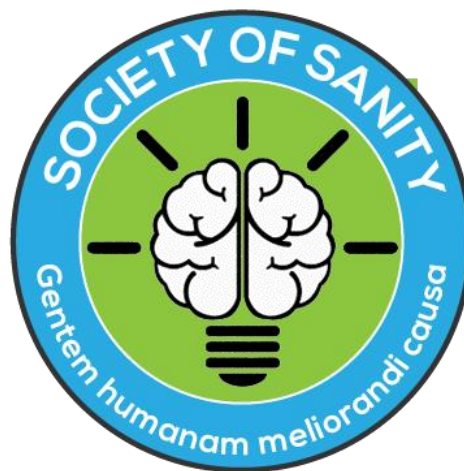


Ebola Virus Disease Report

Version 1.0

In-depth analysis of public data on the Ebola Virus with the intent to assess known and unknown potential transmission vectors, risks, and behavior of a foreign virus within the United States of America.



Disclaimer

At the time of this writing (3rd quarter 2014), many of the topics mentioned in this publication had not yet been addressed. It is possible since the difference in time between this publication, public data, news and unfolding events that some of these concerns may have been addressed or information has changed. As with any written article it reflects a time period upon which information was obtained, analyzed and disseminated. The goal of this document is to be as accurate as possible, however, with the constantly changing protocols by the various health organizations such as the CDC and WHO along with research being performed by various universities as the situation unfolds in West Africa day by day, some of this information may be out of date or upended with new or better information.

It is noted here for the reader to understand the author's intention of authenticity and accuracy. The aforementioned factors are something to consider when reading this document so that the entire documents validity is not invalidated based on some information being outdated or not accurate due to changing conditions, situations and information. It is important to keep this in mind so that one piece of information being outdated, incorrect or wrong (due to changing guidelines, procedures etc.) is not grounds for a dismissal to the validity of the rest of the information contained herein.

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Introduction:

Ebola virus disease (EVD) is a deadly hemorrhagic fever virus with up to a 90% fatality rate. The current Ebola epidemic that began in December 2013 with the death of a single child in is the most deadly and far spread ever on record. As the World Health Organization (WHO) stated on September 26th, 2014 “Never before in recorded history has a biosafety level four pathogen infected so many people so quickly, over such a broad geographical area, for so long.”¹ With a purported 2 to 21 day incubation period in human beings and no known cure it is a silent but deadly virus.

Background:

Ebola was first discovered in 1976 in 2 simultaneous outbreaks; one in Nzara Sudan and one in Yambuku, Democratic Republic of Congo.² Ebola is one of three genera of Filoviridae viruses, the other two are Cuevavirus and Marburgvirus.² There are 5 species of Ebola; Zaire, Bundibugyo, Sudan, Reston and Tai Forest.² The current outbreak that began in December 2013 is the Zaire strain but there is some debate about whether or not this is a divergent strain.^{3,4}

Problems:

Western Africa and America have very different infrastructures. These infrastructures could help to prevent or promote further Ebola infection. **Little is known about the current strain as most information on containment and prevention is based on outdated information based on previous outbreaks.**

- No models for infection have been run for the United States.
- Viruses mutate rapidly under evolutionary pressure. This means they are opportunistic to their environment by nature. As noted a published research paper “the rate of nonsynonymous mutations suggests that continued progression of this epidemic could afford an opportunity for viral adaptation, underscoring the need for rapid containment.”³
- We live in a complex world with a lot of physical contact with handles, door knobs, buttons, cell phones, keyboards, touch screens, glasses, dishes, silverware, large crowded community areas and the ability to travel miles away in matter of minutes using personal or public transportation.
- We use shared laundry and bathroom facilities.
- Much of the recommendations made by the CDC are based on old information from the 1970’s and 1980’s outbreaks and has not been updated with the current strain.
- The strain was genetically sequenced in May/ June from samples taken within the first 24 days of the outbreak. During this sequencing it was determined that over 300 distinct mutations had occurred. At this time only about 2,000 people were infected. There are now approximately 14,000 people that have been infected.⁵

*The fact is this variant of Ebola has **NEVER** been in our environment in the U.S. so we **do not have any data or precedent** to work from. Therefore, we **cannot accurately** determine how it might **mutate**, how it **might survive** or how it **will spread in our environment**.*

The federal government and the CDC need to take a proactive approach and make no assumptions as this virus is unforgiving and requires the highest level of medical care. Ebola does not discriminate; it is a silent, deadly, virus. Until studies are done to determine its virulence in our environment, the environment must be analyzed and all potential vectors considered.

Are we really “cleaner” or “better off” in the U.S.?

The CDC and others claim that we are much “cleaner” here in the U.S. than other countries and that’s why we won’t see Ebola spread like it does in West Africa. The truth is we are not and the problem is a dirty secret flowing under our feet in our air and in our environment. We pollute just like they do, the difference is we have an innate ignorance to these systems and issues unless the news tells us about it.

Laws are passed based on known risks to prevent public health issues and like most environmental and regulatory laws concerning human health they remain toothless rhetoric that goes unenforced. Companies continue to dump waste illegally or even legally that damages our environment by killing or poisoning wildlife, the land, water and air.

Likewise the CDC is tasked with keeping diseases and risks to human health in check. However many times it seems the common sense approach such as Ebola quarantines and banning of travelers entering the U.S. from Ebola affected regions escapes the CDC while other health agencies and governments around the world are doing all they can to stop it from entering their country by enacting such bans.

All too often in the U.S. a blind eye is turned towards a growing problem until it becomes an emergency situation or a severe public health issue with tangible deaths and health issues to quantify a response. Now the response costs even more in human life and time because the problem requires more complex means to resolve it. Ebola is serious and it is a disease that has the potential to become endemic as long as the disease is actively spreading in another country that we continue to allow people in from. It is exposing all the cracks in our infrastructure, our borders, airport security, and maritime security, public policy and our leader’s knee jerk reactionary position instead of being proactive and preventing the issue in the first place.

The reluctance by the CDC and federal government is also showing that we are more concerned for business entities and the spirit of capitalism than we are the risks to the American public. The excuses for not stopping the incoming flights from Ebola infected nations are in my opinion fabricated lies. The first common excuse for the federal government not enacting travel bans from Ebola infected regions such as Western Africa is the claim that enacting such bans may hamper health care workers efforts to go from the U.S. to West Africa to contain the outbreak. The fact is the ban could exempt any humanitarian or medical aid but prohibit anyone else from leaving and require anyone returning to stay up to 40 days in quarantine thereby still allowing crucial help to go West Africa.

The other poor excuse by the CDC and the federal government has been that a travel ban would be detrimental to West Africa's economy. As far as their economy is concerned their economy had problems long before this Ebola outbreak. If the threat is not contained there it could spread to other countries magnifying the potential of economic and human loss. The economy argument may also be based on the fact that some American companies have vested interests in West Africa such as the Firestone Company for example. The bigger problem for West Africa is the food shortage that is occurring right now along with the Ebola outbreak. Instead of being worried about money we should be worried about disease and famine.

Below is a list of concerns the American public should have in regards to Ebola. As citizens of the United States I find we have to really ask ourselves a question we should never have to; when do our rights to live count? When does our health count? When does our freedom count? Is it only during election time?

Many Americans are concerned about Ebola and rightfully should be. The risks are apparent and the only prevention to acquiring the disease lies within instituting draconian measures of quarantining the sick from the rest of the population (until a vaccine become available and is proven effective). It seems during this Ebola threat, like many other issues pertinent to every American that every "vested interest" outside of America or within corporate America is taken into consideration in-depth before any citizen health and well-being in America. In simple terms considerations are given for everyone else except for the people that keep this country running – The American Worker, the American Taxpayer.

Cause for Concern:

As of October 8th 2014 Ebola has been responsible for the infection of 8,399 human beings and has killed 4,033 human beings worldwide.⁶ As of October 14th (6 days later) 9,216 cases with 4,555 deaths⁷, almost 1,000 new cases in one week worldwide. In the US as of 10/20/2014 there have been 3 confirmed cases; Thomas Eric Duncan, and two nurses who treated him; Nina Pham and Amber Vinson. Thomas Eric Duncan died; the other two have been successfully treated. His initial visit was on Sept. 25th exhibiting typical Ebola symptoms and was released from the hospital with a 103 degree fever even after informing staff at the hospital that he had been from Western Africa and exposed to Ebola. Two days later on Sept 28th he was readmitted by ambulance and later confirmed on Sept. 29th or Sept. 30th to have ebola.^{8,9} This incident highlighted the weakness and failure of the readiness and protocols put into place in Hospitals for suspected Ebola patients arriving from West African Region to the US.⁸

Still, it has never been mentioned when he began to exhibit symptoms. It is assumed Sept. 25th may be the first day, based on his hospital visit, but it could have been as early as the day he entered the US on September 20th. He did not instantly go from 98.6 to a 103 degree fever, which means he was experiencing symptoms prior to seeking medical attention. As the CDC has stated Ebola is not contagious until symptoms appear such as fever, nausea, severe headache, muscle pain, vomiting, diarrhea, stomach pain and unexplained bleeding or bruising.¹⁰ Thomas Eric Duncan was displaying symptoms as of September 25th, which means he was out in the community for at least 48 to 72 hours touching things, possibly coughing or sneezing on objects or around others. He vomited on the sidewalk in front of the apartment he was staying at prior to being picked up by ambulance on Sept. 28th and taken to the hospital.

The vomit was flushed off the sidewalk into the sewer storm drain and surrounding area by a power washer. This further questions if the vomit flushed into the surrounding area could infect humans or wildlife including dog¹⁰ (who are known for eating vomit) mice,¹¹ and rats¹¹ since they can become infected as well, and typically reside in public storm drains. Ebola has been demonstrated to survive outside the body for up to 6 days and may last longer in dark, humid, wet or dried biological material.¹²

If Thomas Eric Duncan had survived this brings yet other questions and cause for concern as it has been documented that the Ebola virus “has been isolated from semen 61 to 82 days after the onset of illness, and transmission through semen has occurred 7 weeks after clinical recovery”¹¹ Another study indicates 92 days.¹³ It has not been clearly stated how long Ebola lasts in other body fluids and for how long.

Major Concerns:

The following major concerns of Ebola are listed below. It is a long read but it brings up many valid concerns that have not even begun to be addressed by the CDC, WHO or other organizations and governments that are charged with dealing with the Ebola crisis.

TRAVEL

Unimpeded travel

The travel of people from West African nations to the United States has not been regulated at all. While there are no direct flights we have not banned West African passport holders. Other nations and airlines have initiated lockdowns to prevent the spread of the virus.

Travel to low income regions

A recent study showed the majority of people flying out of Guinea, Liberia and Sierra Leone are traveling to other low- or middle-income countries.¹⁴ This could further Ebola's spread among countries that lack the medical infrastructure to handle such a virus. Dr. Jesse Goodman, professor of medicine and infectious diseases, (not involved with the study) was quoted in a CNN article: "If you look at how challenged the U.S. has been in dealing with this one imported case, I think it's really important for WHO and other countries to up the preparedness in areas where they might have less resources."¹⁴

In other words, considering the issues we have had with containing the virus in the US (given our many resources) what chance do other countries (with little to no health care infrastructure) have at containing Ebola?

Complete Quarantine

As it spreads to each region through international air and water travel the only effective containment method would be to completely quarantine West Africa, allowing only necessary medical and humanitarian aid in and out. As long as people infected with Ebola are allowed to leave Western Africa, and we allow people from the Ebola infected areas to enter our country we will be playing a game of Whack-A-Mole with Ebola. This will continue until Ebola either burns out or over-burdens our health care system and leaves us, along with many other countries unable to treat all of the infected individuals, including our own citizens.

EBOLA

No known cure

There is no known cure for Ebola and all treatments at this point remain unproven and unapproved, by the FDA. Several drug combinations have been used but it has not been 100% effective and the long term effects remain unknown.

Quick spread

“During outbreaks of Ebola, the disease can spread quickly within healthcare settings (such as a clinic or hospital).”¹⁵ This is part of the reason it has been so difficult to control in Sierra Leone among other areas hit by Ebola is because of its rapid transmission in health care facilities and the high risk of contracting the disease among health care workers. A health care worker becoming unknowingly infected and continuing to treat patients becomes a far more serious source for continued infections.

Cost of Ebola Treatment

The cost of Ebola treatment is astronomical, the cost for two patients treated at University of Nebraska Medical Center was over 1 million dollars.¹⁶ This does not include the cost of contact tracing, decontamination, disposal of Ebola infected medical waste, removal and disposal of personal property or funeral costs in the event the patient does not make it. Those factors taken together in whole could put the cost at 1 million or more per person. The biggest question is who will pay these costs? Taxpayers most likely. In the case of Thomas Eric Duncan was not a US resident and did not have insurance. This means the hospital that treated him is left with the bill. The costs associated with that bill will have to be recovered through increased medical care costs to other patients.

Ebola (continued)

Reservoir host still unknown but hypothesized

Little is known about the disease especially its reservoir host. Even studies dating back years ago failed to find the natural host, although it has been hypothesized to be fruit bats. That hypothesis is based on the fact patient zero's (Emile Ouamouno) family sold fruit bat bushmeat and some traces of Ebola antibodies have been found in bats.

According to the CDC's statement on Ebola, "Because the natural reservoir host of Ebola viruses has not yet been identified, the way in which the virus first appears in a human at the start of an outbreak is unknown. However, scientists believe that the first patient becomes infected through contact with an infected animal, such as a fruit bat or primate (apes and monkeys), which is called a spillover event."¹⁵ Earlier studies have been completed in the past resulting in the same outcome; no confirmed host:

- 1999 Kikwit:

According to the study "Most of the **3066 collected specimens were mammals** (87%, 2663), followed by birds (9%, 265) and reptiles and amphibia (4%, 129) and 9 specimens from other taxa. Among the mammals, most of the collection consisted of rodents (72%, 1914), bats (20%, 539), and insectivores (4%, 115). Small numbers of specimens from the orders Carnivora, Primates, Artiodactyla, Pholidota, and Macroscelida were also obtained. ELISA testing for EBO virus antibody has been completed on 2393 of the 2906 blood specimens available for testing. **No antibody against the Zaire subtype of EBO was detected among specimens that could be tested.** "Virus isolation has been completed on 2730 collected animals for which a spleen was available. For an additional 84 specimens, no spleen was available, so isolation attempts were made upon the liver. **All attempts at isolation of EBO virus have been negative.**"¹⁷

- 1979-1980 Democratic Republic of the Congo and Cameroon:

"A total of **1664 animals was collected**: 1478 (89%) in DRC and 186 (11%) in Cameroon. These animals represented 93 species in DRC and 32 species in Cameroon. In Cameroon, 103 animals (55% of specimens) were mice, rats, and other small rodents. Fifty or more specimens were captured of 16 species, 3 of which were primates. Rodents (including squirrels) and bats were two-thirds of all animals captured. Overall, 117 species were tested. The study objectives were to identify local animals and search for evidence of Ebola virus in their tissues. A total of 1664 animals representing 117 species was collected, including >400 bats and 500 rodents. Vero and CV-1 cells and IFA and RIA were used for virus and antibody detection, respectively. **No evidence of Ebola virus infection was found.** This study was limited in time and animal collections and excluded insects and plants"¹⁸

Ebola (continued)

CDC's statement on transmission of Ebola:

"Ebola is spread through direct contact (**through broken skin** or mucous membranes in, for example, the eyes, nose, or mouth) with

- blood or body fluids (including but not limited to urine, saliva, sweat, feces, vomit, breast milk, and semen) of a person who is sick with Ebola
- objects (like needles and syringes) that have been contaminated with the virus
- eating or contact with infected fruit bats or primates (apes and monkeys)

NOTE: *Broken skin includes micro abrasions caused by shaving, scratching or other skin related issues that would produce the same effect as shaving or scratching (dry, cracked, eczema).*

It is also spread by droplet (coughing/sneezing (aerosolization)) or contact with contaminated surfaces!^{11,19, 20,21,22,23,24}

Ebola(continued)

Is Ebola actually now Airborne? UPDATED INFORMATION 12/12/2014

Just as I was finishing this document a new “extremely troubling” report emerged on the Voice of America news website which is **the official external broadcast institution of the United States Federal Government**. The article entitled “Sierra Leone Baffled by Doctors' Ebola Deaths” discusses how Dr. Brima Kargbo chief medical officer in Sierra Leone is **“baffled”** by the recent **death of three doctors in a three day period**. From the article Kargbo said “It’s **difficult for him to understand where the doctors got the disease**. It interesting to note that a **survey was conducted together with the CDC and it came up very clear that more 70 percent of our infections did not come from either our holding or treatment facilities,**”¹⁷⁰

This to me is extremely troubling if a joint study with the CDC comes up with **only 30% of doctors becoming infected with Ebola** from holding or treatment **facilities**.

Where is the other 70% coming from?

That is a huge number of unaccounted infections. If it is not coming from the two most likely places (holding and treatment) facilities then where is it coming from? This would suggest an outside source, outside of the holding and treatment facilities meaning **not in close contact with patients**. This means the Ebola infections are coming from contaminated sources or that Ebola has become airborne.

This is completely plausible since Ebola is an RNA virus, each person it infects it mutates. The Ebola virus was genetically sequenced in May/ June of 2014 from samples taken within the first 24 days of the outbreak. During this sequencing it was determined that over 300 distinct mutations had occurred. At this time about 2,000 people were infected. There are now approximately 18,000 people that have been infected.⁵ If we extrapolate the 300 mutations (which is a conservative number) per 2,000 patients we now get:
 $(18,000 / 2,000) * 300 = 2,700$ mutations.

I find it very troubling that no other news media has picked up this story considering it scientifically shows a high percentage of uncertainty as to where this infection is coming from. I also find it odd that this information is from a government news source and no one else has picked up this story. The article can be found here <http://www.voanews.com/content/a-10th-sierra-leone-doctor-dies-from-ebola/2549903.html> it includes the audio from the interview.

PERSISTENCE AND PREVELANCE OF EBOLA IN PREVIOUSLY INFECTED INDIVIDUALS

Very limited studies have been done to determine how long after an Ebola patient is cleared of the virus that the virus persists in each body fluid. Some fluids have no studies at all. Ebola can persist in the following body fluids up to the days listed after symptom onset.^{10,11,13,22,25,26}

Vomit

No data

Breast Milk

15 Days after symptom onset.²⁶

Organs and Tissues

No data

Saliva

8 Days after symptom onset.²⁶

Vaginal secretions

33 Days after symptom onset.²⁶ Only men have been advised thus far to use a condom but condoms are not foolproof and the question remains what is the exposure risk. **Several people have been cured and released after less than two weeks***

Amniotic fluid

No data

Feces

29 days after symptom onset.²⁶ **This could pose a serious risk for public bathrooms and fomites(surfaces) by toilet aerosolization. NOTE:** The CDC is only implementing 21 day quarantines from symptom onset which means for **8 days after completing quarantine** they can still shed the virus in public toilet systems. **Several people have been cured and released only after less than two weeks***

Urine

23 Days after symptom onset.²⁶ **This could pose a serious risk for public bathrooms and fomites(surfaces) by toilet aerosolization. NOTE:** The CDC is only implementing 21 day quarantines from symptom onset which means individuals are infectious for **2 days after completing quarantine** they can still shed the virus in public toilet systems. **Several people have been cured and released only after less than two weeks***

Sweat

No data

Tears

No data

Persistence and Prevalence of Ebola in Previously Infected individuals (continued)

Blood

Is highly infectious, it carries 1 million virus particles per 1 milliliter of blood at Ebola's peak. Since a woman has her menstrual cycle every 28 days the question is whether or not her next menstrual cycle (after the Ebola infection is cleared) contains the Ebola virus? If it does how many virus particles does it contain and for how long? This could lead to secondary infections from feminine hygiene products disposed of in the garbage.

Human embryos

Little to no information exists. According to a document from the European Centre for Disease Prevention and Control it says "there is a **paucity (scarcity) of data on Ebola virus in human egg cells.** The **risk of Ebola transmission should be considered in connection with reproductive cell donations,** both for 'partner' and 'other than partner' donations. The evidence that Ebola virus may persist for some time in the human body after recovery from Ebola Virus Disease (EVD) is **insufficient to define a specific deferral period for donors who have recovered from EVD.** The current guidance stipulates **deferral for 12 months following recovery from a viral hemorrhagic fever** and **this recommendation also applies to donors who have recovered from EVD.**"²⁷

At birth women have approximately 1 million eggs and by puberty 300,000 will be left of those 300 to 400 will be ovulated.²⁸ Considering Ebola infects **every cell** in the human body it begs the question **how long are human embryos really infected with the virus?** No studies have been done yet to determine it.

Semen

It is the only fluid that has been documented in 1999 as being able to carry and potentially transmit the Ebola virus for up to 101 days.²⁶ The only thing the CDC has said is to abstain from sex for "**at least 3 months including oral sex if you are a male**", there is **no guidance for females** that have been previously infected with Ebola.^{10,13} The CDC says "**condoms may help prevent the spread of disease**" so, **using a condom is not a sure thing.** The number of days semen carries the virus varies according to the source; it has been cited at 82, 91 and 101 days.^{10,13,22,25,26} It does not seem as if a "Safe" time period has been established where it will pose no risk of exposure.

India is currently quarantining a man that has no Ebola in his blood he was deemed **(cured)** but is **still carrying the Ebola virus in his semen.**²⁶ According to a Time magazine article the CDC recommends abstaining from sex for **6 months** and recognizes it can be carried in semen for **3 months.**^{10,26}

Persistence and Prevalence of Ebola in Previously Infected individuals – Semen (continued)

This is a very **problematic situation**, how many people are going to remember to abstain from sex for **6 months**?

According to a recent report Dr. Craig Spencer was going to a boutique hotel with his fiancé' on November 12th 2014 one day after his release from the hospital. Considering he lied to investigators previously the question becomes can he be trusted to have safe sex or abstain from it since his semen can be infective for up to 101 to 180 days after initial Ebola symptom onset? Otherwise this could begin a new cluster of infections starting with his fiancé'. Even if protection is used **if the condom breaks that means you have the beginning of another cluster.**

If **someone previously infected with Ebola and cleared** was to have **unprotected intercourse** which resulted in **pregnancy** that would **not only be a risk to the unborn child but could that child become a carrier of Ebola but not affected by it?** If it puts the child at risk, then the issue becomes how to treat the child and mother. If the child does not make it and dies in the womb **what protocols have to be followed to ensure no one else becomes infected by the unborn fetus?** If the **child is carried to full term and in fact is not affected by Ebola but carries it what risk does a caesarian section or even natural child birth carry?** Could it put not only the parents but the doctors, nurses and maternity ward at risk from the fluids involved?

