Consolidation of Local Health Departments in Ohio:

Motivations and Impacts

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Michael Morris
University of Arkansas for Medical Sciences,
Faye Boozman College of Public Health

Matt Stefanak
Josh Filla
John Hoornbeek
Center for Public Policy and Health
College of Public Health
Kent State University

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Disclaimer

This report and the results presented have been prepared to meet information needs expressed by policymakers in Ohio. We anticipate making further refinements to this work over time to improve upon the methods used and the findings presented. For more information on subsequent findings, please feel free to contact the Center for Public Policy and Health at Kent State University, 330-672-7148.

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Executive Summary

Since 2001, there have been twenty[1] cases of city health departments merging their public health services with those of a county health department or another city health department in Ohio, and this has resulted in a 13% decrease in the number of Local Health Departments (LHDs) in Ohio. This study examines the motivations for and impacts of these consolidations on local public health expenditures, workforces, and service delivery. The study blends information obtained through statistical analyses of administrative data from Annual Financial Reports (AFR) submitted by LHDs and maintained by the Ohio Department of Health (ODH) and interviews conducted with senior county officials of health departments involved in seventeen of these twenty cases of consolidation.

Some of our findings are generally consistent with assertions made by advocates of LHD consolidation. Findings from our study indicate that health departments often seek to save money (82%) and improve services (65%) through consolidation. City government-related factors such as budget deficits and the structure of the city leadership also appear to be influential in promoting consolidations. Our interviewees also report that LHD consolidations appear to have been successful in achieving these goals more than 90% of the time. Consistent with findings from our interviews, analyses of AFR data indicate that LHD consolidation is associated with a statistically significant reduction in per capita total expenditures of about 13%. Analyses of financial records also corroborate assertions that city-county health department consolidations do not lead to increases in local tax burdens for public health services on the county jurisdictions.

Other findings from the study might not have been predicted by advocates of LHD consolidation. We find a statistically significant reduction in nonlocal revenues in the two years after consolidation, but this effect appears to disappear after the second year. These time sensitive results may indicate that this negative relationship between consolidation and near term reductions in nonlocal funding may be traceable to disruptions occurring during the transition to a new and consolidated LHD. In addition, almost half (8/17, or 47%) of the responding officials interviewed acknowledged some form of service loss associated with consolidation. However, many of them reported that the service losses they experienced were not negative ones because they enabled the transfer of resources to uses that they believe are more conducive to public health improvements. Employee layoffs appear to have occurred in three of sixteen cases where data were reported, although staffing levels appear to have changed in other cases due to attrition and other factors.

Overall, however, the impacts of consolidation reported by those we interviewed were positive, as 88% of the reporting senior health officials (15/17) said that they thought that the consolidation their county health department participated in was "a good idea." And, while the statistical data and analyses are not sufficient to corroborate assertions regarding service improvements, they do support the idea that LHD consolidations in Ohio have reduced overall public health expenditures, while protecting county health departments from new and un-reimbursed expenditures in the vast majority of cases.

[1] This figure includes cases of voluntary consolidation, but it does not include cases where municipal health departments are abolished or merged because cities fall below the 5,000 population threshold that is required for the existence of a "city" health department in Ohio.

Introduction

In recent years, the idea of combining Local Health Department (LHD) capabilities to achieve more efficient and effective provision of public health services has received increasing attention from both public health practitioners and scholars. This "Quick Strike" study seeks to inform discussions of local public health department consolidation in Ohio. Its purposes are to: 1) produce evidence improving our understanding of LHD consolidations that have taken place in Ohio since 2001, and; 2) support state and local policymaking relating to local health department consolidation in Ohio.

Recent studies have supported the idea that combining LHDs may increase efficiency and improve the effectiveness of public health services. Santerre (2009) suggested that economies of scale achieved through consolidations of health departments serving 100,000 or fewer persons may improve the efficiency of service provision. Mays and his colleagues (2006) analyzed public health performance information from multiple states and concluded that consolidation "may hold promise for improving the performance of essential (public health) services" (p. 523). More recently in Ohio, the Association of Ohio Health Commissioners (AOHC, 2011) reported results of a survey finding that a majority of LHDs in Ohio are sharing some services with other jurisdictions. In addition, Hoornbeek, Budnik, Beechey, and Filla (2012) recently reported evidence of substantial cost savings and other perceived benefits associated with the consolidation of the City of Barberton, City of Akron, and Summit County Health Departments in northeast Ohio.

While all of these studies suggest that consolidating LHDs may hold potential for positive impacts, none of them reviews evidence from multiple LHD consolidations over extended periods of time. This study begins to fill this gap in the literature by identifying motivating factors for, and impacts of, LHD consolidations in Ohio between 2001 and 2012. It also affords the Research Association for Public Health Improvement (RAPHI) - Ohio's public health practice-based research network funded by the Robert Wood Johnson Foundation – with an opportunity to inform policy makers about the impact of LHD consolidation on public health expenditures, revenues, and services.

Our report presents results of an analysis of financial reports from LHDs filed with the State of Ohio's Department of Health (ODH) and findings from interviews with health commissioners and administrators of LHD's who have led these consolidated departments. In this report, we attempt to provide answers to questions frequently asked by legislators, mayors, township trustees, boards of health, health commissioners and other stakeholders about the impact of LHD consolidations on local government expenditures, tax burdens, and public health services and capacities.

The report is organized in five sections. Following this introduction, we provide background information on the challenges facing LHDs in Ohio and the growing interest in cross-jurisdictional sharing of public health services that has developed as a result of these challenges. We then review our methods and data sources, including the hypotheses investigated. Following this review of methods and data, we present the results of this research and then discuss its implications for policymaking in Ohio and elsewhere, including its implications for future research. We conclude generally that LHD consolidations in Ohio appear to have had positive financial impacts, while – at the same time – we acknowledge that there is a need for further research on the impacts of LHD consolidation – particularly in relation to its impacts on administrative costs, non-local revenues, public health services, and organizational capacities.

Background

As a "home rule" state, the Ohio local public health system is highly decentralized, with wide variations across LHDs in jurisdictional boundaries, the number of residents they serve, expenditures, staffing, and their capacity to provide public health services. Three-quarters of Ohio counties have only one LHD, while the remaining quarter of counties have up to five LHDs operating within their borders.

Although cross jurisdictional sharing of public health services and the consolidation of LHDs has received much recent attention in the public health community and beyond, it is not a new phenomenon in Ohio. Since their creation in 1919, Ohio's LHDs have declined in number from 180 to 125 LHDs in Ohio's 88 counties today. More than 20 of the consolidations leading to this reduction in the numbers of LHDs have occurred since 2000, suggesting that the pace of these mergers has accelerated in the last decade. Some of these consolidations took place as a result of cities reverting to village status after a decennial census, forcing the village to become part of the county health district[2]. Most consolidations however, came about from voluntary agreements between elected officials from county and city health districts to merge agencies or "contract out" services previously provided by a city health department. Likewise, sharing of services through formal contracts, memorandums of understanding and informal agreements between existing health districts is now a common practice in Ohio. According to an AOHC survey, the majority of LHDs (66%) are currently sharing some services with other jurisdictions, including "pooled funding" and contracts with other LHDs (AOHC, 2011). The types of services that are shared most often are epidemiology, Human Immune-Deficiency Virus (HIV) testing, lead hazard assessment, and Sexually Transmitted Disease (STD) testing and treatment.

In the past several years the landscape for public health service sharing and LHD consolidation has received closer attention from policy makers and funding agencies due to fiscal strains placed on government at all levels from declining revenues during the recent recession and cuts in state and federal funding. In 2011, 43% of Ohio LHDs lost staff to layoffs or attrition and 73% were forced to make cuts to at least one program (NACCHO, 2012).

Rising expectations for improved performance from LHDs is another factor contributing to this changing landscape. Initiatives such as the National Public Health Performance Standards and the voluntary accreditation program of the Public Health Accreditation Board (PHAB) have fueled these expectations for performance improvement and have prompted local health officials and policy makers to look beyond their own jurisdictional lines to increase capacities for providing essential public health services identified by the U.S. Centers for Disease Control and Prevention and other public health professional organizations. [CDC, 2013 and PHAB, 2013]. Responding to these influences, the AOHC established the Public Health Futures Project in 2011 to explore new ways to structure and fund local public health services in Ohio. In their 2012 report, AOHC recommended that all LHDs should assess:

1. Their ability to provide a minimum package of public health services,
2. The potential impact of cross-jurisdictional sharing or consolidation on their ability to provide those services, and,
3. The feasibility of and local conditions for cross-jurisdictional sharing or consolidation.

The report further recommended that most LHDs, regardless of size, may benefit from cross-jurisdictional sharing. In particular, LHDs serving populations of fewer than 100,000 may benefit from

[2] In Ohio, municipalities which – by definition – have populations of 5,000 or more are cities authorized to operate health districts, while villages (municipalities with less than 5,000 population) are not authorized to operate health districts.

pursuing cross-jurisdictional sharing or consolidation to ensure adequate capacity to provide the minimum package of public health services (AOHC and HPIO, 2012).

Many of AOHC's recommendations were subsequently endorsed by a legislative study committee created by the Ohio legislature and are contained in the Committee's October 2012 report, including the recommendation that the ODH should encourage and enhance shared services by local health districts such as, but not limited to, the sharing of model contracts, memorandums of understanding, financial and other technical assistance, that are easily adaptable by local boards of health (AOHC & HPIO, 2012).

In addition, at the end of June 2013, Governor Kasich signed a biennial budget bill passed by the state legislature which extended authorities to the ODH to require – as a precedent for receiving funding from ODH – that LHDs in Ohio apply for accreditation by 2018 and achieve accreditation by 2020 (AOHC, 2013). This provision is likely to instigate further discussion and activity in relation LHD consolidation. Multiple LHDs in Ohio are exploring the idea of consolidating their services or otherwise improving their effectiveness and/or efficiency through collaborative means. It is our hope and intent that this report will beneficially inform these discussions and decision-making processes relating to LHD consolidation, as well as follow up studies and publications that may grow from it.

Methods and Data

The research design underlying this study was developed with multiple research questions in mind. Using two complementary research approaches, we begin to develop an evidence base in relation to five hypotheses, all of which are based on questions that have been posed by public health practitioners in Ohio. These five hypotheses are listed below.

1) Consolidating local health departments yields reductions in public health expenditures and workforces.
2) Consolidating local health departments yields new revenues for combined health districts.
3) Consolidating local health departments yields public health service improvements.
4) Consolidating health departments enhances public health system capacities;
5) Consolidating local health departments yields new opportunities for positive future changes in public health.

We use two different research approaches to investigate these hypotheses. While the universe of health departments in our study is comprised of all health departments in Ohio, we focus particularly on health departments that have been involved in LHD consolidations between 2001 and 2011. Based on information provided by the AOHC, the ODH, and experienced health officials in Ohio, we identified a list of twenty voluntary health department consolidations that have occurred in Ohio since 2001[3]. Our statistical analyses of Annual Financial Report (AFR) data submitted by LHDs to the ODH focus on a sample of health departments that operate in counties where both the county and at least one city have a LHD, and analyze differences between cases where city and county health departments have consolidated and cases where they have not consolidated. Our interviews were conducted with senior officials involved in 17 of the 20 LHD consolidations in our sample and produce perceptual data on the motivations, impacts, and experiences of LHD consolidation. The AFR statistical analyses produce

[3] A list of these consolidations is provided in Appendix 1. Based on conversations with experienced Ohio health officials and our own investigations to date, we believe this list includes all health department consolidations in Ohio that occurred between 2001 and 2011, with the exception of mergers necessitated by municipal population losses that resulted in cities becoming villages because their populations fell below the 5,000 population threshold required for status as a "city" in Ohio. We omitted these cases from our analyses because our focus is to inform policy choices regarding consolidation that are not present in these latter cases.

evidence pertinent to the first two hypotheses, while our interviews with senior local health officials yield perceptual information relevant to all five hypotheses. The methods and data used for both of these research approaches are summarized in greater detail in the two following subsections.

Statistical Analyses of AFR Data

The AFR statistical analyses use a range of data sources to sample and analyze recent LHD consolidations in Ohio. The overall goal of these analyses is to compare consolidated health departments with ones that have not consolidated in ways that allow us to ascertain the impacts of consolidation, while controlling for other factors that may influence post consolidation impacts on expenditures and revenues. In the subsections below, we review the data sources, our sample, modeling strategies, and limitations associated with our statistical analyses of AFR data.

