Epinephrine is an endogenous catecholamine secreted by the adrenal glands that will have potent Alpha and Beta effects. In general, the following cardiovascular responses can be expected:

1. Increased heart rate.
2. Increased myocardial contractile force.
3. Increased systemic vascular resistance.
4. Increased arterial blood pressure.
5. Increased myocardial O_2 consumption.
6. Increased automaticity.
7. Bronchodilation.

Indications and Administration:

1. Ventricular fibrillation and pulseless ventricular tachycardia unresponsive to defibrillation.
   a. **Adult** - 1 mg IV push every 3-5 min. until rhythm converted and pulses obtained.
   b. **Pediatric -** Initial dose 0.01 mg/kg (1:10,000) IV/IO. Subsequent doses 0.1 mg/kg (1:1000) IV/IO.
2. Asystole and pulseless electrical activity.
   a. **Adult** - 1 mg IV push every 3-5 min. until rhythm converted and pulses obtained.
   b. **Pediatric -** 0.01 mg/kg (1:10,000) IV/IO. Repeat every 3-5 minutes.
3. Symptomatic bradycardia, hypotension not due to hypovolemia**.**
   a. **Adult –** 2-10 mcg/kg/min. Titrate to patient response.
   b. **Pediatric -** 0.01 mg/kg (1:10,000) IV/IO. Repeat every 3-5 minutes.
4. Systemic allergic reactions.

   Use with caution in patients over 50 yrs old, in woman who are possibly pregnant, and in pts with coronary artery disease. In these circumstances call medical control for advice.

   a. Epi-pen

i. **Adult -** To use the epi-pen place the adult dosed pen on the anterior thigh and press hard until you feel or hear the pen discharge. Always check the expiration date on the pen. Expired pens may still be potent but likely less so than a current pen. Always consider the pt's age and sex and ask about heart disease and pregnancy before applying the epi-pen. Consult medical control when risks are present. Give when the benefits outweigh the risks.

ii. **Peds -** To use the epi-pen make sure it is a pediatric dosed pen and place it on the anterior thigh, pressing hard until you feel or hear the pen discharge. Never use an adult epi-pen unless the pt is rapidly deteriorating and back up is delayed. Always check the expiration date on the pen. An expired pen may mean the pt will need another dose of epi.

b. Epinephrine 1:1000 ampules

i. **Adult -** 0.1 - 0.3 mg (1:1000) IM. If the patient is in severe distress give 0.1 - 0.3 mg (1:10,000 diluted by a factor of 10) IV push followed by a drip.

ii. **Pediatric -** 0.01 mg/kg (1:1000) IM not to exceed 0.3 mg. If the patient is in severe distress give 0.01 mg/kg (1:10,000 diluted by a factor of 10) IV push, not to exceed 0.3 mg, followed by a drip.

5. Croup, epiglottitis, pediatric impending respiratory failure.

a. **IM:** For pediatric patients follow the mg/kg dosing above.

b. **Nebulized:** 0.5mg/kg, max dose 5mg. If the total volume is less than 3ml (3mg dose), dilute to 3ml.

Notes:

1. Anxiety, tremor, palpitations, tachycardia and headache are common side effects.
2. Epinephrine can cause anginal chest pain in patients with coronary artery disease. Use with caution and avoid in patients greater than 50 years old unless the benefits outweigh the risks.
3. Due to vasoconstriction, epinephrine should be used with caution in patients with poor blood flow in legs and feet and in women who may possibly be or are pregnant.
4. Relatively contraindicated in patients with hypertension, hyperthyroidism, ischemic heart disease or cerebrovascular insufficiency, unless the benefits outweigh the risks.

5. Should not be given immediately after bicarbonate injection until the IV line is flushed.
6. Some newer Epi-Pens may be capable of giving more than one dose.

Epinephrine Drip Rate Chart: Mix 1 mg in 250 ml D5W or Normal Saline for a concentration of 4 mcg/ml and run at (ml/hr):

mcg/min	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***
ml/hr	30	45	60	75	90	105	120	135	150