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A photograph of a pile of colorful parrot pellets (green, orange, red, yellow, and purple) on a white surface. A parrot's head is visible in the bottom left corner, looking towards the pellets. The image is partially obscured by a blue curved shape on the right side of the slide.

A Look at Parrot Nutrition in the U.S.

**Why and How Veterinarians
Can Change the Feeding
Practices of Pet Birds**

Exotic Bird Ownership in the U.S.

Birds continue to be popular pets

- **American Pet Product Association 2016 survey of U.S. pets**
 - Surveyed 25,109 households as a representation of total U.S. households
 - 5.7% of U.S. households owned pet birds = 6.9 million households
 - Average of 2.98 birds/household
 - 20.6 million pet birds in the U.S.
- **ZuPreem 2014 survey of U.S. bird population**
 - Surveyed 27,202 households as representation of total U.S. households
 - 6.1% of U.S. households owned pet birds = 7.4 million households
 - Average of 2.50 birds/household
 - 18.6 million pet birds in the U.S.

Exotic Bird Ownership in the U.S.

ZuPreem 2014 survey

- U.S. bird population by species
 - Budgerigar – 4.2 million
 - Cockatiel – 3.1 million
 - Canary – 1.5 million
 - Lovebird – 1.3 million
 - Cockatoo -1.0 million
 - African gray – 0.9 million
 - Amazon – 0.9 million
 - Finch – 0.9 million
 - Conure – 0.6 million
 - Chicken – 0.6 million
 - Dove – 0.5 million
 - Parrotlet – 0.4 million
 - Quaker – 0.3 million
 - All other – 2.4 million

Exotic Bird Ownership Worldwide

Popularity of birds as pets:

- U.S. – popular
- Asia – very popular bird loving culture, especially smaller birds
- China – less popular due to government restrictions re: avian influenza
- Middle East – very popular; bird-loving culture
- South America – very popular; appreciate native birds
- Central America – very popular; appreciate native birds
- Australia – very popular; appreciate native birds
- Western Europe – popular, but less so than small

Bird Health & Nutrition

Veterinarians, bird breeders, and bird-owning communities recognize the association between diet and health:

- **Veterinarians treat many common bird health issues:**
 - Reproductive disease/egg-laying problems
 - Liver disease
 - Kidney disease
 - Feather picking/skin problems

- **Many health issues in birds may be due to poor nutrition:**
 - Atherosclerosis/stroke
 - Obesity
 - Fatty liver disease
 - Kidney failure/gout
 - Egg-binding
 - Feather picking/skin disease

Bird Health & Nutrition

Veterinarians link many bird health issues to nutrient excesses & deficiencies:

- Atherosclerosis/stroke – excess fat/cholesterol/triglycerides
- Obesity – excess fat
- Fatty liver disease – excess fat
- Kidney failure/gout – lack of vitamin A
- Egg-binding – lack of calcium, vitamin D
- Feather picking/skin problems – lack of vitamin A



Pet Birds vs. Wild Birds

Pet birds' nutritional requirements differ from wild birds:

- Wild birds need calories to fly and to forage for food, mates, nest sites
- Wild birds graze all day without becoming obese because they constantly burn calories
- Pet birds become obese because they sit in cages all day
- Pet birds are provided with food, so they don't have to hunt
- Pet birds bond to owners as "mates" and don't seek out other birds
- Food availability changes with seasons in wild, so wild birds get more nutritional variety and balance
- Pet birds typically are fed the same foods every day, often

The Problem: Too Much

Seed! Veterinarians agree that pet birds' seed overconsumption causes many health problems:

- Seed contains excess fat (cholesterol & triglycerides)
- Seed lacks essential vitamins & minerals
- Seed overconsumption leads to nutrient deficiencies
 - Lack of vitamin A → gout, poor skin/feather quality, respiratory problems
 - Lack of calcium, vitamin D → egg binding, soft-shelled/shell-less eggs
- Seed overconsumption leads to nutrient excesses
 - Excess fat → obesity, arthritis, high cholesterol, stroke, heart disease, fatty liver/



Homemade Diets Don't Provide Balance

Bird owners add foods to seed-based diets to try to provide variety & balance, but homemade combinations usually lack essential nutrients & contain excesses:

- Nuts – contains excess fat
- Fruit – contains excess water, few nutrients
- Vegetables – may provide trace nutrients but must be eaten in unreasonably large quantities to meet birds' nutritional requirements
- Processed human foods – typically add excess salt, sugar, fat to diet with little nutritional benefit



ZuPreem 2014 Survey

- N = 1,680 Bird Caregivers
- N = 4,200 Birds



What Are Pet Birds In the U.S. Really Eating?

