RESPONSIBILITY OF PARA-VETERINARIAN IN **PUBLIC HEALTH** AND **FOOD SAFETY**

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Public Health and Food safety

- World Health Organization (WHO)defines veterinary public health as:

"The sum of all contributions to the complete physical, mental and social well-being of humans through an understanding and application of veterinary medical science."

Contribution of Veterinary Public Health

- Animal health Promotion can facilitate augmentation of the quality and quantity of animal products.
- Foods of animal origin help to improve the nutritional status of people by providing high-quality protein.
- Using animals for draught power and their manure for fertilizer and fuel increases crop production.
- Improved animal health and quality assurance of foods of animal origin contributes to food security at local and national levels and thus is contributing towards the goal of "*Health for all*".
- **Veterinary science contributes to human health by promoting the health of animals**

Need of Veterinary service delivery is increasing

- The human population is expected to double by next 10 years resulting in greater demand for animal protein.
- The proportion of the total population of developing countries in urban areas will increase from an estimated 37% in 1990 to 52% by 2020.
- Health problems related to environmental pollution are likely to increase.
- The global temperature will continue to increase and produce environmental changes.
- Patterns of zoonotic diseases will change due to alteration of the environment, establishment of human settlements in formerly uninhabited areas.
- Intensification of animal production, and acceleration of trade in live animals, animal products and other foodstuffs.
- • Global trends in the re-organization of national health services.

History of Veterinary Public Health

- The concept of veterinary public health originated in Egypt, when healer priests drew no distinctions between caring for human patients and animals.
- This "one medicine" approach prevailed until the 19th century. Since then, the gap between human and animal physicians has been increasing.
- During the 1970s to 1980s the Veterinary Public Health works was related to risks of chemical pollution of the environment and presence of chemicals in the food chain.
- Since 1990s emerging and re-emerging zoonotic diseases have acquired global significance for Veterinary Public Health. (Reported zoonotic diseases , *Salmonella enteritidis*, multidrug-resistant *Salmonella typhimurium*, Marburg and Ebola viral haemorrhagic fevers , Rift Valley fever, New World screw worm).

Veterinary Public Health (present context)

