Current value of preimplantation genetic screening

Twisk, M.

Citation for published version (APA):
Preimplantation genetic screening as an alternative to prenatal testing for Down syndrome: preferences of women undergoing in vitro fertilization/intracytoplasmic sperm injection treatment

Moniek Twisk
Maaike L. Haadsma
Fulco van der Veen
Sjoerd Repping
Sebastiaan Mastenbroek
Maas-Jan Heineman
Patrick M.M. Bossuyt
Johanna C. Korevaar

Fertility and Sterility 2007;88:804-810
Abstract

Objective: Although the primary goal of preimplantation genetic screening (PGS) is to increase pregnancy rates in women undergoing IVF/intracytoplasmic sperm injection treatment, it has been suggested that it may also be used as an alternative to prenatal testing for Down syndrome.

Design: Trade-off questionnaires.

Setting: Two university centers for reproductive medicine.

Patient(s): Two hundred forty-four subfertile women.

Intervention(s): Scenarios with different pregnancy chances after PGS and with different risk reductions of a Down syndrome pregnancy were presented.

Main Outcome Measure(s): Willingness to have PGS performed in the various scenarios.

Result(s): In case PGS would discover all Down syndrome embryos without affecting pregnancy chances, 83% of the women would have PGS performed. If PGS lowered pregnancy chances from one in five to one in seven, 36% of the women preferred to have PGS performed. If PGS reduced the chance of a Down syndrome pregnancy with 80% without affecting pregnancy chances, 75% of the women would have PGS performed, and 31% of them would refrain from prenatal testing afterward.

Conclusion(s): Most women favor PGS for Down syndrome screening, even if it is not 100% sensitive. The acceptability depends on the effect PGS has on pregnancy chances, and, to a lower extent on its sensitivity to detect Down syndrome embryos.
Introduction

The chance of having a child with Down syndrome increases with maternal age. To diagnose trisomy 21 antenatally, chromosomal analysis can be performed after chorionic villus sampling or amniocentesis. These invasive tests are labor-intensive, expensive, and carry a procedure-related risk of fetal loss of 0.5–1%. Therefore, not all pregnant women accept chromosomal analysis. Noninvasive screening tests, like sonographic measurement of nuchal translucency thickness or first and second trimester maternal serum screening, have been developed as alternatives. By using these noninvasive screening tests, it is possible to select women with a high probability of a Down syndrome pregnancy who can then be offered invasive testing.

In case a Down syndrome pregnancy is detected, the couple has to decide whether or not to terminate the pregnancy. For many parents terminating a Down syndrome pregnancy is a very difficult decision to make. The grief following termination for a fetal abnormality can be similar to the grief following neonatal death.

With IVF and intracytoplasmic sperm injection (ICSI) fertilization occurs in the laboratory. This provides the possibility to examine embryos before implantation. In preimplantation genetic screening (PGS) one or two blastomeres are removed from an early cleavage stage embryo and used for aneuploidy screening. Only embryos scored as euploid for the chromosomes tested are transferred.

Although the primary goal of this technique is to increase pregnancy rates in women undergoing IVF/ICSI, it has been suggested that it may also be used as an alternative to prenatal testing for Down syndrome. The thought underlying the use of PGS in these cases is that with PGS couples do not have to decide whether they want to undergo invasive prenatal procedures with the risk of miscarriage, nor do they have to make any decisions about terminating a Down syndrome pregnancy. A disadvantage is that embryos can be misdiagnosed, as the chromosomal content of blastomeres from the same embryo can differ, a phenomenon known as mosaicism. Indeed, Down syndrome fetuses have been diagnosed with invasive prenatal procedures after IVF/ICSI with PGS, and births of children with Down syndrome have been reported after PGS.

Another disadvantage of PGS is that the effect it has on pregnancy chances is yet unknown. Although PGS has been developed to improve pregnancy rates, a recent Cochrane review reported no significant difference between ongoing pregnancy rates after IVF/ICSI with PGS compared with IVF/ICSI without PGS. The ongoing pregnancy rate per patient after PGS was 15%, and the ongoing pregnancy rate after IVF/ICSI without PGS was 20% (odds ratio [OR] 0.64, 95% confidence interval [CI] 0.37 to 1.09). By applying PGS, treatment costs are increased. These costs are usually not covered by insurance. Therefore, it might not be affordable for all patients.

