Directorate General (Research)
Livestock & Dairy Dev. Department, Punjab,
Zarrar Shaheed Road, Lahore-54810

939

NOTIFICATION:

ANNUAL SURVEILLANCE PLAN FOR PRIORITY ANIMAL & POULTRY DISEASES, PUNJAB, PAKISTAN FOR THE YEAR 2024-25

Background:

Animal health surveillance is crucial to determine animal diseases' absence, presence, and distribution and it detects emerging diseases as early as possible. The main purpose of surveillance is early detection of disease. An animal health surveillance system is a structured and systematic approach for monitoring and managing the health and well-being of animals in various settings, including livestock, poultry, wildlife, and companion animals. These systems are essential for early detection and response to diseases, ensuring the safety of animal populations, safeguarding public health, and supporting the agricultural and environmental sectors. It is a critical tool for governments, veterinary authorities, and animal health organizations to ensure the well-being of animals and the communities that rely on them. The current disease surveillance plan is also coupled with an online animal health surveillance system, which is a digital platform or networked system that utilizes internet-based technologies to collect, analyze, and disseminate data related to the health and well-being of animals. These systems leverage the power of the internet and digital tools to enhance the efficiency, accuracy, and timeliness of animal health monitoring and reporting.

Disease Losses in the livestock and poultry industry:

Diseases cause significant losses to livestock and poultry in Pakistan. Transboundary Animal Diseases (TADs) are highly contagious diseases that can spread rapidly across national borders and have serious economic, social, and public health consequences. Some TADs that affect Pakistan include Peste des petits ruminants (PPR), Foot and mouth disease (FMD), and Avian influenza (AI). Furthermore, the extent of their consequences may significantly affect food security and national economics. Zoonotic diseases like Brucella, TB, Anthrax, and Rabies are health risks to the population. Other endemic diseases like Haemorrhagic septicemia, Black quarter, enterotoxaemia, Caprine pleuropneumonia, haemoparasites, and endoparasites cause high economic losses to livestock farmers.

Mastitis is also economically important and among the main reasons for Antimicrobial resistance development due to the irrational use of antibiotics. AMR is prevalent in a variety of bacteria associated with poultry, including Salmonella, Campylobacter, Enterococcus, Escherichia coli, and Staphylococcus aureus (de Mesquita Souza Saraiva M, 2022). Similarly,

the drug residues in milk, meat, and other dairy products cause AMR and similar health issues. Antimicrobial resistance (AMR) is one of the top global public health and development threats. It is estimated that bacterial AMR was directly responsible for 1.27 million global deaths in 2019 and contributed to 4.95 million deaths (Antimicrobial Resistance Collaborators, 2022).

941

Rationale:

Animal health surveillance is an essential component of public health, food safety, and sustainable agriculture. It assists in protecting human health, reducing the spread of Poultry diseases, and ensuring the safety of the food supply. Starting from prevention and control of disease outbreaks; early disease detection, averting zoonotic diseases, biosecurity, food safety and security to policy making and regulations, all are inclusive of standard rationales of food animals priority diseases surveillance plan.

Objectives:

The surveillance of economically important animal diseases is a basic requisite and obligatory task for the Directorate of Animals Disease, Diagnostic Reporting and Surveillance, Punjab. The disease plan has been designed to meet all the requirements of the Animal Husbandry Commissioner, Pakistan, and WOAH with the following objectives.

1. To detect early the livestock diseases of economic/food security/public health importance from various parts of Punjab
2. To identify the risk factors at the animal and herd level
3. To estimate the disease frequency and distribution among different agroecological and administrative zones at different times.
4. To provide support for strategic decision-making for the control of the diseases.
5. To evaluate the different veterinary preventive and control measures such as vaccines and restricted animal movements
6. To coordinate with veterinary research institute by providing the field pathogen strains

List of Priority Diseases:

1. Foot and Mouth Disease
2. Anthrax
3. Haemorrhagic septicemia
4. Black Quarter
5. Brucellosis
6. Bovine tuberculosis
7. Rabies
8. PPR
9. Caprine Pleuropneumonia
10. Enterotoxaemia

11. Blood parasites (Theileria, Babesia, Anaplasma, Trypanosoma)
12. Endoparasites
13. Ectoparasites
14. Newcastle disease
15. Avian influenza
16. Other avian Diseases

