Reptile patients have many unique qualities that are important to know about. This Power Page discusses the housing needs, nutritional requirements, restraint techniques, and diseases in various reptiles.

**Housing**
- **Lizards** housing requirements are different for each species depending on biology and natural habitat.
- **Enclosures** (made of synthetic nonporous material, sealed wood, Plexiglas).
- **Vertical** for Arboreal species, **horizontal** for Terrestrial species.
- The larger the enclosure the better, consider adult size for the species.
- Monitor **Temperature** closely. Diurnal **temperature range** (tropical and desert lizards) 85°F -95°F, also provide **basking** light reaching maximum temperature of 100°F-105°F. Temp monitoring is important to avoid thermal burns and achieve optimum temperature ranges.
- Recommended **humidity** for tropical species 80-90%, desert species require 30-50%.
- **UVB** lighting is necessary for **vitamin D synthesis** and calcium absorption.
- **Substrates**: Newspaper, artificial turf (sturdy, good quality), recycled paper products, aspen bedding, cypress, mulch, ornamental bark chips.

**Avoid:**
- Enclosures of uncoated **wire mesh**.
- **Cedar** or **pine** substrate.

**Nutrition-Unique for each species**

**Herbivores (Lizards):**
- **Grasses, leaves, vegetables and fruit.**
- Feed diet with **moderate to high fiber** content and **moderate to low fat and protein**.
- **Alfalfa** should be part of diet to provide **protein source**, should be fed in moderation.
- **Don’t feed** dog and cat food.
- **Avoid Parsley, spinach and chives** (high in oxalic acid may bind calcium and **reduce calcium level**).

**Carnivores (Lizards, Snakes):**
- **Prey, small mammals, birds** or other **reptiles**.
- **High protein** diet with **moderate fat and low fiber**.
- **Immature rodents** should be coated with a **calcium supplement** to increase calcium intake.
- **Avoid** feeding live prey, may cause injury to reptile.

**Insectivores (Lizards):**
- **Insects.**
- **Crickets, mealworms and waxworms.**
- **Insects** must be fed a **nutrient rich diet** for up to 2 days before being offered to the reptile, (this is called **gut loading**).
- **Insects do not provide enough nutrition without gut loading.**
Omnivores (Lizards):
- Plant and prey items.
- Combination of food items for herbivores, carnivores and insectivores.
- Water: depending on the species water may be offered in a dish, misting or dripping system.

Handling/restraint
Lizards:
- Lizards may bite, restrain head first.
- Secure the head by placing the index finger and thumb around base of mandible (dominant hand). Use free hand to hold rear legs and tail.
- Do not grab the tail. Some lizards can lose the distal part of their tail as a defense mechanism (this is called tail autotomy).
- Here’s a calming trick! Some species will calm down when both eyes are covered (use cotton balls or gauze) and wrap around head with bandaging material. This technique produces vagal stimulation resulting in a calming effect.
- Venipuncture sites: ventral coccygeal (tail) vein, jugular vein, ventral abdominal vein.

Chelonians (Turtles & Tortoises):
- Nonaggressive chelonians safe handling by grasping both sides of shell.
- Restrain head by grasping base of skull at the mandible with index finger and thumb. Use gentle traction to extend head and neck. Excessive pressure may lead to injury of cervical spine.
- Seek professional training for tips to handle aggressive species (e.g. freshwater snapping turtles and marine turtles).
- Venipuncture sites: jugular vein, subcarapacial venous sinus (just above head and underneath shell at midline), dorsal coccygeal vein (dorsal midline of tail).

Snakes:
- Main defenses bites and constriction.
- Restrain by grasping head at level of mandible, support body with the other hand.
- There needs to be an additional handler for every 3-4 feet of snake to support the snake’s spine.
- Never drape snakes over a person’s neck.
- Only trained professionals should handle venomous snakes.

Toxins:
Do not administer ivermectin to chelonians, indigo snakes or debilitated snakes. Ivermectin is extremely toxic to turtles and tortoises. Toxicity leads to neurologic defects and often death.

Diseases
Lizards:
- Metabolic Bone Disease- malnutrition and lack of exposure to UVB light (either from sunlight or artificial bulbs). This leads to decreased synthesis of vitamin D3. Vitamin D3 is essential for calcium absorption and metabolism. Low levels of vitamin D3 impairs calcium absorption and metabolism. Patients with metabolic bone disease may exhibit the following clinical signs: weakness, lethargy, stunted growth, muscle fasciculations, abnormal gait or posture, fractures, soft mandible (rubber jaw). Without treatment and correct husbandry this condition is fatal.
Renal Disease.

