

VACCINATION BASED PROPHYLACTIC AND METAPHYLACTIC DISEASE CONTROL PLANS FOR DAIRY ANIMALS

**MUHAMMAD, G., A. RAZA, I. RASHID, M. SAQIB, T.
AHMAD AND A. MANZOOR**

**DEPARTMENT OF CLINICAL MEDICINE AND SURGERY,
UNIVERSITY OF AGRICULTURE, FAISALABAD**

1. ECONOMICALLY IMPORTANT INFECTIOUS DISEASES OF DAIRY ANIMALS IN PAKISTAN

- Well documented and widely known diseases
 - Foot-and-Mouth disease (FMD)
 - Hemorrhagic Septicemia (HS)
 - Black Quarter (BQ)
 - Anthrax
 - Mastitis

(Awan *et al.*, 2009; Khan, 2009; Cheema, 1995; Akhtar and Ali, 1994; Riaz *et al.*, 1992 ; Anonymous, 1991; Egenolf, 1990; Raja, 1984)

◉ Less frequent and less known diseases in native dairy animals

- Bovine Ephemeral Fever
- Pox
- Bovine viral diarrhea (BVD)
- Babesiosis
- Theileriosis
- Para influenza 3 (PI-3)
- Brucellosis
- Tuberculosis
- Leptospirosis
- Pink eye (Infectious keratocconjunctivitis)

(Ahmad *et al.*, 1999; Muhammad *et al.*, 1999; Asi *et al.*, 1998; Cheema, 1995)



- Exotic cattle based burgeoning dairying in Pakistan → a recent phenomenon...
 - Cattle with **exotic blood ... extremely prone to** contagious diseases that are economically less important in autochthonous (native) dairy animals.



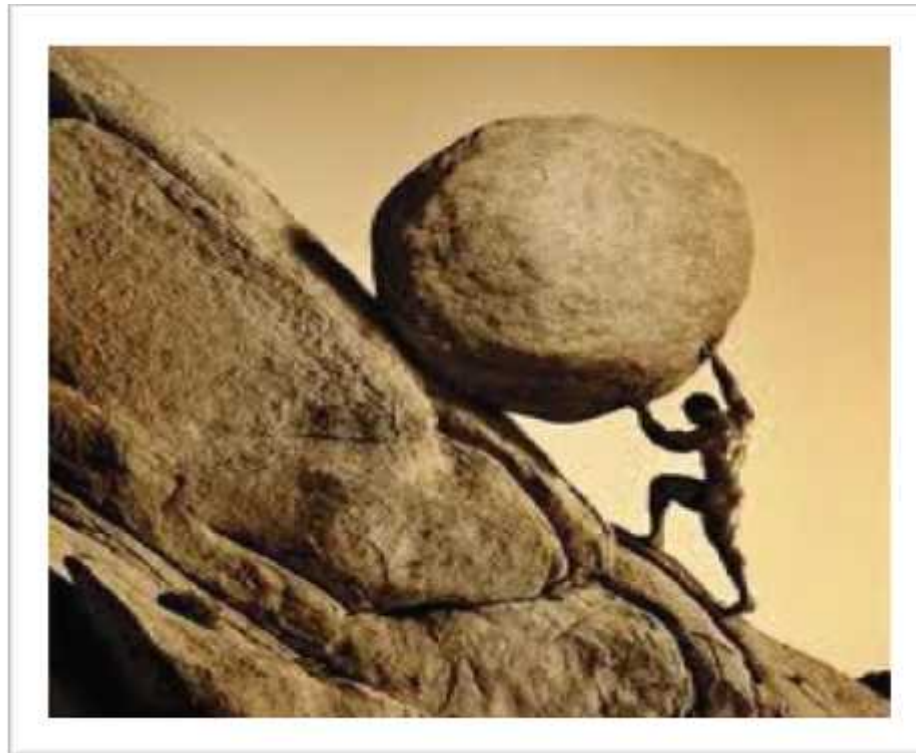
2. PITFALLS AND ISSUES OF INFECTIOUS DISEASE CONTROL

- ⊙ Control of infectious diseases of epidemic proportion ... ought to be **priority # 1** in the animal sector.
(Arye-smith, 1971)
- ⊙ Small herd size ... a hallmark of Pakistan dairying ... one of the **impediments** in the application of principles of scientific management and disease control.

