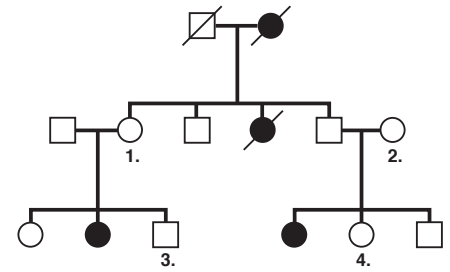


PROBLEM SET > BREAST CANCER: INHERITED RISK

When several cases of breast cancer occur in a family, relatives are often concerned about their own risk of cancer. Such concern has a reasonable basis because research has shown that individuals whose relatives have been diagnosed with cancer have an increased level of risk. In most families, cancer diagnoses occur by chance as people age. However, in families with certain cancers, especially when diagnosis occurs at relatively young ages, the risk of cancer can be due to a gene version that raises the risk of cancer substantially in the family members who inherit it.



A In this family pedigree, the four affected women (indicated by the filled-in circles) were diagnosed with breast cancer before they reached 50 years of age. Please assume that the multiple cases of breast cancer seen in this family are due to transmission and inheritance of an inactivated version of the BRCA2 tumor suppressor gene. Four unaffected members (numbered 1-4 in the above pedigree) of the family have been indicated. For each of these four family members, please estimate the risk that they might inherit the family's inactivated version of BRCA2.

1. _____
2. _____
3. _____
4. _____

B The chance (or risk) that a person will be diagnosed with cancer during their lifetimes can be quite variable and depends on several different factors. In this problem, please assume that a woman who inherits the inactivated BRCA2 allele has a 50% chance of being diagnosed with cancer, and that a man who inherits the same allele has a 10% chance. In the general population, the average risk of a breast cancer diagnosis for all women in the general population is about 8%, and the average risk for all men is about 0.08%. What is the approximate risk of a breast cancer diagnosis for each of these same four individuals?

1. _____
2. _____
3. _____
4. _____