

# **ANNUAL REPORT 2020-2021**



**VETERINARY RESEARCH INSTITUTE  
ZARRAR SHAHEED ROAD, LAHORE CANTT**

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[www.vri.punjab.gov.pk](http://www.vri.punjab.gov.pk)

**MESSAGE FROM  
THE DIRECTOR GENERAL (RESEARCH) LIVESTOCK AND DAIRY  
DEVELOPMENT DEPARTMENT PUNJAB**



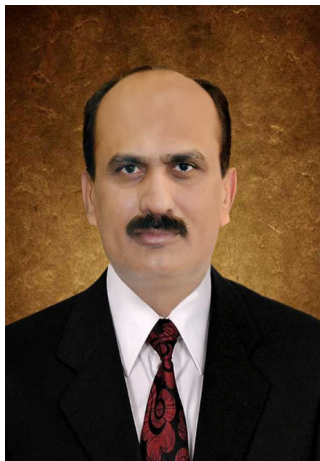
Over the years livestock has emerged as the largest subsector in agriculture. The sector contributed 60.1 percent to the agriculture value addition and 11.5 percent to the GDP during FY2021. More than 8 million rural families are engaged in livestock production and deriving more than 35-40 percent of their income from this source. Gross value addition of livestock increased to Rs 1,505 billion (2020-21) from Rs 1,461 billion (2019-20), an increase of 3.0 percent.

Keeping in view the significance of livestock and livelihood of Livestock farmers, Livestock and Dairy Development Department, Punjab is rendering different services to the farmers of the province through its infrastructure/ network in the field. L&DD Department made paradigm shift from curative to preventive so as to ensure animal health and to save millions of rupees spent on treatment of diseased animals. It is the matter of immense pleasure that Veterinary Research Institute, Lahore has been ISO 9001:2015 certified and playing a pivotal role to achieve goals of sustainable preventive policy of L&DD Department, Punjab. With the recent advancements in biologics production, VRI is supplying vaccines for all the major diseases of Livestock & Poultry in the province due to which the incidence of infectious diseases has tremendously reduced the loss of livestock farmers. I personally acknowledge the leadership of Dr. Sajjad Hussain Sanghi as Director of the institute and appreciate the work of all his team members upon this achievement.

Let's work hard as a team to upgrade our institutions to deliver output to the level of "good manufacturing practices" under auspices of OIE standards to prevent infectious and zoonotic diseases in livestock sector and consequently achieve disease free status, which will lead to produce sufficient livestock and poultry products for domestic consumption and export in regional and international markets.

**Dr. Abdul Rehman**

## MESSAGE FROM THE DIRECTOR VETERINARY RESEARCH INSTITUTE, LAHORE CANTT



Livestock is a backbone of agriculture economy of Pakistan & playing the pivotal role in the poverty alleviation & food security. The increase in livestock production is possible through disease control, better nutrition & management. It is great honor and reverence for me to lead the Veterinary Research Institute (VRI) which is the premier institute of Punjab province for the production of Veterinary Vaccines and antigens along with allied Research & Development.

Veterinary Research Institute is imparting remarkably in controlling and reducing the incidence of infectious diseases of livestock and poultry. It is worthiness to add, this institute has also feather in its cap for eradication of Rinderpest disease from Pakistan during the year 2007 through sustainable hard-work, , unceasing devotion and commitment of its scientists. The Organization has a long & successful history of preventing & controlling diseases and vaccine available today in Institute represents years of innovative research by the scientists. I have firm belief that under the vision of L&DD Department, the organization will achieve its goals through the provision of good quality vaccine. I am of the clear vision that eradication of the transboundary animal diseases like PPR will be a game changer for the development of the sector as per the analogy of Rinderpest which has been achieved successfully & Pakistan has been declared “ Rinderpest Free” in 2007. The next target is the PPR disease eradication under the global pathway of the OIE & FAO by 2030 and progressive control of FMD in the province leading toward development of FMD free zone.

I gratefully admire the efforts of VRI team members and indebted to their constant support and hard work towards production of quality vaccines and their dedication, enthusiasm in improvement of the quality through Research & Development. The VRI team has tackled substantive problems, challenges & built a significant reputation. Veterinary Research Institute is ISO 9001 :2015 certified & 17025 accredited. I wish a triumph of success and progress for this research institute and its team.

***Dr. Sajjad Hussain***

# EXECUTIVE SUMMARY

Veterinary Research Institute, Lahore is the inaugural and leading research organization in the country, administratively controlled by the Livestock and Dairy Development Department, Government of the Punjab. The Institute was established in 1963 and is situated at Zarrar Shaheed Road, Lahore Cantt. The institute pledges research on important animal diseases prevalent throughout the province, produces vaccines and diagnostic agents for their effective control.

The core functions of VRI are research and development activities along with production of vaccines

for the control of different infectious diseases. Institute imparts trainings to the veterinary staff and interns from different institutes. The total non-development budget allocation for the year 2020-21 was 589.293 Million.

The institute produced 212.036 Million doses of different vaccines along with 0.137 Million doses of diagnostics for different tests. The Institute also supplied different biologics to other provinces including AIK. and Gilgit Baltistan along with technical Support.

Total area of VRI is 25 acres of land comprising of different sections and a housing colony for the staff.

VRI, Lahore is rich in highly qualified and trained human resource consisting of technical and nontechnical staff. The total strength of technical staff in BS-17 to BS-20 is 52 and strength of staff in BS-I to BS-16 is 220.

All the labs of VRI are ISO 9001 :2015 Certified. There is a Quality control lab for quality control of the biologics produced in the institute. Institute has successfully mechanized the production of biologics to improve the quality and efficiency of work through different development projects.

