Introduction

Birds were heralded as the pet of the ’90s
Current pet bird population has been estimated to be 50-60 million
In one study only 7.6% of bird owning households sought veterinary care
Compared with 78% of dog owners and 60% of cat owners
Great need for veterinary services for pet birds

Reasons for Popularity of Birds

Lifestyle Changes
Low Maintenance Pet
Increased Availability
Better Success Hand Raising Birds, More Breeders

Hand Raising
-Birds Are Calmer, Bonded to People, Affectionate
-Less Likely to Carry Disease

Nature of Birds
Coloration, Songs, Talking Ability, Social Animals

Reasons for Lack of Vet Care

Birds conceal illness as part of natural defense
By the time veterinary care is sought it is often too late to be effective

Financial
- Clients would rather replace a sick bird than invest in veterinary care
Lack of veterinary practitioners
Lack of Client Education
Do not understand health care needs of birds
Unaware of veterinary services/capabilities
Do not recognize importance of yearly exams

We must make clients aware of our services, demonstrate our sophistication in avian medicine and teach clients about proper health care for their pet birds

Beginning in Avian Medicine

Avian medicine has undergone an information explosion
One may be overwhelmed by the volume of information
Various resources are available

Basic References

Association of Avian Veterinarians (AAV)
-Members regularly receive journals and newsletters that include current research and topics related to avian medicine
-Yearly conference provides opportunity to hear the latest research findings, as well as basic to advanced topics and wet labs
-AAV membership meets the needs of the beginning and advanced avian practitioners
-Anyone considering seeing birds should become a member

Avian Medicine Textbooks
-Diseases of Cage and Birds - Rosskopf and Woerpel
-Aavian Medicine: Principles and Application -Ritchie, Harrison and Harrison
-Aavian Medicine and Surgery - Altman, Clubb, Dorrestein, Quesenberry
-Manual of Avian Practice - Rupley
-Essentials of Avian Medicine: A Guide for Practitioners - Sakas

Avian Laboratory References
-Aavian Hematology and Cytology - Campbell
-Laboratory Medicine: Avian and Exotic Pets - Fudge

Formularies
-Exotic Animal Formulary - AAHA Press
-Exotic Animal Formulary - Carpenter

Avian Medicine Periodicals
-Seminars in Avian and Exotic Pet Medicine-WB Saunders
-Veterinary Clinics of North America/Exotic Animal Practice

Lay Publications
-Parrots of the World - Forshaw and Cooper
-Lavishly illustrated book containing pictures of every imaginable type of parrot
-Displays range in nature and basic physical characteristics
A must have book if you will be seeing parrots

**Bird Talk** (and various other bird magazines)
You need to know what your clients are reading
Contains a great deal of useful information

**General Avian Books**
There are many books written for the general public which contain useful information for the veterinarian as well
Books that are especially helpful are books about parrot behavior
A great deal of your time will be spent on behavior issues in your avian practice

**Web Sites**
There are some good ones, but exercise caution

**Managing and Marketing the Avian Practice**
Avian practitioners feel mired down with the amount of time they spend exchanging information with clients and performing routine procedures
Vet techs and support personnel should be trained and utilized to take over these responsibilities
They can discuss the finer points of husbandry, biology and purchasing options with the owner
Nutritional counseling is a must
Staff should be trained to:
- Restrain birds properly
- Perform basic grooming, trimming of beaks, nails and wings in an expert manner
- Demonstrate administration of oral and injectable antibiotics to client after exam
- Set birds up in the hospital unit
- Provide heat, perches, medication, nutrition (via gavage)
- Take avian blood samples and radiographs
Printed handouts pertaining to bird care are helpful and should be provided to each client
- AAV provides client materials
- Write your own!

**Selection of a Pet Bird**
Clients will look to the veterinarian as an expert that can help them with the selection of the proper bird for their circumstances
There should be a familiarity with the characteristics/attributes of all the common species
Correctly identify birds clients have misidentified, understanding species specific medical conditions, counsel clients about behavioral issues
All too often birds are given away due to a poor relationship
Even worse birds die due to inadequate or improper care
Tremendous increase in the number of bird behaviorists and bird rescue organizations
Past experience or the lack of it plays a key role in the selection of the type of bird

**Guidelines to Consider When Selecting a Bird**
Time commitment
Expense
Housing restrictions (apartment/condo)
Noise potential for the bird
Space constraints
Dangers posed by other household pets
Precautions due to children (birds do bite!)
Allergic reactions (hypersensitivity pneumonitis)
Amount of work caring for bird (cleaning/feeding)
Talking ability (no guarantee bird WILL talk)
Longevity of bird (special arrangements in will)
Personality and attributes of bird (positives and negatives)
Age of bird to be purchased (mature vs. neonate, weaned vs. unweaned)

**Purchasing the Pet Bird**
Purchase from quality breeder pet store
If it is too good to be true it probably is!
Obtain a written guarantee
Prepare a list of questions
Special considerations with baby birds
Weaned? Hand feed at home?
Sale contingent upon examination by veterinarian
Quarantine bird for AT LEAST 30 days

**Characteristics of Common Pet Birds**

**Household Hazards**
Many common household furnishings can be very dangerous for pet birds
- Windows and mirrors
-Open doors and windows
-Open containers of water
-Ceiling fans
-Loud noises
-Other pets (dogs, cats, ferrets, other birds)

**Toxicoses**
Agricultural and gardening chemicals
Rodenticides
Mothballs
Denture cleansing solution
Disinfectants for cage cleaning
Salt (in large amounts)
Cigarette butts
Medications

**Lead Poisoning**
Dangers of lead poisoning are well known
Birds have tendency to chew on objects
Sources include:
- Lead paint, cuckoo clock weights, fishing sinkers, shotgun shot/bullets, solder, putty, linoleum, mirror backings, costume jewelry,
- zippers, unglazed ceramics, foreign made ceramics, wine bottle foil, leaded glass
Characteristic droppings - hemoglobinuria

**Treatment**
Supportive care, such as fluids, gavage feedings, depend upon severity of condition.
Calcium EDTA, DMSA have been used successfully as treatment.
It combines (chelates) with the lead so that it is inactivated and not absorbed.
Large amounts of lead in the gizzard may require surgical removal.

**Houseplants**
Birds like to nibble at vegetation so houseplants can be a problem
Documented cases of actual plant toxicoses in pet birds are rare
Rapid transit time through the GI tract
Birds tend to shred the vegetation rather than ingest it
“Dumb cane” can be a problem
If potentially toxic plants are in the household, clients should prevent access

**Toxic Fumes**
Due to their small size and efficient respiratory tract birds are very sensitive to airborne toxins
Aerosol sprays (propellant)
Burning or overheated cooking oil/butter
Polymer fumes in spray starch
Fumes from self-cleaning oven
Paint fumes
Smoke from burning food
Non-stick plastic sprays (to coat utensils)
Cigarette smoke
Carbon monoxide (car exhaust, water heater, furnace)
Natural gas
PTFE (Teflon, Silverstone, Supra, other non-stick surfaces)
Any material that emits fumes
If fumes are noted remove bird to area free from fumes and having good ventilation

**The Avian Physical Exam**
Do not underestimate the importance of thorough history taking and a complete physical examination
Too often practitioners are eager to perform batteries of diagnostic tests but do not closely observe and physically examine the bird
Early signs of disease are subtle and birds try to hide illness
Part of their natural defense mechanism
By the time the bird owner notices that the bird is sick, they usually have advanced disease conditions
Quite often makes successful treatment difficult
A good history, careful observation of the bird while in the cage and a “hands on” physical examination enables the development of a more selective diagnostic plan

**Receptionist’s Role**
Groundwork for good diagnostics begins with the initial call to the hospital
Ask client to transport bird in regular, uncleaned cage with 24 hours of droppings on cage paper
If cage is too large to transport then place bird in carrier and just bring cage papers
Client should bring medical records, including past and current medications as well as other pertinent information
History

Before examining the bird in detail, it is important to obtain as much information as possible from the owner

The AAV has a very good client information and history form that can be used

Take a careful and systematic approach

You will develop your own set of questions over time

How long has client owned the bird?