Before PGS can be introduced as an alternative to conventional prenatal testing, it is important to know women’s attitudes toward both methods of testing for Down
syndrome, as well as their preferences. To date, only one study has assessed women’s preferences for PGS as an alternative to prenatal testing 19. In this study, 74 infertile couples undergoing IVF/ICSI were asked for their opinion on the acceptability of PGS. However, only information on invasive prenatal testing was provided, and couples were not informed on the possibility of noninvasive prenatal testing. In this study PGS was more acceptable than prenatal testing for 82% of the couples, and 96% of the couples were willing to undergo PGS. Whether women would refrain from prenatal tests after PGS, and whether women would still opt for PGS if it did not detect all embryos with Down syndrome, was not assessed. Furthermore, it is unknown whether couples undergoing IVF/ICSI would still consider PGS if it would negatively affect pregnancy chances. To assess the attitudes of women undergoing IVF/ICSI treatment toward PGS as an alternative to prenatal testing, we designed a questionnaire. In this questionnaire we assessed whether women would opt for PGS if this screening method would be “ideal” and when it would not be ideal, that is, would lower pregnancy chances or would not detect all Down syndrome embryos.

Materials and methods

Eligible for the study were women in the stimulation phase of an IVF/ICSI cycle, attending the Centers for Reproductive Medicine of the Academic Medical Center and the University Medical Center Groningen between May and December 2005. Consenting women were handed out a questionnaire. They were asked to complete the questionnaire at home and return it on their next visit to the clinic. Institutional review board approval was obtained for this study.

Demographic characteristics and information on reproductive history including age, parity, duration of infertility, number of previous IVF/ICSI cycles, previous experiences with prenatal diagnosis, and education level were collected. Written general information about the various possibilities of prenatal tests for Down syndrome pregnancies with their advantages and disadvantages was provided in the questionnaire. Women were then asked whether they would consider prenatal testing for Down syndrome if they were pregnant, and if so, what type of testing: invasive or noninvasive. If a woman would not consider prenatal testing, she was asked to indicate her main reason for not wanting prenatal testing: “every child is welcome,” “I don’t want to decide about termination of the pregnancy,” or “other reason, being.”

Subsequently, information on PGS as a possible alternative was presented. Three scenarios were presented in which pregnancy chances and sensitivity in detecting Down syndrome embryos varied. After each scenario women were asked whether they would opt for PGS in that particular situation.
In the first scenario PGS prevented all Down syndrome pregnancies, without any negative effects on pregnancy chances. One out of five women was expected to become pregnant after one cycle of IVF/ICSI.

In the second scenario PGS still prevented all Down syndrome pregnancies, but with a lower chance to become pregnant with IVF/ICSI treatment: one out of seven.

In the third scenario PGS lowered the chance of having a child with Down syndrome from 1 in 200—the risk of a 37-year-old woman—to 1 in 1,000, without having any negative effect on pregnancy chances. This implied a risk reduction of 80% on having a Down syndrome child after PGS. If women answered “yes” to PGS in this situation, they were asked if they would subsequently undergo prenatal testing for Down syndrome. Addendum 1 contains a translated version of the information provided on PGS in the questionnaire and the three presented scenarios.

Statistical analysis
For data analysis SPSS forWindows version 11.5.1 was used. Statistical significance was defined as P<.05. To determine factors associated with accepting a lower pregnancy change after PGS and determine factors associated with still wanting PGS when its detection possibility is not 100%, we performed univariable and multivariable logistic regression analyses.

Results
A total of 343 questionnaires were handed out, of which 244 were returned (response rate 71%). Baseline characteristics of the respondents are provided in Table 1. Mean age was 34.2 years (SD 4.12). Most women (77%) had no children, and only 8% had previous experience with prenatal testing for Down syndrome.

Sixty-eight percent of the respondents wanted to have prenatal testing for Down syndrome if they became pregnant (Table 2). Of these women, 92% preferred to undergo noninvasive diagnostic tests and 78% of them also considered invasive diagnostic tests, depending on the outcome of the noninvasive test. Eight percent of the women would immediately go for an invasive procedure. Most women who did not consider prenatal testing gave as the reason for this decision “every child is welcome” (38 women, 53%).

