Reporting Episodes of Disease Outbreak

Using Social Media to Identify and Locate Communicable Diseases Worldwide in Real time

**Tag Words:** Communicable diseases, infection, containment, illness, Ebola, outbreak, epidemic, pandemic, social media, Twitter, CDC, WHO

**Authors:** James Gubitosa, Ebanehita Eigbe, Sameer Zain Ahmed, and Julie M. Fagan, Ph.D.

**Summary**
The 2014 outbreak of Ebola and the inability to contain such an outbreak has demonstrated that the current system is ill-prepared. Currently, diseases are identified by doctors, who in turn report these illnesses to a central health authority. What is reported differs from country to country, and, in the USA, from state to state. Placing the role of reporting illnesses in the hands of everyday citizens by permitting them to submit symptoms directly via a mobile phone application to the appropriate central health authority would accelerate reporting of disease outbreaks and help contain such outbreaks.

**Video Link:** [http://youtu.be/nAibA5g0X74](http://youtu.be/nAibA5g0X74)

**A System Designed to Expedite the Process of Identifying and Responding to Communicable Diseases**

**Disease Outbreaks (EE)**

Communicable diseases are capable of spreading from person to person or from animal to a person. The spreading often occurs via contact with blood or other bodily fluids, but can also travel through the air in some cases. The terms “infectious” and “contagious” may be used to describe communicable disease. When diseases are not well monitored they have the potential to spread at an alarming rate and cause an epidemic. This term epidemic has been used interchangeably with “outbreak” by the media. However, a difference exists between the two. An outbreak occurs in greater numbers than is expected in a given community or region, or during a season. It can be a single case of a contagious disease if it is unknown to the community, or has been absent from a population for a long time. An epidemic is an outbreak of a disease among members of a specific population exceeding the extent of occurrence normally found in the population (1). Although most epidemics are caused by infectious organisms, the term can be used to describe an outbreak of any chronic disease. Epidemics can be caused by changes in ecology of the host population, genetic changes in the pathogen, or the introduction of an emerging pathogen to a host population. An epidemic may be restricted to one location, but if it spreads to other countries or continents and affects enough people, it may be termed a “pandemic”. A pandemic is a global disease outbreak which is the end result of poor maintenance of a disease.

**The Ebola Epidemic of 2014 (EE)**
Ebola first surfaced in 1976 and the first recognition of this disease was in Zaire (Democratic republic of Congo). This outbreak eventually spread to Sudan and there was even one case in England due to personal contact and contamination by needles. This particular virus is native to Africa, specifically off the coast of West Africa due in part to its main animal host: the African fruit bat. There have been other documented cases in other parts of Africa, USA, and even Russia but none of the previous outbreaks have been as large as the recent outbreak of 2014. As of December 29, 2014 there have been 19729 human cases and 7708 have proven fatal since the initial incident in March of 2014 (2). This virus has already found its way into at least nine countries and despite containment effort, still remains a major concern. One of the countries hit hardest is Liberia. As of October 2014, there have been 4657 confirmed cases and 2694 confirmed deaths from these cases (3). Shown in the figure below are data collected from healthcare workers that was used to inform decision makers in Liberia of the severity of the epidemic (4). The primary issue with epidemics is that they can spread faster than the efforts to contain them can keep up. When a disease infects someone it is not always symptomatic. The recent outbreak of the Ebola virus is a good example of how ill prepared we are to identify and contain these threats.

![Cumulative total cases of and deaths from Ebola in Liberia](image)

**Figure 1. Cumulative total cases of and deaths from Ebola in Liberia (4)**

**Transmission of the Ebola Virus (EE)**

Ebola symptoms typically begin eight hours to ten days after exposure to bodily fluids (which can survive for several hours on external surfaces). However, symptoms can appear as late as 21 days following exposure; thus someone could be carrying the disease for almost a month without knowing it. This could have a devastating impact. By the time it is realized that an individual has the disease, they may have already spread it to others in their community. Additionally, once these symptoms do eventually present themselves, they can be confused with other ailments. Symptoms of Ebola seem similar to the flu with headaches, fever, pains, rashes, diarrhea, and vomiting. The disease sometimes takes a turn causing the victim to hemorrhage, leading to blood in urine, under the skin and eventually the ultimate cause of death: organ failure as a result of internal leaking of bodily fluids (5).
Containment to Eliminate Diseases

Identification of possible outbreak is an arduous task that needs to be optimized but once it has been identified, it must be contained if there is to be any hope of elimination. The best solution to a problem is to make sure it never happens in the first place, that is why all major health organizations stress the importance of good hygiene and healthy practices. A list of diseases and possible routes of transmission can be found on many health websites simply by doing a google search. A lot of diseases are carried by animals so all incidences involving animal attack should be reported in a timely manner so testing can be done per state regulations (6). Once an outbreak of a disease is identified, containment efforts are put into play. Rapid containment becomes the main priority and this relies heavily on early detection of cases (7). The world health organization had a set protocol in place that responds through surveillance, community engagement, case management, laboratory services, contact tracing, infection control, logistical support and training and assistance with safe burial practices (8). The first step is the initial investigation of local cases. If the outbreak suggests a possible pandemic, then further action must be considered. The risk is then assessed through logistical analysis and epidemiological study of the area with WHO and the country involved, the national authorities are notified, and their decision to take action is carried out on a large scale with antiviral and non-pharmaceutical interventions (7). The possibility of containment is discussed based on location and population density and a containment zone is the identified with known clusters of the infection as well as a buffer-zone where more cases are likely to arise. In the containment zone, all healthy persons and others entering must be given prophylaxis treatment if available or other precautions taken to prevent spread of the disease. These strategies are pretty general but more severe diseases may require much more surveillance and quarantine. Containment brings up ethical issues regarding human rights; this is where we weigh the risk to the populous against the freedoms of infected individuals (6). This is an issue we have seen recently in the current Ebola cases.
Mandated Reporting of Disease (EE)

Laws in most state in the United States mandate reporting of such symptoms that may be indicative of these diseases within 24 hours by healthcare providers or laboratory workers. The World Health Organization (WHO) global alert and response system gathers official reports and rumors of suspected outbreaks from a wide range of formal and informal sources. Formal reports of suspected outbreaks are received from ministries of health, national institutes of public health, WHO Regional and Country offices, WHO collaborating centers, civilian and military laboratories, academic institutes, and nongovernmental organizations (NGOs). These sources rely on healthcare providers or laboratory personnel in order to report (9). A problem presents itself in that not many people have the means of reporting to these officials.

