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PET WELLNESS REPORT

Canine Health Risk Assessment - A review of 7,827 Cases

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SUMMARY

The Pet Wellness Report is a novel, turnkey solution that supports preventive health initiatives in companion animal practice, enhancing the value of regular routine wellness exams for pet owners.

- Health Risk Assessments (HRAs) are commonly used in human medicine to assess individual risk and develop personalized, patient-centered healthcare plans.
- The Pet Wellness Report (PWR), is the first broadly-available, standardized HRA available for use in veterinary medicine. The PWR is designed to assess patient health, identify risk factors, and facilitate client communication and education. It encourages greater pet owner involvement to facilitate better pet health.
- A comprehensive preventive pet healthcare plan should include an evaluation of the current health status of the individual patient as well as an assessment of risk factors that may affect the continued health of the patient.
- The PWR combines an HRA questionnaire, completed by the pet owner, with a comprehensive laboratory screening profile. The laboratory results are included in the report, providing a comprehensive assessment that is available to both the veterinarian and client.
- The PWR provides veterinarians with patient information in several areas including osteoarthritis, kidney disease, nutrition, obesity, dental health, compliance with vaccinations and parasiticides, and general lifestyle information.
- The PWR is designed to help pet owners better understand their pet's health care, reinforce the importance and value of regular preventive care, and improve compliance with veterinary recommendations.
- An analysis was performed on 7,827 Pet Wellness Reports from canine patients presenting for wellness visits originating from 264 primary-care veterinary practices during a 5.5-year period.
- To evaluate the laboratory screening results, reference-range deviations were categorized to identify dogs at risk for specific medical conditions (Appendix A). Using these criteria, 31% of the dogs were identified as having laboratory panel abnormalities consistent with a range of conditions including endocrinopathies (e.g. diabetes mellitus), renal disease, hepatic disease, anemia, or other morbidities.
- Questionnaire responses identified risks or inapparent medical conditions (Appendix B) in nearly one in three dogs. For example, 29% responded that they had missed a dose or were otherwise off schedule with their heartworm preventive, and 27% noted that their dogs showed signs of stiffness or lameness. In all cases, these identified risks provide a clear follow-up opportunity for the veterinarian.

INTRODUCTION

Disease prevention and early intervention strategies are receiving new emphasis in companion animal medicine. This is reflected by the recent introduction of guidelines jointly developed by the American Veterinary Medical Association and the American Animal Hospital Association expressly for canine and feline preventive healthcare.¹ In addition, the North American Veterinary Medical Consortium has recommended that veterinary schools place a renewed emphasis on “primary care, wellness, and prevention” in their curricula to focus on disease prevention as the preferred alternative to acute care.² Developing appropriate healthcare plans for veterinary patients requires an analysis of the patient’s current health status as well as an assessment of risks that may undermine patient health.

A universal or standardized HRA instrument has not previously been developed for use in veterinary medicine. Health Risk Assessments have, however, been utilized in some form in human medicine since at least 1968. The Centers for Disease Control (CDC) recently convened an expert panel that developed recommendations for HRA in clinical

medicine.³ A striking observation in the CDC report was that chronic illness accounts for more than 80% of total U.S. healthcare spending and that only a minority of patients comply with age-specific recommendations for preventive healthcare or treatment of chronic disease. Compliance statistics for veterinary patients suggest a similarly dismal outlook for both preventive care and chronic medical treatments.⁴

Visits to the veterinarian are declining while chronic disease is increasing.⁴ There are numerous examples where early identification and intervention of medical issues in individual patients are important, yet may not be happening as proactively as possible. Incorporating a systematic health risk assessment into routine wellness visits is important as many pet owners fail to recognize morbidities in their pets

The rationale for using an evidence-based HRA like the Pet Wellness Report is that identifying deficiencies in preventive healthcare can potentially improve pet quality of life, longevity, and pet-owner engagement. Furthermore, identifying subclinical conditions early in their progression may avoid or greatly

Incorporating a Systematic Health Risk Assessment into Routine Wellness Visits is Important as Many Pet Owners Fail to Recognize Morbidities in Their Pets

