Design Your Own Zombie

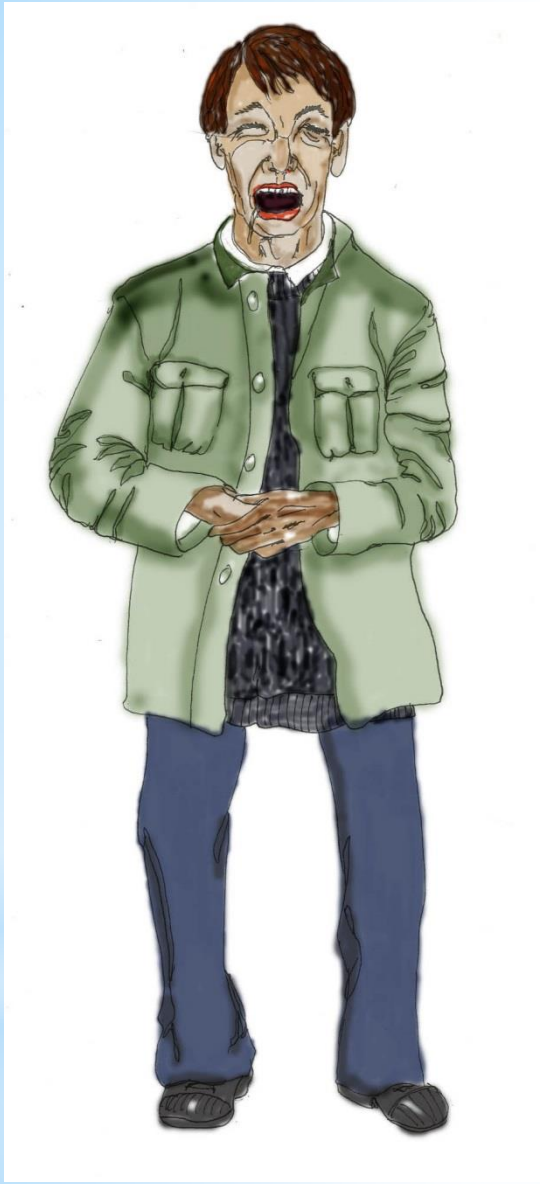
Elaine Cloutman-Green

What Characteristics Do You Need to Consider?

- How easy will it be for your zombie to spread it's infection?
  - Body fluids – contact, airborne (spores), penetration (bites)
- How fast will your zombie be?
- How easy will it be to kill your zombie in order to stop transmission?
- How long is the incubation period of the infection?
- All of these factors contribute to the R_0

What Is An R_0?

* If
  * $R_0 < 1$ the infection will die out in the long run. But if
  * $R_0 > 1$ the infection will be able to spread in a population.
* Generally, the larger the value of R_0, the harder it is to control the epidemic.
* The basic reproduction number is affected by several factors including:
  * the duration of infectivity of affected patients
  * the infectiousness of the organism
  * the number of susceptible people in the population that the affected patients are in contact with

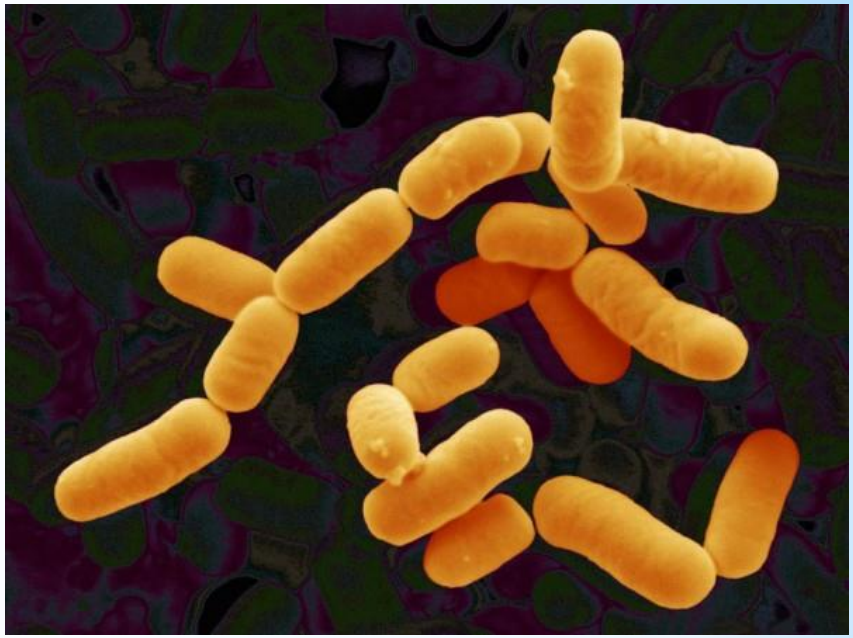


* Transmission of infection = bite
* Physical Characteristics:
  * Speed 6/10
  * Difficulty to kill 6/10
* Length of Incubation = 10 minutes as toxin mediated
* Method needed to kill = decapitation