The CDC plays a huge role in the regulation of state laws when it comes to communicable diseases. In order to protect the public and prevent exposure to uninfected individuals, the presence of contagious diseases may lead to isolation or quarantine. Isolation is to separate sick people from the healthier ones, and quarantine is restricting movement of people who are not yet sick but may have been exposed to see if they get sick (10). The federal government received its authority to prevent entry and spread of communicable diseases by the Commerce Clause of the U.S. Constitution (10). The responsibilities for taking measures have been delegated to the CDC and these diseases include: Cholera, Diphtheria, Infectious Tuberculosis, Plague, Smallpox, Yellow fever, viral hemorrhagic fevers, severe acute respiratory syndromes, and Pandemic flu. This list can be changed by the President by executive order. The CDC has the power to monitor the activities of all persons arriving on the U.S. border and may detain, examine, and release anyone suspected of carrying a disease. Although the federal government is in charge of enforcement of these laws, state, local, and tribal health authorities can use their powers in certain events. Also they may seek the help of law enforcement to execute a public order. If a disease is suspected or identified then a health order is issued and enforced by the proper health authorities with the help of law enforcement. Failure to comply with the order is punishable by fines or imprisonment. A person may be released from quarantine if they comply with monitoring and surveillance (10).

Development of Vaccines to Eradicate Disease (EE)

Eradication of a disease is the ultimate goal with control strategies. This means that the prevalence of the disease in the host population is reduced to zero. Smallpox was the first disease to be fully eradicated due to deliberate human intervention. This was due in major part to the discovery of vaccinations by Edward Jenner (11). Ed Jenner studied the effects of cowpox inoculations and its effects of smallpox prevention. Eventually the vaccination process was improved and optimized and ultimately the prevalence of the disease was brought down to zero (12). Vaccines are the key to elimination of disease because it is a form of prevention. Vaccines for many other disease have already been developed and are being used, and a significant decrease in prevalence can be seen (13). The problem is these vaccines cost money and are time consuming to develop, so most companies wait for the issue to become a hot one like the recent Ebola outbreak. If we can eradicate smallpox we can eradicate more life treating diseases. There is no approved vaccine for Ebola as well as many other infectious diseases. There are currently 2 promising candidates of Ebola vaccines currently in clinical trials but large scale vaccines for
Ebola will not be available for some time. The process of approval is a very long one and even with expedited evaluation of this high priority vaccine there are still a lot of studies that must be done to ensure a safe and efficient product (14, 15).

**Cell Phones and the Internet Playing Key Roles in Health** (EE)

The first mobile cell phone was introduced in 1983 and they were nowhere near as mobile as they are today. The phones had to be connected to cars until years later when consumers could take them outside the car, but they were still the size of a briefcase. As a result of this ownership of these bulky accessories was a sign of wealth and only the rich in developed countries could afford them. In 1990s the second generation phone was introduced and the first true cell phone call was made with these faster, quieter, and much smaller models (16). By this time, just 12 million people had cellular phone subscription (about 1 in every 500 people). The leaders of this list include U.S. on top followed by Japan and then Canada and China, some of the world’s most developed countries (17). Companies strived to make the devices more efficient and prices more affordable. The third generation came out soon after the second and included texting, cell phone usage then spread to the developing world masses and in the 2000s over a third of the US population had cell phone subscriptions. As of 2012, cell phone usage worldwide is over 90% and even including underdeveloped countries (18).

In the 1990s, seven years after the internet had been introduced, 3 million people had access. Only the wealthy could afford to use this service. The United States had the most people using the internet followed by countries in Western Europe. Underdeveloped countries in South America and Africa could not afford such luxuries. By 2000, the amount of users had increased significantly and usage spread to Asia, South America, and even parts of Africa (17). As of 2014 internet is use is approximately 3 billion and is constantly on the rise (19).
Table 1. Cell phone usage in different demographics as of 2014 (20)
Table 2. Internet usage in different demographics as of 2014 (21)

With large amounts of information now at our fingertips, it makes sense that most people want to have the newest smartphones or tablets. Social media is now the most popular source for news and marketing. This has inspired a culture of do it yourselers willing to take on challenges with the help of the internet. YouTube contains thousands of how to videos; if you want to know what to make for dinner, just type in your ingredients and you can get a recipe that will delight.
Now even healthcare is falling into this digital trend. Rather than going to a physician we can just pull out our handy devices, go online and try to figure out what conditions we might have. WebMD is one of the most popular information sites for self-diagnostics, and they even have an app now to make it more convenient. In order to use the app, you type in your age, gender and then signs and symptoms and it generates a list of possible conditions. With access to such a useful tool we should be able to identify and track possible disease breakouts and respond with proper containment and elimination procedures.

The Current System of Identifying and Communicable Disease (JG)

The most recent outbreak of Ebola Hemorrhagic Fever has sparked media outlets as well as the public into a disease-paranoid frenzy. The presence of a deadly, highly contagious, and difficult to cure disease has Americans fearing for the safety of their own lives and the lives of their loved ones. However, the question is, is their fear justified? We would like to think that in today’s age, with our nation’s advances in technology and communication that the chances of an outbreak occurring on American soil are rather minimal. But after examining the current system utilized to detect and contain communicable illnesses, we must admit that we are less than impressed.

Currently, there is no direct global system to which instances of communicable diseases are reported. Rather, occurrences of communicable disease are transmitted through a hierarchy of individuals and organizations (22). Although there are slight differences depending on the initial country in which a disease is detected, everything begins with the afflicted individual being seen and assessed by a medical professional such as a physician or a nurse. The medical professional confirms the presence of a dangerously and/or highly communicable disease in the patient. They are then typically required by law to report the presence of the disease, as well as demographic information regarding the patient (age, sex, race, gender, location, etc.) to a national health authority of some sort. If the national health authority deems the instance to be of international concern (or if they are in need of international aid), they will inform the World Health Organization (WHO). This particular link in the chain of disease reporting is universal for all international health concerns, as the WHO is the highest health authority (23).
After being adequately informed about an international health crisis, the WHO mobilizes its Global Alert and Response (GAR) System within the Department of Pandemic and Epidemic Diseases (PED) to assess the situation. This assessment typically consists of individuals from PED being dispatched to the scene of a potential outbreak. If an outbreak that poses an international threat is indeed confirmed in a particular region, resources from PED will be dedicated to containing and eliminating it. Specifically, the mission of PED includes “[developing] strategies, initiatives, and mechanisms to address priority emerging and re-emerging epidemic diseases, thereby reducing their impact on affected populations and limiting their international spread.

The method of disease identification and reporting in the United States follows a similar mechanism. The Center for Disease Control and Prevention (CDC) acts as the national health authority when dealing with communicable diseases within the United States. Through the National Notifiable Diseases Surveillance System (NNDSS), the CDC asks that a number of diseases be reported (24). A comprehensive list of reportable diseases can be found on the NNDSS Fact Sheet (http://www.cdc.gov/mmwr/PDF/wk/mm6153.pdf). However, the ultimate determination of when a communicable disease gets reported is left up to county laws. There are no strict rules established which counties must adhere to regarding disease reporting, but rather non-binding guidelines provided by the CDC. The majority of counties require hospitals to report all the illnesses advised by the CDC, however not all counties mandate immediate reporting of illnesses. Although no clear factual reason could be found, we hypothesize that this is done because immediate reporting of illnesses to the CDC would require hospitals within the county to update their equipment, an action that could prove to be very costly.

