Diversatek™
Healthcare

ZepHr® *Guide*

Reflux Analysis Guide

ZepHr®

Diversatek
Healthcare
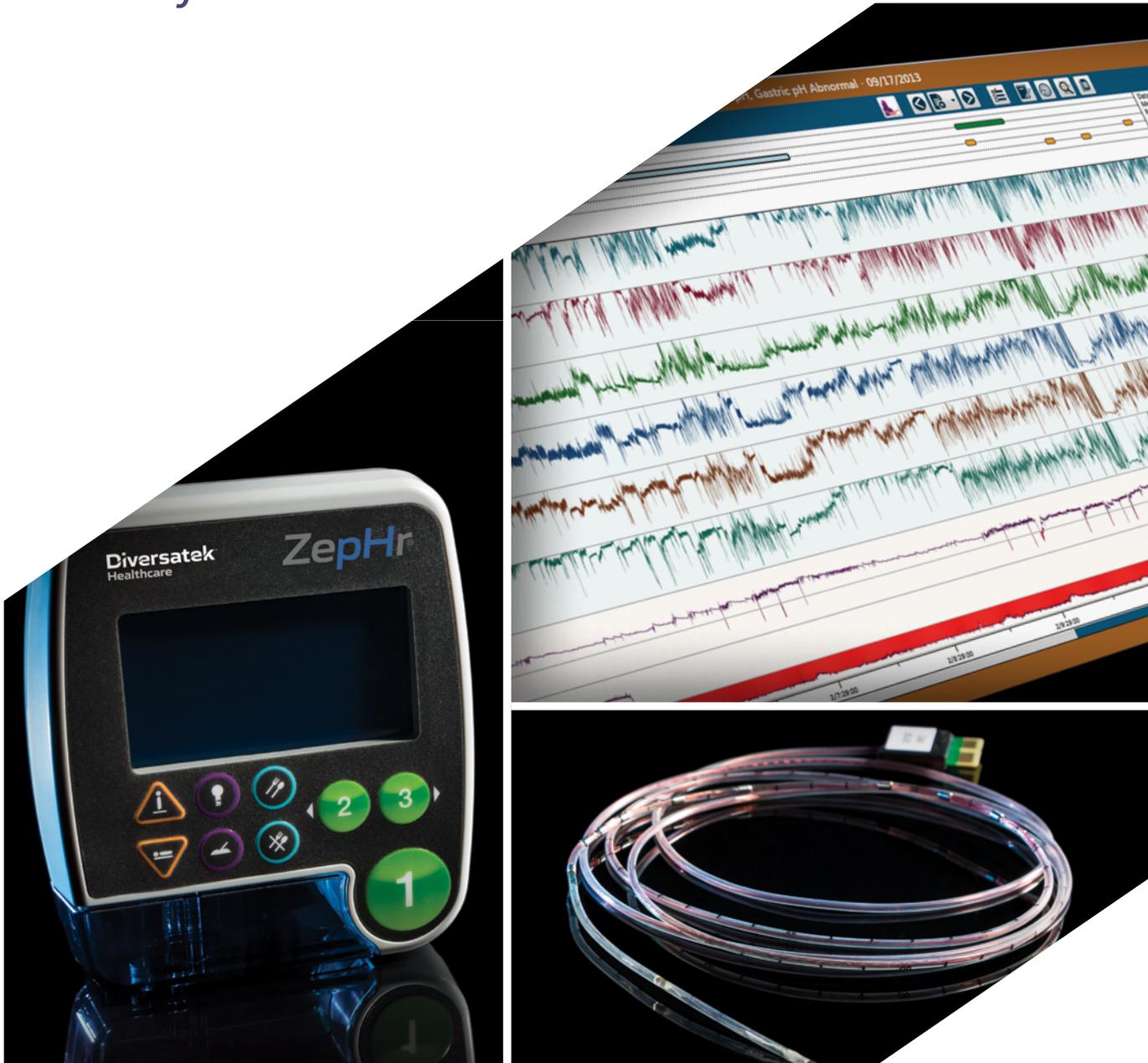
Table of Contents

Select a Study

Double click on the Zvu icon to open the Zvu® application.
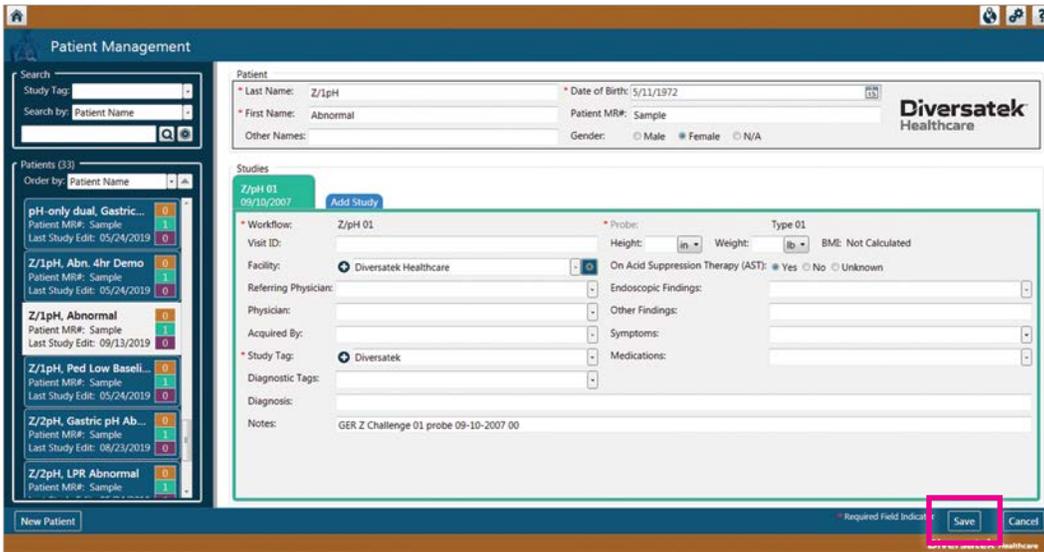
Open the Study in **Patient Management**. Review and correct patient information as needed. Click **Save**.

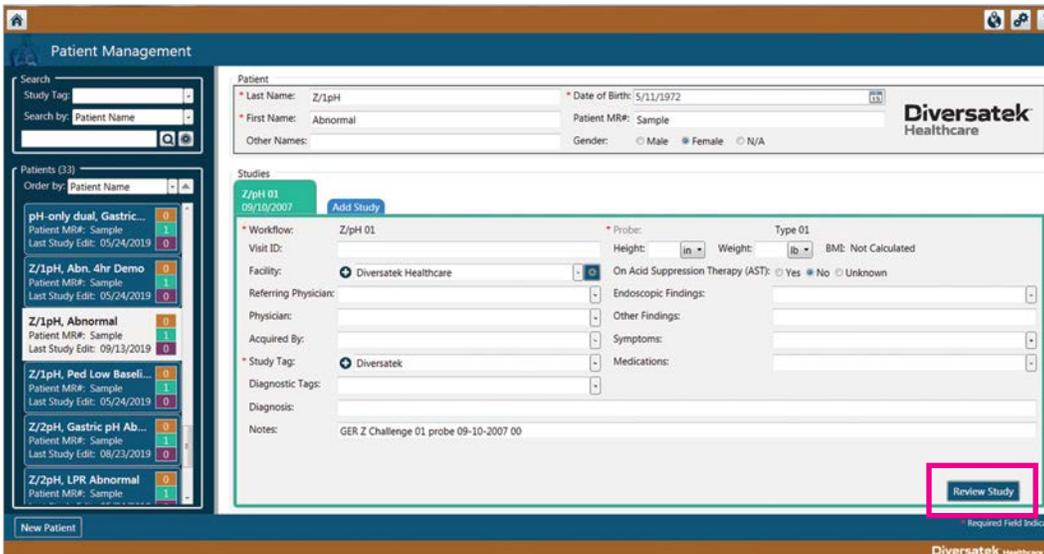Once all corrections have been saved, the **Review Study** button will become active. Click **Review Study** to open the study.

| Select a Study | Review and Correct Annotations | Run AutoSCAN | Review Study | Create Report | Help |

Select a Study

Stacked View (Default View)

The study data will open in a Stacked View with all impedance wareforms stacked together and the pH separated above or below the impedance sensors.

The impedance area (Z channels) are lightly shaded in green and the pH channel(s) are lightly shaded in pink. Additionally the pH channels are filled in red at any point the pH drops below a value of 4.0.


