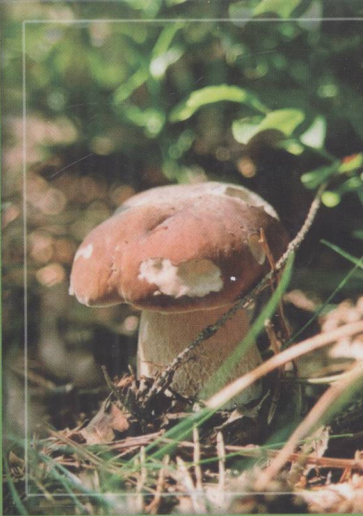
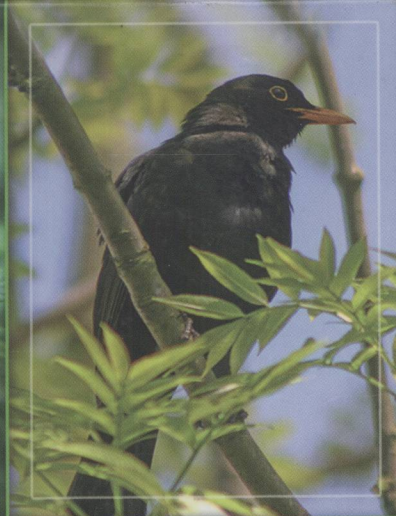
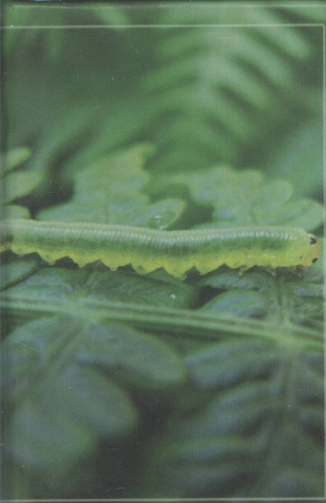


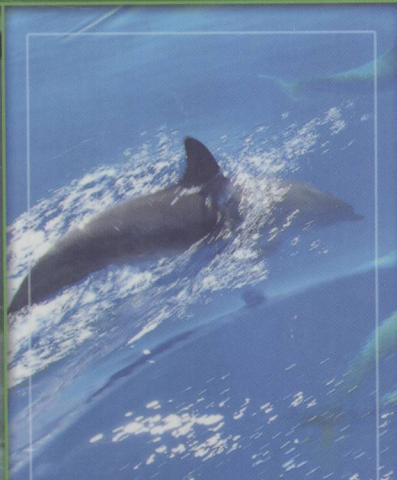


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C.A. Brebbia & M. Zamorano



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University of Thessaly, Greece

C.A. Brebbia

Wessex Institute of Technology, UK

M. Zamorano

University of Granada, Spain



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A. Kungolos
University of Thessaly, Greece

M. Zamorano
University of Granada, Spain

C. A. Brebbia
Wessex Institute of Technology, UK

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Preface

This volume contains the contributions presented at the 2nd Conference on Environmental Toxicology, which was held in Granada, Spain in 2008. The conference was organized by the Wessex Institute of Technology in collaboration with the University of Granada, Spain, and the Department of Planning and Regional Development at the University of Thessaly, Greece. It was sponsored by WIT Transactions on Ecology and the Environment and The International Journal of Sustainable Development and Planning. The first Conference took place in Mykonos Island, Greece in 2006.

Environmental toxicology is one of the most interdisciplinary sciences. Biologists, microbiologists, chemists, engineers, environmentalists, ecologists and other scientists work together in this new scientific discipline. Assessment of the environmental effects of chemicals is complicated as it depends on the organisms tested and involves not only the toxicity of individual chemicals, but also their interactive effects (including antagonistic and synergistic ones), and genotoxicity, mutagenicity and immunotoxicity testing. Hazardous waste management is closely related to environmental toxicology and there is a growing need for techniques and practices to minimize the environmental effects of chemicals.

The Environmental Toxicology Conference created an atmosphere that was conducive to the fruitful interaction and exchange of ideas amongst the participants; fulfilling the aims of the Wessex Institute meetings – the transfer of state-of the art knowledge between colleagues working in industry and government and those employed at universities and research organizations.

The editors would like to thank all the authors for their papers and, in particular, the members of the International Scientific Advisory Committee for their help during the review process.

The Editors,
Granada, 2008

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Spanish influenza: analogue for potential ramifications of bioterrorism

K. Duncan

Health Studies, University of Toronto at Scarborough, Canada

Abstract

During the 20th century, influenza threatened the world in 1918-19, 1957-58, and 1968-69; the latter two pandemics killed a total of three million people. In stark contrast, the Spanish influenza of 1918 killed an estimated 50 million people—even though eighty percent of patients suffered only the usual three- to five-day illness. Twenty percent of all influenza patients developed pneumonia, and half of those died.

In North America, the Spanish influenza pandemic serves as a useful analogue for the potential ramifications of a major epidemic caused by one of the serious biological weapons, such as *Variola major* (smallpox), *Bacillus anthracis* (anthrax), *Yersinia pestis* (plague), Botulinum toxin (produced by *Clostridium botulinum*), and a number of the causative agents of the syndrome termed viral haemorrhagic fever.

Although case fatality rates were 1.9-5.0 percent for Spanish influenza, they might reach 30-80 percent for untreated smallpox and anthrax. In Canada, the 1918 influenza pandemic caused 50,000 deaths, widespread social disruption, and enormous burdens on healthcare and civil infrastructure. A catastrophic epidemic resulting from bioterrorism would 'severely tax society's ability to care for the sick and dying, and to contain disease.'

Preparations for a bioterrorist attack must therefore include several capabilities—to characterize any outbreak, to allocate health resources fairly, to care for mass casualties, to provide mass burials that respect social codes, and to address psychological impacts.

In light of the foregoing, this paper utilizes the 1918 Spanish influenza in Toronto, Canada, as an analogue for the possible impacts of a bioterrorist attack, and makes recommendations for preparedness, safety, and security.

Keywords: *Spanish influenza, bioterrorism, preparedness, safety, security.*

