



ECG, HOLTER AND STRESS TESTING

HOSPITAL INFORMATION SYSTEM (HIS)

PRESCRIBERS

Overview of the Cardiovascular Worklist

The screenshot shows the Cardiovascular Worklist interface. Callout 1 points to the 'Procedures' table header. Callout 2 points to the 'Steps' table. Callout 3 points to the 'Preview' pane showing an ECG image. Callout 4 points to the 'Patient Profile' pane on the right.

| Last Name | First Name | Type | Status | Priority | Sex | MRN | Study State | Encounter Type | Ordered Date |
|-----------|-------------------|-------------|-----------|----------|--------|-------|-----------------|----------------|-----------------------|
| ZZTEST | ASHLEY | ECG 12-Lead | Completed | Routine | Female | 11040 | Matched View... | Inpatient | Tue, 6/16/2020 1... |
| ZZTEST | JUNEEDTOINPATI... | ECG 12-Lead | Cancelled | Stat | Male | 11762 | Not Matched | Inpatient | Mon, 6/8/2020 2... |
| ZZTEST | JUNEEDSTROKE | ECG 12-Lead | Ordered | Routine | Female | 11743 | Not Matched | Inpatient | Thu, 6/11/2020 8... |
| ZZTEST | JUNEEDTOCATHL... | ECG 12-Lead | Ordered | Stat | Male | 11760 | Not Matched | Emergency | Wed, 6/10/2020 ... |
| ZZTEST | ASHLEY | ECG 12-Lead | Ordered | Routine | Female | 11040 | Not Matched | Inpatient | Tue, 6/16/2020 1... |
| ZZTEST | ACTIVITYLOG | ECG 12-Lead | Ordered | Routine | Male | 11654 | Not Matched | Emergency | Fri, 6/26/2020 4:2... |
| ZZTEST | ZACK | ECG 12-Lead | Ordered | Stat | Male | 6875 | Not Matched | Emergency | Tue, 6/30/2020 1... |
| ZZTEST | FRED | ECG 12-Lead | Ordered | Stat | Male | 7291 | Not Matched | Emergency | Tue, 7/21/2020 1... |
| ZZTEST | APRIL | ECG 12-Lead | Ordered | Routine | Female | 11039 | Not Matched | Outpatient | Thu, 8/13/2020 9... |
| ZZTEST | EDTOACUTE | ECG 12-Lead | Ordered | Routine | Female | 12153 | Not Matched | Inpatient | Tue, 8/18/2020 1... |
| ZZTEST | EDTOACUTE | ECG 12-Lead | Ordered | Routine | Female | 12153 | Not Matched | Inpatient | Wed, 8/19/2020 ... |

| Action | Status | Description | Performed Locat... | Performed Start ... | Performed Stop ... | Performed By |
|--------|-----------|---------------------|--------------------|---------------------|--------------------|------------------|
| | Completed | CV ECG Acquisiti... | | Mon, 4/20/2020 ... | Mon, 4/20/2020 ... | |
| Edit | Saved | CV ECG Report | | Tue, 6/16/2020 1... | | CERNER, CERNE... |

| | |
|---------------------|----------------------|
| Patient | ZZTEST, ASHLEY |
| Sex | Female |
| Date of Birth | Sat, 4/8/1967 |
| Age Then | 53 years |
| Age Now | 53 years |
| MRN | 11040 |
| Encounter Type | Inpatient |
| Allergies (0) | No Known Allergies |
| Current Medications | No Known Medications |

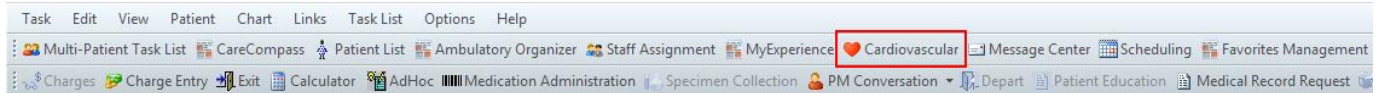
| | |
|----------------------|-----------------------|
| Requested Start D... | 06/16/20 11:15:00 CDT |
| Future Order | No |
| Priority | Routine |
| Stop Date/Time | 06/16/20 11:15:00 CDT |
| Adhoc Frequency L... | |
| ECG Reason | Chest Pain |

| | |
|--------------|-----------------------|
| Last Name | ZZTEST |
| First Name | ASHLEY |
| MRN | 11040 |
| Type | ECG 12-Lead |
| Reason | |
| Request Date | 6/16/2020 11:15 AM CD |

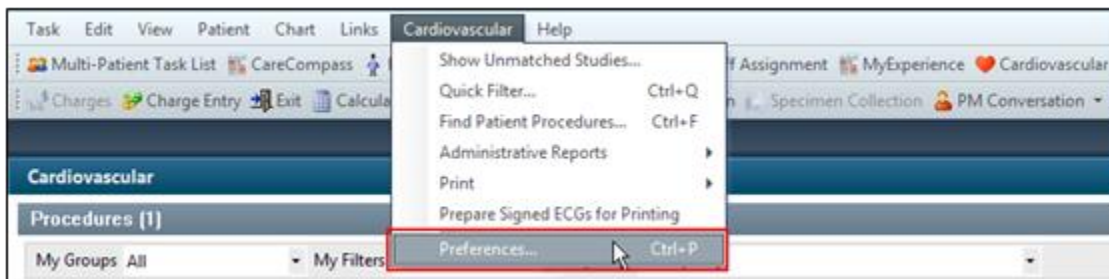
| Section | Description |
|--------------------------------|--|
| 1. Procedure List | Displays a list of ECG procedures and the information relevant to each procedure. This acts as the driver component for the other three panes. It is possible to change the informational fields (columns) and the order in which they are displayed. |
| 2. Procedure Steps List | Displays the list of intra-procedural steps that are associated with the procedure selected in the Procedure List. A step could be acquiring an ECG or completing a final report. |
| 3. Preview Pane | Displays thumbnail previews of images associated with the selected procedure. View an image or report in the appropriate image viewer by double-clicking that thumbnail in the Preview Pane. |
| 4. Patient Profile | Displays contextual patient information relevant to the selected procedure. The Patient Profile is made up of two parts, the Patient Profile and the Details pane. The Patient Profile consists of demographic information, allergies, medications, and current and historical procedures for the patient. The Details pane displays details associated with a selected component of the Patient Profile. For example, if you select a historical procedure from the Patient Profile, the summary findings from the final report for the procedure is displayed in the Details pane, along with a link to open a read-only copy of the final report. |