Women and Sexual intercourse

To date I also have not seen any data on how **long women should abstain from sexual intercourse or oral sex** after clearing an Ebola infection.

Skin

No data

Persistence and Prevalence of Ebola in Previously Infected individuals – Semen (continued)

While Ebola may not be detectable in the patients’ blood they still carry It in other body fluids. I put together the table below to illustrate what risk the different Ebola patients that have been treated and released pose to the general public. The dates indicate the date they were initially diagnosed with Ebola and the “Fluids still infective” indicates how many days after their release and for which particular body fluid is still infectious with Ebola based on CDC information and other research studies.^{10,11,13,22,25,26}

The CDC deems a patient is cured of Ebola when they have no detectable levels in their blood. However as stated above they can continue to carry the virus in various other body fluids.

Name	Position/Profession	Dates	Fluids still infective after deemed “cured” and released. (# of days in parenthesis)
Nancy Writebol ^{149,150} (29,30)	Missionary	7/25/14 – 8/19/14 (25 days)	Feces (4)Vaginal Secretions (8)
Dr. Kent Bradly ¹⁴⁸⁽³¹⁾	Doctor	7/31/14 – 8/21/14 (21 days)	Urine (2) Feces (8) Semen (80 – 159)
Dr. Rick Sacra ¹⁴⁷⁽³²⁾	Doctor	9/4/14 – 9/25/14 (21 days)	Urine (2) Feces (8) Semen (80 – 159)
Ashoka Mukpo ¹⁴⁷⁽³²⁾	News Freelancer	10/2/14 – 10/21/14 (19 days)	Urine (4) Feces (10) Semen (82- 161)
Amber Vinson ¹⁴⁵⁽³³⁾	Nurse	10/15/14 – 10/28/14 (13 days)	Breast Milk (2) Urine (10) Feces (16) Vaginal Secretions (20)
Nina Pham ¹⁴⁶⁽³⁴⁾	Nurse	10/12/14 – 10/24/14 (12 days)	Breast Milk (3) Urine (11) Feces (17) Vaginal Secretions (21)
Dr. Craig Spencer ¹⁵¹⁽³⁵⁾	Doctor	10/23/14 – 11/11/14(20 days)	Urine (3) Feces (9) Semen (81-160)

EBOLA PATIENT ISSUES

As of the time of this writing, patient issues are rapidly changing. New issues are arising and some of these issues may be beginning to be resolved.

Maternity Protocols

No protocol exists for Maternity nurses on how to handle a pregnant woman infected with Ebola. The protocols have varied widely in West Africa. Currently, most doctors are refusing to deliver babies because of the high risk of infection along with low chances of the baby's survival.

Dialysis Patient Protocols

No official protocol exists for the care of dialysis patients infected with Ebola nor the cleaning, maintenance or repair of the machines after usage on an Ebola infected patient to ensure no cross contamination or infection risk to the next user or operator.

Equipment Decontamination

Lab equipment and other medical equipment used on Ebola patients may not be reusable. Some of the medical equipment costs tens of thousands of dollars. Many manufacturers are refusing to cover the machines under maintenance contracts or warranties. Abaxis who makes the Piccolo changed their warranty on their \$14,000.00 device to say "The policy calls for the Piccolo to be incinerated after its use of testing Ebola patients."³⁶ Some companies have changed their policies regarding machines or lab equipment used with Ebola infected patients or fluids to avoid having their technicians become infected or quarantined after servicing the machines as that could severely, negatively impact their business and ability to service other companies using their machines.³⁶

PUBLIC EXPOSURE RISKS

Multiple exposure risks exist that have either not been publicly addressed or addressed at all. The risks below are not an all-inclusive or exhaustive list but instead serve to be catalyst to start looking at alternative avenues that puts the general public at risk of Ebola exposure and infection.

LAUNDRY & PUBLIC LAUNDRY SERVICES

Self Service Laundromats are very common in college towns, urban and suburban areas almost “estimated primary customer base of 86 million people.”³⁷ Approximately 27% of the entire US Population uses coin operated Laundromats. This does not include coin operated laundry facilities located on premises in apartment complexes. If there is not 100% certainty that the Ebola virus cannot thrive in this environment then it remains a potential distribution point.

No guidelines on laundry

No guidelines exist as to whether or not a washing machine on cold, warm or hot cycle will destroy 100% of the Ebola virus. The CDC has recommend the disposal and destruction of any laundry of an Ebola patient.⁴⁵

Infective clothing

No in depth studies have been done to determine how long traces of feces, semen, urine, vaginal secretions, or menstrual blood remain infective in clothing (including underwear) and for how long. Also it is unknown if the clothing could contaminate the washing machine as the CDC itself recommends throwing out all Ebola exposed laundry or incinerating it.⁴⁵

Will a dryer kill Ebola only on certain cycles?

No studies have been done to determine if clothes dryers would kill Ebola or aerosolize it, or if there are differences based on temperature (i.e. fluff, low heat vs high heat/permanent press)

Can laundry machines become contaminated?

Laundry machines could become a distribution point for Ebola in apartment complexes and college towns where public laundry services are highly utilized. According to information on Ebola it states it needs to be heated at 60c (140f) for 30 – 60 minutes or it needs to be boiled for 5 minutes to kill the virus¹¹, water boils at 212F degrees³⁸ Likewise these laundry usually have shared laundry tables and rolling laundry baskets which may contain porous surfaces.

Public Exposure Risks – Laundry & Public Laundry Services (continued)

Modern washing machine temperatures too low to kill Ebola virus

Modern washing machine temperatures are “In general hot water is 130 degrees Fahrenheit (54.4 Celsius) or above. Warm water is between 110 and 90 degrees Fahrenheit (43.3-32.2 Celsius). Cold water is generally between 80 and 60 degrees Fahrenheit (26.7-15 Celsius)”³⁹ With this in mind unless the washer was run for 60 minutes at 140F or above the virus could survive inside the washing machine if it was not destroyed by the detergent.

NOTE: No studies exist to show what exact concentrations, amounts of detergent, and the ingredients those detergents must contain to kill Ebola aside from the mention of bleach mixed in the same ratio a hospital environment uses.

The following information is the CDC gives to hospitals in its “Interim Guidance for Environmental Infection Control in Hospitals for Ebola Virus” guide.

“To reduce exposure among staff to potentially contaminated textiles (cloth products) while laundering, discard all linens, non-fluid-impermeable pillows or mattresses, and textile privacy curtains into the waste stream and disposed of appropriately.”⁴⁵

“**Avoid contamination of reusable porous surfaces** that cannot be made single use. Use only a mattress and pillow with plastic or other covering that fluids cannot get through. Do not place patients with suspected or confirmed Ebola in carpeted rooms. Remove all upholstered furniture and decorative curtains from patient rooms before use”⁴⁵

NOTE: Tile, grout, certain counter tops, wood, and other surfaces are “porous”

“Ebola virus is classified as a Category A infectious substance regulated by the U.S. Department of Transportation’s (DOT) Hazardous Materials Regulations (HMR, 49 C.F.R., Parts 171-180). Any item transported offsite for disposal that is contaminated or suspected of being contaminated with a Category A infectious substance must be packaged and transported in accordance with the HMR.”⁴⁵

Dry Cleaning Ineffective

Dry cleaning would not effectively kill the Ebola Virus - “Dry cleaning with perchloroethylene is not bactericidal and is particularly poorly virucidal for non-enveloped viruses.”⁴⁰

Public Exposure Risks (continued)

SWIMMING POOLS – PUBLIC & PRIVATE

Non-Chlorinated Pools a Risk?

No guidelines or studies exist for the safety of swimming pools or other shared facilities, such as physical rehab pools. It is assumed the virus would not live in a “Chlorinated” environment. However no statements, guidelines or tests have been done on biguanide (Baquacil) type pools. This includes studies on if an infected adult or child were to urinate in the pool or bleed in the pool.

It is assumed, but no actual tests can be found for Ebola surviving in a chlorinated pool and for how long.

GYM EQUIPMENT

While several articles may have ruled out gyms as a possible Ebola exposure point I have to disagree completely. Almost every gym I have ever been to has spray bottles containing some unknown “disinfectant” to spray down gym equipment with. The biggest problem is there is no consistency between gyms. Some use disposable wipes, others use paper towel. Many however have gone to using regular fabric towels placed in strategic locations across the gym. This presents several issues in itself. There is also several other factors as well to contend with such as body fluids and people breathing.

Reliance upon everyone cleaning the equipment

You are relying upon the individual to wipe down the equipment after use. Not everyone does this. Especially some of the most contaminated surfaces such as workout mats and free weights. While you can wipe down the equipment yourself this still provides several infection vectors such as contaminated towels being used to wipe down the equipment.

Dirty or contaminated Gym towels

Many times gym towels will be handled throughout the day. They remain damp with disinfectant but these are akin to using a sponge over and over again to wipe down tables. They are supposed to be changed out daily but that all depends upon the gym staff doing their job. In essence these towels spread more germs they clean and if you have any breaks in your skin it could provide an opportunity for myriad of infections to enter your body.¹⁷¹

Sweat

While the CDC contends that transmission of Ebola through sweat is unlikely it does not negate the fact that they also have stated Ebola is carried in all body fluids.²⁶ Without any solid studies I tend to err on the side of caution when it comes to a potentially lethal virus of this magnitude. Almost everyone sweats at the gym and in no small amount. Lots of times people will be laying on mats, benches, or specific equipment with vinyl seats sweating. Usually when people get up from these machines you can see the wet sweat stains left behind.

Public Exposure Risks (continued)

Aerosolization

Many gyms have fans and dehumidifiers running to keep airflow going throughout the gym. In essence this is to combat the gym becoming a humid sweatbox from all the gym goers' perspiration. The fans and dehumidifiers will cause aerosolization of droplets in the air. The dryer air could also lead to irritated airways resulting in people coughing. Any coughing would result in droplet release and Ebola can be carried in droplets. The disturbance of the air by the fans and dehumidifiers in the gym could cause infected droplets to spread well beyond 3 feet and remain suspended in the air for an extended period of time.^{11,19, 20,23,53,56}

People jumping, running, wiping sweat from their forehead and movement in general will also cause aerosolization of their sweat and dead skin flakes^{25,26,69}

As people inhale, exhale and talk they naturally create droplets however in a gym environment heavy respirations would lead to bigger droplets being released. Straining to lift weights, yelling and blowing air out through the mouth would also create a large amount of droplets ranging in size from $>1\mu\text{m}$ to $10\mu\text{m}$.¹⁷² These factors along with an enclosed space with so many people inhaling and exhaling heavily and/or sweating make the gym a very likely distribution point for many viruses and Ebola would be no exception.

NOTE: More about Ebola's aerosolized risk can be found under the Aerosolized Risk section later in this document.

Gym Showers

Gym showers are notorious for harboring lots of viruses, bacteria and fungus. A paper by the National Athletic Trainers' Association Position Statement goes into great detail of the risks that gyms pose to athletes and trainers for skin diseases, viruses and bacteria.¹⁷¹ Gym Showers and locker rooms are almost always tile based. Tile is a porous surface unless sealed. However the sealant can go bad if proper maintenance is not done to the tile. Grout is extremely porous and the nature of the grout being lower than the tile provides all sorts of places for all kinds of germs (bacteria, viruses, fungus) to hide out making it nearly impossible to fully disinfect the surface.⁴⁴

Showers also create a heavy amount of airborne water droplets. While soap should kill most viruses it is possible that it does not kill all and could lead to contamination of shower surfaces and aerosolization of the virus carried in water droplets.

Public Exposure Risks (continued)

NURSING HOMES, RETIREMENT FACILITIES, SPECIAL ASSISTANCE FACILITIES

Individuals with **reduced and/or compromised immune systems**, nursing homes, retirement & special assistance facilities could become a **reservoir** for Ebola infections that could spread extremely fast. The mere **design** of the facilities **facilitates a close proximity at dinner tables, rooms, and public areas** which would further increase the likelihood of passing the infection to **others**.

CDC advisory to facilities is completely absent

No protocol exists for preventing the spread of Ebola through nursing facilities, retirement homes, and special assistance facilities for the mentally and physically handicapped where the virus could establish a foothold among a population with reduced immune system function.

Inadequate staff preparations

No training has been given to nurses or aides in these facilities to be on the lookout of Ebola symptoms

No screening for contagions

No screening of people entering or exiting these facilities to see if they have recently been to an area infected with Ebola or been around anyone who has.

Inadequate security

Many of these types of facilities have inadequate security or surveillance systems making contact tracing almost impossible.

Increased risk of exposure due to increased chance of body fluids

Many of these individuals have **incontinence (bathroom) issues, easy bleeding or respiratory issues**. If one person was to become infected in such a facility their body fluids would become infectious further exposing aides and nurses within the facility

Public Exposure Risks (continued)

PUBLIC SCHOOLS

Public schools could become a centralized point for rapid spreading of the Ebola virus. Confusion over whether a student has the flu or Ebola could complicate the situation along with the surfaces that could become contaminated. Foreign exchange student programs could also contribute to an increased risk of exposure.

No guidelines given to k-12 and colleges for Ebola screening

The CDC has not given any specific guidelines for schools to follow to screen for Ebola. Likewise nurses in schools have received no information. Considering the severity of Ebola I find it quite haphazard to give guidelines to hospitals and airports but skip k-12 and colleges considering how much human traffic moves through those enclosed buildings every day.

CDC has no guidance on Ebola exposure in K-12 and Colleges

No protocols or guidelines exist for exposure procedures in K-12 institutions or colleges where the virus could spread fast given the amount of traffic and physical contact in these settings.

No guidance for disinfection in Schools

No specialized training or specific CDC protocols have been given to school janitorial staff when dealing with potentially Ebola infected surfaces and waste.

Public Exposure Risks (continued)

EBOLA IN THE PUBLIC SEWER SYSTEM

On October 3rd 2014 workers power washed Thomas Eric Duncan's vomit across the parking lot, into nearby ground and into the public storm drains using a power washer.⁴¹ At the time this occurred Thomas Eric Duncan had been experiencing symptoms for 3 days with a 103F fever and was completely contagious. A picture by WFAA8 channel news confirms a crew cleaning up the vomit outside the apartment with a power washer without any protective equipment.⁴²



This biohazard vomit carried the Ebola virus. By spraying it with high pressure hoses, it would have created aerosolized particles, which could have infected anyone or anything coming into contact with these particles.

Public Exposure Risks - Ebola in the public sewer system (continued)

When flushing Ebola infected waste into a public storm drain or even down modern plumbing it brings a plethora of questions and concerns:

Ebola waste overloading parts of the sewer system

It has already been stated that Ebola can survive outside the body for 6 days or more depending on conditions and material it is contained in (ie blood, vomit, and diarrhea).¹¹

This raises a question, how much infected waste can be handled by the public sewer system before it reaches a saturation point where the infected waste becomes less liquid and instead becomes more solid (As stated in the aforementioned study a more solid waste environment would promote the infection to last longer outside the body) ?

While this may not be an initial concern, as more infections occur more Ebola infected waste (primarily in the form of diarrhea and vomit) would be generated and enter the sewer system. At some point this sewage would become less water based and more solid like sludge.

Rats and other animals in the sewer system

It has not been determined if worms, maggots, lizards and other species/ animals found in public sewers could become infected from Ebola infected waste material in public storm drains and sewage.

Rats can be infected with Ebola. Rats are notorious for being in public sewer systems. What risks are associated with Rats in public sewer systems?

If the Ebola virus can survive in a sewer system in an infected patients waste stream (even if only for a few minutes or hours) the question becomes how easily can it infect a rat? What exposure is needed and what body fluids?

Can a rat transfer Ebola back to the rest of its nest?

Can infected rats transfer it to the human population? There doesn't appear to be a barrier preventing transmission from Human to Rat to Human again.

Raw Sewage and Ebola

As quoted from a website dedicated to building inspection "Disease causing agents in raw sewage include bacteria, fungi, parasites, and viruses and can cause serious illnesses"⁴³ - Studies have indicated that **Ebola** can **survive** for **several days outside** the body in **cooler, darker, humid environments**. *The public storm drains provide this exact ideal environment.*¹¹

Public Exposure Risks - Ebola in the public sewer system (continued)

Sewage Disposal Systems and Spread of Contagions in an Apartment Complex

A study of a SARS outbreak in 2004 in an apartment complex documents the following process and findings “Yu et al. also modeled the spread of aerosol in the Amoy Gardens housing complex during the outbreak, and their results similarly suggested **an aerosol pathway from the sewage disposal system through dry U-traps in bathroom floor drains induced by bathroom exhaust fans, with subsequent exhaust to the open air light well and transport between buildings**, and correlated these with the reporting of the first 187 SARS cases .”⁴⁴

While this part of study deals with SARS, it provides evidence that viruses can be spread in an apartment complex without direct contact and is **dependent upon droplet nuclei** size which is **usually 1um (1 micron) to 5um** The entire size of the Ebola Virus is under **1um at 970nm long by 80nm diameter**. The article summarizes this research. “These findings appear to provide the best explanation for the pattern of the initial 187 SARS cases in the Amoy Gardens apartments, and offer **strong support for a conclusion that airborne transmission was perhaps the primary mechanism for inter-apartment disease transmission during the initial phase of this outbreak**. Taken together, these studies suggest that SARS CoV **microbial droplet nuclei aerosols produced from contaminated sewage and subsequently transported on air currents may be highly infectious for significant periods and over long distances.**”⁴⁴

Sanitary Sewer Survivability

It was stated by the **CDC** “Sanitary sewers may be used for the safe disposal of patient waste. Additionally, sewage handling processes (e.g., anaerobic digestion, composting, and disinfection) in the United States are designed to inactivate infectious agents.”⁴⁵ However **no safety studies have been done as to the survivability of Ebola in sewer sludge and waste**. Also **no** studies have been done to determine **how infective aerosolized Ebola infected waste** is when generated from **toilet flushing**.

It has been **assumed** by the **CDC** that it would not persist in this type of environment yet they have said that body fluids are highly infectious which has caused them to revise their recommendations for hospital staff and PPE (Personal Protective Equipment). Other studies have indicated survival outside of the body for several days with favorable condition of a dark, cooler, humid environment – a public sewer system meets all 3 of these conditions.¹¹

No studies been done on **the survivability of Ebola** in the **pipes, waste pools, affluent, sludge, and the treatment plant** (which is much different from standard water with a different PH)and if that poses a long term risk for any plumbers or other workers involved with public and private sewer systems.

Public Exposure Risks - Ebola in the public sewer system – Sanitary Sewer Survivability(continued)

This is a major cause for concern considering many of the sewer systems today have fallen into complete disrepair requiring major upgrades and renovations to be able to handle the waste stream generated in the public sewer systems. Many of these systems release untreated waste into local waterways, polluting those waterways. Sewer workers are also constantly repairing sewer systems in major cities across the US as the sewer system in some cities dates back to the 1860's⁴⁶

Sewer spillover

There are no guidelines for how to deal with a sewer spillover, backup or line break that has been exposed to or carrying Ebola infected waste. (see the updates section later in this section.)

Stormwater

No studies have been done to assess the survivability of Ebola in public storm drains. Storm water is not processed by sewer treatment plants and flows out to nearby streams, creeks, rivers and lakes.⁴⁷ If the virus enters the storm drains as infectious biological material (blood, vomit, feces) it is unknown if it can contaminate nearby watersheds and other bodies of water such as streams, creeks, rivers, lakes both fresh water, brackish, and saltwater. No tests have been done to assess if the virus can live in various bodies of water and for how long.

Wastewater operations, specialists and employees

The CDC does not have guidance for wastewater operations specialists and employees related specifically to Ebola³⁷ *Currently the CDC is working on this and it is expected to have this completed by the end of October.*

Public Exposure Risks – Ebola in the public sewer system – Wastewater operations, specialists and employees (continued)

LAST MINUTE UPDATE (12/10/2014):

The CDC updated its guidance for sewer workers and wastewater treatment managers in its guide entitled *“Interim Guidance for Managers and Workers Handling Untreated Sewage from Individuals with Ebola in the United States.”* However in its guidance it cites a document from 2001 for handling zoonotic diseases as its basis for guidance in handling Ebola infected waste.

The CDC boldly states **“There has been no evidence to date that Ebola can be transmitted via exposure to sewage(7)”**¹⁶⁵

This sounds all well and fine until you read the actual document cited for the evidence to this statement which is; “Weinstein, R. A., D. J. Weber, and W. A. Rutala. "Risks And Prevention Of Nosocomial Transmission Of Rare Zoonotic Diseases." *Clinical Infectious Diseases* 32, no. 3 (2001): 446-56. Accessed December 12, 2014. <http://cid.oxfordjournals.org/content/32/3/446.long>.”¹⁶⁶

The research **article clearly states that Ebola is infective in body fluids including urine, vomit and stool.** It further recommends seeing the CDC recommendations for dealing with Ebola infected waste material. **Nowhere does it ever mention any tests or studies to determine if Ebola can be transmitted via exposure to sewage. However in appendix B under #8 it says** *“There is no evidence of transmission of viruses that cause VHF to humans or animals through exposure to contaminated sewage”.*

My question is **based on what study or tests and who did the study or tests to determine there has been “no evidence to date that Ebola can be transmitted via exposure to sewage”?** CDC has **no study or tests**, there was **no study or tests** in the article “Risks and prevention of nosocomial transmission of rare zoonotic diseases” either just the statement in appendix B. **This seems to be a very unqualified and unquantified statement.**

Now if in the paper “risks and prevention of nosocomial transmission or rare zoonotic diseases” In Appendix B they are citing citation #8 as their source which is this article “English JF, Cundiff MY, Malone JD, et al. “Bioterrorism readiness plan: a template for healthcare facilities.” Washington, DC: Association for Professionals in Infection Control and Epidemiology; 1999. Accessed December 12, 2014 <http://www.bt.cdc.gov/bioterrorism/pdf/13apr99APIC-CDCBioterrorism.pdf>”¹⁶⁷

There is absolutely **no mention** in that document of **Ebola or Ebola contaminated sewage.**

Public Exposure Risks – Ebola in the public sewer system – Wastewater operations, specialists and employees (continued)

In essence the CDC wrote guidance citing the article above which recommends following the CDC's protocol or wrote it based on a research paper that based their conclusion on a research paper that contains no information about Ebola or Ebola infected sewage. Either way this is absurd! What agency charged with public health cites a paper citing them to cite their claims? This doesn't make any sense!

