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Cost Estimates of Foundational Public Health Services: Results from Piloting an Expert Consensus Methodology

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Cost Estimates of Foundational Public Health Services: 

Results from Piloting an Expert Consensus Methodology

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Glen P. Mays, Ph.D., MPH

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  - Georgia Heise, DrPH (2014 NACCHO President)
  - KHDA Finance Workgroup

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  - Keith Branham, UK DrPH student
  - Carrie Holsinger, UK DrPH student
  - Scott Secamiglio, MPH
# Workgroup on Public Health Cost Estimation

<table>
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<tr>
<th>Name</th>
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<tbody>
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<td>University of Washington</td>
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<td>University of Kentucky</td>
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Cost estimation methods

- **Prospective “expected cost” methods**
  - Vignettes
  - Surveys with staff and/or administrators
  - Delphi group processes

- **Concurrent “actual cost” methods (micro-costing)**
  - Time studies with staff
  - Activity logs with staff
  - Direct observation

- **Retrospective “cost accounting” methods**
  - Modeling and decomposition using administrative records
  - Surveys with staff and/or administrators
Key issues: What’s the cost of capability?

- Delineating state vs. local roles and division of effort
- Identifying scale and scope effects
  - By population served
  - By range of programs supported (portfolio effect)
- Identifying input factors that affect costs
  - Resource prices
  - Case mix
- Identifying key output differences across settings
  - Intensity
  - Quality
  - Reach

Estimating the Costs of Foundational Public Health Capabilities: A Recommended Methodology
Available at http://works.bepress.com/glen_mays/128/
Background and Overview: Piloting the Methodology in Kentucky

- Discussions with Kentucky Health Department Association (KHDA) to introduce & explain *Foundational Public Health Services (FPHS)* framework using RESOLVE FPHS articulation/definitions document

- Buy-in: KHDA formed a finance workgroup to evaluate how to incorporate FPHS framework into current financial & performance reporting system.
  - Crosswalk of chart of accounts with FPHS framework

- Participation in Cost-Estimation Pilot Project (6 members of workgroup serving as a representative sample – from small rural to large urban to multi-county health districts)

- Development of a cost data collection instrument
Adapt Washington DACS instrument as a starting template and modify & enhance accordingly

Goal is for cost data collection instrument to be efficiently self-administered and capture estimates that account for uncertainty (i.e. dynamic nature of public health - FPHS demand and supply)

Empirical approach: Estimate FPHS Costs by modeling uncertainty associated with cost data collected
  • Given sample size, quantify uncertainty through model simulation

Generate probability distribution – the range of all possible values and the likelihood of their occurrence
  • Independent variables / Inputs → Input Distribution
  • Dependent variable / Output → Distribution of output values calculated from all possible combinations (‘scenarios’) of input values
  • Best of all, these probability distributions can be graphed!
# Crosswalk of FPHS with Kentucky’s Chart of Accounts

<table>
<thead>
<tr>
<th>Additional Services</th>
<th>Programs/Activities Specific to Local Community Need Cost Centers - 715, 718, 730, 748, 769, 810, 813, 858, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 882, 891</th>
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<tbody>
<tr>
<td>Foundational Public Health Capabilities</td>
<td>Assessment (Surveillance and Epidemiology) - 844, 890</td>
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</table>
Survey Instrument (4/4): Current Attainment Scale
Used to derive FPHS Projected Costs

“Based on your understanding of how each public health foundational capability and foundational area is defined, please provide your **global or overall assessment** on the following question: *For each foundational category, what is the estimated percentage currently being met by your health department?*”

<table>
<thead>
<tr>
<th>FOUNDATIONAL CAPABILITIES</th>
<th>Point Estimate</th>
<th>Range (Min, Most Likely, Max)</th>
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<tbody>
<tr>
<td>Assessment (surveillance and epidemiology)</td>
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<td>Emergency Preparedness (All Hazards)</td>
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<td>Communication</td>
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<td>Policy Development and Support</td>
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<td>Community Partnership Development</td>
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<td>Organizational Competencies</td>
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<tr>
<th>FOUNDATIONAL AREAS</th>
<th>Point Estimate</th>
<th>Range</th>
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<tr>
<td>Communicable Disease Control</td>
<td></td>
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<tr>
<td>Chronic Disease and Injury Prevention</td>
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<td>Environmental Public Health</td>
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<td>Maternal/Child/ Family Health</td>
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<td>Access/Linkage with Clinical Health Care</td>
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</table>
Estimation of “projected” costs from current attainment ratings

- A. Cost at current attainment level
- B. Projected cost of full attainment
Costing Methodology Outputs