Fifteen (21%) women did not want prenatal testing because they did not want to have to decide about termination of a pregnancy. Nine (12%) women gave various reasons (e.g., “I am young, therefore I am not at risk,” “with normal ultrasound you can also see enough”), and 10 (14%) women gave no reason.

Willingness of women to have PGS performed is shown in Table 3. In case PGS discovered Down syndrome embryos with 100% certainty without affecting pregnancy chances, 201 (83%) women favor PGS.
If PGS was 100% effective in detecting Down syndrome embryos, but lowered pregnancy chances from one out of five to one out of seven, 89 (36%) women would opt for PGS.

If PGS would reduce the risk of a Down syndrome pregnancy by 80% (i.e., PGS lowered the chance of having a child with Down syndrome from 1 in 200 to 1 in 1,000) without affecting pregnancy chances, 183 (75%) women would prefer to have PGS, and 57

Table 1. Baseline characteristics of respondents

<table>
<thead>
<tr>
<th>Characteristic</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years) [mean (SD)]</td>
<td>34.2 (4.12)</td>
</tr>
<tr>
<td>Women with children with current or previous partner (%)</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>77</td>
</tr>
<tr>
<td>1 or more</td>
<td>23</td>
</tr>
<tr>
<td>Previous experience with prenatal testing (%)</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>92</td>
</tr>
<tr>
<td>Non-invasive prenatal diagnostic test</td>
<td>2</td>
</tr>
<tr>
<td>Invasive prenatal diagnostic test</td>
<td>2</td>
</tr>
<tr>
<td>Both invasive and non-invasive diagnostic test</td>
<td>4</td>
</tr>
<tr>
<td>Women with acquaintances with Down syndrome child (%)</td>
<td>27</td>
</tr>
<tr>
<td>Infertility duration (months) [mean (SD)]</td>
<td>50.2 (26.8)</td>
</tr>
<tr>
<td>No. of previous IVF/ICSI cycles (%)</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>33</td>
</tr>
<tr>
<td>1</td>
<td>28</td>
</tr>
<tr>
<td>2 or more</td>
<td>39</td>
</tr>
<tr>
<td>Educational level (%)</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>3</td>
</tr>
<tr>
<td>Medium</td>
<td>54</td>
</tr>
<tr>
<td>High</td>
<td>43</td>
</tr>
<tr>
<td>Educational level of partner (%)</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>1</td>
</tr>
<tr>
<td>Medium</td>
<td>59</td>
</tr>
<tr>
<td>High</td>
<td>40</td>
</tr>
<tr>
<td>Center</td>
<td></td>
</tr>
<tr>
<td>AMC [number (%)]</td>
<td>144 (59)</td>
</tr>
<tr>
<td>UMCG [number (%)]</td>
<td>100 (41)</td>
</tr>
</tbody>
</table>

Table 2. Preferences for Down syndrome testing (%)

If you were pregnant at this moment, would you consider testing for Down syndrome?

Yes
- Only non-invasive testing                                                      165 (68%)
- Non-invasive testing, possibly followed by invasive testing                   128 (78%)
- Invasive testing                                                              14 (8%)
No
- Every child is welcome                                                        72 (30%)
- I don’t want to have to decide about termination of pregnancy                38 (53%)
- Other reason                                                                  15 (21%)
- Unknown                                                                       9 (12%)
- Unknown / unclear                                                             10 (14%)

If PGS was 100% effective in detecting Down syndrome embryos, but lowered pregnancy chances from one out of five to one out of seven, 89 (36%) women would opt for PGS. If PGS would reduce the risk of a Down syndrome pregnancy by 80% (i.e., PGS lowered the chance of having a child with Down syndrome from 1 in 200 to 1 in 1,000) without affecting pregnancy chances, 183 (75%) women would prefer to have PGS, and 57
(31%) of them would refrain from prenatal testing afterwards. Of the women who did choose prenatal testing afterward, 23% would only consider noninvasive tests, 4% would immediately opt for an invasive test, and 73% would start with a noninvasive test possibly followed by an invasive test depending on the outcome of the noninvasive test.