If we were to logically map it out where each arrow points to the next source it would look like this

CDC citing article that cites CDC

CDC -> "Risks and prevention of nosocomial transmission of rare zoonotic diseases" article[2001] > CDC (*Infinite loop with no one providing tests or studies circling back to originator of the claim*)

or

CDC citing article that cites other article, that article contains no data to support claim

CDC -> "Risks and prevention of nosocomial transmission of rare zoonotic diseases" article[2001] > Bioterrorism readiness plan: a template for healthcare facilities [1999] (*Dead end where one cites another that cites another that contains NO DATA related to the claim*)

A further blow to the credibility of this recommendation is even if any of these papers did address Ebola and sewage they are from 1999 and 2001; 15 and 13 year old studies with no mention of what specific strain of Ebola. This brings yet another issue with 5 different strains of Ebola (Bundibugyo, Reston, Sudan, Tai Forest, Zaire¹⁶⁸) each having slightly different nuances. Some are more virulent than others meaning they could potentially have higher survivability in sewage based on the strain. *The Ebolavirus of 2013-2014 is a Zaire strain but it has been noted to be genetically different from previous version due to mutations it has undergone*^{3,169} Zaire has been documented as being the most virulent and deadly strain compared to Bundibugyo, Reston (which has only been found in nonhuman primates) Sudan or Tai Forest.

This begs the question:

Why would the CDC base advice on the handling of Ebola infected sewage (urine, stool, blood, and vomit) on studies that are 13 – 15 years old and studies that don't even address the Zaire strain let alone this mutated version of Ebola Zaire that is responsible for the current outbreak that began a year ago?

Public Exposure Risks – Ebola in the public sewer system – Wastewater operations, specialists and employees (continued)

Another important point to note is that in the CDC guidance document it states ***“If undertaking cleaning processes that generate aerosols, a NIOSH-approved N-95 respirator should be used.”***¹⁶⁵

Why would the CDC state this unless Ebola can be spread by Aerosolized route? This completely contradicts the CDC’s various explanations such as direct contact with fluids, large droplets etc. and in this document they leave it to *“cleaning processes that generate aerosols”* many other things generate aerosols such as HVAC equipment, walking through spills on the floor, flushing toilets, and washing hands.

Public Exposure Risks - Ebola in the public sewer system (continued)

Outdated old leaky under developed treatment systems:

As stated in a NY Times article in 2009 “more than **9,400** of the nation’s 25,000 sewage systems — including those in major cities — have reported violating the law by dumping untreated or partly treated human waste, chemicals and other hazardous materials into rivers and lakes and elsewhere, according to data from state environmental agencies and the Environmental Protection Agency.”⁴⁸ “A 2007 study published in the journal Pediatrics, focusing on one Milwaukee hospital, indicated that the **number of children suffering from serious diarrhea rose whenever local sewers overflowed**. Another study, published in 2008 in the Archives of Environmental and Occupational Health, estimated that as many as **four million people become sick each year in California from swimming in waters containing the kind of pollution often linked to untreated sewage**. Around **New York City**, samples collected at **dozens of beaches or piers have detected the types of bacteria and other pollutants tied to sewage overflows**.”⁴⁸ The **wastewater treatment score** for America for 2013 was **D (Poor)**.⁴⁹

Compliance Issues

Many years after the Clean Water act “**in hundreds of places, sewer systems remain out of compliance with that framework or the Clean Water Act, which regulates most pollution discharges to waterways**”⁴⁸ There are many examples of wastewater being spilled into local waters:

- **“7,500 gallons of wastewater overflows into Lake Waccamaw North Carolina after sewer spills”**⁵⁰
- **“More than 850 billion gallons of raw or untreated sewage reach our streams, rivers, and lakes every year”**⁵¹
- **“Nationwide, an estimated 1.7 trillion gallons of water leaks from pipes each year before it can be put to use. About 900 billion gallons of raw sewage flows into waterways.”**⁴⁶
- **“Raw sewage flows into the Potomac, the Anacostia and Rock Creek whenever it rains hard — hundreds of times a year — an annual flush of about 3 billion gallons, according to D.C. Water.”**⁴⁶

One quote that should really stand out that breaks this false statement that we are more modern or cleaner is this quote right here- “Hawkins recalls telling the visitors that the old mains under New Hampshire Avenue burst fairly often. “They said: ‘You have pipes that were put in in the 1860s? We thought we had it bad in Ghana!’”⁴⁶ The irony here is Ghana is in Western Africa. The same place we claim is so much more unsanitary than we are and citing that as the reason to why disease spreads there so easily and wont spread so easily here.

Public Exposure Risks - Ebola in the public sewer system (continued)

Toilet Sanitization

No studies have been done for particulate or virus matter underneath the rim of toilet bowl with. This could lead to infection when someone cleans or plunges the toilet as it would generate Aerosolized Particles, Flushing the Toilet would have the same effect- this is also addressed under the Toilet Aerosolization section located under the Aerosolization section. Lakes, Rivers, Creeks, Streams and aquifers

It has not been determined if Ebola could be transmitted into various bodies of water.

If various bodies of water can be contaminated with Ebola is it possible that it will infect amphibians, water moccasins, salamanders, turtles, fish, crayfish, slugs, leeches, snakes, flies, mosquito larva, or other animals or insects found in aquatic habitats?

Toilets and Aersolization

No tests have been done for Infection of Ebola from plumbing vent stacks or aerosolization of infected toilet waste and how far it can travel. (This is covered under the Aersolization section)

WEATHER AND SURVIVABILITY

Ebola is more infectious in high humidity and/or lower temperature environments.⁵² The combination of these two factors would make it most infectious. The northern part of the U.S. and Canada are beginning to enter colder temperatures now, thereby increasing the potential for human to human transmissions and its survivability on surfaces outside the body. Ebola has never been studied in an environment such as North America for survivability and transmissibility. At 39 degrees Fahrenheit it was recorded as surviving 50 days outside the body.¹¹

During the colder months in the northern part of the U.S. people are more likely to be in enclosed spaces where they spend a greater amount of time in close proximity. This is why Influenza always strikes harder in the colder months. The closer proximity provides an ideal condition for increased transmissibility.

SPECIAL MEDICAL CONDITIONS AND EBOLA

No guidelines or safety protocols have been made for the handling of individuals with tracheotomies/ stomas, personal oxygen equipment, portable air tanks etc. who suffer from emphysema, COPD or other respiratory illnesses or reduced respiratory functionality that produces sputum, a constant cough or other symptoms that would be considered AGP (Aerosolized Generating Procedures). This coincides with the increased chance of infectivity based on the information contained and cited in the Aerosolized Risk section.

AEROSOLIZED RISK (AEROSOL VS AIRBORNE)

The aerosolized risk of Ebola is being deliberately downplayed by using specific medical terms vs layman's terms causing confusion among the general public. Several studies point to the potential risk of contracting Ebola via aerosolization through coughing, sneezing, vomiting, diarrhea, flushing a toilet, and other aerosol generating actions. As explained in Methods for Sampling of Airborne Viruses; "Any microorganism, including viruses, can become airborne. Contaminated material can be aerosolized in many different ways, ranging from wind to human and animal activities such as sneezing, mechanical processes, etc. If the aerodynamic size of an infectious particle is appropriate, it can remain airborne, come into contact with humans or animals, and potentially cause an infection. The probability of an airborne microorganism-laden particle causing an infection depends on its infectious potential and its ability to resist the stress of aerosolization."⁵³

Airborne vs Aerosolized/Droplet confusion and revolving terminology by the CDC
The CDC has consistently said Ebola is not airborne which is true (so far) by **medical definition only**.

Airborne by medical definition means for something to be classified or called "airborne" it has to be able to **travel through dry air for long distances**; Ebola cannot do this presently.

But here's the catch

Ebola can spread by droplets otherwise known as aerosolization which is microscopic water particles with the Ebola virus travelling inside of them.

Micro sized aerosolized particles (droplets) cannot be seen by the naked eye and are created when you talk, breath, sneeze, cough, vomit, urinate, defecate, have diarrhea, shed skin flakes and so forth. It can also be created by mechanical processes such as walking, flushing toilets, taking a shower, washing hands and even HVAC systems, fans and wind.

To clear up the confusion here is the best example I can give you:

Airborne definition by the CDC:

You are in a room over 20 feet away from someone and you catch "influenza" just by someone breathing that is more or less the definition of airborne by the CDC.

Aerosol / Droplet definition by the CDC:

You are in a room within 3 to 6 feet of someone and they are sneezing, coughing, vomiting all actions that produce heavy amounts of water droplets and you become ill. This is droplet or aerosolization.

Aerosolized Risk (Aerosol vs. Airborne) - Airborne vs Aerosolized/Droplet confusion and revolving terminology by the CDC (continued)

General Public's definition of Airborne:

When the average person asks "Is xyz airborne?" What they mean is can they catch whatever cold or disease as long as you are in proximity to that person and they are coughing, sneezing, vomiting etc.

That is not the way the CDC sees airborne based on the definition above. What the general public is calling "Airborne" is droplet/ aerosolization spread to the CDC's medical terminology which is what they deal in.

To explain it further since the general public's definition includes things that are called **droplets** by **medical terminology** the CDC can "**honestly**" answer NO to the question "Is Ebola airborne?"

If you asked the CDC "**Is Ebola spread by droplets?**" They would have to say yes otherwise they are flat out lying.

It's a game of medical terminology versus average public's usage of medical terms.

Aerosolized Risk (Aerosol vs Airborne)

Droplet studies support that the size of the Ebola virus would make it able to be spread by Aerosolization

According to the CDC's document entitled "Generation and Behavior of Airborne Particles" it states on page 12 and 14 depending on whether it is stagnant or turbulent air that particles 1um (1um is 1 micrometer) in size are airborne for 12 hours before they settle while particles closer to 3um will take 1.5 hours to settle. It further goes on to state how walking on carpeting can create aerosolization of particles and that aerosolized particles can clump together to form bigger particles in addition on page 27 it demonstrates how particles can be carried, deposited and become airborne again to travel further.⁵⁹

Ebola is filamentous, 970 nm long, and about 80nm in diameter.⁶⁰ Given that 1.0 um = 1,000nm,⁶¹ this would make the Ebolavirus (in terms of um (micrometers)) .9um long by .08um in diameter. Based on a study of aerosolized droplets it was concluded the size distribution of droplets exhaled by healthy individuals while mouth breathing, nose breathing, talking, and coughing were primarily under 1 µm⁵⁶ Further "there is agreement that aerosols smaller than 5 µm in aerodynamic diameter (also called droplet nuclei) contribute to airborne infection."⁵⁶ Another study showed that breathing, coughing and speaking generated droplets ranging in size from >1um to 10um. Those particle sizes are than big enough to carry the virus which has a diameter of just .08 µm.¹⁷²

These facts indicate that Ebola is able to be aerosolized. Even the CDC's own separate study on aerosolized particles proves that Ebola infected "droplets" could remain suspended in the air for prolonged periods of time.

In another study they concluded "**82% of droplet nuclei centered in 0.74-2.12 µm**"¹⁷⁵

According to several different studies coughing, talking, sneezing, and breathing all generate aerosolized particles (droplets)^{19,56,62}

"**Sneezing** may produce as many as **40 000 droplets between 0.5–12 µm** in diameter."⁶²

"**Coughing** may produce up to **3000 droplet nuclei**, about the same number as talking for five minutes."⁶²

IMPORTANT NOTE: It **only takes 1 – 10 virus particles (virions)** getting into your mucous membranes, eyes, mouth or a break in your skin such as micro abrasions caused by shaving or dry cracked skin **to become infected with Ebola!**

Aerosolized Risk (Aerosol vs. Airborne)

Ebola is a lot easier to catch than the CDC is willing to admit

In a report in the New York Post dated October 29, 2014 Experts pointed out that Ebola is a lot easier to catch than federal health officials have been saying and that the health officials have now contradicted themselves with their latest poster. From the new information it is apparent Ebola can live outside the body on surfaces for several hours or more. **“If you are sniffing and sneezing, you produce microorganisms that can get on stuff in a room. If people touch them, they could be infected”** said Dr. Meryl Nass, of the Institute for Public Accuracy in Washington, DC. Nass pointed to a poster the Centers for Disease Control and Prevention quietly released on its website saying the deadly virus can be spread through **“droplets.”** **“Droplet spread happens when germs traveling inside droplets that are coughed or sneezed from a sick person enter the eyes, nose or mouth of another person,”** the poster states. Nass slammed the contradiction. **“The CDC said it doesn’t spread at all by air, then Friday they came out with this poster,”** she said. **“They admit that these particles or droplets may land on objects such as doorknobs and that Ebola can be transmitted that way.”**⁵⁵

In another journal article it stated **“Many microorganisms, including viruses, can remain infectious outside their hosts for prolonged periods of time, and this can lead to infections by indirect contact.** For example, a surface can become contaminated by deposited infectious droplets and eventually cause the infection of susceptible hosts coming into contact with it. The probability of airborne transmission of an infectious disease can be determined by conducting epidemiological studies and/or by analyzing the microbiological content of air samples”⁵³

Dr. Rossi Hassad, a professor of epidemiology at Mercy College, said **droplets could remain active for up to a day.** **“A shorter duration for dry surfaces like a table or doorknob, and longer durations in a moist, damp environment,”** Hassad said.⁵⁵

The CIDRAP study has been hotly debated as it came out at the time that the CDC was under fire from media and the general public asking “Is Ebola airborne?” To which as stated before they are able to say “NO” because scientifically it is not. However the media and general public definition of airborne versus the CDC is two different things as discussed earlier.

As CDC was scrambling to calm the media frenzy that occurred when this information was found by the news media the CDC claimed the CIDRAP commentary was deeming Ebola as “airborne” **this is 100% factually inaccurate** as the professors involved with the CIDRAP commentary said from the beginning the likelihood of “aerosolized transmission” was the route of infection they were concerned with.

Aerosolized Risk (Aerosol vs. Airborne) - Ebola is a lot easier to catch than the CDC is willing to admit(continued)

Professor Lisa Brosseau and Assistant Professor Rachael Jones, University of Illinois at Chicago who published the CIDRAP commentary later came out with a position statement to clarify their original commentary. They stated the following “While aerosol emission from the respiratory tract is more familiar, **epidemiological and experimental studies** conducted **over several decades have demonstrated that infectious aerosols may be generated** by vomiting and diarrhea, **particularly toilet flushing**. These aerosols can be inhaled and/or ingested by susceptible people close to an infectious person or the emission event. **Surgical masks** have been shown in laboratory and field studies to **offer insufficient protection against the penetration of small infectious particles** to the respiratory tract.”

Further they go on to state the following “**Organisms that disperse via aerosols from diarrhea and vomiting may result in infections in crowded public spaces**: This may not be observed if the inhabitants can easily leave the space after an emission. Examples of this behavior, however, exist. Norovirus, for example, can be dispersed via vomiting or diarrhea in crowded public spaces, like airplanes and cruise ships. The **opportunity for aerosol transmission is especially high in a healthcare setting**, where workers engage with symptomatic patients and **perform medical procedures that generate aerosols**. There is **clear evidence of Ebola virus being spread from a very sick individual in Nigeria following short contact times without reported droplet spray**. It is these facts that led us to conclude that **Ebola virus may be an opportunistic aerosol transmissible organism**.”

Other studies confirm Ebola is easier to catch

- The Public Health Agency of Canada has stated in their Pathogen Data Safety Sheet on Ebola under the “primary hazards” section “Accidental parenteral inoculation, respiratory exposure to infectious **aerosols/droplets**, and/or direct contact with skin or mucous membranes”¹¹
- As stated in a study of aerosolized contaminants in a hospital setting “**Aerosols can be generated and released by human expiratory actions (speech, coughing, and sneezing), skin shedding, or resuspension from surfaces**.”⁵⁶ The study goes on to note “recent research has shown that the importance of aerosol infection is underrated for common diseases.”
- When a person infected with Ebola **coughs or sneezes it aerosolizes Ebola**. In this case, it is spreadable in the vicinity of the infected person for up to **104 minutes**.¹⁹ Distance is assumed at 3 feet but that is in a room with **NO MOVING AIR**. HVAC vents, exhaust vents such as those found in bathrooms, toilet flushing, hand washing, positive pressurized rooms, people walking or moving and other mechanical processes would cause particle disturbance resulting in aerosolization and further distribution of aerosolized particles beyond 3 feet.

Aerosolized Risk (Aerosol vs. Airborne) - Other studies confirm Ebola is easier to catch

- Depending upon the size of the aerosolized particles (**1um to 5um**) and relative humidity determines how long the virus particles remain suspended in the air in the form of droplets (aerosolization). According to one study someone could walk into a room up to 104 minutes after someone coughed or sneezed take a breath and become infected.¹⁹ Specifically in that study “Marburg, Ebola, and Reston viruses, at 50% to 55% relative humidity and 72°F, had biological decay rates of 3.04%, 3.06%. and 1.55% per minute, respectively. These rates indicate that 99% loss in aerosol infectivity would occur in 93, 104, and 162 minutes, respectively”.¹⁹ Another study states that Ebola can remain infective in aerosolized form for at least 90 minutes.²⁰
- USAMRID’s (U.S. Army Medical Research Institute of Infectious Diseases) Medical Management of Biological Casualties Handbook Volume 7 Published September 2011 on page 117, concerning viral hemorrhagic fever, states:²¹
 - **“In several instances, secondary infection among contacts and medical personnel without direct body fluid exposure have been documented. These instances have prompted concern of a rare phenomenon of aerosol transmission of infection.”**
 - “When VHF is suspected additional infection control measures are indicated.”
 - “Patient should be hospitalized in a private room”
 - “A **negative pressure isolation room** with 6-12 air exchanges per hour is ideal for all VHF patients and is strongly advised for patients with significant cough, hemorrhage, or diarrhea.”
 - “All persons entering the room should wear double gloves, impermeable gowns with leg and shoe coverings, eye protection and HEPA (N-95) masks or positive pressure air-purifying respirators (PAPRs).”²¹

NOTE: The USAMRID guide was published before the current strain of Ebola began in December 2013. The guidance contained in this handbook is not current to the current more virulent outbreak. As stated by many health care experts, not much is known about the current Ebola outbreak.

- Breathing, coughing and speaking certain words generated droplets ranging in size from >1um to 10um. Those particle sizes are than big enough to carry the virus which has a diameter of just .08um.¹⁷²
- Multiple statements and findings by the CDC, WHO, research journals, and other experts have alluded to or confirmed that Ebola can be spread if aerosolized.^{11,19,23,58}

Aerosolized Risk (Aerosol vs. Airborne)

CDC's own contradictions

A statement made by CDC Director Dr. Frieden is very concerning and completely contradictory **"Droplets can generally fly about three feet, so people dealing with anyone who may be ill are told to stand at least three feet away, preferably six. Being within three feet of a patient for a prolonged time, without wearing protective gear, is considered direct contact."**⁵⁴ A recent poster by the CDC explains the difference between droplet and aerosolized (droplet) exposure. ²³The CDC seems to be trying to make a distinction between droplet and aerosolized, but they are the same thing.

"large droplets (splashes or sprays) of respiratory or other secretions from a person who is sick with Ebola could be infectious" **"Droplet spread happens when fluids in large droplets from a sick person splash the eyes, nose, or mouth of another person or through a cut in the skin."**²³ *Droplets can be caused by respiration, coughing or sneezing, how else would you create a droplet? Look at the previous poster below it explains how droplet spread occurs.*

"Droplets may cause short-term environmental contamination, like a soiled bathroom surface or handrails, from which another person can pick up the infectious material." – *This proves that in fact the Ebola virus can survive outside the body which the CDC previously said was not possible. Also it has been proven it can survive up to 104 minutes in droplets.*¹⁹

"Ebola might be spread through large droplets but only when a person is very sick" *-what is defined as "very sick" a fever, vomiting? This statement is widely open to interpretation since there is no definition of "very sick"!*

Aerosolized Risk (Aerosol vs. Airborne) – CDC’s own contradictions (continued)

The CDC poster (found in the next two pages) contains many contradictory statements underlined in red. Also the distance is not accurate 3 feet is assumed in a room with no moving air. It also does not include the discussion of aerosolized particles (droplets), droplets or toilet aerosolization (droplets).^{11,19, 20,23,53,56}

About a week after the original poster was released news reports began to grow rapidly questioning the CDC’s contradictory statements. In response the CDC removed it and replaced it with a new one that states the following things below.⁵⁷

*It’s important to note they have decided to use specific words to form your opinion and give you a visualization that is not accurate. They consistently use the word “large droplet” and “splash” together throughout the new poster. To explain why the usage of these words is disingenuous you must look in depth at the meaning of the words being used. When you think of large droplet you most likely are thinking of something resembling a rain drop or drop of water. You are more than likely relating the word “splash” to the image of a child splashing in a puddle. Hence you are expecting that someone with Ebola has to be coughing large amounts of fluid upon you. This is **deadly inaccurate** and that imagery is created intentionally by taking two common words the human race is familiar with and throwing them together to create a certain expectation based on your personal life experiences.*

If I said “mist” you would probably expect to see the word “fine” together with it to describe a “fine mist” emitted by a “mister” for plants. Now think of a humidifier (fog or steam) where it is an even finer mist. Now to understand how small these “large droplets” are, imagine something smaller, in fact it is so small you cannot see it.

A good visual to help understand how small the Ebola virus and droplets we are talking about is available at this website:

<http://www.cellsalive.com/howbig.htm>

On the website it starts with a pin head, then goes smaller and smaller from largest to smallest

human hair (200 micrometers in diameter)

dust mites *the things that live in off your dead skin flakes* (200 micrometers)

past this point you cannot physically see any of these things without a microscope:

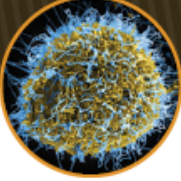
ragweed and pollen *the things that cause your allergies* (20 micrometers)

E.Coli *the thing infamous for food poisoning* (2 micrometers)

Ebola virus (900 nanometers by 80 nanometers diameter)

Aerosolized Risk (Aerosol vs. Airborne) – CDC’s own contradictions (continued)


Original Poster



Ebola

What’s the difference between infections spread through the air or by droplets?


Germs like chickpox and TB are spread through the air.



Airborne spread happens when a germ floats through the air after a person talks, coughs, or sneezes. Germs may land in the eyes, mouth, or nose of another person.

If a germ is airborne, direct contact with the infected person is NOT needed for someone else to get sick. Airborne spread diseases include: chickenpox, tuberculosis.

Ebola is spread through droplets.




Droplet spread happens when germs traveling inside droplets that are coughed or sneezed from a sick person enter the eyes, nose, or mouth of another person. Droplets travel short distances, less than 3 feet (1 meter) from one person to another.

A person might also get infected by touching a surface or object that has germs on it and then touching their mouth or nose.