Urinary Calculi (Bladder Stones).

Gout—elevated levels of uric acid in the bloodstream lead to formation of insoluble uric acid crystals in tissues.

Parasites:
- Ticks.
- Mites.
- Trematodes (flukes).
- Cestodes (tapeworm).
- Nematodes (roundworm).
- Oxyurids—thought to be a commensal in most species. Often present in low numbers without causing disease. Treatment only if associated with clinical disease.
- Entamoeba invadens (protozoal parasite) may cause severe gastrointestinal disease.
- Cryptosporidium spp (protozoal)—when associated with disease does not respond to therapy and fatal.
- Blood parasites—usually do not cause disease, rarely anemia in some patients.

Bacterial: Gram negative bacteria most often associated with infections, occasionally gram positive.

Fungal: localized and systemic infections have been associated with Aspergillus spp., Candida spp., Cryptococcus, and Chrysosporium spp.

Zoonotic Diseases:
- Salmonella—normal inhabitants of the reptile gut flora, intermittently shed in feces. No successful technique to eliminate shedding of these organisms. May result in severe gastrointestinal disease in humans. Infection often associated with poor husbandry &/or poor hygiene. Young children and immune compromised individuals most susceptible to infection.

Viral:
- Adenovirus—nonspecific clinical signs (neurologic, poor body condition, death). Transmission thought to be fecal oral route. No treatment currently available.
- West Nile Virus—recently identified in crocodiles, unsure role of reptiles in route of transmission.
- Herpes Virus—may cause wart like growths on skin, associated with stomatitis, disease in the liver, lung, or spleen. No treatment.

Snakes:
- Malnutrition—often due to inappropriate food or frequency of feeding.
- Obesity—too much feeding and lack of exercise.
- Parasitic:
  - Ticks.
  - Snake mites (may lead to anemia).
  - Cryptosporidium serpentis (protozoal parasite), either asymptomatic carrier or gastroenteritis (weight loss, regurgitation). Antibiotics reduce shedding of cryptosporidium.
  - Coccidian parasites (Eimeria spp, Isospora spp, Caryospora spp). Treatment: sulfonamides.
  - Entamoeba invadens (protozoal parasite), fecal-oral transmission. Clinical signs: hemorrhagic diarrhea, dehydration, muscle wasting, death.
- Bacterial: most infections associated with opportunistic gram-negative bacteria. Sometimes gram-positive bacteria.
- Fungal dermatitis—often associated with poor husbandry.
- **Viral:**
  - **Herpes virus**, isolated from lesions in *liver*, *pancreas*, *kidney* and *adrenal cortex*. No treatment.
  - **Adenovirus**, associated with *liver damage*.
  - **Paramyxovirus**, transmission through contact with *contaminated respiratory secretions*. Clinical signs *nasal discharge*, *pus* and *blood tinged discharge* from *glottis*, *neurologic disease*. No treatment.

- **Cancer.**
- **Zoonotic diseases:**
  - **Salmonella**.
  - **Campylobacter spp**, bacteria naturally *harbored by snakes*. May cause *disease in humans*. Wear gloves when cleaning cages, and clean with *sodium hypochlorite*.
  - **Common Snake Mite**, can *bite people* leading to *dermatitis*, does *not stay on humans*.

**Chelonians:**
- **Hypovitaminosis A**- vitamin A deficiency. Many clinical signs associated with *degeneration of epithelial surfaces*.
- **Metabolic Bone Disease**
- **Gout**-Increased production of *uric acid* results from ingestion of excessive protein.
- **Decreased excretion of uric acid** may be due to *dehydration* or *kidney disease*.
- **Hepatic lipidosis (fatty liver)**-normal physiologic process during *hibernation* or during *egg formation*. Lipidosis can also be a *pathologic* process in *obese* or *anorexic chelonians*. Clinical signs: *obesity*, *lethargy*, *weight loss*, *infertility*, abnormal feces, *anorexia*.
- **Accelerated Growth or Early Maturity**-occurs in juveniles or hatchlings fed *high protein diets*. Associated with *renal disease*, skeletal deformities and *high mortality*.
- **Zoonotic Diseases:**
  - **Salmonella** spp, **Mycobacterium** spp, **Campylobacter** spp, **Chlamydia** spp, **Yersinia** spp, **Vibrio** spp, **Aeromonas** spp and **Escherichia coli**.

**Reference:**