Risk Stratification in Patients With Type 2 Diabetes (T2D) and Cardiovascular Disease (CVD)

- The population health goal of risk stratification is to compile a prioritized list of patients ordered by the level of risk and the reason for the risk.
- Risk stratification is an important element of population health management, particularly in patients with type 2 diabetes and CVD.

Common CVD risk factors in patients with type 2 diabetes are:
- Smoking
- Dyslipidemia
- Hypertension
- Albuminuria
- Overweight/obese
- Family history of premature coronary disease

Risk Stratification Categories and Levels Using Type 2 Diabetes Case Example

**Primary Prevention (Low Resource Use)**
Goal: To prevent onset of disease
- Level 1: Healthy patients

**Secondary Prevention (Moderate Resource Use)**
Goal: To treat a disease and avoid serious complications
- Level 3: Diagnosed with type 2 diabetes
- Blood glucose/lipids brought to within target limits
- Married, family involved
- Level 4: Blood glucose/lipids not within target limits, and financial situation impacted negatively
- Lives alone
- 1 ER visit and 1 hospitalization in past year

**Tertiary (High Resource Use)**
Goal: To treat the late or final stages of a disease and minimize disability
- Level 5: Has diabetes with early renal disease, coronary artery disease, failing eyesight, and lives alone
- Amputation of 1 leg
- Blind
- Lives in nursing home

**Catastrophic (Extremely High Resource Use)**
Goal: May range from restoring health to only providing comfort care
- Level 6: Diagnosed with lung cancer
- Recent myocardial infarction
- Progression to ESRD with renal dialysis
- Amputation of 1 leg
- Blind
- Lives in nursing home

BMI=body mass index; ESRD=end-stage renal disease.
*CVD=Cardiovascular Disease
Risk Stratification in Action: Joslin Diabetes Center

Joslin Diabetes Center’s Registry and Risk Stratification System

- Collects data on key measures of care and provides decision support to primary care providers
- Identifies high-risk patients, recommends patient-specific interventions, and reports a clinic’s process and quality metrics for benchmarking and regional comparisons
- Evaluates 5 risk categories:
  1. Glycemic control
  2. CVD
  3. Peripheral vascular disease/peripheral neuropathy/feet
  4. Retinopathy (eye disease)
  5. Nephropathy (kidney disease)
- Assigns a risk level for every patient—low, moderate, high, or very high
- Allows for targeted intervention to improve care of subpopulations at high risk

Practice Risk Stratification Summary Example
Jackson-April, 2007

<table>
<thead>
<tr>
<th>Category</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>Very High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycemic Control</td>
<td>16%</td>
<td>35%</td>
<td>12%</td>
<td>37%</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>4%</td>
<td>31%</td>
<td>45%</td>
<td>19%</td>
</tr>
<tr>
<td>Foot Disease</td>
<td>25%</td>
<td>53%</td>
<td>22%</td>
<td>0%</td>
</tr>
<tr>
<td>Retinopathy</td>
<td>6%</td>
<td>1%</td>
<td>89%</td>
<td>3%</td>
</tr>
<tr>
<td>Nephropathy</td>
<td>18%</td>
<td>74%</td>
<td>5%</td>
<td>3%</td>
</tr>
</tbody>
</table>

Registry and Risk Stratification System Impact

- Used for 3 years at an inner city practice in the Boston area

Outcomes included:
- Significant improvement in mean A1C level ($P<0.001$)
- Significant reduction in systolic blood pressure ($P<0.001$)
- Significant reduction in diastolic blood pressure ($P<0.001$)
- Significant increase in documented foot exams ($P<0.001$)
- Significant improvements in practice outcomes:
  - Percentage of patients with blood pressure $<130/80$ mm Hg ($P<0.01$)
  - Percentage of patients with low-density lipoprotein (LDL) cholesterol $<100$ mg/dL ($P<0.05$)

References: