# Supplementary Materials

## Text A: Background information

The genetic information that we inherit from our parents determines part of our personal characteristics, for example our hair color. But heredity can also play a role when it comes to certain conditions. Carrier status for certain conditions can be determined by a screening test. Being a carrier usually has no consequences for your own health. As a result, people are often not aware of their carrier status. Couples considering having children in the future can be screened for multiple recessive (non-dominant) hereditary conditions. This screening test is performed using a blood test from both reproductive partners. If both partners are carriers of a mutation in the same gene, they have a 25% chance of conceiving a child with a recessive inherited condition in each pregnancy. When the mother is a carrier of an X-linked recessive condition, there is a 50% chance that the male offspring of the couple will develop the condition in each pregnancy. It is estimated that approximately 1-2% of couples in are at risk of conceiving a child with a recessive hereditary condition.

A preconceptional (takes place before conception) carrier screening test can be used to determine whether a couple has an increased reproductive risk. This information can help couples to make reproductive choices related to future pregnancies. When both partners are carriers of the same hereditary condition they have the choice between accepting the increased risk of conceiving a child with this specific hereditary condition, prenatal diagnosis (additional tests during pregnancy), IVF/ICSI in combination with pre-implantation genetic testing (embryo-selection), gametes donation (sperm or egg donation) adoption or to renounce their desire to have children together (depending on the particular condition).

Within this project we focus on preconception carrier screening. Meaning a carrier screening offer for couples considering having children but who are not yet pregnant. We would like to find out more about the knowledge, attitudes and preferences of potential users towards preconception carrier screening. Even if you are not familiar with this topic, your opinion is still very valuable.

## Text B: Questionnaire

1. What is your gender?
	* Male
	* Female
2. What is your age?
	* < 18
	* 18-24
	* 25-34
	* 35-44
	* 45-49
	* >49
3. What is your highest completed level of education?
	* Primary education
	* Secondary education
	* Non-university higher education
	* University higher education
	* PhD
4. Are you religious?
	* Yes
	* No (go to question 6)
5. To what extent are you active in your religion?
* Not active
* Somewhat active
* Active
1. Do you have children?
* Yes
* No
1. Are you currently in a relationship?
* Yes
* No (go to question 9 )
1. Please, specify:
	* Not living together
	* Living together
	* Married
2. Do you have a (future) child wish?
* Yes
* No
* I’m not sure
1. Have you ever had a consultation at a Centre for Human Genetics? (= centre specialized in hereditary conditions)
* Yes
* No

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1. How do you estimate your chance to be a carrier of a hereditary condition?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Very low | 1 | 2 | 3 | 4 | 5 | Very high |

1. How do you estimate your chance of conceiving a child with a hereditary condition?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Very low | 1 | 2 | 3 | 4 | 5 | Very high |

1. To what extent do you find it acceptable to offer carrier screening for hereditary conditions to couples with a child wish?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Totally un- acceptable | 1 | 2 | 3 | 4 | 5 | Totally acceptable |

1. Would you consider a carrier screening test for yourself in the future?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Definitely will not consider | 1 | 2 | 3 | 4 | 5 | Definitely will consider |

1. I find a preconception carrier screening test for myself to be:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Harmful | 1 | 2 | 3 | 4 | 5 | Beneficial |
| Not important | 1 | 2 | 3 | 4 | 5 | Important |
| Negative | 1 | 2 | 3 | 4 | 5 | Positive |
| Not Reassuring | 1 | 2 | 3 | 4 | 5 | Reassuring |
| Not desirable | 1 | 2 | 3 | 4 | 5 | Desirable |

1. The pressure on future parents to have preconception carrier screening for hereditary conditions will become great.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Definitely not | 1 | 2 | 3 | 4 | 5 | Definitely yes |

1. Carrier research for hereditary conditions will lead to greater anxiety among couples who want to become pregnant.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Definitely not | 1 | 2 | 3 | 4 | 5 | Definitely yes |

