

Evaluation of the Sub-County Assessment of Life Expectancy (SCALE) Project

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1.0 Introduction

1.1. Background of the SCALE Project

Recent public health efforts indicate that life expectancy (LE) is a particularly helpful indicator for detecting health disparities across geographic areas. These efforts also suggest that descriptive analyses of LE across small geographic areas holds potential for identifying modifiable risk factors contributing to such disparities—lending potentially helpful information for consideration in public health program planning. Small area LE estimates hold the potential to benefit several large-scale public health efforts presently underway in the United States, including recent mandates from the U.S. Internal Revenue Service for non-profit hospitals wishing to retain their tax-exempt status and voluntary public health accreditation.

Recognizing the potential added-value of having a standardized methodology for calculating LE for small geographic areas (i.e., sub-county) throughout the United States, the Centers for Disease Control and Prevention (CDC) provided funds to the Council of State and Territorial Epidemiologists (CSTE) to support a multi-year effort to facilitate the development and adoption of small area LE methods. In September 2014, CSTE initiated a collaborative project—the Sub-County Assessment – Life Expectancy (SCALE) Project—with representatives from six state and two local health departments to engage in the first of a multi-phase effort to develop, test, refine, and disseminate standardized methodologies for calculating estimates of LE at a sub-county level.

The SCALE Project comprises a multi-phase effort, each of which built upon the work of the previous phase with the intention of increasing the capacity within state and local health departments to calculate and interpret small-area LE estimates to facilitate the identification of health disparities as well as potential upstream factors contributing to these disparities. Initial phases of the SCALE Project were designed to produce a variety of tools and guidance that could be easily used by state and local health departments in building this capacity.

During Phase I of the SCALE Project (September 2015-July 2015), the team conducted a literature review to learn more about existing methodologies for calculating small-area estimates of life expectancy; reviewed and pilot tested an existing instrument originally developed and published in the United Kingdom (SEPHO) to examine its potential utility¹; refined existing SAS and STATA code to align with the algorithm(s) published in the SEPHO tool; shared an overview of the first phase and the initial lessons learned with epidemiologists at the 2015 CSTE Annual Conference; and developed a draft “how to” guide (“The Guide”) for use by other epidemiologists and public health practitioners interested in utilizing the SEPHO tool. In addition, the team submitted a manuscript to a peer-reviewed journal that provided an orientation to this project, disseminated lessons learned, and advanced support for the potential added value of small-area LE estimates for guiding public health policy, research, and practice.

The second phase of the SCALE Project commenced in late July 2015. Phase II participants include representatives of the six states and two locales who engaged in Phase I as well as

¹ South East Public Health Observatory (SEPHO). (2004). Life expectancy calculator: LA and ward level. Retrieved from: <http://www.sepho.org.uk/viewResource.aspx?id=8943>

several additional states and locales that have expressed an interest in piloting the Phase I methods. Recruitment efforts resulted in participation from geographic areas in which the feasibility of calculating small area estimates of life expectancy can vary substantially. Following Phase II, recruitment of additional jurisdictions occurred on a rolling basis through presentations at various conferences including the CSTE annual conference.

1.2. Purpose/intent of the evaluation documented in this report

Throughout the SCALE project, our evaluation team gathered data to respond to several key evaluation questions. In the early stages of this effort, we sought insights from Phase II participants to better understand how the content and format of draft products developed in Phase I could be improved to facilitate utilization by the public health community. In addition, we gathered insights about the resources that were required to calculate sub-county LE estimates using the methodology and steps proposed in the SCALE Guide. Team members used the insights from these early evaluation activities to revise the SCALE Guide and modify SCALE-related trainings conducted during annual CSTE conferences.

As the project has progressed, and states and localities had an opportunity to calculate sub-county LE estimates and potentially disseminate the findings, we have shifted our inquiry to the potential public health utility of sub-county LE estimates. Specifically, in the current report we aim to answer “*What is the potential public health utility of small-area life expectancy estimates?*” In responding to this question, we first examine efforts that came before SCALE was initiated and subsequently present insights from jurisdictions that participated in SCALE. Since dissemination of estimates, either to internal health department partners or entities external to the health department is required for use to take place we first examine the extent to which SCALE participants were able to calculate and disseminate sub-county LE estimates. In addition, we provide insights from these participants about any challenges they encountered in producing and subsequently disseminating these estimates. Finally, we delve deeper into the potential public health utility of these estimates by presenting cases from two jurisdictions – one at a local level (Shelby County, Tennessee) and one at a state level (Florida). As part of these cases, we interviewed several partners within the jurisdiction who had exposure to the sub-county LE estimates to better understand their response and potential actions based upon the information they received.

