

# Monitoring During Conscious Sedation

# Monitoring Personnel

## ■ Personnel

- You must have current ACLS or PALS and BLS/CPR certification (every 2 years)
- Moderate sedation
  - » During conscious sedation, at least one person in addition to the dentist must be present
    - Individual monitoring the patient may assist the practitioner with interruptible tasks of limited duration
  - » Must be BLS trained

# Monitoring for Moderate Sedation

- Pulse Oximetry
- BP cuff
  - cycles every 5 minutes
  - cuff should be 20% larger than arm diameter
- Precordial stethoscope for sleeping patients or deep sedation
- If deeply sedating, capnography is required
  - Pulse ox is not suitable for monitoring ventilation as there is variable lag time; young children desaturate more quickly; use of supplemental oxygen will delay detection of apnea with pulse oximetry
  - Capnography allows continuous assessment of ventilatory status and is earliest indicator of respiratory compromise
- Continuous ECG monitoring is NOT required b/c it has not been shown to improve outcomes of adverse events

# Vital Signs

Age	Respiratory Rate breaths per min Average (Range)	Pulse Rate (beats per min)	BP
2 years	27 (24-40)	110	98/60
4 years	25 (22-34)	100	98/60
6 years	24 (22-34)	100	98/62
8 years	24 (18-30)	90	104/68
10 years	22 (18-30)	90	110/72
Over 12	20 (12-20)	90	112/72

# Respiratory Rate

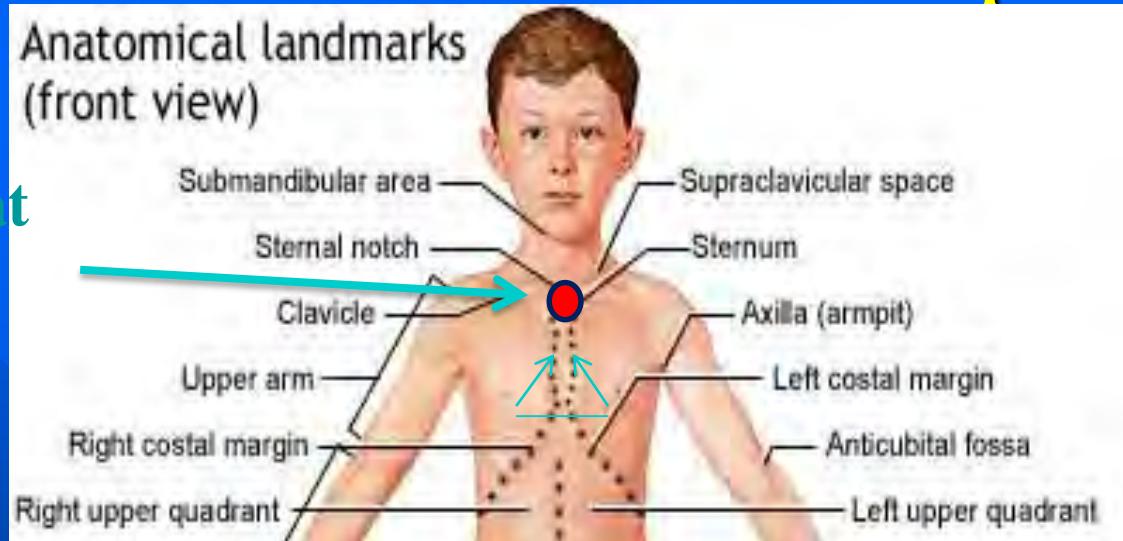
- Bradypnea
  - Respiratory rate for child: approx 25 (**less than 20** in a sedation signals need for assisted breathing)
- Tachypnea
  - Respiratory rate greater than 60/min is abnormal
- Protective Reflexes: these should remain intact with conscious sedation
  - Cough
  - Gag
  - Swallow

# Blood Pressure Monitoring

- Errors can be caused by:
  - Inappropriate sized cuff
  - Patient movement
    - » This is an issue b/c the cuff will continue to recycle and prolonged inflation of the cuff can cause discomfort and further aggravate behavior

