



NOVAERUS

Airborne Infection Control

NOVAERUS' OPINION ON EBOLA

Ebola virus has become a deadly threat for people all across the globe. With the rise in air travel and the freedom of movement of people across continents, will there be a single country that is unaffected by the threat of this disease in 2015? All modern healthcare facilities are currently creating Ebola Isolation Protocols for patients who present with the early onset symptoms of Ebola. At the risk of appearing overly fearful of this disease, we would be remiss if we did not point out several facts in regard to the probable vectors of transmission of Ebola.

EBOLA VIRUS

The current outbreak (which actually began on or before December, 2013) presents genetic strains of Ebola that have never been seen before. The Guinea variant of Ebola was itself novel enough to form its own clade had strong evidence of recombination, which raises concerns of more evolution in the current sub-clade, which has produced a record number of reported Ebola cases and deaths.

There is more than a possibility that these genetic alterations might be causally related to the current outbreak's dramatically higher fatality counts and evidently, higher contagion rates. As to whether the novel viral genotypes might signify that Ebola is now airborne, the CDC and the United Nations now state that Ebola **CAN BE TRANSMITTED** short distances (approx. 2 metres) via droplet nuclei expelled on the breath of infected patients.

Remember this statement, as you will hear it again later in relation to previous global pandemics.

THE SPANISH FLU

The last great global pandemic was Spanish Flu in 1918; it infected 500 million people in only 2 years and killed between 50 and 100 million...including people in such far flung locations as remote Pacific islands and the Arctic. Its spread was unlike anything the modern world had ever seen before. It was also widely down-played in the media of the time, so that there was not widespread pandemonium.

Up until this decade, with the rapid and global spread of SARS in 2008, it was believed that modern Influenza could only be transmitted via droplet nuclei in the air, and that these droplets only remained airborne for a maximum distance of 2 metres before falling to the ground (sound familiar?). It has now been conclusively proven that as these droplets fall to earth, they release smaller viral particles into the air...and these smaller viral particles can remain airborne INDEFINITELY. During these recent studies, researchers found that no

matter where a healthcare worker is in a room, within 5-10 minutes they were exposed to infectious doses of these naked viral particles.

Even more interesting, researchers at Harvard Medical School discovered that these smaller viral particles, which remain airborne indefinitely, are 8.8 times more infective than the droplet nuclei from which they originated. Another interesting fact is that it is impossible to filter a virus using modern mechanical methods of filtration; such as HEPA or ULPA filters. Simply put, if you make the holes small enough to trap individual viruses, you cannot pass any air through them at all.

See attachments (a) http://www.novaerus.hu/documents/Aerosol_Influenza_Study_infectioncontrolday_highlighted_08112013.pdf;

(b) http://www.novaerus.hu/documents/Concentrations_and_distributions_of_airborne_influenza_A_viruses_at_a_health_centre-highlighted.pdf

THE PLAGUE

In the 1350's, The Black Death killed between 75 million and 200 million people around the world, and like the Spanish Flu before it, The Plague (while bacterial in nature) still spread across the globe leaving no country unaffected. This was in a time long before modern air travel made the spread of pandemic diseases so rapid. It has now been conclusively proven that the Bubonic Plague (named after the boils that appear on the skin of infected patients) was actually a far more virulent Pneumonic Plague (as it has now been renamed), capable of being transmitted via the air...in droplet nuclei (sound familiar?).

See: Types of Plague at <http://science.nationalgeographic.com/science/health-and-human-body/human-diseases/plague-article/>

Both of these diseases have now been conclusively proven to be airborne, and not transmitted **solely** by contact (or by rats or fleas), as was previously believed. In fact, in only July of this year, a Colorado resident contracted Pneumonic Plague and it spread it to three other people within days of him contracting it.

NOROVIRUS

Furthermore, medical researchers only last year finally admitted that Norovirus (an extremely infective virus) can also be transmitted via the air, and that the infective dose can be as small as 10 individual virions. These viral particles are released from the vomitus of infected people, and to quote the Washington Health Dept "can infect a person simply by breathing in a room where an infected patient has vomited". This discovery explains why Norovirus spreads so widely and so quickly...and yet only 12 months ago, healthcare professionals were unwilling to accept this as fact...Must we wait years for conclusive evidence of the airborne transmission of Ebola virus to be conclusively proven?

