



SOCIAL CAPITAL AND HEALTH: IMPLICATIONS FOR PUBLIC HEALTH AND EPIDEMIOLOGY

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Abstract—Public health and its “basic science”, epidemiology, have become colonised by the individualistic ethic of medicine and economics. Despite a history in public health dating back to John Snow that underlined the importance of social systems for health, an imbalance has developed in the attention given to generating “social capital” compared to such things as modification of individual’s risk factors. In an illustrative analysis comparing the potential of six progressively less individualised and more community-focused interventions to prevent deaths from heart disease, social support and measures to increase social cohesion fared well against more individual medical care approaches. In the face of such evidence public health professionals and epidemiologists have an ethical and strategic decision concerning the relative effort they give to increasing social cohesion in communities vs expanding access for individuals to traditional public health programs. Practitioners’ relative efforts will be influenced by the kind of research that is being produced by epidemiologists and by the political climate of acceptability for voluntary individual “treatment” approaches vs universal policies to build “social capital”. For epidemiologists to further our emerging understanding of the link between social capital and health they must confront issues in measurement, study design and analysis. For public health advocates to sensitise the political environment to the potential dividend from building social capital, they must confront the values that focus on individual-level causal models rather than models of social structure (dis)integration. The evolution of explanations for inequalities in health is used to illustrate the nature of the change in values. © 1998 Elsevier Science Ltd. All rights reserved

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INTRODUCTION

In a recent essay the sociologist John McKinlay states: “While still largely overlooked in epidemiologic thinking, social system influences... may account for as much (if not more) of the variation in health and/or illness statistics as do environmental influences, or even the attributes and lifestyles of individuals” (McKinlay, 1995, p. 2).

Similarly, in a fascinating book on the Roseto story of the influence of cultural and social cohesion on community rates of cardiovascular disease Wolf and colleagues comment: “While it is the individual who either gets sick and dies or doesn’t and while individual genetic disposition is an important consideration in assessing the likelihood of a disease, the fact that there are striking differences in the prevalence of many diseases from time to time in the same country and from place to place on the globe strongly suggests inquiry into the social environment. Nevertheless, current emphasis in research has been on individual behaviours chiefly involving food, exercise and smoking... where little attention has been accorded the possible influence of social forces in family and community” (Wolf and Bruhn, 1993, p. 3).

These are radical statements indeed, especially when judged against where the lion’s share of our

resources and intellectual energies are currently directed to alleviate illness. Public health practitioners give much attention to screening, immunisation, lifestyle change, or risk-factor modification but discuss little the need to (wo)man the barricades in the name of radical social system change for health. As the “basic science” of public health one might expect epidemiology to provide the ammunition for public health practitioners to focus less on the individual and more on the social system’s influence on health. With a few exceptions (Patrick and Wickizer, 1995; Kawachi and Kennedy, 1997; Shy, 1997; Wilkinson, 1997) it does not.

Indeed, there is an imbalance of effort in both public health and epidemiology. On the one hand millions of dollars are committed to alleviating ill health through individual intervention. Meanwhile we ignore what our everyday experience tells us, i.e. the way we organise our society, the extent to which we encourage interaction among the citizenry and the degree to which we trust and associate with each other in caring communities is probably the most important determinant of our health. For instance, both our resistance to the common cold virus (Cohen *et al.*, 1997) and our use of and satisfaction with health care services (Ahern *et al.*, 1996) are significantly dependent on the cohesiveness of our social milieu.

In this paper I will make a small contribution to redressing the imbalance and suggesting some ways to move forward in both our epidemiologic research and our public health practice to reflect the emerging realisations about the importance of our social systems to health. Put simply, individuals (and their ill-health) cannot be understood solely by looking inside their bodies and brains; one must also look inside their communities, their networks, their workplaces, their families and even the trajectories of their life.

REVISITING THE INFLUENCE OF SOCIAL SYSTEMS

These are not new ideas. When John Snow removed the handle from the parish pump to "cure" an epidemic of cholera he was one of the first to practice what we now call healthy public policy. He was emphasising the importance of structural elements in the community to the health of its members. In this case it was the physical rather than the social structure of the community, but this illustrates that the basic idea of seeing the community as well as the individual as a major focus of public health was well-established before the end of the 19th century. Nevertheless, in our haste to "privatise", "rationalise", "marketise" and "individualise" we now seem to spend more time calculating how to apply medical innovations to the individual's ill-health than we spend evaluating or applying the discoveries of social science to the community's well-being.