# Pre-cordial Stethoscope

Place bell at apex of triangle formed by nipple line

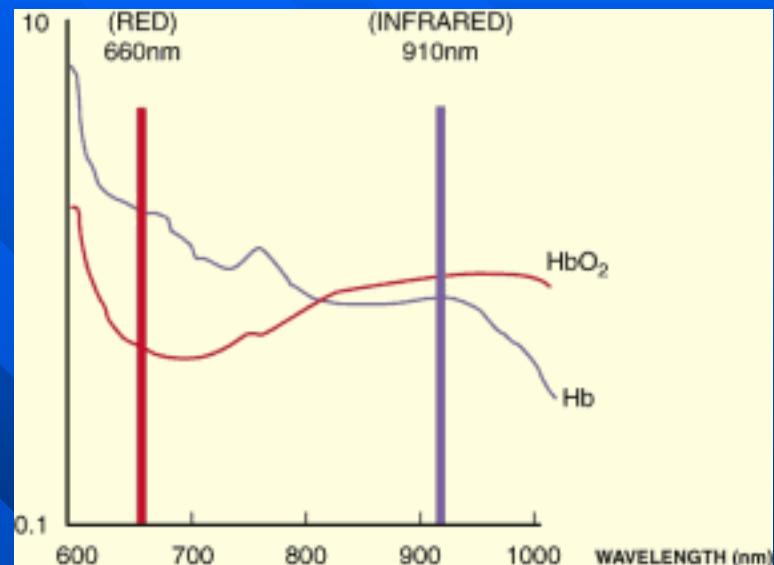


Nasal flaring,  
discordant chestwall  
motion, and retraction  
at the suprasternal  
area (tracheal tug)  
with respiratory effort  
are all physical signs  
of airway obstruction.



# Pulse Oximetry

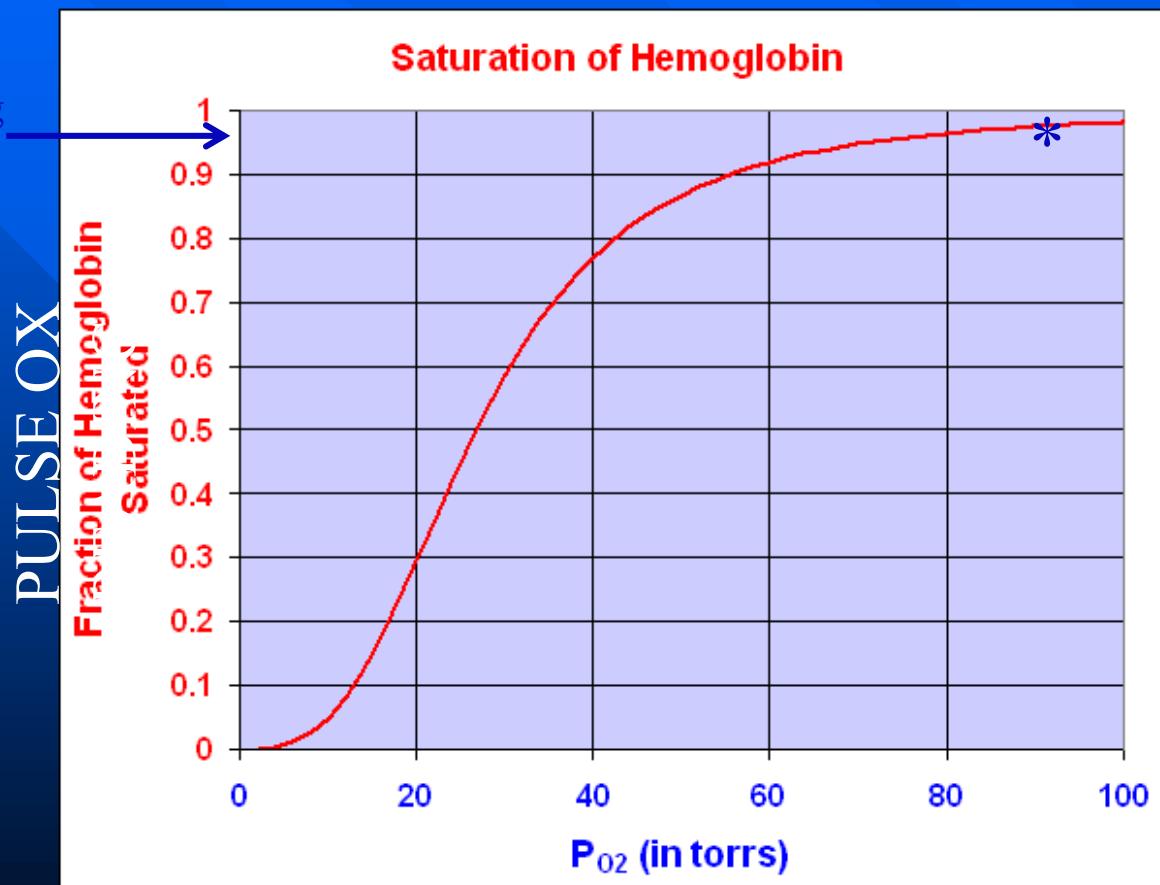
- Distinguishes between oxygenated hemoglobin and deoxygenated hemoglobin
- Deoxy: 600 – 750 nm
- Oxy: 850 – 1000 nm
- Two LEDs at 660 nm and 940 nm
- Indirect measure of PaO<sub>2</sub>
- 5% error
  - Movement
  - Low pulse amplitude (cold extremities)
  - Fingernail polish
  - Profound tissue pigmentation
- Response time
  - Ear: 7-20 seconds
  - Finger: 20-35 seconds
  - Toe: 41-73 seconds



