Resurgence in Diabetes-Related Complications

The improved long-term outlook for adults after receiving a diagnosis of diabetes is one of the most important clinical and public health successes in recent decades. During the early 1990s, patients with diabetes had reductions in lifespan of 7 to 10 years and an increased risk of lower-extremity amputation (LEA) vs those without diabetes (58 vs 3 cases/10 000 persons/year, respectively) and kidney failure (28 vs 2 cases/10 000 persons/year).1 Risk of cardiovascular events, which caused the most deaths, also was higher among persons with diabetes vs those without diabetes (141 vs 38 hospitalizations for acute myocardial infarction [AMI] per 10 000 persons/year).1

But through multifaceted improvements in diabetes care, risk factor management, self-management education and support, and better integration of care, these risk differences were reduced by 28% to 68% across a range of complications between 1990 and 2010, with gains most notable for reductions in AMI, stroke, and death due to hyperglycemia.1,2Although the excess morbidity risk remained too high and the reduction in cardiovascular disease mortality led to new types of complications and causes of death,3a continued reduction in the overall public health burden caused by diabetes seemed promising.

However, in an unanticipated new challenge to these improvements, a resurgence of diabetes complications has appeared in national statistics and in the epidemiology literature. Between 2010 and 2015, an increase in diabetes-related LEAs occurred nationally, reversing again most prominent among young adults. After emerging as diabetes is an open question. The improved long-term outlook for adults after receiving a diagnosis of diabetes is one of the most important clinical and public health successes in recent decades. During the early 1990s, patients with diabetes had reductions in lifespan of 7 to 10 years and an increased risk of lower-extremity amputation (LEA) vs those without diabetes (58 vs 3 cases/10 000 persons/year, respectively) and kidney failure (28 vs 2 cases/10 000 persons/year). Risk of cardiovascular events, which caused the most deaths, also was higher among persons with diabetes vs those without diabetes (141 vs 38 hospitalizations for acute myocardial infarction [AMI] per 10 000 persons/year). But through multifaceted improvements in diabetes care, risk factor management, self-management education and support, and better integration of care, these risk differences were reduced by 28% to 68% across a range of complications between 1990 and 2010, with gains most notable for reductions in AMI, stroke, and death due to hyperglycemia. Although the excess morbidity risk remained too high and the reduction in cardiovascular disease mortality led to new types of complications and causes of death, a continued reduction in the overall public health burden caused by diabetes seemed promising.

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patients at high risk for foot-related complications. Most of the recent increase in amputations has occurred in toes and feet, suggesting that surgeons may be performing minor amputations sooner rather than prolonging attempts to heal infected ulcers, possibly driven by incentives to prevent rehospitalizations. However, smaller preemptive amputations do not account for all of the increase in LEA rates because long-term reductions in more severe amputations also have plateaued.

Third, some broader policy-level factors may be driving the access to preventive care and influencing the risk for complications. Although the proportion of the population that is uninsured has decreased in the United States since passage of the Affordable Care Act, the use of high-deductible health plans (HDHPs) has proliferated and may have contributed to reductions in early preventive care. Employer-based switches to HDHPs, which now cover 43% of the young adult and middle-aged population, have a particularly deleterious effect on those of low income, and have led to both delayed and more frequent treatment for high-acuity complications. Variation in coverage of foot care services could be further affecting the risk and timing of amputations. In addition, the continually increasing cost of insulin and other antihyperglycemic medications could be leading patients to cut back on treatment to cut costs, although the effects of these cost increases on health outcomes has not been quantified.

Fourth, and perhaps most concerning, broader social and economic factors may be affecting vulnerable populations that drive trends in outcomes. Increasing mortality rates during middle age following the economic recession that started in 2008-2009 have received considerable attention and were initially thought to be driven by suicides, opioid overdoses, and social disadvantage. However, other analyses suggest that the increase in middle-age mortality may also include metabolic causes. The economic downturn, employment loss, and financial hardship disproportionately occurred in communities that also have high diabetes prevalence, which means that upstream socioeconomic factors could contribute to a range of adverse complications of diabetes.

Even though concurrent observations of declining rates of diagnosed diabetes are encouraging, the population prevalence of diabetes is 12% and is unlikely to decrease soon because of the long-term increases in prevalence of obesity and lifespan. This means that the future direction of diabetes complications has enormous collective implications for health and costs. The fact that it is only possible to speculate about the causes of such trends in the diabetes-related burden exposes gaps in epidemiology and surveillance, and in the interconnectedness of valuable clinical data. National averages can obscure important variation in morbidity, and conversely, minorities of high-risk individuals can influence overall trends. However, current monitoring systems do not have the granularity to detect or characterize the subgroups that are driving the trends. Rather than assessing the static etiology of disease (whether behavioral, genetic, physiological, or environmental), the current questions call for a more textured comparison of health care practices, policies, and environmental changes underway and how such factors affect the etiology of trends in population health.