



# A Pilot Study of Pain Assessment and Activity Tracking in Dogs Undergoing Radiation Therapy



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## Introduction

Radiation therapy (RT) is an important modality for cancer treatments in dogs and is effective for localized tumors. Radiotherapy has shown to increase the lifespan and quality of life for dogs; however, monitoring health changes and treatment response to cancer therapy is challenging with subjective assessments. In this study, two methods were used for monitoring changes: a novel owner questionnaire and an activity tracking device.

The aims of this pilot study:

- 1) to better assess radiation therapy response and monitor side effects including pain and distress
- 2) to understand the changes in the radiation patients' activity levels and sleep quality
- 3) to investigate overall quality of life throughout radiation therapy and follow-up

Eight healthy control dogs without cancer or radiotherapy, four dogs receiving palliative radiotherapy for cancer, and one dog receiving definitive radiotherapy for cancer were enrolled in this study.

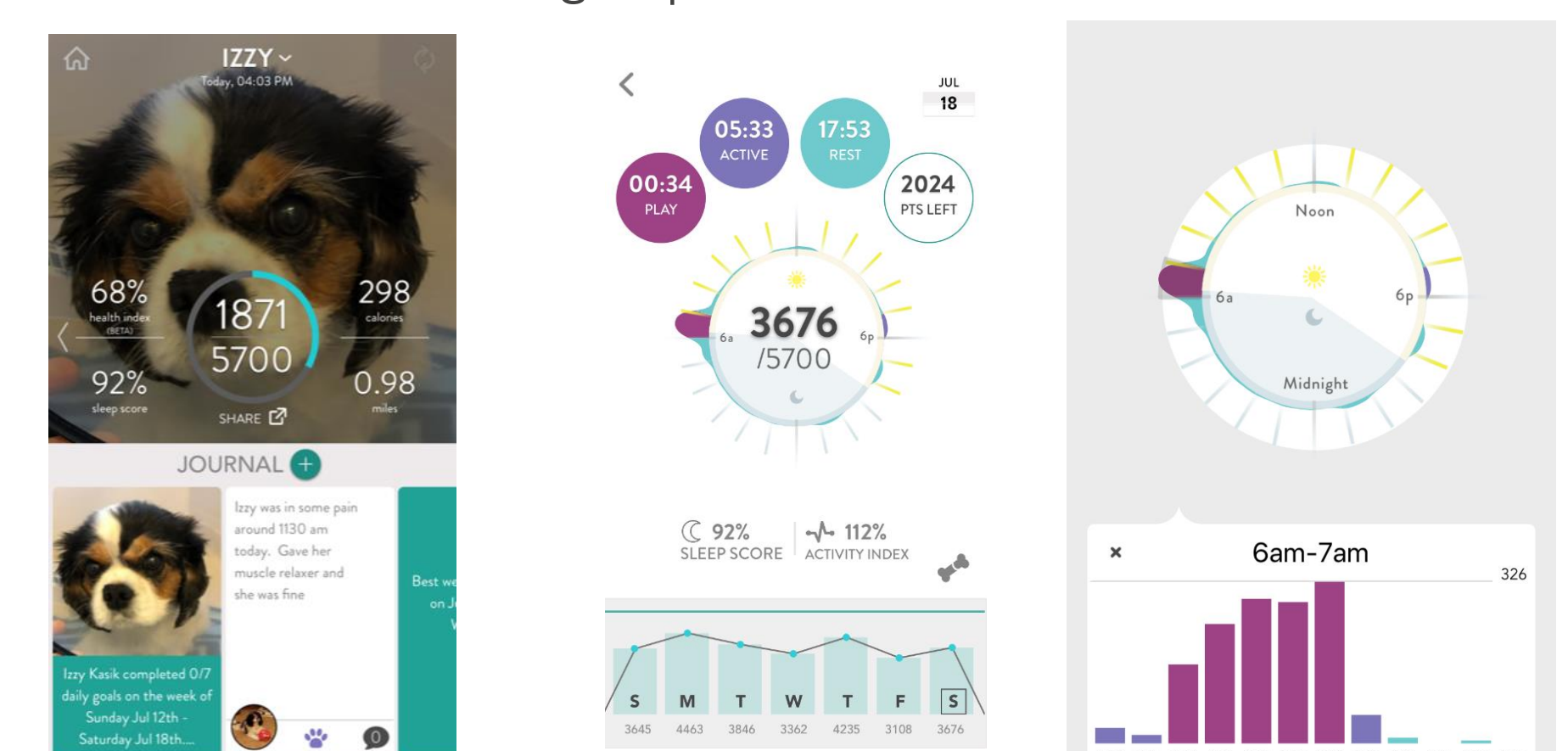
The preliminary results indicate that activity tracking and a novel questionnaire might be useful remote assessment tools.