Research & Development Division is involved in molecular characterization of field samples and vaccinal seed samples. Feed samples from all over the province are tested in provincial nutrition lab. Research is being carried out on different projects.

Capacity building of the staff is done through various local and foreign trainings. A day care center has been established for the children of the women working in the institute. VRI, Lahore continued its R&D and biologics production activities during Covid-19 Pandemic with skeleton Staff to fulfill the field demand.

# CORE TEAM

## Additional Principle Veterinary

### Officers



Dr. Sarwat Naz



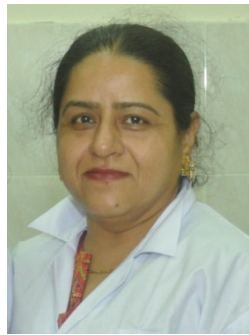
Dr. Rizwan Qayyum



Dr. Umber Rauf



Dr. Azam Ali Nasir



Dr. Asfa Rasool



**Senior Veterinary  
Officers**



Dr. Hafiz Muhammad Numan



Dr. Muhammad Asim



Dr. Bushra Zamir



Dr. Najj Ullah



Dr. Sajjad Ali



Dr. Sobia Amir



Dr. Iffat Huma



Dr. Nadeem Akram



Dr. Summya Sattar



Dr. Abdul Wahab



Dr. Hina Afroz



Dr. Aqsa Mushtaq



Dr. Nida Arooj



Ms. Asma Aziz



Dr. Muhammad Asif



Dr. Waseem Shahzad



## Veterinary Officers



Dr. Sheraz Shahid



Dr. Ali Abbas



Dr. Shahzad Qadir



Dr. Sadia Sarfraz



Dr. Nofil Mustafa



Dr. Tayyaba Naz



Dr. Amjad Iqbal



Dr. Hafiza Zain Ul Fatima



Dr. Shakhseema Shaukat



Dr. Iqra Zafar



Dr. Asma Kausar



Dr. Ayesha Qadri





Dr. Zahid Fareed



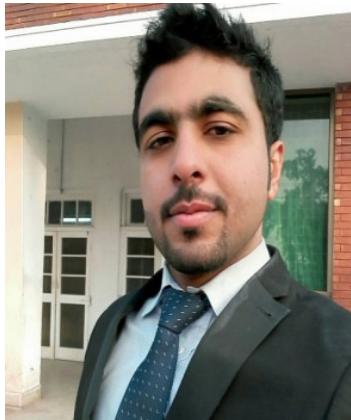
Dr. Atta Ullah



Dr. Saqib Tanveer



Dr. Sami Ullah



Dr. Hafiz M Waqar



Dr. M Usman Ashraf



Dr. Zubair Latif



Dr. M Saqib Hussain

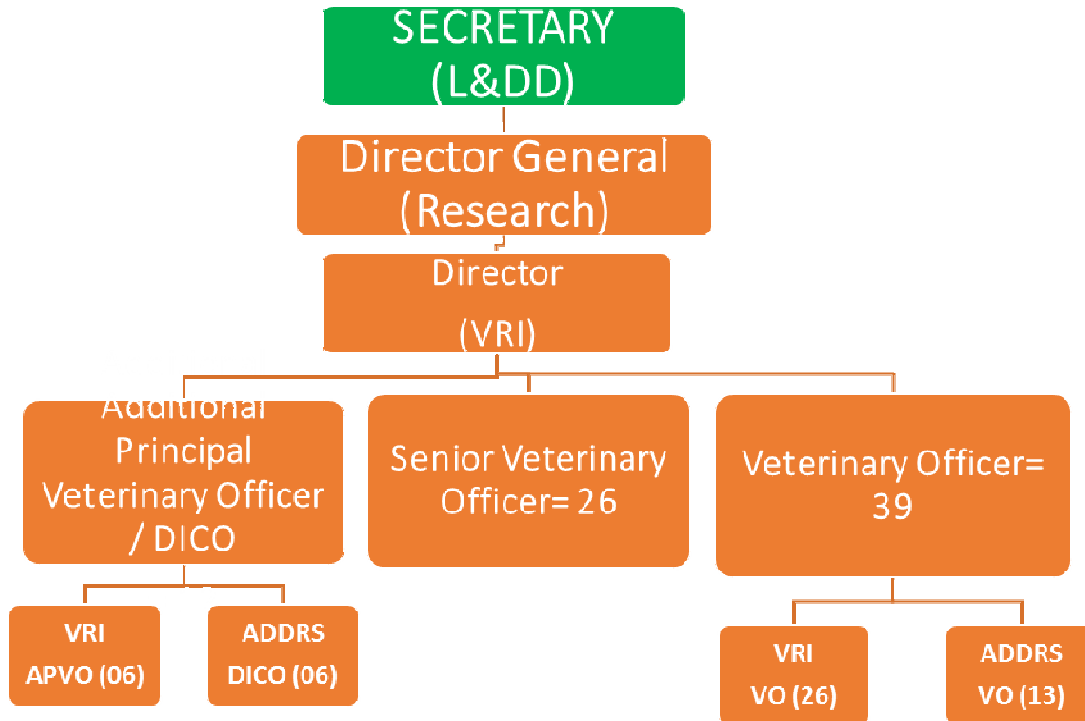


Dr. Afeefa Shafique



Dr. Umar Waqas

# ORGANOGRAM



## **MISSION STATEMENT**

"To improve the health and productivity of livestock and poultry through research on emerging & re-emerging diseases & development of quality vaccine & diagnostic reagents."



# Objectives

The main objectives of the institute include:

- ❖ **Production of standard biologics (Vaccines / Sera / Diagnostic antigens)** for control of infectious diseases of livestock and poultry.
- ❖ Research and Development Studies related to **prevalent diseases** and **newly emerging disease** of Livestock & poultry for diseases control.
- ❖ Development of **modern techniques** for vaccine production and disease investigation.
- ❖ In service **training / internship** of **Para-Veterinary staff** and **DVM** students etc.