2.0. Utility of sub-county life expectancy estimates

2.1. Intended uses of sub-county life expectancy estimates

The intention of calculating and disseminating public health indicators from surveillance data is to inform public health action. Public health surveillance is “the ongoing, systematic collection, analysis, and interpretation of health-related data essential to planning, implementation, and evaluation of public health practice.” <https://www.cdc.gov/publichealth101/surveillance.html>

An indicator, such as sub-county life expectancy, is calculated with the implicit or explicit intention of providing information that will be valuable for taking actions that lead to improved public health. But the route to such public health actions is often unmapped – leaving us to wonder when public health data is getting/making traction towards impact. Examples of public

health efforts that disseminated sub-county LE estimates (whether prior to SCALE or as part of this effort), provide us with insights about the type of influence these estimates may have—including who may be influenced by this data and the types of actions they may take to facilitate improvements in public health. Drawing upon the data gathered through this evaluation we offer the following conceptual figure {to be developed} as a starting point for considering the intended uses of sub-county level LE estimates for facilitating public health action to decrease health inequities.

Potential end-users (Who are the intended audiences of sub-county LE estimates?)

- Funders (current and future)
- Health Department Leadership
 - Health department leadership/management (health director, health officer, health commissioner, board of supervisors, state epidemiologist, chief of epidemiology)
- Health Department Programs
- Local health departments
- Other state or local health departments (e.g., example of “listening to the national conversation” – aligns with what CSTE does)
- Media
- Public health partners outside of health departments (e.g., hospitals, private sector (e.g., social entrepreneurs (PHE)), non-profit organizations, community-based organizations, churches, activists)
- Community members
- Politicians (e.g., state legislature, governor, mayor, city councils)

Potential changes (What changes may occur among the intended audiences as a result of seeing sub-county LE estimates?).

- Facilitate partnerships to address issues identified (could involve program/intervention planning and coordination of efforts)
- Program/intervention planning – identifying areas in high need
- Engage in additional analyses – to better understand factors
- Monitor sub-county LE over time to detect anomalies (e.g., effects of opioid epidemic)
- Raise awareness of existence and severity of disparities
 - Conversation starter about reasons why
 - Facilitate activism to promote action
 - Increase funding to addressing underlying causes of disparities
- Education (kind of aligns with raise awareness but might go beyond – think about more)
 - Health care practitioners (current and future)
 - Community members
 - Partners
- Change dialogue – type of language used, messages relayed (One example is moving toward asset-based language → not so much “health inequality” or “filling in gaps” rather “inclusive growth” “inclusive health”; another example is getting key messages about health disparity articulated by powerful individuals – Teresa May quote)

Ultimately the intended impact of these changes is a decrease in health inequalities.

Need to make clear that this is not a linear system and treating it as such may be a disservice. Rather, this is a complex system that is deeply affected by context – as Paul noted, a decrease in health inequalities is the “long-term game.”

2.2.Examples of use from pre-SCALE projects

As previously noted, one of the reasons for initiating the SCALE project was the observation of several projects throughout the U.S. that were successfully calculating sub-county LE estimates (e.g., Alameda County, Public Health Seattle-King County). In March 2018, CSTE convened 22 individuals to discuss respective project efforts that focus on calculating sub-county LE (USALEEP, VCU project, Public Health England, and SCALE). Presentations from three efforts highlighted the history of their sub-county LE efforts as well as the influence these estimates had in the broader community. These efforts do not necessarily point directly to public health actions taken as a result of disseminating sub-county LE estimates or public health improvements, but do provide interesting examples of early indicators of the traction that sub-county LE estimates can have which may lead to subsequent public health action and improvement.