- Studied a day in the life of 4200 pet birds of varying species
- Surveyed bird owners
- Divided birds into size categories:

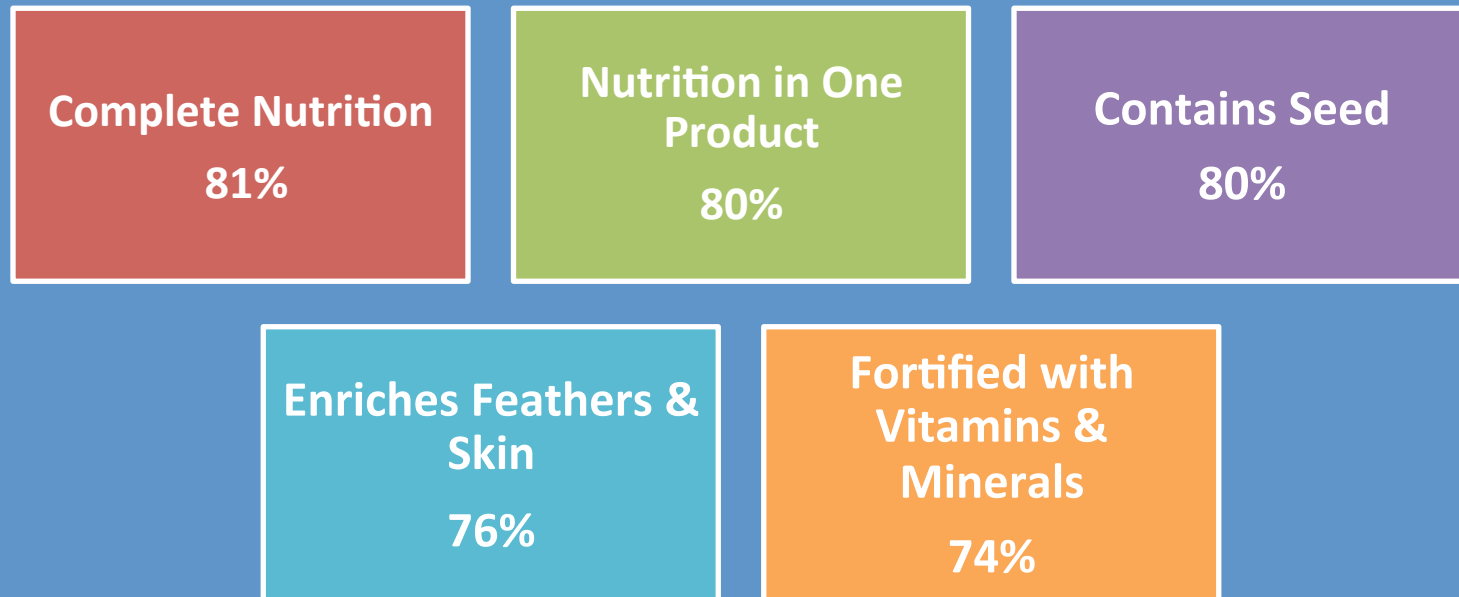
Large Birds	Medium Birds	Small Birds
African Grey Amazon Macaw Toucan Chicken	Cockatiel Cockatoo Conure Dove Parrolets Quaker Eclectus Caique Lorikeet	Parakeet Budgie Lovebird Canary Finch

What Are Pet Birds in the U.S. Really Eating?

What are bird owners looking for in a diet for their pets?

- As expected, the response “provides complete and balanced nutrition” was the top food benefit sought by bird owners
- But, the overwhelming response to “contains seed” was a surprise!

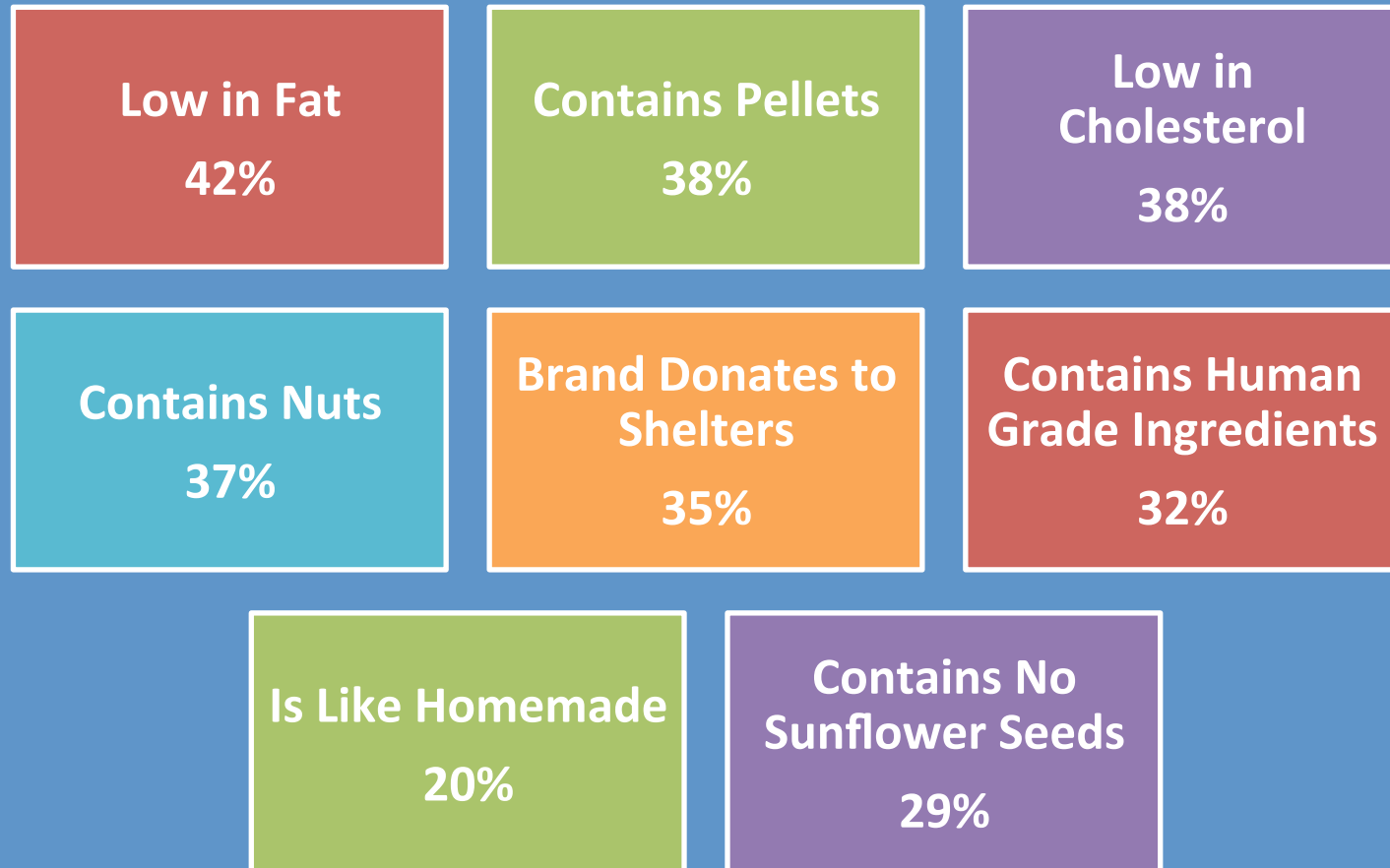
Most Important Benefits Sought From Bird Food



