



# 2019 Population Health Report

Certificate of Public Advantage Population Health Sub-Index  
Measures for Ballad Health

Tennessee Department of Health | COPA Report | February 2020



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# The Ballad Health Certificate of Public Advantage (COPA)

## ***Background***

A **Certificate of Public Advantage (COPA)** is the written approval by the Tennessee Department of Health (TDH) that governs a Cooperative Agreement (a merger) among two or more hospitals. A COPA provides state action immunity to the hospitals from state and federal antitrust laws by **replacing competition with state regulation and Active Supervision**. The goal of the COPA process is to protect the interests of the public in the region affected and the State.

TDH has the authority to issue a COPA if applicants pursuing a COPA demonstrate that the **likely benefits** of the proposed Cooperative Agreement **outweigh the likely disadvantages** that would result from the loss of competition. The ability to grant a COPA is authorized by Tennessee's Hospital Cooperation Act of 1993, amended in 2015. Permanent Rules [1200-38-01](#) implement T.C.A. § 68-11-1301 – 68-11-1309.

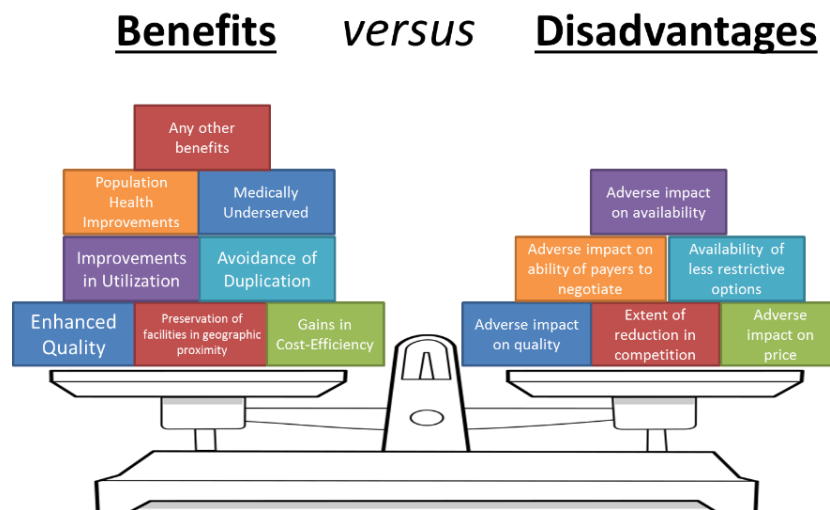
In 2016 Mountain States Health Alliance and Wellmont Health System filed an application with TDH to form a Cooperative Agreement. Together they had a combined market share of over 75 percent in a geographic service area that spans ten counties in northeast Tennessee and 11 counties in southwest Virginia (covering a total square mile area equal to the size of New Jersey) and **impacting a population of nearly 960,000 residents** (roughly equivalent to the population of Montana). These two systems had applied to the state to sanction the largest COPA-governed merger in the country to date.

On January 31, 2018, after a lengthy and robust application review process, the Tennessee Department of Health, in coordination with the Tennessee Office of the Attorney General and Reporter, issued a Certificate of Public Advantage to Mountain States Health Alliance and Wellmont Health System, allowing them to merge under the name Ballad Health.

- [Executed Letter of Approval](#)
- [Amended and Restated Terms of Certification, dated July 31, 2019. \(Terms of Certification, dated January 31, 2018\)](#)
- [Certificate of Public Advantage](#)

## ***Assessing Ongoing Public Advantage***

TDH worked with the applicants and the Attorney General's Office to create an **index** that would be used to determine if the **disadvantages** caused by a reduction in competition of health care and related services continue to be outweighed by clear and convincing evidence of **benefits** of the Cooperative Agreement.



### **Sub-Indices**

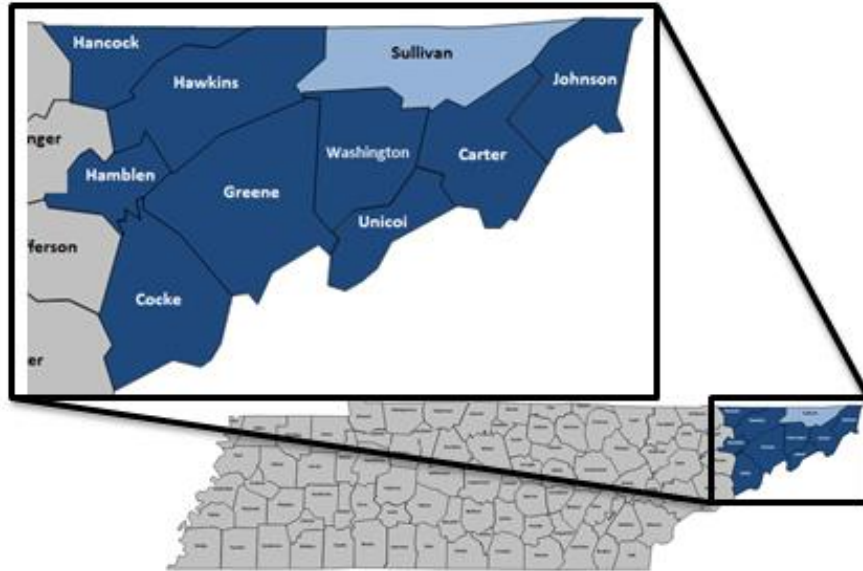
The COPA Index consists of four categories of measures or Sub-Indices that correspond to the potential benefits and disadvantages of the affiliation for which the COPA was issued:

- Population Health Sub-Index – consisting of measures to track improvements in population health;
- Access Sub-Index – consisting of measures to track increased access to health care and prevention services;
- Economic Sub-Index – consisting of measures to verify a minimization of economic disadvantages resulting from a reduction in competition or degree of compliance with the Terms of Certification; and
- Other Sub-Index – consisting of other benefits, such as enhancement of quality of care, patient satisfaction and medical research and education.

## Annual Review

Pursuant to the COPA Rules 1200-38-01-.03 and the Terms of Certification, as part of its exercise of active supervision, TDH will annually use an Index to track the demonstration of ongoing public advantage. The annual review will include: 1) the determination of a final score and pass/fail grade, 2) Ballad's degree of compliance with the Terms of Certification, 3) trends of Ballad's performance subsequent to the issue date and 4) other factors relevant to TDH's determination of the likely benefits and disadvantages of the affiliation.

Data reported in the Population Health, Access to Health Services and Other Report(s) as well as Ballad's Annual Report and other sources as deemed appropriate will be used to calculate the Population Health, Access and Other Sub-Index scores.



The ten counties highlighted above comprise the Tennessee Geographic Service Area for Ballad Health.

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# Population Health Sub-Index

## ***Introduction***

Population health is commonly defined as the health outcomes of a specific group of people and the distribution of such outcomes within the group<sup>1</sup>. The health of the population residing in Ballad's Tennessee Geographic Service Area, or TN GSA, is the focus of the Population Health Sub-Index and this COPA Population Health Report. The following ten counties comprise the TN GSA: Carter, Cocke, Greene, Hamblen, Hancock, Hawkins, Johnson, Sullivan, Unicoi and Washington.

The region currently served by Ballad is part of the Appalachian Region and includes ten counties in Northeast Tennessee and 11 counties and two independent cities in Southwest Virginia (the GSA). This region has a number of health, economic and other issues, which when combined present a unique and challenging environment for the improvement of the quality and access of health care and health outcomes in the region. These unique challenges were reaffirmed in a recent report issued by the Appalachian Regional Commission, Robert Wood Johnson Foundation and the Foundation for a Healthy Kentucky (*Health Disparities in Appalachia*), which found that the performance in the Appalachian Region is worse than the performance in the United States as a whole in seven of the ten leading causes of death: heart disease, cancer, chronic obstructive pulmonary disease, injury, stroke, diabetes and suicide. Additionally, the study found the "years of potential life lost", a measure of premature mortality, is 25 percent higher in the Appalachian Region than in the nation as a whole.

This merger provides a unique opportunity to improve population health for the people in Ballad Health's GSA. Ballad expects the merger to generate substantial savings by reducing duplication of services and improving efficiencies, and is committed to reinvest a portion of that savings, \$75 Million over ten years, to address the region's most vexing health problems and improve the overall health of the population. Confirming that these investments are made and monitoring population health changes in the area are functions of the state's active supervision role. This Population Health Sub-Index serves to objectively track population health changes and evaluate the achievement of population health improvement.

