

# Physicians, Families, and Population Health

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Ferrer, Palmer, and Burge<sup>1</sup> make an important contribution toward reorienting family medicine and the primary care disciplines to understand the health and illness of individuals as members of populations in a multilevel context. It is critical that the health care professions, especially those engaged in primary care, think about and act on broader, often nonbiomedical, determinants of population health while also attending to needs of patients for individualized health care.

The authors credit George Engel for having initially championed a multilevel perspective as an antidote to the biomedical reductionism that then and still now has dominated the biomedical sciences.<sup>2</sup> This perspective emphasizes social and physical-chemical-biological environmental contexts. These contexts begin with the immediate or proximal family and social networks, then extend to the household, neighborhood, and broader environments in which people live and work. They include the broader metropolitan, regional, state, national, and international contexts in which all are embedded. These social contexts may be determinants of the health of individuals that are equal to or more important than biological (including genetic) processes and biomedical treatments operative at the level of the individuals. In the end, we must understand the interactions and relationships among all of these levels.

Attending to those levels above the individual leads to a focus on the health of populations (and individuals only as a component of those populations). Sir Geof-

frey Rose had the key insight that the determinants of variations in the health of populations across time and space might be quite different from the determinants of differences in health between individuals within populations.<sup>3</sup> For example, interindividual differences in cardiovascular health within populations may be a function of individual characteristics, such as body mass, blood pressure, and lipids, or they may be a function of individual behaviors, such as smoking, eating, drinking, and physical activity. In contrast, differences in health between populations are often determined by broader social and cultural factors, (ranging from socioeconomic conditions to regulation and taxation of cigarettes, food, and pollutants, to the cultural and familial influences on health behavior). These population or macro-level factors are likely responsible for the major shifts in population health over time, for example: the rise and decline of cardiovascular disease and major cancers in developed countries during the twentieth century, or the current obesity epidemic. Because they affect so many members of a population for sustained periods, interventions that focus on these broader determinants may be more effective than individualized treatments or prevention approaches.<sup>4</sup>

Ferrer and colleagues endeavor to advance understanding and appreciation of these supraindividual determinants of population health by estimating with hierarchical linear models the proportions of general health status that "can be attributed to" individual-, family-, and community-level determinants of the physical components summary scale (PCS) and mental components summary scale (MCS) of the SF-12 in the Community Tracking Study (CTS). As the CTS included only 60 rather large communities or metropolitan areas, only 1% of the variance was accounted for at the community level. This is, however, probably a considerable underestimate, as the authors suggest, relative both to the individual-level and the family-level variation on which they focus. A more precise and nar-

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row definition of other relevant social contexts could have yielded rather different results.

Across a wide range of family types and across both physical and mental health scores on the CTS, between 13% and 25% of the variance is "attributable to" the family level, as opposed to the individual level (ie, lies between families rather than within families). Adjustment for age and family income reduces the between-family variance by 23% to 60% (of the 13% to 25% total), depending on family configuration.

As the authors note, analyses based on partitioning variability can shed only limited light on the causal importance of factors defined above the level of individuals, because small estimates of between-group variance may coexist with strong effects of specific group-level variables. Nevertheless, illustrating between-group (in this case between-family) variance is a first step in the recognition and investigation of these higher level effects. The authors go one step further in estimating how between-family variance changes as individual-level factors (eg, age), and family-level factors (income) are added to the models. The extent to which an individual-level factor such as age accounts for between-group (in this case between-family) variability will depend on the nature and strength of its association with the outcome and the extent to which age is differentially distributed across families. In the models presented by Ferrer et al, age appears to be more strongly related to the outcomes studied in the married-with-no-kids group than in the other groups studied. There may also be more age variation across families in the married-with-no-kids group, and these factors could explain the greater reduction in between-family variance found after age adjustment.

In any case, age is merely a confounder of between-family differences in the analyses presented by Ferrer et al. A more interesting question is what family-level factors explain between-family differences. The authors investigate family income as one possible family-level influence of health and find that family income generally explains an important proportion of between-family variance, especially for physical health outcomes. Family income may be an important determinant of family effects through its impact on housing location and quality, nutrition, exposure to stressful or toxic environments, or medical care. It may also be a marker

or proxy for a variety of other social and environmental characteristics that differ across families and are likely to be important to health.

The authors discuss a number of ways in which family-level factors and processes could affect health. Understanding these family influences will require further specification and empirical testing of the role of these different processes. It is also important to recognize that families themselves are situated within broader contexts. Specifying and studying these broader contexts are major challenges, as illustrated by the limitations that Ferrer et al allude to in their analyses of between-community variability. As cautiously noted by the authors, much better specified measures and analyses are needed to understand the sources of these variations (at the level of individuals, families, and broader social conditions or contexts) and hence to find appropriate interventions in social policy as well as medical practice for improving the health of the population of individuals and families in the United States and the wider world.

By moving beyond purely individual-level analyses, Ferrer and colleagues importantly sensitize health care professionals to recognize and attempt to influence variations in population health at the level of families and broader social contexts, as well as at the level of individual cases. The tradition of community-oriented primary care provides one example of how such a multilevel approach to medical care<sup>5</sup> may be possible.

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