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A novel workload calculator for the veterinary sector

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Abstract
Effective staffing in veterinary practices, whether public or private, depends on accurate workload estimation to avoid overstaffing or understaffing. A workload analysis calculator was developed using the Full Time Equivalence methodology, based on ten routine daily activities and their estimated Earliest Finish Times. When applied to two veterinary practices, the calculator yielded Full Time Equivalence values of 2.08 and 1.07, revealing that one practitioner was significantly overloaded while the other had a normal workload. These findings highlight the tool's practicality and reliability in assigning tasks and determining appropriate staffing levels. Beyond individual practices, the calculator supports broader strategic planning, such as forecasting workforce needs and aligning veterinary school enrollment targets. Its adaptability makes it a valuable resource for enhancing operational efficiency and long-term workforce planning not only in the veterinary sector but also in other industries where task-based staffing is essential.

Keywords: Workload analysis, full time equivalence, veterinary, practitioner

Introduction
Veterinary profession is among the old professions known and practiced by man (Johnes, 2021; Mark, 2020) [4, 6]. Veterinarians are the assurers of animal health, animal welfare, Food safety as well as the prevention of zoonotic diseases. However, despite the spread of emerging and zoonotic diseases and the growing number of animals and the related services, there is a lack of accurate and instantaneous update of the number of veterinarians in the globe. The last available statistics are dated more than 20 years ago whereat the number of the veterinarians was estimated to be more than 600,000 over the world (Kouba, 2005) [5]. Recently, several countries have begun visualizing the veterinary sector data and implementing targeted measures to address the identified gaps. In Europe, there are over 300,000 veterinarians, however in 2024, the Federation of Veterinarians of Europe (FVE) highlighted a concerning trend as all available indicators, despite the absence of a comprehensive analysis, revealed a growing shortage in the veterinary workforce across most of the European countries (FVE, 2024) [2]. In contrast to Europe, the United States maintains detailed annual statistics on its veterinary workforce. According to the American Veterinary Medical Association (AVMA), the number of veterinarians in the U.S. reached 130,415 in 2024 (AVMA, 2024) [1].
Furthermore, the use of different methodologies of workforce analysis is a common practice in businesses. While various sectors used Full-Time Equivalence (FTE) methodology for workforce analysis, such as healthcare (Nurok *et al*., 2024) [7], logistics (Wicaksono and Fadillah, 2021) [10] and engineering (Rachmuddin *et al*. 2021) [8], such analytical tool was not used in the veterinary sector.
Moreover, addressing veterinary workforce challenges requires not only accurate data and analysis but also strategic collaboration between public institutions, private sector, and educational bodies to ensure sustainable staffing and future readiness, therefore, the objective of the current paper is to develop a workload calculator that could easily be modified and adopted by official authorities as well as the private sector to analyze the workload of the business and long-term workforce planning in the veterinary sector.

Materials and Methods

Daily practitioner activities

The daily activities of a veterinary practitioner vary significantly depending on the species treated, their population density, geographical location, season, practice specialty, and the epidemiological status of the area. Based on the author's experience, ten routine activities were defined and are briefly described in Table 1. Activities related to disease outbreak response were excluded, as they are not considered routine. In livestock practices, most cases are treated on farms or animal holdings, which are often widely dispersed. For the development of the current workload calculator, an average of 80 kilometers covered in an hour of driving is considered reasonable.

Table 1: Daily activities of a practitioner in a veterinary practice

Number	Activity	Description
1	Administrative	Table work, e.g. meetings, report writing … etc.
2	Examination	Clinical examination of an animal including specialized examinations.
3	Follow up	re-examining an animal after treating it,
4	Reproduction-Examination	Examining the reproductive system of a male or female animal.
5	Reproduction-Treatment	Treating a male or female animal for reproductive disorders. Does not include surgical interventions.
6	Surgery-Major	Surgical procedures that take more than 60minutes to perform after the preparation of the animal.
7	Surgery-Minor	Surgical procedures that take up to 60 minutes to perform after the preparation of the animal.
8	Tagging	Identification of an animal with a unique number using an ear tag, a microchip or tattooing
9	Treating	Prescribing and giving treatment to an animal. Does not include surgical interventions.
10	Vaccination	Vaccinating an animal against diseases
11	Driving	Moving from the practice to the animal farm or holding

Work Time

Several standard methods exist for measuring work time; however, for the current article, the Earliest Finish Time (EFT) method, (Tulsian and Pandy, 2006) [9] was used.

Practitioners from two veterinary clinics were requested to estimate the EFT for selected ten routine activities. The time required by the assistants or support staff to prepare animals or materials was excluded from these estimates. Table 2 presents the Earliest Finish Time EFT values for the ten defined daily tasks, which serve as the foundation for the Developed workload analysis calculator.