**Performance of the  
VETERINARY RESEARCH INSTITUTE  
2020-2021**

## 1. BUDGET

### A. Non Development Budget

<b>Name of Head / Function</b>	<b>Demanded</b>	<b>Allocation</b>	<b>Utilization</b>
Total Employees Related	177.180	144.122	143.300
Total Operating Expense	401.241	445.171	445.153
<b>Total:-</b>	<b>578.421</b>	<b>589.293</b>	<b>588.453</b>

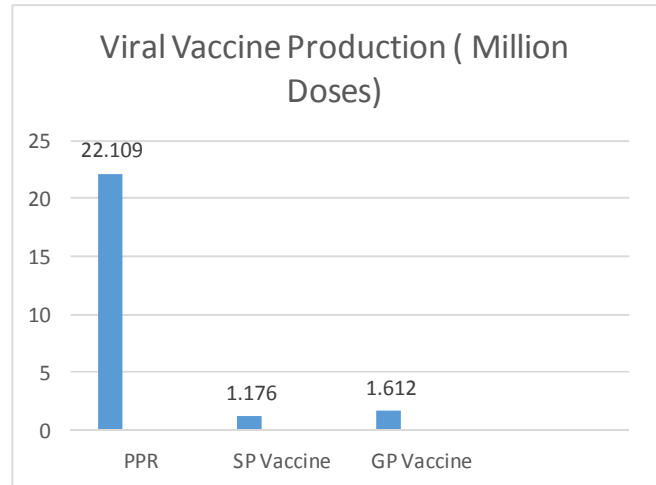
### B. Development Budget

<b>Name of scheme</b>	"Establishment of State of the Art Labs at Veterinary Research Institute & Foot & Mouth Disease Research Centre to Meet the International Standards of Biologics Production & Research & Development"		
	<b>Allocation(Million)</b>	<b>Released</b>	<b>Utilization</b>
Capital	40.000	40.000	40.000
Revenue	5.363	5.171	5.170
<b>Total</b>	<b>45.363</b>	<b>45.171</b>	<b>45.170</b>

## 2. BIOLOGICS PRODUCTION

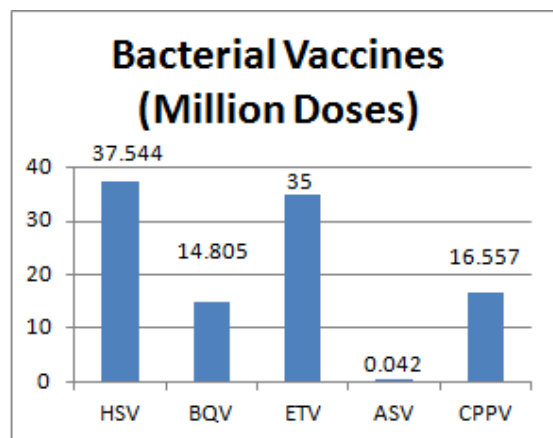
### a. Viral Vaccine Achievement (Million Doses)

Sr. No	Name Of Vaccine	Annual Target	Achievement
1	Peste des petitis Ruminants	20.5	22.109
2	Sheep Pox Vaccine	On Demand	1.176
3	Goat Pox Vaccine	On Demand	1.612

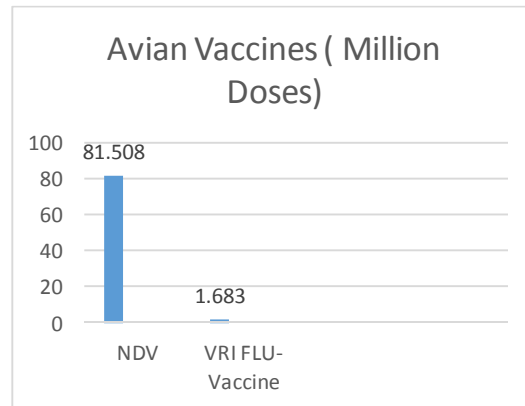


### b. Bacterial Vaccines Achievement (Million Doses)

Sr. No	Name Of Vaccine	Annual Target	Achievement
1	Haemorrhagic Septicemia Vaccine	28.596	37.544
2	Black Quarter Vaccine	14.67	14.805
3	Enterotoxemia Vaccine	35	35
4	Anthrax Vaccine	On Demand	0.042
5	Caprine Pleuropneumonia Vaccine	14.53	16.557



c. Avian Vaccines Achievement (Million Doses)

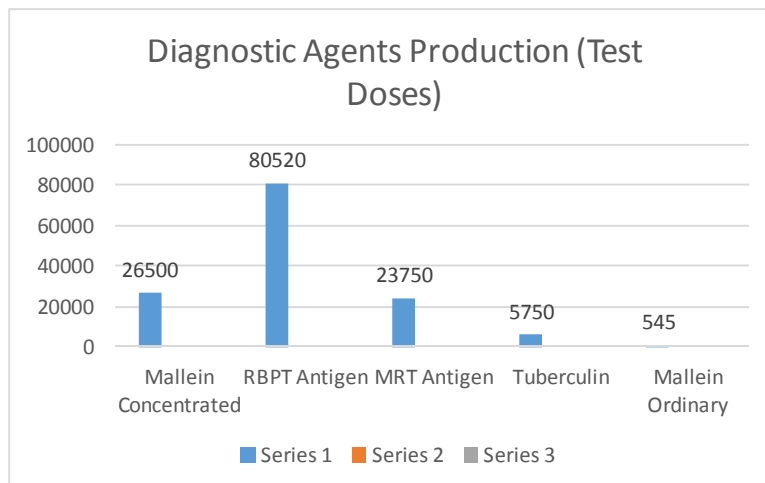


Sr. No	Name Of Vaccine	Annual Target	Ach.
1	Newcastle Disease Vaccine	54.00	81.508
2	VRI-Flu Vaccine	On Demand	1.683

d. Diagnostic Agents Achievement

Name Of Item	Production Current Year
Mallein Conc. Antigen	26,500 test doses
Rose Bengal Plate test Antigen	80,520 test doses
Milk Ring Test Antigen	23,750 test doses
Brucella conc. Antigen	-
Tuberculin Mammalian Antigen	5750 test doses
Tuberculin Avian Antigen	-
Mallein Ordinary	545 test doses