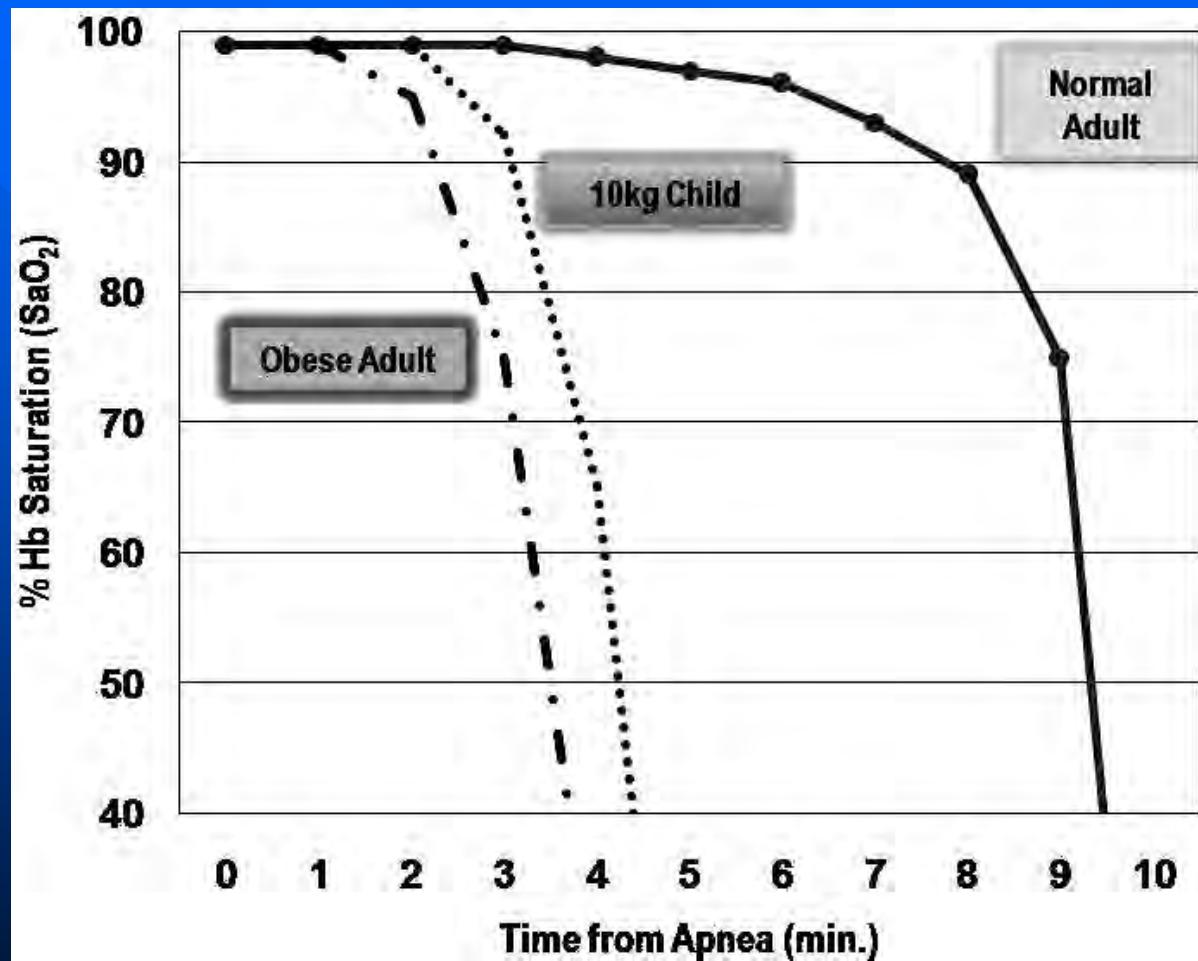
# What's Normal PaO<sub>2</sub>?

