

CHRONIC DISEASE COST CALCULATOR

USER GUIDE

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Centers for Disease Control and Prevention (CDC)



Developed by RTI International*



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the National Association of Chronic Disease Directors (NACDD),
and the National Pharmaceutical Council (NPC)



* RTI International is a trade name of Research Triangle Institute.

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Background and Purpose

Chronic health diseases have been a leading public health concern in the U.S. for decades.¹ Chronic disease lowers quality of life and leads to increased medical expenditures. Previous studies have shown that a small number of chronic diseases account for a large share of annual U.S. medical spending.²

Medicaid, a program that provides health insurance for low-income families and those with disabilities, is publicly funded at the state and federal level. Thus, medical expenditures for the treatment of chronic disease in Medicaid have financial impacts for taxpayers as well as those affected by the diseases. It is therefore important for policy makers to know the costs of chronic disease to Medicaid, but quantifying these costs at the state level requires substantial resources and time.

The Chronic Disease Cost Calculator performs two primary functions:

1. Estimate Medicaid expenditures for the following chronic diseases in the Medicaid population at the state level:
 - § Heart disease
 - § Congestive heart failure (CHF)
 - § Hypertension
 - § Stroke
 - § Diabetes
 - § Cancer
2. Allow the user to generate estimates of the costs to Medicaid of selected chronic diseases using customized inputs.

Intended Audience

The Chronic Disease Cost Calculator was developed for chronic disease directors, state Medicaid directors, and other state policy and decision makers to calculate estimates of their Medicaid costs for selected chronic diseases. The purpose of creating this calculator is to help states estimate both the disease prevalence and associated costs of Medicaid in their state.

Intended Use

The intended use for the cost calculator is to provide estimates of Medicaid expenditures going to select chronic diseases at the state level. Thus, the term “costs” as used in the calculator represents costs to Medicaid. Many states do not have access to “cleaned” Medicaid claims data nor the resources (financial and personnel) to conduct an analysis that will generate these estimates. Cost Calculator estimates can help states quantify and understand the financial impact caused by chronic diseases, as well as inform state decisions on investments in chronic disease prevention and disease management programs.

What the Calculator Does

The Chronic Disease Cost Calculator estimates the 1) prevalence and 2) costs to Medicaid programs at the state level of heart disease, congestive heart failure (CHF), hypertension, stroke, diabetes and cancer. Because many people who suffer from chronic disease actually have two or more different chronic diseases, double-counting of the associated medical costs often occurs. The statistical analysis used to generate the cost estimates minimizes double-counting (i.e., overlap of disease costs) of Medicaid dollars going to multiple diseases. Therefore, the costs of heart disease, CHF, stroke and cancer can be more easily compared across diseases. The cost estimates for hypertension and diabetes, however, include the costs of complications such as heart disease, CHF and stroke. The costs of hypertension and diabetes are therefore not mutually exclusive of the costs of other reported diseases.

States do not have to provide data on their own Medicaid population to use the calculator. Medicaid claims data from selected states has been combined with nationally representative data for the Medicaid population to create sound estimates with no additional data required.

For states that have access to and resources for analyzing their own Medicaid claims data, the calculator also allows users to input their own data in place of default estimates to generate total costs of the selected chronic diseases to Medicaid in their state.

What the Calculator Does Not Do

The calculator does not provide exact prevalence and Medicaid costs of the chronic diseases for each state. All reported numbers are estimates and could differ from actual values. The uncertainty in the estimates arises from a number of factors: the combination of several data sources, different levels of geographic detail available in the source data, and the fact that the parameters of the statistical analysis are themselves estimates. Due to differences in data sources and methods, the estimates will not necessarily agree with other cost estimates.

The calculator is designed to provide the best possible estimates of the economic burden of certain chronic diseases to Medicaid for each state. This involves using data from different levels of geographic detail for some states. Therefore, the calculator is not designed for comparisons across states of the costs of chronic disease to Medicaid.

