Incorporating Economic Modeling and Cost Estimation into Local Public Health Data Reports

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Presenter Disclosures

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The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:

No relationships to disclose
San Diego County

- Over 3 million residents
- Popular tourist destination - 15 million overnight tourists annually
- Largest military installation in continental US
- Over 4500 Sq Miles
- Geographically isolated (bordered by desert, Mexico, Pacific Ocean and Camp Pendleton military base)
- 20 hospitals with Emergency Departments (2 military, no County Hospital)
Background:

• In 2009, Public Health Services embarked on a major, multi-year health promotion effort to reduce death and disability due to chronic disease in the County.

• While incidence and prevalence data on chronic diseases and relevant behavioral data were readily available, there was no local level data on the economic cost of chronic disease.

• This data was necessary in order to create cost benefit analyses and return on investment models to support the need for prevention and early intervention.
Methods:

- Epidemiologists identified existing research on national level cost estimation of chronic disease.
  - *An Unhealthy America: the Economic Burden of Chronic Disease* by the Milken Institute as a model.
  

- Estimated costs were limited to direct medical costs only.
- Multiple data sources were available but for differing geographies.
- MEPS provided expenditure data by condition at the Regional level, which was adjusted to the county level.
- CMS provided point of service data used to verify estimates.
Methods, continued:

- Incidence data for San Diego County was available through Public Health Services.
  - [www.sdhealthstatistics.com](http://www.sdhealthstatistics.com)

- Prevalence data was available through the California Health Interview Survey (CHIS).
  - [www.askCHIS.com](http://www.askCHIS.com)

- Costs were adjusted for medical inflation using county level medical CPI.
Results

- The results showed that direct medical costs associated with chronic disease in San Diego County totaled $4.6 billion in 2007.
  - $4 billion attributable to the 3-4-50 chronic diseases

- Local costs were projected to reach $25 billion in 2050 based on national cost projections and local disease projections, assuming no change in risk behaviors or disease treatment.

- Annual total and per person cost for each of seven chronic diseases were also calculated.
  - Included estimates for chronic mental health direct service costs.
Results of the publication

• Featured report along with 3-4-50: Chronic Disease in San Diego County after the launch of HHSA’s Live Well, San Diego! Initiative.

• Data used to support a multitude of local prevention activities.

• Big increase in email and phone calls from other counties asking how we did it.
As a result of the *Economic Burden of Chronic Disease in San Diego County*:

- Cost data has become an integral part of population health epidemiology in San Diego County.
  - Available online along with other population health reports, analyses, tools and data tables.
- These models have been used to provide evidence to support the costs of local prevention activities.
  - Community partners
  - Grants
  - Component of ROI analyses
- These methods have now been applied to other public health issues.
  - Violent and unintentional injury (in process)
  - Sexually transmitted disease (in process)
  - Maternal and child health and behavioral health (in planning)
If you don’t have a report to model, find a reliable cost calculator…..

- Injuries have defined prevention opportunities that fit neatly into ROI and cost models.
- CDC staff and members of the Injury Control and Emergency Health Section of APHA have worked on various cost of injury calculators for years.
- On the CDC website WISQARS can provide both incidence data for your state or county as well as a cost estimation calculator that includes both direct medical costs and work loss costs.
WISQARS™ provides cost estimates for injury deaths (including violent deaths) and nonfatal injuries where the patient was treated and released from a hospital or ED. http://www.cdc.gov/injury/wisqars/index.html

<table>
<thead>
<tr>
<th>UNINTENTIONAL INJURY</th>
<th>Number of cases</th>
<th>Medical costs</th>
<th>Work loss costs</th>
<th>Total combined costs</th>
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</thead>
<tbody>
<tr>
<td>Deaths</td>
<td>949</td>
<td>$11,868,000</td>
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<tr>
<td>Hospitalizations</td>
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<td>ED discharges</td>
<td>149,437</td>
<td>$136,439,000</td>
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<td></td>
<td>171,535</td>
<td>$688,942,000</td>
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<tr>
<td><strong>TOTAL UNINTENTIONAL INJURY COSTS</strong></td>
<td></td>
<td></td>
<td></td>
<td>$3,279,126,000</td>
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<table>
<thead>
<tr>
<th>INTENTIONAL INJURY</th>
<th>Number of cases</th>
<th>Medical costs</th>
<th>Work loss costs</th>
<th>Total combined costs</th>
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<tbody>
<tr>
<td>Homicides</td>
<td>90</td>
<td>$645,000</td>
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<td>Assault ED discharges</td>
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<td>9,922</td>
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<td><strong>TOTAL ASSAULT INJURY COSTS</strong></td>
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<td>$374,136,000</td>
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</tbody>
</table>

