ZOLL CaseReview
In-Premise User Guide

OCTOBER 2019

ZOLL®

© 2019 ZOLL. All rights reserved.
ZOLL is a registered trademark of ZOLL Medical Corporation.
Other product and company names may be the trademarks of their respective owners.

11802 Ridge Parkway, Suite 400
Broomfield, CO 80021 U.S.A
Tel: (303) 801- 0000
Latest docs: www.zolldata.com

Table of Contents

Overview 1

How it Works 1

CaseReview Basic, Premium, and In-Premise 3

Supported Browsers 3

Upload Cases 4

How to Upload Cases 4

Display Upload Cases 6

Manage Cases Page 6

Filters 7

Custom Filters 7

Mark Cases Infant or Pediatric 8

Open Cases 10

Case Overview 10

Case Summary 11

Steps to add or edit patient data 11

Tags section 12

Delete Cases 14

Cases with 12-Leads 15

12-Lead on the Playback Page 16

Export a 12-Lead Report 17

Performance Summary 18

Accessing Performance Summary 19

Reviewed Cases 19

CPR Times 20

Summaries, Trends, and Velocity 20

CPR Performance 20

Ventilation Performance 23

EtCO2 Trends 23

CPR Summary 24

11802 Ridge Parkway, Suite 400
Broomfield, CO 80021 U.S.A
Tel: (303) 801- 0000
Latest docs: www.zolldata.com

ZOLL

When CPR Pauses are Added and When They Start/Stop 25
When CPR Pauses are added to a Case 25
Adult Cases 26
Infant & Pediatric Cases 26
Longest Pauses and Shocks 26
Display your Company Logo on CPR Performance PDF 27
Enlarge a Segment for Analysis - Zoom 27
Create Segments from CPR Quality Graph 27
Clip a Segment 28
Playback 29
Select the Section you want to View 30
View by Waveform – use 'ECG overview' 31
View by Events – use the Event Timeline 33
View by Full Summary 34
Non-CPR Cases 35
Vitals 36
Audio (X Series and AED3) 38
Case Editor 38
Best Practices for Editing Cases 38
Using the Case Editor 39
Locating the Period you want to Edit 40
Editing a Non-Shaded Area 42
Editing a CPR or ROSC Period 42
Add 42
Edit - Change the period's start or end time 43
Editing a Pause Reason 44
Merging pause reasons 44
Adding ROSC over an existing period 44
Deleting a period 45
Splitting a period 46
Undo 46

Working with Annotations 47
Add an Annotation 48
Edit an Annotation 48
Delete an Annotation 49
Viewing Waveforms on the Case 50
Magnified ECG 50
Additional Waveforms 51
Saved Searches 55
Managing Saved Searches (Administrator only) 57
Create a New Search from an Existing Search 58
Enable/Disable a Saved Search (admin only) 59
Sharing a Saved Search with your Organization (admin only) 59
Tags 59
Display Tags 59
Add Tags 59
Edit 60
Delete 60
Automatic Tagging 60
Tag Cases with Multiple Tags 61
Example 63
Download Cases 66
Download a Single Case File 66
Download the Raw Defib File 66
Run Reports 67
CPR Data Report 67
CaseStatistics.csv 67
IndividualCompressions.csv 69
MinuteByMinuteReport.csv 70
Export Full Disclosure Report 71
Snapshot Report 72
12-Lead Report 74

Audit Log 74
CPR Trend Report 75
Interval Parameters 77
Generate .csv File 78
Settings (Administrators only) 79
CPR Quality Settings 79
Granting Permissions to Standard Users 80
Data Access Keys 80
How to Import Cases into ZOLL Online 82
How to Use Case Push 83
R Series 83
X Series 84
AED 3 85
CaseReview Importer 86
Install CaseReview Importer 86
Configuring CaseReview Importer 88
Static IP Address – Setup the X Series 89
Setup the X Series 89
CaseReview Importer Static IP Settings 90
Using CaseReview Importer 91
Your network 91
IP address 92
X Series devices 92
Using RescueNet Code Review with CaseReview 93
Connect Code Review to CaseReview 93
Configure Code Review 93
Search Cases Using Code Review 94

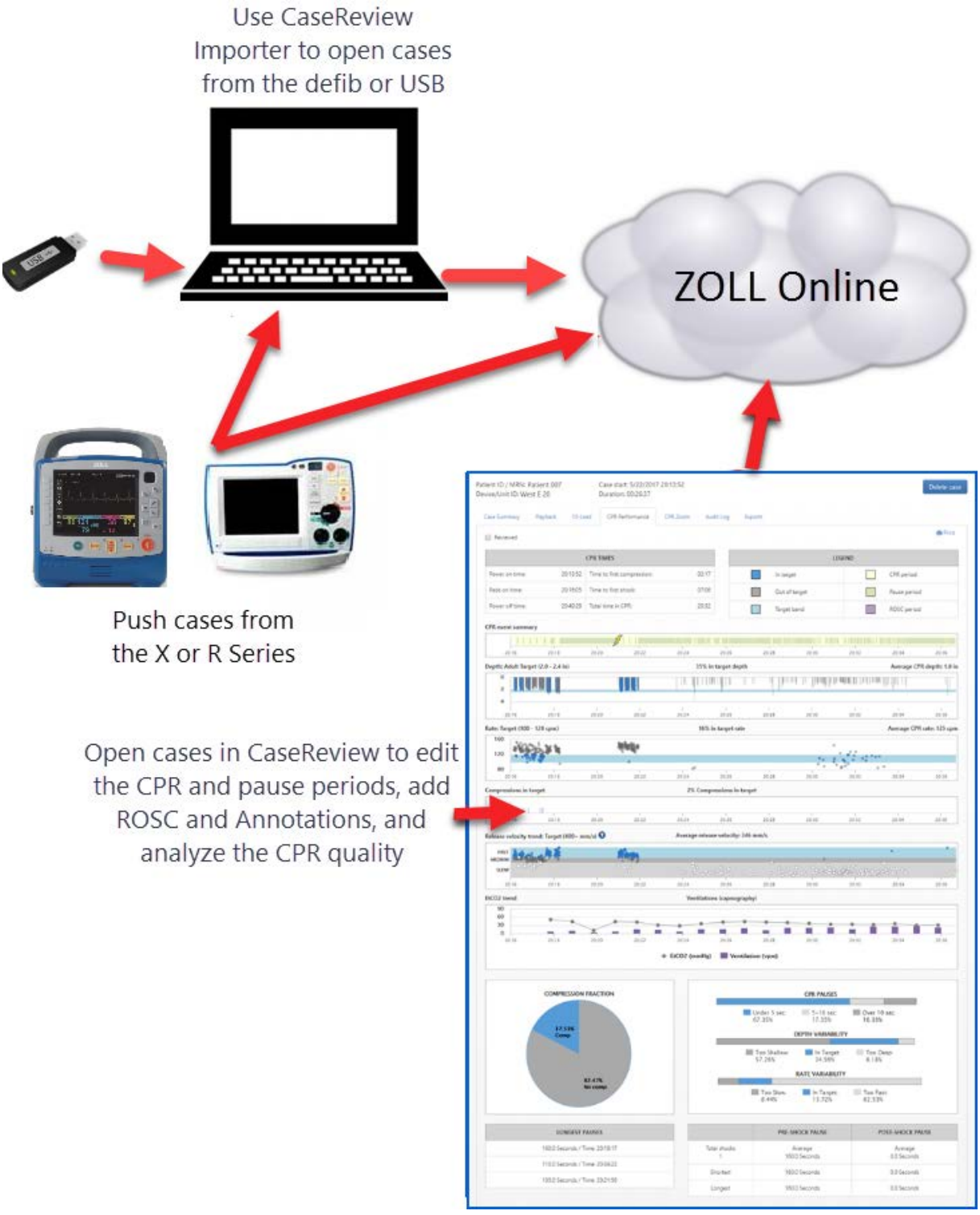
Overview

CaseReview is a case management tool that allows users to upload case files, view CPR quality and trends over time, and identify commonalities between cases. With CaseReview users can filter cases using specific attributes such as the same waveforms, vitals, events, and alarms. For easy identification, users can create custom tags and apply them to one or more cases that require further analysis and review.

How it Works

The system transfers case files directly from the X or R Series ZOLL Defibrillators to ZOLL Online using the Case Push function or via a mobile PC using the CaseReview Importer. Once transferred, users log onto CaseReview to view an instant CPR Performance Summary, which generates data based on the first to last compression in the case. The system draws pause periods wherever there is a two-second or greater gap between compressions. An Administrator sets the two-second pause period threshold on the Settings page.

To help CaseReview provide the most accurate CPR quality information, CaseReview In-Premise users can utilize RescueNet Code Review to add user-defined CPR periods and pause reasons. Once complete, users return to CaseReview to view the modified CPR quality metrics including aggregate CPR dashboards.


Use CaseReview Importer to open cases from the defib or USB
ZOLL Online
Push cases from the X or R Series
Open cases in CaseReview to edit the CPR and pause periods, add ROSC and Annotations, and analyze the CPR quality

CaseReview Basic, Premium, and In-Premise

CaseReview Basic is available free to all ZOLL customers. The free version allows you to upload, download, and view case files users recorded in the previous month. In this way, you can take advantage of the Case Push function of the X Series and use Cloud2Cloud integration to connect your preferred Patient Care Charting program.

In addition to CaseReview Basic, ZOLL customers can purchase CaseReview Premium and CaseReview In-Premise to use the following additional features:

- Snapshots:
  - View the time the snapshot was recorded within the case using the Event Timeline on the Playback page
  - Run the Snapshot report to view all snapshots detected in the case
- 12-Leads:
  - View the time 12-Leads were recorded within the case using the Event Timeline and the ECG Overview on the Playback page
  - View/magnify the 12-Lead image
  - Run a 12-Lead report to view all 12-Leads detected in the case
- Ability to save searches
- Automatic tagging
- Configurable settings for pause periods, CPR rate, and depth ranges
- Longer term access to case files
- Support for distinct infant, pediatric, and adult compression depth target settings
- View the entire ECG
- Clip a segment of an enlarged area (CPR Zoom) of the CPR Quality graph and save it for further analysis. You can have to 10 clipped segments at one time. Segments can be named and printed to a PDF.

For access to CaseReview Basic, call the ZOLL Support team at 1-800-663-3911 or send an email with the request to supportdata@zoll.com.

For access to CaseReview Premium or CaseReview In-Premise, call your ZOLL representative.

Supported Browsers

ZOLL supports the use of the following browsers:

- Microsoft Internet Explorer V11
- Google Chrome Desktop – current version
- Mobile Safari – current version (tied to iOS version)

Upload Cases

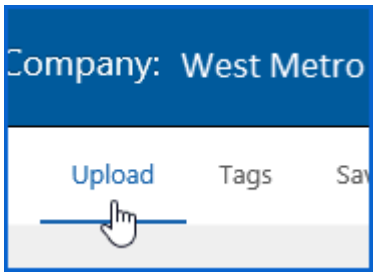
How to Upload Cases

There are three ways to upload cases to CaseReview:

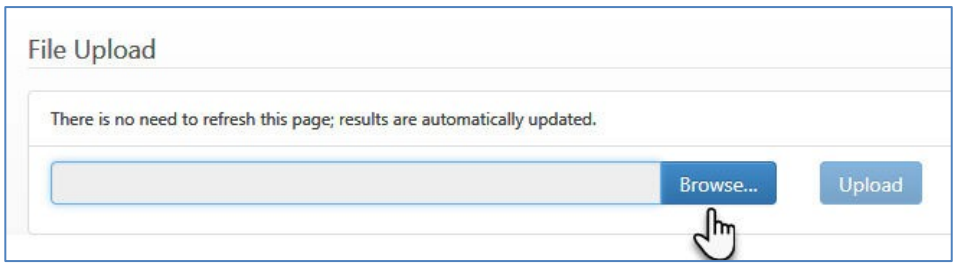
- **Upload page**: Manual upload of ***up to 10 cases*** from a file storage location (instructions below).
- **CaseReview Importer**: Manual retrieval of ***greater than 10 cases*** from the ZOLL X, R, and E Series defibrillators, a USB, or a file system.
- **Case push**: Automatic upload from the X and R Series defibrillators.

To use the Upload page:

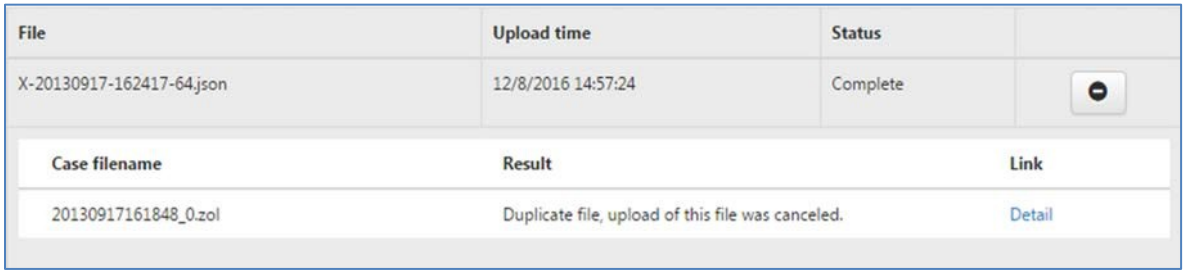
1. From the CaseReview Navigation Bar, click **Upload**.



2. On the Upload page, click **Browse**. A dialog box opens that allows you to navigate to the stored location.

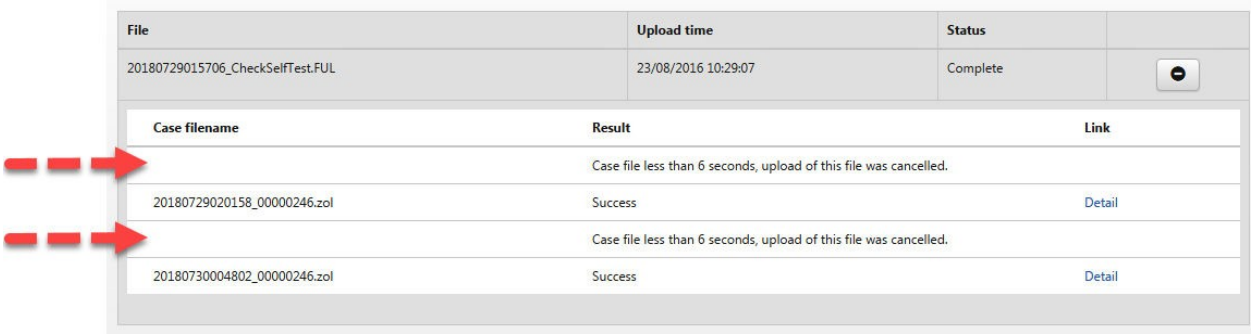


3. At the stored location, highlight case(s) you wish to upload. You can select multiple cases by using the Shift key.
4. Click **Open**. The file(s) appear in the field.
5. Click **Upload**.
6. The page updates to show the upload status. There is no need to refresh the page. As the files upload, the Status column changes from Pending to Complete and a plus sign appears. To view more details, click the plus sign. For case information, click **Detail**.



When you click Manage Cases, the uploaded cases display in the grid.

Note: You will see the following uploaded message if you upload a self-test from an R Series. The system does not create/list a file name for self-test files.

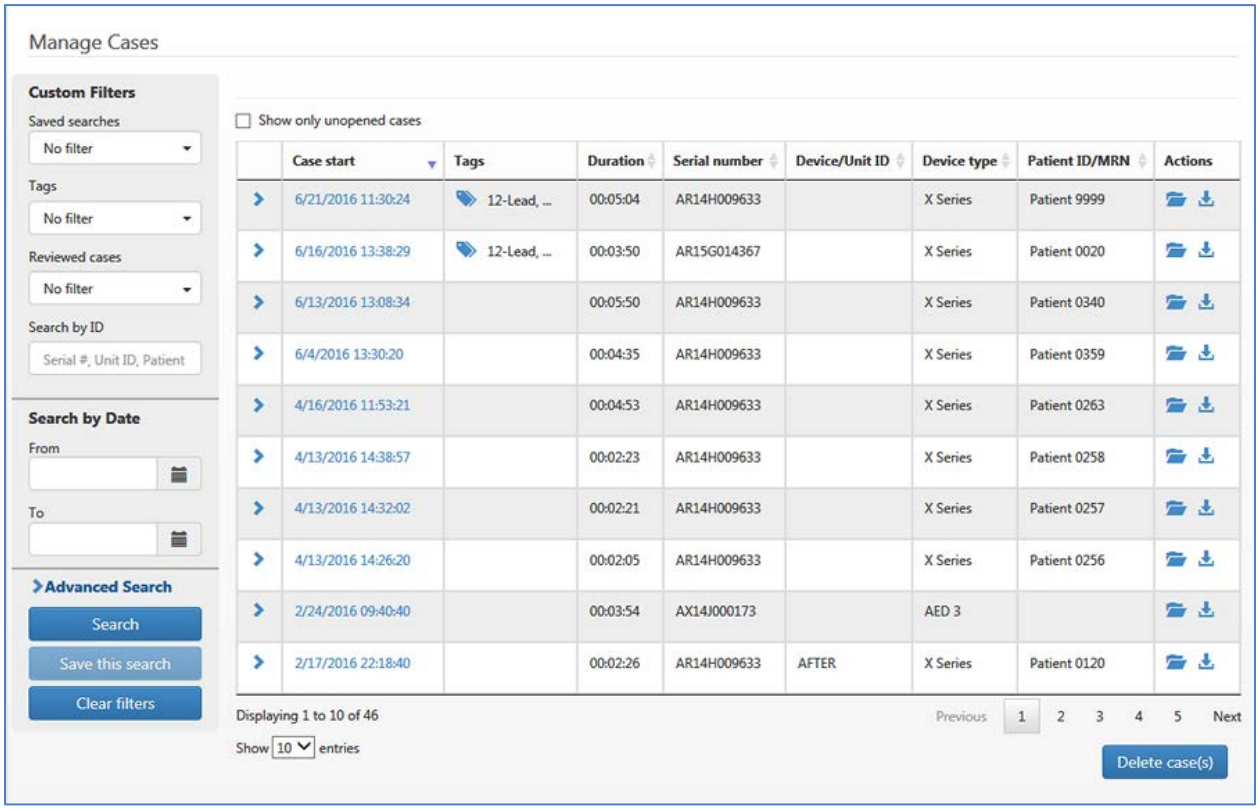


Display Upload Cases

Manage Cases Page

The system displays all cases uploaded to ZOLL Online on the Manage Cases page. If a filter is active, the grid displays the cases that match the filter criteria. To see all cases, ensure that you do not have any active filters.

For CaseReview In-Premise users, case file storage resides on your file system.



Note: Bold text highlights cases that have not been viewed or downloaded to another application. Use the "Show only unopened cases" option to filter the page to show bold text cases only. This option can be used alone or in conjunction with a custom filter or advanced search. However; the results of the "Show only unopened cases" filter cannot be saved, i.e. you cannot create a saved search, apply the "Show only unopened cases" filter to the saved search and save that setting for future searches.

Filters

ZOLL designed filters to improve your ability to find specific cases on the Manage Cases page. Within each filter category, you can choose one or more selections. For example, in the Advanced Search > Events category, you may want to view all case files with "No Shock Advised" and "12-Lead". In addition, you can choose multiple selections within multiple categories.

Custom Filters

Tags: Use tags to mark cases so you can easily find them for further analysis. You can filter the case view to only those that have specific tags applied to them. Choose as many tags as you wish.

Saved searches: Users can name and save searches for future use. After you execute a search, click 'Save this search'.

Reviewed cases: Users can mark the cases reviewed on the CPR Performance Summary page and filter the case view to display only those that have been reviewed or not reviewed.

Search by Date: Select the start and end date of the cases you would like to view.

Advanced Search: Select case attributes such as alarms, events, vitals, etc.

After you set your filter criteria, click **Search**. The system displays all cases that match the criteria you specify. On the top of the page, the system shows a list of filters you selected such as alarms, vitals, events, etc. You can remove a filter by clicking the X next to the filter name.

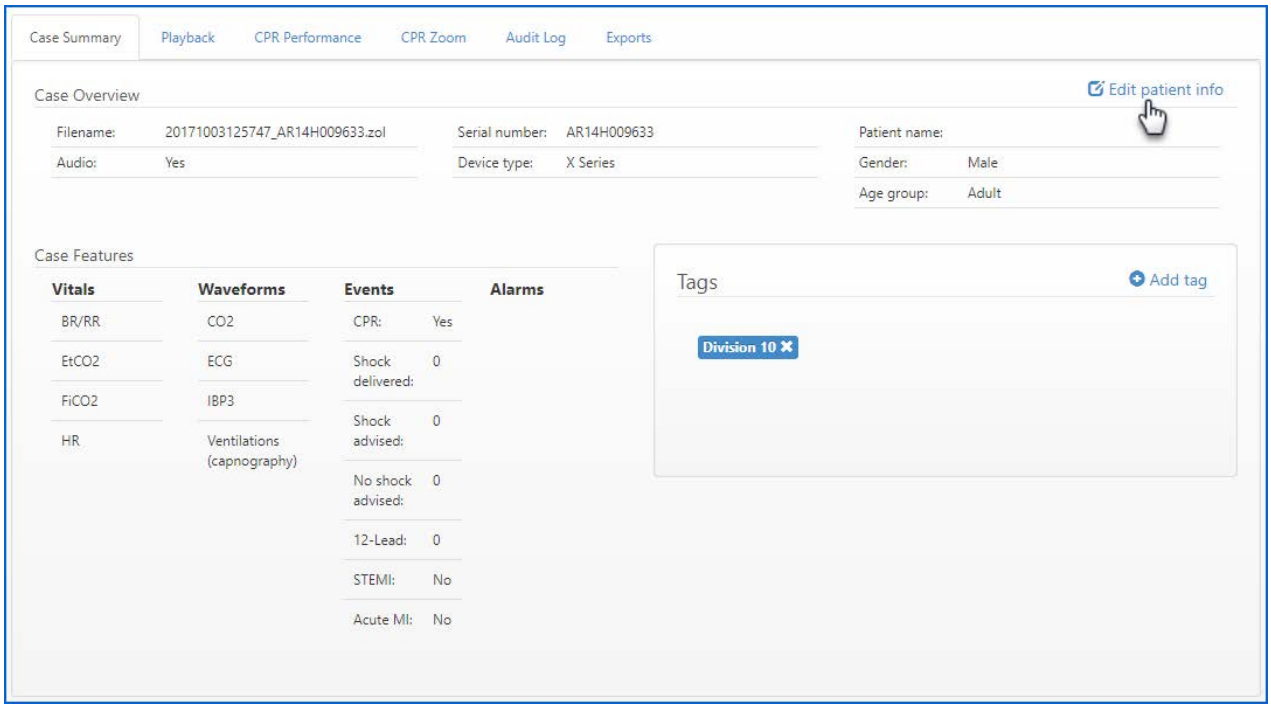
With the exception of a Device Type search, the search results include cases that contain ***all*** of your checked search criteria. Cases that match some but not your entire search, will not display. Device type searches work a little differently; you can check multiple items and your search results will include cases that match one or more of the search criteria.

To remove filters and display all uploaded cases, click **Clear Filters**.

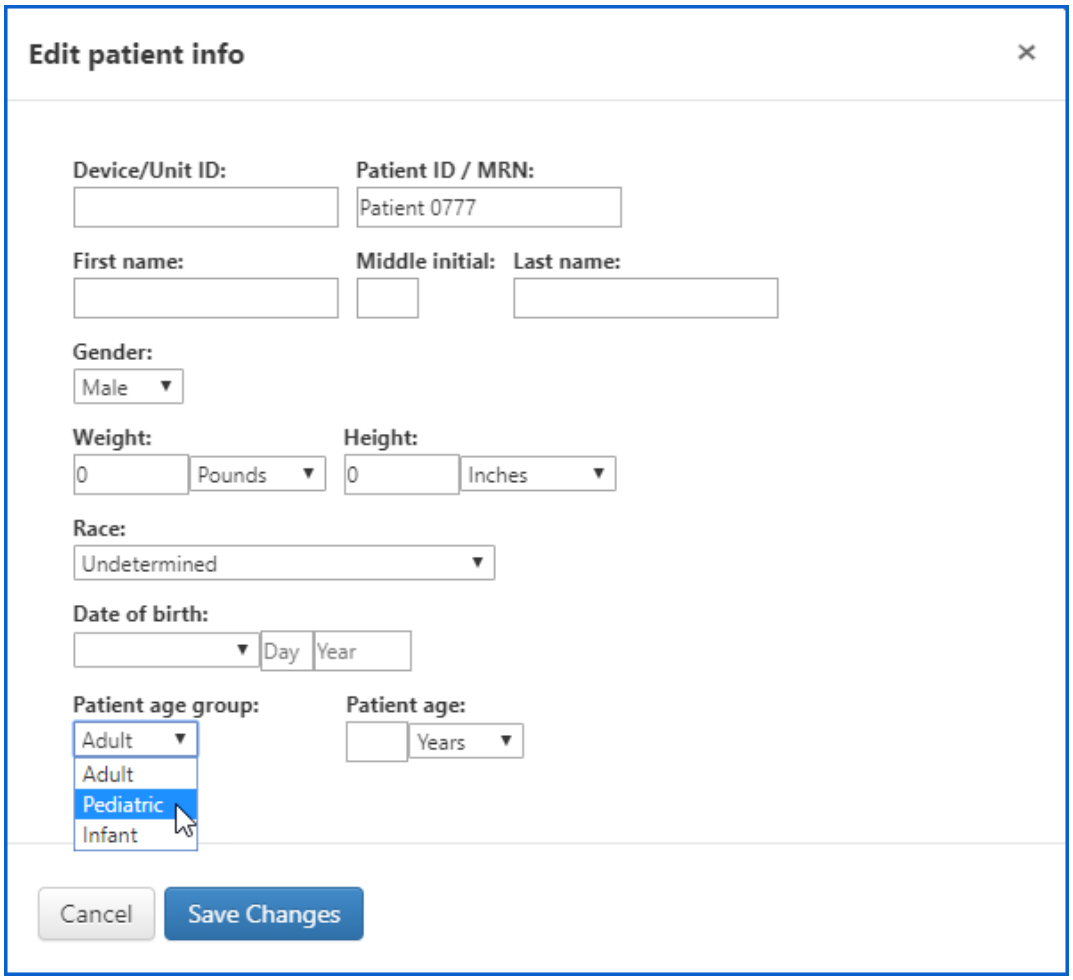
Mark Cases Infant or Pediatric

If the case file is marked as pediatric or neonate on the X Series, it automatically appears in CaseReview as pediatric or infant. However, if the case file was not marked or created on an X Series, you must mark the infant or pediatric case manually. You can filter cases marked pediatric or infant on the Manage Cases page using the 'Patient age group' filter.

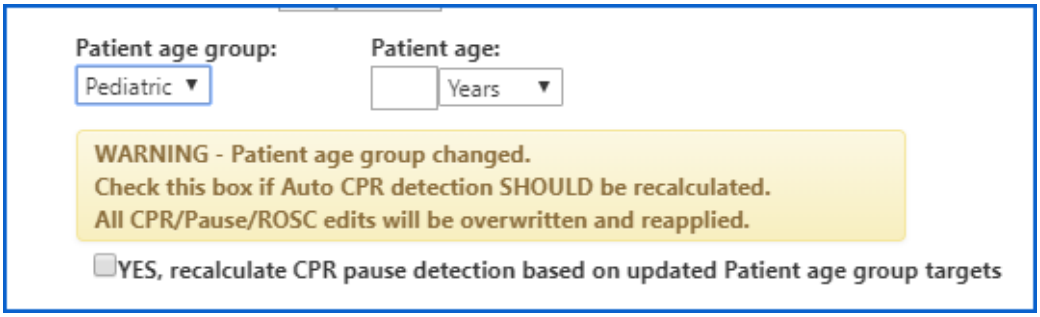
1. Click Manage Cases.
2. On the Manage Cases page, click the case number.
3. On the Case Summary tab, click Edit patient info.



4. On the 'Edit patient info' page, click the 'Patient age group' field and select infant or pediatric from the list.



When you change the 'Patient age group', a warning displays.



5. If you want to reapply CaseReview's auto CPR pause detection based on the new age group target settings and measurements, click the Yes box.

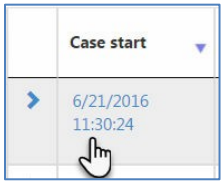
Important! If you check this box, when the system applies auto detection it will remove any edits performed on the case (adds, changes, deletions, and undos). ZOLL recommends that this feature be applied only to cases that have not yet been edited.

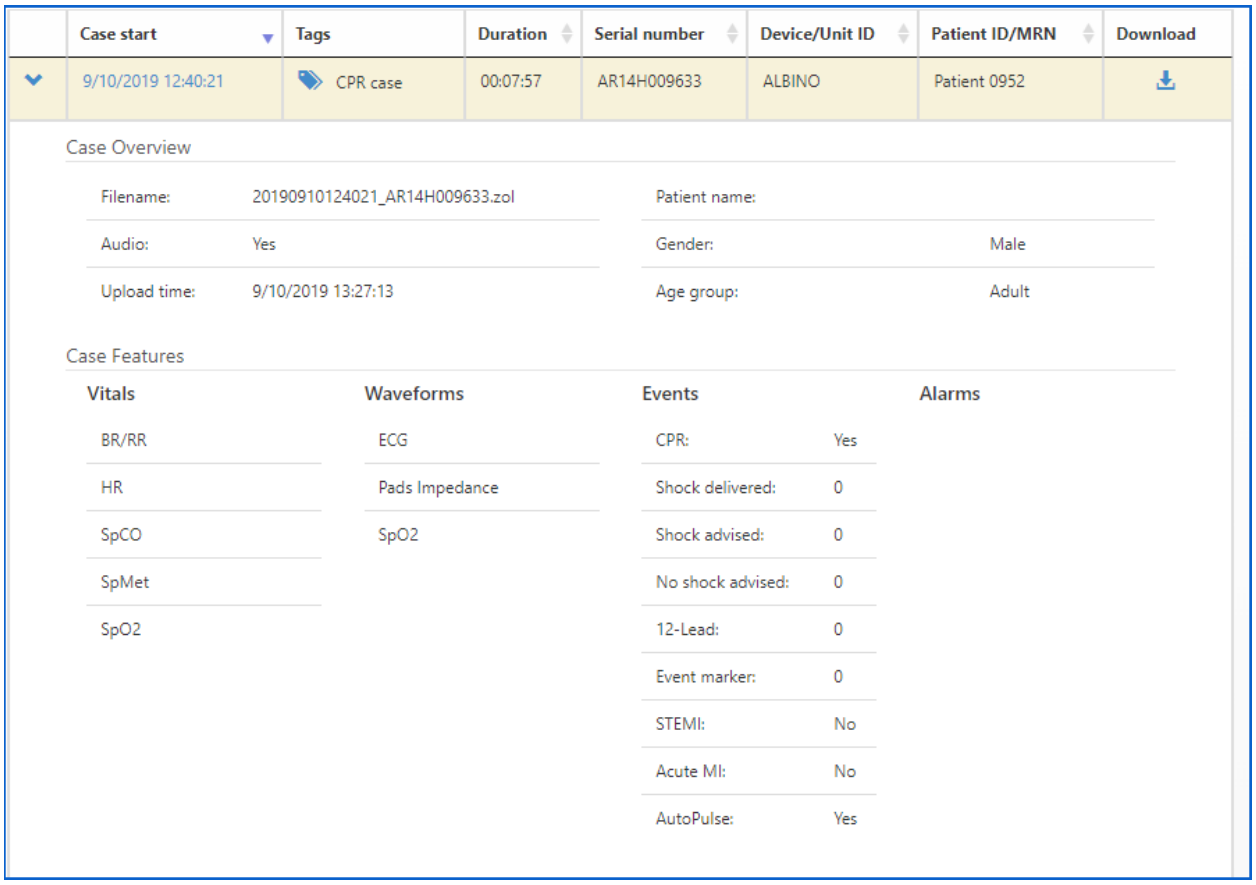
6. Click **Save Changes**.

Open Cases

Case Overview

On the Manage Cases page, click the arrow next to the case start date/time. For greater details on the case, see the Case Details page.

1. 

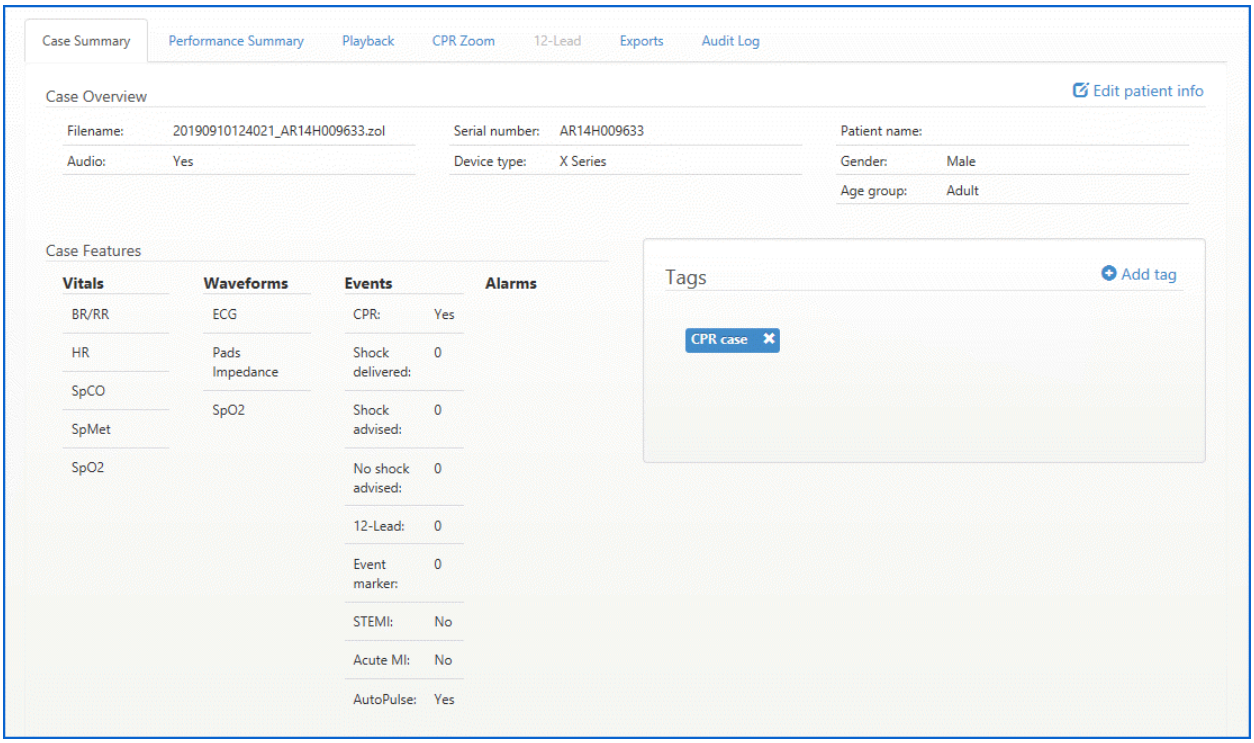


Case Summary

In addition to the details found in the Case Overview, the Case Summary provides the device type and serial number, additional patient information, and the ability to view and add tags. For more information on how tags are used, see Tags.