What Are Pet Birds in the U.S. Really Eating?

- Bird owners are not looking for sunflower seed-free foods
- Also not looking for “contains nuggets/pellets” at a high rate

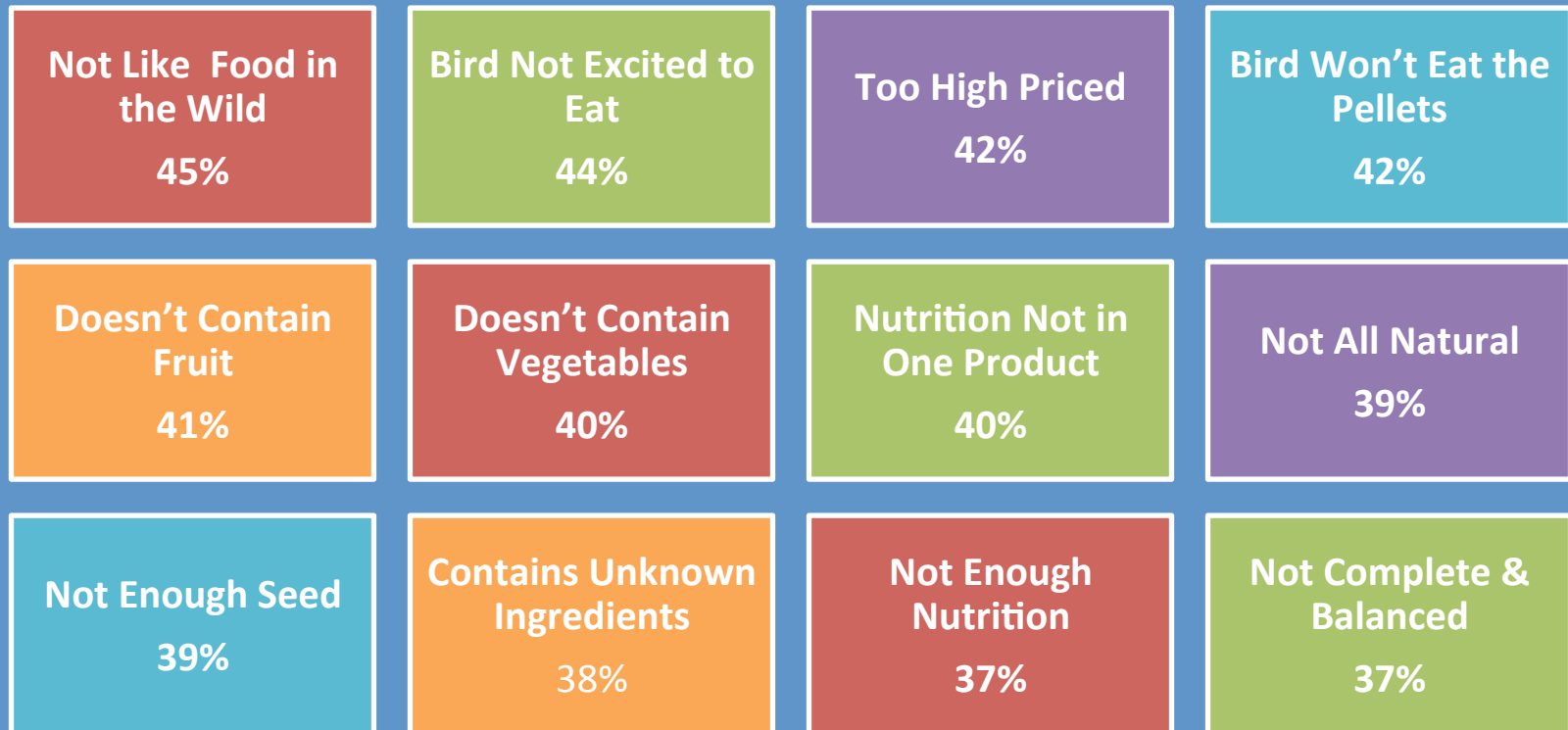
Least Important Benefits Sought From Bird Food