## Methodology

**Owner Questionnaire** A novel online survey was created to measure the changes for pain assessment and quality of life (QOL). Questions include, for example: "My pet's alertness, My pet's general level of happiness, My pet's sleep quality during the night," etc.

This survey consisted of multiple questions using a Likert scale scored 1-5 (1=Much Worse, 2=Worse, 3=Normal/No Change, 4=Better, 5=Much Better). The QOL was scored 0-10 (0=very poor, 10=excellent).

**FitBark®2 Dog Activity Tracker** Monitoring changes in a patient's health status throughout a treatment protocol like radiotherapy is important for tracking progress. The activity tracker used for this study was the FitBark®2 Dog Activity Tracker. This provided raw data for sleep and activity for both the control and treatment groups.



## Study Design and Data Collection

### Control and Treatment Groups:

- The **Control group** consisted of eight (8) dogs varying in age and weight, who underwent no radiation therapy.
- The **Treatment group** consisted of four (4) dogs undergoing palliative radiation therapy, and one (1) undergoing definitive radiation therapy for different types of cancer.

### Questionnaire:

- Treatment group**—Online surveys were distributed to clients every two days for the first two weeks and then weekly following the radiation treatments.
- Control group**—Online surveys were distributed twice to clients, approximately two weeks apart.

### FitBark®2 Dog Activity Tracker:

This tracker was attached to the collar of control and treatment dogs. It remotely sensed and tracked minute-by-minute data of the patients' sleeping and activity habits. The activity was measured in "BarkPoints". Through Bluetooth capabilities, continuous data from the collar was synced to the phone application. The app also had a journal in which the clients documented walks, eating times, or other routine activities.

Name	Type	Location	Radiotherapy	Status
Lucy	Carcinoma	Nasal	Palliative	Post RT
Kaido	Carcinoma	Prostate	Palliative	PTS*
Chloe	Hemangiosarcoma	SQ	Palliative	Post RT
Gizmo	Melanoma	Perianal	Palliative	On RT
Izzy	Spinal tumor	C4	Definitive	Post RT