2.2.1 Public Health Seattle King County {to be condensed into narrative}

- County-level data hides disparities
- When they mapped sub-county LE by Health Reporting Areas (HRA)- almost 10-year difference within KC {Residents of South Auburn have a life expectancy of 76.7 years vs. West Bellevue residents (86 years)}.
- Worked to drill down to see what factors might drive this – so looked at several SDoH by zip code but were having difficulties seeing patterns. ZIPs crossed city and county boundaries and while we could still see large variation in absolute disparities, we couldn't map it well to any social determinants of health.
- Mapped LE by CT – instead of 10 yr gap they had a 25 yr gap. And this 25-year gap really got people talking. → Can see how things are attenuated when aggregating up even to the HRA level
- Used county Health Rankings figure to facilitate conversation about how to drive how to change → took these variables and used BRFSS data to look at them at a lower level of resolution. They asked on the BRFSS for their nearest intersection. These maps were a *real* stretch for the health department. They hung the pictures all around the room at a meeting (hosted or funded by the Federal Reserve Bank) and it had a big influence – same pattern over and over again
 - Led to *Communities of Opportunity*
 - When you compare the highest and lowest deciles of LE and several other indicators (SDoHs) that you see huge differences.
 - Became a strong rallying cry.
 - COO has been going on for the past 4 years now.
 - Through COO several additional funds have been acquired (The Seattle Foundation, Living Cities, RWJ, Accountable Communities of Health (Medicaid Transformation), Best Starts for Kids Levy), cross departmental level collaborations (evaluation, planning teams, and cross-departmental workgroups; shared funding mechanisms), community based priorities

(results based accountability to set priorities; use community leaders; build skills and capacity), funds into the community (RFP process for co-creating strategies with community, funds to community organizations for policy/system changes), developing cross-sector structures for improving lives of high-cost, high-need individuals; aligned activities with county-wide initiatives.

- Remember that this is not only LE but also social determinants of health
- Root cause analysis helps us see our work as ***interconnected***

2.2.2 Virginia Commonwealth University{to be condensed into narrative}

- Center on Society and Health – Academic research center working to connect the dots between social factors and health (www.societyhealth.vcu.edu). Goal is to get research into the hands of policymakers. Large gap between research and policy. “Connecting the dots” – research, policy outreach, strategic communication, and stakeholder engagement (with collaboration at the center). They design their products with the end-user in mind and do a lot of outreach to the end-users.
- One of the first major projects that they did was Place Matters – <https://societyhealth.vcu.edu/work/the-projects/place-matters.html>
- Goal was to produce a communication about LE that is a “conversation starter”.
- Influence...
 - Their work on LE has really been picked up – about 100 interviews with media, millions of people reached through Wash Post article, NYT, ABC News, Facebook posts by Bernie Sanders (of Wash Post article), etc.
 - Mayors are pulling together groups to talk about findings, etc.
 - Question from Paul (PHE) – So what happens now then? What is the uptake of the information and action locally?
 - From the map we just do the awareness piece and jump out. We have changed some of the conversations around local funders in Virginia – when a for profit hospital turns into a nonprofit hospital → we have had several of these in Richmond...one example we have seen locally is engaging in discussions now think about focusing on investments in disadvantaged communities (rather than individual-level engagement). Community Reinvestment Act – they have had some involvement in driving some of the decisions that are being made out of here.
- Purposeful, planful, strategic (?):
 - Talks about how to get on media’s radar – notes importance of having press release that is prepackaged. Many media products on their work just wrote the story directly from the prepackaged materials (which contained quotes, etc.).
 - Argues that the most important thing here is local relevance since action is likely to be taken at local level (“arguably, action is taken more easily at the local level”).
 - CA Healthy Places Index – <http://map.healthyplacesindex.org>; <http://healthyplacesindex.org/policy-actions/> (Public Health Alliance of Southern California)—The indicators for inclusion in this index were specifically selected

with stakeholders and those stakeholders wanted the findings to be specifically relevant to policy actions. This website is currently in beta testing.

