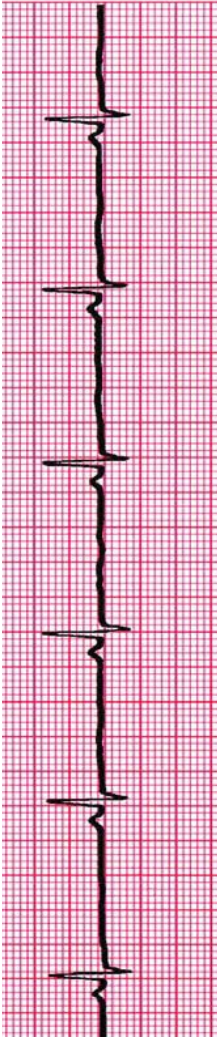
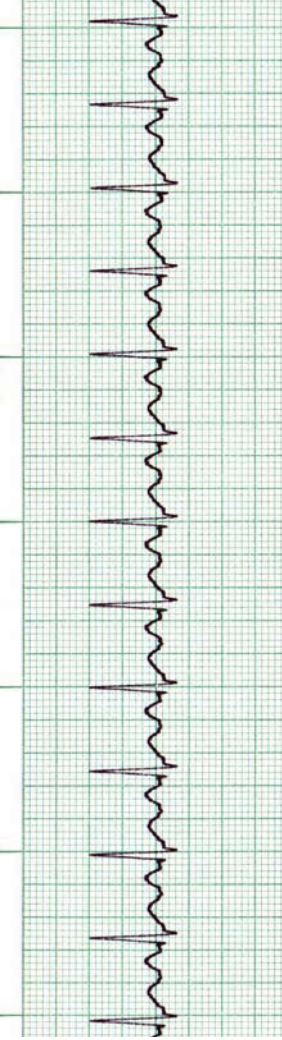
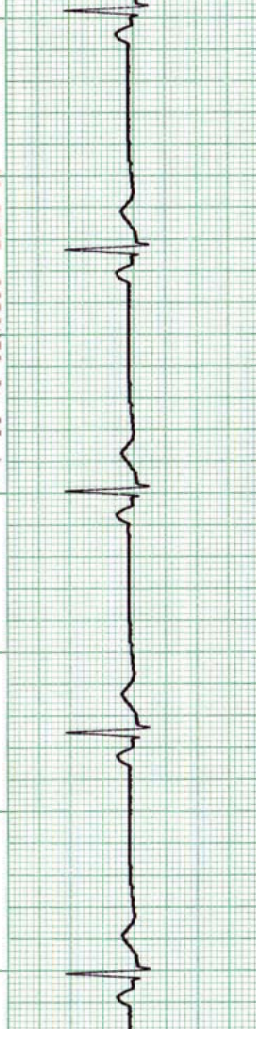

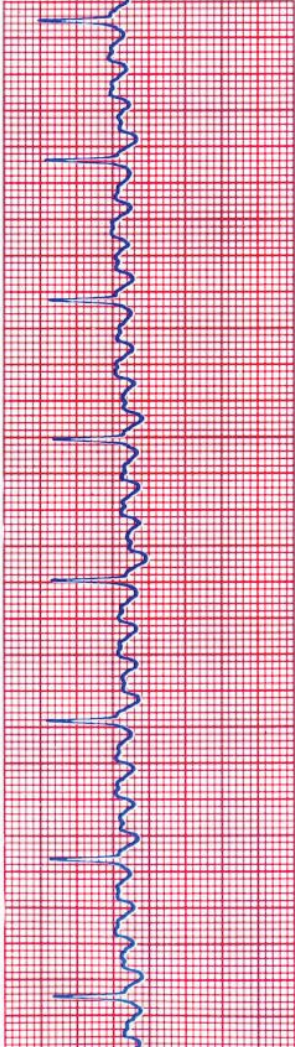
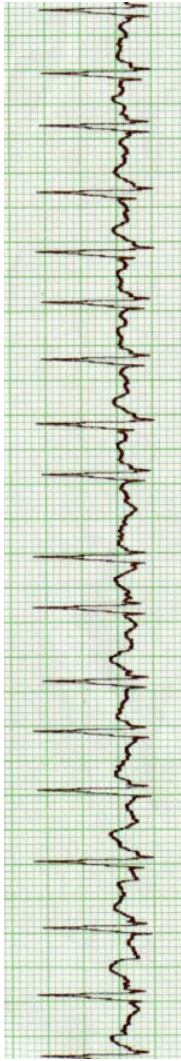
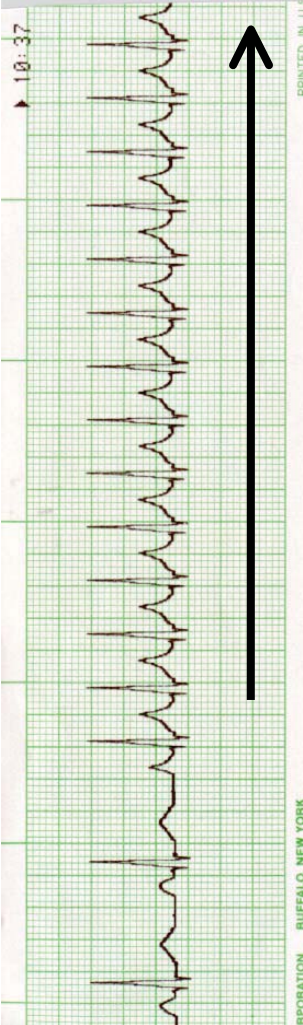
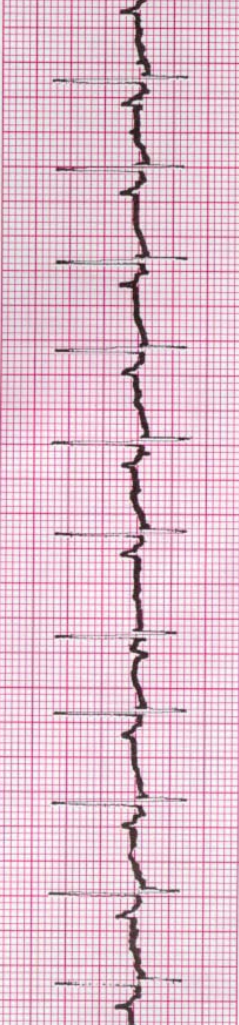
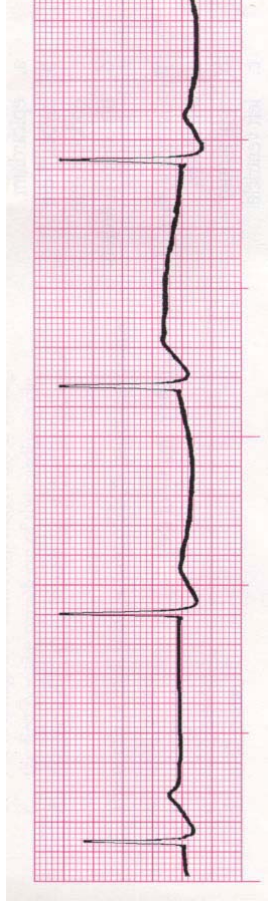
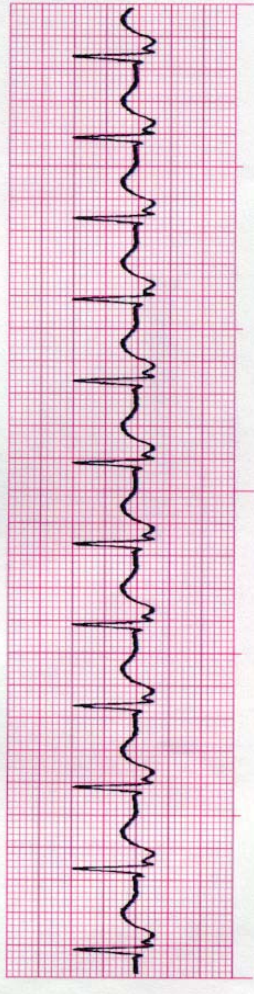
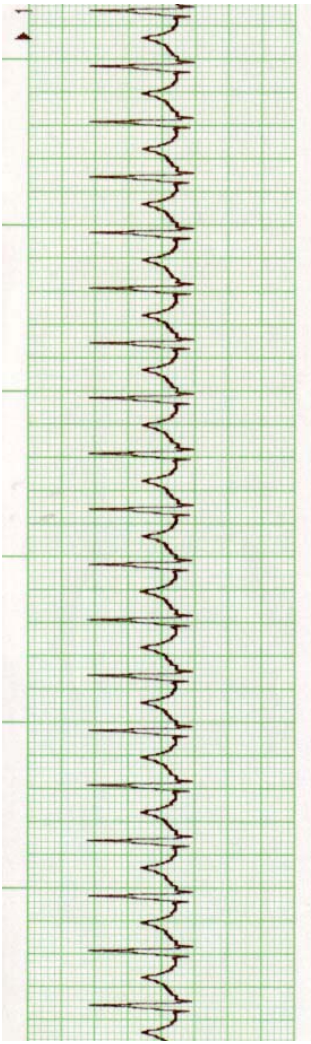


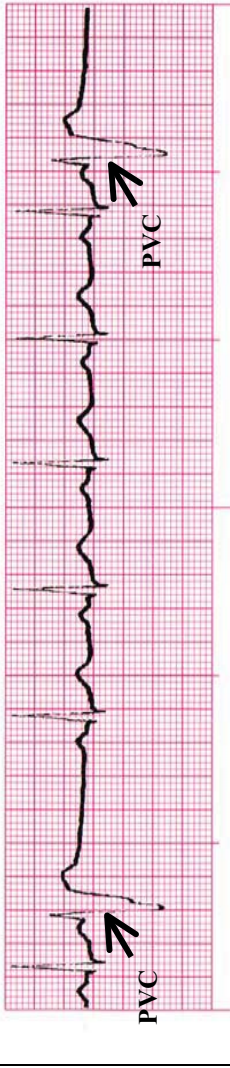
Rhythm	ECG Characteristics	Example
<b>Normal Sinus Rhythm (NSR)</b>	<p> <b>Rate:</b> 60-100 per minute  <b>Rhythm:</b> R- R =  <b>P waves:</b> Upright, similar  <b>P-R:</b> 0.12 -0 .20 second &amp; consistent  <b>qRs:</b> 0.04 – 0.10 second  <b>P:qRs:</b> 1P:1qRs         </p>	
<b>Sinus Tachycardia</b> Causes: <ul style="list-style-type: none"> <li><input type="checkbox"/> Exercise</li> <li><input type="checkbox"/> Hypovolemia</li> <li><input type="checkbox"/> Medications</li> <li><input type="checkbox"/> Fever</li> <li><input type="checkbox"/> Hypoxia</li> <li><input type="checkbox"/> Substances</li> <li><input type="checkbox"/> Anxiety, Fear</li> <li><input type="checkbox"/> Acute MI</li> <li><input type="checkbox"/> Fight or Flight</li> <li><input type="checkbox"/> Congestive Heart Failure</li> </ul>	<p> <b>Rate:</b> &gt; 100  <b>Rhythm:</b> R- R =  <b>P waves:</b> Upright, similar  <b>P-R:</b> 0.12 -0 .20 second &amp; consistent  <b>qRs:</b> 0.04 – 0.10 second  <b>P:qRs:</b> 1P:1qRs         </p>	
