KitBit - User Research Report

Group #42
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Project Description

The goal of the KitBit app is to create a system that allows pet owners to track the weight, nutrition, activity, and general health of their pets. KitBit would provide owners with all of their pet's health information in one convenient place, similar to how we can use tools like Fitbit to track our own (human) health. Using our app, pet owners would have access to a variety of health-related metrics for their pet, which would be either user-entered or gathered from a physical collar-mounted device. With the recorded information, pet owners can make more informed decisions about the health of their pet, such as when and how much to feed them, how often and how long they need to be walked, or even when they might need to see a veterinarian.

Stakeholders

Designers & Developers

The designers and developers of the app, some of whom are also pet owners, are invested in a successful product outcome. Our team wishes for the application in which we've invested our time to not only meet functional requirements, but to also succeed on the market; in other words, the product should be both useful and usable. Designers and developers have the best interests of pets and their owners in mind, and strive to provide user satisfaction in the delivered product. The original idea for our application came from the group's pet owners' desire for a tool to help them achieve optimal health for their pet, a large part of which depends on weight management.

Veterinarians

The primary function of our app is an all-in-one health tracking system for pets; as such, collaboration with veterinarians is paramount to ensuring our application provides quality and credible information and services. Any recommendations our app makes should be in line with current best practices and backed by scientific study, both to benefit our customers as well as to

avoid liability. To help us make a system as complete and helpful to our pets' well-being as possible, we conducted an interview with a veterinary specialist with 40 years of practical experience. Veterinarians may also be interested in the application as a way to obtain more detailed health statistics for their pet clients.

Pet Owners

Pet owners will be the main users of our system. To make it simple to incorporate the application into their daily lives, users require a straightforward and intuitive interface to the system. Asking pet owners themselves what they would want from our system will increase our understanding of what they need and desire from our product. As pet owners, we can test the acceptability and suitability of our design ideas on ourselves to identify their strengths and weaknesses before delivering our app to other potential customers.

Pets

The system we are designing is intended to help enhance the lives of our pets by managing their weight, nutrition, and fitness. While pets may not have a conscious interest in our system, they absolutely have a stake in it when it comes to their quality of life and longevity. Bearing excess weight has been associated with increased risk of skin, respiratory, endocrine and metabolic disorders, orthopedic disease (e.g., arthritis), and certain forms of cancer [1]. It is also important that any interactions between owners and pets that are required by our app are feasible and comfortable for both parties, as we do not wish to agitate or distress of animal friends.

Research Methods - Summary

IDEO Method ASK - Expert Interview

As we intend to develop an app that focuses on pet health and wellness, it is not only valuable but critical to consult a pet health professional in order to gain the perspective of an expert in the field. The 'Expert Interview' method is beneficial for obtaining a high-level overview of the problem domain, the current state-of-the-art, and specific technical advice [2] . To this end, we conducted an approximately 1-hour-long phone interview with Dr. Madonna Mesher, a veterinarian located in Sydney, Nova Scotia, with 40 years experience in veterinary medicine practice (see Appendix A: IDEO Method Ask - Expert Interview).

A selection of problem-domain-specific questions was prepared in advance to ensure our interview addressed critical points relevant to our design. As the interview progressed, further questions were posed to seek further information and clarification in response to ideas that were uncovered.

The most important information obtained from the interview was the guidelines and standards used for clinical pet weight assessment. As confirmed in an interview, weight management is viewed as a key focus in every pet's health care plan, as excess weight can have an adverse impact on the quality of life and increase the risk of various diseases and disorders [2]. During a routine checkup, veterinarians will often make a qualitative judgement of a pet's weight by using visual guidelines in conjunction with physical examination (e.g., rib palpation). The universal standard is the Body Condition Score (BCS) developed by Nestle Purina PetCare Center. The BCS has been validated in many publications [3,4] and is advocated by major animal health associations such as the American Animal Hospital Association (AAHA) and the World Small Animal Veterinary Association (WSAVA) [2,5]. The scoring system has been reproduced many times over by different organizations, a sampling of which is pictured on the following pages.

Should it be warranted, a more objective, *quantitative* tool can be used for pet weight assessment based on morphometric measurements. The Healthy Weight Protocol (HWP) was developed by Hill's Pet Nutrition will collaborators from the University of Tennessee and is available to licensed pet health professionals on both desktop and mobile platforms. Using weight and various morphometric measurements (6 in total for felines – head, front leg, and thoracic (chest) circumferences, and front leg, back leg, and body lengths), the tool determines body fat percentage and generates a customized feeding plan to achieve optimal weight (see Appendix B: Hill's Healthy Weight Protocol (Morphometric Measurement) for captured images of the software).