Hide/Show Impedance Contour

Annotation Area

Impedance

Distal esophageal pH

Gastric pH
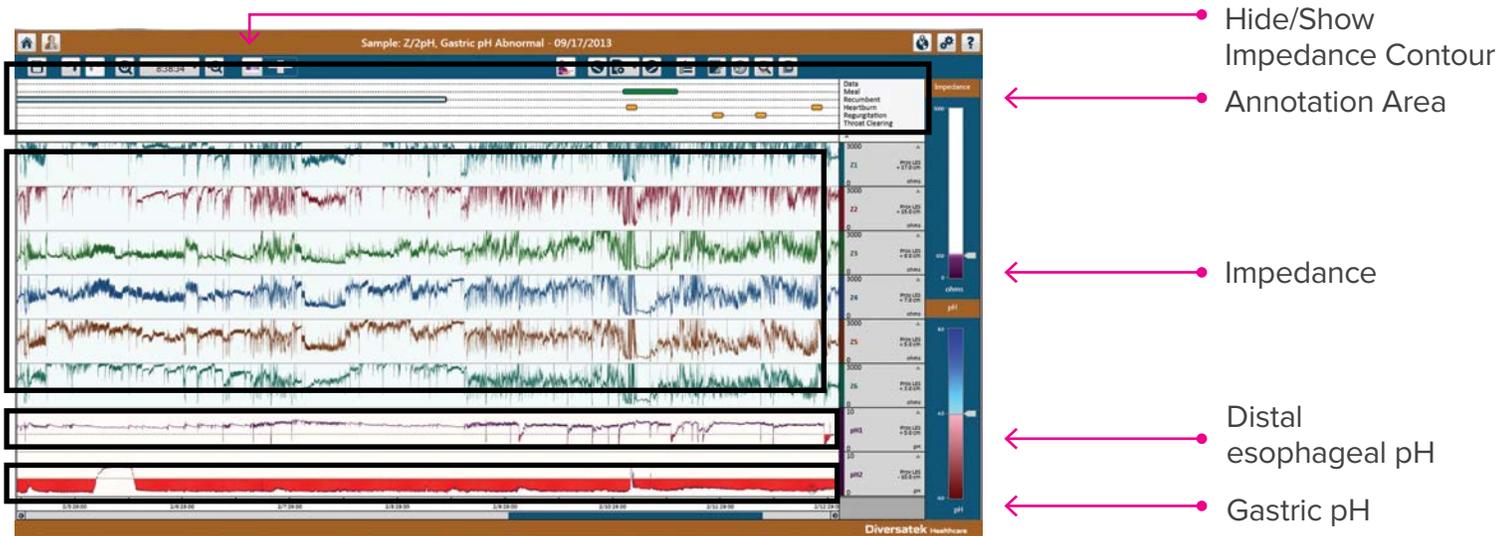
The Annotation Area located above the waveform data displays any annotations the patient has recorded during the study.
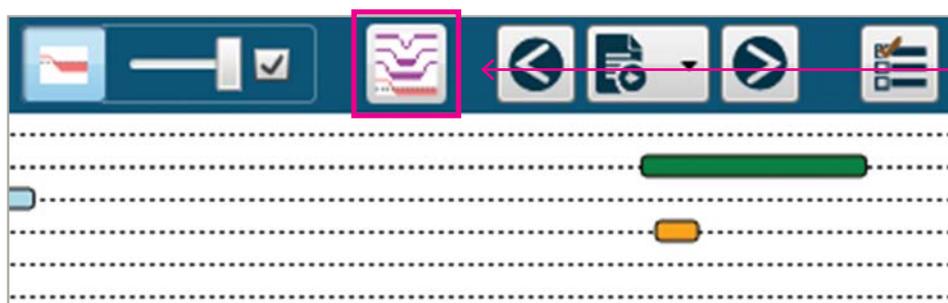
Select a Study

Fit To Probe View
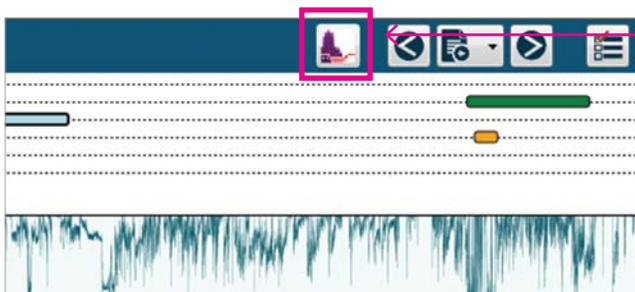
Change Data View to **Fit To Probe** View if desired. This view shows the waveforms as they appear spaced within the body. The impedance contour view is active with the purple color showing low impedance. The pH will display as waveforms filled with red where the pH value is below 4.0.
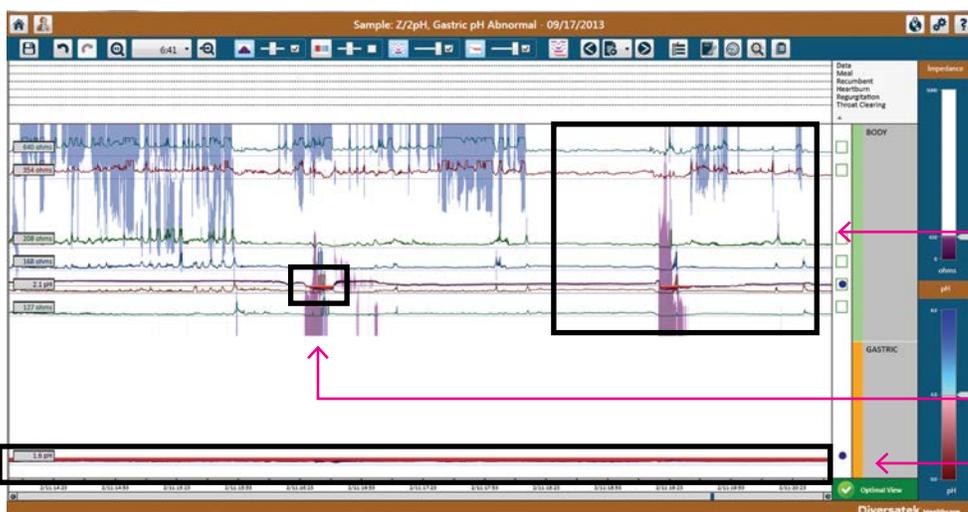
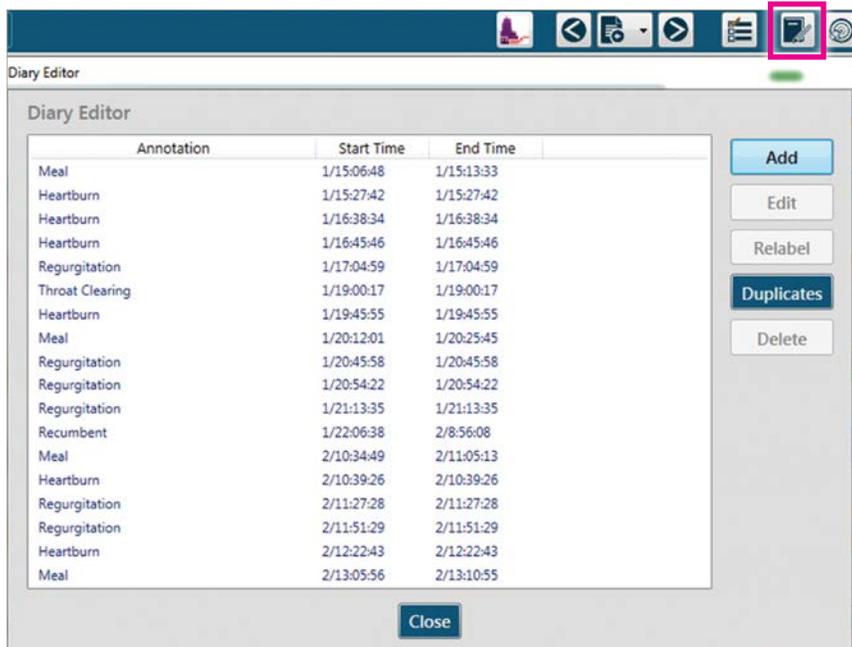

Impedance

Distal esophageal pH

Gastric pH

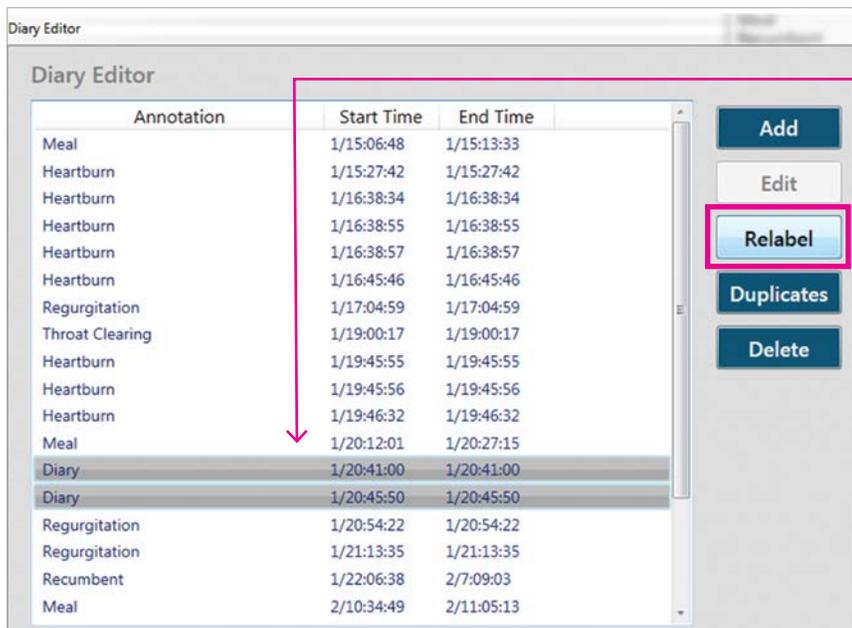Change **Data View** to Stacked View if desired.

Review and Correct Annotations

Click the **Diary Editor** Button.

All annotations can be corrected within the **Diary Editor**.

Relabel any Diary annotations as indicated in the patient's diary.