Droplet spread diseases include: plague, Ebola.

Droplets can contaminate objects like doorknobs.



How do I protect myself from getting sick?


- **Wash your hands** often with soap and water. If soap and water are not available, use an alcohol-based hand sanitizer.
- **Cover your cough!** Cover your nose and mouth with a tissue when you cough or sneeze. Throw the tissue in the trash after you use it.
- **Avoid close contact with people who are sick.**
- **Avoid touching your eyes, nose and mouth.** Germs spread this way.
- **Clean and disinfect commonly touched surfaces** like doorknobs, faucet handles, and toys, since the Ebola virus may live on surfaces for up to several hours.

Is Ebola airborne?
No. Ebola is not spread through the airborne route nor through water or food.

Is Ebola spread through droplets?
Yes. To get Ebola, you have to directly get body fluids (like pee, poop, spit, sweat, vomit, semen, breast milk) from someone who has Ebola in your mouth, nose, eyes or through a break in your skin or through sexual contact.

Healthcare providers caring for Ebola patients and the family and friends in close contact with Ebola patients are at the highest risk of getting sick because they may come in contact with infected blood or body fluids of sick patients.

Air, food, and water do not carry the Ebola germs.



Centers for Disease Control and Prevention
Office of the Director

CSZ02201-A 10/27/2014 075408

Aerosolized Risk (Aerosol vs. Airborne) – CDC’s own contradictions (continued)

New Poster (about a week after the one above was published)

A human cell infected with Ebola

HOW EBOLA IS SPREAD

Is Ebola airborne?

Ebola is not a respiratory disease and is not spread through the airborne route.

Can Ebola be spread by coughing or sneezing?

There is no evidence that Ebola is spread by coughing or sneezing. Ebola is transmitted through direct contact with the blood or body fluids of a person who is sick with Ebola; the virus is not transmitted through the air (like measles virus). However, large droplets (splashes or sprays) of respiratory or other secretions from a person who is sick with Ebola could be infectious, and therefore certain precautions (called standard, contact, and droplet precautions) are recommended for use in healthcare settings to prevent the transmission of Ebola from patients to healthcare personnel and other patients or family members.


Is Ebola spread through droplets?

To get Ebola, you have to directly get body fluids (blood, diarrhea, sweat, vomit, urine, semen, breast milk) from someone who is sick with Ebola in your mouth, nose, eyes or through a break in your skin or through sexual contact. That can happen by being splashed with droplets, or through other direct contact, like touching infectious body fluids.

Healthcare providers caring for Ebola patients and the family and friends in close contact with Ebola patients are at the highest risk of getting sick when they touch or are splashed by infectious blood or body fluids from a sick patient.

How do I protect myself from getting sick?

- Wash your hands often with soap and water. If soap and water are not available, use an alcohol-based hand sanitizer.
- Avoid close contact with people who are sick.
- Avoid touching your eyes, nose and mouth. Germs spread this way.
- Routinely clean and disinfect commonly touched surfaces like bathroom surfaces, since some germs can stay infectious on surfaces for hours or days and lead to transmission.



What’s the difference between infections spread through the air or by droplets?

AIRBORNE SPREAD

Airborne spread happens when germs float through the air after a person talks, coughs, or sneezes. Those germs can be inhaled even after the original person is no longer nearby.

Direct contact with the infectious person is NOT needed for someone else to get sick.

Germs like chicken pox and TB are spread through the air.



DROPLET SPREAD

Droplet spread happens when fluids in large droplets from a sick person splash the eyes, nose, or mouth of another person or through a cut in the skin. Droplets may cause short-term environmental contamination, like a soiled bathroom surface or handrails, from which another person can pick up the infectious material.

Germs like plague can be spread through large droplets. Ebola might be spread through large droplets but only when a person is very sick.



November 6, 2014 CS202291

Aerosolized Risk (Aerosol vs. Airborne)

Projectile Vomit

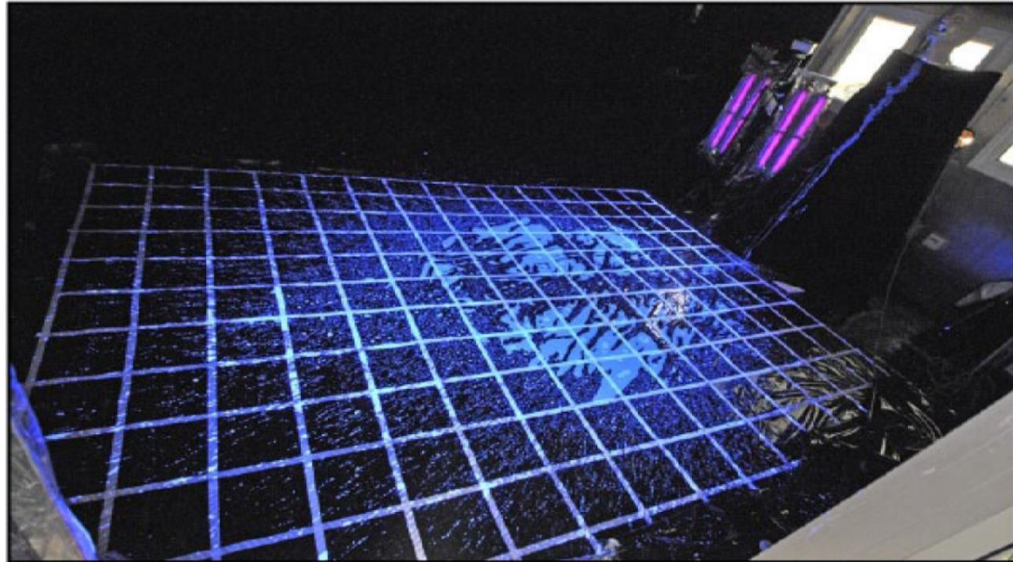
Projectile vomit is one of the symptoms of Ebola in its later stages. While projectile vomiting occurs Ebola's viral load is substantially elevated making the vomit highly infectious.²⁶ A study was done to determine the droplet spread of Noroviruses during projectile vomit. They used "Vomiting Larry"; a robot designed to simulate projectile vomit (which is common symptom with both Norovirus and Ebola) to assess "environmental contamination."

The study concluded "Experiments revealed that **splashes (same term the CDC is currently using)** and **droplets (original term CDC was using)** produced during an episode of projectile vomiting can travel great distances (>3 m **(9 feet) forward spread** and 2.6 m **(7.8 feet) lateral spread**). The research highlighted that small droplets can be hard to see and therefore **cleaning all contaminated surfaces is difficult to achieve**. Evidence from this study suggests that areas of **at least 7.8 m² (83.9585 square feet)** should be **decontaminated following an episode of projectile vomiting**.¹⁷³

From the study authors "Vomiting Larry has shown that **splashes and droplets** produced as a result of simulated projectile vomiting **can travel a considerable distance**. Given that **much of the smaller splashes and droplets were not visible under standard white lighting, it would be difficult to clean up all potentially contaminated splashes** from surfaces that have **become contaminated** after an episode of **vomiting**."

Aerosolized Risk (Aerosol vs. Airborne) – Projectile Vomit (Continued)

This picture from the study best illustrates the issue at hand. The blue dye is where all the fluid (simulated projectile vomit) settled out. If this was Ebola you can see what a high risk of infection being in the presence of someone projectile vomiting or even after the fact how difficult it would be to completely decontaminate an area.



Picture from 173. Makison Booth, C. "Vomiting Larry: a Simulated Vomiting System for Assessing Environmental Contamination From Projectile Vomiting Related to Norovirus Infection." *Journal of Infection Prevention*, Sept. 2014, 15(5), 176-180. <http://dx.doi.org/10.1177/1757177414545390>

NOTE: Each square in the grid is 20cm x 20cm (7.87 in x 7.87 in) overall the grid is 15 tiles long x 11 tiles wide (9.84 ft long x 7.27 ft wide)

This goes well beyond the 3 feet recommendation by the CDC and demonstrates that in fact their advice is not well tested. To do a truly scientific study to eliminate all doubt regarding how far Ebola can be spread via vomit or projectile vomit the CDC should use "Vomitting Larry" and load him with the Ebola virus. They should then test the air and surrounding environment including (floor ceiling, walls) for the presence and concentration of the Ebola virus. It **only takes exposure of 1 – 10 virions or virus particles to become infected with Ebola.**

Even the creators of "Vomiting Larry" stated the following "Vomiting Larry could be employed to assess the true extent of dissemination of pathogens into the local environment through vomiting, by means of adding model surrogates of infectious agent such as norovirus to the system. This would demonstrate how well the agent survives the vomiting process, e.g. shearing forces and drying out, as well as identifying how far the viable agent could spread and whether it is in sufficient concentrations to be infectious upon contact with a susceptible host." This further supports my position that the CDC needs to utilize "Vomiting Larry" to determine Ebola's true risk when vomiting is involved it might just save medical workers lives.

Aerosolized Risk (Aerosol vs. Airborne) – Projectile Vomit (Continued)

It is reckless and unconscionable that the CDC (who is charged with public health) hasn't done its own studies utilizing a tool such as this. Instead they are relying on a mash up of old outdated studies or making statements based on non-existent studies that do not address the current strain of Ebola causing the current outbreak.

The "Vomiting Larry" study was done in a room with no moving air. In a room with HVAC systems and/or air currents/ pressure could further spread the projectile vomit in droplet form leading to it spreading even further than the recorded 84 square feet! This is especially true if return air ducts are mounted near the ceiling on the wall or in the ceiling it will create a pulling air current effect.

Airplane aerosolized risk

Another research article stated "Aeroplanes pack a **diversity of passengers**, including some who may be **symptomatic or asymptomatic carriers of disease** as well as others who may be immunocompromised, into a confined space for long periods of time. The close seating arrangement combined with the **low humidity in the pressurized cabin appears to aid the spread of droplet nuclei** "aerosolized" 1–5 μm in diameter (author comment: ***Ebola is .9 μm long x .08 μm in diameter***), increasing the likelihood of spreading respiratory infections (Wilson 2003). In the late 1990s, a single passenger carrying antibiotic resistant tuberculosis infected **30% of passengers seated within two rows and an additional 3% of passengers on the flight** (Kenyon et al. 1996)."⁶³

Another study included aircraft bathrooms and had almost the same conclusions.⁷⁹ The study conducted by Dr. Lennox Archibald an Epidemiologist for the University Of Florida College of Medicine stated "your hands are as dirty as when you entered".⁸⁰ In another study it was determined that "Every time a toilet is flushed, a fine aerosol mist can be sprayed into the air, over an area of up to 6m^2 (64.578 square feet). This mist may contain many types of fecal bacteria that can cause diseases."⁸¹ **This same mist is also capable of carrying Ebola if someone infected with Ebola were to defecate, urinate or vomit into a public toilet.**

Aerosolized Risk (Aerosol vs. Airborne)

Toilet Aerosolization

“Although a single flush reduced the level of micro-organisms in the toilet bowl water when contaminated at concentrations reflecting pathogen shedding, large numbers of micro-organisms persisted on the toilet bowl surface and in the bowl water which were disseminated into the air by further flushes. Many individuals may be unaware of the risk of air-borne dissemination of microbes when flushing the toilet and the consequent surface contamination that may spread infection within the household, via direct surface-to-hand-to mouth contact. Some enteric viruses could persist in the air after toilet flushing and infection may be acquired after inhalation and swallowing.”⁶⁴

From the article Solving Indoor Airborne Disease Transmission Problems: “A toilet flushing event to a bacteria or virion (virus particle) is like millions of ping pong balls riding down Niagara Falls and being whipped up in the frothing undercurrent which then launches them airborne.”⁶⁵ Fig1 illustrates this.

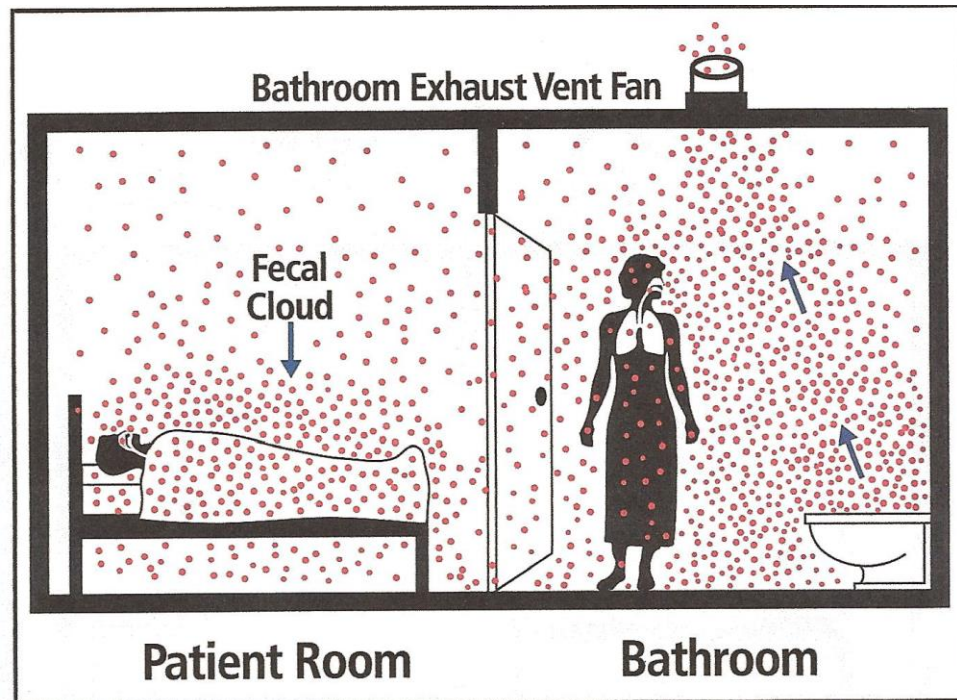


FIGURE 1. Hospital toilet aerosolization event.

(Figure 1. From Solving Indoor Airborne Disease Transmission Problems –Esmagazine pg. 57 - http://www.argoniaq.com/Indoor_Air_Disease_Trans.pdf)

Aerosolized Risk (Aerosol vs. Airborne) – Toilet Aerosolization (continued)

Continued from the same article “Once airborne, these germs are usually riding on a water droplet that is being sucked upwards at supersonic speeds (to a germ) by the bathroom fan’s vacuum power. That droplet quickly evaporates (in less than a second) and the remaining naked germs are called “droplet nuclei”, which can **stay airborne for hours if not days depending on the air movement within the room**. All toilet aerosolized droplet nuclei lifted up into the breathing zone allow unsuspecting people to breathe them in. Eventually bacteria and virions fall (plate out) like party confetti, dusting every single surface in the bathroom and then spill over into the patient rooms coating them and eventually out their doors into the hospital.”⁶⁴

- “Making it impossible to kill all bacteria and viruses.”⁶⁴
- “Providing infinite opportunities for anyone to infect themselves through hand inoculation.”⁶⁵

From the article Solving Indoor Airborne Disease Transmission Problems: “**Toilet aerosolization was the key factor in spreading the 2003 SARS epidemic around the world**. A SARS-infected Chinese doctor stayed at the Metropole Hong Kong hotel and had **diarrhea events in his bathroom located next to the room’s entry door**. Since his **room was positively pressurized to the hallway**, his **aerosolized SARS virions were pushed out into the hallway creating a SARS fecal cloud**. 15 guests and visitors **passed through his SARS fecal cloud** on the ninth-floor common area and **became infected**.”⁶⁵

The CDC’s statement about the Ebola virus “Ebola virus RNA levels in the blood increase logarithmically during the acute phase of illness and significant numbers of EVD patients have **vomiting (67.6%), diarrhea (65.6%)**”.²⁶ Most people use the toilet if they are vomiting or having diarrhea. With each flushing of the toilet **the aerosolization of vomit and diarrhea pose a serious and commonplace infection vector**.

As stated in Solving Indoor Airborne Disease Transmission Problems ;“Most bathroom air is vented up through a ceiling exhaust duct. Ceiling exhaust exacerbates toilet flush aerosolization.(see figure 1 above)” “There are many studies documenting how **asymptomatic infected patients are still shedding their germs within their diarrhea**, which may make them able to **aerosolize germs for months or years**. This explains why many MRSA, C-Diff, and NV patients return back to the hospital: they re-infect themselves with every flush or flatulence event. Aerosolizing millions of the fearsome threesome, when it only takes a couple of them to infect you.”⁶⁵ **Note: Ebola is highly infective it only requires 1 – 10 viral particles to acquire Ebola.**¹¹

Aerosolized Risk (Aerosol vs. Airborne) – SARS and Ebola aerosolized comparison

Important comparison of SARS vs Ebola

The below statements illustrate the eerie similarity between the two diseases. Given that SARS spreads almost the same way as Ebola (close contact) with body fluids, toilet aerosolization could be a greater risk than it is currently being realized. This presents serious implications and complications for public restrooms.

Statement about SARS being airborne (Aerosolized in this case)

“The airborne spread of SARS does not seem to be a major route of transmission.

However, the apparent ease of transmission in some instances is of concern. In particular, the cases in the original Hong Kong cluster that originated at the Metropole hotel (MMWR 52:241-8) and in the Amoy Gardens Outbreak (Government of Hong Kong Special Administrative Region) indicate that the possibility of airborne transmission of the SARS virus, although probably a rare event, cannot be ruled out.”⁶⁶ “Clusters among healthcare workers exposed during high-risk activities (i.e., endotracheal intubation, bronchoscopy, sputum induction) seem to confirm airborne transmission via a contaminated environment (i.e., re-aerosolization when removing protective equipment, etc.)”⁶⁶

“Toilet aerosolization was the key factor in spreading the 2003 SARS epidemic around the world”⁶⁵

CDC Statement on SARS:

“The main way that SARS seems to spread is by close person-to-person contact. The virus that causes SARS is thought to be transmitted most readily by respiratory droplets (droplet spread) produced when an infected person coughs or sneezes. Droplet spread can happen when droplets from the cough or sneeze of an infected person are propelled a short distance (generally up to 3 feet) through the air and deposited on the mucous membranes of the mouth, nose, or eyes of persons who are nearby. The virus also can spread when a person touches a surface or object contaminated with infectious droplets and then touches his or her mouth, nose, or eye(s). In addition, it is possible that the SARS virus might spread more broadly through the air (airborne spread) or by other ways that are not now known.”⁶⁷

CDC Statement on Ebola:

“When an infection does occur in humans, the virus can be spread in several ways to others. Ebola is spread through direct contact (through broken skin or mucous membranes in, for example, the eyes, nose, or mouth) with blood or body fluids (including but not limited to urine, saliva, sweat, feces, vomit, breast milk, and semen) of a person who is sick with Ebola, objects (like needles and syringes) that have been contaminated with the virus infected fruit bats or primates (apes and monkeys).”¹⁵

Aerosolized Risk (Aerosol vs. Airborne) – SARS and Ebola aerosolized comparison

“**Indirect exposure to blood and body fluids (via fomites, or surfaces)** has also been implicated in EVD transmission but is not common.”¹⁵

“CDC infection control recommendations for U.S. hospitals, including recommendations for standard, contact, and **droplet precautions** for general care”.²⁶

The CDC poster states “**Droplet spread** happens when germs traveling inside droplets that are **coughed or sneezed** from a **sick person** enter the **eyes, nose, or mouth of another person**. **Droplets travel short distances, less than 3 feet (1 meter) from one person to another**. A person might also **get infected by touching a surface or object that has germs on it and then touching their mouth or nose**. Droplet spread diseases include: plague, **Ebola**” Yet this not stated on the CDC information page on Ebola.²³

WHO statement on Ebola

“Theoretically, **wet and bigger droplets** from a heavily infected individual, who has respiratory symptoms caused by other conditions or **who vomits violently, could transmit the virus – over a short distance – to another nearby person**. This could happen when virus-laden **heavy droplets are directly propelled, by coughing or sneezing** (which does not mean airborne transmission) **onto the mucus membranes or skin with cuts or abrasions of another person**.”⁶⁸

As demonstrated, the two viruses are very similar in their transmission routes. However, SARS has a higher R0 (r nought) value 2- 5 versus 1-2 for Ebola. SARS however was primarily an inhalation risk while Ebola poses an inhalation risk through droplets. However those droplets can spread farther and stay suspended longer than assumed by the CDC as evidenced by other studies. Those droplets can also be caused by other sources other than coughing or sneezing such as toilet aerosolization.^{19,65}

Aerosolized Risk (Aerosol vs. Airborne)

Ebola spread by flatulence

While Ebola may be transferred only by fluids another study based on a different illness needs to be taken under consideration as another possible route for Ebola infection. If Ebola is transmitted through fluids and diarrhea is one of the symptoms, flatulence most likely occurs with intestinal upset. Considering there is no way to completely cleanse the colon of virus particles, flatulence would cause aerosolization of any Ebola infected fecal particles in the colon.

“New C-Diff airborne transmission studies by Beggs in 2008 and Wilcox in 2010 found that C-Diff patients are surrounded by their own airborne C-Diff spores, which infection specialists labeled as a “fecal cloud.” “The likely suspects: flatulence, rubbing and friction, underwear removal, bed changing, and toilet flushing.”⁶⁵ “Infected person’s flatulence event can aerosolize this bacteria infecting innocent patients”⁶⁵ As quoted from the CDC paper “Review of Human-to-Human Transmission of Ebola Virus” “Ebola virus was detected from vaginal, **rectal**, conjunctival swabs and seminal fluid of 1 or more EVD patients.”²⁶

Skin flakes a possible infection route?

According to a study on Ebola “**virus particles and inclusions were seen in all skin** and liver specimens (from EHF patients) that were examined by EM (Electron Microscope)”⁶⁹“The finding of abundant viral antigens and particles in the skin of EHF patients suggests an epidemiologic role for contact transmission.”⁶⁹

In a study on different bacteria and viruses it stated “MRSA, C-Diff, and NV (Norovirus) happily living on human skin can easily become airborne when the skin they’re nesting on silently flakes off and goes airborne. Since patients are always rubbing their legs against each other, this liberates germ infested skin flakes contributing to their fecal cloud. Anyone in the area, including the patients can breathe and then eventually swallow those grenades, thereby infecting themselves or newly infecting others breathing their fecal cloud.”⁶⁵

“Ebola virus RNA was detected from patients’ saliva, skin (swab of the hand)”²⁶

ONLY 4 HOSPITALS IN THE US HAVE A BIOCONTAINMENT PATIENT CARE UNIT (BPCU)

BPCU's are specially designed containment units with specialized air handling to remove aerosolized or airborne contaminants from the room and prevent contagions from leaving the room⁷⁰ Normal hospitals do not have this type of filtering which is specifically designed to stop the spread of bioaerosols (aerosolized biological contaminants).