<b>Sinus Bradycardia</b> Causes: <ul style="list-style-type: none"> <li><input type="checkbox"/> intrinsic sinus node disease</li> <li><input type="checkbox"/> increased parasympathetic tone</li> <li><input type="checkbox"/> drug effect.</li> </ul>	<p> <b>Rate:</b> &lt; 60  <b>Rhythm:</b> R- R =  <b>P waves:</b> Upright; similar  <b>P-R:</b> 0.12 -0 .20 second &amp; consistent  <b>qRs:</b> 0.04 – 0.10 second  <b>P:qRs:</b> 1P:1qRs         </p>	

Synonym	ECG Characteristics	Example
<p><b>Premature Atrial Contractions (PAC)</b></p> <p>Causes:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> normal</li> <li><input type="checkbox"/> excessive use of caffeine, tobacco, or alcohol</li> <li><input type="checkbox"/> CHF</li> <li><input type="checkbox"/> Myocardial ischemia or injury</li> <li><input type="checkbox"/> Hypokalemia, Dig toxicity</li> <li><input type="checkbox"/> COPD</li> </ul>	<p><b>Rate:</b> usually &lt; 100, dependant On underlying rhythm</p> <p><b>Rhythm:</b> irregular</p> <p><b>P waves:</b> Early &amp; upright, different from Sinus</p> <p><b>PR:</b> 0.12 – 0.20 second; different from Sinus</p> <p><b>qRs:</b> 0.04 – 0.10 second</p> <p><b>P:qRs</b> = 1:1</p>	
