

Community Health Assessment Guide

Book Appendices



NC Division of Public Health

North Carolina Department of Health and Human Services

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Table of Contents



CAROLINA PUBLIC HEALTH

APPENDIX A – NORTH STANDARDS	1
CORE PUBLIC HEALTH FUNCTIONS	1
ACCREDITATION STANDARDS FOR COMMUNITY HEALTH ASSESSMENT	5
ACCREDITATION CHECKLIST FOR COMMUNITY HEALTH ASSESSMENT	6
ACCREDITATION CHECKLIST FOR SOTCH REPORTS.....	7
APPENDIX B - FREQUENTLY ASKED QUESTIONS	8
APPENDIX C - PROBLEMS WITH RATES BASED ON SMALL NUMBERS PRIMER	12
APPENDIX D - AGE-ADJUSTED DEATH RATES PRIMER.....	18
APPENDIX E - SAMPLING GUIDE FOR COMMUNITY HEALTH ASSESSMENT	27
APPENDIX F - TWO-STAGE CLUSTER SAMPLING	33
APPENDIX G - SMALL GROUP DISCUSSION TOOL KIT.....	37
APPENDIX H- RESOURCE GUIDE	47
APPENDIX I - SAMPLE COMMUNITY HEALTH ACTION PLAN FORM.....	57

APPENDIX A
North Carolina Public Health Standards

Standards for Community Health Assessment			
Activity	Accreditation		Consolidated Agreement
	Essential Services	Benchmarks & Activities	
Phase 1 – Establish the CHA Team	4	1(1.1.a , b), 11	See Accreditation Checklist
Phase 2 – Collect Primary Data	1	1(1.1.e, g, i), 11, 19	See Accreditation Checklist
Phase 3 – Collect Secondary Data	1	1(1.1.b, c, d, g, h), 19	
Phase 4 – Analyze and Interpret County Health Data	1	1(1.1.d, e, f, g, h, i, j, k), 11, 19	
Phase 5 – Determine Health Priorities	1	1(1.1.k), 11	See Accreditation Checklist
Phase 6 – Create CHA Document	3	1(1.1.k)	See Accreditation Checklist
Phase 7 – Disseminate CHA Document	3	1(1.3), 11	
Phase 8 – Develop Community Action Plan	4, 5	1, 11, 12, 13, 21, 22, 38	See Accreditation Checklist

Core Public Health Functions and Related Essential Services
(See details below)

Assessment

- Monitor health status to identify community health problems
- Diagnose and investigate health problems and health hazards in the community
- Evaluate effectiveness, accessibility, and quality of personal and population-based health

Policy Development

- Develop policies and plans that support individual and community health efforts
- Enforce laws and regulations that protect health and ensure safety.
- Research for new insights and innovative solutions to health problems

Assurance

- Link people to needed personal health services and assure the provision of health care when otherwise unavailable
- Assure a competent public health and personal health care workforce
- Inform, educate, and empower people about health issues
- Mobilize community **partnerships** to identify and solve health problems

**Operational Definition of a
Functional Local Public Health Agency
(NACCHO, 11/2005)**

*North Carolina Local Health Department Accreditation
Local Health Department Accreditation Guidance Document July 1, 2008*

Essential Service 1: Monitor health status and understand health issues facing the community.

- a. Obtain and maintain data that provide information on the community's health (e.g., provider immunization rates; hospital discharge data; environmental health hazard, risk, and exposure data; community-specific data; number of uninsured; and indicators of health disparities such as high levels of poverty, lack of affordable housing, limited or no access to transportation, etc).
- b. Develop relationships with local providers and others in the community who have information on reportable diseases and other conditions of public health interest and facilitate information exchange.
- c. Conduct or contribute expertise to periodic community health assessments.
- d. Integrate data with health assessment and data collection efforts conducted by others in the public health system.
- e. Analyze data to identify trends, health problems, environmental health hazards, and social and economic conditions that adversely affect the public's health.

Essential Service 2: Protect people from health problems and health hazards.

1. Investigate health problems and environmental health hazards.
2. Prevent, minimize, and contain adverse health events and conditions resulting from communicable diseases; food-, water-, and vector-borne outbreaks; chronic diseases; environmental hazards; injuries; and health disparities.
3. Coordinate with other governmental agencies that investigate and respond to health problems, health disparities, or environmental health hazards.
4. Lead public health emergency planning, exercises, and response activities in the community in accordance with the National Incident Management System, and coordinate with other local, state, and federal agencies.
5. Fully participate in planning, exercises, and response activities for other emergencies in the community that have public health implications, within the context of state and regional plans and in a manner consistent with the community's best public health interest.
6. Maintain access to laboratory and biostatistical expertise and capacity to help monitor community health status and diagnose and investigate public health problems and hazards.
7. Maintain policies and technology required for urgent communications and electronic data exchange.

Essential Service 3: Give people information they need to make healthy choices.

1. Develop relationships with the media to convey information of public health significance, correct misinformation about public health issues, and serve as an essential resource.
2. Exchange information and data with individuals, community groups, other agencies, and the general public about physical, behavioral, environmental, social, economic, and other issues affecting the public's health.

3. Provide targeted, culturally appropriate information to help individuals understand what decisions they can make to be healthy.
4. Provide health promotion programs to address identified health problems.

Essential Service 4: Engage the community to identify and solve health problems.

1. Engage the local public health system in an ongoing, strategic, community-driven, comprehensive planning process to identify, prioritize, and solve public health problems; establish public health goals; and evaluate success in meeting the goals.
2. Promote the community's understanding of, and advocacy for, policies and activities that will improve the public's health.
3. Support, implement, and evaluate strategies that address public health goals in **partnership** with public and private organizations.
4. Develop **partnerships** to generate interest in and support for improved community health status, including new and emerging public health issues.
5. Inform the community, governing bodies, and elected officials about governmental public health services that are being provided, improvements being made in those services, and priority health issues not yet being adequately addressed.

Essential Service 5: Develop public health policies and plans.

1. Serve as a primary resource to governing bodies and policymakers to establish and maintain public health policies, practices, and capacity based on current science and best practices.
2. Advocate for policies that lessen health disparities and improve physical, behavioral, environmental, social, and economic conditions in the community that affect the public's health.
3. Engage in LHD strategic planning to develop a **vision**, mission, and guiding principles that reflect the community's public health needs, and to prioritize services and programs.

Essential Service 6: Enforce public health laws and regulations.

1. Review existing laws and regulations and work with governing bodies and policymakers to update them as needed.
2. Understand existing laws, ordinances, and regulations that protect the public's health.
3. Educate individuals and organizations on the meaning, purpose, and benefit of public health laws, regulations, and ordinances and how to comply.
4. Monitor, and analyze over time, the compliance of regulated organizations, entities, and individuals.
5. Conduct enforcement activities.
6. Coordinate notification of violations among other governmental agencies that enforce laws and regulations that protect the public's health.

Essential Service 7: Help people receive health services.

1. Engage the community to identify gaps in culturally competent, appropriate, and equitable personal health services, including preventive and health promotion services, and develop strategies to close the gaps.
2. Support and implement strategies to increase access to care and establish systems of personal health services, including preventive and health promotion services, in **partnership** with the community.

3. Link individuals to available, accessible personal healthcare providers (i.e., a medical home).

Essential Service 8: Maintain a competent public health workforce.

1. Recruit, train, develop, and retain a diverse staff.
2. Evaluate LHD staff members' public health competencies,⁷ and address deficiencies through continuing education, training, and leadership development activities.
3. Provide practice- and competency based educational experiences for the future public health workforce, and provide expertise in developing and teaching public health curricula, through **partnerships** with academia.
4. Promote the use of effective public health practices among other practitioners and agencies engaged in public health interventions.
5. Provide the public health workforce with adequate resources to do their jobs.

Essential Service 9: Evaluate and improve programs and interventions.

1. Develop evaluation efforts to assess health **outcomes** to the extent possible.
2. Apply evidence-based criteria to evaluation activities where possible.
3. Evaluate the effectiveness and quality of all LHD programs and activities and use the information to improve LHD performance and community health **outcomes.**
4. Review the effectiveness of public health interventions provided by other practitioners and agencies for prevention, containment, and/ or remediation of problems affecting the public's health, and provide expertise to those interventions that need improvement.

Essential Service 10: Contribute to and apply the evidence base of public health.

1. When researchers approach the LHD to engage in research activities that benefit the health of the community,
 - i. Identify appropriate populations, geographic areas, and partners;
 - ii. Work with them to actively involve the community in all phases of research;
 - iii. Provide data and expertise to support research; and,
 - iv. Facilitate their efforts to share research findings with the community, governing bodies, and policymakers.
2. Share results of research, program evaluations, and best practices with other public health practitioners and academics.
3. Apply evidence-based programs and best practices where possible.

These 10 Standards are framed around the Ten Essential Public Health Services, which have been reworded to more accurately reflect the specific LHD roles and responsibilities related to each category. In addition, these standards are consistent with the National Public Health Performance Standards Program (NPHPSP), serving to specify the role of governmental LHDs while the NPHPSP addresses the local public health system as a whole. (www.naccho.org)

North Carolina Local Health Department Accreditation Standards for Community Health Assessment

Benchmarks

- #1: A Local Health Department (LHD) shall conduct and disseminate results of regular community health assessments.

Additional benchmark activities that may directly or indirectly involve the CHA process.

- #10: The LHD shall provide, support, and evaluate health promotion activities designed to influence the behavior of individuals and groups.
- #11: The LHD shall convene key constituents and community partners to identify, analyze and prioritize community health problems/issues.
- #12: The LHD shall develop strategies in **collaboration** with community partners to solve existing community health problems.
- #13: The LHD shall identify and build upon community assets and direct them toward resolving health problems.
- #19: The LHD shall assess use of public health program and health care services by underserved, at-risk and vulnerable populations identified in the community health assessment process.
- #21: The LHD shall lead efforts in the community to link individuals with preventive, health promotion, and other health services.
- #22: When the LHD determines that there are compelling unmet health care needs in the community, the LHD shall develop a plan with community leaders and providers to meet the unmet needs.
- #28: The LHD shall use research to develop and evaluate public health programs.
- #32: The Local Board of Health shall participate in the establishment of public health goals and objectives.

Accreditation Checklist for Community Health Assessment

Accreditation	Consolidated Agreement
Activity 1.1 LHD shall conduct a comprehensive CHA at least every 48 months that includes:	The Community Health Assessment process shall:
1.1.a Evidence of community collaboration in planning/ conducting assessment	<ul style="list-style-type: none"> • be a collaborative effort with local partners such as hospitals, and local Healthy Carolinians Partnerships (if such exists)
1.1.b Reflect the demographic profile of population	
1.1.c Describe socioeconomic, educational & environment factors that affect health	
1.1.d Assemble/analyze secondary data to describe community health status	
1.1.e Collect/analyze primary data to describe community health status	<ul style="list-style-type: none"> • Include collection of primary data at the county level
1.1.f Compile/analyze trend data to describe changes in community health status and factors affecting health	
1.1.g Use scientific methods for collecting/analyzing data	
1.1.h Identify population groups at risk	
1.1.i Identify existing and needed health resources	
1.1.j Compare selected local data with data from other jurisdictions	
1.1.k Identify leading community health problems	<ul style="list-style-type: none"> • list of community health priorities based on CHA findings • include a narrative of the assessment findings
Action plans will be: <ul style="list-style-type: none"> • on the form provided by DPH; • be from identified priorities of the CHA; • targeted to identified at-risk groups; • aligned with the HNC 2020 objectives and have multi-level interventions. 	<ul style="list-style-type: none"> • Include community action plans to address the priorities issues.
Activity 1.2 LHD shall update CHA with an annual interim State of the County’s Health Report annually. The report shall demonstrate that the LHD is tracking priority issues identified in CHA, identify emerging issues, Review major morbidity and mortality data for the county (annual review of county level data book on SCHS website) identify emerging issues, Identify new initiatives.	

Accreditation Checklist for SOTCH Reports

Additional Standards

Community health assessments should include:

- Socioeconomic factors
- Educational factors
- Environmental factors

Analysis should include:

- Trends
- Comparison of local rates to state rates and Healthy North Carolina 2020 Objectives
- Health priorities selection process updates

Reporting the assessment results to community should include at least 2 channels of communication.

Accreditation	Consolidated Agreement	Met	Not Met	Comments
Activity 1.2 LHD shall update CHA with an annual interim State of the County's Health Report annually. The report shall:				
<ul style="list-style-type: none"> • Demonstrate that the LHD is tracking priority issues identified in CHA 	<ul style="list-style-type: none"> • List the health concerns selected as priorities 			
	<ul style="list-style-type: none"> • State progress made in the last year on the selected priorities 			
	<ul style="list-style-type: none"> • Review any changes in the data that guided the selection of priorities 			
<ul style="list-style-type: none"> • Identify emerging issues 	<ul style="list-style-type: none"> • Include new and emerging issues that affect community's health status 			
	<ul style="list-style-type: none"> • Review major morbidity and mortality data for the county (annual review of county level data book on SCHS website) 			
<ul style="list-style-type: none"> • Identify new initiatives 	<ul style="list-style-type: none"> • Include any other changes in your county that affect health concerns (such as economic or political changes, new funds or grants) 			

APPENDIX B

Frequently Asked Questions

What is a Community Health Assessment?

Community health assessment is a process by which community members gain an understanding of the health, health concerns, and health care systems of the community by identifying, collecting, analyzing, and disseminating information on community assets, strengths, resources, and needs. A community health assessment usually culminates in a document that includes information about the health of the community as it is today and about the community's capacity to improve the lives of residents. A community health assessment can provide the basis for discussion and action to improve the health of a community.

What is the North Carolina Community Assessment Process?

The North Carolina Community Assessment Process engages the community in an eight-phase assessment process described in the Community Health Assessment Guide Book. This Guide Book is a step-by-step manual for community-based health assessment that provides tools for collecting county level data, worksheets for analyzing the data, data interpretation tips, guidelines for prioritizing local health needs, and community health planning aids. The County Health Data Book is available online each year through the NC State Center for Health Statistics.

Who should be involved?

Participants in most communities include people from the public health department, community partners, healthcare providers, hospital and clinic representatives, business and civic leaders, educators, social service professionals, elected officials, and concerned community members. Anyone in the community who has a stake in the **outcome** can become involved, and since health is everyone's concern, every citizen is a potential partner. "Fostering ownership of the assessment throughout the community and seeking opportunities for public and private **sector collaboration** will significantly increase the chances that the assessment can be used to inform decisions to improve the community's health, and to effect change in the local health system" (Robin, et al., 1996).

Why should a county conduct a Community Health Assessment?

Community health assessment provides the opportunity to engage multiple agencies and organizations as well as community members in identifying and evaluating health issues. The community assessment process and the resulting document have many uses. The ultimate **purpose** of the assessment process is to improve the health of the community. Community health assessment can provide knowledge about the state of the community's health and can create an environment for change.

How can a Community Health Assessment improve health?

Communities often have to make critical decisions without adequate information. Examples include where to locate new health clinics, how to attract suitable new industry, or how to position the community for future growth. Community health assessments help concerned citizens answer questions like: What is important to our community? How do people like living in our community? What would citizens like to see changed? How have they been successful at meeting challenges in the past? Who (individuals, groups, or organizations) are important

contributors in efforts to improve the community's health? What do they see as the greatest obstacles to good health?

Who is responsible for completing the Community Health Assessment?

Local public health departments are responsible for submitting a community health assessment document at least every four years. They are expected to work with community partners to assemble a community health assessment team, collect and analyze data, set priorities, present results to the community, and develop collaborative action plans to address priority issues.

