INTEGRATION OF DIABETES AND HYPERTENSION IN HEARTS: RATIONALE

DONALD J. DIPETTE MD FACP FAHA
DISTINGUISHED HEALTH SCIENCES PROFESSOR
UNIVERSITY OF SOUTH CAROLINA
UNIVERSITY OF SOUTH CAROLINA SCHOOL OF MEDICINE
COLUMBIA, SOUTH CAROLINA

HEARTS AND NCD SURVEILLANCE WORKSHOP
ST. LUCIA MAY 2023
Integrating hypertension and diabetes management in primary health care settings: HEARTS as a tool

David Flood1*, Elizabeth W. Edwards2*, David Giovannini3, Emily Ridley3, Andres Rosende4, William H. Herman1, Marc G. Jaffe6 and Donald J. DiPette2

Integrated Management of Diabetes and Hypertension: Critical Role of HEARTS

Primary Pathophysiology

**HYPERGLYCEMIA**
- Nephropathy
- Neuropathy
- Retinopathy

**ACCELERATED ATHEROSCLEROSIS**
- Coronary Artery Disease
- Cerebrovascular Disease
- Peripheral Arterial Disease

Prevention/Treatment

Healthy Lifestyles
- Dietary modifications
- Physical activity
- Smoking cessation
- Weight loss

Glycemic Control

Blood Pressure and Lipid Control
FIGURE 1. Overlapping risk factors and management of hypertension and diabetes

Common risk factors
- Genes
- Insulin resistance
- Obesity
- Dyslipidemia
- Physical inactivity

Hypertension

Diabetes

Pathogenesis
- Atherosclerosis
- Endothelial dysfunction
- Vascular inflammation and fibrosis
- Arterial remodeling

Macrovascular disease
Microvascular disease
Cardiovascular disease, kidney disease, neuropathy, vision loss, dementia

Clinical management
- Lifestyle modifications
- Blood pressure control
- Glycemic control
- Lipid control
# TABLE 1. Deaths attributable to modifiable risk factors in the Americas

<table>
<thead>
<tr>
<th>Leading risks 1990</th>
<th>Percentage of deaths 1990</th>
<th>Leading risks 2019</th>
<th>Percentage of deaths 2019</th>
<th>Total deaths 2019 (thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Tobacco</td>
<td>18.8</td>
<td>1 High systolic blood pressure</td>
<td>16.9</td>
<td>1230</td>
</tr>
<tr>
<td>2 <strong>High systolic blood pressure</strong></td>
<td>18.0</td>
<td>2 High fasting plasma glucose</td>
<td>14.7</td>
<td>1064</td>
</tr>
<tr>
<td>3 Dietary risks</td>
<td>14.5</td>
<td>3 Tobacco</td>
<td>14.4</td>
<td>1043</td>
</tr>
<tr>
<td>4 High LDL cholesterol</td>
<td>10.9</td>
<td>4 High body-mass index</td>
<td>13.0</td>
<td>940</td>
</tr>
<tr>
<td>5 <strong>High fasting plasma glucose</strong></td>
<td>10.4</td>
<td>5 Dietary risks</td>
<td>12.6</td>
<td>916</td>
</tr>
<tr>
<td>6 High body-mass index</td>
<td>8.9</td>
<td>6 Kidney dysfunction</td>
<td>7.6</td>
<td>550</td>
</tr>
<tr>
<td>7 Child and maternal malnutrition</td>
<td>7.9</td>
<td>7 High LDL cholesterol</td>
<td>7.3</td>
<td>528</td>
</tr>
<tr>
<td>8 Air pollution</td>
<td>7.0</td>
<td>8 Alcohol use</td>
<td>5.1</td>
<td>370</td>
</tr>
<tr>
<td>9 Kidney dysfunction</td>
<td>5.2</td>
<td>9 Air pollution</td>
<td>4.1</td>
<td>298</td>
</tr>
<tr>
<td>10 Alcohol use</td>
<td>4.5</td>
<td>10 Non-optimal temperature</td>
<td>3.1</td>
<td>225</td>
</tr>
</tbody>
</table>

