

EBOLA

Throughout 2014 the international community became increasingly concerned about the outbreak of a deadly virus in three West African nations. On August 8, the World Health Organisation Director-General declared this outbreak a ***Public Health Emergency of International Concern***. An international effort followed to treat the Ebola victims and stop the virus spreading.

The Ebola virus causes an acute, serious illness which is often fatal if untreated. The current outbreak in West Africa is the largest and most complex Ebola outbreak since the Ebola virus was first discovered in 1976. There have been more cases and deaths in this outbreak than all others combined.

Ebola has spread within and between countries at an alarming rate. The outbreak began in Guinea then spread across land borders to Sierra Leone and Liberia with a few cases in other African countries. Some countries outside Africa have also reported cases of Ebola due to the movement of people; mostly doctors and nurses returning home after treating Ebola victims.



Introduction

This resource, Ebola, has been written for the New Zealand Curriculum. The resource provides a context for use in the teaching and learning of Social Studies. An aim of the resource is to provide a context to examine how the movement of Ebola-infected people between places has consequences for the people and the places. Suggested learning activities for students, together with expected outcomes, are provided.

In Social Studies this resource can be used to examine the level 5 achievement objective:

Understand that people move between places and how this has consequences for the people and the places

A learning objective is that students will expand their understanding of the Ebola epidemic and how people, governments and organisations have responded to it. It is expected that students will develop skills to think critically and reflectively about the movement of Ebola-infected people between places and how this has had consequences for the people and places. Students should be given the opportunity to consider how their own lives could be influenced by the movement of people infected with the Ebola virus and evaluate how their participation as citizens of New Zealand has been influenced by this significant historical event.

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LINKS TO THE CURRICULUM

Understand that people move between places and how this has consequences for the people and the places

Specific Learning Objectives – students should be able to:

- ✓ Understand the difference between an epidemic and a pandemic
- ✓ Explain why Ebola is regarded as a threat to the international community
- ✓ Identify the area of study
- ✓ Identify earlier outbreaks of the Ebola virus
- ✓ Explain how the Ebola virus is spread
- ✓ Understand that the Ebola virus may be transported by air travel passengers
- ✓ Evaluate arguments for and against banning air travel to and from infected areas
- ✓ Describe methods of airport surveillance
- ✓ Identify the origins of the Ebola virus
- ✓ Describe the symptoms of the Ebola virus
- ✓ Identify reasons African nations were unable to control the Ebola outbreak
- ✓ Propose actions to contain the Ebola outbreak and identify consequences
- ✓ Describe the international response to the Ebola outbreak
- ✓ Identify governments and organisations that responded to the Ebola emergency
- ✓ Describe contact tracing
- ✓ Understand the difficulties enforcing a quarantine
- ✓ Propose actions to enforce a quarantine and identify consequences
- ✓ Describe methods of isolation and infection control
- ✓ Evaluate responses and reactions to Ebola
- ✓ Describe the impact of Ebola upon three African nations: Guinea, Liberia and Sierra Leone
- ✓ Explain the impact of Ebola upon children
- ✓ Understand that cultural practices may be a barrier to controlling the Ebola outbreak
- ✓ Identify measures taken to protect a mass gathering of people from the virus
- ✓ Identify possible cures or vaccines for Ebola
- ✓ Describe measures taken by New Zealand to prevent an Ebola outbreak
- ✓ Research other epidemics and pandemics

Key Skills:

Complete table, think pair share, 5 Ws and 1 H, generate questions, interpret map, construct timeline, Venn diagram, interpret film-clip, interpret documents, interpret visual resources, conduct research, star diagram/brainstorm, construct poster, values continuum, form opinions, justify opinions, speak to class, PNI, pair work, group work, debate issues, write an email, write a paragraph, write captions, use websites, match columns, problem-solving, propose social action

Key Vocabulary:

Ebola, virus, quarantine, infected, humanitarian, epidemic, pandemic, isolation, mortality, transmission, symptoms, community engagement, supportive care, case management,

surveillance, contact tracing, screening processes, monitoring, social mobilisation, vaccine, contamination, cultural practices, infrastructure, infectious, incubation period, diagnosis, protective equipment, precautions, border systems, health risk assessment, negative pressure room, WHO, UNICEF, CDC, Medecins Sans Frontiers, ECOWAS, UNMEER

Key Competencies:

- **Thinking** – collect and analyse information, comparing information, use of personal knowledge, making decisions, asking questions, imagining outcomes, forming opinions, expressing opinions, justifying opinions, writing definitions, evaluation and reflection
- **Using language, symbols and texts** – reading, film, photo, learning and using new vocabulary, writing, completing tables and models, information technology
- **Managing self** – research, use of websites, enterprising, resourceful, resilient
- **Relating to others** – pair work, group work, recognising points of view, interaction, listen and respond, sharing ideas
- **Participating and contributing** – work and learn co-operatively in pairs and groups, discussion and feedback to class, suggest social action

Activities:

1. Values continuum:

The teacher reads a statement and students arrange themselves in a line ranging from **totally agree** at one end to **totally disagree** at the other.

Statement: The New Zealand government should ban all travel to and from Liberia, Guinea and Sierra Leone by New Zealand passport holders due to the Ebola epidemic in those countries. This is the best way to protect ourselves.

2. Each student takes a moment to tell the class why they placed themselves in their position on the continuum.
3. Write **six** questions that you have about the current outbreak of the Ebola virus. At the end of this unit you can see if the questions have been answered. Use 5 Ws and 1 H (where, what, who, when, why and how).

An international response team decontaminates after treating Ebola victims in Liberia.



Ebola: Epidemic or Pandemic?

Throughout 2014 the worst-ever outbreak of a deadly and highly infectious virus in Africa became an issue of great concern to the entire international community. An outbreak of Ebola in three West African nations surged out of control and there was a danger that it could spread world-wide.

Ebola was first recognised in 1976 and there have been several outbreaks of the disease since. The virus family includes five species: Zaire, Bundibugyo, Sudan, Reston and Tai Forest. The virus causing the 2014 outbreak belongs to the Zaire species.

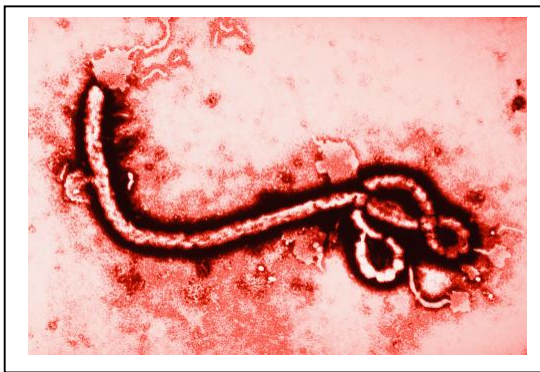
The first outbreaks of Ebola occurred in remote villages in Central Africa, near tropical rainforests and did not spread to major cities. The 2014 outbreak, which had its first case, a 2-year old boy, notified in March 2014, was a far greater danger as it affected major urban as well as rural areas. The 2014 outbreak soon became far worse than any of the previous outbreaks.

Ebola is a virus that causes an acute, serious illness which is often fatal if untreated. The average mortality rate is around 50% with case mortality rates varying from 25% to 90% in past outbreaks.

Ebola virus disease (EVD) was formerly known as Ebola haemorrhagic fever

There are currently no licensed Ebola vaccines but two potential medications are undergoing evaluation and may prove successful.

Ebola continues to wreak havoc upon three very poor African nations and an international effort has been required to treat the virus and contain it. This effort has been largely successful.



In medical laboratories the Ebola virus looks like this.

Definitions:

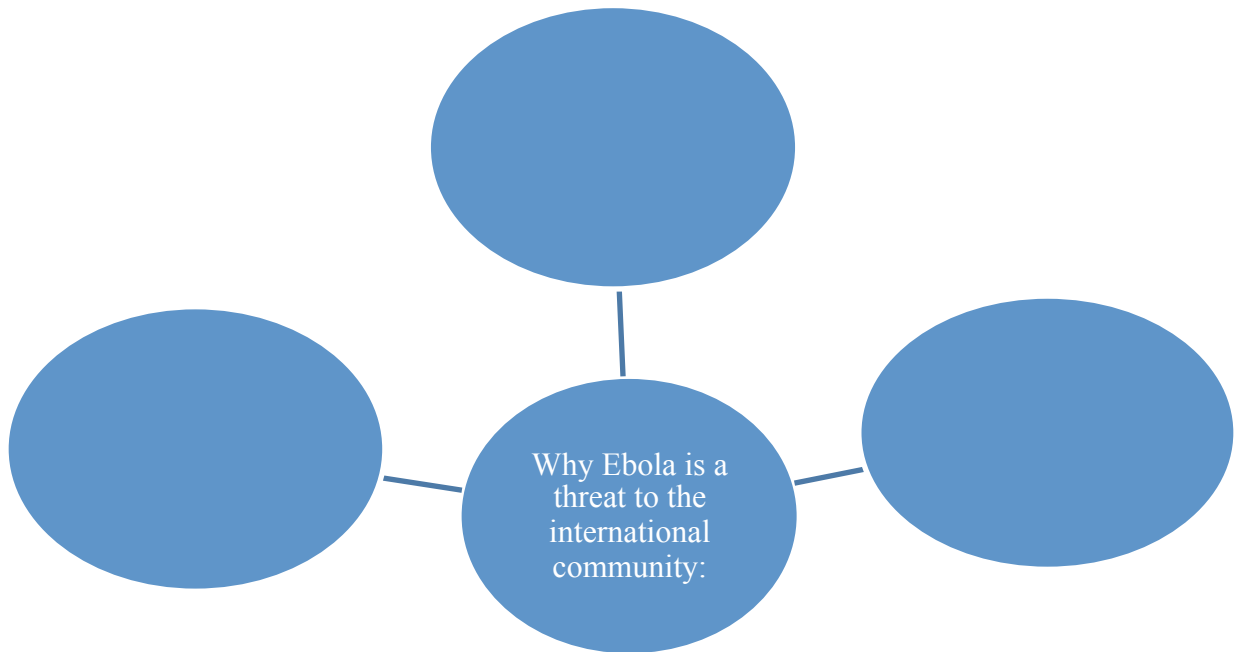
The words pandemic and epidemic are easily confused, so here is some clarification.

According to the World Health Organisation, an **epidemic** refers to a contagious, infectious or viral illness that spreads to many people in one geographic region. It occurs in excess of the numbers of cases that would usually be expected.

A **pandemic** refers to a contagious, infectious or viral illness that spreads, and may include millions of people in many areas throughout the world. Pandemic comes from Greek words (pan –all, demos- people)

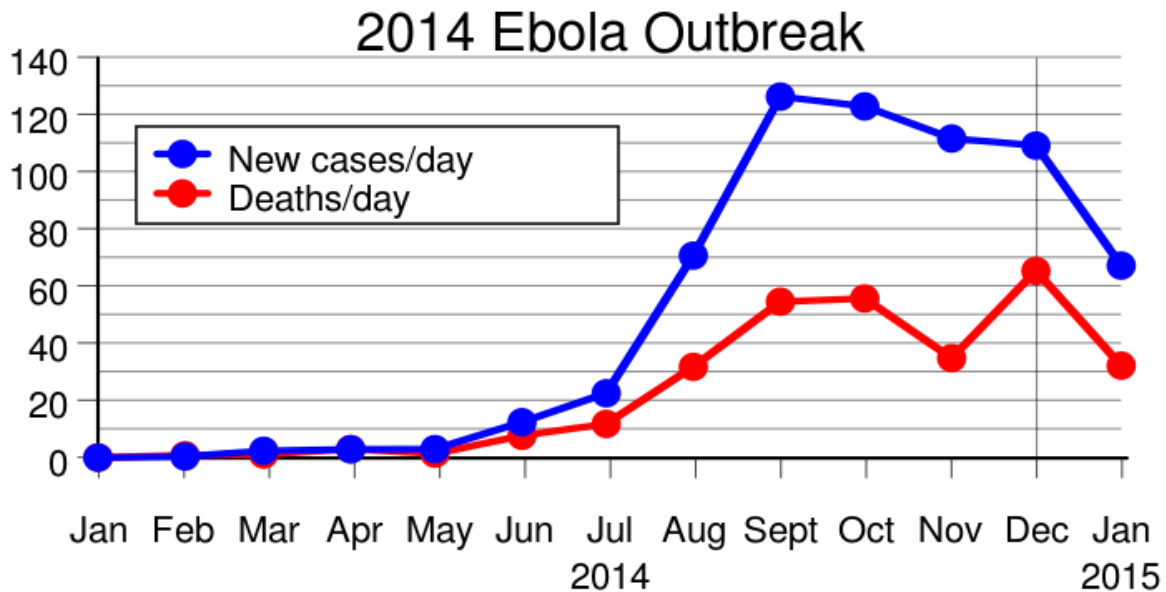
Activities:

1. Complete the following star diagram to show why Ebola should be regarded as a threat to international health.



2. How many species of Ebola are there?
3. Where did the earlier outbreaks of Ebola occur?
4. Where did the 2014 outbreak occur?
5. Why, do you think, the earlier outbreaks of Ebola did not become an epidemic?
6. Can Ebola be described as an epidemic or a pandemic? Support your answer with evidence.