The social system in a community relevant to health consists of at least three elements: physical structure, social structure and social cohesion. A community's *physical structure* (such as Snow's village pump or, today, the design of suburban housing developments) has both direct influences on health through exposure to risks and indirect effects through the creation or neglect of health-inducing environments. *Social structure* in a community is reflected in such things as its meeting places, mechanisms for income redistribution and opportunities for exchange and interaction. This, too, has both direct effects on health, ensuring the availability of basic prerequisites for health, and indirect effects, facilitating collective problem solving or collective identity. Finally, *social cohesion* is very much the product of the adequacy of physical and social structure in a community. Along with such things as the cultural or social homogeneity of a commu-

nity, its physical and social structure can either encourage or discourage mutual support and caring, self-esteem and a sense of belonging, and enriched social relationships. All of these have been shown, largely by social scientists, to have an influence on the health of a community's members (Patrick and Wickizer, 1995).

Nevertheless, although much of the rhetoric in public health pays lip service to the value of a community focus, empowerment, community-based care, population-based need assessments and so on, we see far less evidence of this commitment in the day-to-day service provision of practitioners. Potential contributions from the social sciences tend to be overwhelmed by the appeal of the biomedical and behavioural sciences. Attention to individuals trumps concern over social systems. In the remainder of the paper I focus largely on this neglected link between health and a community's social structure and resulting social cohesion.

COMPARING PROGRESSIVELY LESS INDIVIDUALISTIC INTERVENTIONS

In an attempt to evaluate the relative benefit of focussing on individuals vs social structure I reviewed the various social, behavioural and biomedical literatures in search of potential interventions to improve the public's health. I used heart disease as a vehicle for this exploration. Table 1 outlines a portfolio of six intervention possibilities, best thought of as a continuum moving from highly individualised treatment of sick people, through individual screening of healthy people and on to modification of social structure to increase social cohesion in communities. Interestingly the opportunities for entrepreneurship in responding to points on this continuum, whether by individuals or corporate interests, decreases significantly as one moves from treatment of the individual to nurturing social structure.

The menu of possibilities starts with the imperative of the rule of rescue, the core of what we term medical care. The target population for interventions such as these, coronary artery bypass surgery, thrombolysis and so on, are the sick individuals presenting to emergency rooms or specialists' offices for whom the denial of care would be a clear signal of the denial of caring. After this imperative is routine medical care and its view of disease prevention, screen individuals for biological (cholesterol or

Table 1. A continuum of possible responses to premature death from heart disease

Points on intervention continuum	Target
Rescue, e.g. CABS or thrombolysis	sick individuals
Routine medical care, e.g. cholesterol-lowering drugs, hypertension control	positively screened individuals
Access to health care, e.g. "free" care, increase supply of care	potentially sick individuals
Traditional public health, e.g. immunisation, lifestyle modification programs	worried individuals
Family and support services, e.g. child welfare, home visitors, social support	needy individuals and families
Social cohesion, e.g. subsidised clubs, reduced income inequality	community structure

hypertension) or behavioural (smoking, exercise, diet) risk factors and lower the level in those screened positive, i.e. those over some declared "danger level" for the risk factors.

The third possibility is improved access to health care by the financial interventions undertaken by most governments, provision of health care services at no or much lowered cost to all potentially sick individuals. The next possibility turns away from the "sickness" models but still targets individuals in order to: discourage their "risky" behaviours that might make them sick; inoculate them against likely sicknesses (immunisation, for instance) and modify physical risk factors in their environment such as polluted water, air or food. This is traditional public health, although not all the intervention strategies are implemented on an individual basis, the ultimate target for most continues to be the individual.