Initial Set Up

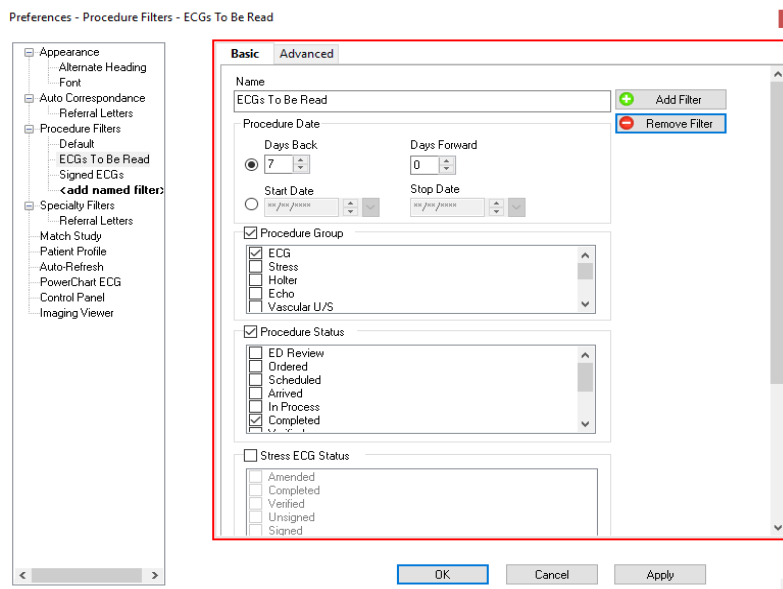
1. Log into **PowerChart** or **FirstNet** using your username and password.
2. Launch the Cardiovascular worklist by clicking the **Cardiovascular** icon on the menu bar.



3. The default worklist appears. From the **Cardiovascular** menu item that now appears at the top of screen, scroll to **Preferences** and select it.



4. Select the  button. Enter a name and the filter parameters, then select OK to save.



- Go back to the Cardiovascular worklist and change your **My Filters** dropdown from **Default** to **ECGs To Be Read**. You should now see a list of ECG waiting to be interpreted and signed.

| Cardiovascular | | | | | | |
|--|------------|----------------------------|-----------|---------------------|--------|--|
| Procedures (1) | | | | | | |
| My Groups All | | My Filters ECGs To Be Read | | My Orgs All My Orgs | | |
| Drag a column header here to group by that column. | | | | | | |
| Last Name | First Name | Type | Status | Priority | Sex | |
| ZZTEST | ASHLEY | ECG 12-Lead | Completed | Routine | Female | |

- Additionally, create a filter for **Signed** ECGs. This is useful for amending any previously read ECGs, if necessary.

Basic | **Advanced**

Name: + Add Filter - Remove Filter

Procedure Date

Days Back: 7 Days Forward: 0

Start Date: Stop Date:

Procedure Group

ECG Cardiac Cath

Filter On Status

Unsigned Signed Cancelled

Status Exceptions

Exclude Procedures with Complete Physician Report

Exclude Procedures with Unsigned Physician Report

Include Procedures without Complete Referral Letters

Age Filtering On

Only show: Older than: Years

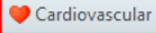
- Changing the **My Filters** dropdown from **Default** to **Signed** should show the list of previously signed ECGs.

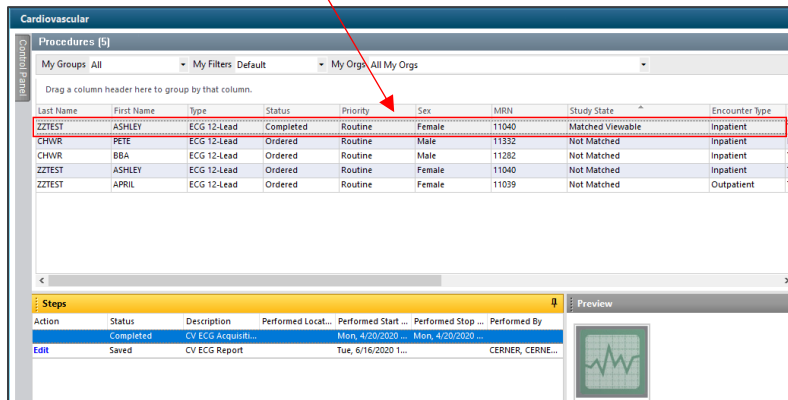
| Cardiovascular | | | | | | | | |
|--|------------|-------------------|--------|---------------------|--------|--------|----------------|--|
| Procedures (1) | | | | | | | | |
| My Groups All | | My Filters Signed | | My Orgs All My Orgs | | | | |
| Drag a column header here to group by that column. | | | | | | | | |
| Last Name | First Name | Type | Status | Priority | Sex | MRN | Encounter Type | |
| ZZTEST | WHITE | ECG | Signed | | Female | 238012 | Inpatient | |

Viewing ECG, Holter, and Stress Test

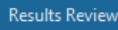
Once the procedure is completed, you will need to find the study you want to read. To be able to view a study, it must be in a **COMPLETED, UNSIGNED, or ED REVIEW** status. These procedures can be viewed from multiple places within Cerner, including the Cardiovascular Worklist, MPAGES, and Results Review.

