turning knowledge into practice

Introduction to the CDC/RTI Chronic Disease Cost Calculator

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RTI International is a trade name of Research Triangle Institute

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Other Collaborators

- Agency for Healthcare Research and Quality (AHRQ)
- National Association of Chronic Disease Directors (NACDD)
- National Pharmaceutical Council (NPC)

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Overview

- Project Goals
- Why are burden estimates needed
- Why examine state-specific total and Medicaid costs
- Project description: objectives, methodology, strategy, estimation, preliminary results
- Screen shots
- Next Steps

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Project Goals

- Apply a consistent framework to calculate state-specific Total and Medicaid costs for persons diagnosed and/or treated for heart diseases, stroke, hypertension, congestive heart failure, diabetes, cancer, [completed] arthritis and major depression [ongoing]
- Calculate the proportion of state Total [ongoing] and Medicaid costs for these diseases [completed]
- Develop a user friendly calculator to estimate prevalence-based state-specific Total [ongoing] and Medicaid [completed] cost estimates for all states without having to analyze claims data
- Expand the toolkit to include indirect costs and a forecasting module [ongoing]
- Disseminate our methodology and results to key stakeholders [ongoing]

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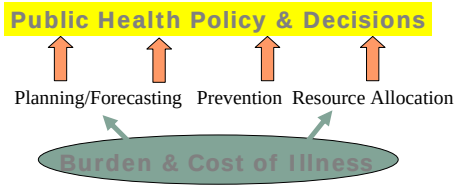
Why are burden estimates needed?



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Why are burden estimates needed (cont.)?

- Evidenced-based recommendations to inform policy decisions
- Cost containment
  - Potential solutions = prevention and control programs at the state and national levels supported by many partners
- Advocacy to increase $$ for prevention efforts
- Expand partnership between state CDD and CMS directors
- Enhance understanding of the burden of disease to state Medicaid program and spending budgets
- Evidence-based data to support resource allocation for state budgets
- Collaborate with state health departments to share strategies to prevent and control chronic diseases: implement disease management, prevention and wellness initiatives

Why Chronic Diseases?

- Chronic diseases are leading causes of mortality and morbidity
  - Over 33% of adults have some form of cardiovascular disease
  - 9.6% of adults have diabetes
  - Over 3% of population has history of cancer
  - Some estimates suggest that chronic diseases account for 83% of total healthcare expenditure in the general population

Why Examine Costs at the State Level?

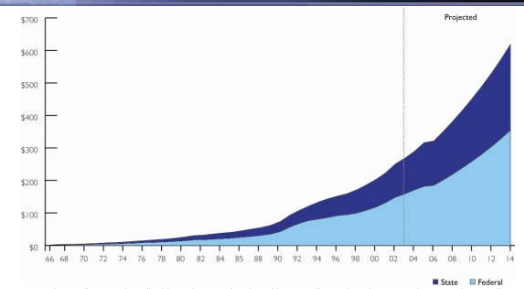
- State estimates are important because much of the prevention dollars are allocated at the state level
  - Indirect costs may also be important for resource allocation decisions
- Chronic Disease directors, state policy makers, and partners have been requesting this information

Why Examine Medicaid Costs Separately

- Approximately 22% of all state spending is for Medicaid expenditures[1]
- Research has not examined the cost burden of chronic diseases to state Medicaid programs in a *consistent* manner across states
- Medicaid directors and others have been requesting this information
- It is feasible to estimate Medicaid costs using claims data, however, it is complicated, expensive and not without limitations

1. National Governors Association and National Association of State Budget Officers. Fiscal Survey of States, June 2007. Accessed from http://www.nasbo.org/Publications/PDFs/Fiscal%20Survey%20of%20the%20States%20June%202007.pdf November 21, 2007.

Federal, State and Total Medicaid Spending, 1965-2014



Source: Centers for Medicare and Medicaid Services, National Health Expenditures (NHE) Amounts by Type of Expenditure and Source of Funds: Calendar Years 1965 -2015, available at: www.cms.hhs.gov/ statistics/nhe/#projects

Why not use existing estimates?