Table 2: Earliest Finish Time EFT of ten routine veterinary activities

Number	Activity	Early Finish Time (minutes)
1	Administrative	30
2	Examination	10
3	Follow up	5
4	Reproduction-Examination	30
5	Reproduction-Treatment	30
6	Surgery-Major	60
7	Surgery-Minor	180
8	Tagging	1
9	Treating	15
10	Vaccination	0.5
11	Distance travelled (every 80 kilometers)	60

Working Hours

Official holidays vary across countries, and annual leave entitlements can differ between male and female employees within the same organizational grade. Therefore, for the purpose of developing the current workload calculator, the assumptions outlined in Table 3 were used to estimate the official working hours per day, month, and year based on the Gregorian calendar.

Table 3: Work hours, allowances and working days assumptions

Variable	Duration (hours/days)
Official Daily Working Hours	8.00
Daily Delay Allowance (hours)	0.25
Daily Early Exit Allowance (hours)	0.32
Daily Exits Allowance (hours)	0.50
Net Official Daily Working Hours	6.93
Official Exit Allowances/Month (days)	8.00
Working Days/Month (days)	22.00
Estimated Effective Working Hours per Month (hours)	144.53
Working Days – Year (days)	261
Official Holidays (days)	15
Official Annual Leaves (days)	22
Official Sick Leaves (days)	10
Net Working Days-Year (days)	214
Net Working Hours-Year (hours)	1387.73

Full Time Equivalent FTE

The Full Time Equivalent FTE of a practitioner's activities in a month was computed using the following equation:

FTE = Practitioner's Total Activities Time/effective working hours per month

Where,

Practitioner's Total Activities Time = sum of the total early finish time of the practitioner's activities in a month expressed in hours.

Effective Working Hours per month = sum of working hours in a month-sum of allowances in the month

The results of the Full Time Equivalent FTE were interpreted according to Harinanda *et al*. (2023) [3] as shown in Table 4.

Table 4: Workload interpretation as per the full time equivalent results

Full Time Equivalent Result	Workload
FTE > 1.28	overload
1.00 < FTE ≤ 1.28	normal
FTE < 1.00	under load

Number of practitioner's activities in a month

The activities of two practitioners in two different practices with different specialties were reported for one Gregorian calendar month. The first practitioner who was a specialist in reproduction applied hormonal treatment to synchronized 939 ewes for estrus and performed 39 minor surgeries as well as examined 39 male and female camels for reproductive disorders, whereas the second practitioner treated 15 herds with a total number of 579 animals. The distance travelled by the two practitioners was not recorded. Table 5 presents the details of the two practitioners

Table 5: Activities of two practitioners in a calendar month

Activity	Number	
	Practitioner I	Practitioner II
Administrative	0	0
Examination	0	0
Follow up	11	0
Reproduction-Examination	52	0
Reproduction-Treatment	0	0
Surgery-Major	0	0
Surgery-Minor	39	9
Tagging	0	0
Treating	939	579
Vaccination	0	0
Distance travelled (every 80 kilometers)	0	0

Results and Discussions

The aim of the current paper is to develop a workload calculator that could easily and effectively be used to calculate the workload for veterinary practices over the world. The variable attributes of the calculator are the daily activities a practitioner veterinarian performs in any veterinary practice. To demonstrate its functionality, the calculator was applied to two practitioners, and the results are presented in Table 6.

Table 6: Activities of two veterinary practitioners in a calendar month

Activity	Practitioner I		Practitioner II	
	Number	Hours	Number	Hours
Administrative	0	0.00	0	0
Examination	0	0.00	0	0
Follow up	11	0.92	0	0
Reproduction-*examination*	52	26.00	0	0
Reproduction-*treatment*	0	0.00	0	0
Surgery-*major*	0	0.00	0	0
Surgery-*minor*	39	39.00	9	9.00
Tagging	0	0.00	0	0
Treating	939	234.75	579	144.75
Vaccination	0	0.00	0	0
Distance travelled (every 80 kilometers)	0	0.00	0	0
Full Time Equivalent FTE	2.08		1.07	

With Full Time Equivalents (FTE) of 2.08 and 1.07 respectively, the results revealed that Practitioner I is significantly overloaded, while Practitioner II has a normal workload. However, the distances traveled by both practitioners were not reported, which likely led to an underestimation of the actual Full Time Equivalent FTE values.

Each of the practitioners covers an area of 100 plus kilometers radius, therefore including distances travelled could substantially alter the results.

Conclusion

To the best of the author's knowledge, this is the first documented application of the Full Time Equivalents FTE methodology to calculate the workload of veterinary practitioners. The findings demonstrate the applicability and flexibility of the workload calculator in assessing existing practices. It can be concluded that with minor adjustments to its parameters, the calculator can be effectively used for long-term workforce planning not only in the veterinary sector but also in other industries where task-based staffing is essential planning new veterinary businesses.

Conflict of Interest

Not available

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Not available

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