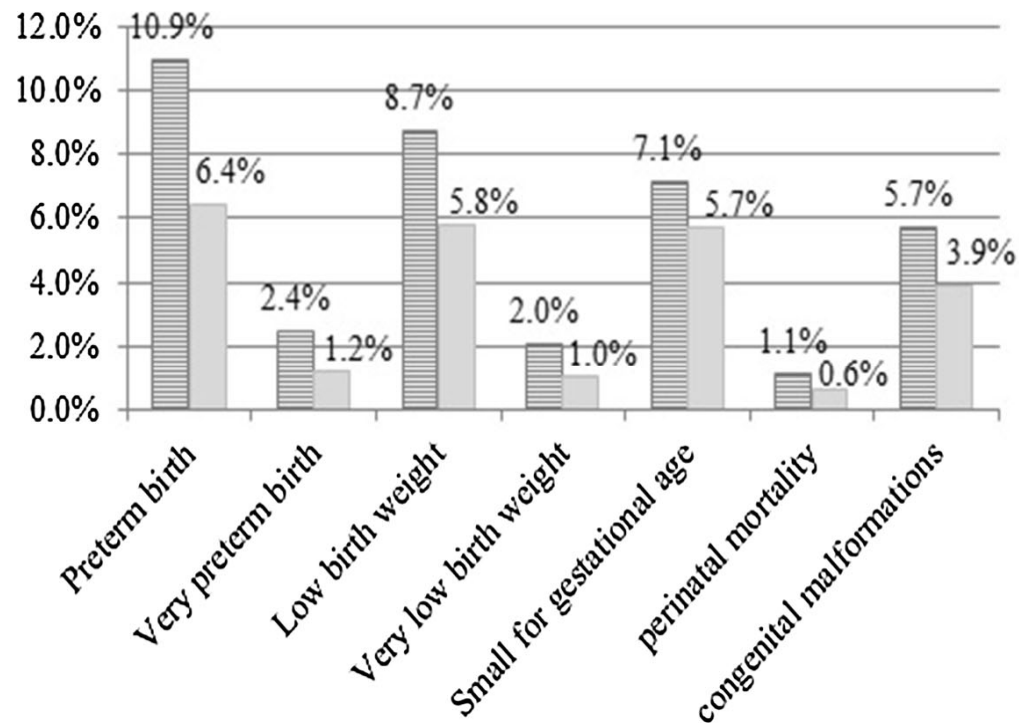


Ottimizzare i trattamenti della PMA



## Worldwide prevalence of adverse pregnancy outcomes among singleton pregnancies after in vitro fertilization/ intracytoplasmic sperm injection: a systematic review and meta-analysis

Jia-Bi Qin<sup>1,2</sup> · Xiao-Qi Sheng<sup>2</sup> · Di Wu<sup>3</sup> · Shi-You Gao<sup>4</sup> · Yi-Ping You<sup>5</sup> · Tu-Bao Yang<sup>6</sup> · Hua Wang<sup>2</sup>




In conclusion, this study shows that ART singleton pregnancies have higher prevalence of APOs compared with those conceived naturally. Significant differences in different continents, countries, income groups, and types of ART were found. However, it remains uncertain whether detected differences in APO prevalence after ART singleton pregnancies represent true or merely methodological differences. In the future, population-wide prospective

- IVF/ICSI singleton pregnancies
- SC singleton pregnancies

# Pregnancy and birth outcomes in couples with infertility with and without assisted reproductive technology: with an emphasis on US population-based studies

Barbara Luke, ScD, MPH

## Conclusions



Subfertility, with or without IVF or NIFT to achieve a pregnancy, is associated with increased risks of adverse maternal and perinatal outcomes. The major risk from IVF treatments of multiple births (and the associated excess of perinatal morbidity) has been reduced over time, with fewer and better-quality embryos transferred.

American Journal of Obstetrics & Gynecology SEPTEMBER 2017

Human Reproduction Update, Vol.22, No.1 pp. 104–115, 2016

Advanced Access publication on September 22, 2015 doi:10.1093/humupd/dmv044

human  
reproduction  
update

## Infertility and reproductive disorders: impact of hormonal and inflammatory mechanisms on pregnancy outcome

Silvia Vannuccini<sup>1</sup>, Vicki L. Clifton<sup>2</sup>, Ian S. Fraser<sup>3</sup>, Hugh S. Taylor<sup>4</sup>, Hilary Critchley<sup>5</sup>, Linda C. Giudice<sup>6,\*</sup>, and Felice Petraglia<sup>1</sup>

Human Reproduction Update, Vol.22, No.1 pp. 104–115, 2016



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## REVIEW

# Pregnancy complications in spontaneous and assisted conceptions of women with infertility and subfertility factors. A comprehensive review



Stefano Palomba <sup>a,\*</sup>, Susanna Santagni <sup>a</sup>, Karen Gibbins <sup>b</sup>,  
Giovanni Battista La Sala <sup>a,c</sup>, Robert M Silver <sup>b</sup>

<sup>a</sup> Center of Reproductive Medicine and Surgery, Arcispedale Santa Maria Nuova (ASMN), Istituto di Ricovero e Cura a Carattere Scientifico (IRCCS), Reggio Emilia, Italy; <sup>b</sup> Division of Maternal-Fetal Medicine, Utah University, Salt Lake City, UT, USA; <sup>c</sup> University of Modena and Reggio Emilia, Reggio Emilia, Italy



**Table 1** Levels and quality of the best available evidence about the relationships between each subfertility factor and its treatment and risk of the main obstetric and neonatal adverse outcomes.

