

# Measuring Blood Pressure



## Disclaimer

A series of booklets has been developed by the Clinical Skills Lab team (staff, recent graduates and students) from the School of Veterinary Sciences, University of Bristol, UK.

Please note:

- Each booklet illustrates one way to perform a skill and it is acknowledged that there are often other approaches. Before using the booklets students should check with their university or college whether the approach illustrated is acceptable in their context or whether an alternative method should be used.
- The booklets are made available in good faith and may be subject to changes.
- In using these booklets you must adopt safe working procedures and take your own risk assessments, checked by your university, college etc. The University of Bristol will not be liable for any loss or damage resulting from failure to adhere to such practices.

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## Equipment list:

# Measuring Blood Pressure

### Equipment for this station:

- Dog model
- Sphygmomanometer
- An assistant

### Considerations for this station:

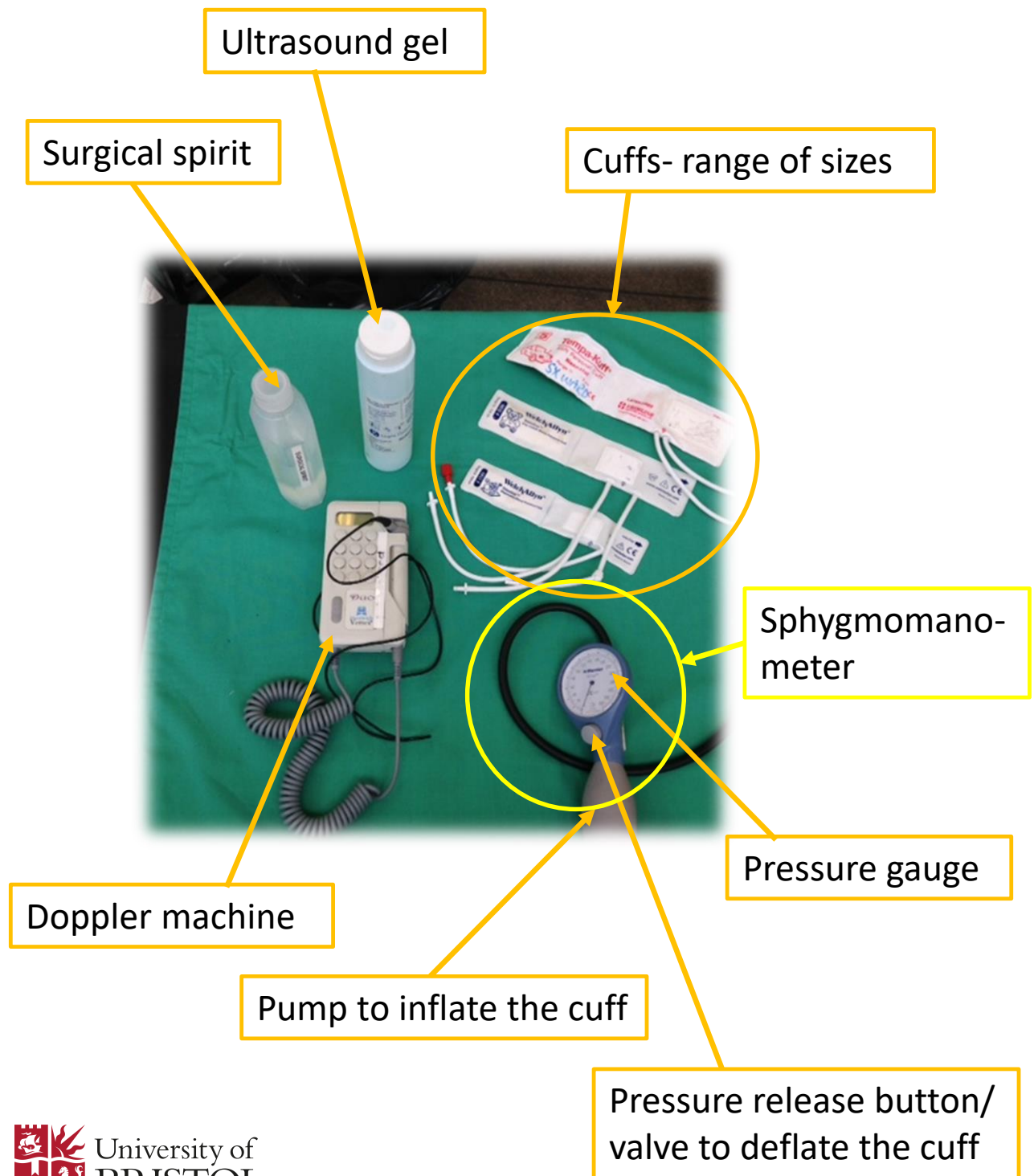
- Please remember this station is to practise the technique for measuring blood pressure and although the equipment can be used to practise on an assistant, it should **not** be used to attempt to **accurately** measure your own or someone else's blood pressure.
- The booklet initially describes how to practise the techniques using a model or on a colleague.
- Towards the end of the booklet there is additional information and a description of how to measure blood pressure on a live animal.