Seventy-two (30%) women answered that they would not have any form of prenatal testing in case of a pregnancy. A significant proportion of them (42 [58%] women) was willing to undergo PGS if PGS would not negatively affect pregnancy chances (Table 3). The 15 women that did not want prenatal testing because they did not want to decide on termination of a pregnancy, were significantly more willing to undergo PGS than the 57 women that do not want prenatal diagnostic tests (PND) for other reasons (14 [93%] vs. 28 [49%], OR 14.5, 95% CI 1.79 to 117.7).

Of the 165 women that answered they would have any form of prenatal testing in case of a pregnancy, 154 (93%) were willing to undergo PGS if it would not negatively affect pregnancy chances and would detect all Down syndrome embryos. If PGS would lower their pregnancy chance 72 (44%) were willing to undergo PGS. If PGS would not detect all Down syndrome embryos 144 (87%) women were still willing to undergo PGS, and 23 (16%) of them would refrain from prenatal testing afterwards (Table 3).

As presented above, out of a total of 201 (44%) women wanting PGS, 89 were willing to accept a lower pregnancy chance after PGS while 112 (56%) were not willing to accept this. Subgroup analysis showed that women who had already undergone one or more IVF treatments in the past were significantly less inclined to accept a negative effect.

Table 3. Women’s willingness to have PGS performed and willingness to refrain from prenatal testing after PGS, for different scenario’s

<table>
<thead>
<tr>
<th></th>
<th>Have PGS performed?</th>
<th>Refrain from prenatal testing?</th>
</tr>
</thead>
<tbody>
<tr>
<td>All women (n = 244)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scenario 1: PGS 100% effective, pregnancy chance 1/5</td>
<td>201 (83%)</td>
<td>n.a.*</td>
</tr>
<tr>
<td>Scenario 2: PGS 100% effective, pregnancy chance 1/7</td>
<td>89 (36%)</td>
<td>n.a.</td>
</tr>
<tr>
<td>Scenario 3: PGS 80% effective†, pregnancy chance 1/5</td>
<td>183 (75%)</td>
<td>57 (31%)</td>
</tr>
<tr>
<td>Women not wanting prenatal testing (n = 72)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scenario 1: PGS 100% effective, pregnancy chance 1/5</td>
<td>42 (58%)</td>
<td>n.a.</td>
</tr>
<tr>
<td>Scenario 2: PGS 100% effective, pregnancy chance 1/7</td>
<td>14 (19%)</td>
<td>n.a.</td>
</tr>
<tr>
<td>Scenario 3: PGS 80% effective†, pregnancy chance 1/5</td>
<td>35 (49%)</td>
<td>n.a.</td>
</tr>
<tr>
<td>Women wanting prenatal testing (n = 165)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scenario 1: PGS 100% effective, pregnancy chance 1/5</td>
<td>154 (93%)</td>
<td>n.a.</td>
</tr>
<tr>
<td>Scenario 2: PGS 100% effective, pregnancy chance 1/7</td>
<td>72 (44%)</td>
<td>n.a.</td>
</tr>
<tr>
<td>Scenario 3: PGS 80% effective†, pregnancy chance 1/5</td>
<td>144 (87%)</td>
<td>23 (16%)</td>
</tr>
</tbody>
</table>

* n.a.: not asked
† i.e. lowers the chance of having a child with Down syndrome from 1 in 200 to 1 in 1000
on their pregnancy chance (40% vs. 58%, OR 0.45, 95% CI 0.2 to 0.85). There were no significant differences between age groups (above or below 36 years) or between women with and without children (Table 4).
A second subgroup analysis showed no significant differences between age groups (above or below 36 years), between women with and without children, and between women with and without IVF/ICSI treatments in the past in women who were still in favor of PGS, even when PGS is not able to prevent all Down syndrome pregnancies, compared with women who only want PGS if this prevents all Down syndrome pregnancies (Table 4).