1. Carrier research for hereditary conditions will make the lives of people living with these condition seem inferior

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Definitely not | 1 | 2 | 3 | 4 | 5 | Definitely yes |

1. We would like to ask you some knowledge questions about preconception carrier screening for hereditary conditions. For each statement, please put a cross in one of the columns on the right. If you don't know the answer, please choose the "I don't know" box.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | True | False | I don’t know |
| 1 | A carrier of an hereditary condition carries a mutation for that condition but does not have the condition himself/herself. |  |  |  |
| 2 | All serious conditions are determined by a genetic predisposition. |  |  |  |
| 3 | All hereditary conditions are expressed during childhood (<18 years). |  |  |  |
| 4 | A carrier screening test examines if you are at risk for developing one or more hereditary conditions. |  |  |  |
| 5 | Genetic carrier screening is only intended for individuals with an increased family risk (families where genetic conditions have already occured). |  |  |  |
| 6 | You can be a carrier of a hereditary condition without this condition occuring in your own family |  |  |  |
| 7 | A carrier of a hereditary condition will always develop that specific condition and get related health problems. |  |  |  |
| 8 | If you are a carrier of a hereditary condition, all your offspring will also be a carrier of that specific hereditary condition. |  |  |  |
| 9 | If the (future) mother is a carrier of a recessive hereditary condition, all her children will develop this condition. |  |  |  |
| 10 | If both partners are carriers of a mutation for the same recessive hereditary condition, they a 50% chance each pregnancy to conceive a child with the condition for which they are carriers |  |  |  |
| 11 | If both partners are carriers of a mutation for a different recessive hereditary condition, they have a 25% chance each pregnancy to conceive a child with one of both condition.  |  |  |  |
| 12 | Two healthy individuals without health problems can have a child with an inherited condition. |  |  |  |
| 13 | When a preconception genetic carrier screening test does not identify an increased risk, this means with certainty that this couple will have a healthy child. |  |  |  |
| 14 | If both partners are carriers of the same genetic condition, they cannot conceive children naturally without this specific genetic condition. |  |  |  |

1. Preconception carrier screening for hereditary conditions should be available through …? (multiple options possible)
* The Centre for Human Genetics
* The General Practitioner
* The Gynaecologist
* The Pharmacy
* The Midwife
* The School
* The Internet
* This test should not be made available
* Others, namely:………………………………
1. Suppose a couple that wants to have children has taken the carrier screening test. How should test results be communicated?
* Individual test results: both partners receive information about the conditions of which they are carriers.
* Couple-based test result: the couple receives information about whether they are both carriers of the same condition or not (individual test results are not given)
* I have no preference
1. How do you think an offer of preconception carrier screening is offered best?
* All or nothing: the list of conditions is fixed. Everyone is screened for the same conditions.
* Categories: the list of conditions is divided into certain categories. A category includes similar conditions. People interested in the screening offer can choose for which different categories they would like to be screened.
* Free choice: those interested are free to choose for which conditions they would like to be screened.
1. Are you willing to pay for a preconception carrier screening test yourself?
	* Yes
	* No
	* I’m not sure
2. How much are you willing to pay for a preconception carrier screening test yourself?
	* < 150 euro
	* 151 – 300 euro
	* 301 – 450 euro
	* 451 – 600 euro
	* > 600 euro

This is the end of the questionnaire. We would like to thank you for filling in this questionnaire and sharing your opinion.

If you have any questions after completing this questionnaire or if you are interested in the study results, please contact:

## Text C: Supplementary data

### Sociodemographic Characteristics

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| Table 8: Sociodemographic Characteristics of participants |
|  | N (%) |
| Age (n=151) |
| 18-24 | 59 (39.1) |
| 25-34 | 62 (41.1) |
| 35-44 | 24 (15.9) |
| 45-49 | 6 (4.0) |
| Highest level of completed education (n=151) |
| Primary Education | 1 (0.7) |
| Secondary Education | 35 (23.2) |
| Non-university higher education | 33 (21.9) |
| University higher education | 81 (53.6) |
| PhD | 1 (0.7) |
| Religiosity (n=151) |
| Yes | 42 (27.8) |
| No | 109 (72.2) |
| Extent of religious involvement (n=42) |
| Not active | 31 (73.8) |
| Somewhat | 9 (21.4) |
| Active | 2 (4.8) |
| Children (n=151) |
| Yes | 37 (24.5) |
| No | 114 (75.5) |
| (Future) Child wish (n=151) |
| Yes | 105 (69.5) |
| No | 30 (19.9) |
| I don’t know | 16 (10.6) |
| Relationship (n=151) |
| Yes | 108 (71.5) |
| No | 43 (28.5) |
| Relationship status (n=108) |
| Not living together | 34 (31.5) |
| Living together | 42 (38.9) |
| Married | 32 (29.6) |
| Consultation at Centre for Human Genetics (CME) (n=151) |
| Yes | 10 (6.6) |
| No | 141 (93.4) |

### Perceived susceptibility

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| Table 9: Perceived susceptibility  |
| Comparison on outcomes amongst independent samples |
| Perceived susceptibility of being a carrier of a hereditary condition |
| Age (U=1488, z=-1.589, p=0.112)aEducation (U=3245.5, z=1.621, p=0.105)aReligiosity (U=2121.5, z=-0.725, p=0.469)aExtent of religious involvement (U=140.5, z=-0.924, p=0.396)a,bChildren (U=2694.5, z=2.639, **p=0.008**)a(Future) Child wish (U=1799, z=-2.595, **p=0.009**)aRelationship (U=2406.5, z=0.363, p=0.717)aRelationship status (U=1114.5, z=-0.990, p=0.322)aCME (U=401.5, z=2.366, **p=0.018**)a |
| Perceived susceptibility of conceiving a child with a hereditary condition |
| Age (U=1614, z=-0.984, p=0.325)aEducation (U=2637, z=-0.753, p=0.451)aReligiosity (U=2278, z=-0.048, p=0.962)aExtent of religious involvement (U=157, z=-0.416, p=0.714)a,bChildren (U=2494.5, z=1.751, p=0.080)a(Future) Child wish (U=1820.5, z=-2.524, **p=0.012**)aRelationship (U=2534.5, z=0.920, p=0.358)aRelationship status (U=1322, z=0.446, p=0.656)aCME (U=243.5, z=-3.626, **p<0.001**)a |

*a Mann-Whitney U test.*

*bExact significance is displayed.*

### Acceptability & intention to participate in ECS

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| Table 10: Acceptability & intention to participate in ECS |
| Comparison on outcomes amongst independent samples |
| Acceptability of offering ECS to couples with a child wish |
| Age (U=1793, z=-0.112 p=0.911)aEducation (U=2794, z=-0.143, p=0.886)aReligiosity (U=2416.5, z=0.579 p=0.563)aExtent of religious involvement (U=129, z=-1.281, p=0.245)a,bChildren (U=2024.5, z=-0.399, p=0.690)a(Future) Child wish (U=2241, z=-0.769, p=0.442)aRelationship (U=1996.5, z=-1.466, p=0.143)aRelationship status (U=1270.5, z=0.092, p=0.927)aCME (U=677.5, z=-0.225, p=0.822)a |
| Intention to participate in ECS |
| Age (U=1378, z=-2.118, **p=0.034**)aEducation (U=2897, z=0.264, p=0.792)aReligiosity (U=2505.5, z=0.934, p=0.350)aExtent of religious involvement (U=116.5, z=-1.593, p=0.124)a,bChildren (U=2500.5, z=1.760, p=0.078)a(Future) Child wish (U=2083.5, z=-1.393, p=0.164)aRelationship (U=2500, z=0.763, p=0.446)aRelationship status (U=1253.5, z=-0.031, p=0.975)aCME (U=564, z=-1.096, p=0.273)a |