<i>Factor</i>	<i>Main adverse outcome</i>	<i>Evidence</i>	
		<i>Level<sup>a</sup></i>	<i>Quality<sup>b</sup></i>
Infertility (TTP longer than 12 months)	GDM	2	Moderate
	PIH/ PE	1	Moderate
	AH	2	Moderate
	PTB	1	High
	VPTB	2	Moderate
	LBW	1	High
	Congenital anomalies	2	Moderate
Advanced maternal age (more than 35, 40 or 45 years)	Miscarriage	2	High
	GDM	2	High
	PIH/ PE	2	High
	Placenta praevia	2	Moderate
	CD	2	High
	Severe maternal morbidity / death	2	High
	PTB	2	High
	VEPTB	2	Moderate
	LBW	2	High
	NICU admission	2	High
	Stillbirth/perinatal mortality / early neonatal mortality	2	High
Congenital anomalies	1	High	
Obesity (BMI higher than 30)	Miscarriage	1	High
	GDM	2	Moderate
	Thromboembolism	2	Moderate
	PIH/ PE	2	Moderate
	Severe maternal morbidity / death	2	Moderate
	PTB	1	High
	EPTB	1	Moderate
	VEPTB	1	High
	Macrosomia/ LGA	2	Moderate
	PPRM	2	High
	NICU admission	2	High
	Stillbirth/perinatal mortality / early neonatal mortality	1	High
	Congenital anomalies	1	High

Leanness (BMI lower than 18 or 18.5)	PTB	2	High
	SGA	1	Moderate
	LBW	1	Moderate
	Congenital anomalies <sup>c</sup>	1	Moderate
PCOS <sup>d</sup>	Miscarriage	1	Moderate
	GDM	1	Moderate
	PIH/PE	1	Moderate
	CD	1	Low
	PTB	1	Low
	EPTB	1-2 <sup>o</sup>	Low-moderate <sup>o</sup>
	LBW	2 <sup>o</sup>	Moderate <sup>o</sup>
	SGA	1	Low
	Macrosomia/LGA	1	Low
	Neonatal jaundice	2	Moderate
	Respiratory complications	2	Moderate
	NICU admission	1	Moderate
	Stillbirth/perinatal mortality/early neonatal mortality	1	Moderate
	Congenital anomalies	2	Moderate
Uterine fibroids	Miscarriage	1	Moderate
	CD	2	Moderate
	PTB	3	Moderate
Endometrial polyps	NA	NA	NA
Congenital uterine anomalies	Miscarriage <sup>e</sup>	1	Low
	PTB	1	Low
	Malpresentation	1	Low
Endometriosis	Miscarriage	1	Moderate
	Ectopic pregnancy	2	Moderate
	PIH/PE	2	Moderate
	GDM	3	Low
	Acute maternal complications	1	Low
	Placenta praevia	2	Moderate
	AH	2	Moderate
	PH	2	Moderate
	PTB	2	Moderate
	SGA	3	Low
	Neonatal hospitalization	3	Moderate
Adenomyosis	Miscarriage	2	Low
	CD	3	Low
	PTB	2	Moderate
	SGA	3	Low
	PPRM	2	Moderate
	PH	3	Low
	Malpresentation	3	Low

## Increased risk of placenta previa in pregnancies following IVF/ICSI; a comparison of ART and non-ART pregnancies in the same mother

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**BACKGROUND:** The risk of placenta previa may be increased in pregnancies conceived by assisted reproduction technology (ART). Whether the increased risk is due to factors related to the reproductive technology, or associated with maternal factors, is not known. **METHODS:** In a nationwide population-based study, we included 845 384 pregnancies reported to the Medical Birth Registry of Norway between 1988 and 2002 and compared the risk of placenta previa in 7568 pregnancies conceived after assisted fertilization, with the risk in naturally conceived pregnancies. To study the influence of ART more directly, we compared the risk of placenta previa between consecutive pregnancies among 1349 women who had conceived both naturally and after assisted fertilization. Odds ratios (OR), adjusted for maternal age, parity, previous Caesarean section and time interval between pregnancies were estimated using logistic regression. **RESULTS:** There was a six-fold higher risk of placenta previa in singleton pregnancies conceived by assisted fertilization compared with naturally conceived pregnancies [adjusted OR 5.6, 95% confidence interval (CI) 4.4–7.0]. Among mothers who had conceived both naturally and after assisted fertilization, the risk of placenta previa was nearly three-fold higher in the pregnancy following assisted fertilization (adjusted OR 2.9, 95% CI 1.4–6.1), compared with that in the naturally conceived pregnancy. **CONCLUSIONS:** The use of ART is associated with an increased risk of placenta previa. Our findings suggest that the increased risk may be caused by factors related to the reproductive technology.

# Risk of peripartum hysterectomy in births after assisted reproductive technology

Antonella Cromi, Ph.D.,<sup>a</sup> Ilario Candeloro, M.D.,<sup>a</sup> Nicola Marconi, M.D.,<sup>a</sup> Jvan Casarin, M.D.,<sup>a</sup> Maurizio Serati, M.D.,<sup>a</sup> Massimo Agosti, M.D.,<sup>b</sup> and Fabio Ghezzi, M.D.<sup>a</sup>

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Reproductive BioMedicine Online (2014) 28, 162–182

**Objective:** To investigate whether women who conceive after assisted reproductive technology (ART) are at higher risk for emergency peripartum hysterectomy.