What Are Pet Birds in the U.S. Really Eating?

- Owners who feed Pellets/Nuggets have concerns birds won't eat it
- A significant number also don't think Nugget/Pellets are nutritious enough!

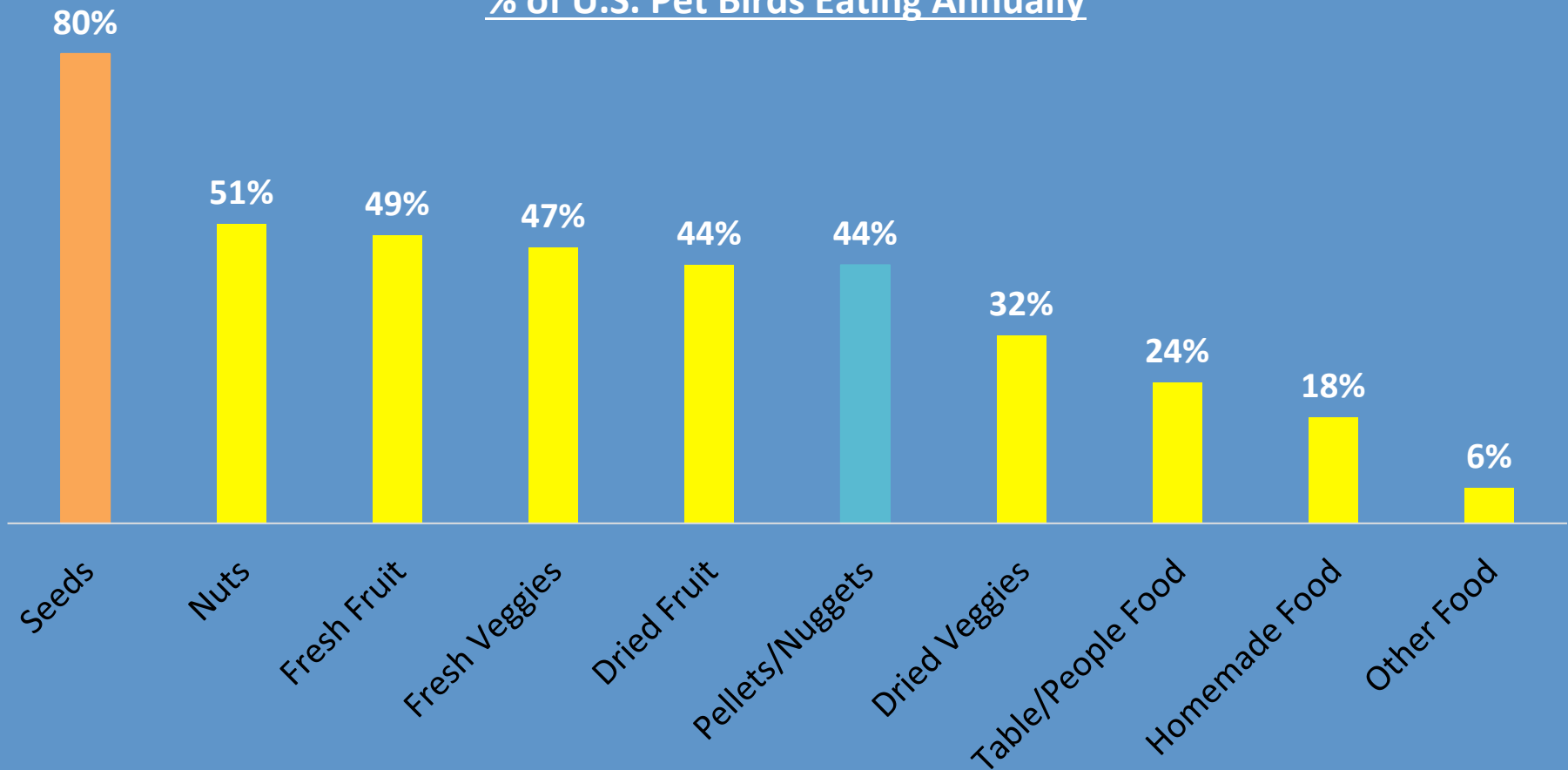
Biggest Problems With Pellets



What Are Pet Birds in the U.S. Really Eating?