Anyone working in the Clinical Skills Lab must read the 'CSL\_I01 Induction' and agree to abide by the 'CSL\_I00 House Rules' & 'CSL\_I02 Lab Area Rules'

Please inform a member of staff if equipment is damaged or about to run out.

# Measuring Blood Pressure

- Equipment required to measure blood pressure

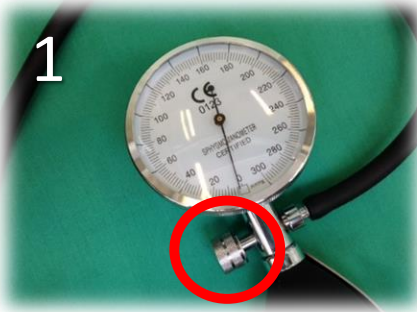


# Clinical Skills:

## Measuring Blood Pressure

### Equipment handling

To practise handling the pump and cuff system use the dog model and select the smallest cuff.



When pumping up the cuff ensure the valve is closed otherwise the cuff will not inflate.



Place the cuff around the model's limb (the forelimb or hind limb can be used). The width of the smallest cuff is approximately 40% of the diameter of the model limb therefore is an appropriate size.



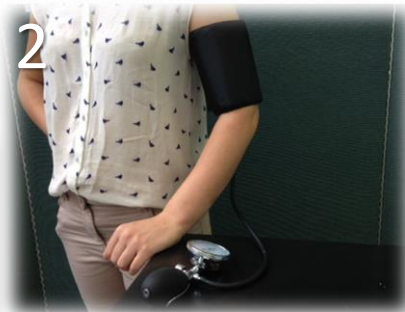
Practise inflating the cuff and then slowly releasing in a controlled manner by opening the valve. This is key when measuring blood pressure on a live animal as it is crucial to know exactly when the 'whooshing' sound of the pulse returns.

You need to be able to do this one-handed as your other hand will be holding the Doppler probe in place.

### Reading the blood pressure measurement



Additionally, it is possible to practise reading the gauge on the sphygmomanometer by placing one of the larger cuffs on an assistant/colleague and measure their blood pressure (with their permission).



Place the cuff on the assistant's upper arm and ask them to use their other hand to feel their own pulse at their wrist.

N.B. Practising the technique of reading the gauge and using the equipment is for educational benefit. It is not a reliable measure of the assistant's blood pressure. If you are concerned, see your doctor.