From this section, you can access the Playback, CPR Performance, CPR Zoom, Audit Log, and Export pages.

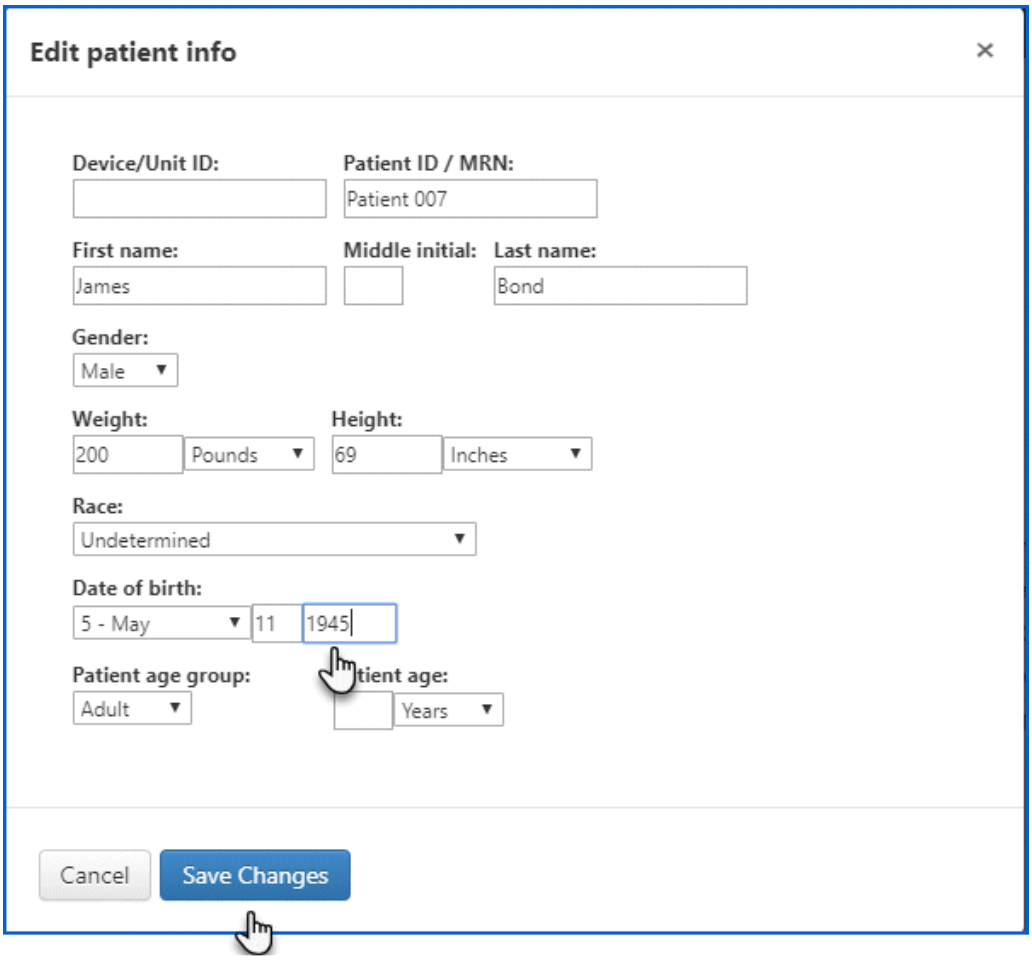
Note: The system enables the CPR Events Summary and CPR Zoom tabs for cases with CPR and grays the tabs for cases without CPR.



Steps to add or edit patient data

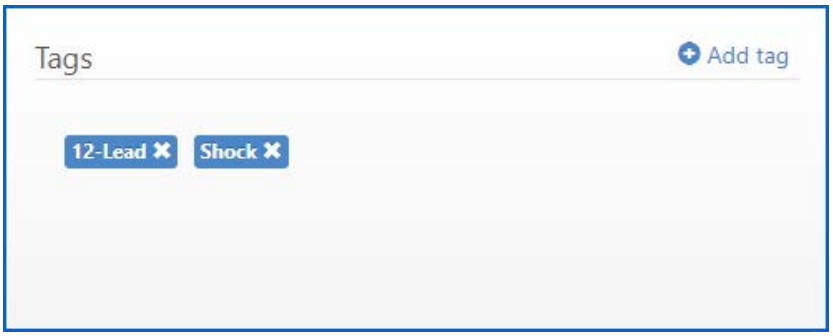
Note: Race and date of birth fields may not display depending on your location.

1. Click Manage Cases on the navigation bar.
2. On the Manage Cases page, click the case number.
3. On the Case Summary tab, click 'Edit patient info'.
4. Modify the existing data and click Save Changes.



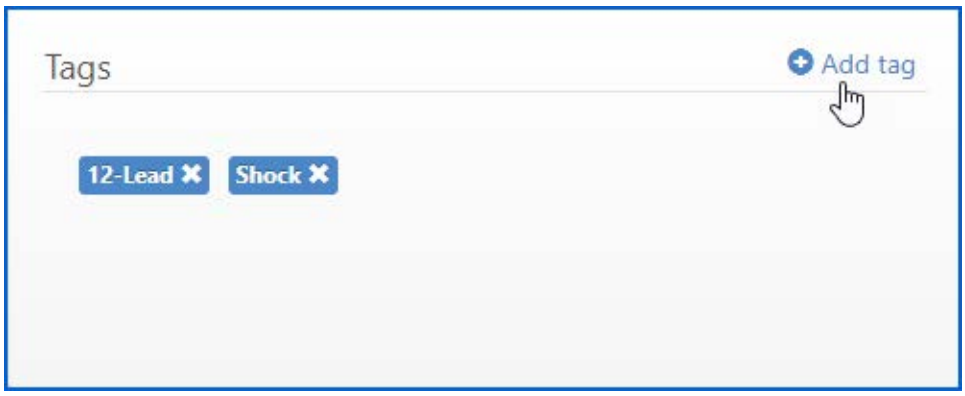
Tags section

The tags section displays all tags currently associated with the case.

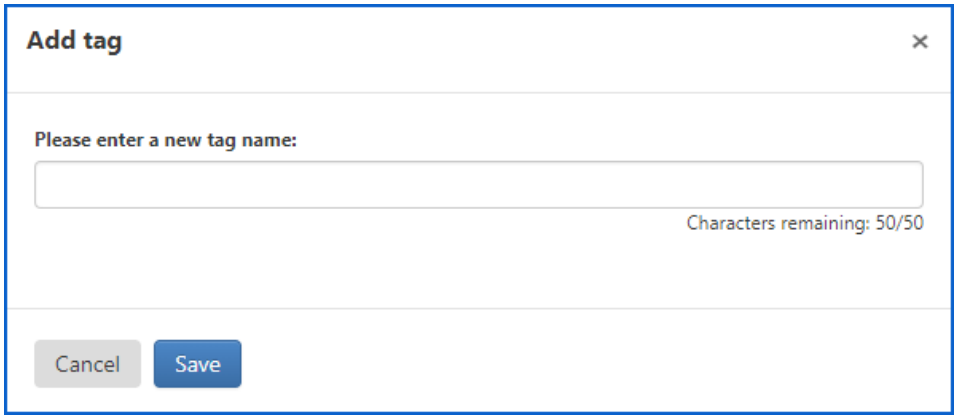


To apply another tag to this case:

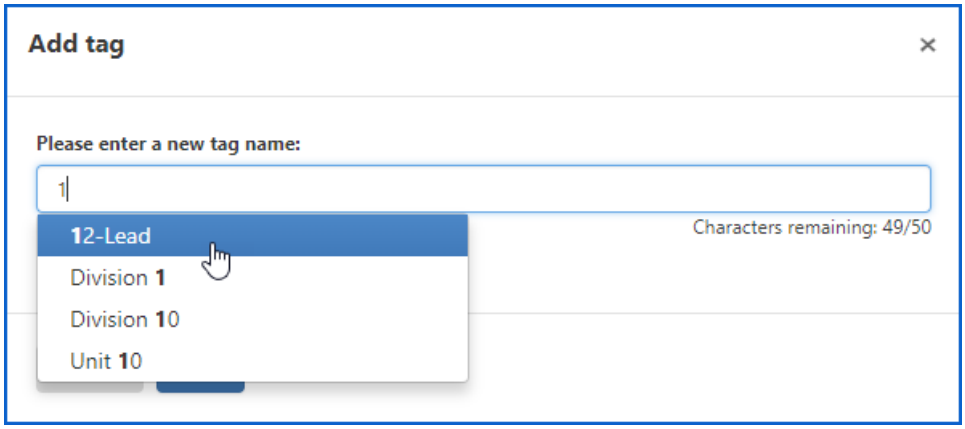
1. On the CaseReview Naviagion bar, click Manage Cases.
2. On the Manage Cases page, click the case number.
3. On the Case Summary tab > Tags section, click Add tag.



4. Enter a new tag name.

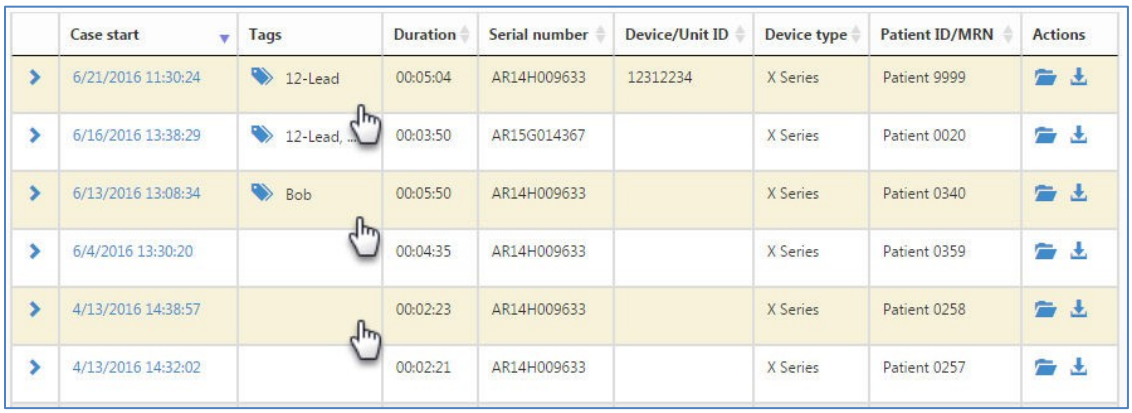


If you wish to use an existing tag, enter the first letter of the tag name and select it from the list.



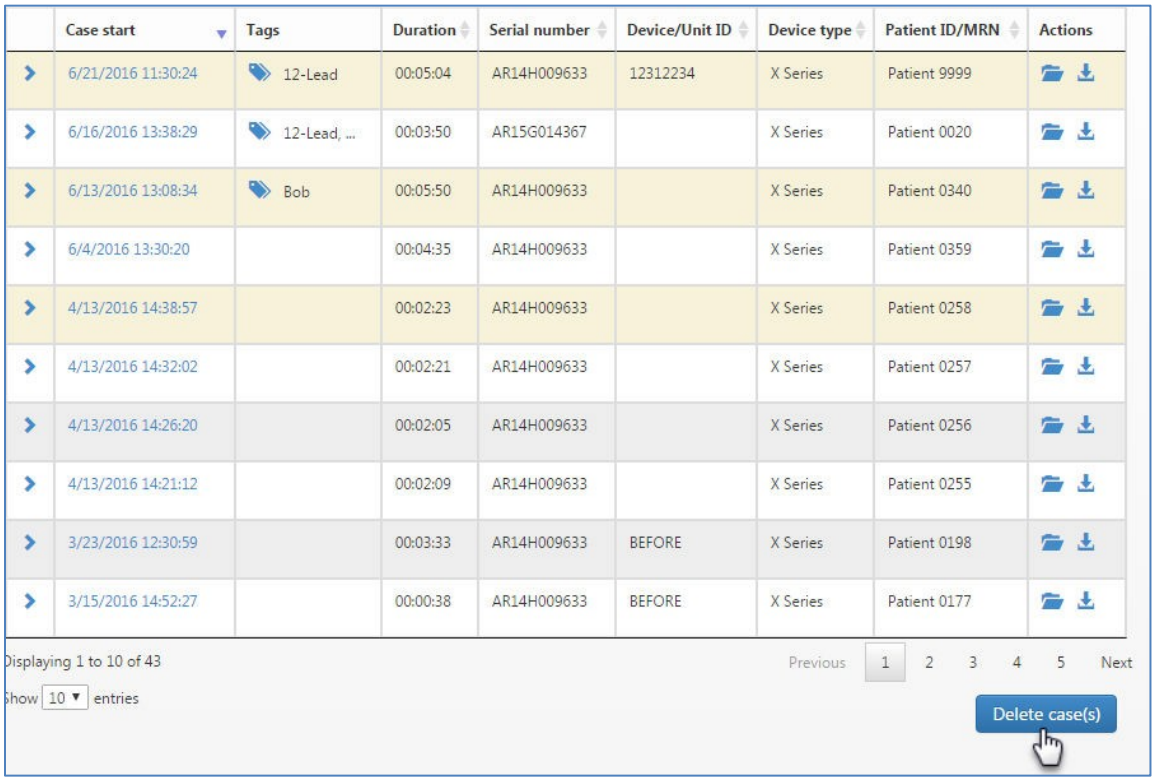
Delete Cases

1. On the Manage Cases page, click the case to highlight. If you want to delete multiple cases, continue clicking cases until you highlight each case you want to delete.



Case start	Tags	Duration	Serial number	Device/Unit ID	Device type	Patient ID/MRN	Actions
6/21/2016 11:30:24	12-Lead	00:05:04	AR14H009633	12312234	X Series	Patient 9999	
6/16/2016 13:38:29	12-Lead, ...	00:03:50	AR15G014367		X Series	Patient 0020	
6/13/2016 13:08:34	Bob	00:05:50	AR14H009633		X Series	Patient 0340	
6/4/2016 13:30:20		00:04:35	AR14H009633		X Series	Patient 0359	
4/13/2016 14:38:57		00:02:23	AR14H009633		X Series	Patient 0258	
4/13/2016 14:32:02		00:02:21	AR14H009633		X Series	Patient 0257	

2. Click **Delete Cases**.



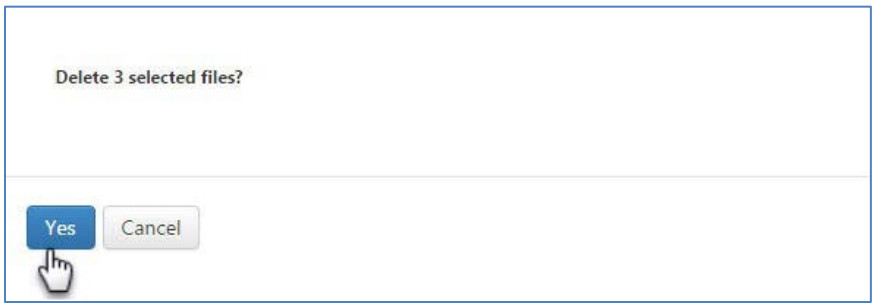
Case start	Tags	Duration	Serial number	Device/Unit ID	Device type	Patient ID/MRN	Actions
6/21/2016 11:30:24	12-Lead	00:05:04	AR14H009633	12312234	X Series	Patient 9999	
6/16/2016 13:38:29	12-Lead, ...	00:03:50	AR15G014367		X Series	Patient 0020	
6/13/2016 13:08:34	Bob	00:05:50	AR14H009633		X Series	Patient 0340	
6/4/2016 13:30:20		00:04:35	AR14H009633		X Series	Patient 0359	
4/13/2016 14:38:57		00:02:23	AR14H009633		X Series	Patient 0258	
4/13/2016 14:32:02		00:02:21	AR14H009633		X Series	Patient 0257	
4/13/2016 14:26:20		00:02:05	AR14H009633		X Series	Patient 0256	
4/13/2016 14:21:12		00:02:09	AR14H009633		X Series	Patient 0255	
3/23/2016 12:30:59		00:03:33	AR14H009633	BEFORE	X Series	Patient 0198	
3/15/2016 14:52:27		00:00:38	AR14H009633	BEFORE	X Series	Patient 0177	

Displaying 1 to 10 of 43 Previous 1 2 3 4 5 Next

Show 10 entries

Delete case(s)

3. Click 'Yes' to verify the action.



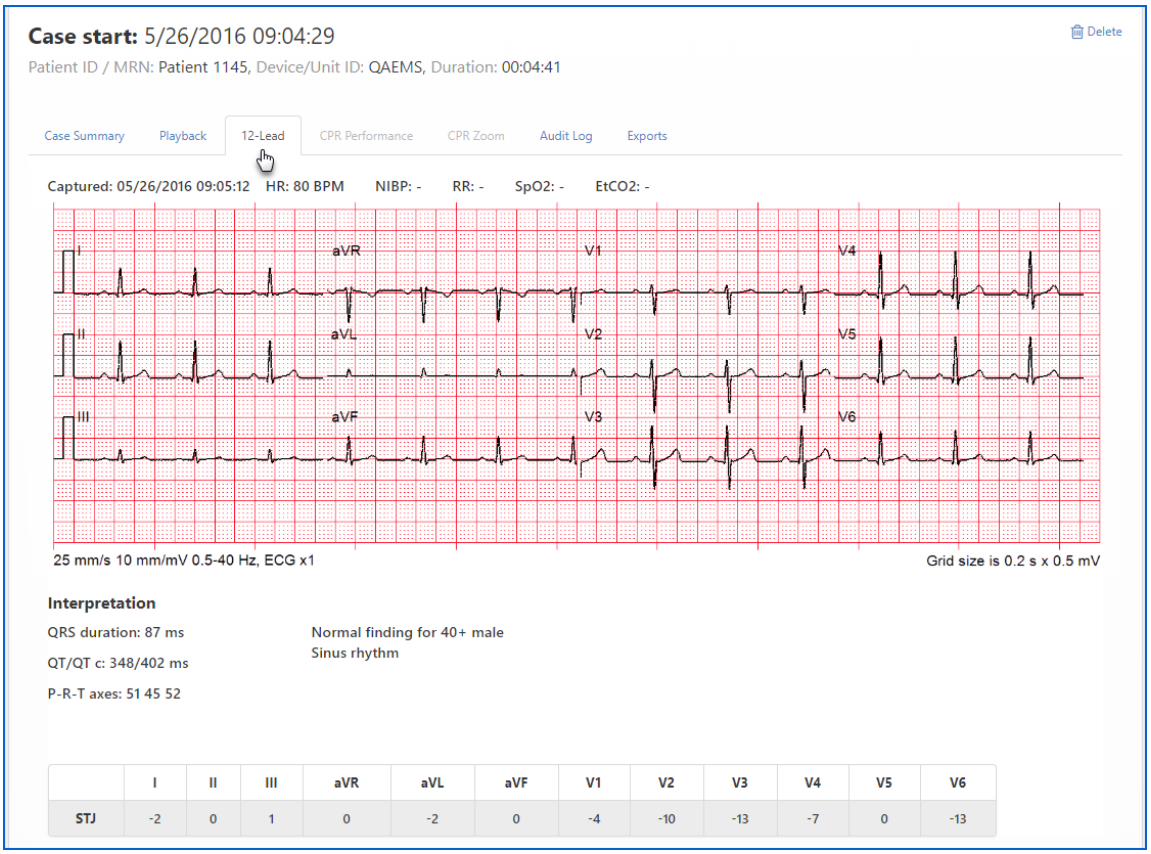
Removed a case by mistake? Click Upload on the CaseReview Navigation Bar to upload it again.

Note: An administrator must grant users permission to delete cases. An Administrator can grant delete permissions to a user by going to Settings and checking "Allow non admin users to delete cases".

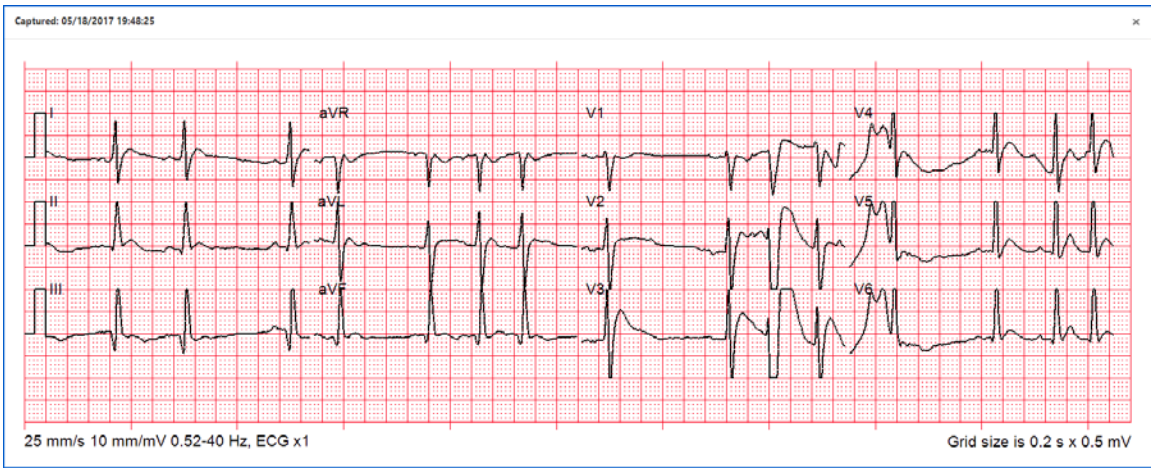
Cases with 12-Leads

If a 12-Lead was detected in the case, the 12-Lead tab enables.

Click the tab to view the 12-Lead.



Click the 12-Lead to magnify the image.



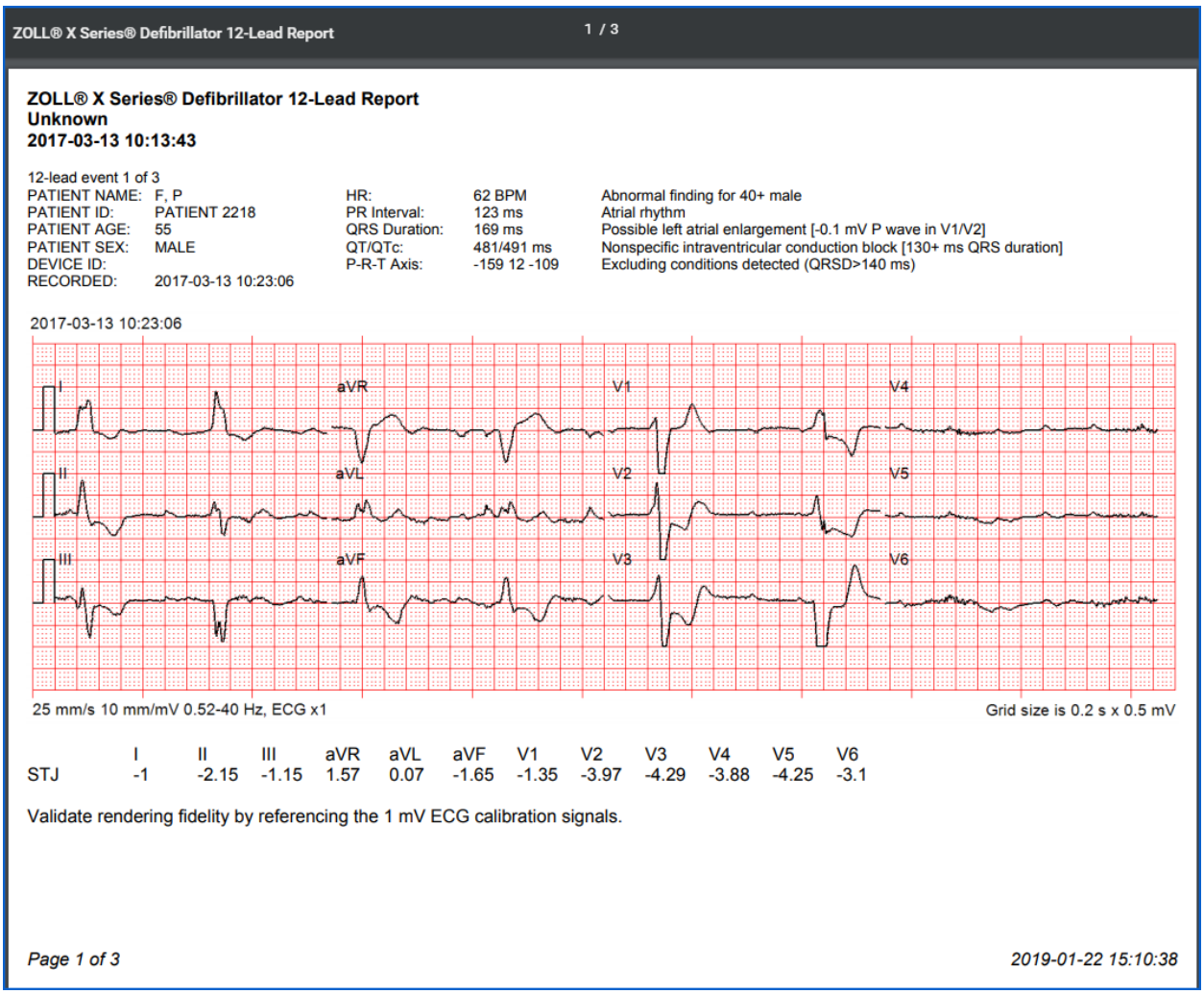
12-Lead on the Playback Page

Click the Playback tab.

The time the 12-Lead was recorded displays as a heart on both the ECG Overview and the Event Timeline.

Export a 12-Lead Report

1. Click the Exports tab.
2. On the Exports page, click 'Download 12-Lead summary'.
3. Click the report (PDF format) to open.



ZOLL® X Series® Defibrillator 12-Lead Report 1 / 3

ZOLL® X Series® Defibrillator 12-Lead Report
Unknown
2017-03-13 10:13:43

12-lead event 1 of 3

PATIENT NAME:	F, P	HR:	62 BPM	Abnormal finding for 40+ male
PATIENT ID:	PATIENT 2218	PR Interval:	123 ms	Atrial rhythm
PATIENT AGE:	55	QRS Duration:	169 ms	Possible left atrial enlargement [-0.1 mV P wave in V1/V2]
PATIENT SEX:	MALE	QT/QTc:	481/491 ms	Nonspecific intraventricular conduction block [130+ ms QRS duration]
DEVICE ID:		P-R-T Axis:	-159 12 -109	Excluding conditions detected (QRSD>140 ms)
RECORDED:	2017-03-13 10:23:06			

2017-03-13 10:23:06

25 mm/s 10 mm/mV 0.52-40 Hz, ECG x1 Grid size is 0.2 s x 0.5 mV

	I	II	III	aVR	aVL	aVF	V1	V2	V3	V4	V5	V6
STJ	-1	-2.15	-1.15	1.57	0.07	-1.65	-1.35	-3.97	-4.29	-3.88	-4.25	-3.1

Validate rendering fidelity by referencing the 1 mV ECG calibration signals.

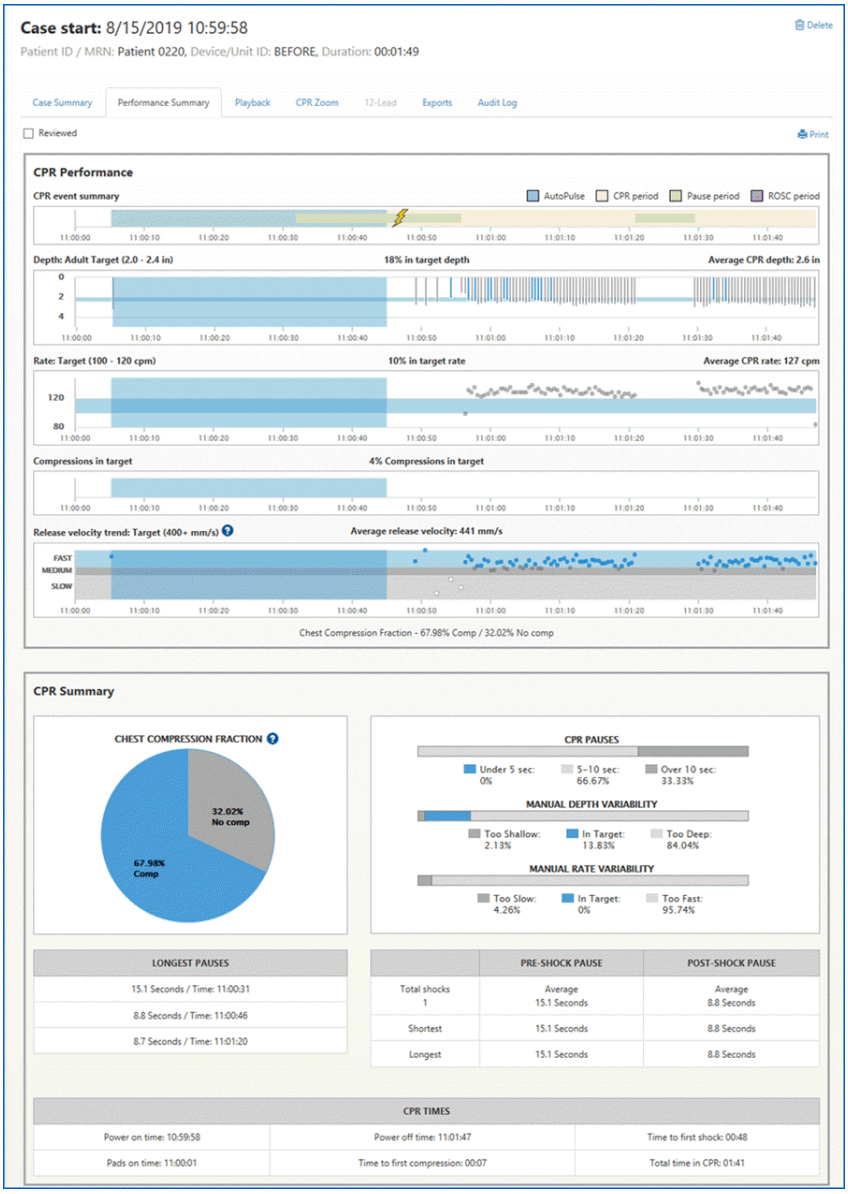
Page 1 of 3 *2019-01-22 15:10:38*

Performance Summary

When you upload a case to CaseReview:

- If the case does not contain CPR periods, CaseReview automatically applies CPR periods to the case.
- Initially, a case sent directly from the ZOLL device will not contain any CPR periods or pauses.
- If a case already contains CPR periods and pauses, CaseReview will not change the already existing CPR periods and pauses.

Performance Summary provides insight on the quality of CPR. You can use it as a training tool to improve patient care quality at hospitals and EMS organizations. ZOLL monitors/defibrillators provide the data used on this page.

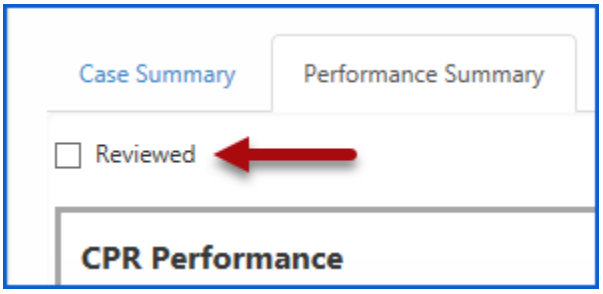


Accessing Performance Summary

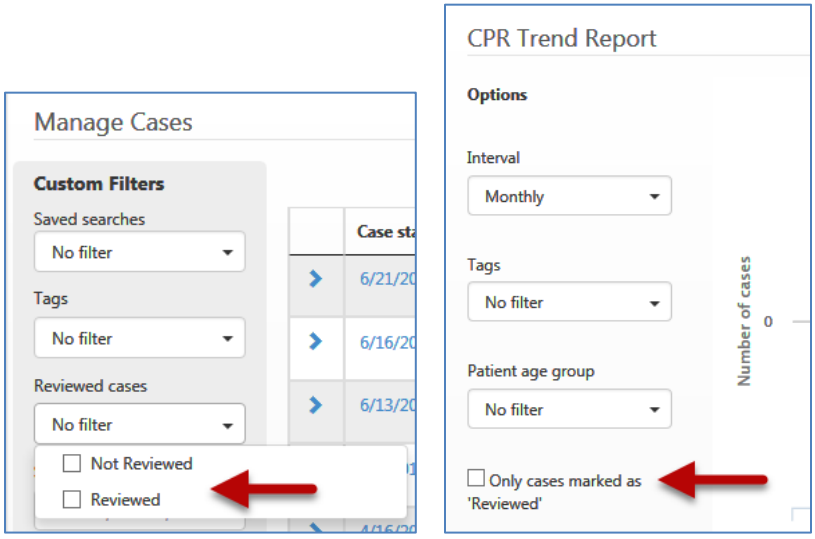
1. On the CaseReview Navigation Bar, click Manage Cases
2. On the Manage Cases page, click the case start time.
3. When the case opens, click the Performance Summary tab.

Reviewed Cases

Once you have reviewed the information associated with this case, check the "Reviewed" box.



You can filter the display on the Manage Cases and CPR Trend pages to view cases marked reviewed or not reviewed.



CPR Times

The CPR Times section displays some of the cases most important milestones.

CPR TIMES		
Power on time: 10:59:58	Power off time: 11:01:47	Time to first shock: 00:48
Pads on time: 11:00:01	Time to first compression: 00:07	Total time in CPR: 01:41

- Power on time: The clock time on the ZOLL device when the device was powered on.
- Pads on time: The clock time on the ZOLL device after the device was turned on, the pads connected to the device, and the pads applied to the patient.
- Power off time: The clock time on the ZOLL device when the device was powered off.
- Time to first compression: The duration from power on time until the first compression was identified by the ZOLL device (regardless of CPR periods).
- Time to first shock: The duration from power on time until the first shock was delivered using the ZOLL device.
- Total time in CPR: The duration of whole seconds of combined time for all CPR and pause periods, including AutoPulse and manual CPR.

Summaries, Trends, and Velocity

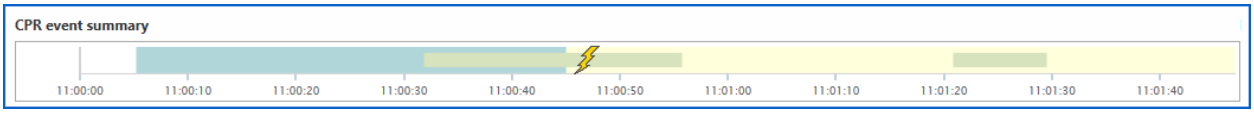
CPR Performance

CPR Event Summary

The CPR Event Summary displays an overview of events that occurred during the life of the case.

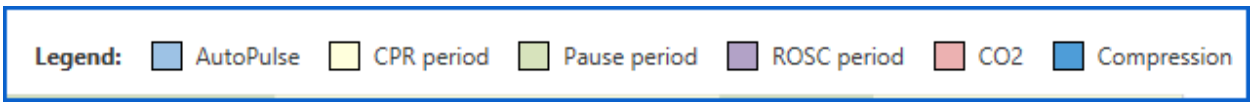
The summary begins when the system detects a CPR period, CPR compression, ventilation, EtCO2, or delivered shock.