### e. Auxiliary Activities

Sr. No.	Activities	Accomplishments	
1	Media, Reagents & solutions produced	73469	Liters
2.	Diluent Produced	18.5	Million ml
3.	No. of Vaccine Doses Lyophilized Doses	94.225	Million
4.	Haemorrhagic Septicaemia Antigen	6800	ml

## f. Performance of Quality Control Lab

Following vaccines/solutions/antigens were received in the section for their quality testing/identity and reports were submitted to the concerned production sections.

Sr. No.	Vaccine/Antigen	2020-21
		Number of Batches Tested
1.	Hemorrhagic Septicemia Vaccine	64
2.	Black Quarter vaccine	24
3.	Enterotoxaemia vaccine	44
4.	Anthrax Spore vaccine	03
5.	Brucella antigen	05
6.	Goat Pox	02
7.	Sheep Pox Vaccine	04
8.	Caprine Pleuropneumonia Vaccine	32
9.	Mallein antigen	02
10.	Tuberculin	01
11.	Newcastle Disease vaccine	66
12.	Peste des petites ruminants (PPR) Vaccine	39
13.	Diluent	37
14.	Avian Influenza+ND	04
15.	RT-PCR Tests	205

\*The standard of ISO-9001-2015 and ISO-17025 in lab management system and lab testing was observed.

### **g. Research & Development Division Performance**

Sr. No	Activity	Number of Samples Processed
1.	Number of Feed Samples Tested at Nutritional Lab of VRI	2064
2.	Number of Field Samples Processed for Molecular Confirmation	136
3.	Number of Seed & Vaccine Samples Processed for Molecular Confirmation	19

## **RESEARCH PROJECTS (2020-21) VRI**

Sr. No.	Title	Objective
1	Preparation and Evaluation of <i>Brucella abortus</i> vaccine at VRI Lahore	1) Standardization and production of Brucella Vaccine. 2) Evaluation of vaccine in Lab Animals. 3) Evaluation of vaccine in field conditions.
2	Development & Evaluation of Rose Bengal Plate Agglutination Test antigen for Glanders at VRI Lahore and its comparative efficacy with Mallein .	1. Preparation & Evaluation of RBT for diagnosis of glanders. 2. Comparison of efficacy of RBT with Mallein.
3	Isolation, Identification and Production of Salmonella pullorum Colored Antigen for the screening of Salmonellosis in Poultry.	1. Isolation & identification of S. pullorum & S. gallinarum from commercial & rural poultry (PRI, Rawalpindi). 2. Preparation & standardization of Salmonella pullorum colored antigen for serological investigation (Antigen section, VRI Lahore) 3. To study the efficacy of locally prepared antigen (PRI & VRI) 4. To compare the efficacy of the locally prepared antigen with that of the imported one (PRI & VRI)
4	Determination of Post-Vaccine titers of Enterotoxemia by IHA and its relationship with toxin titration in Mice from Live Culture	1) To standardize IHA to find out the post vaccine titers of epsilon antitoxin in the serum and its comparison with ELISA 2) Co-relation of Epsilon toxin concentration in the live culture with the potency of vaccine prepared from that culture



5	Preparation of antiserum for passive immunization against Black Quarter disease	Raise blackleg antiserum in rabbits and cattle and its quantification
6	Preparation and Evaluation of Cost Effective Oil adjuvants for Poultry Vaccines	<p>1. To prepare cost effective poultry vaccines Avian Influenza (H9) using Montanide (ISA 70 MVG), Eolane 130, Eolane 150 and Eolane 170 oils as adjuvants.</p> <p>2. Comparative Evaluation of oil based Avian Influenza (H9) vaccines prepared with Montanide, Eolane 130, Eolane 150 and Eolane 170 oil adjuvants by HA and HI tests in cockerels.</p>
7	Preparation And Comparative Evaluation Of Avian Influenza (H9) And Nd (Mukhteswar) Combo Oil Based Vaccines Adjuvanted With Eolane-130, Eolane-150, Eolane-170 And Montanide (ISA 70 MVG)	<p>To prepare cost effective poultry vaccines for Avian Influenza (H9) and ND (Mukhteswar) using Montanide (ISA 70 MVG), Eolane-130, Eolane-150 and Eolane-170 oils as adjuvants and to study stability, safety and efficacy of newly prepared vaccines.</p> <p>Comparative Evaluation of oil based Avian Influenza (H9) and ND (Mukhteswar) vaccines prepared with Montanide, Eolane-130, Eolane-150 and Eolane-170 oil adjuvants by HA (Haemagglutination) and HI (Haemagglutination Inhibition) tests in cockerels.</p>
8	Development of Oil Based Hemorrhagic Septicemia Vaccine using Eolane as Adjuvant (PARB Funded)	Preparation and evaluation of cost effective oil based Hemorrhagic septicemia vaccine using cheaper oil adjuvant (Eolane, Total, France)