In some cases, where modern technology and speedy internet are utilized, information is transmitted immediately to the CDC. However, in many other cases, disease reports may be transmitted to the CDC on merely a daily or even weekly basis. This delay, compounded with the added fact that many individuals do not seek medical care immediately upon developing symptoms may allow days to pass without the CDC being made aware of a potential outbreak and without the afflicted individual being inhibited from transmitting their disease to others.

How is the Disease Actually Recognized? (JG)

From the NNDS Fact Sheet, we can see that there are a wide variety of diseases that the CDC would like to be reported should they present to a medical professional. The symptoms of these diseases are similar to other contagious illnesses, although not nearly as deadly. Ebola, for instance, exhibits very similar symptoms to the Flu at first. Without proper contextual information, a medical professional could easily misdiagnose a dangerous illness as something more mundane. Typically, lab tests for these more dangerous diseases are not performed unless reasonable cause exists to suggest that the individual might have contracted something more atypical. In the instance of diagnosing Ebola, this critical contextual information may be the patient’s recent travel to a location with lots of Ebola activity.

Unfortunately, no universal protocol exists for how a newly emerged, highly-communicable, highly-dangerous disease is to be handled. Protocol does exist, but on a state-to-state or county-to-county basis. The overall procedure usually requires evidence of abnormal levels of
contagiousness and mortality linked to the new disease. Multiple cases all exhibiting the same symptoms in the same geographical area bring attention to the new illness. Afterwards, lab tests are performed to firstly determine if the disease affecting all the afflicted is the same, and secondly to rule out the possibility of other already-known diseases. One protocol that is consistent is that no research into a cure or a vaccine is to be conducted by local hospitals. Rather, disease samples and information are transferred to the CDC (and in some cases the WHO) for them to analyze.

How is the Disease Actually Reported? (JG)

The NNDSS of the CDC has a variety of sources from which it gathers its information regarding diseases. Chief among these sources is the National Electronic Disease Surveillance System (NEDSS), which can be described as a system that facilitates electronically transferring public health surveillance data from the healthcare system to public health departments. NEDSS ensures an easy to understand and consistent method of transmitting disease information directly to the CDC. Additionally, it is provided free of charge to medical institutions by the CDC. Why then does not every jurisdiction utilize NEDSS? Despite NEDSS being free, its operation relies on costly sub-components that are not necessarily mandated in every hospital (such as fast internet and up-to-date computers).

Secondary to NEDSS is Electronic Laboratory Reporting (ELR). ELR can be described in the following quote by the CDC: “ELR is the automated transmission of laboratory-related data from commercial, public health, hospital, and other labs to state and local public health departments through an electronic health records (EHR) system or a Laboratory Information System (LIMS). Thankfully, ELR is standard in hospitals across the United States; however it does not transmit information regarding diagnoses. Information provided by ELR can raise a red flag in various public health departments if it fits certain criteria, however due to the sheer volume of lab reports received daily, use of ELR as a disease identification system has fallen secondary to NEDSS (which can definitively report the diagnosis of an individual).

A tertiary solution to reporting disease presents itself in the form of the currently outdated National Electronic Telecommunications System for Surveillance (NETSS). NETSS “is a computerized public health surveillance information system that provided the CDC with weekly data regarding nationally notifiable diseases”. NETSS is only used in jurisdictions that are not prepared to make the switch to NEDSS (again due to limitations in internet connectivity and/or technology). NETSS has been in use since 1990 and reports instances of communicable disease on merely a weekly basis. The CDC strongly urges all jurisdictions currently utilizing NETSS to upgrade to NEDSS via the NNDSS Modernization Initiative.

Finally, the CDC also receives information from disease-specific reporting systems. Because some diseases are so prolific (such as influenza, HIV, and varicella), they actually have their own reporting systems in addition to NEDSS/NETSS.

The Presence of Technology and its Benefits (JG)
In the Wall Street Journal Article “In the Fight Against Ebola, Connectivity Can Save Lives”, journalist Christopher Mims stresses the importance of technology in managing outbreaks (25). The primary role of the internet is indisputably communication. Whether this communication is from person to person, from organization to organization, or from a government to its people, valuable information is transmitted almost instantaneously.

In Africa, the internet is primarily accessed via mobile phones. These easy to use and comparatively cheap devices enable Africa’s inhabitants to access the internet wherever they may be. According to an Ivory Coast resident in the article, this access is “life or death”. The internet is the only modality through which many citizens receive reliable news and communication, being that the other infrastructures (such as state run news or television services) are not as well developed.

When an individual is determined to have a highly-communicable and deadly disease such as Ebola, it is essential to know which locations they frequented in the past few weeks. However, not many individuals are able to recall exactly where they visited during this time from memory alone. Mims discussed how cellular service companies within Africa were actually voluntarily providing GPS data from afflicted customer’s phones upon request from the WHO. This GPS data allows medical professionals and disease-containment agencies to analyze where a patient has been and determine if their zone of quarantine should be extended or not.

**Why Timing is of the Utmost Importance (JG)**

In reporting instances of communicable disease, timeliness should be a top priority. To analyze its importance, let us examine the recent spread of Ebola into the United States. The vehicle of transmission to our nation was a visiting Liberian man by the name of Thomas Duncan (26). Duncan was a cab driver from Liberia, a then hot-spot for Ebola activity. He arrived on American soil to visit his family in Dallas, Texas on September 20th. On the morning of September 24th, he began to develop abdominal pain, dizziness, nausea, and a high fever. It is at this point, once the afflicted individual becomes symptomatic, that they become capable of spreading Ebola through bodily fluids. Not knowing that he had Ebola, Duncan admitted himself to the emergency room of Dallas Presbyterian Hospital more than 24 hours later on the evening of September 25th. He was assessed, misdiagnosed with sinusitis, and released from the hospital the same evening. On the 28th, over 96 hours since becoming symptomatic, Duncan was re-admitted to Dallas Presbyterian with worsened symptoms. Once it was noted that Duncan had recently been in Liberia, he was placed in quarantine and the CDC was notified immediately. Test results on the 30th confirmed that Duncan did indeed have Ebola. A CDC response team was dispatched shortly after to assist in quarantine operations.

Overall, Duncan was exposed to numerous other individuals while capable of spreading the disease for over 96 hours. Every person whom he had contact with (well over 100 people) during this time had to be enumerated, individually quarantined, and assessed for possible symptoms of Ebola. Fortunately, only two individuals (both of them nurses from Dallas Presbyterian) began to show symptoms of Ebola. Both were quarantined and successfully treated, being able to walk away from the experience with their lives – a fate that Duncan was unable to be given.
However, one cannot ignore the fact that this situation could have turned out much worse. What if one of the individuals Duncan infected was not a non-travelling medical professional with immediate access to top-quality healthcare? What if the individual was a frequent traveler, or unable to receive immediate healthcare due to their finances or legal status? This newly infected individual would then be afforded the opportunity to infect others. If this had become the case the United States could have experienced a devastating epidemic. Thankfully, this was not the case – but it easily could have been. It should be of extremely high priority to ensure this sensitive time between when an individual becomes capable of spreading a highly communicable disease and when they receive treatment and quarantine is minimized as much as possible.