Graph Interpretation



Use the graph above to answer the questions that follow:

1. What do you think the graph shows?
2. What are **two** trends shown by this graph?
 -
 - h
3. When was Ebola at its worst in terms of new case numbers?
4. When was Ebola at its worst in terms of number of deaths?
5. If you were an official working for the World Health Organisation, how would you react to this graph?
6. What is encouraging about the trends shown in this graph?
7. For an update regarding case numbers and deaths from Ebola go to the following website:

<http://apps.who.int/gho/data/view.ebola-sitrep.ebola-summary-20150211?lang=en>

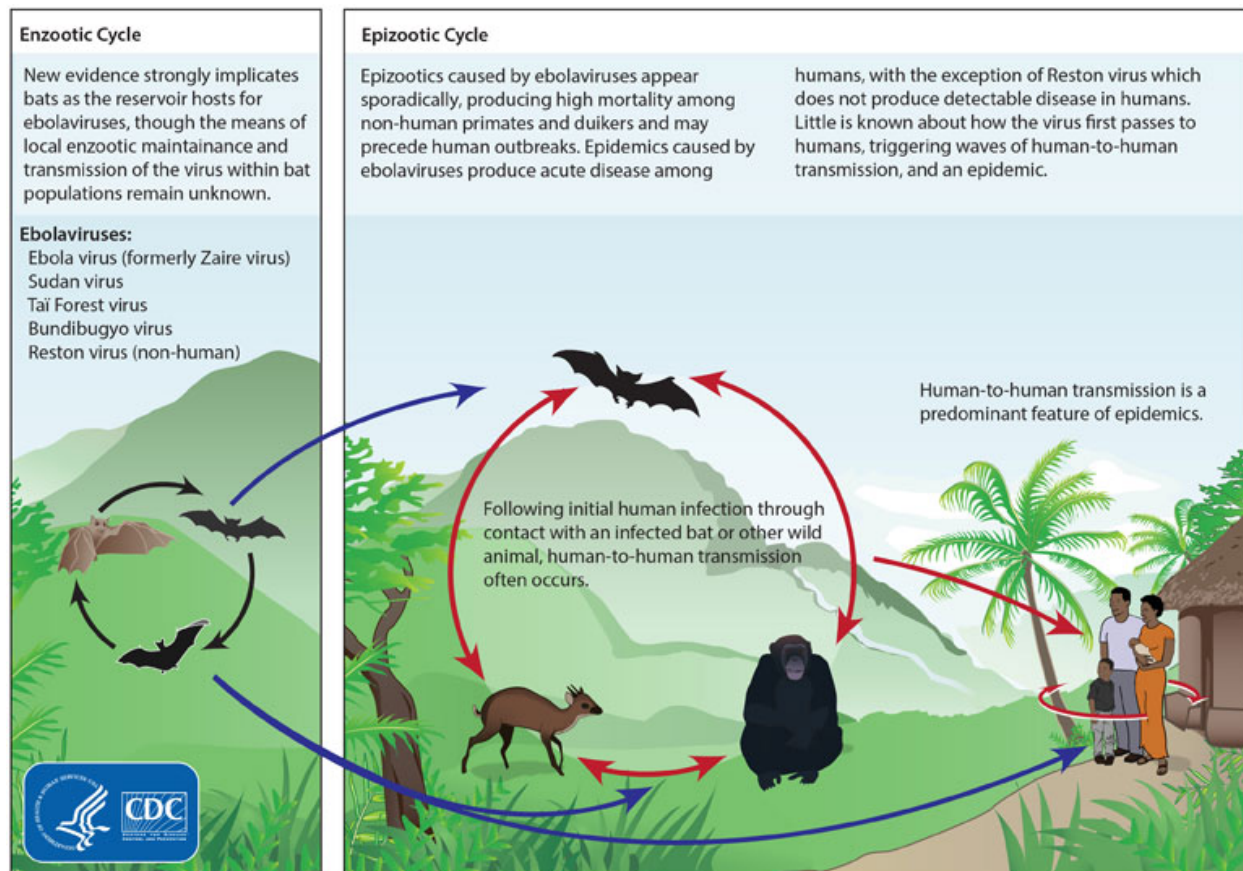
Country:	Total cases:	Total deaths:
Guinea		
Liberia		
Sierra Leone		

How did the Ebola virus begin?

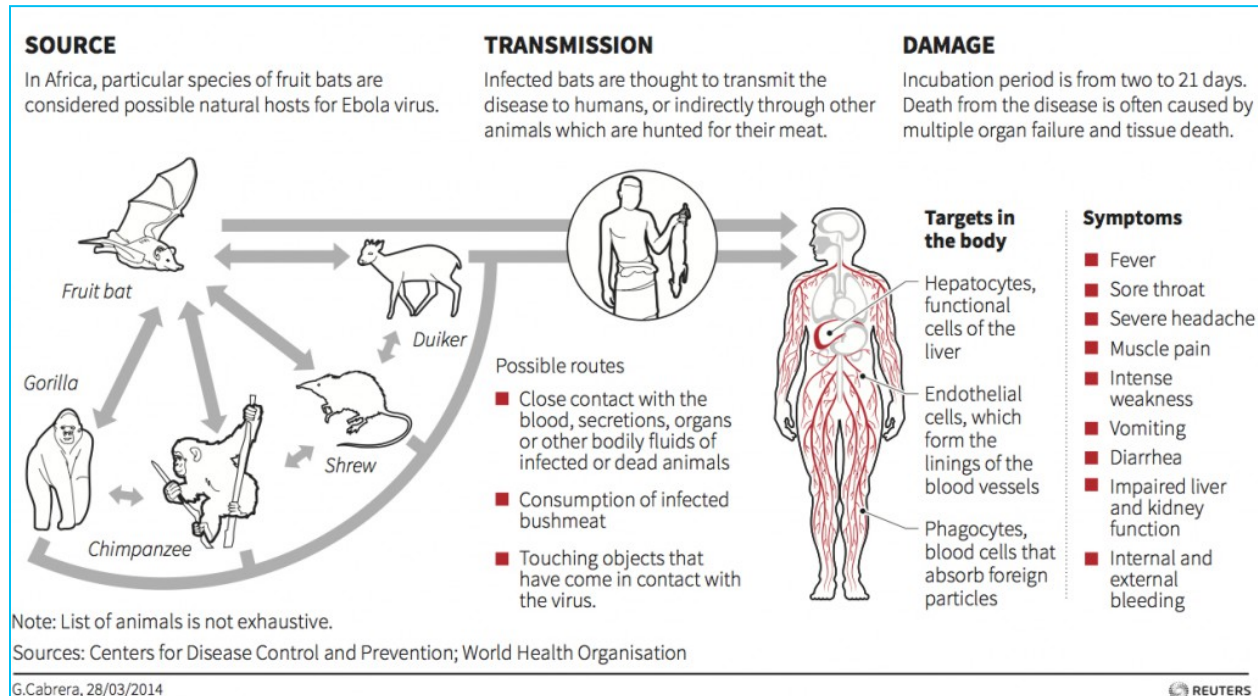
It is thought that fruit bats are natural Ebola virus hosts and that Ebola was introduced into the human population through close contact with the blood, secretions, organs or other bodily fluids of infected animals such as fruit bats, chimpanzees, gorillas, monkeys, forest antelope and porcupines found ill or dead or hunted in the rainforest. These animals are often used for food in remote parts of Africa.

Having reached humans from contaminated animal meat, Ebola then spread through human-to-human transmission. The Ebola virus spreads via direct contact (through broken skin or mucous membranes) with the blood, secretions, organs or other bodily fluids of infected people. It can also be caught from surfaces and materials (e.g. bedding, clothing, eating utensils) contaminated with these fluids.

Resource 1:



Resource 2:



Resource 3:

Bush meat at an African market.



Activities:

In pairs, use resources 1 to 4 to complete the following activities:

1. What species is thought to be a natural Ebola virus host?
2. What is bush meat and why is it likely to transmit Ebola?
3. Describe **three** ways the Ebola virus was transmitted from animals to humans.
4. What can be done to reduce the danger of Ebola-contaminated bush meat?

Resource 4:

Definition: *Bush meat is meat taken from any animal native to African forests, including species that may be endangered or not usually eaten outside Africa*

Symptoms of Ebola

The incubation period, that is, the time interval from infection with the virus to onset of symptoms is 2 to 21 days. Humans are not infectious until they develop symptoms.

First symptoms are the sudden onset of fever, fatigue, muscle pain, headache and sore throat. This is followed by vomiting, diarrhoea, rash, symptoms of impaired kidney and liver function, and in some cases, both internal and external bleeding (e.g. oozing from the gums, blood when you go to the toilet). Laboratory findings include low white blood cell and platelet counts and elevated liver enzymes.

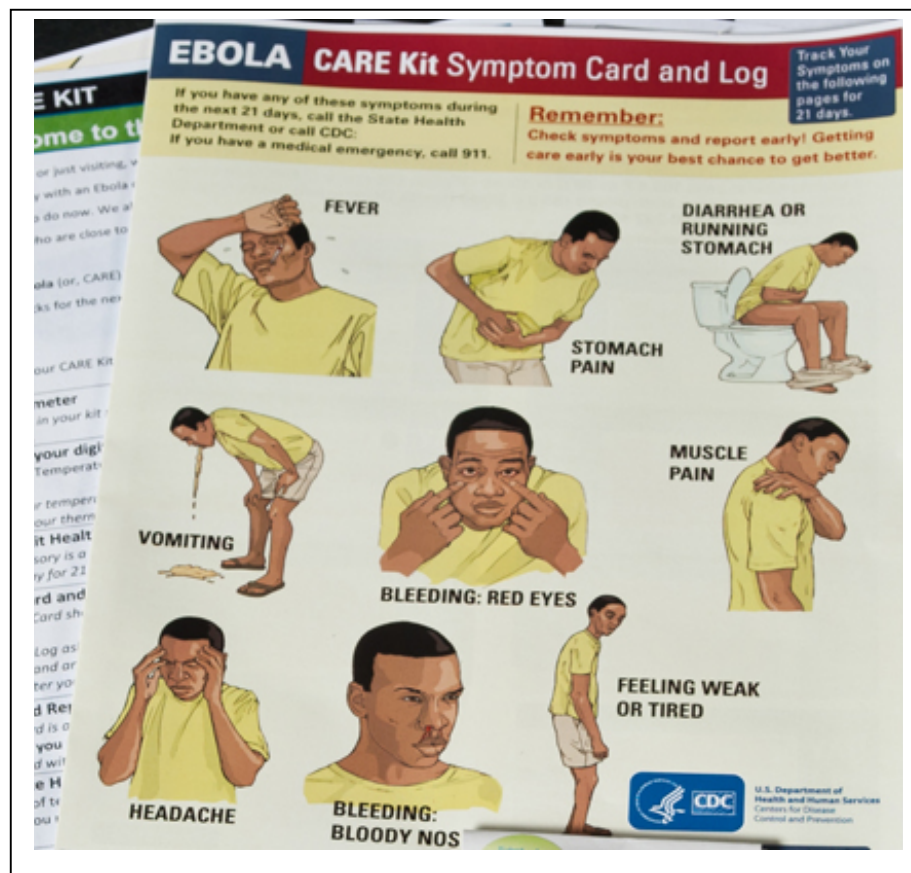
It can be difficult to distinguish Ebola from other infectious diseases such as malaria, typhoid fever and meningitis. Confirmation that symptoms are caused by Ebola virus infection are made using lengthy investigations.

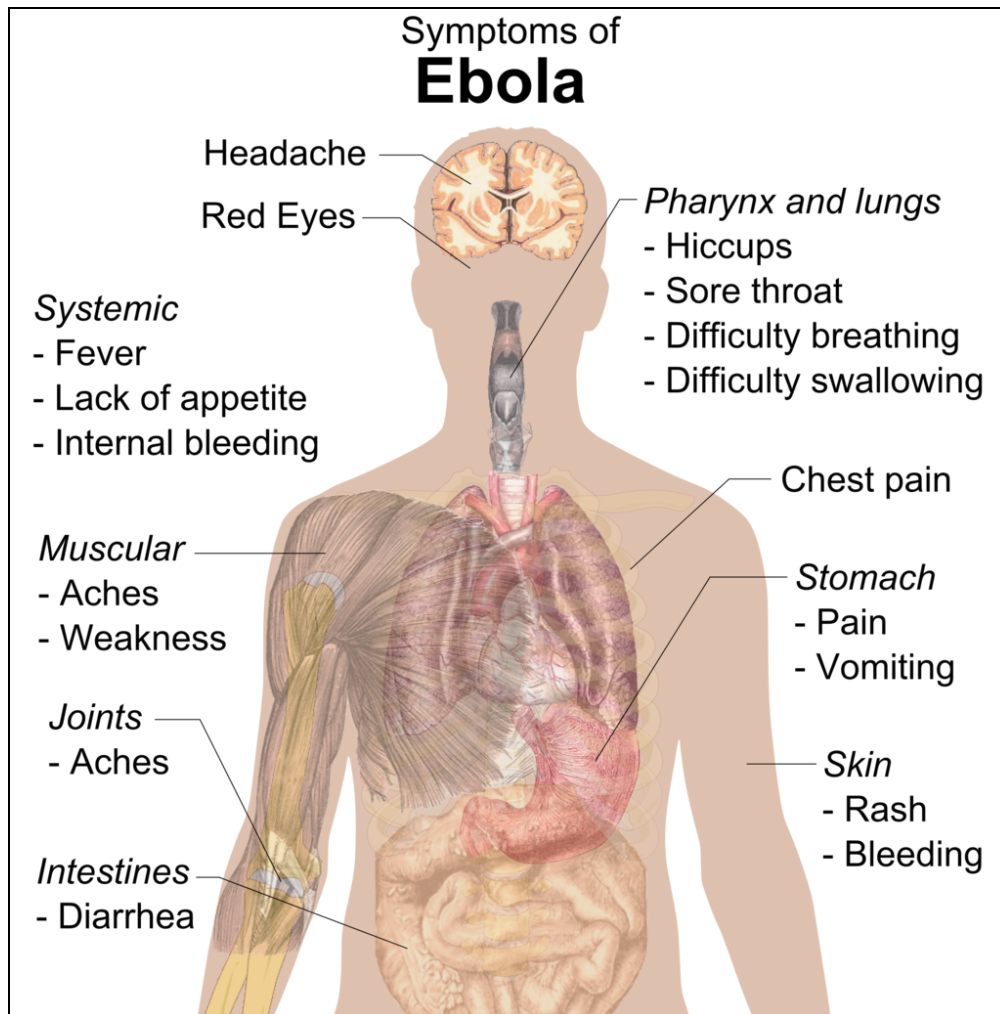
Health-care workers have frequently been infected while treating patients with suspected or confirmed Ebola. This has occurred because of close contact with patients when infection control precautions are not strictly practiced.

Burial ceremonies in which mourners have direct contact with the body of the deceased person can also play a role in the transmission of Ebola.

People remain infectious as long as their blood and body fluids, including semen and breast milk, contain the virus. This can be for up to seven weeks.

Resource 1:





Resource 2:



Resource 3:

Resource 4:



Activities:

1. Use resources 1 to 4 to complete the following table:

How the Ebola virus is transmitted:	How the Ebola virus is not transmitted:

2. Use resources 1 to 4 to write an email to a family member explaining how you are feeling since the doctor informed you that you are infected with the Ebola virus.

Identify the Area of Study

Ebola virus disease first appeared in 1976 in two simultaneous outbreaks, one in Nzara, Sudan, and the other in Yambuku, Democratic Republic of Congo (formerly Zaire). The latter occurred in a village near the Ebola River, from which the disease takes its name.

