

# Primary and Secondary Prevention of Cardiovascular Disease in the Era of the Coronavirus Pandemic

**Running Title:** *Duffy et al.; Prevention of CVD in the Coronavirus Era*

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The World is facing challenging times. COVID-19 is now a global pandemic, and severe cases overwhelm multiple medical centers around the world. Societies struggle to prevent the spread of the disease and effectively treat a rapidly rising number of patients, while not neglecting other health and societal priorities.

This public health crisis has dramatically altered the delivery of preventive cardiology care and healthy lifestyle implementation. In the context of a changing landscape filled with immediate challenges, health interventions that provide long-term benefit may seem counterintuitive and be marginalized. However, continued efforts geared towards preventing cardiovascular disease (CVD) should not be disregarded. Although COVID-19 is the most impending health emergency in most countries, CVD remains the leading cause of death in the World, accounting for 17.8 million deaths in 2017, and diabetes and obesity have also become pandemic.<sup>1</sup> It is crucial to ensure that even during these trying times, CVD prevention efforts remain top health, social and policy priorities.

We are learning that current social distancing restrictions may need to be extended for months, and renowned infectious disease experts believe that coronavirus outbreaks will become seasonal,<sup>2</sup> meaning that long periods of staying at/working from home may become cyclic—at least until effective vaccines become available. These phenomena together with their implications for cardiovascular health will require innovative efforts to adapt current CVD prevention approaches. Importantly, COVID-19-related complications and death are more frequent among individuals with established CVD,<sup>3</sup> and primary and secondary cardiovascular prevention efforts also have direct implications for reducing the burden of current and eventual future outbreaks.

One of the key implications in terms of CVD prevention of the current crisis is the fact that social distancing, staying at home and telecommuting reduce exercise and mobility options, markedly decreasing levels of physical activity.<sup>4</sup> Among the hundreds of millions currently stuck at home, most activities are sedentary and screen time is skyrocketing. Recommendations by health authorities should include aggressive promotion of physical activity for the entire family, adherence to a healthy diet, and reduction of caloric intake to avoid weight gain. Despite physical distance there are now opportunities to engage with others virtually for social support while doing exercise, such as group fitness classes, treadmills and stationary cycling connected online. Some governances still allow for exercising outdoors if within safe social distancing. Mobile health devices, fitness-promoting games, and activity trackers can also be leveraged to promote activity. Also, with many smokers staying at home and having a hard time buying/using tobacco products, the momentum is optimal for massive tobacco cessation counseling. The same is true for vaping.

Health technology was already becoming central to Cardiology, but this novel context will boost implementation further. This is enhanced by expanded coverage of telemedicine for current and new patients by the Centers for Medicare and Medicaid Services, as well as newly covering audio-only visits, thus widening its reach.<sup>5</sup> Preventive cardiology visits are particularly well-suited for telemedicine, as they rely heavily on clinical history, review of laboratory and imaging studies and ambulatory blood pressure monitoring, with less of a need for physical exam. Telemedicine and remote monitoring will make it easier to frequently reach patients to optimize risk factor control, titrate medications, assess diets and physical activity levels, and integrate reminders to meet daily goals, among other capabilities.

Given their higher risk of complications, secondary prevention cardiovascular patients are at the center of social distancing measures, and their cardiologists need to ensure effective communication channels. An emphasis will have to be placed on adhering to cardiovascular medications, rehabilitation activities and healthy lifestyles while isolated. Patients should also be advised to maintain adequate supplies of their chronic medications and instructed how to re-fill prescriptions, potentially utilizing mail order pharmacies in a context of lockdowns/quarantines that impede ready access. Patients should invest in a home blood pressure monitor and a scale. They should be trained to self-evaluate and recognize concerning symptoms, monitor their vital signs/weight and report any abnormalities, and adjust medications. Overall, this new scenario will represent an invaluable opportunity to enhance patient empowerment and ownership in cardiovascular prevention, with less reliance on clinician authority.



Besides health implications, the economic impact of the COVID-19 pandemic will also be enormous, and preventive cardiologists will need to adapt to a landscape of potential economic recession, with some patients facing financial hardship. Care of these patients will have to be particularly sensitive to minimizing financial toxicity through medication choices and emphasis on inexpensive lifestyle changes. Coaching patients for stress management should also be integrated into routine preventive cardiology care.

