Feasibility of Proposed New Public Health Indicators (PHI)
Compiled by Juliet VanEenwyk for discussion at the PHI Workgroup's February 2, 2011 meeting
January 21, 2011

Background
As a follow-up to the December 13, 2010 PHI Workgroup's meeting, the following document provides information on six potential new PHIs. At the December meeting and in a subsequent e-mail, Workgroup members were asked to submit their top two or three choices for new indicators from the list reviewed at the December meeting. Amy Diaz, Shannon Hoskins, Siri Kushner and Lyndia Tye each submitted suggestions for a total of six potential new indicators including:

1. Air quality indicator or air quality violations (3)
2. Physician to population ratio
3. Gini coefficient
4. Youth depression
5. Built environment
6. Falls among adults ages 65 and older

Summary Conclusions

1. Air quality: It might be possible to use nephelometer data to measure days in which the PM2.5 National Ambient Air Quality Standard (NAAQS) was exceeded, but many counties will have zero days. The Workgroup could defer adding an air quality indicator and reconsider adding one in 2013 when a new EPA metric should be available.
2. Physician to population ratio: Several variations for this indicator might be feasible. However, given workload, unresolved conceptual issues, and that three other PHIs address access issues, the relative benefit of adding this indicator is not clear. A county could obtain this information as follow-up action if the Access PHIs indicate difficulties in obtaining care.
3. Gini coefficient: The GINI is a weaker predictor of health status at the county level than more traditional economic measures, such as percent living in poverty. If the Workgroup wants an economic indicator, more traditional ones might be considered.
4. Youth depression: These data are available, but suicide attempts might be a more robust indicator than depression. If we run into a small numbers issue with suicide attempts, we could assess the association of youth-reported depression to suicide in our data and report youth depression if the correlation is apparent. Alternatively, counties with high rates of teen alcohol use (a risk factor for youth suicide) could assess youth suicide as a follow up action.
5. Built environment: Based on the literature and data availability, Washington State Department of Health staff could not identify robust, feasible indicators. This could be reconsidered in 2013.
6. Falls among adults ages 65 and older: Death and hospitalization data are available. There would likely be small numbers issues for death, and possibly for hospitalizations as well.

1. Air Quality

Collectible and Reportable: There are several sources of data for an air quality indicator with the most feasible being data collected by Ecology and EPA, and scheduled to be compiled into county level indicators in the Washington Tracking Network (WTN).

- **WTN** currently includes indicators for PM2.5 and ozone using data from federal (EPA) reference monitors. These indicators are consistent with national Environmental Public Health Tracking Network indicators, but there are PM2.5 monitors in only seven counties and ozone monitors in

six. Thus, far fewer than 80% of the LHJs are covered. Ecology also collects PM2.5 data using nephelometers. These are in 28 counties (see map below). WTN is in the process of incorporating these into the WTN website. WTN would prioritize this work, if the PHI Workgroup wants to include an indicator based on these data. (See Recommendations below.) It is not clear how WTN will compile the nephelometer data. For PM2.5 from the reference monitors, WTN currently includes