Percentage of U.S. birds consuming various types of food annually:

Bird Food Popularity
% of U.S. Pet Birds Eating Annually

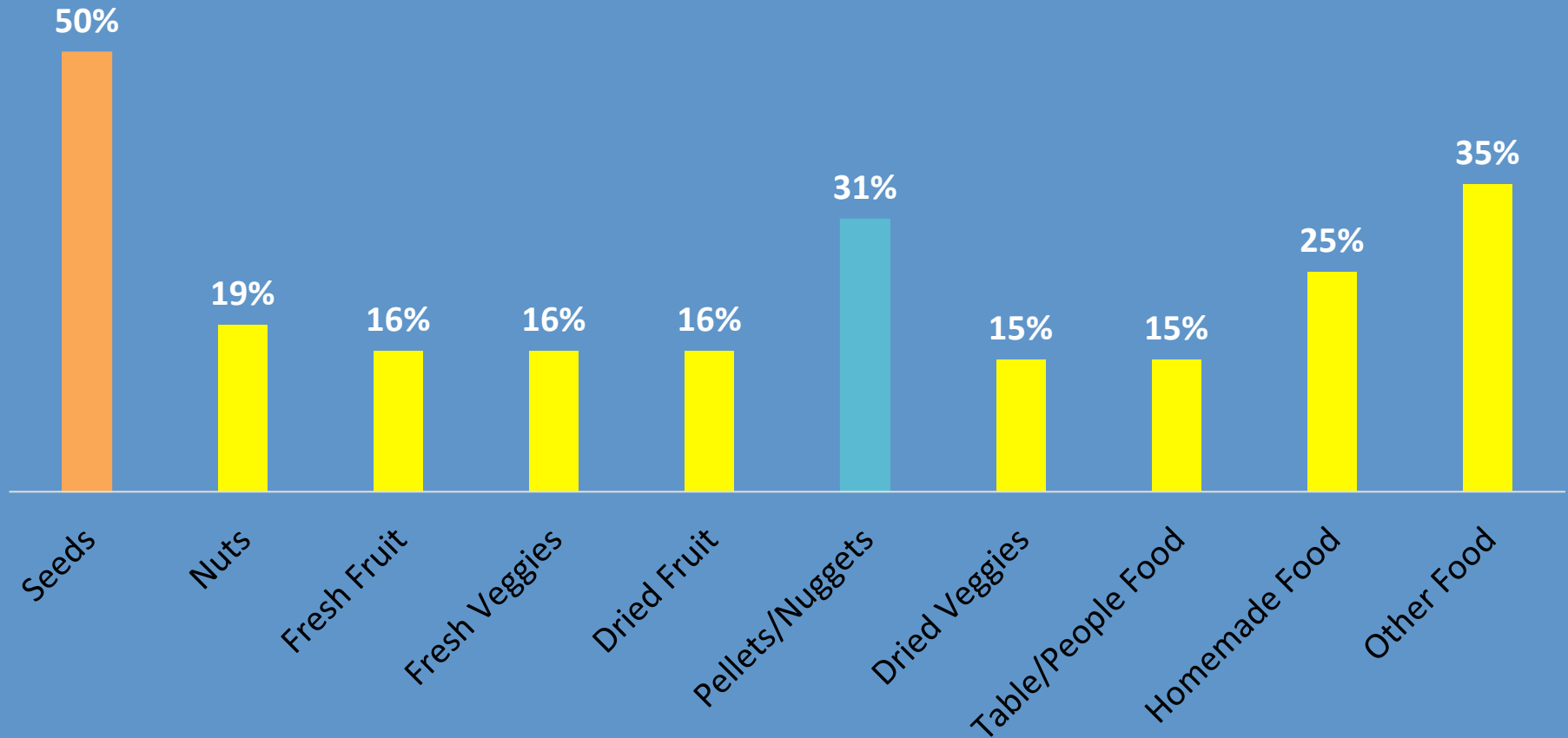


What Are Pet Birds in the U.S. Really Eating?

Percentage of total diet that food type comprises annually:

Bird Food Total Consumption

% of U.S. Pet Birds Total Annual Diet



What Are Pet Birds in the U.S. Really Eating?

Percentage of birds, according to size, that consume various food types:

Bird Food Popularity By Bird Size/Species

Food Type	% U.S. Birds	Small Birds	Medium Birds	Large Birds
Seeds	80%	83%	81%	71%
Nuts	51%	37%	56%	71%
Fresh Fruit	49%	36%	51%	71%
Fresh Veggies	47%	35%	48%	66%
Dried Fruit	44%	38%	47%	54%
Pellets/Nuggets	44%	35%	46%	57%
Dried Veggies	32%	27%	33%	39%
Table/People Food	24%	12%	27%	42%
Homemade Food	18%	16%	17%	28%
Other Food	6%	4%	6%	4%

What Are Pet Birds in the U.S. Really Eating?

