Fredrickson Classification of hyperlipidemias (according to the type of lipoprotein):

<table>
<thead>
<tr>
<th>Phenotype</th>
<th>Elevated lipoproteins(s)</th>
<th>Plasma cholesterol level</th>
<th>Plasma triglyceride level</th>
<th>Atherogenicity</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Chylomicrons</td>
<td>Normal to ↑</td>
<td>Highly increased</td>
<td>-</td>
<td>Rare</td>
</tr>
<tr>
<td>IIa</td>
<td>LDL</td>
<td>Increased</td>
<td>Normal</td>
<td>Yes</td>
<td>10%</td>
</tr>
<tr>
<td>IIb</td>
<td>LDL + VLDL</td>
<td>Increased</td>
<td>Increased</td>
<td>Yes</td>
<td>40%</td>
</tr>
<tr>
<td>III</td>
<td>IDL</td>
<td>Increased</td>
<td>Increased</td>
<td>Yes</td>
<td>Rare</td>
</tr>
<tr>
<td>IV</td>
<td>VLDL</td>
<td>Normal to ↑</td>
<td>Increased</td>
<td>Maybe</td>
<td>45%</td>
</tr>
<tr>
<td>V</td>
<td>VLDL + chylomicrons</td>
<td>Increased</td>
<td>Highly increased</td>
<td>Maybe</td>
<td>5%</td>
</tr>
</tbody>
</table>

Other classifications of dyslipidemia:

- **Primary vs. secondary:**
  - Primary: hereditary and majority of cases are polygenic.
  - Secondary: caused by another disease or might be drug-induced:
    - **Secondary hypercholesterolemia:**
      - Diet
      - Hypothyroidism.
      - Pregnancy.
      - Drugs.
      - Cholestatic liver disease.
      - Nephrotic syndrome.
    - **Secondary hypertriglyceridemia:**
      - Diet.
      - Diabetes type-II
      - Visceral obesity.
      - Chronic renal failure.
      - Drugs.
      - Excess alcohol.
      - Hepatocellular disease.

- **Monogenic vs. Polygenic**
- **Pattern of hyperlipidemia (clinically):**
  - Hypercholesterolemia (treated mainly with statins):
    - **Familial Hypercholesterolemia:**
      - Characterized by: xanthelasma, tendon xanthoma, corneal arcus and premature heart disease.
    - **Familial defective Apo B100:** similar to familial hypercholesterolemia.
    - **Hyperalphalipoproteinemia:**
      - Characterized by: high HDL (good cholesterol) with no cardiovascular risk.
  - Hypertriglyceridemia (treated mainly with fibric acid derivatives):
    - **Familial hypertriglyceridemia:**
      - Characterized by: eruptive xanthoma, lipemia retinalis (creamy appearance of retinal blood vessels), hepatosplenomegaly and pancreatitis.
Lipoprotein lipase deficiency:

- Same features as familial hypertriglyceridemia.

Mixed hyperlipidemia:

- Familial combined hyperlipidemia:
  - Most common type of inherited dyslipidemia.
  - There is increased cardiovascular risk.
  - No unique manifestations.

- Dysbetalipoproteinemia:
  - Characterized by: premature cardiovascular disease, palmar xanthoma and tuberous xanthoma.

Management of dyslipidemia:

- Non-pharmacological management:
  - Reduce the intake of saturated fat.
  - Reduce cholesterol to < 250 mg/day.
  - Reduce energy-dense foods such as soft drinks and fat.
  - Increase cardioprotective foods such as fruits and vegetables.
  - Reduce alcohol consumption.
  - Increase physical activity to lose/maintain weight.

- Pharmacological treatment (check pharmacology note).