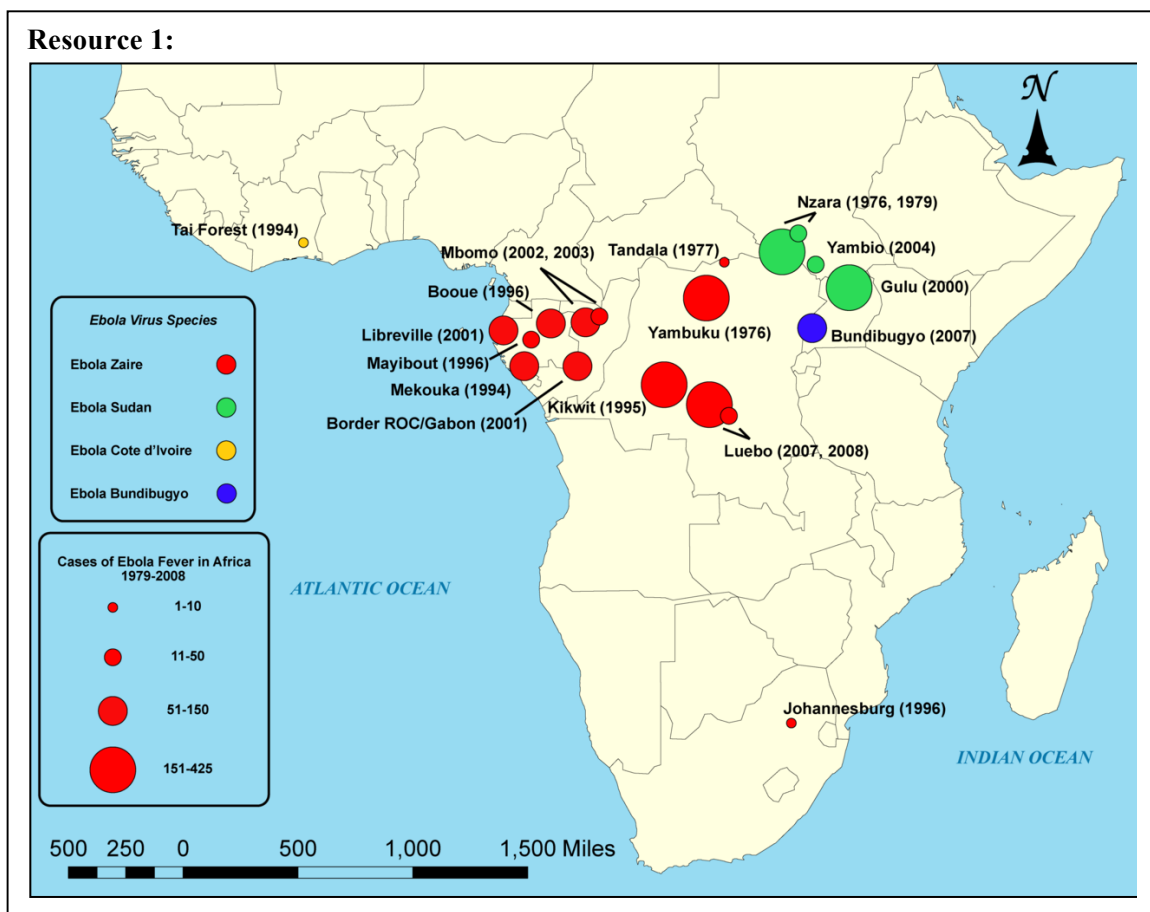
The current outbreak in West Africa is the largest and most complex Ebola outbreak since the Ebola virus was first discovered in 1976. There have been more cases and deaths in this outbreak than all others combined. It has also spread between African countries starting in Guinea then spreading across land borders to Sierra Leone and Liberia, by air (one traveller only) to Nigeria, and by land (one traveller) to Senegal. The disease was quickly brought under control in Senegal and Nigeria.

On August 8, the WHO (World Health Organisation) Director-General declared this outbreak a ***Public Health Emergency of International Concern***.

A separate, unrelated Ebola outbreak began in an isolated part of the Democratic Republic of Congo. This outbreak did not spread.

Activities:

1. How did this virus come to be called Ebola?



2. Use the map above (resource 1) to answer the questions that follow:

- What are two things shown on the map?
- Which continent is represented by this map?
- When was the first-ever case of Ebola recorded?
- Where was the first-ever case of Ebola recorded (place and country)?
- How many different Ebola virus species are shown on this map?

3. Seven countries are shown having been infected with an Ebola virus before 2008. Name these countries and the years of the outbreak by completing the following table:

Country:	Years of outbreak:

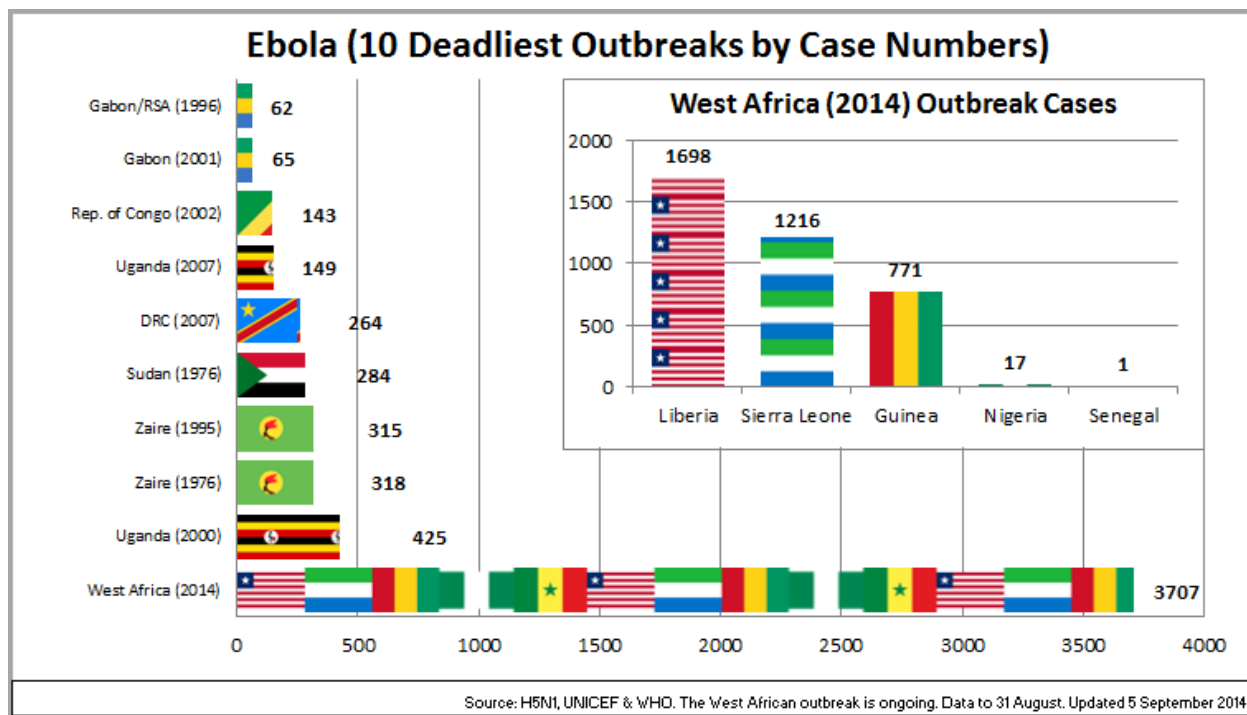
Democratic Republic of Congo (DRC) was formerly called Zaire.

4. Locate and name the African countries infected with Ebola during 2014.

Use **red** for the three worst affected.

- Sierra Leone
- Liberia
- Guinea
- Nigeria
- Senegal
- Mali
- DRC





5. Use the graph above to answer the following questions:

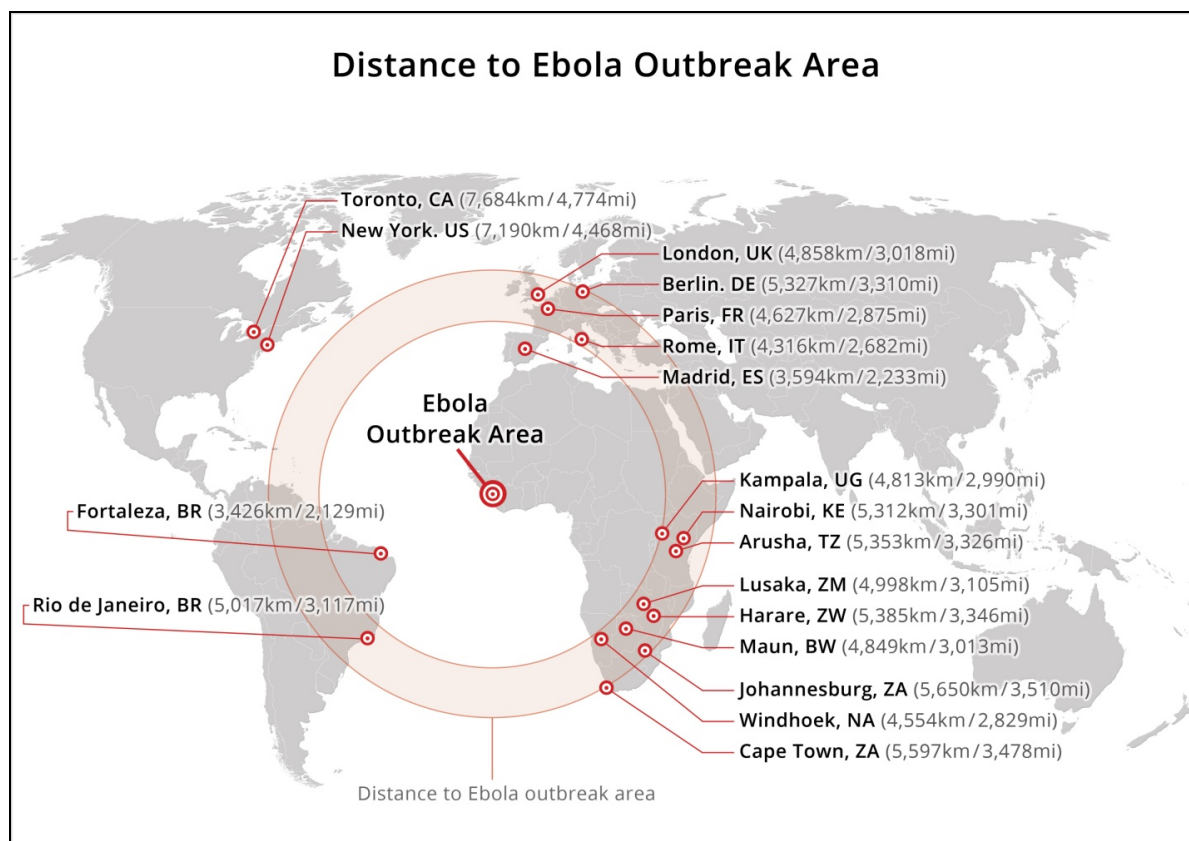
- How many people died of Ebola in its earliest two outbreaks?
- Which country experienced an Ebola outbreak in 2000?
- Which three countries had the most deaths during the 2014 Ebola outbreak?
- Which country suffered the most?
- Use the following website to complete the tables below:

<http://news.yahoo.com/world-health-organization-reports-7-905-ebola-deaths-114752933.html>

Date:	Number of Ebola cases:	Death toll:

f) What is the current situation in the three worst affected countries?

Guinea:	Liberia:	Sierra Leone



6. Use the map above to name **sixteen** countries that experienced isolated cases of Ebola.

BR	DE	UG	BW
CA	FR	KE	ZA
US	IT	TZ	NA
UK	ES	ZM	ZW

- What is the greatest distance the Ebola virus travelled
- How do you think the Ebola virus reached these countries?
- Isolated cases of Ebola occurred in several countries far from the outbreak area. Does this make Ebola a pandemic? Justify your answer.
- What is the consequence of the movement of people infected with the Ebola virus upon other people and places?

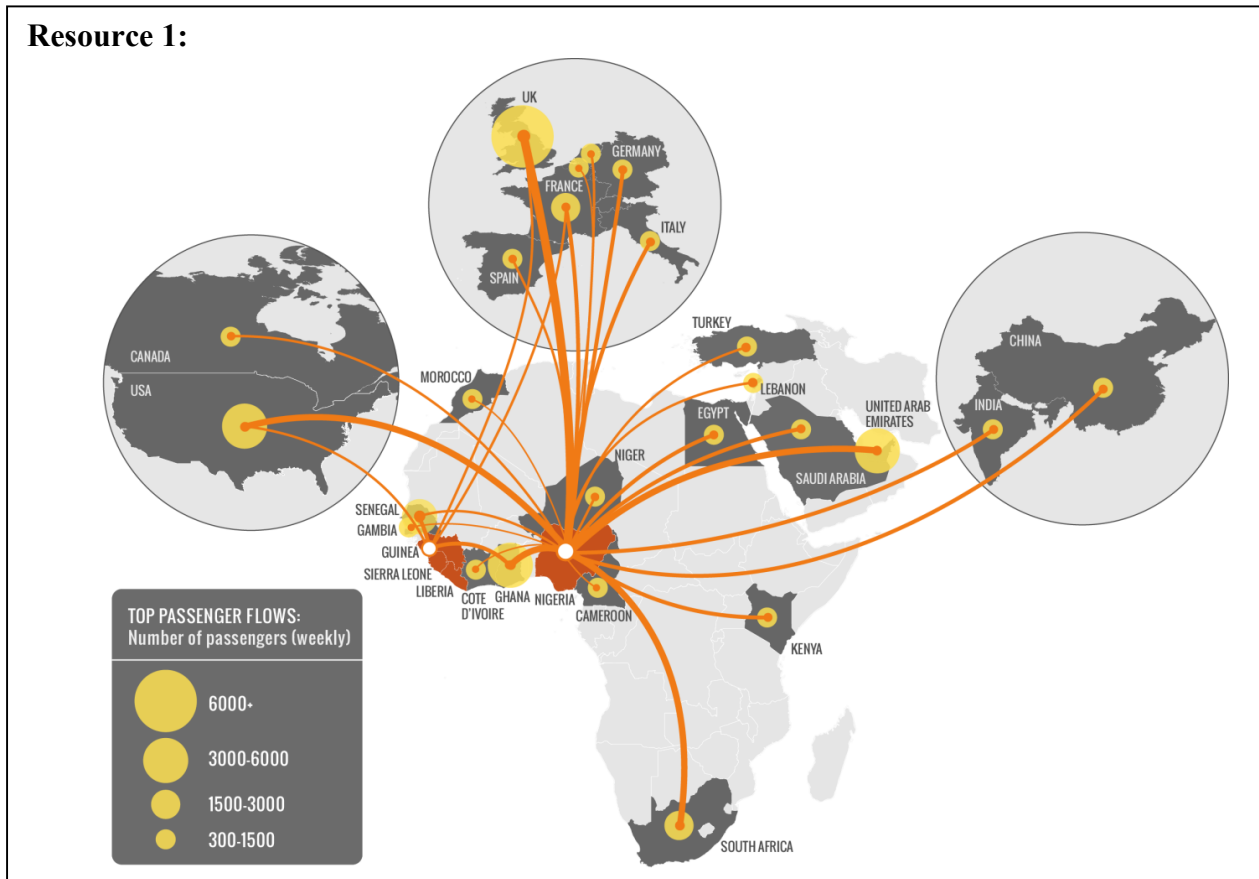
11. Use the following website to complete a **timeline** showing **5 key events** in the spreading of the Ebola virus throughout West Africa and worldwide during 2014: (remember scale and title)

12. List **5 measures** taken to treat and stop the spread of the Ebola virus.

Website: [2014 West African Ebola outbreak: key events, stories](#)

Epidemics and the movement of people:

Resource 1:



The map (Resource 1) shows international flights from West African nations to other African nations and to destinations in Europe, Asia, the Middle East and North America.

There are very few flights from Liberia and Sierra Leone to international destinations but several airlines have connections with Guinea.