For a healthy person, normal is approx 90 mmHg\*

So our pulse ox reading  
will be 95-100%



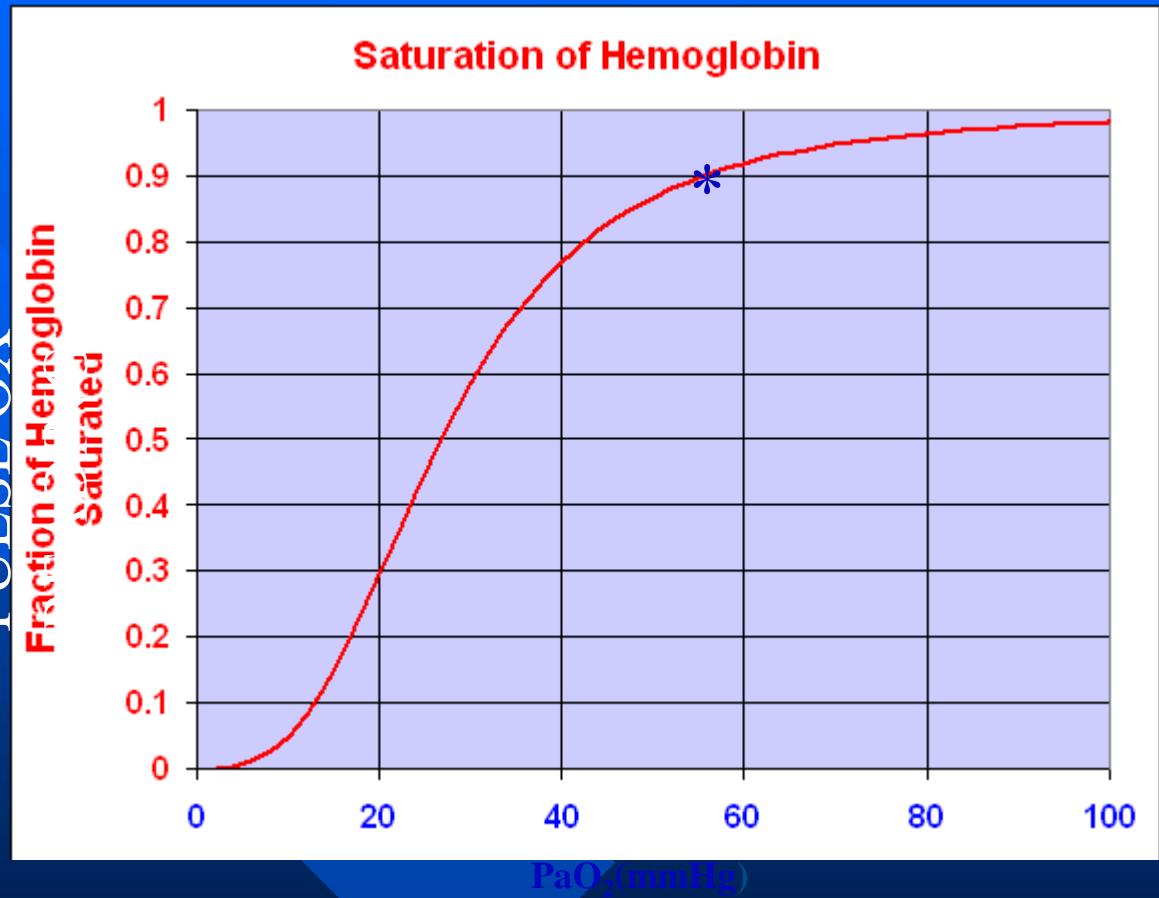
# How much time do I have?



# Hemoglobin Saturation Curve

HBg Sat with O <sub>2</sub>	Partial Pressure of O <sub>2</sub>
100	100
95	80
90*	60

PULSE OX



\*90 is critical point because you begin to lose O<sub>2</sub> partial pressure fast as O<sub>2</sub> sats drop!