- Approximately 10% of dogs presented to primary-care veterinary practices have heart disease.⁵
- Compliance with heartworm preventives (HWP) is poor with only 22-43% of dogs receiving >1 dose of a HWP in 2009.^{6,7}
- 80% of dogs show some degree of dental disease by 5 years of age.⁸⁻¹⁰
- Up to 52% of dogs and 58% of cats in the U.S. are estimated to be overweight or obese.¹¹
- Cancer is the number one cause of death in dogs > 1 year of age.¹²
- 20% of dogs > 1 year of age may be affected by osteoarthritis.¹³
- Although many dogs receive a core set of vaccines regularly, recent research has shown many dogs are not optimally vaccinated based on their risk factors for exposure
 - The incidence of Lyme disease in people has increased approximately 80 percent in the U.S. between 1993 and 2007.¹⁴ It is considered to be the most common arthropod-borne disease of humans in the U.S. and one of the most common in dogs.¹⁵ Canine seroprevalence for Lyme disease is also considered to be a sensitive but nonspecific marker of human risk.¹⁴
 - Canine Leptospirosis continues to be an important emerging disease in the U.S. despite the existence of safe and effective vaccines.^{16,17}

reduce the cost of care for both acute and chronic disease. A 2012 survey of 485,000 insured pets to determine costs associated with the most common preventive canine and feline conditions (dental disease, internal parasites, external parasites, infectious diseases and diseases of the reproductive tract) found the cost of prevention to be significantly less than the cost of treatment. For example, the average cost per pet to prevent dental disease was \$171.82, while the average cost to treat was \$531.71—three times the cost of prevention. Similarly, the average cost of preventing intestinal parasites was found to be \$29.51 while the cost of treatment was \$179.93—six times more.¹⁸

With improved nutrition and healthcare, there has been a two-decade trend of

increased canine and feline life expectancy in the U.S. and Europe.²¹ Currently, an estimated 35% of dogs and cats presented at veterinary practices are considered “senior.”²² Given these demographic factors, HRA screening of pets becomes increasingly important since risk of disease and disability increases with advancing age.

Regular wellness visits and a systematic approach to HRA are also important because clients often fail to recognize morbidities in their animals. A common example involves the growing rate of canine and feline obesity, with prevalence ranging from 22 to 40% depending on the population.^{23,24} Pet owners are frequently unaware that their pets are overweight, in effect normalizing the existence of excessive weight which further compounds the problem.²³ An Association for Pet Obesity Prevention survey conducted in 2012 found that 22% of dog owners and 15% of cat owners characterized their overweight or obese pets as being of normal weight.¹¹ A nutritional assessment and body condition scoring as part of a wellness exam can confirm overweight status and reduce the risk of obesity-related co-morbidities.

Poor client awareness and compliance are well recognized problems in veterinary medicine.^{1,22,25,26} Lack of compliance is a probable contributing factor to the reported increase in prevalence of various canine and feline preventable diseases, including diabetes mellitus, dental disease, parasitism, otitis externa, obesity and overweight, kidney disease, and osteoarthritis.^{27,28} The AAHA-AVMA Task Force that authored the recent Canine and Feline Preventive Healthcare Guidelines noted that “to a great extent, lack of compliance can be preempted and corrected by pet-owner education, a key benefit of regular clinical visits.”¹ Thus, wellness exams not only close gaps in diagnosis of subclinical disease but also improve client compliance that supports successful treatment outcomes.

Regular wellness visits reveal important health risks

A number of recent studies underscore the value of regular pet wellness visits, especially when they incorporate HRA criteria such as patient age or interpretation of clinical chemistry values. For example, European investigators comparing the results of routine health screening tests in asymptomatic older cats (n=100) found that cats >10 years of age had significantly higher systolic blood pressure, heart rate, murmur frequency, urine protein:creatinine ratio, and serum urea and bilirubin concentrations, and significantly lower body condition scores, hematocrit, albumin, and total calcium concentrations compared to values in cats 6 to 10 years of age.¹⁹ The study showed that regular health checks can reveal a broad range of age-related physiologic abnormalities in seemingly healthy older cats. In another study, screening of older dogs (n=45) in a primary care setting identified at least one unrecognized medical problem in 80% of the cases.²⁰ These included chronic but undetected conditions such as osteoarthritis, loss of hearing or sight, as well as potentially life-threatening conditions such as abdominal masses and respiratory distress.

METHODS

The Pet Wellness Report®

A sample PWR for a hypothetical canine patient is shown in Figure 1. (A comparable feline version is also available.) An individualized PWR is based on pet owner responses to an online questionnaire accessed at PetWellnessReport.com.

The questionnaire consists of 53 lifestyle and behavioral assessments that take about 7-10 minutes to complete. Responses to the questionnaire are automatically tabulated. Numerical (1 to 16, worst to best) and qualitative (poor, fair, good, excellent) scores are calculated for each wellness category and for the patient overall.

