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Cost Estimates of Foundational Public Health Services: Results from Piloting the Expert Consensus Methodology in Kentucky

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Cost Estimates of Foundational Public Health Services:

Results from Piloting the Expert Consensus Methodology in Kentucky

C.B. Mamaril, Ph.D. Glen P. Mays, Ph.D., MPH

APHA Public Health Finance Roundtable

New Orleans, LA

16 November 2014





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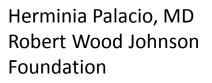
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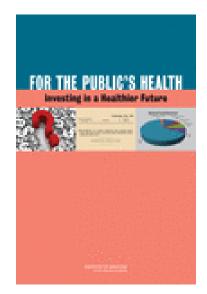
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Toward a deeper understanding of costs & returns

2012 Institute of Medicine Recommendations

- Identify the components and costs of a minimum package of public health services
 - Foundational capabilities
 - Basic programs
- Implement a national chart of accounts for tracking spending and flow of funds
- Expand research on costs and effects of public health delivery



Institute of Medicine. For the Public's Health: Investing in a Healthier Future. Washington, DC: National Academies Press; 2012.

Defining what to cost: the public health package

- Washington State's Foundational Public Health Services
- Ohio's Public Health Futures Committee: Minimum Package of Services
- Colorado's Core Public Health Services

 National Workgroup on Foundational Public Health Capabilities



Defining what to cost: the public health package

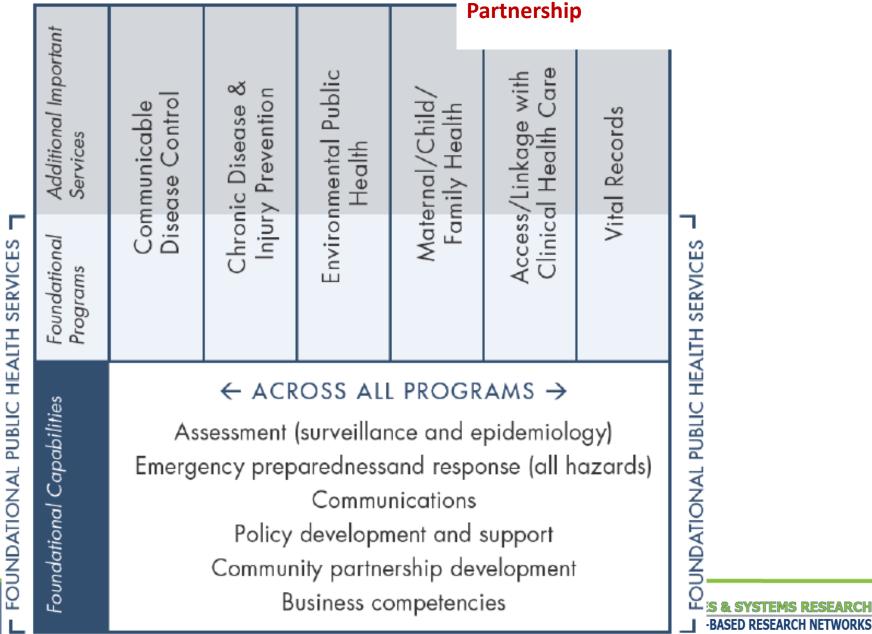
The National Workgroup developed definitions of foundational public health capabilities, specified in the Public Health Leadership Form's Articulation of Foundational Capabilities and Foundational Areas

<u>http://www.resolv.org/site-</u> <u>healthleadershipforum/defining-and-constituting-</u> <u>foundational-capabilities-and-areas/</u>



Defining what to cost

Washington Public Health Improvement



Cost-Estimation Workgroup – Review

- Workgroup on Public Health Cost Estimation convened to develop a methodology for estimating the resources required to develop and maintain foundational capabilities by governmental public health agencies at both state and local levels.
- First Meeting at RESOLVE November 22, 2013
- Series of conference calls to specify methodology
- January 30, 2014 in person meeting to finalize cost-estimation methodology
- Final report on recommended methodology:

Estimating the Costs of Foundational Public Health Capabilities: A Recommended Methodology

Accessible at <u>http://works.bepress.com/glen_mays/128/</u>



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

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



Drawing from and Building on FPHS Cost Estimation in Washington State

- Use Public Health Improvement Partnership's September 2013 Report on estimating the cost of Foundational Capabilities (Berk and Associates)
- Use Washington Delivery and Cost Studies (DACS) to cost out FPHS with additional granularity

 disagregate labor resource use from non-labor costs, etc.
- Adapt Washington's Excel based data collection instrument to national FPHS definitions and national sampling frame

Foundational Public Health Services Preliminary Cost Estimation Model

> Final Report September 2013



FOUNDATIONAL PUBLIC HEALTH SERVICES SUBGROUP Public Health Improvement Partnership Agenda for Change Workgroup





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Information systems specialist		-	0		0	Emergen								0				0						\$0		\$0
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 PUBLIC HEALTH
 SERVICES & SYSTEMS RESEARCH PRACTICE-BASED RESEARCH NETWORKS

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 occurence
 - Independent variables / Inputs \rightarrow 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!