| Suicides                     | 365             | $1,390,000    | $400,950,000    | $402,339,000        |
| Self-inflicted Hospitalizations | 1,590         | $15,120,000   | $29,807,000     | $44,928,000         |
| Self-inflicted ED discharges | 2,435           | $3,360,000    | $2,329,000      | $5,689,000          |
|                              | 4,390           | $19,870,000   |                 |                     |
| **TOTAL SELF-INFlicted INJURY COSTS** |       |               |                 | $452,956,000        |
WISQARS™ also calculates cost estimates by injury mechanism.

### UNINTENTIONAL INJURY

*for 2009

<table>
<thead>
<tr>
<th>Number of cases</th>
<th>Overdose/Poisoning</th>
<th>Falls</th>
<th>Pedestrian</th>
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<tr>
<td>Deaths</td>
<td>409</td>
<td>231</td>
<td>59</td>
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<tr>
<td>Hospitalizations</td>
<td>2,365</td>
<td>10,734</td>
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<td>ED discharges</td>
<td>4,677</td>
<td>52,581</td>
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#### Total costs (both medical & work loss) det. by WISQARS

<table>
<thead>
<tr>
<th></th>
<th>Deaths (based off 2005 CA costs)</th>
<th>Hospitalizations (based off 2005 US costs)</th>
<th>ED discharges (based off 2005 US costs)</th>
<th>Total costs of all three categories</th>
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<tr>
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<td>$492,291,000</td>
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<td>$533,155,000</td>
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<td>$34,325,000</td>
<td>$666,846,000</td>
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<td>$6,539,000</td>
<td>$237,293,000</td>
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#### Calculated cost per person

<table>
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<tr>
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<th>Deaths</th>
<th>Hospitalizations</th>
<th>ED discharges</th>
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<tbody>
<tr>
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<td>$1,203,645</td>
<td>$371,367</td>
<td>$1,116,254</td>
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<td>$14,513</td>
<td>$62,124</td>
<td>$146,040</td>
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<td></td>
<td>$1,398</td>
<td>$4,512</td>
<td>$4,124</td>
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Find the published paper that most closely resembles your data....

- Economic Burden of Sexually Transmitted Infections: Incidence and Direct Medical Cost of Chlamydia, Gonorrhea, and Syphilis Among Illinois Adolescents and Young Adults, 2005-2006 by Elizabeth Pultorak, et al.

- Calculated incidence data from public health databases.

- Adjusted cost multipliers based on local medical CPI.
Four Things to Consider

• Is there a reliable calculator, respected analysis or peer reviewed methodology available?
• Can you apply medical CPI to inflate the cost multiplier to your current data year?
• Does your cost multiplier estimate direct costs or include indirect costs?
• Do you have comparable data?
Data Comparability Issues

• Do you have comparable data?
  – Same or similar source

• Do you have the same disease or injury definition as the cost model?
  – ICD9 or ICD10 code
  – CPT code

• Does your data measure cases the same way?
  – Incidence: e.g. number of new cases in a year
  – Prevalence: e.g. amount of disease in the population
Basic Steps to Creating a Local Burden of Disease/Injury Document

• Identify a scientific or evidence-based cost model from the literature or legitimate cost calculator.
• Adjust the model by local medical CPI to year of your data.
• Pull comparable local data, either incidence or prevalence, based on model.
• Run the numbers and document your methods, results and assumptions.
• Be confident, but always double check your work.
Acknowledgements

• Heartfelt thanks to the Health Economists, Health Policy Researchers and the Public Health Academics who do the hard part by researching, developing and publishing cost models.

• Thanks to my team of intrepid epidemiologists who consider these ideas as challenges.

• Thanks to our leadership team in Public Health for always giving us latitude to try new ideas.
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