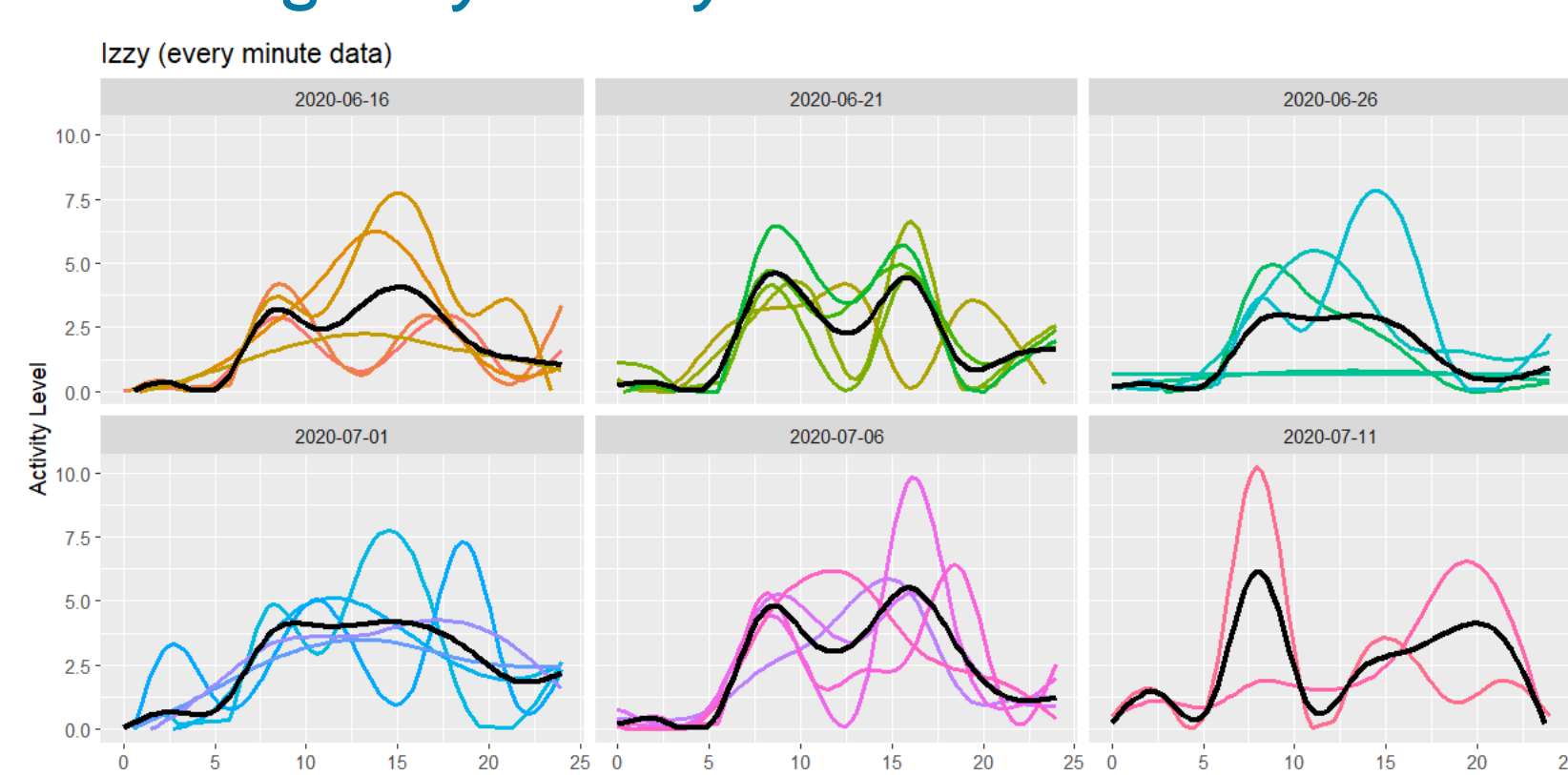
\*PTS= Put To Sleep



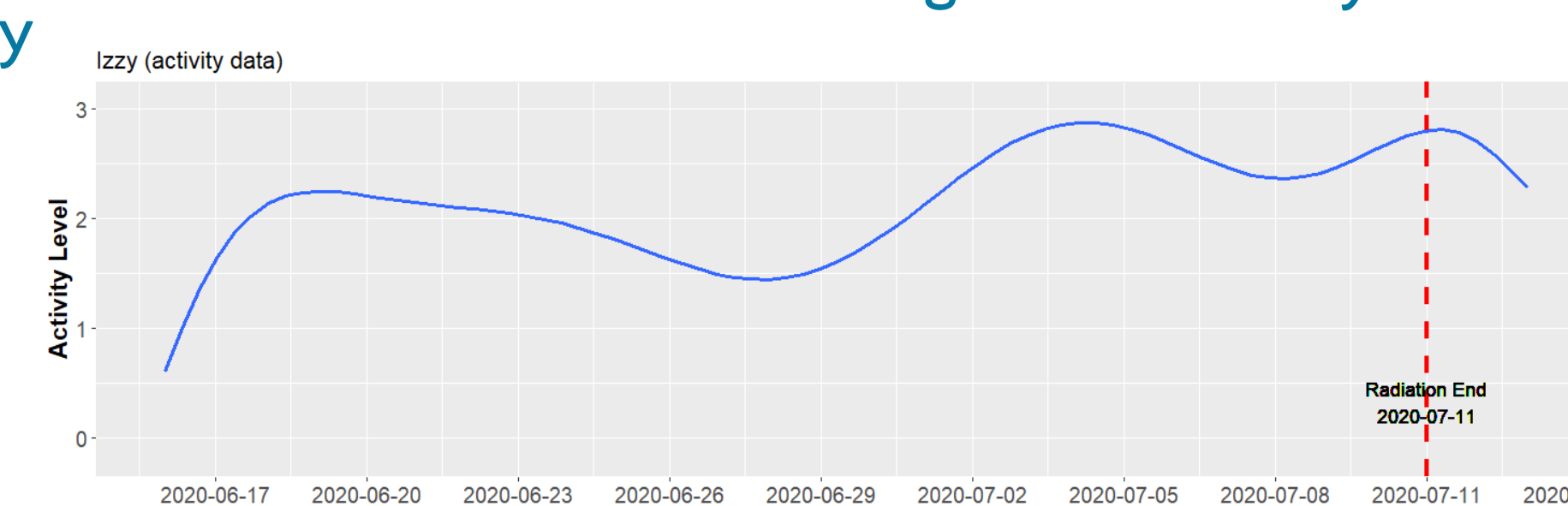
Chloe displaying her FitBark®2 Dog Activity Tracker.

