

This report should be submitted within 2 weeks after you return to Japan. Please do not change the formatting

(Abroad • Domestic) Internship report form (Student)

2022/11/18 (Year/Month/Day)

Name	MWALE Carol
Laboratory	Veterinary Surgery
Year (Grade)	D4
Internship institution	Livestock services Co-operative Society, Lusaka, Zambia
Internship period	Internship period: 10/03/2022 - 10/28/2022 (Departure Date from Sapporo: 10/01/2022, Arrival Date in Sapporo: 10/31/2022)
Purpose	<ol style="list-style-type: none"> 1. Gain exposure to professional industry and create professional networks for possible future collaborations. 2. Gain background knowledge on the types of drugs available for veterinary use on the Zambian market and factors affecting their availability.

-The reason why you chose this institute

Livestock Services Cooperative Society (Livestock services) is an institution that provides a wide range of veterinary services to a broad client base. It also provides services in agriculture and agricultural products. Because of its wide base of services, internship at this institution was a good opportunity to gain industry exposure and to understand the various sectors involved in animal husbandry and healthcare. The institution is multi-faceted and because of this my internship helped to broaden my knowledge base in understanding various aspects of veterinary practice and give me a better understanding of the veterinary sector in Zambia.

- **Result of the activity** (about 800 words, provide photos, tables and figures that clearly show the activities during the period)

The internship was conducted from three different sections of Livestock services cooperative society, and it involved participating in the day-to-day activities performed at each section.

Week 1 (03/10/2022 – 07/10/2022) - Working at the diagnostic laboratory:

The Livestock services Co-operative Society diagnostic laboratory provides services to small holder farmers, veterinarians, and other private practitioners. The services provided include parasitology, clinical biochemistry, hematology, serology, microbiology, and feed analysis. During the internship, I was able to participate in the following activities.

1. Pregnancy diagnosis

Pregnancy diagnosis is mostly performed in ruminants (cattle, goats, and sheep) based on client demand. For laboratory diagnosis, blood, plasma, or serum samples are either brought in by the client (farmers, veterinarians) or veterinary staff from Livestock services are called to the farms and collect the samples themselves. The in vitro pregnancy diagnosis is performed using a "Rapid visual pregnancy test kit" which is an enzyme-linked immunoassay (ELISA) that detects early pregnancy-associated glycoproteins (early PAGs).



Fig. 1: Process of sample analysis for pregnancy diagnosis. Blood samples from cattle (left picture) were presented to the lab and the reagents from the rapid visual pregnancy test kit were sequentially added to the samples (center picture) according to the kit instructions. Samples that are positive turn blue whereas negative samples remain clear (right picture).

2. Feed quality analysis

Feed analysis is performed to determine the content and quality of the feed. The analysis characterizes the kind and amount of organic compounds present in the feed, to ensure that the contents and quality are within acceptable range. This is done for feed that is sold by livestock services for quality control, or for

individual clients/farmers who make their own feed to confirm that the feed contents and various nutrients are proportionately correct for specific groups of animals.

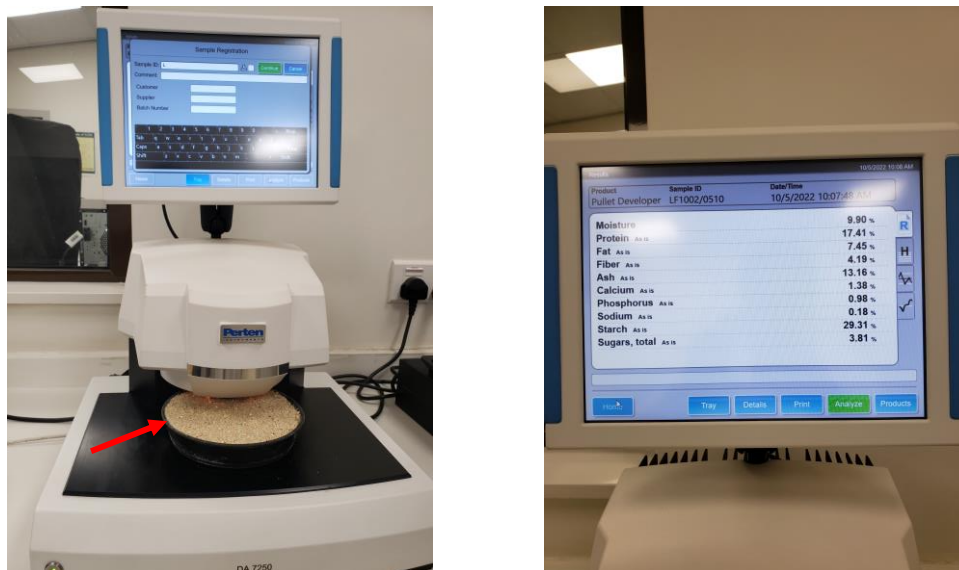


Fig. 2: Feed (red arrow) is mounted onto a machine that detects feed content (left picture) and displays the percentages of various nutrients within the feed (right picture).

