

Near-lethal bout of swine flu successfully treated with heart-lung machine and lung transplant

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According to the critical care experts at The Johns Hopkins Hospital who treated him, Allen Bagents, 24, of Arlington, Va., is the least likely person anyone ever expects to get sick, let alone suffer a six-week, potentially fatal bout with the swine flu, better known as H1N1 influenza.

A recently graduated economist his brother calls the “smartest guy he knows,” Bagents was healthy in July 2009, with no pre-existing medical conditions except for a leg infection caused by a bug bite three weeks earlier in Louisiana, when he sought treatment in a community hospital in Southern Maryland for fevers and trouble breathing.

What happened next, described in a report set to appear in the [Journal of the American Medical Association](#) online Dec. 8, have his caregivers at Johns Hopkins crediting the community hospital medical team’s swift recognition of lung failure and the quick transfer to Hopkins with saving Bagents’ life.

The Johns Hopkins team, including pulmonologist Matthew Pipeling, M.D., and intensivist Eddy Fan, M.D., say Bagents’ experience represents the most extreme case of survival from H1N1 infection reported to date in the United States, transpiring just over a month after the World Health Organization had declared a global [flu](#) pandemic. The outbreak, first reported in the United States in April 2009, during the

usual spring and summer lull in [influenza](#) infections, would eventually claim some 17,000 lives worldwide, including a disproportionate number of young, previously healthy people who would typically be less vulnerable to seasonal flu.

“If the community hospital staff had waited a day longer, even a few hours more, Allen may not have been medically fit for transport and his lungs would have likely failed before any more advanced treatments could be performed to save him,” says Fan, an instructor at the Johns Hopkins University School of Medicine. Fan says Bagents had life-threatening low levels of oxygen in his blood on admission to intensive care at Johns Hopkins, and his breathing was completely dependent on a mechanical ventilator. The Louisiana native had developed his respiratory symptoms, including cough, plus vomiting, two weeks after he was given antibacterial drugs to treat the minor leg infection, a sign to his community physicians that a novel, most likely viral lung infection had taken hold.

Suspecting H1N1 infection, which Pipeling says was then “showing up in emergency rooms across the state,” though not originally tested for at the community hospital, the Hopkins team immediately gave Bagents oseltamivir, or Tamiflu, the only medication at the time known to work against the virus. Some two dozen other tests ruled out other possible pneumococcal, fungal or parasitic infections, further convincing the team’s infectious disease experts that Bagents indeed had H1N1, even though a rapid test for the new strain had been negative.

Despite treatment, Bagents’ lung condition continued to decline over the next 24 hours, with mechanical ventilation unable to keep his blood oxygen levels high enough to keep him alive.

Several emergency techniques were used to boost Bagents’ lung function – inhaling nitric oxide, gently vibrating his lungs to keep his air sacs

open, even lying him face down, on his stomach to reverse the natural pressures on his lungs. Nothing worked, and three days after Bagents entered the ICU, his heart suddenly stopped. CPR and chemical injections kept him alive until the medical team could connect Bagents to a heart-lung machine, a mechanical pumping device that circulates and oxygenates the blood. The advanced technique, more formally known as extracorporeal membrane oxygenation, or ECMO for short, is usually reserved for open-heart surgeries and sometimes as a temporary bridge to transplant patients who need more time for an organ donor to become available. Pipeling and Fan knew that ECMO treatment had saved other patients in severe respiratory failure, essentially giving their lungs a rest and time to heal.

Bagents' lung function stabilized. But over the next month, the Johns Hopkins team was unsuccessful in weaning Bagents off ECMO after a half-dozen attempts. "Every time we tried to take him off ECMO, he was unable to maintain safe oxygen levels by breathing with his own lungs," says Pipeling, also an instructor at Johns Hopkins, who notes that adult patients are rarely ever on ECMO for longer than a week. "Our options were running out."

"Lung transplantation was really his last chance at this point," says Fan, who in consultation with Johns Hopkins transplant surgeon Ashish Shah, M.D., decided that Bagents' youth and healthy heart, brain and kidney function made him a good candidate for a donor organ. And barely a day after being registered on the transplant waitlist, on the Labor Day weekend, Bagents received a new pair of lungs.

Bagents remained at Johns Hopkins until the end of November, when he began weekly check-ups and monitoring for any indications of organ rejection. He has since been re-admitted five times for lung infections and signs that his immune system is rejecting the transplanted lungs. The Hopkins team says the goal now is to prevent further setbacks with his

new lungs so that he is well enough to go home.

Fan notes that few hospitals are equipped with ECMOs and even fewer perform lung transplants, so a quick transfer to a specialized center that has both is critical. “What other physicians need to know is that the window for responding effectively to complex cases of H1N1 is very slim,” says Fan “If we are ever faced with another outbreak, then a coordinated response from community hospitals and larger medical centers will be key to offering infected people the best possible care.”

Provided by Johns Hopkins University

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