A lightning bolt indicates that a shock was delivered.



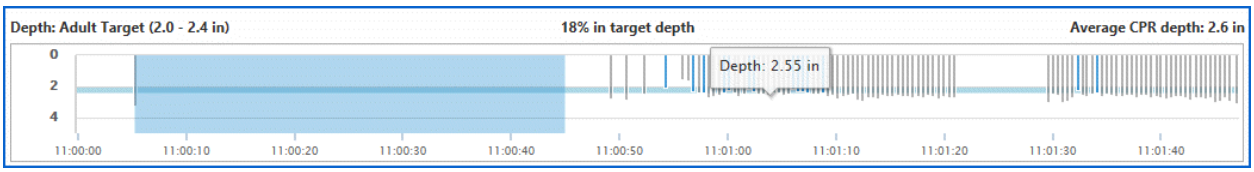
The time at the bottom of the summary is the time the case took place (not time duration).

Each event is color coded.



Depth Summary

The Depth graph displays the compression depth of each compression relative to the target depth range.



Note: This chart and its metric include all compressions found within CPR periods regardless of the rate of each compression. AutoPulse compressions are not included in this chart.

Header:

- **Depth**: Defaults to an adult target range of 2.0 to 2.4 inches. The number will changed based on your CPR Quality Settings.
- **Percent**: The percent of CPR compressions that fell within the target depth.
- **Average CPR depth**: This value is determined by the sum of the depth of all compressions within CPR periods divided by the number of compression in the CPR periods.

Light blue horizontal line: The target depth range configured on the Settings page. This range should be set for optimal perfusion and patient outcome.

Vertical blue lines: CPR compressions that fall within the target range.

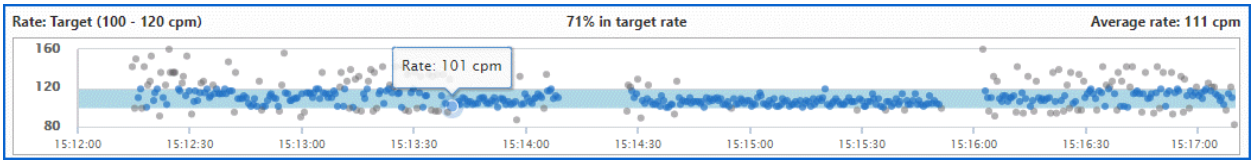
Vertical gray lines: CPR compressions that are too deep or shallow.

Blue shading: CPR compressions performed with AutoPulse.

Hover: Hover your mouse over any compression line. The system displays the depth for that compression.

Rate Summary

The Rate graph displays the compression rate of each compression relative to the target rate range.



Note: This chart and its metric exclude compressions with an abnormally low rate (defined as 40 compressions per minute). The rate of compression is determined based on the elapsed time between it and the prior compression.

Header:

- **Rate Target**: Defaults to target rand of 100 to 120 cpm. The number will change based on your CPR Quality Settings.
- **Percent**: The percent of compressions that fell within the target rate.
- **Average CPR rate**: This value is determined by the sum of the rate of all compressions within CPR periods divided by the number of compressions in the CPR periods.

Compressions with a rate below 40 compressions per minute are exclude from this calculation.

Light blue horizontal line: The target rate range configured on the Settings page. This range should be set for optimal perfusion and patient outcome.

Blue dots: CPR compressions that fall within the target rate.

Gray dots: CPR compressions considered too fast or too slow.

Blue shading: CPR compressions performed with AutoPulse.

Hover: Hover your mouse over any compression line. The system displays the rate for that compression.

Compressions in Target

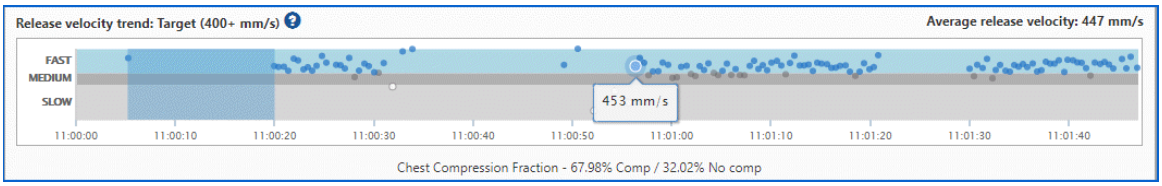
The Compressions in Target graph displays the compressions in the case that are in target for both depth and rate.

Header: Percent of compressions in target.

Blue lines: Compressions that meet both depth and rate targets.

Release Velocity

Release velocity refers to the speed of compression release off the chest. According to research, there is a correlation between the release velocity speeds above 400mm/s and improved patient outcomes.



Header: Release velocity target and average release velocity value.

Light blue horizontal line: Target band above 400mm/s.

Dark gray (medium): Compressions where the release velocity is 300-399 mm/s.

Light gray (slow): Compressions where the release velocity is below 300 mm/s.

Blue dots: Compressions where the release velocity is in target.

Blue shading: CPR compressions performed with AutoPulse.

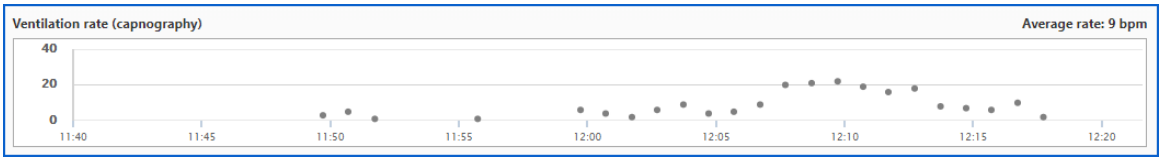
: Provides information on a study that supports the correlation of fast release velocity and improvement in patient outcomes.

Note: Release velocity trend only shows for patients marked as adult. It will not display for patients marked as pediatric or children.

Ventilation Performance

Ventilation Rate

This chart displays the ventilations per minute. Mouse-over the dots to see each value.

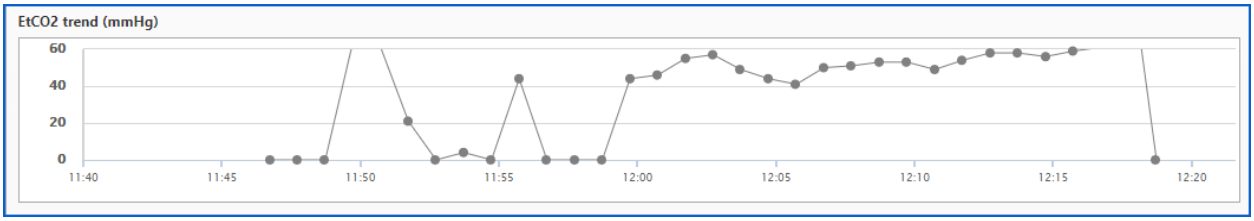


EtCO2 Trends

Over the length of the recorded case, the system displays gray dots on the EtCO2 graph that show the peak EtCO2 readings per minute.

Note: When the case contains no EtCO2 or ventilation readings, this chart does not display.

Note: The EtCO2 values shown represent the peak reading for each minute.



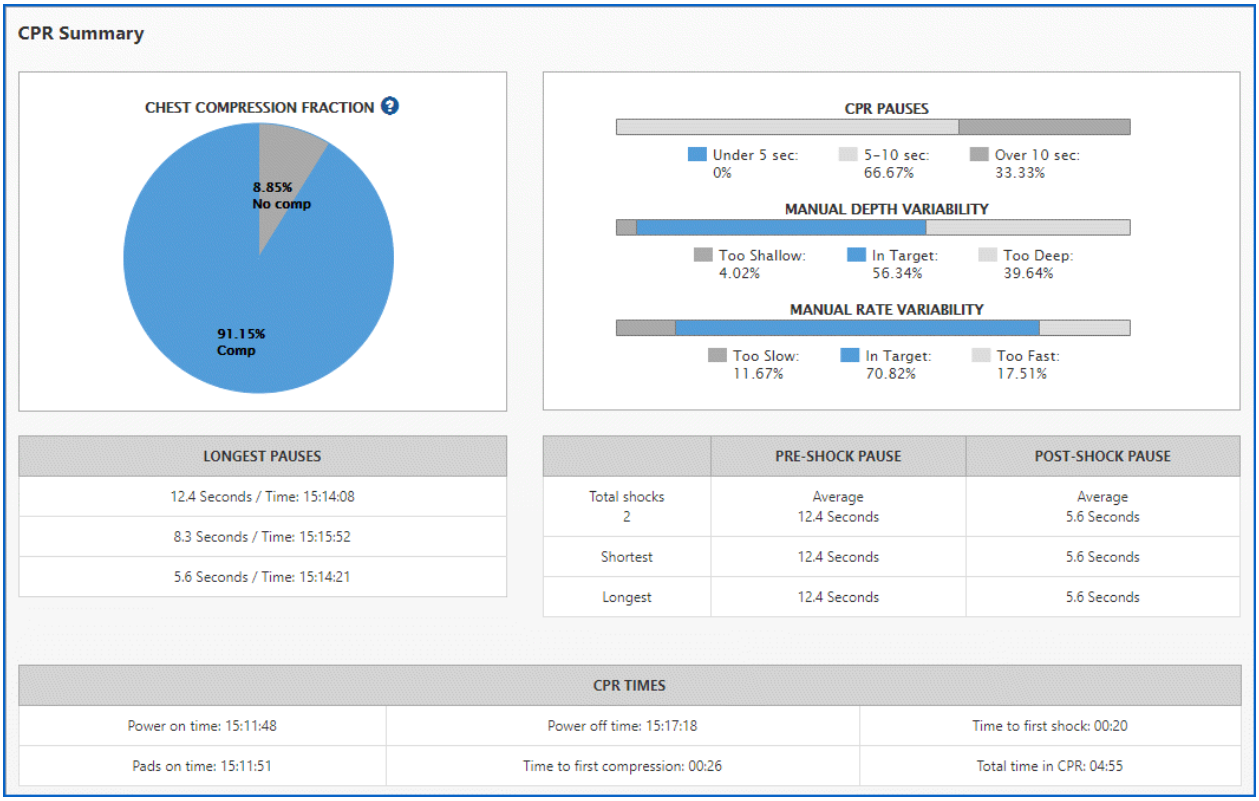
Header: EtCO2 trend title and ventilations with source (centered over the graph).

Gray dots: The peak EtCO2 reading for the minute with a line connecting the dots.

Note: The system does not display pads impedance ventilations if they exist in the case.

Hover: Hover your mouse over any gray dot. The system displays the value for EtCO2 in mmHg or kPa and ventilations (breaths per minute).

CPR Summary



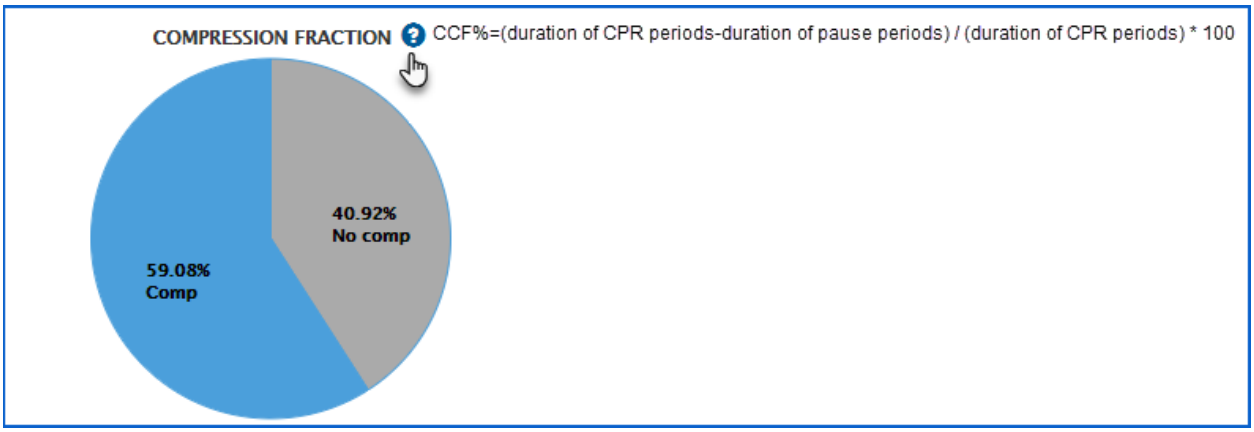
In a real-world cardiac arrest, many things may interrupt or delay CPR such as rescue breaths, pulse checks, and heart rhythm analysis. Researchers found that fewer CPR pauses increase the patient's chance of survival. You can use the Compression Fraction chart to discover the percentage of time caregivers performed chest compressions during a cardiac arrest.

Blue section: Percent of time CPR compressions were performed

Gray section: Percent of time CPR compressions were not performed

Notes:

- This chart shows the duration of whole seconds of combined time for all CPR and pause periods, including AutoPulse and manual CPR.
- The AutoPulse periods are included in the Chest Compression Fraction regardless of whether they are inside or outside a CPR period.
- The Manual Depth Variability and Manual Rate Variability charts do not include AutoPulse compressions.



When CPR Pauses are Added and When They Start/Stop

When CPR Pauses are added to a Case

A CPR pause is added to the case when there is a period in a CPR period that is longer than the "Auto CPR pause detection" (seconds) length and that period is without valid compressions (see Settings (Administrators Only)).

The following criteria is used to determine if compressions are valid:

For adults:

- Each pause period starts with the first good compression, prior to three compressions in a row. Each compression must have a rate of >= 60 and the compression before the three compressions (four total) must have a depth of > .75".
- Each pause period ends the last time a set of four compressions are encountered. Each compression must have a rate of > = 60 and a depth of > .75".

For pediatric and infants:

- Each pause period starts with the first good compression prior to three compressions in a row. Each compression must have a rate of >= 60 and the compression before the three compressions (four total) must have a depth of > .4".
- Each pause period ends the last time four compressions are encountered. Each compression must have a rate of >= 60 and a depth of >.4".

A pause in a CPR period is without valid compressions for longer than five minutes will not be reflected as a pause period. Pauses must be less than five minutes to be added to the case. If a shock was delivered during that pause period, the pause is automatically split into pre-shock and post-shock pauses. If either the pre-shock or post-shock pause is less than one second, then that pre-shock or post-shock pause is not recorded as a pause.

Adult Cases

A CPR period starts when the following criteria is met:

- A first compression is identified prior to three compressions in a row.
- Each of these four compressions has a rate greater or equal to 60 compressions per minute and a depth greater than 0.75 inches.

A CPR period ends the last time you encounter a set of four compressions where each compression has a rate greater or equal to 60 compressions per minute and depth of greater than 0.75.

Any pause period greater than five minutes is removed and the CPR period trimmed according to the above criteria.

Infant & Pediatric Cases

A CPR period starts when the following criteria is met:

- A first compression is identified prior to three compressions in a row.
- Each of these four compressions has a rate greater or equal to 60 compressions per minute and a depth of greater than 0.4 inches.

A CPR period ends the last time it encounters a set of four compressions, each with a rate greater or equal to 60 compressions per minute and a depth of greater than 0.4 inches.

Any pause period greater than five minutes is removed and the CPR period trimmed according to the above criteria.

Longest Pauses and Shocks

The following charts show information on the three longest pauses and shock information.

LONGEST PAUSES
85.0 Seconds / Time: 13:10:54
17.4 Seconds / Time: 13:09:33
14.8 Seconds / Time: 13:09:50

	PRE-SHOCK PAUSE	POST-SHOCK PAUSE
Total shocks 1	Average 14.8 Seconds	Average 8.1 Seconds
Shortest	14.8 Seconds	8.1 Seconds
Longest	14.8 Seconds	8.1 Seconds

Longest pauses: Displays information on the three longest pauses detected in the case. You see the pause duration and the time the pause occurred.

Shocks: Displays the number shocks delivered and the average, shortest, and longest pre- and post-shock pauses.

Display your Company Logo on CPR Performance PDF

CaseReview Premium users can display a company logo at the top of a printed CPR Performance report. If your Administrator has not uploaded your company logo, the system defaults the header to the ZOLL company logo. If you are an Administrator, use the following steps to display a company logo:

1. Click Admin on the ZOLL Online Navigation Bar (blue bar).
2. Click 'View' on the CaseReview In-Premise tile.
3. Click 'View' on the Company Profile tile.
4. On the Company Profile page, click Upload logo file.
5. Click 'Choose File'.
6. Browse to the logo's location and select the file.
7. Click Save.

The logo displays under the "Upload logo" heading. The system will display the logo in the heading of the CPR Performance page when you create the PDF.

Enlarge a Segment for Analysis - Zoom

Create Segments from CPR Quality Graph

Click CPR Zoom to enlarge a segment of the CPR Quality Graph for further analysis. You can create up to 10 segments, apply a meaningful title to each, and print the segments to a PDF.

Notes:

- For clarity sake, the system omits some data on zoom graphs that include more than 800 compressions. For the most accurate representation of compression data, zoom in 5 minutes or less.
- Compressions with a rate below 40 compressions per minute are shown on this chart but do not display a corresponding rate dot since their rates are excluded from the calculations. For more information, see Rate Summary.

1. On the CaseReview Navigation Bar, click Manage Cases.
2. On the Manage Cases page, click the case start time.
3. Click the CPR Zoom tab.
4. Point your mouse to the starting point of the segment you want to enlarge. Left-click and drag your mouse to the end of the segment. The enlarged area displays.

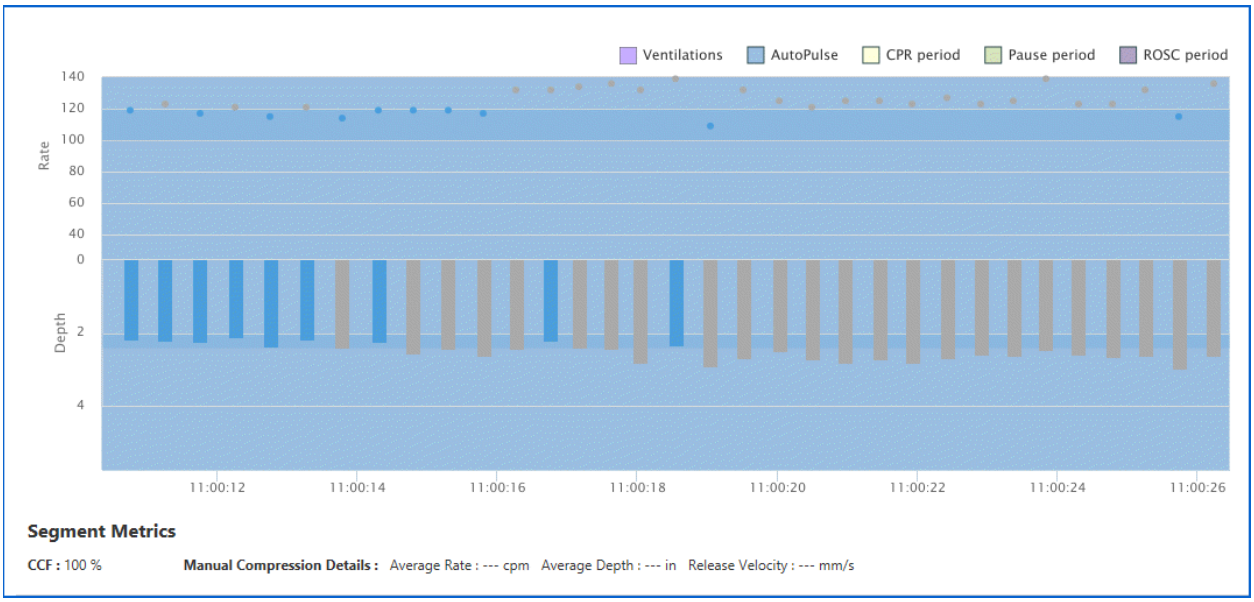
Clip a Segment

To save an enlarged segment, click **Clip segment**.

Things to know about clipping a segment:

- The 'Clip Segment' button will not enable until you zoom into an area on the CPR Quality Graph.
- Segments display under the CPR Quality Graph.
- Give the clipped segment any name you wish. You can edit the name later if you change your mind.
- Clipped segments don't go away until you delete them.
- You can have up to 10 clipped segments at a time.
- If you click 'Print' on the top right of the CPR Zoom page, you get a PDF that shows the CPR Quality Graph and all clipped segments.

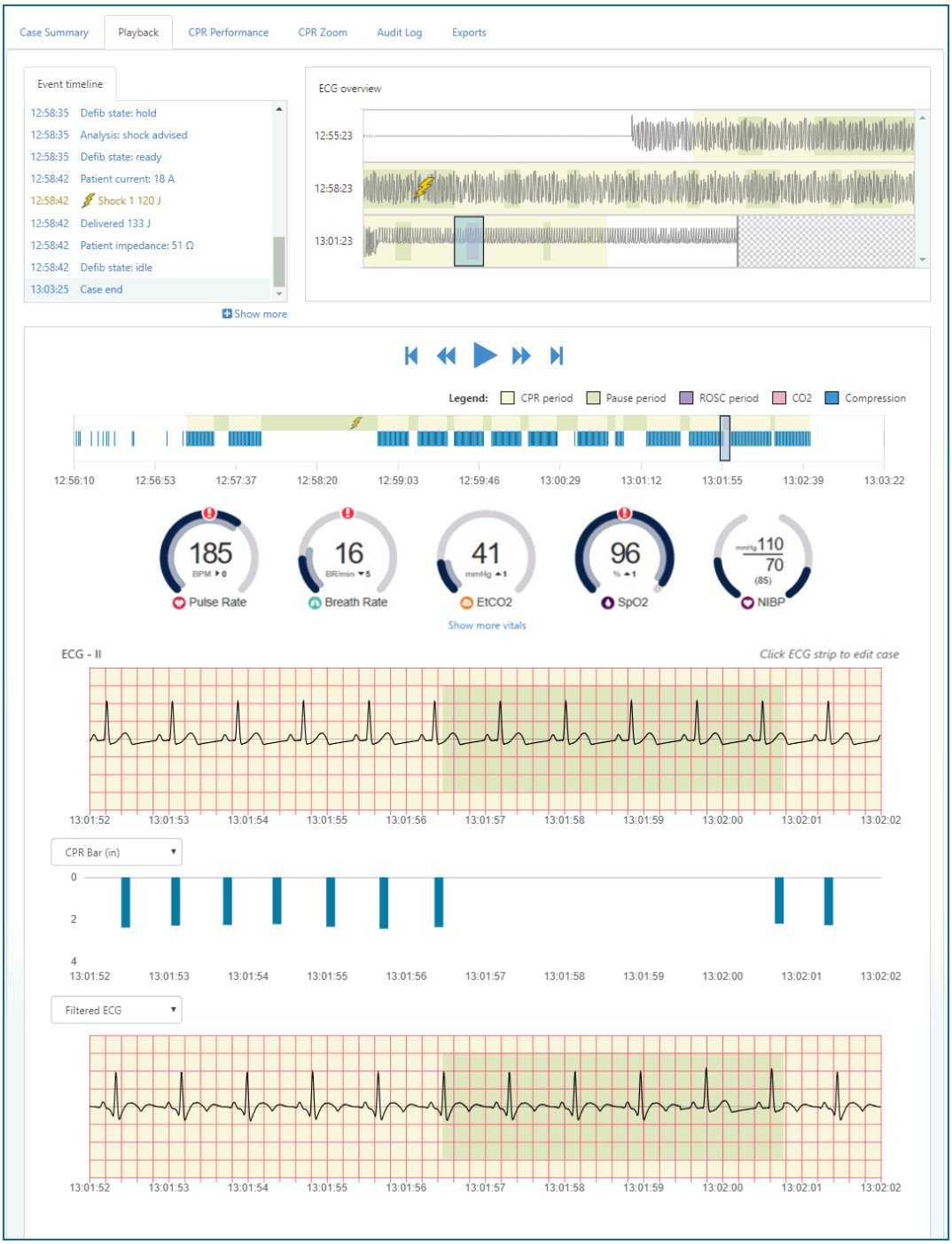
Each clipped segment presents a unique set of metrics based on the clipped segment of time. The compression details are only calculated for manual compressions which will not include AutoPulse.



Note: In the above screen shot, since manual compressions are not performed (using an external device – AutoPulse) Chest Compression Fraction (CCF) shows 100%.

Playback

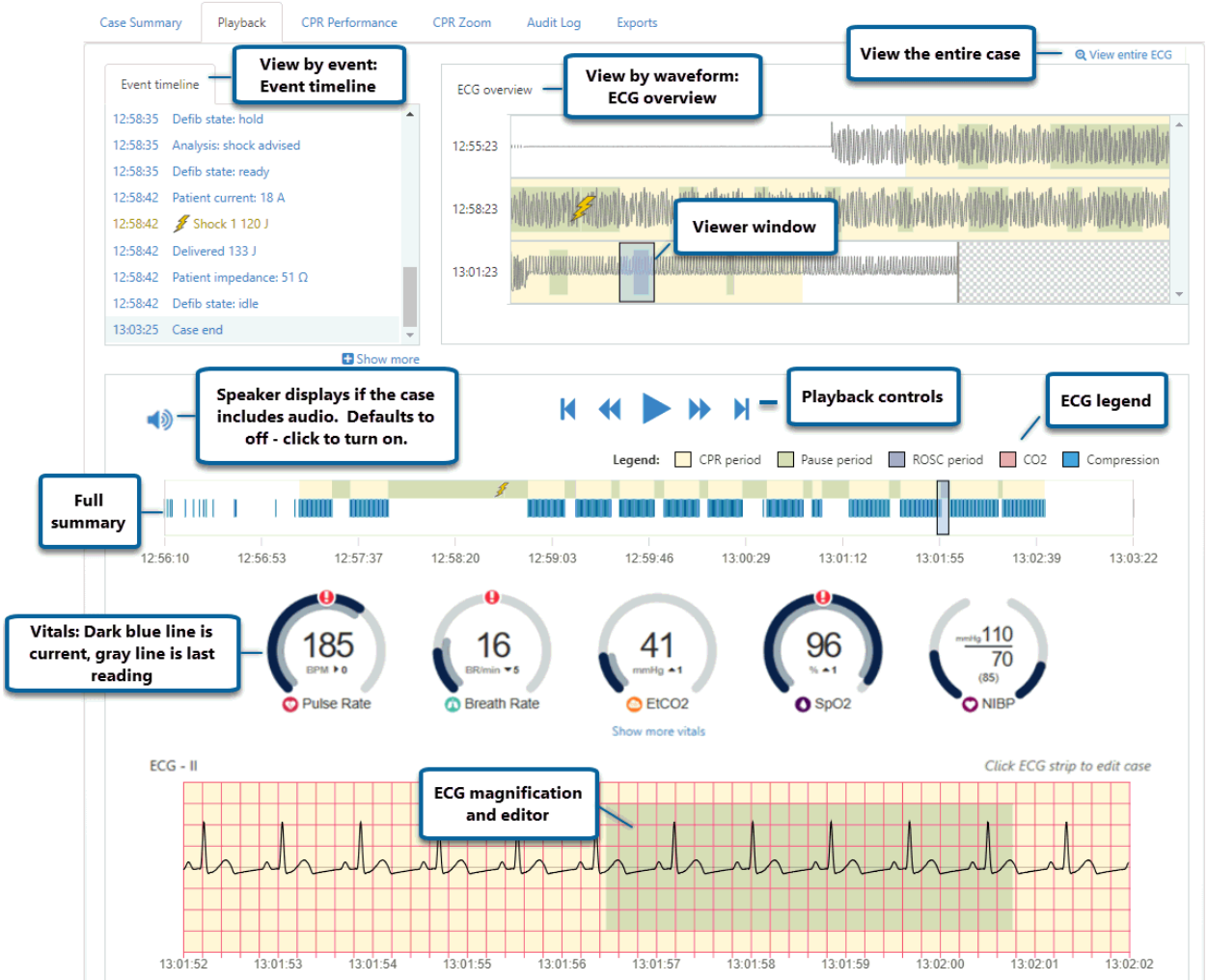
Use the Playback page to view waveforms that exist in the case and to edit the case. Every Playback section, including 'ECG overview', 'Time Bar', and 'Event timeline', work together to give you the best possible understanding of the waveforms and events.



Select the Section you want to View

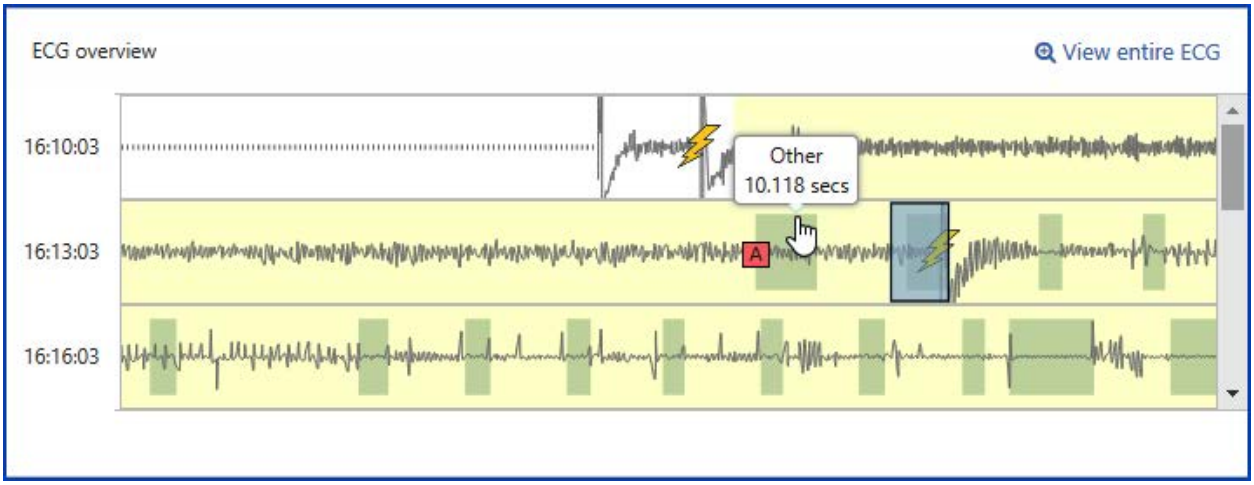
Use the following options to view:

- **Waveforms**: Position the view window to select an area of the waveform on the 'ECG overview'.
- **Events**: Select an event on the 'Event timeline'.
- **Full Summary**: If CPR is present, the Full Summary View displays a summary of the case, including compressions and CO2. Use the slider to go to a specific time.

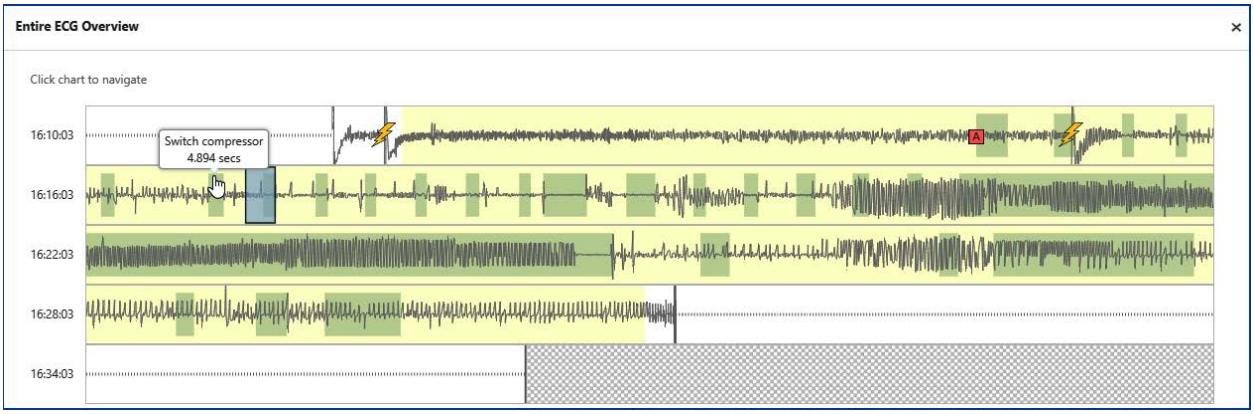


View by Waveform – use 'ECG overview'

Use 'ECG overview' to scroll through the ECG waveforms for the entire case. Each row displays three minutes of case data. The timestamp to the left of the row reflects the starting time for that row.



To view the entire case in a separate window, click "View entire ECG" on the upper right corner. When you click a location on the "Entire ECG Overview" window, the window closes and the system displays that location on the Playback page.



Included in the case data, 'ECG overview' displays event indicators for shock and CPR shading (see the legend on the 'ECG overview' for details).

When you position the viewer window on any 'ECG overview' row, the Playback page displays:

- The corresponding 10-second strip on the magnified ECG,
- The highlighted event that occurred nearest in time to the center point of that strip in the 'Event timeline', and
- The time in the case where the strip occurred on the Full Summary

View by Events – use the Event Timeline

Need to find a specific event in the case? Just scroll up or down on the 'Event timeline' and click the event. Click 'Show more' to expand the tree. The tree will remain expanded until you click one of the events on the tree, click 'Show less', or navigate to a new spot using the 'ECG overview'. All areas on the page synchronize to display the case data matching the spot where the event timestamp happened.

View by Full Summary

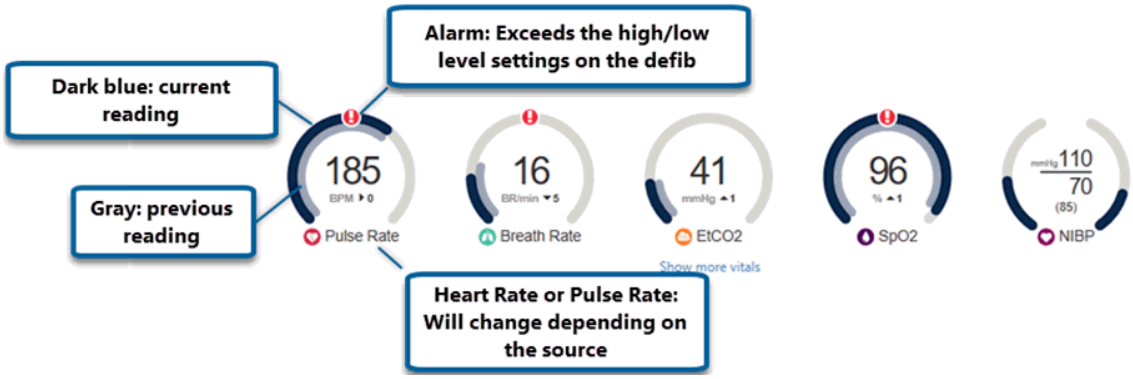
If CPR is present, the Full Summary View displays a summary of the case, including compressions and CO2. Use the slider to go to a specific time.

Non-CPR Cases

For non-CPR cases, the Playback page displays a Time Bar. Move the slider on the time bar to the time you want to view.