**Design:** A case-control study using a prospectively maintained institutional database.

**Setting:** A tertiary referral university teaching maternity hospital.

**Patient(s):** Thirty-one women who underwent peripartum hysterectomy for management of hemorrhage, and 19,902 control women.

**Intervention(s):** None.

**Main Outcome Measure(s):** Association between potential predictors and peripartum hysterectomy.

**Result(s):** The incidence of peripartum hysterectomy was 1.7 cases per 1,000 births (95% confidence interval [CI] 1.2–2.4). After adjustment for maternal age and twin pregnancy, placenta previa (odds ratio [OR] 50.78, 95% CI 23.30–110.68), prior cesarean delivery (OR 6.72, 95% CI 2.99–15.09 for one cesarean; OR 6.80, 95% CI 1.45–31.90 for two or more cesareans), previous myomectomy (OR 24.59, 95% CI 6.70–90.19), and ART conception (OR 5.98, 95% CI 2.18–16.40) were all antenatal predictors for peripartum hysterectomy. In women having a peripartum hysterectomy, 13.4% of the risk is attributable to mode of conception.

**Conclusion(s):** A history of ART increases the likelihood of needing a peripartum hysterectomy to control hemorrhage. Further investigation is needed to determine whether ART conception should be included in algorithms of risk stratification for emergency cesarean hysterectomy and plan of care be modified accordingly. (Fertil Steril® 2016;106:623–8. ©2016 by American Society for Reproductive Medicine.)

## RISULTATI

- 13,4% di rischio di isterectomia peripartum era correlazione alla modalità di concepimento
- Rischio isterectomia 5 volte maggiore
- Necessità di adeguato counselling coppie PMA

Hum Reprod. 2014 Dec;29(12):2787-93. doi: 10.1093/humrep/deu240. Epub 2014 Sep 19.

**Risk of placenta praevia is linked to endometrial thickness in a retrospective cohort study of 4537 singleton assisted reproduction technology births.**

Rombauts L<sup>1</sup>, Motteram C<sup>2</sup>, Berkowitz E<sup>3</sup>, Fernando S<sup>4</sup>.

*Retrospettivo*

*4537 gravidanze singole*

*Rischio aumentato di 4 volte se **spessore endometriale >12 mm**  
(rispetto spessore endometriale di 9 mm al momento del trigger)*

*Rischio non correlato al tipo di ET (fresh/frozen)*

*Rischio correlato alla **MODALITA'** di preparazione dell'endometrio*



*Presente sia nei fresh-ET che nei frozen-ET con maturazione  
endometriale su base ormonale*

*NON* *presente negli ET su ciclo naturale*



**MEGLIO CONGELARE SEMPRE?**

# Are intracytoplasmic sperm injection and high serum estradiol compounding risk factors for adverse obstetric outcomes in assisted reproductive technology?

Fertility and Sterility® Vol. 106, No. 2, August 2016

Greene Donald Royster IV, M.D.,<sup>a,b</sup> Kavitha Krishnamoorthy, M.D.,<sup>c</sup> John M. Csokmay, M.D.,<sup>a</sup> Belinda J. Yauger, M.D.,<sup>a</sup> Rebecca J. Chason, M.D.,<sup>a</sup> Alan H. DeCherney, M.D.,<sup>b</sup> Erin F. Wolff, M.D.,<sup>b</sup> and Micah J. Hill, D.O.<sup>a</sup>

<sup>a</sup> Department of Obstetrics and Gynecology, Division of Reproductive Endocrinology and Infertility, Walter Reed National Military Medical Center, Bethesda, Maryland; <sup>b</sup> Program in Reproductive and Adult Endocrinology, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health, Bethesda, Maryland; and <sup>c</sup> Department of Obstetrics and Gynecology, University of Miami Jackson Health System, Miami, Florida

**Objective:** To evaluate whether intracytoplasmic sperm injection (ICSI) use and E<sub>2</sub> on the final day of assisted reproductive technology (ART) stimulation are associated with adverse obstetric complications related to placentation.

**Design:** Retrospective cohort study.

**Setting:** Large private ART practice.

**Patient(s):** A total of 383 women who underwent ART resulting in a singleton live birth.

**Intervention(s):** None.

**Main Outcome Measure(s):** Adverse placental outcomes composed of placenta accreta, placental abruption, placenta previa, intrauterine growth restriction, preeclampsia, gestational hypertension, and small for gestational age infants.

**Result(s):** Patients with adverse placental outcomes had higher peak serum E<sub>2</sub> levels and were three times more likely to have used ICSI. Adverse placental outcomes were associated with increasing E<sub>2</sub> (odds ratio 1.36, 95% confidence interval 1.13–1.65) and ICSI (odds ratio 3.86, 95% confidence interval 1.61–9.27). Adverse outcomes increased when E<sub>2</sub> was >3,000 pg/mL and continued to increase in a linear fashion until E<sub>2</sub> was >5,000 pg/mL. The association of ICSI with adverse outcomes was independent of male factor infertility. Interaction testing suggested the adverse effect of E<sub>2</sub> was primarily seen in ICSI cycles, but not in conventional IVF cycles. Estradiol >5,000 pg/mL was associated with adverse placental events in 36% of all ART cycles and 52% of ICSI cycles.