Click to highlight the Diary annotation to be changed. Verify the time of the Diary annotation with the patient diary. Click **Relabel**.

*Note: To group all like annotations together, click Annotation at the top of the column to sort alphabetically.

*Note: If multiple diary annotations are to be relabeled to the same annotation text, then click the first Diary annotation and shift-click the last Diary annotation to select all diaries. Relabel as above and all Diary annotations will be relabeled.

Review and Correct Annotations

Example: Diaries relabeled to Cough.
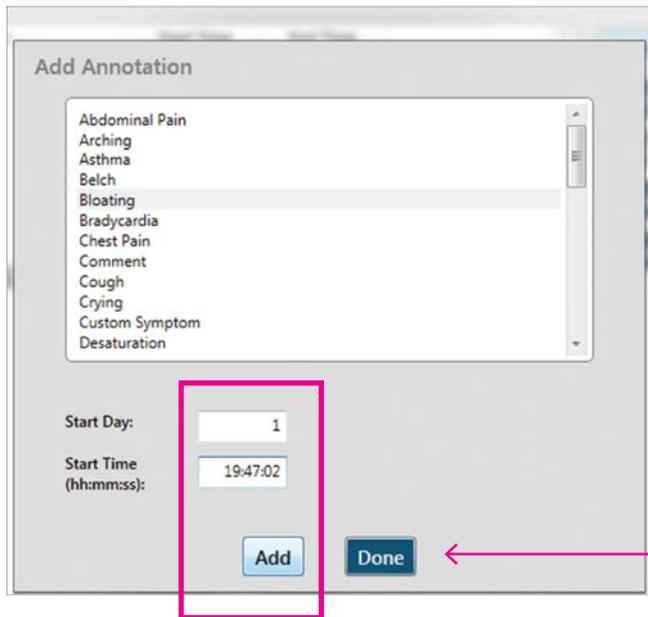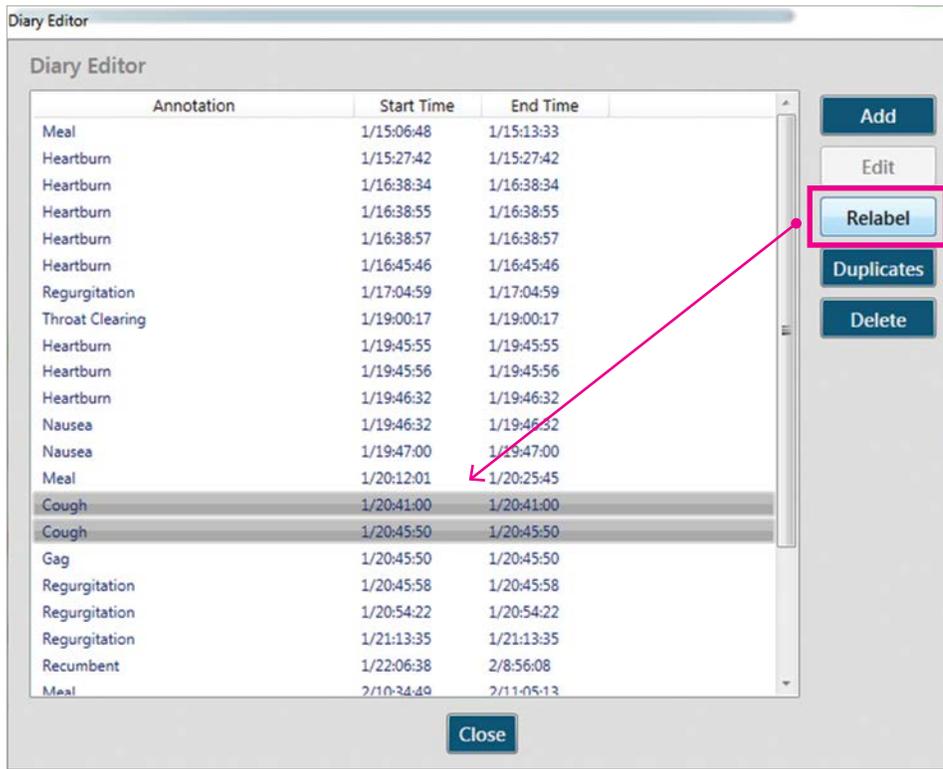
To add annotations from the patient's diary, click **Add**. Select the desired annotation. For symptoms, enter the Start Time by day, hour and minute using a 24 hour time format.

Review and Correct Annotations

Multiple annotations can be added without leaving the screen. A message will appear to indicate if the annotation was added successfully.

When all annotations have been added, click **Done**.

Add Recumbent and Meal periods if needed using a 24 hour time format. Enter both a **Start Time** and an **End Time.**

Review and Correct Annotations
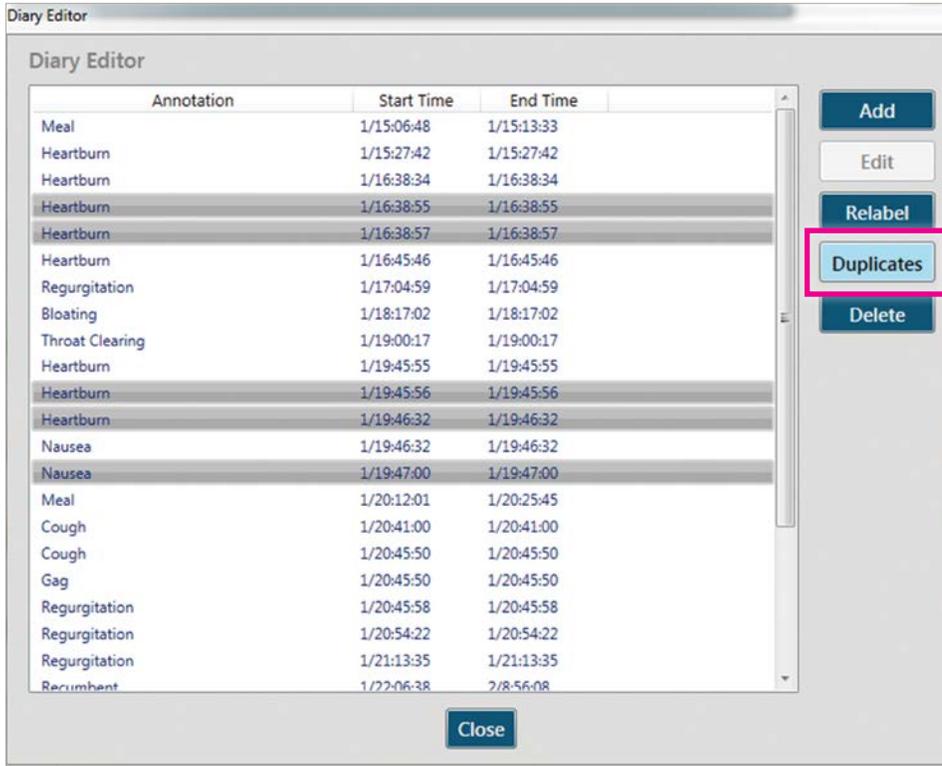
To delete all duplicate annotations, click **Duplicates** and the Diary Editor will highlight any like symptoms occurring within 2 minutes. Click **Delete**. All highlighted symptoms will be deleted.
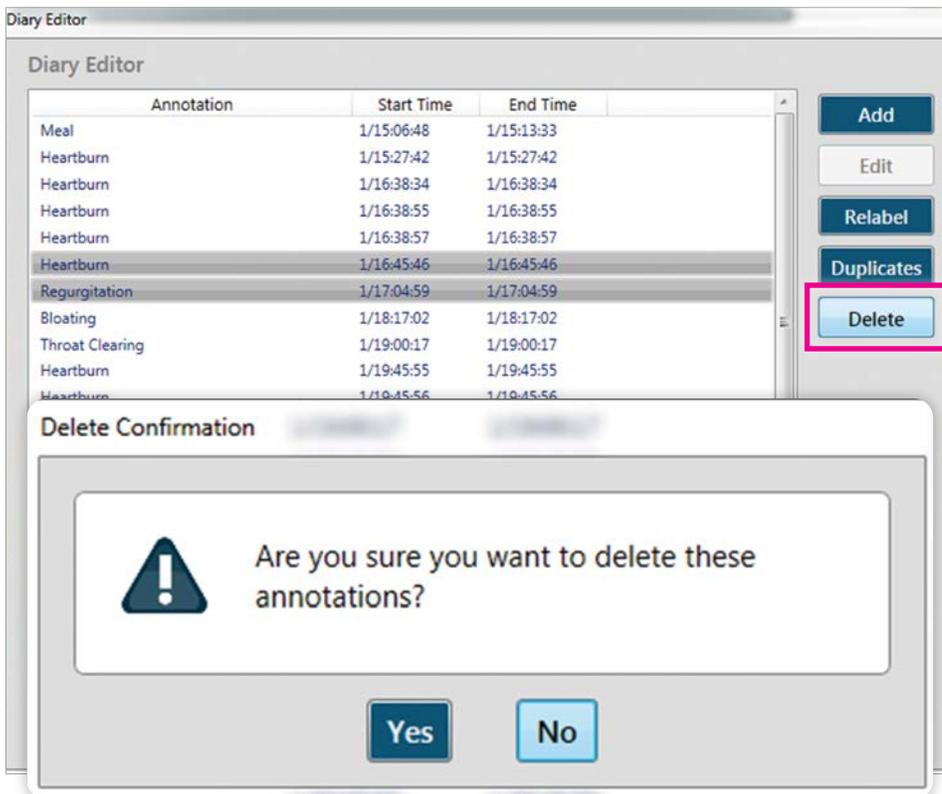
*Note: if deleting only specific duplicates, this must be done individually by highlighting an annotation and clicking **Delete**.