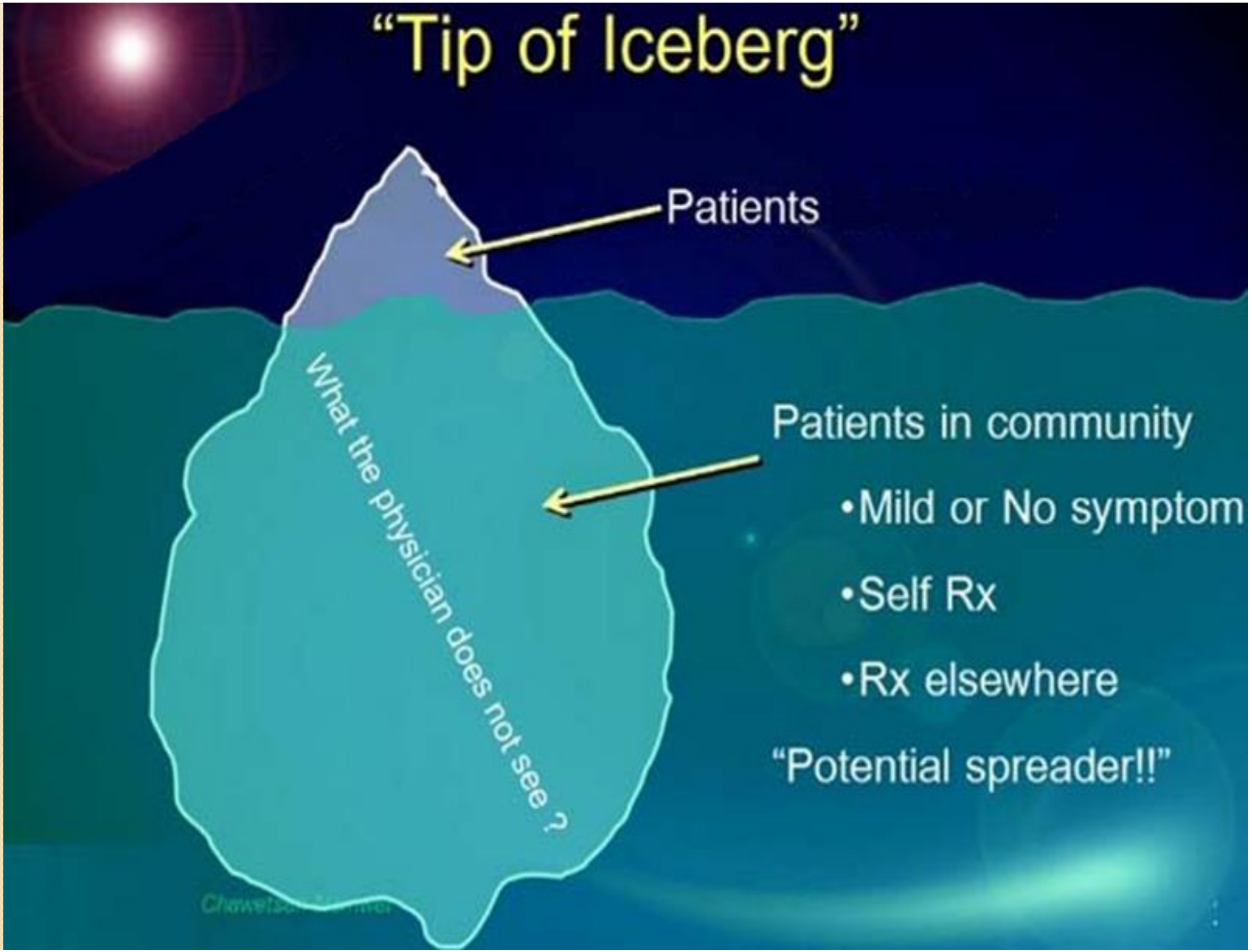
- Link between BSE and variant Creutzfeldt–Jakob disease (vCJD), Rodents with Hantaviruses, Avian spp with West Nile virus illness and death warranted teamwork between, physicians, veterinarians and biologists.
- Threat of a global influenza pandemic has resulted in renewed research actions in relation to mammalian and avian reservoirs.
- Resistance to antimicrobials among zoonotic bacteria has also become an issue of increasing concern for animal production and human health.
- It is now established that 50% of the 1700 agents known to infect humans have an animal or insect vector reservoir, and many emerging infections either are, or appear to be, zoonoses.

Specific roles of Para-Veterinarian

- Accurate diagnosis
- Disease surveillance, reporting, prevention, control and elimination of diseases
- Health education and extension
- Judicial and timely use of biological products.
- Prudent use of antimicrobials
- Management of domestic and wild animal populations
- Protection of drinking-water and the environment
- Management of public health emergencies.