Table 4. Results of univariable and multivariable logistic regression analysis on willingness of PGS in women that are in favor of PGS (n = 201)

<table>
<thead>
<tr>
<th>Clinical parameter</th>
<th>Univariable analysis</th>
<th>Multivariable analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR 95% CI P-value</td>
<td>OR 95% CI P-value</td>
</tr>
<tr>
<td>Question: Would you still want PGS if this lowers your pregnancy chance?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age &lt; 36 years</td>
<td>43% 1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Age ≥ 36 years</td>
<td>49% 1.28 0.73-2.26 0.39</td>
<td>1.21 0.67-2.21 0.53</td>
</tr>
<tr>
<td>Nulliparous women</td>
<td>42% 1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Multiparous women</td>
<td>58% 1.93 0.97-3.83 0.06</td>
<td>1.88 0.92-3.84 0.08</td>
</tr>
<tr>
<td>No IVF treatments in the past</td>
<td>58% 1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>1 or more IVF treatments in the past</td>
<td>40% 0.47 0.25-0.87 0.02</td>
<td>0.45 0.24-0.85 0.01</td>
</tr>
<tr>
<td>Question: Would you still want PGS if this would give a risk reduction of 80% of having a Down syndrome child?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age &lt; 36 years</td>
<td>93% 1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Age ≥ 36 years</td>
<td>91% 0.76 0.27-2.11 0.60</td>
<td>0.66 0.23-1.91 0.45</td>
</tr>
<tr>
<td>Nulliparous women</td>
<td>92% 1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Multiparous women</td>
<td>93% 1.21 0.33-4.46 0.77</td>
<td>1.36 0.35-5.22 0.67</td>
</tr>
<tr>
<td>No IVF treatments in the past</td>
<td>87% 1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>1 or more IVF treatments in the past</td>
<td>94% 2.45 0.88-6.88 0.09</td>
<td>2.55 0.90-7.21 0.08</td>
</tr>
</tbody>
</table>

OR = Odds ratio; CI = 95% confidence intervals.

Discussion

The results of this study show that most women opt for preimplantation genetic screening as an alternative to prenatal testing for Down syndrome if this would have no negative effect on their pregnancy chances. Women are still favourable toward PGS if this would not detect all Down syndrome embryos but would reduce their risk of having a child with Down syndrome with 80% (i.e., PGS lowered the chance of having a child with Down syndrome from 1 in 200 to 1 in 1,000). Thirty-six percent of the women would even accept a lower pregnancy chance, provided that PGS would prevent all Down syndrome pregnancies. Almost half (42%) of the women who would refrain from any form of prenatal testing for Down syndrome, would choose PGS if this was offered.
A possible limitation of our study is that 29% of the women did not return the questionnaire. Women who did not respond could differ systematically in their preferences from those who did respond.

Another limitation of our study could be the fact that women were not informed about the cost of PGS. Women might change their attitude to PGS once they have to pay the cost of the procedure.

The 83% of women wanting PGS if this would prevent all Down syndrome pregnancies without a negative influence on their pregnancy chances is slightly lower than the 96% reported by Chamayou et al. in the latter study, the probability of lowering pregnancy chances and the chance of misdiagnosis was not mentioned. The women in our study could be slightly less favorable toward PGS because we did address these topics.

Another explanation for the difference could be that in the study by Chamayou et al. women were not given information on the possibility of noninvasive prenatal testing. Because invasive prenatal testing carries the risk of inducing a miscarriage, it could be women were more favorable to PGS because this alternative does not jeopardize their pregnancy.

Similar studies have been performed on patients’ preferences for preimplantation genetic diagnosis (PGD) as an alternative to prenatal diagnosis. PGD uses a nearly identical technology as PGS, with embryos being screened for a specific genetic disorder. It is used to prevent the birth of affected children in couples with a high risk of transmitting genetic disorders. These risks are much higher than the risk of having a child with Down syndrome. However, women in these studies have to take the similar pros and cons into consideration of testing before versus during their pregnancy. The studies performed differ in study population and the way preferences were asked for, resulting in a large variation in preferences for PGD in these studies, ranging from 28% to 77%.

PGD is performed mostly in fertile couples, and the main reason for not preferring PGD is the low pregnancy chance after IVF/ICSI. If only women with an IVF/ICSI indication were asked, 70% of the women expressed a preference for PGD, which is lower than the results found in our study.

Most women would not want PGS if this lowered their pregnancy chance, even if PGS discovered all Down syndrome embryos. This is not surprising, because most women with an IVF/ICSI indication suffer from a long period of infertility. In case of a pregnancy, they are more cautious with any procedure that might jeopardize their pregnancy. It has been reported that women who became pregnant after IVF/ICSI are less willing to undergo invasive testing because of the risk of a procedural related miscarriage. Instead, they prefer to undergo noninvasive tests, although these tests provide them with a risk assessment instead of a definite diagnosis.