Where did they obtain it? Pet store? Breeder?

What did they notice to be wrong with bird?

When did the problem start? How long has it lasted?

Is there a history of previous illnesses? Was there treatment? Was it effective?

Are there any other birds at home? Have any been ill or died?

Has the bird been in contact with any other birds? Bird fanciers?

Has there been any changes in the bird’s environment?

Has the client noticed any behavioral changes?

What type of food is the bird fed?

Where is the food stored?

What type of nutritional supplements are given, if any?

Has the type of food been recently changed? Different source?

Have the droppings changed in number, shape, color or appearance?

Where is the cage located?

Is the bird always watched? Is it allowed freedom outside the cage?

Although these questions can be asked by the veterinarian in the exam room, it is more efficient to have the clients fill out a history form while waiting in the reception area

The form can be quickly perused prior to meeting with the owner allowing focus on the particular problem or concerns

Examination of Bird in Cage

One of the most common mistakes is handling the bird too quickly

Due to the excitement of being in a new environment the bird is on alert and subtle signs of disease are lost

Allow the bird to calm down and then observe the bird in the cage from a distance

The bird in the veterinary office environment should be alert, attentive and bright-eyed

The client wonders if the bird is actually sick

When the bird calms down carefully watch for ruffling, wings drooping, changes in posture, breathing abnormalities, eyes closing in a sleepy fashion or any other changes from the norm

Examination of Cage & Contents

A careful examination of the cage and contents is essential for proper diagnosis

The vast majority of problems seen in avian practice are related to poor husbandry

Evaluation of housing and nutritional status are very important

A large portion of the time spent in the avian consultation will be spent educating clients about proper husbandry and disease recognition

Cage/Cage Contents

Food/Water Cups

Evaluate the level of sanitation

A filthy food and water cup may be responsible for GI disturbances

Food and water cups should be cleaned daily to minimize bacterial contamination

Cups should be covered or placed in a location to be protected from fecal contamination

Cups should be of the proper size and construction for the variety of bird

Cage

Is the cage of adequate size for the variety of bird?

Too small of a cage will lead to damaged, dirty or tattered feathers

Constructed of material suitable for the variety of bird housed

Sturdy construction for large birds

Proper bar spacing for small birds

Check for sharp edges or projections that may pose a hazard

Is there extensive rust on the cage?

If the cage is home-made or repainted are the materials non-toxic?

Many older cages have been painted with lead-based paint (can get lead testing kit)

Solder contains lead

Galvanized metal that is not properly treated may cause zinc toxicosis

Perches

Perches should be made of an easily cleaned material

Variety of perch diameters is preferred

Non-rigid perches should be present as well
Sandpaper cover should be removed off perches
Only one “rough type” perch should be used

**Red Mites**
Clients are always worried that their “itchy” birds have mites—classically the red mite
If present they will be seen on the cage fittings, in cracks and crevices, and in slots on the end of the perches
The mites emerge at night to feed off the bird
An engorged mite will be red in color, mites on the perches may appear whitish or black

**Cage Toys**
Cage toys should be suitable for the variety of bird
Larger birds can easily dismantle toys designed for small birds
Glass mirrors are hazardous for large birds
Certain toys may contain lead weights (e.g., penguin toy), check for cracks
Check for sharp edges or hooks on toys
Bell clappers have frequently caused problems to both large and small birds
They chew on the clapper or hook which attaches it and can become impaled on hook.
Bells can be a problem for larger birds, as they try to pull bell off and get it lodged on their beak (frequently occurs with lovebirds)
Home-made toys must be evaluated for suitability and potential for toxicosis

**Nutrition**
Evaluate the diet and level of nutrition of the bird
What is the primary source of nutrition?
Seeds, pellets, home-made, mixture?
Are supplements given?
If fresh fruits or vegetables are given it should be emphasized that they should be washed to eliminate any herbicide/insecticide residue
The vast majority of birds suffer from malnutrition due to an unbalanced diet
Proper nutrition must be stressed to the client!
Hypovitaminosis A and hypocalcemia are two of the most common deficiencies seen

**Vitamin A**
Check for vitamin supplementation, are vitamin A rich foods supplied?
Vitamin A maintains the mucous membranes and epithelial surfaces
Vitamin A deficiencies can lead to secondary infections, development of mucus, plaques, abscessation, etc., in the mouth
A seed diet must be supplemented with vitamin A sources
Pelleted diets are complete and do not need supplementation
Vitamin A sources include:
Red/orange vegetables such as carrots, squash, papaya, red peppers, sweet potatoes
Dark green leafy vegetables such as broccoli leaves, spinach

**Calcium**
The high fat content in seed binds to calcium, lowering availability
Pelleted diets have adequate calcium and do not need to be supplemented
Hypocalcemia may manifest itself as weakness, seizures or pathologic fractures
Actively egg-laying birds need significant calcium supplementation
Calcium Sources
Proper supplements should have a balance of calcium, phosphorus and vitamin D3
Small birds—cuttlebones, mineral blocks, crushed oyster shell, mineral grit, osteoform
Large birds usually do not receive an adequate supply of minerals as most forms are easily destroyed (e.g., cuttlebone) or just not given
Supplements are available for the food and water, mineral blocks designed for larger birds can be used

**Grit**
Use of grit is controversial
Only should be used sparingly as it is not continually required for replenishment of the gizzard
Sick birds, especially with GI disturbances, tend to overeat grit
Often the owner believes the bird is eating when it is actually only eating grit

**Evidence of Eating**
One of the most important determinations that must be made is whether or not the bird is actually eating
Even though a bird may appear to be digging into the food bowl it may not be actually eating
Is seed being hulled or scooped out of the bowl onto the floor?
Check for seed hulls in the bowl
Sometimes a bird may hull seeds and not eat them
Hulled uneaten seeds may be seen on the floor of the cage
It is common for newly weaned parrots who have just been taken off formula to hull seeds and not ingest them
Owner believes that the bird is eating when actually it is not
Many times the young birds are “playing” with the seed and not actually eating
The bulk, form and consistency of droppings should be evaluated
Regurgitation vs. Vomiting
If there are hulled seeds on the bottom of the cage it must be determined if the bird is regurgitating or vomiting
Regurgitation is a normal part of courtship behavior
Regurgitated seeds may be seen on or near mirrors or toys
Very common with budgies and lovebirds
There can be quite large piles of hulled seeds with some birds
There will be no seeds adhered to the head of the bird that is regurgitating
Vomiting is abnormal and a sign of illness
Vomited seeds are seen as sticky clusters throughout the cage, often adhering to the cage bars
Further evidence is that the head feathers of the bird may be pasted with vomitus and sometimes mixed with seed