VCU hopes their maps serve as a "conversation starter to support the work of local officials and community organizations looking to address these factors in order to improve, maintain and reclaim their community's health." <http://wtvr.com/2015/04/29/life-expectancy-map/>

2.2.3 Public Health England{to be condensed into narrative}

Takes us through three case studies

- Story #1 – History
 - Documents history of political system, changes in PHE, and various fluctuations in the trajectory of health inequality being on the map.
 - 2013 – at the local level they have to have a Health and Wellbeing Strategy (have a Health and Wellbeing Board (?))
 - Notes how far they have come since Margaret Thatcher with Teresa May recently stating in one of her speeches a tag line from their work on LE – that if you are poor you are more likely to die 9 years earlier. Never would have occurred in Thatcher days and “life expectancy has been a big part of this” history.
- Story #2 – Healthier lives on premature mortality by LA
 - Others did not want to have a similar color gradient. They wanted “blood red” to depict low LE (i.e., high premature mortality).
 - Media was in a frenzy over this.
 - Notes that the look at the deprivation index and the idea of healthy LE to speak about the costs associated with poor health over the course of several years and perhaps decades for individuals. In England this is a big driver since government funded health care.
 - They brought a bunch of individuals from various backgrounds together. Tons of energy around how to make a difference based upon the findings of this report— one item they wanted to produce was essentially a “Marmot Report” specifically for the North which has much poorer health outcomes and lower LE-> “Due North” (see slides for three key messages in the report).
 - Put together a collection of evidence on the web (Collection - Health Equity); “*At the Heart of Health*” – www.phe.gov.uk; other reports
- Story #3 – Impact
 - Come to a cross roads in England – “What kind of country do we want here?” This is really across the board – both parties. The underlying messages of Brexit was really that people feel disenfranchised.
 - Local councils have gotten together in groups around city regions (often) and they have said “we want to take the decision making out of London into our areas.” There are about 21 *devolution deals* – a deal with the national govt with local authorities—handing over power to the cities to take control of their infrastructure, edu, welfare, and much more—only one place where this has included health – Manchester.
 - Using LE in Manchester to affect these efforts.

- Produced maps – “life on the line? Differences in life expectancy across Greater Manchester” → maps LE along the stops on the subway line.
 - Manchester has huge health inequalities.
 - Healthy LE – gap of 27.6 years males; 25.8 for females
 - Mayor of London – most powerful politician
 - *The London Health Inequalities Strategy*
 - *London Health and Social Care Devolution - MOU*
 - The message here is that you need to get these men and women on your side and they can be very powerful partners.
- Notable quotes:
 - Slide 35
 - “Small area statistics brings to life and make causes of inequalities real to local politicians, the media and public.” (slide 35)
 - Due North is one example where MSOA data has help to generate local and regional action, innovation and community led asset-based approaches. It has also influences manifestoes for elected mayors in Manchester, Liverpool and elsewhere.
 - MSOA data is routinely used in local ‘health and well being strategies’, DPH annual reports, and by the NHS
 - It has helped foster ‘place’ and city regions/ mayors – a will to take action locally pooling budgets for locally agreed priorities.

2.3 Dissemination and Use -SCALE Lessons Learned

In this section we share lessons learned from the SCALE project regarding the challenges and successes in progressing towards sub-county LE estimates, examine the influence of sub-county LE estimates in public health decision making, and highlight suggestions from SCALE participants and their partners about potential next steps for increasing the utility of sub-county LE estimates for public health action.

2.3.1. Dissemination of estimates by SCALE participants

There are two obvious steps that need to occur prior to a jurisdiction disseminating sub-county LE estimates for potential use – obtaining relevant data and subsequently performing the calculations. Several jurisdictions have participated in SCALE since its inception. In an effort to better understand the extent to which SCALE participants were able to progress along the pathway to dissemination and (potentially) use – we disseminated a survey to X jurisdictions that had participated in *{at least one phone call}* for the SCALE project. We requested information about the items listed in Table X.