<p><b>Atrial Flutter</b></p> <p>Causes:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> ischemic heart disease</li> <li><input type="checkbox"/> Hypoxia</li> <li><input type="checkbox"/> Acute MI</li> <li><input type="checkbox"/> Dig Toxicity</li> <li><input type="checkbox"/> Mitral or Tricuspid valve disease</li> <li><input type="checkbox"/> Pulmonary embolism</li> </ul>	<p><b>Rate:</b> Atrial rate 250-350 Vent 150 common</p> <p><b>Rhythm:</b> Atrial = Regular Vent = Reg. or irreg</p> <p><b>P waves:</b> Not identifiable</p> <p><b>F waves:</b> Uniform (sawtooth or picket fence ) not measurable</p> <p><b>PRI:</b> not measurable</p> <p><b>qRs:</b> 0.04 – 0.10 second</p>	
<p><b>Atrial Fibrillation</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ischemic heart disease</li> <li><input type="checkbox"/> Hypoxia</li> <li><input type="checkbox"/> Acute MI</li> <li><input type="checkbox"/> Digitalis toxicity</li> <li><input type="checkbox"/> Mitral or tricuspid disease</li> </ul>	<p><b>Rate:</b> Atrial: 400-700 Vent. 160-180/minute</p> <p><b>Rhythm:</b> Atrial: irregular; Vent.: irregular</p> <p><b>P waves:</b> No identifiable Ps</p> <p><b>f waves:</b> may be seen.</p> <p><b>PRI:</b> unable to measure (No identifiable P)</p> <p><b>qRs:</b> usually normal</p>	

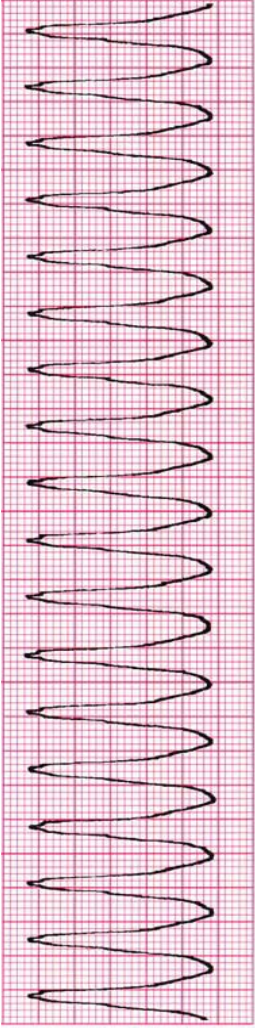
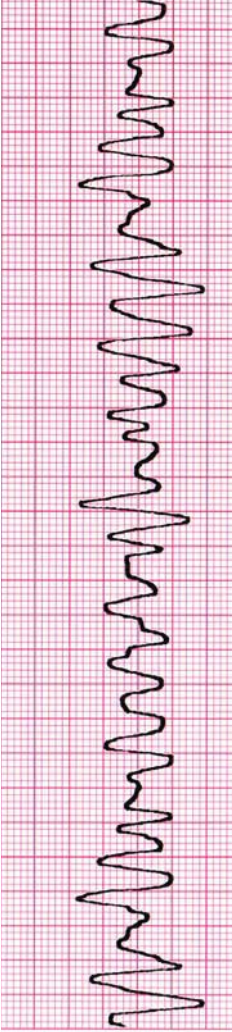


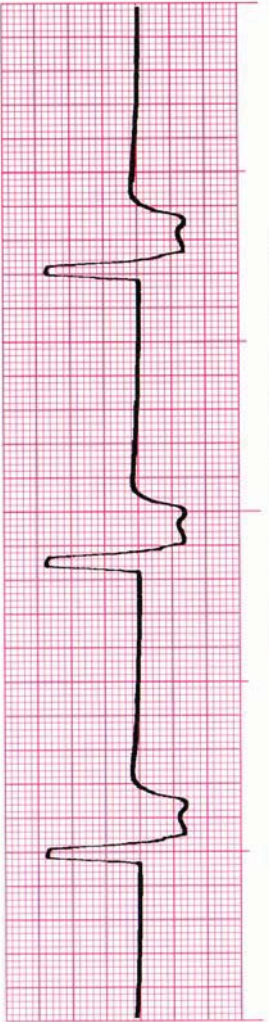
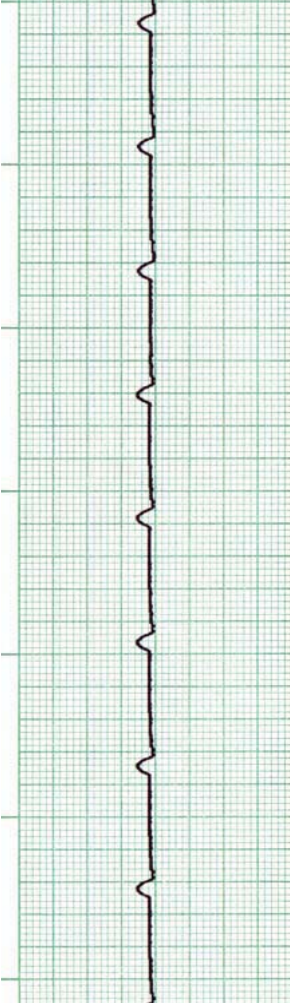
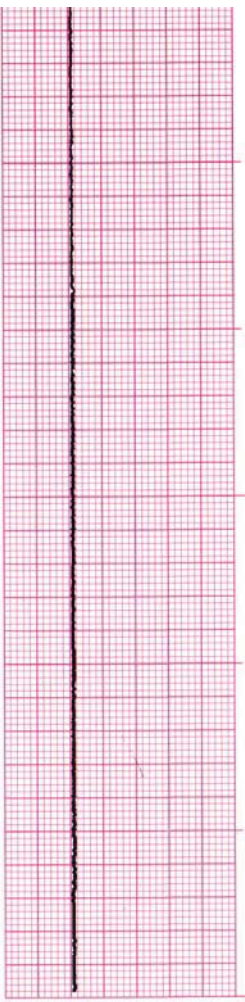
Synonym	ECG Characteristics	Example