## Results

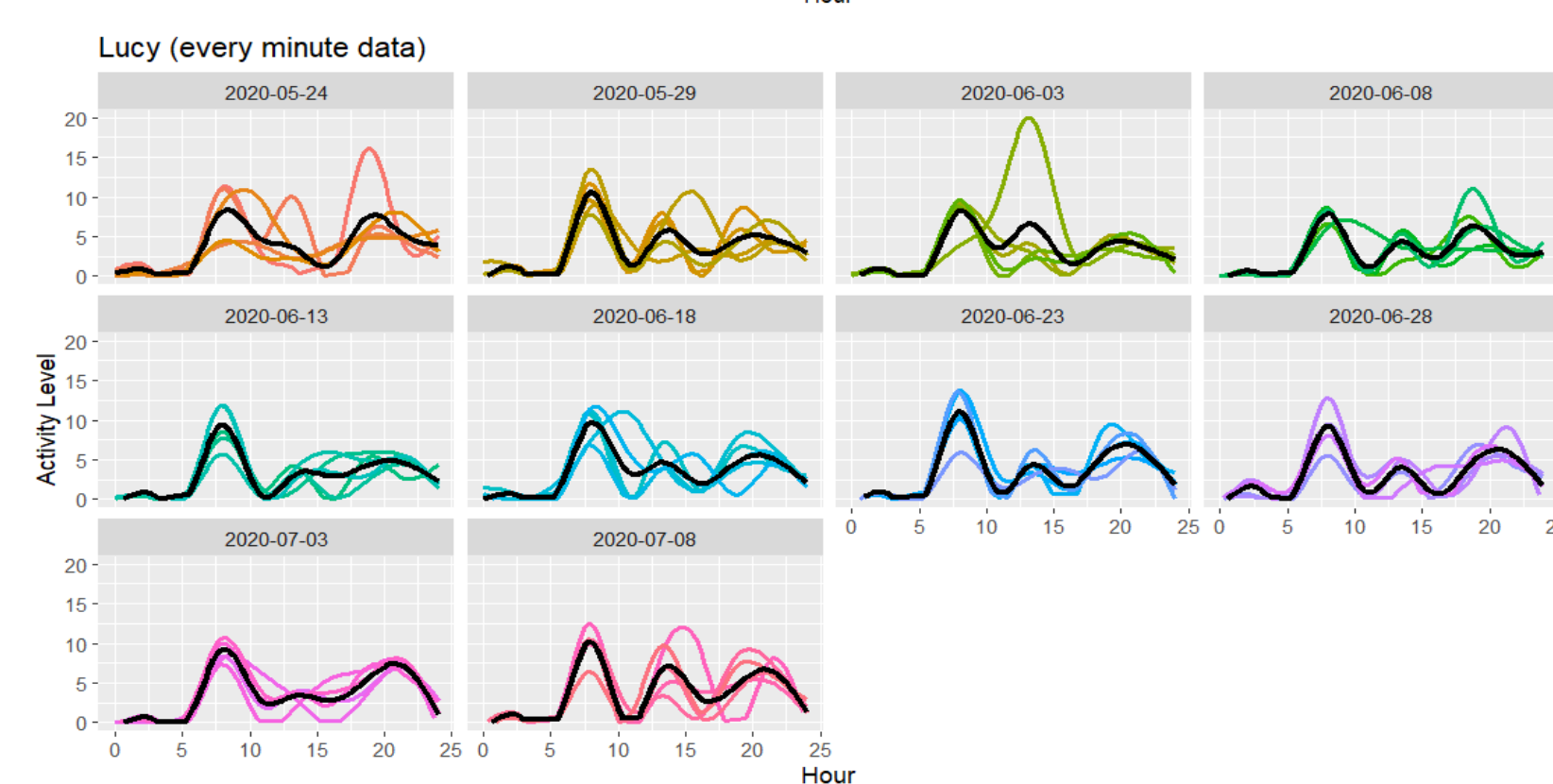
### Tracking Daily Activity Profiles



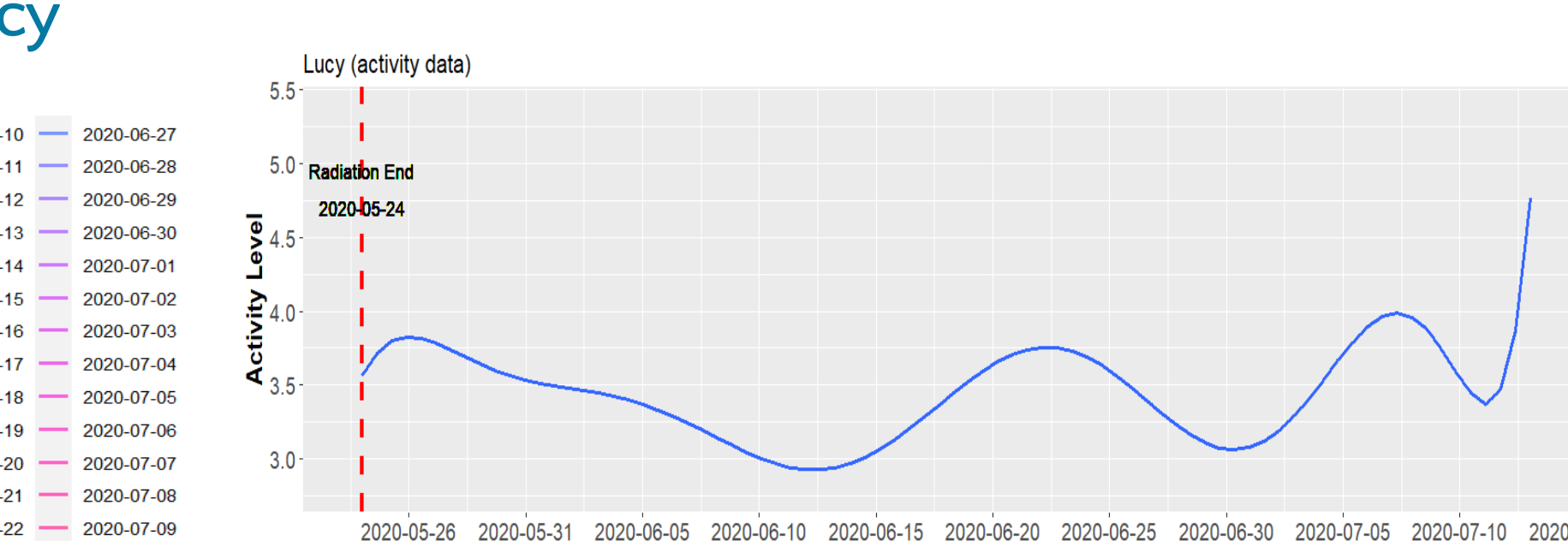