Percentage of annual diet comprised of various food types according to bird size:

Bird Food Consumption By Bird Size/Species

Food Type	% U.S. Birds	Small Birds	Medium Birds	Large Birds
Seeds	50%	61%	48%	37%
Nuts	19%	22%	18%	20%
Fresh Fruit	16%	16%	17%	17%
Fresh Veggies	16%	18%	15%	16%
Dried Fruit	16%	18%	16%	16%
Pellets/Nuggets	31%	31%	31%	31%
Dried Veggies	15%	14%	17%	13%
Table/People Food	15%	14%	14%	16%
Homemade Food	25%	31%	23%	21%
Other Food	35%	30%	37%	19%

What Are Pet Birds in the U.S. Really

Conclusions: Eating?

- More birds eat seeds and nuts than any other foods
- Seeds and nuts make up a greater percentage of U.S. birds' diets annually than any other foods
 - In terms of total food fed to birds in the U.S. in 2014, seed was, on average, 50% of their total consumption
 - 56% of birds in the U.S. eat no pellets
 - Of birds eating Nuggets/Pellets, this food made up only 31% of their total diets
- Seeds and nuts are consumed by U.S. birds more than any other food type, regardless of bird size
 - Seed makes up a larger part of small birds' diets and a smaller part of large birds' diets
 - If a bird eats pellets, it's only about 30% of any size bird's diet
- Seeds make up a greater percentage of U.S. birds' annual diet, regardless of bird size

Clinical Relevance

- Despite improvements in pet bird nutrition in recent years, birds in the U.S. still consume predominantly seed
- Most pet birds never see a veterinarian, so veterinarians never get the chance to improve most birds' diets
- Some nutritionally-related conditions are less commonly seen in pet birds today because of better diets:
 - Sterile nasal granulomas in African gray parrots
 - Gout in all species
- Yet, many nutritionally-related diseases persist in pet birds despite increased knowledge about pet birds' nutritional needs
- Statistics revealed in the ZuPreem survey explain

Nutrient Requirements of Companion Birds

- Few studies have been done to establish true nutrient requirements of psittacine and passerine species
- Nutrient requirements of companion birds have been extrapolated from those established for galliformes
- Some nutritional information has been extrapolated from studies of captive budgerigars & cockatiels
- These extrapolations do not account for several variables:
 - Differences in efficiency of nutrient absorption between species
 - Variable nutrient requirements for different species
 - Variable requirements for different life stages & activities:
 - Breeding/reproduction
 - Exercise/flight/migration
 - Growth
 - Molting
 - Aging

Nutrient profile recommendations for psittacine and passerine birds					
Nutrient		General Psittacine Profile		General Passerine Profile	
		Minimum Level	Maximum Level	Minimum Level	Maximum Level
	Gross energy (kcal/kg)	3200	4200	3500	4500
	Total protein (%)	12	—	14	—
Amino acids	Linoleic acid (%)	1	—	1	—
	Lysine (%)	0.65	—	0.75	—
	Methionine (%)	0.30	—	0.35	—
	Methionine plus cysteine (%)	0.50	—	0.58	—
	Arginine (%)	0.65	—	0.75	—
	Threonine (%)	0.40	—	0.46	—
Vitamins, fat soluble	Vitamin A activity (total) (IU/kg)	8000	—	8000	—
	Vitamin D ₃ (ICU/kg)	500	2000	1000	2500
	Vitamin E (ppm)	50	—	50	—
	Vitamin K (ppm)	1.0	—	1.0	—
Vitamins, water soluble	Thiamine (ppm)	4.0	—	4.0	—
	Riboflavin (ppm)	6.0	—	6.0	—
	Niacin (ppm)	50.0	—	50.0	—
	Pyridoxine (ppm)	20.0	—	20.0	—
	Pantothenic acid (ppm)	20.0	—	20.0	—
	Biotin (ppm)	0.25	—	0.25	—
	Folic acid (ppm)	1.50	—	1.50	—
	Vitamin B ₁₂ (ppm)	0.01	—	0.01	—
	Choline (ppm)	1500	—	1500	—
Minerals	Calcium (%)	0.30	1.20	0.50	1.20
	Phosphorus, total (%)	0.30	—	0.50	—
	Calcium/total phosphorus	1:1	2:1	1:1	2:1
	Potassium (%)	0.40	—	0.40	—
	Sodium (%)	0.12	—	0.12	—
	Chlorine (%)	0.12	—	0.12	—
	Magnesium (ppm)	600	—	600	—
Trace minerals	Manganese (ppm)	65.0	—	65.0	—
	Iron (ppm)	80.0	—	80.0	—
	Zinc (ppm)	50.0	—	50.0	—
	Copper (ppm)	8.0	—	8.0	—
	Iodine (ppm)	0.40	—	0.40	—
	Selenium (ppm)	0.10	—	0.10	—

Nutrient Recommendations for Psittacines & Passerines

From Hawley SB. Year-end report of the nutrition and management committee, AAV Annual Meeting, Tampa, August 27, 1996; and Reprinted from Hawley B, Ritzman T, Edline TM. Avian nutrition. In: Olsen GH, Orosz SE, editors. Manual of avian nutrition. St Louis (MO): Mosby; 2000. p. 378–9.