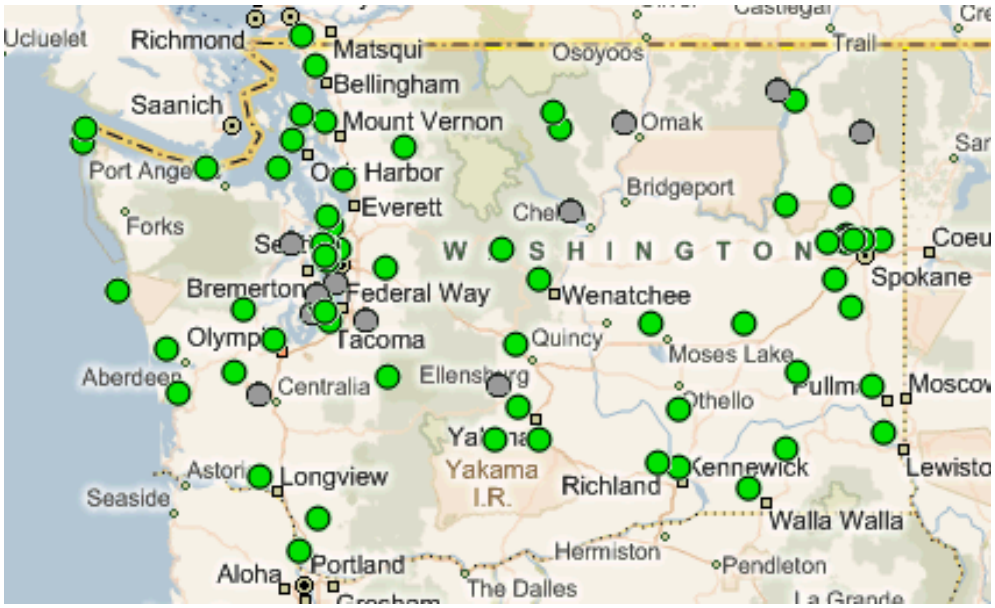
- Number of person-days exceeding the NAAQS and WHO standard
- Percent of people exposed above the NAAQS and WHO standard
- Proportion of days exceeding the NAAQS and WHO standard
- Average annual concentrations

- **Healthy People** includes four very different measures of outdoor air quality including
  - Number of days air quality index (AQI) exceeds 100 (i.e., unhealthy and unhealthy for sensitive groups)
  - Measures of alternative modes of transportation to work
  - Mobile source toxic emissions
  - Area source toxic emissions

  AQI is available from EPA for 28 Washington counties for 305 days of 2008. Using the Healthy People 2020 cut point, only seven counties had non-zero counts with a range of one to six days. Some of the other data for the Healthy People measures is likely available. Ecology compiles a similar measure (Washington Air Quality Advisory) for counties with nephelometers, but the measure derives from monitored data from the previous 12 hours and modeled data for the next 12 hours and often does not correspond to actual air quality.
- **MATCH** includes indicators for annual number of days air quality is unhealthy for sensitive populations for PM2.5 and ozone. They use 2005 data and extensive modeling efforts with CDC and EPA. We cannot replicate this work.
- **In the future**, EPA may have data that uses hierarchical Bayesian modeling to estimate values for air quality. When these data are available, we can begin to assign values to counties with no reference monitors.

Actionable: Several workgroup members have commented that air quality is not under the aegis of LHJs and that they have no authority or resources to partner with other agencies. Another perspective is that Local Health Officers have broad statutory authority to protect public health. As the local public health authority, addressing ambient air-related public health concerns is actionable through the zoning process, informing and educating Local Boards of Health, and commenting on proposed regulatory actions.

Conceptual Issues: Understanding the relationship of air quality at the monitor to the proportion of the population affected requires extensive modeling and is not feasible within current resources. Without modeling, measures of persons exposed is computed by applying values at the monitor(s) to the entire county irrespective of wind patterns, population densities, and cross-county border air pollution.



Recommendation: If the Workgroup wants an air quality measure for this iteration, it might be most feasible to ask WTN to compile the nephelometer data to measure the number of days the PM2.5 NAAQS is exceeded. The EPA AQI includes nephelometer data and so we might get only a handful or so counties with non-zero days. However, we do not need to suppress data for confidentiality or statistical stability. While people in one county can be impacted by air quality in another county, counties with days above the standard could start looking at why this is the case. Alternatively, we could wait until the 2013 iteration and investigate the new EPA data.

