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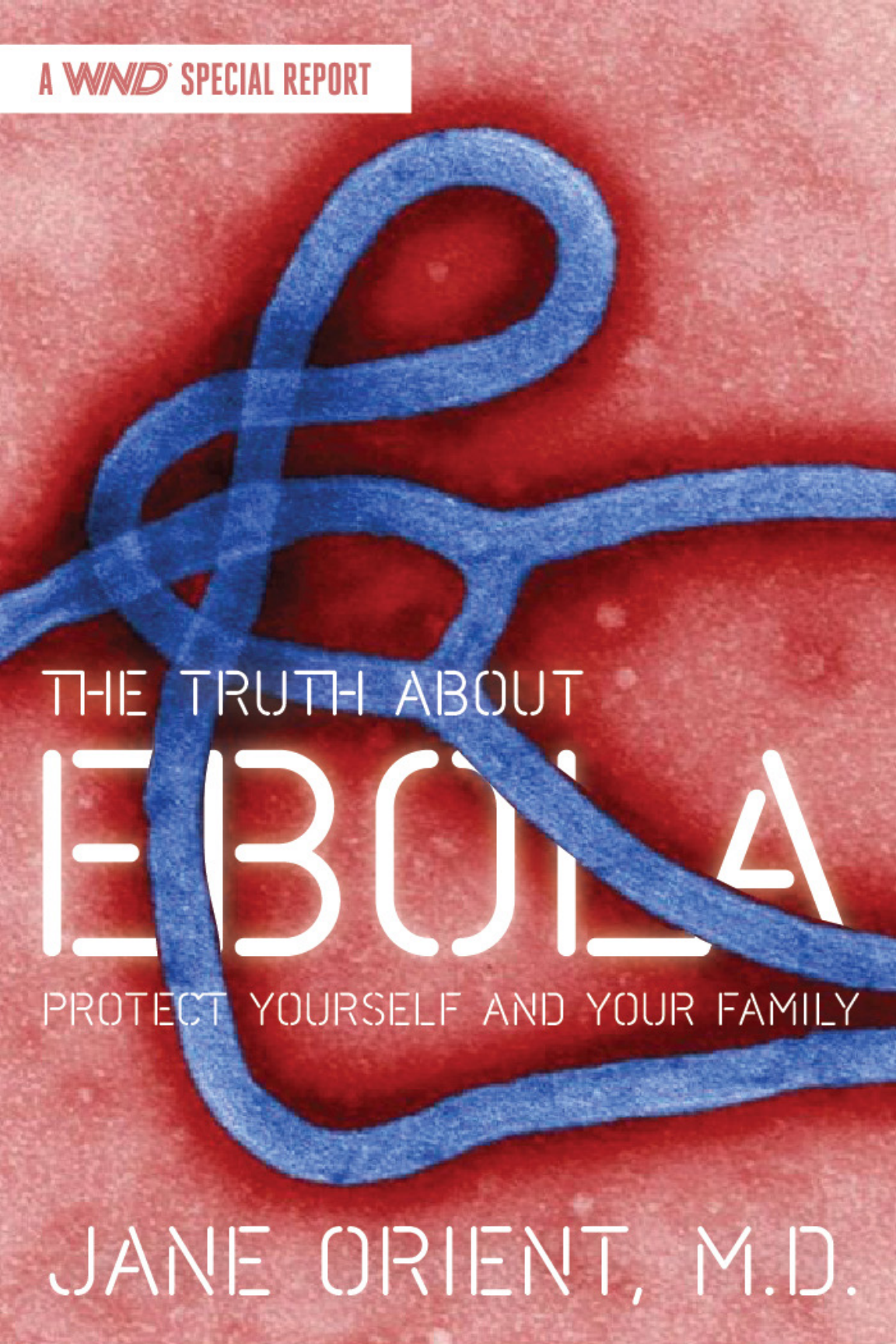

THE TRUTH ABOUT EBOLA

PROTECT YOURSELF AND YOUR FAMILY

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THE TRUTH ABOUT EBOLA

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NOTE: No representations are made that anything in this book constitutes medical advice or that it can protect anyone against Ebola or other deadly disease. Readers need to inform themselves by all possible means and seek help from physicians they trust.

CONTENTS

KNOW YOUR ENEMY

Ebola is a highly lethal form of hemorrhagic fever that is caused by a virus.

A virus is not exactly a living thing, as it is completely inert outside a living cell. It consists of a piece of genetic material that is encased in a coat made of protein – seven different proteins in the case of Ebola. The protein capsid is sometimes, as with Ebola, enclosed in a lipoprotein envelope. Outside a living cell, a virus is a biochemical complex. It cannot perform any of the functions of life by itself. Once it penetrates into a living cell, however, it sheds its coat and takes over the cell's machinery, which churns out copies of the virus.

A thousand viruses have been described, and millions of them exist. They infect every form of living thing, including bacteria. Most of them have no ill effect on their host.

Viruses serve as a way of horizontally transferring genes. For example, they may carry genes from one species of bacteria that enables another type of bacteria to become resistant to antibiotics. We've learned how to use viruses to accomplish many things, such as introducing genes into bacteria that cause them to produce human

insulin. Also, viruses are used to produce genetically modified crops. The human genome incorporates many sequences from viruses.

Pathogenic viruses – those capable of producing disease – cause the cells they infect to make a huge number of viruses, which eventually cause the cell to lyse or break apart, spilling infectious particles into the environment, which can go on to infect other cells.