- Emory University Hospital in Atlanta Georgia
- National Institutes of Health in Maryland
- Rocky Mountain Laboratories in Montana
- University of Nebraska Medical Center.⁷⁰

While the CDC maintains that many other hospitals across the US can handle treating Ebola the problem is those hospitals are not specifically setup to handle a lvl 4 contagion. They lack the special dedicated independent air handling units along with the ability to maintain a constant negative air pressure with x amount of air changes per hour.

These units are also specially outfitted to have a donning and doffing area (putting on the special space suits and taking them off, respectively). They also are isolated from the rest of the hospital where they do not share common hallways with the rest of the hospital where as any regular hospital has common hallways.

ANIMAL INFECTIVITY

Few studies have been done to determine if Ebola can be spread to or from humans from cats, rabbits, raccoons, possums, prairie dogs, deer, squirrel, chipmunks, spiders, mosquitos, fleas, bed bugs, ticks, black fly's, gnats, rats, mice, snakes, ducks, geese, birds and other common wild and domesticated animals and insects. Any existing research is a decade old or older and either does not address the Zaire strain of the Ebola virus or it does not address the current outbreak which has been the largest ever recorded in history.

Domesticated animals & risks

Lacking research and studies

Dogs seem to be the only domesticated animal studied. According to one study “based on a large serologic survey of dogs in the 2001–2002 Ebola outbreak area in Gabon, we found evidence that dogs can be infected by Ebola virus, a finding that raises important human health issues.”⁷¹

An EPA study of the Chesapeake bay area concluded that 40% of pet owners do not clean up after their pets.⁷² This number is consistent with national trends hovering between 40 – 60%. Many people also walk their dogs near waterways which should not be done either.⁷³ This leads to a serious vector for Ebola infection since the infection can be carried and spread by dogs with no symptoms and the dogs do not die from Ebola.

Few studies have been done on the spread and effects of Ebola in animals. One of the studies done, “Dead or alive: animal sampling during Ebola hemorrhagic fever outbreaks in humans”, showed that the virus was found in bats, rats, dogs, and hooved animals some of which are livestock in the US such as sheep, goats, and cows.⁷⁴ Also, it states in the same article, “there are currently no widely accepted animal surveillance guidelines for human Ebola hemorrhagic fever (EHF) outbreak investigations to identify potential sources of *Ebolavirus* (EBOV) spillover into humans and other animals.”⁷⁴ In essence that means they have no data and no idea if people can contract Ebola from any of the aforementioned animals if they have Ebola.

No quarantine protocol for domesticated animals

At the time of this writing no protocol exists for how to test or quarantine animals nor for how long. It is not known how long dogs and other animals are contagious or how long the virus can incubate in them before it becomes active. Additionally there are no recommendations for how the animal should be quarantined including whether or not a negative air pressure containment unit is required and the handling of the animals' waste byproducts which can carry the contagion. We also do not know how readily the virus can spread from dog to dog or dog to cat and other animal to animal transmission. In one study pigs were able to spread the Ebola infection to monkeys from across the room without any direct contact.⁷⁵ This study remains controversial since it is the only one to try to assess this.

Animal Infectivity

Aerosolized transmission risk from domesticated animals

As noted in the Bioaerosols handbook, “it is estimated that approximately **100 million domestic animals reside in the U.S., the most common being cats and dogs**. All of these animals **produce bioaerosols** that can be allergenic”. **Cats** produce allergenic proteins in their **saliva and in skin secretions**. The **saliva is spread onto the fur** by the cat, and **flakes off with activity, becoming aerosolized in very small particles that remain airborne for very long periods of time**. Dog allergens also become airborne **although less is known about the dynamics of bioaerosol production**. Caged pets (hamsters, gerbils, mice, birds) **shed urine and fecal material indoors as well as skin scales and saliva**. Those people handling the pets and especially those that clean the **cages are exposed to intense animal bioaerosols** from these sources as well as bacteria and fungus spore aerosols”.¹⁰

Since Ebola can be spread via aerosols animals remain a serious potential vector for spreading Ebola. Rodents are responsible for many plagues throughout human history that were detrimental to humans. While **research** on domesticated animals is scarce research on Ebola and domesticated animal bioaerosols remains **nonexistent**.

Zoonoses – risk of spread from animal to human

“Nearly all types of VHF (Viral Hemorrhagic Fevers – Ebola is a VHF) are zoonoses – that is, their **causative agents are maintained through cycles of infection in wild animals**, but are occasionally transferred to humans through direct physical contact with **virus-containing blood or tissues, exposure to aerosolized excretions or the bite of a blood-feeding arthropod**”⁷⁶ Transmission of viruses via rodents typically occur when humans come in contact with **body excretions, urine, feces, or saliva of an infected rodent**.⁷⁷

It is interesting to note the above study is the only one that I have come across that even briefly mentions arthropods as being able to spread Ebola via a bite. Arthropods include insects, arachnids, myriapods, and crustaceans. However I have not seen any documents supporting nor discrediting the spreading of Ebola via bed bugs, fleas, ticks, and spiders. Several different sources have mentioned that it is not possible to spread Ebola via a mosquito though.

PUBLIC RESTROOMS AND EBOLA'S SURVIVABILITY OUTSIDE THE BODY

No studies have been done to determine Ebola's survivability in public restrooms, showers, and gyms where high numbers of transmission could occur due to a high number of humans frequenting these places on a daily basis and a humid environment; which according to other studies lengthens the survivability of the virus outside the body.⁷⁸ One laboratory study, which was done under environmental conditions that favor virus persistence, has been reported. This study found that under these ideal conditions Ebola virus could remain active for up to 6 days outside the body.^{45,78} In the same study it also stated "Ebolavirus was found, relative to other enveloped viruses, to be quite sensitive to inactivation by ultraviolet light and drying; yet sub-populations did persist in organic debris" Meaning it can persist even after ultraviolet light exposure in blood, vomit, fecal matter and other dried body fluids. Another report determined that the Ebola virus can also survive for several days at 39°F (4°C).²²

Restrooms

Restrooms have multiple points of infection in them. The handle of the toilet, on the door exiting the stall, on the faucets and on the soap dispenser are all points of exposure to fecal matter or urine. The handle exiting the bathroom can also be contaminated as well if a person does not wash their hands properly. Most people only run their hands under water for less than 10 seconds if at all and use no soap or minimal soap.

In the study "Microbial Biogeography of Public Restroom Surfaces" it examined bacteria in public bathrooms. The study states "The communities clustered into three general categories: those found on surfaces associated with toilets, those on the restroom floor, and those found on surfaces routinely touched with hands. On toilet surfaces, gut-associated taxa were more prevalent, suggesting fecal contamination of these surfaces. Floor surfaces were the most diverse of all communities and contained several taxa commonly found in soils. Skin-associated bacteria, especially the Propionibacteriaceae, dominated surfaces routinely touched with our hands"⁷⁸ It goes on to state "human-associated microbes are commonly found on restroom surfaces suggesting that bacterial pathogens could **readily be transmitted between individuals by the touching of surfaces.**"⁷⁸

Another study included aircraft bathrooms and had almost the same conclusions.⁷⁹ The study conducted by Dr. Lennox Archibald an Epidemiologist for the University Of Florida College of Medicine stated "your hands are as dirty as when you entered".⁸⁰ In another study it was determined that "Every time a toilet is flushed, a fine aerosol mist can be sprayed into the air, over an area of up to 6m² (64.578 square feet). This mist may contain many types of fecal bacteria that can cause diseases."⁸¹ **This same mist is also capable of carrying Ebola if someone infected with Ebola were to defecate, urinate or vomit into a public toilet.**

Public Restrooms and Ebola's Survivability Outside the Body – Restrooms (continued)

Diarrhea is a serious contagion

“A diarrhea event “seeds” 10 billion bacteria and virions into the toilet water. Barker captured aerosolized germs that equated to **2.4 million airborne virions per cubic meter above the toilet**”⁶⁴ (NOTE: Ebola only requires exposure to **1 – 10 virus particles (virions)** to be infected.”^{11, 22, 65,82}

*See the section **Safety of Restrooms after an Ebola patient has used it including hospital settings**

*See **Aerosolized Risk Section**

Hot air dryers

Hot air dryers create an increased risk of Ebola in a public restroom environment as well. Hot air dryers aerosolize contaminants. This particular study noted “The dispersal of bacteria by hot air dryers was found within a radius of approximately 3 feet from hot air dryers.” “Jet air dryers were found to disperse hand contamination to a distance of at least 2 m (6 feet).”⁸¹

Refillable soap dispensers

In a study done to assess the safety of bulk refillable soap dispensers it was determined **“Bulk-soap-refillable dispensers are prone to extrinsic bacterial contamination,** and recent studies demonstrated that approximately **one in four dispensers in public restrooms are contaminated**”⁸³ These type of dispensers are found in many public restrooms including sporting events, restaurants, amusement parks, rest stops on thruways, K-12 educational institutions, colleges and workplaces.

Safety of Restrooms after an Ebola patient has used it including hospital settings

While the CDC document does say it is safe for an Ebola patient to use a restroom they do not address if others can safely use the same bathroom even after disinfection. Patient bathrooms are relatively small in a hospital. The aerosolization of Ebola contaminants via flushing a toilet is not addressed although there is empirical evidence of toilets aerosolizing bacteria up to **64 square feet** which would easily cover the ceiling, walls, floor and doors of a patient bathroom. There are no disinfection procedures in place for ceiling tiles which are made of a porous paper like material in addition to light fixtures and sweating pipes.⁸¹

This also does not address any ducts that may be pulling air from the room to recirculate air or to exhaust. The air ducts could transport aerosolized particles even further including into common hospital hallways.

Public Restrooms and Ebola's Survivability Outside the Body – Safety of Restrooms after an Ebola patient has used it including hospital settings (continued)

No studies have been done to assess Ebola survivability on a public toilet seat. This includes studying particulate matter potentially infected with Ebola underneath the rim of toilet bowl. This could lead to infection when someone flushes, cleans or plunges the toilet as it would generate aerosolized particles. Explosive diarrhea can spray particulate matter underneath the rim of the toilet bowl or around the toilet bowl and seat. Likewise particulate from projectile vomit could become lodged in these areas as well. Tile floors could harbor higher amounts of the virus and make cleaning up all traces of the virus that much more difficult if not impossible.

No studies have been done to assess Ebola survivability in a public urinal. Urinals are notorious for splashing urine all over; they could prove to be a serious reservoir for Ebola.

Female Hygiene Products

No studies have been done to assess Ebola survivability on feminine napkins or tampon products (which cannot be flushed down some toilets and must be deposited in garbage cans or special bins). **Used feminine products contain blood and an Ebola infected individual's blood contains 1 million virus particles in 1 milliliter of blood,** this combination makes feminine hygiene products a highly infectious object.⁸⁴

Grout, Tile and other porous surfaces.

No studies have been done to assess Ebola survivability on ceramic tile floors (commonly used in hospital bathroom floors and showers). Grout is porous and can become damaged. Tile maintains a cooler temperature than the ambient air temperature and could harbor liquids or contaminants in its surface if damaged, porous, or loose. Additionally, any damaged grout could expose the subflooring to contamination.

Most hospitals use a standard spray bottle containing a disinfectant and a mop or mop and bucket to clean floor and bathroom surfaces.^{44,85} "For determinations of microbial contamination on solid surfaces, including ceramics, recommended methods have been developed to allow quantitative determination of bacterial and viral removal (ASTM E2414-05; AOAC 961.02). Standard guidance's for analyzing microbial contamination of grouting have not been developed."⁴⁴ **Grout has a large surface area and remains the difficult part to get clean on any tile floor because it is lower than the tiles and porous**⁴⁴ This means that without a proper study, hospital showers, bathrooms, and vinyl or tile floors **may not be decontaminated properly leading to more possible infections.**

It is not recommended to use a "wet vacuum (110 inches of water lift) system for high flow fluid extraction, and vacuum tank for isolating and containing soils"⁴⁴ because they can generate aerosolized particles.

Public Restrooms and Ebola's Survivability Outside the Body – (continued)

Examples of public and restroom uncleanliness and environmental contamination including airplanes

In the U.S. we consider ourselves to be “cleaner” or more hygienic than other cultures, but this is not entirely true. Multiple studies and personal experience show that Americans are not as clean as they think. Hotel rooms, public bathrooms, airplane lavatories, and even personal items like women's purses have all been shown to be contaminated by high levels of bacteria and viruses.

Doorknob or tabletop - bio contaminant study

A study was done to determine how far biological contaminants could travel and remain on surfaces in an office environment. The study concluded:

“Contamination of just a single doorknob or table top results in the spread of viruses throughout office buildings, hotels, and health care facilities. Within 2 to 4 hours, the virus could be detected on 40 to 60 percent of workers and visitors in the facilities and commonly touched objects, according to research presented at the 54th Interscience Conference on Antimicrobial Agents and Chemotherapy (ICAAC), an infectious disease meeting of the American Society for Microbiology.⁸⁶

Airplane contamination

“The results show that there is a **large diversity of bacterial contamination on aeroplanes,** including **organisms known to be opportunistic pathogens.**”⁶³

“ commercial travel has spread viral diseases such as dengue fever, SARS, and HIV, as well as bacterial pathogens such as Staphylococcus, Shigella and Salmonella (Wilson 2003). **Aeroplane travel,** in particular, is a **major reason** these emerging and reemerging diseases **have spread so widely and so rapidly** (Wilson 2003).”⁶³

“Aeroplanes pack a **diversity of passengers,** including some who may be **symptomatic or asymptomatic carriers of disease** as well as others who may be immunocompromised, into a confined space for long periods of time. The close seating arrangement combined with the **low humidity in the pressurized cabin appears to aid the spread of droplet nuclei** “aerosolized” 1–5 μm in diameter, (authors note: ***Ebola is .9 μm long x .08 μm in diameter***) increasing the likelihood of spreading respiratory infections (Wilson 2003). In the late 1990s, a single passenger carrying antibiotic resistant tuberculosis infected **30% of passengers seated within two rows and an additional 3% of passengers on the flight** (Kenyon et al. 1996).”⁶³

Public Restrooms and Ebola's Survivability Outside the Body – Airplane Contamination(continued)

“The substantial diversity of human-associated bacterial species found on numerous lavatory surfaces on every flight tested, including a paper towel, suggests that **lavatories represent the biggest potential hazard for passengers and crew.**” Interestingly, a significant number of the species that we identified appeared to typically inhabit human oral cavities. The passengers possibly spread these organisms around the confined space of the lavatory via **aerosols** by activities such as **coughing** or **blowing their noses.**”⁶³

“**Air travelers suffer higher rates of disease infection, research has shown.** One study pegged the **increased risk for catching a cold as high as 20%.** And **the holidays are a particularly infectious time of year, with planes packed full of families with all their presents—and all those germs.**”⁸⁷

“One well-known study in 1979 found that when a **plane sat three hours** with its engines off and no air circulating, **72% of the 54 people on board got sick** within two days. The flu strain they had was traced to one passenger. For that reason, the Federal Aviation Administration issued an advisory in 2003 to airlines saying that passengers should be removed from planes within 30 minutes if there's no air circulation, but **compliance isn't mandatory.**”⁸⁷

“The **hot zone for exposure is generally two seats beside, in front of and behind you,** according to a study in July in the journal Emerging Infectious Diseases, published by the U.S. Centers for Disease Control and Prevention.”⁸⁷

“**we see serious potential for ill persons with more threatening conditions to spread disease to other passengers on planes.** Based on the findings of our study and the conclusions of other aeroplane environment research, we suggest the **aeroplane lavatories pose a particular threat to public health.** We recommend that the airlines take this matter very seriously and institute periodic in-flight cleanings of lavatory door, toilet and sink handles using a 10% bleach solution to reduce contamination.”⁶³

Escalator Handrails

“In our testing, we have found food, **E. coli, urine, mucus, feces, and blood on escalator handrails,**” says Gerba. “And where there is mucus, you may also find cold and flu **viruses.**”¹

Public Restrooms and Ebola's Survivability Outside the Body – (continued)

Some other Points of infection include but are not limited to⁸⁸:

- **ATM Keypads**
- **Grocery Carts**
- **Store Checkout Terminals**
- **Condiment Containers**
- **Restaurant Menus**
- **Gym Equipment**
- **Touchscreens**
- **Restaurant check holders**
- **Public pens found at the post office, banks, doctors offices etc.**

Women's Purses

Women's purses carry heavy amounts of bacteria and viruses and are a haven for germs.

Many woman put their purses on floors of restaurants, bathrooms, counters and other unclean places and then when they get home place them on top of the kitchen counter or table or other areas that may come in contact with food or personal items.

In an article on ABC news entitled "Your Purse Could Be Making You Sick" Microbiologist Chuck Gerba stated "We found **fecal bacteria** you normally find on the floor of restroom. We found bacteria that can cause skin infections on the bottom of purses. What's more amazing is the large numbers we find on the bottom of purses, which indicates that they can be picking up a lot of other germs like **cold viruses or viruses that cause diarrhea.**"⁸⁹ "Each time ABC News and Gerba ran an instant field test and later a lab test on swabs from the outside bottom of 10 women's purses, every single one had at least some bacteria, **most had tens of thousands and a few were saturated with millions. Half of the bags tested positive for coliform bacteria,** which indicated the possible **presence of human or animal waste.**"⁸⁹

In the studies Gerba determined women who carry around bags with them at all times should be concerned. "You can move germs that can cause illness from one location to another," he said. "You can later touch that purse and get them on your hands, or you could put your purse near a food preparation area and transfer germs to areas you may touch during food preparation. The purses are really becoming subways for micro-organisms," Gerba said. "They're being transferred from one location to another. So it's just like germ 'public transportation.'"⁸⁹

Public Restrooms and Ebola's Survivability Outside the Body – Women's Purses(continued)

“Researchers swabbed and tested the surfaces of and the items inside 25 different handbags and compared the results to separate data on toilet hygiene. They found that the dirtiest part of the bag is the handle—it carries more bacteria than the average toilet seat—and that **one in five handbags contained enough bacteria** to be considered a **health risk.**”⁹⁰

Considering the results of these studies it confirms that Ebola can live and spread on many more surfaces in our modern civilization than in a West African environment. While their water may not be cleaner or their plumbing the fact remains we have many more surfaces that can become contaminated than they do.

Hotels

“In the study, presented at the annual meeting of the American Society for Microbiology, researchers sampled bacteria levels of 19 common surfaces in nine different hotel rooms in Texas, South Carolina, and Indiana. Overall, researchers found **fecal bacteria** present on **81%** of the samples.”⁹¹ “Top hot spots for aerobic bacteria in hotels turned out to be the bathroom sinks and floors, the main light switches and the TV remotes.”⁹²

Bedspreads

“Unlike the sheets, hotels and motels do not change or launder the bedspreads on a daily basis. It's actually more of an annual thing. And if you don't think there are various bodily fluids lingering in those coverings, let us remind you that when the bedspread from an internationally ranked five-star hotel was introduced as evidence in boxer Mike Tyson's rape trial, investigators found it coated with the DNA (semen) of so many different men that it took some significant time to finally isolate traces of Tyson's contribution.”⁸⁸ Ebola survives in semen for up to 91 days from original date of infection.¹³ However it is not known how long it would survive in dried semen however studies indicate that Ebola survives longer in a dried body fluid than it does outside of that body fluid.^{45,78} A black light will show biological contaminants on a bed.

Hotel Remotes

“The remotes, for instance, racked up a mean of 67.6 colony-forming units of bacteria, or CFU, per cubic centimeter squared.”¹⁴²⁽⁹²⁾

Light switches

Light switches “**often contained high levels of fecal bacteria.**”⁹³ “People might wash their hands once they get inside the room, but the first thing they touch (after being on germy planes and trains) before reaching the bathroom is the room's light switch.”⁹³ “The main light switches in the rooms were worse, with a mean of **112.7 CFU for aerobic bacteria.**”⁹² “When it came to fecal bacteria, the main light switch was the most serious surface offender, with 111.1 CFU.”⁹²

Public Venues and Concerts

Amphitheater type concert events have consistent complaints of dirty bathrooms. Also some people urinate on the lawn at outdoor concerts and there have been incidents of portable bathrooms being tipped over. Some of the comments and picture below from multiple reviews on yelp.com at multiple venues across the United States illustrate the reality and widespread issue that this is.

Venue: Darien Lake Performing Arts Center – Darien NY

“the bathrooms were absolutely UNACCEPTABLE!!!! I'm not going to go into graphic detail but there were **bodily fluids, and garbage everywhere.**”- Tina F⁸⁵

Venue: Hershey Park Stadium – Hershey Park, PA

“**Bathrooms** inside the stadium were **filthy**” – Kyle M.⁸⁶

Venue: First Midwest Bank Amphitheatre – Tinley Park, IL

“Any bathroom facility is definitely out unless you want to wait over twenty minutes for the nastiest toilets in the world.” - Theresa C⁸³

“bathrooms are **DISGUSTING**” “Why yes, **that IS a bloody tampon on the floor**”
- Stephanie G.⁸³ *The user attached the following picture below to their review.*



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Public Restrooms and Ebola's Survivability Outside the Body – Public Venues and Concerts(continued)

With all of these factors taken into consideration; public venues, door handles, public bathrooms, elevators, escalators etc. I think this is a serious public health issue that has had little attention. I can tell you from personal experience no venue is immune to this including indoor venues. **We can claim we are “cleaner” than other people or nations but when you look deeper into it the evidence does not support the claim.** It may in fact support that we are **much more at risk of an epidemic because of our lack of hygiene and general why worry attitude under false pretenses.** We as nation should be absolutely embarrassed by what I will term as our “public hygiene” and we should correct it immediately. **Even if Ebola never becomes an epidemic something someday will and it will have the perfect breeding ground, unsanitary public hygiene to spread rampantly.**

INCUBATION AND CONTAGIOUS PERIODS

The CDC's 21 day contagious period should be questioned, as **multiple factors could affect the contagious period of Ebola**. These factors include an individual's health, mutations within the virus, or an individual's resistance to the virus. Any of these variables could affect the incubation and contagion periods making those periods longer or shorter.

Incubation period inaccurate

Currently the CDC is using a 21 day window to determine if individuals have contracted Ebola. According to a recent study this is not accurate. **0.1 to 12% of the time, an individual case will have a longer period of incubation than 21 days**⁹⁷ This essentially means that using this outdated and unproven number could result in people being deemed clear of the virus after 21 days when they are still potentially contagious. **There is up to a 12% risk of spreading the infection for an additional 10 to 19 days (40 days total from symptom onset).**⁹⁷

The contagious period of the current form of Ebola has not been thoroughly studied There are no studies that have determined how contagious a person is during the incubation period until developing full blown symptoms. There is a **"ramp up"** period where the person's fever or symptoms **increase from unnoticeable to noticeable i.e. 98.6 to 101.3 which leaves 2.7 degrees unaccounted** for as a contagious period assuming the person's body temperature is 98.6. Also this does not account for a difference in displayed symptoms (*i.e.* no fever, but headache or nausea).