The Problem with Seed Diets

- **Seeds:**

- Are high in fat
- Lack fat-soluble vitamins (A, D, E, K) & critical minerals (calcium, phosphorus, sodium, zinc, iron, iodine, selenium, manganese)
- Are deficient in important amino acids (lysine, methionine, riboflavin, pantothenic acid, niacin, choline)
- Provide inadequate hydration
- Are overall nutritionally imbalanced
- Are consumed by wild birds along with other foods (flowers, buds, leaves, insects, vegetables, fruit) so that these birds' diets are nutritionally balanced
- Will be preferably consumed by pet birds if mixed

Pet Bird Diseases Related to Poor Nutrition

Atherosclerosis/vascular ischemic incidents/stroke

- Hepatic lipidosis & liver failure
- Lipomas
- Obesity
- Goiter
- Hypocalcemia/hypovitaminosis D
 - Egg binding
 - Seizures in African grays
- Hypovitaminosis A
 - Squamous metaplasia of respiratory & GI tracts, kidneys, salivary glands
 - Increased incidence of infections
 - Blunted choanal papillae/widened choanal slit
 - Poor feathering/stress bars/poor skin quality/feather picking
 - Impaired function of ocular rods
 - Conjunctiva keratinization, dry corneas, blindness

Atherosclerosis

- Defined as a hardening and narrowing of arteries due to deposition of cholesterol plaques and inflammation in artery walls
- Extremely common in older, female Amazon, African gray, & Quaker parrots (genetic?)
- Increases in total plasma cholesterol have been associated with increased incidence of atherosclerosis in psittacine species
 - Budgies fed a 2% cholesterol/15% lard diet developed hypercholesterolemia and significant atherosclerosis in 6 months
 - Quaker parrots fed a 1% cholesterol diet developed significant atherosclerosis in 2 months & advanced atherosclerosis in 4 months
 - Lesion severity and arterial cholesterol content were correlated with plasma cholesterol concentration
- Amazon and African gray parrots may have increased

Pet Bird Diseases Related to Poor Nutrition

SEEDS ARE THE CULPRIT BEHIND MANY OF THESE DISEASES!

- Many seed manufacturers mislead bird owners into thinking their products are nutritionally complete by coating seed hulls with supplements discarded by birds as they eat
- Well-intentioned owners offer variety of healthy food choices with seeds and expect their pets to choose for proper balance
- Yet - even when offered a varied, healthful diet, birds in captivity do not select for nutritional balance – they select out what they like best (selective eating)
- Often a wide variety of food choices stimulates

How to Solve the Pet Bird Nutrition Problem

FRUITS & VEGETABLES PROVIDE SOME NUTRIENTS
BUT ARE NOT THE SOLUTION!

- Domestic produce has higher energy and water content & lower essential nutrient levels than wild counterparts
- High water content makes nutrient dilution minimal when fed as a complement to pelleted diet
- Produce comprises the basis of a healthy diet for relatively slow-growing, slowly reproducing humans
- Produce cannot provide adequate, balanced nutrition to meet the needs of rapidly growing, quickly reproducing pet birds
- Produce fed with a complete pelleted diet provides

How to Solve the Pet Bird Nutrition Problem

PELLETED DIETS ARE THE SOLUTION!

- Provide all the “required” nutrients, including vitamins and minerals, without excessive fat, to promote birds’ health
- Offer a manageable volume of food for a bird to consume daily that contains complete & balanced nutrition
- May be fed as base diet with smaller amounts of vegetables & fruit to provide micronutrients & enrichment through foraging
- Still provide variety to birds’ diets through different shapes and colors without the risk of “selective eating”

Why Aren't Most Pet Birds Eating Pellets?

BIRD OWNERS SUFFER FROM LACK OF AWARENESS

- Ignorant about the health implications of seed
- Worried that pellets are “artificial,” “processed,” & “boring”
- Concerned that their birds won't be able to express their natural foraging behaviors if eating only pellets
- Mistakenly compare pellets to wild birds' seed-based diets they consider more “natural”
- Have minimal contact with veterinarians
- Are misled by seed manufacturers' labels that seed is fortified & nutritionally complete
- Concerned about expense, as pellets are more expensive than seed!
- Have difficulty converting birds from seeds to pellets

What Can We Do?

CREATE AWARENESS ABOUT PELLETED DIETS

- Veterinarians can continue to stress to bird owners the importance of pellets and the detriment of seeds
- Pelleted food manufacturers can continue to invest in educating bird owners about the health benefits of pellets
- Pet stores can educate store employees about the value of pellets and the harm of seed-based diets
- Bird owners whose birds eat pellets can share their experiences with other bird

Seed to Pellet Conversion

The problems is...

