

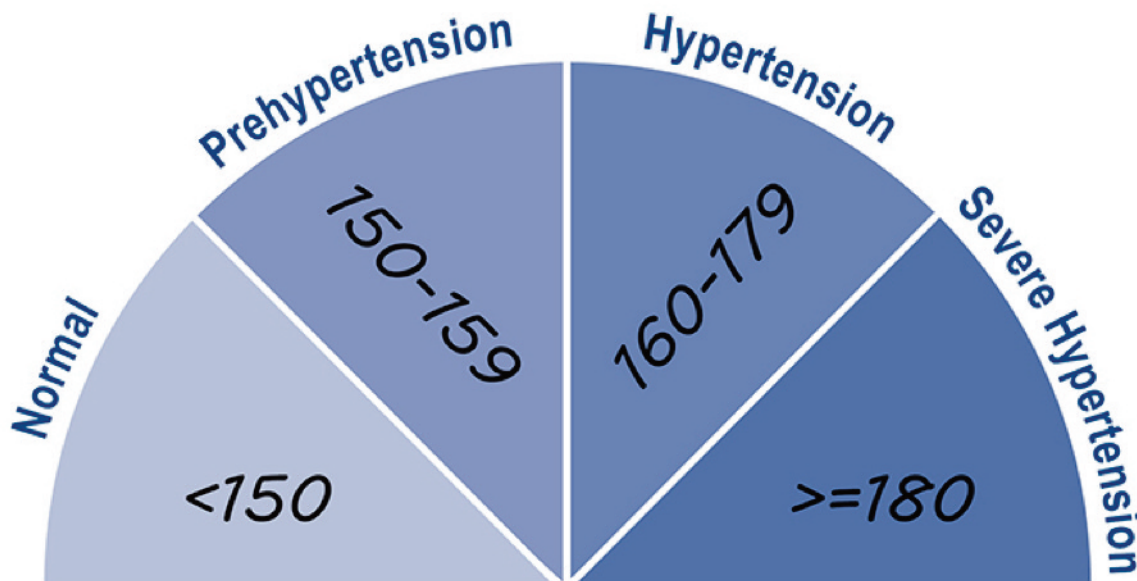


Measuring Blood Pressure

Routinely checking blood pressure at all ages establishes baseline measurements for the individual cat that can be used to track trends and aid in early detection of hypertension. This is especially important in cats 10 years of age and older, and cats at risk for secondary hypertension. Routine blood pressure measurement may also help the cat get used to the procedure and reduce false elevations from situational hypertension. Sustained high blood pressures put cats at risk for TOD.

| SBP(mmHg) | Category | Risk of TOD |
|-----------|------------------------------|-------------|
| <150 | Normal | Minimal |
| 150-159 | Borderline (Prehypertension) | Low |
| 160-179 | High (Hypertension) | Moderate |
| >=180 | Severe Hypertension | High |

**This table was created based on the ISFM Hypertension Guidelines. To view guidelines, please visit <https://journals.sagepub.com/doi/pdf/10.1177/1098612X17693500>.*

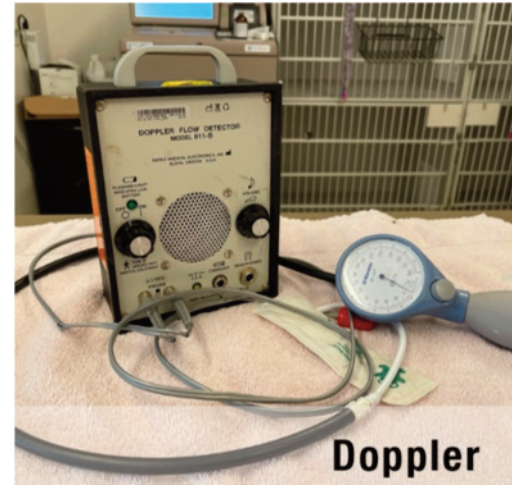


Measuring Blood Pressure continued

Equipment

- Direct
 - Central catheter-arterial cannulation
 - Radio-telemetric implant
- Indirect
 - Doppler
 - Oscillometric
 - HDO
- Doppler sphygmomanometry
 - Good correlation and accuracy compared with direct
 - Requires alcohol or shaved area over artery of interest
 - Requires fixation of the Doppler over the artery with hook and loop self-fasteners
 - Noise may disturb cat – use headphones
- Traditional Oscillometric
 - Less accurate than Doppler in conscious cats
 - Often underestimates BP at higher values
 - Requires cuff placed on limb or tail
 - No noise!
- High Definition Oscillometric (HDO)
 - Shown to produce accurate results compared with direct BP in conscious cats
 - Requires cuff placed on limb or tail
 - Moderate noise
- Check BP equipment calibration weekly if possible, semiannually at a minimum