Delete any individual unwanted annotations. Example: Practice annotations done during patient teaching. Highlight the desired annotation and click **Delete**.

To delete several annotations in a row, Shift-Click on the first and last annotation to be removed and select **Delete**.
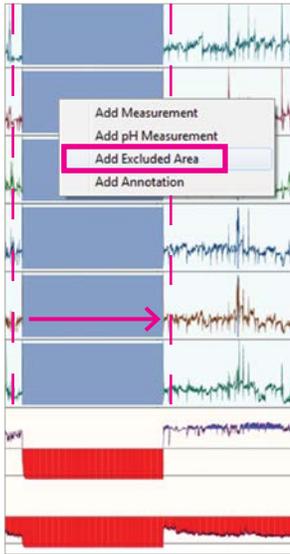
Whenever deleting an annotation, a **Delete Confirmation** dialog box will confirm.

When all annotation changes have been done, click Close to exit the Diary Editor.

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Select a
Study

**Review and
Correct Annotations**

Run
AutoSCAN

Review
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Create
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Help

Review and Correct Annotations

Exclude artifact.

Click and drag

If artifact such as waveform flattening with a probe disconnect is seen in the data display area, this area can be excluded (hidden) from analysis. Right click on the tracing. Select **Add Excluded Area**. Click and drag left to right across the area of artifact.
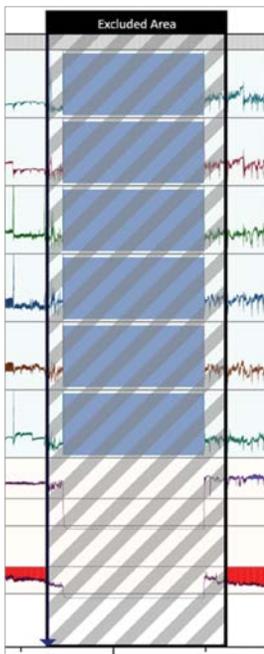
The **Excluded Area** will appear as a diagonal hash mark box over the data. The recorded data are not erased but will be ignored during analysis including any annotations the patient recorded.

| Select a Study | **Review and Correct Annotations** | Run AutoSCAN | Review Study | Create Report | Help |

Run AutoSCAN

Change pH association if desired.
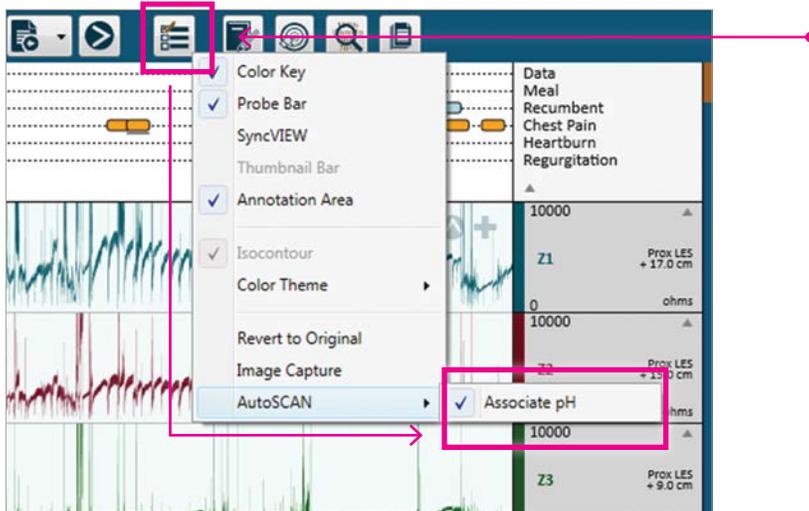
AutoSCAN will analyze a drop in the pH when associated with an impedance-identified reflux episode by default in all but infant studies.

To change this feature, click the **Options** button. Hover or click on **AutoSCAN**. Select or deselect **Associate pH** as desired.

In infant studies, all drops in pH below 4 will be analyzed regardless of changes in impedance.

Run AutoSCAN.
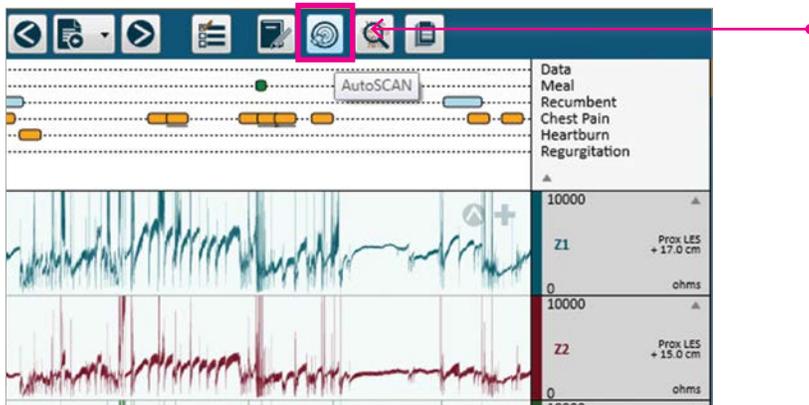
Click the **AutoSCAN** button on the toolbar. **AutoSCAN** scans through the study identifying and measuring retrograde bolus movement utilizing the impedance data, and creating Z reflux measurements. When **Associate pH** is selected, a pH reflux measurement will be created only if impedance identifies reflux in the same time period, and the pH is below 4.0 for at least 5 seconds. If **Associate pH** is not selected, all pH below a value of 4.0 for at least 5 seconds will be measured.
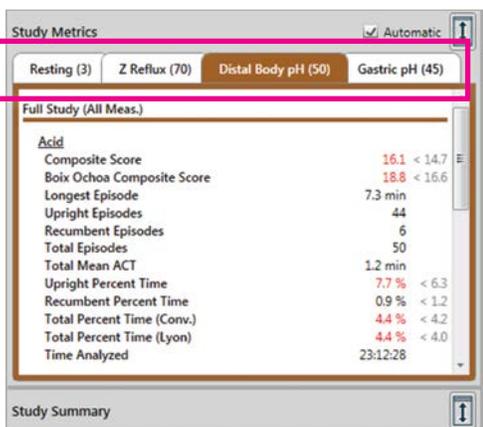
When **AutoSCAN** is complete, measurement boxes will be created wherever reflux is found. The **Study Metrics** tabs will indicate the type and number of impedance and pH measurements identified in the study period. Impedance and esophageal pH data are not analyzed under meal periods by default.
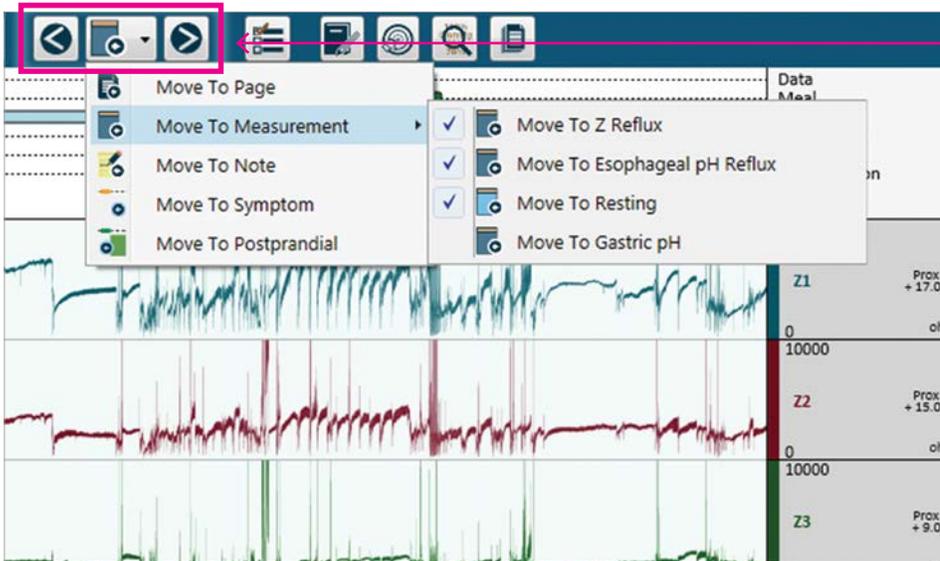
Review Study

