








# Guardian of Safety

## General Anesthesia and Monitoring Guidelines for Dogs and Cats




### Stages of Veterinary Anesthesia

Stages of Veterinary Anesthesia		Jaw Tone	Palpebral reflex	Eyeball Position & Pupil size	RR	HR	Blood Pressure
I Sedation			+		Normal	Normal	/
II Excitement			+		↑	↑	↑
III Narcosis	Plane1		+		N↑	N↓	N↓
	Plane2		—		N↓	N↓	N↓
	Plane3		—		↓	↓↓	↓↓
	Plane4		—		spontaneous respiratory arrest	↓↓	↓↓
IV Respiratory Paralysis		Apnea and cardiac failure, death					

\*The plane 2 of stage III is generally considered adequate for surgery.

### Normal Range of Vital Signs under General Anesthesia

Please note that the choice of anesthetics, the performed surgical procedure, and the patient's health condition can significantly impact these measurements.

<b>HR/PR</b>		Canine 40 -140 bpm Feline 80 -180 bpm
<b>Tips</b>		1. Tachycardia may be caused by intraoperative pain or awakening, hypoxia, hyperthermia and medication. It can also be a physiological response to hypotension correct the situation accordingly. 2. Bradycardia can be caused by excessive anesthetic depth, hypothermia, vagal reflex or medications. Please address the cause and deleterious consequences of bradycardia are identified. 3. Bradycardia together with a decrease in blood pressure requires a reduction in anesthetic dose (if possible) and correction with medication.
<b>RR</b>		Canine 6-30 rpm Feline 12-40 rpm
<b>Tips</b>		1. Bradypnea can be caused by an excessive depth of anaesthesia, hypothermia and medications. Increased efforts despite a slow RR can originate from airway obstruction and needs to be investigated promptly. 2. Institution of mechanical ventilation to resolve bradypnea needs to be set according to capnography values (see below), and can have an impact on the cardiovascular function.
<b>SpO<sub>2</sub></b>		95-100%
<b>Tips</b>		1. If “SpO <sub>2</sub> < 90% + PI < 1%” or “PI < 0.3%”, priority should be given to changing the position of the SpO <sub>2</sub> sensor. Placement of a damp swab between the SpO <sub>2</sub> clip and the tongue might help get better results on smaller patients. 2. In case of hypoxemia (SpO <sub>2</sub> < 90%) and bradypnea, continuous positive airway pressure ventilation should be provided with a reduction of anesthetic agents if possible. 3. In case of hypoxaemia and tachypnea, a potential respiratory disease or complication needs to be considered. Continuous mechanical ventilation might be necessary at this stage too.
<b>EtCO<sub>2</sub></b>		Canine 35-45mmHg Feline 30-40mmHg
<b>Tips</b>		1. If the respiratory rate is decreased and EtCO <sub>2</sub> > 50 mmHg without a treatable cause (excessive depth, hypothermia, medication adverse effect), continuous positive airway pressure ventilation should be provided with appropriate adjustment of anesthetic agents. Concurrent measurement of blood pressure is recommended. 2. Hypercapnia can also be caused by equipment malfunction such as rebreathing or artefacts from water in the capnograph measurement chamber. 3. Hypocapnia can be caused by hyperventilation, from equipment problems or from pulmonary circulation impairment (hypotension, embolism, cardiac arrest). The cause can be identified by paying attention to the details of the capnogram curve.
<b>NIBP</b>		MAP 60-90 mmHg DIA 40-60 mmHg SYS 90-140 mmHg
<b>Tips</b>		1. Choose the size of cuff according to corresponding limb circumference. 2. Once a sustained period of hypertension/hypotension has been noticed during surgery, patients require close monitoring and eventual intervention.
<b>Temp</b>		Canine 37.8-39.2°C Feline 38.1-39.2°C
<b>Tips</b>		1. Hypothermia may cause decrease of HR, BP, RESP and EtCO <sub>2</sub> to different extent. Proper heat source (≤42°C) should be provided for anaesthetized patients to lower the risk of hypothermia. 2. Hyperthermia (>41°C) needs to be treated aggressively to avoid life-threatening consequences.
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Please note: The above information is derived from the Small Animal Anesthesia and Analgesia, industry papers, and contributions from professional veterinary doctors. The content is provided for reference only. For further information on abnormal waveforms, please refer to the Mindray Animal Medical official website.		