Evaluation of the Droppings
Droppings are one of the most important indicators of avian health
Ideally cage papers from an uncleaned cage, collected over a 24 hour period, should be brought in by the client so that the number and character of the droppings can be evaluated
The normal dropping consists of three basic parts:
-A formed fecal portion (usually green in seed eating birds)
-An off-white urate crystal portion
-A liquid urine portion
Seed imparts no color to the feces so the green bile color predominates
The fecal portion of the droppings changes color with the type of food consumed
Pelleted diets produce brown droppings
Strawberries produce red droppings, for example
Consistency of droppings varies with type of diet and bird variety
Succulent foods (fruit and vegetables) will cause more watery droppings
Pelleted diets may lead to increased water intake, hence more watery droppings in addition to the brownish color
Droppings that have suddenly changed consistency and color could indicate disease
Check the amount of fecal portion
If not eating there may be scant feces or a dropping that is predominantly urine
Reduction in feces also may indicate interference with the normal passage of feces, such as vomiting
Birds do “urinate,” passing only liquid urine and urate crystals with no feces occasionally
If these type of droppings predominate, a problem exists
Watery droppings: are they due to polyuria or a GI disturbance?
A somewhat formed fecal portion and excessive urine may indicate renal disease or a metabolic problem such as diabetes
Dietary changes, excitement and anxiety can also lead to more watery droppings
A more liquid consistency to the feces suggests an intestinal tract disturbance
Excessive mucus in the feces may show as a grayish coating
Pancreatic insufficiency produces characteristic “popcorn” droppings that are bulky and off-white to gray in color
Large or bulky droppings can indicate a malabsorptive condition or interference with the passage of feces (tumor or blockage of the cloaca)
Large dropping may not always be abnormal
Some birds hold their droppings overnight and have a large, watery “morning” dropping
Fewer and larger droppings are seen in females going through a reproductive cycle
The enlarged oviduct presses upon the cloaca interfering with the passage of feces with resultant build up
Undigested seed or grit in the droppings are abnormal and could indicate a gizzard malfunction or motility problems
Undigested seed material in the droppings is a characteristic symptom of Proventricular Dilatation Disease (PDD)
In finches, gastrointestinal hypermotility, bowel inflammation, lead poisoning and lack of grit may lead to undigested seed in droppings
Blood in the feces is usually from the cloaca or oviduct
Severe cloacal inflammation, ulceration, or tumors may be responsible
Blood may be seen when there is difficulty in the passage of eggs
Evaluation of the Droppings
Blood in the urine/urates may be indicative of a kidney disturbance
Hemoglobinuria is classically seen with heavy metal toxicosis (lead or zinc)
Reddish urine may be seen with ingestion of red colored foods

Cloacal Papillomas
Seen in New World birds, commonly macaws, Amazons parrots, hawk-headed parrots
It is viral in origin
Produces straining while defecating and blood in the droppings
May notice the presence of “granulation” tissue (appears like a strawberry) around the vent and in the cloaca
Yellow or neon green urates (biliverdinuria) may indicate hepatitis
Neon green urates may be indicative of Chlamydiosis
Dark green urine and urates may indicate liver failure
Green urine may be due to dietary intake or bile staining of urine
If discolored urine or urates are seen on newspaper, check the other side to be certain that it is not the colored ink “bleeding” through.

**Examination of Bird in Cage**
One of the most common mistakes made by the practitioner during the examination is handling the bird too quickly
Due to excitement the subtle signs of disease are lost
View the bird from a distance until it calms down
Glance over at the bird while you are taking the history so you can observe it and evaluate clinical signs
The bird in a new environment will be alert, attentive and bright-eyed
Often the client is surprised that the bird that seemed so sick now appears to be normal
Usually this is when the bird is in the early stages of disease and is still able to mask its illness effectively

**The Healthy Bird**
Should have an erect posture on the perch
Weight evenly distributed on both feet
Wing tips crossed over the back
Tail held at same angle as back (straight line)
Feathers sleek and held close to the body

**The Sick Bird**
Poor posture on perch
Perching unsteadily, wobbly
One or both wings drooped
A single drooped wing may indicate injury to muscle/bone, nerve paralysis, neoplasm
Both wings drooped indicate generalized weakness
Sits with ruffled feathers
Head tucked behind wing
Appears lethargic/drops off to sleep in exam room
Ruffled birds are chilling and need heat
Birds huddling on the bottom of the cage and extremely ruffled are critically ill
These birds should be handled with extreme caution as any undue stress could cause death

**Feathers**
Feathers should be clean and well-groomed
Dirty, tattered feathers may indicate a lack of preening due to illness, mechanical trauma due to poor housing or emotional upset
Staining of the feathers above the nares indicates nasal discharge (rhinitis)
Pasting of the head feathers is seen with vomiting
Droppings stuck to the vent may indicate a GI disturbance or an abdominal mass

**Feet/Legs**
Restlessness/shifting of weight or favoring of leg may indicate pain or dysfunction (from disease or injury)
Pressure sores from improper perches may lead to ulcers/bumblefoot
Nesting material may be wrapped around toes leading to necrosis (especially seen with canaries and finches)

**Leg Bands**
Leg bands can cause severe problems in some birds
Check for free movement of band on leg
Check for signs of irritation on leg due to band
Canary leg bands have little clearance with great potential for damage to foot/leg
If the leg band is not essential for identification, it should be removed (record information)
Unusual crustiness or flakiness on legs may indicate a nutritional deficiency (vitamin A- causing hyperkeratosis) or parasitic condition (Cnemidocoptes-scaley leg mites)
In budgies, unilateral paralysis or paresis may be due to renal enlargement from renal adenocarcinoma

**Respiration**
Evaluate breathing and respiratory rate
When a bird breathes there should be little effort and no obvious sounds
Tail bobbing is a sign of impaired respiration, due to respiratory disease or abdominal enlargement
A dyspneic bird (mouth open and gasping) is in critical condition and should be handled with extreme caution, if at all
A dyspneic bird may not always have a respiratory condition
Possibility is that there may be a space-occupying lesion in the abdomen that prevents full expansion of the posterior air sacs
A bird in extreme respiratory distress may be cyanotic, indicated by bluish color of the feet and/or legs
Do not be fooled by the normal bluish color of the legs of some birds
Normal bluish coloration of the legs/feet of a sexually mature male budgie
Breathing hard at rest or heavy breathing after a short period of exercise or exertion can indicate a problem
Any respiratory noises heard while breathing are abnormal
Wheezing, clicking, frequent sneezing
Nasal discharge may appear as fluid in the nostrils or staining of the feathers above the nares
**Goiter/Thyroid Dysplasia**

Incessant high pitched squeaking in budgies may be thyroid dysplasia
Respiratory wheeze on inspiration and expiration
Due to thyroid enlargement caused by iodine deficiency
Enlarged thyroid gland impinges on trachea and syrinx (voice box) causing dyspnea
Condition responds nicely to iodine supplementation

**Neurological Conditions**

Torticollis, opisthotonos, ataxia, arching, seizures can be seen in pet birds
May be due to a variety of causes:
- Vitamin deficiency
- Hypocalcemia (common cause)
- Head trauma
- Cerebral vascular disturbances
- Tumors
- Toxicoses (lead, zinc)
- Infection (paramyxovirus in pigeons)
- Exotic Newcastle Disease

- If you suspect a bird has been smuggled and it is showing neurologic signs, Exotic Newcastle Disease must be considered
- Contact the USDA immediately
- Keep the bird in extreme isolation, away from other birds
- A variant is paramyxovirus, seen in pigeons, which also causes neurological signs

**Capture and Restraint of Birds**

Birds must be handled for proper evaluation of health status
Clients judge your skills as an avian veterinarian on your method of capture restraint and examination
The inability to handle a bird properly or causing physical trauma during the exam could lead to client dissatisfaction

**Recognize When NOT to Handle a Sick Bird**

A bird in severe respiratory distress should not be handled
Warn the owner that the bird may not be able to withstand capture and restraint so minimal handling is necessary
However, if handled improperly, even a healthy bird could be so stressed that it could die during restraint

**Free Movement of the Sternum is Essential for Respiration**

Birds possess no diaphragm and the lungs do not expand and contract
They breathe through expansion/contraction of air sacs facilitated by intercostal muscles
Undue pressure on the thorax/sternum would restrict breathing
When holding, cup hand around bird, never close fingers around chest
Must allow for free movement of sternum

**Restraint**

During handling monitor bird for signs of stress, discomfort or breathing difficulty
Due to struggling a bird could contort or twist in such a way as to constrict air passages
If in a towel, efforts to escape could lead to hyperthermia
Be alert if bird breathes heavily during handling
If in discomfort, release bird until breathing returns to normal
Amount of restraint varies with each bird
Hand raised baby birds that are being hand fed require minimal restraint
If recently hand fed do not apply pressure to crop, due to risk of aspiration of food
Always evaluate crop fullness before handling
If crop is full put a small amount of pressure on right side of neck (location of esophagus) to prevent backflow
Wild-caught or untamed parrots may require one or two assistants for handling
Overzealous restraint could lead to fracture or dislocations
“White-faced” birds such as macaws or African greys may develop bruises on sides of face during handling
Avoid applying pressure to those areas
The bruises are harmless and will resolve but the clients will believe that it was due to mishandling