Estimated allocated employee hours per week by foundational capability, foundational area & employee category	Health	Public health manager	Registered nurse	Licensed practical or vocational nurse (LPN/LVN)	Nursing aide and home health aide	Public health physician	Environmental health worker	Laboratory worker	Epidemiologist
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FOUNDATIONAL CAPABILITIES (Hours per week per individual for LHD employee/labor functions or services performed that may cut across multiple if not all foundational areas)

Assessment (surveillance and epidemiology)	min ave								
	max								
Emergency Preparedness	min								
(All Hazards)	ave								
	max								
Communication	min								
	ave	Curvou	Inctrumon	+ (1 //)	Labor		urco II	co l	
	max	Survey	Instrumen	ししエ/チノ	Lavu	νεξοι		36	
Policy Development and	min								
Support	ave								
	max								
Community Partnership	min								
Development	ave		Minimum, average or most-likely, Maximum						
	max								
Organizational	min								
Competencies	ave								
	max								

FOUNDATIONAL AREAS (Hours per week per individual for LHD employee/labor functions or services performed specific to each foundataional area or responsibility that is not related to any foundational capability as to avoid double-counting)

			•									
Communicable Disease	min											
Control	ave											
	max											
Chronic Disease and	min											
Injury Prevention	ave											
	max											
Environmental Public	min						/	FTF				
Health	ave	N	еекіу пос	hours conversion rate: 37.5 hrs/week = 1 FTE								
	max											
Maternal/Child/ Family	min											
Health	ave											
	max											
Access/Linkage with	min											
Clinical Health Care	ave											
	max											
						ICALIN						

	Annual Salary + Benefits							
OCCUPATION CATEGORIES	(per 1 FTE basis)							
	Minimum	Average	Maximum					
Public health manager								
Registered nurse								
Licensed practical or vocational nurse (LPN/LVN)								
Nursing aide and home health aide								
Public health physician								
Oral health care professional								
Environmental health worker								
Laboratory worker	_							
Epidemiologist Survey I	nstrument	$\left(\frac{2}{4}\right)$ Wage	Scale					
Health educator								
Community health worker								
Nutritionist								
Information systems specialist								
Public information specialist								
Behavioral health professional								
Emergency preparedness staff								
Administrative or clerical personnel								
Communication Staff								
WIC Coordinator								
Other (please indicate positions below)								
	HE	ALTH PRACTICE	S & SYSTEMS RESEARCH BASED RESEARCH NETWORKS					

Survey Instrument (3/4) Non-Labor Costs

POUNDATE CAPAILITES (statuated annual NON-Labor costs in dollars) Assessment (sourcease) and epidemiology) and epidemiology a	Estimated annual non-labor cos foundational capability, foundat area & non-labor category	ational	Communication	Supplies / Materials	Travel / Registration	т	Vehicles	Printing	Contracts / Services	Training	Other	TOTAL
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Crosswalk of FPHS with Kentucky's Chart of Accounts

Additional Services	Cost Centers -	vities Specific to Lo 715, 718, 730, 748 869, 882, 891	•		863, 864, 865,				
Foundational Public Health		Chronic Disease & Injury Prevention	Environmental Public Health	Maternal, Child & Family Health	Access to & Linkage with Clinical Care				
Programs "Responsibilities"	801, 806, 807, 842, 843, 845	722, 723, 738, 765, 805, 809, 818, 832, 836, 841, 856, 857	500, 520, 540, 560, 580, 591	760, 766, 767, 768, 803, 804, 808, 816, 833, 848, 852, 853, 854	712, 741, 770, 800, 802, 811, 883				
	Across all Programs (i.e	-							
Foundational Public Health	Assessment (Surveillance and Epidemiology) - 844, 890 Foundational Emergency Preparedness & Response (All Hazards)-746,747,749,757,759,763,771,815,821,822,823,824,825 Public Health Communications								
Capabilities	Policy Development & S Community Partnershi	Support - 836, 890 p Development - 735, 7 3	36, 740, 756, 761, 837,	893					
	Organizational/Busines	ss Competencies (Gover	mance, Equity, IT, HR, e	tc.) - 724, 750, 888, 89 4	, 897, 898				