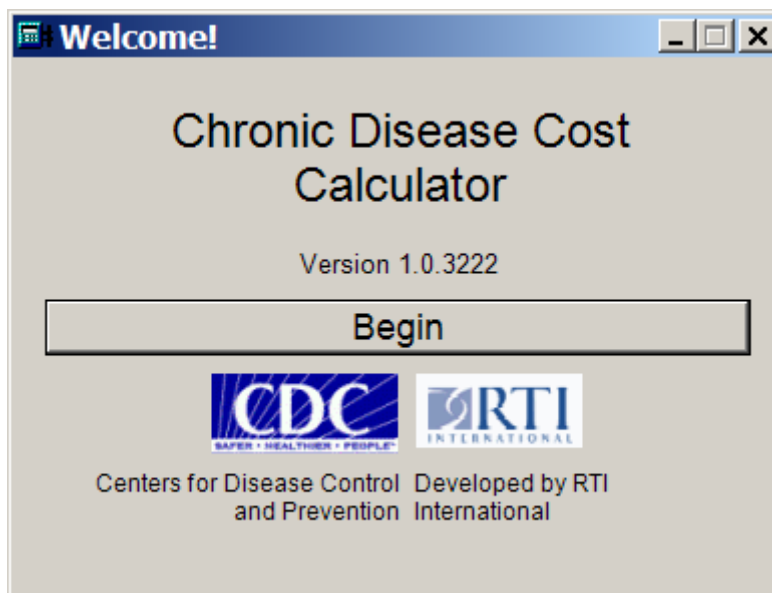
The calculator estimates medical costs of disease to Medicaid only; other costs of chronic disease, including costs to other payers such as Medicare, productivity losses and reductions in the quality of life, are not included in the estimates because these costs are not borne by Medicaid. Future iterations of the calculator will include estimates of the prevalence and costs of asthma, arthritis and depression, estimates of the medical costs to other payers such as Medicare, estimates of the indirect costs of lost productivity, and projections of future costs.

The data used in the analysis pre-dates the Medicare Part D prescription drug expansion, which is expected to shift a share of prescription drug costs from Medicaid to Medicare for persons eligible for both programs.

The Cost Calculator does not make policy or value judgments on Medicaid spending. Instead, the calculator provides information describing present spending patterns and resource allocation, highlighting possible areas of cost savings through targeted prevention efforts or research into new treatments. As such, the calculator provides one of many inputs into a complicated decision-making process.

Overview and Features

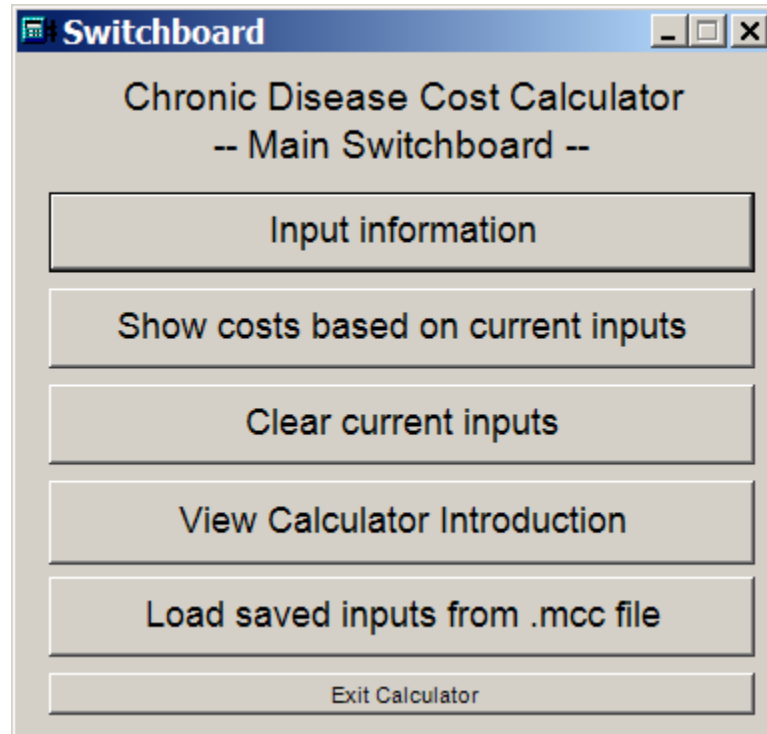
Users are guided through the calculator by a series of input screens. Default values, including the data source for these values, are provided for all inputs, which the user has the option to change. The inputs from each screen are then combined to generate estimates of the cost of selected chronic diseases to Medicaid. Users have the option to generate cost estimates by sex or by adult age category (18-44 years, 45-64, and 65 and over) as well.