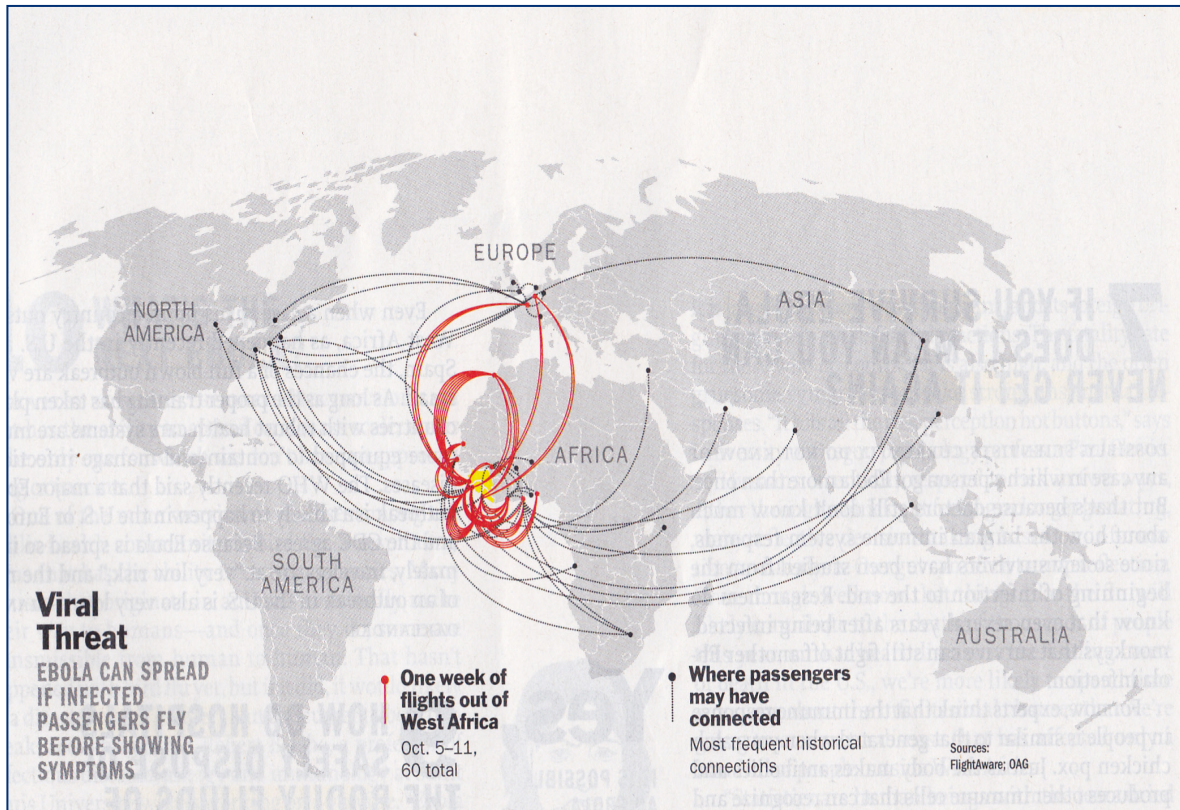
Nigeria has thousands of passengers flying in and out of the country each day. When Ebola cases were identified in Nigeria, the international community became very alarmed. Airline passengers could transmit the Ebola virus to many large cities worldwide in a matter of hours. Airlines were put on heightened alert and all passengers from West Africa were carefully scrutinized.

Activities:

1. Use the map (resource 1) to list the countries passengers could fly to from Guinea.

- By direct flights:
- With a stopover in Nigeria:

Resource 2: Flights out of Ebola-infected West African nations:



2. In pairs, use the map above (Resource 2) to answer the following questions:
 - a) How many international flights are there each week out of the three worst infected countries in West Africa?
 - b) How many airports are there where passengers from these countries may have connected to other flights?
 - c) How could air travel spread the Ebola virus?
 - d) How could the Ebola virus reach New Zealand?
 - e) Name five international airports where infected passengers could connect to New Zealand?
 - f) Apart from air travel, what other ways could the Ebola virus be transported around the world?
3. What methods could airports use to check incoming passengers for the Ebola virus?

Should travel be banned to and from infected areas?

Following the death of a Liberian national in Texas (United States) in October 2014 and the Ebola infection of two American nurses who treated him, there have been calls in the United States for a ban on all travel to the most affected countries: Guinea, Liberia and Sierra Leone.

A Congressman even introduced a bill to Congress that would ban travel from countries experiencing an outbreak of the Ebola virus. The congressman said in a statement: “***Ebola has a death rate of 50 percent. How can you ignore this fact, and take a gamble with American lives by allowing people to travel to and from countries where the virus is quickly spreading?***”

The Congressman’s bill would ‘ban the arrival of any commercial aircraft from a country in which the Ebola virus has reached epidemic proportions and deny an entry visa to any individual whose travel itinerary includes a departure from such a country.’ The travel ban would not affect the US military’s Ebola assistance efforts to West Africa.

Opponents of the ban have suggested that a wall cannot be built around the United States or the most Ebola-infected countries. They use the following arguments:

- ❖ Guinea, Liberia and Sierra Leone are members of the Economic Community of West African States (ECOWAS), which allows the free movement of people across the borders of the fifteen member states. Furthermore, the borders are ill-defined and porous and poorly guarded. An American ban might eventually have to be extended to include all of West Africa (in particular, these 15 countries).



- ❖ There are no scheduled flights to the United States from Liberia, Sierra Leone and Guinea so travellers must fly to Europe first. Would the travel ban be extended to flights coming from Europe? And what of the many Americans and Europeans either currently in the affected countries or planning to travel there soon - either as humanitarian workers or as US or European citizens of African origin. It is not clear how the US government could control this flow of people.

"Imagine a Liberian citizen goes to Spain and in Spain shows symptoms of Ebola and people in Spain get it. Do you now expand the travel ban to include Spain? Somebody from Spain goes to the UK and now it's there, so do you include the UK? Then somebody who gets it there turns out to be a US citizen and wants to come home to get treated. Do you let the citizen in?" Where does the ban stop?

The US could learn from Senegal, which despite maintaining a ban on transport coming from Guinea, Liberia and Sierra Leone, opened a humanitarian corridor to allow doctors and aid workers safe passage to and from the affected regions. They can come and go through a special part of the airport and can bring through their equipment.



Most of the airlines that used to fly to Guinea, Liberia and Sierra Leone have suspended their flights anyway. Many commercial flights have also ceased. This lack of flights is keeping people from responding to the crisis. It has become difficult for aid and medical workers to get themselves and their equipment in and out of infected countries. A United States travel ban would seal the region off and make the problem worse by making it more difficult to transport medical, food and humanitarian aid.

Many Americans, however, are not interested in these arguments and support the proposal to ban all flights with Ebola infected regions. Much of the public debate is emotional and based on real public fears for health and well-being.

Activities:

1. Complete the following table regarding the proposal to ban travel in and out of countries experiencing an Ebola epidemic.

Positive effects of a ban on travel with Ebola-infected countries:	Negative effects of a ban on travel with Ebola-infected countries:

2. Do you personally support a travel ban with West African countries experiencing an Ebola epidemic? Support your answer with **three** reasons.
3. Use the following website to answer the questions below:

<http://www.reuters.com/article/2014/09/16/us-health-ebola-obama-idUSKBN0HB08S20140916>

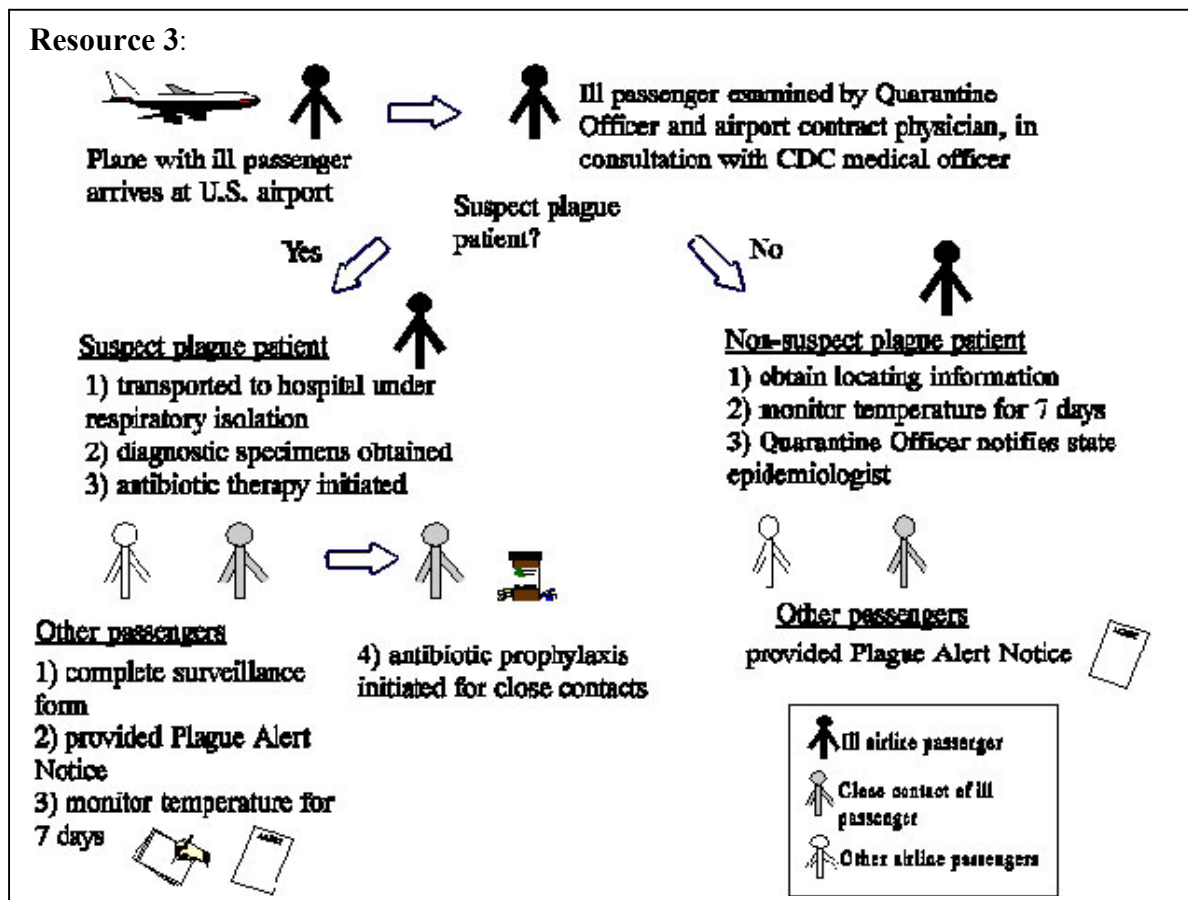
- a) How many American troops did President Obama send to Liberia?
- b) What are three roles these troops have to perform?
- c) What reasons does President Obama offer for this troop commitment?
- d) How will these troops be protected from the Ebola virus?
- e) Do you think this United States troop commitment will help control the Ebola outbreak or will it put Americans at risk when these troops return home? Support your answer with reasons.

Surveillance

American disease experts say that stopping flights from West Africa or denying visas to people from Liberia, Guinea and Sierra Leone will only increase the risk that an infected and unknown traveller will make their way into the United States.

The Department of Homeland Security has therefore ordered that all passengers arriving from Ebola-infected countries land at just one of five designated airports, where quarantine stations and enhanced screening processes are currently in place. Furthermore, passengers arriving from Liberia, Guinea and Sierra Leone will now be actively monitored for Ebola-like symptoms for 21 days upon arrival.

Surveillance of passengers from infected regions is the best response and particularly important at transit airports such as Dubai, Singapore or Hong Kong.



4. In groups, examine the diagram above (Resource 3) and complete the scenarios that follow. What would happen to you in each scenario?
- You arrived in the United States and tested positive for the Ebola virus.
 - You arrived in the United States and tested negative for the Ebola virus.
 - You arrived in the United States and sat near someone who tested positive for Ebola.
 - You were a passenger on an aircraft where someone tested positive for Ebola.

Resource 4: Plague alert notice

Arriving from a Country with Ebola What you need to do

You were given this card because you arrived to the United States from a country with Ebola.

- Ebola is a severe, often fatal disease that spreads through direct contact with a sick person's blood or other body fluids (like feces, saliva, urine, sweat, vomit, and semen). It can also spread by direct contact with objects contaminated with a sick person's blood or body fluids, or with infected animals.
- Symptoms appear between 2 and 21 days of exposure. These symptoms include: fever, severe headache, muscle pain, vomiting, diarrhea, stomach pain, severe weakness, fatigue, or unexplained bleeding or bruising. People with Ebola are not contagious unless they have fever and other symptoms of Ebola.
- If you were exposed to Ebola during your trip, call your doctor even if you do not have symptoms.
- Please watch your health for the next 21 days:
 - Take your temperature every morning and evening, and watch for symptoms of Ebola listed above.
 - Call a doctor if you get a **fever*** or feel like you have a fever, **and have any of the symptoms** listed above.
**A fever is a temperature of 101.5° F / 38.6° C or higher*
 - Tell the doctor you recently arrived from a country with Ebola.
 - Bring this notice and give it to health care staff when you arrive.

For more information

- Travelers' Health updates: www.cdc.gov/travel
- CDC Ebola website: www.cdc.gov/vhf/ebola/

A Note to the Doctor

The patient giving you this card was recently in a country experiencing an outbreak of Ebola and may have signs and symptoms consistent with Ebola. However, other more common infectious diseases should also be considered in the differential diagnosis.

CDC recommends the following:

- Place the patient in a private room, isolated from others.
- Implement standard, contact, and droplet precautions as outlined in CDC guidance. See link below.
- Evaluate the patient using clinical guidance and case definitions provided by CDC. See link below.
- Notify your local or state public health department about the patient.
 - The health department will provide guidance as to whether testing for Ebola is indicated.
 - See www.naccho.org/about/lhd for your local health department contact information.

If you are unable to reach your local or state health department, call the CDC Emergency Operations Center for assistance: 770-488-7100.

CDC is Centre for Disease Control and Prevention.

5. a) What are **four** instructions for the person given this card?
- b) What are **four** instructions for the doctor?

Problem-solving activity – 1:

Students complete a problem-solving activity using their own ideas.

Problem to solve: Imagine you are the President of a country infected with the Ebola virus (Liberia, Sierra Leone or Guinea). What actions can you take to contain the epidemic and stop it from spreading? What could be the consequences of these actions?

Problem: Write 2 sentences

Actions/Solutions to the problem as stated above

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Using the Actions/Solutions above explain 3 Consequences

Positive Consequence

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Negative Consequence

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Which solution do you think is the best and why?

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A Lack of resources to fight the Ebola virus:

The most severely affected countries; Guinea, Sierra Leone and Liberia have very weak health systems, lack human and infrastructural resources and have only recently emerged from long periods of conflict and instability. These countries are desperately poor and simply lack the resources to combat the Ebola epidemic.

Images of impoverished Liberia:



Activities:

1. In pairs, write your impressions of the images of Liberia. Comment on:
 - roads
 - sewerage system
 - water supply
 - waste disposal
 - housing
 - medical facilities
 - schools
 - reminders of war
2. How would the poverty of the three worst affected African countries restrict their ability to treat Ebola victims and contain the Ebola epidemic?
3. Complete the following chart:

During an epidemic a good health service requires:	Human resources required during an epidemic are:
The infrastructure needed during an epidemic includes:	Peace and stability are required because:

4. Lacking the resources to deal with the epidemic themselves, what advice would you give to the Presidents of the three countries most affected by the Ebola virus?
5. What international agencies do you know of that can provide emergency assistance to countries unable to contain an epidemic?
6. What would you now add to your actions suggested in problem-solving activity 1?