1. Data Sources

Data for the statistical analysis component of the study were drawn from multiple data sources. Financial data that were used as outcome measures in the analyses were obtained for all LHDs in Ohio from the AFR data maintained by the ODH for the years 2000 to 2011. The AFR data began being collected by ODH in electronic format in 2008. Data for the years 2005-2007 were obtained from Case Western Reserve University, which had previously entered the AFR data into Microsoft Excel for another study. For the period 2000 to 2004 these data were only available in their original paper copy form and required entry into Excel format. Data entry was conducted by research staff at the University of Arkansas for Medical Sciences with each entry being checked by at least two different persons. City and county government financial data were obtained from the Ohio State Auditor's office to assess local governments' general propensity to spend and to capture information on the general financial health of city governments that operated local health departments. Data on local government form – strong mayor versus not strong mayor – were compiled by KSU-CPPH staff from data put together by the Ohio Municipal League (OML). Demographic data that may influence the need for and/or the complexity of delivering public health services were collected from the United States (US) Census Bureau. These data include the overall population of the health department's service jurisdiction, the population density of the service area, the percentage of the population that are living below the federal poverty level, that are of African American or Hispanic heritage, that are unemployed and who have completed a college degree. Additionally, data on the classification of the health departments' service area as metropolitan, micropolitan or rural was obtained from the Census Bureau.

2. Sample Description

The statistical analyses focus on quantitatively examining the influences of LHD consolidation on health department total expenditures, administrative expenditures, and their generation of nonlocal revenue[4]. These analyses utilize a longitudinal pre – post study design with control group, where the year of consolidation defines the pre and post time periods. As is noted above, a total of twenty voluntary health department consolidations in the state of Ohio were identified as occurring between 2001 and 2011.

Of these consolidations, eighteen occurred within a time period (2002 – 2010) that -- considering data availability -- would allow for at least two years pre consolidation data and one full year post consolidation. Additionally, two of the consolidations (Norton City / Summit County and Pickerington

[4] We had originally intended to analyze staffing levels in this way as well. However, problems with the data collected and compiled led us to abandon this effort for this short term study. We are currently investigating ways to improve these data and incorporate them into further analyses.

City / Franklin County) were cases of cities transitioning from an existing consolidation partner to a different consolidation partner. Because of the nature of these transitions no administrative data were available for the pre-consolidation period.

Of the remaining sixteen consolidations that were not excluded due to these factors, the necessary financial data was available for eleven (69%). Appendix 1provides information on the health departments addressed by the statistical analyses of AFR data included in the study. The collection and statistical analysis of the AFR data component of the study was approved by the IRB of the University of Arkansas for Medical Sciences.

Our statistical analyses of AFR data include not only health departments that engaged in consolidation during the study period, but also all other city health departments and county health departments from counties that had at least one independent city health department. This allows us to utilize the entire population of potential consolidation candidates as the control group in our analyses. Counties that do not have an independent city health department operating within their borders were excluded from the study because all of the consolidations that occurred during the study period involved city health departments. County-to-county consolidation in Ohio would be a substantively different form of alignment and may not be directly comparable to the recent wave of City-County LHD consolidations.

We thus retained all city health departments as eligible for our analyses, but reduced from 88 to 29 the number of potential county health departments. After factoring in LHD attrition due to limitations in data availability, our eligible pool included 51 city health departments and 27 county health departments that operated during the period between 2002 and 2011, for a total sample of 78 city and county LHDs. These 78 health departments were tracked over the twelve year study period. A secondary effect of limiting the study sample to only areas of the state where independent city health departments operate was the exclusion of all of the rural counties in Ohio. Only areas designated by the U.S. Census Bureau as metropolitan or micropolitan communities had at least one independent city health department operating in the county during the study period.

3. Modeling Strategies

In conducting the statistical analyses, a primary concern was the potential that the health departments that consolidated were substantively different than those that did not consolidate. If this was true, a direct analysis of the differences in the pre and post consolidation periods would yield biased results. Because of this potentiality, we use analytical methods designed to reduce the influence of potential selection bias on the estimated effects of consolidation.

The Heckman Two Step regression model is a widely used approach to address selection bias in statistical analyses. It has been in use since the late 1970's and conceptualizes the issue of selection bias as arising from the presence of an unobserved factor that influences the "choice", in our case the decision to consolidate, and in turn the outcomes resulting form that "choice". Implementing this modeling approach consists of running two interrelated models (Heckman, 1979 and Cameron and Trivedi, 2009). The first stage model uses a probit function to create a measure of the propensity of a health department to consolidate based on a series of factors thought to be related to the decision process. The first stage model's assessment of the probability of consolidation is then used in the second stage to adjust the estimates produced from a linear regression model to account for the influence of selection bias. To use the Heckman approach, we had to develop an understanding not only of factors that influenced the impacts of consolidation (our outcomes of interest), but also those factors that potentially would influence the decision to consolidate. This means that we needed to compile data on variables affecting both stages of our two stage model.

a. Variables Addressed in the First Stage Model

For the first stage model, consolidation was operationalized as a dichotomous variable reflecting whether the health department consolidated at any point during the study period. Possible predictor variables for consolidation were identified through discussions among the study team and in consultation with Ohio public health leaders who had been involved in several of the consolidations in the study. Through these discussions, it was determined that a key focus of the first stage model should be on factors related to the cities and their health departments as it was felt that cities were often a catalyst for pursuit of consolidation[5].

One obvious factor to consider as a driver of consolidation was the financial condition of the city health department. In recent years, both in Ohio and nationally, concern has been expressed about the growing demands placed on LHDs while funding has failed to keep pace with needs for services. This would make it reasonable to think that the health departments that are being most fiscally strained would be most likely to search out ways to reduce their costs, such as through consolidation with a larger county organization. The fiscal condition of the LHD was operationalized in this study as the proportion of years the health department spent monies from their reserve funds. This proportion was then weighted to account for variation in the number of years a health department was part of the sample. The weighting was constructed by multiplying the health department's proportion of years of reserve spending by the proportion of years the health department represented of the total number of years for all health departments in the study sample. Because our modeling approach recognizes that county LHD budgets in Ohio operate in ways that are largely independent of overall county budgets, the county LHD's were coded as having the proportion of reserve spending equal to the highest proportion observed among city LHDs operating in that county. This operationalization acknowledges the reality conveyed to us by Ohio public health practitioners that city budgets (and budget deficits) are likely to have greater influence on the propensity to consolidate due to financial constraints than general county budgets.

A second potential factor that could influence consolidation decisions was the overall financial health of the city government. Cities experiencing more financial stress would seem to be more inclined to divest themselves of services that could be shifted to another government jurisdiction for a negotiated payment rate rather than to continue to carry the full financial risk of providing the service. In this study, city financial stress was operationalized as a dichotomous variable indicating whether the city ever had a negative general fund balance during the study period. For health departments that consolidated, the observation period for city deficits ended the year of consolidation. This operationalization was selected rather than utilizing an evaluation period that included a specific number of year's pre and/or post consolidation because with the latter approach the first stage model would eliminate all non-consolidating health departments from the sample. In addition, because – as was noted above -- county LHD budgets in Ohio operate in ways that are largely independent of overall county budgets, it was not felt that county government deficits should be considered in a manner similar to what was done with the city financial information. Instead, we utilized an approach similar to that described for city LHD reserve spending and coded a county LHD as having a a negative general fund balance if any of the cities in the county that operated a city LHD had a negative general fund balance during the study period.

Based on evidence from several consolidations that study team members either were a party to or were involved in the evaluation of, it was believed that the system of mayoral governance in place in the community may influence consolidation decisions. A strong mayor system, where the mayor is elected and holds operational control of city government, may be a factor which promotes consolidation, as the elected mayor has the position within the community to be policy champion for or against consolidation.

[5] That feeling was later verified during our interviews, as twelve of the seventeen (71%) senior county health officials interviewed reported that the cities were involved in initiating conversations regarding consolidation.

In a weak mayor system, where the mayor does not have direct policy responsibilities relating to taxation levels and program operations, it was thought that there would not be a single responsible political official who would be likely to take up the cause and advance consideration of consolidation. In the experience of the study team and the practitioner advisors, strong mayors were serving as advocates for consolidation and, anecdotally, had appeared to have been pivotal in some consolidation efforts. The strong mayor concept was operationalized in the study as a dichotomous variable with the value 1 indicating the presence of a strong mayor city governance system and 0 for a weak mayor system. County LHDs were coded as having a strong mayor system if any of the cities within the county that operated an LHD had a strong mayor system of government.

The other variables that were examined in relation to their influence on the consolidation decision focused on markers that would indicate the size and complexity of the operations of the health department. The total population of the health department jurisdiction may reflect the scale of operations of the health department. Larger city health departments would conceptually be more able to leverage economies of scale than health departments that served smaller populations thus making smaller city health departments more inclined to pursue a strategy of consolidation. It is conceivable that health departments in more densely populated areas may be able to leverage infrastructure better than health departments serving more sparsely populated areas. The converse to this argument is that as a service area becomes denser, there comes a point at which economies of scale are overwhelmed and production costs begin to increase for services. The population density is thus included in the study as a continuous variable reflecting the total number of persons per square mile.

b. Variables Addressed in the Second Stage Model

In the second stage models, our outcomes of interest were post consolidation changes in the LHD's total expenditures, administrative expenditures, and nonlocal revenue generation. Each of these variables was considered both as total amounts and on a per capita basis. In addition changes in the proportion of total revenues derived from nonlocal sources were examined. Because of the skewed distribution of the outcome variables, each was transformed to a natural log scale to improve the performance of the analytical models.

To operationalize the pre/post consolidation change for LHDs that consolidated, a separate analytical file was built to combine city and county totals for the outcomes in the pre-consolidation period. The totals in this file were then compared with the post consolidation county levels of the outcome variable to enable pre/post comparisons for consolidated jurisdictions. City and county health departments that did not consolidate at any point during the study period were left unchanged in their format to serve as the control group[6]. In addition, our coding denoted the year of consolidation as the first post consolidation year.

Control variables used in the various models were selected based on their conceptual linkage to and/or previous demonstration in the literature of being associated with changes in the outcomes of interest in this study. In the models for total expenditures, the control variables include markers of

[6] As an example of this process, let's consider the total expenditures of a city and county health department that hypothetically consolidated in 2003. First a new set of observations were created for the health departments that were consolidating. For the years 2000, 2001, and 2002 (the pre-consolidation period) the total expenditures entered in the new observations is equal to the total expenditures of the city health department plus the total expenditures of the county health department. In 2003and for subsequent years, the city health department no longer exists and the total expenditures for the combined health department are simply those reported by the county health department. This approach is conceptualizing the situation in terms of how much was being spent to cover a defined population (the city plus the county population) before and after consolidation.

community need for public health services such as the total size of the population, the population density, the proportion of African American and Hispanic residents in the community, and the poverty rate.

