Although a CV risk factor is a factor associated with the frequency of CVD, the association can be positive or negative. For example, smoking is positively related to the development of CVD and physical activity is negatively related to the development of CVD.

Principles of total risk prediction

CVD has multiple risk factors (Table 1.1 and Table 1.2); clinicians and primary care teams can identify and manage these conditions and have a major impact on reducing overall CV risk. This will include CV morbidity and mortality.

Traditionally, practice recommendations have focused on the assessment of single risk factors, particularly in the management of hypertension, dyslipidaemia and type 2 diabetes mellitus. In clinical practice, however, a physician needs a holistic approach to patient management, rather than dealing with single aspects of risk.

In particular, blood pressure (BP) and serum lipids (total cholesterol, low-density lipoprotein [LDL] cholesterol and triglycerides) are continuous risk factors (ie, the higher their level, the higher the CV risk; the opposite is true for high-density lipoprotein [HDL] cholesterol) so any cut-off points used to define hypertension or dyslipidaemia are arbitrary. 'Normal' levels of these major risk factors should also be considered in the assessment of absolute CV risk (p. 38–9).

Major independent risk factors for CVD

- Advancing age
- Smoking (length and history)
- Hypertension (systolic BP >140–159 mmHg and diastolic BP >90–99 mmHg), including a morning surge in BP, which is correlated to target-organ damage (eg, renal dysfunction) and the highest incidence of stroke and MI
- Elevated serum total cholesterol (>5–6 mmol/L [200–240 mg/dL]) and elevated serum LDL cholesterol (>3–4 mmol/L [130–160 mg/dL])
- Reduced serum HDL cholesterol (<1 mmol/L [35 mg/dL])
- Type 2 diabetes mellitus

Table 1.1 BP, blood pressure; CVD, cardiovascular disease; HDL, high-density lipoprotein; LDL, low-density lipoprotein; MI, myocardial infarction.

Additional risk factors for CVD

Conditional risk factors

- Elevated serum triglycerides
- Small LDL particles
- Elevated serum homocysteine
- Elevated serum lipoprotein(a)
- Prothrombotic factors (eg, fibrinogen)
- Inflammatory markers (eg, C-reactive protein)

Predisposing risk factors

- Male gender
- Obesity
- Abdominal obesity
- Physical inactivity
- Family history of premature CVD
- Ethnic group
- Psychosocial factors
- Nutritional factors (saturated fat, cholesterol and trans-fatty acids are risk factors for CVD, but fruit and vegetables, fibre and fatty fish consumption are more protective)

Table 1.2 CVD, cardiovascular disease; LDL, low-density lipoprotein.

Because CVD is multifactorial in origin, it is important to consider all of its risk factors simultaneously in consideration of an individual's absolute CV risk. Risk factors tend to cluster, and co-existent risk factors tend to have a multiplicative effect on CV risk. For example, the 'metabolic syndrome' is a cluster of CV risk factors (Table 1.3) that might confer additional risk beyond that expected of its individual components:

- Threefold increase in risk of an MI or a stroke.
- Twofold increase in risk of death from an MI or a stroke.
- Fivefold increase in risk of the development of type 2 diabetes mellitus, if it is not already present.

Total CV risk is determined by the combination of co-existing risk factors in a patient who has not already developed CHD or other major atherosclerotic disease and can be estimated using medical algorithms.