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Original article | Originalartikel

Surveillance and the Tao of leadership: a perspective from the United States

Summary

This paper discusses how the epidemiologists who guide the collection, analysis, and sharing of public health data are powerful and can use their influence to bring about changes that will benefit the health of people around the world. They can frame public debate and the actions of policy makers on major health issues because they have the power to determine what health indicators are measured, which questions are asked, and how the raw data are presented. To be effective leaders, these epidemiologists can learn much from the ancient Chinese philosophy of the *Tao Te Ching,* which advises powerful people to lead others without domination or coercion.

Keywords: **Public health surveillance – Taoism – Leadership – Obesity – Quality of life – Mental health.**

"What gets measured gets done." Mason Haire (Peters & Waterman 1982)

Advances in technology, emerging diseases, and threats of bioterrorism have revolutionized the way public health data are gathered and shared around the world (Stroup et al. 2004). Yet a fundamental issue in public health surveillance remains the question of why do it. Why monitor disease rates, behavioral risk factors, or health conditions in defined populations? One important reason for conducting surveillance is to detect new situations early – for example, before a disease has a chance to spread widely – in hopes that action can be taken to address the problem or find solutions (CDC 2004). Early detection is especially a consideration for infectious diseases (Green & Kaufman 2002) but is also relevant for noninfectious diseases and other conditions (Holford 2004). For example in the United States, with assisted reproductive technology births were occurring in women over 60 years of age (Kalb 2001). Whether this is an epidemic or warrants action is beyond the scope of this paper, but it is worth noting that maternal age at birth has been regularly tracked in most countries (Gregory & Korst 2003).

A second common reason to conduct surveillance is to examine trends and project them into the future, again with the intent of planning ahead should action be needed to prevent a problem from spreading widely (Devine 2004). For example, when Elvis Presley died in 1977, there were an estimated 37 Elvis impersonators in the world. By 1993, there were about 48 000 impersonators (see Fig. 1). If this trend continues, we could expect there to be about 2.5 billion Elvis impersonators in the world by 2010 (Caen 1993). By 2010, the global population is projected to reach about 7.5 billion (U.S. Census Bureau 2001). Thus, we could expect about one-third of the people of the world to be Elvis impersonators in 2010. Whether such a prediction is likely or even particularly dire enough to warrant action is beyond the scope of this paper.

These two examples illustrate the most common purposes for monitoring trends in population characteristics. Each of these examples also relates to the theme of this conference, "Global Issues in Health Surveillance: Translating Data into Action." This theme implies but does not directly state that the purpose of monitoring health is to use the findings to lead to actions, presumably by a society or official agencies. Yet conferences on public health surveillance, even if reasonably well attended by scientists and technical experts, are rarely attended by people in positions to effect policy changes. Similarly meetings of the powerful are rarely attended by the people who monitor health. So it seems there is little likelihood of surveillance influencing public health actions (APHA 1959).

Soz.- Präventivmed. 50 Suppl 1 (2005) S2–S8
0303-8408/03/0100S2–7
DOI 10.1007/s000038-005-4021-6