An International response to the Ebola outbreak

Once it became clear that Guinea, Liberia and Sierra Leone were unable to contain the 2014 Ebola outbreak and treat thousands of ill patients, many countries and international organisations offered support.

In July 2014, the World Health Organisation (WHO) convened an emergency meeting with health ministers from eleven countries and announced a strategy to combat the epidemic.

In August, WHO declared the epidemic an international public health emergency and published a roadmap to guide and coordinate the international response to Ebola, aiming to stop ongoing Ebola transmission worldwide within 6-9 months.

In September, the United Nations Security Council declared the Ebola virus outbreak in West Africa a ‘threat to international peace and security’ and called upon all United Nations members to provide more resources to treat Ebola victims and stop the epidemic spreading. This was the first time in history that the Security Council had passed a resolution on a public health issue. The United Nations Mission for Ebola Emergency Response (UNMEER) was set up to coordinate the work of governments and international organisations under the leadership of WHO.

WHO aims to prevent Ebola outbreaks by maintaining surveillance for Ebola virus disease and supporting at-risk countries to develop preparedness plans. WHO has developed detailed advice on Ebola infection prevention and control and expects to spend \$1 billion in the fight against Ebola.

When an Ebola outbreak is detected WHO responds by:

- ✓ placing a local response team in each ‘hot spot’
- ✓ surveillance and monitoring of suspected Ebola patients to break chains of transmission
- ✓ community engagement and raising awareness
- ✓ case management and patient care in a health-care facility
- ✓ diagnostic laboratory services and personal protective equipment
- ✓ contact tracing
- ✓ infection control and managing exposure to the virus through body fluids
- ✓ environmental cleaning and management of linen
- ✓ waste management
- ✓ logistical support and training
- ✓ assistance with movement of the dead and safe burial practices.

Activities:

1. What is UNMEER and why was it set up?
2. What is WHO and what are **three** actions it took in response to the Ebola outbreak?

3. Go to the following website:

http://en.wikipedia.org/wiki/Responses_to_the_Ebola_virus_epidemic_in_West_Africa

In groups research the contribution made by the following organisations and countries to help combat the Ebola virus:

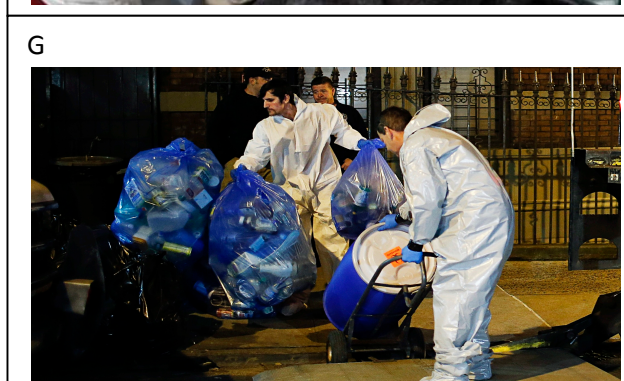
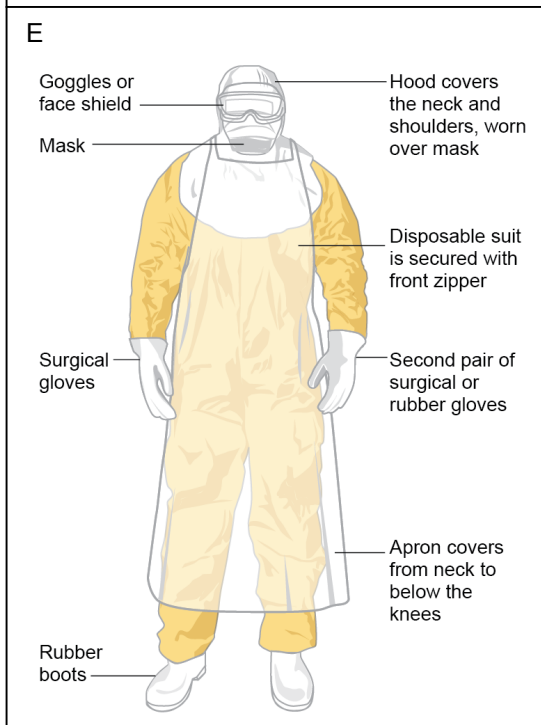
UNICEF	China
World Food Programme	Cuba
African Union	Germany
European Union	New Zealand
World Bank	Medecins Sans Frontieres

Report your findings to the class.

4. Match the following visual resources to the correct caption:

- Case management and patient care
- Community engagement
- Laboratory services
- Personal protective equipment
- Environmental cleaning
- Quarantine a house to prevent people from entering and leaving
- Movement of dead and safe burial





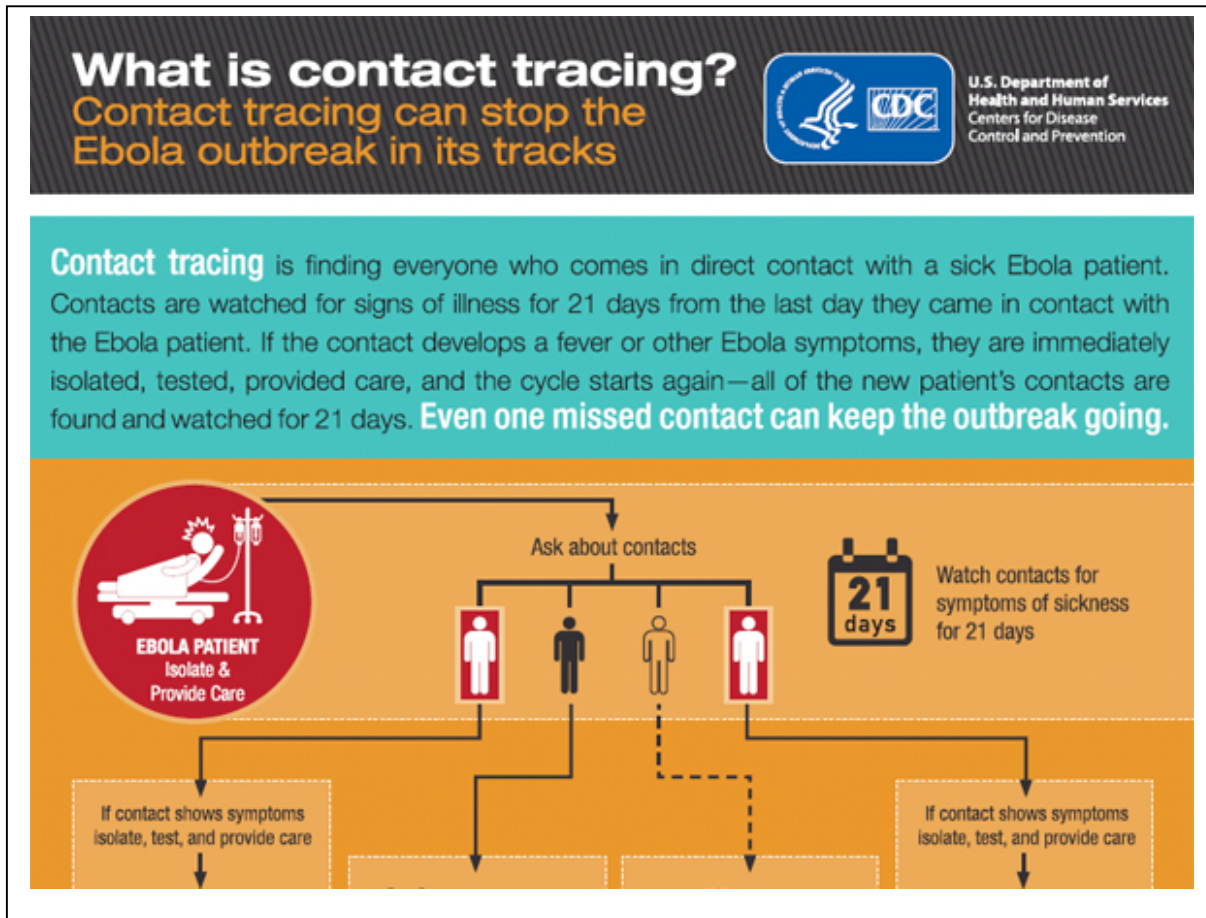
Health-care workers caring for patients with suspected or confirmed Ebola virus need to apply extra infection control measures to prevent contact with the patient's blood and body fluids and contaminated surfaces or materials such as clothing and bedding. When in close contact (within 1 metre) of patients with Ebola, health-care workers need to wear face protection (a face shield or a medical mask and goggles), a clean, non-sterile long-sleeved gown, and gloves (sterile gloves for some procedures). This often appears frightening for patients, especially children.

Laboratory workers are also at risk. Samples taken from humans and animals for investigation of Ebola infection need to be handled by trained staff and processed in suitably equipped laboratories.

Supportive care-rehydration with oral or intravenous fluids- and treatment of specific symptoms, improves survival. There is as yet no proven treatment available for Ebola. However, a range of potential treatments including blood products, immune therapies and drug therapies are currently being evaluated. No licensed vaccines are available yet, but two potential vaccines are undergoing human safety testing.

5. In pairs, examine the following visual resource and write **five** questions for your partner to answer.

Resource A



Resource B: Difficulties Enforcing a Quarantine

Ebola victims in West Africa are being forced to leave quarantine to search for food exposing others to the deadly disease, charities have warned.

Aid agencies are desperately trying to get food to those being monitored to stop them from leaving clinics and spreading the virus.

In Sierra Leone, a government system in place to feed those in quarantine is not working properly and volunteers are "working against the clock" to provide food to 2,100 people in Kailahun and western areas of Freetown, Christian Aid said.

Jeanne Kamara, the charity's director in Sierra Leone, said: "This is a huge concern. People infected with Ebola are desperately searching for food and are in turn exposing others to the disease. They are jostling with people in the market and infecting others through bodily contact. We urgently have to provide food to those who need it to prevent the risk of further spread."

Travel has been restricted in parts of the country preventing trucks from freely delivering food, which has increased in price because of its short supply.

6. What is a quarantine?
7. According to Resource B, why is it difficult to enforce?
8. For what other reasons might people leave a quarantine area?

Resource C: Schools closed

Another concern for aid workers is the impact of the disease on children's education.

Mike Noyes, ActionAid's head of humanitarian response, said: "At the moment all schools in Liberia are closed and the education of children is in danger of completely coming to a halt."

"Parents are very concerned about their children falling behind."

"Many families cannot afford to hire private tutors and others are afraid to hire them because of the potential risk of contact and infection."

"Children living under quarantine in Liberia and Sierra Leone are understandably frightened and unsettled."

9. Why were schools closed in Liberia?
10. In groups, list five impacts upon society of closing schools. Report your findings to the class.

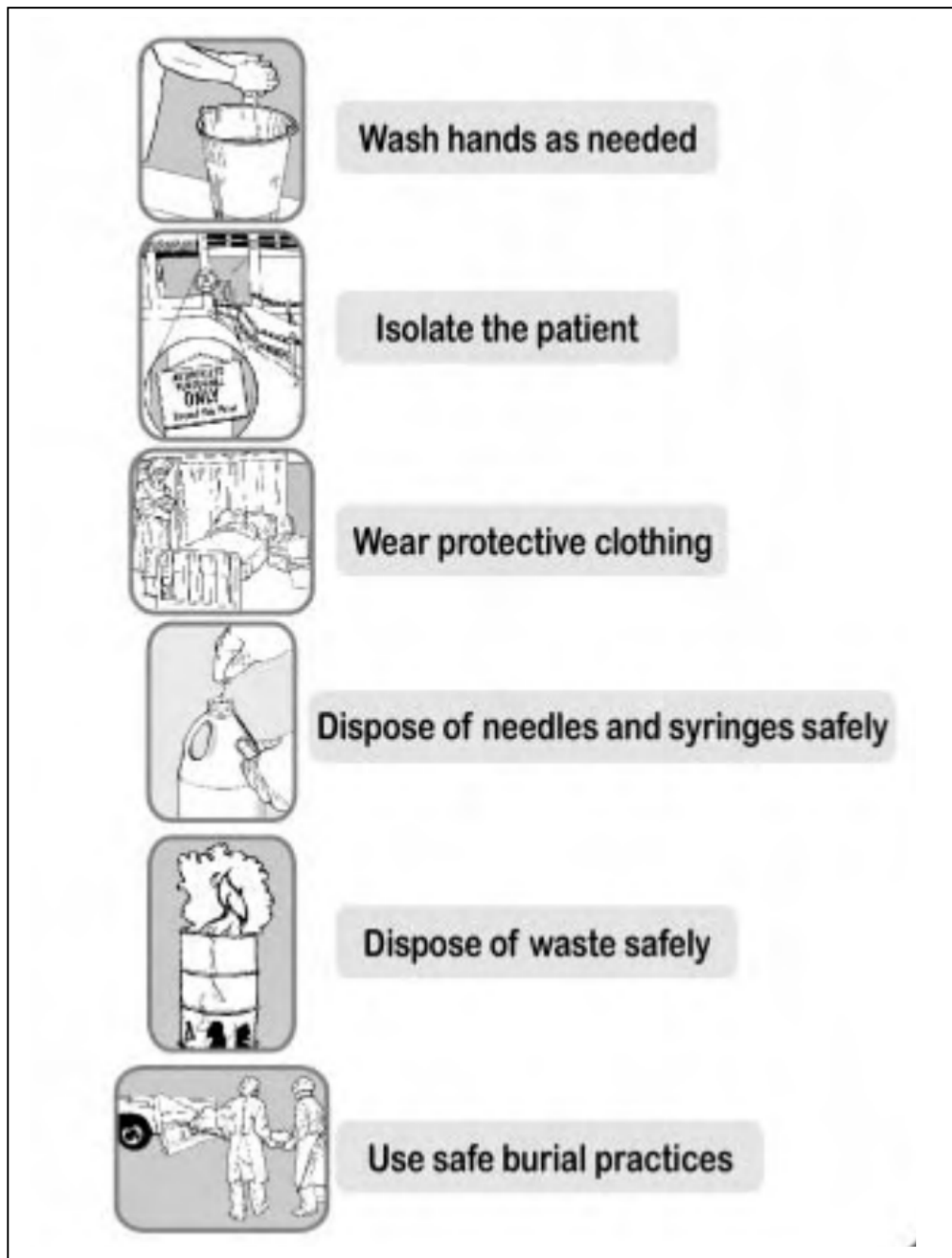
Shops are closed as the free movement of people is stopped to prevent the transmission of Ebola.



11. In pairs, examine the resource below and explain how each of the precautions could be carried out.

Ebola Isolation Precautions and Infection Control

Health-care workers should always take standard precautions when caring for patients, regardless of their presumed diagnosis. These include basic hand hygiene, respiratory hygiene, use of personal protective equipment (to block splashes or other contact with infected materials), safe injection practices and safe burial practices.



- 12 In groups, how would you engage the community and raise awareness? Provide **five** ideas to share with the class.