**Conclusion(s):** ICSI and elevated E<sub>2</sub> on the day of hCG trigger were associated with adverse obstetric outcomes related to placentation. The finding of a potential interaction of E<sub>2</sub> and ICSI with adverse placental events is novel and warrants further investigation. (Fertil Steril® 2016;106:363–70. ©2016 by American Society for Reproductive Medicine.)

**Key Words:** Elevated E<sub>2</sub>, adverse obstetric outcomes, IVF, ICSI

## RISULTATI:

- Difetti placentazione associati a ICSI (non a FIVET)
- Cut off **E2 >3000** pg/mL

malities. This result indicated that elevated E<sub>2</sub> levels may interact with the embryo and/or trophoctoderm differently during ICSI than conventional IVF. It is uncertain why such a difference existed in these patients. This differential interaction may arise from **mechanical disruption** of the zona pellucida (ZP) during sperm insertion, alterations in paternal genes expressed in immobilized sperm compared with sperm that spontaneously fertilize the oocyte or altered embryonic expression of L-selectin or cytokines at the time of embryo implantation. These changes may lead to **abnormal placentation** with oxidative stress, causing failure or delay of cytotrophoblastic differentiation leading to shallow interstitial extravillous cytotrophoblastic invasion and reduced endovascular invasion, culminating with **intrauterine growth restriction** for the fetus or **preeclampsia** for the mother (24, 25).

# Which one has a better obstetric and perinatal outcome in singleton pregnancy, IVF/ICSI or FET?: a systematic review and meta-analysis

J. Zhao, B. Xu, Q. Zhang and Y. P. Li\*



## WHY?

- 1) Endometrium in the state of physiological condition
- 2) Cryo/Thawing: Only TOP QUALITY EMBRYO survive.
- 3) NO suprphysiological hormone levels: NO Asynchronism between Endometrium and Embryo.

Positive Influence on RECEPTIVITY, on IMPLANTATION , BUT on **PLACENTATION** and **FETAL GROWTH** too.



## Is frozen embryo transfer better for mothers and babies? Can cumulative meta-analysis provide a definitive answer?

Abha Maheshwari <sup>1,\*</sup>, Shilpi Pandey<sup>2</sup>, Edwin Amalraj Raja<sup>3</sup>,  
 Ashalatha Shetty<sup>1</sup>, Mark Hamilton<sup>1</sup>, and Siladitya Bhattacharya<sup>3</sup>

**Table III** Summary of findings from cumulative meta-analysis.

Risk of outcome	Evidence	Evidence available by year	No further change in precision, magnitude or direction	More observational data needed
Small for gestational age	Lower in Frozen embryo transfer	2010	2014	No
Low birth weight	Lower in Frozen embryo transfer	1997	2014	No
Very low birth weight	Lower in Frozen embryo transfer	2013	2016	No
Large for gestational age	Higher in Frozen embryo transfer	2010	2014	No
High birth weight	Higher in Frozen embryo transfer	2014	2016	No
Very high birth weight	Higher in Frozen embryo transfer	2013	2014	No
Preterm delivery	Lower in Frozen embryo transfer	2005	2014	No
Very preterm delivery	Lower in Frozen embryo transfer	2016	2016	No
Antepartum haemorrhage	No difference	2010	2014	Yes
Admission to NICU	No difference	2012	2013	Yes
Congenital anomalies	No difference	2014	2016	Yes
Perinatal mortality	No difference	2014	2014	Yes
Hypertensive disorders of pregnancy	Higher in Frozen embryo transfer	2015	2015	Yes

## Is frozen embryo transfer better for mothers and babies? Can cumulative meta-analysis provide a definitive answer?

Abha Maheshwari <sup>1,\*</sup>, Shilpi Pandey<sup>2</sup>, Edwin Amalraj Raja<sup>3</sup>,  
Ashalatha Shetty<sup>1</sup>, Mark Hamilton<sup>1</sup>, and Siladitya Bhattacharya<sup>3</sup>

**OBJECTIVE AND RATIONALE:** The aim of this study was to perform a systematic review and cumulative meta-analysis (trend with time) of obstetric and perinatal complications in singleton pregnancies following the transfer of frozen thawed and fresh embryos generated through *in-vitro* fertilisation.

**WIDER IMPLICATIONS:** The results of this cumulative meta-analysis confirm that the decreased risks of small for gestational age, low birth weight and preterm delivery and increased risks of large for gestational age and high birth weight associated with pregnancies conceived from frozen embryos have been consistent in terms of direction and magnitude of effect over several years, with increasing precision around the point estimates. Replication in a number of different populations has provided external validity for the results, for outcomes of birth weight and preterm delivery. Meanwhile, caution should be exercised about embarking on a policy of electively freezing all embryos in IVF as there are increased risks for large for gestational age babies and hypertensive disorders of pregnancy. Therefore, elective freezing should ideally be undertaken in specific cases such as ovarian hyperstimulation syndrome, fertility preservation or in the context of randomised trials.