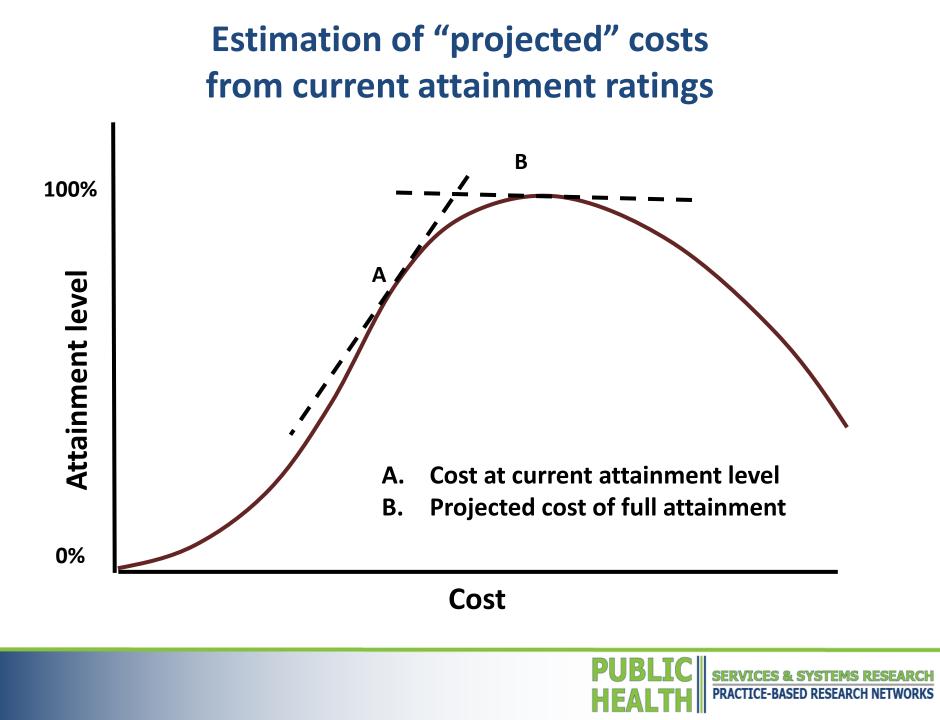


Survey Instrument (4/4): Current Attainment Scale Used to derive FPHS Projected Costs

"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?* "

	Point	Range (Min, Most
FOUNDATIONAL CAPABILITIES	Estimate	Likely, Max)
Assessment (surveillance and epidemiology)		
Emergency Preparedness (All Hazards)		
Communication		
Policy Development and Support		
Community Partnership Development		
Organizational Competencies		

	Point	
FOUNDATIONAL AREAS	Estimate	Range
Communicable Disease Control		
Chronic Disease and Injury Prevention		
Environmental Public Health		
Maternal/Child/ Family Health		
Access/Linkage with Clinical Health Care		



Costing Methodology (2/2)

- Latin Hypercube Sampling
 - A sampling technique that will accurately recreate the probability distributions specified by distribution functions in fewer iterations, when compared with Monte Carlo sampling.
 - All possible values in input distribution are "sampled" for use in calculating total FPHS Costs (i.e. output values).
 - Output distribution generated from output values computed from "bins" or sets of scenarios containing all possible input values.
 - Iteration Each time the outcome value is recalculated using a new set or combination of possible input values (i.e. cost estimate of each FPHS category)
- Sensitivity Analysis
 - Determine which inputs (i.e. FPHS categories) have the greatest impact on overall FPHS costs

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

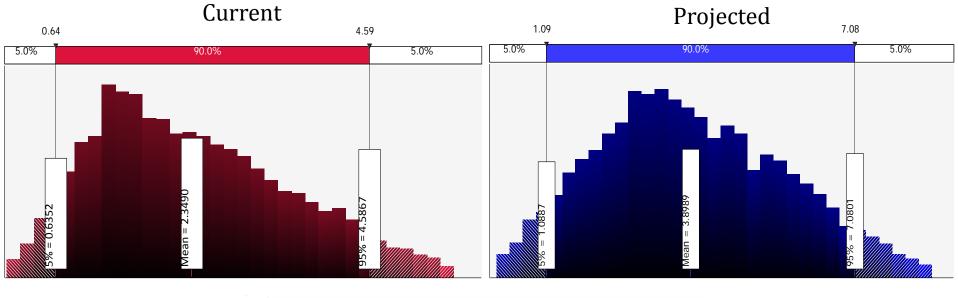
- Health Assessment
- Emergency Preparedness
- Communications
- Policy Development and Support
- Community Partnership Development
- Organizational Competencies

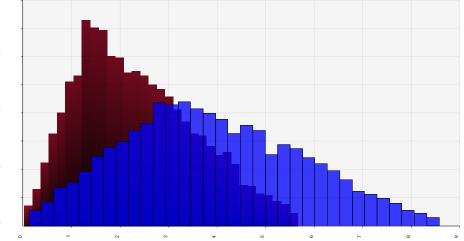
Foundational Areas (FA) Costs

- Communicable Disease Control
- Chronic Disease & Injury Prevention
- Environmental Health
- Maternal and Child Health
- Access and Linkage to Clinical Care
- Total costs = $\sum FC + \sum FA$



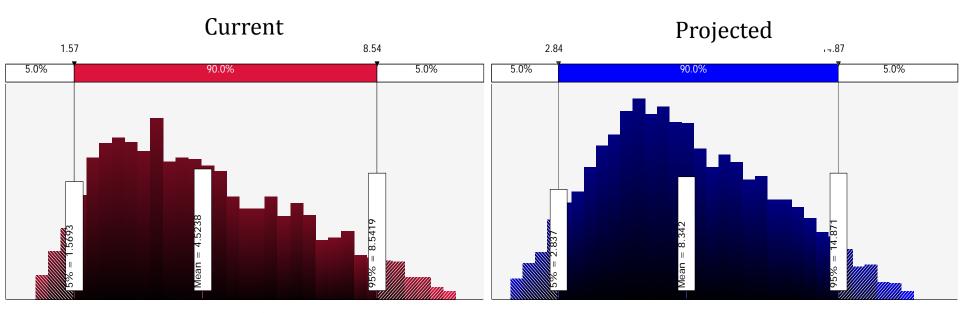
Foundational Capability (FC) – Assessment (per capita \$)

