Background:

Differences in Methods and Specific Issues Encountered:

Education
Early in the preparation of data files for Phase 1 analysis, we found high levels of unknowns on several key variables. To place a fetal-infant death in the matrix, information on both age at death and birthweight is required. Of the original 775 fetal and infant deaths in King County from 1992-1995, 10 percent were excluded because of missing birthweight. An additional 7 percent of cases were excluded because of unknown maternal race. Among the remaining 651 fetal and infant deaths available for analysis, nearly 30 percent could not be placed in a socio-demographic group because either maternal age or education was missing. These cases were placed in an “unclassified” category, but offered little to further our understanding of risk for fetal and infant death. This left just 60 percent of the original 775 deaths available for analysis.

The proportion of unknowns varied by birth outcome, with the highest levels in fetal deaths. Missing data on maternal education accounted for most of the case exclusions: 41 percent of fetal deaths, 37 percent of infant deaths, and 19 percent of the live birth cohort that survived infancy had unknowns on this variable.
Maternal education was added to the Washington State birth certificate in 1992. In that year, one-quarter of King County birth certificates were missing maternal education. The percent unknown decreased to 15% in the following year, and has slowly increased since then. Incomplete reporting of education is concentrated in a few King County facilities. Four hospitals – which collectively delivered 40% of the county’s births – accounted for two-thirds of the missing education data during this period. Two of these hospitals had rates of unknown education that exceeded 30%.

The Washington State Department of Health (DOH) recently completed an evaluation of the birth certificate data collection system. As part of the evaluation process, DOH staff conducted site visits to several delivery facilities with high rates of unknown values to learn what may be causing incomplete reporting, and to identify strategies for improving data quality. Additional training and assistance on data quality issues was provided to hospitals with the release of the latest version of the electronic birth certificate system. In King County, Public Health is working with DOH to address incomplete reporting – particularly for maternal education – at local hospitals. [add more specificity]

**Phase 1 Results**

We examined fetal-infant mortality rates among King County residents for the years 1992-1995. Fetal and infant deaths were distributed across the matrix in a similar pattern as Boston and Honolulu, with the majority of the deaths falling in cells 2, 13, and 16.

In King County, where 80 percent of the population is white, the distribution of fetal and infant deaths is heavily skewed toward the reference group (white mothers age 20 or older with more than 12 years of education). Though African Americans in the county experience disproportionately high rates of infant mortality, their relatively small population size (6%) makes analysis of these rates difficult.
Nearly 30 percent of late fetal and infant deaths fell in the “unclassified” group, primarily due to missing education. This group is disproportionately non-white: 42 percent of African American feto-infant deaths are in the unclassified group compared with 25 percent of white deaths.

The feto-infant mortality rate for the King County population during the 1992-1995 period was 7.7 per 1,000 births (still + live). Birthweight proportionate mortality was concentrated in the maternal health (2.5/1,000) and infant health (2.4/1,000) sections of the matrix.

Using white mothers age 20 or older with more than 12 years of education were as the reference group, we found that the excess fetal-infant mortality rate during this period was 2.7 per 1,000 births.

An estimated 225 fetal and infant deaths would have been averted during this time period if all groups in the population had experienced the same mortality rates as the reference group. Almost half (45%) of the excess mortality fell into the very low birthweight range of the matrix, thought to be related to poor maternal health. Twenty-nine percent of the excess deaths were related to infant health issues, 15% to maternal care, and 10% to newborn care.

Excess mortality rates varied by sociodemographic subgroup, with the highest rates experienced by infants of African American adult mothers with 12 or fewer years education. Though infants born to mothers in the “other race” group (primarily Asian/Pacific Islander) with more than 12 years education had the lowest feto-infant mortality rates, white mothers were used as the reference group for consistency with Boston and Honolulu.
Infants born to mothers whose education level or age was missing on the birth certificate (the “unclassified” socio-demographic group) have high rates of excess mortality in all race groups. Due to the high level of missing education data, __% of the excess feto-infant deaths fell into the unclassified group.

In the maternal health cell group, encompassing deaths to infants weighing less than 1500 grams, African American adult mothers with no post-high school education experienced the highest rates of excess fetal and infant loss (6.9/1,000).

In the infant health area, white mothers younger than 20 and African American adult mothers with 12 or fewer years education had high rates of excess mortality (4.5 and 4.2 per thousand, respectively).

**Poverty Groups**

Since nearly one-third of the fetal and infant deaths could not be classified into a socio-demographic group because maternal education or age was missing, an alternate proxy for SES was necessary. Lacking an individual measure of income on the birth certificate, we thought that the aggregate poverty level of the census tract where the mother resided might be a reasonable alternative. Past analyses of infant mortality in King County have demonstrated the expected relationship between mortality and neighborhood income: infants born into high poverty areas of the county were significantly more likely to die in the first year of life than infants born into more affluent areas. [cite? add chart?]

To create socio-demographic groups based on neighborhood poverty level, we calculated the proportion of women age 12-64 living below the federal poverty level in 1990 for each census tract in King County. We ranked census tracts according to the poverty level, and divided them into three poverty groups: “high” (20% or more below poverty), “medium” (5-19% below poverty), and “low” (<5% below poverty). Using geocoded vital records files (each record is assigned a census tract based on the street address where the mother resided), we added poverty data from the census by matching census tracts, and were then able to stratify fetal and infant deaths by neighborhood poverty.
level. Ninety-six percent of the 651 fetal and infant deaths during this period could be assigned to an age-poverty group – a considerable improvement over maternal education.

Overall, feto-infant mortality rates among adult mothers increase slightly as neighborhood poverty level increases. However, this pattern did not hold when the data were stratified by race. For white mothers, mortality risk decreased as neighborhood poverty increased, while for African Americans and other race groups, the highest mortality rates were found in the “medium” poverty group.

- Income composition of census tracts has change since ’90 census
- Census tracts are too large (too heterogeneous) to approximate individual income
- Aggregate income is a poor proxy for individual income
- Skewed because teens are excluded