The Role of Increased Population (JG)

It is no secret that the size of our population of the world has been increasing since humans first came to be on this planet. What some may find alarming is the rate at which we our population has been growing. Many might think that our population grows steadily and linearly, however data from the computational and statistical search engine, WolframAlpha demonstrates that our population growth actually follows an exponential trend (27). That is to say, that over the majority of our existence, the rate of growth of our population has been increasing in and of itself.
The current human population of the world exceeds 7 billion (28). In the year 1960, merely 54 years ago, our population was less than half of this value at 3.03 billion. Many individuals born in and around the 1960s are still alive today in a world with more than double the population they were born into. Why is this important? According to the famed population analyst Thomas Malthus, an increase in population begets an increase in susceptibility to disease due to greater social interaction. Rather simply, if the volume of space in which humanity occupies (which is currently limited to Earth) does not increase, but the population of Earth increases, there will be less livable space available per individual, and increased interaction between individuals will be necessitated. Interaction is, of course, the method by which diseases spread. Whether the disease spreads via air, blood, or other bodily fluids, increased proximity will result in increased opportunities for these sorts of interactions to occur and thus increased opportunity for the transmission of disease.

Why then, has the human race not been completely overrun and ravaged with uncontrollable disease? The answer is largely due to advances in technology – advances that bring about cures and vaccines for these harmful diseases, as well as hygienic advancements that help to block the spread of disease. But again, why is this important? The rate at which our population is growing and the resultant level of social interaction may be trumping our crutch of technological advancements. In recent years we have seen an alarming amount of worldwide outbreaks of disease from the SARS outbreak in 2002 to the “Swine Flu” of 2009 to the Ebola outbreak of 2014. This calls into question just how well our current system of identifying and reacting to communicable diseases will perform in the future as our population continues to grow.

Although the population growth of the world has decreased and leveled out to approximately 1% per year over previous years, one must take into account that this still results in exponential growth of a population. 1% of this year’s population of approximately 7 billion is 70 million. Next year, the increase in our population will likely be 1% of 7 billion plus 70 million yielding 70 million 700 thousand individuals. This value will continue to grow as our base population increases, resulting in an exponential increase in population, social interaction, and the possibility for transmission of disease.

The Risk of the Afflicted Not Being Seen by a Medical Professional (JG)
What happens when a highly communicable disease is not reported? This happens more often than we would like to think, and can be due to the individual dying prior to being seen by a medical professional, or financial/cultural impediments to seeing a medical professional. To outline the importance of the disease actually being reported, let us imagine the emergence of a new, highly-contagious, extremely deadly disease. This disease, which we will simply refer to as “Disease A”, kills its host within hours of them becoming symptomatic. Because a visit to the doctor’s office or hospital can prove rather costly, most individuals do not immediately consign to a visit at the mere emergence of a cough or a fever, even if they are relatively severe. In an informal poll of individuals from Rutgers University, 18 out of 22 (82%) individuals stated that they would wait a minimum of one day since the onset of symptoms prior to seeing a physician, even if those symptoms were severe. When questioned as to why they chose to wait one day, many individuals stated that they wished to abstain from an expensive medical visit until they were entirely certain it was required. Although Disease A would likely be discovered in the United States due to the thorough process of autopsies, it may not be identified for quite some time in nations with less capable medical systems and less social interaction between individuals (due to lesser population density).

It is speculated that the current Ebola outbreak originated in Guinea due to similar circumstances. Guinea, which has a significantly less capable disease detection system, was unable to swiftly identify the disease. “Patient Zero” was a 2-year old toddler in a small village, miles away from any major medical facilities (29). The disease next spread to the family of the toddler, and then to the rest of the village. Medical intervention was minimal, as many were culturally opposed to the methods of modern medicine. Even those who were not opposed to medicine were unwilling to travel many miles and use valuable resources to receive mediocre medical care. By the time the WHO was informed of the situation, the entire village had already been decimated by Ebola, and the disease was spreading like wildfire throughout Western Africa.

If a mode of communication existed that enabled citizens to sidestep the costly medical visits and interface directly with national and international disease-monitoring agencies such as the CDC and WHO, Ebola may very well have been culled before it left the village in which it emerged.

Community Action: How to Report Episodes of Disease Outbreak

Plan A – Providing a New Application as a Solution (JG)

Our initial plan was to develop a downloadable application which individuals could utilize to document and securely transmit observations of communicable disease to a national health authority. In response to this problem, we suggest the development of the Reporting Episodes of Disease Outbreak (REDO) System. This system will not replace the current approach to disease identification and containment, but rather supplement it. More specifically, the goal of REDO will be to place the ability to report symptoms of potentially communicable diseases into the hands of the common citizen by way of a mobile application. The slow, inconsistent process of physicians reporting disease would be complemented by our application which allows almost anyone to quickly submit their symptoms to be assessed by a central health authority without an advanced level of knowledge of either medicine or technology. Over 7 billion mobile devices
exist worldwide, with the majority of them running the versatile iOS or Android operating systems. All of these devices will be capable of downloading and utilizing the application to report potential illness.

What Would the App Look Like? (JG)

The application would be built from the ground up with simplicity and ubiquity in mind. One of the pillars of the project would be to ensure that REDO is able to be used by anyone, regardless of language or educational level.

Upon first launching the application, the user would be prompted to select their language from an extensive list of languages contained within the application. From that point forward, all text presented will be in the preferred language of the user. Furthermore, all text utilized within the application will be selected for brevity and simplicity; users will not necessarily need to be completely literate to use the application.

After entering the application, the top two-thirds of the screen would be dominated by a map of the surrounding area with a radius of display that can be adjusted by the user. The map will be populated by red markers, each representing the GPS coordinates where a notable symptom was reported. It was in our original set of blueprints to include the ability for these red markers to be tapped to display generic, non-identifying information about the symptom reported at those coordinates to the user. For example, a marker may be tapped to display a text box with the following information: “Symptom(s): Blood in stool, Reported: 10/5/14”. However, further research is required to determine if displaying this information to a non-health authority would violate the Health Insurance Portability and Accountability Act (HIPAA). If this feature would indeed be in violation of HIPAA, it could easily be removed without much consequence.