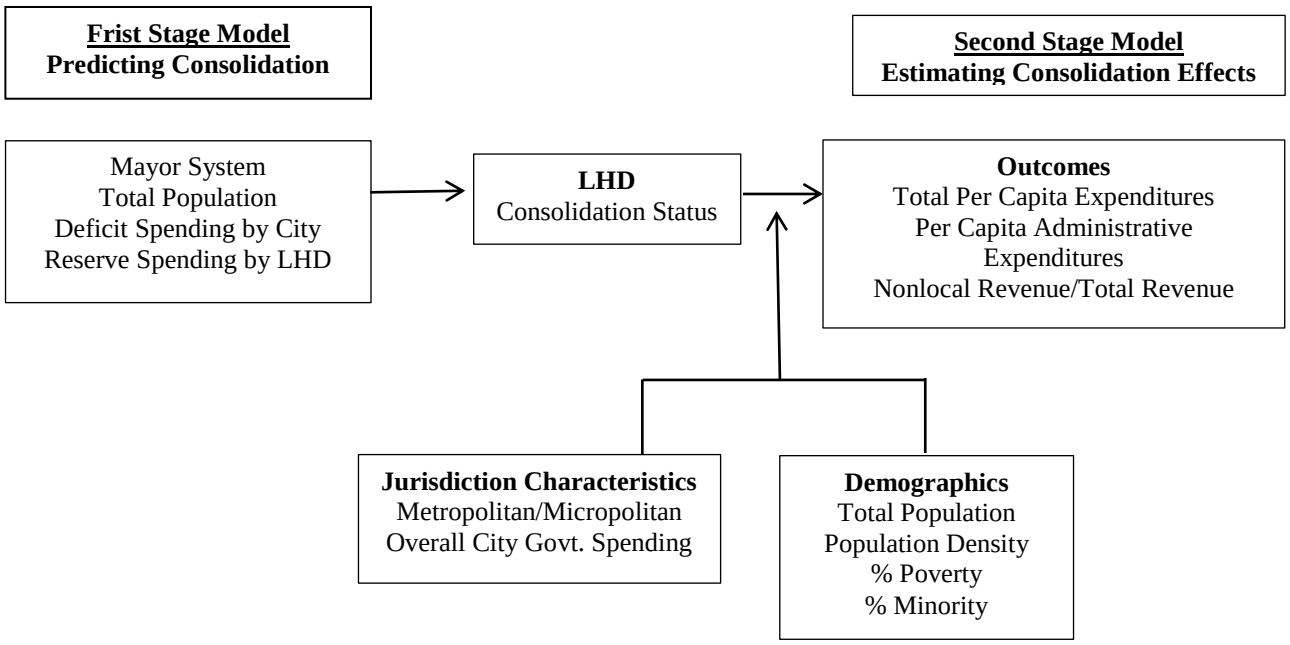
Additionally a dichotomous variable was introduced to control for the health department being located in either a metropolitan or micropolitan area. Total local government expenditures were included as a marker for the propensity of the local area to spend on community services. For city health departments the total city government expenditures were used in this capacity and for county health departments total county government expenditures were used as the marker of local government's willingness to spend.

Models that examine administrative expenditures utilize control variables more targeted at the organizational characteristics of the health department itself. Included in these control variables are a marker for health department serving a metropolitan or micropolitan area, whether the health department is a city or county organization, the population total and the population density of the service area.

Figure 1depicts the generalized conceptual model for the statistical analyses. The boxes on the left side of the figure represent the first stage of the model, where LHD consolidation status is the dependent variable. The boxes on the right side of the model represents the second stage of the model, with jurisdictional characteristics and demographic factors modeled as independent variables which are likely to impact outcome variables relating to expenditures and revenues – the primary outcomes of interest in our study.

While the two-stage modeling approach represented above and used to support our analysis is appropriate given the nature of the questions being investigated, there are limitations in our data and the time available to analyze them that could affect our results. We discuss some of these limitations briefly in the subsection that follows.

Figure 1: Conceptual Model for Two-Stage Regression Analysis of Ohio LHD Consolidation



4. Limitations

The series of statistical analyses described above produces evidence regarding the influences of LHD consolidation in Ohio on key questions raised by policy makers and the public health practice community. While the data we have compiled and the statistical analyses described above enable analyses that address the impacts of recent LHD consolidations in Ohio more completely than has been done in the past, there are limitations associated with the statistical analyses we have conducted. We describe several of these limitations below.

First, one of the significant challenges in policy analysis is obtaining sufficient data on the policy intervention being studied. In this study, we were limited in our sample size by both the relatively small number of consolidations that have occurred recently in Ohio and the availability of data on those consolidations and the LHDs involved in them. In an effort to improve the analytical capacity of the study by expanding the sample of consolidations, we entered five years of additional paper copy AFR data to expand the amount of data utilized to include the years 2000 to 2004. Despite these efforts, our total sample of consolidations was 11 after accounting for LHDs with absent AFR data and other exclusion criteria previously described. This limits the power of the study to detect impacts associated with consolidation.

There is also the potential that the health departments for which we were unable to obtain AFR data were substantively different than the health departments included in our sample. If the departments for which we had sufficient data were substantively different than the health departments for which we did not have sufficient data, this could introduce another source of bias into our analyses. While we were able to consider community level factors such as total population and – in this regard -- there do not appear to be striking differences between groups, we were unable to assess differences based on organizational characteristics between health departments included in the sample and those not included. This means that – in spite of our best efforts – there could still be remnants of selection bias affecting our results.

Another area of limitation relates to the statistical methods used. The Heckman Two Step Model is a well-known and often used approach for dealing with omitted variable situations that result in potential selection bias. While this approach is an appropriate technique for dealing with selection bias, it does not address other potential endogeneity issues. Econometric techniques do exist for simultaneously addressing selection bias with endogeneity, such as the Two Stage Residual Inclusion Model. This approach and other similar approaches require the use of an appropriate instrumental variable. Despite testing several potential instruments, the best efforts of the investigators were unable to identify a viable candidate to serve as an instrumental variable for this kind of analysis. Due to the pressing need within Ohio for evidence to assist in decision making, it was felt to be appropriate to provide estimates based on a well-tested and widely used selection bias modeling approach, while recognizing that there are methodological limitations with the use of this approach.

While limitations associated with our statistical analyses are important to note, our results – particularly when combined with corroborating perceptual data growing from our interviews – provide additional information that can be used by policymakers to make more informed decisions about future city-county LHD consolidations in Ohio. Future work should center around assembling data on the series of consolidations anticipated to occur in the future and on enhancing the analytical methods – possibly by introducing instrumental based approaches and more sophisticated latent class modeling to refine the estimates of consolidation effects for the public health practice and policy making community in Ohio.

Interview Data and Analysis

Using our list of post 2000 Ohio LHD consolidations, we arranged and conducted interviews with Health Commissioners and/or senior health department officials from seventeen of the county health departments involved in these consolidations. In total, these seventeen interviews mean that we consulted leaders from 85% of the county health departments involved in LHD consolidations in Ohio between 2001 and 2011. More than three-quarters of the senior county health officials interviewed (76 %, 13/17), had been involved in the consolidations when they occurred.

We also conducted interviews with three individuals who were involved in several of these consolidations as employees or representatives of the cities involved in the consolidations, bringing the total number of interviews conducted to twenty. We identified these latter individuals based on suggestions provided by the county level officials we interviewed. The three supplemental interviews provided additional perspectives, and should be viewed as sources of anecdotal insight rather than an effort to gain a representative sample of city perspectives. It is useful to note, however, that one of the authors of this report was involved in conducting similar interviews with the Mayors of Akron and Barberton as a part of a 2012 study of these two Summit County consolidations, so we did talk to city officials from a total of five of the seventeen cities involved in the consolidations that formed our overall sample of city-county consolidations in Ohio since 2001.

1. Interview Procedures

The interviews we conducted sought to elicit the perceptions of senior local health officials regarding:

1) The reasons why consolidations occur;
2) The perceived impacts of the consolidation on finances, services, and public health capacities, and;
3) The overall experience associated with the consolidation.

To ascertain perceptions in these areas, we developed a questionnaire in consultation with a group of practitioners from the AOHC during the Fall of 2012. We then submitted the questionnaire for Institutional Review Board (IRB) approval at Kent State University, and received KSU IRB approval to conduct the interviews in December of 2012.

In January, 2013, we conducted several initial pilot interviews with senior county health officials involved in the consolidations to test the questionnaire and make revisions as needed.[7] While we found that the interview instrument worked well overall, we also identified clarifications and improvements that we subsequently incorporated into a revised version of the questionnaire. By mid-February, we finalized the questionnaire and began conducting the final set of interviews. During the course of these interviews, we took careful notes and subsequently recorded them in typed form. Those we interviewed were also given the opportunity to review and comment on our typed notes, and this enabled us to make corrections where needed[8]. In May of 2013, we completed the last of our interviews.

[7] Key questions from the final version of the interview questionnaire can be found in Appendix 2.

[8] Indeed, during one exchange surrounding the proofreading of the interview results that we recorded, we discovered a question that could be interpreted in more than one way. In this case, we re-phrased that question to clarify its intent further, and collected clarifying responses from those interviewed via email. We report these clarified responses in the results that follow, and the wording of the question in Appendix 2 reflects the language used after the corrective re-phrasing of the question.

Upon completion of the interviews, we summarized the data by question and entered it into a spreadsheet for analysis. We also compiled a short summary of the "non-county" interview responses referenced above. While many of the responses from our interviews can be quantified and summarized in numerical form, other insights and ideas presented in this report were received and recorded in narrative form.

2. Limitations

It is important to recognize that perceptual data from interviews – like statistical analyses – are subject to limitations. While the individuals we interviewed were knowledgeable about the LHDs in which they worked (or had worked) and the work of those departments after consolidation, they are also persons who may have biases and/or gaps in their knowledge. While we sought to mitigate these inherent limitations by asking consistent and focused questions to the extent possible and by emphasizing that "I don't know" was an acceptable answer to our inquiries, the interview data we collected are inherently subject to perceptual biases. In addition, our interview data are drawn from the same sample of city-county consolidations that underlie our statistical analyses. As a result, they share limitations associated with its sample characteristics, such as those relating to city and county sizes and a bias toward city-county consolidations (as opposed to city-city consolidations, for example). However, we believe that these inherent limitations associated with our interview data are offset to a substantial degree by the broad ranging and in-depth information that we were able to obtain through this data collection approach. In addition, to the extent that our interview data are corroborated by the results from our statistical analyses of AFR data, we increase our confidence that the impacts of the potential perceptual biases of those we interview do not create a distorted view of the actual impacts of LHD consolidation in Ohio.

Results

Our research yields findings on the changing mix of LHDs in Ohio, the reasons why city and county health departments have consolidated in Ohio since 2001, and in relation to five hypotheses regarding the impacts of these consolidations. Our findings regarding changes in the mix of LHDs in Ohio are based on data provided by the ODH and information contained in the recently released Public Health Futures in Ohio report (AOHC & HPIO, 2012). And while our results regarding the reasons for consolidations of city and county health departments in Ohio grow from the two-stage modeling approach used to analyze the AFR data, relevant findings can also be drawn from the interview data.

Our hypotheses about the impacts of consolidation are also evaluated using information from both AFR data and our interviews with senior county health officials. The first two hypotheses regarding the impacts of LHD consolidation relate to changes in expenditures (and associated local tax burdens) and external revenue received after consolidation. Both the statistical analyses of AFR data and our interviews yield insights relevant to these two hypotheses. The latter three hypotheses relate to public health services, capacities, and the potential for consolidations to yield new and positive changes in public health service provision. The evidence produced in relation to these latter three hypotheses is based solely on perceptual information drawn from our interviews.

The subsection that follows presents findings in relation to the changing mix of LHDs in Ohio. We then focus on factors that appear to influence the decision to consolidate health departments. And finally, we discuss our findings in relation to the five hypotheses outlined above. Not surprisingly, we have greatest confidence in the findings that enjoy support from both the analyses of AFR data and our interviews. The findings regarding our last three hypotheses, which are derived solely from perceptual data gleaned from our interviews, at least at this point, should be viewed as suggestive – rather than conclusive -- in nature.

Findings Regarding The Changing Mix of LHDs in Ohio

As is noted above, our efforts to inventory LHDs in Ohio and the patterns of their consolidation between 2001 and 2012 yields a picture of the changing nature of LHDs in Ohio. In general, the data we have compiled with the assistance of ODH, AOHC, and the Health Policy Institute of Ohio (HPIO) reveals a reduction in the number of LHDs in Ohio during the first decade of the twenty-first century. All of this reduction is accounted for by a decrease in the number of city LHDs, as the number of county LHDs (88) remains unchanged. Table 1 provides a visual summary of the universe of LHDs in Ohio in 2001 and 2012. It shows a 34% decrease in the number of city LHDs, and a 13% reduction in the number of LHDs overall.

Table 1
The Changing Mix of LHDs in Ohio

a. Type of LHD	b. LHDs in Ohio (2001)	c. LHDs in Ohio in 2012	d. % Reduction in the # of LHDs: 2001 to 2012
City LHDs	56	37	34%
County LHDs	88	88	0%
Total LHDs	144*	125*	13%

*These two numbers may include cities with LHDs in 2001 which were subsequently eliminated due to city population losses that prevented them from maintaining a City LHD under Ohio law.

Another thing to note about the changing mix of LHDs in Ohio is that the cities involved in consolidations tend to be relatively small, while the counties involved tend to be relatively large.