Viruses can have either DNA (deoxyribonucleic acid) or RNA (ribonucleic acid) as their genetic material. DNA makes up the double-stranded helix found in the nucleus of living cells. The two strands are bridged by nucleotides that come in complementary pairs. Adenine matches up with thymine, and cytosine with guanine. Each strand serves as the template to make the other, when the DNA is replicating itself, or to make a molecule of messenger RNA, which translates the genetic information into a sequence of amino acids for making proteins. RNA is generally a single strand, and the nucleotide uracil substitutes for thymine.

Ebola, like influenza, is an RNA virus, in which the RNA does double duty. This is important because the mechanism for replicating RNA is much less accurate than for DNA, so that RNA viruses mutate very rapidly. This is why a new flu vaccine is needed every year. It also explains why RNA viruses frequently are able to jump from one species to infect another one – as with swine flu or avian flu.

Viruses get into cells by a lock-and-key mechanism. A part of the protein coat or envelope (an "antigen") matches up with a complementary receptor on the cell.

There are several subtypes of Ebola virus. Different subtypes may target different cells in the host, cause more or less damage to the cells, be transmissible by different species, and have different survival characteristics outside the cell.

WHERE DID THE EBOLA VIRUS COME FROM?

Ebola is one of about 177 pathogens that are considered to be newly emerging diseases. These diseases are generally zoonotic diseases –

animal diseases that have jumped species. A familiar example of a zoonotic disease is measles, which is derived from dog distemper.

For the past thirty years, forty-one previously unrecognized human infectious diseases have jumped from their normal animal hosts to human beings. This has frequently occurred in Africa, as human beings settle into new areas.

Ebola is a member of a small, recently recognized family called filoviruses, named for the filamentous or threadlike appearance of the virus on electron microscopy. Like all viruses, these are far too small to be seen with a regular microscope.

The first recognized outbreak of a filovirus occurred in 1967, when there were thirty-one cases of a hemorrhagic disease in vaccine production workers in Marburg, Germany, who had contact with blood, organs, or cell cultures from a batch of imported African green monkeys from Uganda.

Ebola first emerged in Africa in 1976 in three simultaneous outbreaks and was initially called green monkey fever. The disease also devastated populations of chimpanzees and gorillas. More human outbreaks occurred – and then ended. Intrepid researchers trekked through the jungle trying to find out where the virus went between outbreaks.

In his best-selling book, *Spillover: Animal Infections and the Next Human Pandemic*, David Quammen details how scientists caught, killed, dissected, or took samples of blood and internal organs from more than one thousand animals, including 679 bats. The bats were identified as one important "reservoir." In reservoir animals, the virus can proliferate and be shed without sickening or killing the animals. Some animals domesticated by humans, notably pigs and dogs, can be infected with Ebola virus and serve as reservoir animals.

Bats are especially important. These very diverse animals – of which there are more than a thousand species – have a long association with RNA viruses. They can disseminate a disease widely because they fly hundreds of miles in a season between their summer and winter roosting sites. Humans can be infected by contact with

their droppings, or in the course of hunting and butchering them as a food source. For many Africans, "bush meat" is an important protein source.

DISEASE TRANSMISSION – AND HOW TO STOP IT

Viruses can be transmitted from human to human or between humans and animals by direct or indirect contact, by transmission via vectors such as insects, or by vehicle transmission. Vehicles may be droplets or aerosols, water, food, or fomites. Fomites are inanimate objects or substances including clothing, furniture, soap, surfaces of furniture, papers, and so on. Viruses can enter through the skin, mucous membranes, or cells lining the GI tract.

It is critical to know how long the virus remains infective in the environment. Outside a living host, a virus is a biochemical complex. Its potential activity can be destroyed by factors that break chemical bonds or alter the configuration of the antigens needed to match up with the receptor sites on target cells. Viruses like Ebola, which have a lipophilic envelope, are easier to degrade than non-enveloped viruses such as norovirus, which is famous for causing severe gastroenteritis on cruise ships.

Many factors are important, and different viruses, even different strains of the same virus, can be affected very differently. Temperature is critical; chemical reactions such as protein denaturation are faster at higher temperature. Viruses like it cool. Adsorption to surfaces, association with solids, acidity or alkalinity, sunlight, humidity, and the presence of microorganisms also have an effect. While some viruses infect bacteria, some bacteria use viruses for a protein source. Obviously these questions are very important for wastewater management, agriculture, or cleaning procedures in hospitals and food establishments.

To illustrate the persistence of some viruses, polio virus has been isolated from laundry rinse water and from previously sterile fabrics that were washed with contaminated fabrics. Polio viruses have

survived as long as 188 days in surface water. In one waterborne outbreak of norovirus, the source of the virus appeared to be water from a frozen river that had been contaminated four months earlier. The virus was infective for two weeks on fresh produce stored at refrigeration temperature.[1]

The presence of blood or organic material may make viruses extremely difficult to inactivate, so cleaning is critical for effective disinfection.

There are many uncertainties about the extent to which numerous human or animal viruses survive in the environment, capable of being transported to new hosts.

IS IT AIRBORNE?

The CDC (Centers for Disease Control and Prevention) has repeatedly asserted that Ebola is not "airborne." Its website, at least currently, has a little diagram saying you cannot get it through the air – or through food or water. Many have speculated on what it would take for the virus to become airborne.

CDC director Thomas Frieden, MD, was captured on videotape having to admit to Dr. Sanjay Gupta that he didn't really want an Ebola victim to sneeze on him. For the layperson, catching a disease from droplets that are coughed up or vomited sounds like airborne transmission. If viral particles go through the air and land on something, and then you touch the surface on which they have landed, it was airborne en route.