# Capnography

- One of the least utilized monitoring techniques available, but it is the only monitor that can give an indication of airway patency when used properly
- Capnographs determine the expired carbon dioxide concentrations
- Infrared light is passed through the exhaled gas sample.  $\text{CO}_2$  absorbs infrared light; thus, the less light that passes through the gas, the higher the amount of  $\text{CO}_2$  present.

# Capnography

## ■ Mainstream or Sidestream

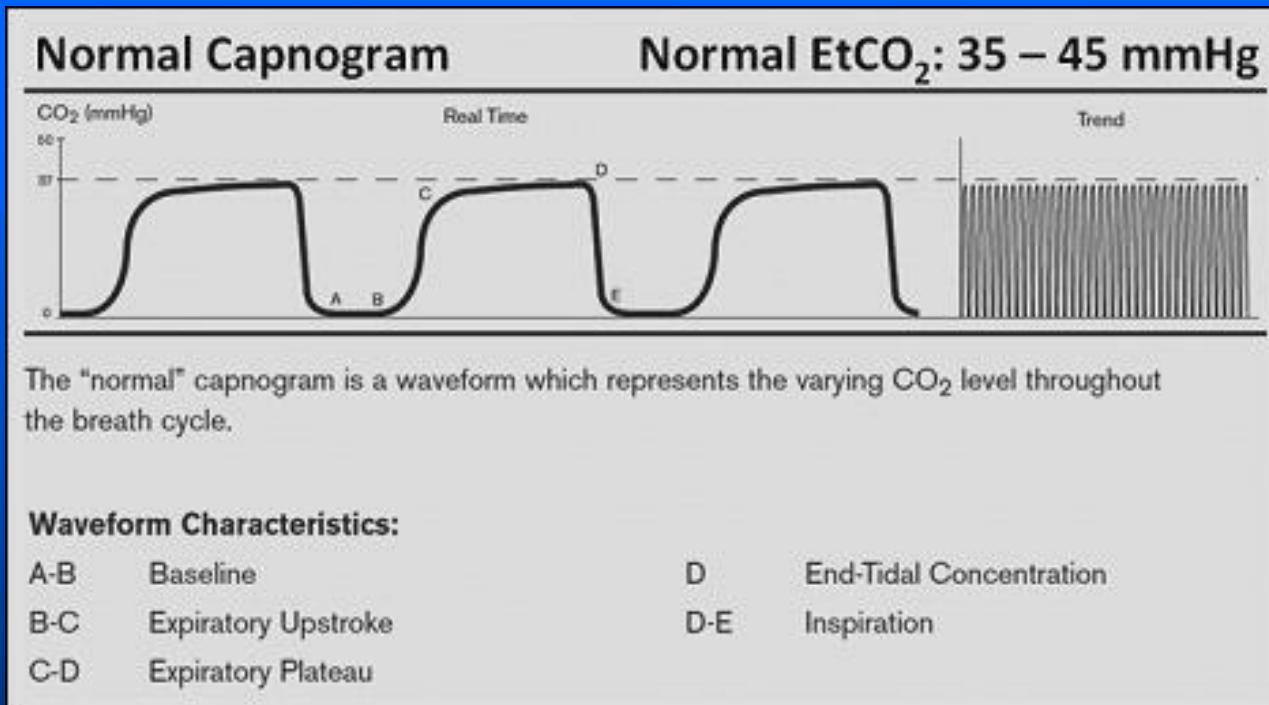
- Mainstream: intubated patients
- Sidestream: air is vacuumed through a port similar to a nasal cannula –
  - for patients breathing spontaneously as in sedated patients
    - » Many capnographs can filter out the wavelength associated with nitrous oxide so the port can be placed under a nitrous hood.