Components and Mechanism of Surveillance System for Priority Food Animal Diseases:

1. **Passive Surveillance System:**

- The passive surveillance method will be adopted to report all the diseases that will be attended at veterinary dispensaries, veterinary hospitals, district, and poultry diagnostic laboratories.
- All the disease outbreaks attended by ADIOs and VOs either by self or on farmer request will also be part of a passive surveillance system.
- The field staff including VAs, and AITs during their activities/services in the field like vaccination, AI, and extension work will report their observations about any disease at the concerned hospitals. The hospital incharge will share this information with the concerned ADIOs or report through ADRS-Info.
- Disease outbreak data from helpline calls, direct phone calls of the farmers, social media information, and electronic and print media information will be part of surveillance after confirmation by the concerned veterinary officer or the Lab.

Mechanism of Passive Surveillance Reporting:

The information is already collected by the following methods of passive surveillance however the disease reports from the veterinary hospitals and dispensaries were less commonly shared previously.

A. **Monthly Notifiable Diseases Reports:**
Monthly notifiable disease reports and lab testing data (including both syndromic and laboratory tests based on confirmed data), retrieved from ADRS-*info* will be maintained by ADIO at the District level and DICOs at the divisional level.

B. **Monthly Laboratory Progress Report:**
The monthly progress reports include all the laboratory-based confirmed passive surveillance data, which is compiled by all the ADIOs for their concerned districts.

C. **Flash Reporting System:**
ADRS-*info* system is in place for flash disease reporting. The Disease intimation reports directly communicated will be confirmed by the concerned ADIO.

D. **Disease reports from the CVH/CVDs**:
The disease cases presented at hospitals or attended by the CVH/CVD staff will be included in the disease surveillance. The hospital staff is also desired to report the cases through ADRS info. The clinical cases of all priority diseases are observed at the hospital OPD and the Field area. The ADIO will collect this information from the district and share it with the Director ADDRS.

2. **Active Surveillance System:**

In this system, two main mechanisms of surveillance will be implemented. The ADIO of the district will work as per the following plan.

A. General Active Surveillance:

This is a cross-sectional study design that will be implemented for the surveillance of important animal diseases such as Brucellosis, Para-tuberculosis, Hemoparasites, endoparasites, Clinical and subclinical Mastitis in food animals.

- **Serum Sampling Methodology:**

  The multistage sampling technique with a random sample approach will be followed to collect these samples rather than a convenient and judgment basis. The financial year is divided into four quarters, and during each quarter the serum samples will be collected randomly from five (5) union councils per tehsil by using one sampling plan according to no. of tehsils in a district. The villages and herds within a UC will be selected on a simple random basis from a sample frame provided by the in-charge veterinary officer, who is responsible for providing the vaccine inoculation record. The UCs and villages selected during one quarter will be excluded from the sample frame in the remaining quarters. All the data will be collected on prescribed Performa through the ADRS-info system.

- **Plan A for District having ≥ 4 Tehsils:**

  In plan A 50 samples of buffalo and 50 from cattle per quarter and a total n= 400 samples (200 Cattle and 200 Buffalo) during a complete financial year will be collected per tehsil in a district. In a tehsil, five UCs per quarter will be selected as primary sampling unit (PSU), and from each selected UC two villages and from a village two herds of minimum size ≥ 6 adult animals will be selected. The herds of different cluster sizes will be selected based on their probability, and within a herd, 3-7 animals of different age and sex groups according to their sample weightage will be sampled.

  For example, if two herds (A & B) of animal size 15 and 50 respectively are selected in a UC then collect 3 samples from herd A and 7 samples from Herd B in such a way that there will be 5 cattle and 5 buffalo, and the selected animals within herd should vary according to their age, sex and breed.

- **Plan B for the Districts having 2-3 Tehsils:**

  Plan B will be the same except in the secondary sampling unit (SSU) three villages will be selected rather than two as in Plan A. It has been aimed to adjust the overall sample size per district.