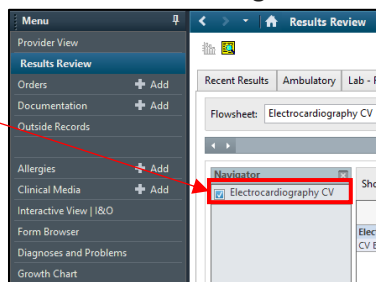
Through Cardiovascular Worklist

1. Launch the Cardiovascular worklist by clicking  on the menu bar.
2. From the Cardiovascular Worklist, double-click the patient's order to launch the ECGViewer.

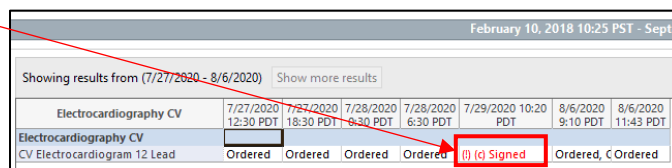


Through Results Review

1. Navigate to the Blue Menu located on the left of the screen and click .
2. Click on the Electrocardiography CV section of the Navigator



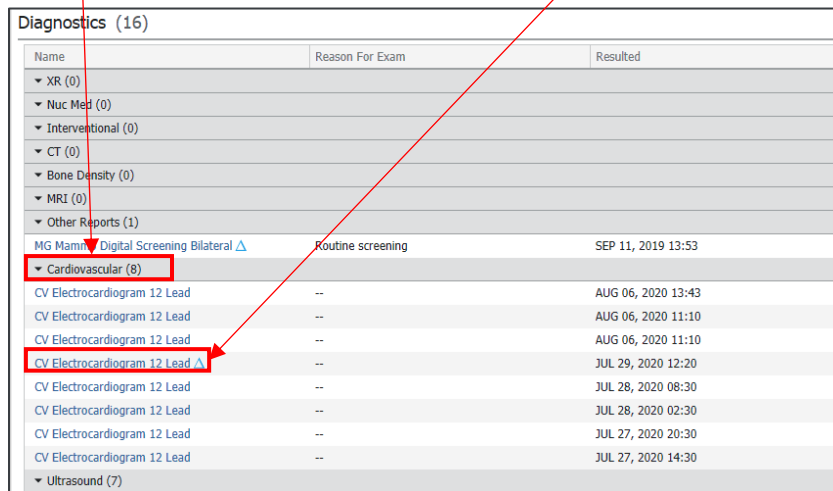
3. Double-click the Completed, Unsigned, ED Review, or Signed order status to launch the ECG Viewer.



| | 7/27/2020 12:30 PDT | 7/27/2020 18:30 PDT | 7/28/2020 6:30 PDT | 7/28/2020 6:30 PDT | 7/29/2020 10:20 PDT | 8/6/2020 9:10 PDT | 8/6/2020 11:43 PDT |
|------------------------------|---------------------|---------------------|--------------------|--------------------|---------------------|-------------------|--------------------|
| Electrocardiography CV | Ordered | Ordered | Ordered | Ordered | (S) Signed | Ordered, C | Ordered |
| CV Electrocardiogram 12 Lead | Ordered | Ordered | Ordered | Ordered | Ordered | Ordered, C | Ordered |


Through Workflow or Summary MPages

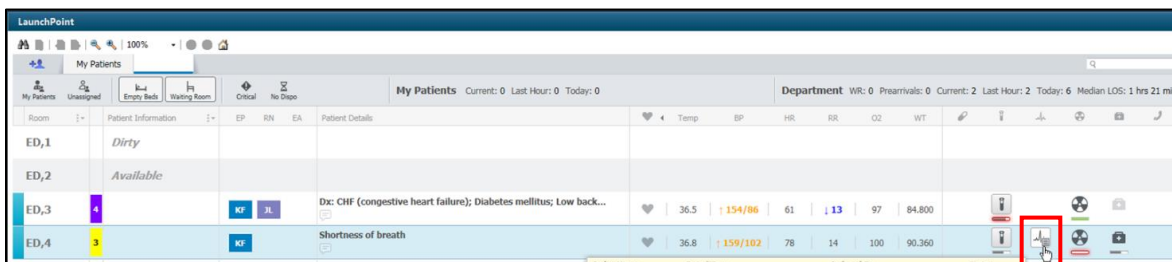
1. Click on **Prescriber View** on the Blue Menu to open the prescriber view.
2. Scroll through the Component List and select **Diagnostics (0)**
3. Expand the Cardiovascular section and double-click the CV Electrocardiogram 12 Lead link to launch the ECG Viewer.