- ⦿ **Movement of animals ...** also a significant impediment in control of animal diseases.
- ⦿ **Only < 20 %** of cattle and buffaloes vaccinated annually.
- ⦿ **Quality of vaccine** produced in public sector generally perceived to be **poor**.



- Convincing Pakistani dairy farmers for a holistic infectious disease control ... a **sisyphean task** (Egenolf, 1990).



- Application of biosecurity and timely vaccination ... a **difficult** proposition.

- Vaccination of cattle and buffalo generally resorted to when an infectious disease has **already hit** the animal population.
 - Metaphylaxis (in the face of an outbreak) —————→
through vaccination and biosecurity
extremely important.

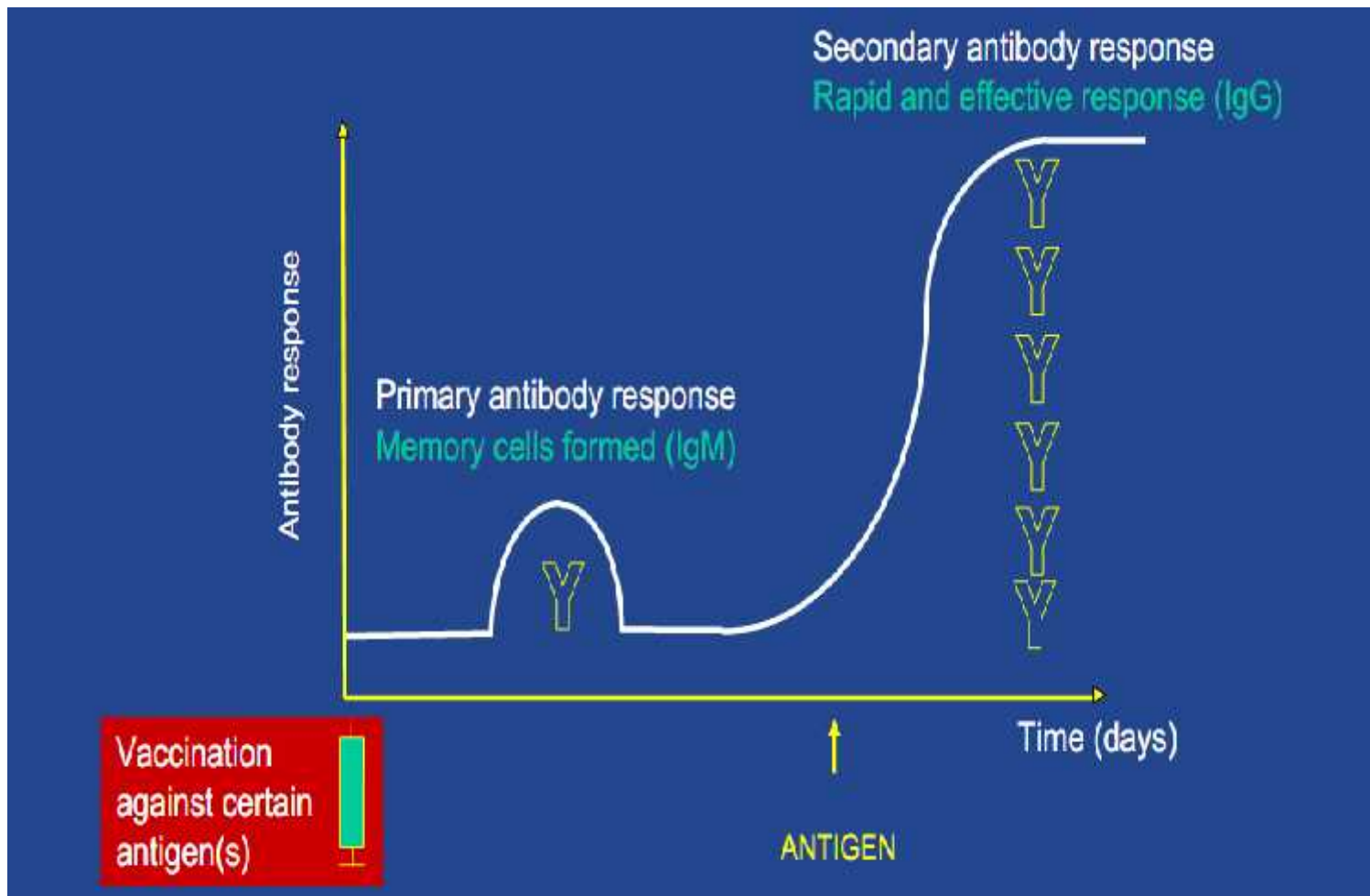


3. CURRENT VACCINATION PROGRAM

1. VACCINATION SCHEDULE FOR CATTLE AND BUFFALO (RECOMMENDED BY V.R.I, LAHORE & L & DD)

Month	Weeks	Disease
February	1 st week	FMD
April	1 st week	BQ
June	1 st week	HS
August	1 st week	Anthrax
September	1 st week	FMD
December	1 st week	HS

- ◉ **NB:** REPEAT VACCINATION (Booster dose) 21-28 days following primary vaccination... **not a recommendation** of VRI and L& DD department
- ◉ **Vaccination failures ... common.**



RESPONSE OF BOOSTER VACCINATION

2. GLARING OMISSIONS ... ONGOING VACCINATION PROGRAMS DO NOT TARGET

- Bovine Ephemeral Fever
- Pox
- Bovine Viral Diarrhea (BVD)
- Babesiosis
- Theileriosis
- Para Influenza 3 (PI-3)
- Brucellosis
- Leptospirosis
- Mastitis



4. WHAT ARE THE WAYS FORWARD?

- **Revisiting** of current vaccines & vaccination program ... clearly **warranted**
 - Dairy animal vaccination plan should embrace:
 - HS, FMD, BQ, Mastitis, Brucellosis, Infectious bovine rhinotracheitis, Rota & Corona viruses, Para-influenza-3 and BVD.
