Knowing the connection between inequality and health is important because of the vast array of policies that attempt to alleviate socioeconomic inequalities in society. A large number of studies have addressed this topic using a variety of methods and data sets. However, to date there has been no comprehensive analysis of whether the link exists during the very early stages of life, and for mothers who are giving birth. These are important points in the life-course that many public policies, such as Medicaid, welfare and WIC target. However, redistribution is associated with certain losses of efficiency, and knowledge of whether there are health consequences of inequality per se is needed for a full understanding of its benefits.

Our study answers the following specific questions:

- Is there a correlation between inequality and child and maternal health at the aggregate state or MSA level?
- Does the relationship hold when we control for average income at the state/MSA level, as well as other time variant and invariant community characteristics?
- Is inequality correlated with individual health when we control for individual-level characteristics ?
- Does inequality appear to be correlated with negative outcomes for those who are less fortunate in a given society?

Our analysis of child and maternal health follows from a consideration of the mechanisms by which inequality may affect health, and from the analyses that have been performed on the general population. For example, we first consider whether there is an ecological relationship-i.e. is state level inequality related to state level health in a single year's cross-section. Although this level of analysis leaves open many possible

interpretations of the result, we start with this to compare with the findings in the early literature on this topic which has been mostly for adults.[1] We then refine our model to consider smaller levels of geography, i.e. the MSA. If inequality affects health through spending and redistribution that happens at the state level, then the MSA is not the correct unit of analysis. However, if the connection is more psychosocial and acts through peer comparisons and relative deprivation, then the MSA is a more appropriate level to consider.

A major issue within this literature is the distinction between inequality and poverty. Is it really inequality (i.e. relative disparities), or simply the absolute poverty level within a state or nation, that matters for health? The association between poverty or social class and health is well established. Thus, we next consider models that control for characteristics of the state or MSA, including mean income. If the relationship acts through inequality per se, health and inequality should still be correlated even once we control for these factors.

The more recent emphasis in the literature has been to study the relationship between inequality and health at lower levels of aggregation, and using multi-level models that enable controlling for both aggregate and individual-level characteristics. Within the U.S., most studies focus on the effect of state-level inequality on individual health (Daly et al. 1998, Kennedy et al. 1998, Blakely et al. 2000, Diez-Roux et al. 2000, Kahn et al. 2000, Lochner et al. 2001, Mellor and Milyo 2002, 2003, Subramanian et al,

[1] Until recently, these studies considered the effect of inequality on aggregate health, and found a negative association between inequality and aggregate health in the community (Rodgers 1979; Flegg 1982; Le Grand 1987; Waldmann 1992; Wilkinson 1992, 1996; Wennemo 1993; Ben-Schlomo, White, and Marmot 1996; Kaplan et al. 1996a; Kennedy, Kawachi, and Prothrow-Stith 1996a; Kawachi and Kennedy 1997; Kawachi, Kennedy, and Lochner 1997; Kawachi et al. 1997 and Lynch et al. 1998).

2001, 2003, Subramanian and Kawachi, 2003, 2004)[2], although the effect of inequality at lower levels of aggregation, i.e. census tracts (Soobader and LeClere 1999), counties (Fiscella and Franks 1997) and metropolitan areas (Mellor and Milyo 2002, Blakely et al. 2002, Sturm and Gresenz 2003) have also been considered. The results of these studies are mixed; a detrimental effect of state-level inequality on individual health appears more consistently, however, studies at the census tract, county and metropolitan area level do not provide a clear answer to whether inequality affects individual health.

Following the literature, we next consider both multilevel and fixed-effects models that look at the effect on individual health of community level inequality at the state and MSA levels, after controlling for a person's own characteristics that may affect their health. As it is more plausible that inequality has varying effects on people according to their position in society, we next consider the interaction terms between the person's socioeconomic status and their society's level of inequality. We argue that those who are towards the bottom of the distribution should see worse outcomes than those towards the top. Finally, it should be noted that unless a study uses exogenous changes in inequality to identify the model, we can only interpret results from the general literature as a whole as suggestive rather than definitively causal as health itself could plausibly affect the level of equality in a society.

We conduct our analysis using the Natality Detail data (a virtual census of birth certificates issued for US births) from 1989-2002. Our measures of inequality derive from the Decennial Censuses. We consider several measures of infant health including infant and neonatal mortality (as considered in Mayer and Sarin, 2005), birthweight, APGAR scores, and indicators of maternal health such as smoking and weight gain

[2] Cited in Subramanian and Kawachi, 2004.

during pregnancy. Smoking is a particularly important outcomes from a theoretical perspective as one hypothesis is that inequality causes social stress, which could affect health through related behavior such as the failure to quit smoking while pregnant. We also consider different forms of inequality- eg inequality in point-in-time income vs inequality in something more indicative of permanent income such as education. We next consider the level at which inequality should be measured. If inequality affects health through the tax system, then income inequality of the society as a whole should matter. However, if inequality affects health through psychosocial means, then a more appropriate measure of income inequality may be that of the closest peer group. We measure the peer group as those who are having a child in the same year in the same society when creating a measure of inequality of close peers.

Our preliminary analysis yields some intriguing results. In a pure cross-section, state level inequality and state level average birthweight are highly negatively correlated. However, once we control for time invariant and time variant state characteristics, this relationship weakens considerably. Interestingly, the pure cross-sectional result between state level inequality and state level maternal smoking during pregnancy is negatively related (with women in unequal states smoking less than women in equal states), however this relationship reverses to a strong positive relationship once we control for time variant and invariant state characteristics. These and subsequent results from our continuing analysis will add to the literature by providing information on the link between inequality and health for children and pregnant women.