Stages of development	Freq (%)
Obtaining relevant data (N=)	
Unable to obtain relevant data	
Obtained some, but not all, relevant data	
Obtained all relevant data	

Calculations (N=)

Unable to start calculations

Started, but did not complete, calculations

Completed calculations

Dissemination (N=)

Have not shared estimates

Shared internal to health department

Shared with audiences external to health department

A total of X jurisdictions provided responses to the survey (X% response rate). Of these *{describe findings by category in Table X above and elaborate for each section about the challenges jurisdictions encountered in obtaining the relevant data}*

2.3.2 Cases

2.3.2.1 Case Selection

Our team used a purposeful sampling approach (Patton, X) in identifying two jurisdictions to examine the potential use of sub-county LE estimates for public health action. In order to be considered for participation, the jurisdiction had to meet several inclusion criteria that were designed to identify jurisdictions where there was the potential for public health action informed by the sub-county LE estimates and where we were likely to be able to gain reasonable access to relevant partners/stakeholders. The following constituted our initial inclusion criteria:

1. Jurisdiction had calculated sub-county LE estimates
2. There was the potential for public health use in action:
 - a. Jurisdiction had disseminated sub-county LE estimates at least internally
 - b. In cases where only internal dissemination occurred, the intention of sharing was public health use rather than informational (e.g., garnering support, resources)
3. There was a point of contact available to serve as an effective gatekeeper for acquiring access to internal and external partners who may make use of sub-county LE estimates

After reviewing notes from SCALE teleconferences, performing a first round of telephone interviews with Phase II jurisdictions, and reflecting on information shared from Phase I states and localities we identified six jurisdictions as potential candidates for the case studies. Three met all inclusion criteria, however, subsequent engagement with these jurisdictions indicated that the data collection process would be most feasible in two jurisdictions – Shelby County, Tennessee and Florida. Since the methods involved in gathering data differed slightly within each of these jurisdictions, we provide further details about methods within the cases below.

2.3.2.2 Shelby County, TN

Shelby County provides an example for how local-level health departments may make use of sub-county life expectancy estimates. We will highlight the breadth in the types of organizations that expressed interest in this work and describe the types of conversations sharing sub-county LE estimates stimulated among/within these groups.

Methodology

- Two conversations with our point of contact to discuss the types of questions we were interested in answering and how best to structure our inquiry (e.g., types of data to collect, who to contact)
- Developed tailored description of the case study inquiry in collaboration with the point of contact to share with leadership
- Obtained relevant permissions to proceed with data collection
- Sampling
 - Identification of internal partners
 - Purposive sample of external partners with whom Health Planning and Promotion Team had shared estimates
- Data collection
 - 2016 data collection efforts
 - Discussions with POC regarding background of effort and dissemination
 - Review of documents including some media
 - Executive Leadership Team telephone focus group
 - Health Planning and Promotion Team focus group
 - One-on-one interviews with 3 external partners
 - Extended invitation to four participants, three agreed
 - Advance notice from lead of Health Planning and Promotion Team (1-page description) for three partners that agreed, cold invite from our team for one potential participant (media contact)
 - Subsequent contact (if agreed to participate) from our team to set up time to perform interview.
 - 2018 data collection
 - Attendance and detailed notes from Claremont meeting
 - Additional search/inquiry re: media reports
- Data analysis
 - All focus groups and interviews – detailed notes and digitally recorded
 - Thematic coding of interviews and focus groups

Results

- Forthcoming

2.3.2.3 Florida

Florida provides an example of the potential utility of sub-county life expectancy estimates at the level of a state health department. Specifically, Florida has provided example sub-county life expectancy maps to a subset of their county health departments. We report out on our follow-up

conversations with a purposive sample of these county health departments to share insights about how the sub-county life expectancy estimates have been used to date.

Methodology (proposed)

- Data collection
 - 2016-2018
 - Regular engagement with points of contact to learn about dissemination efforts to local health departments
 - Engagement with points of contact to scope questions asked during initial dissemination meetings with local health departments
 - 2017-2018
 - Engagement with points of contact on SCALE project to discuss approach to the inquiry – several approaches considered, final one focused on counties where *use* had taken place (X counties, snowball sampling for partners in localities)
 - Shared one-page description of purpose of evaluation project and questions to receive internal permissions to extend invitations to interview local health departments
 - SCALE POC extended advance email to counties with description of purpose of the evaluation
 - Subsequent contact by evaluation team to set up time for interview
 - Snowball sampled 2-3 partners in each locality—extended invitation to participate in interview, engaged in 30 minute telephone interview
- Analysis
 - All interviews – detailed notes and digitally recorded
 - Thematic coding of interviews

Results

- Forthcoming

2.3.3 Opportunities for expanding the utility of sub-county LE estimates from others

Throughout the course of this project, participants have shared and discussed several approaches that may expand the potential utility of sub-county LE estimates for taking public health action. Examples include but are not limited to—healthy life expectancy/disability-free life expectancy, analyses leveraging sub-county life expectancy and the economic hardship index, examination of positive deviants. In this section we share insights from SCALE participants who have been consistently engaged in the project about which of these approaches may hold the most potential for furthering the utility of sub-county LE estimates.

