



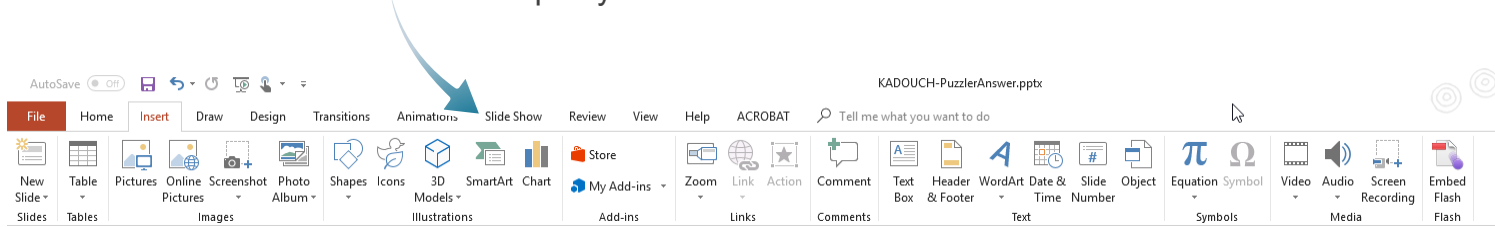
December 2019

# ECG Underwriting Puzzler

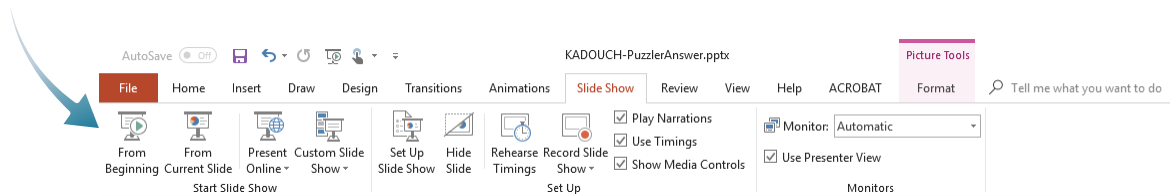
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# To obtain best results...

- Select “Slide Show” from the ribbon at the top of your PowerPoint screen



- Select “From Beginning” on the Slide Show screen



- Slowly click through the presentation
- Enjoy the animation

# The Case

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- A 48 year old manager applies for 3,000,000 of life insurance.
- BMI 27, BP, lipids and LFTs are normal.
- No significant family medical history
- An EKG was provided.