Every four years, each local public health department must be accredited through the North Carolina Local Health Department Accreditation Board. Several of the benchmarks and standards used to assess local public health departments involve the four-year Community Health Assessment process. For more information, see nciph.sph.unc.edu/accred.

How can a community use their Community Health Assessment?

Once a community health assessment has been completed and the assessment document prepared, there are many things the community can do with the information. The value of an assessment is in its use. The community assessment document and the community health action plans are just the beginning of the actions to improve the health of a community. The following are some suggested ways of putting the assessment to use. The CHA Team can:

- Share a greater knowledge and understanding of the community as it is today because they know what is going on and who is involved.
- Publish and make available the results of the assessment to the community because they can describe in detail what they found out.
- Provide facts upon which to base programmatic or organizational decisions because they know where the current services are located and if there is unmet need in the population.
- Plan effective, collaborative interventions to promote better health because they know where the unmet needs are, what the residents want, and the county assets.
- Seek new funding because they can identify the financial resources needed and the health data to support the need.
- Influence and advocate for policy changes with legislators, county government officials, and others because they have factual information about health needs and what the residents want to change.
- Provide a baseline by which to monitor changes because they have information on the current conditions and recent trends.
- Develop resources and market the community because they know the current resources, and what is missing.
- Inform citizens and empower them to act because they know what citizens can do to make a difference, where to start, and what is available to help them.
- Build or strengthen **partnerships**/coalitions because they know who is or wants to be involved in community health and how everyone can work together to make a difference.

- Identify emerging issues because they know the new concerns of community members, what the county data show, and what has changed.

What is the timeline for the Community Health Assessment?

The required **community health assessment** and the resulting required **community assessment document** are due at least every four years. Each local health department is assigned to a specific four-year cycle. That cycle will be synchronized with local health department accreditation, so that community health assessment has been completed before accreditation occurs. The timeline is:

- Submit the Community Health Assessment document by the first Monday in March (beginning in 2015) of the year it is due.
- Submit the Community Health Action Plans by the first Monday of the following September.
- Update the community health assessment with annual State of the County Health Reports, due by the first Monday in March (during years between health assessments).

What should the State of the County's Health Report include?

Content of the report must include:

- A review of major morbidity and mortality data for the county
- A review of the health concerns selected as priorities
- Description of progress made in the last year on these priorities
- A review of any changes in the data that guided the selection of these priorities
- Other changes in the county that affect health concerns (such as economic and/or political changes, new funds or grants available to address health problems)
- New and emerging issues that affect health status
- Ways community members can get involved with ongoing efforts

Depending on the county's specific wishes and possible uses for the report, the report may include other information about the county like geography, history, demographic, social, economic, and political information.

What are the *Healthy NC 2020 Objectives*?

The concept that individuals and communities can improve and control their health was reinforced by the Healthy People initiative of the United States Department of Health and Human Services beginning with the 1979 publication entitled *Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention*. Subsequent reports, such as *Healthy People 2000*, *Healthy People 2010*, and *Healthy People 2020*, have led to the creation of state and local initiatives, such as *Healthy NC 2020 Objectives*. These initiatives set an agenda for communities to work towards healthier living.

Healthy NC 2020 is a collaborative effort of the NCIOM, North Carolina Division of Public Health, and State Center for Health Statistics to develop the state's 2020 health objectives for the Governor's Task Force for **Healthy Carolinians**. The North Carolina Institute of

Medicine web site at www.nciom.org/task-forces-and-projects/?healthy-nc-2020 has additional information on *Healthy NC 2020*.

The *Healthy NC 2020* goals are to:

- Increase the span of healthy life of the citizens of North Carolina
- Remove health disparities among the disadvantaged
- Promote access to preventive health services
- Protect the public's health
- Foster positive and supportive living and working conditions in our communities
- Support individuals to develop the capacities and skills to achieve healthy living.

The 13 focus areas for the *Healthy NC 2020* include tobacco use, nutrition and physical activity, risky sexual behavior, substance abuse, environmental risks, injury, infectious disease/foodborne illness, mental health, dental health, maternal and infant health, social determinants of health, chronic disease, and a cross-cutting focus area.



Appendix C

STATISTICAL

PRIMER

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No. 12

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Problems with Rates Based on Small Numbers

by
Paul A. Buescher

Introduction

Most health professionals are aware that estimates based on a random sample of a population are subject to error due to sampling variability. Fewer people are aware that rates and percentages based on a full population count are also estimates subject to error. Random error may be substantial when the measure, such as a rate or percentage, has a small number of events in the numerator (e.g., less than 20). A rate observed in a single year can be considered as a sample or estimate of the true or underlying rate. This idea of an “underlying” rate is an abstract concept, since the rate observed in one year did actually occur. However, since annual observed rates may fluctuate dramatically, it is the underlying rate that health policies should seek to address. **The larger the numerator of the observed rate, the better the observed rate will estimate the underlying rate.**

Many publications of the State Center for Health Statistics contain rates or percentages with a small numerator. This is a problem with a measure such as the infant mortality rate. In a single year many counties may have only one or two infant deaths and such rates in a small population may fluctuate dramatically from year to year. One means of addressing this problem is to look at five-year rates where the numerator

will be larger. Even with five-year rates, however, many counties will have few events and therefore unstable rates. Many cause-specific death rates for individual counties will have small numerators. This statistical problem is compounded when age-adjusted rates are produced because, in the process of calculating an age-adjusted rate by the direct method, the deaths and population are broken up into smaller groups. Rates are calculated for a number of specific age groups and numerators for each rate are often small.

Some customers of the State Center for Health Statistics may treat our published rates and percentages as completely accurate. Unfortunately, there is the danger of making unwarranted comparisons between geographic areas or comparisons over time when the rates or percentages have small numerators. We do not consider it feasible to completely ignore all rates based on small numbers. In one sense, the rates do describe what actually happened in a year, but you must use caution and interpret any comparisons critically. The following section provides some methods for quantifying random errors in rates as a basis for making decisions about when changes or differences in rates are meaningful.



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Calculation of Errors in Rates

The formulas presented here provide a means of estimating the confidence interval around a single rate and for determining whether the difference between two rates is statistically significant.

***Definition:** A *confidence interval* is a range above and below an observed rate within which we would expect the “true” rate to lie a certain percentage of the time (usually 95%).

Calculation of a confidence interval recognizes that an observed rate is not a precise estimate of the underlying rate because the observed rate is influenced by random error. The formulas below are exactly the same as the ones used for a random sample from a larger population. The population rate for a given year based on a complete count can be considered a sample of one of a large number of possible measurements, all of which cluster in a normal distribution (bell curve) around the “true” (unknown) rate of the population. The larger the numerator of the measured rate, the better the rate will estimate the true or underlying rate of the population. The confidence interval accounts for only random measurement error. Systematic errors or biases in measurement may still be present and cannot be assessed by these formulas.

These formulas apply to any proportion or simple (crude) rate. Random errors may also be estimated for adjusted rates and other more complex measures, but a description of this is beyond the scope of the present Primer.

Proportions vs. Percentages vs. Rates

The formulas below are expressed in terms of *p*, or the proportion or fraction of a population that has a certain characteristic (e.g., death, low birthweight, early prenatal care). In this context, the terms proportion, percentage, and rate are used interchangeably. For example, in 1995 Wake County had a resident population of approximately 518,000 out of which approximately 2,900 died during the year. The proportion who died is $2,900 / 518,000$ or .005598. For the percentage who died, multiply by 100; the result is .5598%. A percentage is simply a rate per 100. For a rate per 1,000, multiply the proportion by 1,000; the result is 5.598 deaths per 1,000 population. The number of deaths per 100,000 is 559.8. So the multiplier is completely arbitrary, though for rare events we

Statistical Primer No. 12

N.C. Department of Health and Human Services

2

usually use 1,000 or higher so that the rate is not a decimal fraction.

The formulas presented below use *p*, or the proportion, so a percentage or rate has been converted back to the proportion (by dividing by the multiplier) in these examples.

Infant Death Rates

The infant death rates (expressed per 1,000 live births) reported in State Center for Health Statistics publications are not strictly proportions since the deaths and births occurred during a particular calendar year. Though approximately one-half of infant deaths occur on the first day of life, some of the infant deaths that occur in a given year are to babies born in the previous calendar year. Technically, the more correct way to compute the proportion of babies who before their first birthday would be to use a linked birth/infant death file to track a population of births (also called a birth cohort) through the first year of life. But in practicality this difference is small. We suggest that the formulas below may reasonably be used for infant deaths rates reported as usual based on year of occurrence and expressed as the proportion of babies who die.

Formula:

$$\text{Infant death rate} = \frac{\text{\#deaths under 1 year of age}}{\text{\#of live births}} \times 1000$$

Confidence Intervals

We can compute a confidence interval around a proportion or rate. The confidence interval is the interval within which we would expect the “true” rate to fall a certain percentage of the time. A 95% confidence interval is frequently used, which means using a multiplier (“*Z*” value) of 1.96. For a 99% confidence interval, one would use the multiplier 2.57. Let us say that in hypothetical Rocky County there are 20 infant deaths (*d*) out of a population of 1,900 live births (*n*) in a single year. The proportion dying (*p*) is $20 / 1,900 = .0105$. You can also say that 1.05 percent died or that the infant death rate is 10.5 per 1,000 births for that year.

Formula:

$$95\% \text{ Confidence Interval} = p \pm 1.96 \sqrt{\frac{p \cdot q}{n}}$$

Division of Public Health

State Center for Health Statistics

where $q = 1 - p$. This formula works for any value of p , though for small values of p (.01 or less), the value of q is very close to 1 and may therefore be ignored. In the current example this calculates out to:

$$q = 1 - .0105 = .9895$$

$$95\% \text{ Confidence Interval} = .0105 \pm 1.96 \sqrt{.0105 \times .9895 / 1900} = .0105 \pm .0046$$

Expressed in the traditional way in terms of infant deaths per 1,000 live births, we can say that we are 95% sure that the true infant death rate for this population is between 5.9 and 15.1. These limits are quite large. A useful rule of thumb is that any rate with fewer than 20 events in the numerator will have a confidence interval that is wider than the rate itself. In the current example of a rate of 10.5 per 1,000 with a numerator of 20, the width of the confidence interval is 9.2.

Formula:

Width of the confidence interval = higher limit - lower limit
In the current example this is: $15.1 - 5.9 = 9.2$

Combining Data for Greater Precision

One way to reduce the error of a rate is to combine several years of data. Another way is to combine geographic areas; for example, look at regional rather than county-level rates. In the example above, let us assume that over a five year period in Rocky County we observed five times as many infant deaths and live births (100 and 9,500 respectively) as in the example above.

The five-year infant death rate would still be 10.5, but with the larger numerator, the range of the 95% confidence interval would be much smaller (8.5 to 12.5). Try the calculations so you can verify this result. In general, you have to quadruple the sample size (n) to cut the random error in half.

Differences Between Rates

When comparing rates, you might want to assess the statistical significance of a change in a rate over time, or of the difference between two rates in one period of time (for example between two geographic areas or population groups).

The **standard error of the difference between two rates** is computed as:

Statistical Primer No. 12
N.C. Department of Health and Human Services

Formula:

$$SE = \sqrt{\frac{p_1 q_1}{n_1} + \frac{p_2 q_2}{n_2}}$$

where p_1 and p_2 are the two rates to be compared expressed as proportions. The difference between the two proportions can be considered statistically significant at the 95% confidence level if the difference is greater than 1.96 multiplied by the standard error (computed above).

As an example, take a county where the percentage of women who smoked during pregnancy (from the birth certificates) declined from 21.4% in 2000 to 16.7% in 2005. We want to know if this change is statistically significant at the 95% confidence level. In 2000, the mother smoked for 150 births (d_1) out of 700 total births (n_1). In 2005, the mother smoked for 125 births (d_2) out of 750 total births (n_2). The proportions are $p_1 = d_1 / n_1 = .214$ and $p_2 = d_2 / n_2 = .167$ (or 21.4% and 16.7%).

Therefore, the calculation of 1.96 times the standard error of the difference is as follows:

$$1.96 \times SE = 1.96 \sqrt{\frac{.214 (.786)}{700} + \frac{.167 (.833)}{750}} = .0404$$

Since the difference between the two proportions of .047 (i.e. $.214 - .167$) exceeds 1.96 times the standard error of the difference (i.e., .0404), we can say that the decline in the smoking percentage in this county is statistically significant at the 95% confidence level. Or stated another way, the probability is less than .05 (or 5%) that the observed decline in smoking was due to chance.

The formula for the standard error of the difference can be used to solve for any unknown in the equation. For example, if you want to know what the exact level of statistical significance of an observed difference between two proportions is, solve for the multiplier (“Z”) by dividing the observed difference by the standard error of the difference and look up the probability value for Z in a table of areas under the normal curve. In the smoking example presented above, the probability that the observed decline would occur just due to random variation in the percentages is .02. Please verify this result by consulting a table of

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areas under the normal curve in your statistical text or online. For assistance with this or for other questions, contact the State Center for Health Statistics.

Other Issues

These formulas are based on parameters of the normal curve and in some cases will be only an approximation. If n (sample or population size, also denominator of the proportion or rate) is less than 30, or if the number of events (numerator of the proportion) is less than five, these formulas become less reliable and readers should contact the State Center for Health Statistics for more appropriate alternatives.

Another important consideration is the issue of practical versus statistical significance. If n is large enough, almost any difference will be statistically significant. However, the same difference may be of very little practical or clinical significance. It is the responsibility of the user of statistics to evaluate whether observed differences, which may be statistically significant, are of real public health importance.

Finally, the issue of using rates versus actual counts should be mentioned. Rates or proportions allow more standardized comparisons between populations of different size, but there may be substantial random measurement error involved. In many cases just looking at the number of events is appropriate; do not always rush to calculate a proportion or rate. If the number of infant deaths in a county increased from one in 2007 to two in 2008 and the number of births remained about the same, looking at the infant mortality rate would erroneously suggest that the problem had become twice as great. In this case, each infant death could be investigated as unique sentinel health event. Examining the numbers behind the rates is always a good idea, and in some cases just looking at the numbers makes more sense.

This section on calculation of errors in rates demonstrates that an observed rate or proportion should not be taken as an exact measure of the true value in a population. Even measures based on complete reporting from a population may have a substantial random error component.

Key Points to Remember

- If the number of events (numerator) is less than 20, your statistic may be unreliable due to random error. Interpret it with caution and look at the raw numbers too!
- You can calculate a confidence interval around your statistic to get an idea of the precision of your estimate. Narrower confidence intervals indicate more precise estimates.
- To get greater precision and increase your sample size, combine data from several years, or several places during one year.
- You can check if the difference between two rates is statistically significant at a certain level by comparing the difference between the rates to the standard error of the difference multiplied by “Z” (usually $Z = 1.96$).
- It is up to you, the health professional, to decide whether the difference between two rates is *clinically* important, no matter whether it is *statistically* significant or not!

Statistical Guidelines

To address the problems of rates based on small numbers, the State Center for Health Statistics has adopted the following statistical guidelines:

- ◆ All publications of the State Center for Health Statistics that contain rates or percentages should contain a caution about interpreting rates or percentages based on small numbers. This caution should be featured prominently in the introductory material, and then discussed in more detail in the methods or technical notes section. See the *2006 North Carolina Vital Statistics, Volume 1 and Volume 2*, for examples of this.
- ◆ Such a caution should accompany any information that is sent out to a customer as a special data request, if the information contains rates or percentages based on small numbers.
- ◆ When rates or percentages are published or distributed, the numerators should also be shown if possible.
- ◆ When maps of rates are produced, where possible there should be a legend warning the reader to “interpret with caution” for rates or percentages based on a very small numerator, e.g., less than 20 events.
- ◆ At every opportunity, customers of the State Center for Health Statistics should be educated about statistical issues, and especially about the potential for misinterpretation when comparisons are made using rates or percentages based on small numbers.