However, what scientists are really talking about is what happens when the droplet that the virus was riding on dries up. A spray of droplets – an aerosol – will settle out within a fairly short distance. So people might say you shouldn't be within three feet, or maybe six feet of a person who has a cold. Sneezing generates the most droplet nuclei, tens of thousands, which can spread to individuals up to ten feet away.

Droplets evaporate in a fraction of a second, leaving really tiny

particles called droplet nuclei, which can float around in the air for a long time. Viruses such as smallpox or influenza survive the drying process, so you can catch these diseases around the corner from a sneeze, or from recirculated air in an aircraft.

The question of whether airborne transmission is possible is critically important. The answer determines whether it is necessary to quarantine everybody who was on an airplane, or whether the protective masks and face shields worn by medical personnel are sufficient. Masks will protect against the inhalation of fairly large particles, but not against the inhalations of those that remain suspended in air on particles too tiny to be trapped by the mask. And if there is not a tight seal, air leaks around the mask.

For "airborne" viruses, protective gear includes a self-contained breathing apparatus that is completely sealed to nonfiltered air, and an airtight suit that maintains a small positive pressure inside. When you look at a person wearing such a suit, it will appear to be ballooned out. This is what workers have to wear in a BSL-4 (biosafety level 4) facility. And the World Health Organization states that research with the Ebola virus must be carried out in a BSL-4 facility, and patients with Ebola should be cared for in such a facility.

The US Army Medical Research Institute of Infectious Disease (USAMRIID) and other institutions have BSL-4 laboratories, but only four hospitals in the United States have such units for patient care. The largest, which has ten beds, not all available for patient care, is in Omaha, Nebraska.

Ebola got its Risk Group 4 designation because of a 1989 outbreak of the Reston Ebola virus at a primate quarantine facility in Reston, Virginia. Some scientists thought there was aerosol transmission between the monkeys and several animal-care workers who showed serologic conversion (antibodies in their blood), although they were not ill. This particular strain of Ebola is not pathogenic to humans. In 2008 Philippine farmers were found to have antibodies for Reston Ebola, as did their pigs; neither farmers nor their animals appeared to be ill.

In human cases of Ebola, infection could be explained by needle stick or direct contact. Ebola does not primarily affect the lungs, unlike influenza, in which copious respiratory secretions are teeming with virus. It seems apparent that respiratory transmission of Ebola is inefficient. But this does not mean it is impossible. There are receptors for Ebola virus in the mucous membranes that line your respiratory tract. It is a matter of probability—how many infective virus particles are on the secretions that are expelled, and what is the likelihood that they will land on a receptor cell in your airway? A fact that is not so reassuring is that the infective dose of virus particles is shown to be about ten. That means one drop of blood contains enough Ebola viruses to infect 500,000 people.

How long can Ebola virus remain infective as droplets dry up? Factors that degrade virus on droplet nuclei are the same as those that inactivate it on surfaces: ultraviolet radiation, heat, other components that may be suspended in the air, and humidity. Also, processes involving oxygen and light may break the bonds in the chemicals that form the virus.

Actual experiments show that while Ebola virus is degraded in aerosols, 1 percent of it is still infective after 90 minutes.[2]

Moreover, before August 2014, both the US CDC and the Public Health Agency of Canada acknowledged the possibility of transmission via "contaminated air." Though this warning was scrubbed from public information sources by the CDC in August and by the Public Health Agency of Canada in October, along with the scientific evidence that supported it, the Threat Journal newsletter retrieved the old wording from the Wayback Machine.

WHEN DOES EBOLA BECOME CONTAGIOUS?

The CDC has stated categorically that you cannot get Ebola from a person who does not yet have symptoms, including fever. This would make it a very unusual virus; many diseases are transmitted during the incubation period.

Fever is the criterion being used to screen arriving passengers at airports. But it is by no means infallible, since it can be masked with acetaminophen, ibuprofen, or other drugs. And, as noted below, not all patients get fever.

At first, the agency set a fever threshold of 101.5°F, then lowered it to 100.4°F. Based on this rigid protocol, CDC officials advised a nurse who had cared for the nation's Ebola "index patient," Thomas Eric Duncan in Dallas, that it was permissible to take a commercial flight when her temperature was 99.5°F. She was, after all, categorized as "low risk" because she had been wearing CDC-recommended personal protective equipment (PPE) at all times.

When the nurse was soon thereafter diagnosed with Ebola, people who were on that flight were notified. What about their contacts? What about people who took later flights on that aircraft before it was taken out of service? Infectious virus has been recovered from surfaces for as long as six days under ideal conditions. What did the nurse touch? Did she use the restroom? If others picked up the virus from a surface, what did they touch afterward?

If Ebola were as easily transmitted as some people fear, everybody in outbreak areas should be infected. It is reassuring that they are not. But it is impossible to be absolutely certain that you "can't get" Ebola by a particular means. How could we determine that?

Viruses are very difficult to study. Until introduced into a living system, viruses are just a submicroscopic collection of biochemicals. They must be grown either in tissue cultures or in living animal models, and they can be very finicky. That a virus does not grow in one system does not mean that it wouldn't grow in a different system – or in an exposed patient. Nor does it mean that its mutant offspring wouldn't thrive.

The virus's ability to enter the cells depends upon a very specific lock-and-key mechanism. Once inside the cell, it may or may not be able to replicate. These features can change as the virus mutates.

Ebola virus has been found in saliva, stool, semen, breast milk, tears, nasal blood, skin, and mucous membrane swabs during the

acute phase of illness. The exact moment at which a patient starts to shed virus cannot be known.

Receptors for the virus are abundant in dendritic "antigen-presenting" cells located in tissues that are in contact with the external environment, such as the skin and the inner lining of the nose, lungs, stomach, and intestines. The cells in the skin are called Langerhans cells. A break in the skin is not necessary for viral penetration.