- Existing estimates are based on inconsistent data and methods
- Results are often contradictory
  - Different populations
  - Different data sets
  - Different methodology
  - Lots of double counting
- Toolkit and estimation approach presents a transparent and evidence-based strategy for calculating costs

Estimation Approach

- Data
  - Nationally Representative Data: Medical Expenditure Panel Survey (MEPS)
  - State Representative Data: Medicaid MAX fee-for-service claims
- Estimation approach
  - Econometric (regression-based) modeling

MEPS Data

- Nationally-representative survey of the US civilian non-institutionalized population
- Quantifies annual medical spending by payer
- Includes information on health insurance status and demographic characteristics
- Identifies all medical conditions for which a participant sought treatment during the survey period and for selected chronic conditions
- AHRQ granted access to state identifiers to quantify state-level adjustment factors

Advantages of MEPS

- Nationally-representative dataset with state identifiers
  - Single data source for all states
- Includes payments for most medical services, including Rx drugs
- Allows for stratification by payer (sample-size permitting)

Disadvantages of MEPS

- Sample size may be inadequate for some diseases/payers/population stratifications
  - Pooling years can help
  - Combined, 2000-2003 MEPS includes approximately 125,000 people, and 25,000 Medicaid recipients
- Data do not include institutionalized population

Data—Medicaid MAX Files
(state Medicaid data)

- Made available by CMS in a uniform format across states
- Used for research on Medicaid population
- Includes person-level eligibility records with demographic (Enrollment file) and claims data
- Available variables include:
  - Chronic disease flags based on diagnosis codes
  - Demographic information (e.g., age, gender, race/ethnicity)
  - Months of eligibility during the year
  - An indicator for dual eligibility
  - Medicaid payments, in total and broken out by type of service

Medicaid MAX Files (cont.)

- Advantages
  - Includes Rx claims
  - Includes long-term care population (unlike MEPS)
  - Single source for state-specific Medicaid prevalence, demographic, and cost data
  - Very large number of observations
  - Available for all states

Medicaid MAX Files (cont.)

- Disadvantages
  - Misses payments for dual eligibles
  - Misses payments for non-covered services
  - Data are incomplete for states with high Medicaid managed care enrollment
  - Data are costly and analyses are labor and computer intensive
  - Incomplete coding on long-term care claims may be problematic for some analyses

Data—Strategy

- Use MEPS to generate annual per capita disease costs for non-institutionalized populations
  - Better controls for confounders
  - Single data source for all states
  - Can use state-level inflators to adjust for regional price variation
  - Can test results using the 4 states MAX data
- Use MAX data for estimating per capita disease costs for institutionalized populations
- Combine unit costs with prevalence data to generate State-specific total and Medicaid costs
  - Prevalence data can be provided by the user or estimated from the model

Estimation Approaches

- Accounting Approach: sum payments for all events with the disease listed as the primary diagnosis
  - May either understate or overstate costs attributable to the disease of interest
    - Understate: does not include attributable costs when disease of interest (e.g., diabetes) is listed as a secondary diagnosis
    - Overstate: may include costs attributable to secondary diagnoses
  - Including primary plus secondary diagnoses results in additional problems
    - Likely to result in double counting

Econometric Approach

- Use multivariate regression analysis to estimate marginal costs associated with each disease while controlling, to the extent possible, for other observable characteristics that affect costs
- Annual $ = *f* (diseases of interest, socio-demographic characteristics, other medical conditions)
  - Diseases of interest: heart disease, stroke, hypertension, CHF, diabetes, cancer
  - Sociodemographic characteristics: gender, race, age, education, income
  - Additional high prevalence or high cost conditions

Econometric Approach

- This approach has several major advantages over other approaches
  - Regressions control for covariates (e.g., age, gender, comorbidities)
  - Allows flexibility in the modeling
  - With appropriate calculation, avoids double-counting of costs for co-occurring diseases
  - Can run model separately on total or Medicaid population

Avoiding double counting

- Commonly-used econometric models also lead to double counting of costs across diseases (Trogdon, Finkelstein and Hoerger 2007)
- Occurs when expenditures for co-occuring diseases (e.g., heart disease with cancer) are not properly allocated across the two diseases
  - Typically results in inflated estimates
- We developed a strategy to estimate the expenditures associated with co-occuring diseases and reallocate these expenditures to the individual diseases
  - Methodology forthcoming in HSR
  - Used in Trogdon et al. (2007) Health Promotion Practice article and in the toolkit
- Note – explains why our estimates are generally lower than what is in the literature

Estimation Strategy

- Determine appropriate functional form for empirical models
- Estimate separate models for annual expenditures in five categories
  - Inpatient
  - Outpatient
  - Office-based
  - Rx
  - Other
- Calculate per capita cost for each disease and combination of diseases
- Use the coefficients from the model, which provide information about the relative importance of each disease on expenditures, to reallocate costs associated with co-occuring diseases

Estimation Strategy cont.