9	Preparation and evaluation of Hemorrhagic Septicemia - Black Quarter Combo Oil adjuvanted vaccine	To prepare oil based HS BQ combo vaccine by using Montanide (ISA 50 V2) and Eolane 170 to evaluate its efficacy in buffalo calves at farm level
10	Isolation, identification and molecular characterization of PPR virus from outbreaks in Punjab. (2020-21)	To study isolation, identification and molecular characterization of PPR virus from outbreaks in Punjab
11	Post Vaccination serum antibodies estimation against PPR vaccine in sheep and goats in control and field conditions in Punjab (2020-21)	To study post vaccination antibodies estimation against PPR virus vaccine in sheep and goats in Punjab.
12	Standardization of Lypholization cycles for Freeze drying of Peste Des Petits Ruminants vaccine and Sheep Pox virus vaccine	Evaluation of different lypholization cycles in order to identify optimal lypholization conditions that will deliver maximum retention of viral infectivity titer.
13	Molecular Detection and differentiation of Fowl adenovirus affecting poultry in Pakistan and determination of their homology with vaccine strains.	<ol style="list-style-type: none"> <li>1) Molecular Characterization of Fowl adeno viruses suspected cause of outbreaks of IBH/HPS in poultry in Pakistan</li> <li>2) Molecular characterization of strains of Fowl adeno virus serotypes associated with suspected outbreaks of HPS available in Punjab</li> <li>3) To determine homology of fowl adeno virus serotypes associated with suspected outbreaks of HPS in Pakistan with fowl adeno-virus serotype 4 strains present in commercial vaccines.</li> </ol>

14	Molecular characterization of fowl pox virus from morbid samples of local poultry and its adaptation on embryonated eggs	<ol style="list-style-type: none"> <li>1. Molecular epidemiology of fowl pox virus associated with outbreaks in rural poultry</li> <li>2. Adaptation of virus on embryonated eggs to develop the seed bank</li> </ol>
15	Molecular characterization of sheep pox virus and goat pox virus, their isolation and adaptation	<ol style="list-style-type: none"> <li>1. Optimization of PCR to differentiate between Pox and Orf virus</li> <li>2. Optimization of PCR to differentiate between Sheep Pox and Goat Pox in one step</li> <li>3. Molecular characterization of Orf virus from small ruminants</li> <li>4. Molecular characterization of Sheep Pox and Goat Pox Virus.</li> </ol>
16	Molecular characterization of Orf virus from Ruminants, Its isolation and adaptation	<ol style="list-style-type: none"> <li>1) PCR confirmation of Orf virus in morbid samples collected from sheep, goat and camel inflicted with papules, pustules and scab like lesions from different districts all over the Punjab province and its differentiation with pox virus.</li> <li>2) Molecular characterization of Orf virus to determine genetic diversity of Orf virus strains effecting different species of ruminants in different districts of Punjab</li> <li>3) Isolation and adaptation of circulation Orf virus strains from characterized morbid samples.</li> </ol>

<p style="text-align: center;"><b>17</b></p>	<p>Isolation and Molecular Identification of Different Lactobacillus strains from chicken and their application as probiotics in commercial Poultry Feed</p>	<ol style="list-style-type: none"> <li>1) Isolation &amp; Molecular characterization of Lactobacillus species lactobacillus rueteri, lactobacillus salivarius, L. rhamnosus, and lactobacillus bulgaricus.</li> <li>2) Standardization of Lactobacillus probiotics.</li> <li>3) Evaluation of probiotics on poultry health and its comparison with antibiotic growth promoters</li> </ol>
<p style="text-align: center;"><b>18</b></p>	<p>Comparative Immunogenic Response of Live Vaccine of La-Sota and Mukteswar Strains of Newcastle Disease Virus by Different Routes of Inoculation in Layer chicken</p>	<ol style="list-style-type: none"> <li>1) Determination of immunogenic effects of ND Lasota vaccine inoculated by ocular drops, injection and drinking water through serology and histopathology.</li> <li>2) Determination of effectiveness of different routes of inoculation of ND Mukteswar (injection, ocular, drinking water) by serology and histopathology.</li> <li>3) Compare the immunogenic response following ocular drops of ND LaSota and booster by injecting ND Mukteswar vaccine</li> <li>4) Compare the immunogenic response following inoculation of both ND LaSota and ND Mukteswar vaccine.</li> <li>5) Determination of adverse effects of both vaccines by Histopathology.</li> </ol>



19	Development Of Fowl Pox Live Vaccine And Evaluation Of Its Efficacy. (2020-21)	<ol style="list-style-type: none"> <li>1. Revival of fowl pox virus, present in section, on embryonated chicken eggs</li> <li>2. Molecular characterization of the virus</li> <li>3. Development and maintenance of seed virus</li> <li>4. Production of lyophilized vaccine</li> <li>5. Efficacy test of vaccine</li> </ol>
20	Optimization, Standardization and Biomass production of <i>Pasteurella multocida</i> serotype B:2 on Fermentation Technology	To optimize the growth conditions to get maximum biomass by using fermentation technology
21	Molecular epidemiology of the causative agent of contagious caprine pleuropneumonia (CCPP) infection in Punjab Pakistan	<ol style="list-style-type: none"> <li>1. To isolate and identify the actual causative agent for CCPP in Pakistan</li> <li>2. To determine the genetic variability among different isolates responsible for CCPP</li> <li>3. To prepare a vaccine containing the field isolate of CCPP</li> <li>4. To prepare cost effective inactivated oil based vaccine of CCPP in order to meet the International standards meant for its preparation.</li> </ol>

# ISO 9001: 2015 CERTIFICATION OF LABS



## CERTIFICATE



Management system as per  
EN ISO 9001:2015

In accordance with TÜV AUSTRIA CERT procedures, it is hereby certified that

**Veterinary Research Institute**

**Zarar Shaheed Road, Lahore Cantt, Pakistan**

applies a management system in line with the above standard for the following scope