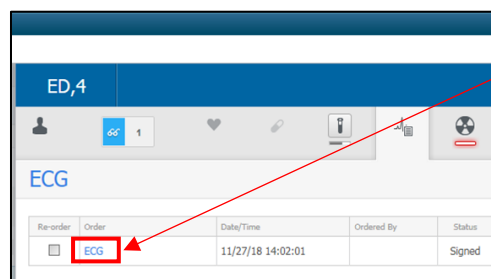
| Name | Reason For Exam | Resulted |
|---|-------------------|--------------------|
| ▼ XR (0) | | |
| ▼ Nuc Med (0) | | |
| ▼ Interventional (0) | | |
| ▼ CT (0) | | |
| ▼ Bone Density (0) | | |
| ▼ MRI (0) | | |
| ▼ Other Reports (1) | | |
| MG Mamm Digital Screening Bilateral ▲ | Routine screening | SEP 11, 2019 13:53 |
| ▼ Cardiovascular (8) | | |
| CV Electrocardiogram 12 Lead | -- | AUG 06, 2020 13:43 |
| CV Electrocardiogram 12 Lead | -- | AUG 06, 2020 11:10 |
| CV Electrocardiogram 12 Lead | -- | AUG 06, 2020 11:10 |
| CV Electrocardiogram 12 Lead ▲ | -- | JUL 29, 2020 12:20 |
| CV Electrocardiogram 12 Lead | -- | JUL 28, 2020 08:30 |
| CV Electrocardiogram 12 Lead | -- | JUL 28, 2020 02:30 |
| CV Electrocardiogram 12 Lead | -- | JUL 27, 2020 20:30 |
| CV Electrocardiogram 12 Lead | -- | JUL 27, 2020 14:30 |
| ▼ Ultrasound (7) | | |

Through FirstNet's LaunchPoint

From FirstNet's Launch Point, select the waveform icon  and then select the ECG order(s) to launch the ECG viewer.

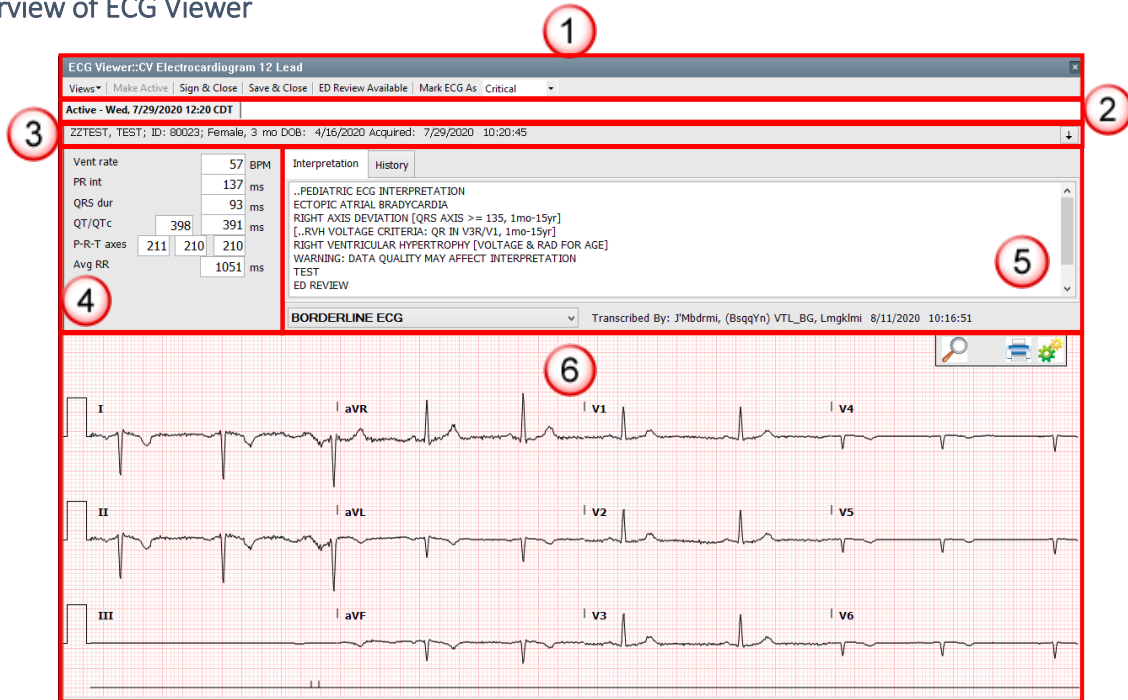


| Room | Patient Information | EP | RN | EA | Patient Details | Temp | BP | HR | RR | O2 | WT |
|------|---------------------|----|----|----|--|------|---------|----|----|-----|--------|
| ED,1 | Dirty | | | | | | | | | | |
| ED,2 | Available | | | | | | | | | | |
| ED,3 | 4 | KF | JL | | Dx: CHF (congestive heart failure); Diabetes mellitus; Low back... | 36.5 | 154/86 | 61 | 13 | 97 | 84.800 |
| ED,4 | 3 | KF | | | Shortness of breath | 36.8 | 159/102 | 78 | 14 | 100 | 90.360 |