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<sup>1</sup> Kindig, D. and G. Stoddart. 2003. What is population health? *American Journal of Public Health* 93(3):380-383 <http://ajph.aphapublications.org/doi/abs/10.2105/AJPH.93.3.380>

## ***Population Health Sub-Index Design***

The purpose of this Population Health Sub-Index is to measure and evaluate the progress of various population health outcomes in Ballad Health's Tennessee Geographic Service Area, also referred to as the TN COPA Region. While the first report (Published in March 2019 and updated November 2019) established the baseline values for the Population Health Sub-Index measures by reporting data available in 2018, this 2019 Population Health Report, on the Certificate of Public Advantage Population Health Sub-Index measures for Ballad Health, provides updated values that TDH will use to track ongoing changes in the health of residents of the TN COPA Region.

The clear and convincing public advantage of the Cooperative Agreement will be demonstrated by comparing the rate of change in a population health priority measure in the TN COPA Region post-merger to the rate of change prior to the merger. The measures' rates of change in Ballad's TN GSA will also be compared to three comparison geographies: 1) TN Peer Counties; 2) the state of Tennessee; and 3) the United States.

The design of the Population Health Sub-Index is a blend of the State Health Plan<sup>2</sup> objectives, TDH's Vital Signs work<sup>3</sup>, the National Academy of Medicine population health efforts<sup>4</sup> and the models of health used in United Health Foundation's America's Health Rankings<sup>5</sup> and the Robert Wood Johnson Foundation's County Health Rankings<sup>6</sup>. AHR has been published since 1990 and CHR since 2010 and both are widely recognized as providing fair assessments of the overall health of a population.

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<sup>2</sup> State of Tennessee, 2015 Edition of the State Health Plan, Division of Health Planning, Tennessee Department of Health, 2015

<sup>3</sup> Tennessee's Vital Signs are a set of metrics meant to measure the pulse of Tennessee's population health. Inspired by the National Academies of Medicine's Vital Signs, TDH began a process in 2015 of identifying Tennessee-specific metrics to measure health and progress at the state level. Through an extensive state-wide public engagement process, 12 metrics were ultimately selected to provide an at-a-glance view of Tennessee's leading indicators of health and prosperity.

<sup>4</sup> National Academies of Sciences, Engineering, and Medicine. 2016. Metrics that matter for population health action: Workshop summary. Washington, DC: The National Academies Press. doi: 10.17226/21899.

<sup>5</sup> United Health Foundation. America's Health Rankings. <https://www.americashealthrankings.org>

<sup>6</sup> University of Wisconsin Population Health Institute. County Health Rankings & Roadmaps 2017. [www.countyhealthrankings.org](http://www.countyhealthrankings.org).

### Comparison Geographies

In order to show changes in health outcomes are likely a result of the merger and not a result of other external factors, it is critical to compare the changes in health outcomes in the TN COPA Region to those in other geographies. Controlling for external factors affecting health outcomes can best be achieved with a comparison region consisting of counties whose characteristics are similar to those of the TN COPA Region.

TDH selected 12 Tennessee counties to serve together as a comparison region, based on their similarities in income, age distribution, educational attainment, population density and geographic proximity to the TN COPA Region. The Tennessee Peer Counties are: Anderson, Cannon, Claiborne, Cumberland, Jefferson, McMinn, Marion, Monroe, Putnam, Roane, Sevier and White. Details of the methodology used in selecting the Tennessee Peer Counties can be found in the Population Health Report Appendix.

### Population Health Sub-Index Scoring

Because Population Health is linked to health behaviors and social circumstances affecting groups of people, change in these measures will take time to achieve. For this reason, the first few scoring years are based on achievement of process measures, as listed in Ballad Health's Population Health Plan, and investments made in population health improvement. (An outline of the Population Health Sub-Index scoring for each of the first ten years of the COPA can be found in this report's Population Health Appendix as well as in Exhibit D of the [Terms of Certification](#).)

56 population health measures were selected by TDH and determined important for objectively tracking the impact of the COPA on Population Health. 25 of those measures comprise the Population Health Sub-Index Score. The 25 Priority Population Health Measures have been identified by the department as being closely related to the department's health planning goals set out in the State Health Plan. Ballad Health will be evaluated on improvement in these 25 measures. They are identified in Table 1 below with an asterisk ("\*"). The remaining 31 measures are considered the Population Health Monitoring Measures and will be tracked by TDH for monitoring purposes only.



## 2019 Population Health Data Table – for Year 1

TABLE 1

|   |  | TN COPA Value | TN Peer Counties Value | TN Value            | U.S. Value          |
|---|--|---------------|------------------------|---------------------|---------------------|
| <b>BIG FOUR / Behaviors</b>               |  |               |                        |                     |                     |
| <b>Tobacco Use</b>                        |  | COPA          | PEER                   | TN                  | US                  |
| 1*  | Smoking (% of adults)  | 26.7%         | 25.9%                  | 20.7%               | 15.5%               |
| 2   | Smoking in higher density counties (% of adults)   | n/a           | n/a                    | n/a                 | n/a                 |
| 3   | Smoking in lower density counties (% of adults)  | n/a           | n/a                    | n/a                 | n/a                 |
| 4   | Smoking among those with less than a high school education (%)   | n/a           | n/a                    | 37.7%               | 25.0%               |
| 5   | Smoking among those with a high school education or more (%)   | 24.1%         | 20.2%                  | 18.0%               | 14.2%               |
| 6*  | Mothers who smoke during pregnancy (%)   | 21.6%         | 20.3%                  | 12.1%               | †††                 |
| 7*  | Youth tobacco use (% of high school students currently using tobacco)                                    | 10.9%         | 8.9%                   | 9.4%                | 8.8%                |
| 8   | Youth - Ever tried cigarette smoking (% of high school students)   | 28.6%         | 22.9%                  | 31.6%               | 28.9%               |
| 9   | Youth electronic vapor product use – ever used electronic vapor products (%)                             | 39.8%         | 31.9%                  | 40.3%               | 42.2%               |
| <b>Physical Activity</b>                  |  | COPA          | PEER                   | TN                  | US                  |
| 10*                                       | Physically active adults (%)   | 68.4%         | 62.6%                  | 69.1%               | 76.2%               |
| 11*                                       | Physically active students (% of high school students)   | 85.7%         | 89.4%                  | 83.2%               | 84.6%               |
| <b>Obesity</b>                            |  | COPA          | PEER                   | TN                  | US                  |
| 12  | Obesity (% of adults)  | 33.9%         | 38.8%                  | 34.4%               | 30.9%               |
| 13  | Obesity in higher density counties (% of adults)   | n/a           | n/a                    | n/a                 | n/a                 |
| 14  | Obesity in lower density counties (% of adults)  | n/a           | n/a                    | n/a                 | n/a                 |
| 15  | Obesity among those with less than a high school education (% of adults)                                 | n/a           | n/a                    | 34.6%               | 35.0%               |
| 16  | Obesity among those with a high school education or more (% of adults)                                   | 34.5%         | 40.3%                  | 34.4%               | 30.4%               |
| 17*                                       | Physician office visits that include counseling or education related to weight and physical activity (%) | New           | n/a                    | n/a                 | n/a                 |
| 18*                                       | Overweight and obesity among TN public school students (%)   | †††           | †††                    | †††                 | n/a                 |
| <b>Breastfeeding Measures</b>             |  | COPA          | PEER                   | TN                  | US                  |
| 19*                                       | Average mPINC (Maternal Practices in Infant Nutrition and Care) score                                    | n/a           | n/a                    | n/a                 | n/a                 |
| 20*                                       | Breastfeeding initiation (% of live births)  | 73.4%         | 74.9%                  | 77.1%               | 83.8% <sup>††</sup> |
| 21*                                       | Infants breastfed at six (6) months (%)  | New           | New                    | 53.4% <sup>††</sup> | 57.3% <sup>††</sup> |
| <b>High School Student Healthy Eating</b> |  | COPA          | PEER                   | TN                  | US                  |
| 22  | Fruit consumption among high school students (% of students who eat fruit)                               | 83.6%         | 85.4%                  | 91.5%               | 94.4%               |
| 23  | Vegetable consumption among high school students (% of students who eat vegetables)                      | 87.7%         | 88.1%                  | 90.0%               | 92.8%               |
| 24  | Soda consumption among high school students (% of students who drink soda)                               | 78.2%         | 81.7%                  | 76.3%               | 72.2%               |
| <b>Substance Abuse</b>                    |  | COPA          | PEER                   | TN                  | US                  |
| 25*                                       | NAS (Neonatal Abstinence Syndrome) births (per 1,000 live births)  | 41.3          | 24.8                   | 11.4                | n/a                 |
| 26*                                       | Drug deaths (deaths per 100,000 population)  | 26.9          | 33.3                   | 26.9                | †††                 |
| 27  | Drug overdoses (non-fatal overdoses per 100,000 population)  | 377.43        | 377.43                 | 352.25              | n/a                 |