Fifty-eight percent of the women who did not want prenatal testing in case of a pregnancy would want PGS. The reason for this seems to be that with PGS a woman does not have to decide about termination of her pregnancy. The women who did not want PND for
the reason “I don’t want to have to decide about termination of pregnancy” were more willing to undergo PGS than women that did not want PND for other reasons. If PGS would reduce the risk of a Down syndrome pregnancy with 80%, 75% of the women would prefer to undergo PGS, and 69% of them would opt for prenatal testing afterwards. However, women should be advised that the positive predictive value of the prenatal test is lowered with this sequential testing 28,29. Because the risk of carrying a child with Down syndrome is lower after PGS, the percentage of false-positive results with noninvasive testing increases.

In conclusion, we have demonstrated a preference for PGS as an alternative to prenatal testing for Down syndrome among subfertile women with an IVF/ICSI indication. The acceptability of PGS depends largely on its effect on pregnancy chances and, to a lower extent, on its effectiveness in detecting Down syndrome embryos. Before PGS can be offered as an alternative to prenatal testing, trials need to be performed to assess the sensitivity of PGS in detecting Down syndrome embryos and its effect on pregnancy rates.

Acknowledgement
The authors wish to thank Moira Muller for her helpful comments.
References


10. Gottlieb S. Doctors may be able to detect Down’s syndrome during IVF. BMJ 2001;323:67.


Addendum 1:

(This is a translated version of our Dutch questionnaire and contains only a part of the questionnaire)

Possible new technique for Down syndrome testing (PGS)
Currently a technique is being developed by which it might be possible to test for Down syndrome before a pregnancy. This technique is called pre-implantation genetic screening (PGS).

With this technique one cell is removed from an embryo three days after fertilization. This removed cell is tested to assess whether the embryo it derives from is a Down syndrome embryo. Only embryos that are tested negative for Down syndrome are transferred to the uterus. Thus far, no negative effects have been described on the development of children that were conceived using this technique.

It is yet unknown whether PGS can detect all Down syndrome embryos. At this moment, PGS is not used as an alternative for the existing testing methods, but it might be possible that PGS will be offered in the future for Down syndrome testing.

We would like to present you a few scenarios. These scenarios are hypothetically developed by us and do not necessarily reflect your personal situation.

After each presented scenario we will ask you whether you would consider to undergo PGS in that particular situation.

Please try to put yourself in the delineated situation as good as possible and to consider what you would prefer if you were really in that situation. Your answers do not have any consequences for your treatment.
Scenario 1, Imagine:
• Based on your age, your chance of a Down syndrome pregnancy is 1 out of 200
• All Down syndrome embryos can be discovered after applying PGS, so you can not get pregnant of a child with Down syndrome.
• Applying PGS does not influence your pregnancy chance: 1 out of 5 women becomes pregnant after an IVF/ICSI treatment.

Question: Would you have PGS performed in this particular situation?
☐ No → End of questionnaire, we would like to thank you for your participation
☐ Yes

Scenario 2, Imagine:
Based on your age, your chance of a Down syndrome pregnancy is 1 out of 200
All Down syndrome embryos can be discovered after applying PGS, so you can not get pregnant of a child with Down syndrome.
Applying PGS influences your pregnancy chance negatively: 1 out of 7 women (instead of 1 out of 5) becomes pregnant after an IVF/ICSI treatment with PGS.

Question: Would you have PGS performed in this particular situation?
☐ No
☐ Yes

Scenario 3, Imagine:
Based on your age, your chance of a Down syndrome pregnancy is 1 out of 200
Most, but not all, Down syndrome embryos can be discovered after applying PGS. Your chance of a child with Down syndrome is 1 out of 1000 after IVF/ICSI with PGS.
Applying PGS does not influence your pregnancy chance: 1 out of 5 women becomes pregnant after an IVF/ICSI treatment.

Question: Would you have PGS performed in this particular situation?
☐ No
☐ Yes → Would you have additional testing for Down syndrome during your pregnancy in this scenario?
☐ No
☐ Yes, only non-invasive testing, regardless of the results of these tests
☐ Yes, non-invasive testing, possibly followed by amniocentesis or chorionic villus sampling, depending on the results of these tests
☐ Yes, amniocentesis or chorionic villus sampling