# Outcome neonatale da gravidanza ottenuta con tecniche di PMA

## Rare congenital disorders, imprinted genes, and assisted reproductive technology

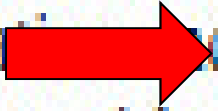
Roger Gosden, Jacquetta Trasler, Diana Lucifero, Malcolm Faddy

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THE LANCET • Vol 361 • June 7, 2003 • [www.thelancet.com](http://www.thelancet.com)



### Conclusions

The epidemiological evidence associating Beckwith-Wiedemann syndrome or Angelman syndrome with ART procedures is still tentative  and does not yet establish a causal link. The absolute risks are small and unlikely to deter would-be parents from using the technology.

# Health outcomes of children born after IVF/ICSI: a review of current expert opinion and literature

**Abstract** The Sixth Evian Annual Reproduction (EVAR) Workshop Group Meeting was held to evaluate the impact of IVF/intracytoplasmic sperm injection on the health of assisted-conception children. Epidemiologists, reproductive endocrinologists, embryologists and geneticists presented data from published literature and ongoing research on the incidence of genetic and epigenetic abnormalities and congenital malformations in assisted-conception versus naturally conceived children to reach a consensus on the reasons for potential differences in outcomes between these two groups. IVF-conceived children have lower birthweights and higher peripheral fat, blood pressure and fasting glucose concentrations than controls. Growth, development and cognitive function in assisted-conception children are similar to controls. The absolute risk of imprinting disorders after assisted reproduction is less than 1%. A direct link between assisted reproduction and health-related outcomes in assisted-conception children could not be established. Women undergoing assisted reproduction are often older, increasing the chances of obtaining abnormal gametes that may cause deviations in outcomes between assisted-conception and naturally conceived children. However, after taking into account these factors, it is not clear to what extent poorer outcomes are due to the assisted reproduction procedures themselves. Large-scale, multicentre, prospective epidemiological studies are needed to investigate this further and to confirm long-term health consequences in assisted-conception children. 

ORIGINAL ARTICLE

## Reproductive Technologies and the Risk of Birth Defects

Michael J. Davies, M.P.H., Ph.D., Vivienne M. Moore, M.P.H., Ph.D.,  
Kristyn J. Willson, B.Sc., Phillipa Van Essen, M.P.H., Kevin Priest, B.Sc.,  
Heather Scott, B.Mgmt., Eric A. Haan, M.B., B.S.,  
and Annabelle Chan, M.B., B.S., D.P.H.

### CONCLUSIONS

The increased risk of birth defects associated with IVF was no longer significant after adjustment for parental factors. The risk of birth defects associated with ICSI remained increased after multivariate adjustment, although the possibility of residual confounding cannot be excluded. (Funded by the National Health and Medical Research Council and the Australian Research Council.)

**INFERTILITA' =  
FATTORE DI RISCHIO**

The risk of a birth defect was increased among women with a history of infertility but no accompanying history of treatment with assisted reproductive technology, an observation that is consistent with the findings in a large Danish registry<sup>8</sup> and that implicates patient factors in this increased risk. Similarly, we found that “spontaneous” con-



## Obstetric outcome and incidence of congenital anomalies in 2351 IVF/ICSI babies

Paolo Emanuele Levi Setti<sup>1</sup> · Melita Moioli<sup>1</sup> · Antonella Smeraldi<sup>1</sup> · Elisa Cesaratto<sup>1</sup> · Francesca Menduni<sup>1</sup> · Stefania Livio<sup>2</sup> · Emanuela Morengli<sup>3</sup> · Pasquale Patrizio<sup>4</sup>

Received: 17 January 2016 / Accepted: 30 March 2016 / Published online: 1 April 2016  
© Springer Science+Business Media New York 2016

### Abstract

**Purpose** The aim of this study was to provide a comprehensive follow-up of fetal and perinatal outcome and the incidence of congenital anomalies in babies born after fresh embryo transfers compared to those conceived spontaneously in infertile couples.

**Methods** Retrospective comparative analysis of all clinical pregnancies from fresh cleavage-stage embryo transfer cycles (IVF and ICSI) compared with infertile patients who conceived spontaneously in the same time period (control). Congenital anomalies were classified following the European Surveillance of Congenital Anomalies (EUROCAT) classification.

**Results** A total of 2414 assisted reproductive technology (ART) pregnancies were compared to 582 spontaneous conceptions in the control infertile group representing 2306 deliveries. No significant differences were found in pregnancy

**Capsule** The rates of congenital anomalies in children born from infertile couples either with ART or spontaneously are higher than those reported in non-infertile couples. These data suggest that the diagnosis of infertility in itself is the common denominator for the increase in the rates of anomalies seen in both ART and spontaneous conceptions.

**2414 Fresh ET vs 582 Infertile Patient with spontaneous conceptions  
EUROCAT classification congenital anomalies**

single and twins mean gestational age, and weight at delivery). A significant difference ( $p < 0.001$ ) was found in the twin (21.3 vs 2.3 %) and triplet rates (2.3 vs 0 %). A total of 2351 babies were delivered in the ART group and 449 in the control group. A total of 90 babies (3.8 %) were diagnosed with a major congenital anomaly in the ART group and 15 (3.3 %) in the control group ( $p = ns$ ). The overall rate of major congenital anomalies (105/2800) in ART and spontaneous pregnancies in infertile couples was significantly higher when compared to the EUROCAT 2.0 versus 3.75 % ( $p = 0.0002$ ).

**Discussion** Babies born after ART treatments and from spontaneous conception in infertile couples had rates of congenital anomalies higher than those recorded by the EUROCAT.