|                                |   |             |             |           |           |
|--------------------------------|---|-------------|-------------|-----------|-----------|
| 28                             | Painkiller prescriptions ( <i>per 1,000 population</i> )  | 1141.4      | 1133.2      | 893.9     | 514       |
| 29                             | Prescription drugs among high school students ( <i>% of high school students using prescription pain relievers not prescribed by the doctor</i> ) | 12.2%       | 10.5%       | 13.2%     | 14.0%     |
| 30*                            | MME for Pain (Total morphine milligram equivalents (MME) opioids for pain per capita)   | 1029.5      | 1097.2      | 760.6     | 424.6     |
| <b>IMMUNIZATIONS</b>           |   | <b>COPA</b> | <b>PEER</b> | <b>TN</b> | <b>US</b> |
| 31*                            | On-time vaccinations – children ( <i>% of children that are up-to-date on immunizations at the time of kindergarten entry</i> ).                  | 96.8%       | 96.3%       | 95.2%     | n/a       |
| 32*                            | Ballad Entity participation in TennIIS ( <i>% of active Ballad entities in Tennessee</i> )  | 109         | n/a         | n/a       | n/a       |
| 33                             | Entity participation in TennIIS ( <i># of active TennIIS entities</i> )   | 352         | 272         | 2994      | n/a       |
| 34                             | Vaccinations – HPV Females ( <i>% of HPV shots administered for females aged 11 to 17 years, either quadrivalent or bivalent</i> )                | 6088        | 4424        | 52673     | n/a       |
| 35                             | Vaccinations – HPV Males ( <i>% of HPV shots administered for males aged 11 to 17 years, either quadrivalent or bivalent</i> )                    | 6010        | 4426        | 53304     | n/a       |
| 36*                            | Vaccinations – Tdap ( <i>% of Tdap shots administered for patients aged 11 to 17 years</i> )  | 7098        | 6387        | 70252     | n/a       |
| 37*                            | Vaccination - Flu, Older Adults ( <i>per 100 adults aged 65+</i> )  | †††         | †††         | †††       | †††       |
| 38                             | Vaccinations - Flu, Adults ( <i>% of adults aged 18+</i> )  | 28.1%       | 29.0%       | 28.6%     | 33.3%     |
| <b>COMMUNITY / ENVIRONMENT</b> |   | <b>COPA</b> | <b>PEER</b> | <b>TN</b> | <b>US</b> |
| 39*                            | Teen births ( <i>per 1,000 females aged 15-19 years</i> )   | 27.2        | 28.3        | 25.3      | †††       |
| <b>Third Grade Reading</b>     |   | <b>COPA</b> | <b>PEER</b> | <b>TN</b> | <b>US</b> |
| 40*                            | Third grade reading level ( <i>% of 3rd graders who score “on-track” or “mastered” on TNReady reading assessment</i> )                            | 36.6%       | 33.0%       | 37.2%     | n/a       |
| 41                             | Third grade reading level - Higher density counties ( <i>% of students</i> )  | 39.2%       | 34.3%       | n/a       | n/a       |
| 42                             | Third grade reading level - Lower density counties ( <i>% of students</i> )   | 32.2%       | 31.7%       | n/a       | n/a       |
| <b>Oral Health</b>             |   | <b>COPA</b> | <b>PEER</b> | <b>TN</b> | <b>US</b> |
| 43                             | Fluoridated water ( <i>% of population on community water systems receiving fluoridated water</i> )   | n/a         | n/a         | n/a       | na        |
| 44*                            | Dental sealants – children ( <i>% aged 6–9 years</i> )  | 11.5%       | 12.0%       | 12.6%     | n/a       |
| 45                             | Dental sealants - adolescents ( <i>% aged 13-15 years</i> )   | 5.8%        | 5.4%        | 6.3%      | n/a       |
| <b>OUTCOMES</b>                |   | <b>COPA</b> | <b>PEER</b> | <b>TN</b> | <b>US</b> |
| 46*                            | Frequent mental distress ( <i>% of adults</i> )   | 17.8%       | 17.8%       | 16.0%     | 12.7%     |
| 47                             | Frequent physical distress ( <i>% of adults</i> )   | 18.2%       | 20.5%       | 16.0%     | 12.5%     |
| 48*                            | Infant mortality ( <i>deaths per 1,000 live births</i> )  | 8.3         | 6.5         | 8.3       | †††       |
| 49*                            | Low birthweight ( <i>% of live births</i> )   | 8.4%        | 8.3%        | 9.3%      | †††       |
| 50                             | Child mortality ( <i>deaths per 100,000 population for children aged 1-19 years</i> )   | 37.6        | 30.6        | 34.5      | †††       |
| 51                             | Cardiovascular deaths ( <i>deaths per 100,000 population</i> )  | 325.1       | 292.6       | 242.5     | †††       |
| 52                             | Cancer deaths ( <i>deaths per 100,000 population</i> )  | 256         | 264.8       | 208.8     | †††       |
| 53                             | Diabetes deaths ( <i>deaths per 100,000 population</i> )  | 28.2        | 37.2        | 29.9      | †††       |
| 54*                            | Diabetes adverse events ( <i>% of adults identified with prediabetes who are referred to a qualifying diabetes prevention program</i> )           | New         | n/a         | n/a       | n/a       |
| 55                             | Suicide deaths ( <i>deaths per 100,000 population</i> )   | 19.8        | 21.1        | 17.1      | †††       |
| 56*                            | Premature death ratio ( <i>ratio of years lost before age 75 per 100,000 population for higher to lower density counties</i> )                    | 0.798       | 0.7999      | n/a       | n/a       |

\* These measures are the Priority Population Health Measures. The Population Health Sub-Index score for years 4-10 will be calculated based on the changes tracked on these 25 measures.

† National data on Mothers who smoke during pregnancy are an aggregate of 46 reporting states and the District of Columbia.

†† For breastfeeding initiation: National data for 2016 births were based on cellular telephone sampling, whereas the other three values are from full population via birth certificates; for breastfeeding at 6 months national and state data for 2016 births were based on cellular telephone sampling.

††† - Data were not available as of the date of publication but are expected to be provided in an update of this report.

*New* – Data are not yet collected at this level, but are expected for future reports.

n/a – Data are not available for comparison.

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The most recent Calendar, Fiscal Year, seasonal, or School Year data, as appropriate, available as of December 2019 were used for this report.

Data reported in these Department Population Health Reports and Ballad Health Annual Reports and other sources as deemed appropriate by the Department will be used to calculate the Sub-Index Score, Index Score, and trends that will be a part of TDH's Annual Review and determination of continuing Public Advantage.

General notes regarding data missing in this report:

- Measures where BRFSS is a data source (Smoking (measures #1, 2, 3 and 5), Physically Active Adults (measure #10), Obesity (measures #12-16), Vaccinations-Adults (measure #38), Frequent Mental Distress (measure #46), and Frequent Physical Distress (measure #47)) BRFSS data must be weighted for the TN COPA Region as well as the Peer Counties Region. This weighting process can be time intensive and cause a delay in the availability of these data. The 2018 BRFSS data were not available in time for the 2019 Population Health Report.
- Measures where Ballad Health is responsible for data collection (Physician Office Visits that include counseling or education related to weight and physical activity (measure #17), Infants Breastfed at 6 months (measure #21) and Diabetes Adverse Events (measure # 54)). Due to lengthy conversations between TDH and Ballad Health regarding these metrics and technical definitions, data have not yet been collected and analyzed for inclusion in this 2019 report.
- Other data, including 2018 Overweight and Obesity among public school students (measure #18) and 2017 national birth and death data (Mothers Who Smoke During Pregnancy (measure #6), Drug Deaths (measure #26), Teen Births (measure #39), Infant

Mortality (measure #48), Low Birthweight (measure #49), Child Mortality (measure #50), Cardiovascular Deaths (measure #51), Cancer Deaths (measure #52), Diabetes Deaths (measure #53), Suicide Deaths (measure #55)) were simply not available as of the publication date of this report.