<p><b>Paroxysmal Atrial Tachycardia</b></p> <p>Causes:</p> <ul style="list-style-type: none"> <li>Same as PACs</li> </ul>	<p><b>Rate:</b> usually 160-220</p> <p><b>Rhythm:</b> Regular</p> <p><b>P waves:</b> differ in shape from Sinus Ps; usually difficult to identify (rate related)</p> <p><b>PR Interval:</b> Normal when the Ps can be identified; short if WPW present</p> <p><b>qRs:</b> usually normal</p> <p><b>Other:</b> Onset sudden, often initiated by a PAC</p>	
<p><b>Premature Junctional Contraction (PJC)</b></p> <p>Causes:</p> <ul style="list-style-type: none"> <li>Same as PACs</li> </ul>	<p><b>Rate:</b> usually &lt; 100, dependant on the underlying rhythm</p> <p><b>Rhythm:</b> irregular</p> <p><b>P waves:</b> Inverted before or after qRs or not visible</p> <p><b>PR interval:</b> &lt; 0.12 second when inverted P is before qRs</p> <p><b>qRs:</b> 0.04 – 0.10 second</p> <p><b>P:qRs</b> = 1:1 if Ps are visible</p>	

Key term	ECG Characteristics	Example
<b>Junctional escape Rhythm</b> Causes: <ul style="list-style-type: none"> <li>□ healthy athlete at rest</li> <li>□ related to medications- Beta Blockers, Calcium Channel Blockers, Digoxin Toxicity</li> <li>□ or increased parasympathetic tone</li> <li>□ Acute Inferior Wall MI</li> <li>□ Rheumatic Heart Disease</li> <li>□ Post-Cardiac Surgery</li> <li>□ Valvular Disease</li> <li>□ SA Node Disease</li> <li>□ Hypoxia</li> </ul>	<b>Rate:</b> 40-60 61 – 