HYPERTENSION IN THE COMMUNITY: OVERVIEW
**Classification of Blood Pressure**

<table>
<thead>
<tr>
<th>Category</th>
<th>SBP</th>
<th>DBP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt; 120 or</td>
<td>&lt; 80</td>
</tr>
<tr>
<td>Prehypertension</td>
<td>120-139</td>
<td>or 80-89</td>
</tr>
<tr>
<td>Stage 1</td>
<td>140-159</td>
<td>or 90-99</td>
</tr>
<tr>
<td>Stage 2</td>
<td>&gt; 160 or</td>
<td>&gt; 100</td>
</tr>
</tbody>
</table>
Impact of High-Normal Blood Pressure on Risk of Major Cardiovascular Events* in Men

*Defined as death due to cardiovascular disease or as having recognized myocardial infarction, stroke, or congestive heart failure.

Blood Pressure Distribution in the Population According to Age

Men

Women

Age

Blood Pressure Distribution in the Population According to Age

Men

Women

Age

PP=Pulse Pressure.

Hypertension is Common

Persons who are normotensive between 55+ 65 years have a 90% lifetime risk for developing hypertension (Framingham Data)

26% of the adult population is hypertensive
Life time risk of Hypertension in Normotensive Women and Men aged 65 years

Risk of Hypertension %

Years to Follow-up

Risk of Hypertension %

Years to Follow-up

JAMA 2002: Framingham data.
Aetiology of Hypertension

90% is essential hypertension – complex interaction between genetic and environmental factors

Common factor in all hypertension is decreased renal sodium excretion

2 most important risk environmental risk factors for development of hypertension are BMI > 25 and sodium intake > 100mmol daily
The only groups who do not develop hypertension are certain isolated tribes leading traditional hunter-gatherer existence. These groups do not experience age-related increase in BP and blood pressures ~ young adolescents in Western communities.

Na+ intake typically < 50mmol/day
Prevalence of Hypertension in the United States by Age Group*

*Based on data from the 1999–2000 National Health and Nutrition Examination Survey. Hypertension is defined as blood pressure $\geq 140/90$ mm Hg or as receiving antihypertensive treatment.

†Low reliability due to large relative error.

New onset hypertension in people with high normal blood pressure

![Bar chart showing percentage of new hypertension over years of follow-up.](NEJM%202006%3B354%3A1685-97)
Development of hypertension in those with high normal blood pressure

Framingham cohort
Vasan. Lancet 2001
Hypertension as a Risk Factor

Hypertension is a significant risk factor for:

- cerebrovascular disease
- coronary artery disease
- congestive heart failure
- renal failure
- peripheral vascular disease
- dementia
- atrial fibrillation
Complications of Hypertension: End-Organ Damage

Hypertension

- Hemorrhage, Stroke
- Retinopathy
- Peripheral Vascular Disease
- Renal Failure, Proteinuria
- LVH, CHD, CHF

CHD = coronary heart disease
CHF = congestive heart failure
LVH = left ventricular hypertrophy

### Relationship of Hypertension to Its Comorbidities

<table>
<thead>
<tr>
<th>Comorbidity</th>
<th>Relationship to Hypertension</th>
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</thead>
<tbody>
<tr>
<td>Coronary artery disease</td>
<td>50% of patients with coronary artery disease have hypertension</td>
</tr>
<tr>
<td>Left ventricular hypertrophy</td>
<td>15% to 20% of hypertensive adults have an increased left ventricular mass</td>
</tr>
<tr>
<td>Ischemic stroke</td>
<td>77% of patients who have a first stroke have a blood pressure &gt;140/90 mm Hg</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td>8% to 15% of hypertensive adults have decreased renal function</td>
</tr>
<tr>
<td>Diabetes</td>
<td>75% of added cardiovascular risk in diabetic patients is attributable to hypertension</td>
</tr>
<tr>
<td>Peripheral artery disease</td>
<td>74% of patients with peripheral artery disease have hypertension</td>
</tr>
</tbody>
</table>

Cardiovascular Mortality Risk Increases as Blood Pressure Rises*

*Measurements taken in individuals aged 40–69 years, beginning with a blood pressure of 115/75 mm Hg.

