Chronic Conditions
(Non-Communicable Diseases)

Number of persons 65+ (1900-2060)
Administration of Aging

In Millions

Year (as of July 1)
Chronic Conditions

Number of people with chronic conditions
Rand Corporation

Chronic Conditions

10 Common Chronic Conditions for Adults 65+

<table>
<thead>
<tr>
<th>Condition</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension (High Blood Pressure)</td>
<td>58%</td>
</tr>
<tr>
<td>High Cholesterol</td>
<td>47%</td>
</tr>
<tr>
<td>Arthritis</td>
<td>31%</td>
</tr>
<tr>
<td>Ischemic Heart Disease</td>
<td>29%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>27%</td>
</tr>
<tr>
<td>Chronic Kidney Disease</td>
<td>18%</td>
</tr>
<tr>
<td>Heart Failure</td>
<td>14%</td>
</tr>
<tr>
<td>Depression</td>
<td>14%</td>
</tr>
<tr>
<td>Alzheimer’s Disease and Dementia</td>
<td>11%</td>
</tr>
<tr>
<td>Chronic Obstructive Pulmonary Disease</td>
<td>11%</td>
</tr>
</tbody>
</table>

Chronic Conditions

DIABETES IS ON THE RISE

422 MILLION adults have diabetes

3.7 MILLION deaths due to diabetes and high blood glucose

1.5 MILLION deaths caused by diabetes

Consequences
Diabetes can lead to complications in many parts of the body and increase the risk of dying prematurely.

- Stroke
- Blindness
- Heart attack
- Kidney failure
- Amputation

Main types of diabetes

- TYPE 1 DIABETES: Body does not produce enough insulin.
- TYPE 2 DIABETES: Body produces insulin but can’t use it well.
- GESTATIONAL DIABETES: A temporary condition in pregnancy.

Chronic Conditions

DIABETES COMORBIDITIES

- Depression (19% Comorbidity)
- Hypertension (49% Comorbidity)
- Hyperlipidemia (77% Comorbidity)
- Coronary Artery Disease (11% Comorbidity)

- Comorbidity: the simultaneous presence of two (or more) chronic diseases or conditions in a patient
Allostasis vs. Homeostasis

- **Homeostasis**: state of steady internal physical & chemical conditions
- **Allostasis**: process of maintaining homeostasis in response to environmental and physiological stress

**Figure 1. Alternative models of regulation.** *Homeostasis* describes mechanisms that hold constant a controlled variable by sensing its deviation from a "setpoint" and feeding back to correct the error. *Allostasis* describes mechanisms that change the controlled variable by predicting what level will be needed and overriding local feedback to meet anticipated demand.
Allostasis vs. Homeostasis

- **Example**: controlling body temperature
  - Homeostasis: too hot/cold: sweating/shivering to cool/warm body
  - Allostasis: dehydration leads to changes in sweat levels, kidney function, eye/nose mucus production, ...

- **Allostatic load** is “the wear and tear on the body” which accumulates as an individual is exposed to repeated or chronic stress.

Determinants of Health in U.S.

- 60% Behavior & environment
- 10% Health Care
- 30% Genetics
**Signs vs. Symptoms**

- **Signs** and **symptoms** are abnormalities that can indicate a potential medical condition.
- Whereas a **symptom** is subjective, i.e., apparent only to the patient (e.g., back pain or fatigue), a **sign** is any objective evidence of a disease that can be observed by others (e.g., a skin rash or lump).

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**Stressor**

- A **stressor** is a chemical or biological agent, environmental condition, external stimulus, or an event that causes stress to an organism.
- Examples: physical inactivity, poor nutrition, distress and trauma, excess body mass, pollution (water, air, noise), tobacco use, drug use, inadequate sleep, socio-economic stress, ...
Interventions

- Level I: Global/country ("public health")
  - Legislation, health-promoting initiatives, policy reports, recommendations, ...
- Level II: Community
  - Healthy lifestyle environments, access to healthy food, physical activity, smoke free environments, etc.
  - Community includes social networks
- Level III: Individual/family
  - Participatory; interactions with all kinds of health professionals, etc.
- Level IV: System-specific interventions
  - Targeting a specific physiological system
  - Pharmacologic interventions, surgery, etc.
  - “Reactive” healthcare; stages C & D

P4 Principles

- Predictive:
  - Predict an increased likelihood for adverse events
  - Prevention & early intervention
- Preventive:
  - Eliminate risk factors
  - As opposed to treatment
- Precise (Personalized):
  - Moving away from generalized healthcare
  - “Customization” of healthcare
- Participatory:
  - Moving away from “top-down approach”
  - Engage patients
Biomarkers

- Measurable indicator of some biological state or condition

- **Diagnostic Biomarker** (used for early detection)
- **Predictive Biomarker** (to infer the efficacy and toxicity of drug)
- **Prognostic Biomarker** (to assess treatment)
- **Staging Biomarker** (to determine the disease progression stage)
Reactive vs. Proactive Healthcare

- Current medical field focuses primarily on care after illness