Cardiovascular Diseases:
Stroke
Rheumatic Heart Disease

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Stroke

- Rapidly developed clinical signs of focal (or global) disturbance of cerebral function; lasting more than 24 hours or leading to death, with no apparent causes other than vascular origin.
• Ischemic strokes
  – Atherosclerotic stenosis or occlusion
  – Cardio-embolism
  – Small vessels disease
  – Misc: CNS infections, hypercoagulable states etc.
• Hemorrhagic strokes
  – Subarachnoid hemorrhage
  – Intracerebral hemorrhage
Distribution of CVD deaths

- Cerebrovascular diseases: 34%
- Ischaemic heart diseases: 46%
- Other cardiovascular diseases: 11%
- Rheumatic heart diseases: 1%
- Hypertensive heart diseases: 6%
- Inflammatory heart diseases: 2%

- Cerebrovascular diseases: 37%
- Ischaemic heart diseases: 38%
- Other cardiovascular diseases: 14%
- Rheumatic heart diseases: 1%
- Hypertensive heart diseases: 7%
- Inflammatory heart diseases: 2%
Distribution of global CVD burden (DALYs)

- Cerebrovascular disease: 29%
- Ischaemic heart disease: 45%
- Other cardiovascular diseases: 14%
- Rheumatic heart disease: 3%
- Hypertensive heart disease: 5%
- Other cardiovascular diseases: 17%
- Rheumatic heart disease: 4%
- Hypertensive heart disease: 6%
Global distribution of Cerebrovascular Disease mortality rates (age standardized, per 100 000) in Males
Global distribution of Cerebrovascular Disease mortality rates (age standardized, per 100 000) in Females

![Map showing the global distribution of Cerebrovascular Disease mortality rates in females. The map uses different colors to represent mortality rates in various regions of the world.](image-url)
Risk Factors

• Non-modifiable risk factors
• Modifiable risk factors
Non-modifiable Risk Factors

- Age
- Sex
- Genetic factors
- Geography & Ethnicity
<table>
<thead>
<tr>
<th><strong>Age</strong></th>
<th>RR every decade after 55yrs: 1.66 – 1.93</th>
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<tbody>
<tr>
<td><strong>Sex</strong></td>
<td>M:F = 1.15-1.3:1.0</td>
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<td><strong>Genetic factors</strong></td>
<td>5x Prevalence in Monozygotic</td>
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<td><strong>Geography</strong></td>
<td>Eastern European countries; US (Ischemic) while Japan &amp; China (Hemorrhagic)</td>
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<td><strong>Ethnicity</strong></td>
<td>African American &gt; White</td>
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Modifiable Risk Factors

- Hypertension
- Diabetes
- Blood lipids
- Cardiovascular diseases
- Smoking
- Alcohol
- Physical activity
| **Hypertension** | RR: 1.5 – 3  
|                  | RR with every 10 mmHg increase in Systolic BP: 1.7 – 1.9  |
| **Diabetes**     | RR: 1.4 – 2; Thromboembolic stroke  |
| **Blood Lipids** | Complex; Inverse relationship between cholesterol & I/C hemorrhage; Modest association between raised serum cholesterol and thrombo-embolic stroke  |
| **Cardiovascular disease** | RR: 1.7; Ischemic stroke.  |
| **Smoking**      | RR: 1.24 (Cerebral hemorrhage) – 2.53 (Ischemic stroke) – 4.85 (Sub arachnoid hemorrhage)  |
| **Alcohol**      | RR: 2-3; SAH  |
| **Physical activity** | Reduce stroke risk  |
Prevention of Stroke

- Primary Prevention
- Secondary Prevention
Rheumatic Fever
Rheumatic Heart Disease
Rheumatic Fever/Rheumatic Heart Disease

• Rheumatic fever
  – a febrile disease affecting connective tissues particularly in the heart and joints
  – initiated by infection of the throat by group A beta haemolytic streptococci.

