



## Arkansas Department of Health

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December 31, 2009

### **PANDEMIC INFLUENZA (H1N1) 2009: BRAZIL, AUTOPSIES**

American Thoracic Society report [edited]

<http://www.sciencecenter.com/news/article.php?q=09122344-researchers-find-new-patterns-h1n1-deaths>

Brazilian researchers have performed the 1st-ever autopsy study to examine the precise causes of death in victims of pandemic influenza (H1N1) 2009 virus infection. "The lack of information on the pathophysiology of this novel disease is a limitation that prevents better clinical management and hinders the development of a therapeutic strategy," said lead author, Thais Mauad, MD, PhD, associate professor of the Department of Pathology at Sao Paulo University, in Brazil. The results of their study will be published in the 1 Jan 2010 issue of the American Thoracic Society's American Journal of Respiratory and Critical Care Medicine [abstract available at <http://ajrccm.atsjournals.org/cgi/content/abstract/181/1/72>].

The researchers examined 21 patients who had died in Sao Paulo with confirmed pandemic (H1N1) 2009 virus infection in July and August 2009. Most were between the ages of 30 and 59. They found that three-quarters (76 percent) of the patients had underlying medical conditions such as heart disease or cancer, but there was no clear complicating medical condition in the remaining quarter. All presented a progressive and rapidly fatal form of disease.

While previous data have shown that most patients with a non-fatal infection have fever, cough and achiness (myalgia), Dr Mauad noted that "most patients with a fatal form of the disease presented with difficulty breathing (dyspnea), with fever and myalgia being less frequently present."

All patients died of severe acute lung injury, but there were 3 distinct patterns of the damage to their lungs, indicating that the infection killed in distinct ways. "All patients have a picture of acute lung injury," said Dr Mauad. "In some patients this is the predominant pattern; in others, acute lung injury is associated with necrotising bronchiolitis (NB); and in others there is a haemorrhagic pattern."

"Patients with NB are more likely to have a bacterial co-infection. Patients with heart disease and cancer are more likely to have a haemorrhagic condition in their lungs. It is important to bear in mind that patients with underlying medical conditions must be adequately monitored, since they

are at greater risk of developing a severe H1N1 infection," said Dr Mauad. In these patients, H1N1 infection may present as a potential fatal disease, requiring early and prompt intensive care management, including protective ventilation strategies and adequate haemodynamic management. "We found that 38 percent of these patients had a bacterial infection (bronchopneumonia). This has important consequences because these patients need to receive antibiotic therapy, in addition to antiviral therapy."

The researchers also found evidence of an influenza-associated 'cytokine storm,' an aberrant immune response in the lungs of certain individuals, which was almost certainly involved in the pathogenesis in these fatal cases of the H1N1 infection. "[This] suggests that an overly vigorous host inflammatory response triggered by the viral infection may spill over to and damage lung tissue, thereby causing acute lung injury and fatal respiratory failure," noted John Heffner, MD, past president of the ATS [American Thoracic Society].

Further research is needed to understand precisely how and why certain patients succumb to a fatal progression when infected with the pandemic (H1N1) 2009 virus. While most patients experience a mild illness with no lasting effects, this research lays important groundwork for future efforts by defining the histological patterns associated with a fatal infection.

"We would like to deepen our efforts into the understanding of the immune responses in cases of severe infection," said Dr Mauad. "This could ultimately lead to new therapeutic approaches."

The results of autopsies carried out in the United States (New York City) can be viewed at ProMED-mail Influenza pandemic (H1N1) 2009 (124): autopsy findings 20091208.4188. - Mod.CP]

If you have any questions please feel free to contact Dr. Sandy Snow at 501-661-2169 or fax to 501-661-2300 or e-mail to [Sandra.snow@arkansas.gov](mailto:Sandra.snow@arkansas.gov).