



Can In Vitro Fertilization enhance fertility in Europe? A scenario study

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Background and aim of the scenario study

Various recent studies (RAND 2006; Valverde 2007; Jensen *et al.* 2007) suggest that early and wide availability of In Vitro Fertilization and other reproductive technologies might have a positive effect on the TFR

We have our doubts --> Our scenario study aims at determining whether earlier and wider availability of IVF is a useful policy measure to help reverse low fertility



Simulation approach

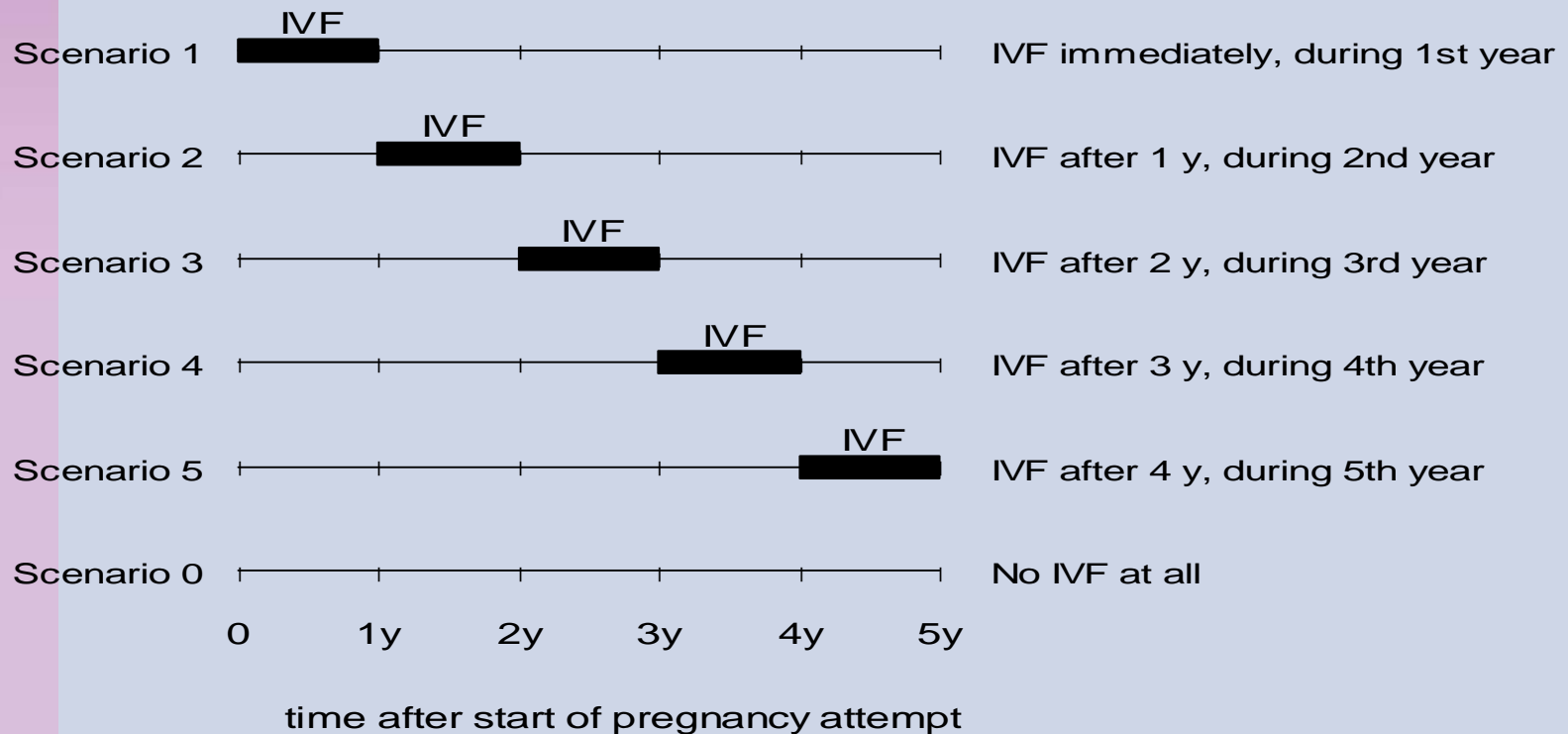
- In a simulation model, a cohort of women trying for their first and second child is followed
- For each woman, the occurrence of a pregnancy leading to a live-birth delivery is the endpoint
- When a natural pregnancy is not realized within a certain period, IVF treatment is started