# Capnographs

- Provides both a numeric readout and a graphic waveform display.
- Have an alarm to indicate obstruction anywhere in the sampling route (ie. mucous blockage)
- Crying will shunt most air through the mouth  
→ will affect the capnography reading, but a crying child is moving air

# Normal Capnography Waveforms



Normal expired CO<sub>2</sub> values range:

Pediatric: 33-40 mmHg

Adult: 35-45 mm Hg

# Dental Record Documentation

- Must include by TN regulation:
  - Current medical history (meds and allergies)
  - Informed consent
  - Baseline vitals
    - » If this is prevented by patient cooperation, this must be documented in the chart
  - Time-oriented anesthesia record
    - » Includes drugs administered and their doses; including nitrous oxide
  - Document any complications/adverse events
  - Status upon discharge

# Dental Record Documentation

- Good to include:
  - Indication for the sedation
  - NPO verified
  - Verification of person(s) bringing child to appt. (ie, one legal guardian)
  - Any expectoration noted
  - Latency period
  - Monitoring devices used
  - Sedation level intended and achieved
  - Treatment provided including
    - » Amount of local anesthetic
    - » Use of rubber dam
    - » Use of any stabilization devices (ie. papoose)
    - » Teeth and their operative treatment
  - Effectiveness of sedation
  - Verbal and written post-op instructions were given
  - Discharged when criteria met
  - List support staff who assisted; any other active restraint noted – ie. asst. held head due to extremely combative behavior

# Discharge Criteria

Post Anesthesia Care Unit: <b>MODIFIED ALDRETE SCORE</b>						
Patient:	Final score:					
Room:	Surgeon:					
Date:	PACU nurse:					
Area of Assessment	Point Score	Upon Admission	After			
			1 h	2 h	3 h	
<u>Muscle Activity:</u>						
• Ability to move all extremities	2					
• Ability to move 2 extremities	1					
• Unable to control any extremity	0					
<u>Respiration:</u>						
• Ability to breathe deeply and cough	2					
• Limited respiratory effort (dyspnea or splinting)	1					
• No spontaneous effort	0					
<u>Circulation:</u>						
• BP $\pm$ 20% of preanesthetic level	2					
• BP $\pm$ 20%–49% of preanesthetic level	1					
• BP $\pm$ 50% of preanesthetic level	0					
<u>Consciousness Level:</u>						
• Fully awake	2					
• Arousable on calling	1					
• Not responding	0					
<u>O<sub>2</sub> Saturation:</u>						
• Able to maintain O <sub>2</sub> sat >92% on room air	2					
• Needs O <sub>2</sub> inhalation to maintain O <sub>2</sub> sat >90%	1					
• O <sub>2</sub> sat <90% even with O <sub>2</sub> supplement	0					
Totals:						
Required for discharge from Post Anesthesia Care Unit: 7–8 points						
Time of release	Signature of nurse					

# Recommended Monitoring for Adult Patients

- Local anesthesia or oral sedation
  - HR/BP-Pre-op
  - Respirations-Visual
- IM
  - HR/BP-Pre-op/post-op/q 5 min
  - Respirations-pretracheal steth intra-op
  - Pulse Ox-intra-op/post-op

# Adult Monitoring contd.

- Inhalation
  - HR/BP- intraop. q5 min
  - Resps-visualize
- IV
  - HR/BP-continuous/q5min
  - Resps-pretracheal steth
  - Pulse oximetry

# Adult Monitoring contd.

## ■ General Anesthesia

### – Outpatient

- » HR/BP-continuous/q5min

- » ECG-recommended

- » Respirations-precordial steth

- » Pulse oximetry

### – Inpatient

- » Same as outpatient with the addition of using end expiratory CO<sub>2</sub> monitoring en lieu of precordial

# Tennessee Rules for Conscious Sedation

- Conscious sedation permit:
  - Limited- enteral or combination of enteral-inhalation in patients over 13 years
  - Comprehensive- enteral, enteral-inhalational, parenteral; or limited modalities in patients<13years
- ACLS or PALS
- Appropriate postdoctoral training or CE course with a minimum of 24 didactic hours and 10 hours of clinically oriented experiences (limited)

# Tennessee Rules for Conscious Sedation

- Comprehensive permit- postdoctoral training program or CE course with a minimum of 60 hrs didactic instruction, management of at least 20 patients to provide parenteral competency
- One BLS qualified person in addition to the operating dentist must be present during the procedure. All involved ancillary staff in the operatory and the recovery area must by BLS qualified

# Tennessee Rules for Conscious Sedation

## ■ Dental Records

- Current medical history including current medications and drug allergies
- Informed consent for type of anesthesia used
- Baseline vital signs
- Time oriented anesthesia record including drugs used and dosage
- Documentation of complications or morbidity
- Status of patient at discharge

# Tennessee Rules for Conscious Sedation

## ■ Monitoring

- Continuous clinical observation
- Interval BP and pulse
- Continuous oxygen saturation monitoring
- Monitoring in recovery by a trained person until stable for discharge