

Thinking of Risk in the Era of COVID-19

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Society remains in the grip of the worldwide coronavirus disease 2019 (COVID-19) pandemic. As each town, city, and country attempts to restore some aspect of normal life, they are confronted with 2 nearly identical questions:



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What is the individual risk of acquiring severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and ultimately COVID-19? What is the risk for the population that renewed activities will fuel a surge of new cases of disease and potentially overwhelm the health care system? Neither of these questions can be answered with precision, and yet they have come to dominate everyday conversation.

Some data are helpful to understand the risk. Overall, since March 1, 2020, the overall cumulative hospitalization rate for COVID-19 in the US was estimated at 67.9 per 100 000 or about 0.068%.¹ In addition, the major risk factors for mortality related to COVID-19 are now well-defined—age and underlying comorbid conditions.²⁻⁴ About 50 million individuals in the US are older than 65 years of age.⁵ Based on various data sources,⁶⁻⁹ about 75% of the more than 100 000 COVID-related deaths in the US to date have occurred among these older individuals; thus the risk of death in this population is about 1.50 per 1000 or 0.15%. One-third to half of the deaths in some US states have involved residents in nursing homes or other long-term care centers.¹⁰ Approximately 1.5 million individuals live in these facilities in the US,^{11,12} and if approximately one-third of the 100 000 deaths in the US have occurred among individuals from these facilities, the risk of death in this population is about 22 per 1000 or 2.2%.

In contrast, the rate of SARS-CoV-2 infection among children thus far appears to be relatively low, and when children do become infected, they are less likely to develop serious COVID-19 illness; however, a new entity, multisystem inflammatory syndrome in children,¹³ has been identified and is of concern to parents and clinicians, and others, including teachers. Yet even with this new entity, it is unclear if the risk of infection or severe disease is 1 in 1000, 1 in 10 000, or 1 in 100 000.

Despite these differences in risk, a general approach has emerged involving the mandatory wearing of masks and physical distancing when indoors, with greater flexibility when outside. However, it is not possible to accurately define the risk of becoming infected while walking or jogging outside or going to the beach. The precise benefit of wearing masks and physical distancing in preventing disease is unknown, although it is quite clear that these are effective behaviors, with virtually no individual consequences.¹⁴

Individual Risk

Some people are risk averse, whereas others are willing to assume far greater risk (eg, the individual who lives a sedentary life vs the individual who rides motorcycles or climbs mountains). Combined with behavioral research, risk analysis can help explain why reasonable people sometimes make different decisions.¹⁵ With COVID-19, a person's perceptions and decisions involving risks involve consideration of at least 3 questions.¹⁵ How much disease is in the community? What is an individual's risk of exposure to COVID-19? How much can individuals do if exposed to SARS-CoV-2?

However, in the coming months, differences in risk-taking behaviors will play out every day. Each person will decide whether and when to travel by plane, visit with friends, shop, or eat in restaurants. What will complicate this further is that individuals will interact with others who may not share the same sense of risk, potentially straining relationships between family members, friends, and colleagues. Regardless, there will be risk, and it will not be possible to accurately define that risk.

Societal Risk

Some individuals are willing to assume risk and are not willing to have their individual freedoms curtailed. This has emerged as a central debate in the US, and poses numerous and substantial challenges for public officials, particularly mayors and governors, who must make decisions about restoring normal activities in their cities and states. Most of these officials consult public health experts, ask for their best estimates, but then must balance the risk to society vs individual rights. This issue of individual freedom vs the common good has always been a central debate in the US. What rights and privileges do individuals surrender for the common good? How should individuals balance their rights against their responsibilities and ensure that their choices and actions do not impose risks on other members of society or their own family members?