- Vaccinations for Adults aged 65+ (measure #37). The data source originally selected for this metric appears to no longer publicly provide these data at the county level. Discussions are underway between TDH and Ballad Health to determine which alternative data source is an acceptable replacement.
- Maternal Practices in Infant Nutrition and Care (mPINC) scores (measure #19). The Centers for Disease Control and Prevention (CDC) had been conducting mPINC surveys on a biannual basis, however, the 2017 administration of the mPINC survey was postponed, therefore, we have no new data since the 2015 baseline data published in last year's report.

# 2019 Population Health Report Appendix:

## Population Health Sub-Index Data Source Table

TABLE 2

|                             | Measure Definition   | TN Data Source  | US Data Source  |
|-----------------------------|--|---|---|
| <b>BIG FOUR (BEHAVIORS)</b> |  |   |   |
| <b>Tobacco Use</b>          |  |   |   |
| 1*                          | Smoking (Percentage of adults who are self-reported smokers (smoked at least 100 cigarettes in their lifetime and currently smoke).)   | TDH. Tennessee Behavioral Risk Factor Surveillance System. Nashville, TN. Tennessee Department of Health, Office of Population Health Surveillance, 2018. | Centers for Disease Control, Behavioral Risk Factor Surveillance System, 2018 |
| 2                           | Smoking in higher density counties (TN COPA Value: Percentage of adults in Hamblen, Sullivan, and Washington counties who are self-reported smokers (smoked at least 100 cigarettes in their lifetime and currently smoke); TN & U.S. Values: Not stratified by population density.)                           | TDH. Tennessee Behavioral Risk Factor Surveillance System. Nashville, TN. Tennessee Department of Health, Office of Population Health Surveillance, 2018. | n/a   |
| 3                           | Smoking in lower density counties (TN COPA Value: Percentage of adults in Carter, Cocke, Greene, Hancock, Hawkins, Johnson, and Unicoi counties who are self-reported smokers (smoked at least 100 cigarettes in their lifetime and currently smoke); TN & U.S. Values: Not stratified by population density.) | TDH. Tennessee Behavioral Risk Factor Surveillance System. Nashville, TN. Tennessee Department of Health, Office of Population Health Surveillance, 2018. | n/a   |
| 4                           | Smoking among those with less than a high school education (Percentage of adults with less than a high school education who are self-reported smokers (smoked at least 100 cigarettes in their lifetime and currently smoke).)   | TDH. Tennessee Behavioral Risk Factor Surveillance System. Nashville, TN. Tennessee Department of Health, Office of Population Health Surveillance, 2018. | CDC, BRFSS, 2018  |
| 5                           | Smoking among those with a high school education or more (Percentage of adults with high school education or more who are self-reported smokers (smoked at least 100 cigarettes in their lifetime and currently smoke).)   | TDH. Tennessee Behavioral Risk Factor Surveillance System. Nashville, TN. Tennessee Department of Health, Office of Population Health Surveillance, 2018. | CDC, BRFSS, 2018  |
| 6*                          | Mothers who smoke during pregnancy (Percentage of mothers who report smoking during pregnancy (%).)  | TDH, Division of Vital Records and Statistics, Office of Vital Statistics, Birth Statistical System, 2018   | CDC WONDER  |
| 7*                          | Youth tobacco use (Percentage of High School Students who self-reported having smoked cigarettes during the 30 days before the survey.)  | Tennessee Department of Education (TDOE), Office of Coordinated School Health, Youth Wellness Survey, YRBS 2018 / YRBS 2017                               | CDC, Youth Risk Behavior Survey, 2017   |
| 8                           | Youth ever tried cigarette smoking (Percentage of High School Students who self-reported ever trying cigarette smoking, even one or two puffs.)  | TDOE, Office of Coordinated School Health, Youth Wellness Survey, YRBS 2018 / YRBS 2017   | CDC, YRBS, 2017   |

|   |  |   |                 |
|---|--|---|-----------------|
| 9 | Youth electronic vapor product use ( <i>Percentage of High School Students who self-reported using an electronic vapor product within the 30 days before the survey.</i> ) | TDOE, Office of Coordinated School Health, Youth Wellness Survey, YRBS 2018 / YRBS 2017 | CDC, YRBS, 2017 |
|---|--|---|-----------------|

#### Physical Activity

|     |   |   |                  |
|-----|---|---|------------------|
| 10* | Physically active adults ( <i>Percentage of adults who reported participating in physical activity such as running, calisthenics, golf, gardening, or walking for exercise over the past month.</i> ) | TDH, Tennessee Behavioral Risk Factor Surveillance System. Nashville, TN. Tennessee Department of Health, Office of Population Health Surveillance, 2018. | CDC, BRFSS, 2018 |
| 11* | Physically active students ( <i>Percentage of High School Students who were physically active 60+ minutes per day for 5 or more days in last 7 days.</i> )  | TDOE, Office of Coordinated School Health, Youth Wellness Survey, YRBS 2018 / YRBS 2017   | CDC, YRBS, 2017  |

#### Obesity

|     |   |   |                  |
|-----|---|---|------------------|
| 12  | Obesity ( <i>Percentage of adults with a body mass index of 30.0 or higher based on reported height and weight.</i> )   | TDH, Tennessee Behavioral Risk Factor Surveillance System. Nashville, TN. Tennessee Department of Health, Office of Population Health Surveillance, 2018. | CDC, BRFSS, 2018 |
| 13  | Obesity in higher density counties ( <i>TN COPA Value: Percentage of adults in Hamblen, Sullivan, and Washington counties with a body mass index of 30.0 or higher based on reported height and weight; TN &amp; U.S. Values: Not stratified by population density.</i> )                           | TDH, Tennessee Behavioral Risk Factor Surveillance System. Nashville, TN. Tennessee Department of Health, Office of Population Health Surveillance, 2018. | n/a              |
| 14  | Obesity in lower density counties ( <i>TN COPA Value: Percentage of adults in Carter, Cocke, Greene, Hancock, Hawkins, Johnson, and Unicoi counties with a body mass index of 30.0 or higher based on reported height and weight; TN &amp; U.S. Values: Not stratified by population density.</i> ) | TDH, Tennessee Behavioral Risk Factor Surveillance System. Nashville, TN. Tennessee Department of Health, Office of Population Health Surveillance, 2018. | n/a              |
| 15  | Obesity among those with less than a high school education ( <i>Percentage of adults with less than a high school education with a body mass index of 30.0 or higher based on reported height and weight.</i> )   | TDH, Tennessee Behavioral Risk Factor Surveillance System. Nashville, TN. Tennessee Department of Health, Office of Population Health Surveillance, 2018. | CDC, BRFSS, 2018 |
| 16  | Obesity among those with a high school education or more ( <i>Percentage of adults with a high school education or more with a body mass index of 30.0 or higher based on reported height and weight.</i> )   | TDH, Tennessee Behavioral Risk Factor Surveillance System. Nashville, TN. Tennessee Department of Health, Office of Population Health Surveillance, 2018. | CDC, BRFSS, 2018 |
| 17* | Obesity counseling and education ( <i>Percentage of physician office visits that include counseling or education related to weight and physical activity.</i> )   | (Data collection to be led by Ballad Health)  | n/a              |
| 18* | Overweight and obesity among TN public school students ( <i>Percentage of public school students in grades Kindergarten, 2, 4, 6, 8, and one year of high school found to be overweight or obese during the school year.</i> )  | TDOE, Office of Coordinated School Health   | n/a              |