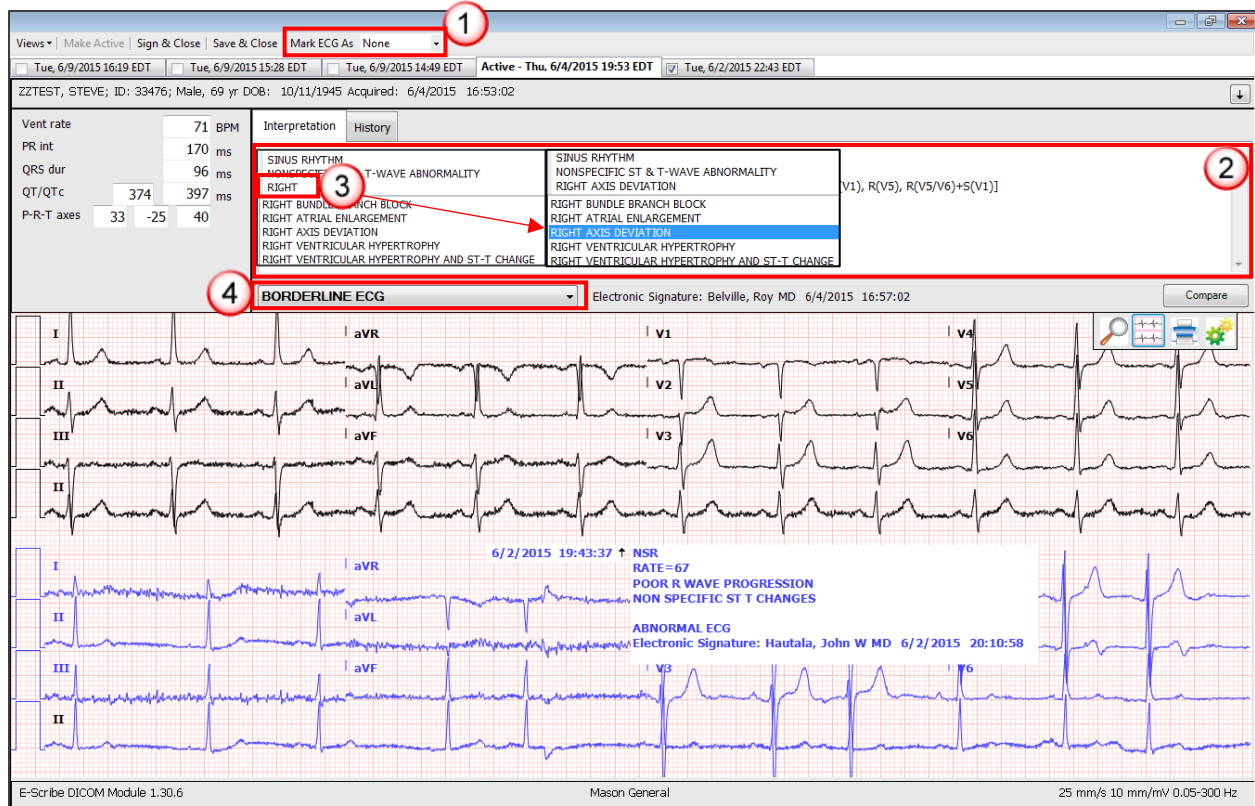
| Re-order | Order | Date/Time | Ordered By | Status |
|--------------------------|-------|-------------------|------------|--------|
| <input type="checkbox"/> | ECG | 11/27/18 14:02:01 | | Signed |

Overview of ECG Viewer



| Section | Description |
|---|--|
| 1 - ECG toolbar | <p>Views list Views*: Includes options for 12-Lead ECG, Median Beats 3x4, and Median Beats Overlay</p> <p>Make Active Make Active: Click any other tab (prior or newer ECG waveform) in the ECG toolbar and click Make Active to make that specific ECG active</p> <p>Sign and Close Sign & Close</p> <p>Save and Close Save & Close</p> <p>Mark ECG As Mark ECG As: Sets the criticality the procedure in ECG Management</p> |
| 2 - ECG Tabs with Dates and Times | Includes the ECG tabs with dates and times when a current or prior ECG was performed. A tab is displayed for each individual ECG in a patient record beginning at date of implementation of solution moving forward. Click a tab or click the previous button (<) or next button (>) to view different ECGs. |
| 3 - Patient Demographics | Click the expand button to show more details. Click the collapse button to hide the details. |
| 4 - ECG Discrete Data | Displays discrete data values derived from the ECG cart algorithm. |
| 5 - ECG Interpretation and History | Displays interpretation data and History tab that displays historical save/sign information. |
| 6 - ECG Waveform | <p>ECG waveform is displayed.</p> <p>Calipers can be utilized for both vertical and horizontal measurements.</p> <p>The following buttons are on the ECG Waveform toolbar:</p> <p>Magnify: Toggle on/off by selecting the button</p> <p>Compare: Click the compare button to compare an available patient ECG with current</p> <p>Print: Sends to a local printer</p> <p>Settings: Expand ECG Waveform viewing options. Click the settings button again to collapse the viewing options. The settings button includes the following options:</p> |