- Combine results to produce a national estimate of per capita costs for each disease
- Use regional/state level adjustment factors to generate per capita costs for each state
- Multiply costs by prevalence estimates (either user supplied or estimated from the model) to generate Total (Medicaid) costs
- Compare estimates to those generated directly from 4 states Medicaid claims data

Medicaid Results: Cardiovascular Disease

- Annual costs per person with disease attributable to the disease to Medicaid
  - Congestive heart failure $4,180
  - Hypertension $1,610
  - Stroke $1,550
  - Other heart disease $1,500
- Source: Trogdon et al. (2007)

Publications

Use of Econometric Models to Estimate Expenditure Shares

Justin G. Trogdon, Eric A. Finkelstein, Thomas J. Hoerger

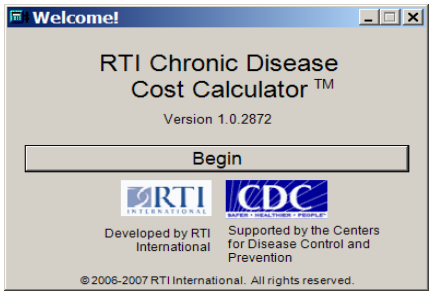
Forthcoming at Health Services Research (CDC-funded through RTI-UNC Center of Excellence in Health Promotion Economics)

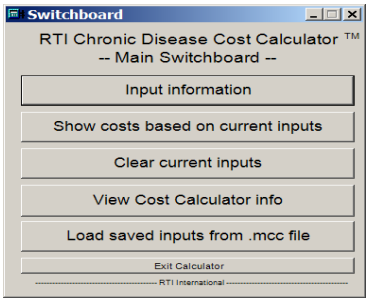
The Economic Burden of Cardiovascular Disease for Major Insurers

Justin G. Trogdon, Eric A. Finkelstein, Isaac Nwaise, Florence Tangka, and Diane Orenstein

Health Promotion Practice 2007;8(3):234-242.