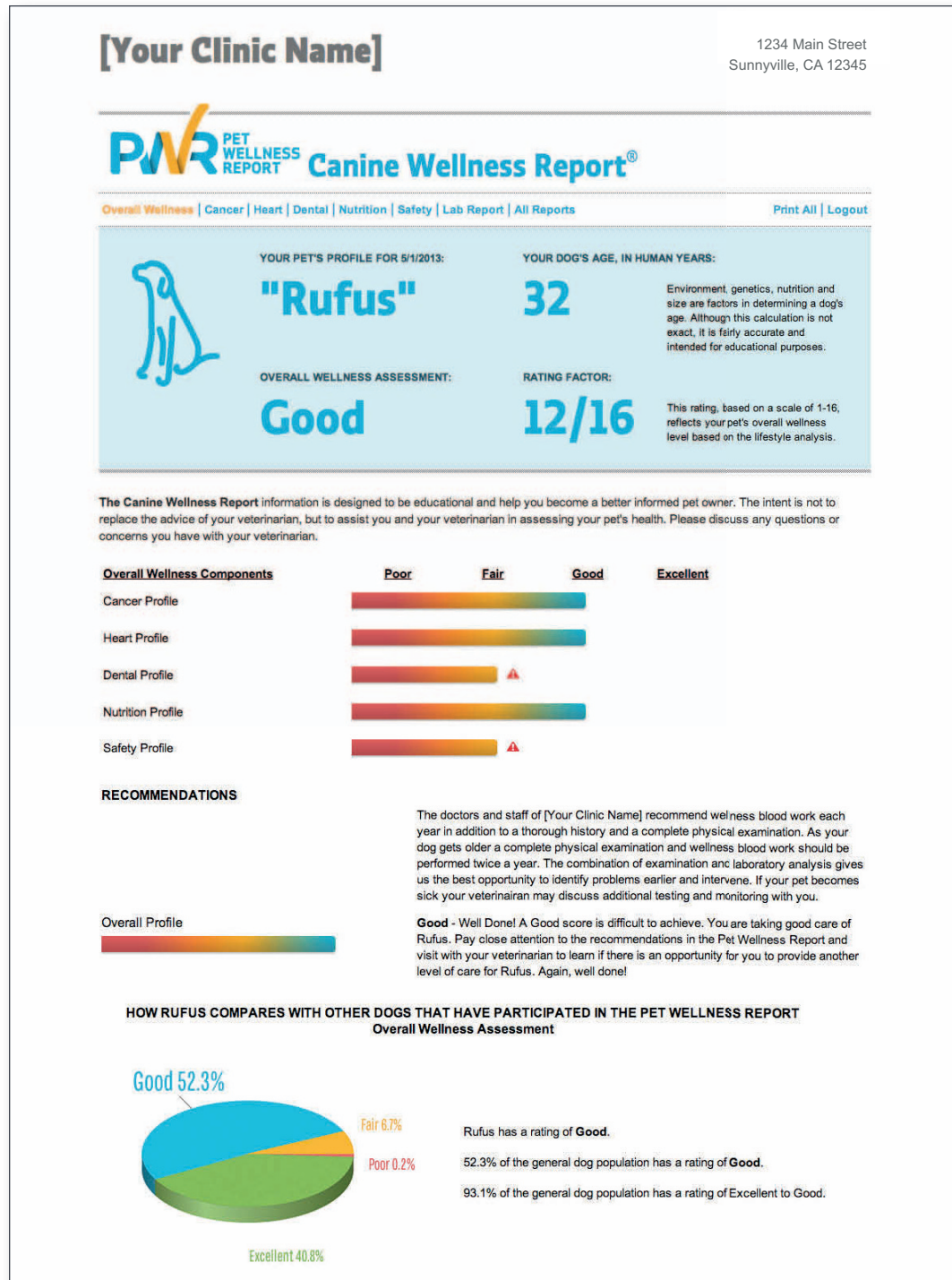


Figure 1 - A sample Pet Wellness Report (PWR) is shown for a hypothetical canine patient.

The PWR is based on owner responses to a health risk assessment questionnaire. The PWR is organized into wellness profiles for cancer, heart, dental, nutrition, and safety categories. The PWR provides a wellness assessment for each category and for the pet overall. The same five wellness categories and overall assessment are included in a feline PWR. The laboratory results are integrated into the report but do not influence the overall health assessment scores.