Table 1: Schematic Plan of Serum Sampling

Plan A	Plan B
Tehsil (1x100 Samples)	Tehsil (1x150 Samples)
UC (5X20 Samples)	UC (5X30 Samples)
Villages (2x10 Samples)	Villages (3x10 Samples)
Herds (2x5 Samples)	Herds (2x5 Samples)

Note: In case of abortion history in a herd all the aborted animals (at > 5 months gestation) will be sampled for brucellosis along with routine sampling.

- The information of each household must be taken on the spot by using ADRS*info*.

Table 2: Quarter-wise sample distribution based on herd size, species, age, and sex:

Samples	Plan A(Districts≥4 Tehsil)			Plan B (Districts 2-3 Tehsil)		
Herds	6-20 Animals	21-50 Animals	> 50 Animals	6-20 Animals	21-50 Animals	> 50 Animals
	10	5	5	15	10	5
Species	Cattle		Buffalo	Cattle		Buffalo
	50		50	75		75
Age	<1yr	2-3yr	>3yr	<1yr	2-3yr	>3yr
	5	15	30	10	25	40
Sex	Male		Female	Male		Female
	According to proportion in a herd			According to proportion in a herd		

B. Participatory Disease Surveillance:

The ADIO will visit at least 4 villages/towns monthly, conduct farmer meetings, and collect information about the presence or previous occurrence of the priority diseases through unstructured interviews. The ADIO will select the villages in a planned way to cover all the areas. Although this type of data might be less accurate and biased but provides useful information regarding the prevalent diseases and losses.

C. Targeted Active Surveillance:

i. Slaughterhouse Surveillance:

The slaughterhouse surveillance for *Mycobacterium bovis,* liver flukes, hemonchus, and other diseases has been planned to find the disease status of TB, liver flukes, Cysticercus, hydatidosis and hemonchus in Punjab.

- **Sampling Methodology:**

Each ADIO/VO will visit one slaughterhouse per week regularly throughout the financial year 2023-24. In the slaughterhouse, he/she will observe the post-mortems of the maximum no. of slaughtered animals to find the TB lesions on lungs and other tissues, liver flukes in the liver, and hemonchus in the abomasum of sheep and goats. The tissue samples of suspected cases that will meet the post-mortem case definition for TB will be collected and dispatched to the provincial lab.

ii. Animal/ Cattle Markets Surveillance:

This survey has been planned to visit the notified cattle markets regularly (one visit/week). The milk samples will be collected from the animals. 50 milk samples per quarter will be collected. Observational surveillance will also be conducted for FMD, PPR, and LSD.

- **Sampling Methodology:**

Milk Samples will be collected separately in a CMT paddle in a centrifuge tube (15ml) collectively from each quarter according to SOPs, by cleaning the teats and discarding the first two streaks. The CMT will be performed on the spot with an immediate result conveying method, however, the milk from all quarters collected in a tube will be transported aseptically (under a cold chain) without deteriorating the milk quality to perform MRT (Milk Ring Test) or drug sensitivity

test in the lab. The MRT-positive milk samples will be centrifuged, and the sediment will be stored and transported to the provincial lab for further confirmation.

iii. Field surveillance of TB and Para TB.
During farm visits in the field based on the clinical picture, emaciation, and shooting diarrhea the suspected animals will be injected with antigens and the data will be recorded. The district-wise annual target will be 25 tests.

D. Disease Wise Surveillance Plan for Monitoring Vaccine Efficacy:

The disease-wise surveillance for HSV, FMDV, PPRV &NDV will be conducted by the Post-vaccination antibody titrations per approved Animal Vaccination Plan for the year 2023-24. In this regard, blood/ serum will be collected as a sample of choice as per the schedule provided.

Vaccine	No. of samples	Duration
HSV	50 samples (cattle) and 50 samples (Buffalo)per tehsil)	@ every 3 months (2 months after vaccine inoculation)
FMDV	50 (FMDRC vaccine per district) 100 samples (imported vaccine under UTF) per District	@ every 6 months (2 months after vaccine inoculation)
PPRV	50 samples per tehsil	@ Annually (2-3 months after inoculation)
NDV	50 samples per tehsil	@ every 3 months (3 weeks after vaccine inoculation)

Surveillance Plan for Poultry Diseases:

- **Geographical coverage**

The province of Punjab will be covered through the already notified plan, through the letter NO. SO (I&C)/L&DD/6-69/16 dated 4th January, 2017. In this notification, 09 Divisional Disease Diagnostic Laboratories under ADDRS and 04 Poultry Disease Diagnostic Laboratories under the Directorate of PRI were included to make 13 Regional Surveillance Units (RSUs). All these labs will perform reporting activity through ADRS-Info for real-time records and prompt response to control the diseases.