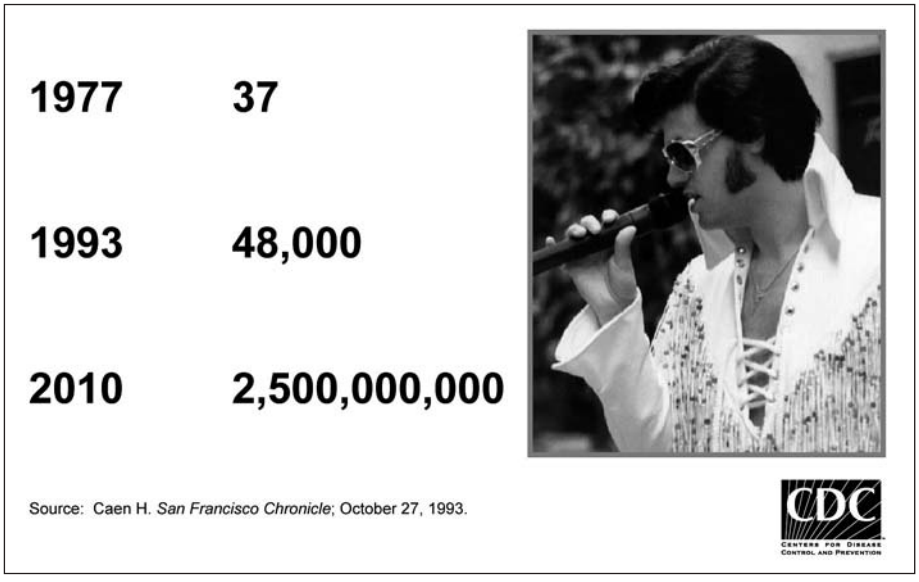

Figure 1 Trends in the number of Elvis impersonators in the world, 1977–2010

Leading quietly, without coercion

This perceived disconnect – between the purpose of public health surveillance and the ability of people who actually do the monitoring of health to effect actions – brings us to the *Tao Te Ching*. This classic Chinese philosophical text, written about 2500 years ago by Lao Tzu, analyzes the way a society works and suggests how a leader should foster action on important issues (Mitchell 1992; Heider 1997). According to the *Tao Te Ching*, a leader must guide process with subtlety and avoid an authoritarian directive model of leadership, a view that was quite unique in that time. Underlying this basic principle is the idea that things work best when people come to believe the actions are their own to take rather than forced or coerced.

The role of monitoring health has much in common with this Taoist philosophy. The people who lead public health surveillance have the means to quietly yet effectively frame public debate and the actions of policy makers on major health issues because they have their hands on two of society's most important levers: first, the power to decide how the raw data are presented and displayed (i. e. the story they tell to the public); and second, the power to determine what health indicators are actually measured and which questions are asked (i. e. which stories are available to tell). This ability to lead quietly, without asserting power, is also reflected in Mason Haire's quotation at the beginning of this paper: "What gets measured, gets done." The act of measuring and reporting determines what is worked on, Haire argues. He says nothing about organizational structure or power (Peters & Waterman 1982).

Allowing data to tell the story

Recent events in public health surveillance support these philosophies. During the 1980s and 1990s, the Centers for Disease Control and Prevention (CDC) collaborated with state health departments across the United States to develop a surveillance system that systematically measures healthy and unhealthy behaviors, especially those that can lead to chronic disease. The Behavioral Risk Factor Surveillance System (BRFSS) now operates in all the U.S. states and annually surveys about 200000 adults (http://www.cdc.gov/brfss). In addition to providing state data, the BRFSS surveys also provide local estimates for many counties and large metropolitan areas (CDC 2003). Among the questions asked are "How tall are you?" and "How much do you weigh?" analysts use these self-reported answers to calculate body mass index (weight in relation to height, or kg/m^2) and then determine what percentage of a population is obese (body mass index >30). When asked how tall they are, adults in the United States tend to respond that they are slightly taller than they actually are. When asked about their weight, they usually answer that they weigh slightly less than they actually do. Thus, estimates of the prevalence of obesity based on self-reports are low. Nevertheless, we have seen a steady increase in the proportion of U.S. adults whose BRFSS responses indicate that they are obese (see Fig. 3) (Galuska et al. 1996). In the 1990s alone, the percentage of adults who were obese increased by about 60–70%. This disturbing health trend received little attention when the BRFSS data were first released to the public in the form of a simple line graph.

In 1999, a JAMA article presented the BRFSS obesity data in a compelling new format – a series of U.S. maps that

