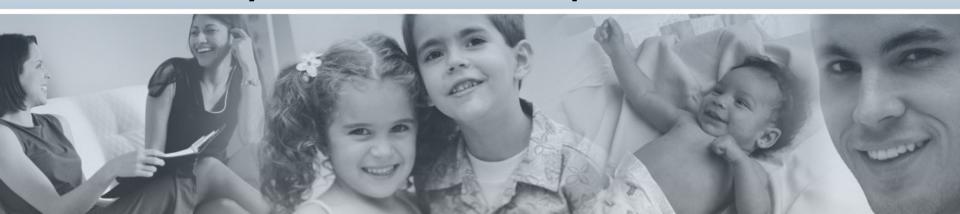# Facility Location Example Problems

Preventive Healthcare

- Preventive care is any medical service that <u>reduces the risk of later negative health outcomes</u> such as medical emergencies, disability or chronic disease.

STAY ONE STEP AHEAD WITH
PREVENTIVE HEALTHCARE

Preventive Healthcare

- Diabetes screening

- Routine vaccinations

- Cholesterol tests

- Wellness programs

- …

Preventive Healthcare

- What is preventive health?
  - Reduces likelihood of life-threatening diseases
  - Aims at diagnosis of serious medical conditions
  - Includes immunizations, blood tests, and cancer screenings
  - Recovery is often more likely if an illness is diagnosed at an early stage
  - Can improve overall efficiency and effectiveness of a healthcare system
  - An increasingly integral part of many health care reform programs

Location of Preventive Healthcare Facilities

- Participation in preventive services
  - Accessibility of facilities
    - Healthy people are willing to travel much less than sick people for medical care
  - People need to choose to receive the service
    - They can choose *when* or *where* to receive preventive care
  - Distance is a major factor for participation
    - Unless services are offered at conventional locations, participation is not likely

Location of Preventive Healthcare Facilities

- The problem:

    - Inputs: a set of population centers and potential facility sites

    - Output: the optimal number and location of facilities that <u>maximize participation</u>

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  - Assumption: Probability of participation decreases with distance

    - Participation~coverage

Location of Preventive Healthcare Facilities

- The problem:

  - Inputs: a set of population centers and potential facility sites

  - Outputs: the optimal number and location of facilities that <u>maximize participation</u>

  - Uses maximal covering location problem to maximize total coverage

  - Total coverage defined as the number of people within the threshold distance from a facility

Location of Preventive Healthcare Facilities

- Assumptions
  - Each participating individual seeks services at the **closest** preventive healthcare facility
    - Single assignment
  - Probability of participation decreases with distance
  - Each open facility needs to have a minimum number of clients (utilization)

- Formulation on notes