3. Haematology

Haematology was performed for complete blood count and diagnosis of various conditions such as leukemia or haemoparasite infections.

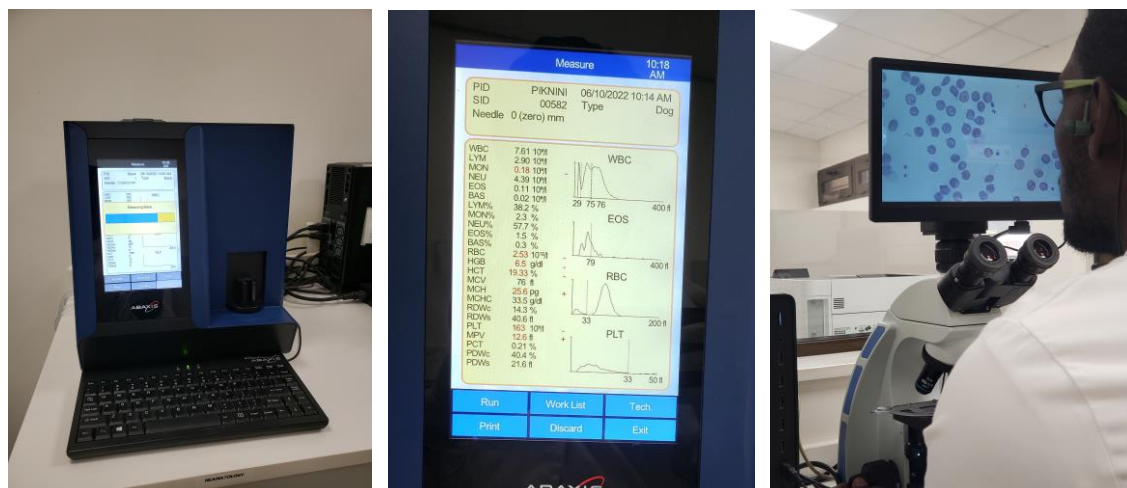


Fig. 3: Automated complete blood count (left picture) that is used to determine the number of each cell type (center picture). Microscopic analysis of blood was also performed to check for morphological abnormalities and hemoparasites (right picture).

Week 2 and 3 (10/10/2022 - 21/10/2022): Working at the Technical services/Consultation section

This involved having consultations with clients and providing advice on various animal health issues such as animal husbandry practices and disease prevention, diagnosis, and treatment. The activities were as follows:

1. Providing advice on animal husbandry and disease prevention

Advice was provided based on the information requested by clients. The information provided to clients included advice on how to raise/keep farm animals, proper housing structure and size for the animals, stocking density, vaccination schedules, and other measures required for disease prevention such as disinfection of premises as well as control of parasites such as ticks and enteroparasites. The consultations also included advice on the types of drugs and supplements that could be used for disease management such as vitamins, dewormers, acaricides, vaccines and disinfectants.



Fig. 4: Face-to-face consultations with clients were performed on a daily basis. The information provided to the clients was based on each individual client's interests, questions, or requests.

