

Santa Clara County PrEP Navigator Program: HIV Impact, Cost-Effectiveness, and Budget Impact Analysis

Model Description, Instructions, and Scenarios to Explore

ONLY CHANGE VALUES IN CELLS HIGHLIGHTED IN ORANGE. RELATED VALUES WILL ADJUST AUTOMATICALLY.

This Excel model can be used to examine the budget impact from continuing and adding PrEP Navigators in the Santa Clara County Getting to Zero initiative. The purpose of the PrEP Navigator is to encourage members of the population at high risk for HIV infection to take PrEP medication and to use it consistently. Although the program will increase short term costs, it is designed to reduce the long-term costs of HIV care and to reduce the number of new infections in the county. This model calculates PrEP Navigator costs, the cost of PrEP, and the HIV infection costs averted by the use of PrEP for a cohort of 1,000 at-risk men who have sex with men (MSM). It also reports a conservative estimate of the number of HIV infections prevented resulting from 12 months of the program.

This Excel model adds a budget impact analysis (BIA) and a cost effectiveness analysis (CEA) for MSM at risk for HIV infection in Santa Clara County to an open source model made available by researchers at Johns Hopkins University and updated by Emory University.^{1,2}

The Excel model has nine worksheets:

1. **Parameter Values:** A table showing the costs, outcomes, probabilities, and client population used in the CEA and the BIA. (Parameters used in the Johns Hopkins model Worksheets 4 -9 are not listed in the Parameter Values worksheet.) Only cells highlighted in ORANGE are specific to this model. Others are either formulas using the values in orange or parameters used in the Johns Hopkins and Emory models.
2. **Budget Impact Analysis:** The BIA examines the relationship between Santa Clara County's investment in PrEP navigators and the subsequent health care costs and costs averted as the result of that investment. The BIA also reports the number of primary HIV infections prevented.
3. **Cost-Effectiveness Analysis:** This worksheet—using the Johns Hopkins and Emory models (worksheets 4-9)—computes the number of HIV infections prevented, the total program costs, and the total cost of HIV infections averted for a specific cohort for five PrEP scenarios including a no PrEP scenario. The worksheet computes several HIV outcomes including the number of HIV infection prevented by primary transmission, by primary and secondary transmission, and the number of quality-adjusted life years associated with preventing an HIV infection. Note: The BIA does not use all scenarios and only uses the number of primary HIV infections prevented.
4. **Worksheets 4 -9:** These worksheets are the open source Johns Hopkins model with updated parameter values from the Emory model. Other than the updates, no changes have been made

to the model. Five of the worksheets are for various PrEP use scenarios and the last worksheet include calculations for parameters used in the models.

How to Use This Excel Model

You can use this model to calculate the impact of using a PrEP Navigator to encourage PrEP use on HIV-related health care costs. You can test these results using different assumptions about PrEP use, PrEP navigator use, effectiveness, and PrEP Navigator and PrEP costs. You can also change the size of the at-risk populations and its HIV prevalence to estimate impacts in other settings. We recommend that you try the model for a range of values around a parameter to discover how changes in values affects the results. This is especially useful for parameters where the values are not known and you are using a “best guess”. This is called sensitivity analysis. **ONLY CHANGE VALUES IN CELLS HIGHLIGHTED IN ORANGE. RELATED VALUES WILL AUTOMATICALLY ADJUST.**