The penultimate intervention approach is in the realm of community health and/or social services, family and support services such as child welfare, home visitor programs and other forms of state-generated social support. Here the target is the needy individual or family. Finally, at the "radical" end of the continuum, are measures to ensure and advance social cohesion. This involves preservation and advancement of social structures such as meeting places, sports leagues, clubs, associations and all the other elements of a community that allow for the exchange of views and values and engender mutual trust. Referred to here as social cohesion, it is what the American political scientist Robert Putnam has termed "social capital" and defined as: "features of social organization such as networks, norms and trust, that facilitate coordination and cooperation for mutual benefit" (Putnam, 1995, p. 66). The individual per se is not the target in this case, for they are subsumed under the integrity of the community's structure.

This continuum raises, of course, the question of the relative effectiveness of these six types of response to lowering death rates from heart disease; rescue, routine medical care, improved access to care, traditional public health, increased social and family support services and improved social cohesion. The question, of course, is not which one type of response to undertake, no one would argue for ignoring the heart attack victim in an emergency room under any allocation of resources. Rather, the question is important to ask to better inform the *pattern* of responses (Bunker, 1997), where, relatively speaking, should we be putting more rather than less effort? In this era of evidence-based decision-making, resource allocations should be informed by whatever research exists on the relative effectiveness of (say) improving social structure vs lowering population cholesterol levels.

Methodological challenges arise, however, in trying to do an "apples vs apples" comparison of

these six areas of potential intervention. First, only the initial four areas are addressed by randomised controlled trial (RCT) evidence, medical care interventions are more likely to have RCT evidence to support resource allocation. Put another way, the value of socially oriented interventions are more likely to depend on their implied potential from observational studies than on direct evaluations from expensive and large controlled trials (Smith *et al.*, 1997). Second, finding studies with a common endpoint for comparison is not easy, even after restricting attention to heart disease, some use cardiovascular disease, some myocardial infarction, some congestive heart failure, some all cause mortality and so on. Third, in calculating rates of success there is a major challenge in deciding what is the relevant "exposed" population and hence the appropriate denominator. Rescue medical care, for instance, has an exposed population that is already highly selected as likely to benefit as it contains only those who have made it alive to a doctor or surgeon; one is comparing their outcome in situations in which nothing is done for them vs ones in which they are subjected to intensive rescue efforts. This is not strictly comparable to the exposure of an entire community (high risk through to no risk) to a health education campaign or to improved social structure, the larger and more heterogeneous denominator will tend to dilute the observed population effect. For these methodological reasons the results of the comparisons should be treated as more indicative or suggestive than definitive.

For each type of intervention Table 2 includes an illustrative study from which I could calculate the likely heart disease deaths prevented per year per 1,000 exposed individuals. In the case of rescue, the Italian RCT of thrombolytics (EMERAS Investigators, 1993) yielded the figure of 15 deaths prevented per 1,000 exposed population. The illustration for routine medical care was the 4 deaths prevented per 1,000 for cholesterol-lowering drugs, the "statins". These data were extracted from the latest RCT by Shepherd *et al.* (1995). The data on the impact of improved access of 2.1 deaths prevented per 1,000 come from a re-analysis of the RAND RCT on health insurance (Himmelstein and Woolhandler, 1984).

The public health approach of individual risk factor modification has proved spectacularly unsuccessful in a series of expensive RCTs, the data given here of zero lives saved are from the Multiple Risk Factor Intervention Trial (1982). Similar data can be found for North Karelia, Pawtucket or the Minnesota Heart Health Program, all recently summarised in a meta-analysis which concluded that "multiple risk factor interventions... were ineffective in achieving reductions in total mortality or mortality from cardiovascular disease" (Ebrahim and Davey Smith, 1997, p. 1671).

Table 2. Illustration of potential heart disease deaths prevented per 1000 exposed to "intervention" per year

Intervention	Endpoint	Target population	Deaths prevented
Rescue, thrombolysis	fatal MI	sick males	15.0
Medical care, cholesterol-lowering drugs	fatal CHD	screened males	4.0
Access, "free" care	all cause deaths	high-risk males > 50 y	2.1
Public health, risk factor modification	fatal CHD	screened males	0.0
Support services, individual social support	fatal CVD	all males	5.0
	all cause deaths	all males	12.1
Social cohesion, networks of associations	fatal MI or CHF	all males	2.9