### Breastfeeding Measures

|     |   |   |  |
|-----|---|---|--|
| 19* | Average mPINC score ( <i>Maternity Practices in Infant and Nutrition Care survey score based on seven birth facility policies and practices with higher scores denoting better maternity care practices and policies.</i> ) | no update available this year   | no update available this year                        |
| 20* | Breastfeeding Initiation ( <i>TN COPA, Peer, and TN Values: Percentage of live births whose birth certificates report that baby is breastfed.</i><br><i>US Value: Proportion of infants who are ever breastfed.</i> )       | TDH, Division of Vital Records and Statistics, Office of Vital Statistics, Birth Statistical System, 2018 | CDC, National Immunization Survey, among 2016 births |
| 21* | Infants breastfed at six (6) months ( <i>Percentage of infants aged six (6) months whose guardians report at well-child visits they continue to be breastfed.</i> )   | (Data collection to be led by Ballard Health)   | CDC, National Immunization Survey, among 2016 births |

### High School Student Healthy Eating

|    |   |  |                 |
|----|---|--|-----------------|
| 22 | Fruit consumption among high school students - ( <i>Percentage of high school students who reported eating fruit during the past 7 days.</i> )<br>Note: Pre-2017 data include drinking 100% fruit juice | TDOE, Office of Coordinated School Health, Youth Wellness Survey 2018 / YRBS, 2017 | CDC, YRBS, 2017 |
| 23 | Vegetable consumption among high school students - ( <i>Percentage of high school students who reported eating vegetables during the past 7 days.</i> )   | TDOE, Office of Coordinated School Health, Youth Wellness Survey 2018 / YRBS, 2017 | CDC, YRBS, 2017 |
| 24 | Soda consumption among high school students - ( <i>Percentage of high school students who reported drinking soda or pop during the past 7 days.</i> )   | TDOE, Office of Coordinated School Health, Youth Wellness Survey 2018 / YRBS, 2017 | CDC, YRBS, 2017 |

### Substance Abuse

|     |  |  |   |
|-----|--|--|---|
| 25* | NAS (Neonatal Abstinence Syndrome) Births ( <i>Number of reported cases with clinical signs of withdrawal per 1,000 live births.</i> )   | TDH, Division of Family Health and Wellness, Neonatal Abstinence Syndrome Surveillance, 2018                     | n/a   |
| 26* | Drug deaths ( <i>All drug overdose deaths caused by acute poisonings, regardless of intent per 100,000 population.</i> )   | TDH, Division of Vital Records and Statistics, Office of Vital Statistics, Death Statistical System, 2018        | CDC   |
| 27  | Drug overdoses ( <i>Non-fatal overdoses caused by acute poisonings, regardless of intent per 100,000 population.</i> )   | TDH, Division of Population Health Assessment, Office of Health Statistics, Hospital Discharge Data System, 2017 | n/a   |
| 28  | Painkiller prescriptions ( <i>Number of opioid prescriptions for pain per 1,000 population</i> )   | TDH, Office of Informatics and Analytics, Controlled Substance Monitoring Database, 2018                         | CDC Annual Surveillance Report of Drug-Related Risks and Outcomes, 2018 |
| 29  | Prescription drugs among high school students ( <i>Percent of high school students who report ever taking prescription drugs without a doctor's prescription (such as codeine, Vicodin, OxyContin, Hydrocodone, and Percocet one or more times during their life).</i> ) | TDOE, Office of Coordinated School Health, Youth Wellness Survey, YRBS 2018 / YRBS 2017                          | CDC, YRBS, 2017   |

|     |   |  |   |
|-----|---|--|---|
| 30* | MME for Pain (Total morphine milligram equivalents (MME) opioids for pain per capita) | TDH, Office of Informatics and Analytics, Controlled Substance Monitoring Database, 2018 | CDC Annual Surveillance Report of Drug-Related Risks and Outcomes, 2018 |
|-----|---|--|---|

#### IMMUNIZATIONS

|     |  |   |                  |
|-----|--|---|------------------|
| 31* | On-time vaccinations – children ( <i>Percentage of children that are up to date on state-required vaccines at the time of kindergarten entry.</i> )                        | Kindergarten Immunization Compliance Assessment, 2018   | n/a              |
| 32* | Ballad entity participation in TennIIS ( <i>Percentage of Ballad Health entities in Tennessee participating in TennIIS.</i> )  | Ballad Health / TennIIS, 2018   | n/a              |
| 33  | Entity participation in TennIIS ( <i>Number of entities in Tennessee participating in TennIIS.</i> )   | Tennessee Immunization Information System (TennIIS), 2018   | n/a              |
| 34  | Vaccinations - HPV females ( <i>Percentage of human papillomavirus (HPV) vaccine shots administered to females aged 11 to 17 years, either quadrivalent or bivalent.</i> ) | TennIIS, 2018   | n/a              |
| 35  | Vaccinations - HPV males ( <i>Percentage of human papillomavirus (HPV) vaccine shots administered to males aged 11 to 17 years, either quadrivalent or bivalent..</i> )    | TennIIS, 2018   | n/a              |
| 36* | Vaccinations - Tdap ( <i>Percentage of tetanus-diphtheria-acellular pertussis (Tdap) vaccine shots administered to males aged 11 to 17 years.</i> )                        | TennIIS, 2018   | n/a              |
| 37* | Vaccination Rate - Flu, Older Adults ( <i>Rate of Medicare fee-for-service beneficiaries aged 65 and over with a flu vaccine claim.</i> )                                  | under review  | under review     |
| 38  | Vaccinations - Flu, Adults ( <i>Percent of adults aged 18 and over who self-reported receiving a flu shot or flu vaccine sprayed in nose in the past 12 months.</i> )      | TDH, Tennessee Behavioral Risk Factor Surveillance System. Nashville, TN. Tennessee Department of Health, Office of Population Health Surveillance, 2018. | CDC, BRFSS, 2018 |

#### COMMUNITY / ENVIRONMENT

|     |   |   |     |
|-----|---|---|-----|
| 39* | Teen births ( <i>Rate of births per 1,000 females aged 15-19 years.</i> ) | TDH, Division of Vital Records and Statistics, Office of Vital Statistics, Birth Statistical System, 2018 | CDC |
|-----|---|---|-----|

#### Third Grade Reading

|     |   |   |     |
|-----|---|---|-----|
| 40* | Third grade reading level ( <i>Percentage of 3rd graders scoring “on-track” or “mastered” on TNReady reading assessment.</i> )  | Tennessee Department of Education, 2018 | n/a |
| 41  | Third grade reading level - Higher density counties ( <i>TN COPA Value: Percentage of 3rd graders in Hamblen, Sullivan, and Washington counties scoring “on-track” or “mastered” on TNReady reading assessment ; TN &amp; U.S. Values: Not stratified by population density</i> ) | Tennessee Department of Education, 2018 | n/a |



|    |  |   |     |
|----|--|---|-----|
| 42 | Third grade reading level - Lower density counties (TN COPA Value: Percentage of 3rd graders in Carter, Cocke, Greene, Hancock, Hawkins, Johnson, and Unicoi counties scoring "on-track" or "mastered" on TNReady reading assessment; TN & U.S. Values: Not stratified by population density.) | Tennessee Department of Education, 2018 | n/a |
|----|--|---|-----|

**Oral Health**

|     |  |                                |                               |
|-----|--|--------------------------------|-------------------------------|
| 43  | Fluoridated water (Percent of population on community water systems (CWS) receiving fluoridated water.)  | CDC My Water's Fluoride, 2018  | CDC My Water's Fluoride, 2018 |
| 44* | Children receiving dental sealants (Percentage of Medicaid enrollees aged 6-9 years receiving dental sealants on permanent first molar teeth.)             | TennCare/DentaQuest, 2017-2018 | n/a                           |
| 45* | Adolescents receiving dental sealants (Percentage of Medicaid enrollees aged 13-15 years receiving dental sealants on their first and second molar teeth.) | TennCare/DentaQuest, 2017-2018 | n/a                           |