Some Suggested Uses for the Model

1. Model a different at-risk population. Change the HIV prevalence. Change the size by adding or subtracting PrEP Navigators.
2. Examine how changes to the program can affect costs and outcomes. Increase the number of PrEP navigators or how many clients a navigator can see in a year. Change the cost of the PrEP Navigator Program.
3. Examine how the cost of PrEP affects the net cost of the PrEP Navigator Program. PrEP costs vary depending on who pays and which programs help subsidize prescriptions. Change the annual cost for PrEP and see how it affects the results. [Note: PrEP costs can currently exceed \\$20,000 year. Current policy proposals may bring that cost down dramatically.](#)
4. Examine costs over 5 – 10 years. The model currently estimates the lifetime HIV infection costs averted. Certain BIAs have set time horizons, often 5 or 10 years. [Note: An average annual cost for treatment of an HIV infection is about \\$24,000. Multiply the annual cost by the number of years for analysis.](#)
5. Change the effectiveness of the PrEP Navigator. Change the assumptions about the proportion of clients who use PrEP and who use it moderately- and highly effectively.
6. Examine the number of both primary and secondary HIV infections prevented. Change the HIV infections prevented per transmission from 1 to 3.24.

For further information or comments on this model contact:

Model Documentation

Introduction

Santa Clara County Getting to Zero (SCCGTZ) is a collaborative initiative aimed to have zero new HIV infections, zero HIV-related deaths, and zero HIV stigma/discrimination in Santa Clara County. SCCGTZ expands PrEP and PEP access and retention by focusing on key and high-risk target populations through a collective impact model. This strategy includes training and supporting a network of PrEP Navigators, educating medical providers on PrEP and PEP, strengthening community partnerships, and promoting PrEP and PEP with social marketing and outreach. As of 2019, the program has trained 4 PrEP navigators, seen a 37% increase in PrEP prescription filled, and trained over 20 providers on [PleasePrEPMe.org](https://www.PleasePrEPMe.org).³

The goal of the PrEP Navigator component of SCCGTZ is to increase the use of and adherence to PrEP and PEP in populations at high risk of HIV infection. One PrEP navigator was initially funded by the Santa Clara County Board of Supervisors. The Santa Clara County Public Health Department wants to explore the potential impact of the use of PrEP Navigators on future HIV infections and costs, its cost effectiveness, and its impact of the County and health care budgets.

This analysis examines the cost effectiveness and budget impact of the PrEP Navigator component of the SCCGTZ Initiative. It focuses on the effectiveness and use of PrEP by men who are at risk of acquiring HIV through sexual contact with other men (MSM). Specifically, it evaluates the use of PrEP Navigators to increase HIV testing and the consistent use of PrEP in HIV negative MSM at risk of acquiring HIV.

This valuation builds on previously published models and studies of the effectiveness and cost effectiveness of PrEP to identify the key variables that contribute to cost effectiveness of PrEP navigators.^{1,2} This valuation will:

- Estimate the number of HIV infections that could be prevented in a one-year period
- Estimate the one-year added costs or savings of the PrEP Navigator program
- Estimate the lifetime health care savings from averted HIV infections

This budget impact analysis uses the Excel-based decision-analytic model of PrEP for MSM developed by Anders Chen and David W. Dowdy in 2014 and updated by Jennie McKenney et al. in 2017.^{1,2} This model was used to estimate the PrEP costs, savings from prevented HIV infections, and the number needed to treat to prevent one HIV infection. The model looked at several scenarios of adherence and risk behavior. The model developers made the model publicly available. We updated the model with parameters from the McKenney analysis and those specific to the SCCGTZ program, added budget impact analysis and model parameter worksheets. The later allows the user to change the parameter values to adapt to different settings, test the sensitivity of the results to changes, and to answer other questions. The default parameter estimates for the SCCGTZ model are provided in Table 1.

These models consider many factors including:

- The number of HIV positive men on antiretroviral therapy and a low risk of transmitting HIV
- Risk compensating and risk averting behavior associated with using PrEP
- Risk and cost of new STD infections associated with risk compensating behavior

Methods

Audience and Question: The SCC Public Health Department is exploring the budget impact of funding for a targeted outreach program and PrEP navigators to encourage increased and consistent use of PrEP in at-risk men to prevent new HIV infections. They plan to use the analysis to make compelling arguments to the SCC Board of Supervisors and other funding sources to increase funding for PrEP navigators.