METHODS

The PWR is electronically delivered to the pet owner under the auspices of the prescribing veterinarian. The PWR system is intended to be used in conjunction with a comprehensive laboratory evaluation of diagnostic samples obtained at the time of the exam.

The PWR system, consisting of the PWR questionnaire in combination with laboratory screening, is suitable for use as part of a standard wellness exam protocol, HRA tool, and a communication/client education resource.

Study design

The study evaluated 7827 PWRs from 264 participating veterinary clinics for canine patients presented for wellness exams during a 5.5 year period extending from May 2007 through December, 2012. After removing any information that

identified the pet owner or pet, the PWR responses were compiled into a single database which was then examined using a statistical program (SAS, Vs 9.2, Cary, NC).

A frequency analysis determined the range of responses for each variable, including the mean and standard deviation. Data were sorted to determine the U.S. state of origin, the gender, age and neutering status of the dogs, the range of pet owner responses and to understand the variability in the laboratory values.

The age data were used to block the dogs into five groups of approximately equal numbers based on 3-year increments. An association analysis examined the pet owner responses from selected pairs of questions and statistically tested the output using chi square and/or binomial analyses (SAS).

Demographic Analyses

Dogs ranged in age from 1-24 years with the majority of dogs being in the age range 2-11 years. For consideration of age-related phenomena, dogs were classified into five groups, each containing a 3-year age range: 0-3 years (n=1304), 4-6 years (n=1968), 7-9 years (n=1973), 10-12 years (n=1694) and 13+ years (n=891). Pet owners were allowed to input the dog's breed as free text, which resulted in approximately 1440 different breed designations, precluding a breed-based analysis. There were slightly more females (n=4249) than males (n=3578) in the database and the preponderance of dogs were neutered (6977/7827; 89%).

Forty-six out of 50 U.S. states were represented in the database, although more than half of the dogs came from Tennessee (57%). Data from pet owners in Tennessee did not differ appreciably from pooled data originating from other

states. As a result, data from all states were combined for purposes of statistical analysis.

Lifestyle Question Analyses

The 53 canine lifestyle questions are broken up under five profiles to facilitate communication with pet owners: Cancer Profile (n= 15 questions), Heart Profile (n=9 questions), Dental Profile (n=7 questions), Nutrition Profile (n=10 questions) and Safety Profile (n=12 questions). The questionnaire takes approximately 7-10 minutes to complete.

Cancer Profile

These questions ask about the dog's potential exposure to herbicides, pesticides, secondhand smoke and other toxins, and previous diagnoses of cancer. The pet owner is made aware of additional risks in dogs that are older, sexually intact, large or giant breed and dogs that spend more time in the sun. Pet owners

RESULTS & DISCUSSION

RESULTS & DISCUSSION

are also asked if they take their dogs to a veterinarian annually for a wellness examination. Examples of questions in the Cancer Profile section are shown in Table 1 along with pet owner responses.

One of the questions asks if the dog has developed new lumps or swellings, sores, bleeding, odors or changes in previously normal behavior, including appetite. While these signs are not specific to cancer, they do encourage further investigation as they could easily be overlooked in a routine office visit.

Another question in the Cancer Profile also asks whether the pet owner regularly examines their dog. As shown in Table 2,

pet owners who indicated that they regularly examined their dog themselves were more likely to comply with annual dental and wellness exams and annual blood work for their pets. This single question is important because it reflects the level of engagement that a pet owner has with his or her pet and ties directly to a veterinarian's ability to enhance a client's perception of value for a product or service. Pet owners who indicated that they regularly examined their own dogs were 4% more likely to obtain a yearly wellness exam, 16% more likely to request annual bloodwork and 45% more likely to obtain an annual dental exam for their dog.

Table 1.

Selected Questions and Pet Owner Responses from the Cancer Profile Section of the PWR Questionnaire

Sample Question	Yes	No
Does your pet have any of the following cancer warning signs: swelling, sores, loss of appetite, bleeding, odor?	23.9%	76.1%
Is your pet more than 7 years old?	49.9%	50.1%
Do you take your pet to the veterinarian for a wellness examination at least once a year?	96.1%	3.9%

Table 2.

Relationship Between Regular Owner Exams and the Likelihood the Owner Will Obtain Three Types of Annual Canine Health Evaluations for Dogs Receiving a PWR Assessment

Type of evaluation	Regularly examine their own dog		RR (95%CI)
	Yes	No	
Yearly wellness exam = Yes	97% (6661/6897)	93% (862/930)	1.04 (1.02 - 1.06)
Annual dental exam = Yes	67% (4641/6897)	46% (432/930)	1.45 (1.35 - 1.56)
Annual blood work = Yes	74% (5123/6897)	64% (597/930)	1.16 (1.10 - 1.22)

RR = relative risk.