Screen Shots






Select State
Select the name of your state or territory:
Alabama
Alaska
Arizona
Arkansas
California
Colorado
Connecticut
Delaware
District of Columbia
Florida
Georgia
Hawaii
Save / Continue
Back
Return to Main
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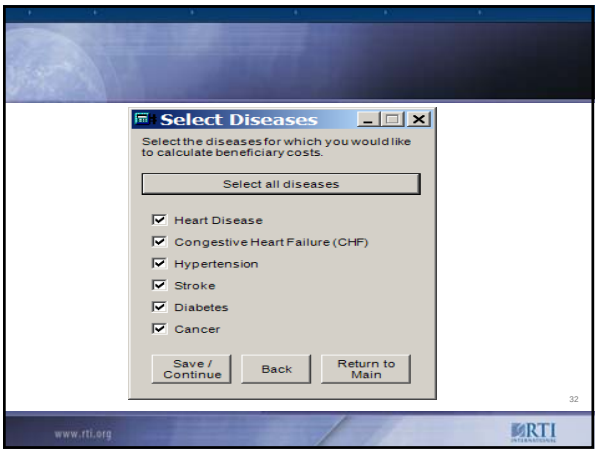
Select Diseases
Select the diseases for which you would like to calculate beneficiary costs.
Select all diseases
Heart Disease
Congestive Heart Failure (CHF)
Hypertension
Stroke
Diabetes
Cancer
Save / Continue
Back
Return to Main
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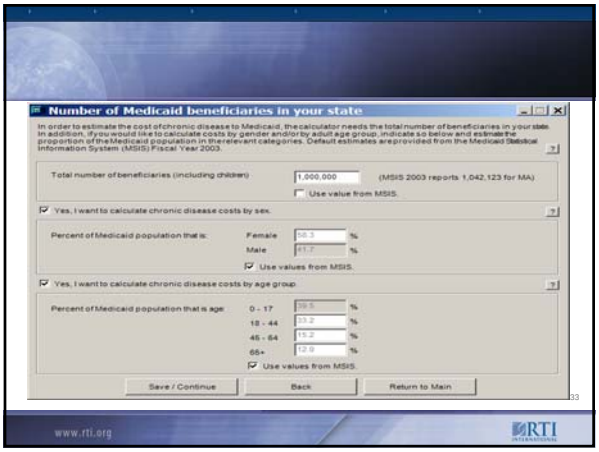
Number of Medicaid beneficiaries in your state
Total number of beneficiaries (including children)
1,000,000
(MSIS 2003 reports 1,042,123 for MA)
Use value from MSIS.
Yes, I want to calculate chronic disease costs by sex.
Percent of Medicaid population that is:
Female
56.3
%
Male
43.7
%
Use values from MSIS.
Yes, I want to calculate chronic disease costs by age group.
Percent of Medicaid population that is age:
0 - 17
29.5
%
18 - 44
33.2
%
45 - 64
15.2
%
65+
12.0
%
Use values from MSIS.
Save / Continue
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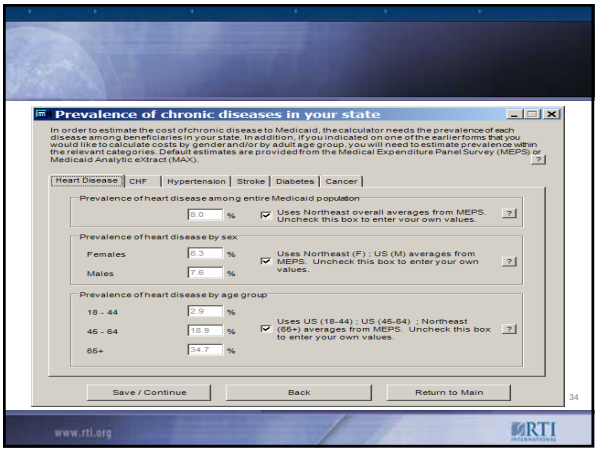
Prevalence of chronic diseases in your state
Heart Disease
CHF
Hypertension
Stroke
Diabetes
Cancer
Prevalence of heart disease among entire Medicaid population
8.0
%
Uses Northeast overall averages from MEPS. Uncheck this box to enter your own values.
Prevalence of heart disease by sex
Females
8.3
%
Males
7.6
%
Uses Northeast (F) ; US (M) averages from MEPS. Uncheck this box to enter your own values.
Prevalence of heart disease by age group
18 - 44
2.9
%
45 - 64
18.9
%
65+
34.7
%
Uses US (18-44) ; US (45-64) ; Northeast (65+) averages from MEPS. Uncheck this box to enter your own values.
Save / Continue
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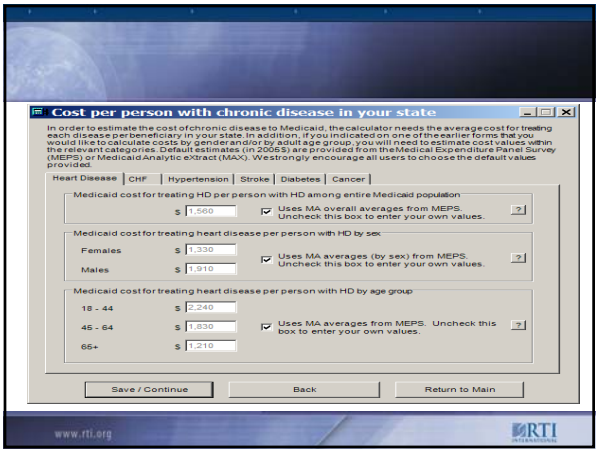
Cost per person with chronic disease in your state
Heart Disease
CHF
Hypertension
Stroke
Diabetes
Cancer
Medicaid cost for treating HD per person with HD among entire Medicaid population
$ 1,560
Uses MA overall averages from MEPS. Uncheck this box to enter your own values.
Medicaid cost for treating heart disease per person with HD by sex
Females
$ 1,330
Males
$ 1,910
Uses MA averages (by sex) from MEPS. Uncheck this box to enter your own values.
Medicaid cost for treating heart disease per person with HD by age group
18 - 44
$ 2,240
45 - 64
$ 1,830
65+
$ 1,210
Uses MA averages from MEPS. Uncheck this box to enter your own values.
Save / Continue
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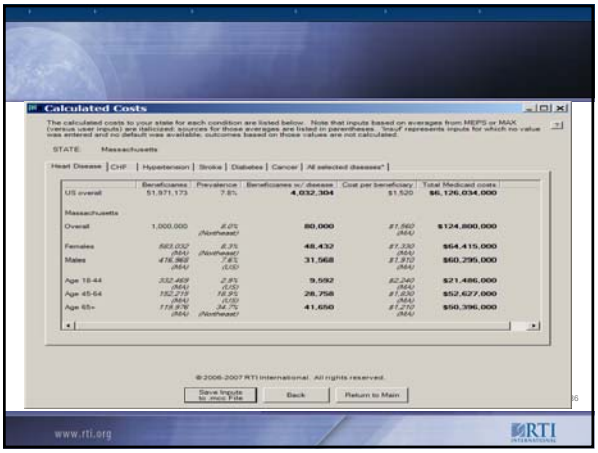
Calculated Costs
STATE: Massachusetts
Heart Disease
CHF
Hypertension
Stroke
Diabetes
Cancer
All selected diseases*
US overall
4,032,304
$6,126,034,000
Massachusetts
Overall
1,000,000
80,000
$124,800,000
Females
48,432
$64,415,000
Males
31,568
$60,295,000
Age 18-44
9,592
$21,486,000
Age 45-64
28,758
$52,627,000
Age 65+
41,650
$50,396,000
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Next Up

- Hands on demonstration of the toolkit
- Policy discussion surrounding the question: ‘How should the estimates generated from the toolkit be used?’