*a Mann-Whitney U test.*

*bExact significance is displayed.*

###  Knowledge about ECS related concepts

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| Table 11: Knowledge about ECS related concepts  |
| Comparison of outcomes amongst independent samples |
| Knowledge Score  |
| Age (U=1340.5, z=-1.392, p=0.164)aEducation (U=3403, z=4.714, **p<0.001**)aReligiosity (U=1763.5, z=-0.424, p=0.672)aExtent of religious involvement (U=96, z=-1.076, p=0.302)a,bChildren (U=2067, z=1.407, p=0.159)a(Future) Child wish (U=1682, z=-1.478, p=0.139)aRelationship (U=1643, z=-1.293, p=0.196)aRelationship status (U=1040.5, z=0.015, p=0.988)aCME (U=571.5, z=-0.531, p=0.595)a |

*a Mann-Whitney U test.*

*bExact significance is displayed.*

### Attitudes towards ECS

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| Table 12: Attitudes towards ECS  |
| Comparison of outcomes amongst independent samples |
| Attitude Score  |
| Age (U=1710, z=-0.491, p=0.623)aEducation (U=3242, z=1.548, p=0.122)aReligiosity (U=2432, z=0.596, p=0.551)aExtent of religious involvement (U=137.5, z=-0.948, p=0.350) a,bChildren (U=2170, z=0.265, p=0.791)a(Future) Child wish (U=2224, z=-0.775, p=0.438)aRelationship (U=2102, z=-0.910, p=0.363)aRelationship status (U=1387.5, z=0.86, p=0.390)aCME (U=342, z=-2.726, **p=0.006**)a |
| Pressure |
| Age (U=1964.5, z=0.727, p=0.467)Education (U=3229.5, z=1.56, p=0.119)Religiosity (U=1889.5, z=-1.730, p=0.084)Extent of religious involvement (U=170.5, z=<0.001, p=1)a,bChildren (U=1963, z=-0.659, p=0.510)(Future) Child wish (U=2297, z=-0.497, p=0.619)Relationship (U=2271, z=-0.219, p=0.826)Relationship status (U=1296.5, z=0.264, p=0.792)CME (U=753.5, z=0.378, p=0.705) |
| Anxiety/worry |
| Age (U=1258.5, z=-2.719, **p=0.007**)Education (U=2514, z=-1.233, p=0.218)Religiosity (U=2037, z=-1.096, p=0.273)Extent of religious involvement (U=169, z=-0.047, p=0.978)a,bChildren (U=2282, z=0.784, p=0.433)(Future) Child wish (U=2101.5, z=-1.328, p=0.184)Relationship (U=2186, z=-0.588, p=0.557)Relationship status (U=1143, z=-0.794, p=0.427)CME (U=960, z=1.999, **p=0.046**) |
| Inferiority |
| Age (U=1650, z=-0.795, p=0.427)Education (U=3071, z=0.934, p=0.350)Religiosity (U=2352.5, z=0.272, p=0.785)Extent of religious involvement (U=187, z=0.486, p=0.652)a,bChildren (U=2274.5, z=0.740, p=0.460)(Future) Child wish (U=2323, z=-0.384, p=0.701)Relationship (U=2410.5, z=0.377, p=0.706)Relationship status (U=1141, z=-0.803, p=0.422)CME (U=995, z=2.241, **p=0.025**) |

