

Tech helps develop new oxygen delivery system

A STANDARD PIECE of medical equipment that had scarcely changed in design for half a century didn't appear to warrant a lot of attention.

But Lee Macdonald, CEO, of Southmed Inc. thought otherwise. How do you make a better mask she asked? The company challenged Julius Hajgato, C.E.T., with this problem.

"Standard oxygen masks are claustrophobic to a lot of people and they can create anxiety," says Hajgato, the certified engineering technologist who is manager of research and development at Southmed, a Barrie, Ont. company specializing in anesthetic and respiratory products.

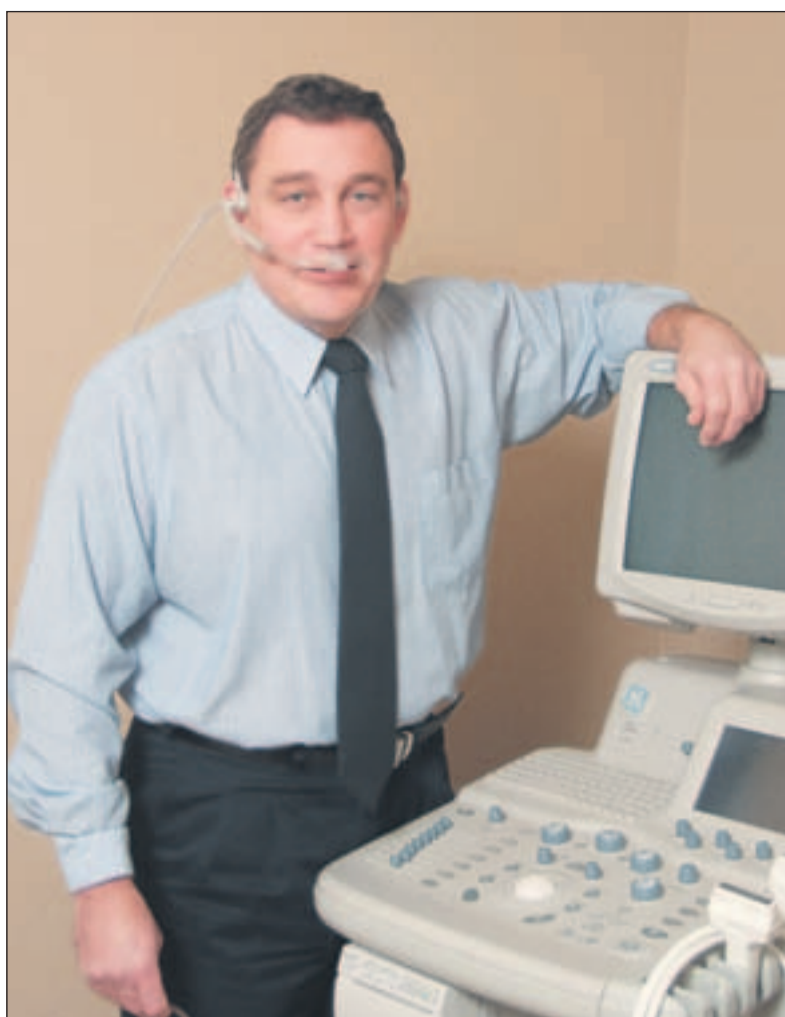
The company has revolutionized the oxygen mask with a product series that completely reconfigures this traditional piece of hospital equipment.

Southmed's first open oxygen delivery device, the OxyArm, looks like a telephone headset. Oxygen flows into the patient's mouth through a patented diffuser assembly positioned in front of the mouth and nose.

Using that technology, Hajgato's team next developed the OxyMask, lighter than the traditional mask and with other benefits.

A Toronto hospital medical study shows that masks have a tendency to retain CO₂ expired gases. Sometimes patients throw up in their mask, a potentially hazardous situation.

Further, when Hajgato and his team ran computer simulations on what occurs inside an oxygen mask, they found that patients were breathing in the same car-



Julius Hajgato, C.E.T., manager of research and development at Southmed, demonstrates the new OxyArm engineered to deliver oxygen comfortably.

bon dioxide they had just breathed out.

"We thought this was an opportunity to change the oxygen mask," remarks Hajgato, who works with a team of designers, machinists and tool shop technicians to create new devices. In addition to the OxyArm and OxyMask, Southmed also offers the OxyChin for use during surgery.

The key is that each system is open and provides oxygen to the patient while

leaving their mouth and nose free. Patients can speak, drink through a straw and use a nasal gastric tube while receiving oxygen.

And while patients in hospitals, clinics and nursing homes use the new equipment, design engineering created it.

"It's helping people," relates Hajgato with evident pride. "It's going to make them more comfortable and enhance their standard of life."

Consulting engineers support water research

MOST MUNICIPAL TAP water in Canada is treated with chlorine to kill harmful microorganisms.