Clearly, the sicker the patient gets, the more contagious he is. Corpses are swarming with virus, and traditional funeral practice involving extensive contact with the corpse is one of the most important factors in the early spread of disease in Africa.

HOW LONG DOES AN EBOLA PATIENT REMAIN CONTAGIOUS?

Infective virus has been demonstrated in the semen of survivors for seven weeks after recovery. One man infected his wife seventy-two days after his recovery, and she died. Would sex be safe after seventy-three days? We don't know.

Convalescence may be slow, and residual symptoms may persist for years. The prospect of a prolonged carrier state is extremely worrisome.

THE COURSE OF EBOLA VIRUS DISEASE

When a glycoprotein in the Ebola virus envelope binds to a receptor on an antigen-presenting cell, the activated cell goes right to a lymph node and "presents" the antigen (the virus) to cells in the immune system. Thus, like the AIDS virus, Ebola begins by attacking the body's defenders. Then as it spreads through the body, it also attacks endothelial cells (the lining of blood vessels), liver cells, and many other cells. Cells that are most seriously affected by Ebola virus disease include the trachea, the cornea, and the conjunctivae.

The affected cells not only release viral progeny, but small proteins that are involved in the inflammatory response. Overreactivity of the response – called a "cytokine storm" – can be extremely dam-

aging in itself. Capillary beds throughout the body leak, causing low blood pressure that may become progressively unresponsive to intravenous fluid therapy or vasopressors (drugs that increase the blood pressure). This can lead to the formation of tiny blood clots, which block the tiny blood vessels in the system and can also consume the body's clotting factors so that the blood becomes unable to clot, causing paradoxical bleeding. This is called disseminated intravascular coagulation, or DIC.

Damage to the vascular system contributes to the multiple organ dysfunction syndrome. Kidneys, liver, and heart may ultimately be involved. When blood supply to the bowel is compromised, bloody diarrhea may result. It is difficult to reverse established organ damage. The chance of survival diminishes as the number of involved organs increases, and the mortality rate of the multiple organ dysfunction syndrome has changed little since it was first recognized in the 1980s.

Classically, symptoms begin between two and twenty-one days after contracting the disease, eight to ten days being the most common time. It is suggested that the incubation period should be extended to twenty-five days, which would be two standard deviations from the mean. The World Health Organization reports that some infections begin as long as forty-two days after exposure.

Symptoms generally begin with fever. However, as many as 15 percent of cases may not have fever, so absence of fever does not absolutely rule out the disease. Other early symptoms and signs include a heart rate greater than ninety beats per minute, headache, muscle pain, nausea, and loss of appetite. In Sierra Leone, the most common symptoms reported between symptom onset and case detection included fever (87.1 percent), fatigue (76.4 percent), loss of appetite (64.5 percent), vomiting (67.6 percent), diarrhea (65.6 percent), headache (53.4 percent), and abdominal pain (44.3 percent). Hemorrhagic symptoms were rarely reported, but unexplained bleeding occurred in 18 percent of cases (See the WHO Ebola Response Team's "Ebola virus disease in West Africa – the first

nine months of the epidemic and forward projections.")[3] Of course, these symptoms also occur in many other illnesses.

A flat spotty skin rash may develop on the face and chest on day two or three in about half of the cases, likely coinciding with an initial burst of virus in the blood and the onset of the systemic inflammatory response. Internal and external bleeding generally begins to appear within five to seven days after the first onset of symptoms. This may occur in the conjunctivae, giving the dreaded appearance of "bleeding eyes."

Specialized rapid diagnostic tests exist, but are not generally available in your standard hospital or commercial laboratory, and specimens require very special handling.

Severe vomiting and diarrhea can cause death from dehydration, with patients possibly needing up to ten liters of fluid replacement in a day.

The mortality rate in West Africa is running at 70 percent.

BIOLOGICAL WARFARE

The high lethality and easy transmissibility of the hemorrhagic fevers, and the lack of effective treatment, make them attractive as agents of biological warfare.

Mankind has waged biological warfare since ancient times. In the twentieth century, huge amounts were invested by governments in mass-scale biological warfare preparations. These included Japan, Britain, the United States, and the USSR.

Anthrax was one favored organism because in spore form it could be made to persist in the soil for prolonged periods of time. Gruinard Island off the coast of Scotland, which was contaminated in World War II experiments, was quarantined for forty-eight years and only declared safe in 1990, four years after decontamination. An accident at a Soviet biowarfare factory at Sverdlovsk killed about 70 people with anthrax. The US anthrax scare may have used an agent prepared in the US biowarfare program.

Smallpox is often considered the best potential agent. There is a vaccine to protect the aggressor, but current populations are almost totally susceptible. The Soviets reportedly manufactured up to one hundred tons of weaponized smallpox annually, possibly supplying Iran, Iraq, Libya, and North Korea. A sophisticated weapon might not even be necessary: one infected human disseminator might be enough to spark a raging epidemic. Robert Preston wrote in *The Hot Zone* that the US population is like a "nuclear reactor without control rods," a setup for an "uncontrolled smallpox chain reaction."

The Soviets also devoted extensive efforts to using hemorrhagic fever viruses as a weapon. Apparently, it succeeded with Marburg virus, a relative of Ebola. This virus was found in a multipurpose warhead that could be delivered by intercontinental or intermediate-range ballistic missiles. The warhead could carry a chemical agent or biological bomblets, which contained a small explosive device. They would spin as they were dropped from a warhead, spread out laterally, and detonate when they hit the ground, releasing an aerosol in the one-to-five-micron size range, which would be taken into the lungs and retained. After the Soviet Union collapsed in 1990, the United States was able to send a team into the testing area to collect soil samples. Soviet efforts to weaponize Ebola in this way were apparently unsuccessful, stated Dr. Steven Hatfill at the 2014 annual meeting of Doctors for Disaster Preparedness. This may be one reason the CDC speaks with such confidence about it not being transmitted in the air.