Raising awareness of risk factors for Ebola infection and protective measures that individuals can take is an effective way to reduce human transmission. Risk reduction should focus on several factors:

- **Reducing the risk of wildlife-to-human transmission** from contact with infected fruit bats or monkeys/apes and the consumption of their raw meat. Animals should be handled with gloves and other appropriate protective clothing. Animal products (blood and meat) should be thoroughly cooked before consumption.
- **Reducing the risk of human-to-human transmission** from direct or close contact with people with Ebola symptoms, particularly with their bodily fluids. Gloves and appropriate personal protective equipment should be worn when taking care of ill patients at home. Regular hand washing is required after visiting patients in hospital, as well as after taking care of patients at home.
- **Outbreak containment measures** including prompt and safe burial of the dead, identifying people who may have been in contact with someone infected with Ebola, monitoring the health of contacts for 21 days, the importance of separating the healthy from the sick to prevent further spread, the importance of good hygiene and maintaining a clean environment.

Community engagement is the key to successfully controlling outbreaks.



Problem-solving activity - 2:

Students complete a problem-solving activity using their own ideas:

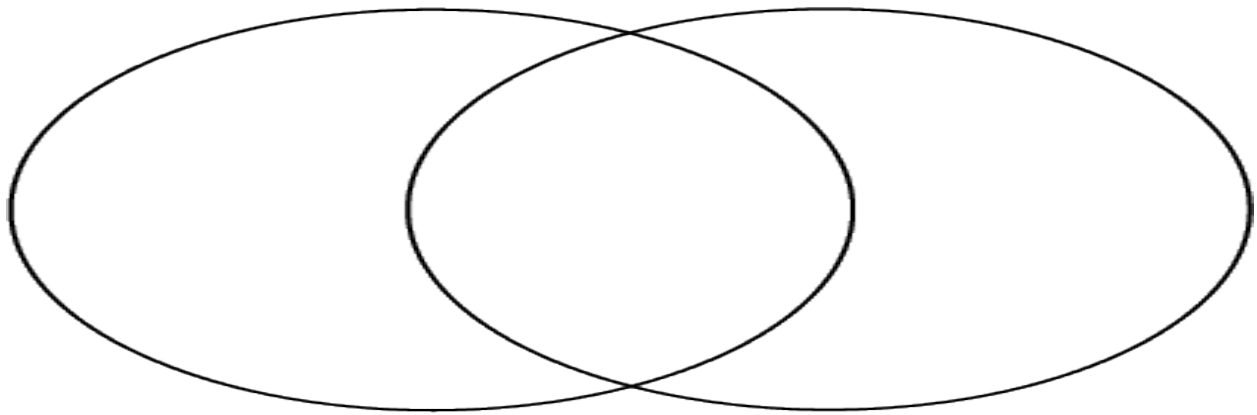
Problem to solve: Imagine you are the head of a medical facility working in Sierra Leone. What actions can you take to prevent people leaving a quarantine zone? What would be the consequences of these actions?

Problem: Write 2 sentences		
Actions/Solutions to the problem as stated above		
↓	↓	↓
Using the Actions/Solutions above explain 3 Consequences		
Positive Consequence		
Negative Consequence		
Which solution do you think is the best and why?		

Reactions and responses to Ebola: Useful or not?

Examine resources A to K that follow.

1. Write a one sentence caption for each visual to explain how people are reacting.
2. Complete a Venn diagram to show whether each reaction would be useful, not useful or both in combating the Ebola virus.



Positive and useful reaction to Ebola

Completely useless reaction to Ebola

Interesting reaction that may be helpful



D



E



F



G



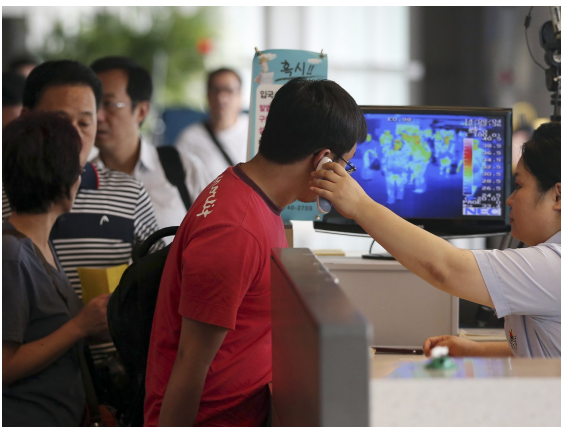
H



I



J



K



The Impact of Ebola upon three African nations

The Ebola outbreak is threatening the livelihoods of millions of men, women and children throughout the three worst affected countries. The epidemic has had a devastating impact upon trade, investment and employment opportunities. The economics of Liberia, Guinea and Sierra Leone, already weak and vulnerable, have been crippled.

Ebola is killing people who are economically active with the majority of victims in the 15-40 age group. Women are at higher risk of infection because they work as caregivers in their families and communities.

Closure of borders and markets, and the introduction of checkpoints and quarantines are reducing people's ability to make a living. Many farmers, for example, can no longer access their farms while others lack seeds or manual labourers for planting and harvesting. Agriculture employs 70% of the workforce and feeds millions but now much of the work and food is gone.

The Ebola outbreak is destroying jobs. Thousands of jobs have been lost in the transport sector and many shops and markets have closed. The closure of schools left thousands of teachers without work or pay for weeks. Employment opportunities have declined in nearly all sectors of the three countries' economies. 60% of the workforce is now unemployed.

Liberia and Sierra Leone had recently emerged from a decade of bitter civil war and were making significant progress with their rebuilding and recovery. That progress has now stopped and the countries are seeing rapid economic growth turn to economic decline. GDP is falling, international trade and investment is drying up and many people are now unable to pay their debts. Increasingly people are forced to subsist on \$2 per day.

Activities:

1. How can the international community assist the three worst affected African countries?

Complete the following table:

Trade:	Investment:
Medical assistance:	Educational assistance:
Infrastructure building:	Peace and security:

Schools Reopen:



January 2015 article from VOA (Voice of America)

Children in Guinea start the school year Monday after a five-month delay due to Ebola. Liberia plans to reopen schools next month. It's a sign of progress as those two countries turn the tide against the epidemic, but not everyone is sure the countries are ready.

"Papa, when will we return to school?" Sampson Wesseh's children ask him every day. He "welcomes" the Liberian government's decision to reopen schools in February. Authorities shut them back in July as Ebola cases surged.

"My kids have been sitting home doing nothing, playing, running here and there," Wesseh says, "Nothing like education has been going on...The more the children sit home, the more they get dull."

Authorities say schools will have all the necessary safety measures like thermometers and chlorine for hand washing. Teachers have also been trained on identifying and dealing with Ebola.

But some Liberian parents say they may keep their children home a while longer. Mother Christine Thomas says she wants the World Health Organisation to declare Liberia Ebola-free first.

"My fear here is that if the children go to school and they come down with Ebola it will not be too good for the parents. We will be feeling bad," she explains. "So we are hoping and praying that there will be a little bit of debate on the opening of schools."

In Guinea, teachers express the same concern. They worry about how to limit contact in what are often overcrowded schoolhouses. Teacher Amadou Diallo says the children play together during recess and no one can stop them from doing that. The students also share food. He says he thinks reopening schools is a risky decision.

In Sierra Leone where schools remain closed, UNICEF reports that teenage pregnancy is up and there are reports of increased child labour.

Liberia and Sierra Leone have been using radio and television to broadcast at-home lessons in the interim but it is no substitute for a classroom and not all children have had access to a radio.

Whenever schools do reopen in Sierra Leone, teachers may need to work evening hours or hold weekend and holiday classes to help children "catch up."

1. Why were schools closed in Liberia, Guinea and Sierra Leone?
2. How was education conducted during that time?
3. What safety measures are now in place to protect students from the Ebola virus?
4. Why is it risky to reopen the schools?
5. What other public facilities could a government close in response to Ebola?
6. If schools were to close in New Zealand in response to an Ebola outbreak, how do you think your education could be continued?
7. If schools were to close in New Zealand, what would be five changes in your life?
8. Do you think closing schools is a useful way to stop the spread of Ebola? Support your answer with reasons.
9. In pairs, look around your classroom and school and list ways in which a virus like Ebola could spread. Complete the table:

10. Why do you think many families decided to keep sick relatives home rather than seek medical help?

	<p>The sign asks parents not to keep sick people home and deny them medical care but many people are afraid of hospitals and the foreign health workers. They see ill people enter hospital and come out dead. Some people even think the health workers are stealing body parts.</p>
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11. What are **two** negative consequences of keeping sick people home and not seeking medical advice?
12. Create a **poster** pointing out the disadvantages of keeping sick people home rather than seeking medical help.

Ebola creates unwanted orphans

The majority of people dying in the Ebola outbreak are aged between 15 and 40 and this is the age group that has children. This puts an enormous strain on families.

Thousands of abandoned children are facing a grim struggle for survival after their parents have died from the Ebola outbreak. These children often wander the streets or clog up treatment centres and have nowhere to go.

These orphans are now alone in the world. They suffer from the impact of Ebola by loss of family members, stigma and rejection from community members, family friends and even relatives for fear of contracting the virus.



On their own ... the Cooper siblings have lost both of their parents and baby brother to Ebola since July while their 13-year-old sister has been hospitalised.
Photo: AP *Source: AP*

Many children become homeless as soon as their parents test positive. The most difficult thing is a child whose family has been affected by the disease. While the child is negative they are supposed to be isolated for 21 days but there are few facilities and the quarantine cannot be enforced. Some children end up wandering the streets infecting other people.

UNICEF (United Nations International Children's Emergency Fund) and other aid agencies such as Child Fund and Medecins Sans Frontieres are responding to this crisis. These agencies are attempting to bring aid to the thousands of abandoned children by opening care centres.

A typical case is that of a five-year-old Harry, who turned up at a health centre with his sick parents in late September.

His parents were sent immediately to the “red zone”, which only 40 per cent of patients leave alive, while Harry spent several days in the “green zone”.

Caregivers took turns during their breaks to keep him company, giving him crayons and paper to pass the time as his parents fought a losing battle against the virus and passed away.

Finally, UNICEF found a family of Ebola survivors to look after Harry.

Activities:

Think – pair – share (work in pairs and share ideas with the class)

1. Why are so many children becoming orphans in West African nations?
2. What needs do these children have?
3. What support networks for these orphans seems to have broken down?
4. What do you think ‘stigma and rejection’ means?
5. What can be done to support these orphans and stop them wandering streets and possibly spreading the Ebola virus?
6. What action can you personally take to assist these orphans?
7. Read the article below. What are the obstacles to the movement of Emmanuel from Liberia to his adoptive parents in the United States?
8. How are these obstacles being overcome?

Established orphanages are being hit as well. What does this mean for the adoption community? With continued exposure to the virus because of a lack of quarantine locations, adoptions are placed on hold for an undetermined amount of time.

The World Health Organisation and America’s Centre for Disease Control, as well as other government agencies, are taking careful precautions to prevent further spread of the Ebola virus. And while hopeful adoptive families understand the need to protect the masses, the urgency to get their adopted children home increases.

Jason and Jessica Neal have been attempting to adopt Emmanuel from Liberia since July 2014. The Neals have raised thousands of dollars to help set up sanitizing stations throughout the country in order to help halt the spread of Ebola and other diseases. They are also working toward getting Emmanuel into his 21-day quarantine so he can then be moved to Ghana, where the couple will meet up with their adopted son. The Neals are prepared to wait out their own 21-day quarantine, if required. “When we get him here alive”, said Jessica, “it’s going to be the biggest sigh of relief.”

Cultural practices cause problems

Many cultural practices in West African countries are a barrier to containing the Ebola epidemic. Governments, international agencies and health workers must be very careful not to offend cultural practices surrounding treatment of the dead.

Burial rituals and funerals are a critical way for the community to safely transfer the deceased into the afterlife. Prohibiting families from performing such rites is not only viewed as an insult to the deceased, but as actually putting the family in danger. In the event of an improper burial, it is believed that the deceased person's spirit may cause harm and illness to the family.

Secret burials are therefore taking place and sick people are not being reported nor getting any treatment. When someone dies many families observe traditional practices in which mourners wash and lay hands on the body. Ebola is spread through contact with bodily fluids. This washing, touching and kissing of bodies, typical in many West African burials, can be deadly.

To overcome this problem, the President of Liberia decreed that the bodies of Ebola victims be cremated. The government brought in a crematorium and hired experts. This order came after many people resisted the burial of hundreds of Ebola victims near their homes.

Cremation, however, violates values and cultural practices in Liberia. The order has so disturbed people that the sick are often kept at home and, if they die, are being secretly buried, increasing the risk of more infections. Families would rather keep sick members home than allow them to be cremated.

Cremations and burials of Ebola victims in body bags in unmarked graves without relatives present, means there won't be a place to honour deceased relatives. Decoration days, where people flock to cemeteries to clean and decorate the graves of relatives, will come with many not knowing the location of the remains of their loved ones. People will find it hard to accept that they will never see the graves of those killed by the disease.

People also have no idea how infectious diseases work. They see people go into the hospital sick and come out dead—or never come out at all. They think if they can avoid the hospital they can survive. This mistrust of the medical world seems to be confirmed when a family is prohibited from honoring the dead, participating in the funeral, or even seeing the body.

Villagers have been seen running away from ambulances, trying to burn down hospitals, and even attacking health workers. These workers, dressed in protective suits with goggles, masks and long gloves appear very dehumanised to the locals. Some people even fear that foreign health workers have come to steal body parts. They fear the disease—but they fear the medicine even more, as well as the people delivering it.

Activity:

1. In groups, how can health workers treat and contain the Ebola virus while respecting local cultural practices and beliefs? How can fears be overcome? Report your ideas to the class.

Protecting One Million Football Fans

In January 2015 almost one million football fans gathered in the small African nation of Equatorial Guinea for the 2015 Africa Cup of Nations. Morocco was originally selected to host the event but declined due to the Ebola outbreak.

Equatorial Guinea is in West Africa near the worst Ebola affected nations. How do you protect such a large gathering of people from the Ebola virus?

Mass gathering require an enormous amount of preparation. Coordinated surveillance and alert systems were installed in entry points such as airports, the stadium and at hospitals. Temperature screening at airports and stadiums and disinfecting spectators' hands with hand sanitizing gel as they enter became common practices.



Rapid response teams, three Ebola Treatment Centres and laboratories were developed and made ready to handle any potential Ebola cases. Healthcare workers were also trained in infection prevention and control.

Health authorities also ensured that local and visitor populations were educated about early symptoms of Ebola and how to protect themselves. Hand washing areas, mobile toilets, isolation areas and personal protective equipment were placed in strategic areas.

These activities are in addition to regular large mass gathering preparedness activities that also must be in place, such as plans for controlling crowds and dealing with traumatic injuries, food and water borne illnesses, weather and physical structure disasters, and terrorism concerns.

Activities:

1. What measures did Equatorial Guinea take to protect one million football fans from the Ebola virus?
2. What other international mass gatherings of people may need protecting from viruses like Ebola?

New Zealand's Ebola readiness

Go to the website and watch the film-clip about Ebola and New Zealand's preparedness.

<http://www.health.govt.nz/your-health/conditions-and-treatments/diseases-and-illnesses/ebola-information-public>

The Ministry of Health believes that the risk to New Zealand from Ebola remains low and that health and border authorities are well prepared.

The Ebola virus is not easy to catch; it is not spread through the air, and it's not as infectious as the flu or measles. Infection requires direct contact with infected body fluids such as blood.

Furthermore, in the unlikely event that there was a case of Ebola in New Zealand, it is expected that it would be quickly brought under control.