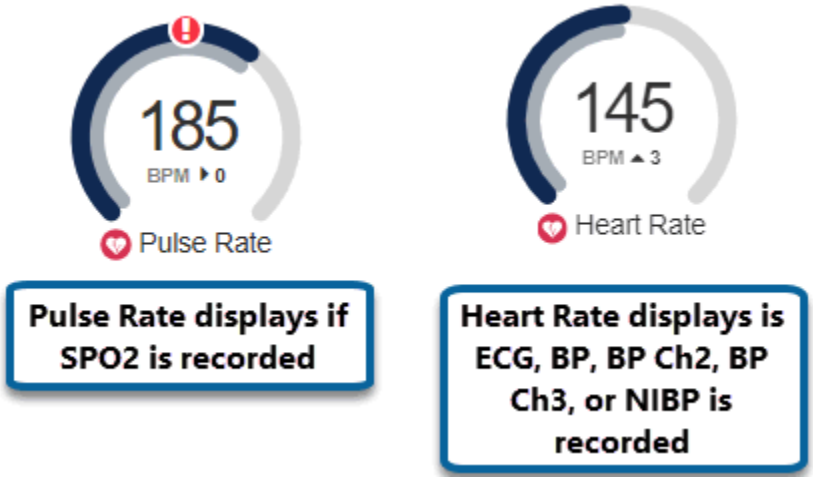
Vitals

The dials reflect the current (dark blue) and last (gray) vital reading for that period in the case. The information that displays is dependent on what is recorded on the defibrillator. For example, the frequency in which the dials change depend how often that vital is recorded while the alarms reflect the defibrillator's high/low levels settings.

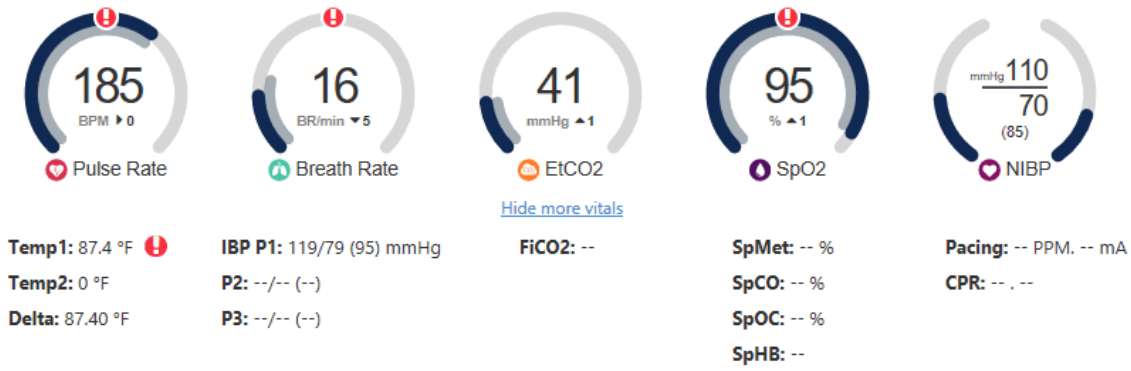


The difference (if any) between the current and last reading displays under the current reading.

Note: The label on the first dial will change depending on how the vital was recorded. If the vital was recorded using SP02, then 'Pulse Rate' will display. If it was recorded using ECG, BP, BP Channel 2, BP Channel 3, or NIBP, then Heart Rate will display.



Click 'Show more vitals' to display additional vitals.



Note: If there is no or invalid data for a set period of time (determined by the vital), the vital displays dashes:

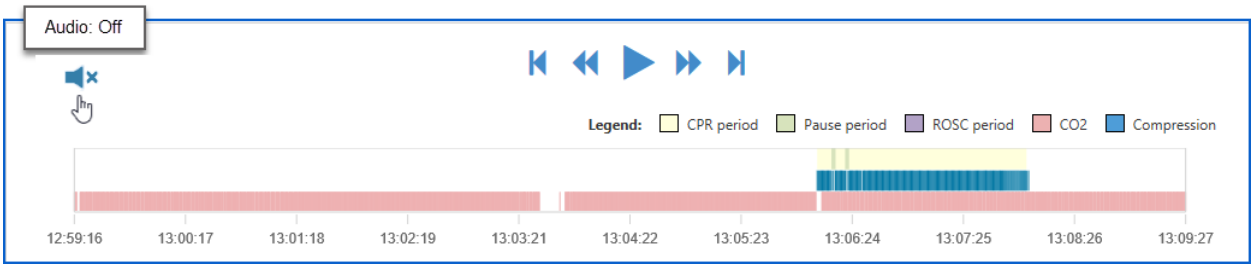
- CPR: two seconds
- NIBP: 16 minutes
- All other vitals: 30 seconds

Vital readings will resume when valid data is detected.

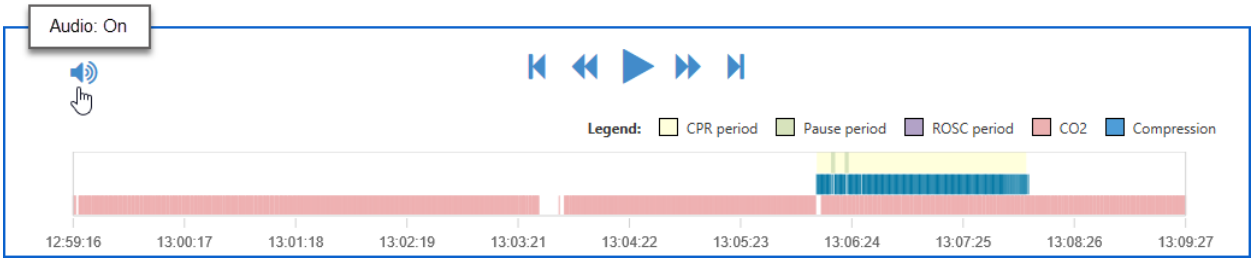
Audio (X Series and AED3)

If audio is included in the case, a speaker displays on the Playback page. This function is only supported on cases that come from the X Series and AED3.

Initially, the audio is turned off by default.



Click the speaker to turn it on.



When you export the case, the export will include the mp3 file of the audio.

Case Editor

Best Practices for Editing Cases

A CPR period should be marked in the case for any time where all the items below are true:

- No pulses are found on the patient
- CPR Pads are on the patient
- Termination of Resuscitation (TOR) has not been declared yet

Mark a CPR pause in the case for times during a CPR period when compressions were not being given to the patient.

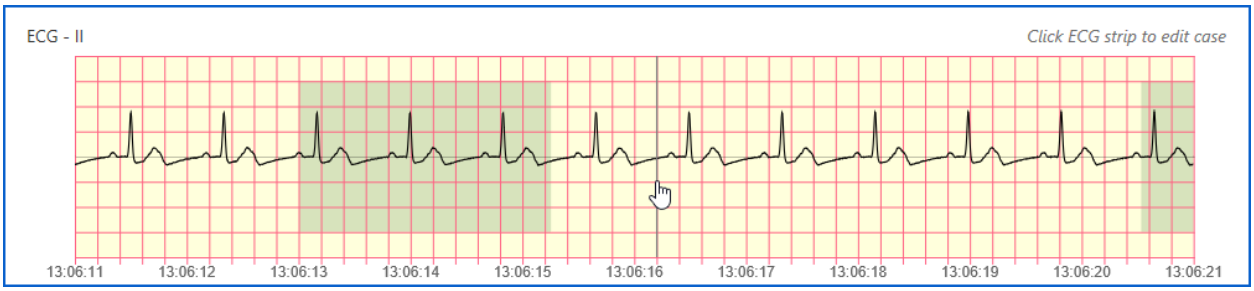
Mark a ROSC in the case for time periods in the case where the patient had a Return of Spontaneous Circulation.

Using the Case Editor

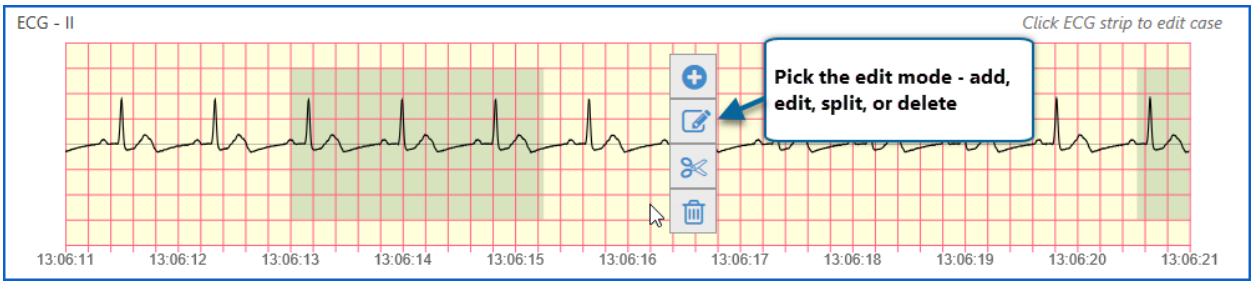
The Case Editor can be used to:

- Add a new CPR period, Pause Period, ROSC, and annotation
- Edit or delete an existing CPR period, pause period, and ROSC
- Split an existing CPR period, pause period, and ROSC

To active the editor, click a location on the ECG strip.

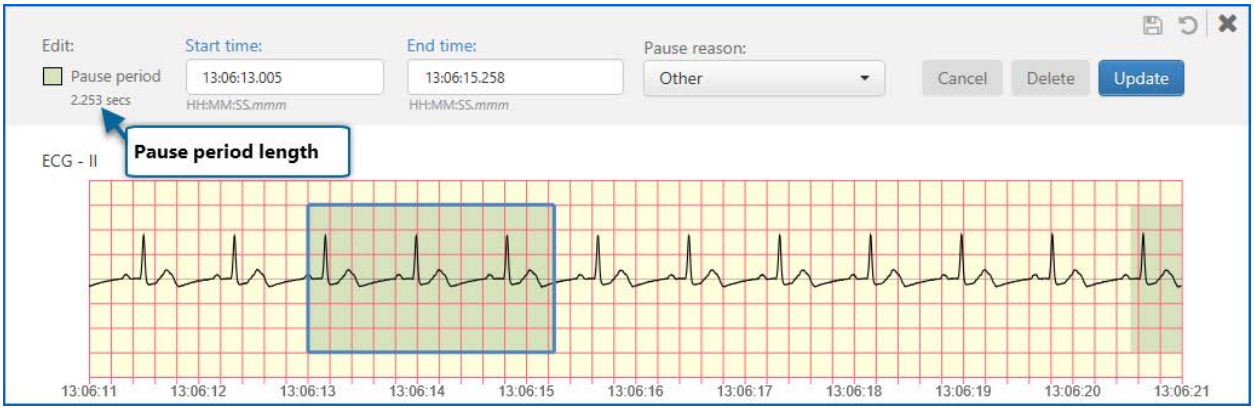


The editor strip displays. Select an edit mode.



The Editor Toolbar displays above the ECG strip.

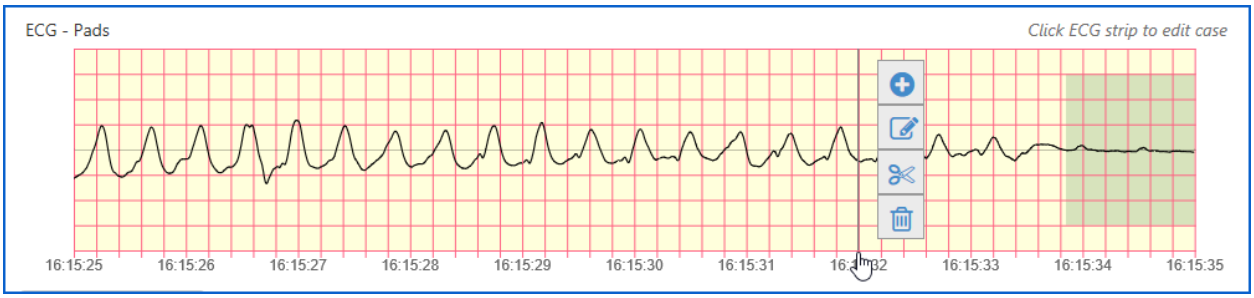
If you choose to edit a pause period, the pause period length displays under 'Pause'.



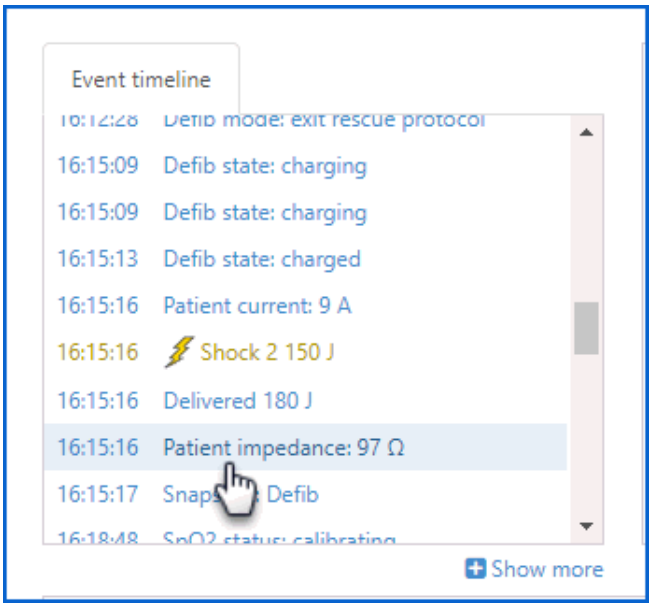
Locating the Period you want to Edit

There are several ways to find a period to edit.

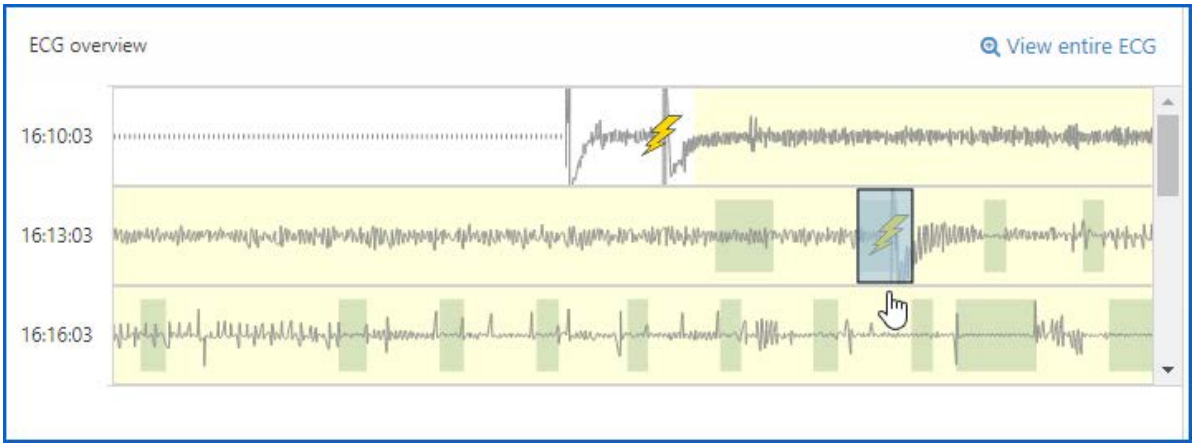
Find the location on the ECG strip and click that time or period.



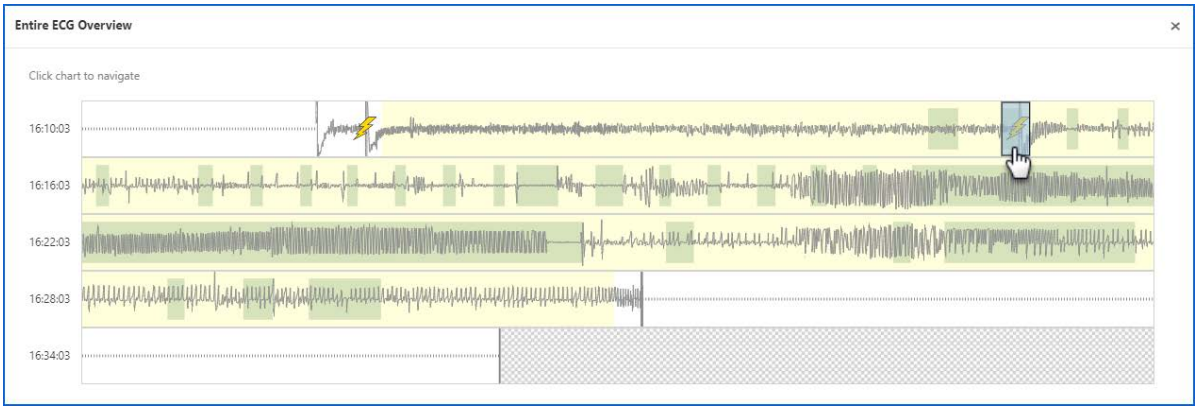
Find by event: Click the event on the 'Event timeline'.



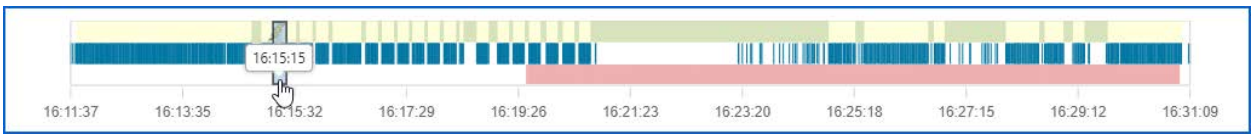
Click the area on the 'ECG overview' or slide the view window to that location.



You can also click 'View entire ECG' and click an area within the 'Entire ECG Overview' window.

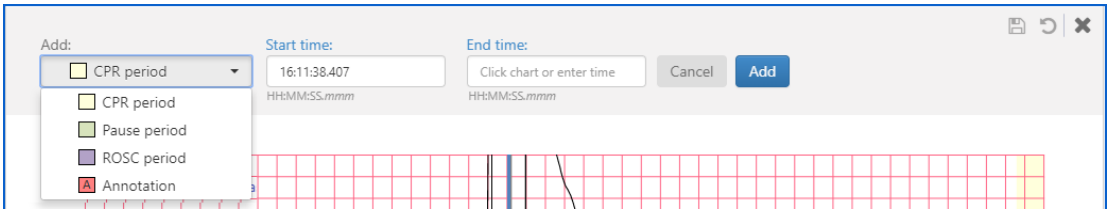


Move the slider on the Full Summary to that location.



Editing a Non-Shaded Area

1. If you click a non-shaded area on the ECG strip, you will be put into the 'Add' mode on the Editor Toolbar. The time you clicked on the ECG strip displays in the 'Start time' field.
2. Click the 'Add' field to select CPR period, Pause, ROSC, or Annotation.

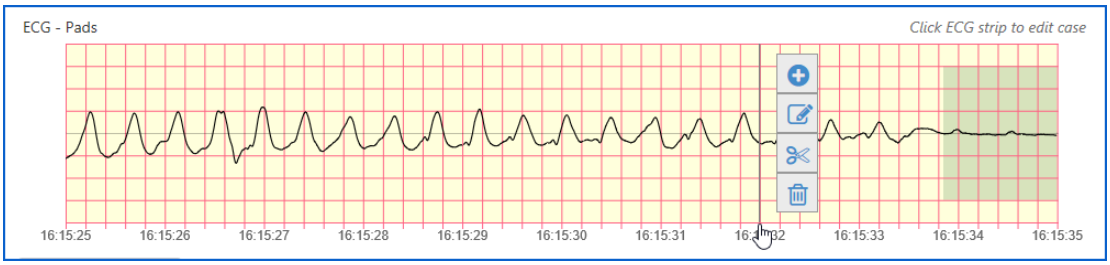


3. Click the 'End time' field and then click the time on the ECG strip. The time you select on the strip displays in the 'End time' field.
4. Click Add.

Note: After you click 'Add', the save icon enables. You must click the save icon to save your changes or they will be lost when you close the editor or when you leave the Playback page.

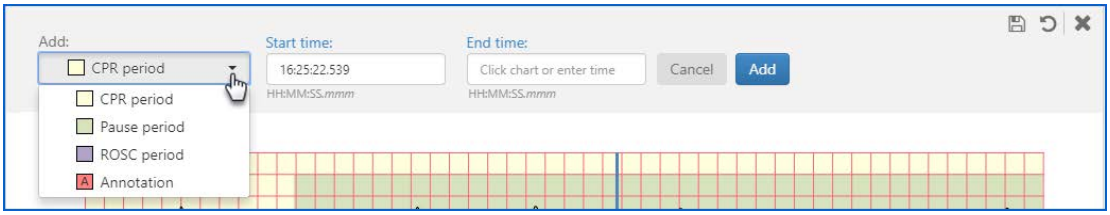
Editing a CPR or ROSC Period

When you click a shaded area, the editor presents options to add, edit, split, or delete.



Add

1. Click the start time within the period on the ECG strip.
2. Click add. The time you click displays in the 'Start time' field on the Editor Toolbar.
3. Click the 'Add' field and select an option.



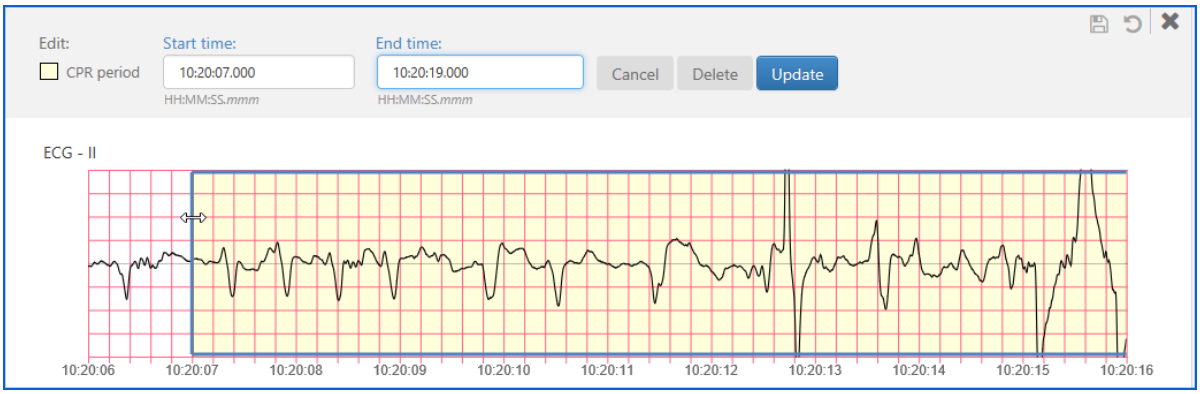
4. Click the location of the stop time on the ECG strip.
5. Click Add.

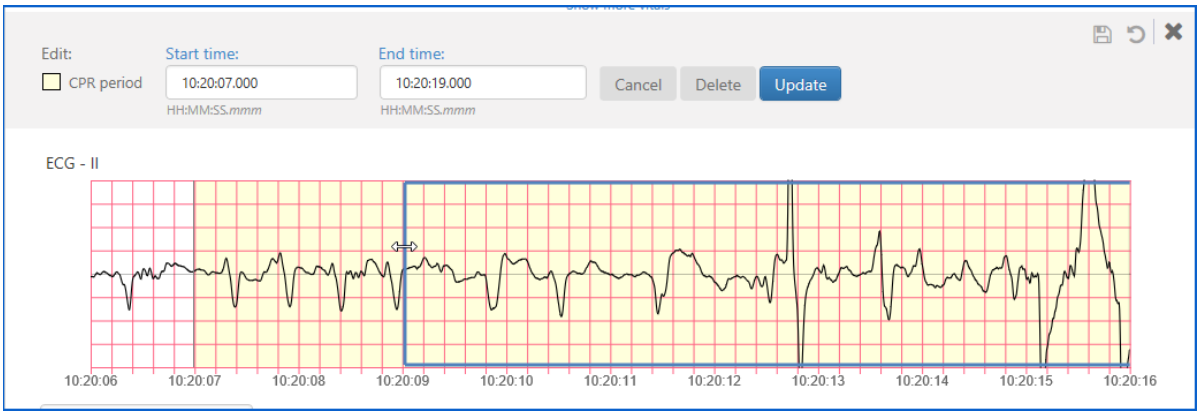
Note: After you click 'Add', the save icon enables. You must click the save icon to save your changes or they will be lost when you close the editor or when you leave the Playback page.

Edit - Change the period's start or end time

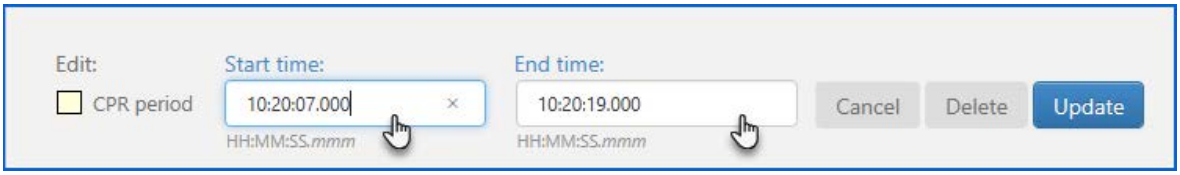
1. On the ECG strip, click on the period you want to edit.
2. Click the edit icon.
3. The Editor Toolbar displays the start and end time of the period you selected. The period highlight in a blue bonding box. To change the start of end time:

    a. Drag the end of the blue boundary to the time you want the period to start or end. You can drag the blue boundary outside the current 10-second view to any area within the case.





Or, change the time in the 'Start time' or 'End time' fields.



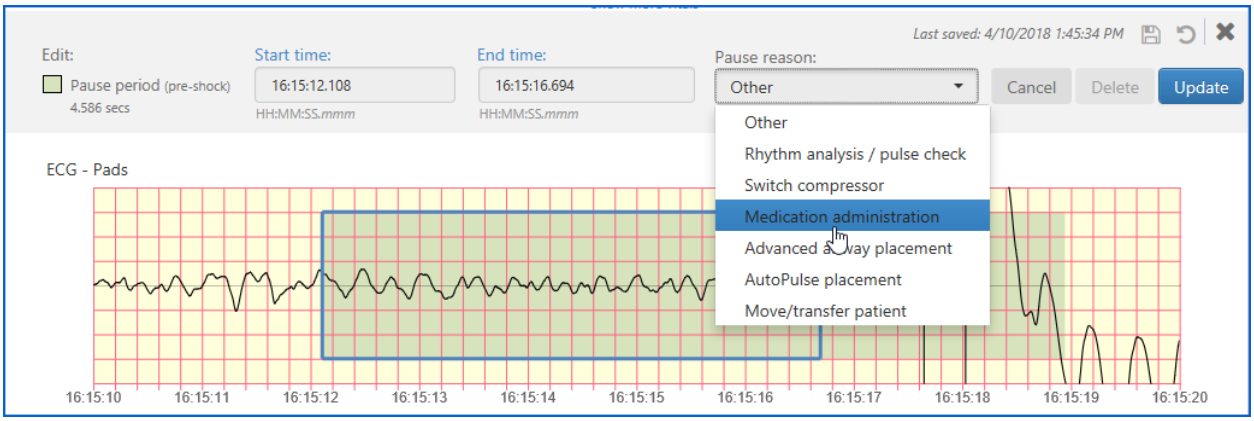
    b. Click Update.

Note: After you click 'Update', the save icon enables. You must click the save icon to save your changes or they will be lost when you close the editor or when you leave the Playback page.

Editing a Pause Reason

Because CaseReview automatically calculates pause periods, you cannot add, split, or delete a pause period. In addition, you cannot edit the start and stop time for a pause period. However, you can add, edit, split, and/or remove the underlining

1. On the ECG strip, click on the period you want to edit.
2. Click the edit icon.
3. On the Editor Toolbar, click the 'Pause reason' field and select a new reason from the list.



4. Click Update.

Note: After you click 'Update', the save icon enables. You must click the save icon to save your changes or they will be lost when you close the editor or when you leave the Playback page.

Merging pause reasons

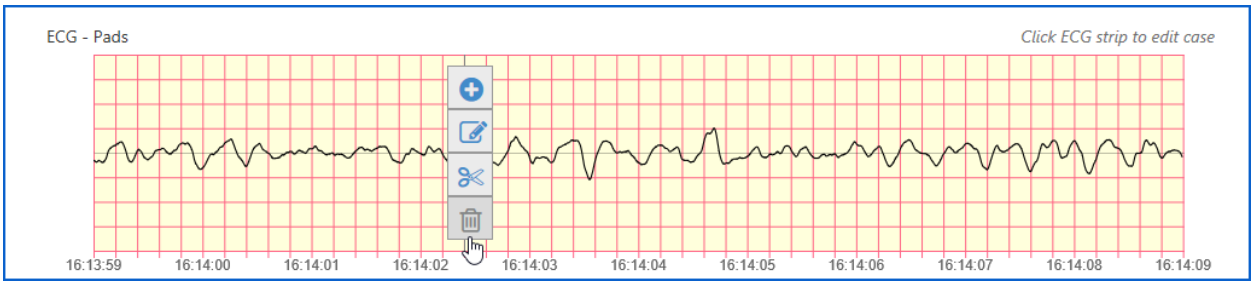
You can merge two pause periods by overlapping the beginning or end of one pause period with the beginning or end of another. If the pause reason is different between the two merged pause periods, the pause reason associated with the pause period you are adding or editing takes precedence over the other.

Adding ROSC over an existing period

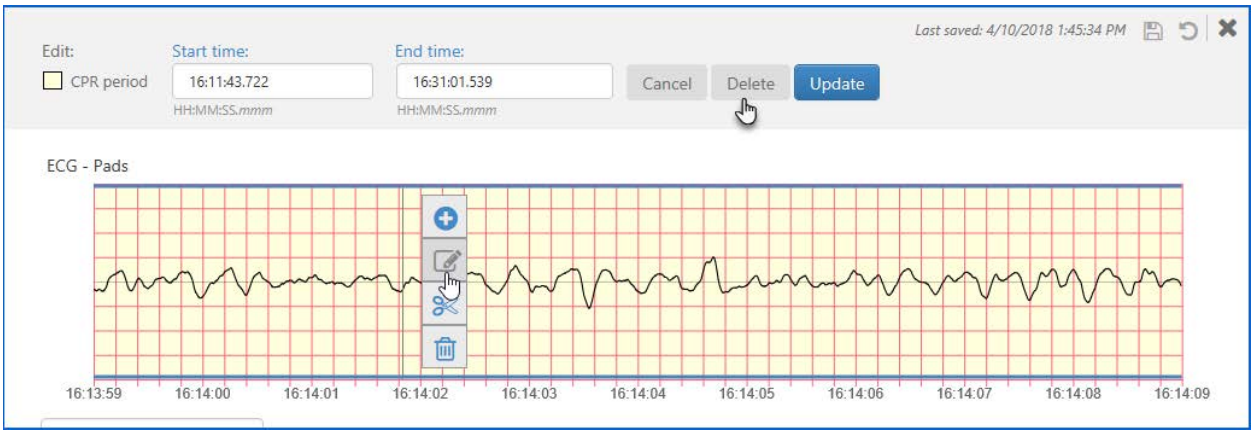
If you add ROSC over an existing period, the system deletes the CPR or pause period and adds ROSC. If you add ROSC anywhere within a period, the system splits the period in two to allow the insertion of ROSC.

Deleting a period

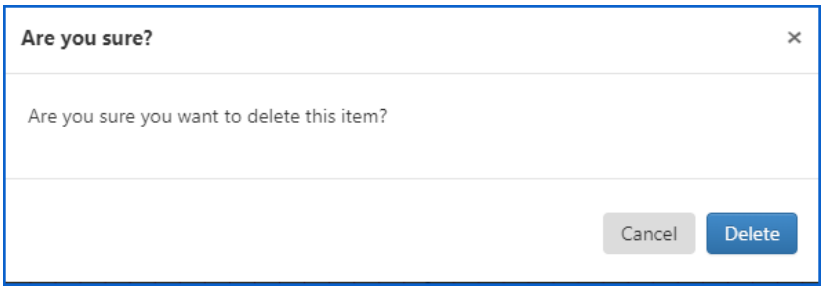
To delete a period, click the shaded area and then the trash can.



Or, click the edit icon and then the delete button on the Editor Toolbar.



The system displays a confirmation message.



If you delete a:

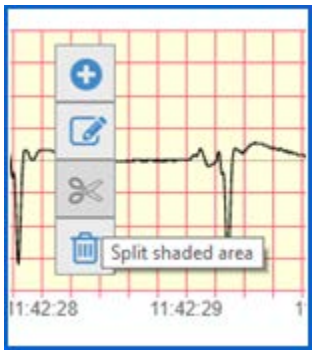
- **ROSC period (purple shading)**: The system will leave that area blank without shading.
- **Pause period (green shading)**: Since pause periods are always contained within a CPR period (yellow shading), when you delete a pause period the system leaves the CPR period so the area will be yellow.
- **CPR period (yellow shading)**: The CPR period, and any pauses contained within that period, will all be deleted resulting in a blank area without shading.

Note: After you delete a period, the save icon enables. You must click the save icon to save your changes or they will be lost when you close the editor or when you leave the Playback page.

Splitting a period

You can slice through a shaded area to create two separate shaded areas that you can edit.

1. On the ECG strip, click the period you want to edit.
2. Click the split icon.



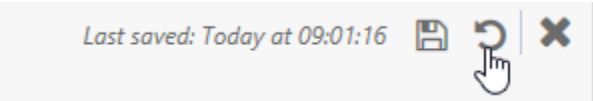
3. The system will ask you to confirm the split of the period. Click 'Split' to continue.
4. After the split, you are put into an edit mode for the left period that resulted from the split. You can change the pause reason or change the start and/or end time by:
    - Dragging the end of the blue boundary to the desired location. You can drag the blue boundary outside the current 10-second view to any area within the case.
    - Entering the period's start and/or stop time in the 'Start time' and 'End time' fields.
5. Click the 'Pause reason' field and select a reason for the period.
6. Click Update.

Note: The editor splits the pause period only, not the underlying CPR period.

Note: After you click 'Update', the save icon enables. You must click the save icon to save your changes or they will be lost when you close the editor or when you leave the Playback page.

Undo

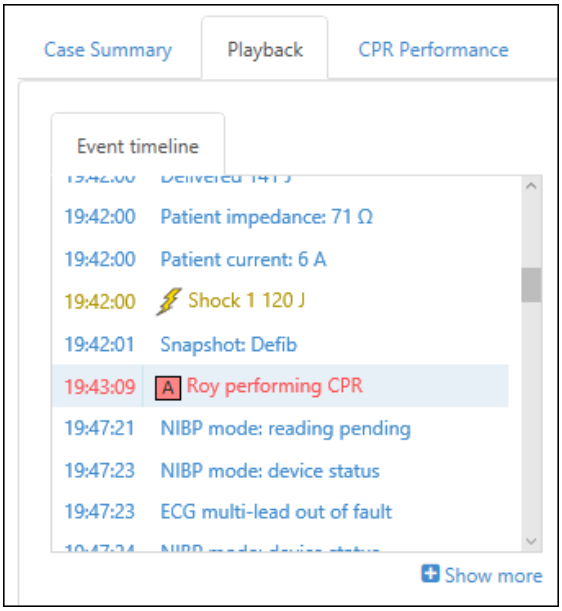
You can undo up to 10 of the last changes made to the case. Undone changes must be saved if you want to keep them. You can undo any changes – including changes you saved, until you leave the Playback page. If the changes you made were in error and you left the Playback page, you will need to delete the case and upload it again.