Readers with questions or comments about this Statistical Primer may contact Paul Buescher at (919) 715-4478 or through e-mail at Paul.Buescher@ncmail.net.

Note: Paul Buescher retired in 2010. Contact Karen Knight at karen.knight@dhhs.nc.gov.

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Appendix D

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PRIMER

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No. 13
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Age-Adjusted Death Rates

by

Paul A. Buescher

Introduction

Mortality or death rates are often used as measures of health status for a population. Population-based incidence or morbidity data are available in North Carolina in a few areas such as cancer and certain communicable diseases, but for many chronic diseases we know only how many people died from the disease and not how many are living with it. Given the importance of data from death certificates in measuring the health of populations, it is important that valid comparisons of death rates are made. Many factors affect the risk of death, including age, race, gender, occupation, education, and income. By far the strongest of these factors affecting the risk of death is age, with persons in the oldest age groups having a much higher risk of death. Populations often differ in age composition. A “young” population has a higher proportion of persons in the younger age groups, while an “old” population has a higher proportion in

the older age groups and is expected to have higher crude (unadjusted) death rates than a “young” population. Therefore, it is often important to control for differences among the age distributions of populations when making comparisons among death rates to assess the relative risk of death. This *Statistical Primer* describes how age-adjusted death rates are calculated and discusses some related issues.

The methods for adjusting death rates for age that are shown here could also be applied to other characteristics of a population, such as income or gender, if it were considered desirable to adjust for such characteristics before comparing death rates. Also, disease incidence rates, birth rates, or other types of rates could be adjusted for age, or other factors, using the general approach presented here.



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Crude and Age-Specific Death Rates

A crude or unadjusted death rate is simply the number of deaths divided by the population at risk, often multiplied by some constant so that the result is not a fraction.

Formula:

$$\text{Crude death rate} = \frac{\text{\# deaths}}{\text{population at risk}} \times 1,000$$

For example, for Hertford County, North Carolina, during the period 1991 through 1995, there were 1,336 deaths to residents of the county. To get an annualized death rate for this five-year period, the estimated mid-year resident population is summed over the five years. For Hertford County, the sum of the population of those five years is 112,419. The crude death rate is 1,336 divided by 112,419 which equals .01188. This is the average annual proportion of residents who died during the period 1991–95 (slightly more than 1 percent). When multiplied by 1,000, which is sometimes used as a multiplier for a death rate for all causes of death, the rate is 11.9 deaths per 1,000 population per year (see last row of **Table 1**). For death rates for specific causes of death, a multiplier of

100,000 is often used so that the rate is not less than 1.0. For smaller geographic areas or when using cause-specific death rates, it is often desirable to calculate multi-year death rates to decrease random variation in the rates due to small numbers of deaths in a single year. These multi-year death rates are essentially average annual rates.

The crude death rate is a good measure of the overall magnitude of mortality in a population. If a population is old and has a high mortality rate as a result, then the crude rate is useful information for some purposes, such as planning for the delivery of health care services.

An age-specific death rate is simply a crude death rate for a specific age group. One can also calculate rates specific for race, gender, or other factors. Table 1 shows age-specific death rates for Hertford County residents for the period 1991–95, with 10 commonly used age groupings. Note that the death rate for ages 0–4 is substantially higher than the death rates for the other younger age groups (primarily due to a high death rate during infancy); only at ages 45–54 does the death rate exceed that for ages 0–4. It can be immediately seen that the death rates

Age Group	1 Number of Deaths (1991–95)	2 Total Population (1991–95)	3 Percent of Population in Each Age Group	4 Proportion Who Died	5 Age-Specific Death Rates per 1,000 Population
0–4	30	8,150	7.3	.00368	3.68
5–14	2	17,109	15.2	.00012	0.12
15–24	24	16,601	14.8	.00145	1.45
25–34	34	14,872	13.2	.00229	2.29
35–44	59	16,199	14.4	.00364	3.64
45–54	85	12,381	11.0	.00687	6.87
55–64	147	10,277	9.2	.01430	14.30
65–74	305	9,370	8.3	.03255	32.55
75–84	406	5,631	5.0	.07210	72.10
85+	244	1,829	1.6	.13341	133.41
Total	1,336	112,419	100.0	.01188	11.9

are many times higher in the oldest age groups. Therefore, a geographic area or demographic group with an older population will automatically have a higher overall death rate just because of the age distribution. **The main purpose of age-adjusting death rates is to control for differences in the age distribution of various populations before making mortality comparisons.**

For some causes of death, such as injuries (i.e., work-related or from automobile crashes) and AIDS, older persons do not have the highest death rates. But even in these cases it is important to standardize for age when comparing death rates across different populations, since some populations may have a higher proportion of persons in the age groups with the highest death rates.

Another *Statistical Primer* by the State Center for Health Statistics discusses the issue of random error in vital rates and presents formulas for quantifying this error and calculating confidence intervals around the measured rates (reference #1). Those formulas are applicable to the crude and age-specific rates presented here, and to any simple or unadjusted rate.

Note: Random error may be substantial when a rate or percentage has a small number of events in the numerator (e.g., less than 20).

Age-Adjusted Death Rates

Direct Method

The direct method of age adjustment is frequently used to compare the death rates of different populations, by controlling for differences in age distribution. The age-specific death rates of the population of interest (sometimes called the “study” population) are applied to the age distribution of a “standard” population in order to calculate “expected deaths.” The expected deaths are the deaths that would occur in the standard population IF it had the same death rates of the study population in each age group. These expected deaths for each age group are then summed and divided by the total standard population to arrive at the age-adjusted death rate. **Stated another way, this is the death rate that the study population would have IF it had the same age distribution as the standard population.**

Statistical Primer No. 13
N.C. Department of Health and Human Services

Formula:

$$\text{Age-adjusted death rate} = \frac{\text{total expected deaths}}{\text{standard population}} \times 1,000$$

Age-adjusted death rates for different geographic areas or population groups are comparable when they are adjusted to the same standard population. The 2000 U.S. population by age has been used as the standard population for all recent publications of the State Center for Health Statistics, following the practice of the National Center for Health Statistics (reference #2). Most often, a “standard million” is used for the standard population (population total is 1,000,000) rather than the actual 2000 population of the U.S. For the age-adjustment calculations, it is only important that the proportions by age for the year 2000 be maintained. A standard population is in effect just an arbitrary set of proportions by age, though it is the current convention to use the proportions from the 2000 U.S. population.

Table 2 provides an example. The age-specific death rates for all causes of death for Hertford County are applied to the 1980 North Carolina population by age, which is used as the standard population only for this illustration of the calculations. To generate the expected deaths in column 4, the rates shown in column 1 are converted to a proportion by moving the decimal point three places to the left and then multiplying by the standard population groups by age in column 2. The total expected deaths are then divided by the total standard population and the result multiplied by 1,000 to yield an age-adjusted death rate for Hertford County of 8.7. Usually it would not be necessary to show the age-specific death rates to two decimal places, but in this case the extra digits are needed to get a more accurate estimate of the number of expected deaths.

This age-adjusted death rate of 8.7 is considerably lower than the crude death rate of 11.9. This is mainly because the percentages in the age groups 65 and older are substantially lower in the 1980 North Carolina standard population (Table 2, column 3) than the same percentages in the 1991–95 Hertford County population (Table 1, column 3). When the Hertford County age-specific death rates are adjusted to a younger standard population, the overall adjusted rate is lower.

Division of Public Health
State Center for Health Statistics

Ten age groups are often used for age adjustment of death rates. This provides enough detail to capture differences in the age distributions of the populations that are being compared, but not so many age categories that the data are “spread too thin.”

An alternate way to compute the age-adjusted death rate by the direct method is simply to multiply the age-specific death rates by the corresponding proportion of the standard population in that age group and then sum these products across all 10 age groups. This weighted sum is represented by the following formula.

Formula:

$$\text{Directly age-adjusted death rate} = \sum_{i=1}^{10} (w_i p_i)$$

where p_i is the age-specific mortality rate for age group i and w_i (or the weight) is the proportion

of the standard population in age group i . (Tip: Move the decimal point of the percentages in column 3 of Table 2 two places to the left to get the proportion.) The crude death rate can also be expressed as a weighted sum of the age-specific death rates and the proportions of the population by age, but in this case the proportions are simply the proportions of the study population (instead of the standard population) in each age group. Try to reproduce the crude and age-adjusted death rates in Tables 1 and 2 using this weighted sum method! Any minor differences are due to rounding.

An age-adjusted death rate is a summary measure that condenses a lot of information into one figure. Where feasible, it is always desirable to inspect the age-specific death rates of the populations being compared. This extra attention to detail often provides further insights into the nature of the mortality differences between the populations.

Age Group	1 Age-Specific Death Rates per 1,000 Population	2 1980 N.C. Population (Standard)	3 Percentage of Standard Population by Age	4 Expected Deaths in Hertford County
0–4	3.68	404,560	6.9	1,489
5–14	0.12	927,836	15.7	111
15–24	1.45	1,144,204	19.4	1,659
25–34	2.29	968,215	16.4	2,217
35–44	3.64	689,838	11.7	2,511
45–54	6.87	601,866	10.2	4,135
55–64	14.30	552,494	9.4	7,901
65–74	32.55	389,244	6.6	12,670
75–84	72.10	172,408	2.9	12,431
85+	133.41	45,956	0.8	6,131
Total	11.9 (Crude death rate)	5,896,621	100.0	51,255

Age-Adjusted Death Rate = $(51,255 \div 5,896,621) \times 1,000 = 8.7$

Table 3. Age Adjustment of the All-Cause Death Rate Using the Indirect Method: Hertford County, North Carolina Residents (1991–95 Combined)

Age Group	1 Total Population (1991–95)	2 Age-Specific Death Rates in 1993 North Carolina Standard Population (per 1,000)	3 Expected Deaths in Hertford County
0–4	8,150	2.44	20
5–14	17,109	0.25	4
15–24	16,601	0.98	16
25–34	14,872	1.53	23
35–44	16,199	2.55	41
45–54	12,381	5.03	62
55–64	10,277	12.41	128
65–74	9,370	28.48	267
75–84	5,631	63.19	356
85+	1,829	147.85	270
Total	112,419	9.0	1,187

(Crude Rate in Standard)

Indirect Method

When to Use:

- When the numbers of deaths in each age group in the study population are too small to calculate stable age-specific rates.
- In developing countries or other areas where no information is available on age-specific deaths for the study population, only for a national or standard population.

The indirect method of age-adjustment applies the age-specific death rates of the standard population to the age distribution of the study population in order to generate expected deaths in the study population. **These are the deaths that would occur in the study population IF the age-specific death rates in the standard population were in operation.** The expected deaths are then summed across the age groups and compared to the actual or observed number of deaths for the study population. This ratio of observed/expected deaths is often referred to as the **standardized mortality ratio**, or SMR. A ratio greater than 1.0 indicates higher mortality in

the study population compared to the standard population (controlling for age distribution), while a ratio less than 1.0 indicates lower mortality in the study population. The SMR controls for age distribution since both the observed and expected deaths are based on the age distribution of the study population. Multiplying the SMR times the crude death rate in the standard population produces the **indirectly standardized death rate** for the study population.

Table 3 presents an example of indirectly standardized death rates. After moving the decimals three places to the left, age-specific death rates in the 1993 North Carolina standard population (column 2) are multiplied by the 1991–95 Hertford County population in column 1 to produce the expected deaths in column 3. These expected deaths by age group may be compared to the actual 1991–95 deaths by age group in Hertford County (Table 1, column 1). Dividing the 1,336 total deaths observed in Hertford County during 1991–95 by the 1,187

total expected deaths gives us an SMR of 1.13. This indicates that the overall 1991–95 death rate in Hertford County was higher than the rate in the 1993 North Carolina standard population, controlling for age. Multiplying the crude death rate in the standard population of 9.0 by 1.13 gives an indirectly standardized death rate for Hertford County of 10.2. To avoid differences between the observed and expected deaths due to changing (often declining) age-specific death rates over time, it is usually desirable to use a standard population that is close to the same year(s) as the data for the study population. Therefore, the 1993 (midpoint) North Carolina standard was used in this example.

✎ Formula:

$$\text{Standardized mortality ratio (SMR)} = \text{observed deaths} \div \text{expected deaths}$$

Ex: SMR for Hertford County using information above =

$$1,336 \div 1,187 = 1.13$$

✎ Formula:

$$\text{Indirectly standardized mortality rate} = \text{crude death rate} \times \text{SMR}$$

Ex: Indirectly standardized mortality rate for Hertford County =

$$9.0 \times 1.13 = 10.2$$

Issues in Using Different Standard Populations

An age-adjusted death rate is a hypothetical index, designed to facilitate comparisons among populations, rather than a true measure of risk. An age-adjusted death rate (by the direct method) answers the question: What would the death rate in a study population be IF that population had the same age distribution as the standard population? So in theory any population distribution can be used as the standard; it is only a set of weights applied to the age-specific death rates. The choice of the standard population will not usually have a great effect on the **relative** levels of the age-adjusted rates that are being compared. But it is important to remember that age-adjusted death rates can be compared to each other only if they are adjusted to the same standard.

For many years the National Center for Health Statistics used the 1940 United States population as the standard for age-adjusting death rates. Converted to a population of one million with the same proportions at each age as in the 1940 population, this standard was presented as a “standard million.” An advantage of consistently using this same standard population is that it promotes comparisons of age-adjusted death rates, especially in looking at trends over time from 1940 to later years. A disadvantage of using this standard is that the size of the adjusted rate is often much different from the size of the crude rate in the study population. This is

Comparison of the Direct and Indirect Methods of Adjustment	
Direct Method	Indirect Method
<ul style="list-style-type: none"> • Use when the number of deaths in the study population is large enough to produce stable age-specific death rates. • Assumes a constant age distribution across all study populations. • Rates from different study populations (e.g., counties in North Carolina) <i>can</i> all be directly compared to each other if adjusted using the same standard population. 	<ul style="list-style-type: none"> • Use when the number of deaths in the study population is too small to calculate stable age specific death rates. • Maintains differences in age distributions between study populations. • Rates from different study populations <i>cannot</i> be compared to each other since they are not based on a common age distribution. • Should compare the adjusted rate only with the rate of the standard population.

mainly because: a) the 1940 United States population was much younger than more recent North Carolina and U.S. populations, and b) death rates are much higher in the older age groups. Therefore, standardizing to a much younger population results in a much lower age-adjusted death rate. In recognition of this problem, the National Center for Health Statistics and the State Center for Health Statistics now use the year 2000 United States population as the standard population (reference #2). This means that the age-adjusted death rates are generally much more similar in size to contemporary crude death rates.

One should be especially careful when assessing trends over time using age-adjusted death rates. **It is essential that rates for different years be adjusted to the same standard population before making comparisons.** Also, if the standard population is very different from the populations of the years being compared (as is often the case when using the 1940 U.S. standard), changes in the adjusted rates over time may not be an accurate reflection of the actual changes in the risk of death. In an attempt to promote comparability of age-adjusted death rates over time, the State Center for Health Statistics recomputed age-adjusted death rates for the period 1979 through 1998 (years in which the 9th revision of the International Classification of Diseases was used for death coding) using the 2000 U.S. standard population. This time series of rates can be accessed at www.schs.state.nc.us/SCHS/deaths/lcd/1998. All adjusted death rates in State Center for Health Statistics publications for the years 1999 and forward use the 2000 U.S. standard population for age adjustment, though for some causes of death there are problems of comparability with previous years due to the use of the 10th revision of the International Classification of Diseases for death coding beginning in 1999.