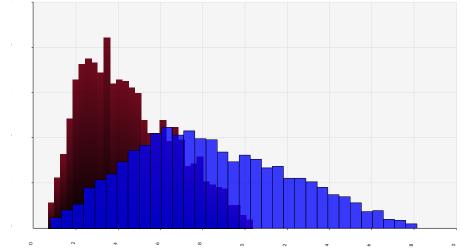






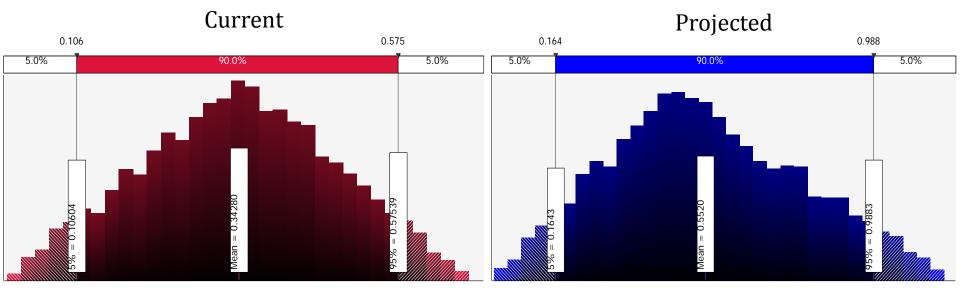
FC_Emergency Preparedness-All Hazards Response (per capita \$)

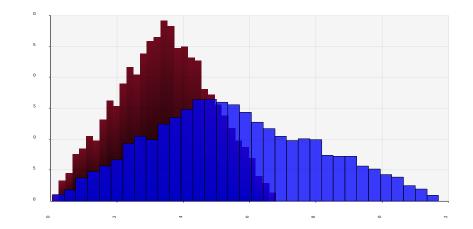






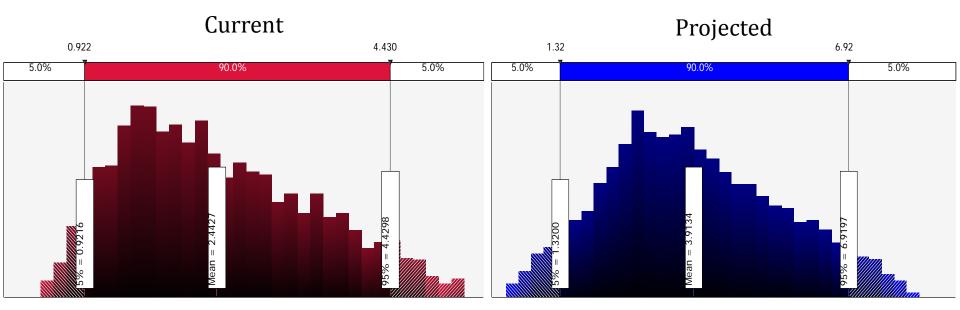
FC_Communications (per capita \$)

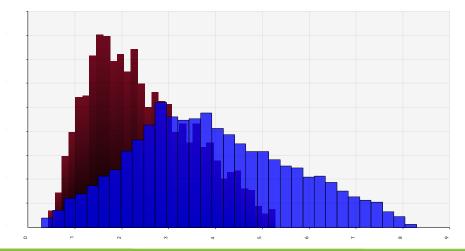






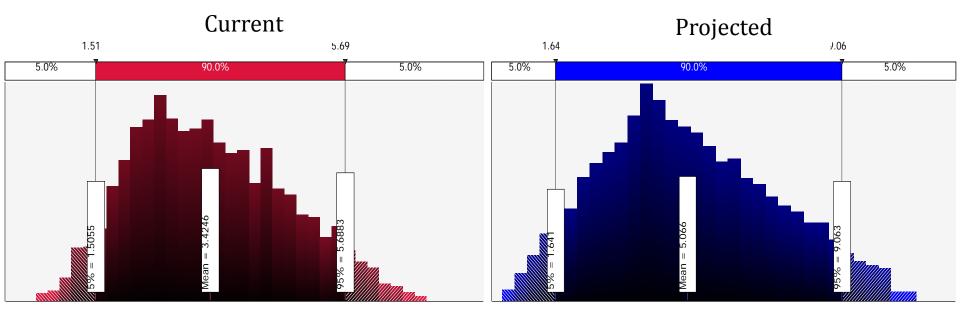
FC_Policy Development & Support (per capita \$)