* Bacterial Based Zombie Outbreak

Real-Life Basis

* Bacteria is the human gut form the gut microbiome
* Different bacteria in the gut microbiome are thought to be responsible for changes in mood of the host, especially in stress and anxiety levels
* Up to 80 per cent of people with irritable bowel syndrome experience increased anxiety and depression



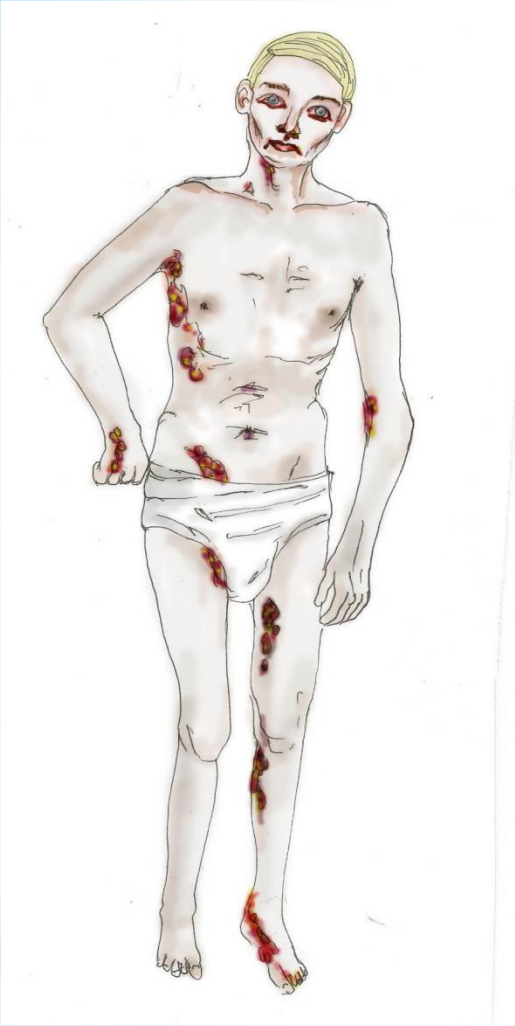
- Other parasites can cause animals and humans to change their behaviour in order to increase spread i.e. *Toxoplasma gondii*

Fungal Outbreak

- Transmission of infection = airborne (inhalation of fungal spores)
- Physical Characteristics:
  - Speed 3/10
  - Difficulty to kill 9/10
- Length of Incubation = 3 days
- Method needed to kill = destruction of central nervous system (incineration)

*Real-Life Basis

* ***Ophiocordyceps unilateralis*** is insect-pathogenising fungus,
* *O. unilateralis*, also referred to as a *zombie fungus* and infects ants of the Camponotini tribe
* Infection is characterized by alteration of the behavioural patterns of the infected ant:
  * Infected hosts leave their canopy nests and foraging trails for the forest floor,
  * Use their mandibles to affix themselves to a major vein on the underside of a leaf, where the host remains until its eventual death.
  * Fruiting bodies grow from the ant's head, rupturing to release the fungus' spores.



* Transmission of infection = contact via bodily fluids
* Physical Characteristics:
  * Speed 8/10
  * Difficulty to kill 4/10
* Length of Incubation = 3 hours
* Method needed to kill = incapacitation, limb removal will lead to bleeding out due to haemorrhage

Virally Mediated Outbreak

* Real-Life Basis

* Rabies is a deadly virus spread to people from the body fluids of infected animals.
* Animals most likely to transmit rabies in the United States include bats, coyotes, foxes, raccoons and skunks. In developing countries of Africa and Southeast Asia, stray dogs are the most likely to spread rabies to people.
* Once a person begins showing signs and symptoms of rabies, the disease is nearly always fatal.
* Rabies alters the behaviour of animals and infected humans making them more likely to bite other and have symptoms such as photophobia

- Other viruses like Ebola are acquired by eating ‘bush meat’ and then transmitted through blood and other bodily fluids = viral haemorrhagic fevers

	Bacterial	Fungal	Viral
Transmission	Biting	Airborne	Body Fluids
Speed	6	3	8
Difficulty to Kill	6	9	4
Length of Incubation	10 minutes	3 days	3 hours

- These are your basic zombie statistics and we will use these to learn what happens when you have a zombie outbreak on your own island.