However, the rates of anomalies were not different within the infertile population whether conceived by ART or spontaneously. These data suggest that the diagnosis of infertility in itself is the common denominator for the increase in the rates of anomalies seen in both ART and spontaneous conceptions.

**Keywords** ART · Pregnancy outcome · Neonatal anomalies · IVF · ICSI



# Outcome dei nati da gravidanza ottenuta con tecniche di PMA



## The longer-term health outcomes for children born as a result of IVF treatment: Part I—General health outcomes

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Submitted on June 20, 2012; resubmitted on December 14, 2012; accepted on December 21, 2012

## The longer-term health outcomes for children born as a result of IVF treatment. Part II—Mental health and development outcomes

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**Table II Summary table of potential effects of IVF treatment on various general health outcomes for the offspring**

General health outcome in adolescence	Summary of effect
Cardiovascular and metabolic	↑ ↔ Fat deposition ↑ Diastolic and systolic blood pressure ↑ ↔ Fasting glucose ↔ Fasting insulin, lipids,
Cancer	↔ All cancers
Asthma, allergy and atopy	↔
Hearing and visual acuity	↔
Growth and pubertal development	↔ Height ↔ BMI ↑ ↔ Bone age ↑ ↔ ♀ Premature activation of the adrenal gland ↔ Menarche and thelarche ↔ ♂ Markers of testicular function
Endocrine abnormalities	↑ Subclinical hypothyroidism
Quality of life	↔ General wellbeing

## The longer-term health outcomes for children born as a result of IVF treatment: Part I—General health outcomes

Roger Hart<sup>1,2,\*</sup> and Robert J. Norman<sup>3</sup>

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Submitted on June 20, 2012; resubmitted on December 14, 2012; accepted on December 21, 2012

## Conclusions

This systematic review of the literature provides some reassuring evidence with regard to the longer-term general health outcome for children born as a result of IVF treatment. However, it is expected that the cardiovascular and metabolic risk factors found in childhood and tracking into adulthood could be worse in later life, and may ultimately be responsible for chronic cardiometabolic disease.

**Table II** Summary table of potential effects of IVF treatment on various mental health outcomes for the offspring.

Mental health outcomes in adolescence	Summary of effect
Cognitive function	↑ ↔ cognitive scores
School performance	↔ educational achievement
Neuromotor development	↔
Social functioning and behaviour	↔ both at home and at school
Attention-deficit disorder	↔
Autism	↔
Depression	↑ ↔
Binge drinking	↑ ♀ more than ♂
Smoking	↔

↑, increased; ↔, no effect; ♀, female; ♂, male.

## The longer-term health outcomes for children born as a result of IVF treatment. Part II–Mental health and development outcomes

Roger Hart<sup>1,2,\*</sup> and Robert J. Norman<sup>3</sup>

<sup>1</sup>School of Women's and Infant's Health, University of Western Australia, King Edward Memorial Hospital, Subiaco, Perth, WA 6008, Australia <sup>2</sup>Fertility Specialists of Western Australia, Claremont, Perth, WA 6010, Australia <sup>3</sup>The Robinson Institute, University of Adelaide, Fertility SA, Adelaide, SA 5006, Australia

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Submitted on June 20, 2012; resubmitted on January 7, 2013; accepted on January 9, 2013

## Conclusion

This systematic review of the literature provides some reassuring evidence with regard to the longer-term mental health outcome for children born as a result of IVF treatment. However, there are potential associations with an increase in the risk of cerebral palsy and slight developmental delay, which appears to be explained by obstetric factors rather than IVF *per se*. Any potential association with autism or ADHD needs to be explored by further study as many of the associations with these conditions are more common in a child born to a couple with subfertility.

Whilst there may be some preliminary evidence for an increase in the incidence of adolescent depression and female binge drinking, the majority of evidence provides a reassuring outlook for the longer-term mental health of children born from IVF treatment.

## Increased time to pregnancy is associated with less optimal neurological condition in 4-year-old singletons, *in vitro* fertilization itself is not

P. Schendelaar<sup>1</sup>, E.R. Van den Heuvel<sup>2</sup>, M.J. Heineman<sup>3</sup>,  
S. La Bastide-Van Gemert<sup>2</sup>, K.J. Middelburg<sup>3</sup>, J. Seggers<sup>1</sup>  
and M. Hadders-Algra<sup>1,\*</sup>

**MAIN RESULTS AND THE ROLE OF CHANCE:** The fluency score, NOS and the prevalence of complex MND were similar in COH-IVF, MNC-IVF and Sub-NC children. The neurological condition of children born to subfertile parents was similar to that of children of fertile parents and was independent of the underlying cause of subfertility. No statistically significant associations were found between TTP and the fluency score and NOS. However, a positive correlation was found between TTP and the prevalence of complex MND (TTP in years, adjusted odds ratio [OR] [95% confidence interval, CI]: 1.207 [1.038 to 1.404],  $P = 0.014$ ); a correlation which could be attributed to girls, in whom an evident positive correlation was present (adjusted OR [95% CI]: 1.542 [1.161 to 2.047],  $P = 0.003$ ). A similar association was absent in boys.

