teen-SPARC

STI Prevention
and Risk Calculator

Version 2.0

Quick Start Guide

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Background

This tool is designed to help public health jurisdictions and other entities explore the **potential impact of behavior change on reducing sexually transmitted infections (STIs) among the sexually active high school-attending adolescent population, as well as pregnancies among females within that population.**

The tool focuses on **three STIs**: gonorrhea (*Neisseria gonorrhea*), chlamydia (*Chlamydia trachomatis*), and HIV (human immunodeficiency virus). **Pregnancies** are an additional measured outcome. The tool includes **three age groups** (13–15-year-olds, 16–17-year-olds, and 18-year-olds) and **three sexual partnering groups** (SPGs): males who have sex with males (MSM), males who have sex with females only (MSF), and females who have sex with males (FSM). For HIV, only MSM are modeled given very low rates among adolescents in the other groups. Number of pregnancies occurring to FSM in each age group are also output. Teen-SPARC also estimates associated costs for all outcomes; for pregnancies, these include societal costs in addition to medical costs.

This Quick Start Guide is designed to walk users through the basics of the teen-SPARC tool without providing additional data or parameters. Full details on definitions, data sources, model details, calculations for default parameters, and instructions on how to import jurisdiction-specific parameters are included in the User's Manual.

Caveats

Caveats are detailed in the welcome section of the User's Manual. In brief, users should keep in mind the following limitations of this tool:

- **Teen-SPARC requires Microsoft Windows to run properly.**
- It only tracks penile-vaginal sex between males and females and penile-anal sex between males.
- It does not separate out transgender adolescents. Transgender adolescents should be considered as included with the gender with which they identified as in the YRBS. Unfortunately, we cannot identify transgender adolescents in the 2015 National Youth Risk Behavior Survey (YRBS) data.
- This tool can be used to evaluate the impact of sexual behavior changes on the burden of gonorrhea, chlamydia and HIV, but it cannot be used to determine what intervention has caused the sexual behavior changes.

Data in the model

Teen-SPARC is designed to work most seamlessly with YRBS data. **For the purposes of this guide, we are using the parameters present in the tool by default**, which are derived from the **national 2015 YRBS** data. Details on how to import jurisdiction-specific data are included in the User's Manual. Whether using default data or introducing one's own, the elements that go into the model, and on which all calculations are based, include the

- total number of high-school-attending adolescents;
- proportion of those adolescents belonging to each age group and sex;
- proportion of adolescents who have had sexual intercourse at least once, by age group and SPG;
- total adolescent population size by age group (whether in school or out);
- number of new partners per year by age group and SPG or weighted counts of persons and average lifetime number of partners by age at first intercourse by current age;*
- mean number of sex acts per partner by age group and SPG;
- probability that the average individual uses a condom during a single act of intercourse, by age group and SPG;
- diagnoses of gonorrhea, chlamydia, and HIV among 13–18-year-olds by SPG (HIV diagnoses only among MSM);
- transmissibility probabilities for each STI by sexual act;*
- proportion of incidence cases that are diagnosed by sex for gonorrhea and chlamydia;*
- average duration of infection for gonorrhea and chlamydia;*
- proportion of adolescent MSM living with HIV who are aware of their status;*
- ratio between prevalence and incidence of diagnosed HIV infection among adolescent MSM;*
- costs per STI diagnosis and pregnancy in 2015 USD;* and
- rates of contraception use among females.*

*Inputs are in the advanced options section of the tool and User's Manual; for most of these, we assume that users will always keep the default values.

Getting Started

Step 1: Create a baseline model using national data to get familiar with teen-SPARC

1. On the *Welcome* worksheet, *Click to Get Started*.
2. Read *About* teen-SPARC, then click *Next*.
3. Click *Go* on the *Table of Contents* for *Population Sizes.*
4. Review and accept all national defaults in the *Population Sizes* worksheet and again in the *Sexual Behavior* worksheet by clicking *Proceed to Next Step*.
5. On the *Diagnoses* worksheet, click *Skip to Results*.