2. Physician to population ratio

Collectable and Reportable

- **MATCH** reports the primary care provider to population ratio. They do not report the overall provider to population ratio, because their review of the literature indicated that an increase in the numbers of the primary care providers is linked to improvements in health, but the overall increase is not. They use data obtained from the Health Resources and Services Administration's (HRSA) Area Resource File (ARF) for 2007, based on the 2006 American Medical Association Master File. I believe the ARF is public access and would be available to us. I do not know about the quality.
- **Healthy People** does not include a physician to population ratio, but rather includes measures for medical insurance; a usual primary care provider; a specific source of ongoing care; and delays in obtaining needed medical care, dental care, or prescription drugs.
- **DOH HSQA** reported that
    - The DOH Integrated Licensing and Regulatory System (ILRS) database can provide physician to population ratio by LHJs, but ILRS does not include specialty information. Counts of physicians are based on active licenses, not practicing physicians.
    - The American Medical Information, Inc. (AMI) dataset provides records of physicians, by primary specialty and county. The databases are prepared for commercial purposes. HQSA

purchased the May 2009 file and is assessing it for completeness and accuracy. HSQA estimates that the cost for the list of primary care physicians would be about $1100.

Conceptual Issues: Washingtonians can cross county and state borders for receipt of care and having an adequate supply of primary care physicians does not ensure access.

Recommendation: Given (1) the workload in understanding and compiling data from the ARF or AMI; (2)that Healthy People does not include this measure; (3) that ILRS does not allow compiling by specialty; (4) that PHIs include three measures (which are similar to some of the Healthy People measures) that are more directly related to whether people in a county can receive health care; and (5) that people can cross county line to receive health care, the extra benefit in adding this indicator is not clear. If a large proportion of people in a county do not have a health care provider or are not getting preventive screenings, counties can assess numbers of providers as a follow-up action. If, however, the PHI workgroup wants this indicator, it would be feasible using the overall physician to population ratio from ILRS. We could also explore using the primary care physician to population ratio from AMI, if money to purchase additional files is available.

3. GINI Coefficients (measure of income inequality)

Collectable and Reportable: GINI coefficients are available as 3-year averages (most recent, 2006-2008; 2007-2009 should be available soon) for 30 of 39 counties through the American Community Survey (ACS). They are likely available as 5-year averages for all counties. It would only be possible to develop data by LHJs if line-listed data are available at the county level. However, downloading line listed data and redeveloping GINI coefficients could pose workload issues. The nine counties for which there are no 3-year data represent eight LHJs. **MATCH** uses the 3-year averages, contracting with an economist to estimate the GINI for the other nine counties.

Actionable: Addressing income inequality at the county level could be achieved directly by the county tax structure and indirectly through provision of services, such as affordable housing and reliable public transportation.

Conceptual Issues: There are conceptual issues with using GINI coefficients at the county level. The measure seems to work well at the international level, while findings at the county level are not robust (i.e. some studies find and effect and others don't). Additionally, while GINI has an independent effect on health or related factors at the county (or smaller) levels in some studies, it generally has a smaller effect than other economic measures, such as individual level income or area-based poverty. Additionally, it is not clear that the range of GINI coefficients for Washington counties is sufficient to detect associations with health. (MATCH reports a range of 40-51, and 40 for the 90th percentile (?). The 2006-2008 ACS GINI coefficients have a range of 39.4-49.9.

Recommendation: Given that (1) the GINI is not a robust indicator at the county level, (2) the evidence for an association of GINI coefficients and health within the range of GINIs in Washington counties has not been explored, and (3) indicators that are easier to understand are more strongly related to health than is the GINI coefficient, there might be better economic indicators to consider if PHI Workgroup wants an economic measure. The Harvard School of Public Health Geocoding Disparities Project continues to recommend percent living in poverty as the best single economic indicator for understanding health. This should be available as 3- or 5-year averages from ACS. This would likely be more possible to estimate at the LHJ level than the GINI index, depending on the

exact indicator. The MATCH indicators include an indicator for children in poverty, which also should be available from ACS.

4. **Youth depression**

Collectable and Reportable: Form B of the Healthy Youth Survey (HYS) asks about depression and suicide thoughts, plans and attempts. Form A includes questions on depression and suicide attempts. Thus, the data will be most robust for depression and attempts. Healthy People 2020 includes an indicator for suicide attempts that uses the same question asked on HYS.