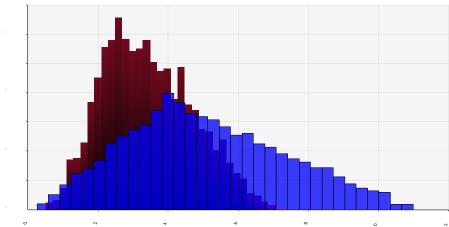






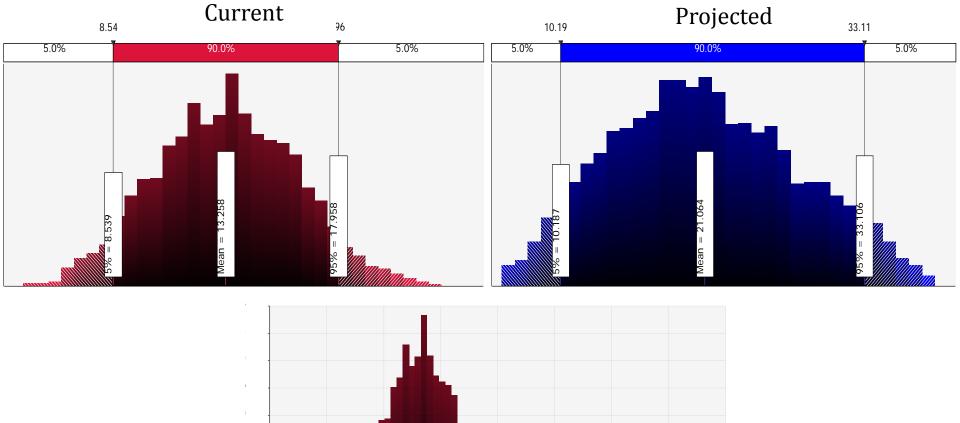
FC_Community Partnership Development (per capita \$)

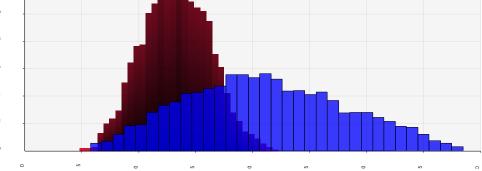






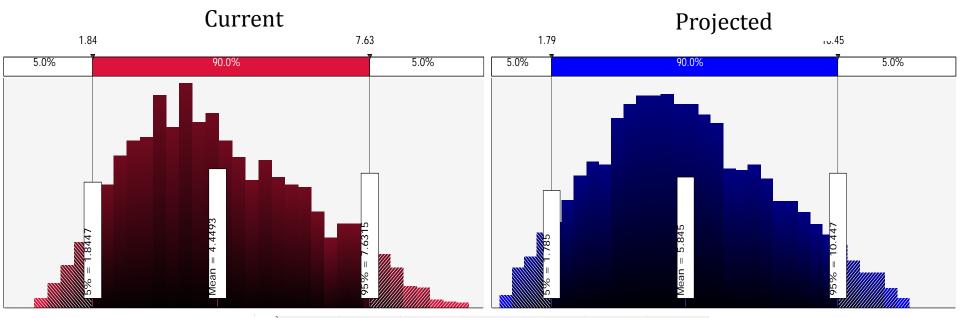
FC_Organizational Competencies (per capita \$)

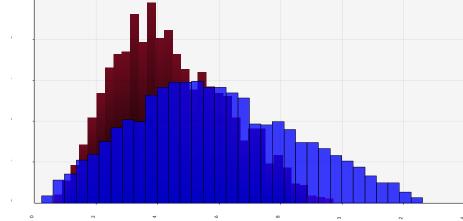






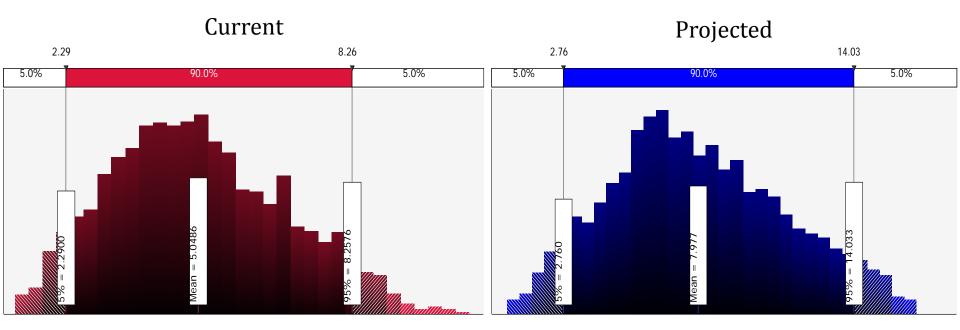
Foundational Area (FA)_Communicable Disease Control (per capita \$)