### Izzy



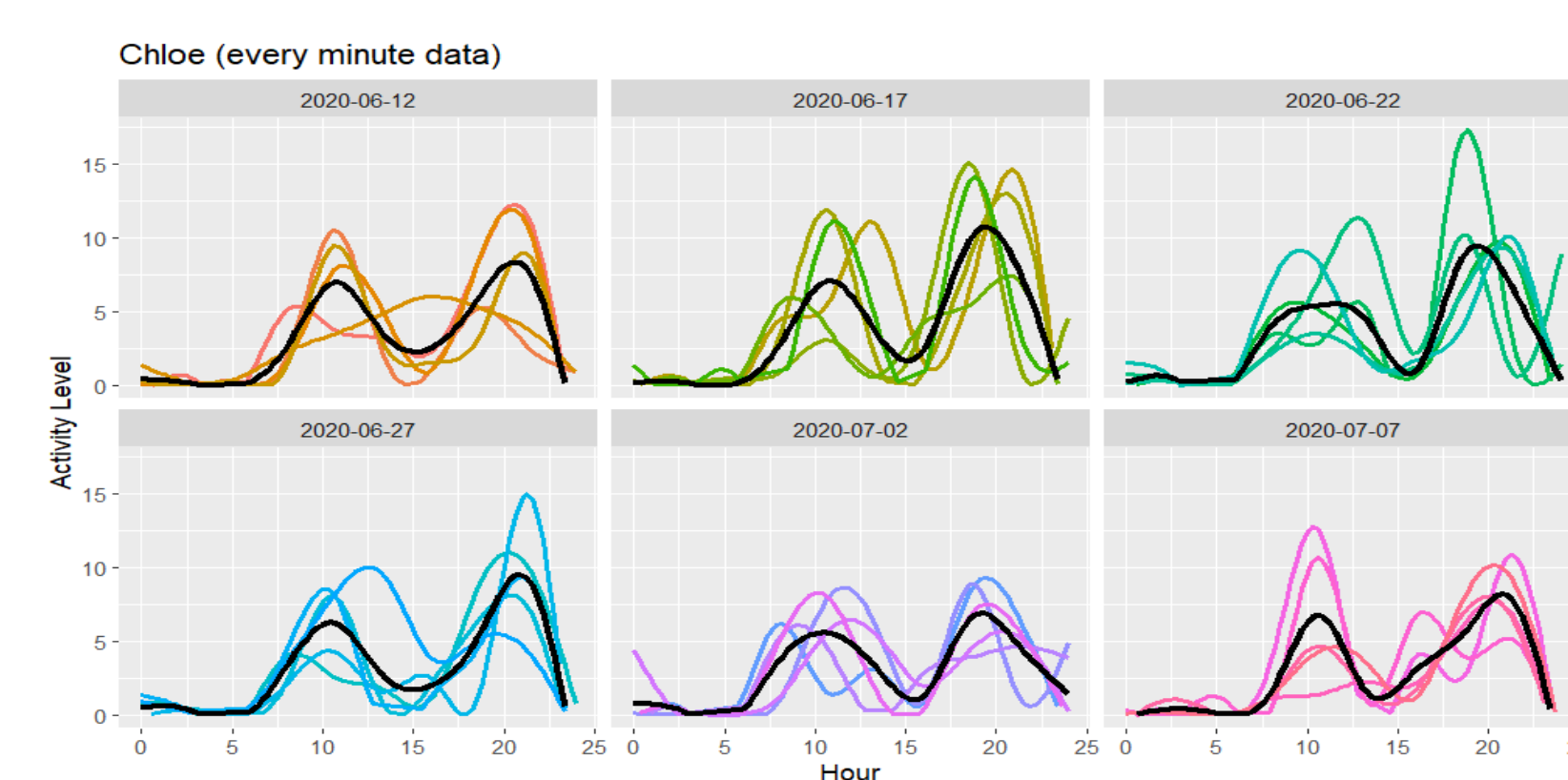
Izzy's activity decreased during the weeks of her radiation since she was an in-patient during her treatment.