Errors of Adjusted Rates

A detailed discussion of random errors in age-adjusted death rates is beyond the scope of this paper. The reader should refer to the *Statistical Primer* cited in reference #1 for information on the general concepts of random errors in rates, confidence intervals, and determining if the difference between two rates is statistically significant. Using the terminology in that paper, a 95% confidence interval around a proportion can be computed.

Formula:

95% confidence interval around a proportion =

$$P \pm 1.96 \sqrt{\frac{pq}{n}}$$

The $\sqrt{pq/n}$ is commonly known as the **standard error of the proportion**. In this case a death rate is treated as the proportion (p) of people who died during the time period of interest. If the proportion who died is small, then q (which is 1-p or the proportion who did not die) will be very close to 1.0 and the formula becomes $\sqrt{p/n}$, where n is the total population.

We saw from the discussion above that a directly age-adjusted death rate is a weighted sum of the age-specific death rates. To get the standard error of the age adjusted death rate, sum up all the products of the square of the weight (w) for each age group and the standard error (squared) of the age-specific death rate. Then take the square root of the sum.

Formula:

Standard error of the age-adjusted death rate =

$$\sqrt{\sum_{i=1}^{10} w_i (p_i/n_i)}$$

Remember that the weight is simply the proportion of the standard population in age group i. To get the 95% confidence interval around the age-adjusted death rate, multiply the standard error of the age-adjusted death rate by 1.96.

This is a very brief discussion of a lengthy topic. For questions or assistance, please contact the author.

Issues in Adjusting for Race and Gender

For many years, the death rates in the *Leading Causes of Death* publication of the State Center for Health Statistics were adjusted simultaneously for age, race, and gender. This was done for five-year death rates for specific causes of death, by county of residence. With 40 age-race-gender-specific rates being computed (10 age groups x 2 race groups: white/minority x 2 gender groups), the data were being spread too thin. A particular problem was in the western North Carolina counties, which generally have very small minority populations. There were also problems

in other counties with small populations overall. Since some causes of deaths are statistically rare, just one or two deaths in a small population group could result in a very high age-race-gender-specific rate, which would severely inflate the adjusted death rate. If this rate were applied to the appropriate age-race-gender group of the standard population, a very large number of expected deaths could result and the adjusted rate would be extremely high. On the other hand, zero deaths in several population groups may result in a very low age-race-gender-adjusted rate. Adjusting only for age reduces the bias due to small numbers.

Age generally has a much stronger impact on mortality than race or gender, and therefore is the most important factor to adjust for. Also, there are other questions about adjusting for race. Age differences in mortality are not easily modified. Racial differences in mortality, on the other hand, are often due to factors that can be changed through public health, medical care, or socioeconomic interventions. Adjusting for race may cover up the fact that certain geographic areas, for example, have higher mortality because they have a larger percentage of minority populations (who often have higher death rates). For example, minorities in Hertford County (primarily African Americans) are approximately 63 percent of the total population. In many cases we would want to target these areas for public health interventions and not produce statistics that adjust a higher level of mortality that is potentially modifiable to make it look lower.

Rather than adjusting for race, a better approach would be to examine racial differences in mortality by calculating race-specific death rates, perhaps adjusted for age. Minority populations often have a younger age distribution than whites. Adjusting for age usually results in relatively higher death rates for minorities, and larger differences between whites and minorities than when comparing crude death rates. In adjusting the death rates of different race (or race-gender) groups for age, it is important to use the same standard population (or set of age-specific weights) in all cases so that the adjusted rates will

be directly comparable. At the county level in North Carolina, small numbers of deaths generally preclude calculating statistically reliable death rates for minority populations other than African Americans. For this reason, we sometimes calculate death rates for two broad racial groups: white and all minorities combined. In North Carolina as a whole, African Americans comprise more than 85% of the minority population. (Hispanics are considered an ethnic rather than a racial group. Most Hispanics are counted within the white racial group for vital statistics.) Another problem with calculating death rates for specific minority subgroups is the lack of accurate population estimates to use in the denominators of the death rates.

Readers with questions or comments about this *Statistical Primer* may contact Paul Buescher at (919) 715-4478 or by e-mail at Paul.Buescher@ncmail.net.

Note: Paul Buescher retired in 2010. Contact Karen Knight at karen.knight@dhhs.nc.gov.

Further reading on the topic of adjusted rates may be found in references 2, 3, and 4.

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APPENDIX E



A Guide to Sampling for Community Health Assessments and Other Projects

Introduction

Healthy Carolinians defines a community health assessment as “a process by which community members gain an understanding of the health, concerns, and health care systems of the community by identifying, collecting, analyzing, and disseminating information on community assets, strengths, resources, and needs.”

This guide will provide you with a crash course in some of the basic ideas that underlie the sampling methods used in community health assessment. We will start with some of the essentials of sampling (simple random samples, cluster sampling, census geography, and

randomization), and then we’ll move into some issues more specific to community health assessment (sample size issues and oversampling). Finally, we’ll end with weighting, an important but often under-used statistical technique that might be helpful during your analysis.

What’s Inside:

Census Geography	2
Randomization	2
Simple Random Samples	3
Cluster Sampling	3
Simple Size Concerns	4
Oversampling	4
Weighting	5
Generalizability	5

For more information on conducting a community health assessment, refer to the *Community Assessment Guide Book* available at: <http://www.healthycarolinians.org/pdfs/02Guidebook.pdf>

Let’s Get Started...

Imagine you work in a county health department, and one morning your boss rushes into your office ranting about health insurance. He tells you to figure out how many adults in your county have health insurance. You know it would be impossible to ask every

adult in the county, and you need to find the best way to get a reliable estimate by talking to a smaller number of people. Then, your boss tells you that no money was budgeted for this project, so you have to conduct your investigation as cheaply as possible. And then he mumbles

something about using census data and goes off to a meeting, leaving you a bit overwhelmed.

While you have a difficult task ahead of you, it can certainly be done. But first, let’s review some basic concepts.

*From the
North Carolina Center for Public
Health Preparedness
in cooperation with
North Carolina Public Health
Regional Surveillance Team 5*

Census Geography

You might be wondering what exactly a census block is! Census geography is the way the U.S. Census Bureau divides the county. *Census blocks* are the smallest census unit and are formed by streets, roads, railroads, streams and other bodies of water, other visible physical and cultural features, and the legal boundaries shown on Census Bureau maps. Census blocks never cross county boundaries. Although most people intuitively think of census blocks as being rectangular or square, of about the same size, and occurring at regular intervals, in many areas of the United States, census block configurations actually are quite different. Patterns, sizes and shapes of census blocks vary within and between areas. Factors that

influence the overall configuration of census blocks include topography, the size and spacing of water features, the land survey system, and the extent, age, type and density of urban and rural development.

Block groups are clusters of census blocks. Block groups usually include between 200 and 600 housing units (between 600 and 3,000 people, with an ideal size of about 1,500 people.)

Census tracts are sets of contiguous census blocks and block groups; they are relatively permanently geographic entities within counties. Generally, census tracts have between 2,500 and 8,000 (the average is about 4,000) residents and boundaries that follow visible features. When first established,

census tracts are to be as uniform as possible with respect to population characteristics, economic status, and living conditions. In other words, people who live within a tract should be more similar to one another than to those who live in another census block.

We will now look at randomization, which is a crucial part of sampling.

Adapted from

<http://www.census.gov/geo/www/GARM/Ch11GARM.pdf> and http://www.census.gov/geo/www/cob/bg_metadata.html

Definition of Random:

Being or relating to a set or to an element of a set each of whose elements has equal probability of occurrence.

From the Merriam Webster Dictionary

Randomization

Why randomize?

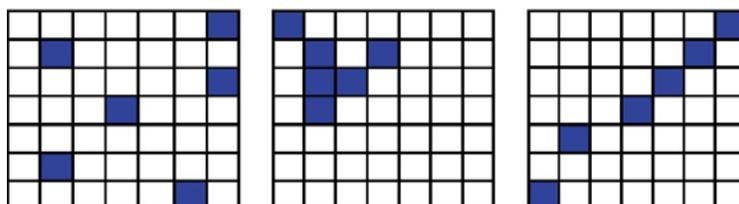
When carried out correctly, randomization helps to ensure that the *sample population* (the people interviewed) represents the *target population* (the community as a whole). Sample sizes that are large enough are important to allow the process of randomization to work (i.e. to generate a sample population that accurately represents the target population).

Which is the most random?

The grids to the right each contain six randomly selected squares, shown in blue. Even though the squares in the first box look more “random”, each square in each grid had the same probability of being selected, so each grid reflects a random pattern; it just so happened that the first grid ended up with the squares spread out and

that the second and third grids did not. Even though it may not look like it, these squares were all randomly selected; the first grid is not more random than the others!

Now that you understand the basics of census geography and randomization, you need to think about what type of sampling you are going to conduct.



Simple Random Samples

You may have heard the term, “simple random sample.” Like the name suggests, it is a relatively simple concept!

The first step in selecting a simple random sample is to list and then assign a number to each element (in the case of the health insurance sample, each adult in your county). The next step is to choose adults in a way that ensures

that each adult has exactly the same chance of being selected. Choosing adults could be done with a computer, a random number table, or certain types of calculators.

Simple random samples are not always feasible because they can be expensive and not terribly practical - you would need a list of every single adult in the whole county before you could even get started.

For this and a few other reasons, other study designs can be used, although these other study designs usually incorporate a random element—such as the way census blocks are selected or how households are selected within the census block.

Next let’s look carefully at another type of sampling: cluster sampling.

Cluster Sampling

Cluster sampling involves dividing the specific population into geographically distinct groups or clusters, such as neighborhoods or villages. Because the information is widely available, many people use census blocks for their clusters. A sample of clusters is then chosen, and everyone (or in the case of a two stage cluster sample, a selection of people within those clusters) is included in the survey.

A commonly used two-stage cluster sampling scheme, the “30 x 7” sample, was developed by the World Health Organization with the aim of calculating the prevalence of immunized children within +/- 10 percentage points. 30 x 7 means that you randomly select 30 census blocks from all of the census blocks in your county and then randomly select seven interview sites per block.

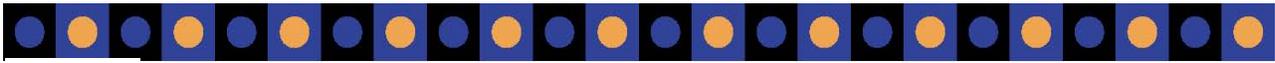
This design has been adopted for other purposes such as rapid needs assessment with no (or only slight) modification. This sampling scheme is thought to be sufficient for most sampling of community health factors.

The 30 x 7 method is an example of what is known as a *two-stage cluster sample*. At the first stage, census blocks are randomly selected, while at the second stage, interview locations are randomly selected within each census block. Census blocks in stage one may be selected through a method known as “probability proportionate to size,” which means that a census block with more households is more likely to be included than one with fewer households.

Two interview locations drawn randomly from within the same census block are likely to be more similar than two

location from different census blocks (remember, the goal of census areas is to be as uniform as possible with respect to population characteristics, economic status, and living conditions). So, two locations within the same census block do not each contribute completely independent information some of the information is redundant.

In statistical terms, this type of correlation always increases the variance of your estimate, which reduces the precision. As a result, it's always better to randomly select more clusters than to randomly select more points within any particular cluster. In other words: selecting an additional cluster provides more information than selecting additional points within a cluster.



Sample Size Concerns

One of the first questions you'll need to answer when performing a CHA is: *how many people do you need to include in your sample?*

Deciding how large a sample size you need boils down to two factors: reliability and cost. As a rule of thumb, a larger sample size will increase the reliability of your estimates. If you only ask two people how many vegetables they eat and they both say five servings a day, can you assume that everyone in your county eats five servings of vegetables a day?

Of course not! A sample size that small will not come up with reliable estimates. (Be sure not to confuse *reliable* with *valid*; everyone may not be honest about how many vegetables they eat, but that is a problem with the way in

which vegetable consumption is being measured, not the estimate's *reliability*.)

The prevalence of a characteristic in your population will affect reliability of your estimate. If only a small number of people in the population have the characteristic that you are interested in, you will have to interview more people to have reliable estimates.

For example, HIV prevalence will probably be low in your community. Therefore, a study of HIV will require more interviews to be reliable than a study of a more common characteristic. Prior knowledge of the prevalence of a characteristic can be a helpful tool when calculating how many people you need to interview

(sample size calculations are often done using computer software such as Epi Info.)

This is where it gets tricky! If you're collecting information on a lot of different characteristics (how many people are uninsured, how many people are worried about drunk driving, how many people know daycare is available, etc.), how can you tell how many people you need to interview?

One strategy is to select a few of the characteristics you are most interested in, calculate how many people you would need for each, and choose the largest number calculated. Unfortunately, as the sample size increases, so does the cost of conducting the study.

Oversampling

Oversampling is done to make sure you have enough information from a particular population subgroup to generate statistically reliable estimates of their characteristics.

Oversampling means that you interview more people from a particular subgroup than you normally would. Unlike with a simple random sample, certain groups are sampled with higher selection probabilities than others. The share of the oversampled group in the sample is greater than its share in the population from which it was drawn. Why? If you don't collect information from enough members of the group, you may not be able to generate reliable

estimates for that subpopulation

For example, say five percent of your county is Latino and you also want to be able to analyze the Latino population independently. So instead of a sample that is five percent Latino, you might need one that is 15% Latino.

When analyzing data for the entire county, the unequal selection probabilities will require using weights to remedy the imbalance, which we'll discuss on the next page.

For example, the Census Bureau oversampled low-income households in 1996 by determining which households were likely to be

low-income, then sampling these low-income households at 1.66 times the rate of high-income households.

This oversampling produced an 18 percent increase in the number of households in and near poverty, with increases up to 24 percent in some subgroups, such as Black and Hispanic households in poverty. These increases strengthened the ability of the analysis to detect important factors in these subgroups. However, sample sizes for higher income and age groups were reduced.

Adapted from
<http://www.sipp.census.gov/sipp/oversample.html>

Weighting

Weighting addresses the different probabilities that certain households are selected as part of the sample. So why would there be any difference in the chance a household has of being selected?

One reason was mentioned above: deliberate oversampling. In the example from the Census Bureau, there is a greater proportion of low-income households in the sample than in the population. You must weight the sample to correct the proportions before doing any population-level calculations.

Another reason for different selection probabilities is the cluster sampling scheme often used. If you choose 10 households from each census block selected, but Block1 has 3,000 households and Block2 has 7,000 households, a household in Block 1 has a higher probability of being selected than Block 2.

Let’s look at the math:

10 households from Block 1:
 $10/3000$; chance of being selected = 1 out of 300

10 households from Block 2:
 $10/7000$; chance of being selected = 1 out of 700

When households are selected with non-equal selection probabilities, the data need to be weighted during the analysis.

How? Weights are calculated in ratio to the inverse of the probability of selection. If household X has half the chance of selection of household Y has, then household X will be given a weight twice as large as that of Y. We’ll look at an example using the census blocks in Table 1 below.

The three census blocks cover about 14,500 households, but only 30 will be selected for the survey. To be representative of the 14,500, the 30 households must be weighted using the numbers in the far right column.