 - **Polyvalent mastitis vaccine** developed at Dept. of Clinical Medicine and Surgery, UAF ... **on horizon**.
 - Development of a **pox vaccine ... being contemplated**
 - Booster dosing of vaccine .. Needs to be advocated.
 - Up-scaling the quantum of vaccines produced locally.

- Improving the quality of vaccines produced locally in the public sector (Afzal, 2009), in particular FMD vaccine.
 - Production of vaccine should be consistent with Good Manufacturing Practices ... a basic requirement for licensing of manufacturing facility.
 - Aluminum hydroxide/ alum based vaccines do have a room in Pakistani dairying context due to need of a **metaphylactic use**.
 - FMD vaccination in the face of an outbreak of FMD ... a recommendation of **“PROGRESSIVE CONTROL OF FOOT AND MOUTH DISEASE IN PAKISTAN”** (Recently launched FAO Project, GCP/PAK/123/USA)

- ◉ **Field staff training** in handling vaccines, biosecurity and other aspects of vaccination.
- Repeated insertion of vaccination needle into the vaccination vial/bottle may lead to **iatrogenic infections** e.g. bovine leukosis, bovine immunodeficiency virus. These infections do exist in Pakistani dairy animals ([Meas et al., 2000](#)).

- ⊙ Vaccination ... **not a panacea** ... Vaccination programs must be complemented by adoption of biosecurity methods.
- ⊙ Subsidized/ free vaccination ... good quality vaccines.
- ⊙ **Research imperatives** ... e.g. combined HS-Mastitis vaccine.
 1. Combined vaccine against FMD, Rabies, HS and BQ ([Srinivasan et al., 2001](#))
 2. **Marker vaccines** ... need to be developed and investigated to support test and slaughter based control program of brucellosis.