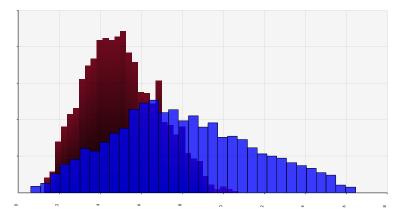






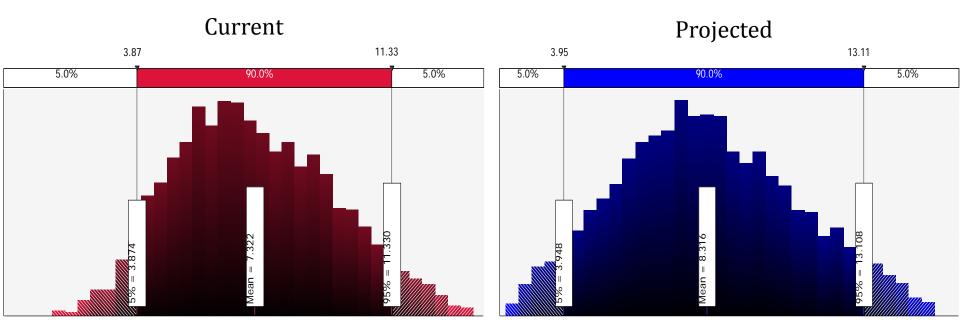
FA_Chronic Disease & Injury Prevention (per capita \$)

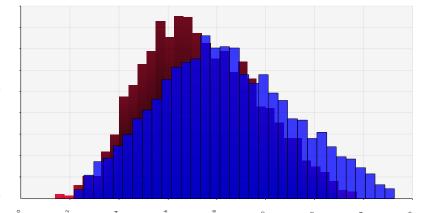






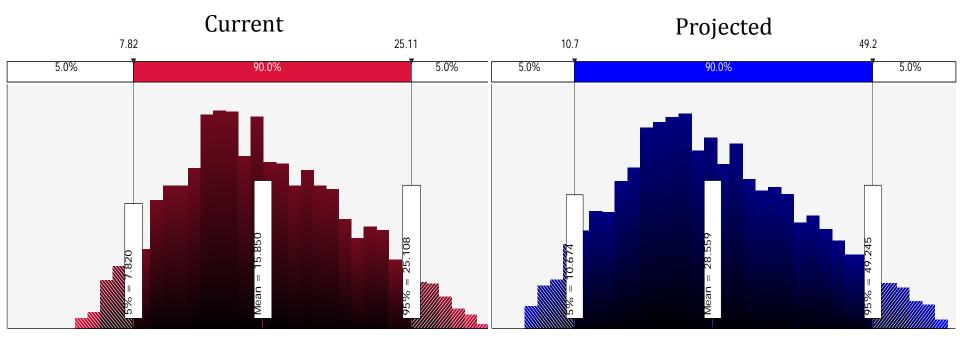
FA_Environmental Public Health (per capita \$)

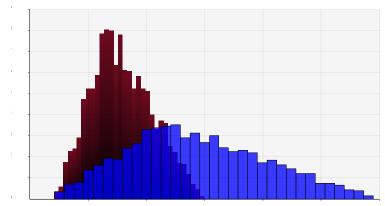






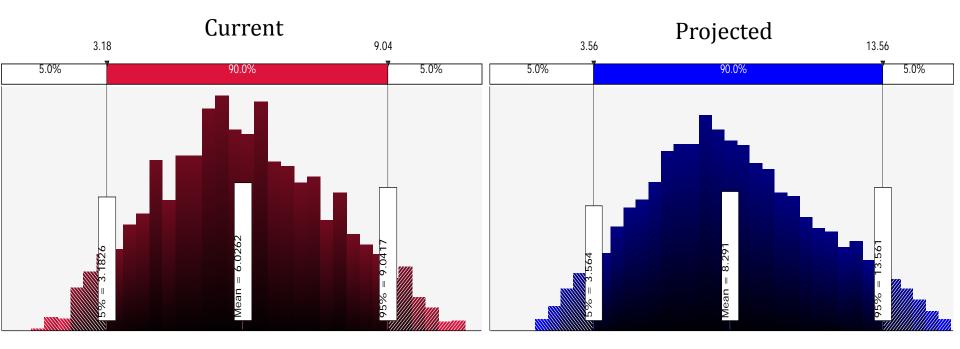
FA_Maternal Child and Family Health (per capita \$)

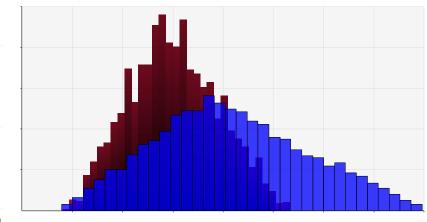






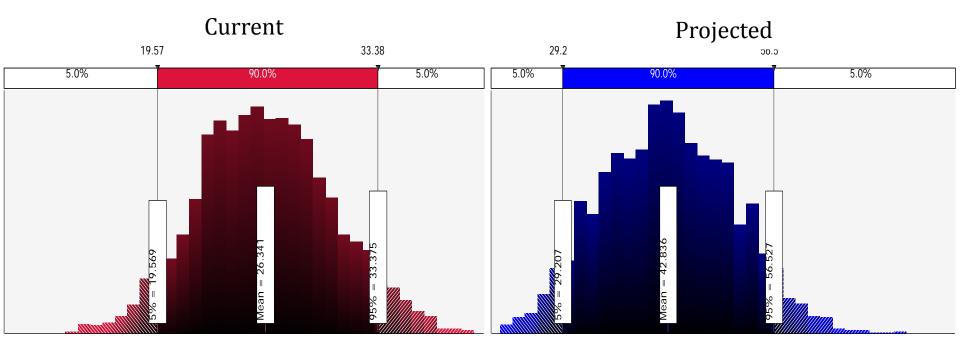
FA_Access to & linkage w/ Clinical Care (per capita \$)

