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## Ventilation Changes Could Double Number of Lungs Available for Transplant

***Simple changes to how ventilators are used could almost double the number of lungs available for transplants, according to new international research involving a doctor at St. Michael's Hospital.***

Many potential donor lungs deteriorate between the time a patient is declared brain dead and the time the lungs are evaluated to determine whether they are suitable for transplant. The study involving Dr. Arthur Slutsky, the hospital's vice president of research, said the deterioration could be in part because of the ventilatory strategy used while potential donors were observed just prior to being declared brain dead.

His team, lead by Dr. Marco Ranieri of the University of Turin in Italy, tested a "lung protective strategy" on patients in 12 hospitals in Spain and Italy that resulted in a significant increase in the number of viable donor lungs that were transplanted. Their results are published in the current issue of the *Journal of the American Medical Association*.

The strategy involved using smaller "tidal volumes," meaning less air was pumped into the lungs with each breath, to prevent injury to the lungs. It also used higher "positive-end expiratory pressure," the amount of pressure applied by the ventilator at the end of an exhalation, to prevent lungs from collapsing.

"A lot of patients who are waiting for lung transplants die before they get a transplant because there aren't enough organs," said Dr. Slutsky, the only Canadian on the research team. "By using this lung protective strategy, one can essentially double the number of lungs available for transplant."

The randomized study involved 118 patients. Of the 59 patients treated with conventional ventilation, 32 (54 per cent) met lung donor eligibility criteria. Of those on the lung

protective strategy, 56 (95 per cent) met the criteria. Ultimately, double the number of lungs was transplanted in the group treated with the lung protective strategy.

According to the Canadian Institute for Health Information, 1,222 lung transplants were performed in Canada between 1997 and 2006, but 299 people died while waiting for a transplant. There were 252 people waiting to receive lung transplants in 2006, up from 119 in 1997.

"This is pretty simple and easy to implement," Dr. Slutsky said. "It's not like a fancy new drug or equipment. You just have to change the ventilator a little bit."

Dr. Slutsky said some doctors and hospitals may already be following a similar "lung protective strategy" but this is the first published randomized clinical trial showing it works, which could lead to standards that all hospitals would follow.

"If this is adopted widely, we think it will increase the number of lungs available for transplant, increase the quality of life for some people and probably save the lives of some people who are on the waiting list," he said.

Luciana Mascia, Daniela Pasero, Arthur S. Slutsky, M. Jose Arguis, Maurizio Berardino, Salvatore Grasso, Marina Munari, Silvia Boifava, Giuseppe Comara, Francesco Della Corte, Nicoletta Vivaldi, Paolo Malacarne, Paolo Del Gaudio, Sergio Livigni, Elisabeth Zavala, Claudia Filippini, Erica L. Martin, Pier Paolo Donadio, Ilaria Mastromauro, V. Marco Ranieri. Effect of a Lung Protective Strategy for Organ Donors on Eligibility and Availability of Lungs for Transplantation: A Randomized Controlled Trial. *JAMA*, 2010;304(23):2620-2627 DOI: 10.1001/jama.2010.1796