To calculate the mean income of your county, you multiply the mean income for each tract by its weight, then divide by the weight for the total population:

$$[(T1 \text{ mean income} \times T1 \text{ weight}) + (T2 \text{ mean income} \times T2 \text{ weight}) + (T3 \text{ mean income} \times T3 \text{ weight})] / \text{Total weight} =$$

$$[(43,193 \times 300) + (41,616 \times 700) + (40,252 \times 450)] / 1450 = 41,519$$

Table 1. Calculation of Mean Income with Selection Probability Weights

Tract #	Mean income	Households per tract	# Households selected	Selection probability	Weight
T1	43,193	3,000	10	$10/3,000 = 0.0033$	300
T2	41,616	7,000	10	$10/7,000 = 0.0014$	700
T3	40,252	4,500	10	$10/4,500 = 0.0022$	450
TOTAL		14,500	30		1450

Adapted from <http://www.napier.ac.uk/depts/fhls/peas/theoryweighting.asp>

Generalizability

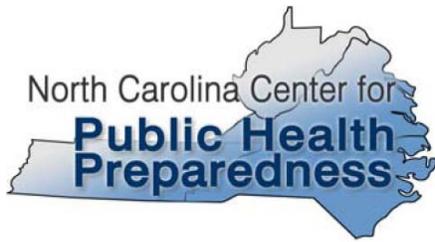
When sampling is carried out correctly, the information collected from the sample population can be generalized to the target population, meaning what is true for the people you interviewed is also (roughly) true for the rest of the population you are studying.

There is, however, an important limitation to generalization – you can’t generalize your findings to units other than those from which you sampled.

When a sample has been properly drawn from the county, you can draw conclusions such as, “Approximately

30% of the people in our county do not have health insurance.”

However, you cannot use this data to claim that 30% of the people in a certain neighborhood or in the entire state don’t have health insurance.



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Conclusion

Now that you've reviewed these concepts, you should be well on your way to assessing the health insurance situation in your county.

Sampling is difficult work, but if done correctly, it can give you very valuable information about your population of interest.

For more information on two-stage sampling, view "Two-Stage Cluster Sampling: General Guidance for Use in Public Health Assessments" available at <http://nccphp.sph.unc.edu/PHRST5>

APPENDIX F

Two-Stage Cluster Sampling: General Guidance for Use in Public Health Assessments

Introduction to Cluster Sampling

Cluster sampling involves dividing the specific population of interest into geographically distinct groups or clusters, such as neighborhoods or families. Because the information is readily available, many people use census blocks or block groups for their clusters.

A random sample of clusters is obtained, and then members of the selected clusters are then surveyed (either randomly or as a census). Contrast this with stratified sampling, in which the population is divided into distinct groups (e.g., states or ethnicities) and then random samples are obtained from each group.

A commonly used two-stage cluster sampling scheme,

the “30 x 7” sample was developed by the World Health Organization with the aim of calculating the prevalence of immunized children within +/- 10 percentage points. That is, if the true prevalence was 40%, one would expect an estimate between 30% and 50% when using the 30x7 method.

This design has been adopted for other purposes such as rapid needs assessments with no (or only slight) modification. This sampling scheme is thought to be sufficient for most sampling of community health factors.

30 x 7 means that you randomly select 30 census blocks from a list from all the census blocks in your county and then randomly

select seven interview sites per block. The 30x7 method is an example of what is known as a *two-stage cluster sample*. In the first stage, census blocks are randomly selected, while in the second stage, interview locations are randomly selected within each census block. Census blocks are the primary sampling units, while the random interview locations are your secondary sampling units

Census blocks may be selected in stage one through a method known as "probability proportionate to population size," which means that a census block with more households is more likely to be included than one with fewer households.

What's Inside:

How the Numbers of Clusters and Interviews Affect the Data	2
Choosing the Right Number of Clusters and Interviews	2
Stratification and Subgroups	3

Want a basic introduction to sampling?
See “A Guide to Sampling for Community Health Assessments and Other Projects” available at:
<http://nccphp.sph.unc.edu/PHRST5>

From the
North Carolina Center for
Public Health Preparedness in
cooperation with
North Carolina Public Health
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How the Numbers of Clusters and Interviews Affect the Data

Two locations drawn randomly from within the same census block are likely to be more similar than two locations from different census blocks (remember, the goal of census blocks is to be as uniform as possible with respect to population characteristics, economic status, and living conditions). So, two locations within the same census block do not each contribute completely independent information; this is known as the “intra-cluster correlation” or ICC.

In statistical terms, this correlation always increases the variance of your estimate, which reduces the precision. As a result, it's always

better to randomly select more clusters than to randomly select more points within any particular cluster. In other words: selecting an additional cluster provides more information than selecting additional points within a cluster.

The variance of an estimate is a measure of its dispersion over all possible samples. For any sampling situation, there are an extremely large number of possible samples, each one of which would produce an estimate of the value of interest. The variance gives an indication of the likely “spread” of the estimates, or the range that values that might result from all these different estimates. A lower

variance or larger sample size results in greater precision.

Precision also gives you an idea of the width of the confidence interval around the estimated prevalence. With an estimated prevalence of 35% and a 95% confidence interval of 25% to 45%, a correct interpretation would be that you are 95% confident that the true (unknown) prevalence lies somewhere between 25% and 45%, but it's just as likely to be near 25% or 45% as to be near 35%. Of course, you never know the true prevalence; otherwise, there would be no reason to do the study!

Choosing the Right Number of Clusters and Interviews

Since selecting more clusters rather than more points within any cluster improves precision, using a “40 x 5” method likely yield estimates with more precision than the 30 x 7 method, even though it involves fewer total interviews (200 compared to 210). So shouldn't you always choose more clusters and fewer interviews?

If survey costs or time are important, such as during a rapid needs assessment, additional clusters may be more costly or time-consuming than additional locations within a cluster, so the reduction in sample size from 210 to 200 might not necessarily lead to improved efficiency or timeliness. For example, interviewer travel time to 40 census blocks may be much greater than travel time to 30

census blocks, which may cost more and delay reporting important results to authorities. Additionally, you may not have more than 30 census blocks in a county or an area affected by a natural disaster or an outbreak.

On the other hand, a 20 x 10 or 15 x 14 method may save time or money, but would result in a substantially less precise estimate. If it's not possible to include more than 15 or 20 census blocks in the first stage of your sample, you may need to increase the number of interview locations in the second stage to as many as 18 or more in order to achieve the same statistical precision as with a 30 x 7 design. The actual number of interview locations depends on the ICC. The higher this correlation, the larger total sample size you need. In fact,

if the ICC is too high, it's not always possible to achieve the same level of precision by sampling 15 or 20 blocks as compared to 30 blocks, no matter how many locations are sampled within each block. If the ICC were as high as 0.20, you would need to sample 96 locations in 20 blocks (for a sample size of 1,920) to achieve the same precision as a 30 x 7 design!

So consider the balance of timeliness and precision in choosing your study design. If you have the time and money, choosing a two-stage cluster sampling design with more census blocks and fewer interviews per block will give you the most precise estimates of the variables you are trying to measure in your community.

Stratification and Subgroups

Stratification is the process of sorting individuals into homogeneous groups prior to sampling. Groups, or strata, should be mutually exclusive (*no member should belong to more than one group*) and exhaustive (*all members should belong to some group*). After individuals are divided into groups, sampling can be done within each group. An example of mutually exclusive and exhaustive groups would be males and females.

Typically, proportionate allocation should be used when conducting stratified sampling. If 60% of your community members are female and 40% are male, then your sample should be 60% female and 40% male. In this way, stratification ensures that all groups are sufficiently represented.

Since stratification almost always increases the precision of your estimates and narrows the confidence intervals around your estimates, it may be desirable to stratify.

This is particularly true if the stratification factor is at least moderately related to your **outcome** variable. An example might be the stratification of properties by designated flood zone in a rapid needs assessment following a hurricane. The statistical precision gained from stratification such as this may result in needing fewer census block clusters in your study than you would with an unstratified design

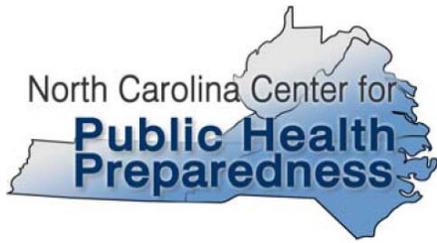
While it is statistically valid and maybe even statistically desirable to stratify, analysis of stratified data collected using a two-stage cluster sampling method can be complex. Your analysis must account for both stratification and clustering when computing your estimates and standard errors. While this is not too difficult to do in sophisticated statistical computing software (usually SAS or SUDAAN), it would require someone with special expertise in this subject area and the software.

The 30 x 7 cluster sampling method was not designed to collect stratified data, but rather to provide overall estimates for a designated assessment area. If a stratified design is used, it is always possible to obtain estimates for each individual stratum (e.g., if the design were stratified by flood plain, you would obtain an overall estimate, but could also obtain estimates within each flood plain). Of course, these stratum-specific estimates will always be less precise than the overall estimate.

If you wish to calculate separate estimates of equal precisions for specific population subgroups using the 30 x 7 or a similar two-stage cluster design, you must obtain sufficient samples from each subgroup to achieve that level of precision; taking separate 30 x 7 samples from each subgroup may even be necessary

Of course, it is always possible to obtain estimates within specific subgroups of your population (as long as members of that subgroup were actually sampled), even if the original sample design was not stratified according to these subgroups. For example, it will be possible to estimate the **outcome** proportion within census blocks that are predominantly Hispanic even if the design was not stratified by ethnicity, as long as some of the census blocks sampled are predominantly Hispanic. Once again, the estimates within any subgroup will be less precise than the overall estimate.

It is also possible to increase the precision of your overall estimate using “post-stratification” in which a stratified analysis is conducted even though the sampling design used to obtain the data was not necessarily stratified. As with stratified sampling, post-stratification will be especially useful if the stratification factor is at least moderately associated with the **outcome** of interest. Post-stratification can be easily accomplished by including the stratification factor as a covariate in a regression model using a statistical software package such as SAS.



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1. Henderson RH and Sundaresan T. Cluster sampling to assess immunization coverage: a review of experience with a simplified sampling method. *Bulletin of the World Health Organization*, 60(2):253-260. Available at: [http://whqlibdoc.who.int/bulletin/1982/Vol60-No2/bulletin_1982_60\(2\)_253-260.pdf](http://whqlibdoc.who.int/bulletin/1982/Vol60-No2/bulletin_1982_60(2)_253-260.pdf)

APPENDIX G

Small-Group Discussion Tool Kit

Small-group discussions require a lot of preparatory work. Listening sessions and focus groups can both be used to reach at least 10 different groups. Each session will need to be at least one hour long and the **same seven to 10 questions** must be used with each group whether it is a listening session or focus group. The questions asked during the discussions will depend on the data needs and goals of the survey. See chart below for a comparison of listening sessions and focus groups.

	Listening Sessions	Focus Groups
Participants	<ul style="list-style-type: none"> • Participants know each other 	<ul style="list-style-type: none"> • Participants do not know each other.
Number of participants	<ul style="list-style-type: none"> • Generally larger number of participants than focus groups • No maximum • 10 different groups minimum 	<ul style="list-style-type: none"> • Small group 6-12 (8-10 ideal) • Minimum of 6 people (smaller group is a conversation) • 10 different groups minimum
Recruitment of Participants	<ul style="list-style-type: none"> • Pre-existing group e.g., volunteer fire men, social clubs, church choirs 	<ul style="list-style-type: none"> • Carefully recruited groups of people who have something in common and are brought together for the purpose of the focus group. e.g., single moms, senior citizens
Questions	<ul style="list-style-type: none"> • 7 to 10 with the same ones repeated at each session 	<ul style="list-style-type: none"> • 7 to 10 with the same ones repeated at each session
Advantages	Since participants know each other: <ul style="list-style-type: none"> • Good participation and attendance • Easier recruitment • Easy scheduling • High trust level among participants increases participation 	<ul style="list-style-type: none"> • Can recruit subjects based on their demographics • Can bring participants together based on their interest in talking about a health topic
Disadvantages	<ul style="list-style-type: none"> • Participants may not feel comfortable talking about sensitive health issues among people they will see again. • Pre-existing group dynamics may influence the discussion 	<ul style="list-style-type: none"> • Hard to get good participation • Tough to schedule • Low level of trust may hamper participation

Advantages

- Offers an opportunity to get opinions and detailed information that cannot be collected in closed-ended questions.
- Participants will tell what is important to them and how they feel about a topic rather than simply responding to predetermined categories of responses.
- Small group discussions also offer the opportunity to get opinions from diverse groups.
- Moderator has the opportunity to observe interaction and discussion on a topic. Nonverbal reactions can often tell observers much about participants' opinions on a topic.

Disadvantages

- Analyzing the results requires time to transcribe the recordings or notes and give thought to the discussion. The responses to questions are often long and complex; translating this information into useful data is not easy.
- Difficult to explore multitude of topics addressed during limited time.
- Participants may feel intimidated as some individuals may be less responsive to discussing certain topics among a group of people than in a one-on-one interview.
- Multiple groups using the same seven to 10 questions must be conducted and analyzed.

Setting Up a Small-group Discussion

Publicity and site selection are important considerations to setting up a discussion. The location or site of the meeting should be:

- Familiar and accessible to community people in that community
- Comfortable with adequate heating, ventilation, lighting
- Neutral location that is a non-threatening location for that community
- Adequate, well lighted parking

The first impression of the meeting room sets the atmosphere for the discussion. It is important that the room be:

- Comfortable with enough seating for number of participants expected
- Quiet or the ability to close door to room if other activities going on
- Space for child care, if needed
- Good lighting

Ideal the chairs should be in a circle or in a circle around a table so that all of the participants can see the moderator and vice-versa. The Moderator should be seated in the circle with the Assistant moderator seated directly opposite so that he or she can hear all participants clearly. Avoid unequal seating arrangements as much as possible (i.e., where some participants are quite close to moderator and some far away from moderator)

Equipment and Supplies

- Tape recorder or other recording device
- 2 cassette tapes if using a tape recorder
- Extension cord
- Name tags or tent cards (optional)
- Legal pad and 4–5 pens or pencils for note taking
- Sign in sheet for participants (optional)
- Manila envelope for anonymous questionnaires (if applicable)
- Copies of questionnaires
- 1 Flip chart sheet with ground rules printed on it and masking tape for posting (optional)
- Handouts/information provided

Moderator Do's and Don'ts

The Moderator sits in the circle, provides introduction and facilitates discussion of each question. The moderator is key to the success of the discussion. This section will outline the expectations of moderators along with some do and don'ts.