Additional guidance and advice for pet health care were obtained through the interview, such as suggested frequency of weigh-ins (a minimum of once a month, no more than once every two weeks) and feedings, nutrition, and activity, as well as educational resources on pet health.


WSAVA
Global Nutrition
Committee
Body Condition Score
1
3
5
7
9
UNDER IDEAL
1 Ribs visible on shorthaired cats. No palpable fat. Severe abdominal tuck. Lumbar vertebrae and wings of ilia easily palpated.
2 Ribs easily visible on shorthaired cats. Lumbar vertebrae obvious. Pronounced abdominal tuck. No palpable fat.
3 Ribs easily palpable with minimal fat covering. Lumbar vertebrae obvious. Obvious waist behind ribs. Minimal abdominal fat.
IDEAL
4 Ribs palpable with minimal fat covering. Noticeable waist behind ribs. Slight abdominal tuck. Abdominal fat pad absent.
5 Well-proportioned. Observe waist behind ribs. Ribs palpable with slight fat covering. Abdominal fat pad minimal.
OVER IDEAL
6 Ribs palpable with slight excess fat covering. Waist and abdominal fat pad distinguishable but not obvious. Abdominal tuck absent.
7 Ribs not easily palpated with moderate fat covering. Waist poorly discernible. Obvious rounding of abdomen. Moderate abdominal fat pad.
8 Ribs not palpable with excess fat covering. Waist absent. Obvious rounding of abdomen with prominent abdominal fat pad. Fat deposits present over lumbar area.
9 Ribs not palpable under heavy fat cover. Heavy fat deposits over lumbar area, face and limbs. Distention of abdomen with no waist. Extensive abdominal fat deposits.
Bjornvad CR, et al. Evaluation of a nine-point body condition scoring system in physically inactive pet cats. AJVR 2011;72:433-437.
Laflamme DP. Development and validation of a body condition score system for cats: A clinical tool. Feline Pract 1997;25:13-18.
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wsava.org

Nestlé PURINA

BODY CONDITION SYSTEM

UNDERFED

1 Ribs visible on shorthaired cats; no palpable fat; severe abdominal tuck; lumbar vertebrae and wing of ilia easily palpated.

2 Shared characteristics of BCS 1 and 3.

3 Ribs easily palpable with minimal fat covering; lumbar vertebrae obvious; obvious waist behind ribs; minimal abdominal fat.

4 Shared characteristics of BCS 3 and 5.

IDEAL

5 **Well-proportioned; observe waist behind ribs; ribs palpable with slight fat covering; abdominal fat pad minimal.**

OVERFED

6 Shared characteristics of BCS 5 and 7.

7 Ribs not easily palpated with moderate fat covering; waist poorly discernible; obvious rounding of abdomen; moderate abdominal fat pad.

8 Shared characteristics of BCS 7 and 9.

9 Ribs not palpable under heavy fat cover; heavy fat deposits over lumbar area, face and limbs; distention of abdomen with no waist; extensive abdominal fat deposits.

The **BODY CONDITION SYSTEM** was developed at the Nestlé Purina Pet Care Center and has been validated as documented in the following publications:

Laflamme DP. ***Development and Validation of a Body Condition Score System for Cats: A Clinical Tool.*** *Feline Practice 1997; 25:13-17*

Laflamme DP, Hume E, Harrison J. ***Evaluation of Zoometric Measures as an Assessment of Body Composition of Dogs and Cats.*** *Compendium 2001; 23(Suppl 9A):88*