Select the desired time scale.
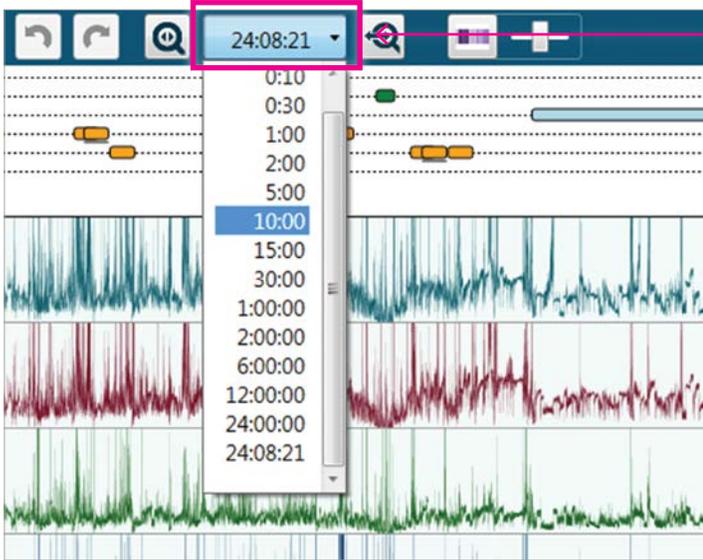
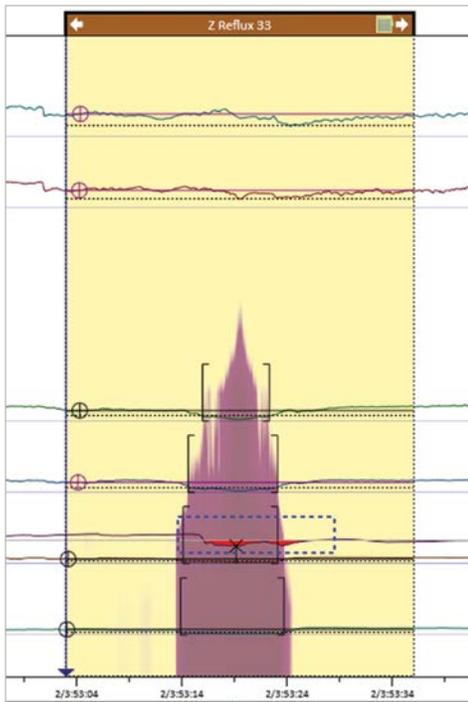Click the down arrow next to the time scale and select the desired time window.

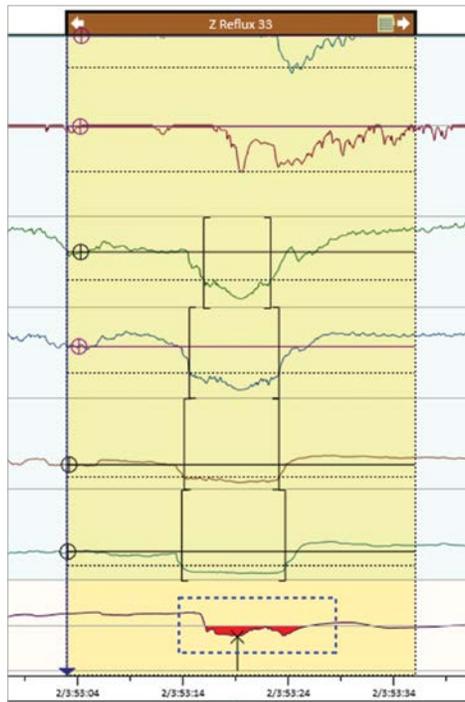Select the desired method to navigate through the study.

Click the down arrow for the **Move To** button and select the desired method for review. The forward and backward arrows will navigate as selected.

Review Study

Acid Reflux Example

Fit-to-Probe View

Stacked View

Retrograde bolus movement identified by impedance is qualified as an acid reflux episode if the distal esophageal pH drops below 4.0 concurrently.
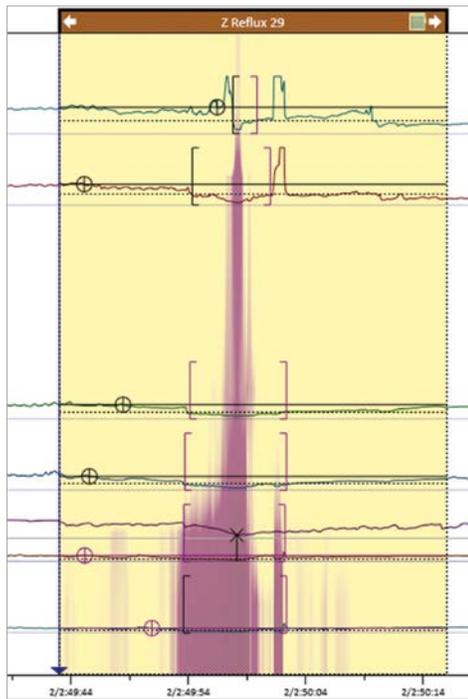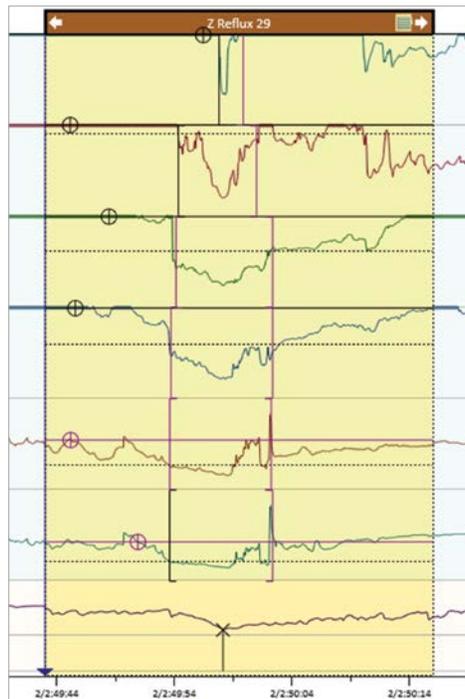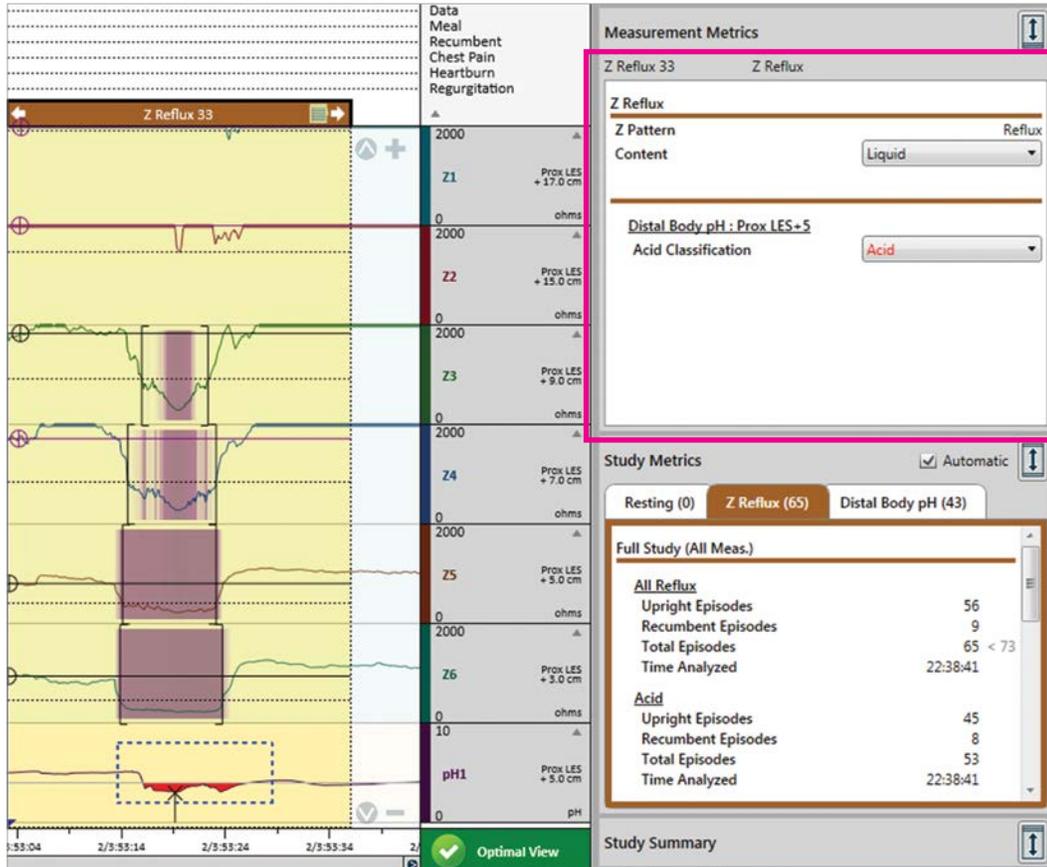
Nonacid Reflux Example

Fit-to-Probe View

Stacked View

Retrograde bolus movement identified by impedance is qualified as a nonacid reflux episode if the distal esophageal pH remains above 4.0.

Select a
Study

Review and
Correct Annotations

Run
AutoSCAN

**Review
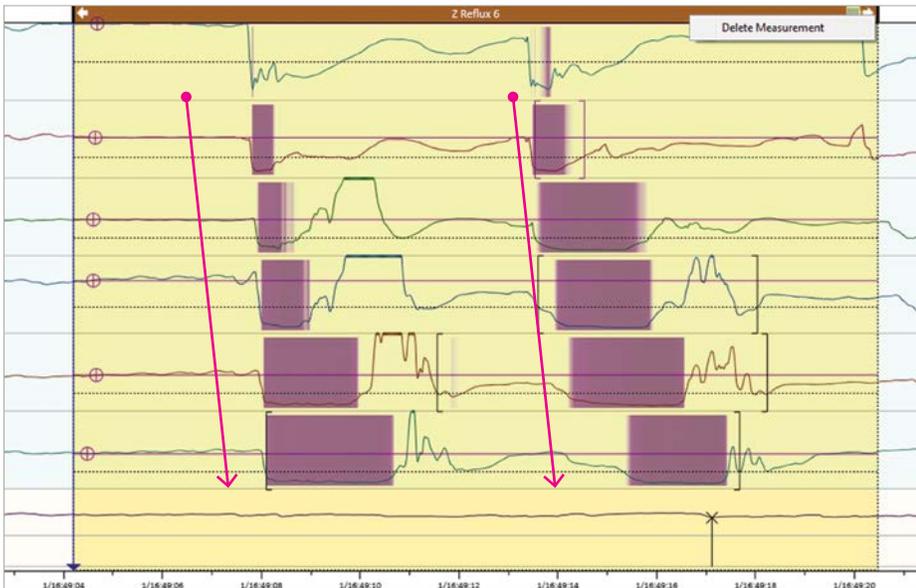Study**

Create
Report

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Review Study

Review reflux measurement data.