**Preparation for Capture**

Do not allow the client to handle or restrain bird during exam as you are liable if injury occurs
Caution them not to kiss or pet the bird during exam
Make sure the exam room doors are closed
Remove any perches or toys in cage that may interfere with capture
Darkening room may facilitate capture
Evaluate opening for removal of bird (and towel)
If too small may require removal of top or bottom of carrier

**Towels vs. Gloves**

Towels
Hands are hidden behind towel and protected
Can drape towel over bird so wings are protected
Bird does not see hands so does not become ‘hand shy’
One person can conduct exam in all but the large parrots

**Gloves**
Grabbing a bird with gloves appears rough
Bird may associate gloved hand with bare hand leading to ‘hand shyness’
Gloves are difficult to clean if several birds are seen daily
Two people are required to handle bird
Gloves will not protect wings
Gloves are essential part of falconry but not for restraint
Used to protect falconers hand as it functions as a perch

**Capture and Restraint of Small Birds**
Budgies, finches, canaries are captured bare-handed (or with a paper towel if preferred)
Reach for the head and cup your hand around their body
No pressure on chest, free movement of sternum is essential

**Capture and Restraint of Large Birds**
Lovebirds, conures and larger require a towel
Amazons, cockatoos, etc. require the help of an assistant

**Tame Bird**
Can drape towel over them while they are on table or owner
Reach for head and wrap in towel
Rest bird on inside of forearm or on table
Hold head using one of the four techniques

**Capture and Restraint of Large Birds**
Wild or untamed large bird
Be patient
Grab head from behind, when facing away from you or climbing
Bird lying on back could be scooped up using both hands protected by towel
Your technique will improve over time…..out of necessity

**Methods of Holding Bird’s Head**
Crook index finger behind back of head, gently place thumb underneath lower mandible
(My preferred method)
Gently circle neck with thumb and index finger in the manner of a tubular restraint collar
Thumb and index finger on either side of temporomandibular joint
Extend head between middle and index finger
“Helmet grip”

**Physical Examination**
Many different methods of performing the examination
I prefer to start with the head and work downward

**Head**
Evaluate feathers on head
Check for normal development/good quality feathers
Poor development or bare patches could indicate metabolic or systemic disease
Traumatic feather loss
Plucked by other birds-black stumps present
Rubbing of head on cage/cage objects
Abnormal crest feathers in cockatoos
Sign of psittacine beak and feather disease syndrome

**Cere**
Normally dry and slightly flaky
No unusual swellings should be noted
Cere color is used to determine sex in budgies
Varies with color mutations and age
Brown hypertrophy of cere
May occlude nares
Due to hormonal stimulation in females
Estrogen-secreting gonadal tumors in males

**Nares**
Should be similar in size, shape and symmetry in cere
Nostrils are normally open with no discharge
Staining of feathers above nostrils due to nasal discharge and rhinitis
May see actual discharge
Discharges should be evaluated microscopically
Enlarged nares due to chronic rhinitis/injury
Chronic nasal discharge can lead to grooves in beak

**Beak**
Smooth, clean with some degree of flakiness
Fatty liver disease in budgies causes beak changes
Overgrown, deteriorating beak with hemorrhages
These birds should be handled with extreme caution as their systems are extremely compromised
Crustiness on beak may be due to external parasites (mites in budgies)
Heredity, trauma, malnutrition, systemic disease
Control through frequent beak trimming

**Mouth**
Take care when opening mouths of cockatoos and macaws
Margins of beak thin, may clamp down on device and damage beak
Epithelium is smooth, dry and odor free
Greyish cast and pungent odor may be found in mouth with bacterial infections

**Choanal Slit**
Margins sharp, clean, bordered by numerous pointed papillae
Lack of papillae, blunted papillae, thickened margins and/or white plaques indicate a vitamin A deficiency
Ample opportunity for secondary bacterial infections
Choanal viral papillomas
Seen in Amazons, macaws, hawk-headed parrots
Appears as a vegetative growth in the choanal slit
May be quite extensive and widespread in the oral cavity
May be adjacent to the glottis interfering with breathing

**Eyes**
May see discharges, conjunctivitis, matting of feathers around eyes, periophthalmic swelling
*Mycoplasma* causes these changes in budgies and cockatiels
Chlamydia may be manifested by conjunctivitis in cockatiels
Avian pox may cause lid deformations and corneal ulcerations
Was seen in wild-caught imported blue-fronted Amazons
Cataracts hereditary in canaries
Infectious diseases are the most commonly reported eye problems in pet birds
Traumatic eye lesions are most common in raptors
Eyelid and nictitating membrane neoplasms are relatively uncommon in birds, but have been described
Menace response is equivocal, at best, in birds and its absence is not diagnostic
Pupil cannot be dilated with atropine

**Ear**
Ear infections are uncommon, but do occur
In my experience otitis externa is most often seen in lovebirds
May occasionally see discharge or swellings, matted feathers around ear in otitis cases
Self mutilation of the ear may occur due to pruritis
Some neonates may have a membrane covering the ear

**Neck/Trachea**
Palpate for any unusual swellings or abnormalities, such as abscesses or neoplasms
Tracheal transillumination for air sac mites
Canaries and finches

**Crop**
Palpate contents
Empty, fluid, food, gas, foreign body, mass?
Take care if fluid is present to prevent backflow
Crop wall is relatively thin
Crop wall can be thickened in candidiasis
Especially with young birds (cockatiels)
Crop burn/fistulas in hand fed birds

**Chest**
Pectoral muscles and keelbone should be evaluated
Sick birds lose muscle mass/weight rapidly
One of the initial signs of disease
Must handle birds as feather ruffling will disguise a thin bird
Palpation of pectoral muscles should not serve as only means of evaluating weight
Every bird should be weighed on gram scale
Weight recorded for future comparisons

**Abdomen**
Abdomen is quite small, little is detectable on palpation, felt as a slight indentation
Can detect lipomas/lipogranulomas
May detect gizzard-firm mass on left side
Especially prominent when displaced
Enlarged liver may be palpable
Right lobe of enlarged liver protrudes beyond margin of sternum
Neoplasms, eggs, enlarged oviduct palpable

**Grossly Enlarged Abdomen**
Reproductive tract disorders (esp. cockatiels)
Neoplasms
Obesity
Ascites
Secondary to heart disease, neoplasms, reproductive tract disorders
Birds with grossly enlarged abdomens and compromised breathing should be handled with extreme caution
Stabilize bird before engaging in involved diagnostic procedures
Enlarged abdomens must be palpated carefully
Rough palpation could rupture abdominal air sacs or a cystic mass, leading to sudden death

**Vent**
Should be clean and unsoiled
Staining is usually due to a GI disturbance
Diarrhea or abdominal mass
Cloacal papillomas, cloacal tumors, egg binding, cloacal prolapse can cause staining
In Amazons and macaws the vent should be everted to check for presence of papillomas
An enlarged, dilated vent in female indicates hormonal stimulation/reproductive cycle

**Feet/Legs**
Scaly skin similar to reptiles, skin smooth and shining
Check bottom for pressure sores/ulcerations
Due to improper perching/malnutrition
Hyperkeratosis
Vitamin A deficiency
Gout tophi (esp. budgies and cockatiels)
Check legs/joints for structural abnormalities