**OUTCOMES**

|     |  |   |                 |
|-----|--|---|-----------------|
| 46  | Frequent mental distress (Percentage of adults who reported their mental health was not good 14 or more days in the past 30 days.)       | TDH, Tennessee Behavioral Risk Factor Surveillance System. Nashville, TN. Tennessee Department of Health, Office of Population Health Surveillance, 2018. | CDC, BRFSS 2018 |
| 47  | Frequent physical distress (Percentage of adults who reported their physical health was not good 14 or more days in the past 30 days.)   | TDH, Tennessee Behavioral Risk Factor Surveillance System. Nashville, TN. Tennessee Department of Health, Office of Population Health Surveillance, 2018. | CDC, BRFSS 2018 |
| 48* | Infant mortality (Number of infant deaths (before age 1) per 1,000 live births.)   | TDH, Division of Vital Records and Statistics, Office of Vital Statistics, Death Statistical System, 2018   | CDC             |
| 49* | Low birthweight (Percentage of infants weighing less than 2,500 grams (5 pounds, 8 ounces) at birth.)                                    | TDH, Division of Vital Records and Statistics, Office of Vital Statistics, Birth Statistical System, 2018   | CDC             |
| 50  | Child mortality (Number of deaths per 100,000 children aged 1 to 18 years.)  | TDH, Division of Vital Records and Statistics, Office of Vital Statistics, Death Statistical System, 2018   | CDC WONDER      |
| 51  | Cardiovascular deaths (Number of deaths due to diseases of the heart per 100,000 population.)  | TDH, Division of Vital Records and Statistics, Office of Vital Statistics, Death Statistical System, 2018   | CDC WONDER      |
| 52  | Cancer deaths (Number of deaths due to all causes of cancer per 100,000 population.)   | TDH, Division of Vital Records and Statistics, Office of Vital Statistics, Death Statistical System, 2018   | CDC WONDER      |
| 53  | Diabetes deaths (Number of deaths due to diabetes per 100,000 population.)   | TDH, Division of Vital Records and Statistics, Office of Vital Statistics, Death Statistical System, 2018   | CDC WONDER      |
| 54* | Diabetes adverse events (Percentage of adults identified with prediabetes who are referred to a qualifying diabetes prevention program.) | (Data collection to be led by Ballad Health)  | n/a             |

|     |  |   |  |
|-----|--|---|--|
| 55  | Suicide deaths ( <i>Number of deaths due to intentional self-harm per 100,000 population.</i> )  | TDH, Division of Vital Records and Statistics, Office of Vital Statistics, Death Statistical System, 2018 | National Institute of Mental Health, NIH |
| 56* | Premature death ratio ( <i>Ratio of years lost before age 75 per 100,000 population for higher density counties to lower density counties.</i> ) | TDH, Division of Vital Records and Statistics, Office of Vital Statistics, Death Statistical System, 2018 | n/a                                      |

\* These measures are the Priority Population Health Measures. The Population Health Sub-Index score will be calculated based on the changes tracked on these 25 measures.

n/a – Data will not be compared at this level.

## Population Health ‘Peer Counties’ Methodology Notes

### Selection of TN Peer Counties

For each metric, comparison geographies are established to permit a comparison of the health in the TN COPA Region to the Peer Counties, the state of Tennessee and the United States. For Population Health Sub-Index evaluation purposes, Peer Counties are established that reflect the data source and its availability across various geographic units. Peer Counties are selected at the beginning of the project and held constant.

With the TN COPA Counties together considered as a single community, the following process was used to establish a peer reference group.

- a. Select counties based upon five primary factors<sup>7</sup>
  - i. Income/Poverty
    1. Income is represented by the median household income.
    2. Poverty is represented equally by the estimated percentage of the population whose income is below the poverty level in two vulnerable groups, those younger than age 18 and those aged 65 and older.
  - ii. Age distribution

<sup>7</sup> The selection of categories is based upon the model used for establishing peer counties for Community Health Status Indicator project, <https://wwwn.cdc.gov/CommunityHealth/info/HowtoUseReport>. Measures were selected based upon availability and appropriateness to the GSA.

1. Age distribution is represented equally by the percentage of the population younger than age 18 and the percentage aged 65 and older.
- iii. Educational attainment
  1. Education is represented equally by the percentage of adults aged 25 and older without a high school diploma and the percentage of adults aged 25 and older with a bachelor's degree.
- iv. Population density
  1. Population is represented equally by the population density (population/square mile) and percent rurality
- v. Geographic proximity to TN GSA (used 570 Bowmantown Rd, Telford, TN 37690 as center of TN GSA, approximately 55 air miles from three corners of TN GSA)
- b. All data except for the distance are standardized using the average of the sample data points and the standard deviation of the sample data points. All z-scores are limited to +/-2 standard deviations from the mean.
  - i. To normalize the geographic proximity to the TN GSA, the standard deviation of the distance between each county and the center of the TN GSA is approximated by the standard deviation of each state (Hawaii and Alaska are excluded) from center of the TN GSA
- c. Calculate the difference of each metric from the TN GSA
  - i. The value for each metric for the TN GSA is the population weighted prevalence for the ten counties in the TN GSA.
  - ii. The difference is the mathematical difference between the normalized value for the TN GSA and the normalized value for each county included in the analysis.
- d. Select the counties by minimizing the square root of the sum of the square of the normalized distances each of the metrics are from the TN GSA
  - i. All of the five primary factors have equal weight. For Income/Poverty, income is weighted equally with overall poverty. Overall poverty is the equal weighting of the two categories of poverty: under 18 and age 65+. For all other primary factors, the two metrics are weighted equally.
- e. Continue selecting counties until the total population of the selected counties is at least equal to the total population in the TN COPA Region AND there are at least ten counties.

### TN COPA Region - Population Density Stratification

To allow for stratification of the TN GSA by population density, the TN GSA was divided into a higher density region (TN COPA Region-Higher density) and a lower density region (TN COPA Region - Lower density). The higher density counties consist of the three most densely populated TN COPA counties: Hamblen, Sullivan and Washington. The lower density counties are the remaining seven counties in the TN COPA Region: Carter, Cocke, Green, Hancock, Hawkins, Johnson and Unicoi.

Some demographic differences between the TN COPA higher density and lower density regions are below:

| <b>Characteristic</b>                                       | <b>TN COPA Region - Higher density</b> | <b>TN COPA Region - Lower density</b> |
|---|--|---------------------------------------|
| Population per square mile, 2010                            | 375-390                                | <170                                  |
| Median HH income  | \$37,617-\$42,817                      | \$26,898-\$36,927                     |
| Average median HH income of counties within group           | \$40,260                               | \$32,485                              |
| Median age  | 44.2 years                             | 43.1 years                            |
| Percent with college degree                                 | 15.5% - 30.6%                          | 9.2% - 12.6%                          |
| Percent in poverty  | 16.4% - 19.0%                          | 18.0% - 31.0%                         |
| YPLL-75 <sup>8</sup> (years lost before age 75 per 100,000) | 9,124                                  | 10,726                                |

<sup>8</sup> Population-weighted YPLL-75, based upon County Health Rankings, 2016, accessed Sept, 2016

### TN Peer Counties - Population Density Stratification

#### Method 1: Considering all Tennessee counties

If all Tennessee counties except those within the service area were considered possible peer counties, the following would be considered peer counties<sup>9</sup>.

| <b>Lower Population Density Peer Counties</b> | <b>Higher Population Density Peer Counties</b> |
|---|--|
| Claiborne                                     | Anderson                                       |
| Granger                                       | Sevier   |
| Monroe  | Jefferson                                      |
| Campbell                                      | Blount   |
| Meigs   |  |
| McMinn  |  |
| Roane   |  |

The parameters for determining fit were child poverty, elder poverty, less than high school diploma, college graduate, household income and distance to service area; identical to those used to select overall peer counties except that population density and rurality were removed. In addition, a population density of 150 persons/square mile was used to stratify counties into higher and lower density groups. The number of counties was selected such that the total population in the peer counties was roughly equal to the population in the service area counties.

#### Method 2: Considering only Service Area counties

For this analysis, only peer counties identified in the COPA (Anderson, Cannon, Claiborne, Cumberland, Jefferson, McMinn, Marion, Monroe, Putnam, Roane, Sevier and White) were used as options for the peer county comparison set.

The peer counties were sorted by population density from Cannon (52 persons per square mile) to Anderson (225 persons per square mile). The most population-dense counties were then selected as the comparison set for the higher population density counties in the service area and the lower ones to compare to the lower population density counties in the service area.