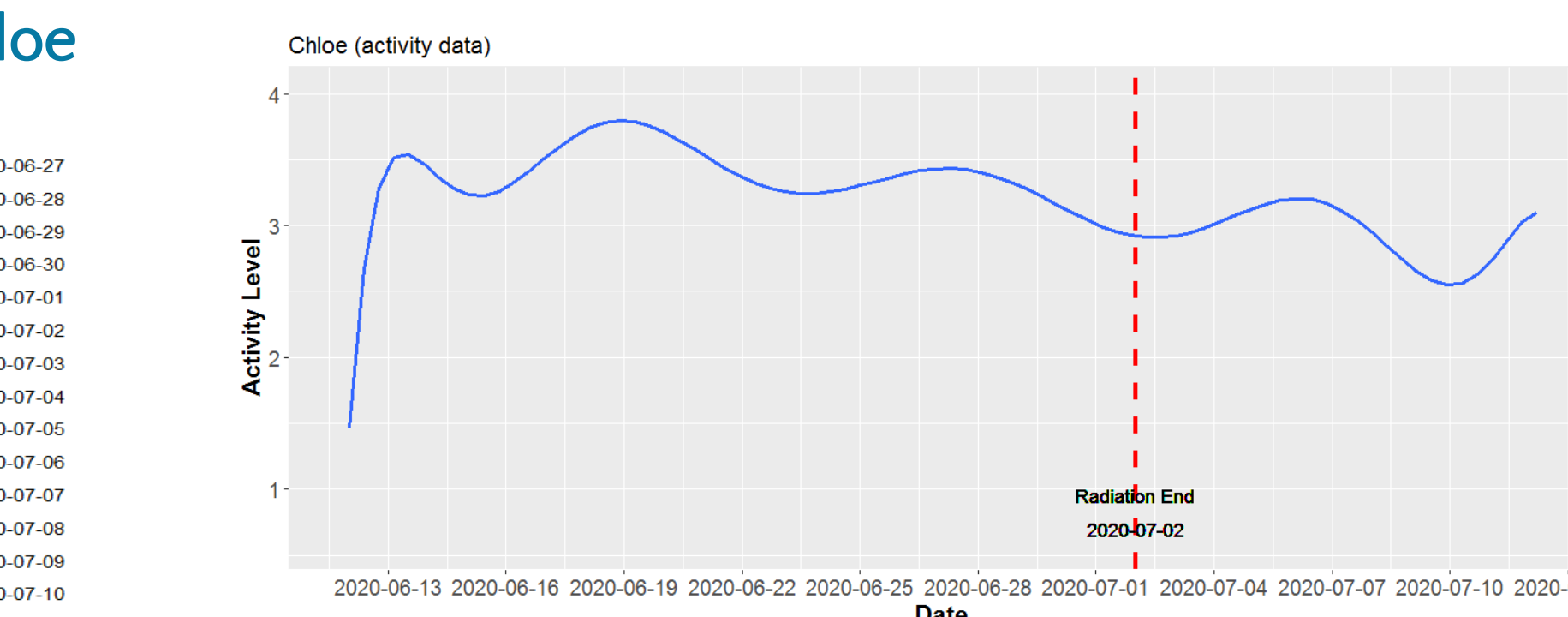
### Lucy



Lucy's activity decreased initially and then gradually increased