Call 1-800-222-VETS (8387), weekdays, 8:00 a.m. to 4:30 p.m. CT

Nestlé PURINA

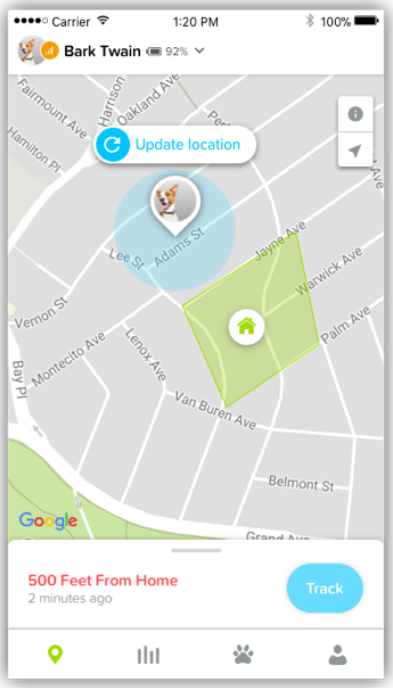
IDEO Method LEARN - Secondary Research

FitBark

Early on we identified other systems similar to that which we planned to design. One such system is FitBark (https://www.fitbark.com), a pet health monitoring device catering to dog owners. The app appears to allow multiple users to access it, although we were unable to test this as the app first requires you to pair a FitBark device to it (none of our group owned one). The key idea for FitBark appears to be dog owners staying healthy with their dogs as it allows for much of the same functionality (set goals, community challenges, sync with FitBit). This of course makes sense as most dog owners take their dogs for walks and runs and are thus already being active with their pet. One of the interesting features is that users are able to share their pets profile with others like their veterinarian, dog-sitter, etc. They also have a program that allows pet data to be shared with researchers to allow them to gather and analyze large quantities of data and then share their findings.

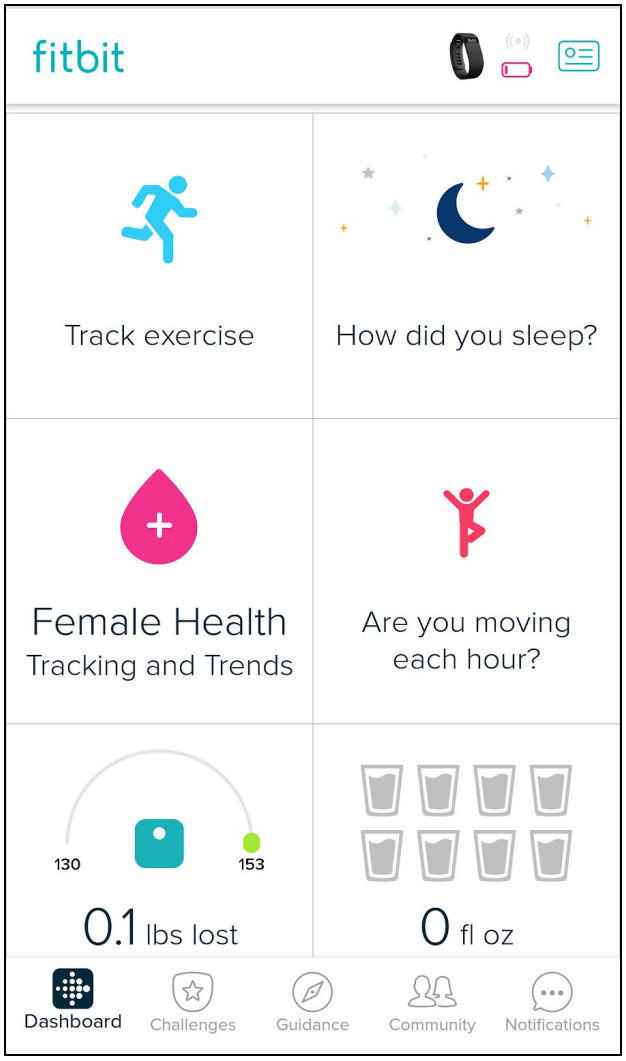
Whistle

Another wearable pet technology and application is Whistle (https://www.whistle.com). Whistle is a collar-mounted GPS tracker for dogs and cats. As in the case with FitBark, while the app is free for download, access to its features requires the purpose of the Whistle device. The main features of the Whistle application are related to its tracking functionality enabled by GPS and cellular coverage. These include 'Custom Safe Places', locations which are deemed "safe" for your pet (i.e., where they can and should be located); 'Location Alerts' to alert the owner when, and how far, their pet has deviated from their safe places; and 'Trips', which follows the pet's location over the last 24 hours. In addition to its tracking features, Whistle also facilitates activity monitoring (estimated minutes of activity) and progress of custom activity goals. The pet owner also receives notification if their pet's activity and sleep patterns appear to be disrupted.



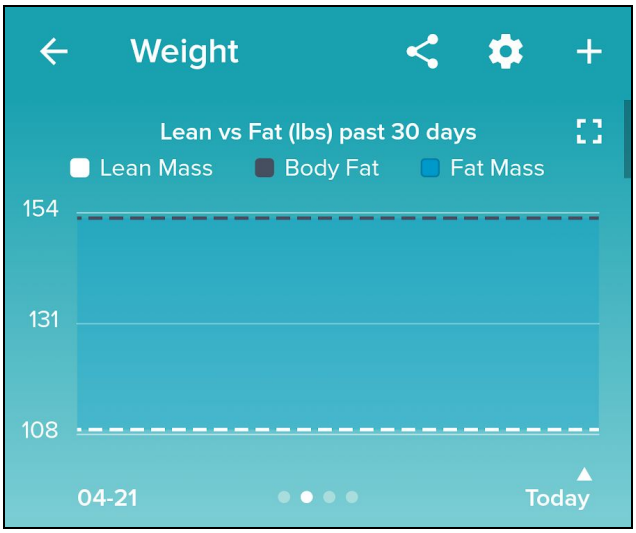
IDEO Method TRY - Try It Yourself

Our original hook for this project was the idea of a Fitbit system for pets. One of our members happened to own a Fitbit device along with an account for the associated app. Thus it was logical to investigate this app to gain some insight on its functionality, and to see how much could potentially be translated into a similar app for pets.