Ebola has the disadvantages, from the viewpoint of an aggressor, that it is not readily transmissible in the air, and that there is no good vaccine for the perpetrators. Vaccines that are entering Phase I trials may have originated from biological warfare research. And who knows what terrors bioengineering might yield. An Ebolapox?

After the demise of the USSR, we do not know what became of the thousands of scientists who were employed in its biological warfare program. They might have gone to better employment opportunities, say, in the Middle East.

Whereas Soviets were not thought to be suicidal, terrorism by suicidal "martyrs" adds a new dimension. The idea of using "martyrs" to deliver Ebola has reportedly occurred to ISIS terrorists.

The apocalyptic potential of biological warfare in the hands of a superpower or a rogue terrorist has long been recognized. Remember that nuclear fallout and chemical agents have a half-life, while biological agents have a doubling time. In West Africa, the number of Ebola victims is doubling every three weeks.

An NBC (nuclear/biological/chemical) shelter is part of every Swiss home or public building. It is possible to protect against these weapons of mass destruction with dense shielding, blast valves, and positive pressure that prevents unfiltered air from entering. The United States, however, has such shelters only for important government officials. Our national "defense" doctrine is to leave our population vulnerable.

Only 56 percent of infection-control practitioners who responded to a recent survey reported receiving any training in bioterrorism preparedness. (RW Grow and L. Rubinson)[4]

Finding the best available means of protecting our population, whether the source is natural or man-made, is a matter of national security, as well as public health.

Yet, despite worsening of the world situation, US defense capabilities are being degraded, not enhanced. We no longer even have a safe method of transporting a patient infected with a highly lethal agent like Ebola. The military's Aeromedical Isolation and Special Medical Augmentation Response Team (AIT-SMART), a rapid-response unit with worldwide airlift capability designed to safely evacuate and manage contagious patients under high-level Biosafety Level-4 (BSL-4) conditions, was dismantled in 2010.

CONTAINING AN EPIDEMIC – OR NOT

Standard public health measures for dealing with infectious disease epidemics have long been known. The mainstays are quarantine and

contact tracing. These are obviously easier and more effective when there are very few cases.

Apparently, neither hospitals nor individuals have adhered to CDC guidelines. Texas Health Presbyterian Dallas discharged the index Ebola patient despite his travel history. Allegedly, the patient was not entirely honest on an airport questionnaire, and his family members violated quarantine, as did members of an NBC filming crew after their cameraman was diagnosed.

Furthermore, CDC guidelines have been inconsistent and lax. The CDC is now saying contacts may not use public transportation during the monitoring period of twenty-one days. But people with contacts in West Africa may still enter the United States as long as they don't have a fever and they provide contact information. They receive a tear sheet with instructions they can show to staff at a hospital if they develop symptoms.

CDC is currently expecting all hospitals to be prepared. But it is still presuming that a level-4 pathogen can be safely treated with level-2 or level-3 precautions. Even in Africa, workers with Doctors Without Borders check to be sure that protective gear leaves not a square millimeter of skin exposed. And workers are doused with strong disinfectant before removing the gear. The CDC simply provides pictures of how to remove gear without touching the outside. One mistake, and you might die.

A BSL-4 facility protects against airborne pathogens. Masks are not adequate; attendants need powered air-purifying respirators (PAPRs). How many nurses will we sacrifice to the CDC's dogma? They are heavily exposed to aerosols when patients have projectile vomiting and explosive diarrhea, or when they flush the toilet. (At Emory, they disinfected the water *before* flushing, apparently out of concern for the sewage system – never mind the nurses).

What about decontaminating the room? Hospitals' current housekeeping procedures don't protect patients against MRSA (methicillin-resistant *Staph aureus*) or *Clostridium difficile*. In a BSL-4 facility, everything that leaves the room must be sterilized

or incinerated on-site. Most hospitals send their linen to an off-site laundry, and on-site incinerators are forbidden by EPA regulations. How many times is waste handled? What is done to protect workers or to disinfect trucks?

And what about decontaminating the environment? Vomit from the index patient in Dallas remained on the ground for days until it was treated with a high-pressure spray by workers clad in T-shirt and jeans. How many people or animals walked through it – or licked it up?

If we are not to harbor Ebola for decades, we must not infect a reservoir species. A survey in Gabon found that more than 30 percent of dogs had antibodies to Ebola virus in the 2001–2002 outbreak.[5] While dog-to-human transmission has not been shown, a future spillover by a mutant strain is possible. This is why the Spanish nurse's dog was killed, and why merely quarantining the dog for a time is not enough.

Note that the quarantine procedure for persons exposed in a laboratory accident in a BSL-4 facility is far different than that used for workers exposed to the index patient in Dallas. David Quammen recounts how a woman in full protective gear stuck herself while injecting Ebola-infected mice with antibodies. She went immediately into a medical facility called the "Slammer," a chamber entered only through an airlock. If the patient proves to be infected, the suite becomes an active BSL-4 zone, in which doctors and nursing staff must wear the full "space suits" and shower thoroughly on the way in and out, leaving their scrub clothing behind in a bag to be autoclaved (steam sterilized). She had to stay in the Slammer for twenty-one days, having blood tests every day. Fortunately, she did not get Ebola. If she had gotten Ebola and died of it, she would have had an autopsy and then the body would have come out of the autoclave (steam sterilizer) chute. Such treatment is not feasible for the dozens of people who had unprotected contact with a sick patient.