following her radiation.

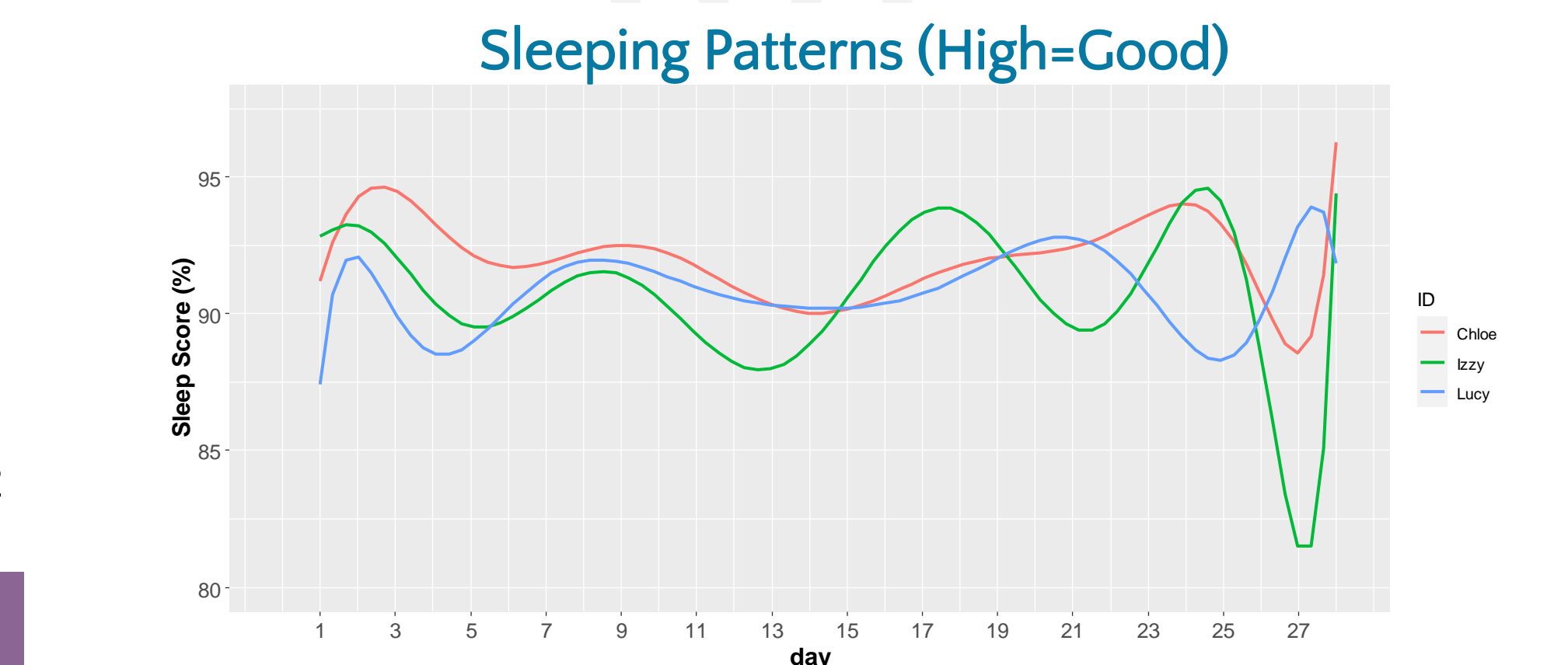
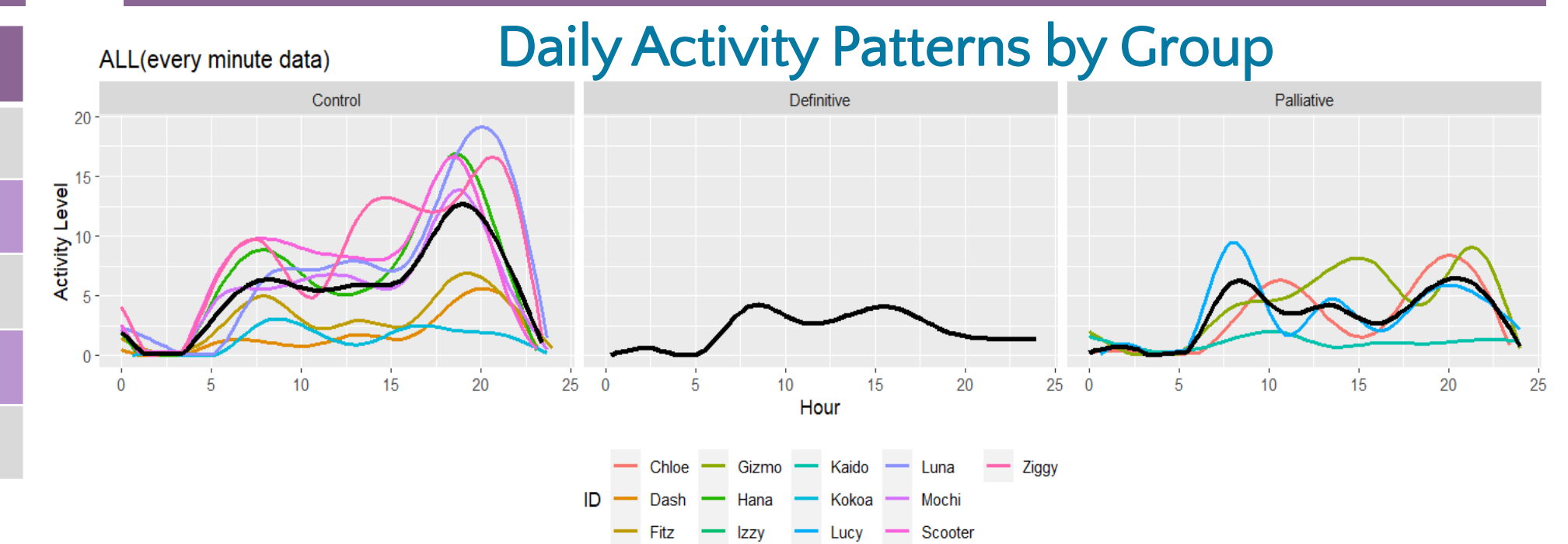