**Leg Bands**
Leg bands should be freely moveable
No signs of irritation, redness or thickening on the leg
Chronic irritation can lead to swelling
May interfere with normal blood supply to foot
Most often seen in canaries due to small clearance between leg and band
Clients see bird limping or foot is turning deep red, or in severe cases black
Leg bands that are causing irritation or are not freely moveable should be removed
In fact, if band is not needed for ID remove it
Whenever a band is removed record information in client record
Small bands and most closed bands can be removed with sharp wire cutters
Stainless steel quarantine open (C) bands should be twisted open
Stainless steel bands are very difficult to remove
Special heavy duty band cutters (preferred), bolt cutters, cutting attachment on small drill
Risk is involved with band removal
Only remove bands if you are experienced
Anesthesia can facilitate the procedure
Caution clients not to try to remove band themselves
May fracture leg
Hemorrhage may occur
Underlying bone may be exposed with tight band
If band is tight or necrosis has developed in foot explain risks and possible outcomes before band is removed
Antibiotic therapy and bandaging will be needed after removing band that has caused trauma to leg

**Wings**
Check range of motion
Check for fractures, dislocations or old healed fractures and dislocations
Check wing web for India ink tattoo
Was used for identifying surgically sexed birds
Males-right wing web, Females-left wing web
Evaluate feathering
Check for abnormal feathers, cysts, stress lines, parasites

**Skin**
Skin should be paper thin and slightly flaky
Excessive flakiness may indicate a nutritional disorder (vitamin A deficiency)
Check for parasites, dermatitis, self mutilation
Dehydration can be detected by skin fold elasticity, as in other animals
The skin of a dehydrated bird will appear dark and have little elasticity
Appears almost tight on the face and trunk

**Auscultation**
Best done with a pediatric stethoscope
Heart rate is difficult to evaluate due to rapid beat
Can detect heart murmurs in large birds
Can also detect respiratory abnormalities

**Weight**
Once a bird become an adult weight should remain relatively constant
Be certain to evaluate the fullness of the crop, excessive food or hand feeding formula in the crop can falsely increase the weight
Weight comparisons from yearly examinations should be evaluated as they can provide valuable information as to the state of health

**Sex Determination**
Avian reproductive organs are internal and few species have sexually dimorphic coloration
Sex determination is difficult and mistakes are frequently made
Surgical sexing vs. DNA blood sexing
With a few common species of bird a reasonable guess can be made

**Eclectus parrots** are sexually dimorphic
Male is green
Female is red

**Canaries**
Sex can sometimes be visually determined
Males – the vent protrudes somewhat
Females – the vent is more flush with the surrounding skin
Difference is subtle but can be detected with experience
Male canaries sing and females do not

**Budgies**
Male cere is deep blue
Female cere will become brown and crusty when in reproductive condition (brown hypertrophy)
Male with testicular tumor may develop brown hypertrophy (feminizing syndrome)
Immature female ceros may vary from pale blue to brown
Color mutations are more difficult, males have color all around nostril, females have pale rim around nostril
Males tend to be more vocal, more likely to talk

**Cockatiels**
All immature cockatiels have female coloration
Dull coloration on head, bars on underside of wing feathers, speckled tail feathers
When males mature and undergo first molt (8 months or so), head coloration brightens, underside of wing feathers lose bars, tail is solid grey
Female coloration remains the same at maturity
Males whistle and can talk, females do not
Some breeders sex birds by activity when young
Mutations (lutinos, pearls) are difficult to sex

**Cockatoos**
Eye color can be, but not always serve as an indicator of sex
Females that become sexually mature develop a red coloration to their irises, which is very distinct from the brown color of the male
Not all females develop this color change
Thus – red irises = female, brown irises = males, immature females, mature females that have not undergone the color change (and will not)

**African grey parrots**
This one is a bit of a stretch
Males
Broader beak
No red tips on vent feathers
Females
Narrower beak
Red tips on vent feathers

**Spectacled Amazon**
Males
Red color on coverlets extend all the way to the end of the wing
Females
Green coverlets at end of wing (2-3), remainder red

**Sex Determination**
Numerous other questionable techniques
Pelvic sexing
Females wide, males narrow
Head shape
Eye shape
Beak width
Pendulum

**Age Determination**
Owners of hand raised birds will know exact hatch dates
Birds that have been domestically bred will have a closed band with the year of hatching
Rotated 90˚and two number designation “98”
USDA quarantine leg bands have no date
Can make a relative guess is young or old, but difficult to provide an accurate age for mature birds
Young bird have a dark iris, which gradually lightens as they mature
When adults the iris is typically light in color
Budgies – distinguishing feature are the black lines on top of the head that extend from the cere (parallel to it) backwards
Young birds – lines extend from the cere back
Maturing bird – feathers develop that cover the lines so they begin to disappear until gone
When bird is mature it is virtually impossible to determine age
Some birds become more color intense as they age but an age still cannot be determined, rather a general idea
Yellow napes – nape develops as they age
Double yellow head – head becomes more yellow with age
Sally – 128 years old

**Avian Diagnostics**
Physical exams are much less revealing in birds than other animals so clinical pathology plays an important role in health evaluation
A complete avian physical examination should minimally include a CBC, fecal examination and pharyngeal Gram stain
Other diagnostics that could be included are a comprehensive blood chemistry, radiographs and fecal/oral culture/sensitivity
Newly purchased birds should be tested for chlamydiosis, psittacine beak and feather disease and polyomavirus
Diagnostic panels are available

**Blood Collection**
Multiple sites are available
Seriously ill birds may be unable to undergo stress of handling for blood collection
Birds should be in stable condition before undergoing diagnostic testing
Blood collection is required for hematology, chemistries, immunologic studies, virology, Chlamydia studies and DNA sexing
Blood volume-6-13% of total body weight
Sample volumes of 0.5-1% body weight can be safely taken (10% of total body volume)
This volume is more than adequate for testing
Volume depends upon type of bird and testing desired
Small samples are collected in microhematocrit tubes, heparinized
Larger samples in microtainer serum separators

**Blood Volumes That Can Be Withdrawn Safely**

<table>
<thead>
<tr>
<th>Bird Type</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budgie (35g)</td>
<td>0.35ml</td>
</tr>
<tr>
<td>Cockatiel (95g)</td>
<td>0.95ml</td>
</tr>
<tr>
<td>African grey (375g)</td>
<td>3.0ml</td>
</tr>
<tr>
<td>Macaw (1,000g)</td>
<td>5.0ml</td>
</tr>
</tbody>
</table>
**Toenail Clip**
Fast, easy, readily accessible, minimal restraint needed, most birds can be sampled by one person
Preferred method if only a small amount of blood is needed or sampling very small bird
Problems include:
Can be painful to bird
May be contamination of sample with uric acid residue from dropping material on toes
Hemolysis caused by “milking” toe
Clip conservatively, just enough to get adequate flow
Small birds-human nail clippers, small suture scissors, small wire clippers
Large birds-sharp dog nail clipper
Squeezing the toe may cause cell lysis
Can collect samples directly into microhematocrit or microtainer tubes
Hemostasis
Ferric subsulfate (Monsel’s powder), QuickStop
Silver nitrate sticks
Flour, cornstarch, baking soda, bar soap

**Ulnar Vein**
Ventral aspect of wing, easily located over the elbow
Lack of subQ tissue predisposes to hematoma formation
Vein easily sampled but usually reserved for IV fluids/antibiotics in critically ill birds
Use insulin syringe (30 or 50 unit) with ultrafine (28 gauge) or 1cc syringe with 25 gauge needle for venipuncture and collection

**Medial Metatarsal Vein**
Superficial along the metatarsus
Appears to fit in a groove in the bone
Easily visualized and used in larger birds, especially raptors
Can be used in small birds-lovebirds & cockatiels
Scaliness and thickness prevents hematoma formation
Penetrate just below hock and pass distal to proximal carefully, to avoid penetrating joint

**Skin Prick**
Some practitioners prefer this in small birds
Puncture skin over medial metatarsal with 25 gauge needle
Apply pressure for hemostasis
Can be very stressful to the bird
This method is not recommended