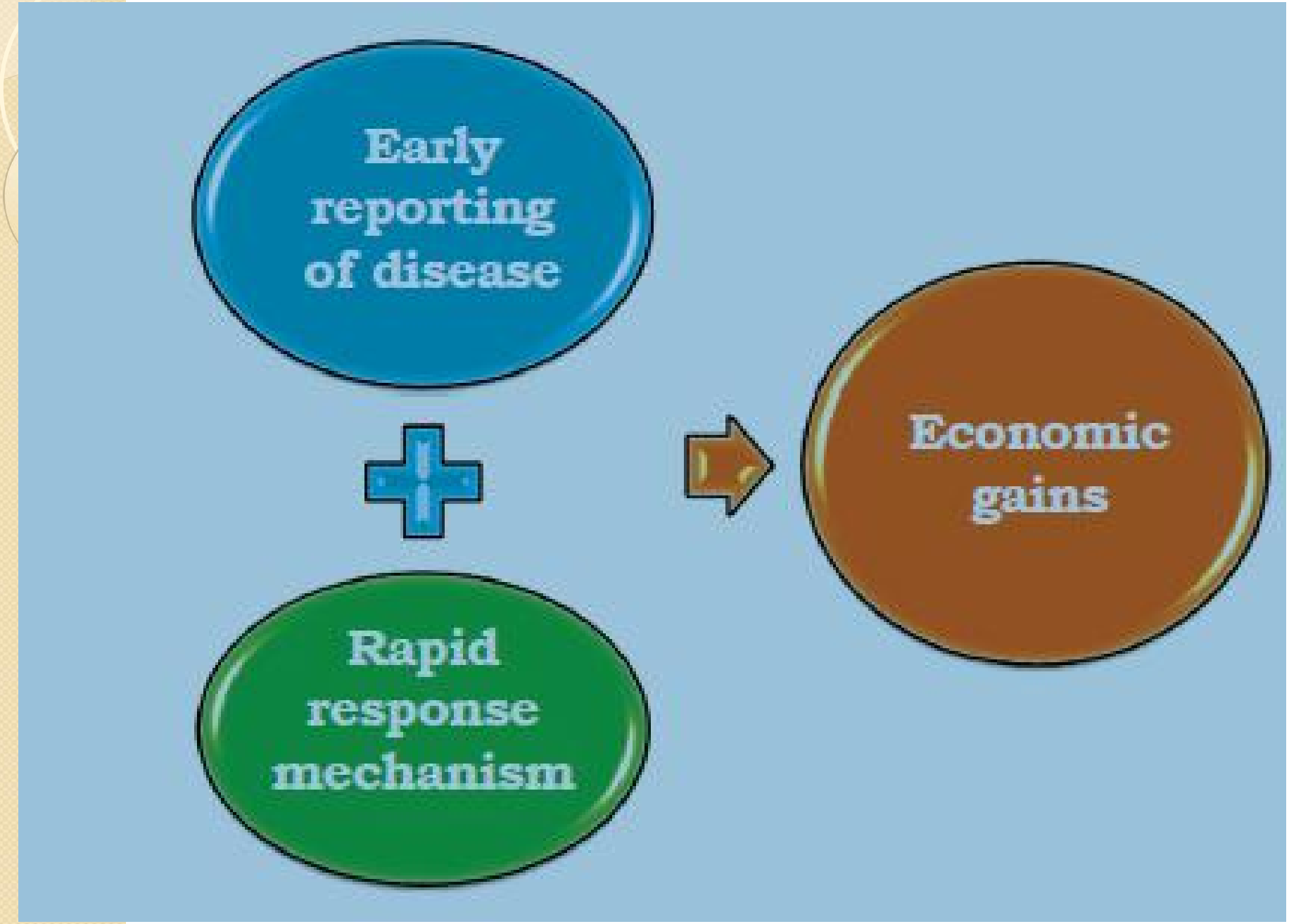
Early diagnosis and preventive interventions

- Early diagnosis and treatment is also a major component related to preventive health care. Symptomatic treatment sometimes may prove detrimental.
- Output of farm animals will be optimal and food obtained from them will be much safer provided they remain healthy, therefore regular vaccination against prevailing diseases is essential.
- Prevention is better than cure, and therefore preventive animal health care is very important (Farm Biosecurity)


"Tip of Iceberg"
Patients
What the physician does not see ?
Patients in community
•Mild or No symptom
•Self Rx
•Rx elsewhere
"Potential spreader!!"

Timely reporting of the diseases

- Keeping a track of the information received regularly about the occurrence of diseases from various sources, helps in developing a disease alert system.
- The overall benefits of timely reporting of the diseases are:
  - The animal owners can follow better management of diseases for their animals.
  - Early reporting of diseases helps in the timely adoption of preventive strategies like vaccination of the susceptible animals.
  - It helps in maintaining the productivity of animals.
  - It helps in saving the costs that would have been incurred in the treatment of animals.