100 (accelerated) <b>Rhythm:</b> Regular <b>P waves:</b> Inverted before or after qRs or not visible <b>PR interval:</b> < 0.12 second when inverted P is before qRs <b>qRs:</b> 0.04 – 0.10 second <b>P:qRs</b> 1:1 if Ps are visible	
<b>Junctional Tachycardia</b> Causes: <ul style="list-style-type: none"> <li>□ Same as Paroxysmal Atrial Tachycardia (PAT)</li> </ul>	<b>Rate:</b> 101-200 Same as Junctional Escape Rhythms.	
<b>Supraventricular Tachycardia (SVT)</b> An umbrella term used when unable to distinguish which rhythm is present. Causes: <ul style="list-style-type: none"> <li>Same as Sinus, Atrial, and Junctional Tachycardia, and Atrial Flutter</li> </ul>	<b>Rhythm:</b> Absolutely regular <b>Rate:</b> > 150 per minute <b>P Waves:</b> Not visible (PRI not measurable) <b>qRs:</b> normal 0.04 – 0.10 sec	

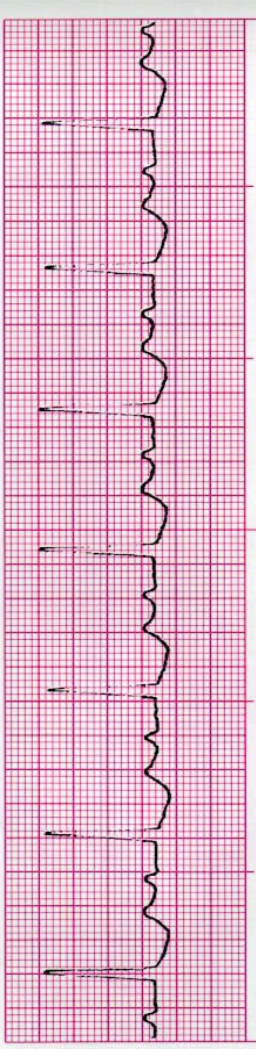
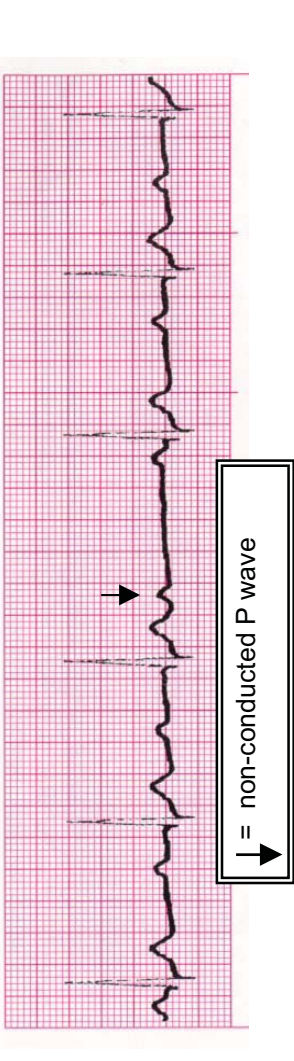
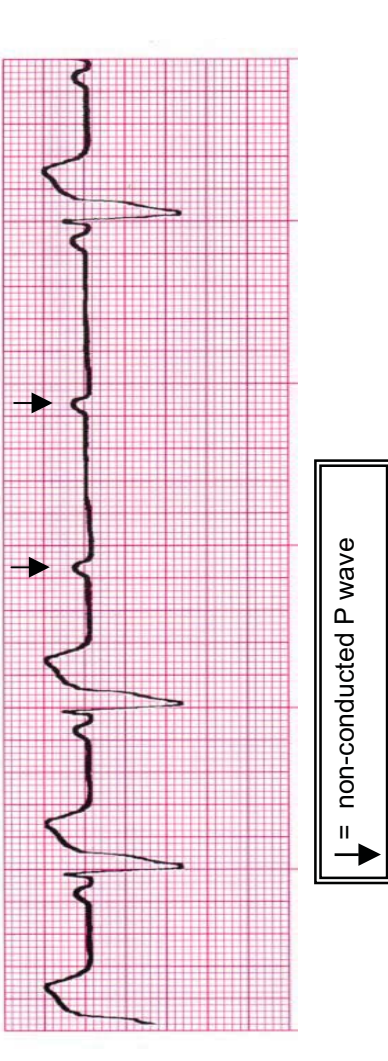
Synonym	ECG Characteristics	Example
<p><b>Premature Ventricular Complex (PVC)</b></p> <p>Causes:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Gastric overload</li> <li><input type="checkbox"/> Stress</li> <li><input type="checkbox"/> Caffeine, Alcohol, Nicotine</li> <li><input type="checkbox"/> Heart Disease</li> <li><input type="checkbox"/> Acid-Base Imbalance</li> <li><input type="checkbox"/> Electrolyte Imbalance</li> <li><input type="checkbox"/> Cyclic