**Production of veterinary biologics (veterinary vaccines and antigens)**

Certificate Registration No. 20100213011262

Valid until 2024-05-09  
Initial certification: 2021-05-10

Certification Body  
at TÜV AUSTRIA CERT GMBH

Vienna, 2021-05-10

This certification was conducted in accordance with TÜV AUSTRIA CERT auditing and certification procedures and is subject to regular surveillance audits.  
TÜV AUSTRIA CERT GMBH Deutschstraße 10 A-1230 Wien www.tuv.at



CERTIFIKAT | CERTIFICATE | CERTIFICAT | CERTIFICADO | СЕРТИФИКАТ | شهادة | 证书 | 인증서

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**Visit of Minister L&DD Punjab, Sardar Hussain Buhadir Darishk on 10-06-21**





**Visit of Secretary L&DD, Mr. Asad Rehman Gillani on 18-05-2021**







Visit of Secretary L&DD, Capt (Retd) Saqib Zafar VRI on 18-08-2020



Visit of Additional Secretary (Admin) on 08-09-2020

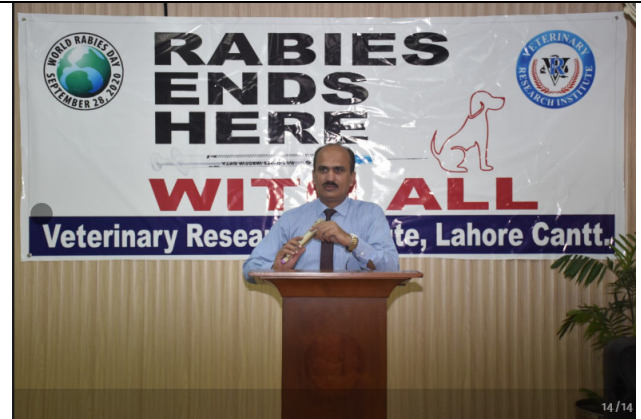


Solidarity with Kashmir at Chief Minister House on 27-10-2020





# World Rabies Day (September 28, 2020)



Activities Regarding World Rabies Day at VRI, Lahore



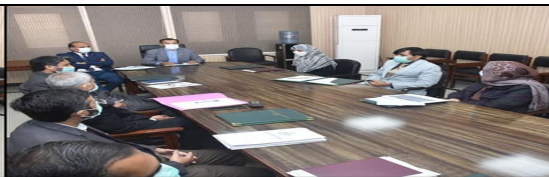
## Visit of Different Delegations/ Trainings/ Meetings at VRI, Lahore



Visit of Delegation From Planning & Development Dept, Peshawar on 18-09-2020



Visit of CEO, PARB Dr. Abid on 18-12-2020



A progress review meeting regarding approved Research Projects being conducted under the chairman ship of DG (Research)Dr. Abdul Rehman. On 28-01-2021

**Technical Seminar entitled "Insight on Toxoplasmosis and its control through Vaccination : A one health approach " By Dr. Hamza Khalid Veterinary Officer, Veterinary Research Institute, Lahore. Dated 15-09-2020**





**Anti Dengue Activities on Dated 13-03-2021.**





Annual Management Review Meeting regarding ISO 9001:2015. Dated 02-03-2021





بفتہ شانِ رحمت للعالمین صلی اللہ علیہ والہ وسلم" کے حوالہ سے ڈائریکٹر جنرل ریسرچ ڈاکٹر سجاد حسین کی سربراہی میں سیرت النبی صلی اللہ علیہ والہ وسلم کانفرنس کا انعقاد

Dated:19-11-202



Meetings Chaired by Director VRI regarding formulation Animal Health Rule 2020 On Dated:03-06-2020,11-06-2020,16-06-2020,1-12-2020,16-12-2020,05-04-2021 and 08-04-2021.





**Meeting of Working Group for Disease control & prevention for Livestock and poultry sector chaired by Director General (Research) Dr. Sajjad Hussain. Dated:24-11-2020**