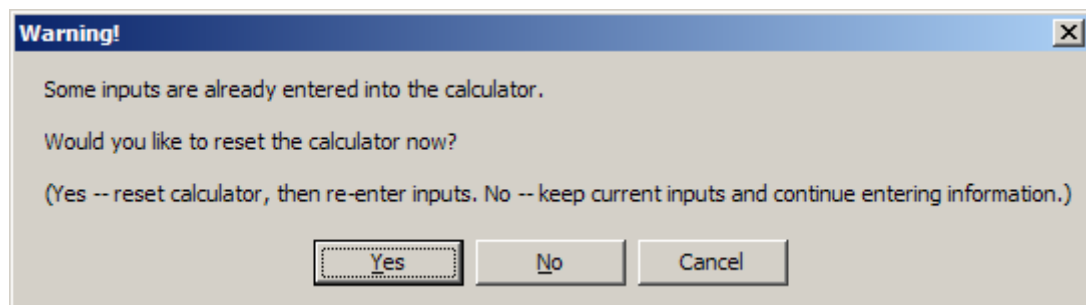
Using the Calculator

Main Switchboard

After the Welcome screen and a brief Introduction, the user is taken to the main switchboard for the calculator.



The "Input information" button takes the user to the beginning of the process to input the data used by the calculator to generate cost estimates. This process is described below. If the user has already entered data, even in a previous session, the "Input information" button will generate a pop-up window asking the user if they would like to retain the previously entered inputs or to reset all data to the default values.



The "Show costs based on current inputs" button takes the user directly to the output screen using inputs currently in the calculator. If inputs are missing, a warning message is generated before returning the user to the main switchboard.

The “Clear current inputs” button clears all inputs in the calculator, resetting them to default values. The user must then proceed through the input screens to generate cost estimates.

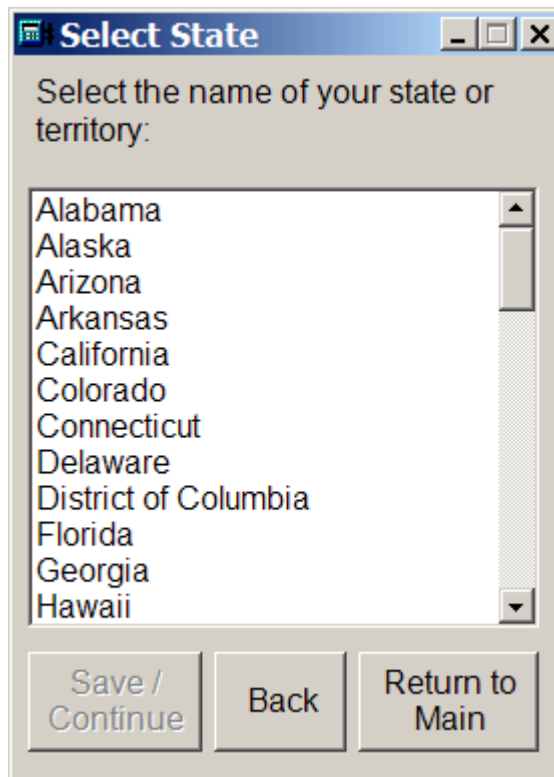
The “View Calculator Introduction” button returns the user to the Introduction screen.

The “Load saved inputs from .mcc file” button opens a dialog window to let the user choose a .mcc file of saved inputs from a previous session (see below). Once the file is selected, the calculator sets all inputs to those saved in that session.

To exit the calculator, the user must return to the switchboard and hit the “Exit Calculator” button at the bottom. All inputs are saved and will be available in the next session.

Selection of State and Diseases

Users first select one state from a drop-down menu. All 50 states plus the District of Columbia are included.



Next, the user selects the set of diseases for which they would like to calculate beneficiary costs. The user can choose to generate estimates for any combination of the six chronic diseases (heart disease, CHF, hypertension, stroke, diabetes, and cancer). The calculator reports costs for each selected disease as well as the sum of the costs across diseases.

Select Diseases

Select the diseases for which you would like to calculate beneficiary costs.