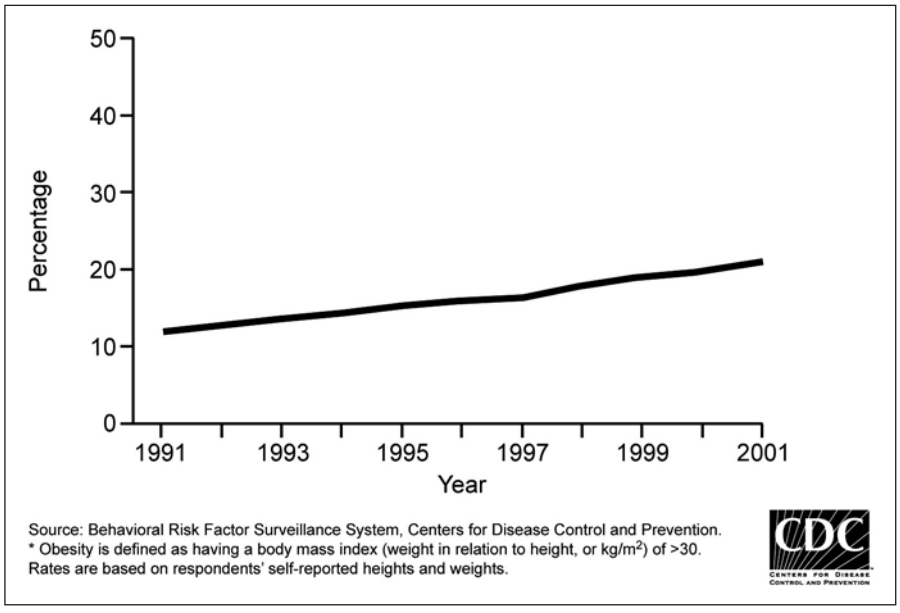

Figure 2 Percentage of U.S. adults who are obese, 1991–2001

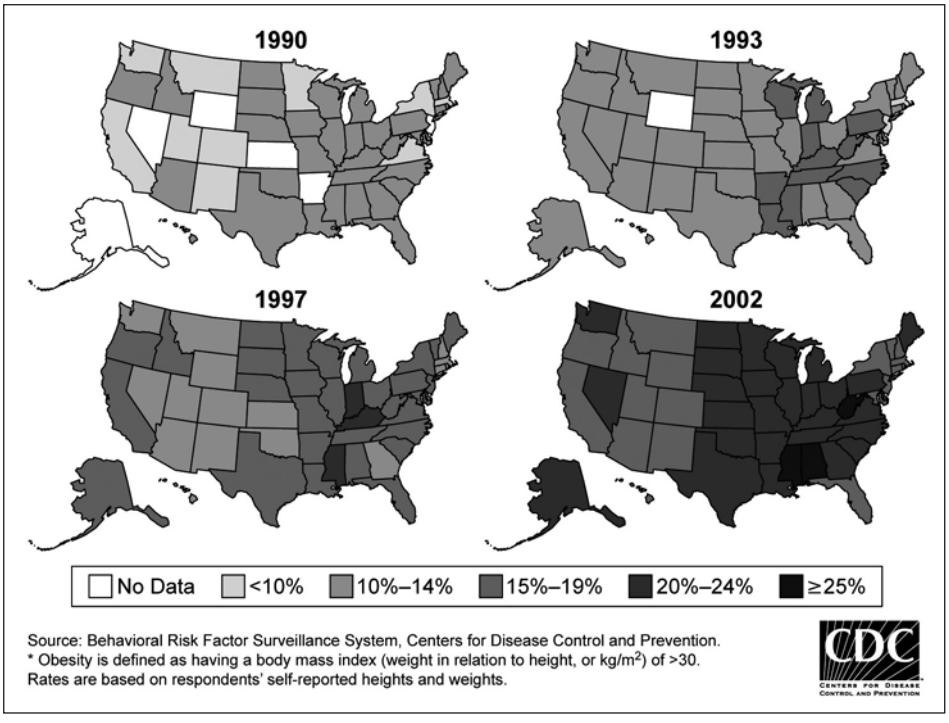

Figure 3 State trends in obesity among U.S. adults, 1990–2002

showed how obesity was increasing in each state over several years (Mokdad et al. 1999). These maps generated tremendous media attention, even though they presented basically the same obesity data that had been available for several years. When these maps were updated just a few years later, the prevalence of obesity had grown such that new color categories had to be added to the map legend in order to show the proportion of U.S. adults who were obese (see Fig. 4). The visual impact is even more compelling when these maps are viewed during an oral presentation in rapid succession: the United States quickly grows darker with each passing year, as obesity rates climb. Will U.S. interest in rising obesity rates last and will public health actions be effective in combating obesity? It is too early to tell, but clearly, this style of data display has had a strong effect in generating public discourse, an event that is uncommon