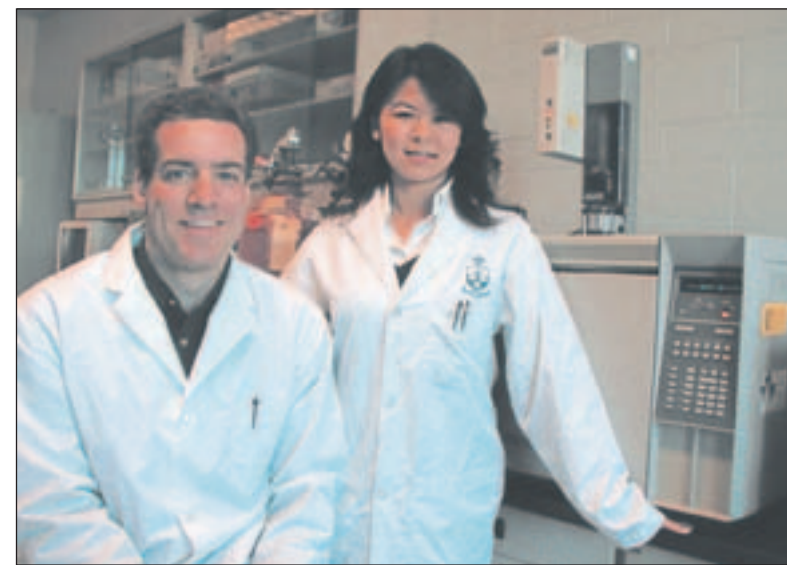
While the approach is largely effective, however, it has shortcomings. Besides often leaving an objectionable taste, chlorine is linked to certain potentially harmful chemical byproducts.

That's why Dr. Ron Hofmann, P.Eng., of the University of Toronto put forward the name of one of his best young researchers for a Water Quality Research Scholarship to study the use of ultraviolet light to disinfect drinking water.

"We want to see if UV light can do good things to the water over and above destroying the microorganisms," says Dr. Hofmann, whose chemical engineering student Anni Luck is being granted \$20,000 in each of two years.

The scholarship program for research into the protection and treatment of drinking water is a quarter million dollar initiative of Consulting Engineers Ontario, the association representing Ontario engineering firms. This past year the program allowed for two university researchers to each hire a graduate student for two years. Selected projects focus on practical solutions to assist consulting engineers and municipalities in meeting the need to deliver safe drinking water.

"Walkerton wasn't just a wakeup call, it was a reminder," comments CEO president John Gamble, P.Eng., referring to the Ontario town where seven people died from contaminated drinking water. "Cholera in the early century was a big



Dr. Ron Hofmann, P.Eng., of the University of Toronto, recommended chemical engineering student Anni Luck for a Water Quality Research Scholarship

issue. Ontario has an aging infrastructure and the potential for contaminants has increased."

CEO hopes the scholarships can help lead to improved contamination and detection technologies; better source water protection; and new economic tools for sustainable drinking water infrastructure.

"There's a growing recognition of the significant infrastructure deficit in this country," Gamble remarks.

CEO became strongly involved in the water quality issue in the aftermath of Walkerton. The association aided the provincial government by operating an engineering consultant roster to facilitate the peer review of drinking water studies performed for every municipal water system in the province to ensure the safety of public water systems.

"The revenue from that work has allowed us to make meaningful contributions to a number of different worthy projects," Gamble relates. "It also allows us to invest in the education of promising engineering students who may someday become the leaders of the profession."

One of those is Sarah Watts at the

University of Guelph. Also a CEO scholarship recipient, she is working with Dr. Bahram Gharabaghi, P.Eng., to investigate source water protection.

"In the last few decades," Dr. Gharabaghi explains, "a wide variety of watershed models have been developed that can predict downstream contaminant loadings."

Watts' research, he continues, "is focused on investigating the strengths and weaknesses of a range of watershed models and their accuracy in predicting runoff and in predicting sediment, nutrient and bacteria loads in Ontario's watersheds."

This research, Dr. Gharabaghi believes will be particularly beneficial to conservation authorities, ministries and consulting engineers involved in source water protection, as well as the Ontario agri-food sector as it will improve procedures for identification of locations in rural watersheds most likely to be at risk of water quality impairment and soil degradation.

This coming year, CEO will be making scholarships available to research programs at the University of Windsor and McMaster University.

Technology enhances quality of life at long-term facilities

ON THE CAMPUS of Fleming College in Peterborough, Ont. rests a structure that bids to transform long-term care facilities for the aged.

In the first such partnership in Canada, The Institute for Healthy Aging — St. Joseph's at Fleming is a long-term facility fully allied with a teaching institution that will work continuously to improve the quality of life there.

And the first major step in remaking the long-term care environment for seniors came

with the application of bricks to mortar around a remarkably engineered building.

"It was designed with a core infrastructure for many capabilities," explains Ron Walker, C.E.T., professor of applied computing and engineering services at Fleming.

"We asked how can we use the electronic technology that we're seeing in smart homes and buildings to enhance the safety, quality of life and dignity of long-term care residents?" says the certified engineering

technologist.

The answer is — in many significant ways. "We have started research projects to facilitate the residents' control of their environment when they have limited mobility," notes Walker.

His team works with humanities faculty from other Fleming Centers and nearby Trent University to align goals such as improved safety through nurse monitoring with privacy concerns.

Specific features range from voice control to activate a television set to an automatic signal that would alert staff if a patient had not left a bathroom after an extended duration.

Even the redesign of the hand control for adjusting the bed without aid will give residents a significant level of autonomy.

The ambitions behind The Institute for Healthy Aging extend to other areas as well, of course. The facility's presence will anchor

a "healthy aging" emphasis in the curriculum of every relevant faculty at the college, for example, and new programs to benefit residents will result.

The smart wiring built into its walls served as the starting point for the Institute as a learning centre and prototype for long-term care across the country. That was where Walker and other engineering professionals first took on the mission of enhancing the quality of life for the residents within.

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