HIV Prevention Modeling at the Centers for Disease Control and Prevention

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Prevention Modeling for HIV

- Apply quantitative science to prevent HIV infection and reduce HIV-related illness and death
- Focus on effectiveness of prevention efforts
  - HIV testing
  - HIV care engagement/retention
  - Treatment as prevention
  - Pre-exposed prophylaxis (PrEP)
  - Behavioral interventions
Agent-based Model

- Progression and Transmission of HIV (PATH)
  - Track disease progression, treatment, and transmission at individual level
- Estimate HIV transmission rate
  - Population risk group
  - HIV care continuum
  - Age group
- Replicate transmission networks/clusters
Compartmental Model

- HIV Optimization and Prevention Economics Model (HOPE)
  - Population-level analysis
    - age group, risk level, transmission group, sex, race/ethnicity
  - System of differential equations solved in Matlab

- Effects of Reaching National HIV/AIDS Strategy goals

- Analyze the cost effectiveness of different interventions
  - Increasing testing frequency
  - Increasing adherence to HIV treatment
  - Increasing coverage of PrEP
Optimization Model

- **Resource allocation**
  - Excel-based tool for state/local health departments to allocate HIV funding
  - Input:
    - Efficacy of intervention programs
    - Epidemiological/clinical data
    - Budget
  - Use linear program to find the optimal fund allocation to each intervention program
Thank you!

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