Review measurement data as needed in the **Measurement Metrics** section.

Review Study

Delete false positives.

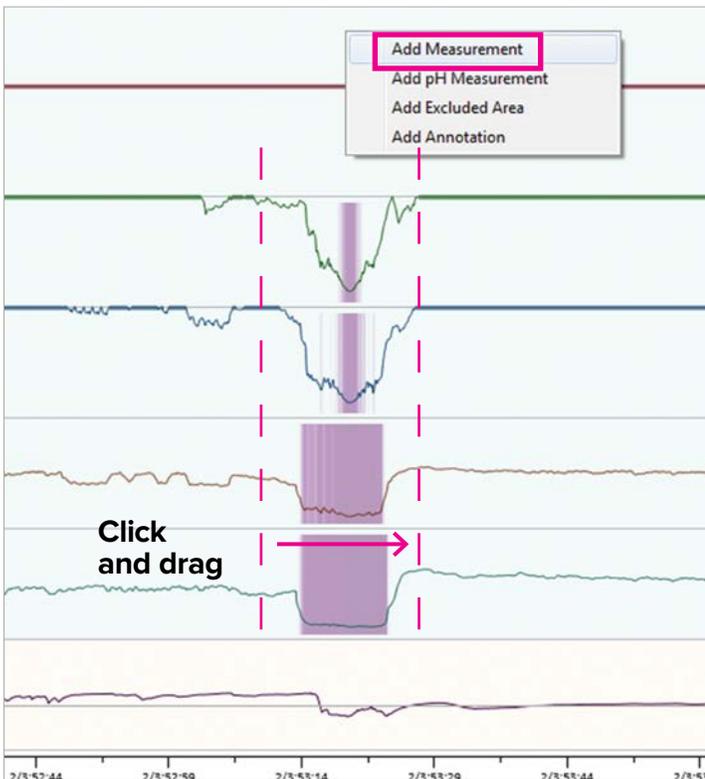Multiple Swallows

Delete any measurements where reflux is not true. Right click on the measurement title bar and select **Delete Measurement**.
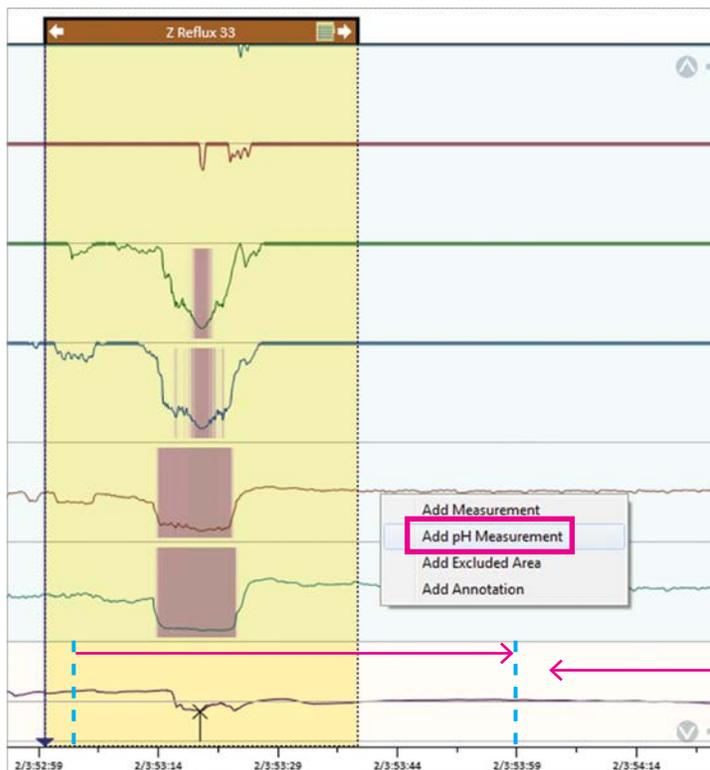
Manually add Impedance Reflux Measurement.

For reflux episodes identified by the user but not marked by AutoSCAN, right click on the tracing and select **Add Measurement**. Click and drag left to right across the identified reflux episode. Make sure to include at least 3 seconds before and 5 seconds after the reflux episode.
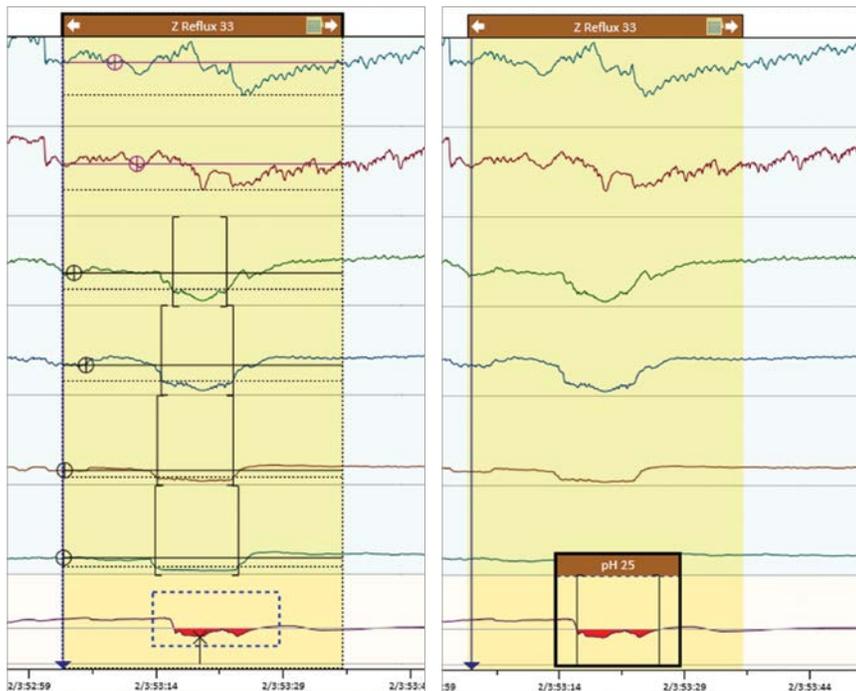
Review Study

Manually add pH Measurement.

For any added Z reflux measurements with a pH below 4.0 for at least 5 seconds, a separate pH measurement must be created. Right click on the tracing and select **Add pH Measurement**.

Click and drag left to right across the desired pH waveform where acid reflux is seen. Make sure to include at least 3 seconds before and 5 seconds after the acid episode.

Only pH drops below 4.0 for at least 5 seconds will show a value in the Metrics and be reported in the Acid Exposure section of the report.

Below is the corrected measurement.

Z Reflux Measurement Active   pH Reflux Measurement Active

Review the complete study adding and deleting measurements if needed.

Review methods:
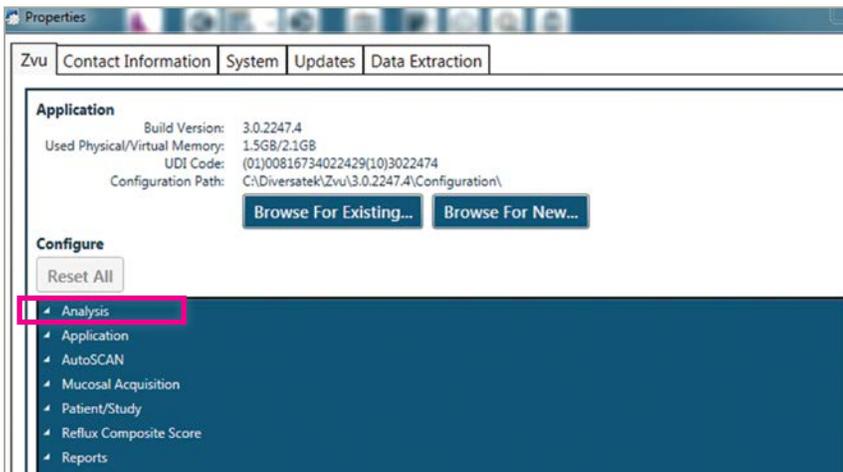
• Page by Page

• Symptom by Symptom

To activate the pH reflux measurement for review, click within its dashed blue lines.
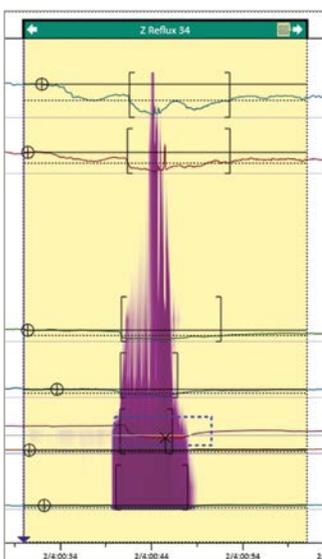
Review Study

Proximal Extent when using a Standard Configuration Probe (non-LPR)

AutoSCAN can identify Proximal Reflux Episodes if this feature is enabled. Click on the **Properties** (gears) icon above the tool bar from any Zvu page.