The bottom one-third of the screen would be dedicated to a large and easily recognizable button that will state “SUBMIT SYMPTOM” in the user’s chosen language. Upon being tapped, a page will present itself with a number of fields to be populated by the user. The primary field required to submission of the form would be entitled: “How are you feeling?”. The user would submit a brief description (less than 200 characters) of their symptoms into this field. Additional optional fields could be added that would serve to give a central health authority a better picture of the situation. These fields would include name, age, address, phone number, and additional symptom descriptions, again as long as they are compliant with HIPAA. A snapshot of the user’s GPS coordinates would also be recorded as well. After filling in the fields to the best of their ability, the user would then tap a “SUBMIT” button, which would populate all of the entered information into a .txt file and send it to a central health authority.
What Happens to Personal Information? (JG)

All information submitted into the application would be quickly and securely transmitted to the appropriate central health authority. It would be ideal if, in addition to the CDC of the United States, to integrate this system with other national health systems as well. After receiving multiple reports, either an epidemiologist or a sophisticated computer algorithm can assess the severity of a potential outbreak (23). Factors that would be taken into account when assessing this risk include the proximity of reports relative to each other as well as their nature and similarity. A threshold could be set so that if a certain volume of individuals report similar symptoms in a given area, the region would be flagged and assessed further for possible intervention. For instance, if 2000 reports of congestion, fever, nausea, and vomiting were to be submitted within a mile radius, the situation may be escalated due to a potential outbreak of influenza pending further investigation by a team of epidemiologists.

Virtually no identifying information would be released to any party without the user’s consent. After selecting their desired language, but prior to actually using the application, the user would be prompted to accept Terms & Conditions that would explicitly outline that their information would be released to a central health authority.

Marketing the APP through Social Media (SA)

The creation and development of REDO will need to be advertised to reach a large number of people. A disease needs to be identified and addressed before being covered by sensationalist media coverage. Marketing through social media including Facebook, Twitter, Instagram and other sites will allow millions of people to be more aware, knowledgeable and alert of communicable illness. Social media marketing allows millions to be reached within an instant. REDO needs to be marketed to spread word of its inception. The information shared about the product can inform others to download the product on their smartphones and receive news on their phone at any possible moment. There’s no way quicker to get the name of our product out than social media because it is used by all age groups to not only receive information, but also to share with others.

What do we envision for REDO in the future through social media? (SA)

This product is only as effective and successful as long as the demand for the product stays strong as it continues to grow. Marketing attempts to achieve, maintain, and raise the standard of living in society because it facilitates innovative and quality products, such as REDO. This app holds the potential to assist citizens of not only in the United States, but also the rest of the world as it promotes, protects, and prolongs the lives of individuals through awareness, expertise, and knowledge. The goal of public health is to serve and protect citizens through all possible measurable efforts that range from public service announcements to news feeds on websites. The goal of public health officials is bringing the information to as many people as humanly possible. We want to make REDO accessible for everyone that has a smart-phone because if people are willing to get updates via Facebook, Instagram, or other inane avenues, they are definitely willing to get updates about a virus that could possibly affect and harm a loved one or themselves if they don’t get the proper information about its location, spread, and
recommendations to stay safe. Thus, its importance cannot be understated because without this product, the information about the location, spread, or possible impact of any potential virus is significantly slowed.

**What does REDO want to accomplish?** (SA)

The success of any product is not attributed to just marketing alone; it starts with intuition. An idea such as ours requires the synthesis of talent, diligence, and teamwork to attain our goals. The people responsible for the direction, planning, and strategic execution of this product should establish a mission statement that will address the needs to serve, protect, and prolong the lives of individuals through an app that can be accessed anywhere to provide news alerts on the symptoms of a virus or illness on a minute to minute basis. Our mission statement will provide insight on how we plan on informing others and how we are going to track the location and spread of disease. Our mission statement might be as follows: “REDO is an app committed to tracking and containing disease for people all across the world. With the ability to be accessed anywhere, REDO will protect and prolong the lives of individuals by providing important information about diseases to the organizations that can best respond to them.” No application’s success occurs overnight and there has never been an application that moves forward without establishing clear, measurable objectives. An objective allows us to set an agenda to accomplish our goals and our measurable results will determine the benefits it brings to society. Without a mission statement, there’s no application because there is no agenda to set clear objectives and achieve those through planning. As a result, the foundation for our application begins and ends with a mission statement because it answers the utmost, significant question of any application.

What have you accomplished?

**What’s our vision for REDO?** (SA)

As the saying goes, “What comes around must go around”. The vision statement goes hand-in-hand with the mission statement because the vision statement measures the goals that the creators of REDO want to measure. We want to develop this app with the goal of it being accessed via mobile phones, so people are able to access information, pinpoint their location, and track instances of disease at their fingertips. Our vision statement focuses on how the creators want to see the application within the first few months, which would be our goal for consumers of North America to possess this app and within a year, the goal is to be able to spread this app worldwide. Our mission statement builds the groundwork necessary for what we want to accomplish, but our vision statement is our first step because it’s our clearly visualized, inspirational goal. Our vision statement is as follows: “Empowering people to save lives anyplace, anytime with the mere touch of a finger.” Our software app begins with a vision statement on how we want to bring change into the world and how we plan on doing so by using a smart-phone. The moment this app gains notoriety and acceptance among mobile users, our vision of saving lives will be the measuring stick for us to work harder, faster, and more efficiently than any application competing with our product. Our motivation will determine how far we go as an application and our vision is the vision for the future, the hope that will save lives and change the way technology shapes the lives of people all over the world.

**Are we legally allowed to reveal information for the future of an app?** (SA)
The Health Insurance Portability and Accountability Act (HIPAA) outline would be important to REDO because it would discuss regulations regarding privacy and informed consent. HIPAA clearly outlines that informed consent must occur for our application to post health information on individuals without informed consent. Under the authorization of HIPPA for marketing, there seems to be an underlying loophole. Directly from HIPAA: “But covered entities may communicate freely with patients about treatment options and other health-related information, including disease-management programs.” The importance of this quote is that our app is disease-management software with our ultimate goal to deliver awareness and location of potential viruses or diseases through technology. We are not revealing information specifically on particular individuals or families; rather we are focusing on tracking locations and establishing a guideline for people to be aware of their surroundings. We do not need authorization for a health program about certain individual’s virus or disease because we are not trying to specifically point out individuals for others to avoid as a result. Rather, we are pinpointing the location of the disease and bring awareness, so others do not catch it. Our goal as a public health organization would be to promote, protect, and prolong the lives of all individuals across the communities to make a much safer and healthier society as a result.

The Current State of the App (JG)

As of yet, a REDO application has still not begun development and the REDO app is merely at the idea stage. We lack the funds and technological know-how to create a mobile application. To facilitate the inception of a REDO app, we would need to procure funding as well as an organization that would be willing to develop it. In order to provide the infrastructure to report episodes of disease outbreak, we examined the use of existing social media platforms.