There were no RCTs available to generate the data for the areas of social support and social cohesion. In both these cases I have relied on observational data. For social support the range of 5.0 to 12.1 cardiovascular deaths prevented per 1,000 (depending upon the endpoint chosen) comes from a comparison of the groups with high vs low levels of social connectedness in Kaplan's analysis of a cohort of over 6,000 Finnish males assembled in the 1970s and followed since then (Kaplan *et al.*, 1988). For social cohesion the 2.9 deaths prevented per 1,000 are based on a comparison of 50 years of data for the two neighbouring communities of Roseto and Bangor in Pennsylvania (Bruhn *et al.*, 1966; Egolf *et al.*, 1992). These two communities shared the same health care system, climate, water supply and health habits/risk factors, but until the mid-1960s differed significantly in measures of their social cohesion such as numbers of and membership in clubs and associations, proportion of three-generation families living in the same house, degree of migration out of the town, and so on. The data used here are the differences between Roseto and Bangor in the 1955–1964 period.

The striking observation from these comparative data is that, despite the methodological biases that likely dilute the comparative size of their effects, interventions to increase social support and/or social cohesion in a community are at least as worthy of exploration as improved access or routine medical care. Certainly they are more worthwhile than public health's traditional risk factor modification approach to cardiovascular disease.

THE IMPLICATIONS FOR PUBLIC HEALTH AND EPIDEMIOLOGY

These findings imply quite different approaches to the current ones in the practice of public health and the conduct of epidemiologic research. A public health that was responsive to this evidence would focus on improving income and power distributions, advocating for increased leisure time to facilitate social interaction, changing planning by-laws to create more public spaces or to encourage verandahs on the front of houses rather than patios on the back or increasing subsidies and support for locally-based clubs and associations. In other words, changes in the physical and social structure of communities to create local social capital.

If epidemiologic research agendas were driven by the comparative evidence of Table 2, far more attention would be given to evaluating "community-level" rather than "community-based" interventions. This distinction is described by Patrick and Wickizer (1995, p. 52):

A community-level intervention is an intervention organized to modify the entire community through community organization and activation, as distinct from interventions that are simply community-based, which may attempt to modify individual health behaviors such as smoking, diet or physical activity.

However, these types of interventions suggest "social engineering"; as such they are not politically popular in this era of individual rights. As Margaret Thatcher once put it, "there is no such thing as society, there are just individuals". Tesh, in her excellent political analysis of disease prevention policy "Hidden Arguments", describes the situation thus: "Individualistic ideology... makes the individual the basic unit of social analysis. It supports a politically conservative predisposition to bracket off questions about the structure of society, about the distribution of wealth and power for example, and to concentrate instead on questions about the behavior of individuals within that (apparently fixed) structure. One consequence is the assumption that health education is the best way to prevent disease" (Tesh, 1988, p. 161).

Should public health practitioners and epidemiologic researchers acquiesce to the politics of the moment and succumb to the prevailing dogma by implementing or searching for more effective individualistic interventions delivered within a formal "health care system?" Or, should they adopt and embellish the messages from social science studies that imply reformed social systems as an effective way forward in the search for better population health (McKnight, 1994)?

This ethical and strategic decision is, of course, a very personal one for each public health professional and epidemiologist. It reflects their desired trade-offs on a series of work-related dimensions such as: acceptance vs marginalisation, familiarity vs change, resource access vs resource famine, individual relations vs community interaction, individualised short-term impacts vs diffuse long-term evolution and so on. These trade-off decisions are related to both the political climate in which they work, and the availability of "tools" that may

make life easier with one or the other chosen path. Hence, if attention to the impact of social capital on health is to be advanced more efforts are needed to improve the theories, methods and measurement tools for its practice and study. Progress on these fronts may, in turn, sensitise the political climate to the potential health and well-being dividend from the creation of social capital.