Heart Profile

Pet owners are asked to respond to a series of questions about exercise, cardiac disease and their understanding and compliance with veterinary recommendations to prevent heartworm disease. Sample questions and pet owner responses are shown in Table 3.

Data from the Heart Profile provides insights into pet owner compliance with veterinary recommendations for heartworm prophylaxis. It is well understood that clients overstate their compliance with medications.²⁶ Reviewing client answers to the Heart Profile questions provides an opportunity to educate non-compliant pet owners or reinforce positive behaviors with “apparently” compliant clients.

Capturing this information in a patient-specific, customized report further serves to enhance a client’s perception of the value of a preventive healthcare visit and

improve compliance with veterinary recommendations.

Dental Profile

The Dental Profile section asks whether the dog has signs of oral disease, including halitosis and missing or broken teeth, and whether they were given treats, table scraps, or chew toys. The Dental Profile reinforces the importance of a routine dental examination and prompts pet owners to consider an appropriate diet to improve their pets’ oral health. Identifying warning signs of oral disease provides a clear opportunity to recommend a routine dental examination. A comprehensive laboratory screening would facilitate this recommendation in at-risk pets, whereas healthy pets would not need to have preanesthetic blood screening performed. Sample Dental Profile questions and pet owner responses are shown in Table 4.

Table 3.		
Selected Questions and Pet Owner Responses from the Heart Profile Section of the PWR Questionnaire		
Sample Question	Yes	No
Do you have your pet tested for heartworm every year?	88.1%	11.6%
Is your pet on a 12-month heartworm prevention program?	91.4%	8.6%
Have you ever missed or gotten off schedule in providing your pet with its prescribed heartworm medication?	28.8%	71.2%

Table 4.		
Selected Questions and Pet Owner Responses from the Dental Profile Section of the PWR Questionnaire		
Sample Question	Yes	No
Does your pet exhibit any of the following warning signs of oral disease?	29.6%	70.4%
Does your pet receive a regular dental examination?	64.8%	35.2%
Does your pet have any teeth that are missing, chipped or broken?	9.6%	90.4%

RESULTS & DISCUSSION

Nutrition Profile

This section asks for the client's perception of whether the dog is overweight, arthritic, or has signs of a food sensitivity. Pet owners are also asked how they select their pet's food, whether they measure portion size at each meal, and if they considered the dog's activity level when choosing food. Sample Nutrition Profile questions and owner responses from this section are shown in Table 5.

The role of diet in canine obesity and the impact this condition has on an aging dog are addressed in the Nutrition Profile. The pet owner is asked to consider the dog's caloric balance as determined by the diet they feed, the amount of food given with each meal, and the dog's activity level. Pet-owner responses showed that only 18% thought that their pet was overweight. This appears to be a gross underestimation based on

information from a 2012 survey conducted by the Association for Pet Obesity Prevention (APOP), which found that 52.5% of dogs were overweight or obese.¹¹ APOP surveyed 121 clinics in 36 states and assessed 1485 dogs. The Nutrition Profile of the PWR allows a veterinarian to determine if a pet owner understands the risk imposed by canine obesity and creates an opportunity for discussion, client education, and intervention.

Pet owners who identified their dogs as being overweight were less likely to provide them with regular exercise opportunities (Table 6). These clients would be more in need of counseling regarding energy balance and the benefits of regular exercise for their pets.

The PWR Nutrition Profile also asked whether their dog demonstrated any stiffness or lameness and whether the dog received regular exercise (Table 7).

Table 5.

Selected Questions and Pet Owner Responses from the Nutrition Profile Section of the PWR Questionnaire

Sample Question	Yes	No
Do you believe that your dog is overweight?	18.2%	81.8%
Do you measure your dog's food every day?	78.7%	21.3%
Does your dog appear stiff or lame when rising from bed or after exercise; exhibit any signs of pain, such as reluctance to stand, climb stairs, jump or run; or have difficulty in performing any of these activities?	26.6%	73.3%

Table 6.

Relationship Between Regular Exercise and Overweight Status in Dogs Receiving a PWR Assessment

Overweight status	Regular Exercise	
	Yes	No
Yes	65%	35%
No	89%	11%

Table 7.