**INFERTILITA' = FATTORE DI RISCHIO**

## Review

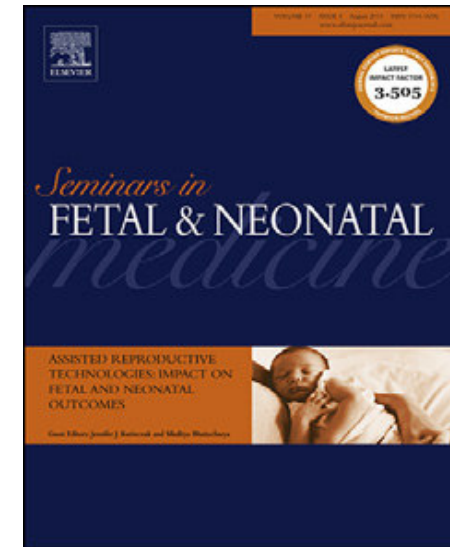
# I was born following ART: how will I get on at school?

Omar Abdel-Mannan\*, Alastair Sutcliffe

*General and Adolescent Paediatric Unit, Institute of Child Health, London, UK*

## Practice points

- IVF pregnancies carry a higher risk of genetic imprinting disorders, preterm birth, low birth weight, and being small for gestational age.
- No major concerns or differences have been found for neurocognitive and motor development assessment in ICSI and IVF children, compared with NC children.
- Environmental factors, e.g. birth weight, gestational age, socio-economic status, and parental educational levels are greater predictors of IQ than is ART treatment.



# ETEROLOGA



# Obstetric outcomes in donor oocyte pregnancies compared with advanced maternal age in in vitro fertilization pregnancies

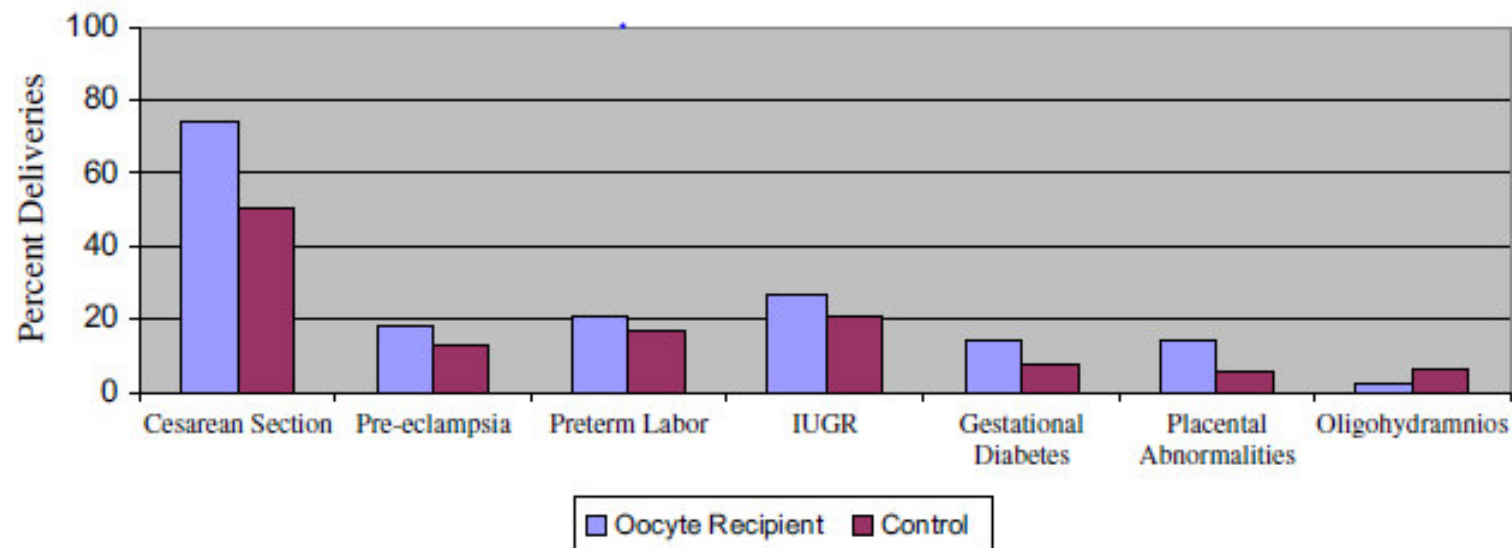
Sacha A. Krieg, M.D., Ph.D.,<sup>a</sup> Melinda B. Henne, M.D., M.S.,<sup>b</sup> and Lynn M. Westphal, M.D.<sup>c</sup>

Fertility and Sterility® Vol. 90, No. 1, July 2008

IVF with donated oocytes may **not be** at increased risk of obstetric complications when compared with women of **similar age** undergoing IVF with autologous oocytes.

COMPLICATIONS related  
**ADVANCED MATERNAL AGE**

Obstetric outcomes in recipients of donor oocytes compared to IVF controls



# IN CONTRASTO CON...

Human Reproduction Update, Vol.16, No.6 pp. 704–712, 2010

Advanced Access publication on June 12, 2010 doi:10.1093/humupd/dmq017

human  
reproduction  
update

## Clinical and immunologic aspects of egg donation pregnancies: a systematic review

M.L.P. van der Hoorn<sup>1</sup>, E.E.L.O. Lashley<sup>1</sup>, D.W. Bianchi<sup>2</sup>, F.H.J. Claas<sup>3</sup>,  
C.M.C. Schonkeren<sup>1</sup>, and S.A. Scherjon<sup>1,\*</sup>

### RISCHIO > di:

- Disordini Ipertensivi della Gravidanza
- Sanguinamenti (I trimestre e EPP)
- Disordini della Placentazione

“The benefits of having a take-home baby are counter-balanced by the higher risk of maternal morbidity.”