Select all diseases

- Heart Disease
- Congestive Heart Failure
- Hypertension
- Stroke
- Diabetes
- Cancer

Save / Continue Back Return to Main

Medicaid Enrollment

The following screen provides default values for the number of Medicaid beneficiaries in the state, which the user can change. To generate cost estimates by sex or by adult age categories, the user should check the appropriate box. The percentage of beneficiaries in each subpopulation should also be entered. Default values are provided for these inputs as well. If the user does not want to use the default values, new values between 0 and 100 can be entered into the white cells. The gray cells will be automatically calculated based on the values in the white cells.

To change any of the default values in the calculator, the user must uncheck the box underneath the default value and type over the default value (now in black text instead of gray). The default values will be reported next to the field for guidance. For example, as seen in the screen capture below, “1,500,000” was entered for the total number of beneficiaries and the sex categories are set to use the default data.

For help throughout the calculator, the user can click on the “?” boxes on the right. Pop-up windows will provide information about data sources, definitions, and how to enter data.

Number of Medicaid beneficiaries in your state

In order to estimate the cost of chronic disease to Medicaid, the calculator needs the total number of beneficiaries in your state. In addition, if you would like to calculate costs by gender or by adult age group, indicate so below and estimate the proportion of the Medicaid population in the relevant categories. Default estimates are provided from the Medicaid Statistical Information System (MSIS) Fiscal Year 2004.

Total number of beneficiaries (including children)

Use value from MSIS. (MSIS 2004 reports 1,512,608 for NC)

Yes, I want to calculate chronic disease costs by sex.

Percent of Medicaid population that is:

Use values from MSIS.

Male %

Female %

Yes, I want to calculate chronic disease costs by age group.

Save / Continue Back Return to Main

Prevalence

The next screen asks the user to provide prevalence estimates for each disease selected among Medicaid beneficiaries in the state. Each disease has a separate tab that can be brought to the foreground by clicking the tab. The user can choose to use default prevalence rates for each desired subpopulation or to enter their own estimates. If sex or age subpopulations are desired, the user must enter prevalence for those subpopulations; the prevalence among the entire Medicaid population will then be calculated. Prevalence was defined as the percentage of the Medicaid population reporting treatment for or problems with the disease in the previous year. Please see the Technical Appendix for a detailed description of the default prevalence rates and their relation to those available in other data sources.

Census region is the most detailed geographic prevalence data available (see the Technical Appendix). Prevalence is calculated separately by region, region/age category, and region/sex where sample sizes permit. Where sample sizes are too small, prevalence from the national level by sex or by age is used. In cases where sample sizes are too small even at the national level for estimates by sex or age, the calculator will not report output by these subgroups.

Prevalence of chronic diseases in your state

In order to estimate the cost of chronic disease to Medicaid, the calculator needs the prevalence of each disease among beneficiaries in your state. In addition, if you indicated on one of the earlier forms that you would like to calculate costs by gender or by adult age group, you will need to estimate prevalence within the relevant categories. Default estimates are provided from the 2001-2005 Medical Expenditure Panel Survey (MEPS). Prevalence was defined as the percentage of the Medicaid population reporting treatment for or problems with the disease in the previous year. ?

Heart Disease | CHF | Hypertension | Stroke | Diabetes | Cancer

Prevalence of heart disease among entire Medicaid population

7.5 % Calculated based on prevalence by sex.

Prevalence of heart disease by sex

Uses averages (by sex) from MEPS. Uncheck this box to enter your own values.

Males 6.1 %

Females 8.5 % ?

Save / Continue Back Return to Main

Costs per Beneficiary

Next, for each disease selected, a tab provides estimates of the average annual Medicaid costs per beneficiary attributable to the disease. These numbers represent the extent to which Medicaid expenditures per person with the disease would be lower in the absence of the disease, all else constant. The Technical Appendix describes in detail the generation of the per-person cost estimates.

The user may adjust the cost inputs from their default values to obtain customized total cost estimates. *However, we strongly encourage all users to choose the default values provided unless they have conducted rigorous analysis of appropriate data similar to that described in the Technical Appendix.*

Cost per person with chronic disease in your state

In order to estimate the cost of chronic disease to Medicaid, the calculator needs the average cost for treating each disease per beneficiary in your state. In addition, if you indicated on one of the earlier forms that you would like to calculate costs by gender or by adult age group, you will need to estimate cost values within the relevant categories. Default estimates are provided from the 2001-2005 Medical Expenditure Panel Survey (MEPS), inflated to 2007\$. We strongly encourage all users to choose the default values provided.