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<sup>9</sup> Counties are listed in order of “fit” with service area counties, that is those on the top of the list are most similar to the service area counties.

| <b>County</b> | <b>Population Density (#/Sq. Mi.)</b> |
|---------------|---------------------------------------|
| Cannon        | 52                                    |
| Marion        | 57                                    |
| White         | 70                                    |
| Monroe        | 72                                    |
| Claiborne     | 73                                    |
| Cumberland    | 86                                    |
| McMinn        | 122                                   |
| Roane         | 146                                   |
| Sevier        | 162                                   |
| Putnam        | 186                                   |
| Jefferson     | 194                                   |
| Anderson      | 224                                   |

These 12 counties were then modeled using poverty, age distribution, education and distance to see which are closest in terms of being peer counties. The result was a different ordering of the counties than listed above, but one that supported using the more dense counties as comparison for the higher density columns in the service area. The listing by population density is much simpler. The modeling suggests the cutoff should be 150 persons per square mile, making Sevier, Putnam, Jefferson and Anderson counties as the comparison group for the more densely populated counties within the service area.

Yet, the initial modeling indicates that these counties, even with lower population densities, closely resemble the higher population density counties in the service area. Therefore, the decision was made that the comparison group for higher-density counties in the service area consist of Sevier, Putnam, Jefferson and Anderson. All other counties from the original peer county list are considered the peer group for lower population density counties.

## ***Population Health Sub-Index Data Notes***

### **DentaQuest**

- Dental sealant 2017-2018 data were collected from 10/1/2017 - 9/30/2018.

### **Behavioral Risk Factor Surveillance System**

- All estimates are weighted using demographic information from each of the four geographies: 1) The TN COPA Region; 2) TN Peer Counties region; 3) the state of Tennessee and 4) the US.
- US data include data from the U.S. Virgin Islands, Puerto Rico and Guam.

### **Tennessee Immunization Information System**

- A participating facility is an entity in TennIIS production that has submitted or entered an administered and/or historical vaccination during the year of evaluation.
- Vaccinations are evaluated as being administered by the entities in each county group (the TN COPA Region, TN Peer Counties region and the state of Tennessee) during the year of evaluation.
- The entity can report administered and/or historical vaccinations and the entity can submit these vaccines manually or electronically. The number of participating entities are summed for: 1) Ballard, 2) the TN COPA Region, 3) TN Peer Counties region and 4) the state of Tennessee.
- Vaccination CVX codes identified were pulled for each county group; these may not include all CVX codes associated with those vaccination families as some CVX codes are not relevant.
- Population data source: 2018 Population Data Files, Division of Population Health Assessment, Tennessee Department of Health

| <b>IMMUNIZATION</b> | <b>VACCINATION CVX CODES EVALUATED</b>   |
|---------------------|--|
| HPV                 | HPV, quadrivalent - CVX CODE 62; HPV, bivalent - CVX CODE 118; Human Papillomavirus 9-valent vaccine - CVX CODE 165; HPV, uncertain formulation - CVX CODE 137 |
| TDAP                | Tdap - CVX CODE 115  |

**Vital Statistics data:**

For Death Statistical Data System: Rates are age adjusted per 100,000

**ICD-10 Coding for Tennessee Mortality Data, 2018**

| <b>Underlying Cause of Death</b> | <b>ICD-10 Codes or UCD Group Codes Used</b>                                |
|----------------------------------|--|
| Diseases of the Heart            | UCD Group Codes 049-059  |
| Cancer                           | UCD Group Codes 018-040  |
| Diabetes                         | UCD Group Code 043   |
| Suicide                          | UCD Group Codes 105 and 106  |
| All Drug Overdoses               | ICD-10 codes for underlying cause of death: X40-X44, X60-X64, X85, Y10-Y14 |

**Youth Wellness Survey data:**

- The Youth Wellness Survey is an online survey on health behaviors administered annually in Tennessee’s public high schools.
- The Youth Wellness Survey consists of a limited number of Youth Risk Behavior Survey questions and follows the same sampling methodology used for the YRBS.
- Schools are selected with probability proportional to the size of student enrollment in grades 9-12 and then a specific period of the school day (e.g., 2nd period) is randomly selected to participate. Within selected classes, all students are eligible to participate.
- Tennessee COPA and peer subsets were weighted by grade to match the U.S. population proportions for high school students.
- Only respondents with a valid grade level (9, 10, 11 or 12) were used in the analysis.
- Participation level:
  - COPA: 10/10 counties = 100%; 1206/1462\* students = 82.5%; Participation = 82.5%
  - Peer: 11/12 counties = 91.7%; 1027/1462\* students = 70.2 percent; Participation =64.4%
- 1,462 is the projected sample size for both regions based on school enrollments.

NOTE: The definition for Youth Tobacco Use (measure # 7) changed as of this report. Due to the reduced number of questions on the youth wellness survey, this measure now only tracks current cigarette smoking instead of current use of multiple tobacco products.

**Mothers who smoke during pregnancy, U.S. value:**

Each birth record represents one living baby. Maternal tobacco use data have been recoded to "Not Reported" for births to mothers residing in a reporting area that used the 1989 U.S.



Standard Certificate of Live Birth or did not report tobacco use in the specified data year. All reporting areas except California routinely collect information on maternal tobacco use, but information from the 2003 revision of the birth certificate is not comparable to the information based on the earlier certificate. The following reporting areas have maternal tobacco use data coded to "Not Reported": Connecticut and New Jersey. To read more, visit <http://wonder.cdc.gov/natality-current.html>.<sup>10</sup>

### **Overweight and obesity prevalence among students, Tennessee values:**

Body Mass Index is calculated based on the height and weight measurements collected during screening in the current school year. BMI measurements are age and sex specific for children and teens. Some counties and school districts require an active opt-in informed consent for BMI student data collection. This requirement can have a significant impact on the number of students screened.

Overweight/obese was defined as body mass index greater than or equal to the 85th percentile for children of the same age and sex. Data were collected by the Tennessee Department of Education's Office of Coordinated School Health in partnership with TDH.

### **Breastfeeding initiation, U.S. value:**

- Data from 2009 to 2015 births were based on landline and cellular telephone sampling and data for 2016 births were based on cellular telephone sampling only.
- The Council of American Survey and Research Organizations response rates for landline sample of National Immunization Survey (NIS) years 2001–2017 ranged from 51.9% to 76.1%. Response rates for the cellular telephone sample of NIS years 2011–2018 ranged from 24.6% to 33.5%. A detailed description of the methods can be found at <https://www.cdc.gov/vaccines/imz-managers/nis/index.html>.
- Data sources and estimates for the U.S. value differ slightly from the TN values but the data are still useful for the purpose of comparing trends.
  - The CDC NIS value is an estimate is the proportion of infants born in 2016 whose parents answered on a phone survey that their babies had been breastfed.
  - The TN vital statistic data come from Tennessee birth certificates, which asks if the newborn is breastfeeding.

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<sup>10</sup> To read more, visit <http://wonder.cdc.gov/natality-current.html>.

US Breastfeeding initiation data acknowledgment: CDC National Immunization Survey (NIS) for births in 2016. Accessed August 12, 2019 at [https://www.cdc.gov/breastfeeding/data/nis\\_dat/results.html](https://www.cdc.gov/breastfeeding/data/nis_dat/results.html)

**Theory:** Babies who will ever be breastfed will be breastfed in the first few days of life, which is the same time period captured by the birth certificate. As such, estimates of “ever breastfed” and “breastfeeding initiation” should be similar.

**Neonatal Abstinence Syndrome, Tennessee values:**

Neonatal Abstinence Syndrome (NAS) Data acknowledgment: Neonatal Abstinence Syndrome Surveillance System, Division of Family Health and Wellness; Tennessee Department of Health. Birth Statistical System, Division of Vital Records; Tennessee Department of Health. Prepared by Division of Family Health and Wellness, December 3, 2018

**Non-Fatal Drug Overdose, Tennessee values:**

- All drug overdose *inpatient* hospitalizations of Tennessee residents caused by non-fatal acute poisonings due to the effects of drugs, regardless of intent.
- All drug overdose *outpatient* visits by Tennessee residents caused by non-fatal acute poisonings due to the effects of drugs, regardless of intent.
- Count/rate suppressed in accordance with TDH Data Suppression Guidelines

**Morphine milligram equivalents opioids for pain per capita, Tennessee values:**

Morphine milligram equivalents or MME are calculated as the quantity multiplied by the strength of the drug per unit multiplied by a conversion factor provided to the Tennessee Department of Health by the CDC.