“The increased rate of complications may be related to the ***allogeneic nature of the fetus.***”





## Obstetric and neonatal complications in pregnancies conceived after oocyte donation: a systematic review and meta-analysis

M Storgaard,<sup>a</sup> A Loft,<sup>b</sup> C Bergh,<sup>c</sup> UB Wennerholm,<sup>d</sup> V Söderström-Anttila,<sup>e</sup> LB Romundstad,<sup>f,g</sup> K Aittomaki,<sup>h</sup> N Oldereid,<sup>i</sup> J Forman,<sup>j</sup> A Pinborg<sup>k</sup>

### Conclusions

This review and meta-analysis show elevated risks of HDP, PE, LBW, PTB, CS and postpartum haemorrhage in OD versus IVF and SC pregnancies, while there was no difference in the incidence of SGA and gestational diabetes mellitus.

The increased risks of adverse maternal and neonatal outcomes should be taken into account when offering parental counselling prior to fertility treatment with OD and when planning ante- and perinatal care.

Since some of the risks in OD pregnancies such as HDP and postpartum bleeding are further increased in multiple pregnancies, single-embryo transfer should be recommended, and couples wishing for a multiple pregnancy should be properly informed about their risk profile prior to double-embryo transfer.

## Maternal and fetal outcomes in oocyte donation pregnancies

Valeria Maria Savasi<sup>1,\*</sup>, Luca Mandia<sup>1</sup>, Arianna Laoreti<sup>1</sup>,  
and Irene Cetin<sup>1,2</sup>

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Pregnancy Care		Assessment	Suggested action
	First Trimester	<ul style="list-style-type: none"> <li>Identify women who may need additional care and plan pattern of care for the pregnancy</li> <li>Measure blood pressure and test urine for proteinuria</li> </ul> <ul style="list-style-type: none"> <li>Offer screening for Down's syndrome.</li> </ul>	<ul style="list-style-type: none"> <li>Folic acid (400 mcg/die)</li> <li>Low-dose aspirin prophylaxis starting from first Trimester</li> <li>Multivitamin-multimineral supplementation + DHA 200 mg/die + Calcium 1000 mg/die</li> </ul> <ul style="list-style-type: none"> <li>Consider non-invasive test for screening of Down's syndrome</li> </ul>
	Second Trimester	<ul style="list-style-type: none"> <li>Offer ultrasound screening for structural anomalies and uterine arteries doppler assessment</li> <li>Review, discuss and record the results of screening test</li> </ul> <ul style="list-style-type: none"> <li>Preterm Birth screening</li> <li>Gestational Diabetes screening</li> </ul>	<ul style="list-style-type: none"> <li>Ultrasound assessment of cervix length</li> <li>Oral Glucose Tolerance Test 75 g glucose</li> </ul>
	Third Trimester	<ul style="list-style-type: none"> <li>Offer ultrasound screening for detection of growth anomalies and doppler assessment</li> </ul> <ul style="list-style-type: none"> <li>Attentive discussion of the mode of delivery</li> </ul>	

**Monthly clinical evaluation**  
Assessment of dietary and lifestyle habits

## Conclusion

Oocyte donation seems to be independently associated with a higher rate of placental diseases of pregnancy, such as gestational hypertension and pre-eclampsia. The risk of having poorer neonatal outcomes is increased in oocyte donation pregnancies compared to IVF. Nevertheless, poorer outcomes have been demonstrated especially for twin pregnancies and in association with the development of obstetrical complications and previous chronic pathologies. Single high-quality embryo transfer has to be favored for oocyte donation recipients. In this light, the recognition of risks associated with oocyte donation pregnancies should lead obstetricians to consider tailored clinical surveillance and, possibly, preventive strategies and appropriate screening.

- 1) RICONOSCERE E RIDURRE FATTORI RISCHIO PRE-ESISTENTI**
- 2) SINGLE HIGH QUALITY EMBRIO TRANSFER**
- 3) SORVEGLIANZA GRAVIDANZA “AD HOC”**

.....outcome a lungo termine, soprattutto psicologico,  
dei nati da PMA eterologa??

## Take home messages

- Le gravidanze ottenute con tecniche di PMA sembrano avere outcome ostetrici più sfavorevoli rispetto alle gravidanze spontanee (aumentata incidenza di parto pretermine, di disordini di placentazione, di ipertensione gestazionale, di emorragia post-parto).
- I neonati da gravidanze ottenute con tecniche di PMA sono a più alto rischio di disordini genetici di imprinting, di basso peso alla nascita, di piccolo o grande per età gestazionale
- Nei nati da PMA non è stato riscontrato né un aumento di anomalie congenite né di differenze neurocognitive e motorie rispetto ai nati da gravidanze spontanee.

## Take home messages

- Il comune denominatore degli outcome sfavorevoli sembra essere legato non alla tecnica di PMA ma all'**infertilità**.
- Fattori ambientali e comportamentali, l'età della donna, lo stato sociale, il grado di istruzione ecc.. sono i principali predittori dell'outcome della gravidanza e dei nati da PMA.
- Le gravidanze e i nati da PMA necessitano di una sorveglianza e un follow up «ad hoc»
- Ulteriori studi sono necessari per stabilire il reale nesso causale degli outcome sfavorevoli delle gravidanze e dei nati da PMA



Grazie!