Table 2
Comparison of the Sizes of Jurisdictions Served by Consolidating and Non-consolidating LHDs

Type of Health Jurisdiction and Health Department	Mean Population	Median Population	Minimum Population	Maximum Population	Percent "Small" Jurisdiction
City					"Small" = 20,000 or less
Consolidating (n=17)*	30,583	11,523	5,648	216,695	65%
Non-consolidating (n=36)	67,155	20,997	6,664	704,367	41%
County					"Small" = 100,000 or less
Consolidating (n=14)**	205,579	111,305	27,863	886,980	50%
Non-consolidating (n=74)	75,784	46,308	12,806	549,383	80%

Notes:
*The number of consolidating cities presented here is 17 because three cities – Barberton, Norton, and Pickerington were involved in two consolidations each between 2001 and 2011. We therefore counted them only once each in this descriptive characterization.
**There are fourteen counties because some counties were involved in multiple consolidations between 2001 and 2011.

Table 2 provides information on the population characteristics of cities and counties that underwent LHD consolidations between 2001 and 2012. It shows that while 65% of consolidating cities were relatively small (20,000 people or fewer), only 41% of the non-consolidating LHDs were in cities that meet this population threshold. Conversely, while 50% of county LHDs involved consolidations were relatively small (100,000 population or less), 80% of the non-consolidating county LHDs met this population threshold. Thus, overall, the consolidating cities appear to be relatively small, while the consolidating counties appear to be relatively large compared to counties that have not experienced consolidations[9].

Findings Regarding Factors Affecting the Decision to Consolidate

As noted above, our findings regarding the decision to consolidate health departments is informed by both AFR and interview data. Below, we present relevant results from analyses of both of these data sources.

1. Findings from Statistical Analysis of AFR Data

Our statistical analysis of the factors influencing the decision to consolidate is guided by input from the practitioner community in Ohio. Based on this guidance and our statistical analyses of the resulting data, we identify factors associated with both city governments and the city health departments that may influence the decision to consolidate. Table 3 presents findings from a logistic regression model examining the influence of the identified factors on whether a health department consolidates at any point during the study period.

Table 3
Logistic regression model of factors associated with health department consolidation*

Predictor Variables	Odds Ratio	p-value	Confidence Interval	
Mayor Governance Type	2.94	0.009	1.308	6.644
City General Fund Balance Deficit	9.57	0.000	5.249	17.44
Weighted Proportion of LHD Reserve Spending	2.10e+11	0.34	9.29e-55	4.75e+76
Population	1.00	0.000	1.000	1.000
_Cons	.079	0.000	0.0342	0.180

*Note: The model presented is a logistic regression model and not the actual probit model that the Heckman approach uses in the first stage for estimating propensity to consolidate. The logistic regression model is presented for ease of interpretation, as it reveals an odds ratio that is easily explained in narrative terms.

The findings indicate that the strongest predictor of consolidation activity is whether a city government that operated a health department had experienced an overall negative general fund balance at any point during the study period. These cities and their corresponding county health departments are 9.57 times more likely to consolidate than other health departments. The presence of a strong mayor governance system is also influential, as it is associated with a nearly threefold statistically significant

[9] It is important to note that while we find differences in the population characteristics of the city and county jurisdictions that consolidated in Ohio between 2001 and 2012, our modeling efforts did not account for differences between city and county LHDs in this regard. Rather, we controlled for differences in populations served using local LHDs (regardless of whether they were based in cities or counties) as our unit of analysis. While we uncovered these specific differences in population characteristics after our data had been compiled and modeling approaches had been determined, the approach we took may also have been necessitated by limits in our sample size. However, based on our findings here, it appears that future research efforts may benefit from statistical approaches that attempt to distinguish further between city and county LHDs.

increase in the odds of consolidation. The financial condition of the health department itself, as operationalized by the weighted proportion of years of reserve spending during the study period, was not found to be significantly associated with consolidation. The overall population of the health department service area is significantly associated with increased odds of consolidation but the effect size is relatively small when controlling for other factors.

Taken overall, the findings from the statistical analysis of influences on the consolidation decision indicate that these decisions may be driven more by factors external to the health department than by internal conditions. Cities that are experiencing financial pressure and have a strong mayor form of governance appear to be most likely to consolidate health departments according the results of our statistical model.

2. Findings from Interviews

The local health officials we interviewed offered insights about both the role of cities and the motivations for consolidating LHDs in Ohio.

During our interviews, we asked about who initiated the discussion of the consolidation of city and county health departments. Eleven of 16 directly responding officials indicated that the city had initiated the discussion, and 3 of 11 said the county initiated the discussion. These interview results appear consistent with the statistical results presented above and they suggest that city officials instigate discussions of consolidation in many cases – at least in cases of city-county LHD consolidation occurring during the first decade of the twenty-first century in Ohio.

We also asked those we interviewed about the stated goals of their LHD consolidation. Table 4 summarizes the prevalence of various stated goals for LHD consolidation.

Table 4
Motivations for Health Department Consolidations in Ohio: 2001-2012,
As reported by Senior Local Health Officials in Ohio

Stated Goal of the Consolidation	Number/percent of health consolidations to which this stated goal applies
"Save money"	14/17 (82%)
"Improve services"	11/17 (65%)
"Build long term capacities"	6/17 (35%)
"Increase efficiency"	4/17 (24%)

The results in Table 4 suggest that "saving money" has been the most common motivation for consolidations undertaken in Ohio in recent years, a finding that appears consistent with the statistical results reported above. They also suggest that many senior health officials believe that a desire to "improve services" was an important motivating factor for consolidation efforts. Both building "capacities" and increasing "efficiency" were also cited as motivations underlying the LHD consolidations in our sample. Notably, most of the officials we interviewed (12/17, or 73%) said that the goals of the consolidation did not change over time.

Our interview results also suggest that prior collaborative work may help foster consolidation. The vast majority of the responding senior county health officials (14/17, or 82%) reported that city-county service sharing activities were in place within five years prior to the consolidation.

3. *Summary of Findings from Statistical Analyses and Interviews*

The results from both the AFR and interview data analyses suggest that city governments appear to be influential in driving LHD consolidation efforts in Ohio. They also suggest that financial goals appear to be important factors driving city efforts to consolidate in many cases. The experience of a negative general fund balance in the city budget appears to be the strongest single factor driving LHD consolidation based on the statistical analyses presented above, and more than eighty percent of our interviewees reported that "saving money" was a stated goal of their consolidation. Strong mayor governance forms also appear to be important in encouraging consolidations, as cities with strong mayors are identified as more likely to consolidate than cities with other governance forms.

It is also important to note that our interviewees also revealed other important goals that appear to drive LHD consolidations. More than half of our interviewees suggested that service improvement was a goal of their consolidation, and more than a third of those interviewed said that building long term capacities was a stated goal of their consolidation.

Findings Regarding the Impacts of Consolidation

1. *Hypothesis 1: LHD Consolidation Yields Reduced Expenditures and Workforce*

The evidence addressing this hypothesis is drawn from our statistical analyses of AFR data and interviews with senior county health officials, both of which are addressed in the following subsections.

a. *Findings from Statistical Analyses of AFR Data*

Our statistical analyses of AFR data evaluated total expenditures and administrative expenditures, and discussions of our analytical results according to both of these measures are provided below.

Total Expenditures:

Total per capita expenditures represent a cost marker because they reflect the amount of public resources dedicated to local public health services. Table 5 presents findings from a Heckman two-step selection bias model conducted to assess differences in pre and post consolidation total expenditures controlling for other relevant factors, as discussed in the methods and data section above.

Table 5
Heckman Regression Results:
Logged Per Capita Total Expenditures (controlling for 1st stage selection)

Variable	Coefficient	P > [z]	95% Confidence Interval	
_Constant	-65.17	0.022	-120.814	-9.536
Post Consolidation	-0.130	0.040	-0.254	-0.006
Poverty %	0.014	0.262	- 0.0106	0.0399
Minority %	0.021	0.063	-0.0110	0.0423
Metropolitan Service Area	0.057	0.283	-0.0469	0.1607
Population Total	3.75e-07	0.152	1.38e-07	8.89e-07
Population Density	-0.0003	0.000	-0.0005	-0.0002
Total Local Government Spending	-2.54e-10	0.006	-4.21e-10	-6.93e-11
Year	0.340	0.017	0.0061	0.0618
Lambda (Mills Ratio)	0.0936	0.311	-0.0873	0.2745

*Total Expenditures are in logged form. Interpretation of coefficient magnitudes requires transformation.

Based on these findings, consolidations examined in this sample are associated with a statistically significant 13.9% decrease in total expenditures controlling for other factors in the model. This indicates that when adjusting for community service need factors, service area complexity factors, and the propensity of the local government to spend, there is a decrease in the average health department's overall expenditures of 13.9%. Increases in population density are associated with a small but statistically significant decrease in total expenditures.

Increases in total local government spending are associated with a very small but statistically significant decrease in total health department expenditures. The progress of time as marked by the year of the observation was associated with a statistically significant 3 percent increase in expenditures. At bottom, these results suggest that consolidations of LHDs in Ohio tend to reduce post-consolidation expenditures, controlling for multiple other influences on expenditures. This supports the idea that consolidation is a source of monetary savings. These results clearly support hypothesis 1, as discussed above.

Administrative Expenditures:

One potential area where savings may be realized as a result of consolidation is through reductions in the administrative expenditures of the organization. These reductions in expenditures could come through eliminating redundancy in managerial functions and reducing facilities and/or equipment costs, as well as from other sources. To test for changes in administrative expenditures, we examine pre and post consolidation per capita expenditures for administrative functions. Table 6 presents the findings from that statistical analysis.

Table 6
Heckman Regression Results:
Logged Per Capita Administrative Expenditures (controlling for 1st stage selection).

Variable	Coefficient	P > [z]	95% Confidence Interval	
_Constant	26.28	0.489	-48.190	100.746
Post Consolidation	-0.030	0.808	-0.268	0.209
Metropolitan Service Area	0.114	0.262	-0.0852	0.3128
Population Total	-1.61e-06	0.007	-2.77e-06	-4.45e-07
Population Density	-0.0002	0.087	-0.0005	.00004
Year	-0.011	0.054	-0.0486	0.0256
Lambda (Mills Ratio)	-0.7965	0.001	-1.254	-0.3886

*Administrative Expenditures are in logged form. Interpretation of coefficient magnitudes requires transformation.

The results from the regression model indicate that consolidation is not associated with a statistically significant change in per capita administrative expenditures. An increase in the total population is associated with small but statistically significant decrease in administrative expenditures. The year is associated with a marginally significant (p value 0.054) decrease of 1.1 percent in administrative expenditures. This suggests that over time health departments may be reducing their administrative costs.

The findings regarding the impact of consolidation on administrative costs are inconclusive. While the negative coefficient associated with the "post consolidation" variable is consistent with our expectations, the variable does not achieve statistical significance. The lack of significance here may mean that consolidation does not have predictable impacts in lowering administrative costs. However, it may also be that more extensive studies using larger samples are necessary to discern this kind of effect. Further research is therefore appropriate in this area.

b. Findings from Interviews

Our interviews provide evidence regarding the impacts of consolidation on expenditures through responses to inquiries concerning expenditures and local tax burdens that are devoted to public health services. They also yield perceptual evidence about post consolidation workforces and staffing levels.

Expenditures and Tax Burdens for Public Health Services:

Consistent with the statistical findings above, our interviews revealed rather substantial evidence indicating that LHD consolidations yield financial benefits. As is mentioned above, fourteen of the seventeen (82%) senior health officials we interviewed indicated that cost savings was a stated goal of the consolidation. More importantly, thirteen of these fourteen (93%) officials indicated that cost savings were in fact achieved after their consolidation.

The interview data also suggest that these financial benefits accrue rather quickly in many cases. Table 7 below summarizes responses to a question concerning whether the consolidation yielded financial benefits and savings over several distinct time frames.

Table 7
Perceptions on the Impacts of Consolidation on Finances: Changes Over Time

Statements on financial benefits of consolidation and their timing	Responses of Senior County Health Officials					
"The consolidation of public health services yielded financial benefits and savings" …..	**Strongly Agree**	**Agree**	**Neither Agree Nor Disagree**	**Disagree**	**Strongly Disagree**	**I Don't Know or Non-response**
"within one year …"	8	4	2	1	0	2
"after two years…"	6	5	3	1	0	2
"after five years …"	5	3	0	0	0	9

The responses in Table 7 reveal that the vast majority of the senior health officials interviewed believe that consolidating health departments yielded financial benefits and savings, and they indicate that these benefits accrue rather quickly. In fact, the majority of the responses indicate financial benefits flowing within one year of the consolidation.