Interpreting ECG



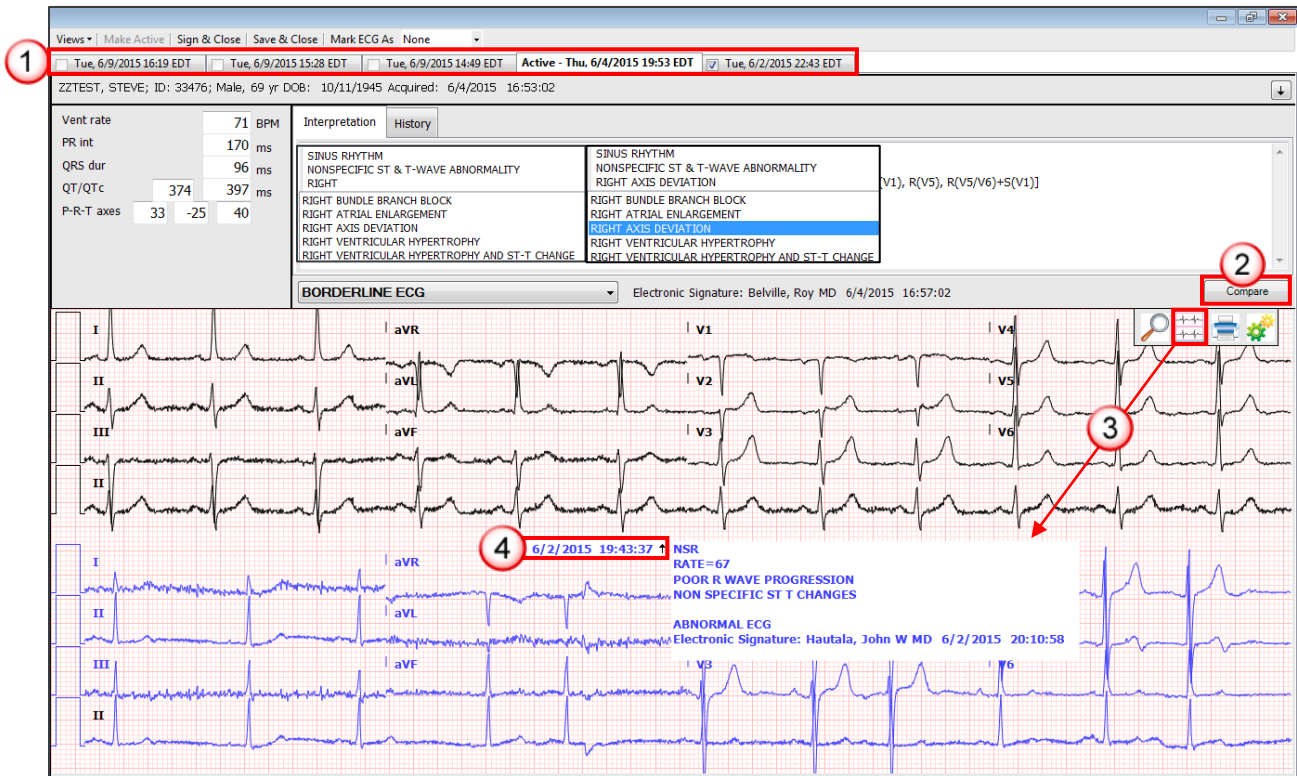
The screenshot shows an ECG interpretation window. At the top, a dropdown menu (1) is set to 'Mark ECG As: None'. Below this, patient information and ECG parameters are displayed. The Interpretation box (2) contains a list of findings, with 'RIGHT AXIS DEVIATION' (3) highlighted by a red arrow. Below the list, a dropdown menu (4) shows the classification 'BORDERLINE ECG'. The ECG traces are shown below, with a summary box indicating 'ABNORMAL ECG' and 'POOR R WAVE PROGRESSION'. The interface includes a signature line for the reading provider and a 'Compare' button.

1. Normalcy Indicator – This box contains the normalcy indicator (None, Abnormal, Critical) assigned to the ECG. This can be determined by the Classification Statements previously selected, or by the Reading Provider manually changing the value.

2. Interpretation Box - The interpretation box will be populated with a preliminary interpretation from the cart, as well as the preliminary / wet read interpretation from the ED Physician or Mid-Level, if present. If there is a preliminary interpretation, the signature line will display “Transcribed by <Name>” instead of the usual “Unconfirmed Report.”

3. Predictive Statements - To use predictive text statements, simply start typing. The predictive search engine will suggest different options based on frequency of use. Select the desired statement from the list using the mouse or using the “Down Arrow” key.

4. Classification Statements - This box contains a general classification of the interpretation from the cart. Clicking on the dropdown arrow allows the Reading Provider to change this classification.



Views | Make Active | Sign & Close | Save & Close | Mark ECG As: None

Tue, 6/9/2015 16:19 EDT | Tue, 6/9/2015 15:28 EDT | Tue, 6/9/2015 14:49 EDT | **Active - Thu, 6/4/2015 19:53 EDT** | Tue, 6/2/2015 22:43 EDT

ZZTEST, STEVE; ID: 33476; Male, 69 yr DOB: 10/11/1945 Acquired: 6/4/2015 16:53:02

| | | |
|------------|-----|-----|
| Vent rate | 71 | BPM |
| PR int | 170 | ms |
| QRS dur | 96 | ms |
| QT/QTc | 374 | 397 |
| P-R-T axes | 33 | -25 |
| | | 40 |


| Interpretation | History |
|---|---|
| SINUS RHYTHM NONSPECIFIC ST & T-WAVE ABNORMALITY RIGHT | SINUS RHYTHM NONSPECIFIC ST & T-WAVE ABNORMALITY RIGHT AXIS DEVIATION V1), R(V5), R(V5/V6)+S(V1)] |
| RIGHT BUNDLE BRANCH BLOCK RIGHT ATRIAL ENLARGEMENT RIGHT AXIS DEVIATION RIGHT VENTRICULAR HYPERTROPHY RIGHT VENTRICULAR HYPERTROPHY AND ST-T CHANGE | RIGHT BUNDLE BRANCH BLOCK RIGHT ATRIAL ENLARGEMENT RIGHT AXIS DEVIATION RIGHT VENTRICULAR HYPERTROPHY RIGHT VENTRICULAR HYPERTROPHY AND ST-T CHANGE |