Relationship Between Regular Exercise and Lameness in Dogs Receiving a PWR Assessment

Stiff or lame?	Regular Exercise	
	Yes	No
Yes	72%	28%
No	89%	11%

Not surprisingly, fewer pet owners exercised their dog if they observed signs of osteoarthritis. Stiffness or lameness are indicators of osteoarthritis and other musculoskeletal disorders. A positive response to this question provides an opportunity to recommend an orthopedic exam and further work up. It may also provide a call to action for pet owners not complying with previous recommendations regarding treatment for osteoarthritis, including the appropriate use of pain medications.

Safety Profile

This section focuses on the pet owner's awareness of day-to-day risks associated with keeping a dog, including pet-proofing the house, use of a leash or car restraints when taking the dog away from home, use of flea and tick control, having a permanent ID, and risks associated with contact with other dogs. Sample questions and pet owner responses from the Safety Profile section are shown in Table 8.

The Safety Profile asks owners to identify safety concerns that might not otherwise

be addressed in an annual office visit. About a third of owners in the PWR database indicated that their dogs were not restrained in the car and about 20% indicated that they were not aware of human foods or medications that should not be given to a dog. Both questions represent client education opportunities. Pet owners who indicated that their dog had contact with non-household dogs may benefit from a discussion around transmissible diseases, appropriate vaccination, and parasite control programs.

Laboratory Screening Tests

An annual blood panel enables the veterinarian to detect subclinical disease and initiate treatment earlier in the disease progression. In healthy animals, the data provides both a valuable point of reference (benchmark) for future tests and reassures pet owners regarding their pets' health status.

As part of the PWR, 7827 dogs were tested with a canine complete blood count (CBC) and serum chemistry panel. Combinations of related analytes were

Sample Question	Yes	No
Are you careful about keeping your dog from overheating?	98.6%	1.4%
Do you know what people foods are potentially poisonous to dogs and puppies?	81.6%	18.4%
Do you allow your dog to ride in the car without restraint?	61.9%	31.8%
Has your dog been vaccinated for Lyme Disease?	44.7%*	55.3%*
Do you currently use any commercial flea/tick medication on your dog?	81.4%*	18.6%*
Does your dog have contact with other dogs (outside the home)?	66.6%*	33.4%*

*% Based on 494 responses as question added to PWR in September 2012

RESULTS & DISCUSSION

categorized in order to identify dogs at risk for specific medical conditions (Appendix A). Using these criteria, 31% of the dogs were identified as having laboratory panel abnormalities that could be consistent with a range of conditions including endocrinopathies (e.g., diabetes mellitus), renal disease, hepatic disease and anemia. Although participating veterinarians were instructed to use the PWR to evaluate only clinically normal dogs presented for routine preventive care visits, some clinically sick dogs may have been included (see further comments below).

Dogs that were flagged as being at risk for disease through the bloodwork analysis were broken into 3-year age blocks (Table 9). The proportion of the canine population identified as “at risk” increased as dogs aged ranging from approximately 23% in the youngest group (dogs 0-3 years of age) to almost half of dogs >13 years of age.

Only 1% of dogs in this study had all CBC/profile analytes within the normal range. Forty three percent (43%) had 1-2 analytes out of range, which is not unexpected for healthy dogs.

Fifty three percent (53%) of dogs had 3-8 analytes out of range, representing cases

that may warrant further investigation. The remaining 2.5% had 9-17 analytes outside the normal range and likely represented clinically sick dogs.

When the 2.5% of dogs with 9-17 analyte abnormalities are excluded from the analysis, the bloodwork identified approximately 28% of dogs that had laboratory screening excursions that may be of medical significance. The study did not evaluate the magnitude of the CBC/serum panel excursions nor include urinalysis data, which would have provided further information as to the significance of these deviations from normal ranges.

Lifestyle Questions

Selected lifestyle questions were used to identify areas of concern that a veterinarian could focus on for further discussion with a pet owner (Appendix B). Overall, 77% of the pet owners provided one or more responses that identified an area of lifestyle concern (Table 10), creating an opportunity for education and discussion. The proportion of lifestyle question responses that generated a potential risk increased as dogs aged. This may reflect an increase in signs of disease that become

Table 9.

A Summary of CBC/Serum Chemistry Abnormalities by Age Block

	0-3 yrs	4-6 yrs	7-9 yrs	10-12 yrs	13+ yrs	Total
Total n	1303	1966	1973	1694	891	7827
At Risk (n)	308	447	588	635	434	2412
At Risk (%)	23.6%	22.7%	29.8%	37.5%	48.7%	30.8%

Table 10.