From a research standpoint, enhanced incorporation of telemedicine and other technologies will generate very granular monitoring and patient trajectory data. Evaluation of the benefits of increased self-care and close e-health follow-up approaches will be key areas of cardiovascular outcomes research in the coming years. The same will be true for research on patient- and context-level determinants associated with adverse cardiovascular outcomes during lockdowns, and on opportunities to improve these. Some patients will flourish and others will

decompensate. This pandemic will further enrich our understanding of the many factors that drive cardiovascular health, disease and outcomes under various circumstances.

Despite the challenges that CVD prevention is already facing in this unprecedented context, we believe there are good reasons for hope. As with all crises, novel opportunities and innovation arise (**Figure**). The overflow of COVID-19 health-related information has likely increased the general public's awareness of the importance of CVD and its risk factors as powerful predictors of outcomes of both communicable and non-communicable diseases. The COVID-19 pandemic has demonstrated the extraordinary things that our societies can do when it comes to tackling urgent crises, and in the coming years we will need to use similar determination, resilience and innovation to tackle the pandemics of obesity and diabetes, which will also overwhelm health systems and economies if we don't act promptly. Marked advances in telemedicine in the post COVID-19 era will provide an opportunity to enhance the care of primary and secondary prevention patients, with implications not only for CVD outcomes, but also for reducing the burden of complications and deaths in current and future viral outbreaks.

## Disclosures

The authors declare that they have no conflicts of interest relevant to the content of this manuscript.

## References

1. Virani SS, Alonso A, Benjamin EJ, Bittencourt MS, Callaway CW, Carson AP, Chamberlain AM, Chang AR, Cheng S, Delling FN, et al; American Heart Association Council on Epidemiology and Prevention Statistics Committee and Stroke Statistics Subcommittee. Heart Disease and Stroke Statistics-2020 Update: A Report From the American Heart Association. *Circulation*. 2020;141:e139-e596.

2. Fauci AS, Lane HC, Redfield RR. Covid-19 - Navigating the Uncharted. *N Engl J Med.* 2020;382:1268-1269.
3. Yang J, Zheng Y, Gou X, Pu K, Chen Z, Guo Q, Ji R, Wang H, Wang Y, Zhou Y. Prevalence of comorbidities in the novel Wuhan coronavirus (COVID-19) infection: a systematic review and meta-analysis. *Int J Infect Dis.* 2020 Mar 12. doi: 10.1016/j.ijid.2020.03.017. [Epub ahead of print].
4. Fitbit. Fitbit News. The Impact of Coronavirus On Global Activity. March 23, 2020. <https://blog.fitbit.com/covid-19-global-activity/> Accessed April 1, 2020.
5. Centers for Medicare and Medicaid Services. CMS.gov. Newsroom. Additional Background: Sweeping Regulatory Changes to Help U.S. Healthcare System Address COVID-19 Patient Surge. March 30, 2020. <https://www.cms.gov/newsroom/factsheets/additional-backgroundsweeping-regulatory-changes-help-us-healthcare-system-address-covid-19-patient>. Accessed April 1, 2020.



# Circulation

## Figure Legends

**Figure.** Novel opportunities and related roles for primary and secondary cardiovascular disease prevention during a coronavirus pandemic.



Circulation



## Health Authorities

- Leverage mass media, internet and social media for massive health communication
- Promote cardiovascular health to a highly engaged audience for which health is again a top priority
- Emphasis on exercise, healthy diets and calorie reduction
- Provide tobacco and vaping cessation recommendations



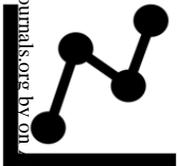
## Preventive Cardiology Professionals

- Ensure communication with physically isolated secondary prevention patients
- Leverage telemedicine
- Use e-visits to monitor physical activity and diet, assess risk factors, titrate drugs
- Emphasis on medication adherence, cardiac rehab and healthy lifestyles
- Adapt to patient financial hardship



## Patients

- Take ownership of their own cardiovascular health, self-monitor, self-care
- Exercise engaging virtually to remain connected and socially supported
- Explore mobile health devices, activity trackers and online fitness games
- Involve the entire family in healthy activities with a special focus on children



## Preventive Cardiology Research

- Telemedicine and enhanced monitoring generating very granular data
- Outcomes evaluation of increased self-care and remote monitoring/telemedicine
- Research findings will guide management approaches in future pandemics
- Identify determinants of adverse outcomes during pandemics and opportunities to ameliorate them