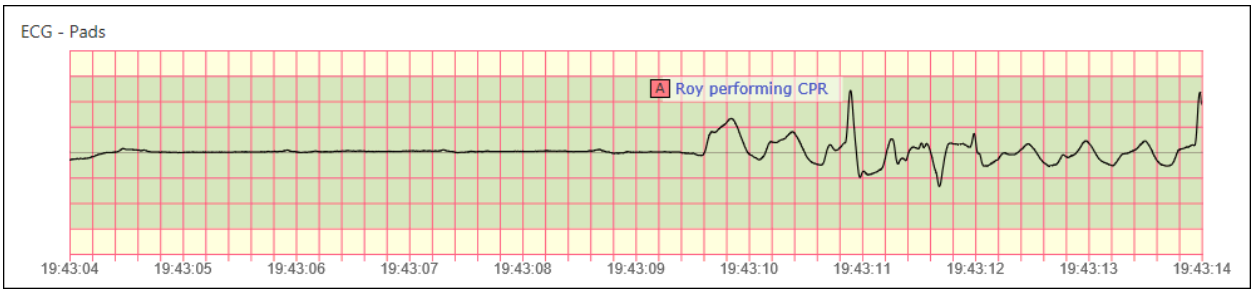


Note: After you undo a change, the save icon enables. You must click the save icon to save your changes or they will be lost when you close the editor or when you leave the Playback page.

Working with Annotations

Annotations provide an explanation or comment at a specific time in the case. Annotations can be used to note the conditions in which the case was recorded and the actions taken by the crew during the case. When you add an annotation, an annotation icon in the 'Event timeline' and the 'Playback and editing' section marks the event. The support text displays next to the annotation icon.





Add an Annotation

1. Locate the place in the case in which you want to insert an annotation. Click the time on the ECG strip and select the plus sign.
2. Click the 'Add' filed and select 'Annotation'.

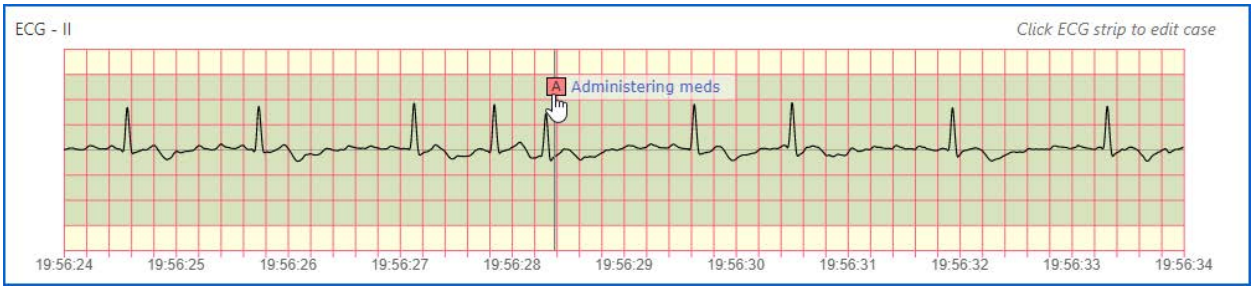
- Time: This field displays the time you click on the ECG strip. Adjust the time if needed.
- Text: Enter the comment or note. This supporting text displays next to the annotation icon.

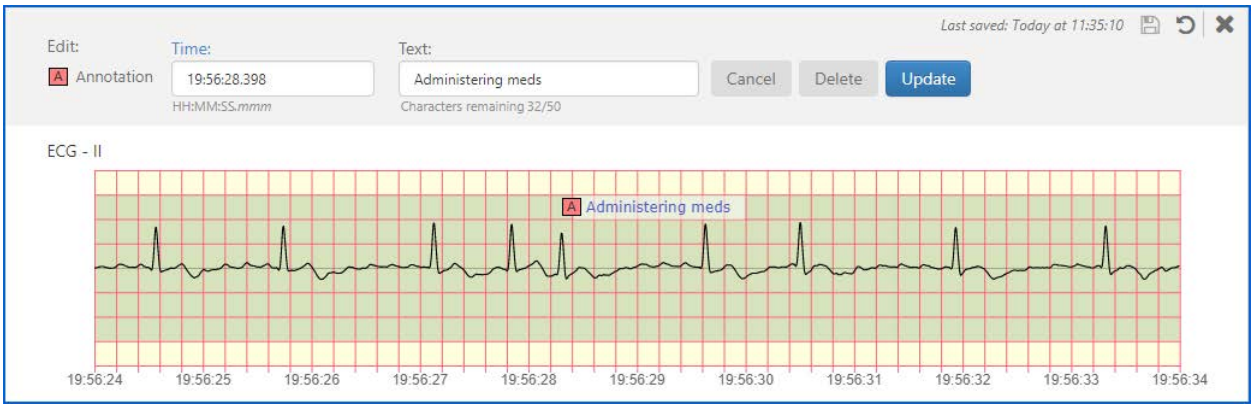
3. Click Add .

Note: After you click 'Add', the save icon enables. You must click the save icon to save your changes or they will be lost when you close the editor or when you leave the Playback page.

Edit an Annotation

1. On the ECG strip, click the annotation to enter into the edit mode on the Editor Toolbar.





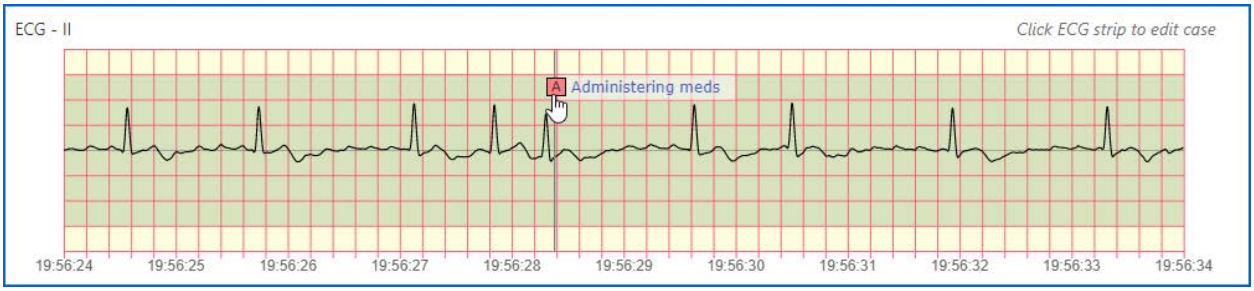
- Time: Click this field to modify the annotation time.
- Text: Click this field to modify or change the supporting text.

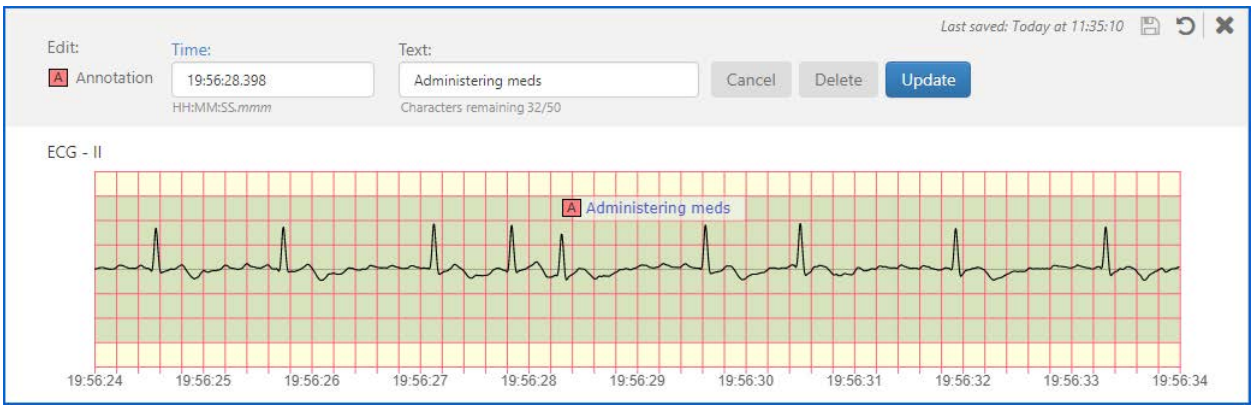
2. Click Update.

Note: After you click 'Update', the save icon enables. You must click the save icon to save your changes or they will be lost when you close the editor or when you leave the Playback page.

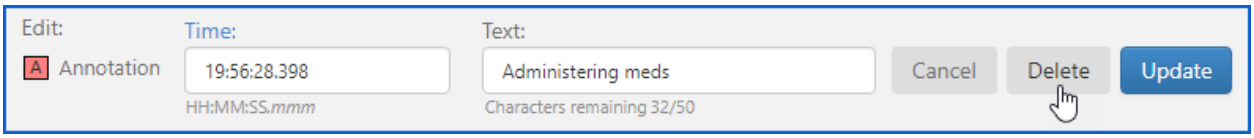
Delete an Annotation

1. On the ECG strip, click the annotation to enter into the edit mode on the Editor Toolbar.

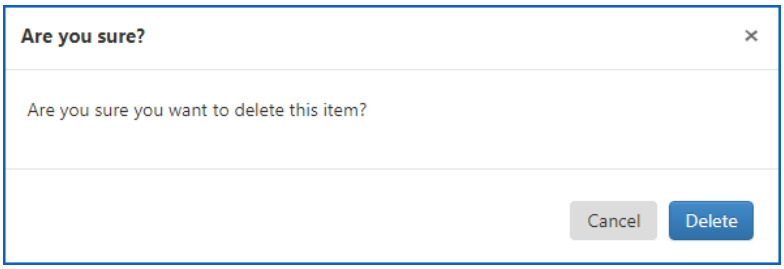




2. Click 'Delete'.



3. On the confirmation message, click 'Delete'.



Note: After you click 'Delete', the save icon enables. You must click the save icon to save your changes or they will be lost when you close the editor or when you leave the Playback page.

Viewing Waveforms on the Case

Magnified ECG

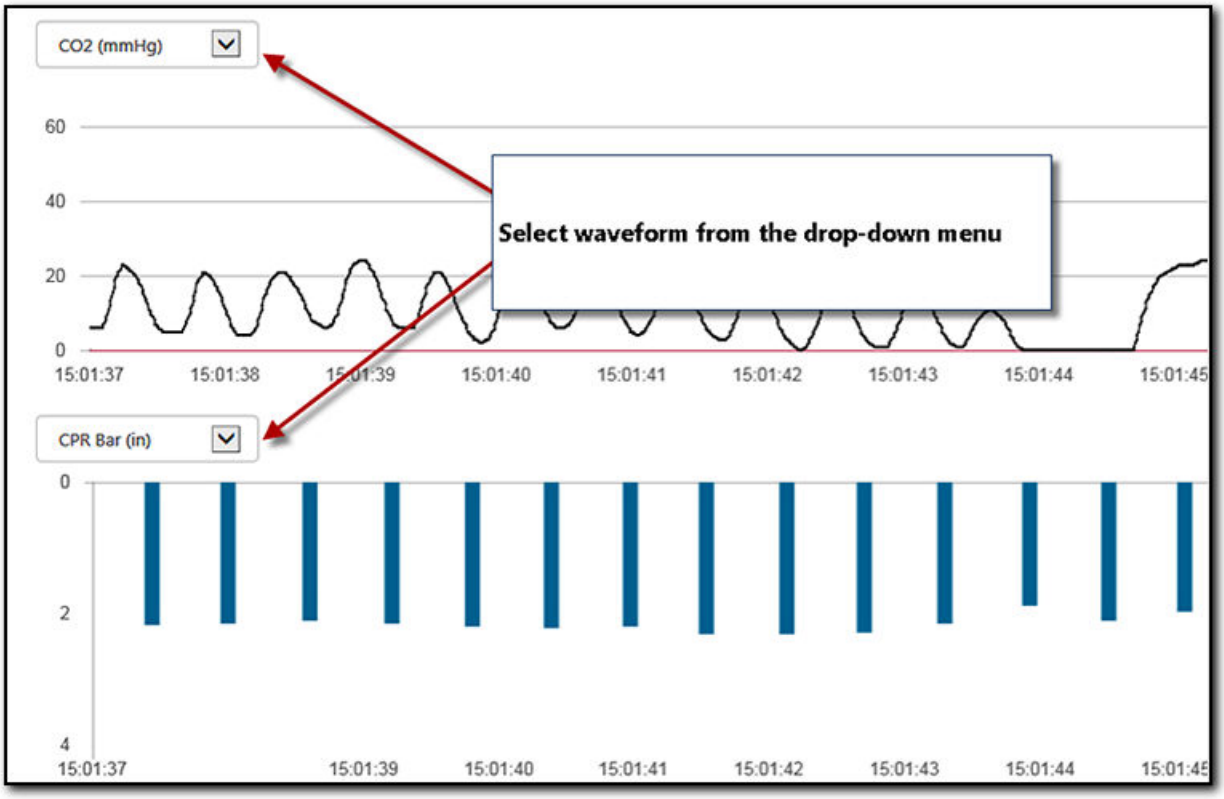
The first area under the Waveform tab displays 10-seconds of ECG in addition to event indicators for shocks, synchronized cardioversion, external pacing, and CPR shading. You can change the 10-seconds you are viewing by clicking an event on the 'Event timeline', moving the viewer window on the 'ECG overview', or moving the slider on the Time Bar.

In the top left corner, the magnified ECG displays the lead type viewed by the clinicians using the ZOLL device during the case. Possible lead types include:

- Pads
- Lead I, lead II, and lead III
- Lead aVR
- Lead aVL
- Lead VF
- N/A if no ECG reading is available

Additional Waveforms

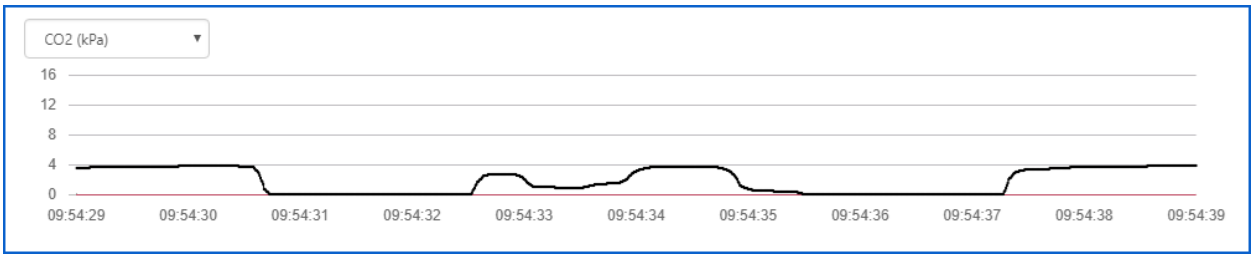
If they are included in the case, you can use the drop-down menu above the two sections under the magnified ECG to view CO2 and SpO2 waveforms. In addition, you can select the option to view a CPR bar graph.

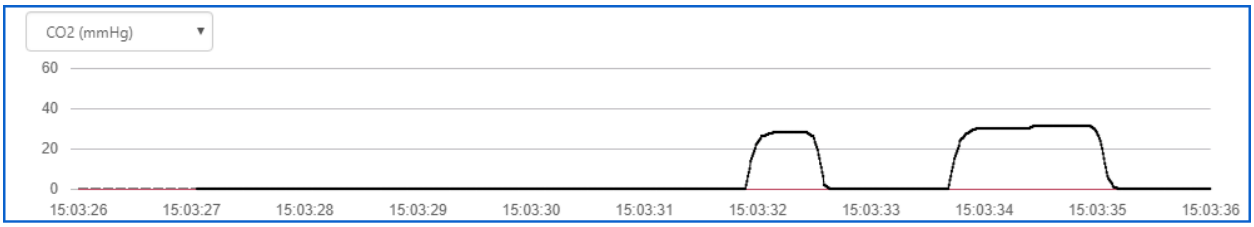


CO2 Capnogram

The capnogram is a valuable clinical tool that can be used to assess patient airway integrity and proper endotracheal (ET) tube placement. The end tidal point of the expiration (EtCO2) on the capnogram waveform may also be used to help determine return of spontaneous circulation (ROSC).

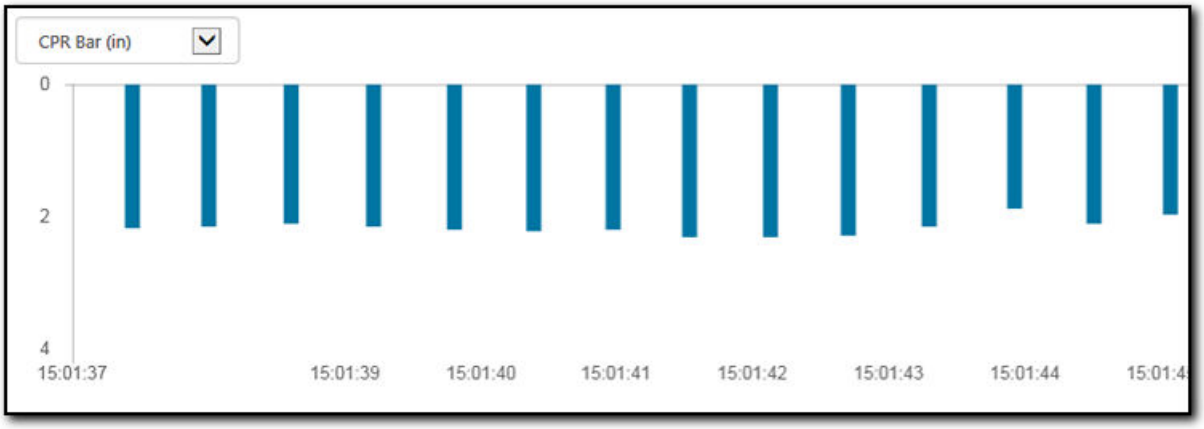
CaseReview recognizes if the defibrillator was set to record CO2 in kPa or mmHg units.



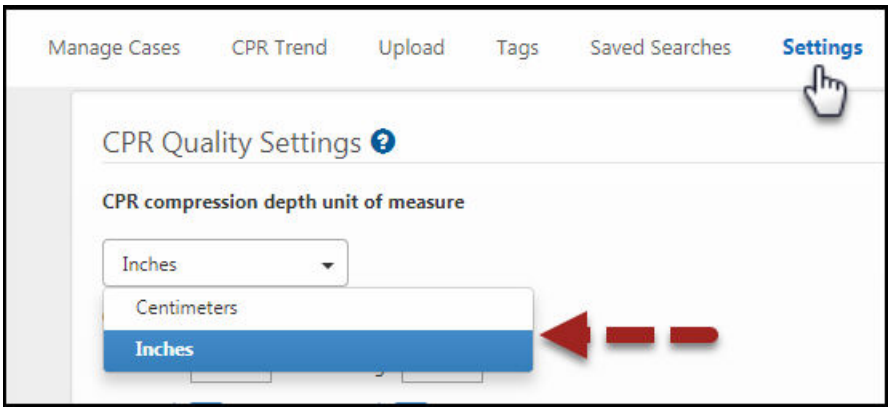


CPR Bar Chart

The CPR Bar chart uses bars to represent the depth (vertical numbers) and the rate of compressions (distance between bars). If a compression is deeper than four inches or 10 cm (depending on the configuration in Settings), the chart axis does not change.

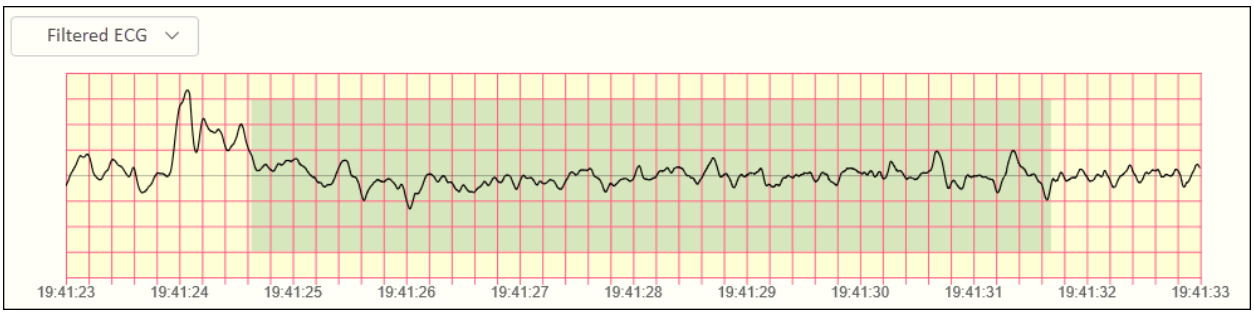


The depth can display in centimeters or inches depending on the configuration setup on the Settings page.



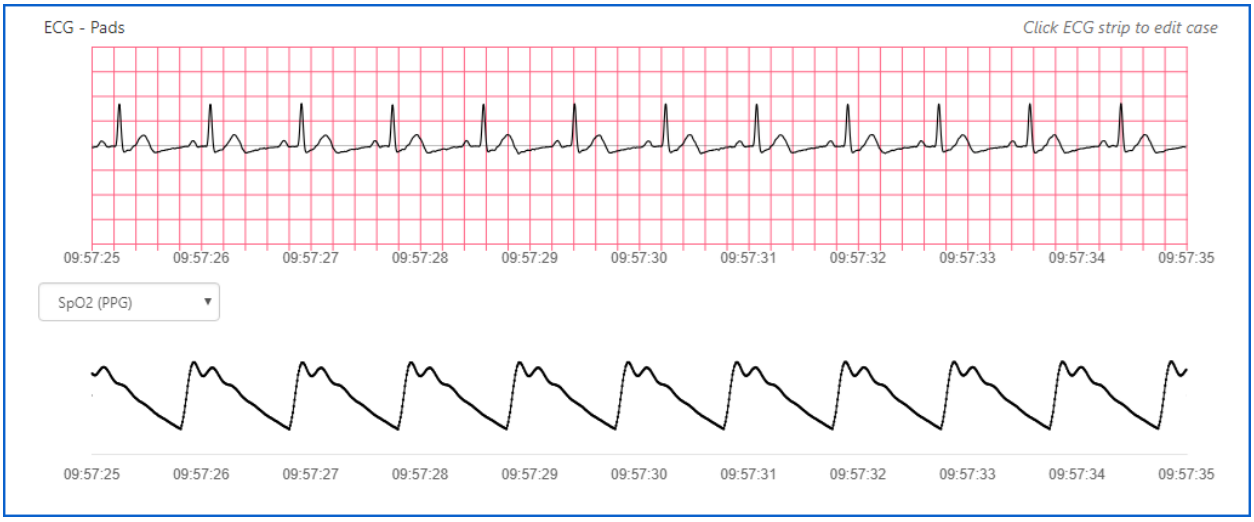
Filtered ECG

Filtered ECG technology filters out compression artifact to enable rescuers to see the underlying heart rhythm during CPR, thereby reducing the duration of pauses in during CPR.



SpO2 (PPG)

SpO2 is the percentage of oxygenated haemoglobin (haemoglobin containing oxygen) compared to the total amount of haemoglobin in the blood. If SpO2 does not exist in the case, it will be grayed out.



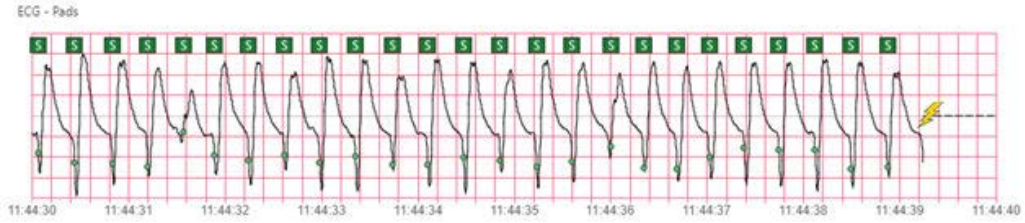
Event Indicators

If the following events were performed using the defibrillator during the time the case was recorded, Playback displays event indicators for:

- **Shocks** ⚡: Displays on the 'ECG overview', magnified ECG, CO2, and Filtered ECG.
- **External Pacing** P: Displays on the magnified ECG.
- **Synchronized Cardioversion** S: Displays on the magnified ECG.

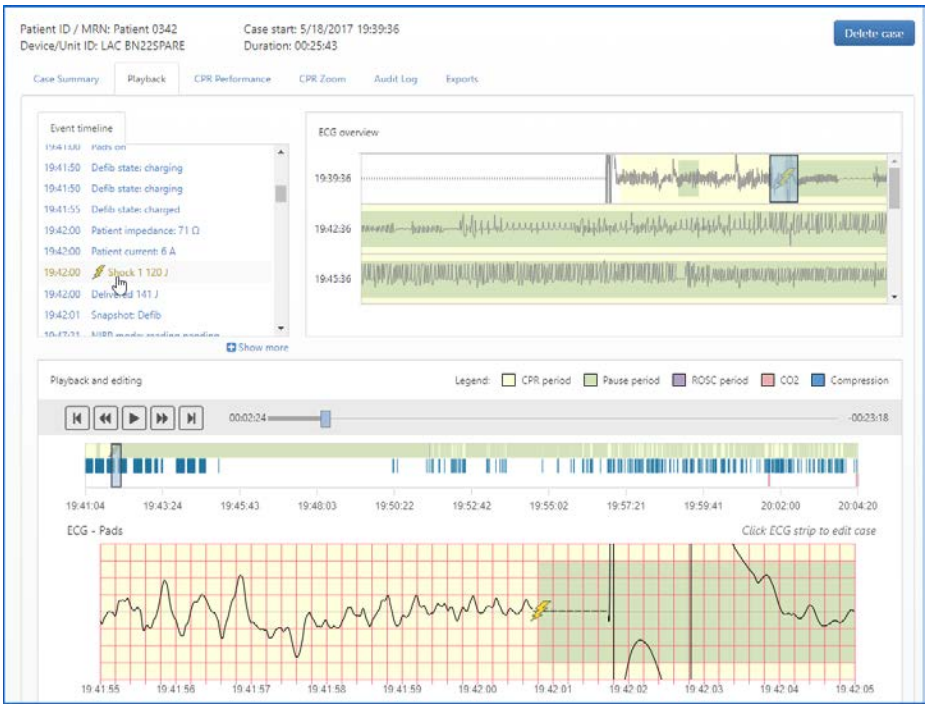
Cardioversion Synchronization

The event indicator displays at the top of the strip if the presence of synchronized cardioversion was detected. A green ball on the waveform indicates when the ZOLL device detected and synchronized the patient's R-wave.



Shocks

If a shock exists in the case, Playback displays a shock event indicator.

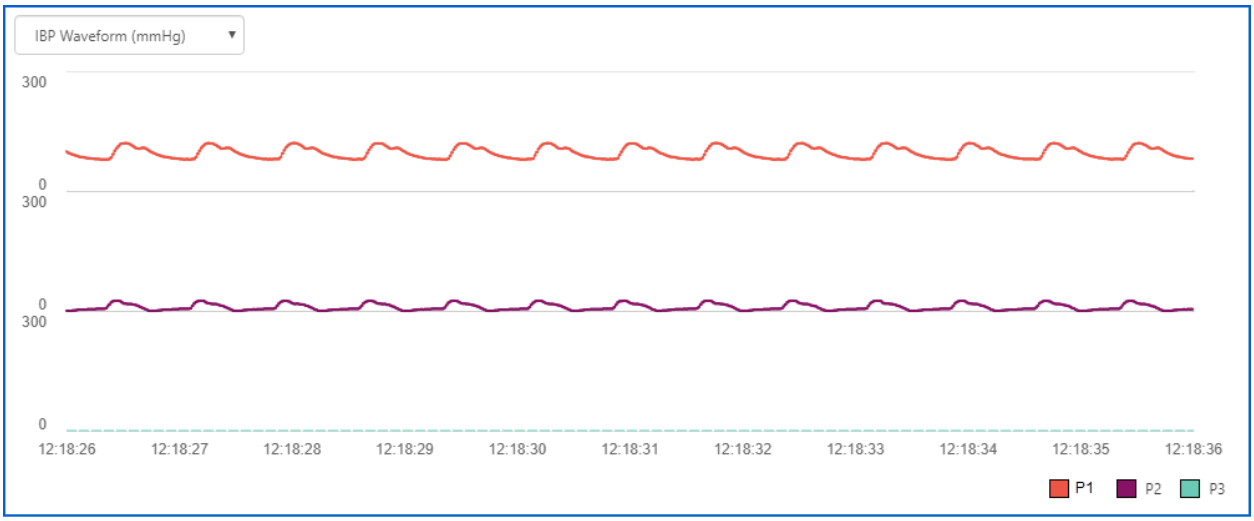


Pacing

External pacing event indicators appear above each complex where pacing was delivered.

Invasive Blood Pressure (IBP)

The system displays up to three IBP waveforms.



Saved Searches

While every CaseReview In-Premise user can create and save searches, users with administrator permission, have several more abilities than that of a standard user.

An administrator can:

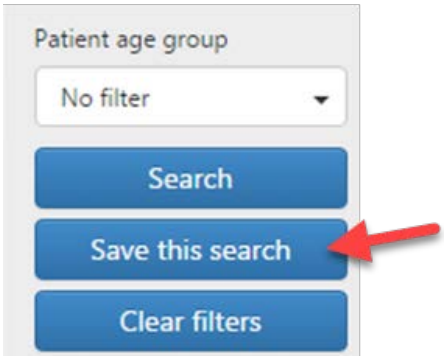
- Run, edit, and delete any saved search on the system using the Saved Searches page
- Share their searches with the organization

In contrast, a standard user can:

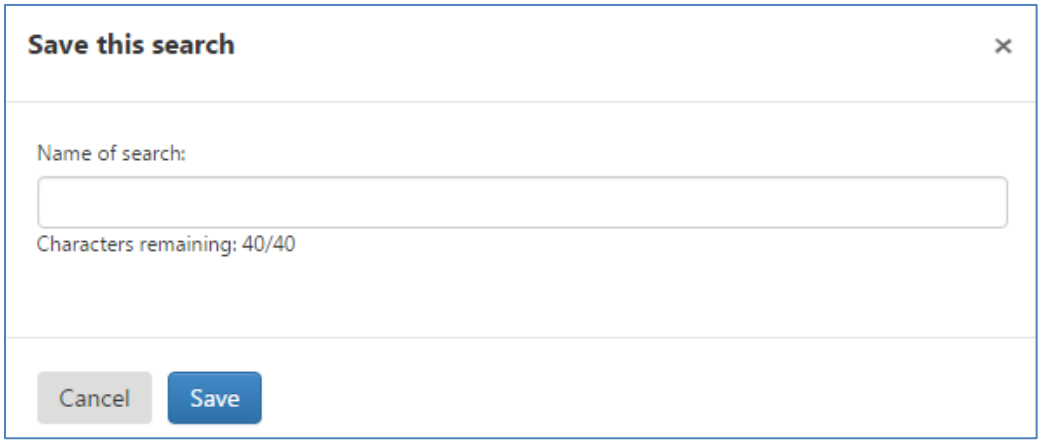
- View searches they create and those shared by the administrator
- View and modify the searches they create but they cannot delete them. Instead of deleting, a standard user can modify an existing search with different search criteria.

To save a search for future use:

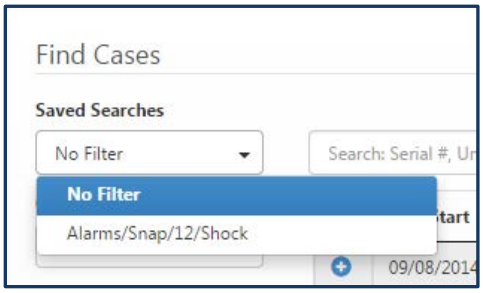
1. Click Manage Cases
2. Click '**Advanced Search**' to expand your search categories.
3. Select filters in one or more categories.
4. Click Search. The page displays the search results. At the top of the page, the system displays the search attributes.
5. Click '**Save this search**'.



The Save search window opens.



6. In the 'Save this search' window, enter a name (maximum 40 characters) and click **Save**
7. To use the search, click the **Saved Searches** field on the Manage Cases page and click the search name.

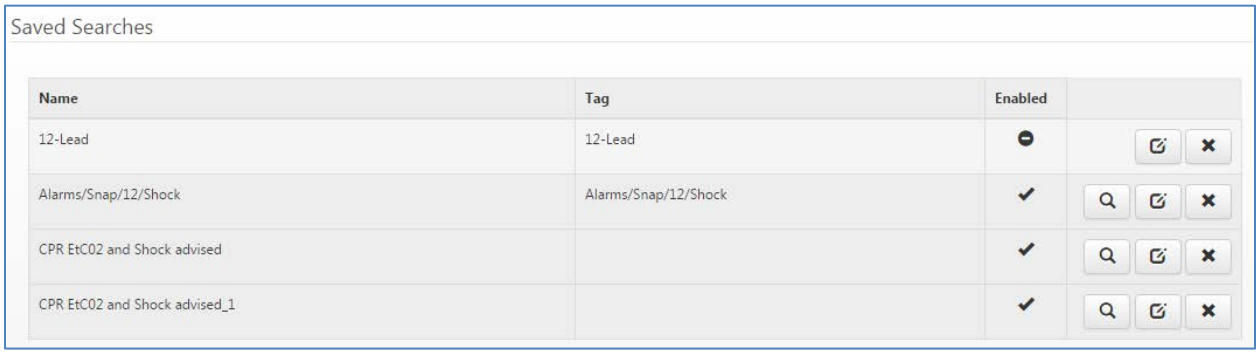


Note: If you just saved a search, refresh the Manage Cases page and then click '**Saved Searches**'.

Managing Saved Searches (Administrator only)

On the CaseReview Navigation Bar, click **Saved Searches** to:

- View a list of existing searches
- View related tags
- Enable/disable a search
- Run a search
- Edit a search
- Delete a search

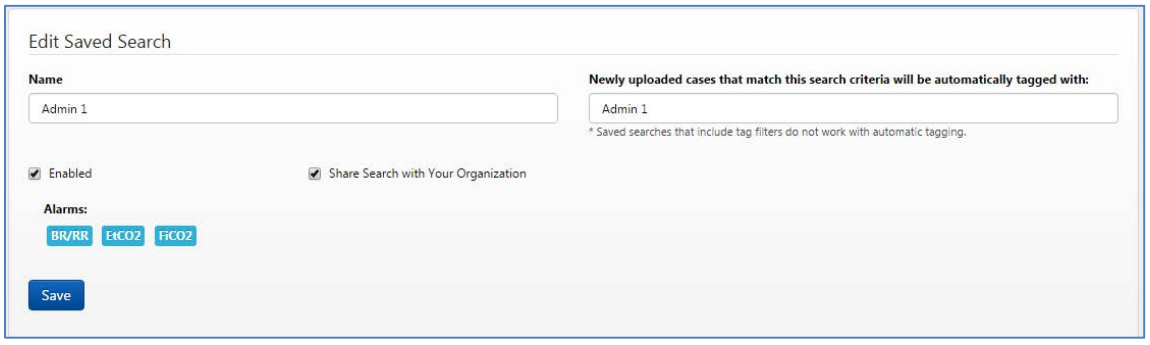


Run

1. Click Run .
2. The results will display on the Manage Cases page.

Edit

1. Click Edit . The Edit Saved Search page displays.



2. **Name**: Click the 'Name' field to modify the name.
3. **Automatic tag**: If you enter a tag name in this field, the system will automatically apply this tag to any newly uploaded case that matches this search.
    a. Ensure that the Enabled box is checked (checked by default).

b. The system defaults the search name as the tag name. You can change the tag name by clicking the 'Newly uploaded cases that match this search criteria will automatically tagged with' field and entering a new name.