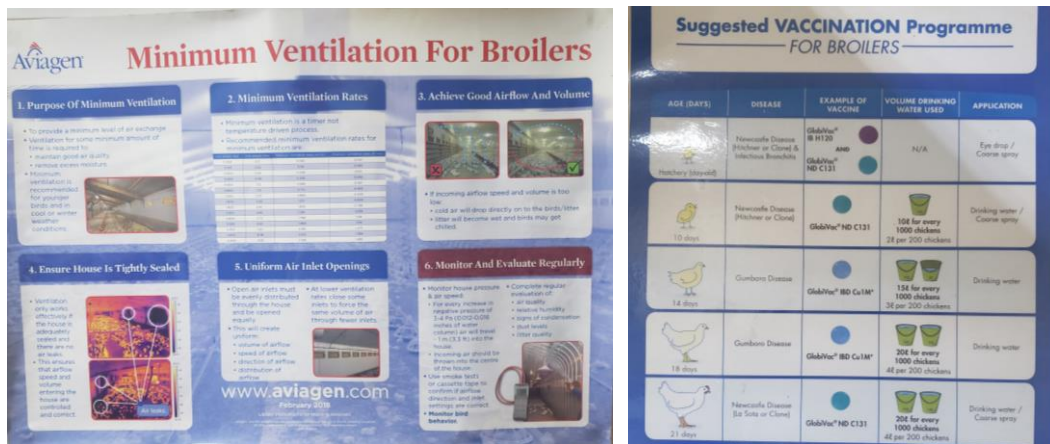


Fig. 5: Example of the type of advice that was given to clients during the face-to-face consultations. Such information is very important in the prevention of infectious diseases and other developmental or nutritional diseases.

2. Postmortems

Postmortems were performed on a daily basis based on client requests. Most of the postmortems were conducted in poultry, particularly chickens. Following postmortem, clients were given treatment plans and advised on how the diseases could be prevented in the future. Some of the diseases that were diagnosed during postmortems included:

- New castle disease (NDV)
- Infectious bursal disease (IBD; also known as Gumboro)
- Coccidiosis
- Infectious bronchitis (IB)

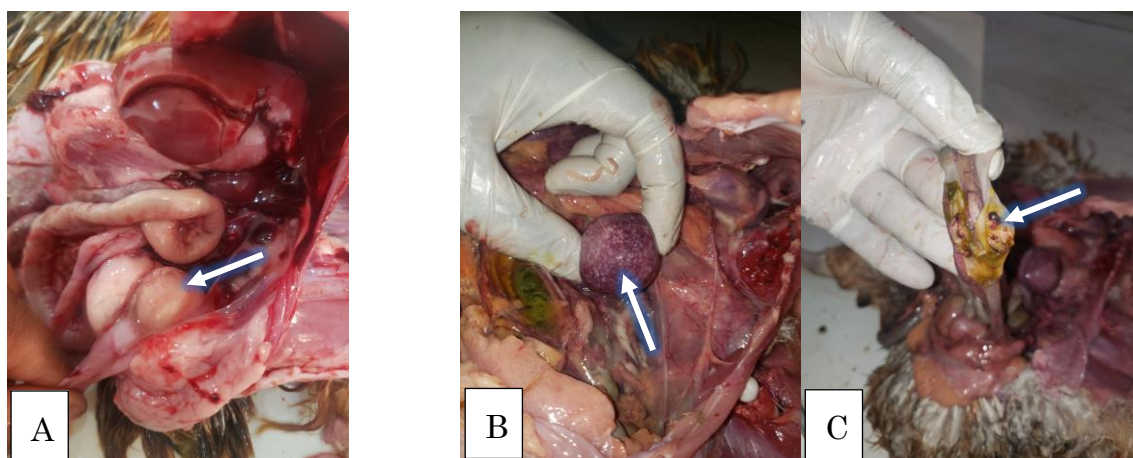


Fig. 6: Examples of postmortem findings in chickens. **A:** Enlarged/edematous bursa of Fabricius in a chicken with IBD (arrow). **B, C:** Enlarged, friable spleen (B) and hemorrhagic cecal tonsils (C) in a chicken with NDV (arrows).

3. Field visit

A field visit was made to a poultry farm. Blood/serum samples were collected from egg laying chickens that were experiencing a drop in egg production and increased death rate. The blood samples were sent to the livestock services laboratory to check for vaccine titers in the blood.



Fig. 7: Serum samples being collected from the wing vein of a chicken. The samples were sent to the laboratory for further analysis of vaccine titers.

Week 4 (25/10/2022 – 28/10/2022): Working at the Medicament Section

The medicament section is the department where the pharmaceutical products are housed. These include veterinary drugs and related veterinary products. The medicament section also houses the compliance department, which deals with compliance to laws and regulations related to the pharmaceutical industry. The activities were as follows:

1. Familiarization with medicament products and services

I was introduced to the types and classes of drugs (such as anesthetics, antibiotics, and vaccines) and allied pharmaceutical substances (such as vitamins and acaricides) available for retail and wholesale at livestock services. I also learned about the different stakeholders involved in the pharmaceutical industry, including producers, suppliers, regulatory bodies and clinicians, and what role they play in the drug supply chain. I was able to understand how the different stakeholders can affect clinical practice, by influencing the availability and types of drugs on the market and this was important in understanding how the one health concept is applicable in this case.