BORDERLINE ECG Electronic Signature: Belville, Roy MD 6/4/2015 16:57:02

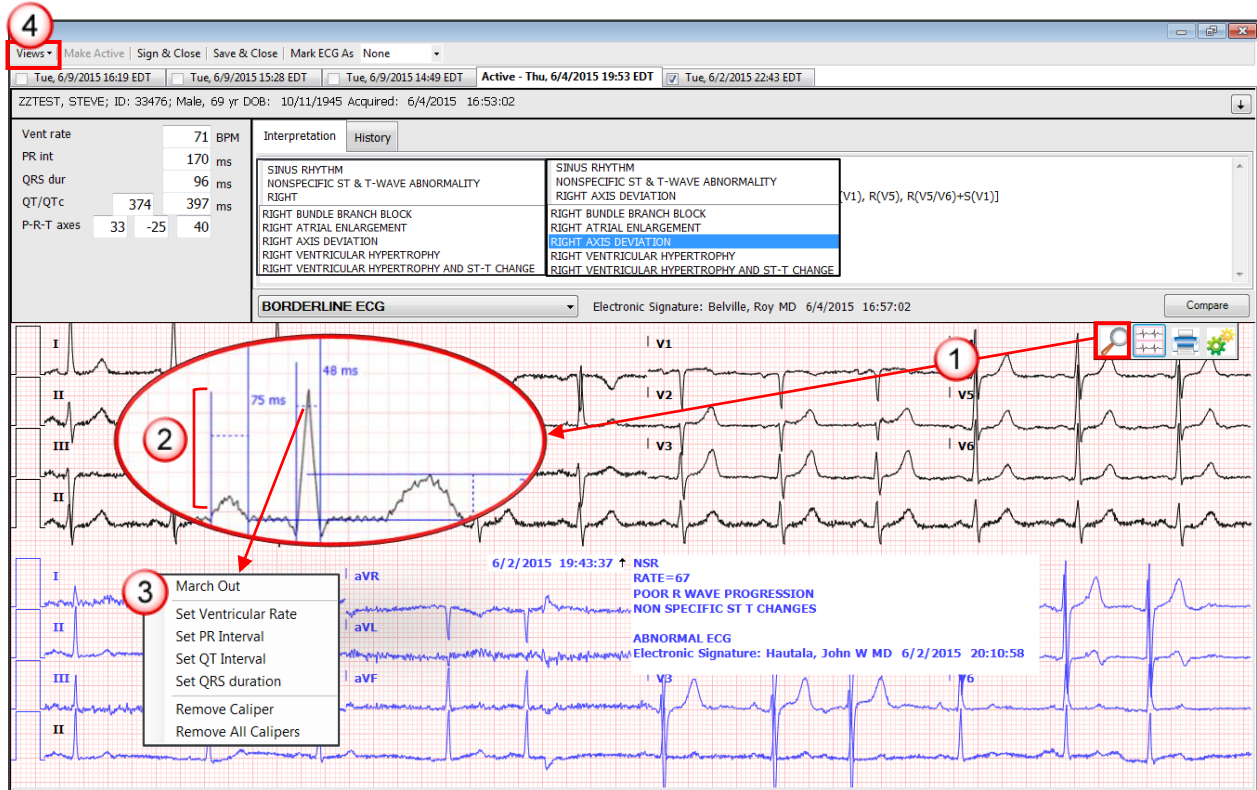
6/2/2015 19:43:37 ↑ NSR
RATE=67
POOR R WAVE PROGRESSION
NON SPECIFIC ST T CHANGES
ABNORMAL ECG
Electronic Signature: Hautala, John W MD 6/2/2015 20:10:58

1. **Comparison View** - Prior ECGs can be located using the tabs along the top of the viewer. Selecting a prior ECG will activate the comparison tool.

2. To perform a serial comparison between ECGs, select the **Compare** button on the right. A comparison text box will be added along with the comparison text.

3. To perform a beat comparison (or side by side comparison) toggle the  button while the prior ECG is checked.

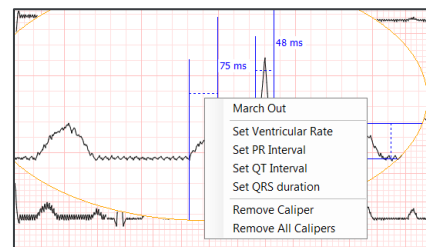
4. Hide/move the comparison interpretation by clicking on the arrow.



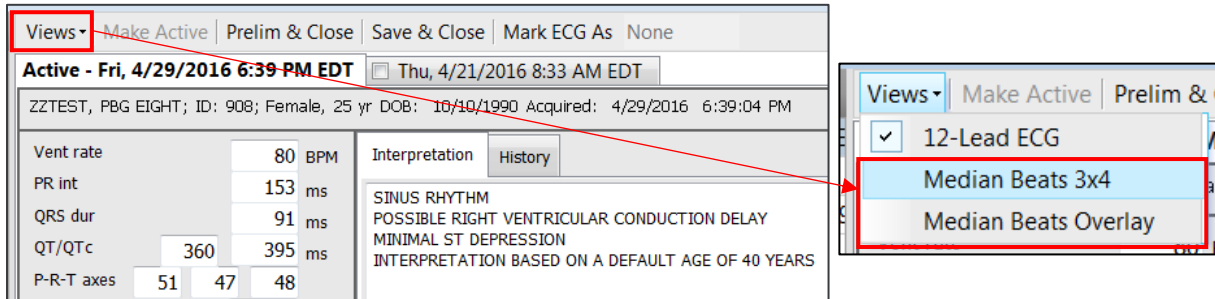
1. Zoom - Toggle the zoom/magnification with the zoom button. Alternatively, if using a mouse with a scroll wheel, slide the wheel up or down to zoom in or out without having to select the magnifying glass icon.

2. Calipers - Calipers can be quickly drawn by holding a left click anywhere on the waveform, dragging the cursor, and then releasing the left click. Multiple calipers can be drawn, even while using the Magnifying Glass option. Move Calipers by selecting the dashed line and dragging the caliper to a new location. Resize Calipers by selecting the solid blue lines and dragging them closer together or farther apart.