**Jugular Vein**
The method is recommended for collecting blood samples.
Large samples are obtained easily and quickly
Can provide large volume of blood with low incidence of hematoma formation
Jugular varies in size and location
Right jugular is usually larger than the left
Jugular is visualized in featherless area alongside cervical vertebrae.
Must have proper restraint because improper technique could lead to fatal hemorrhage
Bird is held in left lateral recumbency
Jugular vein is held off and 28 gauge needle is carefully inserted to avoid tearing the delicate vessel
After collection apply pressure for a few moments and be certain clot has formed before bird is released from restraint

**Avian Screening CBC**
Should be able to easily perform your own screening CBCs in-house
The technique described is simple and adds a facet to your practice that assists you both diagnostically and financially

**Hematocrit**
Blood is drawn into two small diameter microhematocrit tubes
Volume can be safely drawn from finches and larger
Normal avian PCV is 40-60%
Cockatiel PCV tends to be higher 45-60%
Cockatoo PCV tends to be lower 35-55%

**Plasma Protein**
 Plasma color should be clear
 Lipemia
 Hemolysis
 Icterus
 Cockatiels typically have a faint yellow color
 Yellow plasma must be carefully evaluated as birds that consume a diet high in carotene may give the appearance of icterus
Normal range 3.5-5.5 mg%
Smaller birds tend to be on the lower end of range
Large numbers of birds are hypoproteinemic due to inadequate diet
Birds with protein levels 2.5 mg% or lower and not on supplemental feedings may not survive
Lipemia will falsely elevate values

**Blood Smear Preparation**
Collect blood in microhematocrit capillary tubes, heparinized
Collect a volume of approximately 20% in tube, as skill improves you will need less
Prefer the cover slip method for smear prep
More uniform distribution of cells
Less likelihood of cell damage or rupture

**Rapid Screening CBC**
View on high dry power
View in monolayer region
Count number of WBCs per field
Check 10 fields—take average
Multiply number by 2,000 to determine estimate WBC/µl
Count of 10-12,000 is normal but can elevate to 20,000 due to excitement/stress
Greater than 20,000 is indication of disease
Normal leukocyte distribution is 50% heterophils and 50% lymphocytes
Ratio changes when bird is under stress
Some species respond to stress with lymphocytosis while others do so with heterophilia

**WBC Count with Unopette Method**
Use Unopette (Becton-Dickinson) and hemocytometer
Number of stained cells (granulocytes) in four corner squares are counted
Average calculated from two sides of hemocytometer
Average multiplied by 80 to determine number of granulocytes/µl (indicates WBC count)
Differential is then performed

**Automated WBC Counts in Birds**
At this time there is no automated system that has proven effective in determining avian WBC counts
The nucleated RBCs interfere with most automated methods
If uncomfortable with performing your own hematology, commercial labs do an excellent job with avian samples

**Fecal Examination**
Another component of the avian physical examination is the microscopic evaluation of the droppings
In our laboratory we perform wet mounts and Gram stains of the droppings

**Fecal Wet Mounts**
A small amount of fresh dropping is placed on a slide and mixed with one or two drops of saline
A cover slip is added and the slide initially examined under low, then high power
Normal elements include background bacteria, non-budding yeast (*Candida*), undigested food and urate crystals (often mistaken for ova)

**Bacteria**
The normal avian dropping should not contain an abundance of bacteria
Normal flora is Gram positive and generally cocci
If there is an abundance of bacilli, Gram staining will indicate if these are Gram negative and potentially pathogenic
Motile bacteria are almost always pathogenic

**Yeast (*Candida*)**
*Candida* may be normal flora if there is a small non-budding population
Budding yeast and mycelia are indicative of invasive/infecitive forms
Birds fed bread products will occasionally have non-pathogenic yeast in the droppings

**Megabacteriosis (Avian Gastric Yeast)**
Originally thought to be a large Gram positive bacilli now found to be yeast organism
Normal inhabitant of proventriculus, can overgrow leading to vomiting and wasting condition
Seen commonly in budgies, occasionally cockatiels
Appear like gigantic bacilli
Staining characteristics of yeast

**Parasites**
Can be detected on wet mounts
Protozoans can be identified in FRESH fecals
*Giardia, Hexamita* and *Trichomonas* can all be seen on wet mounts
Samples can be preserved in 5% formalin for staining and dark-field phase-contrast microscopy
Occasionally helminth eggs can be found
Typically birds kept in outdoor aviaries, wild birds or raptors

**Gram Staining**
Normal gut flora of birds is Gram positive
Most commonly isolated pathogens from birds are Gram negative bacteria
Most commonly *E. coli*
The presence of a few Gram negative bacteria does not always indicate disease as a few are normal in psittacine droppings
Some sources consider 10% or less normal
Evaluate the bird and the clinical signs
Gram staining is an important part of the diagnostic process
It assists in the determination of the character of the bacterial population
But it is only a screening tool
Studies have failed to correlate presence or absence of Gram negative bacteria with culture results
Final confirmation can be made through culture and sensitivity

**Choanal/Mouth Smears**

Same principles apply as described for fecal examinations
Too often the mouth smear, a valuable diagnostic tool, is overlooked
Collect sample with moistened swab
Choana receives flora from the upper respiratory tract and oral cavity
Provides good indication of flora in those areas
Bacterial populations, *Candida* and *Trichomonas* can be screened with a wet mount and further refined with a Gram stain
*Trichomonas* is best seen on a FRESH wet mount (can be intracellular)
Due to the prevalence of vitamin A deficiencies in pet birds, pharyngitis is quite common
They may present with excessive mucus in the mouth, abscessation, congested sounding breathing and poor eating

**Nasal Flushes**

Clean external nares, place tip of sterile saline filled syringe against naris and flush
Bird is held in sternal recumbency, tail tilted slightly up
Do not force solution in naris, allow it to flow easily through choana or other naris
Collect sample with sterile swab or syringe

**Sampling Other Sites**

Impression smears or needle aspirates should be taken at any site that exhibits abnormality
Stain samples to identify cellular response and Gram stain to determine microbial flora
Choana, crop and cloaca can be easily sampled with moistened swabs
Tracheal samples are taken under anesthesia
Surgical techniques (endoscopy) for internal organs

**Culture/Sensitivity**

Valuable for confirming diagnoses of bacterial diseases
With seriously ill birds you do not want to guess upon your therapeutic regimen
In house microbiology might produce quicker response, however, commercial laboratories do quite well with avian samples
Some pathogens fail to grow on conventional media
Chlamydia
Mycobacteria
Megabacteria
Anaerobes
Some pathogens are present in low numbers or are shed intermittently
Salmonella

**Blood Chemistry**

Serum is preferred over whole blood or plasma
Some labs prefer plasma
Collection and storage of blood is very important as mishandling, such as hemolysis, could lead to inaccuracies

**Laboratory Equipment for Serology**

Currently available chemistry systems are extremely useful for performing chemistries on serum and plasma
Vet Test, Abaxis
Initial cost may seem high but system can be used in your small animal practice and used to run chemistries on other exotic animals
Many commercial labs offer excellent avian profiles and diagnostic testing, including hematology and serology

**Serum Protein**

Normal range from 3.0-5.5
Small birds tend to be on lower end of range
Low protein
Malnutrition, malabsorption, chronic disease, renal disease, liver disease, parasitism, stress
Elevated protein
Dehydration, shock, infection
Hemolysis, lipemia

**Calcium**

Normal range 8.0-13.0 mg%
Low calcium levels are frequent causes of seizures
Hypocalcemia
Poor calcium supplementation, renal disease, other metabolic conditions
Hypercalcemia
Ovulating birds (values approaching 20 mg%)
Vitamin D3 oversupplementation
Renal mineralization
Neoplasia

**Glucose**
Normal range 200-500 mg%
Hypoglycemia
Malnutrition, liver disease, fasting, systemic disease
Hyperglycemia
Breeding, stress, egg yolk peritonitis, pancreatitis
Diabetes mellitus (common in cockatiels, budgies)
Values usually over 700 mg%, sometimes 1,000 mg% +
Repealed glucose testing to eliminate possibility of transient cause of hyperglycemia