Use of this app gave us valuable insight into the different kinds of metrics we could track in our pets-focused version. Different types of fitness metrics are displayed, such as the number of steps, flights of stairs, or distance travelled. Other health-related data can also be tracked, such as length and quality of sleep, water intake, weight, and nutrition. Many of these could be applied to our app.

The Fitbit website provided information on how certain metrics were gathered or calculated, which is useful in determining which metrics we could translate. For example, an estimate of distance travelled is calculated by multiplying the number of steps taken and an estimated stride length, which is calculated from the user's height and gender. Steps taken could be a potential metric recorded from a physical device, and we might be able to make a stride length estimate given the pet's breed and/or height. This would allow us to display a 'distance travelled' metric.



We found that the Fitbit app had a pretty well laid-out user interface, with a consistent data visualization scheme. The app opens to a 'Dashboard' (pictured above), where each metric has a card to display a major piece of data at a glance. Each card then opens up to another view, where a graph (pictured right) is

displayed at the top of the screen and a raw data log is listed below. Some panes have multiple graphs, chosen by swiping left or right, and each graph can be expanded to fill the screen of the device. The raw data can also be entered, edited, or deleted here. This might be a good starting point for determining how we will display data in our own app.

Research Methods - Reflection

IDEO Method ASK - Expert Interview

The advice and knowledge obtained through an interview with a pet health professional were very successful in terms of discovering the standards in veterinary medicine practice for weight assessment and management. The knowledge obtained provides us with a domain-knowledge base on which we can continue to build by pursuing suggested resources and references. Further, advice collected through the communication can be passed along to the user through application/system features, such as “information tidbits” (e.g., tips on actions that can be taken, and practices that can be incorporated, to increase the activity level of a sedentary house cat).

While the interview did not provide insight into user interaction with a potential system, it did provide basic technical knowledge about pet health. In order to develop a credible, trustworthy application for empowering pet owners in the management of their pet’s health, authoritative medical expertise must be acknowledged and incorporated. The credibility of an application such as that we wish to develop would be greatly improved by formally enlisting veterinary health professionals in the development and validation of the system.

IDEO Method LEARN - Secondary Research

The information available for the other pet health apps was quite limited. While there were some interesting functionalities described for the apps, we were unable to investigate these features in detail due to the requirement of a pairing device. Nonetheless, this research has provided inspiration for features to include in our application, such as sharing your pet’s profile with their veterinarian.

The inability to explore the apps before purchasing the required pairing devices may have been a shortcoming to improve upon if we were to fully develop this system. Since this project will only reach the stage of a high-fidelity prototype, it is unlikely we will be able to make any meaningful improvement on this issue of not being able to access full functionality without device purchase.

In this instance, the secondary research was severely hampered by the fact that companies with a product developed for profit are unlikely to make information readily available to competitors who aim to create a comparable product.

IDEO Method TRY - Try It Yourself

The investigation into the functionality of the Fitbit app was overall quite successful. It provided a great deal of insight into potential solutions for the 'what' and 'how' of our app: what data can be gathered, how can it be gathered, and how can it be displayed to the user in a meaningful way?

A problem with using this method, however, was that the app was not currently in use, and so there was no backlog of data to view and interact with. Our use of the app was equivalent to what an entirely new user would experience, which limits our understanding to users of that type. Someone who had used the app for a longer period would have more in-depth knowledge about what works well or works poorly in the Fitbit app. Our time constraints prevent us from committing to heavy use of the Fitbit app, so we will have to proceed with only our surface level of experience with it.

Task Descriptions

Profile Creation/Edit

This is the first task that every user will encounter when they begin using the app. The user will be prompted to make both a profile for themselves, and a profile for their pet (potentially multiple profiles if the user has more than one pet). For the user profile a photo, a name and an email address must be submitted. For a pet profile, additional metrics must be input such as daily calorie consumption, the weight of the pet, the shape of pet and the amount of sleep the pet is getting. A user will have the ability to edit this profile after submission.