A Summary of Lifestyle Question Concerns by Age Block

	0-3 yrs	4-6 yrs	7-9 yrs	10-12 yrs	13+ yrs	Total
Total n	1303	1966	1973	1694	891	7827
Concern (n)	791	1409	1544	1462	835	6041
Concern (%)	60.7%	71.7%	78.3%	86.3%	93.7%	77.2%

apparent with aging, or may be related to less daily pet owner attention or less yearly veterinary attention in older dogs.

The PWR questionnaire covers a wide range of topics that focus on the current lifestyle and health of dogs. It is intended to enhance the quality of the traditional wellness office visit for adult pets. For many pet owners, the administration of canine vaccines has historically been the primary value of the annual wellness visit.^{29,30} The focus of the annual veterinary visit needs to be shifted towards the evaluation and improvement of the patient lifestyle, as is recognized in human medicine. The PWR facilitates the goal by addressing key areas of importance to a healthy canine lifestyle. It also provides an opportunity for the veterinarian and pet owner to identify important lifestyle risk factors and take definitive steps to mitigate these risks. Interpreting the lifestyle questionnaire in the context of the laboratory screening tests also provides the opportunity to identify subclinical disease and to establish a benchmark for future reference. Lastly, the PWR provides the pet owner with a customized written summary that adds to the perceived value of the annual wellness visit.

Most experts agree that a veterinary practice model placing primary emphasis on acute care and vaccinations is economically unsustainable.^{4,30} The current consensus is that focusing on preventive care will benefit the patient, pet owner, and veterinary practice in ways that cannot be achieved through sporadic symptom-based care.^{4,30} Preventive care allows the pet owner to be more active in the overall care of their pet, as well as more accountable for that care. Those factors may lead to improved compliance with veterinary recommendations and allow a more proactive approach to patient care—resulting in earlier diagnosis and treatment of disease, and consequent improved case outcomes. Greater focus on preventive care will also reduce the potential

revenue loss associated with the shift from annual to multi-year revaccination intervals.

Benefits of incorporating an HRA into routine preventive care

1. Allows the pet owner to be more active in the overall care of the pet.
2. Increases pet-owner accountability, which may lead to improved compliance with veterinary recommendations.
3. Reduces the potential revenue loss associated with extended, multi-year revaccination intervals
4. Allows the veterinarian to practice more proactive, preventive healthcare resulting in earlier diagnosis and treatment of disease and improved case outcomes.

The PWR facilitates the goal of refocusing veterinary care on prevention and health-risk assessment by providing the basis for more productive dialogue between the pet owner and the veterinarian. Questions in each PWR section provide the veterinarian with new patient information that falls outside the typical patient history. In place of the catch all question “How is your dog doing today?”, each PWR section asks specific questions targeting key lifestyle factors. The PWR implements several aspects of the HRA framework developed for human patients by the CDC.³ These include:

- A shared process involving the veterinarian and pet owner.
- Identification of modifiable pet health risks as targets for medical intervention, pet-owner management of disease, or risk reduction.
- A basis for developing a healthcare plan based on the patient’s lifestyle risk factors.
- A means of monitoring individual progress toward health improvement goals.
- A resource for client education, information exchange, and dialog between clinic staff and pet owners.
- Utilization of electronic data management to save provider resources and to facilitate information security and transfer.

RESULTS & DISCUSSION

Many of these characteristics directly involve the pet owner in the active management of the health and well being of their pets and serve to position the veterinarian and other clinic staff as being central to this process. When the pet owner sees the clinic staff as a resource and partner in a pet's health and well-being, the likelihood of compliance and meeting healthcare goals for the pet greatly increases. Pet owners who are highly loyal to the practice are more likely to accept veterinary recommendations than clients who are not. A client who believes a practice is committed first to the well-being of its patients is more likely to believe that the veterinarian will only recommend interventions that the pet needs without attempting to "sell them unnecessary products or services."³¹

Practice revenue from regular wellness visits together with the diagnostics, preventive measures, and treatments during these visits is considerable. While this revenue source is meaningful, the AVMA-AAHA Preventive Healthcare Guidelines Task Force makes it clear that the most reliable revenue stream for veterinary practices is linked to the wellness exam itself, not to symptomatic "acute" care or management of chronic disease. When clients rely on veterinarians only for acute care and vaccinations, as nearly a third currently do, they become sporadic users of veterinary medical services.⁴ The Task Force calls attention to a decade-long decline in veterinary practice utilization by pet owners, with the average number of patients seen per week by companion animal veterinarians having declined by 13% from 2000 to 2009 and the median number of active clients per full-time veterinarian declining by 17%.¹