## Research Publications 2020-2021

Sr. No.	Research Publication
1	R. Rafique*1, S. Noor1, <b>S. Hussain1</b> , R. Munir1, A. Mubarak1, S. Ali1 and R. Rafique2 Epidemiological Statistics Of Fmd Virus Serotypes A, O And Asia-1 In Punjab, Pakistan During 2014-2019 Pakistan Journal of Science (Vol. 72 No. 4 December, 2020)
2	R. Rafique*1, S. Noor1, <b>S. Hussain1</b> , R. Munir1, A. Mubarak1, S. Ali1 and R. Rafique2 An Overview About Prevalence Of Foot And Mouth Disease Virus In Districts Kasur And Lahore, Punjab, Pakistan From 2014-2019 Pakistan Journal of Science (Vol. 72 No. 4 December, 2020).
3	<b>W. Shahzad*1, A. A. Nasir1, S. Hussain2, N. Mustafa1, A. Kausar1, U. Ashraf1, M. S. Qadir1, A. Mehmood1</b> , S. Ali3, R. Rafique3 and <b>Y. Abbas1</b> comparative evaluation of antibody titre against <i>p. Multocida</i> in nili ravi buffalo calves by using hs+bq combo vaccines adjuvanted with montanide isa 50 v2 and eolane-170 Pakistan Journal of Science (Vol. 72 No. 4 December, 2020)
4	Ayan, A., Ahmed, I., Khan, J.M., Munir, S., Hussain, M., Khan, A.K., Jalal, A., Qudus, M.A., Saleem, M.I., Sheraz, A. and <b>Hussain, S.</b> , 2020 Hematological Changes and Comparative Efficacy of Allopathic and Herbal Drugs on Coccidiosis in Rabbits. Baltica Journal 33(2)
5	Rafique, R., Mubarak, A., Noor, M.S., <b>Hussain, S.</b> , Munir, R. and Ali, S. 2020, Adaptation of foot & mouth disease virus subtypes pan asia-ii, tur-06 and sindh-08 towards the vaccine development and serological findings by spc elisa and serum neutralization test. Pakistan Journal of Science, 72 (3): 169-175.
6	<b>Shahzad, W., Zameer, B., Sanghi, S.H., Hussain, S and Mustafa,N.</b> 2020. Preparation and comparative evaluation of Haemorrhagic Septicaemia vaccines using Eolane-150 and Eolane-170 as oil adjuvants for cattle and buffalo. Pakistan Journal of Agriculture, Agricultural Engineering and Veterinary Sciences.36 (1): 78-84.
7	Syed Abdul Khaliq1§, Mudassar Mohiuddin2,3§, Mudasser Habib4, Riaz Hussain2, Muhammad Abbas1, Xiaoxia Du5, <b>Azam Ali Nasir6</b> , Ayesha Mohi ud Din7, Ahrar Khan5,8* and Jiang Bayi5 Clinico-Hemato-Biochemical and Molecular Diagnostic Investigations of Peste des Petits Ruminants in Goats Pakistan Veterinary Journal ISSN: 0253-8318 (PRINT), 2074-7764 (ONLINE) DOI: 10.29261/pakvetj/2020.013
8	Muhammad Nauman Zahid1*, Muhammad Akbar Shahid2*, Hafiz Muhammad Imran3, Muhammad Oneeb3, Mushtaq Ahmed4, Zia Ur Rehman5, <b>Nida Arooj6</b> and Tahir Yaqub Integrins and Heparan Sulfate Play Crucial Role in Pathogenesis of Foot-and-Mouth Disease Virus Pakistan Veterinary Journal ISSN: 0253-8318 (PRINT), 2074-7764 (ONLINE) DOI: 10.29261/pakvetj/2020.016

09	Muhammad Umair Aziz <sup>1</sup> , Muhammad Ijaz <sup>1*</sup> , Arslan Ahmed <sup>1</sup> , Awais Ghaffar <sup>1</sup> , Hammad Nayyar Ghauri <sup>1</sup> , Muhammad Zeeshan Zafar <sup>2</sup> , Muhammad Altaf <sup>1</sup> , Farah Nadia Sheikh <sup>3</sup> , Imtiaz Ahmad <sup>4</sup> and <b>Waseem Shahzad</b> Serological study for the detection of antibodies against leptospira in goats. Pakistan Veterinary Journal SSN: 0253-8318 (PRINT), 2074-7764 (ONLINE)
10	Muhammad Ali Qureshi <sup>1</sup> , <b>Sami Ullah<sup>2</sup> *</b> , <b>Muhammad Zubair Latif<sup>1</sup></b> , <b>Sadia Sarfaraz<sup>1</sup></b> , Sohail Ahmed <sup>3</sup> , <b>Iffat Huma<sup>1</sup></b> , <b>Ali Abbas<sup>1</sup></b> Immune status against Newcastle Disease Virus in backyard Poultry in Punjab, Province, Pakistan. <i>Advances in Animal and Veterinary Sciences</i> (2021)
11	Rabia Riaz <sup>1</sup> , Khushi Muhammad <sup>1 *</sup> , Masood Rabbani <sup>1</sup> , Muhammad Amjad Iqbal <sup>2</sup> , Aamir Riaz Khan <sup>2</sup> , <b>Sadia Sarfaraz<sup>1</sup></b> , Mudassar Naseer <sup>3</sup> and Khalid Majeed Immunomodulatory Effect of New Castle Disease Virus on Inactivated Mycoplasma gallisepticum Vaccine Response in Broilers Pakistan J. Zool., pp 1-4, 2021.
12	Liu, Jiafeng, M. Shahid Mahmood, Rao Zahid Abbas, Amina Dillawar, Zeeshan Nawaz, M. Luqman, <b>Ali Abbas</b> , and Azhar Rafique. "Therapeutic appraisal of ethanolic and aqueous extracts of clove ( <i>Syzygium aromaticum</i> ) and garlic ( <i>Allium sativum</i> ) as antimicrobial agent." <i>Pakistan Journal of Agricultural Sciences</i> 58 (2021).
13	Qudrat Ullah <sup>1,2,3†</sup> , Tariq Jamil <sup>1,4 * †</sup> , Falk Melzer <sup>1</sup> , Muhammad Saqib <sup>5 *</sup> , Muhammad Hammad Hussain <sup>6</sup> , Muhammad Aamir Aslam <sup>7</sup> , Huma Jamil <sup>3</sup> , <b>Muhammad Amjad Iqbal<sup>8</sup></b> , Usman Tahir <sup>9</sup> , Shakeeb Ullah <sup>2</sup> , Zafar Iqbal Qureshi <sup>3</sup> , Stefan Schwarz <sup>4</sup> and Heinrich Neubau Epidemiology and Associated Risk Factors for Brucellosis in Small Ruminants Kept at Institutional Livestock Farms in Punjab, Pakistan, <i>frontiers in veterinary Sciences</i>
14	<b>Azam Ali Nasir<sup>1*</sup></b> , <b>Muhammad Usman Ashraf<sup>1</sup></b> , <b>Asma Kausar<sup>1</sup></b> , <b>Nofil Mustafa<sup>1</sup></b> , <b>Zain-ul Fatima<sup>1</sup></b> , Mobeen Sarwar <sup>2</sup> , Rabia Riaz <sup>1</sup> , Waseem Shahzad <sup>1</sup> , Abdul Khaliq <sup>2</sup> , Riaz Hussain <sup>3</sup> Detection of <i>Clostridium perfringens</i> Alpha, Epsilon and <i>Clostridium chauvoei</i> A toxin genes in Blackleg Asian J Agric & Biol. DOI: 10.35495/ajab.2020.02.120
15	<b>A.W. Manzoor</b> , <b>S. Ali</b> , S. Ahmad, S. Ali , R. Rafique , <b>H. M. Waqar</b> , R. Akram , R. Rafique , M. Shaukat, H. Shaukat, <b>A. Abbas</b> and S. G. M. Din, 2020. Effect of <i>Babesia Bigemina</i> and <i>Theileria Annulata</i> on weight gain, milk yield and estrous cycle in experimentally infected <i>Bos Taurus</i> and <i>Bubalus Bubalis</i> . <i>Pakistan Journal of Science</i> , 72(4): 292-298.
16	M. Lateef <sup>1</sup> , R. Akhtar <sup>1*</sup> , B. Zahid <sup>1</sup> , U.F. Durrani <sup>1</sup> , <b>A. Qadry<sup>2</sup></b> , N. Afzal <sup>1</sup> , Y.G. Yuan <sup>3</sup> , M. Farhab <sup>3*</sup> Prevalence of trichostrongylus in sheep in the district Zhob, Balochistan, Pakistan <i>Arq. Bras. Med. Vet. Zootec.</i> , v.73, n.2, p.522-524, 2021
17	M. Shaukat , H. Shaukat , S. G. Mohy-ud-Din , R. Akram , S. Ali , R. Rafique , <b>H. M. Waqar</b> , Z. Afzal , <b>A. W. Manzoor</b> , <b>S. Ali</b> , <b>S. Tanveer</b> , <b>A. Abbas</b> and R. Rafique, 2021. Review Article: Transgenic technology in Livestock: Current status and Future horizons. <i>Pakistan Journal of Science</i> , 73(1):237-248.