Early reporting of disease
Rapid response mechanism
Economic gains

Core Activities

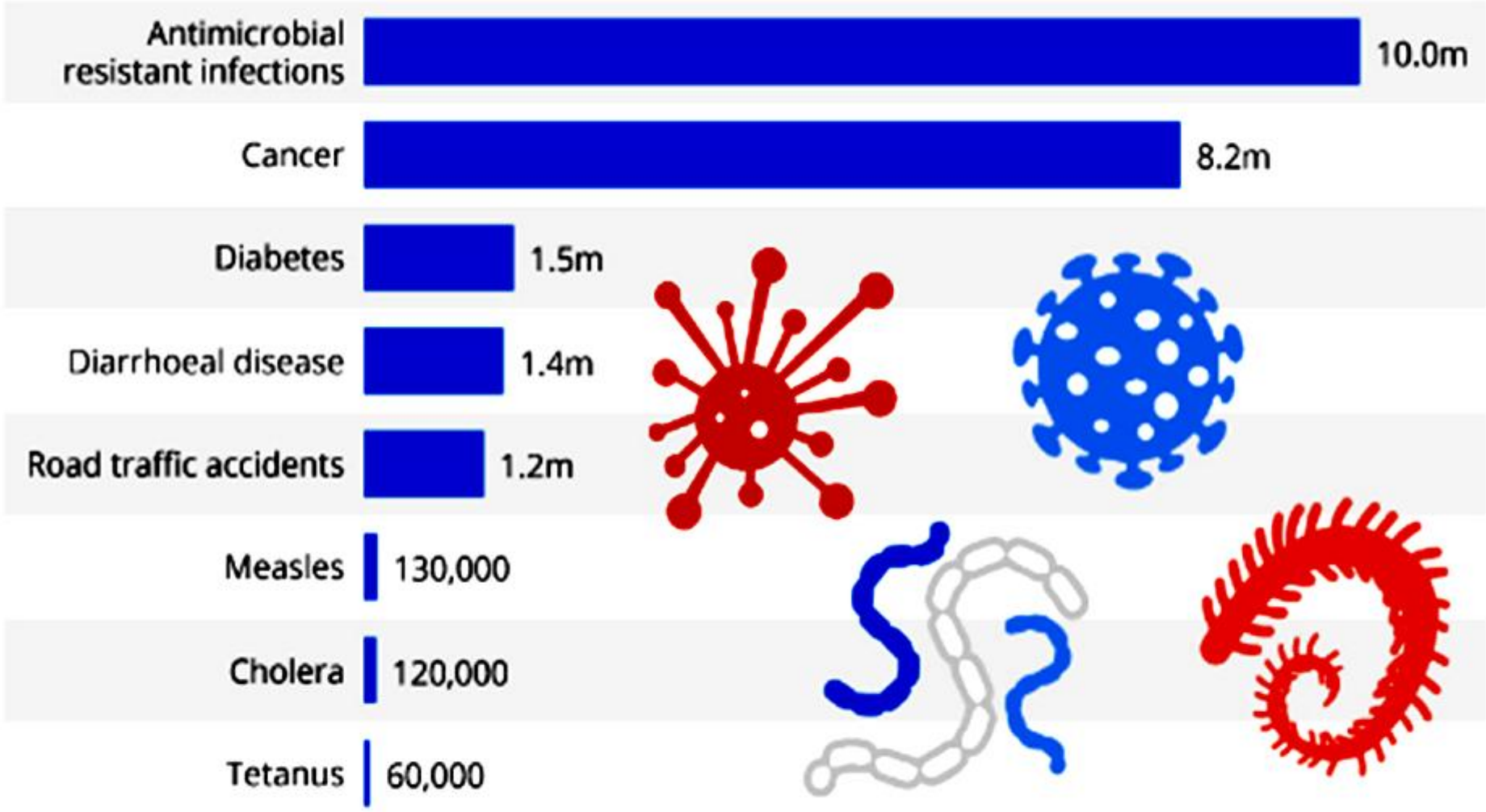
- Traditionally VPH activity was focused primarily on zoonoses and food hygiene.
- With the advent of the "One Health" programs these activities have expanded to cover more topics including
  - AMR
  - Environment protection
  - Animals in society, companion animals & AAT
  - Liaison
  - Disaster management etc.