Prevention Strategy: This analysis examines the impact of the use of PrEP navigators to increase the use and effectiveness of PrEP to prevent new HIV infections in MSM. It seeks to increase the number of at-risk MSM using PrEP, the number of at-risk MSM using PrEP consistently, and the reduction of risk compensating behavior in at-risk MSM using PrEP.

The cost effectiveness analysis compares a “no PrEP navigator” strategy with a “two PrEP navigator” strategy. We assume that:

- 1) There is no PrEP usage in MSM in the at-risk cohort at start of model.
- 2) The use of PrEP is recommended by clinical providers but without the additional outreach, information, and encouragement from PrEP navigators.
- 3) Incomplete adherence and risk compensating behavior are greater in the “no PrEP navigator” scenario.

Perspective: This analysis takes the health care perspective in that it includes all costs and cost savings to the health care system. In this analysis health care costs are likely paid for by SCC, private insurance, the State of California (Medi-Cal), the federal government (Medicare, VA, Tricare, Ryan White, etc.), patients, drug companies, nonprofit organizations subsidizing PrEP, and other sources.

Time Frame and Analytic Horizon: This analysis examines the use of the PrEP navigator strategies over a *one-year* period (Time Frame) and includes the *lifetime* treatment costs of new HIV infections that are acquired during that one-year period (Analytic Horizon).

Analytic Methods: We conducted a CEA and a BIA of the PrEP navigator component of SCCGTZ for a cohort of 1,000 MSM. We assumed that two PrEP Navigators would see 1,000 clients annually. The BIA adds the fixed costs of the PrEP navigator to the results from the CEA to calculate the impact on the SCC budget from adding a PrEP navigator.

Intervention effectiveness: Values for parameters (Parameter Values worksheet of Excel workbook) for the use of and effectiveness of the PrEP navigator were estimated from anecdotal information reported by the SCC Public Health Department and the PrEP navigator.³

Costs: This analysis includes SCC PrEP navigator costs, clinical and drug costs of PrEP, and the lifetime treatment costs of HIV infection. The PrEP costs are divided into the clinical costs for patients on PrEP and the cost of the PrEP drug. Clinical costs include HIV tests, renal function tests, STI tests and treatment as needed, and physician visits. The lifetime HIV treatment costs are discounted at 3%. The costs are reported in 2020 US dollars. Costs are shown in Parameter Values worksheet of the Excel workbook.

Outcomes: The analysis examines the impact of each strategy on the number of new HIV infections from primary transmission.

Sources of Uncertainty: The spreadsheet is constructed to allow examination of sources of uncertainty. These include HIV prevalence, PrEP effectiveness, drug cost, and HIV infection costs. Sources of uncertainty for the two models upon which this analysis is based are described in the literature.^{1,2}

Summary Measures: The spreadsheet reports total costs for each of the two strategies—including total cost of PrEP and total HIV treatment costs—and the total number of new HIV infections. It also reports the additional cost or savings of the PrEP navigator strategy and the additional number of new HIV infections prevented compared to the no PrEP navigator strategy. The spreadsheet includes the cost effectiveness of the PrEP navigator strategy. The spreadsheet shows the budget impact of extending the current PrEP navigator and adding an additional PrEP navigator.

¹ Chen A, Dowdy DW. Clinical effectiveness and cost-effectiveness of HIV pre-exposure prophylaxis in men who have sex with men: risk calculators for real world decision making. PLoS ONE 9(10): e108742. doi:10.1371/journal.pone.0108742

² McKenney J, Chen A, Hoover KW, Kelly J, Dowdy D, Sharifi P, et al. (2017) Optimal costs of HIV pre-exposure prophylaxis for men who have sex with men. PLoS ONE 12(6): e0178170. <https://doi.org/10.1371/journal.pone.0178170>

³ JSI. *The GETTING TO ZERO Initiative Silicon Valley, County of Santa Clara. Draft: Year 3 Action Research and Evaluation Report.* Prepared for STD/HIV Prevention & Control, County of Santa Clara Public Health Department and the Silicon Valley | County of Santa Clara GETTING TO ZERO Leadership Team. July 31, 2019.