**Source:** Prepared by the authors using estimates from the Global Burden of Disease study (1).

**Note:** The arrows refer to changes in order ranking for high systolic blood pressure and high fasting plasma glucose from 1990 to 2019.
Number of adults with diabetes is increasing exponentially
Met need for diabetes treatment in 55 low- and middle-income countries

<table>
<thead>
<tr>
<th>Module</th>
<th>What does it include?</th>
<th>Who are the target users?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy-lifestyle counselling</td>
<td>Information on the four behavioural risk factors for CVD is provided. Brief interventions are described as an approach to providing counselling on risk factors and encouraging people to have healthy lifestyles.</td>
<td>National: ✓ Subnational: ✓ Primary care: ✓</td>
</tr>
<tr>
<td>Evidence-based protocols</td>
<td>A collection of protocols to standardize a clinical approach to the management of hypertension and diabetes.</td>
<td>National: ✓ Subnational: ✓ Primary care: ✓</td>
</tr>
<tr>
<td>Access to essential medicines and technology</td>
<td>Information on CVD medicine and technology procurement, quantification, distribution, management and handling of supplies at facility level.</td>
<td>National: ✓ Subnational: ✓ Primary care: ✓</td>
</tr>
<tr>
<td>Risk-based CVD management</td>
<td>Information on a total risk approach to the assessment and management of CVD, including country-specific risk charts.</td>
<td>National: ✓ Subnational: ✓ Primary care: ✓</td>
</tr>
<tr>
<td>Team-based care</td>
<td>Guidance and examples on team-based care and task shifting related to the care of CVD. Some training materials are also provided.</td>
<td>National: ✓ Subnational: ✓ Primary care: ✓</td>
</tr>
<tr>
<td>Systems for monitoring</td>
<td>Information on how to monitor and report on the prevention and management of CVD. Contains standardized indicators and data-collection tools.</td>
<td>National: ✓ Subnational: ✓ Primary care: ✓</td>
</tr>
</tbody>
</table>
Hypertension Clinical Pathway

A  ACCURATE BLOOD PRESSURE MEASUREMENT
Measure blood pressure in all adults and at all visits

1. Don't have a conversation
2. Support arm at heart level
3. Put the cuff on bare arm
4. Use correct cuff size
5. Support feet
6. Keep legs uncrossed
7. Empty bladder first
8. Support back

B  CARDIOVASCULAR RISK
Know your risk of cardiovascular disease and how to modify it

CARDIOVASCULAR RISK CALCULATOR
Use the HEARTS App to assess your cardiovascular risk

Scan code to access the cardiovascular risk calculator

This App does not replace clinical judgment.
# Treatment Protocol

Start treatment immediately after confirming hypertension.

Blood pressure $\geq 140/90$ mmHg in all hypertensives.
Systolic blood pressure $\geq 130$ mmHg in high-risk hypertensives
(Established cardiovascular disease, Diabetes, Chronic Kidney Disease, Risk score $\geq 10\%$)

## Cardiovascular Risk

<table>
<thead>
<tr>
<th></th>
<th>All Hypertensives</th>
<th>HIGH-RISK Hypertensives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>WITH established</td>
</tr>
<tr>
<td></td>
<td></td>
<td>cardiovascular disease</td>
</tr>
<tr>
<td>Blood Pressure TARGET $&lt;140/90$ mmHg</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Systolic Blood Pressure TARGET $&lt;130$ mmHg</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>ASPIRIN 100 mg/daily</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>High-dose statins: ATORVASTATIN 40 mg/daily</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Moderate-dose statins: ATORVASTATIN 20 mg/daily</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Integration of Hypertension and Diabetes: Closing thoughts

HYPERTENSION AND DIABETES ARE:

• Major independent and interdependent cardiovascular risk factors
• Markedly increasing globally
• Poorly diagnosed, treated, and controlled
• Directly managed by the HEARTS Technical Package and Pillars
Thank You