Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

($p < 0.001$) (3), suggesting great care is needed to avoid caloric and other dietary deficiencies when advising sodium restriction in patients with heart failure (HF). In 42 GOURMET-HF patients with complete food frequency questionnaires for analysis, both sodium and calorie intake trended lower between hospitalization and 12 weeks post-discharge (3,073 ± 1,389 to 2,646 ± 1,413 mg Na/day; $p = 0.06$; 1,760 ± 783 to 1,543 ± 726 kcal/day; $p = 0.09$). This suggests that home-delivered meals had little influence on longer-term dietary patterns and that additional support is needed. Optimism is provided by the SODIUM-HF (Study of Dietary Intervention Under 100 mmol in Heart Failure) pilot study, which randomized 38 stable outpatients with HF to a strategy of 1,500 versus 2,300 mg Na/day. With repeated dietitian counseling and intermittent food logging over 6 months, dietary nutritional quality and grip strength were preserved in patients who successfully reduced their sodium intake (4). However, even high-quality dietary counseling is of little use if patients have difficulties in obtaining and eating healthy food. Mobility limitations, social isolation, and symptoms such as dyspnea, fatigue, early satiety, and depression can compromise food intake in patients with HF (5). In addition, the prevalence of food insecurity in patients with HF is higher than in the general U.S. population; increased sharply between 2005 to 2012 (6); and, as Dr. Mehmood suggests, has likely worsened during the coronavirus disease-2019 pandemic. These complex challenges will require complex, multidisciplinary solutions. We believe it is time for clinicians to embrace the concept of "food as medicine" and promote the individual and societal change needed to make healthy diets feasible for and accessible to all.

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The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the Author Center.

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Insights From HeartLogic Multisensor Monitoring During the COVID-19 Pandemic in New York City

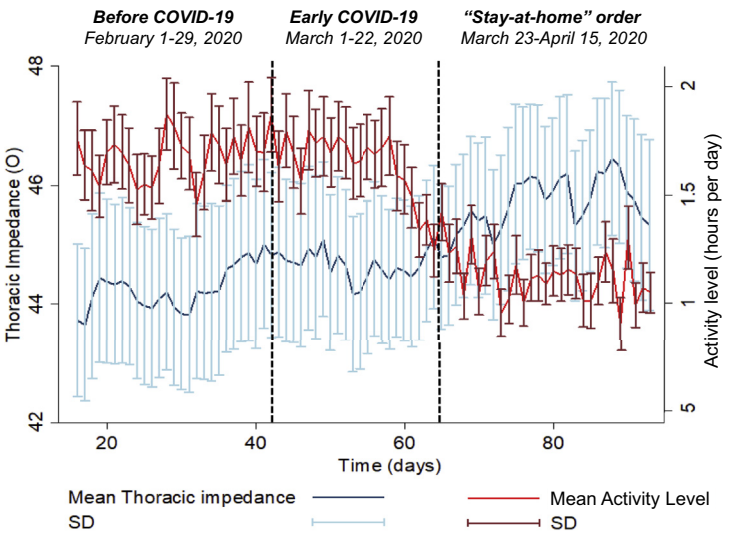
In a recent issue of *JACC: Heart Failure*, DeFilippis et al. (1) and Abraham et al. (2) recommended increasing utilization of telemedicine and remote monitoring platforms for heart failure (HF) care amid the coronavirus disease-2019 (COVID-19) pandemic. To date, COVID-19 has claimed over 180,000 lives in the United States (3). Our group (4) and Almufleh et al. (5) recently showed effective remote pulmonary arterial (PA) pressure monitoring using the CardioMEMS platform (Abbott Laboratories, Plymouth, Minnesota) with a reduction in HF admissions during the peak of the pandemic in New York and Massachusetts, respectively. Widespread use of this technology is limited to patients with pre-existing implantation, prompting a query of other telemonitoring platforms. Boston Scientific's widely available HeartLogic platform (Boston Scientific, Marlborough, Massachusetts) is a proprietary algorithm in their high-voltage cardiac implantable electronic devices and incorporates heart sounds, thoracic impedance, respirations, heart rate, and

FIGURE 1 Clinical Characteristics and Mean Thoracic Impedance and Activity Levels of Patients During the COVID-19 Pandemic in New York City

A

	N=38 patients
Age (years)	59.9 (16.4)
Male	29 (76.3)
Left ventricular ejection fraction (%)	32 (20-45)
HFrEF (LVEF<40%)	25 (65.8)
NYHA Functional Class I	7 (18.4)
NYHA Functional Class II	24 (63.2)
NYHA Functional Class III	7 (18.4)
Hypertension	22 (57.9)
Diabetes Mellitus	13 (34.2)
Atrial fibrillation	15 (39.5)
Chronic renal disease	11 (29.0)
Beta-Blocker	35 (92.1)
ACEi or ARB or ARNI	32 (84.2)
Mineralocorticoid receptor blockers	17 (44.7)

B



(A) Clinical characteristics of the study population. Data are expressed as number (%), mean ± SD, or median (interquartile range), as appropriate. **(B)** Mean ± SD of thoracic impedance **(blue)** and activity level **(red)** before and after the first case of coronavirus disease-2019 (COVID-19) and after the stay-at-home policy in New York City. ACEi = angiotensin-converting enzyme inhibitor; ARB = angiotensin receptor blocker; ARNI = angiotensin receptor neprilysin inhibitor; HFrEF = heart failure with reduced ejection fraction; LVEF = left ventricular ejection fraction; NYHA = New York Heart Association.

activity to provide integrated data that may allow for detection of early signs of worsening HF.