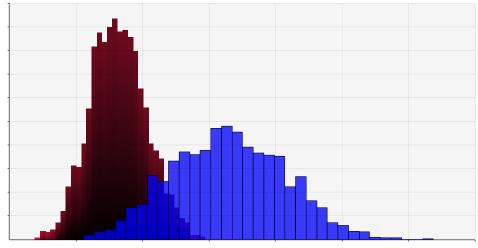






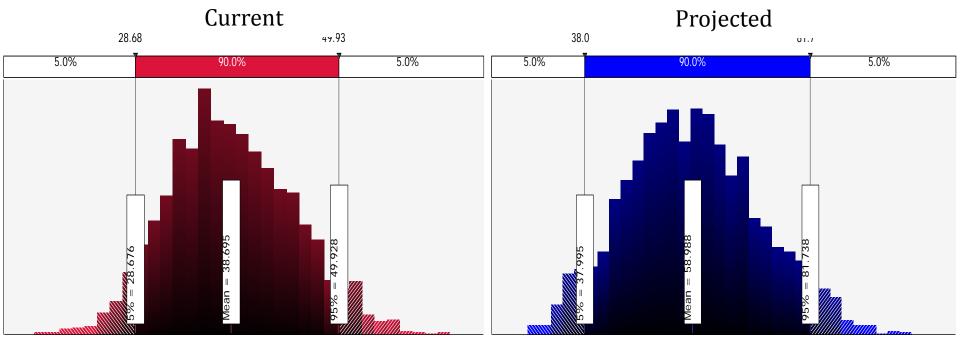
Foundational Capability – Total Costs per capita (Current & Projected)

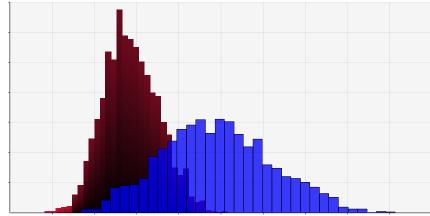






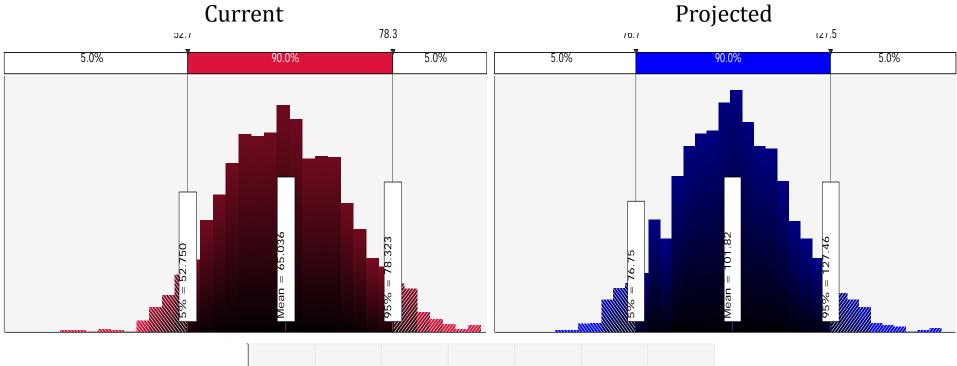
Foundational Areas_Total Costs per capita (Current & Projected)