AMR

- AMR is a serious threat to global public health. AMR mechanisms are emerging and spreading globally. Some serious problems encountered are:
  - Resistance in *K. pneumoniae* to carbapenem antibiotics.
  - Resistance in *E. coli* to fluoroquinolone (floxacin) antibiotics is very widespread.
  - Treatment failure for gonorrhoea by cephalosporin antibiotics.
  - Emergence of MRSA (methicillin-resistant *Staphylococcus aureus*).
  - Emergence of MDR-TB and XDR-TB

Deaths From Drug-Resistant Infections Set To Skyrocket

Deaths from antimicrobial resistant infections and other causes in 2050



Source: Review on Antimicrobial Resistance

Preventive measures for reducing AMR

- The over-use and misuse of antibiotics in livestock, aquaculture and crops is to be stopped
- Ensure that antibiotics given to animals—including food producing and companion animals—are only used to control or treat infections with full dose and course.
- Vaccinate animals to reduce the need for antibiotics and develop alternatives to the use of antibiotics in plants
- Promote and apply good practices at all steps of production and processing of foods from animal and plant sources
- Adopt sustainable systems with improved hygiene, biosecurity and stress-free handling of animals

Carcass disposal

Role to be played in other areas (1)

- **Farming method**
  - The VPH personal have to educate farmers to adopt environmentally friendly approaches in the changing scenario in the intensity of livestock production including aquaculture, mixed farming etc.
  - Education in the field of development and uptake of new technologies.
  - Education in the field of Methods of Biosecurity, waste disposal and carcass disposal
  - Addressing the need of advancement of women's rights in rural areas

Role to be played in other areas (2)

- ***Food production chain*:**
  - Need of a change in focus from individual animals to herds and populations, and systems-based controls (HACCP)
  - Ensuring uptake of responsibilities by stakeholders at respective points in the food production chain to certify the quality at all phases of production (from Farm to fork)
  - Dissemination of knowledge for implementation of new technologies for food and feed production, preservation and commercialization, and related problems of toxic residues and improved standards of hygiene
  - Updates with new social needs, in particular greater attention to consumers' requirements.

AAT in acute psychiatric crisis

Role to be played in other areas (3)

- ***Environment Protection*:**
  - Safe disposal of anmal wastes
  - Changing incidence of animal-related hazards
  - Role of companion animals and human well-being (and AAT)
  - New requirements connected with increasing urban and peri-urban animal populations
  -

Activities for environment protection

- Waste management, disposal of animal by products, understanding the impact of medicines.
- Range of activities linked to vectors, water, wildlife and use of animal monitors.
- Changes in land and water use, overgrazing, encroachment of farming and human activities onto wildlife habitat, sewage, pollutants, and introduced toxins contribute to the threats and degradation of environmental resources

Role to be played in other areas (4)

- ***Natural and man-made disasters:***
  - Demand for Veterinary services to respond to non-epidemic emergencies such as droughts, famines, floods, hurricane, earthquakes, industrial and nuclear accidents, and to epidemics.
- ***Emerging and re-emerging zoonotic diseases***

  *E*xpansion and increasing importance of zoonoses and other communicable diseases common to humans and animals.

Animal rescue

FOOD SAFETY AND QUALITY

- Food and waterborne diarrhoeal diseases are leading causes of illness and death, killing approximately 2.2 Million people annually 1.9 million of whom are children.

Measures needed

On Farm	On Production
Disease control	Meat hygiene
Hygiene	Milk hygiene
Antibiotics use	
Farm health planning	

- There is need to minimize the risk of biological, chemical and physical contamination entering the food chain

Interventions in food safety

- Food is one of the physical environment.
- Hygienic food is necessary for maintaining the health, vitality and well-being of an individual.
- Food also is an important vehicle of transmission of the diseases
- Education regarding precautions and regulations that to be followed for procuring, storing, processing and cooking of foods.

Food (Meat) Surveillance

- Food (Meat) surveillance is essential for the protection and maintenance of community health including ante-mortem and post-mortem examination.
- **Hygiene of food handlers**
  - Food Handlers may be carriers of various diseases such as typhoid, diarrhea, dysenteries, enteroviruses, viral hepatitis, amebiasis, ascariasis, strepto and staphylococcal infections. They should be subjected to periodical health checkups.
  - They should be educated to maintain a high standard of personnel care for overall cleanliness habits, care for Hair, nails etc.