*a Mann-Whitney U test.*

*bExact significance is displayed.*

### Preferences for the practical organization of a population-based ECS offer

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| Table 13: Preferences for the practical organization of a population-based ECS offer  |
| Comparison on outcomes amongst independent samples |
| Availability (Gynaecologist) |
| Age (χ2(1)=2.924, p=0.087, V=0.139)Education (χ2(1)=0.003, p=0.959, V=0.004) Religiosity (χ2(1)=1.153, p=0.283, V=0.087)Extent of religious involvement (p=0.593\*)Children (χ2(1)=1.412, p=0.235, V=0.097)(Future) Child wish (χ2(1)=2.08, p=0.149, V=0.117)Relationship (χ2(1)=0.581, p=0.446, V=0.062)Relationship status (χ2(1)=4.307, **p=0.038**, V=0.200)CME (p=0.683\*)  |
| Availability (GP) |
| Age (χ2(1)=0.135, p=0.713, V=0.030)Education (χ2(1)=0.173, p=0.678, V=0.034)Religiosity (χ2(1)=0.604, p=0.437, V=0.063Extent of religious involvement (p=0.726\*)Children (χ2(1)=0.020, p=0.886, V=0.012)(Future) Child wish (χ2(1)=0.166, p=0.684, V=0.033)Relationship (χ2(1)=1.466, p=0.226, V=0.099)Relationship status (χ2(1)=0.651, p=0.420, V=0.078)CME (p=0.533\*) |
| Availability (CME) |
| Age (χ2(1)=2.183, p=0.140, V=0.120)Education (χ2(1)=0.255, p=0.614, V=0.041)Religiosity (χ2(1)=0.105, p=0.746, V=0.026)Extent of religious involvement (p=0.305\*)Children (χ2(1)=1.561, p=0.211, V=0.102)(Future) Child wish (χ2(1)=0.368, p=0.544, V=0.049)Relationship (χ2(1)=1.668, p=0.197, V=0.105)Relationship status (χ2(1)=0202, p=0.653, V=0.043)CME (p=1\*) |
| Test offer |
| Age (χ2(2)=2.597, p=0.273, V=0.139)Education (χ2(2)=0.756, p=0.685, V=0.075)Religiosity (χ2(2)=2.240, p=0.326, V=0.129)Extent of religious involvement (p=0.487\*\*)Children (χ2(2)=0.846, p=0.655, V=0.079)(Future) Child wish (χ2(2)=0.261, p=0.878, V=0.044)Relationship (χ2(2)=0.108, p=0.947, V=0.028)Relationship status (χ2(2)=2.323, p=0.313, V=0.155)CME (**p=0.007\*\***) |
| Results reporting |
| Age (χ2(2)=1.462, p=0.481, V=0.104)Education (χ2(2)=3.842, p=0.146, V=0.169)Religiosity (χ2(2)=3.776, p=0.151, V=0.167)Extent of religious involvement (p=0.208\*\*)Children (χ2(2)=0.697, p=0.706, V=0.072)(Future) Child wish (χ2(2)=1.039, p=0.595, V=0.088)Relationship (χ2(2)=3.472, p=0.176, V=0.160)Relationship status (χ2(2)=2.168, p=0.338, V=0.150)CME (p=0.719\*\*) |
| WTP |
| Age (χ2(2)=1.793, p=0.408, V=0.115)Education (χ2(2)=6.722, **p=0.035**, V=0.223)Religiosity (χ2(2)=2.571, p=0.277, V=0.138)Extent of religious involvement (p=0.655\*\*)Children (χ2(2)=0.643, p=0.725, V=0.069)(Future) Child wish (χ2(2)=0.337, p=0.845, V=0.050)Relationship (χ2(2)=4.855, p=0.088, V=0.190)Relationship status (χ2(2)=1.393, p=0.498, V=0.120)CME (p=0.687\*\*) |
| WTP (Amount) |
| Age (χ2(2)=1.017, p=0.601, V=0.117) Education (χ2(2)=1.743, p=0.418, V=0.153)Religiosity (χ2(2)=1.206, p=0.547, V=0.128)Extent of religious involvement (p=0.072\*\*)Children (χ2(2)=1.259, p=0.533, V=0.130)(Future) Child wish (χ2(2)=5.164, p=0.076, V=0.264)Relationship (χ2(2)=0.854, p=0.652, V=0.107)Relationship status (χ2(2)=1.913, p=0.384, V=0.183)CME (p=0.887\*\*) |

*Chi-Square test of independence notation: χ2(df), p-value, V (Cramer’s V , measure for the strength/magnitude of the association)*

*\* Fisher-Exact test*

*\*\*Fisher-Freeman-Holton test*