# ART OUTCOME: THE TOTAL NUMBER OF EMBRYOS REPLACED AS A PREDICTOR OF SUCCESS

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In vitro fertilisation (IVF) has greatly evolved since the first successful pregnancy was reported, and many lessons have been learned since then about its efficacy, efficiency and safety.

An important aspect is also the capacity to define the upper limits, to be able to identify the point at which a couple must consider giving up due to too low chances of success, which is in close relation to the intention to minimize IVF complications such as ovarian hyperstimulation syndrome (OHSS), multiple pregnancies, and emotional stress.

To this end, it is mandatory to define the concept of IVF success, which has also evolved over time. Ideally, an IVF treatment should lead to a single healthy term pregnancy. Subsequently, the way to define success should imply the probability of reaching this event per attempt, and is highly dependent on the number and quality of the embryos replaced.

The transfer of a single embryo provides a similar outcome to the transfer of two embryos but only in couples with a good prognosis. In addition, national regulations and restrictions may vary among countries determining the maximum number of embryos replaced. Moreover, there is a trend towards increasing the number of ET with the number of failed IVF attempts.

Patients undergoing IVF wish to know the take-home baby rate among the entire treatment against infertility, as well as how their chances may change as the number of failed treatments increase. With the aim of being able to advise couples seeking IVF treatment, many studies have addressed cumulative pregnancy or live-birth rates, but to date only one has reported cumulative rates, including multiple pregnancies, in a sufficiently large cohort of couples from which to draw valid conclusions.

According to that recent study, it is estimated that couples undergoing IVF have a 72% probability of live-birth after 6 cycles of controlled ovarian stimulation (COS) and ovum pick-up.

None of the aforementioned reports have taken into consideration the number of embryos replaced per attempt, and this fact may be biasing the results, given that a number of cycles may include a wide range of total embryos transferred. This fact demonstrates that cumulative rates per cycle may not be the most realistic information on which to base advice to patients.

A more pragmatic approach to predicting outcome in a given couple would be to analyze the increase in cumulative live-birth rates depending on the total number of embryos replaced, thus considering each ET as a single opportunity for achieving a newborn. Although this approach has not yet been used in IVF, it has the advantage of providing clinicians and patients with a more accurate perspective of the probability of success, and how this probability changes as the number of failed treatments increase.

Thus, in this report, we describe an analysis of our database in which we calculated the cumulative live-birth rates per ET since 1998, considering each ET as a single chance to achieve a live-birth, and taking into consideration the relevance of age, infertility aetiology, and day of embryo transfer as key parameters affecting IVF success.

To this end, we employ survival curves and Kaplan-Meier methods to analyse cumulative live-birth rates in a large retrospective cohort from a single-centre with respect to the number of embryos transferred (ET), finding a rapid increase in cumulative livebirth rates between one and five ET, moderately between five and fifteen, and slowly thereafter.

Live-birth rates rise more slowly when embryos are transferred on day 2-3 rather than on day 5-6, although the long term results are comparable.

Women's age is a negative factor from 35 to 37 years old, with a dramatic decrease in live-birth rates beyond 40. In addition there are significant differences in outcome between infertility aetiologies, with endometriosis having the worst prognosis, and polycystic ovarian syndrome and tubal occlusion having the best.

Then, we can conclude that the relationship between cumulative live-birth rates and number of ET provides realistic, accurate and precise information regarding the chances of IVF success and can be used to guide couples in the decision-making process that forms part of assisted reproduction treatments. Moreover, this approach may be valid in the measurement of success in IVF depending on other study designs, when the whole treatment against infertility is considered (follow-up studies).