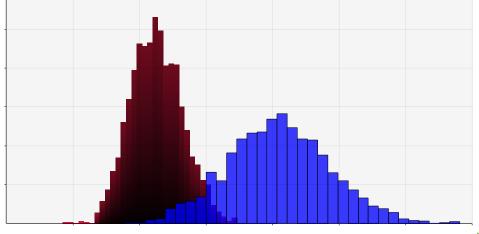






Total Local Per Capita Cost Estimates: Current and Projected

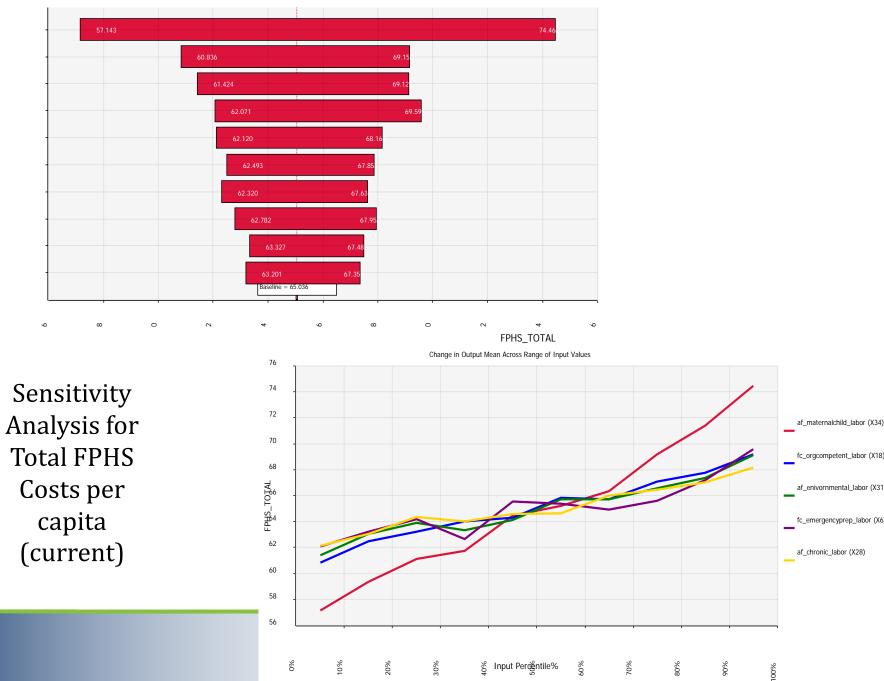




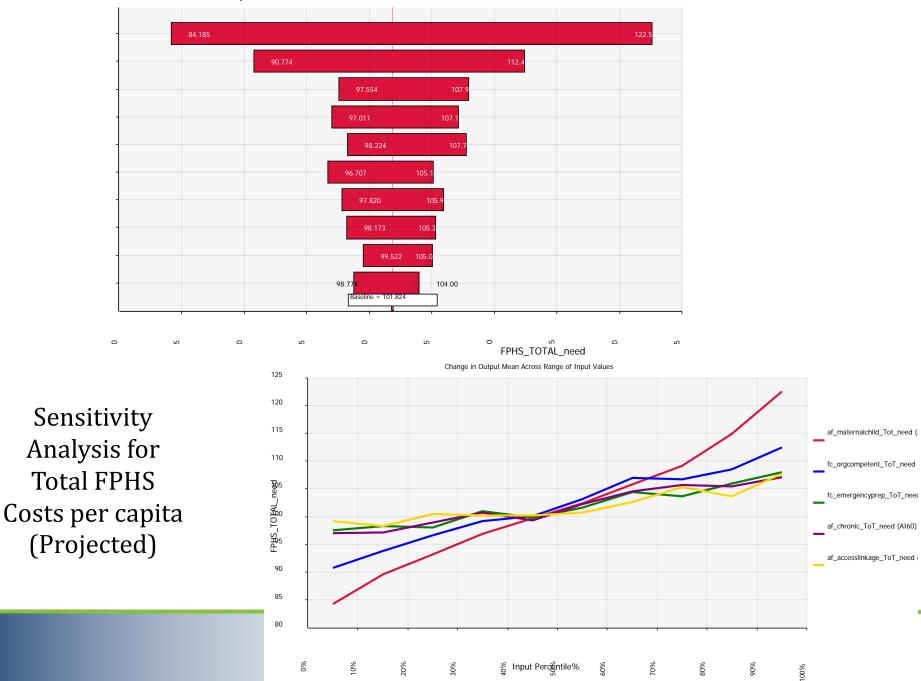
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Drivers of Total Current Costs: Which FCs and FAs are Most Influential?



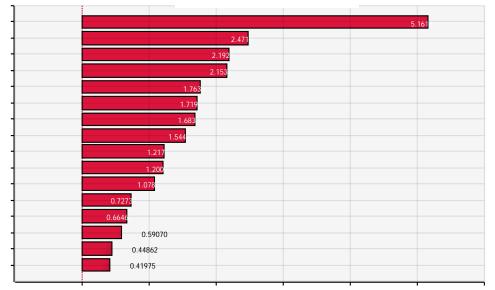
Drivers of Total Projected Costs: Which FCs and FAs are Most Influential?



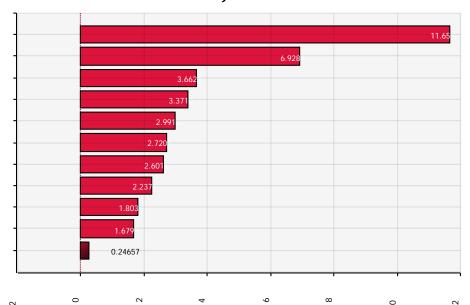
How Sensitive Are Total Costs to FCs and FAs

 \sim

Current



Projected



Sensitivity Analysis for Total FPHS Costs per capita (current & projected) standardized beta coefficients

Comparison of Cost Estimates

Washington PHIP - BERK Foundational Cost Report

- \$328 million total annual cost projected (state+local)
- \$165 million local annual cost projected
- \$47 total per capita cost projected
- \$24 local per capita cost projected

Kentucky Pilot Project Baseline (i.e. most likely)

- \$286 million local annual current cost
- \$65 local per capita current cost
- State cost estimates TBD

Other State Estimates (different definitions & methods)

- Ohio: \$32 local per capita current cost
- Colorado: \$37 local per capita current cost



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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