It needs to be determined **how contagious (viral load) someone can be during the first 24 hours of onset of symptoms to determine environmental contamination and exposure risk to other non-infected individuals**. The guidance of a 101.3 fever is flawed and does not account for other factors that influence what a normal person's temperature may be. The 101.3 is based upon the old myth that a normal temperature is 98.6 degrees.⁹⁸

"Normal" temperature is a bad indicator of an active, contagious Ebola infection The **101.3 degree temperature** used as a **definition for someone having Ebola is an arbitrary number. Many individuals** can have normal temperatures at **96 degrees up to approximately 99 degrees**. The **101.3 temperature** assumes a normal temperature of **98.6** which is an arbitrary number instead of a solid number **meaning if someone's normal temperature is 96 degrees someone showing as 98.7 would be infectious as they are 2.7 degrees higher than their normal temperature**. There is a great divide on this subject, as seasoned nurses understand a person's body temperature is an arbitrary number and that some individuals run lower than normal. Other nurses stick to the 98.6 as a solid number, it is in all actuality, an average.⁹⁸

Incubation and Contagious Periods – Normal temperature is a bad indicator of an active, contagious Ebola infection (continued)

This misunderstanding of a person's "normal" body temperature may account for the recent revelation that **13% of people tested do not show a 101.3 fever, but are contagious with Ebola**. This means airport temperature screening is not a foolproof method for rooting out infected individuals and carries a **20% overall risk of failing to identify an Ebola infected patient based on the percentage of individuals in the general population who do not follow the average temperature of 98.6 degrees (20%)**.

Further fevers can be masked by taking fever reducers. In a Washington Times article infection control specialist Sean Kaufman, president of Behavioral-Based Improvement Solutions, stated "**the fever-screening instruments run low and aren't that accurate,**" and **people can take ibuprofen to reduce their fever enough to pass screening**, and why wouldn't they? If it will get them on a plane so they can come to the United States and get effective treatment after they're exposed to Ebola, wouldn't you do that to save your life?"⁹⁹ Unfortunately there is no statistics on the number of people using fever reducers to bypass airport security but it definitely increases the risk of someone being infected with Ebola entering the United States while completely contagious.

Thermometers may not be accurate

Digital thermometers used in Emergency Rooms and home digital oral thermometers may not be accurate. They may indicate a lower temperatures when it is actually higher. This coupled with the fact that some people run a lower temperature could produce **a .5 to 4 degree difference, meaning the person is completely infectious even though they are not displaying a fever**.¹⁰⁰ Measurement of temperature using forehead type thermometers could be affected by air across forehead, intubation, and other factors such as the patient being flush.¹⁰¹ Ear thermometers are the most inaccurate, but still highly used in private physicians' offices. There is no testing or verification or certification protocol for thermometers like there is for scales (all scales have to be certified yearly for accuracy).

Kaci Hickox, a nurse that returned from working with Ebola patients in Sierra Leone **was held at an airport when she registered as having a fever**. The airport used a **non-contact forehead thermometer like all other airports**. At the time she stated "I believe that the forehead scanner used to take that temperature was **completely inaccurate**." "I didn't take any anti-fever medicines while at the airport and when I arrived in the isolation facility they took my temperature by an oral thermometer and it was completely normal." "You don't get rid of a fever without taking something within a couple of hours, so I think **we need to discuss also the instrumentation that officials are using**."¹⁰²

NO SINGLE STANDARD

This inherently limits any cohesive, comprehensive, consistent plan of action for dealing with a national health issue such as Ebola. The unintended consequence is an ill-informed, ill prepared, **fragmented approach in dealing with this threat to human health where a failure at one medical facility in one state could cause the further spread of this disease nationally.**

Standard for dealing with Ebola – State or Federal

The US Lacks any single standard for handling suspected Ebola cases.¹⁰³ "One of the things we have to understand is the federal, state and local public health relationships," says Michael Osterholm, director of the Center for Infectious Disease Research and Policy at the University of Minnesota. "Public health is inherently a state issue. The state really is in charge of public health at the state and local level. It's a constitutional issue. The CDC can't just walk in on these cases. They have to be invited in."

Insufficient Protection

The CDC has been giving guidance that could lead to health care workers becoming infected or has changed their recommendations several times during the course of this outbreak. One such change is the posters the **CDC** released where one time it **stated Ebola could be spread by droplets** and then it was **suddenly removed and replaced** with a poster that basically made it sound like you would have to bathing in Ebola to get it.

Lax lockdown procedures

Other nations have banned flights and passports of anyone from West Africa to prevent the spread of the disease to their region. **The CDC has continued to allow the flights and visitors from West Africa to the US unimpeded** except for the new temperature screenings which have not found a single case of Ebola yet. This has led some people to now believe that Ebola is no longer a threat and is overhyped however it may be that people are taking fever reducers or not showing signs upon entry to the U.S.

SELF QUARANTINE INEFFECTIVE AND OTHER QUARANTINE ISSUES

Self-quarantining for Ebola exposure has already been proven to be ineffective further putting more people at risk if they do not present a fever and are infectious. If a doctor knowing how bad Ebola is, is willing to put American lives at risk for takeout food, and another one is willing to put people at risk for a night out on the town and then lie to investigators about his whereabouts. It begs the question; what will other individuals under self-quarantine do? Anyone violating self-quarantine should be arrested immediately and be ordered to pay (out of their own pocket) for any guards posted at their house, special quarantine facilities, or any services provided while placed under mandatory quarantine. These individuals are obviously not taking the threat they pose to the American public health seriously and are more concerned for their personal interests. Several different incidents have highlighted either shortcomings at the CDC or individuals not following quarantine procedures. Those incidents are discussed in detail further below.

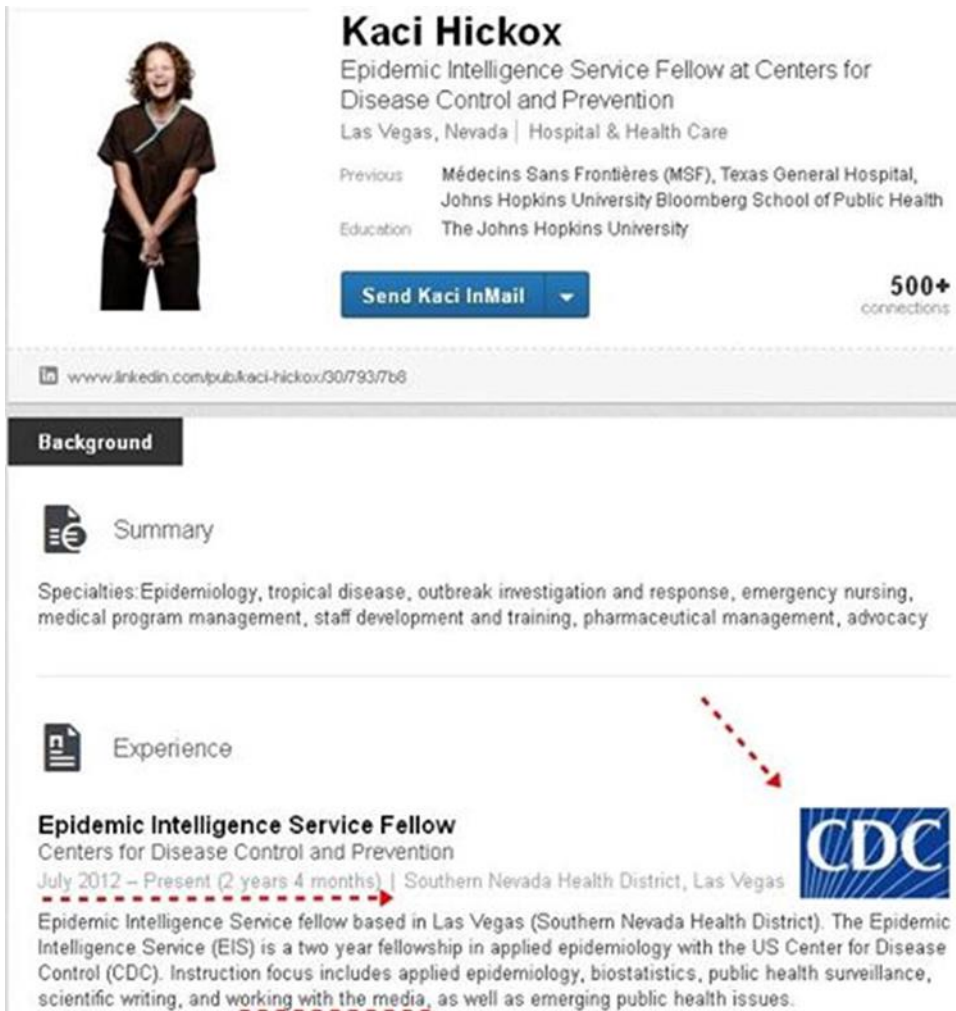
Kaci Hickox - Controversy over mandatory quarantine enacted by states

Recently there has been uproar over the quarantine of medical personnel returning from West Africa. Kaci Hickox was quarantined upon her return from West Africa in New Jersey on October 24th 2014. She was released from quarantine on October 27th. She was transported back to Maine where she was ordered to stay inside her home for 21 days as part of the state's policy. She is now tying up resources with lawsuits to have the quarantine removed when as a healthcare worker she should be more concerned about passing the infection to others (especially in a high traffic health care setting) rather than her own personal ideals and freedoms. **24 of her co-workers have tested positive for Ebola and 13 have died as of this writing.**^{104,105} Other states are experiencing similar issues with mandatorily ordering quarantines. Instead of focusing on curbing and preventing this disease, (which requires draconian measures to stop its spread) it seems to me she is focused on her own personal interests. The message she is sending seems to be; it's okay to be a risk to the general public and possibly start an Ebola epidemic (that's already in full swing overseas) in the US.

To date no one else has raised a fuss about mandatory quarantines for medical personnel returning from West Africa except Kaci Hickox. Interesting enough last weekend her LinkedIn profile was deleted and all records scrubbed from Google's Cache, Bing's Cache and other online resources **connecting her employment to the CDC**. However, below are some screenshots still available on the internet of her LinkedIn Profile and a document she was an author on at the CDC showing she, in fact, works for the CDC and that Doctors Without Borders was just a 6 week assignment.

Self Quarantine Ineffective and Other Quarantine Issues – Kaci Hickox (continued)

LinkedIn Profile (now missing but can be found through image searches)^{114, 117}



Kaci Hickox
Epidemic Intelligence Service Fellow at Centers for Disease Control and Prevention
Las Vegas, Nevada | Hospital & Health Care

Previous Médecins Sans Frontières (MSF), Texas General Hospital, Johns Hopkins University Bloomberg School of Public Health
Education The Johns Hopkins University

Send Kaci InMail

500+ connections

www.linkedin.com/pub/kaci-hickox/30/793/7b8

Background


Summary

Specialties: Epidemiology, tropical disease, outbreak investigation and response, emergency nursing, medical program management, staff development and training, pharmaceutical management, advocacy

Experience

Epidemic Intelligence Service Fellow
Centers for Disease Control and Prevention
July 2012 – Present (2 years 4 months) | Southern Nevada Health District, Las Vegas

Epidemic Intelligence Service fellow based in Las Vegas (Southern Nevada Health District). The Epidemic Intelligence Service (EIS) is a two year fellowship in applied epidemiology with the US Center for Disease Control (CDC). Instruction focus includes applied epidemiology, biostatistics, public health surveillance, scientific writing, and working with the media, as well as emerging public health issues.



Self Quarantine Ineffective and Other Quarantine Issues – Kaci Hickox (continued)

Paper authored by Kaci Hickox¹⁰⁶

The screenshot shows the CDC website interface for the Morbidity and Mortality Weekly Report (MMWR). The article title is "Pedestrian Traffic Deaths Among Residents, Visitors, and Homeless Persons – Clark County, Nevada, 2008-2011". The issue is dated July 18, 2014, with volume 63(28) and pages 597-602. The authors listed are Kaci L. Hickox, MSN, MPH^{1,2}, Nancy Williams, MD², Laurie F. Beck, MPH³, Tom Coleman, MD², John Fudenberg⁴, Byron Robinson, PhD⁵, and John Middaugh, MD². The abstract discusses motor vehicle collisions and pedestrian deaths in Clark County, Nevada, from 2008 to 2011, highlighting the impact on residents, visitors, and homeless persons.

63rd Annual EIS Conference EIS Officers – Kaci L. Hickox¹¹⁰

138 2013 EIS Conference EIS Officers

EIS Officers, Class of 2012

The image displays a grid of 30 portraits of EIS Officers from the Class of 2012. Each portrait is accompanied by the officer's name and affiliation. The officers listed are:

- Abanyie, Francisca A.* - CGH
- Adams, Laura E.* - SEPDPO
- Agaku, Israel - NCCDPHP
- Ahmad, Nina* - SEPDPO
- Alami, Negar (Nikki) - NCHHSTP
- Anderson, Tara C.* - NCEZID
- Bagchi, Suparna* - SEPDPO
- Beaudoin, Amanda L.* - SEPDPO
- Brinker, Kimberly - NIOSH
- Canon, Abbey I.* - SEPDPO
- Choi, Mary* - SEPDPO
- Cooley, Laura A.* - NCHHSTP
- Demirjian, Alicia* - NCIRD
- Djawa, Kpandja* - NCHHSTP
- Doker, Thomas - NCEZID
- Durand, Lizette - NCIRD
- Edison, Laura S.* - SEPDPO
- Ellis, Esther - NCEZID
- Epson, Erin* - SEPDPO
- Geller, Andrew - NCEZID
- Gerbi, Gemechu - NCHHSTP
- Gilbert, Leah K.* - NCIPC
- Gunnala, Rajni - NCCDPHP
- Harris, Aaron M.* - NCIRD
- Haven, Fiona R.* - NCIRD
- Hickox, Kaci L.* - SEPDPO
- Idowu, Kachet - CGH
- Irving, Sharon M.* - NCCDPHP
- Iyengar, Preetha* - CGH
- Johnson, Candice - NIOSH

Self Quarantine Ineffective and Other Quarantine Issues – Kaci Hickox (continued)

This information brings the CDC and Kaci into a difficult spot. Why would someone who is an Epidemic Intelligence Service fellow working for the CDC, the agency that is overseeing the handling of Ebola in America, detest a mandatory quarantine so heavily? Especially when **she has specific training in handling infectious diseases** and is aware of the risks Ebola carries seeing as how **24 of her co-workers became infected and 13 died**. The CDC vehemently has opposed **Travel Bans which would stop all incoming infected flyers from West Africa**. It seems the CDC has some explaining to do and so does Kaci. See images below and web links in footnotes^{106,107,108,109,110}

As stated on John Hopkins University website “Some activists at the Bloomberg School carry that sentiment further: they believe price shouldn’t be a barrier to Hopkins-generated innovations anywhere in the world.” Kaci Hickox, completed her Master of Public Health (MPH) in December, and has been a member of the Hopkins chapter of the University Alliance for Essential Medicines, an **international campaign to ensure that medicines and medical devices are accessible in the developing world**.” Kaci stated “When I worked in Burma with **Doctors Without Borders**, I saw up close how important it is for people to have access to HIV medications.”¹¹¹

In a letter dated October 27th 2014 it stated “**Kaci spent six weeks in Sierra Leone with Doctors without Borders, treating patients with Ebola**.”¹¹² This proves that she was only on a temporary assignment with Doctors Without Borders and not their employee as stated in various news media outlets. Many news outlets failed to mention Kaci working for the CDC even while on the 6 week assignment.

While it appears to be two separate people both “Kaci Hickox” and “Kaci L. Hickox” have the same MPH credentials and appear to be the same individual also verified by the viewing her picture in the 62nd Annual EIS conference material.¹¹⁰ She also was listed as an incoming EIS Officer in the EIS 61st Annual EIS Conference 2012¹⁰⁷, At the 62nd EIS Conference in 2013 she was a presenter for “Pedestrian Traffic Fatalities — Clark County, Nevada, 2008–2011”¹¹⁰, At the 63rd EIS Conference 2014 she was a presenter for “Contact Investigation of Health Care Personnel Exposed to Maternal and Neonatal Tuberculosis— Clark County, Nevada, 2013”^{108,109}

From another site reporting on her, “Hickox’s travels as a nurse took her to Myanmar, Cambodia, and Nigeria and **convinced her of the importance of quarantines and ‘health surveillance’**, according to the University of Texas-Arlington newsmagazine. Hickox was quoted as saying “**I realize that we need to find better ways to improve health surveillance and outbreak response in settings with poor resources, my training in the EIS with the CDC will allow me to learn the gold standard of this kind of work**.”¹¹³

Self Quarantine Ineffective and Other Quarantine Issues – Kaci Hickox (continued)

You have to ask yourself why is she so opposed to being quarantined if she understands the importance of quarantines and “health surveillance”?

Why is a CDC employee making such a fuss about being quarantined when so many other doctors have become infected, including Dr. Craig Spencer?

It seems odd that her LinkedIn Profile was deleted during the same time this controversy was going on. Various alternative news reporting websites are theorizing that the timing of this, the fact she works for CDC (*which has been hidden by most of the major news sites and stated that she works for Doctors without Borders*), the fact that her LinkedIn profile has been scrubbed, the fact that she is specially trained in “working with the media”¹¹⁴ seems to suggest this is a P.R. Stunt aimed at limiting states’ rights to quarantine, since the Whitehouse and CDC are against it and against travel bans.

Many questions come to mind regarding these factors in an article posted by NaturalNews entitled “*Ebola quarantine nurse’s ties to CDC scrubbed from web; was it a staged op to invoke opposition to quarantines?*” Is this a deliberate attempt by the CDC to get a bigger operating budget? Among other questions, the full article can be read here¹¹⁵
http://www.naturalnews.com/047406_Ebola_quarantines_New_Jersey_CDC.html

I believe this may be a way for the **White House and CDC to take over control of public health throughout the United States**. By having a civil rights lawsuit, if the *court sided with the person* arguing their **civil rights have been violated by the states quarantine**, it would effectively **take away the States Constitutional Rights to implement their own health policies**. This in effect makes it so that **only the federal government could implement quarantines and policies regarding Ebola** especially if Ebola is determined to be a pandemic by enacting section 361(b) of the Public Health Service Act (42 U.S.C. 264(b)), subsection a.¹¹⁶

So far the Federal guidelines have been extremely lax and have neglected to ban incoming travelers from the affected regions or implement mandatory quarantine of travelers from those regions. However many other countries have enacted complete travel bans refusing anyone from the Ebola affected regions.

Self Quarantine Ineffective and Other Quarantine Issues – Kaci Hickox (continued)

Some Serious Questions Remain:

Kaci Hickox, quarantines, civil rights and limiting states constitutional power

Is Kaci Hickox purposely making the state's Ebola quarantine an issue to be challenged on the **basis of civil rights** so that **the CDC (her employer) can be the only organization calling the shots in public health**, thereby taking away or limiting the state's constitutional rights and control of Ebola's spread? Or is she merely a pawn being used by the CDC for this purpose? Or is it all just a coincidence? One thing is for certain if it becomes a civil rights challenge it could send ripples through every state trying to do a better job at protecting its citizens than the CDC has done so far with its keep calm, carry on approach.

Why is the State Department planning to bring foreign Ebola patients to U.S.?

Is this the real reason behind the White House not wanting to implement a travel ban which would effectively stop the virus?

From a Washington Times article "**The State Department has quietly made plans to bring Ebola-infected doctors and medical aides to the U.S. for treatment**, according to an internal department document that argued the only way to get other countries to send medical teams to West Africa is to promise that the U.S. will be the world's medical backstop. Some countries 'are implicitly or explicitly waiting for medevac assurances' before they will agree to send their own medical teams to join U.S. and U.N. aid workers on the ground, the State Department argues in the undated four-page memo, which was reviewed by The Washington Times". "The United States needs to show leadership and act as we are asking others to act by admitting certain non-citizens into the country for medical treatment for Ebola Virus Disease (EVD) during the Ebola crisis." The four page memo lists the author as Robert Sorenson, deputy director of the office of international health and biodefense.¹¹⁸

It was previously reported by the NPR that the **State Department has already been arranging private Ebola medical flights**, "regardless of the patient's nationality, flight arrangements have been coordinated by the U.S. State Department and Centers for Disease Control and Prevention for 10 of the evacuees. A high-risk individual should be **evacuated in a plane with a biological containment unit**. That way, pilots, medical staff and ground crew are kept out of harm's way. U.S.-based Phoenix Air has two such planes, which are monitored by the **State Department and CDC. And the State Department decides** who'll be flown out on these planes."¹¹⁹

Self Quarantine Ineffective and Other Quarantine Issues – Some Serious Questions Remain (continued)

Why are troops quarantined for 21 days and medical personnel are not?

“U.S. troops returning from Ebola-stricken nations will be isolated for 21 days, Defense Secretary Chuck Hagel announced Wednesday, a day after the White House raised concerns about states imposing strict quarantines of health care workers returning from West Africa. Top commanders for the Navy, Air Force and Marine Corps made the recommendation to Hagel on Tuesday. The Army instituted an isolation requirement for 21 days on Monday.”¹²⁰

October 1, 2014 Statement **“Deploying soldiers have a “very, very low” risk of contracting Ebola,** Lt. Col. Brian DeSantis, the 101st Airborne Division’s spokesman, told the Military Times. “If anything, there are other health risks we’re more concerned about, and we’ll mitigate those.” Rear Admiral Kirby stressed, too, that US military personnel **“are not and will not be providing direct care to Ebola patients.”** The next group of US troops to be deployed to Liberia will be the ones to **actually build the hospitals.** “They’ll come in waves.”¹²¹

“During their deployment to West Africa, U.S. troops are not treating Ebola patients but rather are assigned to building clinics and training and testing blood samples for the presence of the virus.”¹²⁰

President Obama **defended less stringent federal Ebola protocols for private citizens than for U.S. soldiers** returning from the **Ebola hot zone.** “We’ve got to make sure that we continue to provide the support of health workers who are going overseas to deal with the disease where it really has been raging,” Mr. Obama said on the White House lawn Tuesday. “We don’t expect to have similar rules for our military as we do for civilians.”¹²²

Why wouldn’t **medical workers** be subject to **higher level of scrutiny** when clearly several have broken quarantine protocols and they are dealing directly with Ebola infected patients when troops are clearly less of a risk since **troops do not have any direct contact with Ebola patients. All of the Ebola patients in the U.S. (with the exception of the NBC news Cameraman and Thomas Eric Duncan) have been health care workers?**

Also, add to that the fact that Thomas Eric Duncan’s fiancé, her children and a family friend were all in ordered quarantine; this lax policy towards health care workers makes little sense.

