

PROMATION PRAISED BY UNIVERSITY HEALTH NETWORK, U of T and Mi² FOR DEVELOPING LOW-COST, MOBILE VENTILATOR IN JUST TWO WEEKS

(Toronto - MAY 7, 2020) Promotion, an Oakville-based custom design and manufacturing firm, is being lauded by Toronto scientists and industry experts at University Health Network (UHN), University of Toronto (U of T), and Mackenzie Innovation Institute (Mi²) for the fast development of a low-cost ventilator in response to the potential of a sudden surge in demand due to COVID-19 or other future emergencies.

“We are incredibly grateful to the Promotion team for their engineering expertise and generous support,” said Dr. Azad Mashari, anesthetist and lead researcher from University Health Network (UHN). “Prototypes like this often take months or years to develop. The Promotion team worked almost around the clock to develop this version in just two weeks.”

In early April, with forecasted concerns of ventilator shortages, researchers saw a void that needed to be filled quickly during this COVID-19 crisis. Responding to a call for assistance, Promotion immediately committed pro-bono support and joined the fight against COVID-19.

The Promotion team designed, machined, programmed, built and tested two functioning prototypes, to ensure reliability, durability, safety and ease of use. Promotion’s design can easily be mass-produced, and they are sharing their knowledge with other teams globally.

“We are thrilled with the development and rigorous testing that has gone into building this prototype,” said Dr. Kamran Behdinan, Professor and NSERC Design Chair in multidisciplinary engineering design at the Faculty of Applied Science & Engineering, University of Toronto. “It has been a great privilege to collaborate with the researchers and physicians from UHN-TGH as well as the experts from Promotion to deliver a life-saving working prototype at the time of this pandemic.”

“We heard in March there was a possibility Canada could run out of ventilators and we felt compelled to do whatever we could to help,” said Darryl Spector, President of Promotion, and an alumnus of the U of T Engineering program. “It’s beautiful to witness when personal values, moral obligation and professional competencies converge in response to a compelling call-to-action, where truly incredible things happen.”

“This collaboration is a testament that business is beyond quarterly performance and balance sheets — it is the real-life embodiment and manifestation of individual visions, values and passions.”

VENTILATOR DEVELOPMENT

After initial investigations at the U of T and UHN, a ventilator device was adapted from an open source original design from MIT. It uses a motor and mechanical arms to squeeze a balloon-shaped “Bag Valve Mask, most commonly associated with the brand name “Ambubag (™/R)”

which pushes oxygen into the patient's lungs. An electronic controller allows the user to regulate the frequency, timing and amount of air squeezed.

The advantage of this ventilator's design is that it can be rapidly deployed in case of a surge in demand, and operated in any emergency situation where there are no other alternatives. The device is portable and can operate 'in-the-field' using only two standard car battery packs for three days.

"All of the design files and related data are being put on an open-source platform so that others can learn from what we've done," said Dr. Aviv Gladman, ICU Physician and Engineer, and Board Member of Mackenzie Innovation Institute. "We are all in this fight together."

The prototype has undergone extensive testing at UHN's facilities, and an expedited approval process is in discussion with Health Canada. The low-cost ventilator can be rapidly scaled and manufactured in large quantities as required.

"This simple but effective ventilator has the potential to be used not only for demand surges in Canada but also in low- and middle-income countries where conventional ventilators are prohibitively expensive," says Dr. Ben Chan, Assistant Professor of Global Health at the University of Toronto and collaborator on the project.

Promation's team consisted of Steve Evans, Alex Sakuta, Adam Mitlyng, Harin De Mel, Yajurvin Govindraj, David Chakhnazarov, Derek Jarzak, and Manju Shivaswamy, with support from Dr. Jesse May from UHN, Jeff Hulcoop from Laveer Engineering, and Matthew Humeny from Alithya.

To learn more, and for photos, visit: <https://apil.ca/bvm-halo-vent/>

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About Promotion

Promotion is a leading designer and manufacturer of high quality tooling, automation and robotic systems since 1995. With a strong commitment to excellence and strict conformance to quality management programs, Promotion delivers custom equipment and engineered turnkey systems while catering to the unique quality and safety requirements of the nuclear, aerospace & defence, radio-pharmaceutical, and automotive industries. By utilizing innovation and advanced manufacturing technologies, Promotion ensures continuous development of leading-edge solutions which are essential to optimum operation and long-term reliability.

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About University Health Network

University Health Network consists of Toronto General, recently voted one of the Top 10 Hospitals in the World according to Newsweek Magazine, and Toronto Western Hospital, the Princess Margaret Cancer Centre, Toronto Rehabilitation Institute, and the Michener Institute of Education at UHN. The scope of research and complexity of cases at University Health Network has made it a national and international source of discovery, education and patient care. It has the largest hospital-based research program in Canada, with major research in cardiology, transplantation, neurosciences, oncology, surgical innovation, infectious diseases, genomic medicine and rehabilitation medicine. University Health Network is a research hospital affiliated with the University of Toronto

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About the Faculty of Applied Science and Engineering, University of Toronto

Established as Ontario's first engineering school in 1873, the Faculty of Applied Science & Engineering at the University of Toronto is Canada's #1-ranked engineering school and among the world's best. Our diverse community includes more than 5,200 undergraduates, 2,400 graduate students, 300 staff, 260 faculty and over 50,000 alumni. Through innovations in engineering education and research, we prepare the next generation of global engineering leaders to address the world's most pressing challenges.

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About Mackenzie Innovation Institute

Mackenzie Innovation Institute (Mi²) is positioned as a leader in healthcare applied innovation with a focus to ensure sustainability and long-term success. Mi² is a not-for-profit organization that focuses on creating and propagating sustainable change within Mackenzie Health, and to spread it more broadly at the healthcare system level. Mi² builds partnerships with industry, academia and government organizations and to establish system processes on implementation,

usability, adoption and scalability of disruptive innovations, predominately in healthcare technology, but also in evidence-based practice changes and alternative service delivery and procurement models.

To learn more about how Mi² can help you grow in the health innovation space, email info@mi2health.com or visit www.mi2health.com

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