We extended invitations to 11 individuals from 10 jurisdictions (4 local health departments, 6 state health departments) to participate in a 30 minute telephone interview. Jurisdictions eligible for participation were those that started to engage in SCALE during Phase I or Phase II of the project and maintained consistent participation through regular teleconferences, in person meetings, conferences, and trainings. We tailored the interviews to each jurisdiction, however, as

part of these interviews, we consistently asked interviewees about: (1) Their dissemination efforts (including the status of disseminating sub-county LE estimates and procedures for dissemination more generally in their jurisdiction), (2) How decisions are made about what to analyze within their program/jurisdiction, (3) Thoughts on priority analyses in their jurisdiction that might facilitate greater use of sub-county LE estimates for public health, and (4) Next steps for the SCALE effort. In this report, we share the respondents' thoughts about item #3, their insights on other items are reported elsewhere.

Priorities:

- Attribution/Decomposition of causes of death/Determinants
 - One thing we are interested in here is attributable LE, something like that. There was something like that with the PHE – they had at least one tool that dealt with that a little bit. We find that to be really interesting because it gives you a toehold for working on more specific health policies around those issues.
 - Working on a decomposition analysis – when you see these disparities, what is driving the disparity based upon leading causes of death?
 - Looking at certain determinants of health that might affect LE above and beyond causes of death – which is actually what drives LE? What is causing that? Why are there those deaths? Infant mortality? Low birthweight?
 - Leading causes of death is of interest – what is causing the disparities in LE – particularly within age groups
 - Teasing out drivers per age group, definitely mortality drivers per area
 - Cause-specific mortality sliced in many different ways. Also, one idea we have talked around is to combine all areas with low LE and look for cause-specific drivers that way (to boost #s) and compare with drivers in higher LE.
 - Potential gains in LE – taking out certain causes of death and then re-running LE estimates without those. That could be really cool, even for a particular town or county to help them zero-in on what is driving their LE estimates. They may already have some sense of it.
- LE for different ages/age categories
 - Also think we should break down the LE and look at it by middle age – since lots of folks are starting to see a decline there due to opioid use.
 - We have done sub-county LE at birth, LE at 25, 65, etc. because LE is different depending upon the age. It is the same method – the SEPHO calculator works for LE at any age. I think LE at 65 would be useful because you can go from there.
 - Calculating LE at birth but also at a diff reference point (e.g., @55yrs) – so less focus on childhood and infant mortality – to show disparities in older populations.
- Other indicators/analyses
 - Healthy LE down to census tract
 - Healthy LE- might be interesting to see what the differences are, not sure if they would scale well with full LE or vary from census tract to census tract.

- Probably should move away from LE at birth – what about years of life lost?
- Looking at how things have changed over time – how does it look in 1995, compared to 2000? See how granular we can take it.
- Economic hardship index
- Refining/delineating methods
 - Strong population estimates (particularly if intention to compare over time)
 - Which differences are meaningful differences when we look at the range of LE? We see a range – quite a wide range at the census tract, can be 30 years. But which diffs are meaningful and which are just variations but not important variations?
 - Specific guidelines/rules so every jurisdiction can calculate sub-county LE the same way
 - Sensitivity analyses to finalize decision rules
 - Selection of geospatial analytic methods
 - Group similar indicators and nest within relevant geographic areas (geographic areas nested)
 - Consider moving away from traditional geographic units

3.0. Conclusions, key messages for the utility of sub-county life expectancy estimates

In this final section, we will summarize key insights provided through the evaluation data regarding the potential utility of sub-county life expectancy estimates and key considerations in improving utility.

- Facilitating public health action, even influencing it through changes in earlier indicators, is more than *method*.
- Public health action is not the most important consideration in “success” but rather the precursor *influences* that may gain traction and facilitate (indirectly or directly) public health action.
- Others TBD