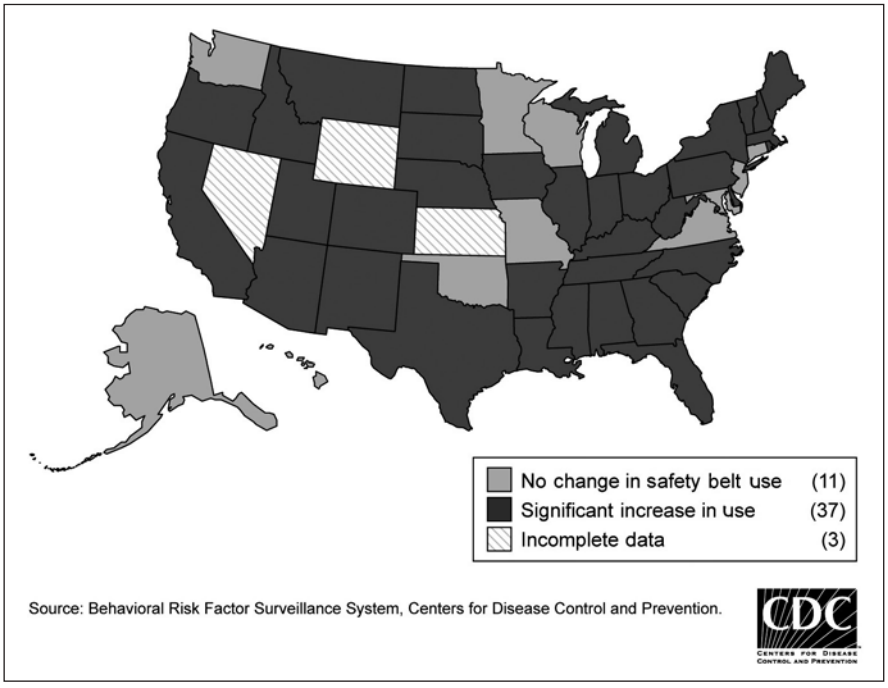

Figure 4 State trends in safety belt use among U.S. adults, 1991–1997

in the field of chronic disease prevention and health promotion (Walker 2003).

The U.S. obesity maps have conveyed a powerful public health message, despite their statistical limitations (e.g. the data are self-reported; changes in estimates from one year to the next are not always statistically significant; and the obesity prevalence categories are based on thresholds that use point estimates). Precision and accuracy are important, but they may be only a small part of the story the data can tell and the public health actions to be urged. As the British statistician Major Greenwood once said, "the scientific purist, who will wait for medical statistics until they are nosologically exact, is no wiser than Horace's rustic waiting for the river to flow away" (1948).

The systematic surveillance of health-related behaviors is relatively new for public health (Puska 2003), and year-to-year changes in data can seem to happen slowly and without a sense of urgency. However, by presenting the data in a compelling format and displaying trends over time, public health agencies can convey the significance of a public health trend. For example, CDC researchers recently used BRFSS data to create U.S. maps that identified states with significant increases in the proportion of adults who used their safety belts regularly (Nelson et al. 2002). The researchers looked at the data over a decade and found that seat belt use was increasing in most states (see Fig. 4). A similar presentation of trends in self-reported binge drinking (consuming five or more alcoholic drinks on one occasion) revealed little improvement, however (see Fig. 5) (Naimi et al. 2003). Nevertheless, in both instances, the BRFSS maps compelled people to compare their own state's health trends with those of their neighboring states, and these comparisons fueled some lively public health discussions.

Choosing what questions to ask

"The indicators a society chooses to report to itself about itself are surprisingly powerful. They reflect collective values and inform collective decisions. A nation that keeps a watchful eye on its salmon runs or the safety of its streets makes different choices than does a nation that is only paying attention to its GNP." Donella H. Meadows (1993)

Public health professionals who influence what is asked in surveys or analyzed from a vast array of data are in tremendously powerful positions. They have the opportunity to strongly influence what society chooses as a focus of health concerns. In this report, we have discussed principally how data analysis and display influenced the public discourse because most of our intellectual energy is spent on analysis or how to improve questions about fairly standard risks or behaviors. What we propose now is that we need to be equally creative in determining what we monitor or ask about. Developing approximate answers to important problems is likely a far better use of limited time and resources than minor improvements in quality of data from well-studied standard risks.