Expectations of Moderators

Before the Listening Session

- Confirm date, place, time, and number of participants with contact for host group
- Coordinate logistics with assistant moderator (location, arrival time, supplies)
- Practice your introduction
- Be comfortable with the questions
- Arrive early
- Be well rested
- Set up space: arrange chairs, make sure area is as quiet as possible
- Help host set up any refreshments
- Have materials for note taking

During the Listening Session

- Welcome people
- Begin the group close to the designated time and conclude by the ending time. Monitor your time to be sure all questions are discussed
- Introduce yourself and the project (remind people why they are there)
- Explain use of recording device and ask the group's permission to record the session
- Explain ground rules for discussion
- Explain confidentiality
- Group introductions—it is good to ask a question that you “go around” and have everyone answer. It is easier for people to talk later if they have already said something to the group
- Take some basic notes as you ask questions to help in summarizing issues raised or in probing for specifics
- Don't offer your opinions
- Do not answer questions regarding your views or opinions
- Use pauses and probes to obtain information
- Control your verbal and nonverbal reactions to participants (e.g., “great,” or head nodding)
- Use key facilitation behaviors (see Guidelines)
- Remember to remain neutral, and elicit participation from everyone
- Ask ending question “Have we missed anything?”
- At the end of the session, thank everyone

After the Listening Session

- Conduct debriefing with Assistant Moderator: Fill any gaps in the notes. Refer to the recorded information as needed to fill in gaps
- Decide who will type the written summary from the notes
- Review typed summary for accuracy and completeness with Assistant Moderator and amend as needed. (Refer to the recorded information as needed to insure accuracy of key points and/or quotes)
- Send summary to _____ by _____
- Attend (your organization) reporting session when scheduled to:
 - Share your summary report
 - Listen to reports of other moderators
 - Interpret results and develop recommendations

Effective moderators:

- Have a good memory
- Communicate clearly in speech and in writing
- Demonstrate respect for participants
- Make participants feel comfortable and supported
- Clearly explain the purpose of the discussion
- Demonstrate enthusiasm about the project
- Can clearly explain how the data will be used and who will have access to it
- Clarify each question for participants
- Facilitate and guide discussion by being able to:
 - Prevent the domination of discussion by an individual or subset of the group
 - Model good listening
 - Maintain a neutral, impartial role
 - Avoid answering or addressing issues raised
 - Provide positive reinforcement for participant input
- Keep the discussion focused without dominating it
- Dress and behave appropriately for the group
- Introduce themselves in ways that define common ground with those being interviewed

Moderators need to avoid:

- Talking too much
- Not allowing silence to work
- Leading participants
- Advocating a particular position or solution
- Appearing judgmental or appearing to approve or support one position (e.g., head nodding)

Moderator Introduction Suggestion

Welcome Participants. “Good evening, and welcome to our discussion. We appreciate your willingness to take the time to join this discussion. I’m _____ and I will be your moderator. Assisting me is _____ who will take notes during the session. We are volunteers representing the (name of your group). We thank the (host person and host organization) for allowing us to hold this discussion here today.”

(Also provide any needed information; i.e., where bathrooms are located, participants can get up and move about when necessary, food available.)

Provide Overview. “The (name of your group) is a group of individuals and organizations that has come together to see what might be done locally to improve health and health care access in (your) County. In order to do this, we need to better understand community members’ views about health and health care. We are interested in your views of all aspects of health including physical health, mental health, and other aspects you feel are important. Our purpose is to gain information from community members throughout (your) County, and to use that information to address the most important concerns.

“You have been asked to participate because we think you can tell us what you and others in the (local community name) community are experiencing related to health and health care. This will be the focus of our discussion today.”

Review Ground Rules

“We will meet for about 1-1½ hours during which time we will ask you several questions.

“Everything that is said here is confidential and neither you nor we should repeat any personal information when outside of this room. We would like to, with your permission, record the session so when summarizing the interview we can be sure we have your statements recorded as accurately as possible. No one will hear the recorded information but the assistant moderator and myself. We will erase the information as soon as we’ve completed a written summary of the interview. If everyone is comfortable with our using a recorder, we’ll turn it on when we start asking questions.” (Watch for group agreement)

“There are no right or wrong answers to the questions, only opinions. We encourage you to offer those opinions even if they differ from what someone else has said.

“As moderator and assistant moderator, our role is to listen to your views and ideas and record them as accurately as possible. Sometimes we will ask you follow-up questions so we can make sure that we understand what you have said, or we may ask that you give us a specific example.

“We encourage *everyone* to participate. We realize that some people like to talk in groups and some people are less comfortable. We want you all to feel comfortable sharing your views.

“We ask that you speak one at a time, again so that we can be sure that your views are heard.”

Confidentiality

“As I said, you may be assured of complete confidentiality. Everything that we say is confidential and no one’s name will be listed with any written summaries of the discussion. We will only report on the issues cited for this group as a whole. We also need your agreement not to discuss any information shared by individuals in the group with anyone outside of the group. Will everyone indicate their agreement by nodding their head?”

“We’ve also given you a copy of the questions that we will be asking so that you can follow along during the session and for keeping your own notes, if you like. If you have any responses that you do not feel comfortable sharing in the group, write them on this questionnaire and place it in this manila envelope at the end of the interview. The questionnaire is anonymous. You do not need to write your name on it.

“*Does anyone have any questions?* If you want to know more about the listening sessions or the final results, you can call (give name and phone number).”

Some more specifics about our discussion, to help in answering questions.

“Information gathered will help the (name of your group) determine:

- Current community practices for maintaining health,
- Kinds of health problems that you think occur most often in your community,
- Barriers people have to good health,
- Community ideas for solutions to health problems,
- Identification of groups of people underserved for health needs.”

Moderator Guide to the Questions

The following section lists the questions, some possible prompts to use with them and the rationale behind each question. First, a word about probes and prompts.

Probes and prompts are questions you may want to use to elicit additional information beyond that given in response to the initial question. They do not have to be used if participants are openly and completely answering the major questions. It is important that probes and prompts be worded in such a way that is not leading the respondent. It helps to stick to open-ended prompts, like “What about transportation,” “What about costs of medicines?”

Some possible prompts are included in this *Moderator Guide to the Questions*. Only use them if participants seem stuck or do not address these issues themselves. You may want to use other prompts based on issues raised in previous questions. You can also use prompts to elicit more specific information, for example, “Why do you think that happened?” or “Tell me more about that,” or “Can you give me an example?” Prompts help you explore consensus as well: After one participant offers a response, you can say, “How do the rest of you feel?”

Opening Question

1. *“Let’s go around the room and have each one of you introduce yourself and tell us what you think is the best thing about living in this community.”*

The opening question is designed more to establish the participation of everyone rather than to get “hard” information. It is designed to involve each participant one at a time in the group discussion. It breaks the ice and gets each participant talking. Once a participant has said something, it becomes easier to speak again. This question will also help identify perceived assets in the various communities.

Introductory Question

2. *“What do people in this community do to stay healthy?”*
“How do people get information about health?”

Possible Prompts: *“What about personal healthy behaviors?”*

“What about getting check-ups or health screenings?”

“What about physicians?”

“What about other providers?”

“What about pharmacists?”

“What about neighbors?”

“What about family?”

“What about health food stores?”

The open-ended introductory question begins to focus on the topic. It can also give the moderator clues about where the participants are coming from and may be useful for suggesting future prompts. Occasionally, the participants will offer answers to introductory questions that are completely unanticipated and may lead to additional probes or follow-up questions. The probe allows the Moderator to explore how people get information that helps them stay healthy.

Key Questions

These are the questions that drive the study. The report on the listening sessions will focus primarily on the responses to these questions. The moderator will need to spend the most time on these questions and probe for specificity in participants’ responses.

3. *“In this group’s opinion, what are the serious health problems in your community?”*
“What are some causes of these problems?”

Possible Prompts: *“What about physical health problems?”*

“What about social problems that affect health (e.g., violence, substance abuse)?”

“What about mental health problems?”

The open-ended question helps to focus discussion on what problems are of most concern in this community. The follow up question probes for participants’ perceptions and insights about what might be causes for the problems that they have identified in the first question. It will help to probe for causes for each health problem identified right after it is mentioned.

4. *“What keeps people in your community from being healthy?”*
Possible Prompts: *“What about costs of medical office visits?”*
“What about costs of medicines?”
“What about health insurance?”
“What about costs of other types of health services?”
“What about availability of information on health and health services?”
“What about challenges of having healthy habits?”

The open-ended questions help to elicit participants’ views of barriers and challenges that prevent people in their community from maintaining good health and accessing health care services.

Summarize: Before question 5, the moderator should succinctly summarize the health problems, barriers and challenges heard in questions 3 and 4, to help the group focus their discussion of solutions in the next question.

5. *“What could be done to solve these problems?”*

The open-ended question allows participants to share their views of possible solutions to the health problems, their causes and barriers that they have discussed in the previous questions.

6. *“Is there any group not receiving enough health care? If so, why?”*

This question helps the participants to consider and identify specific groups in their community or the county that are particularly underutilizing, or underserved by, local health care resources.

Ending Question

This final question allows participants to bring up any issues missed in prior questions and wraps up the interview.

7. *“Is there anything else you would like to add, or you think would be helpful for us to know?”*

During the Listening Session, Use These Key Facilitative Behaviors

1. Prompt for specifics and details
2. Keep everyone participating
3. Respect and use periods of silence
4. Remain neutral at all times
5. Relax and have fun

After the Listening Session

“Thank you for participating in our discussion today. Your responses will be summarized along with those of other community groups in our county that are hosting these sessions. The results will be shared with the members of the (name of group) in (date) to help them in determining the most important health issues in our County.”

“Thanks again to (host person and host group) hosting this session.”

Assistant Moderator Do's and Don'ts

Expectations of Assistant Moderators

The Assistant Moderator or Recorder sits opposite from the Moderator and takes detailed notes. He or she can introduce probes as necessary. If session is recorded, he or she will need proximity to outlet and the ability to position the recorder to best record all participants.

Before the Discussion

- Pack Supplies - a legal pad and two pens for note-taking and copies of the questions for participants.
- Arrange Room - Rearrange chairs and table (if any) so everyone can see each other.
- Set Up and Test Recorder - Place recorder as central to where participants will be seated as possible. Bring an extension cord to help in reaching outlets. Test recorder to be sure it is working properly. Record the date, time, and place of the session prior to starting the session so the recorded information can be easily identified.
- Post flip chart sheet showing ground rules (optional)

During the Listening Session

- Welcome participants as they arrive. Make small talk and introduce participants to each other.
- Sit in designated location - Assistant moderator should sit opposite the moderator, and close to the door. If someone arrives after the session begins, meet the person at the door, take them outside of the room and give them a short briefing as to what has happened and the current topic of discussion. Then bring the late participant into the room and show him or her where to sit.
- Take detailed notes throughout the discussion - Record the key issues raised in participants' answers. Try to record important quotes that best illustrate participants' views.
- Keep track of whether or not the recorder is working properly - Deal with any problems that may occur.
- Observe the discussion and introduce probes as needed - Monitor non-verbal reactions and comfort level of group participants. Introduce probes as needed to help the moderator draw out comments from all participants. Control your non-verbal actions no matter how strongly you feel about an issue.
- Ask questions when invited - At the end of the discussion the moderator may invite you to ask questions of amplification or clarification.

After the Listening Session

- Mail a thank you note to the host group
- Conduct debriefing with Moderator. Fill any gaps in the notes. Refer to the recorded information as needed for items missed or needing clarification in the notes
- Decide who will type the written summary from the notes (Moderator or Assistant Moderator)
- Review typed summary with Moderator and amend as needed. Refer to the recorded information as needed to insure accuracy of key points and/or quotes

- Send summary to _____ by _____
- Attend (your organization) reporting session when scheduled to:
 - Share your summary report
 - Listen to reports of other moderators
 - Interpret results
 - Develop recommendations

Note Taking Tips for Assistant Moderators

Note taking is a primary responsibility of the assistant moderator. (The moderator is not expected to take detailed written notes during the discussion in order to maintain maximum eye contact with participants during the session.) Note taking is important even if the session is also being recorded in order to highlight strong quotes and themes, record observed non-verbal activity, or any discussion missed in the event of the recording device fails. Here are some tips:

- Have plenty of paper available for note taking and 2 pens (or well-sharpened pencils) in case one runs out of ink.
- To help keep track of participants' names and who is saying what, make a sketch in your note pad of the seating arrangement with initials or first name of each seated participant. Alternatively, you can just assign each participant a number. *While participants' names will not appear in the final written summary of the listening session, it is helpful to indicate participants' initials or assigned number by their specific comments in your handwritten notes. You can then follow up with a participant for clarification of their comment if necessary or if you need to refer back to that comment later in the session.*
- When capturing notable quotes, listen for well-said quotes. Capture word for word as much of the statement as possible. Listen for sentences or phrases that are particularly enlightening or eloquently express a particular point of view. Place name or initial of speaker after the quotations. Usually, it is impossible to capture the entire quote. Capture as much as you can with attention to the key phrases. Use three periods ... to indicate that part of the quote was missing.
- In your notes, write phrases or key words that best capture or express the key ideas. (This will help in identifying key themes later as you write the summary.)
- Note the non-verbal activity. Watch for the obvious, such as head nods, physical excitement, eye contact between certain participants, or other clues that would indicate level of agreement, support or interest.
- Indicate areas of strong consensus in your notes. Place an asterisk by key points or ideas where there was agreement by several people. You can also record in brackets other observed signs of consensus (for example, "lots of yes's here" or "lots of head-nodding here").
- If a question occurs to you that you would like to ask at the end of the discussion, write it down in a circle or box so it will be remembered.

The materials in this toolkit are adapted from information on Listening Sessions from the Mountain Area Health Education Center's Community Health Resources Services (CHRS). For more information, consult the Office of Healthy Carolinians and Health Education at www.healthycarolinians.org and from Krueger, R. (1994) Listening to MES Customers: A Plan for the Minnesota Extension Service to listen to its customers and employees. Minnesota Extension Service.

APPENDIX H

A Resource Guide for Community Health Assessment in North Carolina

Updated December 2011

Purpose

Each local health department is assigned to a specific 4-year cycle to conduct a community health assessment (CHA). The process involves community members analyzing and interpreting available data to determine their priority health problems. A report is created to highlight the results of this assessment. The CHA report can then be used to write action plans, inform funding requests and areas for legislative action, and plan programs and interventions.

In recent years, the CHA process has expanded beyond the activities of local public health departments to encompass hospitals, voluntary health agencies, and many other community organizations. A major impetus behind this expanded assessment has been the development and activities of **Healthy Carolinians partnerships** across the state. In addition, North Carolina has received funding through August 2012 from the Centers for Disease Control (CDC) for the North Carolina Community Health Assessment Initiative. A major goal of this Initiative has been to strengthen and build on this collaborative approach to community health assessment.

The purpose of this document is to provide data sources that traditionally have not been included in State Center for Health Statistics publications. Listed sources include data on housing, economic status, the environment, education, crime, mental health, child abuse, and social services. Factors such as these are often important determinants of physical health and set the context for public health problems and interventions. A broad approach to community health is also consistent with the spirit of the NC Department of Health and Human Services, which was established to integrate the provision of health and human services programs in North Carolina. Following are sources of local and state-wide data about communities in North Carolina.

General Data (Demographics, Vital Statistics, and Health Indicators)

County/Sub-county

- **North Carolina Association of Local Health Directors:** www.ncalhd.org/county.htm
Most North Carolina county/district health departments now have web sites with links to county data and past community health assessments. A list of health departments, as well as their contact information and web site addresses are available at this website.
- **The State Center for Health Statistics (SCHS):** www.schs.state.nc.us/SCHS/
Describes the programs and services of the State Center and offers a plethora of county-level data that can assist communities in performing their assessment. Some of the resources available are:
 - **NC Behavioral Risk Factor Surveillance System (NC BRFSS):**
www.schs.state.nc.us/SCHS/brfss/index.html
Data collected annually in a routine, standardized manner on a variety of health behaviors and preventive health practices related to the leading causes of death and disability.
 - **County Health Data Book:** www.schs.state.nc.us/SCHS/data/databook/
Annual publication which features data searchable by county and archived for over a decade.

- **Trends in Key Health Indicators:** www.schs.state.nc.us/SCHS/data/trends/pdf/
A report which presents graphs depicting county and statewide trends for select health measures such as morbidity, mortality, births, provider to population ratios, and childhood obesity.
- **NC Health Data Query System:** www.schs.state.nc.us/SCHS/data/query.html
A system for searching statewide vital statistics databases and creating a user-defined spreadsheet of statistics.
- **Other county-level information:** www.schs.state.nc.us/SCHS/data/county.cfm Other county data such as the Life Expectancy estimates can be viewed at the above link.