As an alternative to a mobile application, our team has been researching methods through which REDO could exist outside of an application (Plan B). Social media is an ideal environment for this alternative development option. Websites, such as Geofeedia.com for example, are capable of identifying and analyzing the posting trends of people on social media. What an individual is posting, their time, and their location can all be identified through the use of Geofeedia. Social networking is even more widely used than mobile devices. However, with their current system, there is no way to make the posting anonymous. If an individual reported that they had a rather intimate symptom such as blood in their stool or a yeast infection, this post would be broadcast to all of their friends with the poster’s name exposed. Additionally, the service offered by Geofeedia requires payment; once again presenting the issue of generating funds. Plan B is further investigated below.

Plan B- How to Use Existing Social Media Platforms to Report Illnesses (SA)

Upon further review, the goal of the app and our organization REDO (Reporting Episodes of Disease Outbreak System) is to promote, prolong and protect the lives of individuals though education and awareness. The REDO app is the first step, but a system needs to be implemented to bring people together for information to spread quicker from individual to individual. We want to use social media because it gives the platform to reach wider groups of people from all demographics and it can essentially be used by anyone. We came up with the idea of using Twitter as a site for reading, accessing, and sharing information from one user to another. Twitter
is the fastest growing social media website on the Internet and it’s growing at a geometric rate of over forty percent each month (30).

**How the Hashtag Works (SA)**

Through the major news stories and information spreading through the internet, Twitter has served as a voice for the opinions of its users. When reading upon the information, the Twitter user often leaves a comment on the topic and shares it with others. For example, suppose a Twitter user writes a post on how the event of an Australian criminal taking hostages in a café and having a standoff with police to listen to his specific demands. The individual then adds after the post, #Australian standoff. The # is a symbol for hashtag, which allows people to add onto a comment. When someone reads the tweet, they put in their comment about the situation going on in Australia or something relevant, and then they add #Australian standoff. Since the media coverage on this topic has been expansive, people will want to read their posts, add their comment and the post spreads like a wildfire on the internet. As a result, our organization, REDO will use our setup to explain how we want to get the message to the social media public and the public at large (31).

**Twitter and REDO**

A Twitter account could be named REDO and we will demonstrate its applicability. Our goal is to be able to provide a platform that allows people to post information about their symptoms anonymously and use a social media site such as Twitter to do so. They can be able to post their symptoms and their address; however we recommend that they do not give their specific address. We recommend they put a major building or simply the street’s name rather than their specific address to avoid any safety concerns. For example, an individual living in France or Germany would not be concerned about the symptoms of citizens of New Jersey. Instead, they would care about the symptoms in their respective countries. An individual in Paris can be able to use REDO because they can post #illnessregion. As an organization, we will encourage users to use region, province, or municipality for the #illness (province/state/region). Thus, when the user posts information on Twitter about the symptoms and the major address, their #illnessregion for example would clarify any potential confusion with areas in other parts of the world and it also will make it easier for the user to sort through organized information without wasting any time by clicking on the hashtag (#illnessregion).

In its application to the United States, the user is simply able to post #illnessstate. Thus, an individual living in New Jersey can be able to identify whether or not a specific location would be ideal to visit in this particular time or place. The organization of the posts allows the users to make an informed decision by weighing the risks associated with symptoms and helps determine if the symptoms jeopardize their safety by going to that specific area.

**REDO will be Responsible for Communicating Information to Health Authorities (JG)**

Prior to a reaction from any health agencies, clear and comprehensive information regarding the location and frequency of illness must be provided. There are two methods that we could use to procure this location/frequency information and transmit it to health authorities. Firstly, we
could analyze tweets with the #illness handle manually, requiring individuals to persistently comb the universal twitter feed. Once a #illness tweet had been identified, the location would be recorded. Obviously, more tweets coming from geographically similar locations at an increased frequency might point to a potential outbreak. If a particular trend is noticed, such as the one previously mentioned, the health authorities of the county in which the outbreak may be occurring will be notified and provided with the data for their own analysis.

On the other hand, we could utilize a service that would automate the process. Harvard’s WorldMap (32) is an application that automatically analyzes and archives each and every tweet on Twitter, along with its location information (should the individual choose to share their location). On WorldMap, tweets appear as small blue dots at the location where they were reported atop a Google Maps layout. Specific lines of text can be searched for to narrow down the amount of dots on the map. Additionally, the times of tweets can be filtered. This is where WorldMap’s only shortcoming presents itself: the latest tweets that it displays are over ten days old. This delay is likely due to the extensive amount of processing required to archive and analyze millions of tweets per day. WorldMap is still in alpha stages now, so improvements may be made as the program matures.

If tweets become be viewable in real-time via WorldMap, it would tremendously assist REDO. Just as with the manual system of analyzing illnesses, once a heightened amount of tweets regarding a particular illness are identified as coming from similar locations, the county in which those locations reside will be notified and provided with our data.

Why Twitter Will Work NOW (SA)

Through its utilization of communication among peers and its function as an information database, Twitter has changed the lives of millions upon millions of people. The name of our organization is REDO, which stands for Reporting Episodes of Disease Outbreak System. We want to be able to tap into a market that allows information to be spread within a matter of seconds and it can be accessible by anyone that has access to a device with internet connection. Twitter can be accessed through an iPad, computer, lab-top, a mobile device or any other technology that enables internet connection. We decided to use Twitter because it’s an emerging social media market with well-over six-hundred million users and growing at an arithmetic pace. Twitter gives us our mission of protecting, promoting, and prolonging the lives of individuals through awareness and education. It allows information to be accessed, spread, and shared from one person to another. As an organization, there’s no better way to combat our mission of prolonging the lives of individuals by informing them the health consequences of visiting a certain area and how people can be given prior knowledge before visiting a certain area as a result.

REDO’s Twitter Post (SA)

Twitter will be our haven for marketing our organization, REDO. This is how would devise the plan. The first step involves the creation of our user name, which would be REDO. Once we are registered, we can post any information, however specifically we want to spread the word about our new company and how we plan on accomplishing our objective of protecting as well as
promoting health through awareness and education. Instead of using our mission statement, we will devise simple shorthand approach to capture the reader’s attention and bring our product to the forefront. Our mission statement tells us what we want to accomplish, but the user on Twitter wants to be able to read a post that is engaging, creative and informative. If they find these characteristics in our Tweet, they will share it with others who read and it becomes viral within a matter minutes. Our post will be the driving force behind our company, but we need to keep it concise and precise. We will create a profile page for Twitter, which asks you to fill out certain information and you can pick a topic related to health, which asks you to follow certain Twitter users. We are going to type the following in our post: REDO allows you to post information anonymously about the location of your illness or someone you know and the specific kind of illness. Following this tweet, if anyone talks about their symptoms or that of someone else, they will be able to see the hashtag and access the responses that others have posted as a result.