- Methodology produces a *cost distribution* for each Foundational Capability (FC) and Foundational Area (FA) specified in the National FPHS Definition document.
- Separate estimates of “current” and “projected” costs:
  - **Current**: cost of resources currently used to produce FCs and FAs.
  - **Projected**: cost of resources estimated to be required to fully meet FC and FA definitions, based on current levels of attainment.
Costing Methodology Outputs

- **Foundational Capabilities (FCs) Costs**
  - Health Assessment
  - Emergency Preparedness
  - Communications
  - Policy Development and Support
  - Community Partnership Development
  - Organizational Competencies

- **Foundational Areas (FA) Costs**
  - Communicable Disease Control
  - Chronic Disease & Injury Prevention
  - Environmental Health
  - Maternal and Child Health
  - Access and Linkage to Clinical Care

- Total costs = $\Sigma$FC + $\Sigma$FA
Foundational Capability (FC) – Assessment (per capita $)

Current

- Mean = 2.3490
- 5% = 0.6352
- 95% = 4.5867

Projected

- Mean = 3.8989
- 5% = 1.0887
- 95% = 7.0801
FC_Emergency Preparedness-All Hazards Response (per capita $)

**Current**
- Mean = 4.5238
- 5% = 1.5693
- 95% = 8.5419

**Projected**
- Mean = 8.342
- 5% = 2.837
- 95% = 14.871
FC_Communications (per capita $)

Current

Projected
FCCommunity Partnership Development (per capita $)

Current

Projected

FC_Community Partnership Development (per capita $)

Projected

FC_Community Partnership Development (per capita $)

Projected
FC_Organizational Competencies (per capita $)

**Current**
- Mean = 13.258
- 5% = 8.539
- 95% = 17.958

**Projected**
- Mean = 21.064
- 5% = 10.187
- 95% = 33.106

**FC_Organizational Competencies (per capita $)**

- Projected vs Current
Foundational Area (FA) _Communicable Disease Control (per capita $)

Current

Projected

Mean = 4.4493
5% = 1.8447
95% = 7.6315

Mean = 5.845
5% = 1.785
95% = 10.447

Projected
FA_Chronic Disease & Injury Prevention (per capita $)

Current

Projected

Mean = 5.0486
5% = 2.2900
95% = 8.2576

Mean = 7.977
5% = 2.760
95% = 14.033

FA_Chronic Disease & Injury Prevention (per capita $)
**FA_Environmental Public Health (per capita $)**

**Current**

- Mean = 3.874
- 5% = 3.954
- 90% = 11.330

**Projected**

- Mean = 3.954
- 5% = 3.948
- 90% = 13.108
FA_Maternal Child and Family Health (per capita $)

Current

Mean = 15.850
5% = 7.820
95% = 25.108

Projected

Mean = 28.599
5% = 10.674
95% = 49.245

FA_Maternal Child and Family Health (per capita $)
FA_Access to & linkage w/ Clinical Care (per capita $)

Current

Mean = 6.0262
5% = 3.1826
95% = 9.0417

Projected

Mean = 8.291
5% = 3.564
95% = 13.561
Foundational Capability – Total Costs per capita (Current & Projected)

Current

Mean = 26.341
5% = 19.569
95% = 33.375

Projected

Mean = 42.836
5% = 29.207
95% = 56.527

Projected Costs

Mean = 26.341
5% = 19.569
95% = 33.375

Projected Costs

Mean = 42.836
5% = 29.207
95% = 56.527

Projected Costs

Foundational Capability – Total Costs per capita (Current & Projected)
Foundational Areas_Total Costs per capita (Current & Projected)

Current

Projected

Mean = 38.695

5% = 28.676

95% = 49.928

Mean = 58.988

5% = 37.995

95% = 81.738

Projected Costs per capita

Current Costs per capita

PUBLIC HEALTH
SERVICES & SYSTEMS RESEARCH
PRACTICE-BASED RESEARCH NETWORKS
Total Local Per Capita Cost Estimates: Current and Projected

**Current**

- Mean = 65.036
- 5% = 52.750
- 95% = 78.323

**Projected**

- Mean = 101.82
- 5% = 76.75
- 95% = 127.46

Total Local Per Capita Cost Estimates: Current and Projected
How Sensitive Are Total Costs to FCs and FAs

Sensitivity Analysis for Total FPHS Costs per capita (current & projected) – standardized beta coefficients
Next Steps: National Estimates

- National stratified, nested sample of state and local jurisdictions
- Selection of 6 states stratified by administrative structure:
  - Centralized: AR, SC
  - Shared: FL, GA (KY)
  - Decentralized: NY, CA (WA)
- Selection of 3 local jurisdictions in each state, stratified by population: <50k | 50-299k | >=300k
- Supplement data already collected from KY, WA
- Web-based survey administration with telephone support
For More Information

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