- **Diseases followed:**
  The following diseases will be captured under the ongoing surveillance plan.
  - New castle disease
  - Avian Influenza
  - Mycoplasma (MG/MS)
  - Salmonella Pullorum/ Galinarum.

Plan:

Surveillance	Vaccine	Type of Birds	Serum	RSUs	Frequency	Total	Tracheal	Cloacal	Total	RSUs	Frequency	Total	Grand Total	Remarks
Passive	-	-	100	13	12	15600	50	50	100	13	12	15600	31200	Monthly
Active	Non-vaccinated	Farms	50	13	4	2600	25	25	50	13	4	2600	5200	After 3 months
		Live Bird Markets	30	13	4	1560	15	15	30	13	4	1560	3120	After 3 months
		Zoo	10	13	4	520	5	5	10	13	4	520	1040	After 3 months
	Vaccinated	Farms	50	13	4	2600	25	25	50	13	4	2600	5200	After 3 months
Total						**22880**						**22880**	**45760**	

a) **Directorate of PRI, Rawalpindi**

Provincial Disease Diagnostic Laboratory, PRI, Rawalpindi

Poultry Disease Diagnostic Lab, Kamalia

Poultry Disease Diagnostic Lab, Samundri

Poultry Disease Diagnostic Lab, Ghakkar Gujranwala

Poultry Disease Diagnostic Lab, Arifwala

b). **Directorate of Animal Disease Diagnostic, Reporting & Surveillance (ADDRS), Cooper Road, Lahore**

Divisional Disease Diagnostic Lab, DG Khan

Divisional Disease Diagnostic Lab, Multan

Divisional Disease Diagnostic Lab, Bahawalpur

Divisional Disease Diagnostic Lab, Sahiwal

Divisional Disease Diagnostic Lab, Lahore

Divisional Disease Diagnostic Lab, Faisalabad

Divisional Disease Diagnostic Lab, Sargodha

Divisional Disease Diagnostic Lab, Gujranwala

Divisional Disease Diagnostic Lab, Rawalpindi

- **Farmers Training and Staff Training:**

The involvement of all stakeholders including livestock farmers is necessary for the successful results of the disease control plan. The ADIO of the concerned lab will provide training to the technical staff and the farmers on disease reporting and control in the district. The ADIO of the concerned district will keep a record of the ADRS-info app installation by the VOs/SVOs, VAs, and AITs and update the DI&CO and Director ADDRS offices.

References:

1. de Mesquita Souza Saraiva M, Lim K, do Monte DFM, Givisiez PEN, Alves LBR, de Freitas Neto OC, Kariuki S, Júnior AB, de Oliveira CJB, Gebreyes WA. Antimicrobial resistance in the globalized food chain: a One Health perspective applied to the poultry industry. Braz J Microbiol. 2022 Mar;53(1):465-486. Doi: 10.1007/s42770-021-00635-8. Epub 2021 Nov 13. PMID: 34775576; PMCID: PMC8590523.
2. Antimicrobial Resistance Collaborators. (2022). Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis. The Lancet; 399(10325): P629-655. DOI: https://doi.org/10.1016/S0140-6736(21)02724-0

Director General Research

No. 3267 /5.V.A Dated. 16-12- /2024

Copy is forwarded for information and necessary action:

1. The secretary, L&DD, Punjab, Lahore.
2. The Animal Husbandry Commissioner, Islamabad.
3. The Director General (Production), L&DD, Punjab Lahore.
4. The Director General (Extension), L&DD, Punjab Lahore.
5. The Director General (ERP), L&DD, South Punjab Bahawalpur.
6. The Director, Poultry Research Institute, Rawalpindi.
7. All the Divisional Director Livestock in Punjab.
8. The Director, Animal Disease Diagnostic, Reporting & surveillance, Lahore.
9. All the DICOs Working at Divisional Diagnostic Laboratories in Punjab.
10. All the ADIOs Working at Divisional Diagnostic Laboratories in Punjab.

Director General Research