5. UPSHOT

- ⦿ Current infectious disease control program in Pakistan leave a lot to be desired in
 - A. Meeting expectations of fast developing dairying.
 - B. Conforming to the phytosanitary standards of WTO accord



- “CHANGE IS THE ONLY CONSTANT IN LIFE”
- “CHANGE IS OFTEN DESIRABLE, FREQUENTLY NECESSARY AND ALWAYS INEVITABLE”

REFERENCES

- ◉ Afzal, M., 2009. Improving veterinary service in Pakistan. *Pakistan Vet. J.*, 29 (4): 206-210.
- ◉ Ahmad, I., A. Hameed, m. Memon and K. Naeem, 1999. Seroprevalence of bovine herpesvirus-1 among cattle and buffaloes in Pakistan. *Pakistan Vet. J.*, 19 (2): 61-63.
- ◉ Akhtar. S. and S. Ali, 1994. \monitoring of bovine health problems of small dairy herds in Islamabad capital territory: design, data and disease frequencies. *Triop. Anim. Hlth. Prod.*, 26: 193-198.
- ◉ Anonymus, 1991, *Epidemiology of Major Livestock Diseases in Pakistan*. (Project report). Pakistan Agriculture Research Council, Islamabad, Pakistan.
- ◉ Arye-Smith, R., 1971. Principles of increasing livestock production in developing countries. *Trop. Anim. Hlth. Prod.*, 3: 43-49.
- ◉ Asi, M. N., G. Muhammad, M. Saqib and A. Inayat, 1998. A preliminary clinical report on the occurrence of bovine ephemeral fever among crossbred cattle in Pakistan. *Pakistan Vet. J.*, 19(2): 98-99.
- ◉ Awan, F. N., M. A. Khan, K. Muhammad, M. Rabbani, M. Younas and R, M. Khawaja, 2009. Epidemiological investigation of foot and mouth disease in districts of Punjab, Pakistan. *Pakistan J. Zool. Suppl. Ser.* 9, pp: 179-185.
- ◉ Cheema, A. H., 1995. Status of bovine viral diseases in Pakistan. *Asian livestock*, Vol. XX No.1: 1-5.

- ◉ Egenolf, P., 1990. Health and production problems of smallholder ruminants in the Punjab, Pakistan. *Animal Res. Development, Instt. For Scientific Cooperation, Tubingen, Germany*, 32: 102-111.
- ◉ Khan, F. M., 2009. Participatory appraisal and screening surveillance based contagious diseases risk profile of district Rahim Yar Khan (Pakistan). *Pakistan Vet. J.*, 30(4): 198-202.
- ◉ Meas, S., J. Seto, C. Sugimoto, M. Bakhsh, M. Riaz T. Sato, K. Naeem, K. Ohashi and M. Onuma, 2000. Infection of bovine immunodeficiency virus and bovine leukemia virus in water buffalo and cattle populations in Pakistan. *J. Vet. Med. Sci.* 62: 329-331.
- ◉ Muhammad, G., M. Saqib, M. Athar, M. Z. Khan and M. N. Asi, 1999. Clinico-epidemiological and therapeutic aspects of bovine theileriosis in Faisalabad. *Pakistan Vet. J.*, 19(2): 64-71.
- ◉ Raja, R. H., 1984. Pakistan. In: *Proc. International Seminar on Viral Diseases of Veterinary Importance in South-East Asia and the Western Pacific, Organized by CSIRO at Australian National Animal Health Lab., Geelong, Australia, 27-30 Aug.* pp: 216-222.
- ◉ Riaz, M., M. S. Khan, M. A. Khan, A. Rabbani and M. Arshad, 1992. Investigation of epidemiology and economic losses of major livestock diseases in district Gujrat. *Pakistan Vet. J.*, 12 (2): 86-88.
- ◉ Srinivasan, V. A., G. S. Reddy, K. A. Rao and U. Kihm, 2001. Serological response of bovines to combined vaccine containing foot and mouth disease virus, rabies virus, *Pasteurella multocida* and *Clostridium chauvoei* antigens. *Veterinarski Arhiv* 71 (1): 37-45.