The population used for rates is pulled from CDC Wonder from the year in which it was first calculated. (i.e., The 2015 population estimate comes from the first estimate provided mid-year 2016, not the updated population estimates that were produced later.)

Additional notes and exclusions:

- Only Tennessee residents were considered;
- Only drug schedules II, III and IV were included;
- Only drugs identified in the CDC’s 2017 MME Conversion Table were considered;
- Only opioid prescriptions FDA label indicated for pain (analgesics) contribute to the MME calculation;

- Prescriptions with zero or implausibly high quantities were excluded;
- Prescriptions with zero or implausibly high days' supply were excluded.

**Third Grade Reading Level, Tennessee values**

- Reflects proficiency TNReady ELA, English I, English II and English III.
- Results are suppressed where the number of valid test scores is less than ten. In these files, suppression also occurs where any individual proficiency level is less than one percent or greater than 99 percent at the state and district level, or less than five percent or greater than 95 percent at the school level.
- As of 2016-2017 school year, the definition of Third Grade Reading Level changed to “Third graders scoring ‘mastered’ or ‘on-track’ on TNReady reading assessment”.<sup>11</sup>

*\*All data are subject to limitations as explained in the data source.*

***Table of Weights for Population Health Sub-Index***

TABLE 3

|           | <b>Priority Measure</b>   | <b>Weight</b> |
|-----------|---|---------------|
| <b>1</b>  | Smoking   | 4.0%          |
| <b>2</b>  | Mothers who Smoke During Pregnancy                                | 4.0%          |
| <b>3</b>  | Youth Tobacco Use   | 6.0%          |
| <b>4</b>  | Physically Active Adults  | 2.0%          |
| <b>5</b>  | Physically Active Students  | 6.0%          |
| <b>6</b>  | Obesity – Counseling or Education                                 | 4.0%          |
| <b>7</b>  | Overweight and Obesity Prevalence among TN Public School Students | 6.0%          |
| <b>8</b>  | Average mPINC Score   | 4.0%          |
| <b>9</b>  | Breastfeeding Initiation  | 4.0%          |
| <b>10</b> | Infants Breastfed at Six (6) Months                               | 4.0%          |
| <b>11</b> | NAS Births  | 6.0%          |
| <b>12</b> | Drug Deaths   | 4.0%          |
| <b>13</b> | MME for Pain  | 4.0%          |
| <b>14</b> | Children - On-time vaccinations                                   | 4.0%          |
| <b>15</b> | Ballad participation in TennHS                                    | 2.0%          |
| <b>16</b> | Vaccinations – Tdap   | 4.0%          |
| <b>17</b> | Vaccinations - Flu Vaccine, Older Adults                          | 2.0%          |
| <b>18</b> | Teen Birth Rate   | 4.0%          |
| <b>19</b> | Third Grade Reading Level   | 6.0%          |

<sup>11</sup> To read more, visit <https://www.tn.gov/content/tn/education/assessment/tnready.html>

|              |   |             |
|--------------|---|-------------|
| 20           | Dental Sealants   | 4.0%        |
| 21           | Frequent Mental Distress  | 2.0%        |
| 22           | Infant Mortality  | 4.0%        |
| 23           | Low Birthweight   | 4.0%        |
| 24           | Adults identified with pre-diabetes who are referred to a qualifying diabetes prevention program. | 2.0%        |
| 25           | Ratio of Premature Deaths (Higher Density / Lower Density Counties)                               | 4.0%        |
| <b>TOTAL</b> |   | <b>100%</b> |

### ***Population Health Sub-Index Scoring Calculation***

Scores for the Priority Population Health Measures and related investment and planning processes will be calculated by the department annually according to the following schedule:

**For Year 1**, the period that begins with the issue date January 31, 2018 and concludes on June 30, 2019, the Population Health Sub-Index will be calculated as follows:

|  |             |
|--|-------------|
| Population Health Investment   | 25%         |
| Implementation of the Population Health Plan                         | 35%         |
| Achievement of Process Measures Identified in Population Health Plan | 40%         |
| <b>TOTAL:</b>  | <b>100%</b> |

**For year 2**, the Population Health Sub-Index will be calculated as follows:

|  |             |
|--|-------------|
| Population Health Investment   | 25%         |
| Achievement of Process Measures Identified in Population Health Plan | 75%         |
| <b>TOTAL:</b>  | <b>100%</b> |

**For year 3**, the Population Health Sub-Index will be calculated as follows:

|  |             |
|--|-------------|
| Population Health Investment   | 25%         |
| Achievement of Process Measures Identified in Population Health Plan                       | 65-75%      |
| Improvement in Priority Measures as compared to Tennessee Geographic Service Area Baseline | 0-10%       |
| <b>TOTAL:</b>  | <b>100%</b> |

**For year 4, 5, 6 and 7**, the Population Health Sub-Index will be calculated as follows:

|  |         |
|--|---------|
| Achievement of Process Measures Identified in Population Health Plan                       | 0-25%   |
| Improvement in Priority Measures as compared to Tennessee Geographic Service Area Baseline | 75-100% |

**TOTAL: 100%**

Note:

- Improvement for a given measure will be determined by comparing the rate of change in the Tennessee Geographic Service Area prior to the issue date to the rate of change in the Tennessee Geographic Service Area between baseline and the respective year, as determined by the department.
- A credit of between 0-1 percent may be given per measure at the discretion of the department for up to ten measures that improve over the baseline Tennessee and/or U.S. measures, for a maximum of five percent total available extra credit. Geographic Service Area measures that are better than existing Tennessee and/or U.S. numbers at baseline do not qualify for extra credit consideration.

**For years 8, 9 and 10** the Population Health Sub-Index will be calculated as follows:

|  |          |
|--|----------|
| Achievement of Process Measures Identified in Population Health Plan                       | 0-25%    |
| Improvement in Priority Measures as compared to Tennessee Geographic Service Area Baseline | 37.5-50% |
| Improvement in Priority Measures as compared to Tennessee Peer Counties                    | 37.5-50% |

**TOTAL: 100%**

The same extra credit opportunity described above for years 4, 5, 6 and 7 will be available for years 8, 9 and 10.

**Final Score calculation:**

1. Determine score (pass or fail) for Economic Sub-Index.
2. If applicable, determine impact of a failing score on the Economic Sub-Index on continuing public advantage.
3. If the result of Item 2 indicates a possible continuing public advantage, then determine from the results of the Annual Review the numerical score ranging from 0 to 100 for each Sub-Index (excluding the Economic Sub-Index).
4. Multiply the applicable score for each Sub-Index by its assigned weighting:

| <u>Sub-Index</u>  | <b>Year 1</b><br><u>Percentage Weight</u> |
|-------------------|---|
| Population Health | 50%                                       |
| Access to Care    | 30%                                       |
| Other             | <u>20%</u>                                |
| <b>Total</b>      | <b><u>100%</u></b>                        |

5. Add results of Item 4 for Final Score.
6. Application of Final Score to Public Advantage:

| <u>Final Score</u> | <u>Public Advantage Clear and Convincing?</u>   |
|--------------------|---|
| (≥ 85)             | Yes   |
| (60-<85)           | Unclear. All facts and circumstances to be considered in determination of continuing public advantage. May constitute noncompliance and/or result in proposal by the department of a COPA modification. |
| (< 60)             | No. COPA revoked absent compelling circumstances, including without limitation additional COPA modifications proposed by the department.  |

## **Credits**

**Commissioner Lisa Piercey, MD, MBA, FAAP.**

### **TDH Division of Health Planning**

- Jeff Ockerman
- Judi Knecht
- Elizabeth Jones

### **Arundel Metrics**

- Tom Eckstein
- Sarah Milder
- Mary Ann Honors

### **TDH Office of Population Health Surveillance**

- Shalini Parekh
- Lindsey Hall
- Generosa Kakoti
- Fred Croom
- Angela Miller
- Benjamin Crumpler
- Yuanchun Wang
- Vanessa Lefler

### **TDH Office of Informatics and Analytics**

- Nagesh Aragam
- Ben Tyndall
- Fenggang Peng

### **Tennessee Department of Education**

- Mark Bloodworth
- Lori Paisley
- Melissa Fuhrmeister

### **TDH Division of Family Health and Wellness**

- Joana Rosales

### **TDH Office of Primary Prevention**

- John Vick

### **TDH Office of Communication & Media Relations**

- Shelley Walker