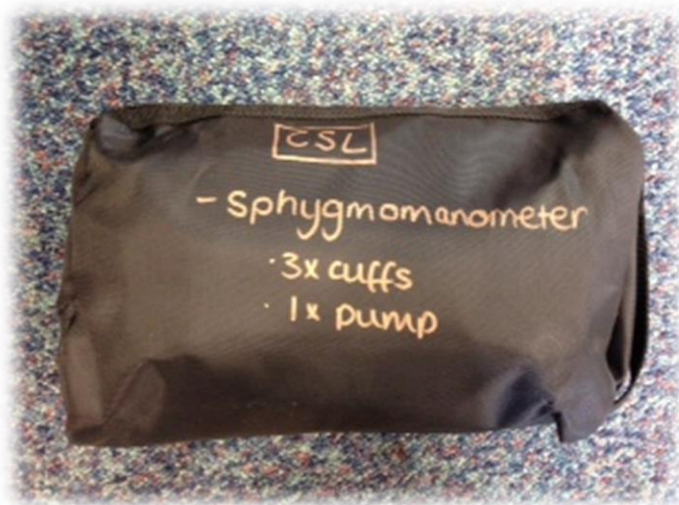
Inflate the cuff until the pulse disappears. Then release the cuff slowly until the pulse can be felt again. Read the value of the pressure at the point when the pulse returns.

Perform this a few times to get an average.

# Resetting the station: Measuring Blood Pressure

1. Place equipment back in the carry case as shown below
2. Return the equipment and model to where you found them

*Station ready for the next person:*



Please inform a member of staff if equipment is damaged or about to run out.



# Additional Information

## Measuring Blood Pressure

### Doppler technique

- Doppler is a non-invasive, indirect blood pressure measurement technique commonly used in first opinion small animal practice. It involves occluding a peripheral artery using a cuff and pump system, releasing the pressure gradually and listening for a return of blood flow.
- To measure blood pressure accurately there are a number of factors to consider:
  - Minimising stress - perform blood pressure measurements before any other procedures. Aim to handle the animal slowly and gently, talking quietly to reduce stress. Perform the procedure in a quiet room away from other animals. Allow plenty of time for the animal to get used to the situation.
  - Take repeat measurements – not just one
  - Cuff size - pick a cuff which has a width of approximately 40% of the total circumference of the animal's limb. A cuff that is too large will give falsely low blood pressure readings and a cuff that is too small will give falsely elevated blood pressure readings.



A range of cuff sizes are available: pick the most appropriate size by measuring the width of the cuff against the limb being used for the blood pressure recording.

# Measuring Blood Pressure On a Live Animal

- Place the animal on its side (encourage it to lie down) for the measurement. Place the cuff on the animal with the masked line on the cuff aligned with the artery and connect to the sphygmomanometer.



Location on forelimb- between elbow and carpus



Location on hind limb- between stifle and hock

- Prepare the skin to improve the quality of the sounds - use surgical spirit over the approximate location of the artery (where the pulse can be palpated in each limb). Put plenty of ultrasound gel on the probe (and skin). Consider clipping the fur over the site.
- Find the pulse first by palpation and then place the probe at the site where the pulse is felt. Alternatively, place the probe in the approximate location of the pulse and move it around until the characteristic 'whooshing' sound of the pulse can be heard.



Palpate the pulse on palmar aspect of the forelimb, between carpal and metacarpal pads.



Palpate the pulse on dorsal, and slightly medially, aspect of the hind limb, at the proximal end of the metatarsal bones.

# Measuring Blood Pressure On a Live Animal

- Once the artery has been located, hold the probe still and inflate the cuff until the 'whooshing' sound of the pulse is no longer heard.
- Gradually deflate the cuff using the pressure release button/valve and listen for the return of the 'whooshing' sound.
- Note the level on the pressure gauge (reading in mmHg) as soon as the return of blood flow ('whooshing' sound) is heard.



In this photo the gauge reads 140mmHg.

- Inflate and deflate the cuff a number of times to record several readings, ensuring the cuff is completely deflated between readings. Take the average value as the systolic blood pressure reading.



# I wish I'd known:

## Measuring Blood Pressure

- It is important to minimise stress to the animal in order to record an accurate blood pressure measurement.
- Always use the same cuff for a particular patient to minimise variation between measurements and potentially false results.
- Oscillometric blood pressure measurement will determine systolic, diastolic and a mean blood pressure (see photo below). Place the cuff in the same location as for the Doppler technique and the machine will do the rest, providing the blood pressure readings once it has finished.