Note: You can apply this tag to uploaded cases that match multiple searches. For more information, see Automatic Tagging.

Note: The system will not automatically tag cases that users uploaded prior to implementing automatic tagging.

4. **Enabled**: You have the capability to disable a search for future use.
5. **Share Search with Your Organization**: Check this box if you want to give other users the ability to use your search. If checked, the search name displays when standard users click Saved Searches on the Manage Cases page.
6. **Alarms**: This section displays the search criteria.
7. To apply your changes, click '**Save**'.

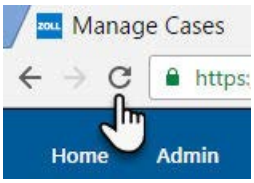
Delete

1. Click '**Delete**'. A confirmation window opens to verify the delete action.
2. If you wish to continue, click '**Delete**'.

Create a New Search from an Existing Search

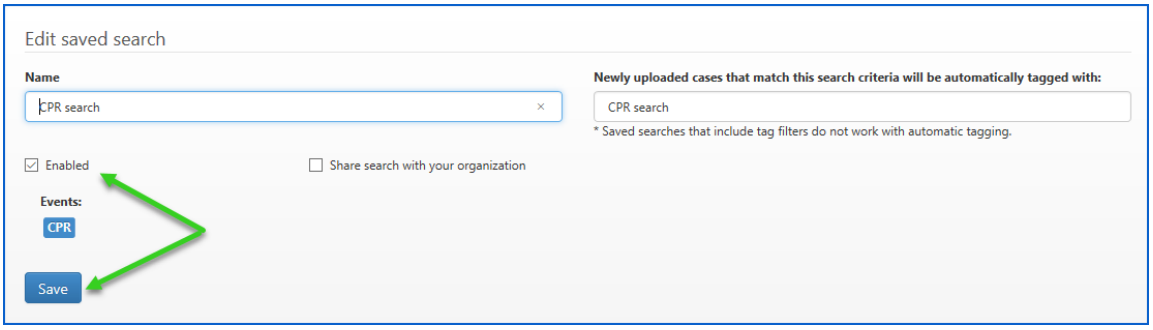
1. On the Manage Cases page, click the 'Saved searches' field.
2. Select the saved search from the list.
3. To remove an attribute, click the X next to the attribute name.

4. Click 'Save this search'.
5. Click the search name field to modify the existing search name or enter a new name. Click 'Update Search'.
6. Refresh the page to view the modified search on the Manage Cases page.



Enable/Disable a Saved Search (admin only)

1. On the CaseReview Navigation Bar, click 'Saved Searches'.
2. On the line associated with the search you want to disable/enable, click the edit icon.
3. Check the 'Enabled' box to disable/enable the search and then click Save.



Sharing a Saved Search with your Organization (admin only)

1. On the CaseReview Navigation Bar, click 'Saved Searches'.
2. On the line associated with the search you want to disable/enable, click the edit icon.
3. Check the 'Share search with your organization' box and then click Save.

Tags

Use Tags to mark cases so you can easily find them for further analysis.

For example:

1. Create a unit 12 tag and apply it to the cases handled by Unit 12.
2. On the Manage Cases page, in the filters section, click the 'Tags' field and check the box next to Unit 12.
3. Click 'Search'.
4. The system displays the cases with the associated Unit 12 Tag on the page.

Note: The search mechanism associated with the filters uses 'and', 'not', and 'or' to find and display cases. If you select multiple tags, the system displays all cases associated with all tags you selected in the filtered results.

Display Tags

1. On the Manage Cases page, click 'View all' next to Tags under Custom Filters.

Add Tags

1. On the Manage Cases page, click 'View all' next to Tags under Custom Filters.

2. Click '**Add tag**'.
3. In the Add Tag dialog box, enter the tag name and then click **Save**.
4. To apply a tag to a specific case:
    a. Click Manage Cases on the Navigation Bar.
    b. Click the case start time on the line of the targeted case.
    c. On the Case Details page, click '**Add tag**'.
    d. In the 'Add tag' window, enter the first letter of the tag name and select the tag from the list.

Edit

1. On the Manage Cases page, click 'View all' next to Tags under Custom Filters. The system displays a list of existing tags.
2. Click the tag name. The Edit Tag dialog box opens. This window displays the number of cases associated with the tag.
3. Modify the tag name and click '**Save**'.

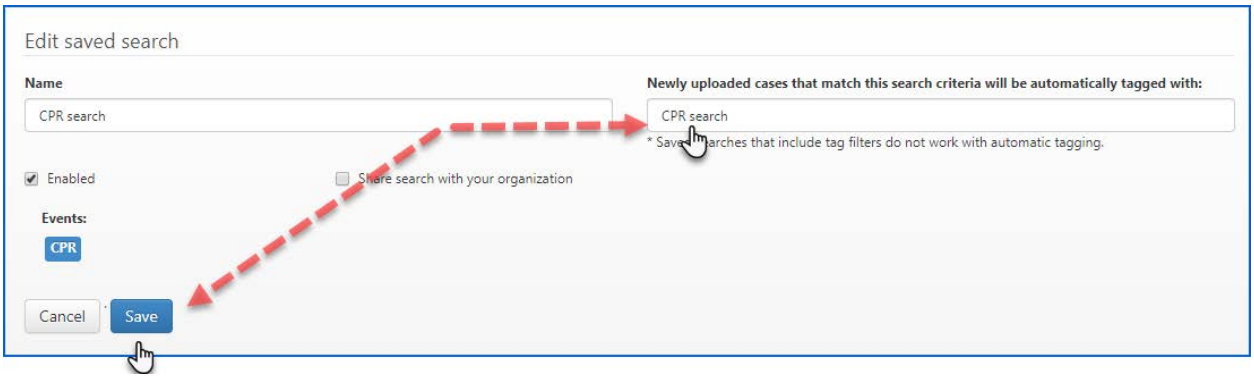
Delete

1. On the Manage Cases page, click 'View all' next to Tags under Custom Filters. The system displays a list of existing tags.
2. Click **X** next to the Tag name. The Delete Tag dialog box opens. This window displays the number of cases associated with the tag.
3. If you click '**Delete**', the system removes the tag and all its associations.
4. To keep the tag in the system but remove its association with a case:
    a. Click Manage Cases on the Navigation Bar.
    b. Click the case start time.
    c. On the Case Details page, click the X next to the tag name.

Automatic Tagging

When Automatic Tagging is enabled, the system automatically applies the tag name you enter to any newly updated case that matches the search. The system will not apply the tag to cases that were uploaded prior to the time you started automatic tagging.

1. Click 'View all' next to 'Saved Searches' to see a list of configured searches.
2. On the line of the tag you want to enable, click edit.
3. In the 'Newly uploaded cases that match this search criteria will be automatically tagged with' field, enter the search name and click Save.



Tag Cases with Multiple Tags

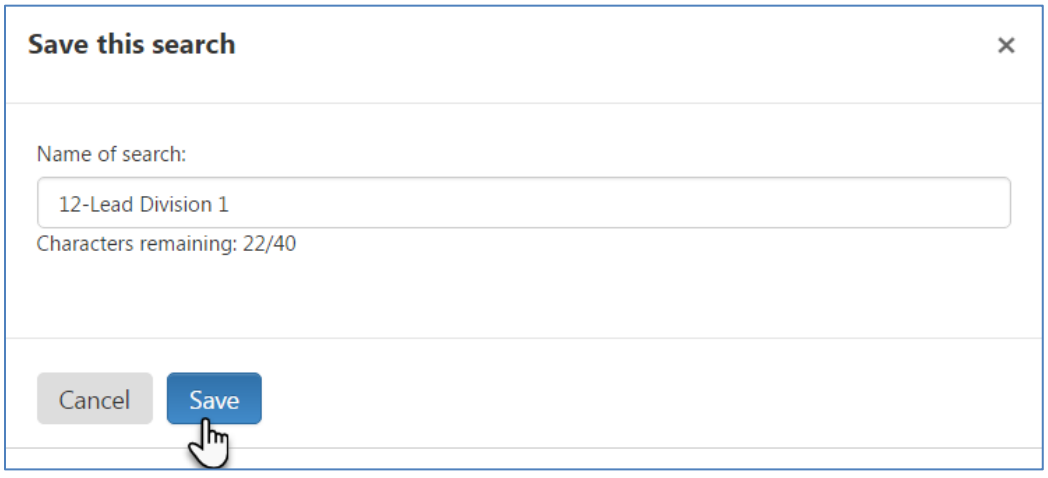
CaseReview automatically applies one or more tags to newly uploaded cases. You can apply multiple tags by creating multiple saved searches. When the system uploads a case, it runs the case through all the saved searches. If the search criteria in one or more saved search matches those in the uploaded case, the system tags the case with the tag name associated with that search.

You can use this feature in situations where you have multiple teams and you want to identify cases that match a single saved search from each team. For example, you have two groups or divisions sending cases to CaseReview. You want to identify the cases that contain12-Leads from each group. In this case, you would create a saved search with a filter criteria of 12-Lead, and then save that search two times, each with a name that reflects the group. The saved search would apply a unique automatic tag that you can use to identify the team's cases and filter them on the Manage Cases page.

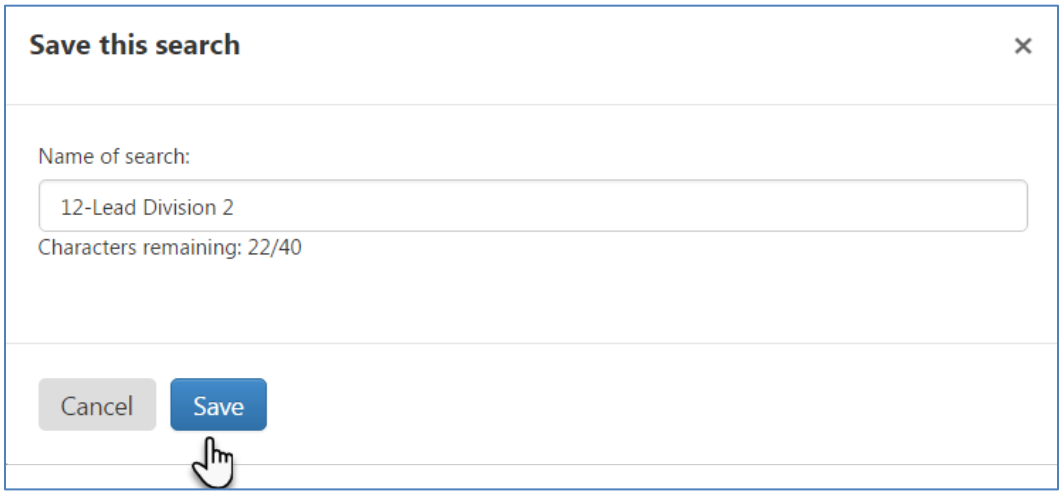
Note: The system will not tag existing cases with a newly configured tag. To tag existing cases, you must either manually open cases individually and apply tags or delete and re-upload existing case files.

Steps

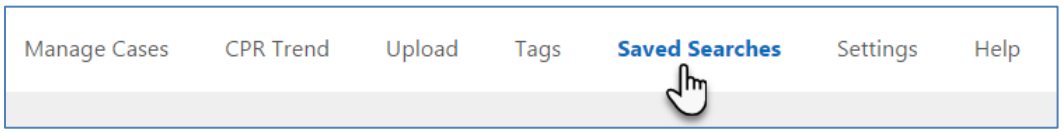
1. On the Manage Cases page, enter your filter criteria and click **Search**. When the search results appear, click **Save this search**.
2. The "Save this search" window opens. Enter the name of the search, and click **Save**.



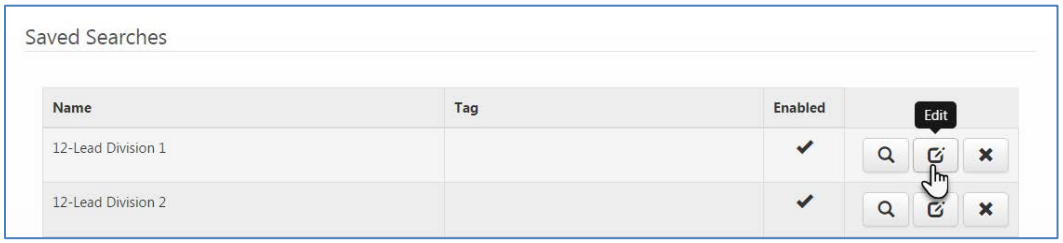
3. Because this search will be used for multiple tags, you can enter any number of new names in the "Name of search" field, clicking **Save** each time.



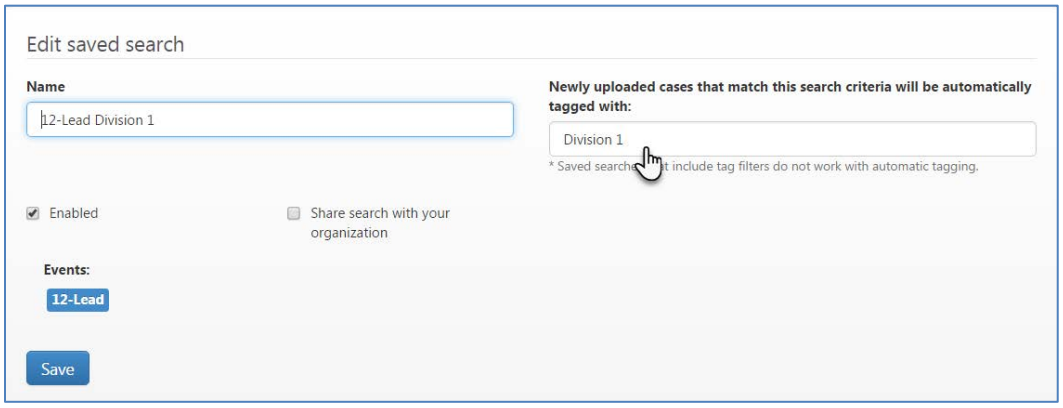
4. On the CaseReview Navigation Bar, click **Saved Searches**.



5. Find the name of the first saved search and click **Edit**.



6. In the "Newly uploaded cases that match this search criteria will be automatically tagged with" field, enter the group's name.



7. Click **Save**.
8. Continue with steps 5 – 7 until you have entered tag names for all your saved searches.

Example

In the following example, we want the system to tag cases from a single X-Series device with three tags: Division, Battalion, and Station.

First, we enter the Device ID or Serial Number in the text search box and click **Search**.

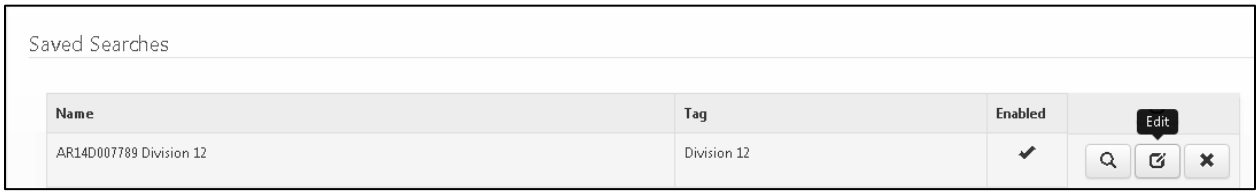
When the search results appear, select **Save this search** and name the search – For example: "Device ID 1 - Division 12".

Because we want to apply three different tags to the same Device ID, we will create our second and third saved searches and then add the automatic tags.

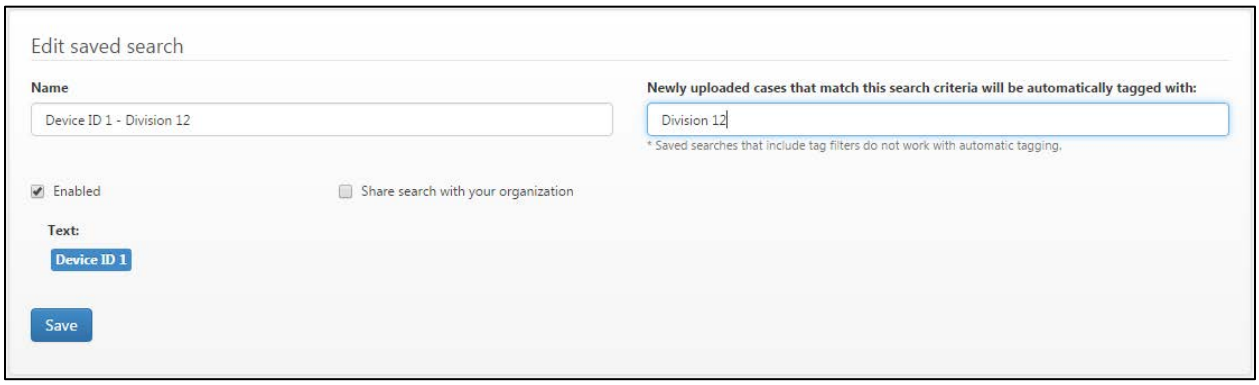
Select **Save this search** again, name the second search "Device ID 1 - Battalion 1" and click **Save**.

Select **Save this search** again, name the third search "Device ID 1 - Station 14" and click **Save**.

The next step is to go to the Saved Searches page on the top toolbar and edit the searches to add automatic tags. Find the "Division 12" search in the list of saved searches, and click the "Edit" icon.



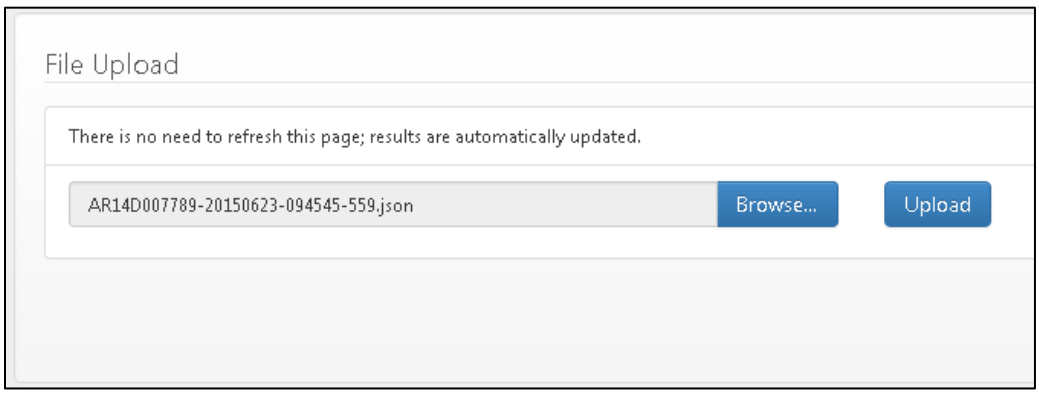
We want the search to tag cases with "Division 12" so we will enter that in the box that says "**Newly uploaded cases that match this search criteria will be automatically tagged with:"** and then click **Save** to save the search.



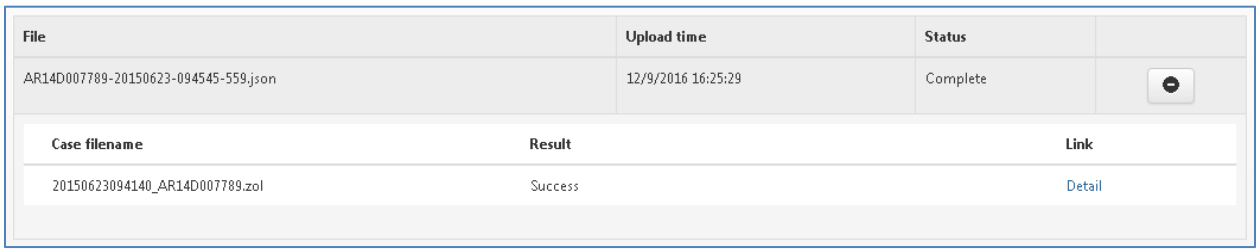
Find the "Battalion 1" search in your list of saved searches and click the "Edit" icon. We want the search to tag cases with "Battalion 1" so enter that in the box that says "**Newly uploaded cases that match this search criteria will be automatically tagged with:"** and click **Save**.

Find the "Station 14" search in your list of saved searches and click the "Edit" icon. We want the search to tag cases with "Station 14" so enter that in the box that says "**Newly uploaded cases that match this search criteria will be automatically tagged with:"** and click **Save**.

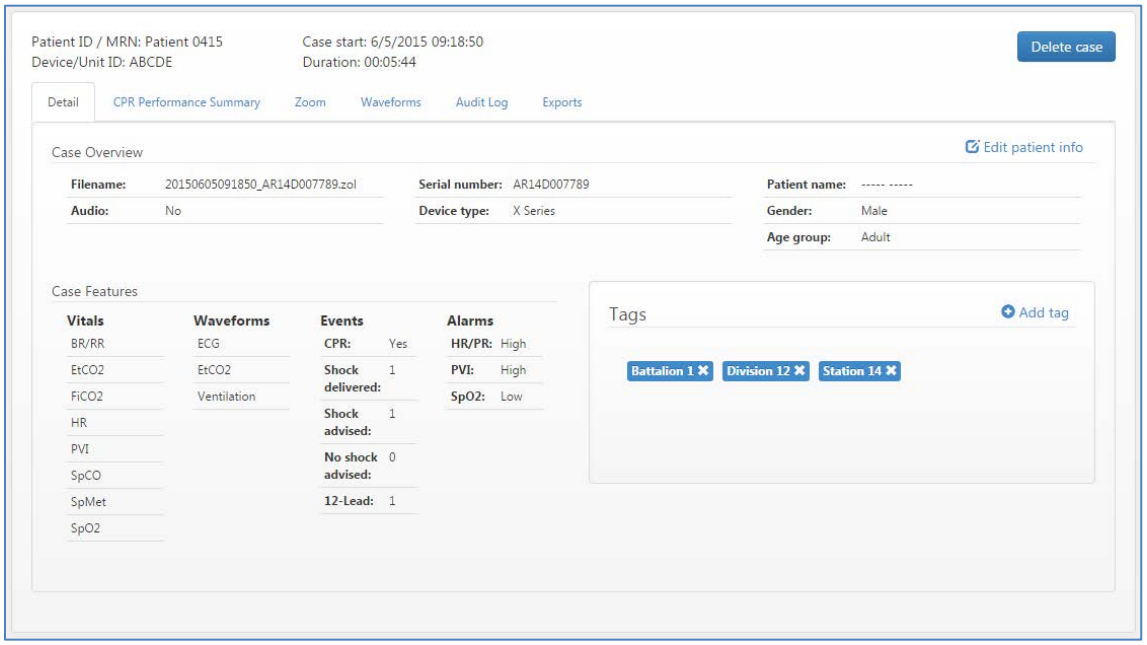
Go to the Upload page on the top toolbar and upload a case file(s) from this device.



Click **Detail** on the Upload page and look at the tags that the system applied to the uploaded case file.



You will see the system automatically added tags "Battalion 1", "Division 12" and "Station 14" to the uploaded case.



Now you can view all case files with one, two, or all three of these tags from the "Manage Cases" page by selecting the tags filter and checking the tag(s) for cases to include in your search. If you select multiple tags, only those cases with all of the selected tags display.

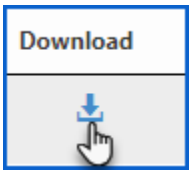
To create automatic tags for a different device, repeat these steps with the new Device ID. You can give this new device the same tags or modify them depending on your needs. For example, you can use the same Division and Battalion but a different Station for the cases uploaded from this second device.

To view the list of all tags used in your system, go to the "Tags" tab on the top toolbar menu.

Download Cases

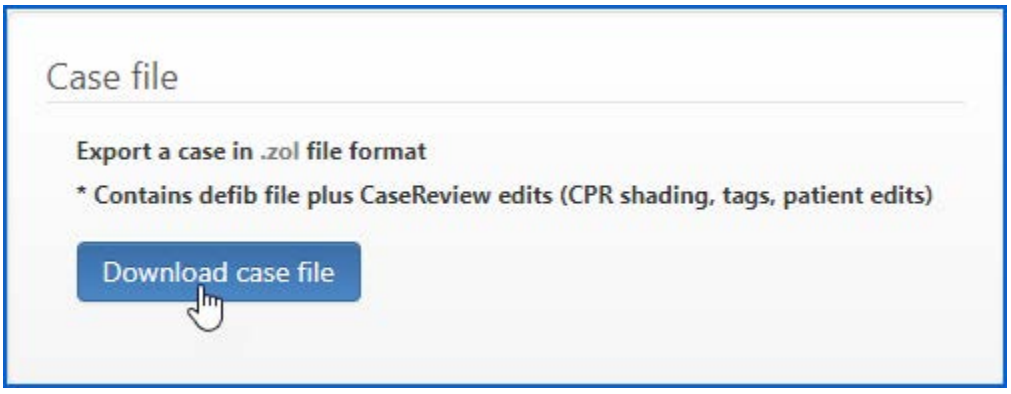
Note: If the case includes audio, the .mp3 file will be included in the export. The audio for the X Series and the AED comes off of the defib in the form of an .ogg file. This file will be combined with the correlating defib file and added into the .zol file. The segments in the .ogg file with audio are lined up with that time within the case file. You will hear silence with no audio.

1. Click Manage Cases.
2. On the line of the case you wish to download, click the download icon.



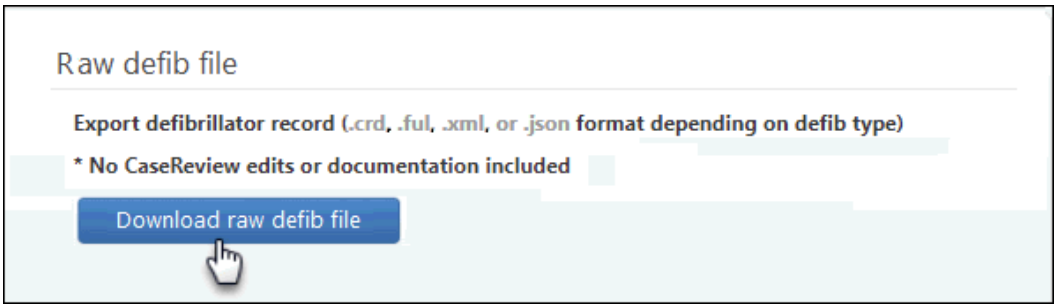
Download a Single Case File

Click Download case file to download the highlighted case to your desktop. If you have Code Review installed, the system opens the case in Code Review when you click the .zol file.



Download the Raw Defib File

Use this option to down the raw case sent from the defib.

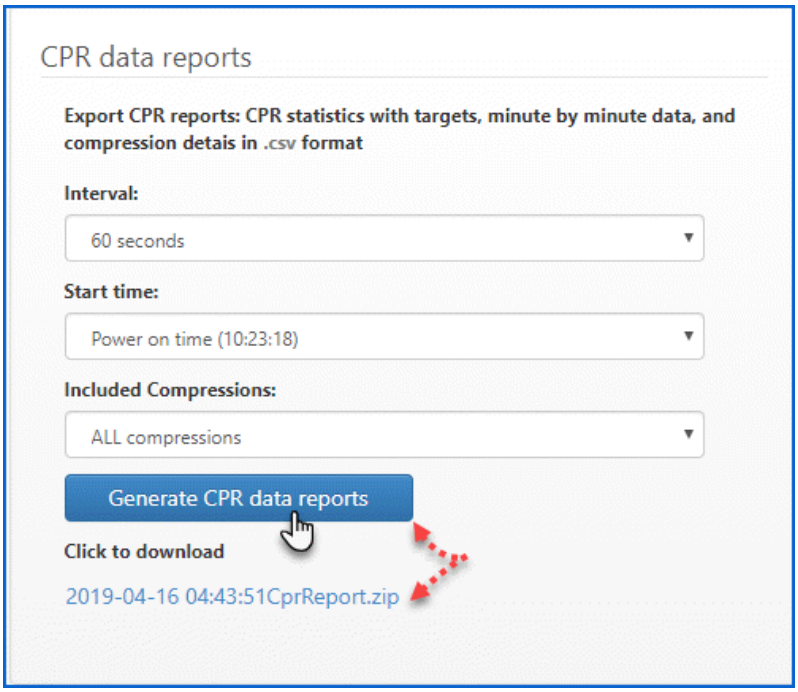


Run Reports

Reports are available from the Exports tab.

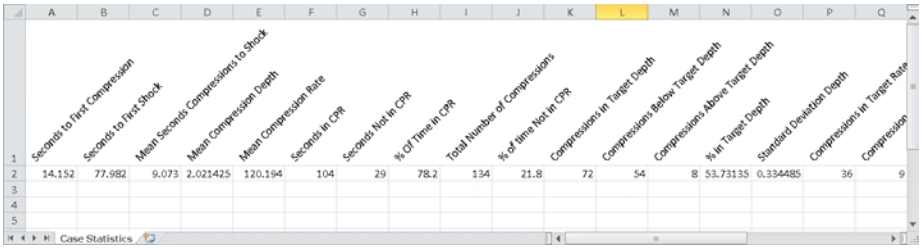
1. Click Manage Cases.
2. Click the case start time and then click the Exports tab.

CPR Data Report



1. **Interval**: Select 15, 30, or 60 seconds.
2. **Start time**: Select either power-on time, pads-on time, or Manual Start Time.
3. **Included compressions**: Include compressions in drawn CPR periods only or *all* compressions in the case
4. Click **Generate CPR Data report**. When the system generates the .zip file, it displays next to the Request CPR Data report button. Click the .zip file to download it to your computer.

CaseStatistics.csv



- Seconds to First Compression: Time between power-on time and the initial chest compression detected
- Seconds to First Shock: Time between power-on time and the first defibrillation shock delivered
- Average length of Post-shock pause (sec): Average length of all post-shock pauses

--

- Mean Compression Depth: Average chest compression depth measured by the CPR sensor
- Mean Compression Rate: Average chest compression rate (compressions/min) measured by the CPR sensor

--

- Seconds in CPR: Duration of case time in defined CPR periods
- Seconds Not in CPR: Duration of case time not in defined CPR periods

--

- % Of Time in CPR: Percentage of case time in CPR periods relative to time not in CPR
- % of time Not in CPR: Percentage of time not in CPR relative to CPR periods

--

- Total Number of Compressions: Total number of chest compressions recorded by the CPR sensor
- Compressions in target %: Percentage of compressions in both target rate and depth range (CPR Quality) for the interval

--

- Compressions in Target Depth: Total number of chest compressions within the target depth range
- Compressions Below Target Depth: Total number of chest compressions below the target depth range
- Compressions Above Target Depth: Total number of chest compressions above the target depth range
- % in Target Depth: Percentage of compressions in the target depth range
- Standard Deviation Depth: Standard deviation for chest compression depth

--

- Compressions in Target Rate: Total number of chest compressions within the target range
- Compressions Below Target Rate: Total number of chest compressions below the target range
- Compressions Above Target Rate: Total number of chest compressions above the target range
- % in Target Rate: Percentage of compressions with rate in the target range
- Standard Deviation Rate: Standard deviation for chest compression rate

--

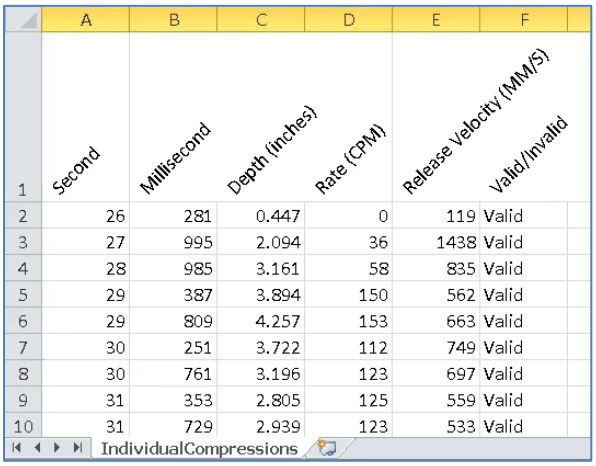
- Mean Release Velocity: Average chest compression release velocity (mm/s)

- Standard Deviation Release Velocity: Standard deviation for chest compression release velocity (mm/s)

--

- Mean EtCO2: Average end-tidal carbon dioxide (mmHg)
- Maximum EtCO2: Highest end-tidal carbon dioxide (mmHg) value
- Target Setting Compression Depth: Compression depth range used to determine compressions in target
- Target Setting Compression Rate: Compression rate range used to determine compressions in target
- Target Setting Compression Quality Percentage: Setting for minimum CPR Quality target (compressions in target %)
- Target Setting CPR Fraction Percentage: Setting for minimum Chest Compression Fraction target

IndividualCompressions.csv

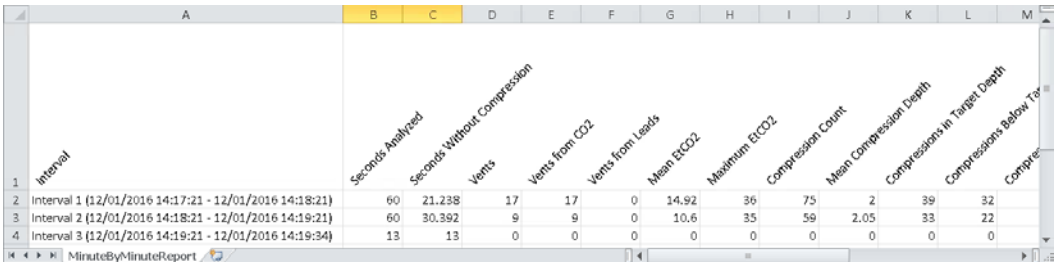


	A	B	C	D	E	F
1	Second	Millisecond	Depth (inches)	Rate (CPM)	Release Velocity (MM/S)	Valid/Invalid
2	26	281	0.447	0	119	Valid
3	27	995	2.094	36	1438	Valid
4	28	985	3.161	58	835	Valid
5	29	387	3.894	150	562	Valid
6	29	809	4.257	153	663	Valid
7	30	251	3.722	112	749	Valid
8	30	761	3.196	123	697	Valid
9	31	353	2.805	125	559	Valid
10	31	729	2.939	123	533	Valid

IndividualCompressions

- Second: Case time corresponding to individual chest compression
- Millisecond: Case time (ms) corresponding to individual chest compression
- Depth: Individual compression depth recorded
- Rate (CPM): Individual compression rate (compressions/min) recorded
- Release Velocity (MM/S): Individual compression rate (mm/s) recorded
- Valid/Invalid: Individual compression valid/invalid recorded

MinuteByMinuteReport.csv



	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Interval	Seconds Analyzed	Seconds Without Compression	Vents	Vents from CO2	Vents from Leads	Mean ETCO2	Maximum ETCO2	Compression Count	Mean Compression Depth	Compressions in Target Depth	Compressions Below Ta	Compre
2	Interval 1 (12/01/2016 14:17:21 - 12/01/2016 14:18:21)	60	21.238	17	17	0	14.92	36	75	2	39	32	
3	Interval 2 (12/01/2016 14:18:21 - 12/01/2016 14:19:21)	60	30.392	9	9	0	10.6	35	59	2.05	33	22	
4	Interval 3 (12/01/2016 14:19:21 - 12/01/2016 14:19:34)	13	13	0	0	0	0	0	0	0	0	0	

MinuteByMinuteReport

- Interval: Sequential case time 'Intervals' (15, 30 or 60 seconds)
- Seconds Analyzed: Total time for interval
- Seconds Without Compression: Total time with no chest compressions recorded for interval

--

- Vents: Number of ventilations measured for interval
- Vents from CO2: Number of ventilations measured by end-tidal carbon dioxide for interval
- Vents from Leads: Number of ventilations measured by defibrillator leads for interval

--

- Mean EtCO2: Average end-tidal carbon dioxide (mmHg) for interval
- Maximum EtCO2: Maximal end-tidal carbon dioxide (mmHg) for interval

--

- Compression Count: Total number of chest compressions recorded by the CPR sensor for interval
- Mean Compression Depth: Average chest compression depth for interval
- Compressions in Target Depth: Total number of compressions in target depth range for interval
- Compressions Below Target Depth: Total number of compressions below target depth range for interval
- Compressions Above Target Depth: Total number of compressions above target depth range for interval
- % Compressions in Target Depth: Percentage of compressions in target depth range for interval
- Standard Deviation Compression Depth: Standard deviation for chest compression depth for interval

--

- Mean Compression Rate: Average compression rate (compressions/min) for interval
- Compressions in Target Rate: Total number of compressions in target rate range for interval
- Compressions Below Target Rate: Total number of compressions below target rate range for interval

- Compressions Above Target Rate: Total number of compressions above target rate range for interval
- % Compressions in Target Rate: Percentage of compressions in target rate range for interval
- Standard Deviation Compression Rate: Standard deviation for chest compression rate for interval

--

- Compression Fraction: Percentage of time in chest compressions during defined CPR period for interval
- Compressions in Target Depth And Rate: Total number of compressions in both target rate and depth range for interval
- Percentage of Compressions in Target: Percentage of compressions in both target rate and depth range for interval; "CPR Quality" for interval

--

- Mean Release Velocity: Average chest compression release velocity (mm/s) for interval
- Standard Deviation Release Velocity: Standard deviation for release velocity (mm/s) for interval

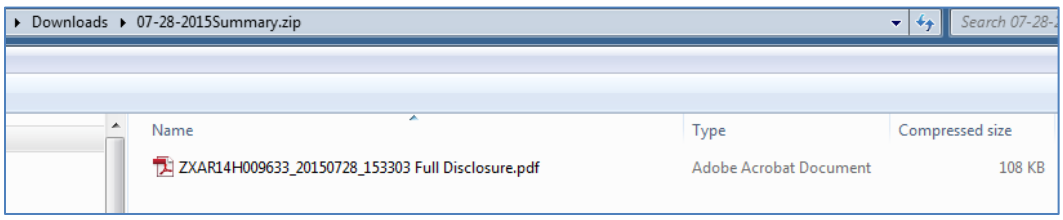
--

- Target Setting Compression Depth: Compression depth range used to determine compressions in target for interval
- Target Setting Compression Rate: Compression rate range used to determine compressions in target for interval
- Target Setting Compression Quality Percentage: Setting for minimum CPR Quality target (compressions in target %) for interval
- Target Setting CPR Fraction Percentage: Setting for minimum chest compression fraction target for interval

Export Full Disclosure Report

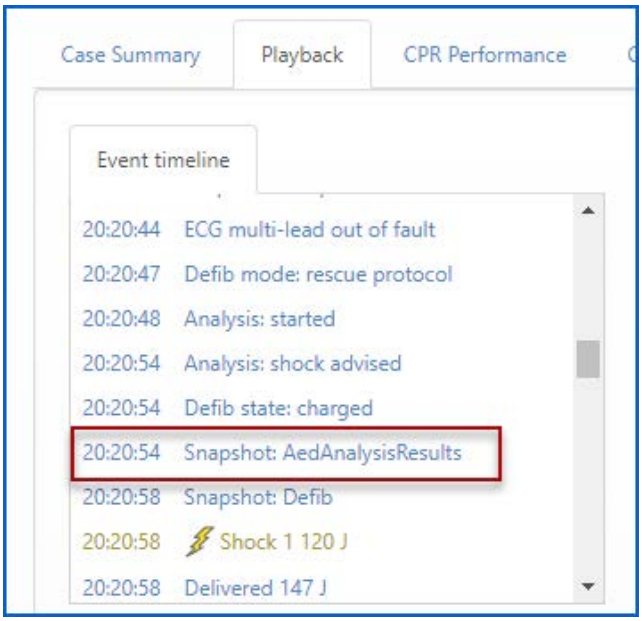
1. Click '**Request Full Disclosure Report**'.