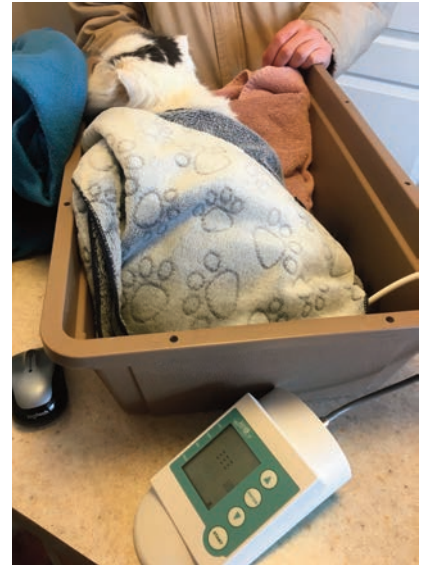
Try to obtain BP at the beginning of the examination before handling or any diagnostic tests. Assign and train specific technicians to measure BP. Cat Friendly Veterinary Professionals (CFVPs) are ideally suited for this role. Please visit catvets.com/certificate to learn more about the Cat Friendly Certificate Program.



Measuring Blood Pressure *continued*

Environment

- Conduct in a calm, quiet room away from other animals
- Allow the cat to adjust to the room and explore if desired (ideally 5-10 minutes)
- Having the owner present may be helpful
- Allow the cat to rest on its own bedding or a warm towel in a comfortable position
- If carrier has a removable top, allow the cat to stay in the bottom of the carrier if preferred (some cats prefer to be partially or fully covered with a blanket)
- Consider using a synthetic facial pheromone to reduce stress
- Use quiet clippers if shaving fur is needed to detect blood flow (Doppler), and allow cat time to resettle before measuring SBP
- Use minimal, gentle Feline-Friendly handling (visit catvets.com/handling). Some cats will sit still with ZERO restraint, and ZERO restraint is ideal
- If the cat becomes stressed, take a break and allow the cat to resettle or reschedule if necessary



Cuff Selection and Placement

- Measure cuff for every patient each time BP is checked
- Cuff width should be 30%-40% the circumference of the limb or tail which it is applied
- Some cuffs show "optimum zones" to help determine the 30%-40% circumference
- Use a flexible metric ruler to measure circumference
- A cuff that is too large falsely decreases readings
- A cuff that is too small falsely elevates readings
- Doppler: cuff may be placed mid-radius on forelimb, **proximal to hock on hindlimb**, or tail base
- Oscillometric: cuff may be placed mid-radius on forelimb, **mid-tarsus on hindlimb**, or tail base
- **Select a limb positioned at heart level whenever possible**
 - Cuff placement above the plane of the heart falsely decreases readings
 - Cuff placement below the plain of the heart falsely increases readings
 - If in lateral recumbency, use the nondependent leg
- Tail is preferable for HDO and cats with osteoarthritis (seniors) or cats with sensitive paws
- Ensure the inflation tube is positioned over the artery to be occluded
- Ideally, direct transducer tubing should be away from the cat and towards the monitoring device
- Secure the cuff with hook and loop self-fasteners. Only use a very loose piece of tape if absolutely necessary, as tightly wrapped tape will restrict airflow to the cuff's bladder and cause inaccurate readings
- Do not place cuff on a compromised limb or a limb with an arterial catheter, IV catheter, or pulse Ox probe
- Review the Cuff Do's and Don'ts for additional information and examples of best practices
- See next page for full size print version of the Blood Pressure Cuff DO's and DON'Ts form.

