



Quick Start Guide

Steven M. Goodreau, PhD¹; Emily D. Pollock, MA¹; Eli S. Rosenberg, PhD²; Elizabeth M. Rosenthal, MPH²; Meredith A. Barranco, BS²; Richard L. Dunville, MPH³; Lisa C. Barrios, DrPH³; Maria V. Aslam, PhD⁴; Li Yan Wang, MBA, MA³. ¹Dept. of Anthropology and Center for Studies in Demography and Ecology, Univ. of Washington, Seattle WA. ²Dept. of Epidemiology and Biostatistics, Univ. at Albany School of Public Health, State Univ. of New York, Rensselaer NY. ³Division of Adolescent and School Health, Centers for Disease Control and Prevention, Atlanta GA. ⁴Office of the Director, National Center for HIV, Viral Hepatitis, STD, and TB Prevention, Centers for Disease Control and Prevention, Atlanta, GA. This work was funded by the US Centers for Disease Control and Prevention National Center for HIV, Viral Hepatitis, STD, and TB Prevention (Epidemiologic and Economic Modeling Agreement #U38PS004646). The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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.**

The tool focuses on **three STIs**: gonorrhea (*Neisseria gonorrhoea*), chlamydia (*Chlamydia trachomatis*), and HIV (Human immunodeficiency virus). It 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.

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 sex with which they identify.
- 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 Youth Risk Behavior Survey (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 sexual partnering group, 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 (diagnoses only among MSM for HIV)
- 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*

*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 tab, "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'll also see these results by age group and sexual partnering group for each STI. For example, you should see there are 669 incident cases of gonorrhea expected in the next year among 13-15 year-old MSM attending high school in the US.
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 and/or increase the condom use 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 586 incident cases of gonorrhea expected in the next year among 13-15-year-old MSM in high school in the US, and that an expected 83 incident cases would be averted in this group using this intervention.

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 13-15 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 uncheck 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 sexual partnering group (decrease among MSM, MSF, and FSM) within the 13-15-year-old age group. Leave the 16-17 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 13-15 year olds.” You should see that, for instance, there are 569 incident cases of gonorrhea expected in the next year among 13-15 year-old MSM in school in the US and that 100 incident cases would be averted through this behavior change.

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 13-15 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, 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.

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, may be subject to programming errors.*
- *This tool may not be compatible with Microsoft Excel 2013 or earlier versions.*