TREATMENT

There are no specific FDA-approved treatments for Ebola. "Supportive therapy" is mainly fluid replacement and pain relief. DIC might be helped by giving heparin, an anticoagulant. And blood transfusions may be needed if bleeding is severe.

Several mechanisms might be utilized in combating the disease. First is to prevent the virus from attaching to the receptor by blocking the antigenic site. That is how antibodies work. Second is to block the intracellular processes for viral RNA replication or protein manufacture. Third is to block the body's destructive inflammatory response.

A certain percentage of patients do survive, presumably because they are able to mount an adequate immune response. Plasma from recovered patients, which is thought to contain protective antibodies, is being given and might have some effect, especially early in the course of the disease. Some survivors are said to be selling their blood in certain African countries.

One promising preparation is ZMapp, a combination of monoclonal antibodies developed from tobacco plants. Supplies have reportedly been exhausted. Some patients receiving this have survived, but it is impossible to know whether the treatment was responsible.

There are also several experimental drugs of unknown efficacy and safety. Supplies are short, and availability is also limited by FDA barriers and disputes about who should get priority when there is not enough for everyone.

Then there are a variety of unproven claims from "alternative" practitioners. One unproven claim that nonetheless looks promising to me is high-dose vitamin C. If you ask a physician about it, you will probably get the same response as I did when asking a group of respected physicians whether it might be worth trying: an unqualified "no."

But there's the case of the New Zealand dairy farmer with swine flu who was about to be removed from life support. His lungs were

filled with fluid, and he was on extracorporeal membrane oxygenation (ECMO). His family persuaded a doctor to try intravenous vitamin C as a last-ditch resort. He recovered fully. That's an "anecdote." It could be pure coincidence or even a fabrication. But why not try it when the alternative may be death?

Initial work with heroic doses of intravenous vitamin C was reported by a North Carolina family physician named Frederick Klenner. He claimed to have cured sixty patients of polio during the epidemic of 1948–1949. No double-blind controlled study was done, and diagnoses were purely clinical. Interest in polio treatments waned after effective vaccines stopped the epidemics. Klenner also claimed to have cured many other conditions. But he was just a rural doctor, and the claims spanned such a wide variety of conditions that they sounded like too-good-to-be-true snake oil. Klenner reportedly hoped that Linus Pauling would undertake serious clinical studies, but Pauling was not interested. So vitamin C was adopted by the "alternative" medicine community, which in itself was enough to squelch the interest of academics and the AMA.

There are, however, plausible biological mechanisms through which vitamin C could have a beneficial effect on many disparate conditions.

The first is to suppress the "cytokine storm" responsible for the damage to small blood vessels and hence the lethal multiple organ dysfunction syndrome. Australian physician Archie Kalokerinos and colleagues discussed this with respect to Gram-negative sepsis. It had been assumed that the multiplication of living bacteria caused all of the toxic effects of various infectious diseases. Kalokerinos writes: "The scientific and medical worlds could barely believe the idea that the death of the infected animal (sepsis) was due to bacteriolysis and release of internal 'endotoxins,' and that the multiplication of the bacteria themselves was in the most part benign."

Endotoxin could by itself cause vascular collapse, hemorrhage, DIC, and multiple organ failure – which sound a lot like the effects of Ebola virus. Endotoxin turns on the genes that code for cytokines.

The authors discuss in detail how high-dose vitamin C can block those harmful effects.[6]

Klenner discussed ways in which vitamin C might prevent viral replication, or alternately, cause invaded cells to die before they could produce virus.[7]

Note that very large doses of vitamin C are required, say, repeated doses of 50 g (50,000 mg) or more. It may be impossible to get a high enough blood level with oral medicine. Unfortunately, in today's protocolized world, your doctor, even if open-minded, might be risking his hospital privileges or his entire career by administering such treatment. Some naturopaths do administer intravenous vitamin C in their office, but are very unlikely to be treating patients sick with Ebola.

HOW CAN YOU PROTECT YOURSELF AND YOUR FAMILY?

By now, it should be obvious that we cannot rely on this administration to keep Ebola out of our country. It has been unwilling to restrict air travelers from entering or to secure the open land border. The CDC is simply offering lame rationales to support administration policy. Its advice on infection control is inconsistent. Also it is based on categorical assertions that are unproved or demonstrably false. Hospitals are unprepared even by CDC standards.

Americans are at risk of exposure from foreign nationals who have been in West Africa, from Americans who have traveled there or been deployed there by our military, from medical workers who may have treated infected patients (knowingly or unknowingly), and from those who have come in contact with any of the above.

A particularly ugly possibility is contact with a terrorist intent on infecting as many people as possible. Not only does law enforcement refuse to profile likely terrorists; alarmingly, some terrorists may be alienated Westerners with a name as common as "John Smith," a middle-American accent, and inconspicuous dress, who acquired their ideology and training from the Internet. We need

to be increasingly careful in our social interactions, and watch for reports of diagnosed cases near our area.

Is it safe to go to a hospital? Even without the Ebola threat, a hospital is increasingly a high-risk environment. As demonstrated by the SARS (severe acute respiratory syndrome) outbreak, hospitals can become major venues for contagious disease transmission. In Canada 77 percent of probable SARS cases resulted from in-hospital exposures. In Taiwan, the director general of the health ministry stated that after the initial importation of SARS, almost 94 percent of SARS infections were transmitted within hospitals (Grow and Rubinson, op. cit.).

Then there is the question of whether hospitals will even be available to you. Hospitals are already understaffed. If it takes 20 full-time staff to care for one Ebola patient, how many such patients would it take to disable (and bankrupt) the hospital? How many of the staff will decide to change jobs?