Select **Analysis**. Select Yes next to Show Proximal Extent Data. X-out of the Properties Page. Re-run **AutoSCAN** if needed. This selection will apply to all standard Z/pH study analyses.

Reflux height 17cm above the LES

Migration level 15 cm above the LES reached

Impedance measurements in which retrograde bolus movement reached the designated proximal migration level will have a green title bar.

Review Study
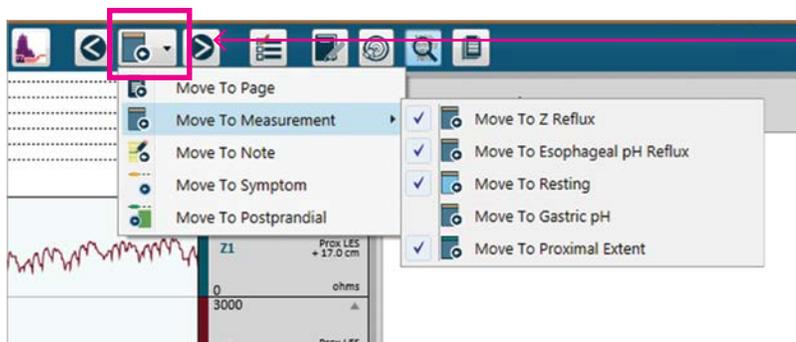
Each measurement should be checked for proximal level accuracy. The **Move To Measurement** feature can be set to Proximal Extent to aid in this review.

To change the migration level, and then click the Options icon, click on AutoSCAN, and then click on **Proximal Migration Level**. The default level is the height of the second Z sensor. The migration level can be changed to the waveform above or below this default.

Select a
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The Measurement Metrics will reflect the height of the reflux episode and whether or not it reached the proximal migration threshold which will designate the reflux as a proximal episode.
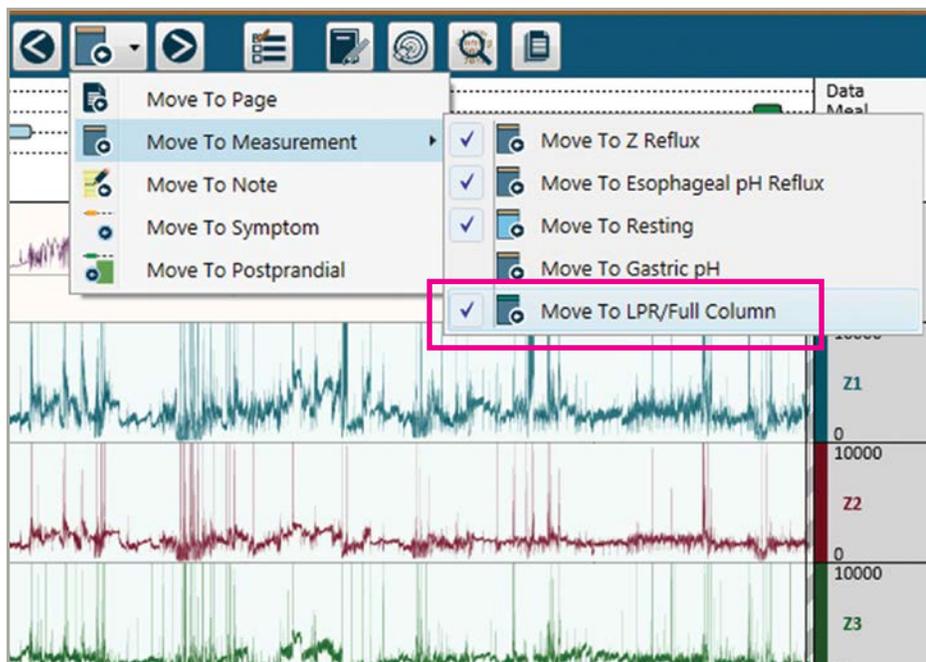

The Study Metrics and report will indicate how many episodes reached the proximal migration level.

Review Study

**Full Column and LPR (Laryngopharyngeal Reflux) when using an LPR Probe**

LPR level (Z1)

Full Column level (Z3)

Reflux reached Full Column shown in Fit-to-Probe View

Distal level (Z5)

If an LPR probe is used, **AutoSCAN** will identify **Full Column** and LPR reflux episodes. Impedance measurements in which retrograde bolus movement reached the **Full Column (Z3)** or **LPR (Z1)** levels will have a green title bar.

Reflux reached LPR level shown in the Stacked View

LPR level (Z1)

Full Column level (Z3)

Distal level (Z5)

Review Study

Each measurement should be checked for level accuracy. The **Move To Measurement** feature can be set to LPR/Full Column to aid in this review.
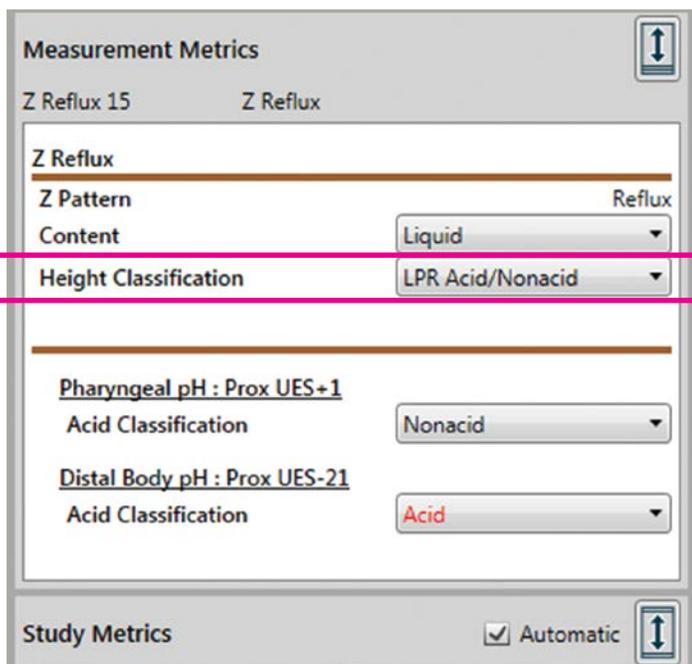
The **Measurement Metrics** will designate the level reached by the reflux episode as Distal, Full Column or LPR. If the episode reaches the LPR level, it will further be described based on the pH data. LPR Acid/Nonacid would be the label for an episode that reached the LPR level of Z1 with pH below 4.0 at the distal sensor and pH above 4.0 at the pharyngeal sensor.

Review Study
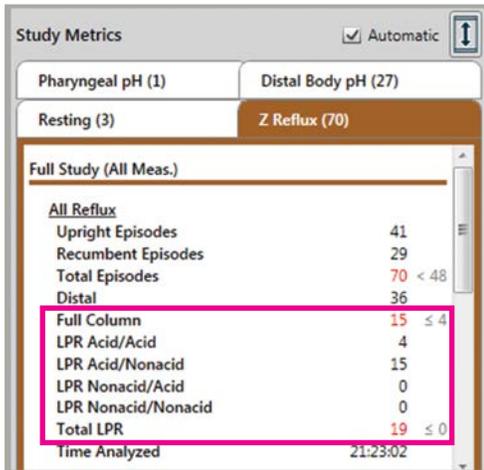
The **Study Metrics** and report will indicate the number of Full Column and LPR episodes in the study with the LPR episodes further defined by pH.

More LPR data are detailed in the report.

Mean Nocturnal Baseline Impedance (MNBI)

Average baseline ohms measured in Z5

AutoSCAN will create three 10-minute Resting measurements around 1 A.M., 2 A.M. and 3 A.M. if the patient is marked as recumbent. The software will keep the measurement away from reflux episodes. The reviewer may need to move the measurements away from swallow activity. In each Resting measurement, the average ohms in Z5 are given as a baseline value. The three baseline values are averaged to obtain the MNBI value. The MNBI value is displayed under the Resting tab in the Study Metrics and in its own section on the report.

Create Report

Review Study Metrics.

The **Study Metrics** are located on the right side of the study tabulating all data during the study period.
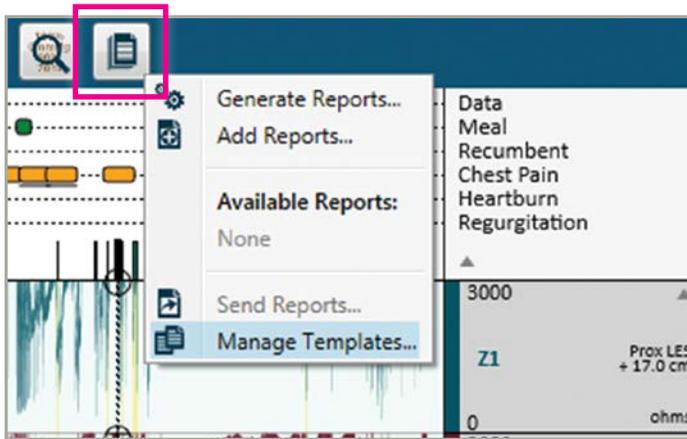
Enter Study Summary Data.