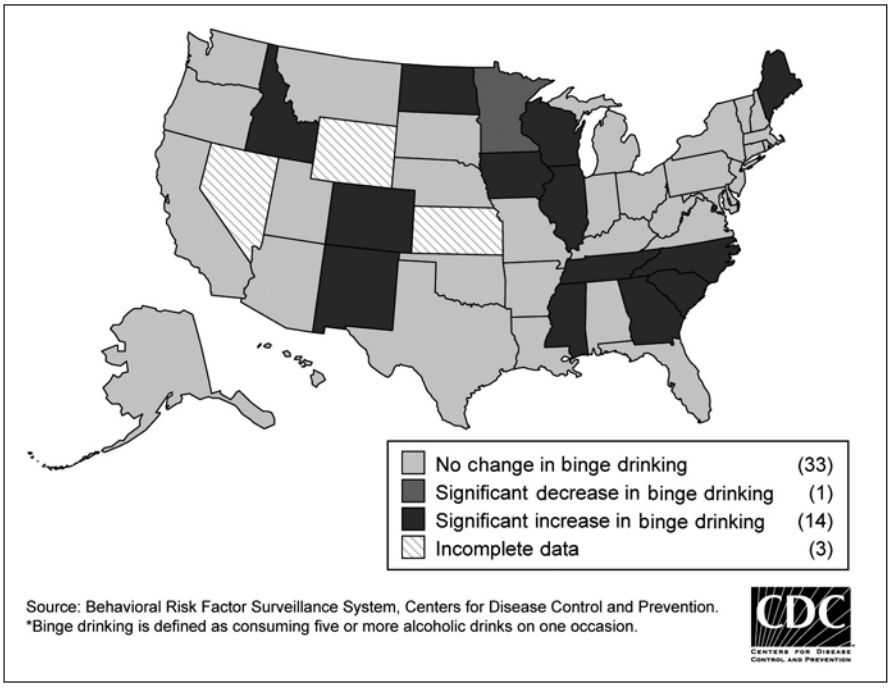

Figure 5 State trends in binge alcohol drinking among U.S. adults, 1991–1999

One important indicator to consider monitoring is quality of life. Most countries compare themselves to each other by measuring life expectancy and infant mortality – both purely measures of mortality. Yet in many countries, the availability of death registration data can vary tremendously (WHO 2003). Further, with the aging of the world's population, health-related quality of life becomes vitally important as an outcome (CDC 2001). Independence, ability to care for oneself, to be able to work, and to be free from pain, mental distress, and dementia are critical issues, yet they are not monitored in any systematic fashion. In addition, if we do not assess quality of life meaningfully, we will ignore entire areas of health that cause significant illness and suffering – for example, arthritis and mental health problems. These health problems will not be reflected in summary measures of health that are based on death.

Quality of life

Quality of life data can influence our decisions about how to allocate resources for health care. Good measures of quality of life can slowly and subtly shift a society's focus from the view that *we are paying for disease* to the view that *we are buying health*. Quality of life has become an important outcome in major clinical studies of serious illnesses like cancer and thus is gaining acceptance by the clinical community (Baker et al. 2003). We also know a fair amount about the predictive value and good correlation of simple questions like, "How would you characterize your general state of health? Excellent, good, fair, or poor?" with more detailed assessments of health-related quality of life (Caron et al. 2003; Zack et al. 2004). Only by monitoring quality of life on a population-wide basis, and then linking it to other important health states and conditions, can we move beyond measures of death as the way societies track the health of their communities.

Mental health

A second health issue of great importance that is not generally monitored well, at least not in the United States, is mental health. Can we track mental health meaningfully on a population basis? Can the monitoring support action, indicate progress, or illustrate real differences between populations? Many published studies have examined the effects of mental health problems at school, work-related stress, distress among caregivers for the elderly, depression, aggression and behavior problems in children, child abuse, and suicide (Cuijpers 2003). This considerable body of research has shown that some prevention programs in mental health are effective in improving social skills, problem-solving skills, stress-management skills, pro-social behavior, and social support. Researchers also have found that these programs can reduce the consequences of risk factors, psychiatric symptoms, and substance use and that they might have positive economic effects as well. Despite this large body of

research, few studies have examined whether these prevention programs actually reduce the incidence of new cases of mental disorders.

Over the past decade, we have learned much about mental health that can guide future public health surveillance efforts. For example, we now know that depression is the leading cause of years lived with disability worldwide and is second only to ischemic heart disease in developed regions (Murray & Lopez 1996). We also know that Medicare recipients with diabetes are 1.6 times more likely than those without diabetes to suffer from major depression. In addition, health care expenditures for non-mental health complaints are 21% higher among people with major depression than among those without depression (Lebowitz et al. 1997). People with mental illness are almost twice as likely to smoke as those without mental illness (Goldberg et al. 2002). And lastly, physical activity might protect against the development of depression (Stear 2003). These associations clearly raise important questions, both from a public health perspective and from a scientific point of view.

Influencing public discourse

As surveillance and information systems gain more public attention and resources, it is often the epidemiologist or other technical person who plays a major role in deciding what key health issues can and should be assessed. This is an incredible position of leadership. Epidemiologists around the world can wield this power with a gentle hand on the lever, guiding the process with good public health data rather than coercion. That is the Tao of leadership.

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