Those we interviewed also indicated that public health system[10] expenditures *did not* increase within a year after consolidation in eleven of the fifteen (73%) cases where we received direct responses to this question. In fact, in a majority of the cases (8/15, or 53%), they indicated that expenditures were actually reduced within one year after consolidation. It is worth noting, however, that the responses we received to this line of questioning may have included expenditures that are driven by external revenues such as grants and contracts. As a result, the responses received here do not directly measure expenditures of *locally derived revenue* or local tax burdens attributable to public health services.

[10] For purposes of this question, we defined the public health system as including both the city and the county department before consolidation and the consolidated county department after consolidation.

For this reason, we also asked about trends in tax burdens on *local* citizens (in both the city and county jurisdictions) for public health services in the year following the consolidation. Fifteen of our sixteen responding (94%) senior health officials indicated that tax burdens for public health services *did not* increase for residents of the city involved in the consolidation, and all sixteen (100%) said that the county jurisdiction involved in the consolidation experienced no increase in tax burdens for public health services as a result of the consolidation.

The interviews also suggested particular financial benefits accruing to the cities involved in the consolidations. Overall, eleven of fifteen (73%) responding officials in our sample said that tax burdens for public health services were actually reduced for residents of the cities involved in the consolidations.[11] In other words, in these cities, the cost of operating an independent city health department appears to have exceeded the cost of paying the county health department to provide public health services within their municipal boundaries. In addition, all eleven of these respondents attributed these reductions in public health tax burden to the financial savings associated with the consolidation.

Workforce Changes after Consolidation:

We also asked our respondents about overall county-wide public health staffing levels after the consolidation took place. Overall, twelve of the sixteen officials who responded to this question indicated that public sector staffing levels in this area changed after the consolidation, while the remaining four suggested that staffing levels stayed about the same. Nine out of the twelve (75%) indicated that staffing levels changed within the first year after implementation of the consolidation. Six out of these nine (67%) indicated that staffing levels decreased within the first year, while three (33%) of the nine indicated staffing levels increased. Six out of the twelve who noted changes in staffing levels (50%) indicated that staffing levels changed after the first year of implementing the consolidation, with four out of these six (67%) indicating that staffing levels subsequently decreased. Overall, therefore, it appears that staffing reductions were more common after consolidation than staff increases.

Our interviews also yielded information on employee layoffs associated with the consolidation. Only two out of the eleven officials who indicated there were changes in staffing levels (one individual answered "I don't know") or 18% indicated that, yes, there were layoffs in either of the jurisdictions involved as a result of the consolidation. However, another county health official noted that there were layoffs in a neighboring county jurisdiction after a city ended its contract for public health services with that jurisdiction and entered into a new contract with the responding official's jurisdiction. This means that there were layoffs reported in 3 of the 17 cases of consolidation we investigated through the interview portion of our investigation.

The interviewees also indicated that city health department employees were sometimes reallocated within the city or voluntarily separated themselves from the health department, although in some cases this was because they were part time or contract employees who had full-time employment elsewhere. However, a number of respondents indicated that there had been attrition of some employees after consolidation, and that not all of the positions that were vacated were subsequently re-filled. Thus, while actual layoffs of staff associated with consolidation were relatively uncommon, changes in staffing levels – and often decreases in overall staffing – were reported to be common after LHD consolidation, as is suggested above.

[11]It is useful to note that all three representatives of municipalities that took part in a health department consolidation also indicated that city expenditures related to public health services were reduced as a result of consolidating, thus confirming the reports of the county officials in this regard.

Overall, the evidence emerging from our interviews appears to provide support for the hypothesis that LHD consolidations in Ohio have reduced local health department expenditures and tax burdens.

c. Summary of Findings from Statistical Analyses and Interviews

The findings from both the statistical analyses of AFR data and the interviews with senior county health officials provide clear support for the hypothesis that consolidation yields reductions in local public health system expenditures, as well as local tax burdens associated with public health services.

The statistical model based on AFR data finds that health department expenditures are lower after LHD consolidation, holding other potential driving factors constant. These results are supported by our interview data, which suggest that costs savings have been achieved in more than 90% of the cases where saving money was a goal of the consolidation. While one might also expect savings in administrative costs after consolidation, this variable did not achieve statistical significance in the model results presented above. Overall, however, these results suggest that LHDs which consolidate can reasonably expect that cost savings will occur in most cases.

By contrast, while many of those we spoke with suggested that staffing level changes occurred post-consolidation, the evidence regarding the exact nature and magnitude of those impacts appears to be variable across the consolidations in our sample. The interview evidence does not suggest that layoffs are frequent, as only 3 of the 17 cases in our sample are reported to have employee layoffs associated with them. Nevertheless, further research on pre and post-consolidation staffing levels appears to be appropriate to improve our understanding the impacts of LHD consolidation on public health workforces.

2. Hypothesis 2: LHD Consolidation Yields New Revenues for Combined Health Districts

Evidence addressing the impacts of consolidation on health department revenues is drawn from both our statistical analyses of AFR data and our interviews with senior county health officials. These findings are presented below.

a. Findings from Statistical Analyses of AFR Data

The potential to make the health department more competitive for generating nonlocal revenues such as state and federal grants is an often mentioned point in discussions of LHD consolidation. To examine this issue, we compared the pre-consolidation percent of total revenues generated from nonlocal sources with post consolidation nonlocal revenues, holding a number of other potential driving factors constant.

Table 8
Heckman Regression Results:
Logged Percent Nonlocal Revenue/All Years Post Consolidation (controlling for 1st stage selection)

Variable	Coefficient	P > [z]	95% Confidence Interval	
_Constant	3.692	0.930	-79.029	86.415
Post Consolidation	-0.417	0.002	-0.6821	-0.1518
Metropolitan Service Area	0.051	0.652	-0.170	0.272
Population Total	4.17e-06	0.000	2.88e-06	5.47e-06
Population Density	-0.0009	0.000	-0.0012	-0.0006
Year	-0.003	0.878	-0.0444	0.0380
Lambda (Mills Ratio)	0.8848	0.001	0.3761	1.393

*Percent nonlocal revenue is in logged form. Interpretation of coefficient magnitudes requires transformation, which was done to inform the narrative discussion regarding these results below.

Results from the model presented in Table 8 indicate that consolidation is associated with a statistically significant 0.51.7 percent *decrease* in nonlocal revenues. The population total is associated with a very small increase in the percentage of nonlocal revenue obtained by a health department. Population density however is found to exert a small negative influence on the percentage of nonlocal revenue.

On initial consideration, the statistically significant *negative* finding regarding the impact of consolidation on post consolidation non-local revenues is surprising because advocates of consolidation sometimes suggest that, through consolidation, the newly formed larger health department would likely be in a better position to leverage its resources to capture nonlocal sources of funding. However, our findings indicate that this suggestion may not fully address the overall organizational influences of consolidation and how those effects vary over time.

Based on study team members experience with organizational change and past work (Hoornbeek, et al, 2012), it was suggested that perhaps at least part of this decrease in nonlocal revenue may be an artifact of work process disruptions created when health department staff are involved in dealing with consolidation issues and are therefore not fully pursuing their normal functions that include grant writing and other activities that generate nonlocal revenue. We conducted two sets of additional statistical tests of AFR data to investigate this explanation. When we focused the analysis of the post consolidation period on only the first two years after consolidation, we found that the size of the effect on the generation of nonlocal revenues is even larger than when considering all years post consolidation in the model. The results of this alternative model specification are displayed in Table 9. The statistically significant 0.611 decrease in nonlocal revenue is almost 18 percent higher than observed in our original model; this suggests a stronger influence on nonlocal revenue generation the closer the window of observation is to the actual consolidation event. This is consistent with the suggestion that disruptions in work processes associated with merging two organizations may hinder the ability of staff to pursue external revenue such as grants -- at least in the short term.

Table 9
Heckman Regression Results:
Logged Percent Nonlocal Revenue/Two Year Post Consolidation (controlling for 1st stage selection)

Variable	Coefficient	P > [z]	95% Confidence Interval	
_Constant	-4.97	0.918	-99.239	89.296
Two Year Period Post Consolidation	-0.477	0.000	-0.7212	-0.2332
Metropolitan Service Area	0.087	0.475	-0.1511	0.3242
Population Total	3.298e-06	0.000	3.01e-06	4.94e-06
Population Density	-0.001	0.000	-0.0013	-0.0008
Year	0.001	0.955	-0.0456	0.0483
Lambda (Mills Ratio)	0.4785	0.010	0.1164	0.8407

*Percent nonlocal revenue is in logged form. Interpretation of coefficient magnitudes requires transformation, which was done to inform the narrative discussion.

To further examine the plausibility of a "disruption effect" explanation for the decrease in nonlocal revenues, we re-estimated the model using a post consolidation period that was shifted so as to begin two years after the actual consolidation occurred. There are statistical power concerns with changes in the specification of any model that may result in a reduction in sample size; this is particularly true with the present research because of the limited sample of consolidations available to study. Roughly half of the consolidations in our sample occurred between 2008 and 2011 and 3 (27%) occurred in 2010 meaning that when the post consolidation period was shifted by two years, these consolidations were lost from the analyses. Nevertheless, findings from this re-specified model are presented in Table 10.

Table 10
Heckman Regression Results:
Logged Percent Nonlocal Revenue/Delayed Post Consolidation (controlling for 1st stage selection)

Variable	Coefficient	P > [z]	95% Confidence Interval	
_Constant	89.39	0.024	11.8807	166.8951
Post Consolidation Period Shifted Later	-0.019	0.878	-0.2650	0.2265
Metropolitan Service Area	0.1042	0.333	-0.1067	0.3150
Population Total	4.01e-06	0.000	2.93e-06	5.08e-06
Population Density	-.0013	0.000	-0.0016	-0.00096
Year	-0.0459	0.020	-0.0845	-0.0073
Lambda (Mills Ratio)	0.6307	0.004	0.2051	1.056

*Percent nonlocal revenue is in logged form. Interpretation of coefficient magnitudes requires transformation.

When we shifted the post consolidation period to begin two years after the actual consolidation occurred, we observed a change in the significance of the coefficient for pre/post differences in nonlocal revenue. While the coefficient remains negative, the results are no longer statistically significant. The shift from a strong negative association in the previous two models to an insignificant result in this model is consistent with the concept that the actual process of consolidation disrupts the short term ability of health departments to pursue nonlocal revenues, but as time moves further from the point of consolidation this influence appears to disappear. This is a question that should be revisited in the future as further data and more consolidations become available for study.

b. Findings from Interviews

We also asked our sample of senior county health officials about revenue flows to their public health system, and their perceptions of the impacts of LHD consolidation on those revenue flows[12]. The responses are reported in Table 11. Overall, they suggest that more of the jurisdictions affected by the consolidation *did not* experience revenue increases than those which *did* experience revenue increases after the consolidation went into effect.

However, among the few cases where revenues from external sources increased, the respondents attributed the revenue increases to the consolidation. In other words, according to this subset of respondents, the consolidation did have positive impacts on revenue flows to their public health system. For example, all (100%) of the respondents who said increases in external grant revenue and program revenues (3 of 17 and 5 of 17, respectively) indicated that the revenue increases were "at least partially attributable to (the) consolidation". In addition, the majority (5 of 6, or 83%) of those respondents reporting increases in overall revenue indicated that those increase were at least partially due to the consolidation. By contrast, comparatively few of those who indicated a lack of revenue increases post consolidation attributed them to the consolidation in whole or in part. Those who did tended to point to the disruption of the transition to a consolidated health department and its negative effects on grant writing processes or other transitory factors associated with the transition to a consolidated health department. This latter set of comments is consistent with the disruption effect hypotheses discussed in relation to the statistical analyses of AFR data presented above.

[12] It is important to note that our questions regarding revenue flows after consolidation referred to the public health system, rather than the newly consolidated department. In this context, we asked respondents to consider revenues to both of the two departments that consolidated (the city department and the county department) as they assessed whether revenues had increased or decreased.