ISSUES IN MEASUREMENT, METHODS AND THEORY

Our plethora of measurement tools for the impact of interventions on individuals contrasts with the paucity of tools for measuring impacts at the level of the community (Patrick and Wickizer, 1995). If it is the characteristics and attributes of a particular community's structure that influence health and well-being (over and above the characteristics and attributes of the individuals in that community), what are those characteristics and how can they be captured in a measurement tool? There are few known and validated ways to measure such things as community competence, community cohesion, or a sense of worth at the level of the community (Davidson and Cotter, 1986; McMillan and Chavis, 1986; Hawe, 1994; Goodman *et al.*, 1996). Attention to the individualistic ethic has allowed our view of the community, just like Margaret Thatcher's, to be the summation of the characteristics of whatever individuals exist in the community (Shiell and Hawe, 1996).

Although the rhetoric of governments and practitioners emphasises the importance of community, this is rarely reflected in policies and practices. Rissel (1996) illustrates this in an analysis of the public health policy and planning documents from the New South Wales (NSW) government in Australia. In the "vision" documents of NSW Health the word "community" is used liberally, averaging over 2 mentions per page. However, in the planning and technical documents, where implementation and measurement come to the fore, there is little or no focus on community, with only 0.2 mentions per page and even these were usually as a synonym for "the general public" or a setting, rather than as a "dynamic entity, including community as relationships".

There is, however, some hope on the horizon. For instance, a number of teams around the world are now actively assessing measures of social capital. Putnam's assessment of governance effectiveness in 18 Italian regions developed an empirical measure of social capital from levels of newspaper readership, rates of voting in referenda, the number of local clubs and associations and the prevalence of preference voting (Putnam, 1993). With this measure he demonstrated a close association between levels of citizen satisfaction and levels of social capital in a region. Others are now replicating

and extending this finding (Cox, 1995; Kawachi *et al.*, 1997; Veenstra and Lomas, 1998).

At the level of statistical analysis and study design, technologies are just now being developed to capture social structure and community as a variable. Cluster analysis allows for a focus on locality or setting rather than individuals as the unit of analysis (Donner *et al.*, 1990). Hierarchical modeling techniques are now being applied to health and community studies and allow investigators to capture the interaction between community-level and individual variables (Duncan *et al.*, 1993; Goldstein, 1995; Diez-Roux, 1998).

Unfortunately, through the auspices of clinically dominated views of evidence, researchers have come to rely on the RCT as the definitive study design to demonstrate causality (Shy, 1997), criticising other approaches as inferior and invalid (Smith *et al.*, 1997). Yet much of public health is not easily or cost-effectively able to be subjected to such types of evaluation. Instead epidemiologists must be more willing to adopt creative study designs that tell compelling causative stories from associative data, an extension to social structure of the same kinds of techniques that demonstrated the link between lung cancer and smoking.

Sensitising the political environment to the importance of social capital for health and well-being relates strongly to debates around values which, in turn, are about what we see as the causes of ill health - the theories of public health and epidemiology. Here again, Tesh notes the bias of the individualistic ethic: "The ideology of individualism... in science takes for granted a reductionist unit of analysis. Hence, *it reinforces the political assumptions that impugn structural analyses of causality...* Research that takes the social structure as the unit of analysis gets pushed to the periphery of science. At most it is a lesser kind of science, social science. At worst it is not science at all but a pseudoscience contaminated with politics" (Tesh, 1988, p. 169, emphasis added). Is heart disease caused by atherosclerosis in those choosing to eat too much butter, or is it caused by the stress of them living isolated lives in a social structure that fails to value their input compared to the input of a select few with command of the resources? How do we explain the fact that residents of Roseto were so much less likely than residents of Bangor to die of heart disease, despite comparability on all the traditional causative (risk) factors?

Hence the political meets the methodological. It is no coincidence that the disciplines that currently dominate the health policy world, economics and biomedical science, have deep within them a core assumption that the individual is the unit of measurement, analysis and modification. Many of the other social sciences, especially sociology, anthropology and community psychology, assume social structure not the individual is the unit of in-

vestigation and modification. These are not the politically popular disciplines. They are, however, the disciplines in which the influences of community setting and social structure are integral to theories of individual behaviour.

INDIVIDUALS VS SOCIAL SYSTEMS IN EXPLANATORY CAUSAL MODELS

The values embedded in the assumed causal models that underpin much of public health practice and epidemiologic research become clear when they are critically evaluated. They adopt the individual rather than social systems as the unit of interest. These different value positions are highlighted by the evolution of causal explanations for inequalities in health from individual "victim blaming", through relative status in a social milieu, to density of links and caring in a social structure (Wilkinson, 1996).