Between 2011 and 2012, a select group of animal hospitals experienced a level of growth that greatly outpaced that of the overall economy. These hospitals were able to grow their revenue and increase patient visits irrespective of location through creating client-centric practices

that focused on preventive care. Five major factors were seen to be critical to growth in these hospitals:

- 1) focusing on operating a "client-centered practice"
- 2) driving preventive care
- 3) leveraging technology to drive clients to focus on preventive care
- 4) setting goals and metrics for success
- 5) communicating the value of higher standards to customers.⁶

In many cases, pet owners now rely on the Internet, not a veterinarian, as their primary source of pet health information. In contrast, as noted above, pet owners become regular consumers of services delivered by their veterinary team when they understand that regular routine wellness visits ensure the long-term well-being of their animals, safeguard the relationship between the owner and the pet, and potentially reduce the expense for costly acute care and maximize the value of chronic care.^{1,4,6,28}

CONCLUSION

Regular wellness visits are key for the early diagnosis and treatment of chronic conditions such as renal disease, osteoarthritis, and periodontal disease.³²⁻³⁴ The additional information gleaned from a Health Risk Assessment (HRA) like the Pet Wellness Report (PWR), coupled with the benefits of enhanced veterinarian-client communication and interaction associated with the HRA process, leads to an improvement in the preventive care received by an individual pet and demonstrates the value of routine veterinary visits to pet owners.

Veterinary practices that approach regular routine preventive care as the most cost-effective approach to patient care tend to enjoy greater client loyalty, improved compliance, and a stable or growing client base.^{4,6} The trend in successful companion animal practices is to make the regular wellness exam and disease prevention the foundation of

optimum pet care in a viable business model.^{1,6}

The PWR is a novel, turnkey solution to support preventive health initiatives in companion animal practice and enhances the value of regular routine wellness exams for pet owners.

The PWR reinforces the role of the veterinary professional as a problem preventer and the best source of pet health information and care and enhance

the veterinarian-client-pet relationship by integrating the pet owner more fully into the health care process.

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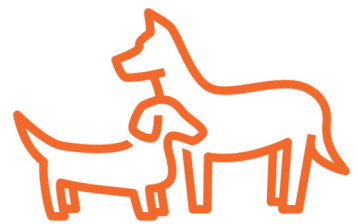
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Appendix A.		
The Definitions Used as Bloodwork Risk Factors and the Frequency with which Dogs in this Study Met These Definitions.		
Risk factor	Diagnostic criteria	Study dogs that meet this criteria
Renal	Increased BUN and creatinine	1.80%
Hepatic	Increased alkaline phosphatase and ALT Increased total bilirubin	4.98% 4.25%
Addison's Disease	Increased potassium and decreased sodium	0.05%
Diabetes Mellitus	Increased glucose	1.33%
Pancreatitis	Increased lipase and amylase	2.41%
Muscle Damage	Increased CPK	1.11%
Anemia	Decreased RBC and hematocrit and hemoglobin	0.98%
Infection/Cancer	Increased globulin Increased WBC and globulin Increased neutrophils Increased neutrophils and bands Increased neutrophils and monocytes	7.32% 0.87% 6.15% 0.69% 2.53%
Stress or Steroid Exposure	Increased neutrophils and decreased lymphocytes	0.42%
Parasitism	Increased eosinophils Increased basophils	3.83% 1.35%
Hypothyroidism	Decreased T4	2.81%
Poor nutrition/wasting	Decreased total protein and albumin Decreased albumin	0.24% 1.35%
Thrombocytopenia	Decreased platelets	3.87%

Appendix B.	
The Definitions Used as Lifestyle Risk Factors and the Frequency with which Dogs in this Study Met These Definitions.	
Lifestyle Question Risk factor	Study dogs that meet this criteria
Heart disease warning signs = Yes	18.4%
Cancer Warning Signs = Yes	23.9%
Female Spayed = No	7.0%
12 Month Heartworm Prevention Program = No	8.6%
Missed or Off Schedule Giving Heartworm Medications	28.8%
Oral Disease Warning Signs = Yes	29.6%
Contact With Other Dogs Outside the Home = Yes	66.6%
Not Giving Heartworm Medication	9.9%
Overweight = Yes	18.2%
Stiff/Lame/Pain = Yes	26.6%
Signs of Food Allergies/Sensitivities = yes	28.2%



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