Table 11
Perceptions of Senior County Health Officials:
Post Consolidation Changes in Public Health System Revenues

	Perceived Revenue Change Within One Year after Consolidation: Proportions of Respondents (%)		
Type of Revenue	**Revenue Increased**	**Revenue *did not* Increase**	**"I don't know"**
External Grant Revenue	3/17 (18%)	11/17 (65%)	3/17 (18%)
Program Revenue	5/17 (29%)	9/17 (53%)	3/17 (18%)
Overall Revenue	6/17 (35%)	8/17 (47%)	3/17 (18%)

While the results presented above relate to overall revenues to the public health *systems* (ie. both the city and the county health departments combined pre-consolidation), we also asked about whether revenue flows to the new unified county health *departments* from "tax based sources (state aids, local levies, etc.)" increased. The responses we received here were positive. All sixteen of our responding senior officials reported increased tax-based funds flowing to their county health departments after the consolidation. Two frequently cited sources of this new revenue were contract payments (which are drawn from municipal tax dollars) from the city to the county to support public health services to the city which consolidated and state aid increases associated with population growth within their jurisdictions (due to the fact that the people who lived in the city became a part of the county health department's jurisdiction). So, while the interview data yield mixed findings regarding overall revenue flows to the public health system, it suggests that county health departments consistently receive new revenue to help support their expansion of services into the cities that are incorporated into their jurisdictions.

c. Summary of Findings from Statistical Analyses and Interviews

Contrary to our expectations (and hypothesis 2), consolidation appears to yield *reductions* in external revenues to the public health system rather than increases, at least in the short term (within the first year or two after consolidation). However, there is statistical evidence in the analyses above that this may be a temporary effect, which is associated with the transition to a consolidated health department. These statistical results are supported by our interview data, which also suggest that reductions in external revenue are common in the time period immediately following consolidation. These data also suggest that disruptions in health department activities may be generated by the consolidation process, and this may contribute to reductions in external revenues during the first year or two after consolidation. Further research is appropriate to discern whether external revenues grow after the initial transition period has passed.

The senior officials we interviewed also reported increases in external revenues flowing to the county health *department* (as opposed to the overall public health system, as is reported in the statistical results above). All sixteen of the reporting senior county health officials indicated that their department received additional revenues from tax based sources as a result of the consolidation. These sources included contract funds from the city to pay for services for their residents and increases in state aids due to the expanded size of the country health jurisdiction. Thus, while the public health system as a whole may not generate new external revenues quickly due to disruptive effects of the consolidation on grant and fee revenue generation, the participating county health departments do appear to receive new revenues to offset the costs of providing services to the residents of the cities involved in the consolidation.

3. *Hypothesis 3: LHD Consolidation Yields Public Health Service Improvements*

Because we did not collect data on the services provided by health departments in Ohio, our findings here are based entirely on the perceptions of the senior public health officials we interviewed. As is noted above, we collected data on whether or not service quality improvement was a stated goal of the consolidation, and whether or not the health officials we interviewed perceived that this goal was achieved. We also asked those we interviewed about whether or not public health services were maintained and improved over time, as well as whether positive public health impacts increased after consolidation. And finally, we also asked about the extent to which the mix of services changed after consolidation. The discussion below reports our interview findings in each of these areas.

Service improvement was a commonly stated goal for the health department consolidations that occurred in Ohio between 2001 and 2012. Of the seventeen senior county officials we interviewed, eleven (65%) asserted that service improvement was a stated goal of their consolidation, and several of these respondents suggested that it was *the* key goal for their consolidation. Perhaps more importantly, however, all eleven (100%) respondents who asserted that service improvement was a goal of their consolidation also reported that this goal was achieved after the consolidation took place.

Our respondents also commented on the impacts of the consolidated health department on the maintenance of existing public health services, public health service improvement, and the perceived impacts of public health efforts over time. Table 12 reports on the extent to which respondents agreed (or strongly agreed) that public health services were maintained, improved, and positively impactful at three distinct points in time (one year, two years, and five years) after their consolidation took place. Overall, the results suggest that the service benefits of consolidation, as perceived by local public health leaders, began to accrue relatively quickly in most cases.

Table 12
Senior County Health Official Perceptions of the Effects of LHD Consolidation on Public Health Services and Impacts Over Time

	During the First Year of Transition #(%) Agreeing or Strongly Agreeing*	Two years after the Transition #(%) Agreeing or Strongly Agreeing*	Five years after the Transition #(%) Agreeing or Strongly Agreeing*
Public health services were at least maintained at existing levels.	16/17 (94%)	17/17 (100%)	9/9 (100%)
Public health services were improved	12/17 (71%)	14/17 (82%)	8/8 (100%)
Increased positive impacts on public health	14/15 (93%)	15/16 (94%)	9/9 (100%)

*Totals in the numerators reflect the proportion of direct responses in which the respondent "strongly agreed" or "agreed".

While these results on services and public health impacts are generally positive, a number of our respondents pointed out that the transition to a consolidated department holds potential for disruption, a finding that is supportive of the points made above regarding the impacts of consolidation on external revenues. While four of seventeen respondents reported that their transition to a consolidated health department was "smooth and without problems", seven suggested that their consolidation was "orderly, given the magnitude of the changes" (7/17). On the other hand, however, six of the seventeen reported that the transition was either "an ongoing process, with expected ups and downs" (4/17) or "very difficult and problematic" (2/17). It is important to point out, however, that perceptions of the disruptive effects of transitions to a consolidated health department may vary across the audiences involved, so these perceptions may not be representative of the overall perceptions of health department staffs.[13]

There were also cases revealed in our interviews where consolidations appear to have affected the mix of services provided in the community. Seven of seventeen (41%) interview respondents reported that the consolidation yielded a change in the mix of public health services provided in their communities. Four of these seven respondents reported that they viewed this change in service mix as a positive thing. Overall, the most frequently mentioned service area to have experienced a benefit as a result of the consolidation was environmental health, as multiple respondents suggested that larger and more extensive environmental health staffs associated with county health departments stepped in to assist cities which did not have extensive staff capabilities in this area.

It is also important to recognize that our respondents indicated that there were service losses in a number of cases. In total, eight of our seventeen respondents indicated that a service loss of some kind took place as a result of their consolidation. However, seven of these eight respondents said that they did not view these service losses as a negative change. In many cases, these county health officials noted that the services being provided were ineffective, and that by discontinuing the services they were able to reallocate the dollars from that service and put them to use in more effective ways. Often times the discontinued services reflected "old school" public health services focused on providing services to individuals, such as through home health nursing services, and other low impact forms of services. Another example of a discontinued service that was not seen as a negative change included a city that consolidated its health department no longer providing death records. The city had only been providing a limited number of death records and residents had already had to travel to a nearby city for all other vital statistic records prior to the consolidation. This impact was seen as minimal.

Overall, these findings from our interviews suggest that most senior county officials perceive that LHD consolidation had positive net effects on public health services within their jurisdictions. Perhaps the most common perception reported was that small city health departments were having trouble providing the full range of needed services, and that consolidation enabled county expertise and resources to be applied more fully to the provision of enhanced services in the affected cities, which – in at least some cases – appear to have been operating without sufficient staff. It is worth noting, however, that perceptions of the impacts of LHD consolidation on public health services may vary (see Hoornbeek et. al, 2012), so further research is appropriate in this area.

[13] For a discussion of differences in viewpoint on the potential disruptive effects of the transition to a consolidated health department, see Hoornbeek, Budnik, Beechey, and Filla, 2012. This investigation of the Akron-Summit County and Barberton-Summit County mergers "one year later" found that agency leaders tended to believe that transitions to consolidated agencies were less disruptive than line agency staff.

4. LHD Consolidation Enhances Public Health Capacities

We asked senior county health officials in our sample questions about the impacts of LHD consolidation on their departments' capacities to provide quality services and improve public health within their jurisdictions. We asked about the extent to which long term capacity building was a stated goal of consolidation. We also asked about whether that goal had been achieved by those who pursued it, as well as about the overall impacts of consolidation on public health capacities across the jurisdictions in our sample. The discussion below summarizes our findings from these inquiries.

Six of our seventeen respondents (35%) indicated that building long term capacities was a stated goal of their departments' consolidation effort(s). Five of these six (83%) respondents reported that their department was successful in achieving the capacity building goals they had sought. Thus, in spite of system-wide net reductions in expenditures (and staffing in some cases), it appears that county health department leaders believe that consolidation can have a positive effect on their capacities. Some officials pointed out that they gained capacities in certain areas when they hired staff members from city health departments who brought new kinds of experiences and capabilities to the county health department. This kind of impact was particularly prevalent in cases where the consolidation required the county health departments to take on new kinds of services for urban areas (with which they were not previously familiar). Others noted that the county health department already had a greater capacity than the smaller city departments with which they merged, and felt that in some cases they already had the capacity to absorb the new jurisdiction with their current workforce. This suggests any additional staff or revenue the county departments picked up from the city departments may have helped to bolster that county health department's capacity.

We also asked about the impacts of consolidation on the capacities of all (not just the six consolidations for which long term capacity building was a stated goal) of the health departments in our sample on their "capacity to provide quality health services". Overall, nine of the seventeen respondents (53%) reported that their capacity increased as a result of (the) consolidation, while the eight remaining respondents reported that their capacities "stayed about the same" (6/17, or 36%) or "decreased" (2/17, or 12%). These findings suggest that at least some health department leaders believe they have enhanced their own department's capacities through consolidation, even though net reductions in expenditures and staffing for the local public health systems are evident in a number of cases. Thus, in many cases, while net public health expenditures for the local public health system decreased post-consolidation, the revenue coming into the county health department increased after consolidation (usually from a contract with the city and/or increased state aid), thus increasing county health departments' capacity to provide services.

In summary, while our interview data suggest that capacity enhancement was a stated goal of consolidation in about one-third of the cases and that this goal was achieved in most of these cases, they also suggest that a majority of the county health department leaders in our sample view consolidation as a means by which they have increased their health departments' capacities --- in spite of mixed or negative impacts on public health system revenues and staffing levels after consolidation in a number of cases. Further research is appropriate to improve our understanding of the long term impacts of LHD consolidation on public health capacities in Ohio, and probably elsewhere as well.

5. LHD Consolidation Yields New Opportunities for Positive Change

One potential benefit of consolidating health departments (in Ohio and elsewhere) is that it may yield opportunities for changes in the way(s) in which public sector leaders and staff view and carry out their public health service work. If these changes are in fact positive, they may affect both public health services and public health system capacities in positive ways.

In Summit County, Ohio – for example -- where two city health departments have recently merged with the county health district, public health leaders reported that consolidation helped yield new opportunities to re-think their ways of doing business, and that this represented an advantage that ended up flowing from consolidation (Beechey et al., 2012). To gain at least an initial sense of the extent to which this kind of advantage of LHD consolidation may be widespread, we asked our interview respondents to let us know whether their consolidation "yielded new opportunities for future public health improvements" at various points of time after the consolidation took place. Table 13 documents their responses.

Table 13
Perceived Impacts of Consolidation on New Opportunities for Public Health Improvements

		Senior County Health Official Response		
	Time Period	Agree***	Disagree**	Non-committal*
"Consolidating public health services yielded new opportunities for future public health improvements (insert time period) after the consolidation took place."	Within one year	10/16 (62.5%)	2/16 (12.5%)	4/16 (25%)
	After two years	12/16 (75%)	2/16 (12.5%)	2/16 (12.5%)
	After five years	9/9 (100%)	0/9 (0%)	0/9 (0%)

*Non-committal – indicated "I don't know" or "Neither agree nor disagree"
** Disagree – indicated "disagree" or "strongly disagree"
*** Agree – indicated "agree" or "strongly agree"

The interview results reported in Table 13 suggest that the vast majority of senior public health officials in our sample believe that their consolidation yielded in new opportunities for public health improvements. Their responses also suggest that these opportunities may grow over time. While almost 63% of our respondents cited these kinds of opportunities within the first year of consolidation, 100% of the respondents whose consolidations had been in effect for five or more years cited this kind of positive growth in opportunities for improvement. While the responses here suggest that new opportunities may grow from consolidation efforts, further research is appropriate to understand the nature of these opportunities more fully and to ascertain their long term impacts.

Implications

The research findings presented above have implications for local and state policymaking in Ohio. They also have potential national implications and yield insights regarding directions for future research. The four following subsections discuss the implications of this work in these areas.

1. Implications for Local Policymaking in Ohio.

Overall, our findings are encouraging for local officials in Ohio who are contemplating consolidation of city and county health departments. The pictures painted by the senior county health officials we interviewed are – for the most part -- positive ones. They illustrate that cost savings and service improvement are common goals for city-county health department consolidations in Ohio. More importantly, the officials we interviewed report that they believe these cost saving and service improvement goals were actually achieved post-consolidation more than 90% of the time.