See attachment - (c) http://www.novaerus.hu/documents/Washington_State_Dept_of_Health_on_Norovirus-highlighted.pdf

AIRBORNE VECTOR OF TRANSMISSION

All of these diseases (Influenza, Pneumonic Plague and Norovirus) are found in the bodily fluids of infected patients, and yet through a variety of environmental influences, have been conclusively proven to be able to deliver an infective dose to otherwise healthy

people SOLELY via the airborne vector of transmission. Will it be too late when we finally admit that Ebola virus can also be transmitted in a similar manner? Is it worth the risk to pretend that this is not a possible, indeed an extremely probable, current method of transmission of Ebola virus.

NOVAERUS PROPRIETARY PLASMA TECHNOLOGY

One company, NOVAERUS, has developed a simple yet extremely effective technology to destroy all airborne pathogens in a single pass. Novaerus' proprietary plasma technology is based around a dielectric barrier discharge plasma field, that is uniquely destructive to all micro-organisms that are passed through it. Recirculating contaminated air through this field, destroys all pathogens and provides sterile air within any enclosed environment.

Novaerus has recently been verified by NASA after 12 months of comprehensive study, using E. coli as the test bacteria in a series of tests, which were then further verified by researchers at Stanford University. NASA studied the effects of the Novaerus plasma field, under scanning electron microscope; examining bacteria after a single pass through a Novaerus device using its patented plasma field. These results were further verified using the Synchrotron particle accelerator at Stanford University. The results showed total destruction of the bacteria, and its constituent DNA material, after only a single pass through the Plasma Field. This data is now under peer review and will be published shortly in the *Journal of Hospital Infection*.

See attachment - (d) http://www.novaerus.hu/documents/Air_sterilization_manuscript_Journal_of_Hosp_Inf_2014.pdf

Prior to this, Novaerus has been tested in the laboratory environment against multiple organisms; a range of Gram negative bacteria, Gram positive bacteria, Gram positive spores, as well as a range of Yeasts and Moulds. The technology was also tested against a range of viruses (single and double strand RNA, and single and double strand DNA viruses) using bacteria phages to represent the individual viral families.

See attachment - (e) http://www.novaerus.hu/documents/independent_validation_report_for_novaerus_microsearch_laboratories.pdf

The operational methodology of the technology is described in detail in a paper by Professor Stephen Daniels, the Head of the National Centre for Plasma Science and Technology at Dublin City University, which is attached herein.

See attachment - (f) http://www.novaerus.hu/documents/Novaerus_Gaseous_Plasma_Discharge_Technology_Daniels_07.pdf

Furthermore, in an extensive clinical trial in the Royal Free Hospital in London, using 21 locations around the hospital and taking 8,500 air and surface samples, Novaerus was proven to reduce the odds of an outbreak of environmental MRSA by 97% and reduced surface bacteria counts by between 23% and 75% versus controls. The range in effectiveness depended on the installation height of the equipment (low versus high) height.

See attachment - (g) http://www.novaerus.hu/documents/nhs_uk_clinical_trial.pdf

In a more recent test in Huddersfield University, Novaerus was proven to remove 95% of the pathogens from the air in only 30 minutes, and even more impressively, was able to completely destroy 3,700 CFU's / M3 / second. No other technology in the world is as effective at destroying airborne pathogens as Novaerus' proprietary plasma field technology.

See attachment - (h) http://www.novaerus.hu/documents/Huddersfield_Air_sampling_report_Novaerus_May_14.pdf

While the world's politicians wait to see what happens with Ebola and attempt to reduce the populations fear of Ebola outbreaks in the press, there is one heartening outcome. Healthcare facilities around the world are proactively creating isolation protocols for potential Ebola patients when they arrive at their hospitals. Now is the time to present Novaerus to these proactive hospital staff, who should be including NOVAERUS in these isolation protocols to protect their front-line staff from the real dangers of the transmission of Ebola.

SUMMARY

Ebola virus is no different than any other virus that is carried in human bodily fluids, such as Influenza, Pneumonic Plague and Norovirus...it can become airborne through a variety of environmental factors in a healthcare facility. Additionally, Ebola has an extremely low infectious dose (just like Influenza and Norovirus) and has already mutated to make itself more contagious to the human population. It is imperative that healthcare facilities take ALL possible precautions to protect their staff from this disease, and to help halt the spread of Ebola BEFORE it becomes a global pandemic.