Hypertension is widely recognized as a public health menace but rarely treated as one. In many ways, the challenge of hypertension reflects a transition from classic public health strategies that have been applied to control microbial epidemics to a fully medicalized approach requiring individual doctor–patient encounters. One reason why hypertension has perhaps not been seen as a legitimate public health problem is the unavailability of good surveill ance measures that can describe disease burden. Although we have abundant information about the relative risk associated with various levels of blood pressure and the benefit to be gained from treatment, it had not been possible until recently to relate levels of hypertension treatment and control in a specific population to rates of cardiovascular sequelae.

Reasonable evidence suggests that increased levels of treatment of cardiovascular (CV) risk factors have been associated with declines in CV mortality. The most recent estimates suggest that ~60% of the CV decline can be explained by a combination of primary and secondary prevention. Soon after antihypertensive therapy came into widespread use, the long-term decline in stroke mortality in the US increased from 1% to 2% per year. Although stroke occurrence has been known to vary widely among countries, there are inadequate data on blood pressure control from national surveys that have been collected in standardized fashion to assess fully its impact on CV disease rates. A comparison of the United States and Canada with several European countries, however, did suggest a strong relationship among mean blood pressure, the rate of hypertension control, and death from stroke.

In this issue of Hypertension, Redon et al add an important new dimension to our understanding of the public health significance of blood pressure control. Using a standardized protocol, they sampled >7000 patients over the age of 60 years from primary care facilities in the 17 administrative regions in Spain. Using the Framingham model, they generated a multivariate estimate of stroke risk and averaged this by region. This aggregate measure of stroke risk was significantly related to observed stroke mortality by region, and, as might be expected, left ventricular hypertrophy and poor hypertension control were the primary factors driving this association. Overall, measured patient attributes accounted for almost two thirds of the variation in mortality. As demonstrated in both the United States and the United Kingdom, these more recent estimates of hypertension control from Spain continue to show some modest improvement. These data could form the basis of a regional “report card” that could be a useful tool in surveillance and control of CV diseases where medical services are provided on a comprehensive basis.

The design used in this study is a specialized version of an “ecological” comparison. In this design, the observations generated by the average data from all of the geographic units being studied are assumed to apply to the individuals within those units. The primary risk to validity for such studies is confounding; that is to say another attribute of the populations is actually accounting for the differences in stroke death rates, and it happens to vary along with treatment and control. For example, in some circumstances, relative wealth could influence both mortality and access to care, or the racial/ethnic composition of the population might play a role. Neither of these would appear to apply in Spain. Constructing an analysis from data derived from totally independent sources (such as mortality and hypertension control rates) can pose difficult standardization issues. Thus, the mortality rates from stroke in this study were age standardized, because participants were selected as a random sample of persons >60 years of age. Because age is an important risk factor in the stroke model, if the age distribution of persons >60 years varied by region, and this effect was removed from the mortality data but not the patient data, some bias could be introduced. Again, fortunately, the mean age of participants was similar across communities. For these analyses to be valid, it must also be assumed that the prevalence and severity of hypertension does not vary substantially across regions. Treatment would be unlikely to equalize lifelong exposure to higher blood pressures, as has occurred in the southern United States compared with other parts of the country.

The study by Redon et al, together with the other data summarized above, thus suggests that we can begin to consider stroke as a surveillance measure that indicates the quality of hypertension control. Several decades ago, there was general agreement that medical care, as mediated through specific physician encounters, did not have a sufficiently widespread effect to register in basic measures of population health (eg, life expectancy or mortality), which were instead influenced only by living conditions and nutrition. However, a recent analysis suggests that medical care may have made a significant contribution to lengthening life expectancy in the United States, particularly the 4.9 years of average life added
by the decline in CV diseases.\textsuperscript{9} In fact, pill taking to prevent CV events has become a mass phenomenon, with more than half of the US population >60 years of age taking antihypertensive medications alone. Long-term drug therapy has, thus, become a public health intervention and can now be considered a bridge between clinical medicine and traditional population-wide preventive measures. The report by Redon et al\textsuperscript{5} is, therefore, particularly timely, because it offers one strategy to reconcile the scope of this intervention with appropriate surveillance outcomes.

Public health strategies to reduce or eliminate the consequences of elevated blood pressure are usually focused on low-intensity, population-wide interventions, such as lowering salt intake, increasing fruit and vegetable intake, promoting healthy weight, and increasing physical activity. The power of these interventions was demonstrated in the late 1990s when folate supplementation was associated with a 5- to 10-fold increase in the rate of stroke decline in the United States and Canada.\textsuperscript{10} By contrast, strategies that require diagnosis and treatment of 1 patient at a time often have a less dramatic benefit. The course of the decline in all forms of CV disease over the last half century, however, shows that a combined attack using primary prevention, secondary prevention, and treatment of patients with established disease can result in continued long-term improvement in death rates. Although additional studies are needed in diverse contexts to confirm that stroke mortality can be used to monitor progress in hypertension control, using public health measures to evaluate large-scale medical interventions could be an advance for health services research.

**Disclosures**

None.

**References**

Using Public Health Indicators to Measure the Success of Hypertension Control
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