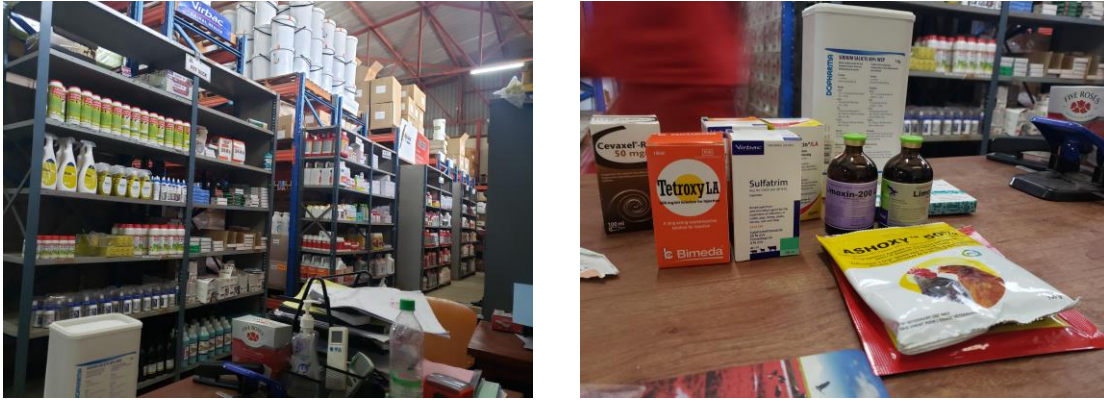


Fig. 8: Image of the drugs and allied substances at the pharmaceutical warehouse (left). Some examples of the antibiotics supplied by livestock services are pictured on the right.

2. Dispensing products/inventory

This involved dispensing products that were ordered by clients to the retail front desk. It also involved taking inventory of the drugs and products to keep track of the available stock.

3. Compliance department

The compliance section deals with adherence to laws and regulations associated with the supply of pharmaceutical products in Zambia. I learned how these laws and regulations guide the proper and safe way to produce, register, store, supply and dispose of pharmaceutical products.



Fig. 9: Dangerous products safely stored according to the pharmaceutical laws and regulations of Zambia.

- What do you think the positive impact of the activity will have on your further career path?

My future career will be working as an academician, clinician, and researcher in veterinary anesthesia. The job requires me to have a broad understanding of the veterinary profession and to continuously acquire applicable knowledge. As such, the internship activity will be helpful as follows:

1. I gained exposure on how a professional workplace operates from an administrative point of view. I was able to see the importance of having different roles in the same institution and how these roles are designed to achieve the same goals.
2. I was able to create a rapport with the top management as well as other veterinarians that work at Livestock services Co-operative Society. This will be helpful in creating a professional network during my career.
3. Interactions with clients and fellow veterinarians helped me gain information on the types of products and services that are commonly requested by clients, especially small-scale farmers and how this can affect the availability of drugs and other products used in clinical practice.
4. I learned the importance of drug regulation and how it is conducted in Zambia. I also learned about the different kinds of stake holders involved in drug supply and use, including producers, suppliers, regulators, and end users such as clinicians, and how this translates to the one health concept. This is important for understanding what role I play in the drug supply chain and how I can work together with other stakeholders to improve drug availability and ensure proper and safe use of drugs and other related substances.
5. I was able to recognise areas that need improvement in the supply chain, and what role I can play as a stakeholder, to effectively apply good clinical practices in anesthesia in the future. This information will be helpful in how I conduct research and teach students during my career.

- Advice for your junior fellows

Student internship is a good opportunity to gain industry exposure and it allows students to have practical experience. It can also be helpful in understanding how the one health concept is applied in real life situations. Take this as an opportunity to expand your knowledge and do not restrict yourself to what you already know.

Approval of supervisor	Institution • Official title • Name Hokkaido University, Graduate School of Veterinary Medicine, Laboratory of Veterinary Surgery, Professor, Masahiro OKUMURA.
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- ※1 Send the electronic file to the WISE Program Office
- ※2 Attach a copy certificate of the content of internship activity that is prepared by the counterpart at the internship institution (any form with a signature of the counterpart).
- ※3 The Steering Committee for the WISE Program will first confirm the content of this report and report will be forwarded to the Educational Affairs Committee for credits evaluation.