• Rheumatic fever often leads to Rheumatic Heart Disease (RHD).
• RF and RHD remain significant causes of cardiovascular diseases in the world today.
• The most devastating effects are on children and young adults in their most productive years
Magnitude of the Problem

• RF is the most common cause of heart disease in the 5-30 year age group throughout the world.
• Based on hospital data, RHD accounts for 12-65 percent of hospital admissions related to cardiovascular disease.
• RF and RHD continue to exert a significant burden on the health of low socioeconomic populations in LMICs despite the near disappearance of the disease in the developed world over the past century.
If treated, 75% of people with rheumatic fever recover completely.
Proportion of global CVD deaths due to RHD, 2008

- Other cardiovascular diseases: 99%
- Rheumatic heart disease: 1%

- Other cardiovascular diseases: 98.5%
- Rheumatic heart disease: 1.5%
Proportion of global CVD burden (DALYs) due to RHD, 2008
Epidemiological Factors

• Agent Factors:
  - Rheumatic Fever (RF) and Rheumatic Heart Disease (RHD) are nonsuppurative complications of Group A streptococcal pharyngitis due to a delayed immune response.
  - All strains of Group A streptococci are not implicated in causation of Rheumatic Fever but the serotype which has attracted the most attention in M type 5.
• **Host Factors:**
  – (a) Age- Rheumatic Fever is commonly a disease of childhood and adolescent age group (5-15 years).
  – (b) Sex-Affects both sexes equally.

• **Environmental Factors:**
  – low socio-economic status
  – overcrowding and
  – poor ventilation/housing conditions.
## Environmental and Health-system determinants

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<th>Effects</th>
<th>Impact on RF and RHD burden</th>
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<td>-shortage of resources for health care;</td>
<td>-Misdiagnosis or late diagnosis of acute RF.</td>
<td>-Patients unaware of the first RF episode.</td>
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<td>-inadequate expertise of health-care providers.</td>
<td>-Inadequate secondary prophylaxis and/or non-compliance with secondary</td>
<td>-More severe evolution of disease.</td>
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<td>-low-level awareness of the disease in the community.</td>
<td>prophylaxis</td>
<td>-Untimely initiation or lack of secondary prophylaxis.</td>
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<td>-Higher rates of recurrent attacks with more frequent and severe heart valve involvement, and</td>
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<td>higher rates of repeated hospital admissions and expensive surgical interventions.</td>
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Clinical Features

| Major manifestations | • Carditis  
|                      | • Polyarthritis  
|                      | • Chorea  
|                      | • Erythema marginatum  
|                      | • Subcutaneous nodules  
| Minor manifestations | • Fever, polyarthralgia  
|                      | • Lab: elevated acute phase reactants (erythrocyte sedimentation rate or leukocyte count).  
| Supporting evidence of a preceding streptococcal infection | • Prolonged P-R interval  
|                      | • Elevated or rising antistreptolysin-O or other streptococcal antibody  
|                      | OR  
|                      | • A positive throat culture  
|                      | OR  
|                      | • Rapid antigen test for group A streptococci  
|                      | OR  
|                      | • Recent scarlet fever  

# Jones Criteria

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<th>Primary episode of RF</th>
<th>Two major or One major and two minor manifestations <em>plus</em> evidence of a preceding group A streptococcal infection</th>
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<td>Recurrent attack of RF in a patient without established rheumatic heart disease</td>
<td>Two major or One major and two minor manifestations <em>plus</em> evidence of a preceding group A streptococcal infection.</td>
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<td>Recurrent attack of RF in a patient with established rheumatic heart disease</td>
<td>Two minor manifestations <em>plus</em> evidence of a preceding group A Streptococcal infection</td>
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Prevention of Rheumatic Fever and Rheumatic Heart Disease

- Primary prevention
- Secondary prevention
Primary Prevention

• The adequate antibiotic therapy* of group A streptococcal Upper Respiratory Tract (URT) infections to prevent an initial attack of acute RF.

• Approach is theoretically simple, but it may not be practically feasible.
  – In order to prevent a single case of RHD, several thousand cases of streptococcal throat infection will need to be identified and treated.

*Inj. Benzathine Peniclline 12 lacs IU IM AST
• A more practical and viable approach is to concentrate on “high risk” group such as school children and to treat a sore throat with penicillin empirically even without the throat swab culture.
Secondary prevention

• The continuous administration of specific antibiotics to patients with a previous attack of RF, or a well-documented Rheumatic Heart Disease (RHD).

• The purpose is to prevent colonization or infection of the Upper Respiratory Tract (URT) with group A beta-hemolytic streptococci and the development of recurrent attacks of RF.

• Secondary prophylaxis is mandatory for all patients, who have had an attack of RF, whether or not they have residual rheumatic valvular heart disease.
Other measures for the prevention/control of RF/RHD

• Improving living conditions,
• Breaking the poverty-disease-poverty cycle.
• Improvements in socio-economic conditions (particularly better housing).
• It is not always feasible to implement broad-based primary prevention programs in most developing countries.

• A provision for the prompt diagnosis and effective therapy of streptococcal pharyngitis should be integrated into the existing healthcare facilities.
THANKS