2. The .zip file displays next to the button. Click the .zip file to download the file to your computer.

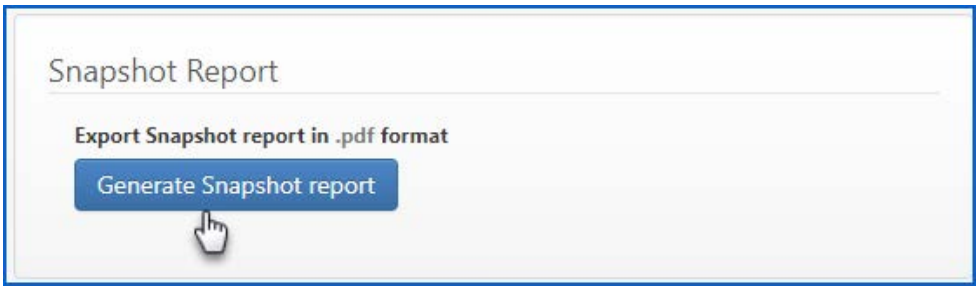


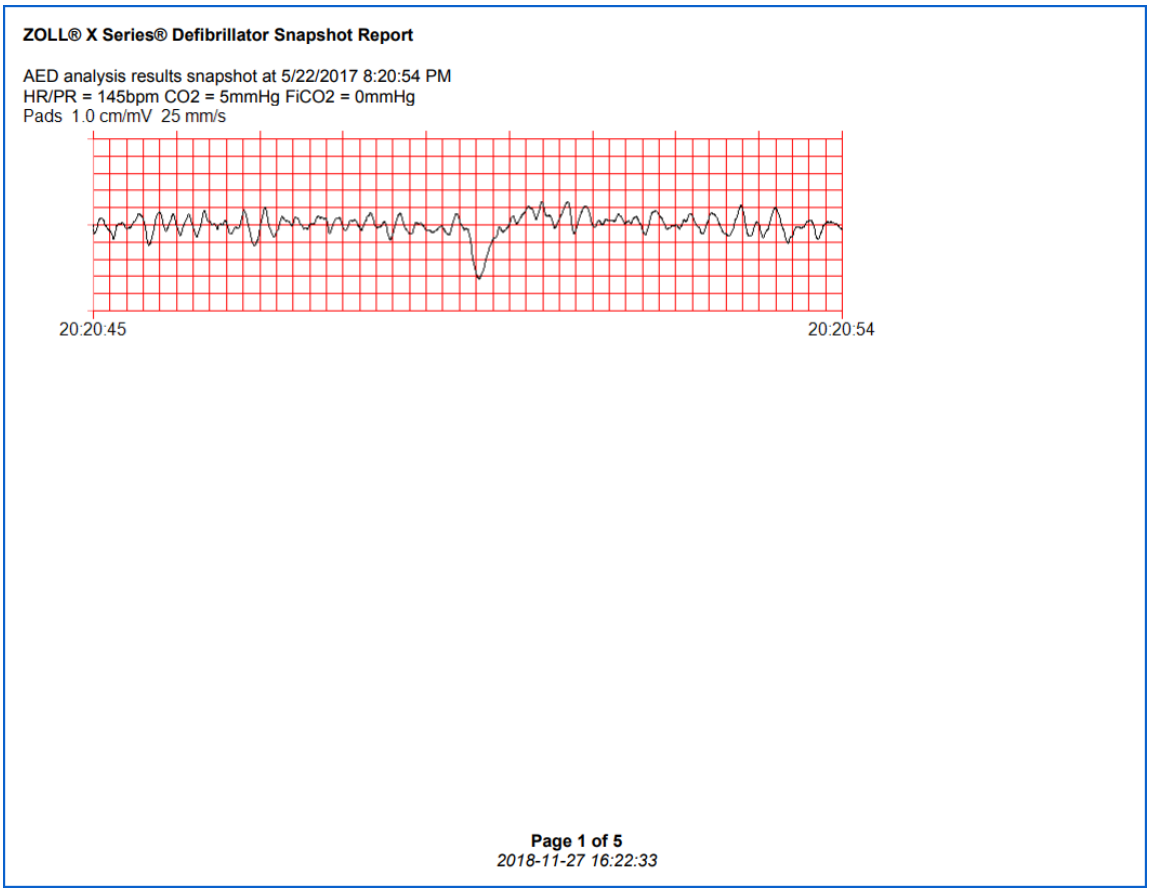
Snapshot Report

When you upload a case to ZOLL Online, CaseReview displays the snapshots recorded in the case in the 'Event timeline' on the Playback page.

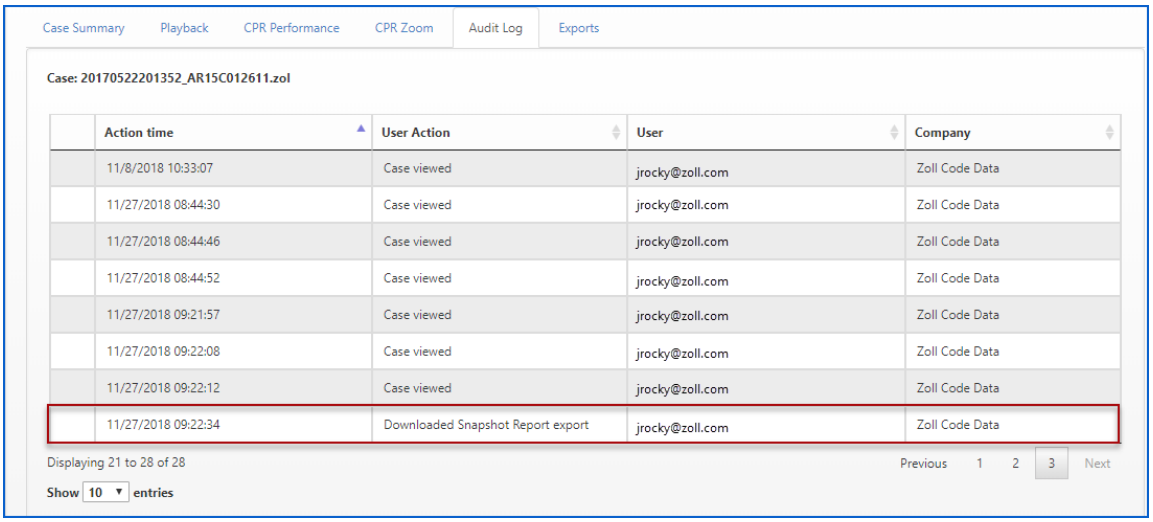


To see all the snapshots detected in the case, generate a Snapshot report.

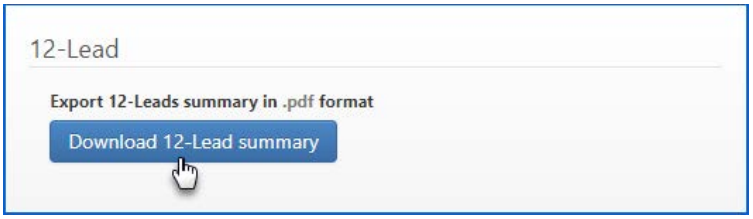


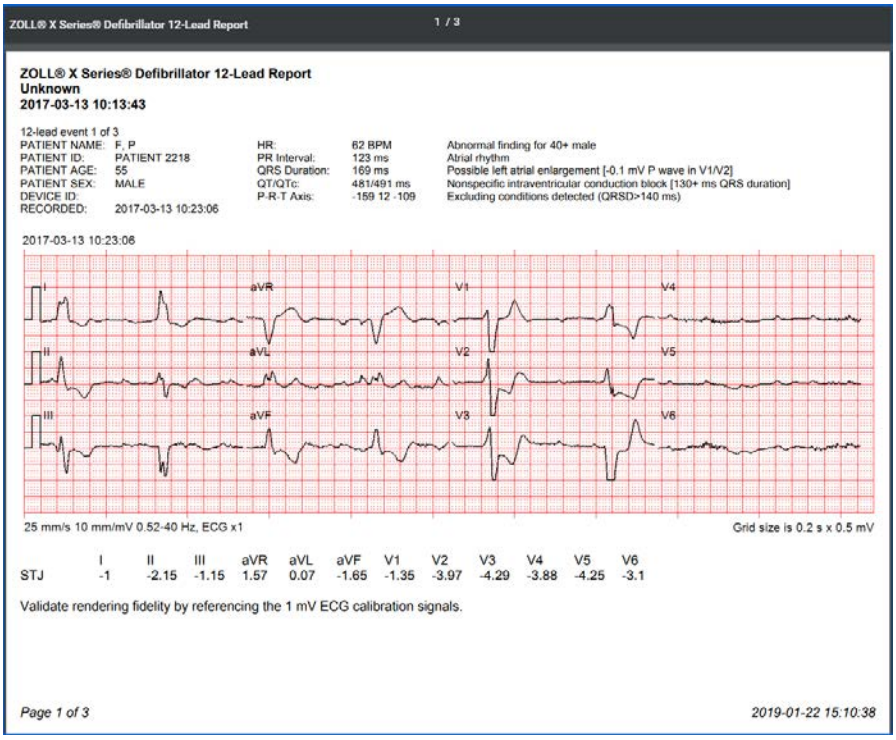


An entry in the Audit Log displays the day and time the user requested the report.



12-Lead Report



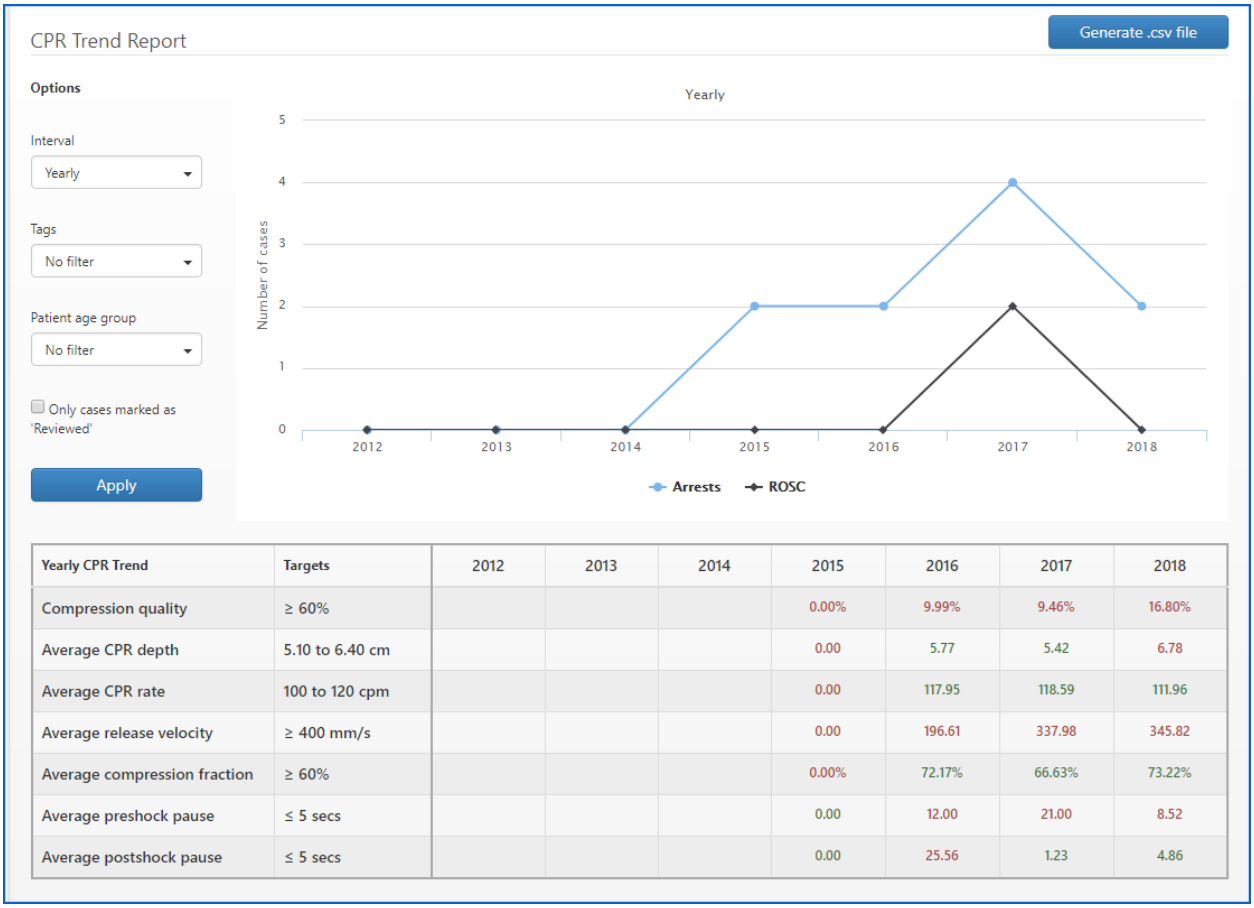


Audit Log

The Audit Log displays actions that have occurred to this case since the upload. The columns of information include the time the action happened, the action, the user that performed the action, and the name of the user's company. If a user prints or emails a .pdf of a case, the system logs that action in the audit log.

1. On the CaseReview Navigation Bar, click Manage Cases.
2. Click the case start time.
3. Click the Audit Log tab.

CPR Trend Report



Yearly CPR Trend	Targets	2012	2013	2014	2015	2016	2017	2018
Compression quality	≥ 60%				0.00%	9.99%	9.46%	16.80%
Average CPR depth	5.10 to 6.40 cm				0.00	5.77	5.42	6.78
Average CPR rate	100 to 120 cpm				0.00	117.95	118.59	111.96
Average release velocity	≥ 400 mm/s				0.00	196.61	337.98	345.82
Average compression fraction	≥ 60%				0.00%	72.17%	66.63%	73.22%
Average preshock pause	≤ 5 secs				0.00	12.00	21.00	8.52
Average postshock pause	≤ 5 secs				0.00	25.56	1.23	4.86

Each CPR Trend value in this table represent aggregate values for the cases selected by the filter options on this page.

- Target column: Targets in the Targets column are determined by your System Administrator and can be changed on the Settings page. See Settings (Administrators Only).
- Red values: Indicate that the time interval value did not meet the target as shown in the Targets column.
- Green values: Indicate that the target was met for that time interval.
- Percentages: Calculated using individual case totals to determine a daily weighted average.
- Compression quality: Percentage of selected cases that met both the depth and rate targets.
- Average CPR depth: Average compression depth determined by averaging the averages of each selected case.
- Average CPR rate: Average compression rate determined by averaging the averages of each selected case.
- Average release velocity: Average release velocity determined by averaging the averages of each selected case.
- Average compression fraction: Average chest compression fraction (CCF) determined by averaging the averages of each selected case.

- Average pre-shock pause: For the selected cases containing pre-shock pauses, this is the average pre-shock length in time for those cases.
- Average post-shock pause: For selected cases containing post-shock pauses, this is the average post-shock length in time for those cases.

Note: Changes to compression rate or depth or unit of measurement on the Settings page will cause a recalculation of data in the CPR Trend. When you see the NOTICE above the Trend table, it signifies that the system is recalculating the gray columns and they do not yet reflect current values based on the change.

It is important to note that any changes to compression rate targets or compression depth targets can take up to 24 hours or more to reflect in the CPR Trend Report.

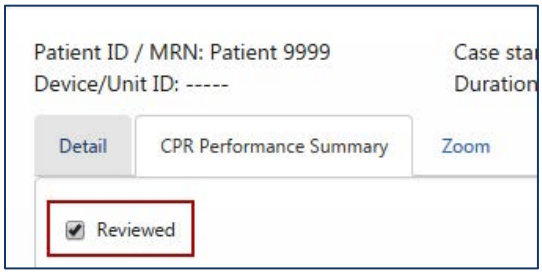
NOTICE: Case data is currently being recalculated. Completed :81 of 84. Case data is current from NOW back to 2/10/2005 5:40:21 PM.

Yearly CPR Trend	Targets	2012	2013	2014	2015	2016	2017	2018
Compression quality	≥ 60%				0.00%	9.99%	9.46%	16.80%
Average CPR depth	5.10 to 6.40 cm				0.00	5.77	5.42	6.78
Average CPR rate	100 to 120 cpm				0.00	117.95	118.59	111.96
Average release velocity	≥ 400 mm/s				0.00	196.61	337.98	345.82
Average compression fraction	≥ 60%				0.00%	72.17%	66.63%	73.22%
Average preshock pause	≤ 5 secs				0.00	12.00	21.00	8.52
Average postshock pause	≤ 5 secs				0.00	25.56	1.23	4.86

Interval Parameters

The CPR Trend report displays trends in CPR data based on interval parameters that you choose. When you click CPR Trend on the navigation bar, the system defaults the report to a monthly interval with no filters. Use the following steps to change the interval and apply filters:

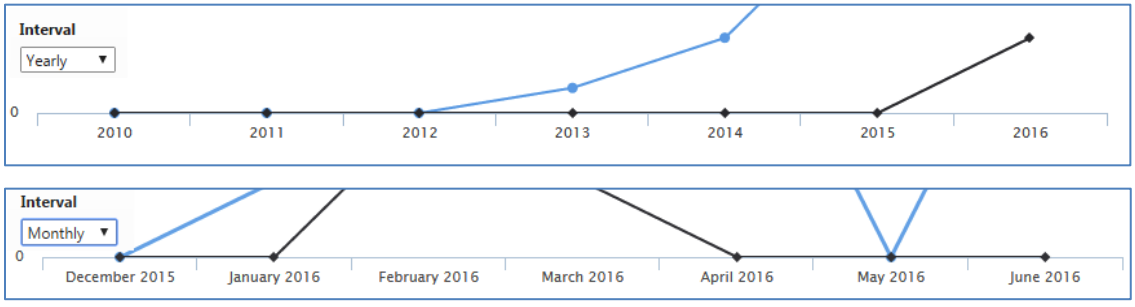
1. Select an interval from the drop-down list. Choose daily, weekly, monthly, quarterly, or yearly.
2. **Filters**:
    a. **Tags**: Select one or more tags to show trend data from the cases with those tags applied to them.
    b. **Patient age group**: Choose adult, pediatric, infant, or any combination of the three.
    c. **Only cases marked as reviewed**: Check this box to show only trend data from cases marked "Reviewed" on the CPR Performance Summary.



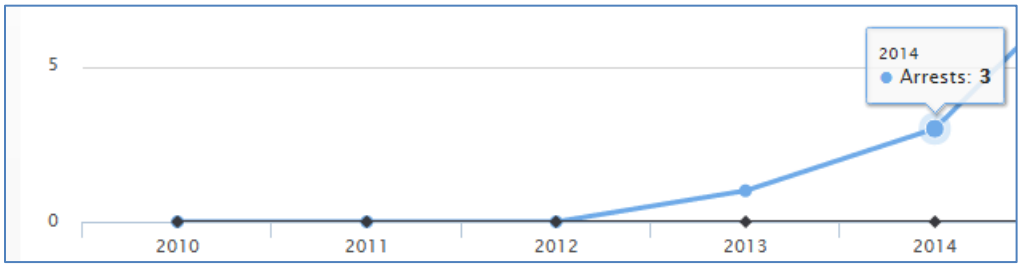
3. Click '**Apply**'.

The graph displays the arrests and ROSC trends. Mouse over a point in the graph to see the point value.

The horizontal bar represents the chosen interval:



The vertical bars represent the number of arrests and ROSC.



The table displays trend data for CPR quality. Your administrator sets the target ranges for quality metrics shown in the table on the Settings page. The system highlights the values in green to show the number of cases that fell within acceptable target range and red for the number of cases that fell within the unacceptable target range.

The acceptable target for the:

- Average CPR Depth chart is 2 – 2.4 inches
- CPR Rate chart is 100 to 120 cpm
- CPR Fraction chart is 60% or higher

Generate .csv File

Click 'Generate .csv file' to download the CPR Trend report onto your computer.

The report must contain at least one case. If you have less than one case, adjust the filter options to expand your results.

The .csv file is limited to 1000 cases. If you have more than 1000 cases, adjust the filter options to narrow your results.

When the report is generated, you will see the file name display next to the generate button.

The report will contain the following information:

- Seconds to first compression
- Seconds to first shock
- Mean seconds compression to shock
- Mean compression depth and rate
- Man release velocity
- Standard deviation release velocity
- Mean and maximum EtCO2
- Seconds in CPR and not in CPR
- Percent of time in CPR and not in CPR
- Percent in target depth, rate, and standard deviation depth
- Total number of compressions and percent compressions in target
- Compressions in, below, and above target depth
- Compressions in, below, and above target rate
- Standard deviation rate
- Target setting compression depth, rate, and quality percentage
- Target setting CPR fraction percentage

Settings (Administrators only)

Settings displays on the CaseReview Navigation Bar if you have administrative privileges. Use the Settings page to change range values, assign/unassign user permissions, download the CaseReview Importer tool, and create a new data access key.

The system comes pre-configured with compression rate, compression depth, and Auto CPR pause detection values. Administrators can change the value of the compression target for adults and the measurements from inches to cm.

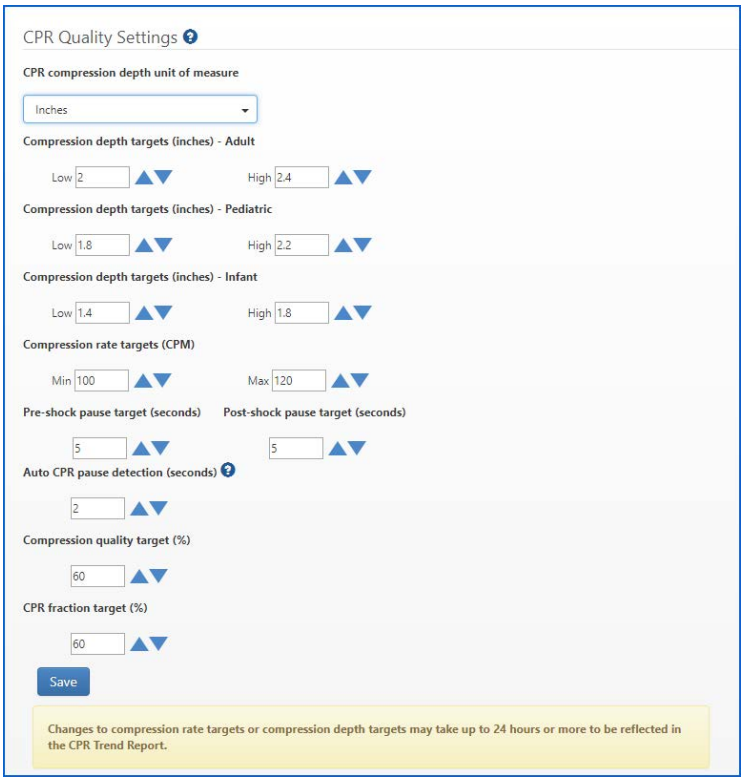
CPR Quality Settings

Administrators can change the CPR Quality Settings to match those accepted by their company. These values determine whether the system displays a compress rate or depth in an acceptable range on the CPR Performance page.

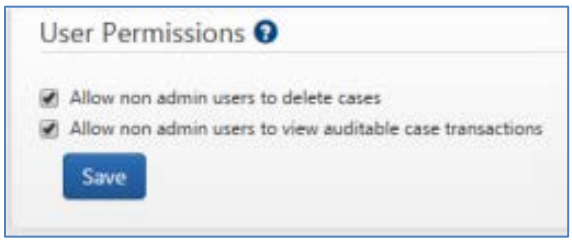
The system comes pre-configured with compression rate, compression depth, and Auto CPR pause detection values. The Auto CPR pause detection value is the minimum pause length in seconds that CaseReview will automatically mark as a pause period.

The "Pre-shock pause target (seconds)" value displays the target value for the maximum length of pre-shock pause averages on the CPR Trend page.

The "Post-shock pause target (seconds)" value displays target values for the maximum length of post-shock pause averages on the CPR Trend page.



Granting Permissions to Standard Users

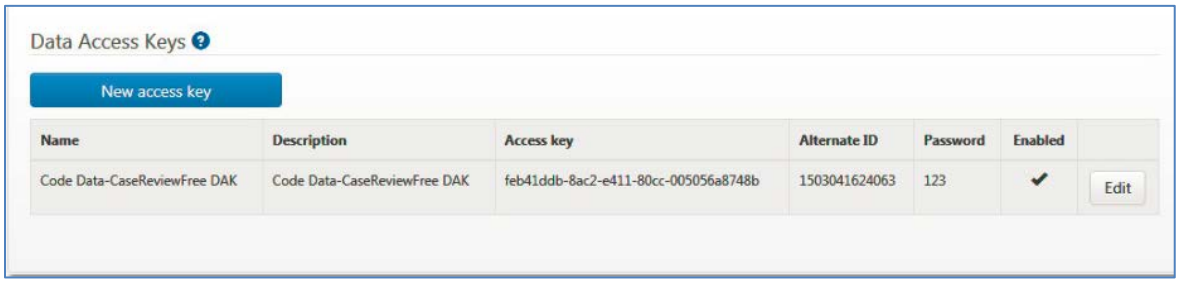


This section gives additional privileges to Standard Users:

- Ability to delete cases.
- Ability to view auditable case transactions by clicking the Audit Log on the Case Details page.

Data Access Keys

Use this section to create Data Access Keys (DAK) to connect other products to CaseReview such as RescueNet Code Review and CaseReview Importer.



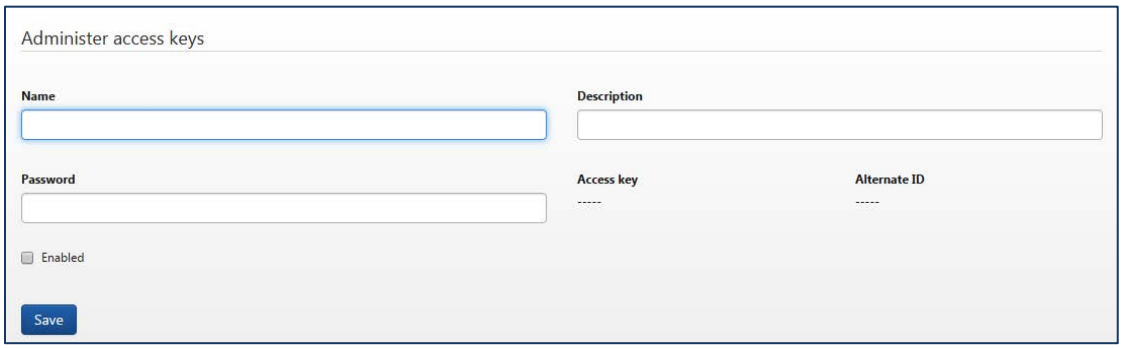
You can enable/disable a DAK. When you disable a DAK you deny the connection access to CaseReview. While you can enable/disable a DAK, you cannot delete one.

ZOLL recommends that you create DAKs for different applications. This gives you the flexibility to create a DAK for future use or to temporarily disable a DAK for a period of time. For example, if you configured a DAK for a Cloud2Cloud PCR partner and another for X Series, you could disable access for the Cloud2Cloud PCR partner at any time while still allowing X Series defibrillators to submit data to the system.

Note: DAK passwords can be numeric only.

To create a new DAK:

1. Click '**New Access Key**'.

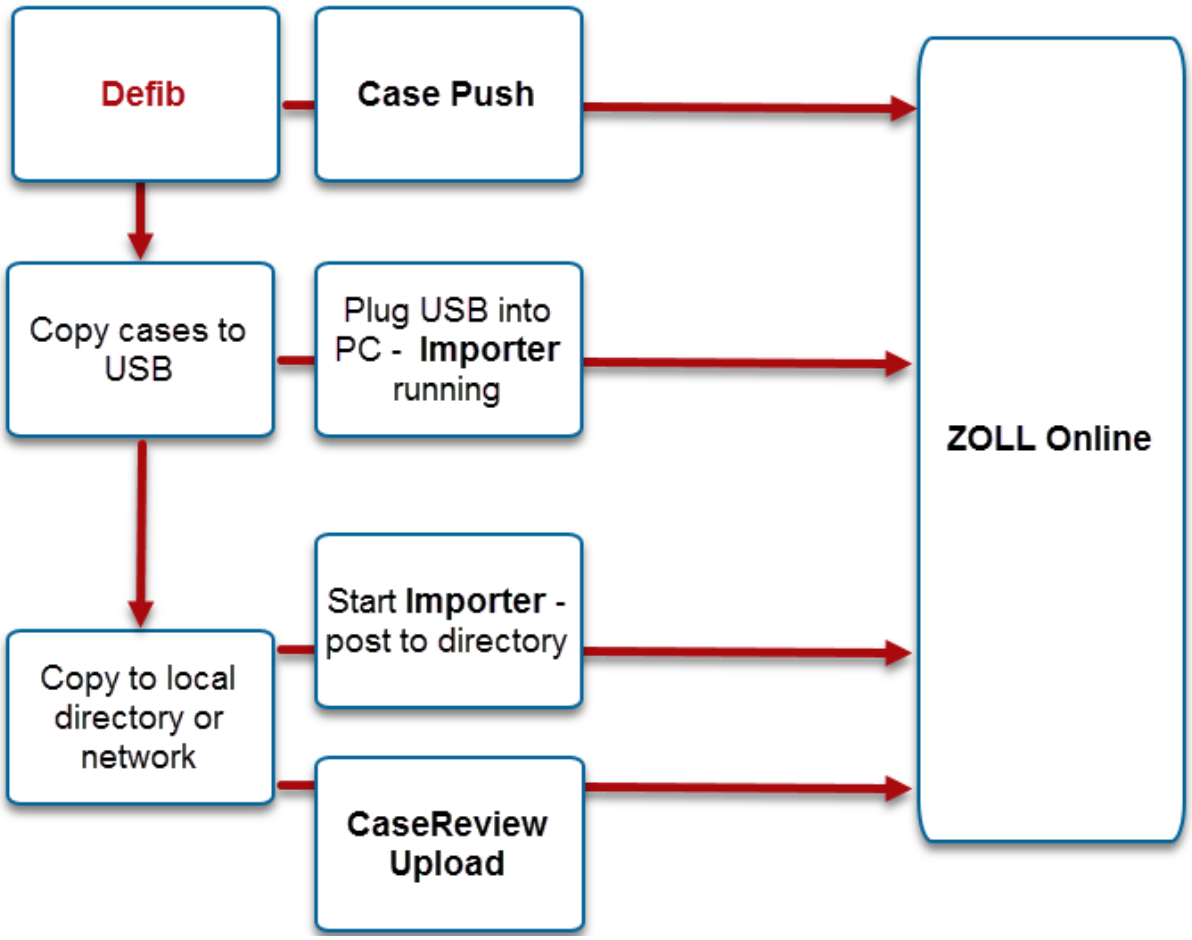


2. On the 'Administer Access Keys' page, enter the name, description, and password for the DAK.
3. **Enabled**: Check the Enabled box. The system allows you to disable or enable a DAK at any time. This gives you the flexibility to create a DAK for future use or to temporarily disable a DAK that is currently not needed.
4. Click '**Save**'. The new DAK displays in the DAK list.