Food stalls

- Food stalls and surroundings should be neat and clean as well as hygienic having a source of clean water. The stalls are to be subjected to periodical disinfection excercises

Unhygienic meat shop

MILK HYGIENE

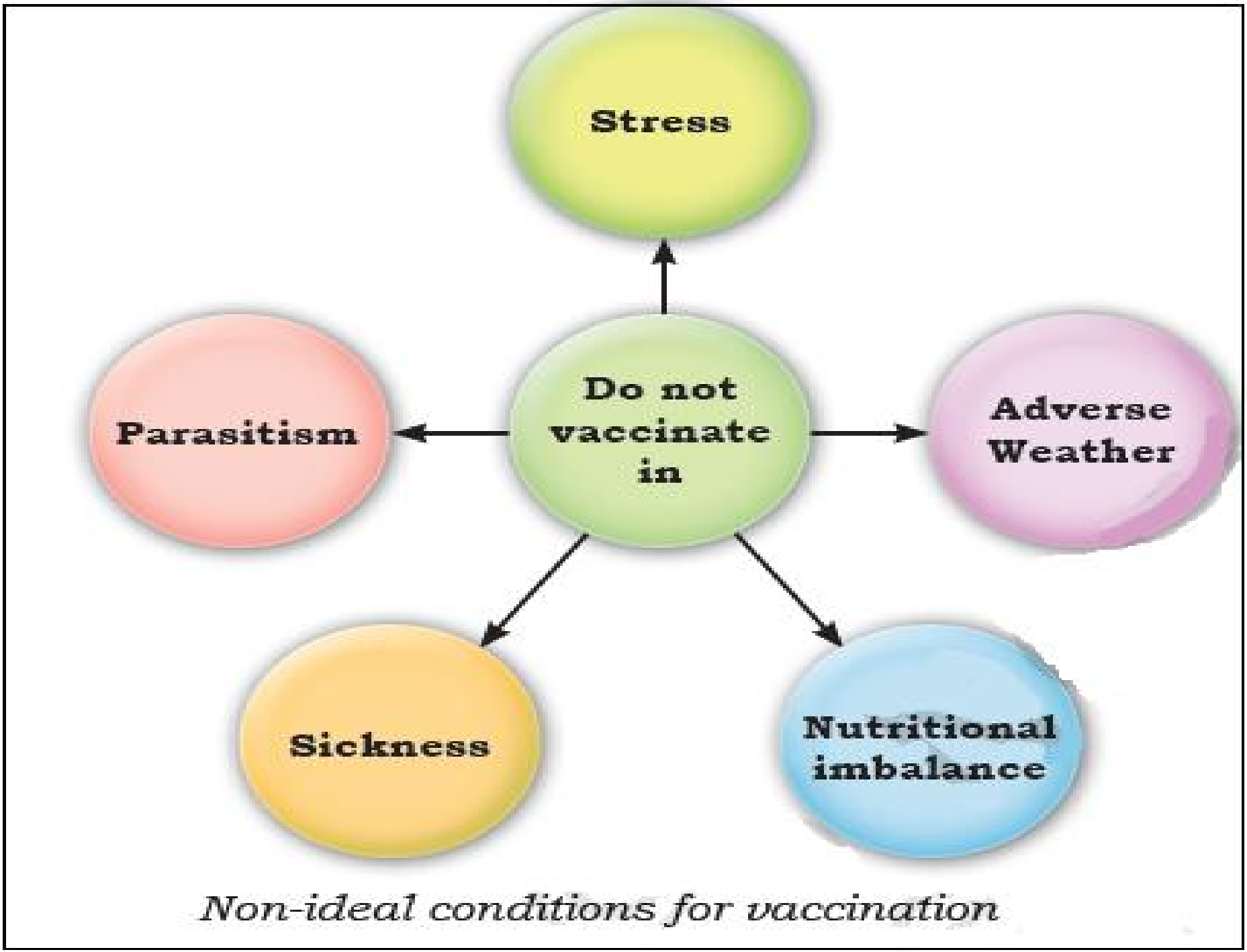
- Milk is an efficient vehicle for spread of diseases like Salmonellosis, brucellosis, tuberculosis, Q-fever, anthrax etc.
- Milk is also liable for contamination from animals, human beings and environments.
- Milk is most commonly adulterated with water. If source is water is not safe than it may carry germs of Water borne diseases like viral hepatitis A & E, typhoid, diarrhea, dysentery, amoebiasis, giardiasis, ascariasis, staphylococcal food poisoning
- Prevention of milk borne diseases can be achieved through farm hygiene, Hygienic milking practices and Pasteurization.