Monitoring for Ebola:

New Zealand has routine border systems in place for managing ill travellers. Additional border screening has been introduced for individuals arriving from West African countries affected by the Ebola outbreak. These controls are similar to those in place in other countries.

The Ministry of Health closely monitors the advice from the World Health Organisation and other countries in relation to the Ebola outbreak in West Africa.

Anyone arriving in New Zealand who in the last month has visited West African countries affected by the Ebola outbreak is screened for symptoms of the disease and possible exposure to the virus, and where necessary given a public health-risk assessment.

Since screening was introduced in August 2014, almost 100 people have been identified as having visited Ebola-affected countries. The only individuals who have been referred for a formal public health risk assessment are a small number of pre-identified returning aid workers. All other travellers who have been screened due to their travel history have had no other risk

factors identified by Customs officers. They have been given a health card and advice on where to call if they become unwell or have any queries.

The public health risk assessment involves taking a temperature (fever is the first symptom of Ebola) and asking more detailed questions on travel history, any symptoms and potential contact with Ebola. This information is used to decide whether the individual has had only casual contact (no risk), low risk or high risk contact with suspected or confirmed Ebola cases.

Important message from the New Zealand Ministry of Health

Kia ora, welcome to New Zealand.

If you get **sick** within a **month** of arriving in New Zealand, please seek **medical advice** as soon as you can.

Telephone the **free** Health line on **0800 611 116** or contact a doctor.

It is **important** to tell them that you have been **outside New Zealand** recently.

Tell the health professional if you have a temperature of 38 degrees or higher and one or more of the following symptoms:

- Ongoing coughing
- Difficulty breathing
- Ongoing diarrhoea
- Ongoing vomiting
- Skin rash
- Bruising or bleeding without injury
- Looking obviously unwell
- confusion

It is very unlikely that someone with Ebola will arrive in New Zealand. This is because:

- the current outbreak is mainly affecting three countries in West Africa (Sierra Leone, Guinea and Liberia)
- even in Ebola-affected countries the disease is not common
- there are very few people who travel from Ebola-affected countries to New Zealand, and very few people who travel from New Zealand to those countries.

For more information about New Zealand's preparedness go to:

[People considering travel to Ebola-affected countries](#)

- [Ebola – information for the public](#)
- [Ebola updates](#)
- [Ebola information for health professionals](#)

If the Ebola virus enters New Zealand it will be through an international airport.



Activities:

1. Who does New Zealand monitor for the Ebola virus?
2. What does the health risk assessment involve?
3. What information is provided on the health card?
4. Why is it unlikely the Ebola virus will enter New Zealand?
5. Should New Zealand's international airports monitor all travellers arriving? Explain your answer.

Treating Ebola Suspects:

Existing quarantine facilities and infection control protocols in New Zealand hospitals are suitable for treating a suspected or confirmed case of Ebola. Given the serious nature of the disease, samples would be sent to a high security reference laboratory overseas for testing.

There are more than 200 negative pressure rooms across all New Zealand hospitals, and 25 of these are within an Intensive Care Unit. A negative pressure room incorporates a ventilation system which prevents contaminated air from being circulated from that room to other parts of the hospital.

All hospitals with negative pressure rooms would be capable of managing a suspected Ebola patient. However, they would most likely be treated at one of the following tertiary level hospitals: Auckland, Middlemore, Wellington or Christchurch.

While Ebola is not an airborne virus – it is transmitted through direct contact with infected body fluid such as blood – negative pressure rooms provide an extra level of protection for treatment of patients. This is particularly important given that any patient being tested for Ebola is much more likely to have another infectious disease.

The Ministry of Health has recently provided up-to-date clinical information on Ebola to district health boards and other health services.

Would Ebola spread if it arrived in New Zealand?

In the unlikely event that a person with Ebola arrives in New Zealand the chance of Ebola spreading is extremely low.

Local and international expert advice, together with international experience of managing other viral haemorrhagic diseases, is that Ebola would be well contained in countries with health services like New Zealand's.

New Zealand's health care system is very familiar with managing infectious diseases, and has made preparations for an Ebola outbreak.

Like other countries, New Zealand may see people who need to be tested for Ebola, but they are far more likely to have other infections such as malaria.

Information regarding people returning from working in Ebola-affected regions:

The Ministry of Health has developed a protocol for people returning to New Zealand after assisting with the international Ebola response. This includes a 21 day self-monitoring period, starting from the date of departure from the Ebola-affected country.

The Ministry of Health recommends people reconsider their need to travel to Ebola-affected countries.

Activities:

1. In your opinion, is New Zealand doing enough to prevent the Ebola virus entering this country?
2. In your opinion, what more could be done?
3. What do you consider the greatest area of weakness in New Zealand's monitoring for the Ebola virus?
4. Class discussion: Is New Zealand's Ministry of Health doing enough to prevent the Ebola virus reaching New Zealand?
5. Class discussion: Does New Zealand have enough facilities to deal with an Ebola outbreak?

The search for a vaccine

A safe, inexpensive and effective drug to cure Ebola is desperately needed. The World Health Organisation currently has 200 drugs listed as potential treatments.

There are some medicines currently being trialled that may be effective. A drug called brincidofovir which can be taken daily as a pill meets the requirements. This drug works by stopping viruses from creating additional copies of themselves. This drug is not on the market yet as an Ebola cure and may never be an accepted treatment.

Another drug called TKM-Ebola, made by a Canadian company Tekmira, is also causing interest. This drug, in laboratory tests, has given 100% protection from the Ebola virus in monkeys and even been through safety trials with healthy human volunteers. This drug is also not available yet.

Trials of drugs can take up to 18 months and there must be considerable evidence that the drug is effective before a pharmaceutical company will apply for a marketing licence.

To test the drugs in Ebola infected African nations medical staff need the following:

- Well-designed buildings
- Trained and disciplined health workers
- Internet and road access
- Reliable power supply and plug sockets
- Safe storage of the drug on-site
- Good data management
- Access to a good laboratory
- Informed consent from sick patients
- A drug easy to take, cheap and easily mass produced



These requirements are not easy to find in the three worst affected African nations.

Activity: Complete the table:

1. What obstacles are likely when attempting to introduce an Ebola cure to African nations?

How could these obstacles be overcome? Complete the table below:

Obstacle:	How to overcome the obstacle:

Other Epidemics and Pandemics

Ebola is by no means the only infectious disease that has the ability to spread on a mass scale, nor is it the only one for which we don't have an approved drug or vaccine.

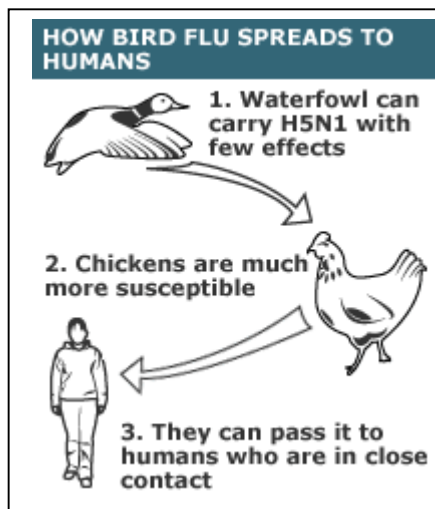
One virus that did break out and become a **pandemic** is HIV/AIDS.

Refer to the following website and answer the questions that follow:

http://en.wikipedia.org/wiki/Epidemiology_of_HIV/AIDS

Activities:

1. How many people are infected?
2. How many deaths are there worldwide each year?
3. Which countries are worst affected?
4. Is HIV/AIDS an epidemic or pandemic? Explain your answer.
5. Where and when did the HIV virus originate?
6. If HIV/AIDS began in Democratic Republic of Congo, how do you think it spread worldwide?



One of the more worrisome diseases among the international health community is H5N1 (Avian Flu) also known as 'bird flu', a respiratory virus that has the ability to cause a pandemic. This virus, which originates in chickens eventually made its way to humans.

Many viruses that originate in animals and make their way to humans become transmissible from human to human. That has not happened with bird flu yet, but if it did, it could likely become a pandemic and far exceed the current Ebola outbreak.

Another infectious disease that concerns the international health community is the Middle East Respiratory Syndrome (MERS), which was first reported in Saudi Arabia in 2012. In 2014, two people brought the disease to the United States.

7. In groups, **research** a possible future pandemic.

Use the website: <http://en.wikipedia.org/wiki/Pandemic> and choose from:

- ❖ SARS http://en.wikipedia.org/wiki/Severe_acute_respiratory_syndrome
- ❖ H5N1 (bird flu) http://en.wikipedia.org/wiki/Influenza_A_virus_subtype_H5N1
- ❖ 2009 H1N1 flu
http://bodyandhealth.canada.com/condition_info_details.asp?channel_id=0&relation_id=0&disease_id=350&page_no=2
- ❖ Viral hemorrhagic fevers http://en.wikipedia.org/wiki/Viral_hemorrhagic_fever

Complete the table below:

Name of virus	
Where has it been found?	
When were the outbreak/s?	
Why is this virus of concern?	
How is this virus spread?	
What are the symptoms of this virus?	
How can this virus be treated or controlled?	

Report your findings to the class.

Reflection and Evaluation

1. Were your **six** questions from page 4 answered? If so what are the answers to the six questions that you wrote at the beginning of this unit?

Question:	Answer:

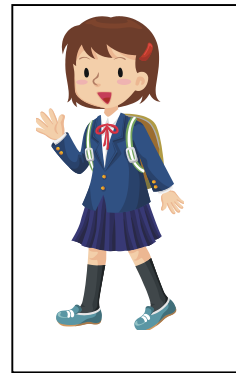
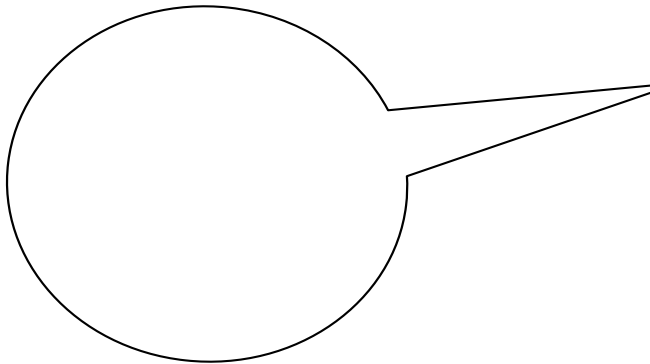
2. What have you learnt that is positive, negative and interesting from this study of Ebola? Complete the table below:

Positive:	Negative:	Interesting:

3. Write a paragraph using any **ten** words from the **Key Vocabulary** list on page 3.

4. Write **three** new questions that you have about the spread of Ebola. (Select from 5 Ws and 1 H).
5. Having studied this unit about Ebola, would you now change your position on the values continuum (page 4). Justify your answer.
6. In groups, what is the main lesson of the Ebola outbreak for New Zealand?
7. What social action can you take to prevent an Ebola outbreak in New Zealand?

I could.....



8. If the Ebola virus reached New Zealand and began to spread amongst the population what are **ten** changes that you would expect to encounter in everyday life? Complete the table:

Matching columns: Vocabulary

Match the word in column one with a definition from column two.

Word	Definition:
Quarantine	1. The passing on and spreading of a virus from one person to another.
Epidemic	2. A treatment or medicine used to provide patients with immunity to a disease or virus.
Transmission	3. A change in the mental or physical condition of a person which indicates they have contracted a disease or virus.
Surveillance	4. An infectious disease that spreads to many people in one geographic region.
Virus	5. A specialised outfit worn by health workers to offer protection from a highly contagious virus or disease.
Health-risk assessment	6. Traditions, beliefs and practices carried out by a group of people.
Pandemic	7. The process whereby people who have had close contact with an infected person are tracked down and monitored. This is a method used to prevent a virus spreading.
Contact tracing	8. A process whereby people suspected of being infected with a virus are closely monitored for a short period of time.
Community engagement	9. Isolation of people who have been exposed to the Ebola virus. This is often difficult to enforce.
Symptoms	10. A set of questions and short medical test administered to a person to determine whether they have been in contact with a virus and therefore pose a risk to public health.
Vaccine	11. An infectious disease that spreads worldwide and affects millions of people.
Protective equipment	12. An infected and disease-producing agent that reproduces within a host cell to cause illness.
Cultural practices	13. The process whereby members of a community are consulted and educated about a particular problem. They are invited to offer solutions and become involved in actions taken.

Further study:

The following websites provide further information about the Ebola outbreak:

- [All features on Ebola](#)
- [Ebola virus disease - website](#)
- [FAQs on Ebola virus disease](#)
- [Ebola response roadmap](#)
- [All publications on Ebola virus disease](#)

Answers and expected outcomes:

Page 4: Introduction:

Questions 1-3 Students own answers.

Page 6: Epidemic or pandemic?

1. Ebola is a threat to the international community because:
 - There is no known cure and no licenced medication yet
 - Ebola is lethal with a 50% mortality rate
 - Ebola has spread rapidly across land borders and by international flights to become an epidemic in three West African nations. It could spread worldwide and become a pandemic.
2. There are 5 species of Ebola.
3. Earlier outbreaks of Ebola occurred near tropical rainforests.
4. The 2014 outbreak was different and occurred in major urban and rural areas.
5. Earlier outbreaks of Ebola did not become epidemics because the virus was confined to isolated and remote areas.
6. Ebola is an epidemic because it has spread throughout one geographic region and not worldwide.

Page 7: Graph interpretation:

1. The graph shows the number of new cases and deaths from Ebola.
2. Two trends shown by the graph are:
 - New cases and deaths rapidly increase after July 2014
 - There has been a decline in new cases and deaths since December 2014
3. New cases of Ebola were worst in September 2014.
4. Deaths from Ebola were worst in December 2014.
5. As a WHO official I would be cautiously optimistic that numbers of Ebola victims are in decline but I would remain vigilant.
6. The trends are encouraging because both new cases and deaths from Ebola are declining after December 2014.
7. Answers will vary according to date selected. Figures are cumulative.

Page 8-9: How did the Ebola virus begin?