Data Input

This is used when a user wants to add a change of metric for their pet. By default, the initial metrics put into the profile creation for the pet are carried over every day. If there is a change in these metrics, a user can access the data input menu for that day and enter that metric. For example, if a user's cat is eating more calories than normal that day, you can provide that in the daily data input menu. Some users will utilize the data input task every day to get the most accurate results. Note: for metrics that have consistently changed such as weight, the profile editor should be used rather than the data input.

Quick Dashboard Menu Access

Accessing the quick dashboard menu is the main task that the user will perform. The quick dashboard menu shows a summary of what the app has to offer for each different pet profile that

the user has. Contained in the quick dashboard menu will be exercise targets, calorie targets, sleep targets, some general advice for a user and some daily and weekly trends.

Check Weight Tracking

The weight tracking menu is accessible from the quick dashboard. It displays a graph of the animal's weight over time, and it can be changed from a kg format to a lb format.

Check Time Asleep

The time asleep menu is accessible from the quick dashboard. It displays how long the user's pet was asleep, and other details such as sleep cycles and sleep over time.

Check Distance Traveled

The distance traveled menu is accessible from the quick dashboard. It displays how far the pet has traveled over time using GPS technology. The format can be changed from km to miles.

Check Calories Burnt

The calories burnt menu is accessible from the quick dashboard. It displays how many calories the user's pet has burnt over time, and which activities burned which calories

Elicit Guidance/Recommendations

This menu is both used for general advice based on daily metrics, and for specific advice if a concerned owner starts noticing a change in physical or behavioural aspects of their pets' lives. In this scenario, the user will be able to input the symptoms or changes and get a potential diagnosis, similar to the website WebMD.

Community Interaction

The community interaction window is part of the main dashboard and can be used to add other users to a friends list. Once a user is your friend, you can comment on their pet's profile and view challenges that their pet has completed. You can also bring up a side by side view of your pet vs their pet and compare things such as who has completed the most challenges.

Tackle and View Challenges

The tackle and view challenges menu is part of the main dashboard and can be used to show the daily, weekly and seasonal challenges and the progress towards completing them. The menu also shows challenges that have been completed.

Change App Settings

A separate settings menu can be used by the user to change some basic settings of the app. Some settings include notifications, theme, text size, and the option to delete all data.

References

[1] *2014 AAHA Weight Management Guidelines for Dogs and Cats*. Accessed May 20, 2019. Available at https://www.aaha.org/public_documents/professional/guidelines/weightmgmt_booklet.pdf.

[2] *Expert Interview*, Design Kit. Accessed May 20, 2019. Available at http://www.designkit.org/methods/43.

[3] Laflamme, D. (1997). Development and validation of a body condition score system for cats: a clinical tool. *Feline practice*, 25, 13-18.

[4] Bjornvad, C. R. et al. (2011). Evaluation of a nine-point body condition scoring system in physically inactive pet cats. *American journal of veterinary research*, 72(4), 433-437.

[5] *Global Nutrition Guidelines*, World Small Animal Veterinary Association (WSAVA) Global Veterinary Community. Accessed May 20, 2019. Available at https://www.wsava.org/Guidelines/Global-Nutrition-Guidelines.

Appendix A: IDEO Method ASK - Expert Interview

Circumstantial details

Interviewer: Mariella Nalepa
Interviewee: Dr. Madonna Mesher
Date and time: May 20, 4:54 pm – 5:58 pm (MDT) (54 minutes)
Medium: Phone

Notes: Question and Answer

How would assess the weight of a pet?

I would use the World's Small Animal Veterinary Association (WSAVA)Body Condition Score. It involves visual assessment of the animal's overall shape in addition to physical examination such as palpitation of the ribs. For example, overweight dogs often have "love handles" in front of their hips, and overweight cats often have a hanging "pouch" of stomach fat.

What are the health implications of excess weight?

Underweight – signals there may be health issues causing difficulty to gain and retain weight, appetite issues, or mass wasting
Overweight – precursor to more severe conditions such as diabetes

For older pets with excess weight and arthritis, #1 treatment to help with the arthritis is weight loss.

Weight is an individual assessment for each animal – can depend on breed, frame size, etc. A general range for domestic cats is 6-10 pounds, but depending on breed and frame, a cat can place outside of this range and still be healthy.

Weight should only be used as a *baseline* for tracking changes in weight over time. A weigh-in would be done upon every standard examination/vet visit for this reason. This record helps us determine, for example, is the pet continuously gaining weight or suddenly losing weight? This would help make an assessment of their health.

Is there an age at which weight stabilizes?