Some facts about Vaccines and vaccination

- A vaccine is a substance that helps the animal to become immune to a disease.
- The vaccine contains the germ which is modified to such an extent so that it cannot make the animal sick, rather it helps the animal to develop antibodies to fight the germ and thereby protecting it from getting diseased in future.
- Herd vaccination produces resistance in the entire herd thereby minimizing the economic losses.
- As a rule, vaccines should be administered only to the healthy animals.

Vaccination schedule

- A full vaccination schedule includes primary vaccination, booster vaccination and revaccination.
  - **Primary vaccination:** It is the first dose of vaccine administered to the animal for developing an initial immune response towards a specific disease. Primary vaccination may not confer full immunity to a disease and therefore booster vaccination is needed.
  - **Booster vaccination:** To obtain and maintain the optimum level of immunity in the body of the animal, another dose of the same vaccine is administered within a short interval of time which is called the booster vaccination.
  - **Revaccination:** Most of the vaccines once administered do not give long term protection to the animal. There is a certain period of time for which the vaccine protects the animal and generally it ranges from 6 months to 1 year. Therefore, vaccination is to be repeated on a particular time after the booster vaccine. This is called revaccination.



Non-ideal conditions for vaccination

Factors leading to failure of vaccination

- **Animal Factor**: Vaccines administered to an unhealthy animal may fail to provide the required immunity.
- **Maintenance of cold chain:** Vaccine carries organisms that need to be preserved maintaining cold chain. Failure to maintain cold chain may lead to vaccination failure
- **Dosing:** Inadequate dosing will lead to vaccination failure
- **Route of administration:** If the prescribed route of administration is not followed there may be vaccination failure or adverse effects
- **Germ load in environment**: If the environment of the vaccination area is unhygienic than there will be increased germ load, this also may affect health status of animals and lead to vaccination failure.
- **Concentration of vaccine**: If the actual concentration that is needed for an effective vaccination response is not provided in the vaccine formulation than it may lead to vaccination failure

Care in Handling of vaccines

- Vaccines are very sensitive to temperature variations.
- Once the vaccines are unloaded, they are to be stored at 2°–7°C. Monitoring the temperature is essential in warmer environments.
- Liquid vaccines should never be frozen.
- Most of the vaccines are available in multi-dose vials. For using such vials, a single needle is permanently inserted into the stopper of the vial and the vaccine is drawn out with a fresh syringe used for every animal. This practice maintains the sterility of the vaccine.
- Many of the vaccines are freeze-dried, therefore they need to be mixed with a sterile diluent prior to their use for vaccination. The vaccine is reconstituted by mixing and thoroughly dissolving the diluents with the vaccine under sterile conditions.
- Once a vaccine has been reconstituted it is to be administered within 60-90 minutes and protected from temperature extremes by maintaining its temperature.

Concluding remarks

- Estimates suggest that world production of food animals if is reduced by more than 20% due to non-zoonotic health problems may lead to serious public health problems due to the resulting shortages and deficiencies that can follow. Therefore, importance of veterinary service is increasing.
- Veterinary public health is an essential part of public health and includes various types of cooperation between the disciplines that link the health triad, people-animals-environment, and all of its interactions. Thus we must rise to the occasion.


One Health
People
Animals
Environment
THANKS