Effects of Systolic and Diastolic Blood Pressures on CHD Mortality: MRFIT*

*Data shown only for 316,099 white men 35 to 57 years of age who were followed for a mean of 12 years.

CHD = coronary heart disease
MRFIT = Multiple Risk Factor Intervention Trial
Risk of Stroke Death According to Blood Pressure (mm Hg): MRFIT

MRFIT = Multiple Risk Factor Intervention Trial; *P < 0.01; †P < 0.001.

• Continuum of increasing CV risk from SBP 115mmHg
• CV mortality doubles for every 10/5 increase in BP > 120/70mmHg
• High BP causes
  - 35% of all cardiovascular deaths
  - 50% of all stroke deaths
  - 25% of all CAD deaths
  - 50% of all congestive heart failure
  - 25% of all premature deaths
  - commonest cause of CKD overall and commonest cause of ESRD in older individuals
Proportion of deaths attributable to leading risk factors worldwide (2000)

- High blood pressure
- Tobacco
- High cholesterol
- Underweight
- Unsafe sex
- High BMI
- Physical inactivity
- Alcohol
- Indoor smoke from solid fuels
- Iron deficiency

Systolic blood pressure greater than 115 mmHg

Untreated hypertension reduces life expectancy by ~ 5 years
### Unequivocal Benefits of Lowering BP:

**Relative risk reduction** – constant  
**Absolute risk reduction** – varies  

<table>
<thead>
<tr>
<th>Condition</th>
<th>Average % Reduction</th>
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<tr>
<td>Stroke incidence</td>
<td>35-40%</td>
</tr>
<tr>
<td>Myocardial Infarction</td>
<td>20-25%</td>
</tr>
<tr>
<td>Heart Failure</td>
<td>50%</td>
</tr>
</tbody>
</table>
Benefits of Treating Hypertension

- Younger than 60 (reducing BP 10/5-6 mmHg)
  - reduces the risk of stroke by 42%
  - reduces the risk of coronary event by 14%

- Older than 60 (reducing BP 15/6 mmHg)
  - reduces overall mortality by 15%
  - reduces cardiovascular mortality by 36%
  - reduces incidence of stroke by 35%
  - reduces coronary artery disease by 18%

Lancet 1990;335:827-38
Arch Fam Med 1995;4:943-50
Benefits of Treating to Target

- Older than 60 with isolated systolic hypertension (SBP ≥160 mm Hg and DBP <90 mm Hg)
  - 42% reduction in the risk of stroke
  - 26% reduction in the risk of coronary events

*Lancet* 1997;350:757-64
Hypertension occurs less than 20% of the time without one or more of the following risk factors:

- High triglyceride or LDL cholesterol
- Low HDL cholesterol
- Glucose intolerance
- Hyperinsulinaemia
- Obesity
- Metabolic Syndrome
- Left ventricular hypertrophy
90% of Hypertensive Individuals have other Cardiovascular Risk factors

10% Reduction in BP + 10% Reduction in Total-C = 45% Reduction in CVD
Treating hypertension and other risk factors

Predicted Reduction in Major CVD (%)

- Treatment Based on lipids (statin)
  - Top 10%: -6
  - Top 20%: -9
  - Top 30%: -12

- Treatment Based on BP
  - Top 10%: -6
  - Top 20%: -8
  - Top 30%: -10

- Treatment Based on Overall Absolute Risk (ASA, lipids, BP)
  - Top 10%: -17
  - Top 20%: -28
  - Top 30%: -37

Summary

Hypertension is common in all age groups

Usually coexists with other CV risk factors

Leading cause of cardiovascular disease and death

Much of the excess morbidity and mortality can be prevented by detection and appropriate treatment