While our statistical results do not address the issue of public health service improvement, they do support the positive findings on city-county consolidations in Ohio with respect to cost savings. Municipal officials in Ohio who are contemplating a contract for public health services or a merger with their county health department as a cost saving measure can take encouragement from our findings that savings have accrued to cities that have consolidated their health departments with their counties since 2001, without major reported declines in services. For their part, county health department officials may be reassured that agreeing to provide public health services to a city need not result in a diversion of resources to meet the city's needs, nor an increase in the tax burdens to citizens for support of their county health department.

For these (and other) reasons, most of the senior local health officials we interviewed viewed their consolidation as "a good idea". Eighty eight percent (15 of 17)[14] of our responding senior county health officials expressed this view for their particular cases of consolidation. It is worth noting in this context that only one city from among all of those that have consolidated since the turn of the century (Salem) has chosen to reconstitute its city health department post- consolidation.

It is also noteworthy, however, that our statistical findings provide only minimal support (at best) for the idea that consolidation yields reductions in administrative costs through the economies of scale that larger agencies serving larger populations are thought to enjoy. The negative coefficients in our statistical results -- while suggesting that consolidation may yield downward pressure on administrative costs -- fail to achieve statistical significance.

Likewise, we find little evidence in the financial data to support the frequently heard assertion that larger consolidated LHDs are more successful in competing for outside grants and revenue. Indeed, our findings suggest that the opposite may be true in the short run, as consolidations may have disruptive effects on LHDs' ability to pursue new outside funding opportunities within the first two years after consolidation. This finding was re-enforced by comments made by the senior county health officials we interviewed. Our statistical analyses, however, suggest that this effect may be short lived, as the statistical significance of the decrease in non-local revenue disappears in our results after two years.

2. Implications for State Policymaking in Ohio.

Our findings are also encouraging for those at the state level in Ohio who have sought to encourage collaboration and consolidation among local governments generally, and local health departments in particular. However, our findings in this regard are relatively narrow in that they relate only to city-county consolidations – and, in this regard, they appear to relate disproportionately to smaller cities and larger counties. In this and other senses, our findings also highlight the value of additional research on the impacts of health department consolidation to guide future state actions by addressing questions that are not fully or adequately addressed by this study.

In recent years, the State of Ohio has placed substantial emphasis on encouraging local governments to collaborate with one another. Under Democratic and Republican Governors alike, state policymakers have supported both studies and actions to improve the efficiency and effectiveness of local government by enhancing collaboration and encouraging consolidations among government entities where appropriate.

[14] The two non-positive responses included one "no" response and one "I don't know" response.

These efforts have been pursued with particular aggressiveness in recent years by the Kasich administration and the state legislature. They have enacted legislative changes to:

1) Reduce the obstacles facing governments who seek to collaborate;
2) Create a new Local Government Innovation Fund (LGIF) grant program to encourage collaboration and consolidation, and;
3) Tie state funding support for public health services to demonstrated health department capacities.

Indeed, through this latter change, the Ohio legislature enacted of a law authorizing the Ohio Department of Health to compel LHDs to seek accreditation by 2018 and become accredited by 2020 or face the loss of state funds. This change is yet another impetus for small LHDs to pursue service sharing agreements with their larger neighbors and/or LHD consolidations.

Because the findings here suggest that cost savings result from consolidations of city and county health departments in Ohio, they also suggest that state actions to foster such consolidations are likely to reduce the costs of local public health services. They also make it clear that such actions may require transitions on the parts of the LHDs involved, and these transitions may be at least temporarily disruptive in some cases. Even so, our findings also suggest that leaders of these consolidated county health departments believe that the long-term benefits of consolidation are likely to make these transition efforts worthwhile in most cases.

While these implications for state policymaking are reasonably clear, further research is appropriate to investigate the extent to which the findings here regarding city-county consolidations apply to other forms of consolidation – such as might occur among county health departments for example. At the same time, while the dominant impression emerging from our interviews with county health officials regarding the impacts of consolidation is that the consolidations in our sample yielded service and capacity improvements, the empirical justification for these perceptions is not (at least as yet) strong.

Discussions about consolidation among LHDs in Ohio are likely to continue with the ongoing financial strains facing local governments, and this study provides evidence supporting some of the common arguments made in these discussions, even as it modifies – and calls into question – other arguments that are often made. In this sense, perhaps one of the more important implications of this study is that the State of Ohio would be likely to benefit from investigating the likely consequences of consolidation both across a broader range of potentially consolidating entities and on the capacities and services of the resulting unified departments. We return to this point in our discussion below, after briefly reviewing the national implications of this study.

3. Implications at the national level.

In their decade-old discussion of the future of public health in the U.S., Baker and Koplan (2002) suggested that in the coming years there would be widespread consolidation among local public health agencies. Their prediction that the number of health departments would drop from roughly 3,000 to one third or less of that number may have seemed bold at the time and while we are far from those levels of reductions at present, a comparison over time of the number of local health departments reported by the National Association of County and City Health Officials (NACCHO) Profile studies indicate that the numbers are decreasing. In the year 2000, there were an estimated 2,912 local health departments operating in the U.S. By 2010, that number had decreased to roughly 2,565 (NACCHO Profiles, 2001 and 2010). This process is clearly in motion in Ohio, where health department consolidations have become relatively common in recent years.

In this respect, the current trend of health department consolidations occurring in Ohio provides a laboratory for the nation through which to study this phenomenon. This is facilitated by the Annual Financial Report (AFR) data system maintained by the ODH, which permits longitudinal change studies to be conducted for a wide range of indicators associated with health department finances and operations. While there are certainly limitations to the data in the AFR system, from a comparative perspective it is among the nation's most developed data systems for tracking local health department operational information. When coupled with the eagerness of public health leaders in the state to actively engage in the process of studying the effects of consolidation, this makes Ohio a rich repository of experience with one of the most prominent features of organizational change occurring in the U.S. public health system.

Our findings indicate that consolidation of city and county health departments may lead to reduced overall expenditures when compared to the total being spent by the two separate agencies prior to consolidation. In the current fiscal environment, reductions in expenditures may be viewed positively by local governments. It is important to emphasize, however, that we had limited ability in this study to address what these reductions in expenditures may reflect in terms of service delivery and quality. This is particularly true given that observed reductions in administrative expenditures were not statistically significant, raising the potential that a portion of the reductions in expenditures may be arising from reductions in services. While the local health department officials we interviewed did acknowledge service losses in some cases, they generally argued that these losses were not large or consequential. At the same time, they also suggested overwhelmingly that consolidation had positive impacts on service quality and impact in their particular cases. However, because these viewpoints are not (at least yet) backed by hard data on service provision and could be viewed by some as biased, further research and investigation is appropriate before this perceptual evidence can be viewed as compelling.

Our findings that, at least in the short term, the effect of consolidation on nonlocal revenue generation is negative indicate that consolidation may have a (transient?) disruptive effect on the processes and performance of the newly combined health department. As noted above this viewpoint is also echoed by comments heard during our interview processes. This kind of effect is consistent with what has been observed in many industries, so it should come as no significant surprise. However, it does warrant consideration by decision makers so that should they elect to pursue a strategy of consolidation, any potential process disruption effects can be incorporated into the transition plan.

Libbey and Miyahra found in their 2011 review of cross-jurisdictional relationships in public health that the vocabulary of transformation in organizational alignment and service sharing among local health departments is complex and varies by context. We use the term "consolidation" in this study to refer to instances where two local health departments enter into a legal agreement that combines their operations, either through contracting for full service delivery or actual legal merger of the entities. In other settings this term coveys a different meaning. For instance, in the state of North Carolina the term "consolidation" refers to the realignment of standalone local health departments into combined multipurpose social services agencies that provide not only public health services but numerous other types of human service programs.

Even within the context of "consolidation" as we are using the term, there are significant nuances that must be considered. In the Ohio context, consolidations are occurring primarily between city health departments and county health departments. In other areas of the country, consolidations -- as we have termed them -- are occurring or are being considered by not only cities and counties but also by counties with other counties and even multicounty regional groups.

Because of these differences in the characters of consolidation activity, it must be recognized that the findings of this study may not be directly reflective of the potential outcomes of other forms of consolidation around the nation. However, 21% of the nation's health departments are operated by municipal governments, thus making these findings potentially instructive to a large group of local public health agencies (NACCHO Profile, 2010)[15].

4. Implications for future research.

Consolidation among local health departments is a prominent and growing phenomenon within Ohio and across the nation. Because of the significance of this trend in organizational restructuring of local public health services, it is important that the public health practice and policy making communities have access to timely evidence developed through the most robust analytical methods practicable and available. In this study, we use a "multiple methods" approach that takes advantage of a state-wide supply of longitudinal data and the insights of knowledgeable and experienced public health practitioners. By relying on reported financial data and the expertise of the local public health officials interviewed as a part of this study, we increase our confidence in the findings we provide – particularly when the results are consistent across these two broad sources of information.

However, while there are certainly advantages to this broad research strategy, there are also limitations in our data and analyses that can and should be addressed by future research. Most of these limitations are discussed in one way another above, but it is useful to summarize them here succinctly. First, the universe of LHD consolidations we investigate is limited to city-county health department consolidations in Ohio. Consequently, future research efforts may benefit from looking at LHD consolidations that are outside of this scope of investigation.

Second, while we asked the senior LHD officials we interviewed about their perceptions regarding the impacts of consolidation on services and health department capacities, the data we collected in these areas are perceptual and potentially subject to biases. For this reason, future efforts to measure the service and capacity related impacts of LHD consolidation more directly would be appropriate. Our statistical analyses of AFR data did not address these measures (because the data on them were not available), so future efforts to collect service and cost data documenting the relationship between consolidation, service quality, and public health system capacities are warranted.

Third, while our statistical analyses suggest a potentially negative relationship between LHD consolidation and administrative costs, they do not achieve statistical significance. This lack of significance may mean that there is no relationship between these two variables, but it may also mean that our operational sample was not large enough to discern these effects. Further research with a larger sample of LHD consolidations is therefore appropriate to identify whether or not consolidations are likely to yield reductions in administrative costs.

Fourth, and similarly, our findings suggest a statistically significant negative relationship between consolidation and non-local revenues in the two years following consolidation. While this result suggests the existence of a disruptive transition effect, it does not address the longer term impacts of consolidation on external revenues. For this reason, further research with larger sample sizes is appropriate to determine if the disruptive short term effects are reversed in the long term.

[15] However, it may very well be that a significant portion of these city health departments are not embedded in counties with county level health departments, as is the case in Ohio.

And finally, we believe it is possible and appropriate to improve the statistical analysis strategies used in this study over time. Because of the need to deliver timely evidence to Ohio decision makers, this study utilizes statistical methods that are widely used in the literature but that do not address all potential analytical issues. In the pursuit of developing more robust evidence, reexamination of the current data with other techniques such as those that require instrumental variables and more sophisticated latent class techniques should be pursued. In addition, over the course of the next year there are expected to be a number of additional consolidations occurring. This will present the opportunity to expand the sample size used for analyses in ways that may address the third and fourth research needs identified above.

While the expenditures of a local public health department are the most visible marker of costs for the public and their elected and appointed policy makers, expenditures may not fully and directly reflect the full costs of providing particular services. It would advance the understanding of health department consolidation if future research were to examine the influence of organizational consolidation on the changes in actual "costs", the financial resources consumed, to produce defined units of public health services. This would be the more direct way of testing for the existence of economies of scale and scope being created by drawing together smaller health departments to create larger unified organizations. Research being led by the Ohio RAPHI network on the cost of producing public health services is scheduled to begin the summer of 2013. This work potentially lays the methodological ground work for the future study of the influences of consolidation on the production cost function for public health services provided by health departments and their system partners.

As discussed in the prior section of this report, consolidation is a national level issue and not solely a challenge facing the state of Ohio. Decision makers in many jurisdictions need (or will need in the future) evidence to assist in their decision making processes regarding consolidation among health departments. Expanding the current mixed methods approach to multiple states would allow for more generalizable findings to be produced. Other states such as Colorado, North Carolina, and Connecticut are currently dealing with their own variants of the consolidation debate and could potentially serve as other study sites for a broader investigation of consolidation's effects on local public health organizations.

Conclusion

While the scholarly literature has begun to address the impact of size on economic efficiency in public health service provision (Santerre, 2009) and the likely effects of health department capacities on the quality of services provided (Mays et al., 2006), it has not yet done a good job of investigating the motivations for, and impacts of, actual LHD consolidations in a defined universe of health departments over time. This kind of study is valuable, however, because it holds the potential to enable state and local policy makers to learn from the experiences of LHD consolidations that have occurred in the past, thus enabling them to make decisions regarding future policy directions that are well informed by past experience.