Essential feature:

- Dynamic interplay between natural and IVF-pregnancy chances



5 IVF scenarios and a no-IVF scenario





Model assumptions

(based on literature)

- The age-specific fertility rates at first childbirth are adapted from Dutch data for 2002
- The age-dependent onset of infertility increases from 3% at age 25 to 85% at age 45 (Henry 1965; Leridon 2004)
- The monthly pregnancy chances of couples who are not (yet) infertile follow a beta-distribution (Bongaarts 1975)
- The chance of conception during the first month of exposure (25% for women under 30) and the decline thereafter (13% at age 35; 8% at age 40 and 3% at age 45) (Dunson *et al.* 2004; Van Noord-Zaadstra 1991; Schwartz & Mayaux 1982)
- The distribution of IVF singletons (75.5%), twins (23.2%) and triplets (1.3%) (Andersen *et al.* 2005)
- The age-dependent ongoing pregnancy rates after IVF in NL (Lintsen *et al.* 2007)



Scenario outcomes (first and second children)

Number of:	Immediate IVF (scen. 1)	IVF after 1 y. (scen. 2)	IVF after 3 y. (scen. 4)	No IVF (scen. 0)	Difference between Scen. 2 and 4
Live-born deliveries	175,455	182,303	182,160	176,713	143
All children	198,117	189,850	186,046	178,480	3,804
IVF-children	106,057	29,033	10,476	-	18,557
Twins and triplets	45,662	15,094	7,772	3,534	7,322
IVF cycles	326,020	102,486	50,575	-	51,911
TFR increase relative to no IVF	0.196	0.114	0.076	-	0.038



Difference of applying IVF after 1 or 3 years (scenario 2 minus scenario 4)

- 140 more live-birth deliveries (~0%)
- 3,800 more children (~2%)
- 18,600 more IVF children (~177%)
- 7,300 more twin/triplet children (~94%)
- 51,900 more IVF cycles (~103%)
- 0.038 in TFR