**How Twitter Tracks all the Tweets (SA)**

Twitter’s uniqueness relies upon the posts of the user and dictates any information they want to communicate such as expressing an emotion, discussing a current event issue or conveying an idea. The user is responsible for writing a post and sending it for his or her followers to read. The term “followers” is just another word for friend, since they usually follow one another on Twitter. The most unique feature of Twitter is that it allows the user to be his or herself without tracking their location, thoughts or whereabouts. Twitter does not have a mapping system because they do not track the location of the user’s tweets unless the user posts that information themselves or update it on their profile page. However, the responsibility for accumulating and tracking all those tweets will be done by REDO (Reporting Episodes of Disease Outbreak System). As an organization with the goal to promote, protect and prolong the lives of individuals through education and awareness, we are fully aware of how to ensure the Tweets are organized by our organization and how we can use those tweets to communicate with other twitter users.

The crucial question that one may ask when it comes to Twitter would be “How will REDO manage all the tweets?” To be successful in anything in life, whether it’s playing on a team, serving in the military or balancing one’s lifestyle, two qualities are imperative: discipline and organization. Discipline is a vital component of any organization; being able to find the smallest detail in our life, design a plan, execute that plan and continue to focus on making that plan better. Organization is another key component because we need to keep everything organized and simplified, so that any twitter user can access information without any confusion. We need discipline to continue to send out Tweets about our organization, whether or not anyone follows us. Once we continue to tweet and carry out our goal of bringing more and more followers, then we will able to spread the word more effectively. Once we become established, organization follows by establishing twitter pages for #illness state. When you post information about your address and the symptoms, you put a hashtag with the words illness and the state that you are currently located in. When the Twitter user posts information, there would be a page with the #illness state. The Twitter page becomes organized because you present your symptoms and your location with a hashtag of the state you are currently located in. It creates a feasible and pleasant experience for the user because they are able to skim through all the updates given on that page.
and within a matter of minutes, they are thus able to determine if going to that specific location would be beneficial or not. As a result, organization is the key component because the user has to be able to find information at any moment without being bewildered by the technology. A demonstration will be shown below.

Application of our Twitter APP using “Real Person” (SA)

The following is an application of a made-up Twitter user, whose information we are using to illustrate its ease and effectiveness in spreading the tweet within a matter of moments. Sam Smith creates another user name called TheMysteryMan. He’s been feeling a little under the weather lately. He can post the following information: I feel nauseous, am vomiting, have diarrhea, headache, and a sore throat. The location is near 33 Livingston Avenue, New Brunswick, NJ. #illnessNJ. This ability for Sam Smith to post the symptoms of his illness anonymously and using a different user name allows him to bring awareness about his symptoms. He also gives an address of the Bloustein School of Public Health, which is located on Livingston Avenue. He gave a location of a major building on the street and there are houses near that area, so Sam never reveals to a random stranger about the precise location of his address. His posts and address eliminate any doubt about the possible anonymity one can use when it comes to Twitter and posting the symptoms.

What The Twitter User Needs to be Aware of (SA)

It’s is highly recommended that the Twitter user uses another Twitter name, so their real name would not be shown and no one knows their information pertaining to street address or the location of their area. It’s a safety concern that should be taken seriously. We encourage people to take the following steps when it comes to reporting their illness. The first step involves setting up another account, which doesn’t tip off anyone about your identification. It only takes a minute or two to fill out one’s information. Also, it is advisable that one does not post a real picture or one can use an avatar as a profile picture. The next step would be to post the information when it comes to the symptom and the location. Make sure the location is not specific, use a general area as a reference frame including a major building or a street. It’s also important to keep the post under 140 characters as per Twitter limitations on word count (34). Finally, you insert the # illnessstate. Following your post, your information will be read by others who may come across the tag word illness and be alerted about the possible precautions about entering a specific area. As a result, Twitter could be a savior as long as proper procedure and protocols are taken. It can help REDO advance as an organization and this platform provides the opportunity to spread the word about our organization.

How to differentiate between the actual Flu and Twitter Users just discussing the Flu? (SA)

Through the use of Johns Hopkins statistical software system that is based on human-language processing technologies, we are able to identify two key elements before we discuss the development of our map. Our first issue would be differentiating between those individuals who have the flu and those who are simply talking about it. For example, “I have the flu and I will be sick” is very different than “I have Justin Bieber Fever.” This statistical software system differentiates between the flu and even though Justin Bieber does not actually have a fever,
REDO (Reporting Episodes of Disease Outbreak System) wants an overall picture of public’s health information to identify trends and risks factors for the prevention of an outbreak. Our other advantage of using Johns Hopkins statistical software product through Twitter would be the accurate results that are yielded in a time span of approximately few to several weeks earlier than the CDC (35). If we were able to contain the spread of the diseases and prevent its distribution from infecting others, then we can prolong the lives of others through a more sophisticated software system through the assistance of Johns Hopkins University.

**Does Twitter Create Maps and how does this apply to REDO? (SA)**

How can the police, Dr. Greber and Twitter help REDO out? Well, the police are starting to use a tracking system called KDE (Kernel Density Estimation). This involves real time Twitter posts by its users that is based more on a mathematical probability than a meta-physical one. It’s a simplified version in which they look at a criminal record at a specific geographic location and use a probability function to calculate the possibility of a crime occurring in that area. There are certain algorithms in the Twitter posts in terms of language and post. If people are planning on going to the bars, parties, clubs and these events often correlate with crime depending on the area (36). In our application to REDO, we can apply KDE to Twitter. We can use previous areas that have had outbreaks and calculate the probability function of an illness in that specific area. Through the assistance of the software statistical program from Johns Hopkins and the Kernel Density Estimation, we can be able to determine the likelihood of an outbreak occurring in the area and also simplifying the text to reduce the number of unnecessary posts on Twitter. Through the combination of KDE and Twitter, REDO can target specific geographic locations. Finally, the virtual map is created on Twitter by the GPS tagged Tweets. When you sign up on Twitter, you have the option of opt-in for Twitter and most, if not all people on Twitter do it because they want others to read their post. Once the GPS tags in the tweet, there is a virtual map created to target hotspots, which in our case would be the areas specifically designed to target symptoms and illnesses. Once we are able to find our target, we can then be able to inform the public about the risk of obtaining an illness in the area and allow people to form their own decisions. Below is an example of a map created by the GPS tagged tweets.
We strongly believe that it would be extremely beneficial for the health and well-being of everyone, whether it is a small village, a community or the world, if a formalized system or process existed that would immediately identify locations and symptoms of disease. Engaging everyday people to aid in this mission, we believe, is the way to go. In order to pass our idea on to organizations whose role it is to monitor, assess, and advise the health of all individuals, we have sent the letter below to the CDC and the WHO.

**Letter to the CDC/WHO (JG, JF)**

Given the recent epidemic events (outbreak of Ebola hemorrhagic fever), a tremendous amount of pressure has been placed on both healthcare professionals, the CDC, and WHO to ensure the population is protected against illness. As we saw in the first diagnosed case of Ebola in the United States, the patient waited more than two days from the onset of symptoms to the point of care at Dallas Presbyterian Hospital. If this sort of delay in reporting potential illness occurred on a widespread level, it could spell disaster for any given population.