3. Right clicking on a Caliper provides the option to either remove the Caliper, or to set fiducial measurements.



4. Fiducial Measurements - When an ECG is taken, the fiducial measurements are automatically marked on the ECG. The ECG Viewer gives you the ability to view and change these measurements. To view Fiducial Measurements, select either the **Median Beats 3x4** or the **Median Beats Overlay** option from the **Views** drop down.

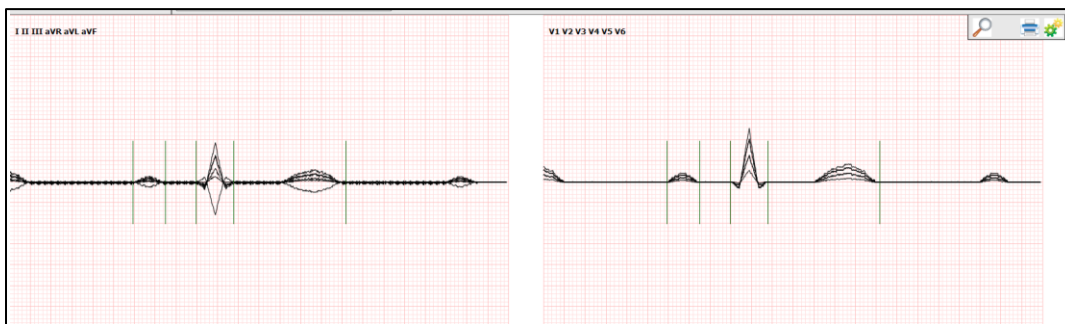


The screenshot shows the ECG Viewer interface. The 'Views' dropdown menu is open, showing three options: '12-Lead ECG', 'Median Beats 3x4', and 'Median Beats Overlay'. The 'Median Beats 3x4' and 'Median Beats Overlay' options are highlighted with a red box. The main interface shows patient information: ZZTEST, PBG EIGHT; ID: 908; Female, 25 yr DOB: 10/10/1990 Acquired: 4/29/2016 6:39:04 PM. The ECG parameters are: Vent rate 80 BPM, PR int 153 ms, QRS dur 91 ms, QT/QTc 360/395 ms, P-R-T axes 51, 47, 48. The interpretation is: SINUS RHYTHM, POSSIBLE RIGHT VENTRICULAR CONDUCTION DELAY, MINIMAL ST DEPRESSION, INTERPRETATION BASED ON A DEFAULT AGE OF 40 YEARS.

Median Beats 3x4 View

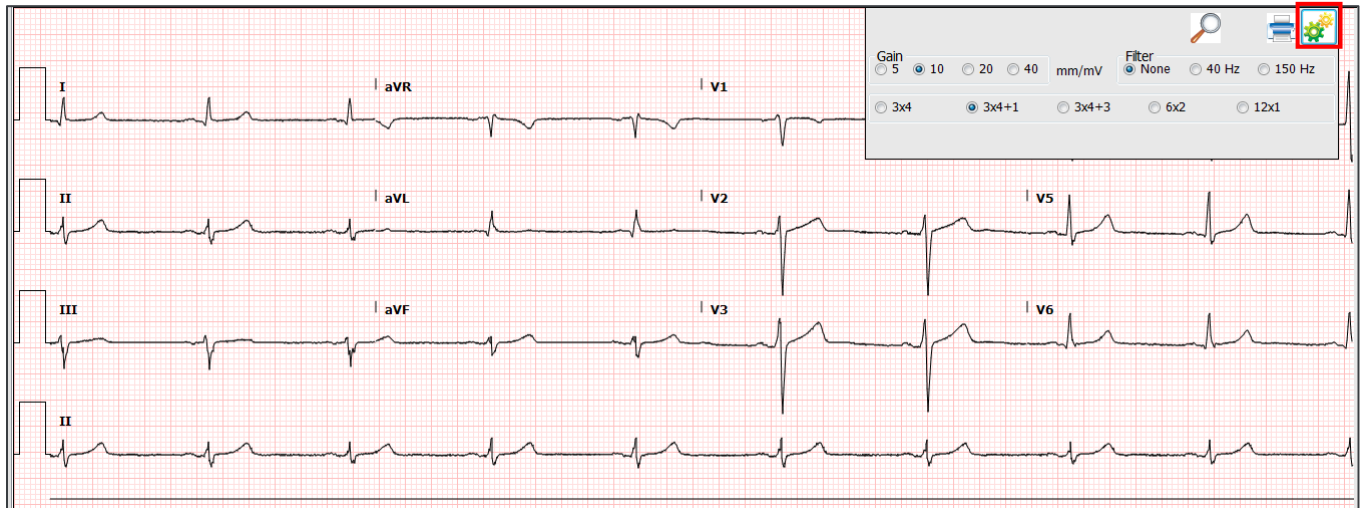


Median Beats Overlay View



Setting Fiducial Measurements - Zoom into the wave form, draw a caliper, right click on that caliper, and select the appropriate measurement as desired. Updated measurements will display in bolded text in the ECG Viewer.

Gain and Filter - By default, the ECG Viewer displays a **3x4** ECG with a **Gain** value of 10 mm/mV and a **Filter** value of **None**, but these settings can be adjusted using the cog wheel icon. These changes are a user preference and will apply to all ECGs viewed until the settings are changed again.



Signing ECG

After interpreting the ECG, make sure to save your changes by selecting either **Sign & Close** or **Save & Close** when done.

- If you are ready to finalize the ECG, select **Sign & Close**.
- If you are not ready to finalize the ECG, select **Save & Close**.

Please note, if you are not a finalizing provider, the **Sign & Close** option should display either **ED Review & Close** or **Unsign & Close** instead.