There is also the burden on the economy, and the disruptions in essential services if people self-quarantine instead of reporting to work. And what if other nations decide to impose restrictions on travel and commerce from the new Hot Zone of the United States?

To avoid the dire effects of an uncontained outbreak here, we need unceasing activism to urge Congress to block a continuation of this administration's disastrous policy. Some congressmen are asking some of the right questions, and author Alan Korwin suggests many more. For example: Why didn't president Obama seek out a broad coalition of troops before sending our soldiers to fight the Ebola virus? What was Obama's basis for seeking to fight it unilaterally, deploying troops without congressional approval? Why exactly did he need an extra thousand troops to fight the virus, so soon after the first deployment? Is Russia or China sending in troops to fight the virus? When do our troops come home? Is there a rotation schedule? Do they have to be quarantined for twenty-one days when they do come home? What's the plan for troops who come back and have Ebola? Has the Veterans Administration been prepared for handling Ebola cases?

Since the situation is likely to get much worse before it gets better, you need an emergency plan. This will be good insurance for various other disasters as well.

Remember, do not rely on the government to protect you or help you.

AVOIDANCE

1. Watch the outbreaks section of the CDC website, your local news, and the Threat Journal.
2. If there has been an outbreak in an area, stay away for at least twenty-five days after the last reported case; preferably wait forty-two days.
3. If your child is in public school, consider changing to a private school, or homeschooling. In addition to hospitals, public schools, which must accept illegal foreign nationals without adequate health screening, are prime sites for contagion. Additionally, think of the political indoctrination and moral corruption in government schools.
4. Limit travel. If you must use public transportation, take a travel kit (see below), and don't be shy about setting new fashion and etiquette trends.
5. Think twice about attending large public gatherings, especially if new cases of disease are being reported.

SELF-QUARANTINE

1. Do you have some food? Before you go for expensive "survival foods" (which some say are becoming unavailable, surely a bad harbinger), stock up on the basics: rice, beans, salt, sugar, baking soda, salt substitute (for your rehydration kit, see below), and canned food that requires no cooking. The best advice for long-term storage is still Cresson Kearny's *Nuclear War Survival Skills*, invaluable for all types of disaster.

2. You can't have too much water.
3. Do you have cleaning supplies: chlorine bleach, soap, detergent?
4. Do you have a stockpile of medications you need?
5. Do you have a battery-powered or hand-crank radio and enough batteries in case of power outage? A light source and a means of cooking?
6. Stock up on trash bags and ziplock bags.
7. Make a shopping list, and add a few essentials to your supplies whenever you go out. Remember that store shelves will empty quickly in an emergency.

MEDICAL CARE

1. Do not rely on the hospital emergency department for things that can be treated elsewhere. You do not want to be sitting for hours in the waiting room. (You might want to take your travel disinfection kit with you if you do decide to go to the emergency room.) Find a doctor who is not beholden to a hospital or an insurance network, and support him by seeing him for all your medical needs, not just the bad ones.
2. Have medical information on your bookshelf. Don't rely on the availability of the Internet. Suggestions: an old PDR (*Physicians Desk Reference* on prescription drugs); used medical textbooks (state-of-the art treatment changes, but diseases not so much); a *Merck Manual*; Dr. Lee Hieb's suggestions (*The Special Operations Forces Medical Handbook* and the *U.S. Army First Aid Manual*).
3. There are many suggested lists of medical equipment and supplies, including drugs that your doctor would need to prescribe. The 1987 prices in the Doctors for Disaster Preparedness Basic Medical Kit for a 10-to-20 Person Shelter, which is directed toward physicians but has many items that lay people can use, show how devastating medical inflation has been.

A TRAVEL KIT

1. You need several pairs of powder-free disposable gloves (nitrile, latex, polyisoprene, or neoprene), some N-95 masks, a small bottle of hand sanitizer, some individually wrapped sanitizing wipes, a one-gallon ziplock plastic bag for contents of the kit, and several 1-quart ziplock bags for disposing of waste.

2. Practice taking the gloves off without touching the outside with your fingers; turn them inside out as you do so.

3. Alcohol-based hand sanitizers are effective against many bacteria and enveloped viruses such as Ebola. For non-enveloped viruses such as norovirus, alcohol is ineffective. Zylast uses benzethonium chloride. Other products are hydrogen-peroxide based, though plain 3 percent hydrogen peroxide is said to be ineffective. Look for disinfectant wipes shown to be effective against norovirus. They won't have been tested against Ebola, but enveloped viruses like Ebola are easier to inactivate. If they don't come individually wrapped, put them in a ziplock bag. The EPA has a sixty-five-page list of products registered as effective against norovirus.

4. You should still vigorously wash your hands for twenty seconds with soap and water at every opportunity.

DISINFECTANTS IN HOME OR SICK ROOM

1. A 1:10 dilution of hypochlorite can be prepared from household chlorine bleach (hypochlorite at 5.25-to-6.25 percent). This is equivalent to 5,000 parts per million (ppm) chlorine. To make this, add 1½ cups of household bleach to one gallon of water. The effectiveness of diluted hypochlorite decays over time, so working solution should be prepared fresh every twenty-four hours. Paper towels or cotton cloths should not be used in open cleaning buckets because cellulose reduces the effectiveness of hypochlorite and hydrogen peroxide. *Do not mix chlorine bleach with other agents, to avoid generating poisonous chlorine gas.*

2. According to the Kimberly Clark Ebola virus disease precautions brief of September 19, 2014, a contact time of ten minutes should be sufficient if there is no organic matter present.