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➤ **Office of State Budget and Management:**

North Carolina State Data Center maintains the OSBM web site which offers great deal of data available by county, including LINC below. www.osbm.state.nc.us/ncosbm/facts_and_figures/index.shtm

- **Log Into North Carolina (LINC):** <http://linc.state.nc.us/>
LINC provides web access to over 1,300 data items from state and federal agencies. The site includes the ability to query **Census** data, including information on housing and on the demographic, social, and economic characteristics of the population. These data are available for very small geographic areas. LINC has connections to data on vital statistics and health, social and human services, education, law enforcement, and a variety of other topic areas.

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➤ **NC Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT):** www.ncdetect.org/

This is a web-based early event detection and surveillance system for clinical syndromes resulting from exposure to infectious, chemical, or environmental agents as well as a source of information on injuries, asthma, vaccine-preventable diseases, and natural disaster related health **outcomes**. The system includes data updated daily from emergency rooms through NC Hospital Emergency Surveillance System (NCHES), Carolina Poison Center, Pre-Hospital Medical Information System (Pre MIS), Piedmont Wildlife Center, NCSU College of Veterinary Medicine Laboratories. To request an account, visit the above website and click on the “Account Request” link. For more information or free training on how to use the system, please contact Amy Ising, NC DETECT Program Director at (919) 966-8853 or by email at amy_ising@med.unc.edu. Training is customized to the user's location, authorization and interests.

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➤ **CDC**

- **CDC SNAPS** provides a brief snapshot of a community, searchable by zip code, county, or state. Snapshots contain demographic information as well as information about languages spoken at home, immigrant countries of origin, religious affiliations, educational attainment, vehicle and phone availability, disabilities and other information about community members. <http://emergency.cdc.gov/snaps/>
- **WONDER** is a query system which offers an online link to public health databases and reports which allows easy access to many different kinds of data including Healthy People 2010 data. <http://wonder.cdc.gov/>
- **YRBSS -CDC Youth Risk Behavior Surveillance System:** www.cdc.gov/HealthyYouth/yrbs/
YRBSS contains national, state, and local (for some major urban areas) data on health-risk behaviors, asthma, and obesity in youths and young adults surveyed from 1991 to 2009. Click on “Youth Online” to get the profile for North Carolina and for the Charlotte-Mecklenburg School System. Risk behavior trends are compared between states and between participating urban school districts.

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➤ **U.S Census Bureau:** www.census.gov

The U.S Census Bureau homepage allows searches for demographics by entering the name of the state, county, or city into the “Population Finders” search engine under the “Data Finders” heading on the right side of the main page. Click on the headings in the middle of the web page. You can also link to topic-specific data by. The link to the left, called “Data Tools” leads you to many other useful tools for finding data including “Censtats” which allows you to locate streets within census tracts and look at business patterns by county and zip code.

Agriculture

- **North Carolina Department of Agriculture:** www.agr.state.nc.us/stats/

The web site has county-level statistics related to agriculture, including crops, farm income, and other agricultural economic data.

Crime/Public Safety

- **State Bureau of Investigation:** <http://ncdoj.gov/Crime/View-Crime-Statistics.aspx>

The SBI collects detailed information on crimes and traffic stops made by law enforcement that occur in North Carolina and has a variety of county and municipal data available on their web site. Some crime indicators are also included in the LINC data system, described in the State Data Center section above. For questions about the crime data or to make special requests, contact: SBI-crime-reporting@ncdoj.gov or (919) 662-4500.

Information about sex offenders can be found at <http://sexoffender.ncdoj.gov/>

Maps of clandestine (drug) labs by county are available through the Department of Justice by clicking on “bust clandestine drug labs” at the following link: www.ncdoj.com/Crime/Enforce-Drug-Laws.aspx

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- **North Carolina Council for Women/Domestic Violence Commission:** www.ncfwdvc.com/stats.htm

This site has information on domestic violence, sexual assault, and rape prevention programs. The “County Statistics” provide a variety of county-level data on domestic violence, sexual assault, displaced homemaker, and abuser treatment. The “Statistical Bulletin” provides information on the number of clients served, education/training, and shelter services use.

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- **North Carolina Department of Crime Control & Public Safety:** www.ncgccd.org/sysstat.htm

North Carolina Department of Crime Control & Public Safety maintains this website through the Governor’s Crime Commission. It has links to reports containing data on gangs, burglary, and domestic violence. Data are mostly aggregated to the state; however, some county level data are available. Maps of some crime statistics by county are also available in some reports.

Children

- **North Carolina Action for Children:** www.ncchild.org/action/content/view/817/716/

Formerly the North Carolina Child Advocacy Institute, NC Action for Children provides county-level information on child health and well-being. Areas covered include demographics, physical well-being, intellectual well-being, social well-being, and economic well-being. Extensive county-level data are available in their North Carolina Children’s Index County Data Cards which include more than 75 indicators of child and youth well-being. This page also contains links to information by school districts, legislative districts, and congressional districts for North Carolina.

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- **KIDS COUNT:** <http://datacenter.kidscount.org/>

A project funded by the Annie E. Casey Foundation which focuses on national, state, and local indicators of childhood well-being including teen pregnancy, childhood obesity, and uninsured children. County and school district level data are available for North Carolina by going to “Data by State,” choosing NC from the US map, and then clicking on “View Community Level Profiles.”

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- **Children’s Environmental Health Branch:** www.deh.enr.state.nc.us/ehs/Children_Health/Lead/lead.html

The **Childhood Lead Surveillance** data are maintained in the Department of Environment and Natural Resources, Environmental Health Services Section. North Carolina state law requires all laboratories doing business in North Carolina to report all positive blood lead test results for children less than six years of age. The database includes blood lead screening and follow-up information as well as environmental follow-up information. From the Child Lead Poisoning web page, go to “Surveillance Data Tables” for access to lead screening data.

County Comparisons (Nationwide)

- **Mobilizing Action Toward Community Health (MATCH):** www.countyhealthrankings.org/
MATCH is a collaborative project created by the Robert Wood Johnson Foundation and the University of Wisconsin **Population Health** Institute. In addition to reports for each state, MATCH provides a **County Health Ranking** of each county within its state, as well as an overview of the many statistics that went into deciding this ranking.

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- **Community Health Status Indicators:** <http://communityhealth.hhs.gov/HomePage.aspx>
The Community Health Status **Indicators** (CHSI) reports provide an overview of key health **indicators** for local communities and provide nationwide peer counties to compare a county against.

Education

- **North Carolina Department of Public Instruction:** www.dpi.state.nc.us
DPI collects a variety of information related to education in North Carolina, much of which is available through their web site. From the top of the main page, select “Data & Statistics” and then select “Reports and Statistics.” For information on school performance, go to the *North Carolina School Report Cards*. For detailed educational data including demographics of the student body and percent of free and reduced lunch, go to the *NC Statistical Profile*. This page also has a link to *Education Statistics Access System (ESAS)* -- a web-based interactive data extraction and distribution tool designed to enable anyone with access to the Internet to extract the basic data for the NC school systems, create custom reports, and then download these to your computer.

For charter schools, see www.ncpublicschools.org/charterschools/schools.

To search for private schools in your county, go to the **National Center for Education Statistics, Private School Universe Survey**. <http://nces.ed.gov/surveys/pss/privateschoolsearch/>

Environment/Nature

- **Environmental Finance Center (EFC):** www.efc.unc.edu/projects/NCLandfillCapacity.htm
The EFC conducts an annual survey of all of the landfills in NC to figure out how much longer waste can be deposited there before the landfill has reached its capacity. A listing of landfills by county and their remaining capacity in years is available on this website under the “Landfill Capacity Factsheets.”

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- **United States Environmental Protection Agency (EPA):** www.epa.gov/epahome/commsearch.htm
This link, “**Search Your Environment by ZIP Code**”, links to one of seven environmental databases with local data. “My Environment” has a wide variety of mapped local information including air emissions and Superfund site locations. “Envirofacts” and the “Facilities Registry System” provide a list of facilities subject to environmental regulation. “AirData” provides information about air pollution sources and monitoring sites. “Toxic Release Inventory” has information about any chemical releases in the area. “Cleanups in My Community” locates any Superfunds, Brownfields, or corrective action sites in the area. “Enforcement and Compliance History Online” has a list of facility inspections and any resulting enforcement actions.

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- **NC Department of Environmental and Natural Resources (DENR):**
<http://portal.ncdenr.org/web/guest/>
NC DENR administers regulatory programs designed to protect air quality, water quality, and the public's health. Contact the local regional office for information about your area or see the following sources of data listed on the NC-DENR website:
 - **Brownfield sites** <http://portal.ncdenr.org/web/wm/bf/projectinventory>
The goal of the NC Brownfields Program is to assist in redevelopment of abandoned, idled or underused properties where the threat of environmental contamination has hindered its redevelopment. For more information and a map of Brownfield sites in the state, click on the “Brownfields Map Viewer” link on the left side of the webpage.

- **Division of Waste Management:** <http://portal.ncdenr.org/web/wm/>
The DWM site has reports and other information on solid waste disposal/landfills, hazardous waste management, underground storage tanks and superfund cleanups, and links to maps and GIS data files.

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- **NC Division of Parks and Recreation:** www.ncparks.gov/Visit/main.php
In 2008, the Division of Parks and Recreation has conducted a recent Economic Impact Study on 14 state parks and assessed the impact of state park visitors on local economies. See the 2008 annual report for more updated information. Use the drop down box on the left to "Find a park by map." Click on your region of the map to see the locations of nearby state park(s) by county. The county website may also have a link to local parks and recreation departments from which you can find information on neighborhood parks and recreational programming for your community.

Geography/Mapping

- **Children's Environmental Health Initiative (CEHI):** www.nicholas.duke.edu/cehi/index.html
CEHI of Duke University has links to many free mapping tools under the heading "List of open source alternatives to ArcGIS" at the bottom of their training website: <http://cehi.env.duke.edu/training/?q=node/3>
North Carolina mapping data files are also on the above website under "Map Making Resources" and "North Carolina Data Resources."

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- **North Carolina Center for Geographic Information and Analysis (CGIA):**
www.cgia.state.nc.us/Default.aspx?tabid=55
NC CGIA now offers the **NC OneMap** program online from which users can search, view, and download statewide GIS (Geographic Information Systems) datasets using only your Internet browser.

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- **Google Earth:** <http://earth.google.com/outreach/index.html>
Download this free product to create maps for your region, county, city, or neighborhood. These maps can be used to locate disease events during an outbreak or show placement of community resources such as parks, hospitals or restaurants to assess whether your community offers its citizens a positive environment with many choices that lead to overall health and wellness. Click on "Tutorials" in the left-hand column of the Google Earth Outreach main page to learn how to use this valuable tool to create maps for your own community.

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- **Your Food Environment Atlas:** <http://maps.ers.usda.gov/FoodAtlas/>
Create maps of the food environment for North Carolina counties and access county-level information related to healthy food access.

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- **US Census:** www.census.gov/
The US Census website has a number of features to help with mapping county's statistics. Use the American Fact Finder Reference Map feature to zoom in to your county to view census tract locations at the following website: http://factfinder.census.gov/jsp/saff/SAFFInfo.jsp?_pageId=gn7_maps
Geographic Information System (GIS) shape files for census tract, zip code, school district, city, and county boundaries (and many other geographic levels) are available for to download for free from: www.census.gov/geo/www/cob/shape_info.html. These files can then be imported into EpiInfo or some other software with mapping capability and combined with Excel spreadsheets to map health data.

Healthcare and Human Services Programs/Utilization

- **North Carolina Asthma Program:** www.asthma.ncdhhs.gov/index.htm
This website has a School Asthma Action Plan, the NC Air Quality Forecasts, information about asthma in both English and Spanish, and other asthma information.

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- **NC Division of Medical Assistance:** www.dhhs.state.nc.us/dma/

The state Medicaid agency is part of the NC Department of Health and Human Services. They produce an annual report now available on their web site with some county-level data called Medicaid in North Carolina Annual Report. From their main page, go to “Statistics and Reports” to find their Annual Report. Also click on the link to “County Specific Snapshots for Medicaid Services,” then click on the dropdown list for the current year to find a personalized snapshot of the county.

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➤ **NC Division of Social Services (DSS):** www.ncdhhs.gov/dss/

This division of the NC Department of Health and Human Services collects information in a number of human services areas, including child support and welfare services, Food and Nutrition Services, and the Work First program. To view their statistical reports, from their main page, click on “Statistics and Reviews.” Choose data regarding Child Welfare, Child Support, Food and Nutrition Services, or Work First, by clicking on the links at the top of the page.

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➤ **NC Division of Health Service Regulation:** www.ncdhhs.gov/dhsr/index.html

The Division of Health Service Regulation (Formerly Division of Facility Services) of the NC Department of Health and Human Services collects data for each hospital and nursing home in the state through the annual re-licensure process. Directories listing all regulated facilities by service type are available for download. Search the “Adult Facilities Star Ratings” by county for a list of each facility and their ratings and violations for the county.

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➤ **Cecil G. Sheps Center for Health Services Research:** www.shepscenter.unc.edu/

The Sheps Center has county-level data on topics such as health manpower, women and infant health indicators, health care claims and utilization, and rural healthcare maps. Click on “Data Available” on the main page to access data. For health manpower, go to the “North Carolina Health Professions Data System” and then click on “Download data.” There are county-level tables for different categories of health manpower. “State and County Profiles” can be accessed on the left-hand side of this page.

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➤ **Kaiser Family Foundation’s *State Health Facts*:** www.statehealthfacts.org/

This is a source of summary statistics for the state with comparisons to the nation and other states on a number of issues (including healthcare costs and utilization, insurance coverage, and minority and women’s health issues).

Housing

➤ **US Department of Housing and Urban Development (HUD):**

http://portal.hud.gov/portal/page/portal/HUD/states/north_carolina

The US Department of Housing and Urban Development website has information by state. Search for subsidized housing units by county and city by visiting the website:

www.hud.gov/apps/section8/step2.cfm?state=NC%2CNorth+Carolina

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➤ **US Department of Agriculture (USDA):**

http://rdmfhrentals.sc.egov.usda.gov/RDMFHRentals/about_mfh.jsp

Search this website for Rural Development **Multi-Family Housing Rentals** for farm laborers. Search for housing by zip code, town, or property name using the links in the left column of this page.

Labor/Economy

➤ **University of North Carolina (UNC) at Chapel Hill, Health Sciences Library:**

www.lib.unc.edu/reference/govinfo/statistics/county.html

The Health Sciences Library maintains a website that indexes numerous sources of county-level, socio-economic news and data. For additional assistance, contact the Regional Documents Librarian at (919) 962-1151.

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➤ **North Carolina Rural Economic Development Center, Inc.:** www.ncruralcenter.org/

This center has resources for people living in rural communities. It serves the state’s 85 rural counties, with a special focus on individuals with low to moderate incomes and communities with limited resources. Their web

site below leads to a “**Rural Data Bank**” which includes County and Small Town Profiles as well as the ability to perform custom data searches and comparisons between counties.

www.ncruralcenter.org/databank/index.html

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➤ **Employment Security Commission (ESC) of North Carolina:** www.ncesc.com/

The ESC collects a variety of information related to employment, occupations, industries, wages, and unemployment in North Carolina. On their “Labor Market Information” page, they have links to labor force statistics, occupational information such as employment and wages, industry information, as well as information access tools and links to statistical sources. In their “Information Access Tools” section, they have several web query systems, such as WebSARAS, NC and County Profile, NC STARS, and Area Labor Analyses, which provide labor and employment information for counties and other geographic areas of the state. For further information or for special requests, contact the Labor Market Information Division at (919) 733-2936.

Find monthly reports by county on mass layoffs and business closings by county from newspaper announcements and surveys of employers at: <http://eslmi23.esc.state.nc.us/masslayoff/>

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➤ **North Carolina Department of Commerce:** <https://edis.commerce.state.nc.us/>

The NC Department of Commerce has a new Economic Development Intelligence System (**EDIS**) that contains a variety of useful data for each county in the state. Data can be downloaded into Excel for further analysis. EDIS also has a mapping interface which allows you to zoom to a county.