- Rate of infertility after 5 yrs:
4.4% in scenario 2 versus 4.8% in scenario 4



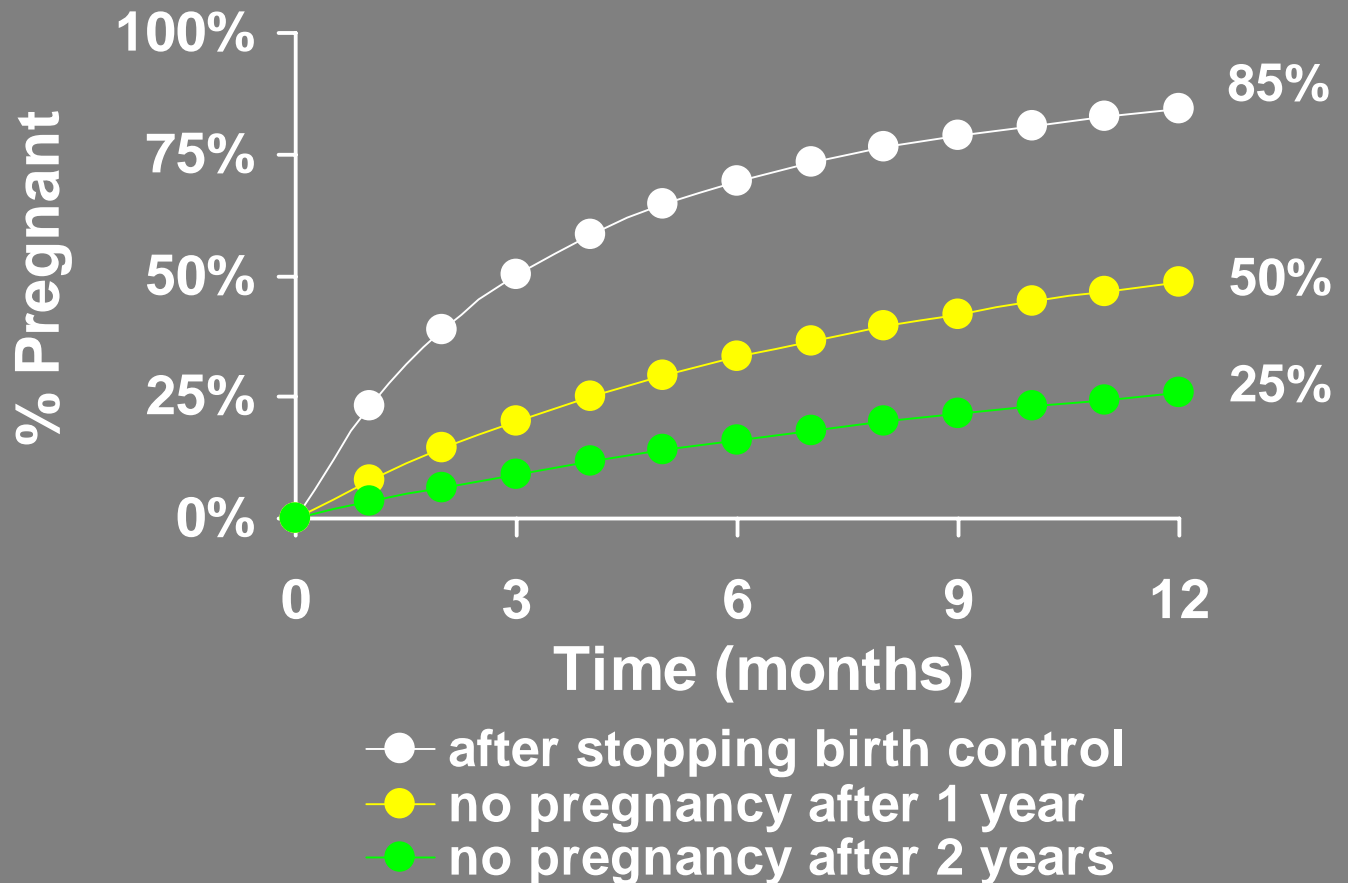
Different infertility concepts

- The publications by RAND, Sunde and Jensen suppose that 'infertility after 1 year' = life time childlessness, i.e. after 1 year no natural pregnancies will occur
- We know that natural pregnancies will occur also after IVF: many IVF pregnancies with scenario 2 would have taken place naturally within the following 2 yrs



The proportion of couples having a natural pregnancy leading to a live birth

(Te Velde *et al.*, Lancet 2000)





Price to be paid for an extra TFR of 0.038

- Extra children almost entirely from multiple births
- Associated with multiple births are increased risks of prematurity and low birth weights, leading to considerably more infant morbidity and a highly increased risk of cognitive and neurological problems later in life
- Increased risk of complications for the mother
- Financial effect of multiple births on (late) health care resources is much larger than actual IVF treatment costs



Conclusion

- We believe that IVF is the most important treatment modality for couples who have no or little chance of conceiving naturally: for these couples it should be widely available free of charge in all EU Member States after 1 yr of trying to conceive
- For the remaining couples it should also be widely available after 3 yrs for free
- But this treatment on the *micro* level has no role to play in enhancing fertility on the *macro* level