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

Cezar B Mamaril, University of Kentucky
Glen P. Mays, University of Kentucky

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<tr>
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<td>Research Triangle Institute</td>
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<td>Los Angeles County (CA) Health Department</td>
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<td>Temple University</td>
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<td>Florida Atlantic University</td>
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<td>Justin Marlowe, PhD</td>
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<td>Lizeth Fowler, MS, MPA</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
Costing Methodology (1/2)

- 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>Foundational Public Health Programs</th>
<th>Foundational Public Health Capabilities</th>
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</thead>
<tbody>
<tr>
<td>Programs/Activities Specific to Local Community Need</td>
<td>Communicable Disease Control</td>
<td>Assessment (Surveillance and Epidemiology)</td>
</tr>
<tr>
<td>Cost Centers - 715, 718, 730, 748, 769, 810, 813, 858, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 882, 891</td>
<td>Chronic Disease &amp; Injury Prevention</td>
<td>Emergency Preparedness &amp; Response (All Hazards)</td>
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<tr>
<td></td>
<td>Environmental Public Health</td>
<td>Policy Development &amp; Support</td>
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<td></td>
<td>Maternal, Child &amp; Family Health</td>
<td>Community Partnership Development</td>
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<tr>
<td></td>
<td>Access to &amp; Linkage with Clinical Care</td>
<td>Organizational/Business Competencies (Governance, Equity, IT, HR, etc.)</td>
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**Operational**

- **Across all Programs (i.e. cross-cutting)**
  - 844, 890
- **Communications**
  - 746, 747, 749, 757, 759, 763, 771, 815, 821, 822, 823, 824, 825
- **Policy Development & Support**
  - 836, 890
- **Community Partnership Development**
  - 735, 736, 740, 750, 756, 761, 837, 893
- **Organizational/Business Competencies (Governance, Equity, IT, HR, etc.)**
  - 724, 750, 888, 894, 897, 898

**Foundational Public Health Programs**

- **Communicable Disease Control**
  - 801, 806, 807, 842, 843, 845
- **Chronic Disease & Injury Prevention**
  - 722, 723, 738, 765, 805, 809, 818, 832, 836, 841, 856, 857
- **Environmental Public Health**
  - 500, 520, 540, 560, 580, 591
- **Maternal, Child & Family Health**
  - 760, 766, 767, 768, 803, 804, 808, 816, 833, 848, 852, 853, 854
- **Access to & Linkage with Clinical Care**
  - 712, 741, 770, 800, 802, 811, 883
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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<th>Range</th>
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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 = $\sum FC + \sum FA$
Foundational Capability (FC) – Assessment (per capita $)

Current

Projected

Mean = 2.3490
5% = 0.6352
95% = 4.5867

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

Current

Projected

Projected
**FC_Communications (per capita $)**

**Current**
- Mean = 0.34280
- 5% = 0.10604
- 95% = 0.57539

**Projected**
- Mean = 0.55200
- 5% = 0.16432
- 95% = 0.98832
FC_Policy Development & Support (per capita $)

Current

Mean = 2.4427
5% = 0.9216
95% = 4.4298

Projected

Mean = 3.9134
5% = 1.3200
95% = 6.9197
FC_Organizational Competencies (per capita $)

Current

Projected

Mean = 13.258
5% = 8.539
95% = 17.958

Mean = 21.064
5% = 10.187
95% = 33.106

FC_Organizational Competencies (per capita $)
Projected
Current
Foundational Area (FA)_Communicable Disease Control (per capita $)

Current

Mean = 4.4493
5% = 1.8447
95% = 7.6315

Projected

Mean = 5.845
5% = 1.785
95% = 10.447
FA_Chronic Disease & Injury Prevention (per capita $)

Current

Projected
FA_Environmental Public Health (per capita $)

Current

- 5% = 3.87
- 90% = 11.33
- Mean = 7.322

Projected

- 5% = 3.95
- 90% = 13.11
- Mean = 8.316
FA_Access to & linkage w/ Clinical Care (per capita $)
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
Foundational Areas_Total Costs per capita (Current & Projected)

Current

- Mean = 38.695
- 5% = 28.676
- 95% = 49.928

Projected

- Mean = 58.988
- 5% = 37.995
- 95% = 81.738

Projected Costs per capita (Current & Projected)
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
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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