Risk Assumed vs Risk Imposed

Some individuals, even if they are willing to assume personal risk, are not willing to have risk imposed on them or their family. This issue will emerge as an important question in the coming months as businesses begin to reopen and schools and colleges consider whether and how to open and resume classes in the fall. Some businesses may continue work-from-home arrangements, whereas other businesses may require that their employees return to the workplace. For some businesses, employees cannot work from home, and many businesses will implement changes that will reduce the

likelihood of employees being exposed to and acquiring SARS-CoV-2 infection, but the risk will never be zero. The question of risk is even more complicated for schools.¹⁶ Even though schools can make various changes, the risk of exposure to SARS-CoV-2 to students, their families, and teachers will never be zero. Most families and most teachers will likely be willing to assume some risk, but others may not, leading to substantial logistical complexities and potential legal challenges.

Another debate involving assumed vs imposed risk is likely to emerge in the US about mandatory vaccination. Many experts agree that preventive and therapeutic treatments, including measures such as physical distancing and wearing of masks or therapies such as monoclonal antibodies, are only a bridge to the ultimate goal—an effective vaccine. Vaccines against non-COVID diseases are overwhelmingly safe, and it will be incumbent that federal agencies ensure that any new vaccine against SARS-CoV-2 is safe, and the potential adverse effects are well-defined. It is possible that many people who are willing to assume individual risk will not want the risk of vaccination to be imposed on them. How to reconcile this tension between individual rights and privileges vs the common good is unclear.

Lingering Risk

For the foreseeable future, the risk of acquiring SARS-CoV-2 may decrease but will persist. Professional sports teams could quarantine their athletes in isolated hotels, conduct events in venues without fans, and adopt new rules; colleges could create individual dorm rooms, test students twice per week, and end classes before Thanksgiving; businesses could ensure appropriate work spaces, require employees to wear masks, and insist that workers who are ill stay home; but none of these mandates can ensure zero risk of disease exposure and transmission—it simply is not possible. Every discussion about return to school, college, work, or other activities must start with the acknowledgment of this fact, and individuals need to be mindful that everyday life has risks. For instance, each year in the US, there are approximately 35 000 motor vehicle-related deaths, 40 000 individuals die from firearms, and hundreds of thousands of deaths are attributable to smoking cigarettes.^{17,18} Admittedly, most indi-

viduals perceive they have some control over how they drive a car, are exposed to firearms or smoking, whereas being exposed to COVID-19 seems more random and less controllable. Yet in 2018-2019, the US Centers for Disease Control and Prevention (CDC) estimated that approximately 500 000 hospitalizations and 34 000 deaths were associated with influenza,¹⁹ but this recurrent morbidity and mortality had almost no effect on normal activities.

In the era of the COVID-19 pandemic, there is a greater discussion to be had—and it is far more difficult. What is the risk to individuals, families, and society with such a radical change in everyday behaviors and activities? How does society balance the risk of COVID-19-related death or serious disease with the short-term and long-term consequences of nearly 40 million people being unemployed; 55 million children home from school; and millions of families, friends, and colleagues kept apart without the ability to touch, feel, laugh, or cry with one another. Is there a way to protect the most vulnerable, or at least reduce their risk of disease, without a total disruption of everyday life? Is there a way to make patients feel safe enough to return to health care facilities for care? What will be necessary for people to feel safe enough to return to work? There are answers to some of these questions, and the CDC and others have offered substantial guidance for many of these issues.^{20,21}

However, without more direct, definitive, and evidence-based guidance from the appropriate federal agencies, primarily officials from the CDC, the National Institutes of Health, and the US Food and Drug Administration, individual states will be left to chart a course forward, and this is likely to create additional uncertainty and political discord. Perhaps most important, rigorous scientific evidence and epidemiological assessments must serve as the basis for objective discussion, fact-based decisions, and optimal determination of the best path forward for individuals and for society.

For the foreseeable future, the risk of acquiring COVID-19 will never be zero. Grappling with and balancing risk, personal choice, and freedoms against individual responsibility and the common good must be part of the discussion of how each person as well as how towns, cities, and countries decide to return to work, school, play, and other activities.

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