Weight for domestic pets (cats and dogs) usually stabilizes by about 6 months of age; at this age, a pet is close to mature body size and weight, and he/she/it is entering the reproductive phase.

If someone came in with an overweight pet, what would be your recommendations?

A combination of both exercise and diet.

What about house cats that don't often have occasion/motivation to exercise?

They pet owner could attempt to motivate exercise through the use of exercise wheels, lasers, toys, kibble toys, etc. For cats, the most controllable factor in weight is diet. Experts do recommend that if a house cat is overweight, the owner should put it on a harness and attempt to take it outside for exercise, but only if they have shots for fleas, worms, etc. An owner might even attempt to teach their cat to play fetch — many do. On a multi-level house, the owner could place food and litter boxes on different levels to encourage movement. Also, it is recommended that owners feed their pets outside of the kitchen; it is a busy environment, and pets will graze while hanging out with you.

For more ideas on getting your house cat active: "Indoor Cat Initiative", Ohio State University Indoorpet.osu.edu/cats

Another method to assess weight is morphometric measurement.

Are morphometric different than the previously mentioned charts?

They are a bit more accurate – not as subjective. The Healthy Weight Protocol software was developed by Hill's (animal food company) in conjunction with veterinarians at the University of Tennessee.

Healthy Weight Protocol
https://www.hwp.hillsvet.com
In the software, you input various measurements (training required to do measurements correctly), and the application informs you of your pet's body fat percentage, how much they should weigh, and a feeding schedule to achieve that goal, which specifies the rate at which weight loss should occur.

How often should an owner weigh their pet?

Probably monthly. Every two weeks at the most.

How would you suggest weighing a pet?

If the pet is small, the owner could use a food scale + basket for better accuracy. Otherwise, the owner can use a regular scale and weigh themselves with and without the pet.

Speaking of feeding, do you always recommend medical-line diets?

If a pet is overweight, I would recommend a diet line specifically formulated for weight loss. A specific formulation is required to ensure that the animal gets the nutrients they need when restricted to a lower amount of calories.

Example: Hill's geriatric formulations, weight-loss urinary diet

There are a few companies that do a significant amount of research on nutrition and weight loss.

What would you feed a cat or dog in good health?

Good brand pet food formulated by a company that employs research to back the nutritional claims they make.

What are good brands that do research?

Iams, Science Diet, Royal Canin, Hill's

As far as you know, are there activity level guidelines for small animals?

No, not that I am aware. I did read a story of an overweight dog taken care of by a vet student. To help the dog lose weight and get walking, the student slowly increased the number of steps each day.

How long have you been a veterinarian?

Since 1979. 40 years.

Some of these technologies claim to monitor the sleep of your pet. Can you see any use in this?

Not really.

What about urination/defecation?

Only noting if they are not going, or if they are having trouble.

Do you think this application would be useful?

It would be useful for the pet owner to become more aware of how much they are feeding their pet, and what their pet's activity level is. Of course, to make sense of activity level, you would require a baseline — one that either you establish with time as the norm for your pet, or a target activity

level established by some external studies. It would be best if the application was developed in conjunction with animal researchers.

I would recommend the major items to track are: how much you are feeding your pet, and how much they weigh. For a dog or cat that goes on walks, you could also track time and distance, and increase one of the parameters as needed to establish activity goals.

How do you recommend distributing calories throughout the day?