Self Quarantine Ineffective and Other Quarantine Issues - Some Serious Questions Remain (continued)

Why is the Whitehouse so adamant on avoiding mandatory quarantines or travel bans?

- If the reason against a travel ban is because it will limit doctors and nurses by placing a travel ban, why can't exceptions be made for only those medical workers allowing them to leave and come back while everyone else is banned?
- If the reason against a travel ban is because of West Africa's economy, that should be the least of anyone's concerns because if Ebola is not contained there won't be anyone left alive to work or buy things; things that are required to support an "economy".
- If the reason against mandatory quarantine is "supporting health care workers" how is it supporting them on a national level if it is risking exposing other health care workers and patients in a high paced highly crowded environment such as a hospital or health care setting?

Is this tied to the 34 million Permanent Resident Cards that will be granted to illegal immigrants?

"U.S. Civil Rights Commissioner Peter Kirsanow asked on Monday whether the Obama administration is preparing to allow **34 million new immigrants into the United States over the next five years.**" "In a letter to Obama and the Congressional Black Caucus, Kirsanow warned President Barack Obama and the Congressional Black Caucus that Obama's planned executive amnesty would "devastate" America's black workers the most. He said his concerns "center around the effect such grant of legal status will have on two subsets of American workers: low-skilled workers, particularly low-skilled black workers, and high-skilled STEM workers.

He noted that a recent USCIS solicitation, which Breitbart News first reported, provides that the estimated maximum for the entire contract is 34 million cards." "Given that the base ordering period is 02/01/15 to 01/30/16, with optional ordering periods that last only until 01/30/20, this solicitation contemplates that USCIS will grant an estimated 34 million Permanent Resident Cards (PRC) and Employment Authorization Documents (EAD) in only five years," he added. "Such an increase in lawful workers would have a deleterious effect on low-skilled American workers, particularly black workers." Kirsanow noted that "some members of your administration have attempted to dismiss questions about why DHS would issue a draft solicitation for such a large number of identity documents." But he added that "given that the solicitation itself states that it contemplates immigration reform, and you have publicly discussed issuing work authorizations via executive action (and have indeed done so in the past under Deferred Action for Childhood Arrivals), it seems prudent to take DHS at its word."¹²³

Self-Quarantine Ineffective and Other Quarantine Issues - Some Serious Questions Remain

Mandatory Quarantines and Legal Issues

If push comes to shove and it is deemed that the states cannot enforce a mandatory quarantine, then the laws should be modified to make each individual who does not abide by quarantine (whether requested or required by law) responsible both financially and legally. Since they say they are not a risk, then they should be willing to accept 100% responsibility for that decision. If these conditions scare or worry those individuals, then that proves they are not beyond reasonable doubt of being clear of the virus.

- All those under “self-quarantine” will be required to wear an ankle bracelet for 21 days minimum (up to 40) to monitor their movements.
- All those under self-quarantine must sign a legal form saying they will be fully responsible (both legally and financially) and agree to the conditions below. If they are found violating quarantine parameters (i.e. they suddenly take a drive from one state to another etc.), they will be arrested and mandatorily quarantined.

All those under self-quarantine who violate self-quarantine parameters and expose others shall be held financially and legally responsible for the following:

- All contact tracing
- All decontamination of any areas they have travelled to
- All loss of business caused by their exposure of Ebola
- Any loss of income to others caused by their exposure to those people
- All medical bills for affected parties if others develop Ebola from their exposure
- Charged with negligence
- If they are a health care workers all medical licenses revoked or suspended until they can be reviewed
- Arrested and mandatory quarantined
- Any deaths caused will be charged as negligent homicide since they knowingly took a risk at exposing individuals
- Any individuals under quarantine making false statements to police or investigators during an investigation to determine required contact tracing shall be charged with obstruction of justice

Self-Quarantine Ineffective and Other Quarantine Issues

So far the self-quarantine method has been somewhat ineffective and two of the self-quarantine violators are doctors:

- Both Thomas Eric Duncan's Girlfriend along with others living in her apartment violated officials request to stay inside. Texas Department of State Health Services had to order them quarantined and post guards because they broke quarantine.¹²⁴
- Dr. Nancy Snyderman was part of an NBC news crew that was under self-quarantine and not supposed to be out in public due to their cameraman Ashoka Mukpo testing positive for Ebola. On October 9th 2014 "Dr. Nancy Snyderman was spotted outside the Peasant Grill in nearby Hopewell New Jersey on Thursday afternoon, according to Planet Princeton. Snyderman, who was wearing sunglasses and had her long hair pulled back, waited while a man went inside the eatery to pick up a takeout order, another man was sitting in the back seat according to the local news blog Planet reported."⁷⁴
- Dr. Craig Spencer, The New York Post reported on October 29th 2014 "Dr. Craig Spencer **initially lied** to authorities "Dr. Craig Spencer at first told officials that he isolated himself in his Harlem apartment — and didn't admit he rode the subways, dined out and went bowling until cops looked at his MetroCard the sources said. "He told the authorities that he self-quarantined. Detectives then reviewed his credit-card statement and MetroCard and found that he went over here, over there, up and down and all around," a source said. Spencer finally 'fessed up when a cop "got on the phone and had to relay questions to him through the Health Department," a source said. Officials then retraced Spencer's steps, which included dining at The Meatball Shop in Greenwich Village and bowling at The Gutter in Brooklyn."¹¹⁴

Dr. Craig Spencer was then placed into the hospital to be treated for Ebola, he cleared the virus and was subsequently released and hailed as a "hero".^{125,126} I personally don't understand how someone that **breaks quarantine protocol potentially endangering the lives of thousands of New Yorkers and then lies about it to investigators is a "hero"**. That sounds more like someone who was trying to keep from getting sued due to their blatant negligence. I also don't know how he is not in trouble with the state medical licensing board. And while I am no lawyer, I do believe his **lying to investigators to hide his guilt would technically be an obstruction of justice charge**. Further, I believe that **any doctor that is willing to put anyone at risk by not only, not following protocol but lying, has no business being a doctor anymore** as they clearly do not believe in the "do no harm" oath.

Self Quarantine Ineffective and Other Quarantine Issues - So far the self-quarantine method has been somewhat ineffective and two of the self-quarantine violators are doctors (continued):

- Amber Vinson a nurse at Texas Presbyterian Hospital travelled to Ohio after being unknowingly exposed to Ebola while treating Thomas Eric Duncan. On her trip to Ohio she had visited Kent State, travelled to a bridal shop and was around family and friends. She subsequently developed a fever while in Ohio and contacted the CDC. She was then 'cleared' by someone at the CDC to travel back home to Texas by commercial airline. According to various reports someone at the CDC gave her the go ahead to fly back on a commercial airline even though she had stated multiple times to them she had a fever, meaning she was contagious¹²⁷ In an interview with Matt Lauer on the Today show Vinson said this was completely false and she did not feel ill until she got back to Texas.¹²⁸ Additionally Amber Vinson and Nina Pham both worked for Texas Presbyterian Hospital and both contend they were following full CDC protocols during the treatment of Thomas Eric Duncan.
- Kaci Hickox has returned from Sierra Leone upon a 6 week assignment with Doctors Without Borders. **24 of her colleagues have become infected with Ebola and 13 had died by the time she returned to the US.** She adamantly refused any quarantine at all maintaining she knew what was best and even started a civil suit against New Jersey and then again in Maine. She went out in public against the state of Maine's wishes and a judge in Maine would not enforce the quarantine requested by the state. She luckily to date has not developed Ebola and appears to be clear of the virus unless the virus has morphed to have a longer incubation period.

Self Quarantine Ineffective and Other Quarantine Issues (continued)

Contact tracing ineffective

Contract tracing is only as effective as the infected persons memory and the ability for them to communicate who, what, where, and when they interacted with other objects or people in public. If the infected person was contagious and was in a high traffic area such as a mall, airport, casino, sporting event or concert, it would be next to impossible to do full contact tracing unless full surveillance video was available for the areas that person was. Even then, it would be difficult to identify all individuals. Additionally, considering the primary threat of Ebola being brought into the US is from West Africa **most travelers from West Africa are likely destined to go metropolitan areas with the largest West African population.**

Liberia is one of several West African Areas. Liberian immigrant populations are high in New York and Washington, D.C. Other cities with significant numbers of Liberians include Atlanta, Boston, Chicago, Detroit, Houston and Fort Worth (Texas), Hartford (Connecticut), Los Angeles and Oakland (California), Miami, Minneapolis, Philadelphia, Rhode Island and New Jersey.¹²⁹

This leads to two issues:

1. It will be extremely difficult to do accurate contact tracing in highly populated metropolitan areas and the virus could spread quickly and easily before those infected could be quarantined.
2. While most Liberians and other Western African Immigrants may legally be in the US, there may be some who are here illegally. Therefore, if an individual from West African who comes to America later tests positive for Ebola (providing they go to an emergency room for medical care instead of being afraid of treatment) they **may not be honest about who they have been in contact with for fear of deportation** and/or their personal belief they did not infect their friends or family.

Self Quarantine Ineffective and Other Quarantine Issues – Contact Tracing Ineffective (continued)

Illegal immigrants and contact tracing

We have a total of approximately 11.7 million illegal immigrants living in the United States.¹³⁰ Contact tracing of these people would be near impossible as most stay under the radar; many do not use cell phones, do not have driver's licenses, credit cards, bank accounts etc. or other methods that could be used to track them. Therefore, they remain undocumented. If the Ebola virus gets into the illegal immigrant population it will be unknown and become very difficult to contact trace leading to the virus popping up across the country in Urban, Suburban and Rural settings. Many may not seek out medical treatment for fear of deportation and may rely upon native homeopathic medicine to treat their illness not even realizing they have contracted Ebola.

Approximately **50% of all crop farmworker help is illegal** immigrants (this excludes hired livestock farmworkers) or other jobs which prefer to hire illegal immigrants.¹³¹ This could lead to other infections, such as livestock or a tainted food supply, which would not be traceable until after a cluster of Ebola infections was investigated properly (providing there is enough personnel available to carry out such an investigation and providing the cluster was not so big that it preoccupied all CDC staff).

Tainted food supply

As mentioned in the previous section, illegal immigrants could become infected with Ebola and be employed on farms working with livestock. In the event that an illegal immigrant becomes infected they could pass the infection on to livestock such as pigs, cows, chickens, turkeys, or sheep. As there has been no recorded infection of US livestock as of yet, the CDC advisory on bushmeat would be best applied, as any livestock becoming infected would expose any handlers or processors of livestock and livestock meat. Since Ebola is transmitted through body fluids, the nature of meat processing deals in a heavy amount of blood and other animals fluids. Dairy farms deal in a large quantity of milk production from cattle that likewise could be infected with Ebola through contact with an Ebola infected individual.

- **Bushmeat** is still being illegally transported into the US which remains a vector for Ebola transmission, "At least one estimate puts the number at **15,000 pounds every month.**"³¹⁽¹³²⁾
- **Milk**
The Ebolavirus can be carried in milk. Pasteurized milk may contain blood, pus and feces.⁵⁵⁽¹³³⁾ All of these can carry the Ebola virus. According to the IDFA "The most common method of pasteurization in the United States today is High Temperature Short Time (HTST) pasteurization, which uses metal plates and hot water to raise milk temperatures to at least 161° F for not less than 15 seconds, followed by rapid cooling."⁵⁷⁽¹³⁴⁾ As stated previously Ebola requires **160F for 30 to 60 minutes** to kill it.⁶⁽¹¹⁾ This would not kill Ebola. The cold milk could keep the virus alive longer since it prefers **colder and more humid temperatures.**

CLEANUP AND DECONTAMINATION

With **Ebola able to last up to 6 days outside of the body** on objects and surfaces and even longer in colder temperatures, it is very important that whatever and wherever that patient and/or their body fluids were in contact with is properly decontaminated.

Dumpster diving (the act of going through the dumpsters also known as Picking or Garbage Picking)

Dumpster diving is a very common practice in apartment complexes as many individuals throw out slightly damaged or good items due to moving. Many “scrappers” peruse through dumpsters to get valuable items that can be resold or used to furnish their apartment or home.¹³⁵ Some people resort to Dumpster diving for food as well.¹³⁶ Food pickers are more common in urbanized areas, general pickers (furniture, art, appliances) are very common in both urban and suburban settings. However, in suburban settings most pickers look for scrap metal or other items that can quickly be resold for cash with minimal work versus a necessity. Regardless of the reason this presents a vector for transient infections. If any Ebola infected waste or body fluids are disposed of in a common dumpster it could provide an infectious reservoir that could last for days.^{12,45}

Due to these factors, effective contact tracing must also include the tracing of an individual’s waste stream. The individual’s waste stream could be infected which would expose secondary contacts such as refuse haulers, recycling companies, garbage pickers, scrappers and more. The last two are the most at risk to spread the disease with no ability to contact trace.

Special considerations for apartments and apartment complexes

So far three confirmed Ebola patients, Thomas Eric Duncan, Nina Pham and Dr. Craig Spencer lived in apartments. This living situation has the potential to expose many others to the virus through direct and indirect contact with those individuals’ body fluids. Most apartments share common hallways, walkways, laundry and garbage facilities all of these areas could be contaminated through body fluids. Additionally any aerosolized particulate matter could be deposited in common hallways or other areas of high traffic.

Apartment shared HVAC systems

Most apartment complex’s share air duct venting within the HVAC system. If a person with Ebola is in an apartment complex and generating aerosolized droplets the common HVAC system should be swabbed to ensure that no others in the apartment complex were exposed via the HVAC system. Unclean HVAC systems have historically been a breeding ground for Legionnaires Disease among many others. It is not unfathomable to think that they could spread Ebola.

Cleanup and Decontamination (continued)

Unprepared or improperly trained waste management companies

The waste management company “Bio-Recovery” was hired to handle the decontamination of Dr. Craig Spencer’s apartment. According to news reports the company apparently **does not have** the years of experience in handling biologically infected waste that the owner claimed he had. The owner has had previous **fraud charges**. In addition he apparently **exaggerated his credentials** according to a report in Newsweek.¹³⁷ What makes this even worse is **the company is certified by the EPA and the New York DEC** but from the report it appears **those certifications were transferred as part of the sale of the company**. In other words the owner actually never got the certification himself but paid for an existing certificate thereby circumventing the certification process. This in turns means he was completely unqualified to be handling the decontamination of Dr. Craig Spencer’s apartment.

Any future **waste management companies need to be specifically trained and certified to handle Ebola infectious waste**. It is obvious that previously obtained permits and certifications are questionable and lack credibility. It is also apparent that owners of companies are willing to exaggerate their experience to gain a contract with the city or state. This should be criminal in itself as an Ebola patient’s waste stream is extremely infectious as it could contain highly infectious fluids. **Any mishandling of that infectious waste could result in unnecessary risks and exposures to humans, animals or the environment resulting in new clusters of Ebola**. Going forward waste management companies are going to need to go through a more rigorous vetting process before being allowed to handle or clean up Ebola waste.

Cleanup and Decontamination (continued)

Infectious waste disposal issues

While the CDC maintains that U.S. hospitals are ready to handle cases of Ebola they clearly were not prepared to handle the waste stream generated by Ebola patients. The waste generated by Thomas Eric Duncan became a big issue as it was later revealed the hazardous waste was piled up to the ceiling in the hospital.¹³⁸ The company Stericycle which was hired by Texas Health Resource (the owners of Texas Health Presbyterian) to dispose of the Ebola waste from Thomas Eric Duncan's finances apartment is **currently under investigation by the state of Utah for emissions violations at a medical waste incinerator.**¹³⁹ **Stericycle currently holds a contract with Emory University Hospital in Atlanta,** the same hospital that treated Nancy Writebol and Dr. Kent Brantly.¹³⁹ A special permit was required by the DOT before being able to transport the waste to the incinerator in Salt Lake City Utah.

With all of the red tape and companies refusing to either take the waste, or states refusing to accept the waste it is making it very difficult to dispose of Ebola infected waste. The Department of Transportation (DOT) requires specialized permits to be able to transport any medical waste to any of the disposal companies located outside of the state where the waste is generated. It displays not only how unprepared everyone is to deal with the waste stream but also how many companies while "qualified" in dealing with the waste they may not be following proper protocols and procedures which could result in unnecessary exposure risks to workers and the environment.

HVAC SYSTEMS RISK

“Exposure to airborne particles is detrimental to human health and indoor exposures dominate total exposures for most people. The accidental or intentional release of aerosolized chemical and biological agents within or near a building can lead to exposures of building occupants to hazardous agents and costly building remediation. **Particle deposition in heating, ventilation and air-conditioning (HVAC) systems may significantly influence exposures to particles indoors, diminish HVAC performance and lead to secondary pollutant release within buildings**”¹⁴⁰

Although Ebola is not airborne by medical definitions it **can become aerosolized**. As stated in the above section “Aerosolized Risk” Ebola could remain suspended in the air up to 104 minutes later.¹⁹

Studies should be done to assess HVAC systems and the **risk they pose to promoting secondary Ebola infections after the system is exposed to Ebola infected particles**. Until those tests are done it is anybody’s guess as to whether or not HVAC systems pose a significant secondary infection risk.

CDC ERRORS & RISING TOLL ON AMERICAN HEALTH CARE

Original CDC recommendations for personal protective equipment (PPE) were severely lacking. **Those recommendations have now changed after health care workers became infected**. At the time the recommendations were made, many doctors questioned the recommendations based on what they had seen in West Africa while treating Ebola. The original recommendations reported in NY Times on August 15th 2014 were:

“The C.D.C. says that health care workers treating Ebola patients need only wear gloves, a fluid-resistant gown, eye protection and a face mask to prevent becoming infected with the virus.” “Faced with “copious amounts” of vomit or diarrhea, the C.D.C. acknowledges that leg coverings or double gloving might also be needed.” **“Dr. Michael V. Callahan, an infectious disease specialist at Massachusetts General Hospital who has worked in Africa during Ebola outbreaks, does not think it is wrong for hospitals to opt for more protective equipment. The minimal precautions recommended by the C.D.C. Dr. Callahan stated “led to the infection of my nurses and physician co-workers who came in contact with body fluids, I understand the desire to maintain absolute protection in U.S. hospitals.”**¹⁴¹ The CDC recommendations fall in line with a level 2 Biosafety procedure, Ebola is a BSL4 Pathogen.¹⁴²

A good comparison of the CDC’s BSL2 recommendations for health care workers dealing with Ebola versus the recommendations by the CDC for Bio Safety Level 4 (BSL 4) pathogens (Ebola is a BSL4) are available at a posting by TXConservative on DailyKos entitled “CDC recommendations are going to kill health care workers” dated October 13th 2014:

<http://www.dailykos.com/story/2014/10/13/1336165/-CDC-recommendations-are-going-to-kill-health-care-workers#>

CDC Errors and the Rising Toll on American Health Care – (continued)

CDC Biosafety Levels

<http://www.cdc.gov/training/quicklearns/biosafety/>

Under Table 2 under primary barriers and safety equipment of the CDC Biosafety level publication it states¹⁴²:

BSL 1 - PPE: Laboratory coats and gloves; eye, face protection, as needed

BSL 2 - PPE: Laboratory coats, gloves, face and eye protection, as needed

BSL 3 - PPE: Protective laboratory clothing, gloves, face, eye and respiratory protection, as needed

BSL 4 - All procedures conducted in Class III BSCs or Class I or II BSCs in combination with (PPE) **full-body, air-supplied, positive pressure suit**

The CDC can argue all they want that these Bio Safety Levels are recommendations for a lab. However take this into consideration:

A lab is a **controlled environment** where the virus is on a petri dish and everyone takes their time when handling it as there is no need to run around the lab. The virus is also dealt with in a sealed environment meaning inside of a sealed room or box so as not to contaminate any other area or allow the pathogen to escape from the room.

Which is a **stark contrast to:**

A **hospital emergency room or an ambulance** is a chaotic environment where it is a race to save a patient's life.

The patient is infected with Ebola is violently throwing up all over, coughing, having uncontrollable bowel movements and may require intubation which would aerosolize any vomit or other body fluids in that patients respiratory track generating Ebola infected droplets in the air. Further only 4 hospitals in the entire U.S. have Bio Containment Patient Units which provide areas to don and doff personal protective equipment and keeps the patient isolated in a special chamber.

Logically it **makes little sense** that the CDC would **recommend less stringent controls (in a uncontrolled hospital room setting)** such as an N95 respirator and gown. Especially if the health care workers have to intubate the patient or deal with vomit and other body fluids that are highly contagious and can be aerosolized. **However in a controlled environment specifically setup for dealing with a BSL 4 contagion they would use more stringent controls and use a higher level of personal protective equipment complete with full air supplied positive pressure suits.**

CDC Errors and the Rising Toll on American Health Care – CDC Biosafety Levels (continued)

Why does the CDC provide more protection in a controlled environment than an uncontrolled one?

The original CDC recommendations are now being revised after two health care workers have become infected however, they still fall short. The new recommendation by the CDC includes:¹⁴³⁾

- Two Layers of Gloves
- Hood that covers the neck
- Fluid resistant leg and shoe coverings

IMPORTANT NOTE: They still are not using full body suits or a Powered Air Purifying Respirator (PAPR)

NOTE: Some hospitals have now gone to an impermeable body suit, thicker outer glove, sealed hood, breathing pack, taped seams.¹⁴³

Other CDC Mistakes & Issues

- The CDC may have contaminated the hospital by walking in and out of Thomas Eric Duncan's room at Texas Presbyterian Hospital.¹⁴⁴
- The CDC recommendations **have not been scientifically proven effective for the current Ebola strain**. Other recommendations in question are the **21 day incubation period** for the virus as recent research shows it **could be up to 40 days of quarantine**.⁹⁷
- The CDC stated multiple times that **no one with Ebola is infectious until they begin to display symptoms**, yet **they permitted Amber Vinson to fly anyway** when she had called to report, on October 13th, that she had a **99.5F fever**. That plane was then used on 5 other flights before being taken out of service for decontamination. Vinson flew on Frontier Airlines Flight 1143, with a 132 other passengers.¹⁴⁴
- The CDC has flown several doctors infected with Ebola back to the US (not including other unidentified people that were evacuated using a special State Department plane) for treatment. Almost every one of the doctors or medical personnel brought here have been cleared of Ebola. These include: Dr. Kent Brantly, Nancy Writebol, Dr. Rick Sacra, an unidentified health care worker for WHO, Unidentified American Doctor, and Ashoka Mukpo.¹¹⁹ All 4 known patients recovered or are doing well. This does not include the two nurses Nina Pham or Amber Vinson, who contracted Ebola from Thomas Eric Duncan a Liberian resident who came to the US. So far the only doctor that was not successfully cured was Dr. Martin Salia who was brought back here to be treated at the Nebraska Medical Center and passed away November 17th, 2014.

