Key Stage 4
Genetic Counselling

Student worksheet

Charlotte's story

My name is Charlotte and I'm 30 years old. I have a daughter, Daisy who is 3 and I hope to have another child soon.

Ever since learning about genetics in school I have been fascinated about how DNA works and how our genes make us who we are. For my birthday my Mum and Dad bought me a genetic testing kit which I could not wait to use! I put some saliva in a tube and sent it away to a lab for my DNA to be tested. A few weeks later I got an email to tell me that my information has been uploaded onto a website.

I got a shock; the information told me that I had a faulty copy of the BRAC1 gene, which increases my risk of developing breast and ovarian cancer. My grandmother died of breast cancer when she was 78, and knowing that I have this gene has made me very worried that I would get cancer too. The website advised me to contact a genetic counsellor to discuss the results further, which I have done.

Your task

You will act as the genetic counsellor and answer Charlotte's questions at the meeting to advise her on what having the faulty gene means and her options.

- Read through the sheet 'Charlotte's questions'.
- Use the information cards to research answers to them.
- Write your answers to each question.

https://www.oxfordsparks.ox.ac.uk/content/how-read-dna
Charlotte's questions

1. Why does having the faulty BRAC1 gene increase my risk of developing cancer? Is the increase in risk significant?

2. What are my options for reducing the risk?

3. Which do you think is the best option/s for me and why?

4. Could other people in my family also have the faulty gene? What should I tell them?
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#### Information cards

<table>
<thead>
<tr>
<th>The average woman in the UK has a 12.5 per cent chance of developing breast cancer at some point in her life.</th>
<th>A female BRCA1 carrier has a 60 – 90 per cent chance of developing breast cancer and around 40 – 60 per cent chance of ovarian cancer.</th>
<th>The BRAC1 gene codes for a protein that helps repair damage to DNA. People who inherit a faulty copy that has a mutation are less able to repair damage that accumulates in their DNA over time so they're at higher risk of cancer.</th>
<th>The early signs of breast cancer can be detected with mammograms or MRI scans. These can pick up cancers when they’re small, in one place, and easier to treat successfully.</th>
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<tr>
<td>A woman is at a higher risk of breast cancer if she has close relatives that have had breast cancer.</td>
<td>Only about one in 20 (5 per cent) – of the 50,000 women diagnosed with breast cancer every year carries an inherited faulty gene like BRCA1. Most breast cancers arise from genetic damage that accumulates over a person’s lifetime.</td>
<td>The ovaries and fallopian tubes can be removed to stop ovarian cancer developing. Removing the ovaries in younger women brings on early menopause and makes them infertile.</td>
<td>Breast tissue can be removed by having a double mastectomy. This is major surgery but greatly reduces the risk of developing breast cancer.</td>
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<td>The risk of developing cancer can be reduced by living a healthy lifestyle (exercising regularly, eating a healthy diet, not smoking). The older a person gets, the higher their risk of developing cancer.</td>
<td>A faulty BRCA1 gene can be inherited from a person’s mother or father. Each child of a parent who carries the gene has a 50 per cent chance of inheriting it.</td>
<td>Some women who inherit a faulty BRCA1 gene will never develop breast or ovarian cancer.</td>
<td>No effective ovarian cancer screening methods currently exist so it is difficult to detect at an early stage.</td>
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