Mental Health

➤ **NC Division of Mental Health, Developmental Disabilities, and Substance Abuse Services**

(**MHDDSAS**): www.dhhs.state.nc.us/mhddsas/

NC MHDDSAS in the North Carolina Department of Health and Human Services collects statistics from state-operated mental health facilities across the state. Annual reports, containing facility and county-level information, are available on community mental health centers, state psychiatric hospitals, alcohol and drug treatment centers, developmental disabilities services, and Local Management Entities (LMEs) that are responsible for coordinating these services in their catchment areas. To view the reports, click on the “Statistics and Publications” link in the left column from the main page.

Smoking/Tobacco

➤ **Step Up NC:** <http://stepupnc.com>

Step Up NC is an interactive website for teens which promotes youth tobacco prevention and control.

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➤ **Tobacco Prevention and Control Branch:** <http://tobaccopreventionandcontrol.ncdhhs.gov/index.htm>

The Tobacco Prevention and Control Branch is part of the NC Division of Public Health. Their website has resources for evidence-based interventions on tobacco use prevention and control targeted towards both adults and kids. Click on the “Research and Data” link for results of the NC Youth Tobacco Survey and information on the Restaurant Heart Health Survey, as well as other types of data. Contact their office for more information about tobacco-related data at (919) 707-5400.

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Special Populations

➤ **Health Sciences Library, UNC-Chapel Hill:** www.hsl.unc.edu/phpapers/phpapers.cfm

Reports on the **Community Diagnoses**, conducted by master’s students in the Health Behavior/ Health Education Department at UNC-Chapel Hill, are a useful resource with in-depth interviews and focus groups as well as a thorough history and background of each group. Projects are listed for 1999 to 2008 and for several different counties around the Piedmont area. Special populations (i.e. refugees, elderly, etc.) or agencies are often chosen for diagnosis within each community. Action points/ policy recommendations are usually included at the end of the reports.

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- **North Carolina Division of Aging and Adult Services:** www.dhhs.state.nc.us/aging/cprofile/cprofile.htm
The above link leads to county profiles with data on education level, disabilities, Medicaid/ Medicare/Social Security benefit usage, transportation, homeownership, and nursing home residency – all important topics for counties with large elderly populations.

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- **NC Office of Minority Health and Health Disparities:** www.ncminorityhealth.org/omhhd/index.html
The NC Office of Minority Health and Health Disparities aims to eliminate health disparities among all racial and ethnic minorities and underserved populations in the state. Many useful fact sheets, reports, and state-wide initiatives can be found under their “Publications” tab. The “Data/ Statistics” tab links to many sources of data cited elsewhere in this guide.

Transportation/Highway Safety

- **North Carolina Department of Transportation (DOT):** www.ncdot.gov/
The NCDOT web site has information on travel, highways, transportation services, and building projects. For information on public transit services, go to www.ncdot.gov/nctransit/ and use the scroll-down list to choose a geographic area. Click on the map at www.ncdot.gov/projects/ for current county project listings.

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- **UNC-Chapel Hill, Highway Safety Research Center:** www.hsrc.unc.edu/index.cfm
This center collects data on motor vehicle crashes, including alcohol involvement and seat belt use, and other information related to highway safety. Click on the “Safety Information” tab for information by topic. Click on the “web Sites” tab for links to data query systems. The **NC Crash Data Query** enables users to create tables reflecting crash, vehicle, and person/driver information for crashes occurring in North Carolina. All data are available by county, city, Highway Patrol area, or NCDOT division. HSRC also maintains the **North Carolina Alcohol Facts (NCAF)** web site, a query system specific to alcohol-related crashes and injuries. The **North Carolina Bikes and Pedestrian Crashes** is a query system which houses data on crashes involving bicycles and/or pedestrians and is searchable by county or city. In addition, special research publications prepared by the HSRC are available for download from their Research Library.

Other Resources

- **ACHI Community Health Assessment Toolkit:** www.assesstoolkit.org/
- **America’s Health Rankings:** www.americashealthrankings.org/
The **United Health Foundation** ranks each state by comparing them to the national average and to each other for several health **indicators** in America’s Health Rankings.
- **Community Health Improvement Resources (Compiled by Missouri DHSS):**
www.dhss.mo.gov/CHIR/
- **Healthy Carolinians, NC 2020 Health Objectives:**
www.healthycarolinians.org/objectives/userGuide/default.asp
- **North Carolina Local Health Department Accreditation Board:** <http://nciph.sph.unc.edu/accred/>
Accreditation standards, rules, and updates can be found on the following website:
- **North Carolina State Board of Elections:** www.sboe.state.nc.us/content.aspx?id=41
The **Board of Elections** website allows a search for voter registration statistics by district, race, gender, party, and age group. Click on the “Latest Statistics” tab under the “By County” heading to get a spreadsheet of the most updated, county-level, voter registration.
- **State of North Carolina:** www.state.nc.us

This is the state's official web site. State's agencies and departmental web sites can be accessed through the main home page. In addition, many state agency web sites have links to other web sites related to their topic area. Click on the link to "NC Agencies" the left column on the main page to find a listing of state agency websites.

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- **Trust for America's Health:** healthyamericans.org/states/?stateid=NC
Trust for America's Health ranks each state by several health indicators and includes information about funding for health expenditures, economics, public health preparedness, obesity and other health facts

Contacts to Local Organizations with Data

A good place to start in collecting community data is in the local community. The following local organizations often have useful information for developing a community profile.

- County Planning Department
- Chamber of Commerce
- County Department of Social Services
- Local Highway Patrol Troup (can call the State Highway Patrol office for local contact information at (919) 733-5027).

In addition, there are 17 **Councils of Government** (or Lead Regional Organizations) across the state, many of which collect pertinent data for the counties in their regions. Following is a list of these "COG" agencies with a phone number and the counties they cover. More information about the **North Carolina Regional Councils** can also be found at: www.ncregions.org/regcouncils.htm

Region A:

Southwestern Commission – Cherokee, Clay, Graham, Haywood, Jackson, Macon, & Swain counties
(828) 586-1962 www.regiona.org/

Region B:

Land- of- Sky Regional Council – Buncombe, Henderson, Madison, & Transylvania counties
(828) 251-6622 www.landofsky.org/

Region C:

Isothermal Planning and Development Commission – Cleveland, McDowell, Polk, & Rutherford counties
(828) 287-2281 www.regionc.org/

Region D:

High Country Council of Governments – Ashe, Alleghany, Avery, Mitchell, Watauga, Wilkes, & Yancey counties
(828) 265-5434 www.regiond.org/

Region E:

Western Piedmont Council of Governments – Alexander, Burke, Caldwell, & Catawba counties
(828) 322-9191 www.wpcog.org/

Region F:

Centralina Council of Governments – Anson, Cabarrus, Gaston, Iredell, Lincoln, Mecklenburg, Rowan, Stanly, & Union counties
(704) 372-2416 www.centralina.org/

Region G:

Piedmont Triad Council of Governments – Alamance, Caswell, Davidson, Guilford, Montgomery, Randolph, & Rockingham counties
(336) 294-4950 www.ptcog.org/

Region H: This region was dissolved in 2001. Member counties and municipalities were reassigned to adjacent council of governments.

Region I:

Northwest Piedmont Council of Governments – Davie, Forsyth, Stokes, Surry, & Yadkin counties
(336) 761-2111 www.nwpcog.dst.nc.us/

Region J:

Triangle J Council of Governments – Chatham, Durham, Johnston, Lee, Moore, Orange, & Wake counties
(919) 549-0551 www.tjcog.dst.nc.us/

Region K:

Kerr-Tar Regional Council of Governments – Franklin, Granville, Person, Vance, & Warren counties
(252) 436-2040 www.kerrtarcog.org/

Region L:

Upper Coastal Plain Council of Governments – Edgecombe, Halifax, Nash, Northampton, & Wilson counties
(252) 446-0411 www.ucpcog.org/

Region M:

Mid-Carolina Council of Governments – Cumberland, Harnett, & Sampson counties
(910) 323-4191 mccog.org/

Region N:

Lumber River Council of Governments – Bladen, Hoke, Richmond, Robeson, & Scotland counties
(910) 618-5533 www.lrcog.dst.nc.us/

Region O:

Cape Fear Council of Governments – Brunswick, Columbus, New Hanover, & Pender counties
(910) 395-4553 <http://capefearcog.org/>

Region P:

Eastern Carolina Council of Governments – Carteret, Craven, Duplin, Greene, Jones, Lenoir, Onslow, Pamlico, & Wayne counties
(252) 638-3185 www.eccog.org/

Region Q:

Mid-East Commission – Beaufort, Bertie, Hertford, Martin, & Pitt counties
1-800-735-8262 www.mideastcom.org/

Region R:

Albemarle Commission – Camden, Chowan, Currituck, Dare, Gates, Hyde, Pasquotank, Perquimans, Tyrrell, & Washington counties
(252) 426-5753 www.albemarlecommission.org/

APPENDIX I

Guidelines for *Community Health Action Plan* Forms

The *Community Health Action Plan* form was developed for local health departments and other local community agencies to describe plans for health activities supported by programs in the NC Division of Public Health. Use the *Community Health Action Plan* form to submit action plans. Local public health departments and **Healthy Carolinians partnerships** are encouraged to focus interventions toward achieving selected objectives that will have a significant impact on the identified needs of the community. The number of objectives and activities planned will depend on funding as well as other resources available for activities in the county.

When and Where to Submit the Action Plan Documents

The *Community Health Action Plan* form is due the **first Monday of September** of the year after the county was assigned to complete a community health assessment (CHA). All forms can be sent as an email attachment to the Local Technical Assistance & Training Branch. The forms may also be mailed on CD or as a printed copy to:

Local Technical Assistance & Training Branch
Division of Public Health
1916 Mail Service Center
Raleigh, NC 27699-1916
E-mail: beth.murray@dhhs.nc.gov

General Guidance

The current *Community Health Action Plan* form is available on the DPH website: www.publichealth.nc.gov/lhd/cha. This form is adapted every year, so use the most current version. Use a separate form for each health objective. Contact the regional consultant assigned to the county or the Local Technical Assistance & Training Branch with questions about the form. The form provides detailed instructions for completing the Community Health Action Plan.

Summary of Major Steps for Completing the Community Health Action Plan form:

- Go to www.publichealth.nc.gov/lhd/cha to download the *Community Health Action Plan* Form and instructions. Make sure to use the most current form.
- Review *Healthy NC 2020* Objectives. Look at the focus areas, and choose one or more objectives that align with the county's priorities.
- Complete a separate *Community Health Action Plan* form for each of objectives and submit as detailed above.

ONGOING INTERVENTIONS – List ongoing interventions under this heading. Use the same information as above. Insert extra rows as needed.
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Insert County Logo



Community Health Action Plan _____(yr)

Designed to address Community Health Assessment priorities

County: **Partnership, if applicable:** Period Covered:

LOCAL PRIORITY ISSUE

- Priority issue:
- Was this issue identified as a priority in your county's most recent CHA? Yes No

LOCAL COMMUNITY OBJECTIVE Please check one: New Ongoing (was addressed in previous Action Plan)

- By (year):
- Objective (specific, measurable, achievable, realistic, time-lined change in health status of population)
- Original Baseline:
- Date and source of original baseline data:
- Updated information (For continuing objective only):
- Date and source of updated information:

POPULATION(S)

- Describe the local population(s) experiencing disparities related to this local community objective:
- Total number of persons in the local disparity population(s):
- Number you plan to reach with the interventions in this action plan:

HEALTHY NC 2020 FOCUS AREA ADDRESSED

- | | | |
|--|--|--|
| <input type="checkbox"/> Tobacco Use | <input type="checkbox"/> Social Determinants of Health (Poverty, Education, Housing) | <input type="checkbox"/> Infectious Diseases/ Food-Borne Illness |
| <input type="checkbox"/> Physical Activity and Nutrition | <input type="checkbox"/> Maternal and Infant Health | <input type="checkbox"/> Chronic Disease (Diabetes, Colorectal Cancer, Cardiovascular Disease) |
| <input type="checkbox"/> Substance Abuse | <input type="checkbox"/> Injury | <input type="checkbox"/> Cross-cutting (Life Expectancy, Uninsured, Adult Obesity) |
| <input type="checkbox"/> STDs/Unintended Pregnancy | <input type="checkbox"/> Mental Health | |
| <input type="checkbox"/> Environmental Health | <input type="checkbox"/> Oral Health | |

- Check **one** Healthy NC 2020 focus area: (Which objective below most closely aligns with your local community objective?)
- List **HEALTHY NC 2020 Objective:** (Detailed information can be found at <http://publichealth.nc.gov/hnc2020/> website)

RESEARCH RE. WHAT HAS WORKED ELSEWHERE*

List the 3-5 evidence-based interventions (proven to effectively address this priority issue) that seem the most suitable for your community and/or target group. *Training and information are available from DPH. Contact your regional consultant about how to access them.

Intervention	Describe the evidence of effectiveness (type of evaluation, outcomes)	Source

(Insert rows as needed)

WHAT INTERVENTIONS ARE ALREADY ADDRESSING THIS ISSUE IN YOUR COMMUNITY?

Are any interventions/organizations currently addressing this issue? Yes ___ No ___ If so, please list below.

Intervention	Lead Agency	Progress to Date

(Insert rows as needed)

WHAT RELEVANT COMMUNITY STRENGTHS AND ASSETS MIGHT HELP ADDRESS THIS PRIORITY ISSUE?

Community, neighborhood, and/or demographic group	Individual, civic group, organization, business, facility, etc. connected to this group	How this asset might help

(Insert rows as needed)

INTERVENTIONS: SETTING, & TIMEFRAME	COMMUNITY PARTNERS' Roles and Responsibilities	PLAN HOW YOU WILL EVALUATE EFFECTIVENESS
INTERVENTIONS SPECIFICALLY TARGETING HEALTH DISPARITIES		
Intervention: _____ Intervention: _____ ___ new ___ ongoing ___ completed Setting: _____ Start Date – End Date (mm/yy): _____ Level of Intervention - change in: ___ Individuals ___ Policy &/or Environment	Lead Agency: _____ Role: _____ Partners: _____ Role: _____ Partners: _____ Role: _____ Include how you're marketing the intervention	1. Quantify what you will do (# classes & participants, policy change, built environment change, etc.) 2. Expected outcomes: Explain how this will help reach the local community objective (what evidence do you have that this intervention will get you there?)
INDIVIDUAL CHANGE INTERVENTIONS		
Intervention: _____ Intervention: _____ ___ new ___ ongoing ___ completed Setting: _____ Start Date – End Date (mm/yy): _____	The lead agency is _____ and it will _____ List other agencies and what they plan to do: _____ Include how you're marketing the intervention	1. Quantify what you will do (# classes, # participants, etc.) 2. Expected outcomes: Explain how this will help reach the local community objective (what evidence do you have that this intervention will get you there?)

POLICY OR ENVIRONMENTAL CHANGE INTERVENTIONS		
<p>Intervention: _____</p> <p>Intervention: ___ new ___ ongoing ___ completed</p> <p>Setting:</p> <p>Start Date – End Date (mm/yy):</p>	<p>The lead agency is ____ and it will _____</p> <p>List other agencies and what they plan to do:</p> <p>Include how you're marketing the intervention</p>	<p>1. Quantify what you will do (policy change, change to built environment, etc.)</p> <p>2. Expected outcomes: Explain how this will help reach the local community objective (what evidence do you have that this intervention will get you there?)</p>

(Insert rows as needed)