### Chloe



Chloe's activity decreased slightly following her radiation.

## Results - Cont'd



### Health Scores by Owner Survey Data

Name	Health Score (1=much worse, 5=much better)			Quality of Life Score (1=very poor, 10=excellent)		
	1st visit	Last visit	Difference	1st visit	Last visit	Difference
Chloe	2.91	3.00	0.09	10	8	-2
Kaido	3.29	1.14	-2.15	5	2	-3
Izzy	3.08	3.55	0.47	7	8	1

## Conclusion

- Preliminary results revealed a slight decrease in activity, an initial decrease in the quality of sleep, and a marginal increase in overall well-being of treated dogs compared to control dogs.
- These results indicate that activity tracking and a novel questionnaire might provide useful remote assessment and stimulate proactive communication regarding quality of life, which has potential to improve patient care for dogs undergoing radiation therapy for cancer.

## Future

In continuation of this pilot study, more patients receiving definitive and palliative radiation therapy will be recruited to participate in this study. By increasing the sample size, we hope to obtain enough data to solidify our findings and establish that the questionnaire created serves as a reliable and valid tool in assessing both quality of life as well as treatment progress.

## Acknowledgements

Research Grant: Department of Clinical Sciences, College of Veterinary Medicine, Kansas State University  
 Student Support: Kurz Family Scholarship and KSU CVM Office of Research