We examined whether the HeartLogic multiple sensor platform may elucidate behavioral changes that impact congestion and HF hospitalizations. A retrospective chart review and analysis of patients with HF and cardiac devices with HeartLogic was performed. Forty-five patients met criteria; however, 7 patients had devices implanted after February 2020 and were thus excluded. Of the 38 included patients, 22 (58%) had implantable cardioverter-defibrillators only, 15 (40%) had cardiac resynchronization therapy, and 1 patient had a pacemaker. Mean age was 60 ± 16 years, 76% were male, and the majority had New York Heart Association functional class II symptoms (Figure 1A). Overall, there was no difference in median composite HeartLogic scores in the period before COVID-19 (February 1 to 29, 2020) or during the pandemic after implementation of stay-at-home orders (March 23 to April 15, 2020) (4.8 [interquartile range (IQR): 0.4 to 6.2] vs. 2.7 [IQR: 0.1 to 5.2]; p = 0.891). However, as the pandemic surged, we observed a significant drop in activity level (1.6 [IQR: 1.0 to 2.2] vs. 1.2 [IQR: 0.8 to 1.5]; p < 0.001), with a corresponding decrease in mean heart rate (75 beats/min vs. 73 beats/min; p = 0.004). We also observed small increases in thoracic impedance (44.6 [IQR: 39.0 to 49.3] vs. 45.5 [IQR: 39.7 to 50.3]; p = 0.007) and less frequent S3 (0.91 vs. 0.87; p = 0.001) (both potentially representing decreased pulmonary congestion). (Figure 1B). No significant trends were observed in other indices of the composite HeartLogic index. While sedentary behavior is often thought to lead to worsening HF, here decreased autonomic tone with less activity and potentially less frequent access to unhealthy food options may have resulted in less congestion; however, this remains a testable hypothesis. The generalizability of these observations is limited by small sample size and short follow-up. Three (7.9%) patients were hospitalized for HF during the study period, comparable to 4 (10.5%) patients in the 3 months prior to the outbreak.

Similar to others' experiences, the COVID-19 pandemic has acted as a catalyst for our group to further leverage HeartLogic and CardioMEMS telemonitoring systems. Broadly, the evolving patterns of care required by the pandemic serve as a call to action to better implement, expand, and innovate remote monitoring platforms for HF. How outcomes will be impacted accordingly remains to be seen.

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The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the Author Center.

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REPLY: Insights From HeartLogic Multisensor Monitoring During the COVID-19 Pandemic in New York City

We recently described effects of the coronavirus disease-2019 (COVID-19) pandemic on health care delivery for patients with heart failure as well as the intersections between COVID-19 infection and heart failure (1). In light of increased noncontact care delivery methods for ambulatory care, telemedicine combined with the use of pulmonary artery pressure monitoring and biosensing devices can help guide heart failure management.

Dr. Mitter and colleagues describe their institutional experience with remote monitoring using HeartLogic multisensor monitoring during the COVID-19 pandemic. The HeartLogic algorithm captures information regarding heart sounds, respiration, thoracic impedance, heart rate, and activity data (2). They retrospectively reviewed data from 38 patients and found a significant decrease in activity level with only small increases in thoracic impedance. As the authors note, sedentary behavior is thought to contribute to worsening heart failure syndromes. They postulate that changes in diet and decreased autonomic tone may have contributed to their findings. While thought provoking, these data are reported from a very small sample population and are hypothesis generating. As the COVID-19 pandemic continues, larger such studies in populations of patients with heart failure and cardiac implantable electronic devices are warranted.

The COVID-19 pandemic is an opportunity for the heart failure community to incorporate more data generated by implantable monitors into routine care. Many of our patients, particularly those with systolic heart failure, have cardiac implantable electronic devices. Although HeartLogic is specific to Boston Scientific (Marlborough, Massachusetts) devices, Medtronic (Minneapolis, Minnesota) similarly has a CareLink remote monitoring network, and St. Jude Medical (St. Paul, Minnesota) has the Merlin network in addition to the implantable CardioMEMS device. These tools can provide valuable insight into patients' activity levels, volume status, and arrhythmia burden, which could also be a trigger for worsening heart failure. These devices have limitations, and the use of intrathoracic impedance monitoring or heart rate variability from cardiac implantable electronic devices has not been demonstrated to improve clinical outcomes in large trials (3). Yet, integrating these data from remote monitoring may constructively supplement our care of patients with heart failure during the COVID-19 pandemic and beyond.

We thank Dr. Mitter and colleagues for their application of important insights from our work. Moving forward, we must continue to stay vigilant and creative to find new and effective strategies for caring for our patients with heart failure.

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