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

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Results from Piloting an Expert Consensus Methodology

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Glen P. Mays, Ph.D., MPH

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<th>Affiliation</th>
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<td>Research Triangle Institute</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
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>Programs/Activities Specific to Local Community Need</th>
<th>Cost Centers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Additional Services</strong></td>
<td><strong>715, 718, 730, 748, 769, 810, 813, 858, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 882, 891</strong></td>
</tr>
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<table>
<thead>
<tr>
<th>Communicable Disease Control</th>
<th>Chronic Disease &amp; Injury Prevention</th>
<th>Environmental Public Health</th>
<th>Maternal, Child &amp; Family Health</th>
<th>Access to &amp; Linkage with Clinical Care</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>801, 806, 807, 842, 843, 845</strong></td>
<td><strong>722, 723, 738, 765, 805, 809, 818, 832, 836, 841, 856, 857</strong></td>
<td><strong>500, 520, 540, 560, 580, 591</strong></td>
<td><strong>760, 766, 767, 768, 803, 804, 808, 816, 833, 848, 852, 853, 854</strong></td>
<td><strong>712, 741, 770, 800, 802, 811, 883</strong></td>
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### Foundational Public Health Programs: "Responsibilities"

- Communicable Disease Control
- Chronic Disease & Injury Prevention
- Environmental Public Health
- Maternal, Child & Family Health
- Access to & Linkage with Clinical Care

### Foundational Public Health Capabilities

- Assessment (Surveillance and Epidemiology) - **844, 890**
- Emergency Preparedness & Response (All Hazards) - **746, 747, 749, 757, 759, 763, 771, 815, 821, 822, 823, 824, 825**
- Communications
- Policy Development & Support - **836, 890**
- Community Partnership Development - **735, 736, 740, 756, 761, 837, 893**
- Organizational/Business Competencies (Governance, Equity, IT, HR, etc.) - **724, 750, 888, 894, 897, 898**

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*PUBLIC HEALTH SERVICES & SYSTEMS RESEARCH PRACTICE-BASED RESEARCH NETWORKS*
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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<tr>
<td>Emergency Preparedness (All Hazards)</td>
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<tr>
<td>Communication</td>
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<tr>
<td>Policy Development and Support</td>
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<tr>
<td>Community Partnership Development</td>
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<td>Organizational Competencies</td>
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<th>FOUNDATIONAL AREAS</th>
<th>Point Estimate</th>
<th>Range</th>
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<tr>
<td>Access/Linkage with Clinical Health Care</td>
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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**

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

**Project**

- 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

Mean = 0.34280
5% = 0.10604
95% = 0.57539

Mean = 0.5520
5% = 0.1643
95% = 0.9883

FC_Communications (per capita $)

Projected
FC_Policy Development & Support (per capita $)

Current

Projected

Projected

Mean = 2.4427

Mean = 3.9134

Mean = 2.4427

Mean = 3.9134

5% = 0.9216

5% = 1.3200

95% = 4.4298

95% = 6.9197

0 1 2 3 4 5 6 7 8 9

0 5 0 5 0 5 0 5 0

FC_Policy Development & Support (per capita $)

Projected

Current

Projected
FC_Community Partnership Development (per capita $)

Current

Projected

Mean = 3.4246
5% = 1.5055
95% = 5.6883

Mean = 5.066
5% = 1.641
95% = 9.063

FC_Community Partnership Development (per capita $)
Projected

Mean = 5.066
5% = 1.641
95% = 9.063

Public Health Services & Systems Research
Practice-Based Research Networks
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
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**
- Mean = 5.0486
- 5% = 2.2900
- 95% = 8.2576

**Projected**
- Mean = 7.977
- 5% = 2.7600
- 95% = 14.033

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

- **Current**
  - Mean = 7.322
  - 5% = 3.874
  - 95% = 11.330

- **Projected**
  - Mean = 8.316
  - 5% = 3.948
  - 95% = 13.108

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**FA_Environmental Public Health (per capita $)**

- **Projected**
  - Mean = 8.316
  - 5% = 3.948
  - 95% = 13.108
FA_Maternal Child and Family Health (per capita $)

**Current**
- Mean = 15.850
- 5% = 7.820
- 95% = 25.108

**Projected**
- Mean = 28.559
- 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

FA_Access to & linkage w/ Clinical Care (per capita $)
Foundational Capability – Total Costs per capita (Current & Projected)

Current

Projected

Mean = 26.341
5% = 19.569
95% = 33.375

Mean = 42.836
5% = 29.207
95% = 56.527

Projected
Total Local Per Capita Cost Estimates: Current and Projected

Current

Projected

Mean = 65.036
5% = 52.750
95% = 78.323

Mean = 101.82
5% = 76.75
95% = 127.46

Total Local Per Capita Cost Estimates: Current and Projected
Sensitivity Analysis for Total FPHS Costs per capita (current & projected) – standardized beta coefficients

How Sensitive Are Total Costs to FCs and FAs
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