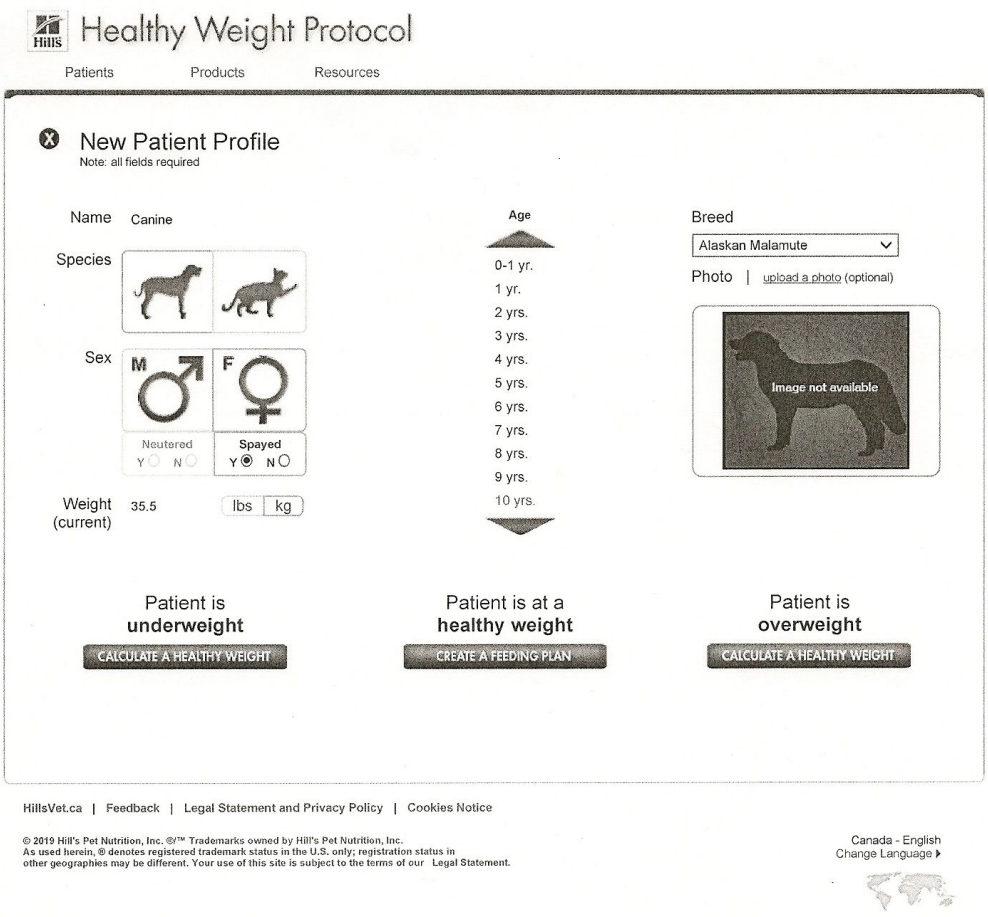
Dogs – once or twice a day
Cats – small meals, often

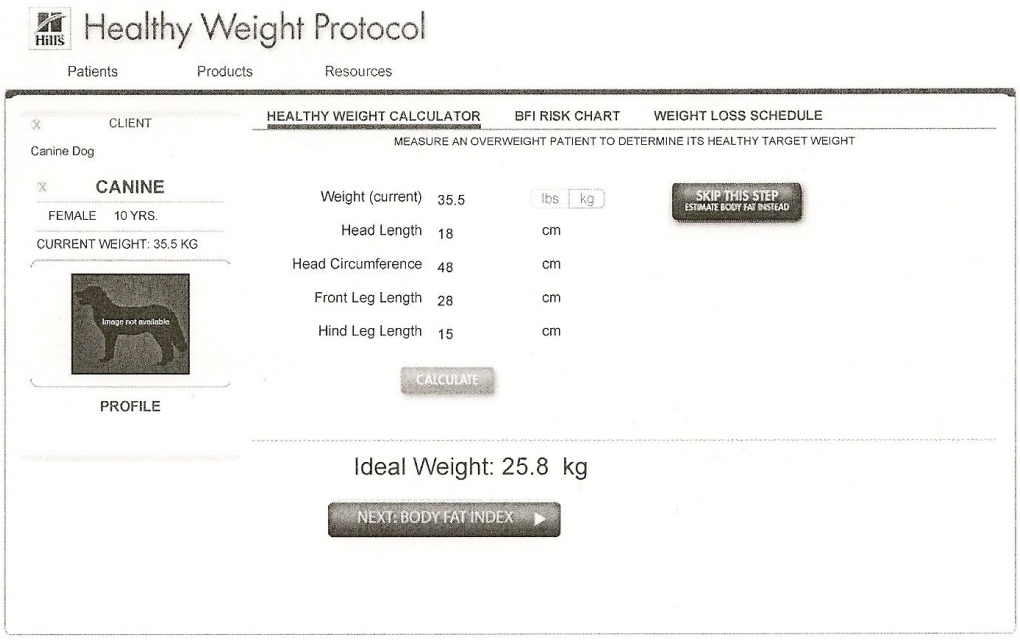
Of course, the feeding schedule will also depend on the pet owner's schedule, so compromises have to be made.