How to Import Cases into ZOLL Online

You can use several ways to import cases into ZOLL Online:

- Case Push: This is a manual process users perform at the defib. Users can push up to 15 cases at one time to ZOLL Online.
- CaseReview Importer: This tool can be used to retrieve cases from the ZOLL E and X Series, USB, or file system.
- Upload cases: Use the upload functionality in CaseReview to upload one or more cases.



How to Use Case Push

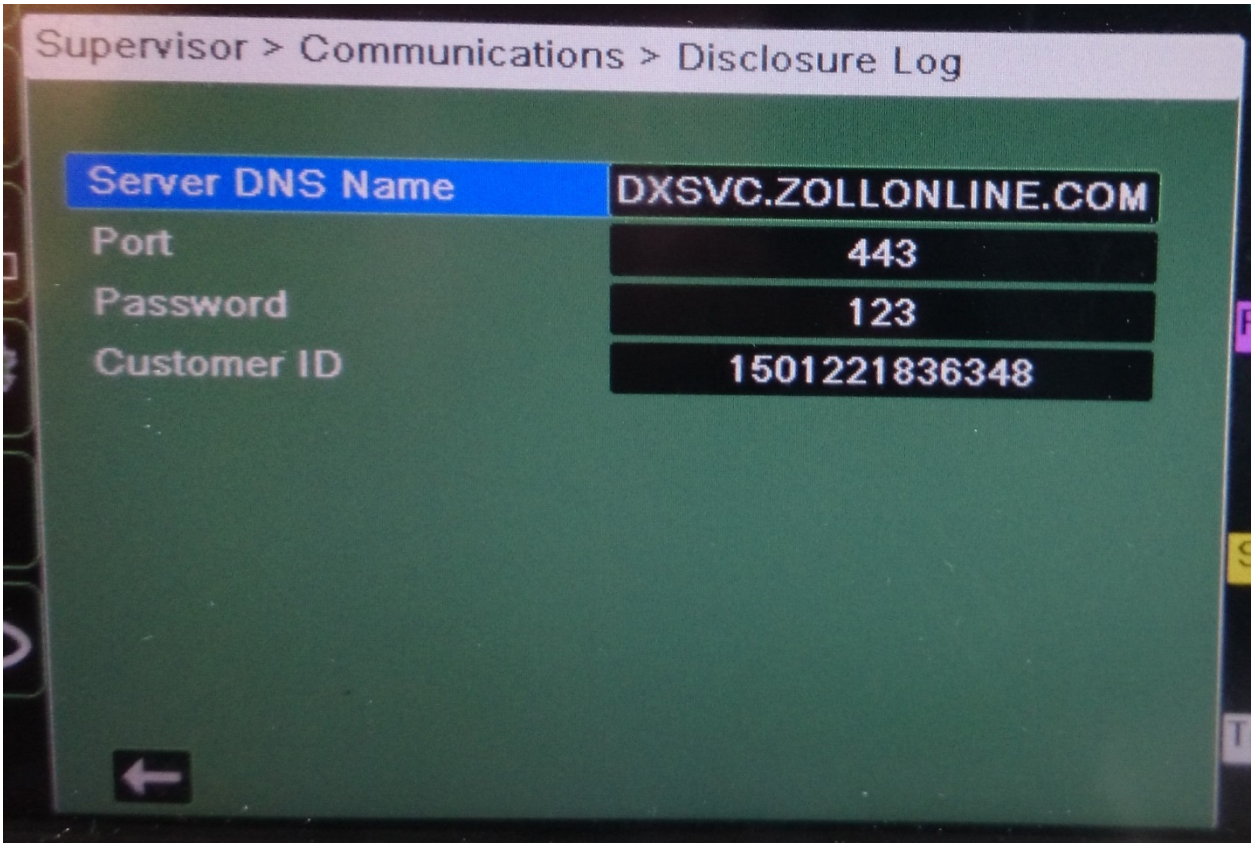
ZOLL devices can push cases directly to the CaseReview server. Use the following instructions to perform a case push for your specific device type.

R Series

1. Go to **Supervisor Mode** > **WiFi**
2. Press **Read from Card**
3. Configure as follows:
    a. **Use Hostname**: Enter **Yes**
    b. **Server Servername (Full Disclosure):** Enter your Server DNS name. If you do not know the name, contact your IT department.
    c. **Server Port (Full Disclosure)**: Enter **444** or your DXS server port.
    d. **Username (full Disclosure)**: Enter **DAK Alternate ID**
    e. **Password (Full Disclosure)**: Enter **DAK password**
    f. Edit Network Profile I
        i. **SSID**: Enter your **SSID**
        ii. **Security Key**: Enter your **security key**
    g. Continue pushing the '**Next item**' button until 'Save to WiFi Card' displays
    h. Select **Save to WiFi Card**
    i. After save completes, push **Category List**
    j. Push **Main Menu**
    k. Push **Exit Config**
    l. The highlighted option is set to **Save Changes and Exit** – push **Enter**
    m. After saving is complete, set the option for **Save Changes to Card** to **No** and push **Enter**
    n. Power off the R Series
4. Wait several seconds and turn the R Series back on
5. If not already configured, set Defib to **Manual mode** and **Confirm**
6. Select **Report Data**, then 'Transfer Mode, then 'Report to Wi-Fi'
7. Push **Send Report** and wait until you see 100%. The cases are now uploaded to the server.

X Series

1. Go to **Supervisor>Communication>Disclosure Log**
2. Configure as follows:
    a. **Server DNS Name**: Enter your **Server DNS name**. If you do not know the name, contact your IT department.
    b. **Port**: Enter Enter 444 or your DXS server port.
    c. **On CaseReview > Settings page**: Create a Data Access Key (DAK) in CaseReview
    d. **On the X Series**: Enter the DAK password and alternate ID in the Password and Customer ID fields



AED 3

1. Press and hold the power button to start in Configuration mode. Stop pressing when the ZOLL name displays.
2. Select the blue tools (gears) icon .
3. Select the orange (lock) icon .
4. Enter the supervisor passcode and click **OK**.
5. Select the blue WiFi setup icon .
6. Select IT Setup (Quick Setup or IT Setup).
7. Clinical Archive WiFi Settings:
    a. Select the left icon (three connected computers).
    b. Ensure that DHCP is in the ON setting.
    c. Select the middle icon (Stacked computers with a cloud in the background).

    Mode: URL (IP or URL)

    Address: Enter your **Server DNS name**. If you do not know the name, contact your IT department.

    Port: Enter: **444** or your DXS server port.

    User ID: **enter User ID or DAK**

    Passcode: **enter password**

    Select **Save**

    c. Select the right icon (page with person in upper left).

    Profile Settings:

    Network (SSID):

    Hidden SSID: **OFF (On or OFF)**

    Authentication: **PSK (PSK/PEAP/TLS)**

    Password (Pre-Shared Key)

    Select **Save**

    d. Power the AED off.
8. Click **Test WiFi button**.
9. Press and hold the power button to start in setup mode. You can stop pressing when the ZOLL name appears.
10. Select the blue tools (gears) icon to view the Configuration Menu.
11. Select the green icon to view the Export Files menu.
12. Select **Clinical Archives** (all) and then select **Send** (WiFi).

A progress update message displays the status of the transfer.

13. When the transfer is complete, click **OK**.

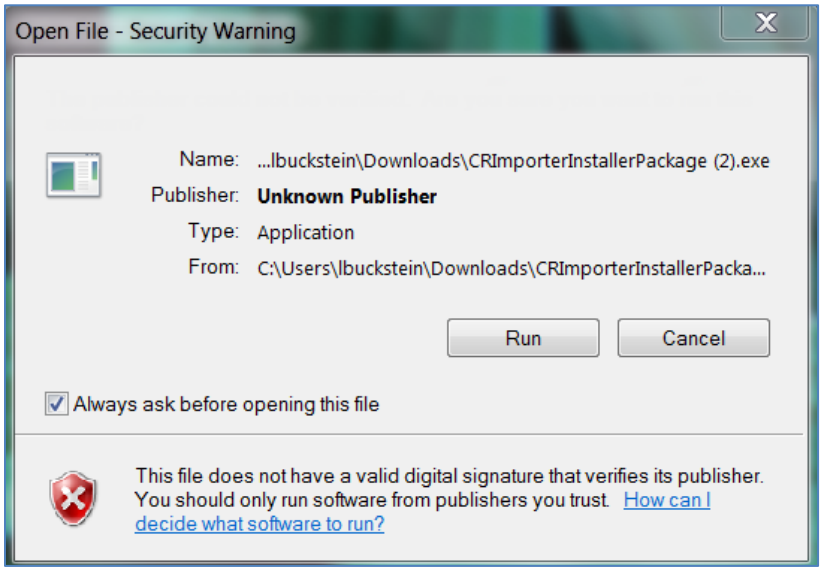
CaseReview Importer

Use CaseReview Importer to retrieve cases from the ZOLL E, R, and X Series defibrillators, a USB, or a file system.

Install CaseReview Importer

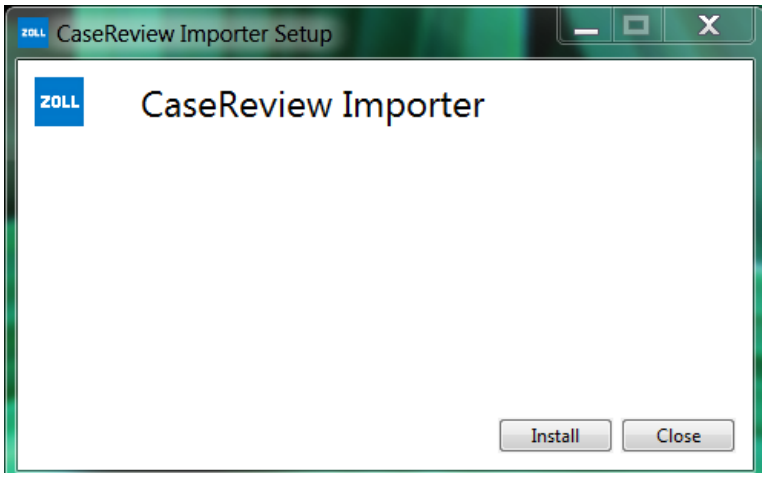
1. On the CaseReview Navigation Bar, click '**Settings**'.
2. Click '**Download Application**'.

3. The system downloads an executable file to your PC. Double-click to open the executable.

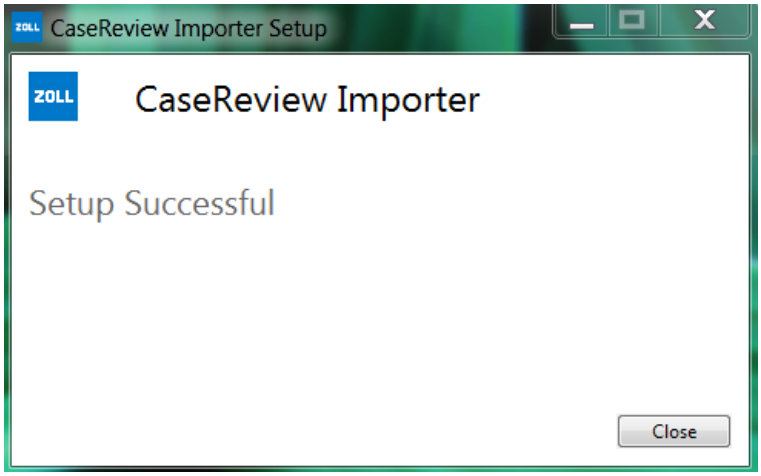


4. Click '**Run**'.

5. In the CaseReview Importer Setup window, click '**Install**'.



6. When setup is complete, you will see the following window:



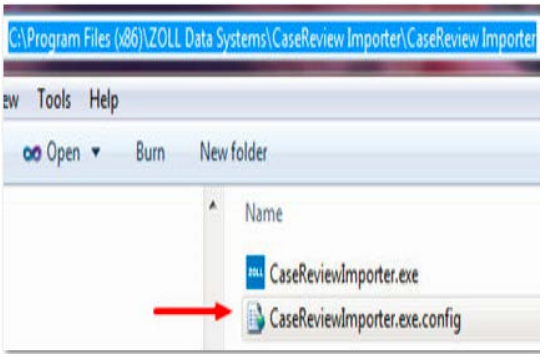
7. For easy access, you may want to display a CaseReview icon on your desktop. To make an icon, click '**Start**' and right-click on **CaseReview Importer**. Keep your mouse button down and drag your mouse to your desktop. Release your mouse button.

   When you minimize CaseReview Importer, the system displays it in your system tray.

Configuring CaseReview Importer

1. Find the CaseReviewImporter.exe.config file on the server where CaseReview Importer is intalled. The default location is C:\Program Files (x86)\ZOLL Data Systems\CaseReview Importer\CaseReview Importer.

2. Open CaseReviewImporter.exe.config with a text editor.



3. Update the <appSettings>key="GemstoneWebApiServiceUri" value to your Hostname or IP address and save the file.

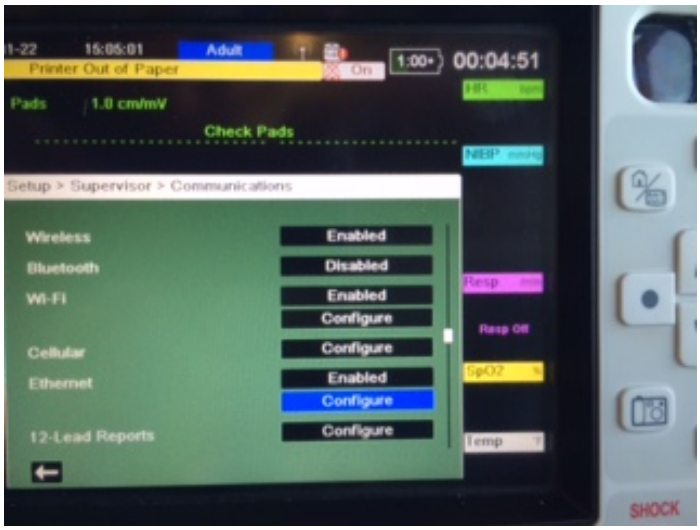
Note: The default port in Internet Information Services (IIS) Manager for CaseReview WebAPI is 8895. If this port was changed, contact your IT department to determine the correct port number to use.

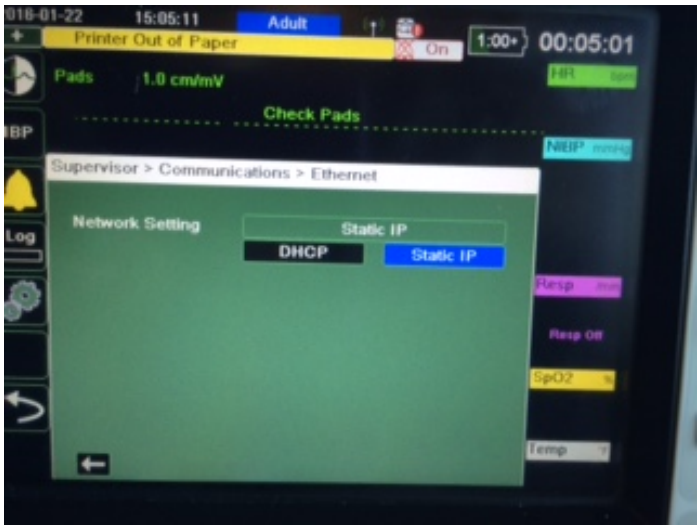
Static IP Address – Setup the X Series

Use the following steps to configure CaseReview Importer with a static IP address.

Setup the X Series

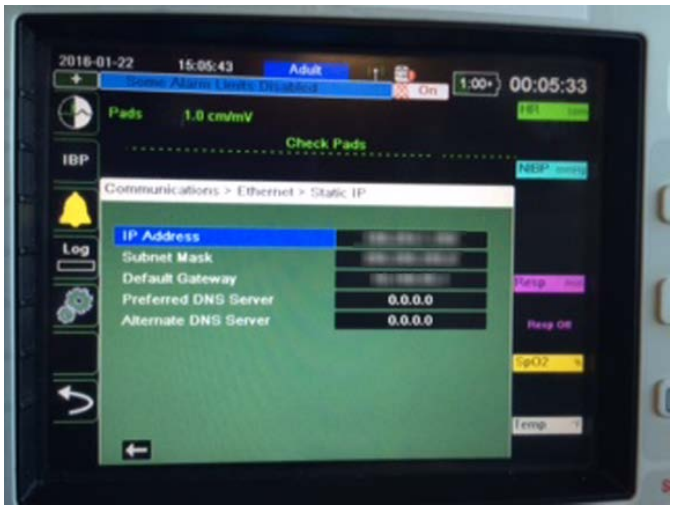
1. Obtain an Ethernet to USB cable.
2. Plug the USB side of the cable to the X Series and the other side to your computer.
3. Power on the X Series.
4. Go to **Setup** > **Supervisor** > **Communications** > **Wireless** and change setting to **Disable Wireless**.
5. Go to **Ethernet** > **Configure** and change setting to **Setup Static IP**.





11802 Ridge Parkway, Suite 400
Broomfield, CO 80021 U.S.A
Tel: (303) 801- 0000
Latest docs: www.zolldata.com

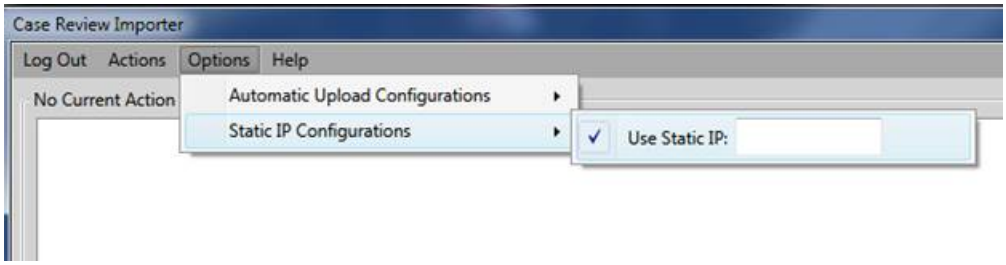
6. Enter you Static IP address info.



7. Save your changes.
8. You may have to wait one to two minutes until the communication shows that the Ethernet is connected (three green boxes).
9. Go back to **Supervisor** > **Communication** and find the IP address for Ethernet.

CaseReview Importer Static IP Settings

1. Launch CaseReview Importer and login with a valid DAK key/alternate ID and password.
2. Go to **Options** > **Static IP Configuration** and enter your Ethernet IP address from the X Series.



3. Click '**Get Cases**'.

Note: The system marks 'Previously Uploaded' on cases that were already uploaded.

4. Select cases and click '**Upload**'.
5. The Output Log displays uploaded messages.

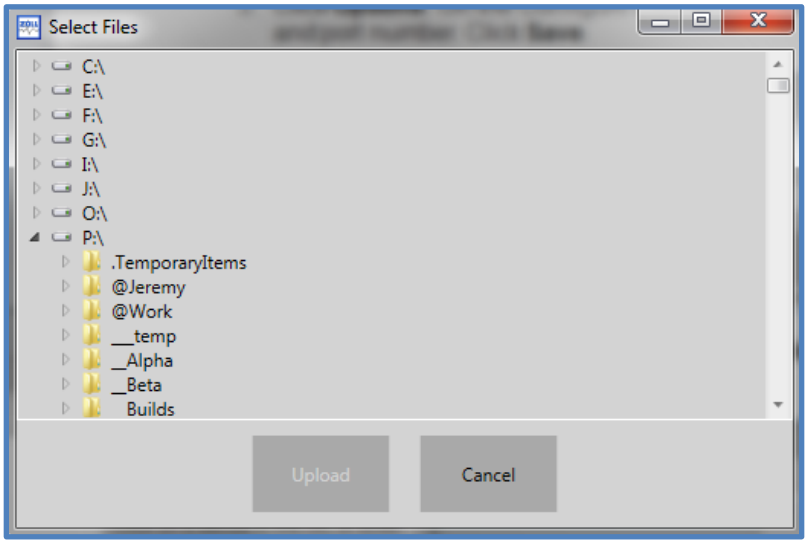
Using CaseReview Importer

After you configure your system, you can elect to upload cases from a location on your network, enter an IP address of a ZOLL E, R, or X Series defibrillator, or click **Discover** to find available devices.

Your network

1. Click '**Actions** > **Upload Cases from File System**'. A window opens with the locations on your network.

Important! When you upload cases using CaseReview Importer, there should be no more than 30 files at a time in the directory.

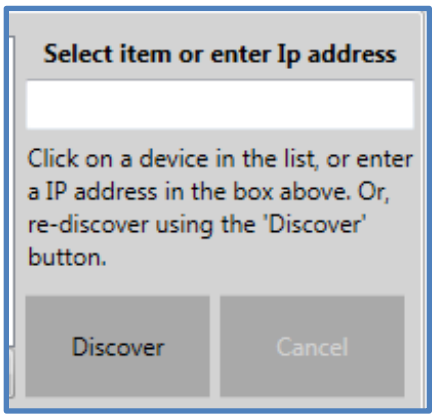


2. Select the location on which the files reside.

3. Click '**Upload**'. The Importer will inform you when the transfer is completed.

IP address

1. Enter the IP address in the field.



2. Click '**Discover**'. The system displays the cases that reside on the specified X Series.
3. Select the cases you wish to upload.
4. Click '**Upload**'.

X Series devices

1. Click '**Discover**' to find all available devices on your network.
2. The system displays a list of devices in the Output Log.
3. Select the device.
4. Select the cases you want to upload.
5. Click '**Upload**'.

Using RescueNet Code Review with CaseReview

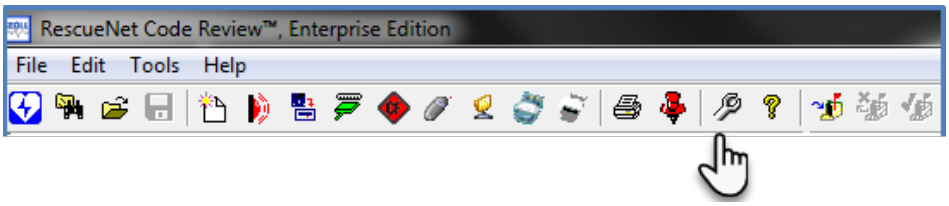
You can use CaseReview In-Premise to annotate CPR periods, pause periods, and add/edit ROSC.

Connect Code Review to CaseReview

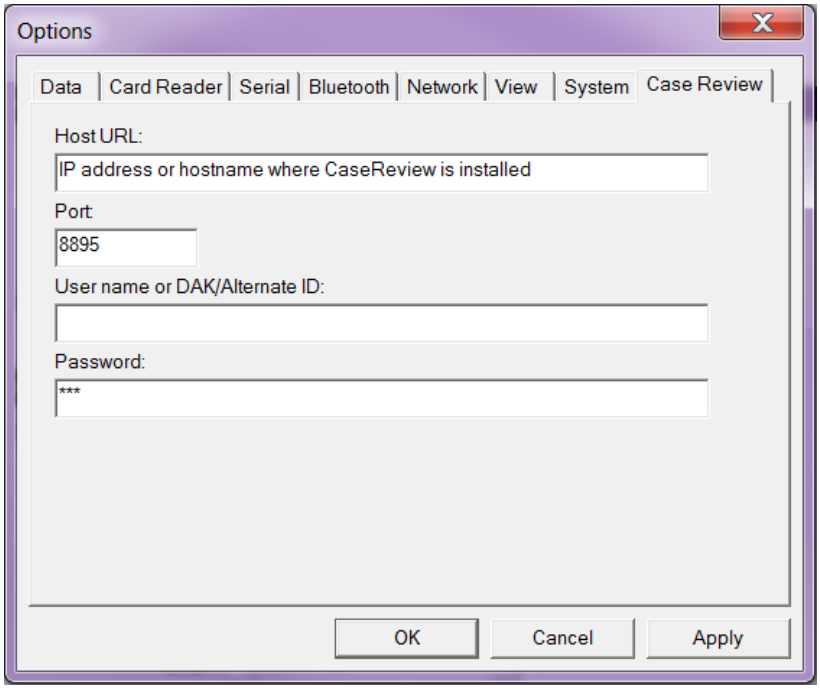
Use the following instructions to connect RescueNet Code Review to CaseReview for searching and annotation of CPR periods and pause periods relating to one more cases.

Configure Code Review

1. In Code Review, click '**Options**'.



2. On the Options window, click the CaseReview tab.



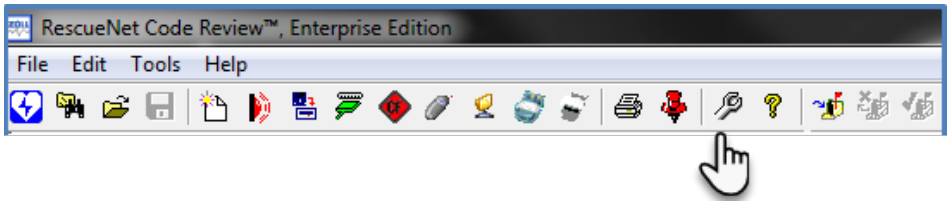
3. **Host URL**: The Host URL is the IP address or hostname of the machine on which CaseReview is installed.
4. **Port**: By default, the port setting is 8895. Verify this port setting with your IT department before proceeding.
5. **Username or DAK/Alternate ID and Password**: Enter your Alternate ID and password from the Data Access Keys section of the Settings page in CaseReview.

6. Click **Apply**.

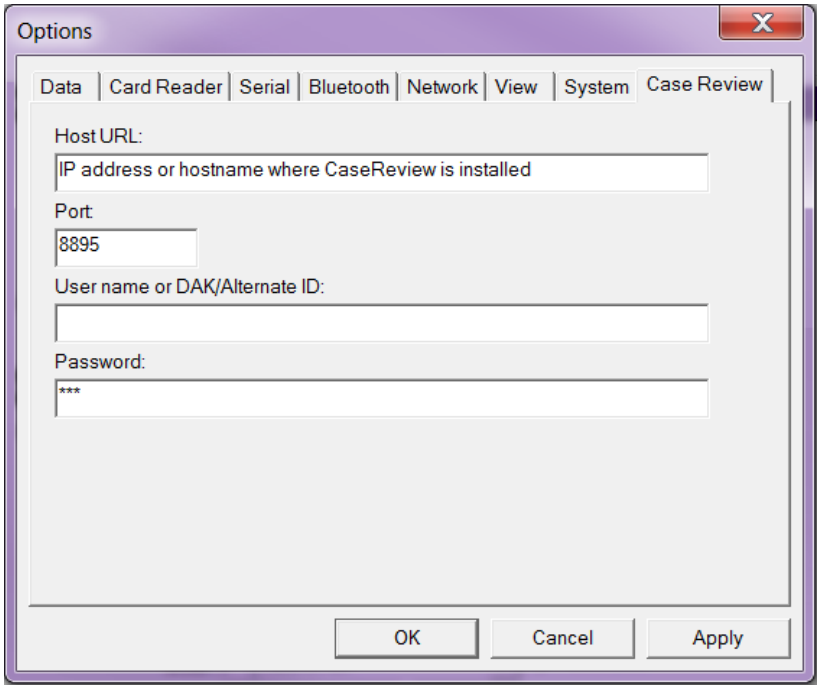
Search Cases Using Code Review

Use the following instructions to search a file from CaseReview to RescueNet Code Review for annotation of CPR periods and pause periods relating to one or more cases.

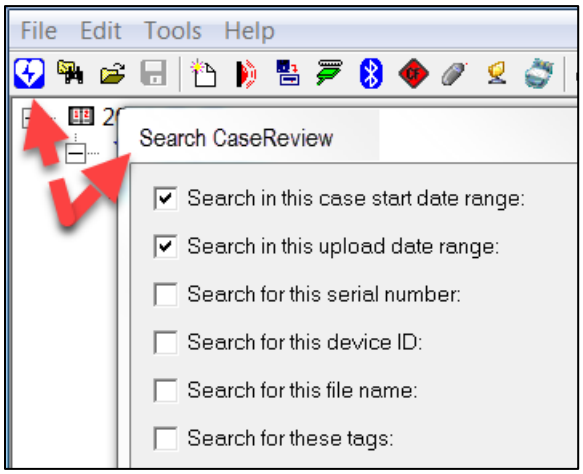
1. In Code Review, click '**Options**'.



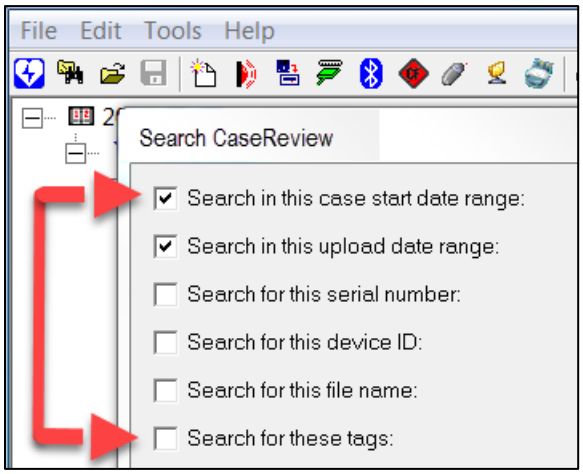
2. On the Options window, click the CaseReview tab.



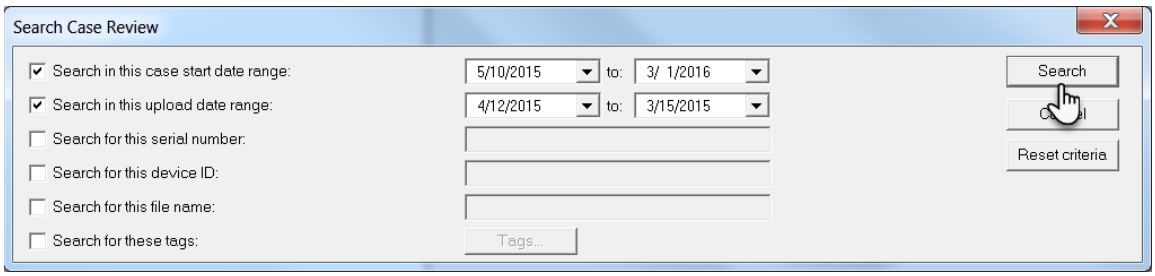
3. **Username or DAK/Alternate ID and Password**: Enter your Alternate ID and password from the Data Access Keys section of the Settings page in CaseReview.
4. Click **Apply**.
5. Click the CaseReview icon to open the Search CaseReview window.



6. Select your search criteria.

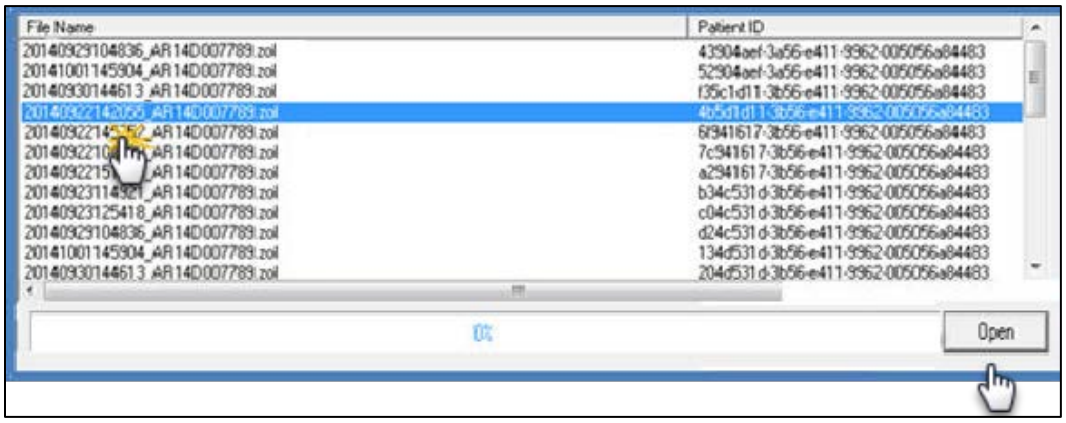


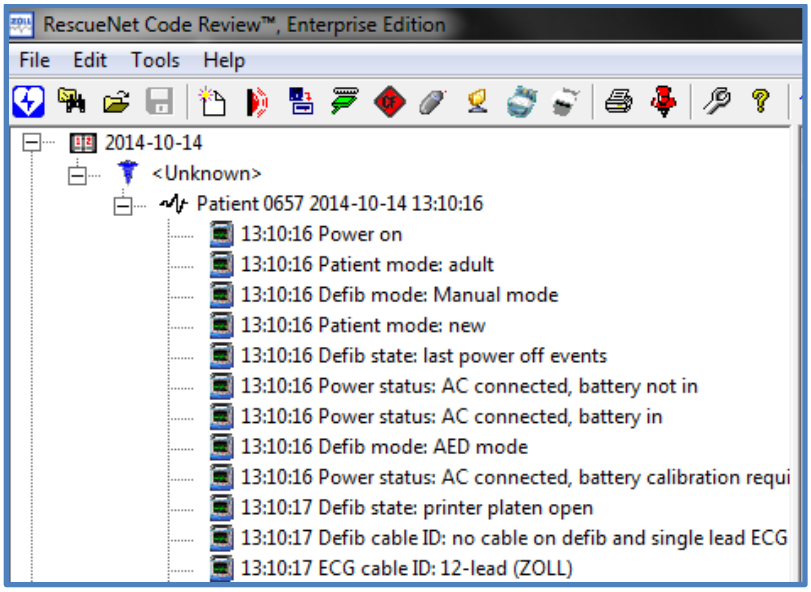
7. Click '**Search**'.



Note: The maximum number of cases returned for this search window is 1000. ZOLL recommends that you enter as many options as you can to narrow the search result to a manageable number.

8. Click on a case to open it. You can use shift + click to select one. Once you have selected a case, click '**Open**'.


File Name
Patient ID
Open


RescueNet Code Review™, Enterprise Edition
File Edit Tools Help
2014-10-14
<Unknown>
Patient 0657 2014-10-14 13:10:16
13:10:16 Power on
13:10:16 Patient mode: adult
13:10:16 Defib mode: Manual mode
13:10:16 Patient mode: new
13:10:16 Defib state: last power off events
13:10:16 Power status: AC connected, battery not in
13:10:16 Power status: AC connected, battery in
13:10:16 Defib mode: AED mode
13:10:16 Power status: AC connected, battery calibration requi
13:10:17 Defib state: printer platen open
13:10:17 Defib cable ID: no cable on defib and single lead ECG
13:10:17 ECG cable ID: 12-lead (ZOLL)