Antidepressants</li> <li><input type="checkbox"/> Hypoxia</li> <li><input type="checkbox"/> Acidosis</li> <li><input type="checkbox"/> Acute MI</li> </ul>	<p><b>Rate:</b> Dependent upon underlying rhythm</p> <p><b>Rhythm:</b> R – R ≠</p> <p><b>P waves:</b> Usually absent, if present, not associated with PVC</p> <p><b>qRs:</b> 0.12 second or greater; bizarre and notched</p> <p><b>ST &amp; T:</b> Often opposite in direction to the qRs.</p> <p><b>Timing</b></p> <p>One on a strip = Rare</p> <p>One in a row = Isolated</p> <p>Two in a row = Pair, couplet</p> <p>Three in a row = V Tachycardia</p> <p><b>Pattern</b></p> <p>Every other = Bigeminy</p> <p>Every third = Trigeminy</p> <p><b>Morphology</b></p> <p>Similar shape = Uniformed</p> <p>Different shape = Multiformed</p> <p><b>Location</b></p> <p>R – on – T = PVC falls on the T wave of the complex before the PVC</p>	



Name	ECG Characteristics	Example
<p><b>Ventricular Tachycardia</b></p> <p>Causes:</p> <ul style="list-style-type: none"> <li>□ Same as PVCs</li> <li>□ R on T Phenomenon</li> </ul>	<p><b>Rate:</b> &gt; 100 per minute and usually not &gt; 220</p> <p><b>Rhythm:</b> Usually regular</p> <p><b>P Waves:</b> Ø P waves or if present, not associated with qRs</p> <p><b>qRs:</b> Wide (<math>\geq 0.12</math> sec), bizarre</p> <p><b>ST/T wave:</b> Opposite direction of qRs</p> <p>A group of three PVCs in a row or more at a rate greater than 100/minute or more constitutes Ventricular Tachycardia.</p>	