**Cholesterol**
Normal range approx. 100-300 mg%
Low cholesterol
Liver, kidney disease
Elevated cholesterol
High-fat diets, obesity, hypothyroidism

**Uric Acid**
Primary nitrogenous waste product of kidney
Level in serum excellent indicator of renal function
Normal range generally 2.0-10.0 mg%
Up to 15.0 mg% in some species
Reduced uric acid levels
End-stage liver disease
Elevated uric acid levels
Over 15 mg% most often indicates renal disease
Even with advanced disease levels may be high normal
Starvation, dehydration, tissue trauma, aminoglycoside therapy

**Aspartate Aminotransferase (AST)**
One of the most reliable indicators of liver disease in caged birds (formerly termed SGOT)
Serum values greater than 350 IU/L abnormal
Indicative of liver disease
Liver, heart, muscle damage may also result in elevated values
Not beneficial in diagnosis of chronic or end-stage liver disease
Values low or will decrease due to hepatocyte loss

**Bilirubin**
Not important test for liver disease in birds as primary bile pigment is biliverdin
Elevations of bilirubin may be seen in severe liver disease
Caution: often yellow plasma in birds may be due to elevated carotene levels
Evaluate diet for presence of carotene rich foods

**Lactate Dehydrogenase (LDH)**
Normal range 70-400 IU/L
Elevated values
Most common in liver disease
Levels rise and fall more rapidly than AST
May Indicate chronicity of condition
May occur with heart or muscle damage
If values are increased and CPK is normal then liver disease is probably indicated
Decreased values
End-stage liver disease

**Bile Acids**
Found to be the most sensitive indicator of hepatobiliary disease in birds
Concentration indicates liver clearing capacity
Normal range 6.0-144 µmol/L
Racing pigeons and most psittacines
Greater than 70 µmol/L fasted and 100 µmol/L postprandially should be considered elevated and indicative of liver disease
Amazons greater than 145 µmol/L elevated
Decreased values in liver cirrhosis

**Creatinine Phosphokinase (CPK)**
Useful in distinguishing between muscle and liver disease in birds
CPK found primarily in cardiac & skeletal muscle
Normal range 100-300 IU/L
Elevated levels
Occur with damage to skeletal muscle or myocardial disease
Injections, trauma, feather picking
Can be seen with advanced PDD

**Amylase**
Normal range 100-600 IU/L
Elevated levels
Acute pancreatitis
Can be as high as three times normal
Some cases of enteritis
Even in absence of pancreatic lesions
PDD
Not a consistent finding

**Lipase**
Levels are poorly established in birds
May see elevations in acute pancreatitis

**Electrophoresis**
Received much attention recently as a valuable diagnostic tool in avian medicine
Implemented as part of *Aspergillus* panel at University of Miami

**Specialized Laboratory Services**
Specialized tests are available that can be used for screening new bird purchases or detecting particular diseases
Chlamydiosis testing, virology studies (PBFDS, polyomavirus, PDD), *Aspergillus* titers, DNA blood sexing, and others
Discuss the merits of these tests with the client
Have some sort of documentation that the testing was discussed and if the client declines a test, make a notation in the record

**Radiology**
Radiographic contrast, due to the extensive air sac system is good
The grit-filled ventriculus is a useful landmark
Normal location is left of mid-line at the level of the acetabulum
Liver enlargements will push ventriculus caudally
Renal, ovarian and abdominal masses tend to push it cranially
Abdominal enlargements will also push it ventrally aiding in determination of origin of mass
Juvenile psittacines have a comparatively large GI tract
Do not mistake this for abdominal dilatation
Consider the condition of the bird to be certain that it can tolerate the stress of the procedure
Proper restraint is essential
To aid restraint some practitioners utilize anesthesia for radiographic procedures
Plexiglas positioning boards also facilitate process
Some practitioners tape small birds directly onto the cassette
Recommended film screen combination is a high-detail rare earth system
The avian radiographic technique chart will have a fixed mAs and time but the kVp adjusted for changes in the patient size
Short exposures are preferred, faster than 1/60 of a second

**Barium Series**
Because abdominal structures are poorly defined on plain films, barium series are frequently performed
Contrast medium enables distinguishing the course and size of divisions of GI tract
Displacement of the GI tract helps define abdominal masses and enlargements
Can identify obstructions, masses and foreign bodies
Contrast medium is gavaged into crop
Volume same as if supplementally feeding
Contrast medium will usually be in lower GI tract in less than an hour
Transit time varies depending upon condition
Upper GI study
Timing immediate, 5, 10, and 30 minutes
Lower GI
Timing depends upon position of area of interest

**Laparoscopy**
Becoming increasing popular in avian medicine
Used for many years in surgical sexings
DNA blood sexing has reduced this application but is still popular with some breeders
Enables evaluation of gonads and abdominal organs
Endoscopy applications extend far beyond sexing
Laparoscopic evaluations and biopsy
Examination of inside of GI tract and trachea
Locate and identify obstructions

**Ultrasound/CAT Scan**
Available on referral basis in some areas
Due to air sac system in birds, ultrasound is of limited diagnostic value
May be useful in certain neoplastic or abdominal lesions

**Fluoroscopy**
Fluoroscopy has proven valuable for investigating GI motility
May aid in the diagnosis of PDD

**Treatment Techniques: Supportive Care for the Sick Bird**
In most cases birds are sent home with client with appropriate medications and instructions for their use
If bird has been ruffled they are instructed to keep the bird warm, either with a heat lamp or home-made incubator
We recommend a heating pad on side of cage, then enclose in saran wrap with holes for ventilation
Client is told to monitor the bird for changes and count daily droppings
Some birds are too ill to send home and need varying degrees of hospital care
Rarely send home a vomiting bird
Hospitalize and treat with injectables until vomiting subsides
Some birds are so ill that only minimal or no handling can be performed
Only basic supportive care can be provided until stabilized and diagnostics can be completed
The basic means of supportive care for sick birds:
- **Heat**
- **Fluid therapy**
- **Drug therapy**
- **Gavage feeding**

**Heat**
Temperature-controlled environment is essential
Incubators (avian or human), kennels with heat lamps, aquaria with heating pads can be used
Sick, ruffled birds should be kept at 80-95˚
Critically ill birds may need to be maintained at 100˚
The bird’s response to heat must be monitored
If the bird is ruffled and close to the heat source, increase the heat
If the bird is away from the heat, open mouth panting, feathers slicked close to body, wings held out, reduce heat
Dry heat can lead to dehydration so humidity source is needed in the incubators
Quality commercial incubators have built in means of controlling humidity
Have means of detecting temperature/humidity
Humidity can be provided by placing a jar with water with many holes punctured in the cap in the unit

**Fluid Therapy**
Advances in fluid therapy have led to great improvement in survival rate of sick birds
For rapid fluid administration an intravenous bolus or intraosseous catheter can be used
Birds will not tolerate standard catheterization
Due to the safety of isoflurane some practitioners anesthetize birds during fluid administration
Discretion must be used when sedating sick birds

**Intravenous Boluses**
Veins used for IV boluses are ulnar (large birds), medial metatarsal, jugular (small birds)
Fluids are warmed, bolus injected with 25 to 28 gauge needle
Fluids include LRS (most situations), 5% dextrose, normal saline
Fluids given at 10-15 mg/kg per bolus, up to 30 mg/kg per bolus
If sites are rotated can give three times a day

