

HSC Biology

Core 3 - Search for Better Health

Focus 7

✚ Increased understanding has led to the development of a wide range of strategies to prevent and control disease.

Discuss the role of quarantine in preventing the spread of disease and plants and animals into Australia and across regions of Australia.

- Australia's geological isolation:
 - Protects native species from foreign predators.
 - Prevents introduction of foreign plant & animal diseases.
- Quarantine ensures protection by guarding entry points into Aust.
 - Regulations prevent entry of infectious diseases that threaten population & economy.
 - Eg.** Foot & mouth disease.
 - Also prevents spread of disease within the country.
- First quarantine set up at marine entry points.
 - Now covers imports, airports & shipping terminals.
- North Head, Sydney.
 - Quarantine station.
 - 1828-1984.
 - Prevented entry & spread of;
 - Plague.
 - Cholera.
 - Typhus fever.
 - Typhoid fever.
 - Yellow fever.
 - Smallpox.
 - Leprosy.

Explain how one of the following strategies has controlled and/or prevented disease:

- **Public health programs.**
- **Pesticides.**
- **Genetic engineering to produce disease resistant plants and animals.**

- **Public Health Programs:**
 - Health promotion.
 - Encouraging safe, healthy behaviour.
 - Prevention is better than cure.
 - Targets;
 - The pathogen.
 - The host.
 - The environment.

 - Pathogen controlled by standardisation procedures.
 - Sterilisation.
 - Universal Precautions.
 - Provide guidelines for health workers to reduce spread of blood borne viruses (HIV, hepatitis).

 - Law requires Gov. to be notified of occurrence of certain diseases.
 - Eg.** Leprosy, AIDS.
 - Effective in stopping spread

 - Public education.
 - Creates awareness.
 - Influences lifestyle changes.

 - Environment improved by;
 - Pollution monitoring.
 - Waste control.
 - Clean water management.
 - Domestic sanitation.
 - Garbage collection.

- Vermin control.
- Designing buildings that increase ventilation.
- High personal hygiene standards.
- Food inspections.
- Quarantine.
- Legislation (OH & S).

Eg. Slip + Slop + Slap

- NSW Health & Cancer Council.
- Targets entire population.
 - Especially young children & youth.
- Aims to raise awareness, prevent skin cancer, develop personal skills.

- **Pesticides:**

- Chemicals used to destroy organisms that damage crops, cause disease in animals.
 - Herbivores feeding on crops.
 - Numbers of natural predators on monocultures can become plague proportioned.
- Eliminate vectors of disease.
 - Aphids causing potato leaf roll virus eliminated using pesticides.
 - Killing of mosquito larvae to prevent spread of disease.

Eg. Flies

- Flies are vectors of disease.
 - Carry disease from previously walked-on surfaces (eg. Rotting food).
 - Known to carry;
 - Salmonella.
 - Typhoid fever.
 - Poliomyelitis.
 - Gastrointestinal disorders.
- Most households spray flies with pesticides.
- Covering food, eliminating potential breeding sites also controls flies.

- **Genetic Engineering:**
 - Produced disease resistant plants & animals.
 - Improved health of crops & livestock.
 - Increased food supply.
 - Techniques are controversial.
 - Side effects not yet fully known.
 - Ethical battles.

Eg. Australian Peas

- Aust. Scientists developed peas resistant to weevils.
 - Gene isolated in kidney beans.
 - Protein blocks digestion → prevents growth of larvae.
 - No chemicals used.

Eg. Bloat In Cattle

- Bloat:
 - Caused by production of foam in animal's rumen.
 - Eating large quantities of clover, lucerne.
 - Causes throat to close.
 - Digestive gases build up.
 - Organs crushed, animal dies.
- If *tannin* can be controlled (enable it to 'switch on');
 - Prevent foaming.

Eg. Humans

- Production of insulin using recombinant DNA technology.
 - Assists in control of diabetes.

Process and Analyse information from secondary sources to Evaluate the effectiveness of quarantine in preventing the spread of plant and animal disease into Australia or across regions of Australia.

- Fire blight:
 - Disease infects apples, pears.
 - Related to ornamental plants.
 - Lives in N. America.
 - Spread to Europe, Central America, New Zealand.
 - Strict quarantine, controlling entry of potential threats into Aust. prevented impact of disease on Aust. fruit industry.
- Australian quarantine has effectively prevented entry or spread of diseases throughout the country.

Eg. Prevention of entry of bird flu.

Gather, Process information and Use Available Evidence, to Discuss the changing methods of dealing with plant and animal diseases, including the shift in emphasis from treatment and control to management or prevention of disease.

- Movement from treating disease once it occurred to preventing disease from occurring.
 - Evident in agriculture.
 - Genetically modified crops grown to prevent spraying of crops.
 - Quarantine.
 - Prevents entry of disease into country or spreading throughout country.
- Understanding of genetics:
 - Human genome project.
 - Mapping of human genes.
 - Led to an increased emphasis on genetic technologies.
 - eg. genetic engineering, DNA technologies.
 - Genetic epidemiology.
 - Analysis of gene interaction, genetic variations & effect of environment.
 - Contribute to discovery of new medicines, treatment methods.
 - Will continue to change emphasis of health from cure to prevention.