*Now It's Time to Make Your Own Zombie

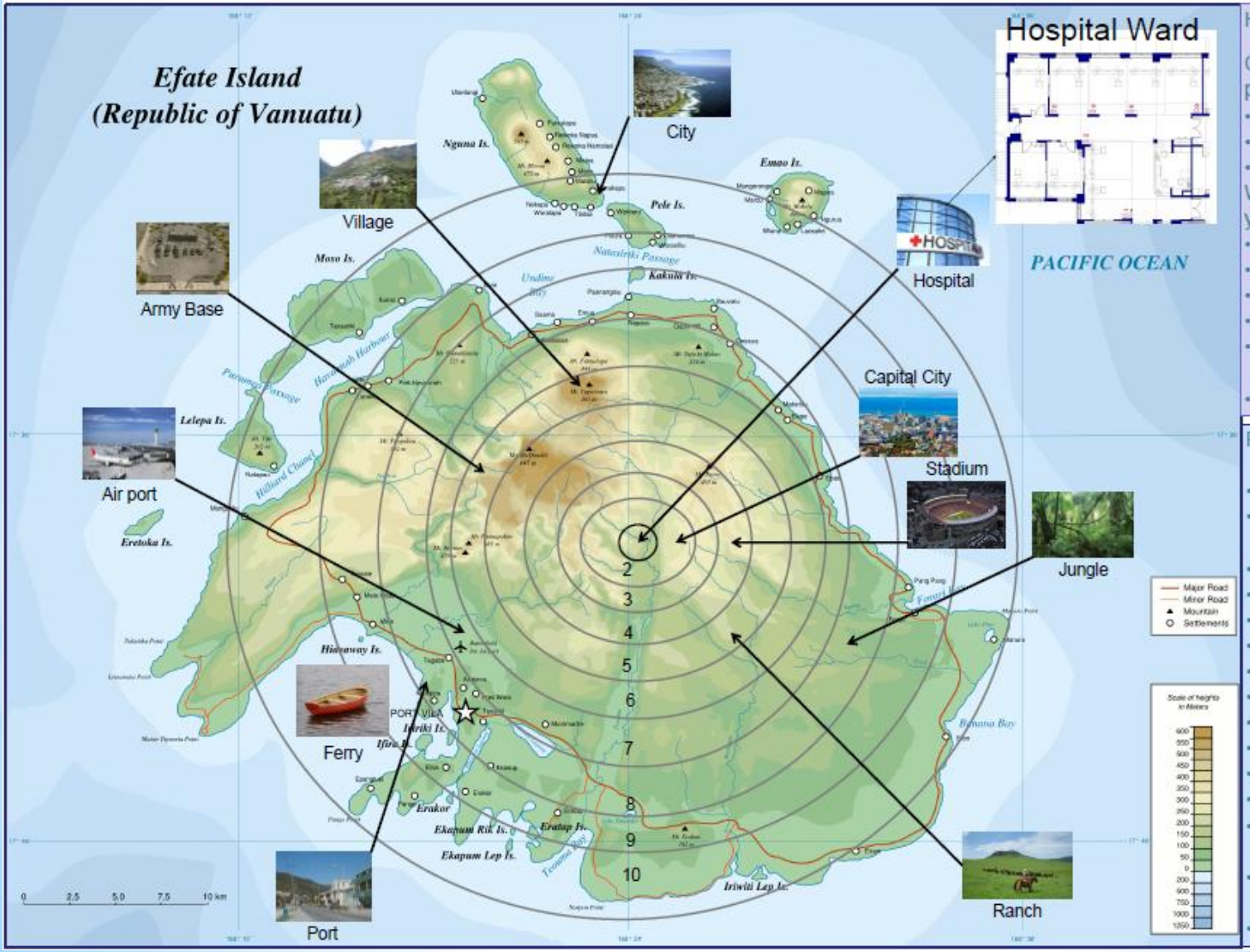
* As every outbreak is different you need to think about what kind of things you can do to make your R_0 <1

* Hospital infection control precautions
* Isolation of the sick
* Make a vaccine
* Introduce screening at ports of entry and exit
* Identification of a source
* Education of populace
* What will you with your dead?

Now We Have Our Zombies……

Your beautiful island of Efate is undergoing an outbreak of Zombism

What will you do to stop it spreading to your population, your food source and to other places across the world??



Hospital Interventions:

Choose your infection control precautions:

- Standard precautions
- Contact precautions
- Airborne precautions

Would you isolate the patient? yes/no

- Restrict patient admission
- Restrict visitation
- Staff cohorting
- Ration medicines
- Vaccination of staff when available
- Vaccination of populace

Public Health Interventions:

- Make a vaccine
- Introduce screening at ports of entry and exit
- Instigate a curfew
- Stop public gatherings
- Identify a source
- Introduce food screening
- Quarantine populated area
- Call in the army
- Seek international aid
- Stock pile food and drugs
- Make public announcement
- Education of populace
- Organise cremation of all dead
- Set up assessment and care centres
- Contact tracing