# The Insurance EKG

SB, ~ 50 bpm

Normal axis

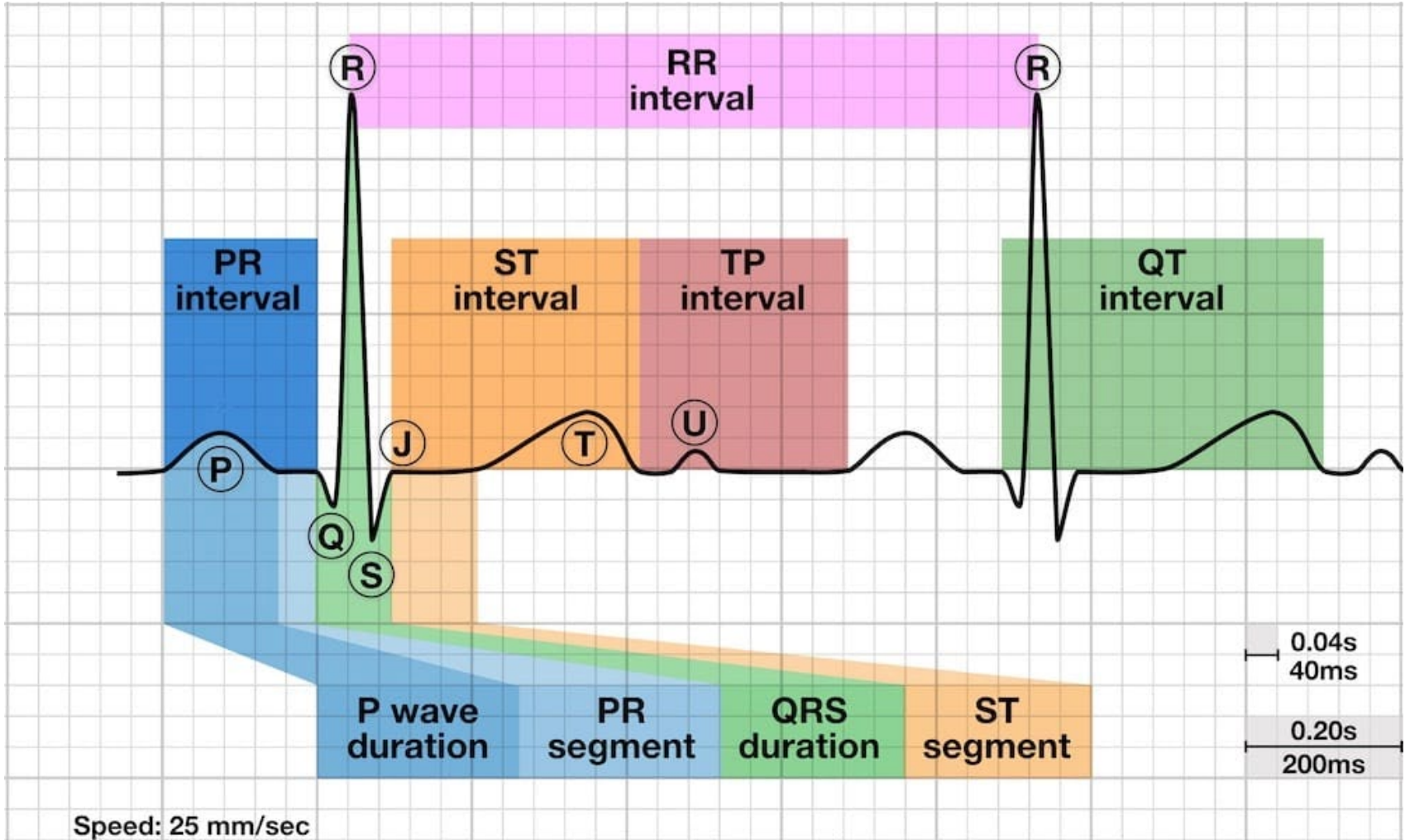
No Q waves

Positive T waves

What are these?



# EKG primer, segments and intervals



# U waves - Normal

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- Low voltage positive deflection immediately following the T wave
- Usually in the same direction as the T wave
- Usually best seen in V2-V4
- Usually inversely proportional to the heart rate



- The origin is uncertain, but three theories are:
  - Delayed repolarization of Purkinje fibers
  - Prolonged repolarization of the mid-myocardial M-cells
  - After-potentials from mechanical forces in the ventricular walls



- Often become visible at heart rates  $< 65$  bpm
- Voltage should be  $< 25\%$  of the T wave voltage
- Maximum amplitude is usually 1-2 mm

# Abnormal U waves

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- **Prominent U waves**, > 1-2 mm or 25% of the height of the T wave
  - **Common causes:** bradycardia, severe hypokalemia
  - **Less common causes:** hypocalcemia, hypomagnesemia, hypothermia, increased intracranial pressure, LVH, hypertrophic cardiomyopathy, certain forms of long QT syndrome
  - **Drugs associated with prominent U waves:** digoxin, phenothiazines, Class Ia antiarrhythmics (quinidine, procainamide) and Class III antiarrhythmics (sotalol, amiodarone), among others
- **Inverted U waves**, always abnormal in leads with upright T waves
  - **Highly specific for heart disease**, including coronary artery disease, congenital heart disease, valvular disease, cardiomyopathy, left ventricular overload
  - **Chest pain and inverted T waves are very suspicious for myocardial ischemia**

## Back to the case...

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- This was an insurance EKG with no previous EKG in the APS.
- The u waves are of minimal height, <1-2 mm, and are of a positive deflection.
- They are best seen in V2-V6.
- The heart rate is ~50 bpm, so bradycardia.
- No other concerning or suspicious signs or symptoms.
- There appears to be no excess risk here, and the case was assessed as standard.