Mendelian patterns

1.1 Autosomal dominant

- i) Vertical pattern, affected patients have an affected parent
- ii) If an affected person marries and has offspring, the risk of any child being affected is $\frac{1}{2}$
- iii) Both sexes are equally effected
- iv) Both sexes are equally likely to transmit the disease

![Autosomal dominant pedigree with non-penetrance](image)

1.2 Autosomal recessive

- i) Horizontal pattern, normal parents have one or more affected children
- ii) Unless the affected person marries a carrier (.), the children will be unaffected
- iii) Associated with consanguineous marriages
- iv) Both sexes equally affected

![Autosomal recessive pedigree](image)
1.3 X-linked inheritance

**X-Recessive**

- Disease affects mainly males
- A ‘knight’s move’ pattern, affected males have unaffected parents but may have affected maternal uncles
- The disease is transmitted by carrier women who are usually asymptomatic; half the son’s of a carrier are affected, and half the daughters are carriers
- If an affected male has children, none of his sons is affected but all of his daughters are carriers
- Affected women can be born if an affected man marries a carrier woman

**X-Dominant**

- Affected males cannot have affected sons but can have affected daughters
- If an affected male has children, all of his sons are carriers and affected daughters also have affected sons
i) Resembles autosomal dominant pedigrees, except that affected males have all normal sons and all affected daughters

Caveats...

i) Lyonization (random inactivation of the X chromosome) can lead to carrier females manifesting signs of disease.

ii) Germline mosaics

iii) New mutations (should be considered for very serious autosomal dominant and X-linked disease, that reduce or are incompatible with reproduction)

iv) X-autosome translocations

v) Imprinting

vi) Epigenetics

…etc