With the release of this "quick strike" study and the policy brief accompanying it, we contribute to current policy discussions in Ohio concerning the value of consolidating city and county LHDs. We find that city governments and leaders have often been key instigators for efforts to consolidate the operations of their city health departments into the operations of the county health departments that serve surrounding communities within their county. We also find that a history of general fund balance deficits and "Strong Mayor" type governance systems appear to be more likely to consolidate their health departments than cities that do not share these characteristics.

Importantly, we also find evidence from both statistical analyses and targeted interviews that recent LHD consolidations in Ohio have resulted in reduced public health expenditures across the affected jurisdictions. We also find that the financial positions of most consolidated county health departments do not appear to have been impaired as a result of the consolidations they experienced. We also offer evidence that the process of consolidation can be disruptive, and that these disruptions may contribute to reductions in nonlocal revenue flows in the first two years after consolidation. And finally, we also find evidence indicating that leaders of the unified county health departments remaining after consolidations believe that the consolidations their departments experienced have enabled them to improve public health services. Most of these same informants say they believe that the consolidation their department experienced was "a good idea", even with the kinds of potential disruptions outlined above. However, in spite of these positive perceptions, it is important to acknowledge that we have not uncovered solid data demonstrating the service improvements that are alleged to have actually occurred.

While there is much research and investigation yet to be done to improve our understanding of the impacts LHD consolidation, the findings in this study should address some of the key questions being raised about LHD consolidation by public health practitioners in Ohio – and perhaps elsewhere as well. Our hope is that future research can build on these findings and enable policymaking improvements in Ohio and elsewhere that positively affect the structure and operations of our local, state, and national public health systems.

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List of Appendices

1. **List of LHD Consolidations that Occurred in Ohio 2001 – 2011**
2. **Wording of Key Questions from Final Interview Script**

Appendix 1

Local Health Department Consolidations (LHDs) in Ohio: 2001 – 2011			
Parties to Consolidation	Year of Consolidation	Interview Conducted?	Used in AFR Analysis
Norton (City) and Barberton (City)	2001	No	No
Martins Ferry and Belmont County	2001	Yes	No
Bucyrus and Crawford County	2002	Yes	Yes
Lancaster and Fairfield County	2002	Yes	Yes
Pickerington and Fairfield County	2002	No	No
Campbell and Mahoning County	2003	Yes	No
Reading and Hamilton County	2003	No	No
New Carlisle and Clark County	2005	Yes	Yes
Indian Hill and Hamilton County	2006	Yes	No
Bellevue and Huron County	2006	Yes	Yes
Bexley and Franklin County	2007[16]	Yes	Yes
Toronto and Jefferson County	2007[17]	Yes	Yes
Lakewood and Cuyahoga County	2008	Yes	Yes
Newark and Licking County	2008	Yes	Yes
Struthers and Mahoning County	2009	Yes	No
Norton and Summit County	2009	Yes	No
Pickerington and Franklin County	2010	Yes	No
Akron and Summit County	2010	Yes	Yes
Barberton and Summit County	2010	Yes	Yes
Marion and Marion County	2010	Yes	Yes

Sources: AFR data 2001-2010, Association of Ohio Health Commissioners (AOHC), and County Health Commissioner/Administrator Interview

[16] The contract between Bexley and Franklin County was effective on January 1, 2007.
[17] The year of consolidation between Toronto and Jefferson County is based on the year AFR data was no longer available for the City of Toronto's health department.

Appendix 2: Wording of Key Questions from Final Interview Script

The Consolidation: Why It Occurred?

1) In your recollection, who initiated the discussion about this consolidation? _____ IDK_____

2) What were the original stated goals of the consolidation your health department took part in?

a. Save money? _____

b. Increase efficiency? _____

c. Improve services? _____

d. Build long term capacities? _____

e. Other, please specify?: _____

f. I don't know _____

a. Did these goals change over time? Yes No IDK

- If yes, how did these goals change over time?

- If yes, what led to these changes in goals? What were the drivers of change?

3) Was there cross-jurisdictional sharing of services and/or resources occurring among the health departments involved within the last 5 years before consolidation? Yes _____ No _____ IDK ____

a. If yes, could you briefly describe the cross-jurisdictional sharing that was occurring?

i. Services:

ii. Resources:

Impacts

1. In your view, did the consolidation achieve its stated goals (as you described above)? Please answer all that apply, based on your response(s) to question B. 1.

A. Save Money Yes _____ No _____ IDK _____

B. Enhance Efficiency Yes _____ No _____ IDK ____

C. Improve Services Yes _____ No _____ IDK _____

D. Build Long Term Capacities Yes _____ No _____ IDK ____

E. Other, please specify _____ Yes _____ No _____ IDK ____

A. For stated goal A, please explain how the goals were met or how the results fell short of the desired goals? (if applicable)

B. For stated goal B, please explain how the goals were met or how the results fell short of the desired goals? (if applicable)

C. For stated goal C, please explain how the goals were met or how the results fell short of the desired goals? (if applicable)

D. For stated goal D, please explain how the goals were met or how the results fell short of the desired goals? (if applicable)

E. For stated goal E, please explain how the goals were met or how the results fell short of the desired goals? (if applicable)

2. To characterize your public health system's (the system here is defined to include local public sector expenditures for the jurisdictions covered by the consolidation) *revenue* changes one year before the consolidation and one year after the consolidation, please answer true (T) or false (F) to the following statements? (where "tax burdens" are referred to here, the words refer to burdens associated with public health services).

A) T ____ F _____ IDK_____ Tax burdens (for PH services) on local citizens within your original jurisdiction for public health services did not increase

a. Was this at least partially due to the consolidation? Y____ N _____

b. Did this change over time (eg. After one year)? Y____ N _____ Explanation:

B) T_____ F _____ IDK_____ Tax burdens (for PH services) on local citizens within the other original jurisdiction for public health services did not increase

a. Was this at least partially due to the consolidation? Y____ N _____

b. Did this change over time (eg. After one year)? Y____ N _____ Explanation:

C) T ____ F _____ IDK_____ Tax Burdens (for PH services) on local citizens in your original jurisdiction were actually reduced

a. Was this at least partially due to the consolidation? Y____ N _____

b. Did this change over time (eg. After one year)? Y____ N _____ Explanation:

D) T ____ F _____ IDK_____ Tax Burdens (for PH services) on local citizens in the other original jurisdiction were reduced

a. Was this at least partially due to the consolidation? Y____ N _____

b. Did this change over time (eg. After one year)? Y____ N _____ Explanation:

E) T ____ F _____ IDK_____ External grant revenues increased

a. Was this change at least partially due to the consolidation? Y____ N _____

b. Did this change over time (eg. After one year)? Y____ N _____ Explanation:

F) T ____ F _____ IDK_____ Program revenues from services delivered increased

a. Was this at least partially due to the consolidation? Y____ N _____

b. Did this change over time (eg. After one year)? Y____ N _____ Explanation:

G) T ____ F _____ IDK_____ Overall revenues for the public health jurisdictions involved in the consolidation increased

a. Was this change at least partially due to the consolidation? Y____ N _____

b. Did this change over time (eg. After one year)? Y____ N _____ Explanation:

Please use this space to explain further any of the answers provided above.

3. T ____ F _____ IDK_____ Revenues to your *department* from tax-based sources increased (state aid, local levies, etc) within one year after the consolidation.

a. Was this change at least partially due to the consolidation? Y____ N _____

4. Can you (easily) provide data supporting your responses regarding revenues in questions 2 and 3 above? If so, can you send it our way?

Yes ____ No _____

5. To characterize your public health system's (the system here is defined to include local public sector expenditures for the jurisdictions covered by the consolidation) *expenditure* changes one year before the consolidation and one year after the consolidation, please answer yes or no to the following statements?

A) T ____ F _____ IDK_____ Public health expenditures increased

a. Was this change at least partially due to the consolidation? Y____ N _____

b. Did this change over time (eg. After one year)? Y____ N _____ Explanation:

B) T ____ F _____ IDK_____ Public health expenditures were reduced

a. Was this change at least partially due to the consolidation? Y____ N _____

b. Did this change over time (eg. After one year)? Y____ N _____ Explanation:

C) T ____ F _____ IDK_____ Public health expenditures stayed about the same

a. Was this change at least partially due to the consolidation? Y____ N _____

b. Did this change over time (eg. After one year)? Y____ N _____ Explanation:

D) T ____ F _____ IDK_____ Grant expenditures increased

a. Was this change at least partially due to the consolidation? Y____ N _____

b. Did this change over time (eg. After one year)? Y____ N _____ Explanation:

Please use this space to explain further any of the answers provided above.

6. Can you (easily) provide data supporting your responses regarding expenditures above? If so, can you send it our way?

7. How did your department's *capacity* to provide quality public health services change as a result of the consolidation? Please check the most appropriate space below?

a. _____ increased, please explain?:

b. _____ decreased, please explain?:

c. _____ stayed about the same, please explain?:

d. _____ I do not know

8. Did the mix of public health services provided by your department change as a result of the consolidation?

Yes _____ No _____ IDK _____

a. If yes, do you believe this was a positive change? Yes ___ No ____ IDK _____
Please explain:

9. What area of public health service, if any, benefited most as a result of the consolidation? Please check one area of service below and explain in the space provided.

___ Environmental Services (septic, well, restaurants)?
___ Clinical/nursing Services?
____ Health Referral Services?
____ Health Education Services?
____ Other Services?, please specify _____
____ No service area benefited significantly

Explanation (please include information on the geographic scope of the benefit):

10. Was there a service "loss" in any community within the jurisdictions addressed by the consolidation or otherwise provided by your health department as a result of the consolidation?

Yes _____ No _____ IDK _____

a. If yes, what area of public health service experienced a "loss" as a result of the consolidation? Please check one area of service below and explain in the space provided.

____ Environmental Services (septic, well, restaurants)?
___ Clinical/nursing Services?
____ Health Referral Services?
____ Health Education Services?
____ Other Services?, please specify _____

Explanation (please include information on the geographic scope of the "loss"):

b. If yes, do you believe this was a negative change? Yes ____ No ____
Please explain:

11. Did overall county public health staffing levels change by consolidating?

Y _____ N _____ IDK _____
If so, do you know how did changed? If yes, by how many people?
(+ or -)_____FTE or ____% (within one year?)
(+ or -) _____FTE or ____% (since the consolidation?)
Can you provide data to document these changes? If so, can you (easily) send it our way?

12. Were there employee layoffs as a result of the consolidation?

Yes _____ No _____ IDK _____

If yes, please explain and quantify the numbers:

13. How would you describe the transition from two departments into one integrated department? (check the answer that best fits your understanding and recollection)

_____ Smooth and without problems

_____ Orderly, given the magnitude of the changes

_____ An ongoing process, with expected ups and downs

_____ Very difficult and problematic

_____ A major problem with very negative consequences

_____ I don't know

14. Please indicate the box that best reflects your views regarding these statements describing the impacts of the consolidation (as best you understand/recall them) at various points of time after implementation. If you do not know, please indicate that this is the case.

Statement *Regarding Changes in Services/Efforts as a whole*	**Strongly Agree**	**Agree**	**Neither agree or disagree**	**Disagree**	**Strongly Disagree**
A.1.Services provided by the consolidated department were at least maintained at existing levels during the first year following implementation of the consolidation.					
A.2.After two years?					
A.3.After five years (if applicable?)					
B.1.The delivery of public health services by the consolidated department improved within one year of consolidation taking place.					
B.2. After two years?					
B.3 After five years (if applicable?)					
C.1.The consolidated department increased its positive impacts on public health in the community within one year after implementing the consolidation.					
C.2. After two years?					
C.3. After five years (if applicable?)					
D.1. Consolidating public health services yielded new opportunities for future public health improvements within one year after the consolidation took place.					
D.2. After two years?					
D.3. After five years (if applicable?)					
E.1. The consolidation of public health services yielded financial benefits and savings within one year after the consolidation took place.					
E.2. After two years?					
E.3. After five years (if applicable?)					

Please use this space to comment on your reactions to the statements above and/or your responses to them?

15. In retrospect, do you think consolidating the health departments was a good idea?
Y _____ N _____ IDK _____

a. Why or why not?

16. If we are going to understand your county's experience with consolidating health departments, what else should we know?