CDC Errors and the Rising Toll on American Health Care –Other CDC Mistakes & Issues (continued)

Just these numbers alone prove that among hospital workers we have had only 1 fatality for a disease that currently has up to a 70% kill rate in West Africa and has infected over **400 health care workers** and over **230 have died**.¹⁴⁵ This creates the idea that the U.S. has far superior treatment for Ebola due to our higher success rate. A recent report by Forbes prior to the death of Dr. Martin Salia confirmed that the current survival rate (with Thomas Eric Duncan figured in) in the U.S. is up to 80%, while only 30% in Liberia and Guinea survive.¹⁴⁶ These numbers suggest we have a cure when, in fact, one does not exist. Between these statistics and the CDC's bolstering we can handle this, it invites people from other countries to come to the U.S. by any means necessary to get better treatment including taking over the counter fever reduction medication.⁹⁹ Furthermore, **13% do not display a fever who have become infected with Ebola**.

- According to a recent article from Fox News, "National Nurses United is protesting the lack of equipment and training. **Eighty-five percent of nurses** surveyed by NNU said they **hadn't received Ebola training**."¹⁴⁷
- Ebola takes a heavy toll on resources "It takes **twenty full-time medical staff** to care for **one** Ebola patient."¹⁴⁷
- As each health care worker is exposed to Ebola there are only two options
 1. They are quarantined for x amount of days
 2. They remain working in a setting that has a high amount of traffic leading to the potential of a lot of exposure if that health care worker comes down positive for Ebola. Another risk is that the health care worker may not display a fever which the CDC is currently using as a determining factor for Ebola. As the above information noted **13% of individuals infected with Ebola** do not display a fever.¹⁴⁸ Further the quarantine time of 21 days may not be long enough as **13% of individuals that contract Ebola may take up to 40 days to display symptoms**.⁹⁷

Option 2 could continue an epidemic but would allow the hospital to remain fully staffed unless the health care worker developed Ebola. However option 2 could lead to more workers being exposed than instituting option 1. Option 1 will lead to sooner shortage of health care workers but would ensure no health care workers were spreading Ebola to more people.

The more health care workers that become infected or suspected of Ebola the less health care workers will be available to treat routine health issues and Ebola. This strain will cause severe containment and treatment issues. The same shortages are being faced by West Africa now. Ebola patients far outnumber the number of beds, facilities and health care workers available, causing people to travel to other areas to seek medical assistance all while spreading the disease.

CDC Errors and the Rising Toll on American Health Care –Other CDC Mistakes & Issues - As each health care worker is exposed to Ebola there are only two options (continued)

Considering both nurses and doctors are at an equally high risk of contracting Ebola, the best method would be prevention rather than take the risk of health care workers inadvertently spreading Ebola because they “seem” healthy. As reported previously, **13% may be infected with Ebola and never produce a fever.**

EBOLA TESTING PROTOCOL FLAWED

Many potentially infected individuals have been held 48-72 hours in quarantine and have been given a PCR test (the most accurate test for Ebola as it can pick up extremely small amounts of the virus).¹⁴⁹ The test results take 24-48 hours. Once the results are back, if the test comes back negative and they are not exhibiting a sudden increase in symptoms they are released. The problem is the test can show someone is free of the disease when they simply have too low of a level of the virus in their system. The problem is that the person still poses a risk to the public since they can continue to incubate the virus after their release.

"This test can be negative during the first three days an infected person has symptoms, said Dr. Sandro Cinti, an infectious-disease specialist at the University of Michigan Hospital System/Ann Arbor VA Health System. **"Somebody could be in the hospital for three to five days before a diagnosis [of Ebola] is confirmed,"** Cinti told Live Science. "The important thing is keeping the patient isolated until you can get to a diagnosis." Meanwhile, doctors will be running tests to rule out other diseases, such as malaria, which can be detected more quickly than Ebola, he said."¹⁴⁹

Many people have been released within 24 – 72 hours of the PCR test this means a potential exists for someone to pass the test and later come down positive blaming it on a cold or something less serious since they were initially told they were negative.

OTHER REGIONS OF CONCERN THAT COULD CAUSE A MASS PANDEMIC

While the CDC focuses on the US and the WHO focuses on West Africa other at risk nations lacking the health care infrastructure to handle Ebola are not being properly prepared in case they encounter possible or confirmed cases of Ebola.

If the virus takes a foothold **in poor regions in Asia or South America it will spread like wildfire** (temporarily off the radar) through the densely populated low income areas until a cluster of people are infected and die. At this point an investigative team would be sent out, tests would be done and once they come back positive all contacts would have to be traced. **This would be a very difficult process in regions with little infrastructure.** Ultimately we would have an even larger influx of people infected with Ebola; eventually reaching the United States and overwhelming our healthcare infrastructure.

VACCINE PRODUCTION SCHEDULE

The leaked documents of Glaxo Smith Kline is a disturbing document in itself as it predicts the production of a vaccine that hasn't even begun safety testing. A lot of assumptions have gone into the document in regards to the demand and production of the vaccine. "GSK estimates that it will have 24,000 doses of its vaccine ready by January for the efficacy trials. If it cranks up production to full capacity before the those trials are complete, the company could have 230,000 doses available in April, and then could steadily increase capacity to produce more than 1 million doses a month by December 2015."¹⁵⁰

Glaxo Smith Kline Manufacturing Capacity Chart¹⁵⁰

GSK Manufacturing Capacity		Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15
1	Purified bulk		24000		24000	30000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	Manufacture	35,000	35,000	35,000
	Released				24000	24000*	30000**	0	35,000	35,000	35,000	35,000	35,000	35,000	35,000	0	35,000
2	Purified bulk			Purchase	10/0/0		35,000	35,000	35,000	35,000	35,000	35,000	35,000	Manufacture	35,000	35,000	35,000
	Released						35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	0	35,000
3	Purified bulk						80,000	80,000	80,000	80,000	80,000	40,000	Manufacture	320,000	320,000	320,000	320,000
	Released								80,000	80,000	80,000	80,000	80,000	40,000	0	320,000	320,000
5	Purified bulk						80,000	80,000	80,000	80,000	40,000	Manufacture	320,000	320,000	320,000	320,000	
	Released								80,000	80,000	80,000	80,000	80,000	40,000	0	320,000	320,000
5	Purified bulk								80,000	80,000	80,000	40,000	Manufacture	320,000	320,000	320,000	320,000
	Released								80,000	80,000	80,000	80,000	40,000	0	320,000	320,000	
	Total PB																
	Total Released		0	0	24,000	24000*	30000**	0	230,000	230,000	310,000	310,000	310,000	190,000	70,000	960,000	1,030,000

* At risk, will be released in January if filled by Jan. 9th, 2015
 ** At risk, will be released in February if filled by Feb. 6th, 2015

Considering the following:

WHO warned that Ebola must be contained in 60 days. That statement was made October 1st 2014. "The UN has warned the world has just 60 days to get Ebola under control, or face an "unprecedented situation for which we don't have a plan". A new report issued by the organization's health arm, the World Health Organization, says the virus "is running faster than us and it is winning the race" as it sweeps West Africa and has begun to make its way across the globe."¹⁵¹

"The WHO advises within 60 days we must ensure 70 per cent of infected people are in a care facility and 70 per cent of burials are done without causing further infection"¹⁵²

RedCross report "A top Red Cross official said Wednesday that he is confident the Ebola epidemic that has killed thousands of people in West Africa can be contained within four to six months. Elhadj As Sy, secretary general of the International Federation of Red Cross and Red Crescent Societies, told a news conference in Beijing that the time frame is possible if there is "good isolation, good treatment of the cases which are confirmed," and "safe burials" of those who die from the disease."¹⁵²

The burning question that remains

If the **Ebola Virus is expected to be under control within 60 days or 4 to 6 months** then **why are drug makers plotting out shipments of vaccines into December 2015?** They wouldn't be needed by this time if this is under control. Seems like some serious "hedging" on something that is clearly costing a lot of money to research and produce if there is no market for it.

TERRORISM AND BIOLOGICAL WARFARE

On one hand the US government and news media cannot stress enough about terrorism. A week doesn't go by without the mention of some terrorist group plotting against the U.S. Some see this as overhyped threats played up for the control of public opinion or support of the public for various war efforts, other people take this as a serious threat and want greater security exercised. There is little argument over the fact that greater security equals less liberty. As security tightens down many afforded "freedoms" and rights erode and disappear. One burning question that has come to everyone's mind is could Ebola be used by terrorists as a bioweapon for bioterrorism?

There seems to be little agreement on whether Ebola as a bioweapon is feasible and viable with one side of the scientific, intelligence, and government communities saying yes it is and the other side saying no.¹⁵³ The US Biomedical Advanced Research and Development Authority (BARDA) has concerns over Ebola being used as a bioweapon and the Department of Homeland Security has also ascertained that it has the potential to be used as a bioweapon. Studies on Ebola's feasibility as a bioweapon have been done by Department of Homeland Security but at this time the information is still classified for the projections of its spread and what vector was being used. The director of BARDA did not seem very worried about Ebola becoming a Bioweapon based on its rate of infection and the fact vaccines are being worked on right now.¹⁵⁴

Given that there are already production schedules slated all the way up to December 2015 for Ebola vaccines along with several major pharmaceutical companies involved in trying to create a vaccine it makes me wonder if someone has inside information on a possible terrorist threat or if other studies have been done like the DHS studies to assess its use and potential damage as a bioweapon.

Missing Nigerian Girls

Boko Haram has kidnapped girls and young women on several occasions. In April 2014 over 200 Schoolgirls were abducted in Chibok. 60 Girls were abducted on October 23rd 2014 in Northeastern Nigeria near Adamawa State along with 300 cows. Another 30 or more boys and girls were abducted in Mafa in Northeastern Nigeria October 24th and 25th. Boko Haram has denied the kidnappings.^{155,156,157}

Usually the kidnappings result in the girls married off to members of Boko Haram or executed if they fight against the forced illegal marriage. The numbers of kidnapped young women seems kind of high. I also find it odd that Boko Haram would deny it if they did do it as they seem to fear no one. Unfortunately I have to take the newspapers choice of words and assume they did do it but do not want to admit to it since they have a history of these kidnapping acts.

Terrorism and Biological Warfare – (continued)

Boko Haram, Al Qaida, and Isis links?

Boko Haram had released a video around November 10th that was called by Vasudevan Sridharan of International Business Times an “ISIS-style preaching video.” It was reported that in the video they pledged support to other Islamic Caliphates including the Sunni militant group Islamic State (ISIS) that is currently engaged in terrorist operations in Iraq and Syria.¹⁵⁸

In another article in Mother Jones, Mark Schroeder, an Africa Analyst for Stratfor, a geopolitical intelligence firm says it is unlikely that Boko Haram will make “any material gains by trying to associate itself with ISIS.”¹⁵⁹

In an article in Al Jazeera dated June 6th 2014 by Robin Simcox it states “By 2006, **Boko Haram members were training in the Sahel alongside al-Qaeda** in the Islamic Maghreb (AQIM), whose emir Abdulmalek Droukdel admits assisting Boko Haram in a variety of other ways. **Co-operation continued until at least 2013, when a large contingent of Boko Haram fighters attended an AQIM training centre in Timbuktu, Mali.** *(Authors note: At the time of this writing (October-November 2014) Mali is the newest region affected by a new cluster of Ebola cases).*”

The article goes on to make several other connections between Al Qaida and Boko Haram including **Boko Haram meeting senior Al Qaeda members in Saudi Arabia** and Boko Haram fighting alongside Al Qaeda affiliated groups in Mali.¹⁶⁰

Another report in the Washington Post by Jacan Zenn on November 13th 2014 states. “Since Boko Haram leader Abubakar Shekau first expressed “support” for Islamic State leader Abu Bakr al-Baghdadi in July 2014, **Boko Haram has adopted the Islamic State’s semiotics.** Boko Haram edited its own logo to feature the Islamic State’s rayat al-uqab flag on top of its previous logo of crossed guns over a Koran. **In a different video, released in October, Boko Haram played the Islamic State’s “national anthem,” the nasheed “My Umma, Dawn Has Arrived,” while Shekau declared Boko Haram’s own Islamic state in northeastern Nigeria in October.** And on Sunday, Boko Haram released a video of Shekau in a mosque and praising al-Baghdadi’s caliphate in Iraq and Syria before a screenshot of an al-Baghdadi sermon emerged in the video alongside Shekau.”¹⁶¹

The article goes on to point out that Boko Haram also follows the ISIS insurgency doctrine, seizes and holds territories, and carrying out executions, whippings, stonings and amputations of “sinners”.¹⁶¹

One thing is for sure ISIS is undergoing rapid expansion. In a report from The Fiscal Times by Riyadh Mohammed it states “New research conducted by Terrorism Research and Analysis Consortium TRAC in Florida has found that 60 Jihadist groups in 30 countries around the world have pledged allegiance or support to ISIS.”¹⁶²

Terrorism and Biological Warfare – Boko Haram, Al Qaida, and Isis links?(continued)

The old saying the enemy of my enemy is my friend really begins to apply to all these terrorist groups.

According to a recently released report by Vision of Humanity in their Global Terrorism Index Report published November 16th 2014 it states “Since the 1960s, 83% of terrorist organizations that ended, ceased to operate due to policing or politicization. **Only 7% ended due to military intervention.**” This means that all of our military intervention isn’t going to succeed and since last year 61% more people died this year than the previous year in terrorist attacks.¹⁶³

Terrorism operations in the works in West Africa with Ebola?

You may be asking what terrorist groups and missing girls has to do with Ebola? Take into consideration the following facts below and you will quickly see the possibility that exists.

Ebola has been extremely difficult to control

- While Liberia may be finally coming under control recently there has been a surge in cases in Sierra Leone especially in Freeport where 100 new cases per week are appearing. According to an article dated November 15th 2014 in Newsweek magazine currently the WHO has only been able to make 29% of their planned 1,200 Ebola Treatment Centre beds available to Ebola patients and they have only succeeded in isolating 37% of Ebola cases. They need to reach a goal of 70% isolation to reduce the spread.¹⁶⁴
- Mali has also had a new Ebola cluster begin recently potentially exposing hundreds to infection. UPDATE 12/12/2014: The cases in Mali have been resolved and no further cases have been reported but it remains as an area where Ebola cases could pop up.

ISIS has already made multiple threats of using Ebola as a weapon.

It has been mentioned multiple times in the news that they have every intention of using Ebola against anyone that doesn’t believe in their beliefs.

Ebola infected blood was stolen in Guinea.

The thieves were described as thugs or bandits giving the image of a small rag tag group of criminals that pose no real threat. To me this is a **red herring**, what idiot would purposely steal potentially infected Ebola blood without an intention for using it? American news leads many people to believe that people in West Africa are not very smart. They have doctors, scientists, and other accomplished individuals so this is completely false. They also have terrorist groups that know how to do “terrorism”. This means they know how to create fear, panic, bombs, and use people to their advantage among other things.

Terrorism and Biological Warfare – Boko Haram, Al Qaida, and Isis links? – Terrorism Operations In the works in West Africa with Ebola?(continued)

The distance between Nigeria and Guinea is about 1,253 Miles.

This may sound like a long distance but it is only about 12.5 hours travelling at 60MPH. Many Americans drive much longer than this for vacation. Contrary to Americanized portrayals of West Africa they do have access to motor vehicles; especially well financed groups like Boko Haram.

So what do all of these facts mean?

Boko Haram has **demonstrated multiple times** that they can raid villages and **kidnap women, girls and boys**. According to recent reports it suggests that Boko Haram is looking for **ISIS's attention and recognition** for their efforts. Likewise anyone that is not part of their organization or belief system is not of value except where sold into slavery or marriage but even that is not highly valued.^{155,156,157,158,159,160,161}

The **recent theft of Ebola containing blood vials In Guinea** may very well have been an **operation by Boko Haram to secure Ebola for use as a bioterrorism weapon**. If so they may be preparing to carry out one of the worst **terrorist attacks** possible using **the cheapest, most silent weapon possible**.

Many experts from around the world including military intelligence, bioterrorism experts, terrorism experts, and doctors have been focused on ISIS or other terrorist organizations using in a bomb to distribute Ebola in one form or another causing widespread infection.

The one angle that has not been discussed is using **people as the biological weapon**. I am not talking about bombs strapped to them. I am talking about a vial of Ebola infected blood being injected into kidnapped women, girls and boys and then they are released back to their communities under the auspices of Boko Haram working out a "peace deal". They are used much like how a drug mule is used.

The people are released the community rejoices. The community is grateful to have their once kidnapped women and children back as they gather around them to celebrate their return. It is unknown to anyone that these people harbor the Ebola virus. With an incubation period that generally takes 3 to 10 days on average Boko Haram can leave the area safe from harm sit back and wait for the town to fall. And so begins a new cluster that is difficult to do contact tracing. At the same time it weakens that regions infrastructure. This would provide an opportunity for Boko Haram to gain new ground in Western Africa with relative ease as the military is too busy trying to institute quarantines, peace and order. The heightened response to Ebola would leave the police and military fragmented so that a small unit of Boko Haram fighters could easily overtake regions with relative ease.

Terrorism and Biological Warfare – So what do all these facts mean?(continued)

This scenario could be used by other terrorist organizations as well. The current security protocols setup at the airports could easily be thwarted. Just as Thomas Eric Duncan lied on a form in Liberia and eventually took a connecting flight to the US. many others could do the same thing. It has already been proven that someone only needs to take a heavy amount of fever reducers to get through the airport temperature screening and lie on a form. It has also been proven that the temperature screening is flawed based on the accuracy of non-contact thermometers being used which became an issue for Kaci Hickox upon returning to the US. She was shown as having a fever and then did not have one. Other factors include an individual's body temperature (which was previously discussed) and the fact that 13% of Ebola infected patients will **not** have a fever and be contagious with Ebola.

SUMMARY

In summary, there are **too many unknowns about how Ebola can and will spread through the various climates, environments and ethnic groups within the United States for anyone to make the statement they have it "under control"** as the CDC has indicated multiple times. **Many questions remain** and many studies need to be done to conclude the potential destruction this lethal virus may do. Now that it has been proven that Ebola can reach us the time has come to stop passing the buck or assuming it is someone else's problem. When it comes to serious viruses that are either highly infectious or highly contagious we need a coordinated response, specialized personal, protective equipment, specialized training, and special Biocontainment Patient-Care Units (BPCUs).

Thankfully, we have not yet had to experience a biological or chemical attack in this country.

Considering the current difficulties in the handling of Ebola on such a small scale, we would be completely ill equipped to handle any sort of surprise biological or chemical attack on a larger scale.

We also lack specialized facilities to treat such exposure. Going forward the CDC along with Federal, State, and Local levels will need to revise policies, upgrade facilities to handle and treat biological and chemical exposure and revise procedures in regards to biological hazards and communicable diseases to create a coordinated consistent response when these types of issues occur.

It has been mentioned that certain governments were working on Ebola as a biological weapon but they supposedly had a difficult time weaponizing it given the technology at the time (1970's). Regardless if Ebola was lab made or occurred naturally through a reservoir host (which remains to be found actually carrying the virus) the fact is, it is here, it has spread farther than any BSL 4 Pathogen has ever spread before and it can be a silent, cheap, biological weapon that can force mass quarantines, martial law, depletion of medical resources and cost nations millions if not billions of dollars to contain and eliminate.

Summary (continued)

The intentional down play of the Ebola virus along with constantly changing protocols to avoid public panic is actually doing more harm than good. Ignorance in the presence of Ebola could mean certain death. While it may be true that there are many other viruses or health issues to be concerned about, trying to compare Ebola to other viruses is not a fair comparison by any means. Influenza has a much higher R nought value meaning it is easier to spread at a more rapid rate. However influenza doesn't generally kill a healthy individual it is usually the immunocompromised, old, really young or weak. With Ebola you could be completely healthy and die. To say it is not important based on the number of infected or that have died is like making a comparison between say Cancer, Heart Disease, ALS, MS, and Diabetes and saying one is more important than the other. They are all important human health issues.

This should be a wakeup call to Americans to revisit their personal hygiene habits and bring them in line with practices that prevent the transmission of bacteria, viruses and disease. This also should open up a dialogue to discuss the future designs of public spaces including restrooms, public showers, water treatment capabilities, and implementing mandatory enforceable regulations and designs to implement touchless faucets, toilets, paper towel, soap dispensers, restroom doors and stall doors. The assumption that we are a "cleaner society" is a complete fallacy, proven by multiple scientific studies on environmental contamination. This will not be the last time we face a threat like this, we need to learn as much as we can from our initial mistakes and not make them again in the future.

Likewise this should also be a call to Americans to start demanding that the wasteful government spending on pet projects ends and America's infrastructure be upgraded. Everything from our bridges, electrical grids, public water treatment facilities, sewers, public spaces, nuclear power plants, are all in different states of disrepair. If one of these systems fail it could be quite catastrophic and that is wherein the problem lies. Bureaucrats will find a million ways to spend money they don't have on things that are not even needed, meanwhile the things that matter most are ignored because they "work" and only the operators and maintenance people know how bad it is really is. I say "work" in quotes because while it may function it most likely does not function efficiently, properly, or 100% up to par for the job. In other words it is just barely "working" and is constantly requiring maintenance and parts which ends up costing more money than just replacing it.

The further cost of this failing infrastructure is cost in terms of human health and lives. One incident at say a nuclear reactor resulting in partial or full meltdown could make an entire state uninhabitable. A waste treatment spillover into lakes could pollute the lake with lethal levels of bacteria making it unsafe to swim in, drink it or eat the fish from it. The countless examples go could go on forever highlighting this entire countries broken infrastructure. The point is we shouldn't wait for something bad to happen to take care of it because in some cases by then it is far too late and the irreparable damage is done.

This is the same caution we need to heed for the prevention of Ebola in this country. Once it reaches the general population here it will be extremely difficult to contain resulting in it becoming endemic like HIV/AIDS (which supposedly also began in Africa and is now at the global distribution it is at). If proper containment and prevention was followed in the very beginning it may not be as prevalent as it has become in the U.S.

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