CSE 6730, Group 37 Proposal

Discrete Event Simulation

1 Project Title:

Simulation of Disease Progression of Sexually Transmitted Diseases at Home Care Community.

2 Team Members:

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3 Problem Description and Purpose:

Sexually transmitted diseases (STD) is one of the problems troubling home care community. According to Athena Health, patients over 60 account for the biggest increase of in-office treatments for sexually transmitted infections.

There are several factors that have led to the spread of STIs among older people:

- Lack of safer sex practices (such as condom use) in older individuals. People who became sexually active before AIDS are less likely to follow safe sex practices.

- Imbalance between the number of men and women. In retirement homes, there are typically significantly more women than men. It would not be surprising to find that the few healthy men would act as a nexus for sexually transmitted infections.

- Shame around testing and treatment. Older people (especially married older people) might be reluctant to tell their doctor about symptoms, get tested, and pursue treatment.

- Number of opportunities for transmission. In earlier times, we could expect sexual activity to diminish in the aging population. However, with people living longer, healthier lives and the proliferation of safe erectile dysfunction drugs, people in retirement communities are more sexually active than their parents were at the same age – especially if they live in close community with a large number of potential partners.

Discrete Event Simulation (DES) was been used for long time in many healthcare simulation, ranging from health care system operation, disease progression modeling, screening modeling and health behavior modeling [?, ?].

A realistic simulation of the transmission of STIs in retirement homes could be useful in deciding between different interventions. For example, would increasing condom use by 20% be more effective than annual STI tests?

4 Methodology

We shall get the data from the Centers for Disease Control and Prevention (CDC) website for the related information on the related STDs. This includes:

- Rates in the general population at the ages at which people would enter retirement homes

- Likelihood of transmission for different types of sexual activity (intercourse, oral, anal).

- Time after infection before symptoms appear.

We will also use a local retirement community to be modeled. From that administration we will find out:

- Number of men and women

- Ages at which people enter the community

- Duration that people stay in the community

- What, if any, STI testing and treatment are provided to the residents

Finally, we will do some interviews with residents to create a model of the individual:

- Number of sexual partners per year

- History of STI testing and treatment

- Marital status

- Gender

- Age

- Types of sexual activity that they engage in (if possible)

5 Development Platform

The programming language is Python 3. Depends on the suitability of the project, we plan to provide a Jupyter notebook for user interaction, or just a command line execution.

6 Data source

We plan to obtain our data from CDC. The data is used for the projection of the disease progression. Subsequently, we shall use the data for designing the interaction within population in our simulated home care.

7 Division of Labor

As we move forward on our project, we plan to work concurrently. The timeline is as below:

Task	Duration
Data collection	2 weeks
Modeling design and implementaion	4 weeks
Modeling revised	4 weeks