3. Remember that toilet flushing generates aerosols filled with pathogenic organisms. If caring for someone with vomiting or diarrhea, it might be helpful to pour bleach in the toilet and allow it to stand for at least ten minutes before flushing with the lid closed. (Then disinfect the lid.)

4. Ultraviolet radiation from the sun is the primary germicide in the environment. The time it takes for sunlight to inactivate filoviruses has been studied under various conditions. For example, filovirus activity is reduced by 90 percent on a clear day at midday in April in Griffin, Georgia, in about one hundred minutes.[8] Viruses are protected by the presence of organic matter.

5. UV-C, a shorter wavelength than found in sunlight, is more effective. Ultraviolet "Ebola-zapping" robots are being used to disinfect hospital and nursing home rooms. The UV lights commonly present in isolation rooms in hospitals have fallen out of favor; literature on them is decades old. You can purchase air-purifying devices with HEPA filters and UV light (see EbolaReady.com for suggested sources). Efficacy against viruses is unproven, but the devices at least purify the air of allergens. *Your eyes must be protected if you are looking at a UV source, and sunglasses are not adequate.*

6. Viruses are degraded over time. "Quarantining" a room for a week after cleaning and disinfection provides an added margin of safety.

SUPPLEMENTS

1. Surprisingly, the majority of people, even in the sunny Southwest, are deficient in vitamin D, which is essential for immune function. There is some evidence that optimal

levels of vitamin D may be even more protective against influenza than immunizations. The best possible method is to expose a goodly portion of your skin to sunlight for twenty minutes a day, without sunscreen. As that is difficult for most people, supplements are a good idea and are safe; 10,000 IU of vitamin D3 each day is recommended.

2. Vitamin C needs to be in your food stockpiles, as it is essential for all, and fresh fruits and vegetables may be impossible to obtain during a crisis. Fighting infections depletes your vitamin C level, so you need more when you are sick. Sugar also depletes vitamin C. Vitamin C tablets deteriorate over time, so your supply needs to be rotated. Taking large doses at frequent intervals to "bowel tolerance" (backing off when you get diarrhea) is suggested by some practitioners at the first sign of any illness. Lypo-Spheric vitamin C, available online, is expensive but may be tolerated in higher doses. In fact, it may be combined with tablets, as the two forms may act somewhat differently. This is *not* mainstream medical advice. There are no good efficacy studies, but it is very unlikely to be harmful.

3. Numerous other supplements are touted, but discussion of them is beyond the scope of this booklet. One caution is not to spend all your money on unproven remedies if you don't have the basics covered. And do not make any assumptions that you will be protected and can thus take a risk of exposure.

ORAL REHYDRATION

1. Patients who might otherwise recover can die rapidly from loss of fluid through diarrhea and vomiting. Given the present shortage of basic medications in the United States, even essentials such as sterile intravenous solutions, it is imperative to have the ingredients for oral rehydration.

2. Formula for homemade rehydration solution: Take one quart of water, add one scant teaspoon of Morton's Lite-salt or other salt substitute containing potassium chloride,

10 teaspoons of sugar, and 1/3 teaspoon of sodium bicarbonate (baking soda).

3. If using a salt substitute that contains potassium only (read the label), use 1/2 teaspoon of the substitute and 1/2 teaspoon ordinary table salt.

4. Sip slowly; the patient might be able to retain enough even if vomiting.

CONCLUSIONS

As biological warfare experts have recognized, Ebola virus has the potential to kill 90 percent of the world's population. The infective dose is so low that the only certain way to avoid infection is to avoid being in an area where the virus is present.

Time-honored principles of quarantine are to keep infected persons *in* an area, and uninfected ones *out*, unless they are taking care of the sick. Current US federal policy is the reverse: to send healthy troops into a raging epidemic, allow potentially infected persons to leave, and possibly even deliberately bring infected foreigners to our shores despite lack of appropriate facilities for transport or care.

The American medical system could potentially collapse under the strain, becoming unable to meet ordinary medical needs. Americans need both to protect themselves from contagion and to be as prepared as possible to fend for themselves without access to medical care.

"A third part of thee shall die with the pestilence."
– Ezekiel 5:12

"The sword is without, and the pestilence and famine within."
– Ezekiel 7:15

ADDITIONAL RESOURCES

Federal and State Quarantine-Isolation Authority
http://fas.org/sgp/crs/homesec/RL33201.pdf

Protect Yourself from Ebola
http://alison.com/protect-yourself-against-ebola

Ebola crisis: Online courses help spread awareness and fill the knowledge gap
http://www.theguardian.com/world/2014/oct/10/ebola-crisis-online-courses-alison-knowledge-gap

The 2014 Ebola Outbreak: International and US Responses
http://fas.org/sgp/crs/row/R43697.pdf

CDC releases revised Ebola gear guidelines
http://news.yahoo.com/cdc-releases-revised-ebola-gear-guidelines-082949093.html

Doctors for Disaster Preparedness
www.ddponline.org

Physicians for Civil Defense
www.physciansforcivildefense.org

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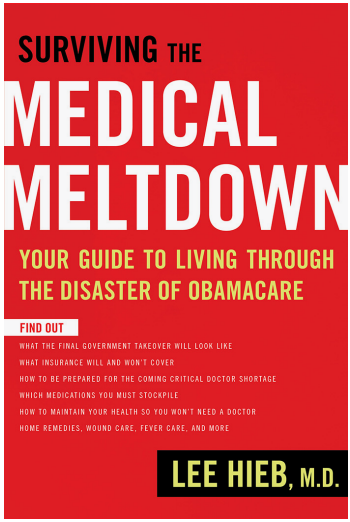

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