Conceptual Issues: Department staff do not know why Healthy People selected suicide attempts over depression. A large proportion of adolescents report depression: about ¼ of 8th graders and 30% of 10th and 12th graders answered "yes" to the question, "In the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?" Thus, the question is clearly measuring something other than clinical depression. It might be that Healthy People selected suicide attempt as a "cleaner" indicator in the sense that we know what we are capturing. Seven to nine percent of 2008 HYS respondents in grades 8, 10 and 12 answered "yes" to the attempted suicide question. While there is a well-established relationship between depression and suicide, it is not clear whether the relationship holds in the HYS data due to what seems to be over-reporting of depression.

Recommendation: If the PHI Workgroup wants an indicator in this area, use the youth suicide attempts. If there are not sufficient counties with sufficient numbers, we could investigate whether depression and suicide attempts are well-correlated in the HYS data and if so, we could use the depression question as an indicator of suicide knowing that it is measuring something other than clinical depression. Another approach would be to not include an indicator in PHI, but counties with high levels of teen alcohol use, a risk factor for teen suicide, could assess suicide and related factors as follow-up actions.

5. **Built Environment**

Collectable

- **Washington State Department of Health**: The consensus among programs studying this issue is that there is not a metric that is ready for prime time due to lack of reliable data, lack of feasibility of compiling data within current resources, or lack of robust evidence for a relationship between the indicator and health outcomes. (See for example, the MATCH indicator below.)
- **Healthy People** has one developmental built environment indicator: Increase legislative policies for the built environment that enhance access to and availability of physical activity opportunities. The indicator includes community-scale policies, street-scale policies, and travel and transportation policies. The potential data source is a legislative database, which leads me to think they are tracking state-level policies. Healthy People also includes state-level policies incentivizing retail outlets to provide foods that are encouraged by the Dietary Guidelines and a developmental indicator for access to food retail outlets selling healthy foods. For the latter, there is no potential data source listed. Healthy People also includes some quasi-built environment indicators that might be feasible to reproduce, such as percent of schools that do not sell or offer calorically sweetened beverages to students and percent of schools allowing

access to facilities for physical activity after hours. The former might be on the CDC Winnable Battles scorecard.

MATCH uses the 2006 Zip Code Business Patterns data to measure the percent of county Zip codes with at least one "healthy food outlet" (grocery stores with more than four employees and produce stands or farmer's markets) There is not evidence, however, that this metric is related to health behaviors or outcomes. MATCH details problems with measuring food outlets, including defining "neighborhood" and differing availability of food within a specific type of outlet (e.g., supermarkets in poorer areas might carry lower quality produce) and across specific types of outlets (e.g., large supermarkets compared to medium and small-sized food stores). A 2009 review, "Built environments and obesity in disadvantaged populations," concluded that the "research provided the strongest support for food stores….as potentially influential for disadvantaged groups." A 2010 study, "Associations of supermarket accessibility with obesity and fruit and vegetable consumption in the conterminous United States," found distance to supermarkets was a factor in urban, but not other areas.

Recommendation: Given that programs within the Department working on identifying indicators for the built environment could not identify robust and feasible indicators, reconsider in 2013.

6. Falls among older adults

Collectable and Reportable: The 2007 Health of Washington State presented data on fall hospitalizations among adults ages 65 and older for 35 counties by combining three years of data. Several counties would likely not have sufficient data if we changed to two years of data. There are two Healthy People 2020 indicators for falls among older adults: IVP-23.2, prevent an increase in rate of fall-related deaths and OA-12, reduce rate of emergency department visits due to falls. MATCH does not include an indicator for falls among older adults.

Recommendation: It is unlikely that we would have sufficient numbers of deaths to include 80% of the LHJs with two or even three years of data. Thus, we would need to investigate whether we would have sufficient hospitalizations using two years of data.