The traditional explanation of inequalities in health is that they are caused by the behaviour of those from the lower socio-economic classes who drink, smoke and generally engage in too many "risky behaviours" leading to their early demise from heart disease, lung cancer and so on. The solution is, therefore, to modify their risky behaviours and so anti-smoking campaigns and other health promotion programs are launched. Unfortunately, historical data shows that such inequalities are independent of the causes of death and they are as prevalent now as they were when the main causes of death were entirely different at the turn of the century (Hertzman *et al.*, 1994). This suggests that there is a more general explanation than the disease-specific risk-factor exposures that gain so much of public health's current attention.

The next level of explanation is that the inequality is caused by the material deprivation suffered by those in the lower socio-economic groups - poor housing, poor nutrition, inadequate access to care and so on. The solution, therefore, is to provide income or other resource support to the poor in society, enough to raise them above some declared level of deprivation. Although there is undoubtedly some truth to this proposed causal model, Marmot's data from the British civil service study tells us that it is far from the whole story. Across five classes of civil servants, all of whom are "well-off", there are marked inequalities in health; none suffer what could be called "deprivation" (Marmot *et al.*, 1978).

At the next level of explanation we move away from causes based on the behaviours of or the assaults on individuals' biological integrity, and into the realm of economic system causes. Wilkinson contends that there is a strong negative association between the degree of income inequality in a country and its health as measured by mortality statistics (Wilkinson, 1996, 1997). Here the

causal model proposed is that the feelings of *relative* deprivation among those in the lower half of the income distribution express themselves through neuro-immunological systems as disease and death (Charlton, 1996), the larger the differences the more likely and the more severe are the negative health consequences. The implied solution is the reduction in income inequalities by better distribution of wealth in a society.

This level of explanation has now being pushed one stage further by Kawachi *et al.* who isolate social capital as a more likely causal factor (Kawachi *et al.*, 1997). Using the fifty U.S. states as the unit of analysis, they relate the extent of social capital in each state to both mortality and the extent of income inequality. They found that a path analysis isolates social capital (measured by levels of trust of fellow citizens and their extent of membership in various voluntary groups and associations) as the causative variable and argue that income inequality exerts its effect only through the social capital variable. In other words, they conclude that income inequality is a reflection of low social capital and it is the latter that causes increases in mortality.

Indeed, Kawachi *et al.* go as far as to estimate that a 10% increase in overall trust across citizens would lead to 0.6 fewer deaths per thousand people per year, or a one-unit increment in group membership would lead to 0.83 fewer deaths per thousand people per year. Although further confirmatory studies are clearly needed to establish the validity of this latest causal model, it suggests that a solution to inequalities in health is attention to the integrity of the social structures in which we live, our ability to feel safe amongst our neighbours, trusted or helped by and trusting or helping those around us and participating in groups and associations that expose us to others with whom we share our community.

CONCLUSION

Whether or not public health practitioners and epidemiologists are ready to take up the implied challenge of these findings is, inevitably, related to the extent to which they are willing to disavow the current political trend toward asocial individualism (Hobsbawm, 1996) and embrace collective approaches to building community solidarity (McKnight, 1994). There is no doubt that the approaches implied by such models of how disease and ill-health are caused radically alter the role of public health professionals and epidemiologic researchers. A better balance is needed between the focus on evaluating and modifying each individual's risk factors for ill-health and evaluating and modifying the impact of disintegrating social structures on health. As Kawachi and Kennedy (1997, p. 1038) state: "what has been missing from recent

epidemiological studies of social relationships and health is the social context in which people lead their lives... by focusing on the outcomes of socially isolated (or well connected) individuals, epidemiology has neglected the possibility that entire communities or societies might be lacking in social connections”.

Measurement, monitoring and advocacy for community integrity, social cohesion and collective reallocation of our fiscal and social resources will call for a wholesale re-tooling of the public health workforce, re-balancing it to complement its individualistic biomedical and economic views of the world with a social science focus on community and societal structure. This is not a “new public health”, it is a return to the “old public health” of John Snow that recognised social systems as integral to good health.

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