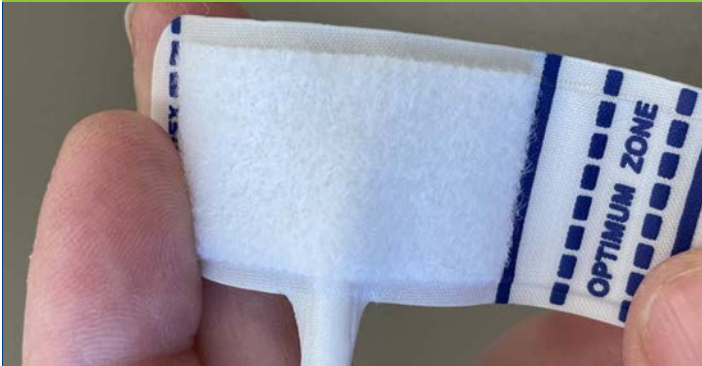


Top: Cuffs showing optimal zones

Bottom: Proper cuff placement

Blood Pressure Cuff DO's and DON'Ts

DO



✓ CLEAN CUFF IN GOOD CONDITION

DON'T



✗ CUFF WITH FUR COVERING THE HOOK AND LOOP SELF-FASTENER



✓ CUFF PLACED WITH TRANSDUCER TUBING DIRECTED AWAY FROM THE CAT



✗ CUFF PLACED WITH TRANSDUCER TUBING DIRECTED TOWARD THE CAT



✓

- CUFF POSITIONED AT HEART LEVEL
- CUFF PLACED ON NONDEPENDENT LEG IN LATERAL RECUMBENCY
- TRANSDUCER TUBING AWAY FROM THE CAT



✗

- CUFF POSITIONED BELOW HEART LEVEL
- CUFF PLACED ON DEPENDENT LEG IN LATERAL RECUMBENCY
- TRANSDUCER TUBING TOWARD THE CAT

For more information, visit catvets.com/hypertension-toolkit.

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Measuring Blood Pressure *continued*

Taking BP Measurements

- Use the minimum number of people necessary (no more than two if possible)
- The cat can be positioned in ventral or lateral recumbency. The cuff needs to be in plane with the level of the heart whenever possible. Above (false decrease) or below (false increase) changes the readings
- The cat must be still and relaxed during readings. Movement and stress will cause false readings
- Doppler
 - Sound may disturb cats. Use headphones. If not available, use lowest volume needed to hear pulsatile blood flow
 - Blood flow detection requires good contact between the Doppler probe and the skin. This is best achieved with alcohol to dampen the hair and skin, and plenty of ultrasound gel
 - Position probe with gentle pressure to avoid restricting blood flow, and adjust the position slowly until pulsatile blood flow is heard
 - Inflate and deflate the cuff a few times before taking recordings to help the cat to get used to the sensation
 - Slowly inflate the cuff to 20-40 mmHg above the point where blood flow is no longer heard
 - Allow air to bleed from the cuff slowly. SBP is the point at which pulsatile blood flow is first detected
- A minimum of six readings should be taken, with the first reading discarded and the remainder averaged
- Use the same patient position, limb, cuff, and machine when rechecking a patient to document trends accurately
- Document details, including cuff site, cuff size, staff, and if the owner was present. The BP Assessment Form in the digital toolkit can be used to record data from initial and recheck readings
- See next page for full size print version of the Blood Pressure Assessment Form.



Blood Pressure Assessment Form

CAT'S NAME

OWNER'S NAME

CAT'S AGE

WEIGHT

WHO'S IN THE ROOM

DATE

TIME

ROOM

PERFORMED BY

MEDICATION(S) GIVEN & TIME

CAT'S POSITION

Ventral

Lateral

Other (specify): _____

CAT'S LOCATION

Carrier

Exam Table

Other (specify): _____

CAT'S Demeanor (Subjective)

Calm

Slightly Anxious

Anxious

Stressed

EQUIPMENT USED

Doppler

Oscillometric

HDO

CUFF SIZE _____

CUFF SITE

Tail

Front limb (L/R)

Hind limb (L/R)

POSITION OF CUFF (e.g. below elbow) _____

SBP READINGS (mmHg) 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____

AVERAGE (discard first reading) _____

TREATS PROVIDED _____

FACIAL PHEROMONES USED

Diffuser

Spray

Wipe

CAT'S PREFERENCES NOTED (describe experience in detail for future readings) _____

*This form can be printed, saved on a desktop, or scanned into the patient's medical record.
Recheck blood pressure measurements can be added on subsequent visits.*

For more information, visit catvets.com/hypertension-toolkit.



Measuring Blood Pressure *continued*



Tips for Successful Blood Pressure Management

- Avoid measuring BP while the cat is moving
- Attempt to schedule BP appointments at times when the practice is less busy
- Consider technician appointments for BP readings
- If errors, check for:
 - Expired tubing/cuffs
 - Broken Doppler crystals
 - Not cleaning/covering crystal after each use
 - Kinked/cracked tubing
 - Poor hook and loop self-fastener closure due to fur/fuzz
 - Degradation of inflation bulb and pressure-release valve
 - Degradation of cuff bladder
- If false elevations occur, check for:
 - Correct size of cuff (too small increases BP)
 - Cuff is not deflating or has stretched areas
 - Cuff is being overly inflated
 - Cuff is not vertical to the heart
- Use minimal Cat Friendly handling (visit catvets.com/interaction) whenever possible