Heart Disease | CHF | Hypertension | Stroke | Diabetes | Cancer

Medicaid cost for treating heart disease per person with heart disease among entire Medicaid population

\$ 1,340 Calculated based on cost per person and prevalence by sex.

Medicaid cost for treating heart disease per person with heart disease by sex

Males	\$ 1,280	<input checked="" type="checkbox"/> Uses averages (by sex) from MEPS. Uncheck this box to enter your own values. <input data-bbox="1291 1260 1323 1302" type="button" value="?"/>
Females	\$ 1,360	

Save / Continue Back Return to Main

Calculated Costs

For each chronic disease and subpopulation selected, the model reports the following:

1. Summary of inputs including the number of beneficiaries, prevalence, and costs per beneficiary
2. Estimate of the total number of Medicaid beneficiaries with the disease
3. Estimate of the total annual Medicaid costs attributable to the disease

Default prevalence has been rounded to one decimal place, cost per beneficiary is rounded to the nearest \$10, and total Medicaid costs are rounded to the nearest \$1,000. All calculations were performed using unrounded values. The user can select to view results for each disease by selecting the appropriate tab. There is also a tab for the sum of the costs for all selected diseases. However, the cost estimates for hypertension and diabetes include the costs of complications such as heart disease, CHF and stroke. *The sum of costs over selected diseases that include hypertension and diabetes could overestimate the costs associated with all the selected diseases.*

Users can print a hard copy of the output by selecting “Print”; a “Print Preview” is also available. Users can save an electronic copy of output by selecting “Save Output to Text File.” The file is saved as a comma-separated file and can be opened and edited in spreadsheet software such as Microsoft Excel. Users can save the inputs entered for later use in the Chronic Disease Cost Calculator by selecting “Save Inputs to .mcc File.” The .mcc file containing the user-defined inputs can be loaded into the calculator at the main switchboard.

All expenditure data were inflated to 2007 dollars using the Medical Care Consumer Price Index provided by the Bureau of Labor Statistics to reflect more current dollar values. All results generated from the tool are estimates. Actual results may be larger or smaller than those reported.

Calculated Costs

The calculated costs to your state for each disease are listed below. Note that user inputs (versus inputs based on averages from MEPS) are italicized. 'Insuf' represents inputs for which no value was entered and no default was available; outcomes based on those values are not calculated.

STATE North Carolina

Heart Disease CHF Hypertension Stroke Diabetes Cancer All selected diseases

Group	Beneficiaries	Prevalence	Beneficiaries w/ disease	Cost per beneficiary	Total Medicaid costs
US overall	55,002,107	6.5%	3,578,268	\$1,320	\$4,714,560,000
North Carolina					
Overall	<i>1,500,000</i>	7.5%	112,942	\$1,340	\$151,107,000
Males	601,405	6.1%	36,844	\$1,280	\$47,244,000
Females	898,595	8.5%	76,099	\$1,360	\$103,863,000

Annual expenditures inflated to 2007 \$. Default prevalence has been rounded to one decimal place, cost per beneficiary is rounded to the nearest \$10, and total Medicaid costs are rounded to the nearest \$1,000. All calculations performed using unrounded values. Sums of the totals may not equal the overall total due to rounding. Rounding error is less than 0.1%. Prevalence was defined as the percentage of the Medicaid population reporting treatment for or problems with the disease in the previous year. All results generated from the tool are estimates. Actual costs may be larger or smaller than those reported. Please see the Technical Appendix for a detailed description of the methodology used to generate the estimates.

Print Preview Print Save Output to Text File Save Inputs to .mcc File Back Return to Main

Glossary of Terms

Attributable: The portion of expenditures directly associated with a disease.

CHF: Congestive heart failure

Per-person costs: Average Medicaid costs per person with the disease attributable to the disease. These numbers represent the extent to which Medicaid expenditures per person with the disease would be lower in the absence of the disease, all else constant.

Prevalence: The percentage of the Medicaid population reporting treatment for or problems with the disease in the previous (i.e., interview) year.

References

1. Hoffman C, Rice D, Sung HY. Persons with chronic conditions: their prevalence and costs. *JAMA* 1996;276 (18):1473-1479.
2. Berk ML, Monheit AC. The concentration of health care expenditures, revisited. *Health Affairs* 2001 Mar-Apr;20 (2):9-18.