ELECTIVE FERTILITY PRESERVATION (SOCIAL EGG FREEZING)

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Objectives:

• To focus on the developments in ART leading the pavement to ‘social egg freezing’

• To review the data for counseling of patients seeking oocyte cryopreservation to delay childbearing

• To outline the updated results with elective fertility preservation
Potential indications

- Age related decline in fertility (social reasons)
- Endometriosis
- Low ovarian reserve
- Any medical condition contraindicating pregnancy
Distribution of elective FP cycles

- 94.2%
- 1.7%
- 1.6%
- 2.1%
- 0.5%

Men do not show up easily nowadays!

Reasons for not pursuing childbearing earlier.

# of cropreserved oocytes needed to achieve 1 pregnancy

![Graph showing the number of oocytes needed to achieve pregnancy over time. The graph shows a significant decrease from 100 in 1999 to 20 in 2013.](image)

Porcu et al, 1999

Donnez and Dolmans, 2013

Time frame in yrs

0 20 40 60 80 100 120

Number needed to treat
Oocyte Vitrification
Oocytes: slow freezing vs vitrification

Rienzi et al; HR Update, 2017
Oocyte vitrification versus fresh oocytes

Cobo et al, Hum Reprod 2010

- RCT (300/300)
- Ongoing CPR/woman randomized RR=1.03, CI:0.87-1.21
- Ongoing CPR/cycle RR=1.01, CI: 0.86-1.18
- Ongoing CPR/utilized oocyte RR=1.02, CI: 0.82-1.26
Women should receive correct information about oocyte cryopreservation and its success rates, and do not accept it as an insurance policy as it is often portrayed.
So doctor, please tell me:

- How many eggs should we need to vitrify?
- Is my age appropriate for this right now?
Predicting the likelihood of live birth for elective oocyte cryopreservation: a counseling tool for physicians and patients

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Assumptions

• < 36 yrs: 95% survival of thawed mature oocytes

• ≥ 36 yrs: 85% survival of thawed mature oocytes

ASRM Practice Committee Report 2013
Cobo et al Fertil Steril 2016

• The probability of a mature oocyte fertilizing and blastulating in a frozen-thawed cycle ≈ the fertilizing and blastulation of a fresh oocyte.

• 60% live birth rate per transferred euploid blastocyst
\[ p \text{ (livebirth)} = 1 - [1 - 0.6p(\text{euploid}) \times p(\text{blast})] \times \text{Number of mature oocytes} \]
The y axis represents the probability of live birth at horizon age, which is 7 years after decision age. Decision age is presented on the x axis. Solid lines: oocyte cryopreservation (OC). Dashed lines: no action. Model A (red) represents women requiring marriage before attempting pregnancy. Model B (black) represents women who do not require marriage before attempting pregnancy (will attempt pregnancy with husband, donor sperm, or unmarried male partner).

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Distribution of patients’ age at vitrification for social EFP

Cost-effectiveness

Devine et al, Fertil Steril 2015
Kaplan-Meier plotting of the cumulative live birth rates (CLBR) of at least one baby, depending on the total number of consumed oocytes and categorized by age (≤35 y and ≥36 y). Overall comparisons: log rank (Mantel-Cox); $P=.003$; Tarone-Ware; $P=.011$. The table shows the CLBRs and 95% confidence intervals (CI) when 5–15 oocytes were consumed, according to age.

### Survival and clinical outcomes according to age at time of vitrification, n (%).

<table>
<thead>
<tr>
<th>Age, y</th>
<th>Patients, n</th>
<th>Cycles, n</th>
<th>Survival rate, n (%)</th>
<th>CPR/cycle, n (%)</th>
<th>CPR/ET, n (%)</th>
<th>OPR/cycle, n (%)</th>
<th>OPR/ET, n (%)</th>
<th>Live births/patients, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤35</td>
<td>32</td>
<td>41</td>
<td>257/272 (94.6)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>24/41 (58.5)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>24/39 (61.5)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>21/41 (51.2)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>21/39 (53.9)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>16/32 (50)&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>≥36</td>
<td>105</td>
<td>150</td>
<td>750/910 (82.4)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>47/150 (31.3)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>47/118 (39.8)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>27/150 (18.0)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>27/118 (22.9)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>24/105 (22.9)&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Total</td>
<td>137</td>
<td>191</td>
<td>1,007/1,182 (85.2)</td>
<td>71/191 (37.1)</td>
<td>71/157 (45.2)</td>
<td>48/191 (25.1)</td>
<td>48/157 (30.5)</td>
<td>40/137 (29.2)</td>
</tr>
</tbody>
</table>

**Survival and clinical outcomes according to different groups of age at vitrification**

<table>
<thead>
<tr>
<th>Age</th>
<th>Patients, n</th>
<th>Cycles, n</th>
<th>Survival rate, n (%)</th>
<th>CPR/cycle, n (%)</th>
<th>CPR/ET, n (%)</th>
<th>OPR/cycle, n (%)</th>
<th>OPR/ET, n (%)</th>
<th>Live births/patients, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤29</td>
<td>6</td>
<td>9</td>
<td>59/62 (94.5)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>6/9 (66.6)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>6/9 (66.6)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>6/9 (66.6)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>6/9 (66.6)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>6/6 (100)&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>30–34</td>
<td>20</td>
<td>23</td>
<td>155/161 (96.1)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>14/23 (60.9)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>14/21 (66.7)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>13/23 (56.5)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>13/21 (61.9)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>9/20 (45)&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>35–39</td>
<td>84</td>
<td>127</td>
<td>601/734 (81.8)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>48/127 (37.8)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>48/112 (42.9)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>27/127 (21.3)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>27/112 (24.1)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>24/84 (28.5)&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>≥40</td>
<td>27</td>
<td>32</td>
<td>192/225 (85.3)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3/32 (9.8)&lt;sup&gt;c&lt;/sup&gt;</td>
<td>3/15 (20)&lt;sup&gt;c&lt;/sup&gt;</td>
<td>2/32 (6.3)&lt;sup&gt;c&lt;/sup&gt;</td>
<td>2/15 (13.3)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1 (3.7)&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
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**Note:** Abbreviations as in Table 1.

<sup>a,b,c</sup> Different superscripts in the same column indicate statistical differences (P<.05).

Thank you....