<p><b>Ventricular Fibrillation</b></p> <p>Causes:</p> <ul style="list-style-type: none"> <li>□ Acute Myocardial Infarction</li> <li>□ Untreated Ventricular Tachycardia</li> <li>□ Hypothermia</li> <li>□ R-on-T PVCs</li> <li>□ Electrolyte imbalance</li> <li>□ Electrical shock</li> </ul>	<p><b>Rate:</b> Ø</p> <p><b>Rhythm:</b> Ø regularity, chaotic undulating waves</p> <p><b>P Waves:</b> Ø</p> <p><b>qRs:</b> Ø</p> <p><b>ST/T Wave:</b> Ø</p> <p><b>Organized activity:</b> Ø</p> <p>No Cardiac Output or Pulse</p>	

Name	ECG Characteristics	Example
<p><b>Idioventricular Rhythm</b></p> <p>Causes:</p> <ul style="list-style-type: none"> <li>❑ Myocardial Infarction</li> <li>❑ Digitalis toxicity</li> <li>❑ Metabolic imbalances</li> <li>❑ Post resuscitation rhythm</li> </ul>	<p><b>Rate:</b> 20-40 per minute</p> <p><b>Rhythm:</b> R – R =</p> <p><b>P waves:</b> No P waves associated to qRs</p> <p><b>qRs:</b> &gt; 0.12 sec, notched, bizarre appearance</p> <p><b>ST/T :</b> Opposite direction of qRs</p> <p>Rate &gt; 40 to 100 = Accelerated</p>	
<p><b>Asystole</b></p> <p>Causes:</p> <ul style="list-style-type: none"> <li>❑ Extensive myocardial damage</li> <li>❑ Acute respiratory failure</li> <li>❑ Ischemia or Infarction</li> <li>❑ Traumatic cardiac arrest</li> <li>❑ Ventricular aneurysm</li> <li>❑ Countershock</li> <li>❑ Hypoxia, Hypothermia</li> <li>❑ Hyperkalemia, Hypokalemia</li> <li>❑ Preexisting acidosis</li> <li>❑ Drug overdose</li> </ul>	<p><b>Rate:</b> Ventricular rate = 0</p> <p><b>Rhythm:</b> Ø unless Ps are present, then regular or irregular</p> <p><b>P waves:</b> may be present</p> <p><b>qRs:</b> Ø</p> <p><b>P:qRs</b> Ø</p>	 



Synonym	ECG Characteristics	Example
<b>1<sup>st</sup> degree AV Block</b>	<ul style="list-style-type: none"> <li>◆ 1P : 1 qRs</li> <li>◆ Prolonged PRI (<math>&gt; 0.20</math> sec not <math>&gt; 0.40</math> sec)</li> </ul>	
<b>2<sup>nd</sup> degree AV Block, Type I</b>	<ul style="list-style-type: none"> <li>◆ More P waves than qRs</li> <li>◆ PRI progressively increases in a cycle until P appears w/o qRs.</li> <li>◆ Cyclic pattern reoccurs</li> <li>◆ R – R <math>\neq</math></li> </ul>	 <p>↓ = non-conducted P wave</p>
<b>2<sup>nd</sup> degree AV Block, Type II</b>	<p>More P waves than qRs</p> <ul style="list-style-type: none"> <li>◆ PRI consistent</li> <li>◆ qRs normal or wide (bundle branch block)</li> <li>◆ R – R <math>\neq</math> or R – R =</li> </ul>	 <p>↓ = non-conducted P wave</p>



Knyunm	ECG Characteristics	Example
<p><b>3<sup>rd</sup> degree AV Block</b></p>	<ul style="list-style-type: none"> <li>◆ More P waves than qRs</li> <li>◆ P not r/t qRs (P too close, P too far)</li> <li>◆ PRI varies greatly</li> <li>◆ qRs normal or wide</li> <li>◆ R – R =</li> </ul>	