**Intraosseous Catheter**
Catheter placed in any bone with rich marrow cavity
Dorsolateral portion of distal ulna
Better for long term use in medium to large birds
Proximal tibia
Ideal for short term use in medium to large birds
Distal radius
Pneumatic bones, such as the humerus and femur cannot be used
Medium to large birds
18-22 gauge 1.5 to 2.5 inch spinal needle
Small birds
25-30 gauge hypodermic needle
Prepare site, align needle with axis of bone, insert and rotate through bone cortex
Remove stylet and suture in place
Wing should be bandaged in figure 8
A burette or infusion pump should be used to regulate volume of fluid administered
Catheters should be replaced after 72 hours
Fluid administration should be calculated in much the same manner as other animals
A portion of maintenance fluid can be given subcutaneously

**Subcutaneous Fluids**
The majority of hospitalized birds do not require rapid administration of fluids
Subcutaneous and oral routes can be implemented
Multiple sites can be used for subQ fluids
Wing webs
Intrascapular region
Breast region
Inguinal region
Fluids are delivered via a 22 gauge needle until the skin is taut
Deliver 50 ml/kg/24 hours (.05 ml/gm) in divided doses in multiple sites
Fluid replacement will also be assisted with gavage feeding
SubQ fluids are absorbed more slowly than IV sites, even slower in seriously debilitated birds

**Guidelines for Initiating Drug Therapy**
A “best guess” therapy has to be started in critically ill birds before diagnostics are done
If the bird is vomiting oral antibiotics should not be given
Use injectables due to rapid and effective absorption
Piperacillin, Claforan or Baytril are good first choice injectable antibiotics
Dexamethasone can be given to “shocky” birds
Vitamin B complex can give boost to debilitated bird
When stable and no vomiting, change to orals

**Guidelines for Intravenous Drug Administration**
IV drugs are generally used only if an intraosseous or intravenous catheter is already in place

**Guidelines for SubQ or IM Drug Administration**
Topical alcohol application can aid in the placement of subQ injections
IM injections are easily given into the breast
Injection should be given near the keel, below the crop and above the abdomen
Palpate the landmarks
In small birds such as finches take care not to puncture sternum
Never give IM injections in leg muscle

**Guidelines for Oral Drug Administration**
Best given directly by mouth or gavage
Adding medication to food is discouraged as it is difficult to monitor how much is taken in
Exception is with birds being hand fed as medication can be placed in a small amount of formula
Some birds may take medication in soft food mix
Medications in water is unreliable
Sometimes may be the only alternative
Alters taste of water, variable intake of water

**Guidelines for Topical Drug Administration**
Topical medications, especially creams, can be beneficial in avian medicine
Use only on unfeathered areas and apply sparingly, preferably covered with a bandage
Problem is that excessive ointment may become a widespread contaminant as the bird preens
Prior to having client apply ointment, caution them to use tiny amounts

**Guidelines for Nebulization**
Sometimes indispensable for delivering medication to the respiratory tract of birds
Few controlled studies as to the pharmacokinetics of this route of administration
Should be considered supplement to systemic medications

**Nebulizer**
Invaluable aid in treating severe respiratory tract or air sac disease
Injected or oral antibiotics do not reach therapeutic levels in the air sacs
Many varieties available, including veterinary and human sources
Do not hesitate to purchase a new one
Can be used to treat respiratory disease in other animals. Nebulizing solutions can be formulated containing antibiotics, bronchodilators or antifungals, depending upon the condition being treated.

**Force Feeding/Gavage Feeding**

Most sick birds have either stopped eating or are not eating enough to maintain themselves so supplemental feeding is essential. A variety of feeding solutions can be used, commercial or home-made.

**Feeding solutions** to provide nutritional support for hospitalized birds is of utmost importance.

**Commercial**

- Emercal/Emeraid (Lafeber Co.)
- Roudybush (Tempeleton, CA)
- Oral electrolyte solution (Pedialyte)
- Various hand feeding formulas (Exact, Pretty Bird)

**Home-made**

- Nutrical
- Baby food/baby cereal

**Force Feeding/Gavage Feeding**

In a bird that is vomiting, a very dilute high energy solution (Emercal) can be given in small amounts until the bird keeps it down. At that point, the thickness can be gradually increased until conversion to a maintenance solution (Emeraid II).

If the hospitalized bird is in reasonable condition, the maintenance solution can be started immediately. Solutions administered with rubber feeding tube or metal feeding tube with ball end. The tubing used is a matter of personal preference.

Rubber tubing could be severed by beak when passed into the esophagus. Overzealous passage of the metal tube could damage the esophagus.

<table>
<thead>
<tr>
<th>Bird</th>
<th>Catheter Size</th>
<th>Amount Fed (ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finch</td>
<td>5</td>
<td>1/4-1/2</td>
</tr>
<tr>
<td>Canary</td>
<td>5-8</td>
<td>1/4-1/2</td>
</tr>
<tr>
<td>Parakeet</td>
<td>8-10</td>
<td>1-2</td>
</tr>
<tr>
<td>Lovebird</td>
<td>10</td>
<td>3-4</td>
</tr>
<tr>
<td>Cockatiel</td>
<td>10</td>
<td>3-4</td>
</tr>
<tr>
<td>Conure</td>
<td>10-14</td>
<td>6-8</td>
</tr>
<tr>
<td>Amazon</td>
<td>10-18</td>
<td>30-35</td>
</tr>
<tr>
<td>Cockatoo</td>
<td>18</td>
<td>40-45</td>
</tr>
<tr>
<td>Macaw</td>
<td>18</td>
<td>30-60</td>
</tr>
</tbody>
</table>

The number of times a day gavage feeding can be performed depends upon crop emptying. Feeding should only be performed when crop empty. Thinner solutions pass through more rapidly.

Hospitalized birds fed 2-3 times daily. Always evaluate crop fullness before feeding. If crop not emptying, will need to aspirate contents and refill with dilute solution. Estimate the length of feeding tube to be passed by measuring distance into the crop from the mouth. Tube can be marked as an aid.

Canaries, mynahs and certain other birds do not possess a crop. Estimate should be to the “region of the crop.” Small birds may not require a speculum to open the mouth and tube passage. Speculum is necessary in large birds. Can use a Nylabone with a hole drilled in the center to ease tube introduction. Laterally displacing the upper beak a centimeter can also expedite tube passage. Care must be taken to avoid damaging beak or having beak sever tube.

Extend the neck slightly with head upright so when tube is introduced it is more of a direct, straight passage. Introduce the tube on the left side of the mouth, pass it gently, but firmly over the tongue and it will pass over to the esophagus which runs on the right side of the neck. Tube should be passed slowly and cautiously. Never force the tube as it could puncture the esophagus or crop. It is extremely important to determine that the tube is positioned in the crop. Palpate the crop to be sure the tube is in position before administering feeding. When tube is in position slowly deliver the feeding solution. Crop will begin to fill and can be visualized or palpated.

Observe mouth for evidence of solution welling up in mouth, indicating overfilling or poorly positioned tube. If this occurs remove tube, turn bird over with head directed downward so solution can pass out through mouth and prevent aspiration. A bird may retch or vomit occasionally after tube feeding. If this occurs frequently then carefully evaluate your technique to determine the cause.
Anesthesia
Due to the stress birds experience from handling and restraint sedation and anesthesia are frequently used in avian medicine
Careful evaluation must be made before the bird is subjected to sedation/anesthesia
Fasting before sedation/anesthesia is not always required
All that is required is an empty crop
Isoflurane is the anesthetic of choice
In certain situations injectable agents are still suitable but should be used cautiously

Pain Management
Poorly understood in avian species
Indications of pain include: behavior, appearance or discomfort, decreased activity or anorexia, abdominal tenseness
Injuries associated with pain include: burns, beak trauma, crushing trauma, trauma to extremities
Agents used: aspirin, flunixin, butorphanol, metacam, buprenophine

Avian Therapeutics
Drug dosages in birds are poorly established
Dosages are empirically based or based upon clinical experience
Drugs that are effective in certain species may be inappropriate or toxic in others
A good exotic animal formulary is essential

Conclusion
I hope this information will give you confidence to begin seeing pet birds in your practice
If you already do see birds  I hope it has provided you with practical insights into avian medicine