- Veterinarians see a very small fraction of the total pet bird population
- Veterinary staff can encourage bird owners to convert pets to pelleted diets, but owners need ongoing support during conversion process
- Many owners get frustrated or too stressed to continue conversion process if birds don't eat pellets immediately and just give up
- Bird owners who never see veterinarians may not be aware of importance of pelleted diets at all
- Bird owners who don't see veterinarians and try converting their birds to pellets need even more support and encouragement

ZuPreem® Pellet Conversion Project

- Goal is to provide support to veterinary staff and to bird owners as they convert pet birds from seed-based diets to pellets
- Aim is to transition birds to healthier pelleted diets, regardless of pellet brand or variety
- Veterinary staff first examine pet birds to ensure they're healthy
- Veterinarians then ask bird owners to follow 1 of 3 pellet conversion methods (detailed on ZuPreem website) or a variation of these methods
- ZuPreem aids veterinary staff in answering owners' questions during conversion process
- Owners are then sent follow-up surveys to see how conversion process went, what problems they encountered, what conversion methods worked best for

ZuPreem® Pellet Conversion Project

- >175 veterinary hospitals in U.S and Canada enrolled
- Each hospital sees a minimum of 20 birds per week
- All birds must receive a veterinary check-up & be deemed healthy before conversion starts
- All hospitals receive material to promote pellet conversion:
 - Samples of pellets for large and small birds
 - Refrigerator magnets with ZuPreem contact information for owners' questions
 - Literature describing pellet conversion process and links to online videos showing conversion methods
- Ability to impact $\geq 400,000$ birds whose diets and health could be improved with pellets

ZuPreem® Pellet Conversion Project

- **ZuPreem website has detailed description of 3 pellet conversion methods:**
 - **Birdie's choice**
 - **Tough love**
 - **Slow & steady**
- **Each method is broken down into a series of simple steps**
- **Each step has several tips to help owners implement**
- **Each step is described in words plus easy-to-follow illustrations**
- **Each method is also be described in a real-life**

ZuPreem® Pellet Conversion Project



BIRDIE'S CHOICE

Choose three types of pellets and let your bird select his new pellet-based feeding plan quickly and without weeks of transitioning foods.

Choose this plan if your bird is:

Cockatiel or smaller

Under 3 years old

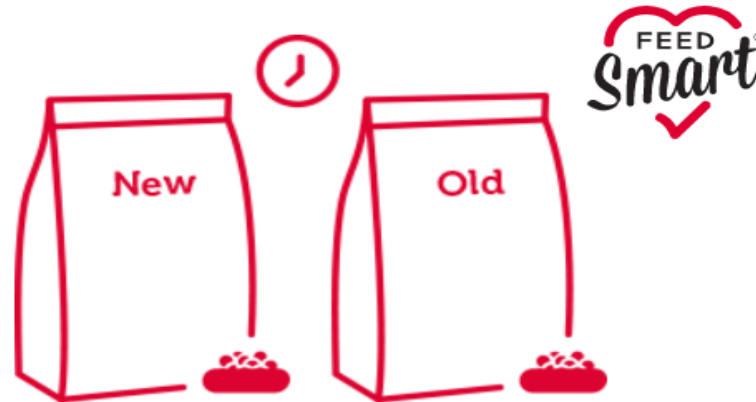
Ground feeding species

Finger tame

Birdie's Choice



ZuPreem® Pellet Conversion Project



TOUGH LOVE

By moving between old food, new food, and treat incentives, your bird converts to a new pellet-based feeding plan by creating a routine he recognizes.

Choose this plan if your bird is:

Most species

Any age

Likes treats

Easily accepts new food

Tough Love



ZuPreem® Pellet Conversion



SLOW AND STEADY

Over the course of a week, your bird gradually transitions from his old food to a new pellet-based feeding plan.

Choose this plan if your bird is:

A Conure or larger

Over 3 years old

A foot feeder

A shy personality

Slow & Steady



ZuPreem® Pellet Conversion Project

Goals of current project:

- Identify which conversion methods work best for different species
 - Determine average time for conversion of each species
 - Determine which specific pellet brands & varieties worked best for particular species
 - Identify most common problems owners encounter during conversion process and how to overcome them
 - Set bird owners up for successful future pellet conversions
- (Conversion results are in the next presentation)

ZuPreem® Pellet Conversion Project

Owner surveys:

- Post-conversion surveys were sent digitally to owners to gather information about the conversion process
- Owners filled out surveys and sent back to ZuPreem
- Drs. Alison Cummings and Dr. Hess gathered survey results from hospitals
- Statistics were run on conversion survey results
- Project results will be published to help aid veterinary staff and bird owners understand how to make future pellet conversion easier

ZuPreem® Pellet Conversion Project

Survey questions:

- **What species is your bird?**
- **How old is your bird?**
- **Is your bird male or female, or is the gender unknown?**
- **Were you able to convert your bird to eating pellets?**
- **Which of the 3 methods did you use to convert your bird to eating pellets?**
- **If another method, please describe.**
- **To what brand of pellets did your bird convert?**
- **Which variety of that brand?**
- **How long did it take for your bird to convert to eating pellets?**
- **What were main problems you encountered when you**

ZuPreem® Pellet Conversion Project

Future study goals:

- To follow birds before and after conversion to pelleted diet:
 - Monitor body weight
 - Assess body condition score
 - Determine activity level
 - Measure blood lipid (cholesterol, triglyceride) concentrations
 - Document overall health
- Hypothesis is that birds on pelleted diets will have more appropriate body weights/condition, improved activity level, more normal lipid concentrations, and overall better health than those on seed diets