6. On the *Results* worksheet, click *Calculate Baseline Model*. This will display the expected number of in-school incident cases and diagnoses in the next year for each STI. If you scroll to the right, you will also see these results by age group and SPG for each STI. For example, you should see there are 29,961 incident cases of chlamydia expected in the next year among 16–17-year-old FSM attending high school in the United States. If you scroll down, you will see the estimated costs associated with these cases total $3,771,197.
7. Now that you have a baseline model, click *Back to Interventions* at the top of the worksheet to create a comparison model.

Step 2: Create Comparison Model 1 to explore the effects of increased condom use

1. On the *Interventions* worksheet, you have the option to decrease the frequency of sex acts, increase the condom use, and/or introduce delays in the age at which some adolescents initiate sexual activity. You may make these changes equally across all subgroups or differentially within each subgroup.
2. In this example, we will start by increasing condom use across all subgroups by 10%. Be sure to check the box to the left of *By what percent should condom use be increased?* Then, enter 0.10 into the box for *Across all subgroups*. Click *Proceed to Results*.
3. On the *Results* worksheet, click *Calculate Comparison Model*. You will be prompted to add a name for this model. Enter *10% increase in condom use*. Click *OK*. This data will display under the baseline model results. This comparison model will display the incident number and percent of in-school cases averted from the baseline model. You should also see that there are now 26,070 incident cases of chlamydia expected in the next year among 16–17-year-old FSM in high school in the United States, and that an expected 3,891 incident cases would be averted in this group using this intervention. Costs averted for this STI and age and population group alone would total $489,788. Costs averted across all STIs and adolescents in school would be over $25 million.

Step 3: Create Comparison Model 2 to explore the effects of decreased frequency of sex acts

1. This second example will examine a 15% decrease in the frequency of sex acts among 16–17-year-olds. From the *Results* worksheet, click *Back to Interventions* at the top.
2. On the *Interventions* worksheet, be sure to check the box to the left of *By what percent should the frequency of sex acts be decreased?* and <u>uncheck</u> the box to the left of *By what percent should condom use be increased?*
3. Under *Within each subgroup* of this intervention, enter 0.15 for each SPG (decrease among MSM, MSF, and FSM) within the 16–17-year-old age group. Leave the 13–15 and 18+ age groups blank. Click *Proceed to Results*.
4. On the *Results* worksheet, click *Calculate Comparison Model*. Name this model *15% decrease in frequency of sex acts among 16–17-year-olds*. You should see 25,501 incident cases of chlamydia expected in the next year among 16–17-year-old FSM in school in the United States, with 4,460 incident cases averted through this behavior change in this group and a cost savings of $561,379.

Step 4: Export results

1. Click *Export Results* at the top of the *Results* worksheet; this will take you to the *Export* worksheet.
2. Make sure that the *10% increase in condom use* and *15% decrease in frequency of sex acts among 16–17-year-olds* are checked (or check them if they are not) and click *Export to PDF*.
3. A PDF with the detailed results of the output for the baseline model and both comparison models will be generated.

Next Steps

After you feel comfortable with these basic interventions, add your own population sizes, diagnosis data, costs, and behavioral data where available. Full instructions on customizing parameters are included in the User's Manual, including step-by-step details for preparing YRBS data and generating parameters, with accompanying SAS code. Run Step 1 again for your own jurisdiction. Then, adjust the behavior changes you explored in Steps 2 and 3 to look at the potential impact of different kinds of changes for your own jurisdiction.

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Disclaimers
- *This guide and the tool described reflect the views of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention (CDC).*
- *Estimating the impact of behavior change is subject to uncertainty.*
- *This tool, like all software, might be subject to programming errors.*
- *This tool might not be compatible with Microsoft Excel 2013 or earlier versions.*