1. Fruit bats are thought to be the natural Ebola virus host.
2. Bush meat is meat from animals living in the forest. It spreads Ebola if it is infected with the virus.
3. Three ways Ebola was transmitted from animals to humans are:

- Close contact with body fluids of infected animals
- Eating bushmeat
- Touching objects that have come into contact with the virus

Page 12: Symptoms - Table:

How Ebola is transmitted:	How Ebola is not transmitted:
Contact with body fluids of infected person	Through water
Exposure to contaminated objects	Through food
Touching people who have died from Ebola	Through the air

2. Student's own ideas but must refer to Ebola symptoms

Pages 13-16: Identify the area of study

1. Ebola was named after the Ebola River; location of one of the first outbreaks.
2. a) The map shows Ebola virus species and cases of Ebola reported.
 - b) The map represents Africa
 - c) The first-ever case of Ebola was recorded in 1976.
 - d) The first-ever cases of Ebola were recorded at Yambuku (Zaire now called Democratic Republic of Congo) and Nzara (Sudan).
 - e) The map shows 4 species of Ebola.
3. Countries with Ebola outbreaks prior to 2008:

Sudan	1976, 1979, 2004
Democratic Republic of Congo (Zaire)	1976, 1995, 2007, 2008
Uganda	2000, 2007
Republic of Congo	2001, 2002, 2003
Gabon	1994, 1996, 2001
Cote d'Ivoire (Ivory Coast)	1994
South Africa	1996

4. Map has Sierra Leone, Liberia and Guinea shaded in red.
5. a) In 1976 284 people died of Ebola in Sudan and 318 died in DRC (Zaire)
 - b) Uganda experienced an outbreak of Ebola in 2000.
 - c) The three countries that experienced an Ebola outbreak in 2014 are: Liberia, Sierra Leone and Guinea.
 - d) Liberia had the most victims.
 - e) Report will depend upon date.
6. Sixteen countries that have experienced cases of Ebola are:

Brazil	Germany	Uganda	Botswana
Canada	France	Kenya	South Africa
United States	Italy	Tanzania	Namibia
United Kingdom	Spain	Zambia	Zimbabwe

7. The greatest distance Ebola travelled was 7684 kilometres.
8. The virus reached countries through passengers on aircraft.
9. Ebola is not a pandemic as the virus has not infected millions of people worldwide.
10. If people are infected with the Ebola virus and move they take the virus with them and spread it to other people.
11. The best dates to focus on are; March 23 and 29, May 25, July 27, August 30, September 30, October 6 and 23.
12. Five measures taken to treat and stop the spread of Ebola are:
 - Social mobilisation
 - Community education
 - Contact tracing
 - Personal protective equipment
 - Safe air travel
 - More hospital beds

Page 17-18 : Epidemics and the movement of people:

1. Direct flights: UK, France, USA and Ghana

Stopover in Nigeria: 23 countries – South Africa, Kenya, Cameroon, Cote d'Ivoire, Niger, Morocco, Egypt, Turkey, Lebanon, UAE, Saudi Arabia, USA, Canada, UK, France, Spain, Germany, Italy, India, China, Senegal, Gambia, Ghana.
2.
 - a) There are 60 international flights weekly from the 3 worst infected countries.
 - b) There are 22 international airports where passengers from these countries connect to other flights
 - c) Passengers infected with Ebola can fly to another country and spread the virus within hours.
 - d) The Ebola virus could reach NZ through an infected airline passenger.
 - e) International airports that connect to NZ are: Singapore, Hong Kong, London, Paris, Rome, New York and Dubai.
 - f) Ebola could also be transported by ships, bus, car and trains.

Page 21: Should travel be banned to and from infected areas

1. Positive and negative effects of a travel ban:

Positive:	Negative:
Ebola-infected people would be unable to fly to USA	A ban might need to be expanded to other countries. Where would it stop?
There would be a reduced chance of virus transmission	US citizens may not be able to return home.
	It would become harder to get medical supplies and staff into infected countries.
	Land borders allow the virus to spread to countries outside the flight ban.

2. Students own opinions supported with evidence.

3. a) 3000 American troops were dispatched to Liberia.

b) Three roles the troops have are:

- Build treatment centres
- Train health care workers
- Create an 'airbridge' to get health workers and supplies into infected areas

c) Obama says that the world is looking to the US to take a lead, save lives and step-up and do more.

d) US troops will be protected from the virus as they will not be responsible for direct patient care.

e) Own opinions with reasons.

Page 22: Surveillance:

- If you arrive in USA and test positive for Ebola you will be transported to hospital, diagnostic specimens obtained and receive antibiotic therapy.
- If you arrived in USA and tested negative for Ebola you will be asked to say where you can be located, take temperature for 7 days and an epidemiologist will be notified.
- If you arrived in USA and sat near someone who tested positive for Ebola you will complete a surveillance form, receive plague alert notice, monitor temperature for 7 days and take antibiotics.
- If you were a passenger on a plane where someone tested positive for Ebola you will complete a surveillance form, receive plague alert notice and monitor temperature for 7 days.

Page 23: Plague alert notice

5. a) Four instructions for the person given the notice are:

- Take your temperature twice a day and watch for Ebola symptoms
- Call the doctor if you get a fever
- Tell the doctor you recently travelled to a country with Ebola
- Bring the alert notice and give it to health care staff

b) Four instructions for the doctor are:

- Isolate the patient
- Implement contact precautions
- Evaluate the patient
- Notify the local or state health department

Page 24: Problem-solving activity - 1

Problem: Ebola has become an epidemic in Liberia. As President of Liberia I would take decisive actions to contain the epidemic and stop it spreading.

Actions:

- Close schools and ban public gatherings
- Ban people from moving out of areas infected with Ebola – impose a quarantine
- Educate people through a public campaign on how to treat people with Ebola

Consequences:

- Positive: less contact will reduce the chance of the virus spreading
- Negative: closed schools will reduce education opportunities
- Positive: a quarantine may keep infected people off the streets
- Negative: a quarantine is bad for trade, business and family responsibilities
- Positive: if awareness is raised people will take precautions against Ebola
- Negative: many people are superstitious and uneducated so will ignore the campaign

Best solution and why: Student's own ideas.

Page 26: Lack of resources to fight the Ebola virus

1. Impressions of images:

- Roads: unsealed, busted up and flooded
- Sewerage system: open sewers
- Water supply: polluted, contaminated with garbage and sewerage
- Housing: shacks, tiny and overcrowded
- Medical facilities: lacking, often in tents, lack of hospitals, staff and medicines
- Schools: overcrowded and lacking resources
- Reminders of war: bombed out buildings and infrastructure

2. The three impoverished African nations would lack education, health, welfare, roads and communication systems all essential to combat Ebola. People live in dirty, unhygienic conditions which spreads disease.

3. A good health service requires: doctors, nurses, medicines, hospitals, beds and laboratories	Human resources are: doctors, nurses, laboratory technicians, teachers, social workers, funeral directors, cleaners
Infrastructure needed includes: hospitals, roads, airports, safe water, sewerage system, cemeteries, waste collection	Peace and stability means more money can be spent on health, education and welfare. War makes the country unsafe for relief workers.

4. The Presidents of these three countries could ask for international aid and advice.
5. International agencies that can provide aid are: WHO, United Nations, Medecins Sans Frontieres, Red Cross, Bill Gates' Foundation.
6. Student's own opinions (hopefully ask for international assistance).

Page 27- 33: An international response to the Ebola outbreak:

1. UNMEER is United Nations Mission for Ebola Emergency Response and it was set up to coordinate the international campaign to treat Ebola victims and stop the virus spreading.
2. WHO is World Health Organisation – any three actions from the list on page 27
3. The contribution made by countries and international organisations:

UNICEF: money, infrastructure, staff, education campaigns	China: medical supplies, medical teams, money, building hospitals
World Food Programme: food for one million people, transport, medicine	Cuba: doctors, nurses, infection control specialists
African Union: Health care workers	Germany: money, air transport, motorbikes to rush samples to laboratories
European Union: money, mobile laboratories	New Zealand: 24 doctors and nurses
World Bank: money for medicine and health workers	Medecins Sans Frontieres: money, 3347 health workers, 6 treatment stations

4. Visual resources and captions:

- Case management and patient care – F
- Community engagement – D
- Laboratory services – A
- Personal protective equipment – E
- Environmental cleaning – G
- Movement of dead and safe burial – C

5. Possible questions could include:

- Define contact tracing
- What happens to the Ebola patient?
- How long are contacts watched?
- What happens if a contact develops Ebola symptoms?
- What is the aim of contact tracing?

6. A quarantine is when a person is put into isolation and cannot move freely about.
7. A quarantine is difficult to enforce because people go out to get food. They go to markets..
8. People also leave quarantine areas to attend funerals, visit friends and relatives and to help ill family and friends.
9. Schools were closed in Liberia to stop Ebola spreading – to stop contact and transmission.
10. Five impacts of closing schools could include:

- Disruption of education
- Children stay at home and are bored with little to do
- Teachers are without jobs and pay
- Exams are postponed because courses are incomplete
- School friendships are disrupted

11. Wash hands as needed: use buckets, sanitizers and clean water

Isolate the patient: have special rooms at hospitals and erect signage

Wear protective clothing: cover face, hands, mouth and body

Dispose of needles and syringes safely: use a deposit box and destroy later

Dispose of waste safely: install sewerage system, garbage collection and destruction

Use safe burial practices: educate people, supervise burial, do not allow contact with dead

12. How to engage the community and raise awareness:

- Hold classes, lectures, discussions
- Put up signs offering advice
- Talk to and involve community leaders
- Use TV and radio to get the message across
- Give incentives for community involvement

Page 34: Problem-solving activity – 2

Problem: To stop transmission of the Ebola virus many infected people are placed in isolation or quarantine. They are denied free movement and must not leave their home or hospital room. Many people break the quarantine rules so how can a quarantine be enforced?

Actions:

- Seal off the house or room under quarantine and display warning signs
- Give people incentives to obey quarantine rules such as food, medicine and money
- Create quarantine zones surrounded by wire and guards and maintain the quarantine by force

Consequences:

- Positive: People see the warning signs and stay away
- Negative: Barriers and signs are ignored and people continue to move in and out of quarantine zones
- Positive: With food, money and medicine people stay inside quarantine zones – no need to go out
- Negative: People set up markets and sell the food and medicine to other people outside the quarantine zone
- Positive: People have no ability to leave – they are forced to remain in the quarantine zone or be punished
- Negative: Guards become infected with the virus or accept bribes and allow people to leave

Best solution and why: Student's own ideas.

Page 35-36: Reactions and responses to Ebola

1. Captions:

- a) Aid worker washes and sanitizes hands
- b) People are asked to donate to an Ebola aid agency
- c) President Obama makes a speech about Ebola
- d) Man holds a sign warning of an Ebola outbreak in his village
- e) Ebola worker takes 'selfie' with children
- f) Students receive a lesson about Ebola
- g) Doctor gives a vaccine to a patient
- h) Aid worker sprays outside an Ebola-infected house
- i) A demonstration against Ebola to raise awareness
- j) Passengers have temperature taken at international airport
- k) People pray for a release from Ebola

2. Venn diagram:

Useful reactions:

- Wash hands/ take temperature/vaccine/spraying/lessons/Obama speech/donation/warning sign

Interesting reactions:

- Praying/demonstration

Useless reactions:

- Selfie ?

Page 39: The impact of the Ebola outbreak upon three African nations

1. How can the international community assist?

Trade: expand export trade (food, minerals), allow new markets	Investment: Governments, banks and international organisations give loans for development and infrastructure – invest in projects
Medical assistance: Provide doctors, nurses, medicines, hospitals and equipment as aid	Educational assistance: Provide teachers, donate resources, aid to build schools
Infrastructure: Advisors, contractors and loans to build roads, ports, airports, dams etc	Peace and security: Provide peace-keeping forces and give military aid to army

Page 41: Activities:

1. Schools were closed to stop Ebola spreading between children
2. Education continued through radio and television – or not at all for many
3. Teachers are now trained to identify Ebola. Schools have thermometers and hand washing
4. It is risky reopening schools as the Ebola virus is still active – maybe too soon
5. Governments could also close: movies, sports stadiums, parks, public transport
6. In NZ our education could be continued through radio, television and the internet
7. Student's own ideas
8. Student's own ideas
9. Ebola could be spread from: sharing food/drinks, door knobs, drinking fountains, tuck shop utensils, students coughing and sneezing, contaminated desks/keyboards/chairs

10. Many families kept sick family members home because they were afraid of the foreign doctors in 'space suits' and hospitals where people went in alive and came out dead. Some thought their body organs would be stolen. Other people wanted to keep the infection a secret to avoid being stigmatised by the community.
11. Negative consequences of keeping sick people home include
 - Sick people denied medical assistance will get worse and infect others – maybe die
 - Virus spreads through the household and to everyone else family members have contact with
12. Student's own creation.

Page 41: Ebola creates unwanted orphans

1. Children become orphans because both parents die from Ebola
2. These orphans need: food, clothing, education, a home, care, love and support
3. The extended family support network is breaking down because other family members are afraid of catching the Ebola virus. Less assistance is forthcoming.
4. Stigma and rejection means the community avoids people suspected of having Ebola – become outcasts
5. Orphans need international aid, adoption, orphanages and community workers.
6. Student's own ideas (donate)
7. The obstacles facing the adoption of Emmanuel from Liberia include: lack of quarantine facilities, the Neals need to travel to neighbouring Ghana and wait and must undergo 21 days quarantine themselves.
8. The Neals have donated money to sanitizing stations and will not give up on the adoption case.

Page 42: Cultural practices cause problems

- Health care workers can control the handling of dead people but allow other cultural practices to continue – just no touching or kissing.
- Mass graves and cremations should be avoided
- Provide an education campaign about how Ebola is spread
- Allow community involvement and consult community leaders

Page 43: Protecting one million football fans

1. Equatorial Guinea protected football fans from Ebola by: setting up rapid response teams, 3 Ebola treatment stations and laboratories and trained health care workers in Ebola prevention and control. Visitors were also educated about Ebola symptoms and hand washing, toilets, isolation areas and protective equipment were placed in strategic areas. Monitoring and health tests at airports.
2. Other mass gatherings that may need protecting are: Olympics, Commonwealth Games, FIFA World Cup, the pilgrimage of Muslims to Mecca.

Page 46: New Zealand's Ebola readiness

1. New Zealand monitors anyone arriving here who has in the last month visited West African countries affected by Ebola.
2. The health risk assessment involves taking a temperature and asking detail questions about travel history, any symptoms and potential contact with Ebola.
3. The health card provides information on who to call if you get sick and what to tell your health professional.
4. It is unlikely that Ebola will reach New Zealand because the outbreak is confined to three countries in West Africa, even in those countries Ebola is not common and few people travel between Ebola affected areas and New Zealand.
5. Student's own opinion with justification.

Page 47: Activities

1. Student's own opinions with justification
2. Student's own opinions with justification
3. Weaknesses in New Zealand's Ebola readiness could include: people with Ebola could enter by boat or ship and are all airports serving international flights equally prepared (e.g. Christchurch, Wellington and Queenstown)?
4. Own views
5. Own views

Page 48: The search for a vaccine

1. Obstacles could include:
 - Lack of well-designed buildings
 - Lack of trained and disciplined health workers
 - Lack of internet and road access
 - Power service is not reliable
 - Lack of safe storage for the drugs
 - No facilities for data management
 - Lack of laboratory facilities
 - Drugs are too expensive and difficult to administer

Student's own ideas on how to overcome each obstacle.

Page 49: Other Epidemics and Pandemics

1. 35,300,000 people are infected with HIV/AIDS worldwide
2. 1,800,000 people die from HIV/AIDS each year
3. Sub-Saharan Africa is worst affected, in particular South Africa, Swaziland and Botswana.
4. HIV/AIDS is a pandemic because it affects millions of people worldwide.
5. The virus originated in 1920 in Kinshasa (Democratic Republic of Congo).
6. The virus spread worldwide when infected people travelled and had contact with other people.

Page 53: Matching columns - vocabulary

Quarantine	9	Contact tracing	7
Epidemic	4	Community engagement	13
Transmission	1	Symptoms	3
Surveillance	8	Vaccine	2
Virus	12	Protective equipment	5
Health risk assessment	10	Cultural practices	6
Pandemic	11		