18	A. Abbas , F. Rizvi , <b>A. Abbas</b> , <b>S. Hussain</b> , <b>S. Ali</b> , S. Ali , R. Rafique , <b>A. W. Manzoor</b> , <b>H. M. Waqar</b> , R. Akram , M.Shaukat , H. Shaukat and R. Rafique, 2021. Immuno-modulatory effects of lactobacillus in salmonella gallinarum infected broiler chicks. <i>Pakistan Journal of Science</i> , 73(1):77-87.
19	Hussain, Riaz, Khalid Mehmood, Rao Zahid Abbas, lahtasham Khan, Abu Baker Siddique, Sabaqaa Masood, <b>Muhammad Shahzad Qadir</b> et al. "Epidemiology and patho-physiological studies in Trypanosoma evansi infected camels and buffaloes in Pakistan." <i>Pakistan Journal of Agricultural Sciences</i> 58 (2021).
20	Sabira Nazir <sup>1</sup> , , Mushtaq Ahmad Gondal <sup>2</sup> , Muhammad Zubair Shabbir <sup>3</sup> ,Muhammad Safdar <sup>4</sup> ,Qudrat Ullah <sup>5</sup> ,Firasat Hussain <sup>6</sup> , Kashif Rahim <sup>6</sup> , Fazal Wadood <sup>7</sup> , Khalid Mehmood <sup>8</sup> , <b>Sajjad Ali</b> , <b>Shahzad Qadir</b> , Javed Iqbal Gondal <sup>11</sup> Development and optimization of polymerase chain reaction for screening of Burkholderia mallei among indigenous working equines of Pakistan. <i>THAI JOURNAL OF VETERINARY MEDICINE</i> .2021
21	Khan, Muhammad Umar Zafar, Muhammad Humza, Shunli Yang, Mughees Aizaz Alvi, Muhammad Zahid Iqbal, <b>Hafiza Zain-ul-Fatima</b> , Shumaila Khalid, Tahir Munir, and Jianping Cai. "Occurrence and Toxicogenetic Profiling of Clostridium perfringens in Buffalo and Cattle: An Update from Pakistan." <i>Toxins</i> 13 (2021)

## Way Forward/Research Priority Area

- Progressive control of the PPR in the Punjab leading towards its eradication under the road map of OIE and FAO 2030.
- 100% Vaccine Production for control of HS, BQ, ETV, CPPV, ND, etc.
- Development of Brucellosis Vaccine.
- Molecular Epidemiological Study of Causative Agent of Contagious Caprine pleuropneumonia.
- Development of HS+BQ Combo Vaccine.
- Preparation and Standardization of cost effective vaccine adjuvant.

# TARGETS FOR YEAR 2021-2022

## A.

Sr. No.	Name of Vaccine	Demand for the year (Million doses)
1	Haemorrhagic Septicaemia Vaccine	28.60
2	Black Quarter Vaccine	14.66
3	Enterotoxaemia Vaccine	35.00
4	Caprine Pleuropneumonia Vaccine	14.55
5	New Castle Disease Vaccine (Lasota)	54.00
6	Peste Des Petits Ruminants Vaccine	20.50
7	*Other Vaccine (ASV, SPV, GPV)	On demand
8	Diluent	20.50
9	Diagnostic Agents (in doses)	On demand

## B. RESEARCH & DEVELOPMENT

Sr. No.	RESEARCH & DEVELOPMENT	2021-22 Target
1.	No. of Publications	05
2.	No. of Research Projects	15
3.	No. of Feed Samples to be Tested	2000

### C. Other Activities

Sr. No.	Activities	2021-22 Target
1.	No. of Students / Internee to be trained	60
2.	No. of Seminars / Conferences / workshops	02
3.	Short Training Conducted	05