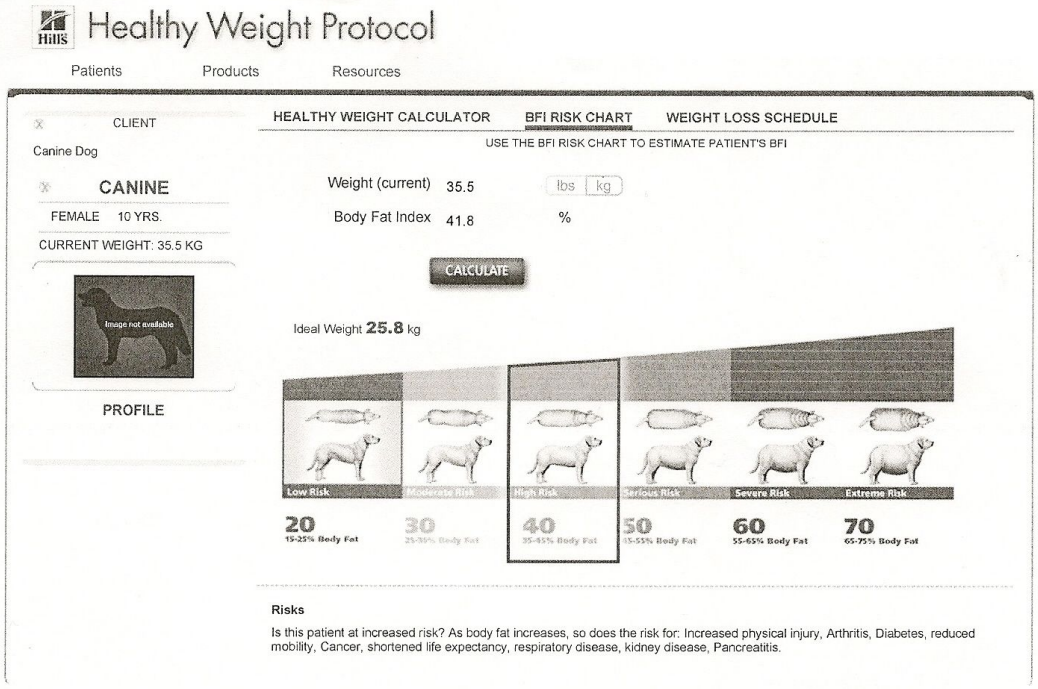
Appendix B: Hill's Healthy Weight Protocol

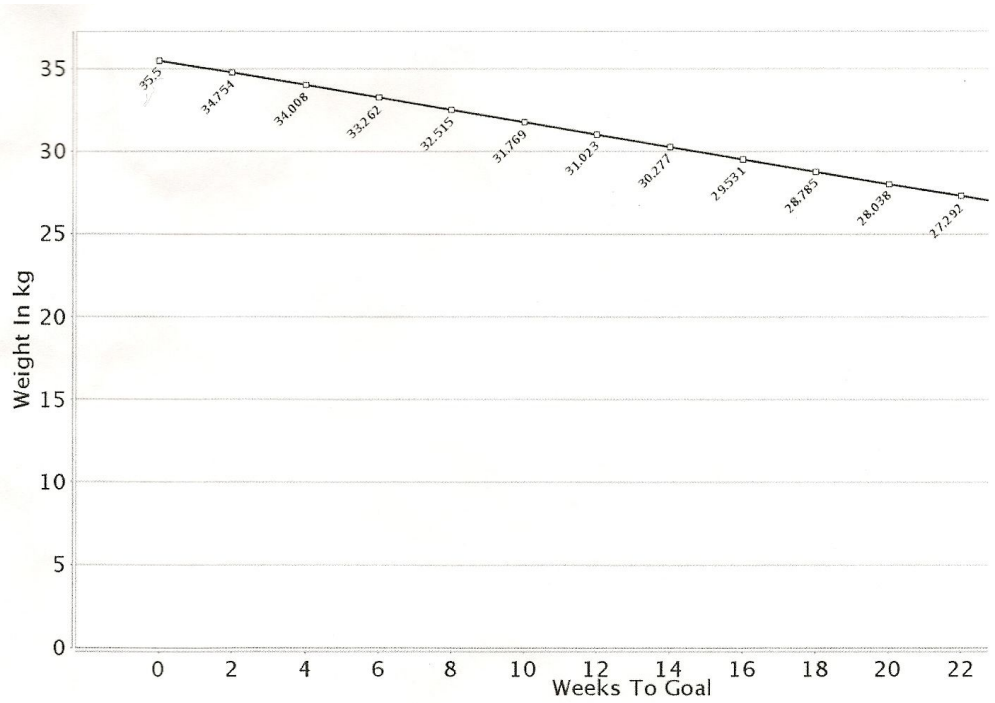
(Morphometric Measurement)

The following are images captured from the Hill's Healthy Weight Protocol (HWP) user interface, courtesy of Dr. Madonna Mesher, illustrating data input and diagnostic output.








35
30
25
20
15
10
5
0
Weight In kg
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34.008
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30.277
29.531
28.785
28.038
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2
4
6
8
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Weeks To Goal