We believe that a mobile application that places the role of reporting the symptoms of communicable diseases into the hands of the everyday citizen would provide an essential supplement to how diseases are reported currently. This is not to say a citizen will be able to self-diagnose themselves with Ebola, Yellow Fever, flu or foodborne illness. What this does imply is that anyone with a mobile device will be able to swiftly and securely submit GPS-flagged symptomatic information directly to a central health authority such as the CDC or the WHO.

The goal of this application is not to ensure increased priority of care of any one individual, but rather increased priority of care for an entire population that may be on the verge of an epidemic. An example of the system in action would be the following: If the CDC or WHO or any other health authority received 2000 independent reports of congestion, fever, nausea, and vomiting within a timeframe of three days, and a radius of one mile, the situation could be flagged and examined by an epidemiologist for possible intervention. We are unaware of the CDC’s exact criteria as to what qualifies as an epidemic that elicits intervention, thus all numbers utilized in this example are arbitrary. However, the central outcome is that these possible cases of communicable disease would be reported to a professional medical institution much more quickly than if each person were to wait until they had seen a physician to have the disease reported. Of course, each user will be encouraged to consult a medical professional in addition to submitting their symptoms.

We believe that you, the CDC and WHO, should work together to develop a mobile application that would empower citizens to report episodes of disease outbreak. While we are very enthusiastic about its usefulness, we lack the technological experience and the funding to actually bring such an application to fruition. We have attached a copy of our paper (which should be googleable in a few months and hope that you will seriously consider engaging the public in helping to report episodes of disease outbreak.

Please contact Professor Julie Fagan, Rutgers University for further information.

**References**


Letters to the Editor

Dear Press of Atlantic City,

My name is Ebanehita Eigbe and I am an undergraduate student of Rutgers the State University in the School of environmental and Biological Sciences. We are writing to raise awareness about an application we are developing that has the potential to save lives. REDO (Reporting Episodes of Disease Outbreak) is still under development but we would like spread the word of its progress in order to hit the ground running upon it’s release. We are currently in contact with WHO and CDC in order to optimize the utility of the system. If you have any questions, comments, or concerns please feel free to contact me. Thank you for your time and we look forward to hearing from you.

Ebola hemorrhagic fever or simply Ebola is a devastating communicable disease that can be seen in almost all form of media in recent days. You can turn to one channel and the news will have stories of nurses being quarantined and then switch to another channel and have a comedian making joking at the impracticality of the Ebola protocol. The disease is very serious and continues to spread despite the efforts to contain it. As possible victims it is the right of all of us to do whatever we can to detect and prevent the extent of this outbreak. Consequentially, as part of a service project my group and I have thought up a solution to aid in the efforts in the Ebola campaign. In keeping with the growing technology age we are currently working on a cell phone application that if used properly could help identify initial incidences of infectious diseases before it can spread to the populous. REDO (Reporting Episodes of Disease Outbreak) is in no way meant to replace the current system of detection or reporting of outbreaks, but to supplement the World Health Organization, Center of Disease Control, and other programs set up to protect the citizens around the world. The Program would be accessible from any device with app capabilities and is a way to empower people to protect themselves with their own fingers. Use of the app would be as easy as pulling out your phone, and after a series of prompt the information could be sent to a central location for analysis. There will be a mapping feature and if appropriate a marker will be placed at the location of the incident reported. This mapping system will be available to anyone with the app, increase awareness of the event in a matter of minutes rather than days. Thus, REDO has the capacity to increase education, awareness, tracking, and prevention of disease and could be the tool that saves a life.

Ebenehita Eigbe

Letter to the Editor-Sent 10/21/14

Cover letter for the Letter to the Daily Targum - Sameer 10/21/14

We are sending this letter for other possible suggestions to reach wider spectrum of people. Social media has a huge platform to reach large groups of people and it provides the foundation for our application to set out our goals to prevent the spread of illness as well as to save lives. As
we continue to develop and work on our app called GOLD (General Outbreak Location Detection), we need to continue looking forward to reach older groups of people. We do not know exactly how to address the issues of an elderly population (65 or older) and how they will be able to gather information to our app. Please provide any recommendations if possible. Your opinion certainly counts.

Dear Daily Targum

My name is Sameer Ahmed. I am an undergraduate currently attending the School of Environmental and Biological Sciences at Rutgers University. In one of my courses, Ethics in Science, my group has been formed to undergo a service project that identifies an ethical issue and provide an alternative. Our group has to identify a potential problem, come up with possible solutions, and possibly implement those solutions.

The protecting and improving of health in society through education, promotion of healthy living, as well as through research to prevent injury and disease is not just public health, it’s our main focus. Through the development and application of GOLD (General Outbreak Location Detection), our goal isn’t the cliché to change the world, rather our goal is to educate, aware, and track the disease to prevent others from getting it. The question becomes how do we move forward with this product? Our goal is to market this product through all forms of social media including Facebook, Twitter, LinkedIn, Instagram, Twitter, etc. Recent trends have pointed out that 78% of the world uses some form of social media to gather information and this market needs to be accessed. Companies are increasingly advertising on social media because it provides the platform necessary to bring awareness about their products, but the education about the symptoms and effective methods necessary to prevent oneself from gaining any illness from others will be the staple of our GOLD.

Our App is simple in terms of our mission and what we envision doing with our app. Our mission statement is our measurable goal and it follows as this: “The General Outbreak Location Detection is an app committed to educating, tracking, and containing the viruses to not only the citizens of the United States, but to the citizens all across the world. This app can be accessed on smart phones combined with our goal to promote, protect, and prolong the lives of people all over the world by providing the necessary information to avoid possible dreadful diseases”. Our mission is very clear in the foundation that the app sets to accomplish our goals of bringing a healthier and safer society to not only this country, but all over the world. This is not about protecting a certain group of individuals; rather it’s our belief in the product that will make this APP applicable and successful in the long run. The world is globalizing and cell-phones are accessible as other technological products such as televisions, radios, lPads, etc. We need to envision not only a safer world, but a better future for upcoming generations. Through technology and health, our vision is this statement. “Empower people through great application anytime, anyplace through the touch of your fingertips on your mobile device.” Our goal is to develop an app that allows access to as many individuals as possible, providing an opportunity to promote, protect and prolong the lives of people all across the world.

From its original conception, Gold (General Outbreak Location Detection) has a powerful marketing tool that cannot be found anywhere in the market. It brings a combination of
education, awareness, tracking, and prevention from gaining illness before news gets out. For instance, the second Ebola victim who was a nurse traveled days before finding out that she had the virus. Under this new technology, it wouldn’t take the media an ample amount of days to figure out where and when the virus has spread. Under our app, information can be available in matter of seconds with a touch of the finger. GOLD can revolutionize the way that not only illnesses are reported, but how they can be reported without anonymity being stripped away in contrast to how the media shames its victims. Thus, GOLD (General Outbreak Location Detection) provides the blueprint necessary to create a more efficient as well as savvy app that can prevent possible illnesses and bring awareness, but save lives more importantly.