The Study Summary section below the Study Metrics provides fields to enter any **Notes** related to the study. Physicians can enter Impressions and Diagnostic information to be included on the final report.

Editing can also be done directly on the report. Once the report is saved outside of Zvu, it can be added back to the study.

Select a Study   Review and Correct Annotations   Run AutoSCAN   Review Study   **Create Report**   Help
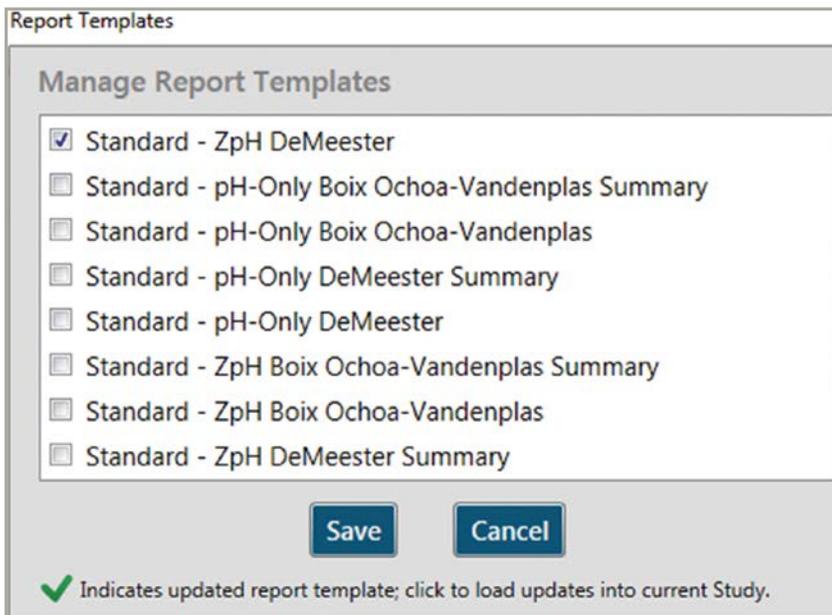
Create Report

Create Report.

Click on the **Reports** icon on the toolbar and select **Generate Reports** to create the report(s) that were selected in the workflow.
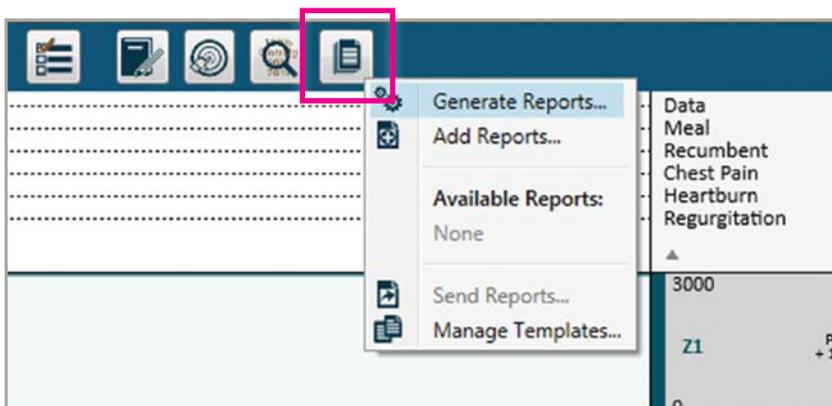
To change the designated report template, select **Manage Templates**.

Select Template.

Once the desired template is selected, click **Save**. Report templates will reflect normal values based on the age of the patient and the selection for Acid Suppression Therapy set for the study on the **Patient Management** screen.
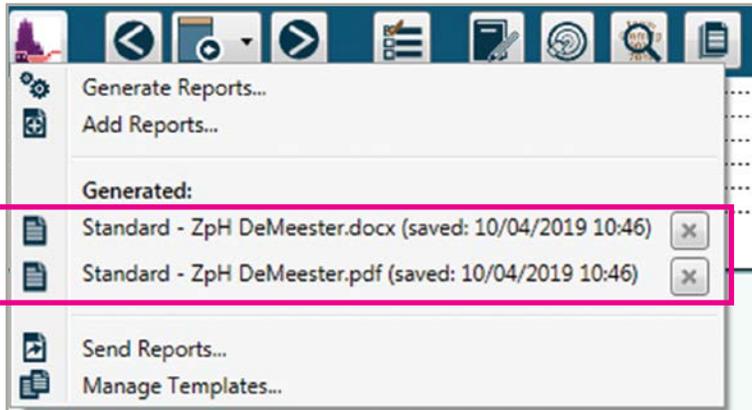
Generate Report.

After a review or change has been made under Manage Templates, select **Generate Reports**.
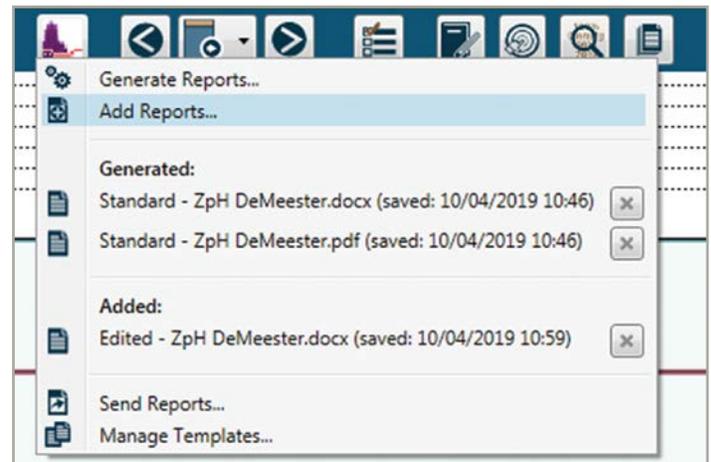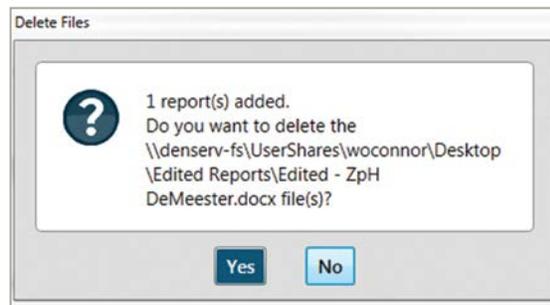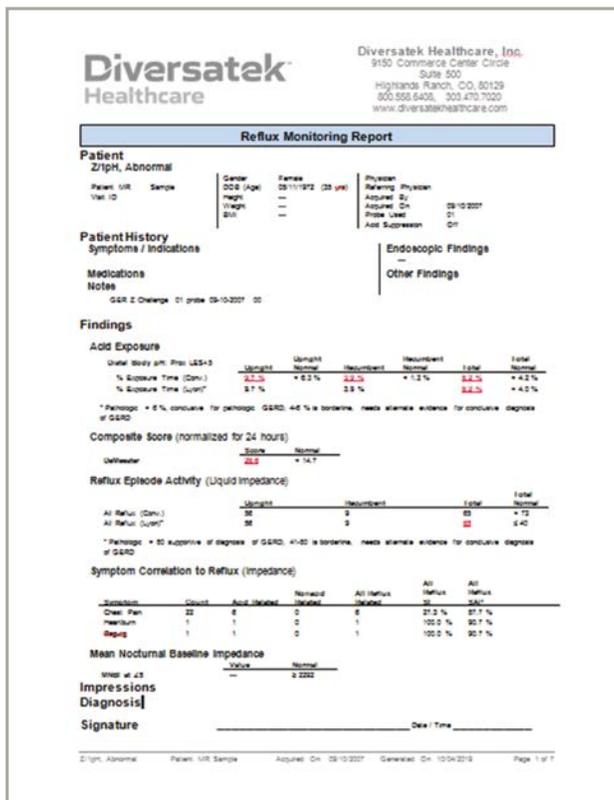
Create Report

Report Format.

A report pop up menu will open when reports are generated. Select a report from the **Generated** list and review data.
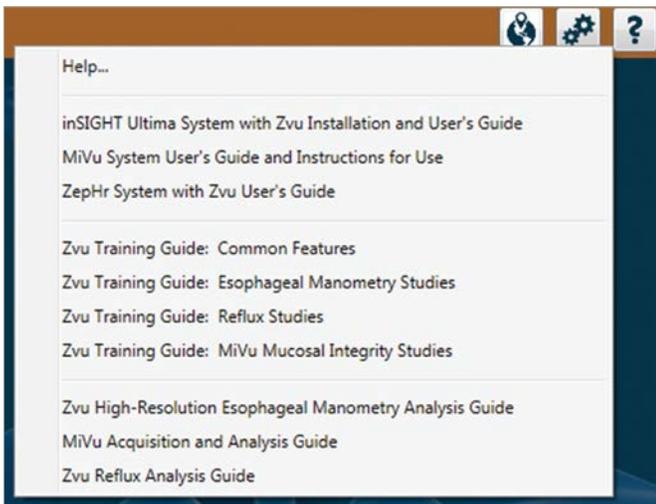
Review Data.

If the report is edited, click the **Save** icon in the editor. Save the report to a desktop folder. After exiting the report, click on the **Reports** icon again and select **Add Reports** to bring the edited report back into the study.

If the report is edited and saved by the user, the saved report will contain patient identifying information. The report should be added back to the study so that the software can encrypt the information. It is recommended that the saved unencrypted copy should be deleted once the report is added into the study to protect the patient's data.

Help

For additional details click the ❓ icon on the right end of the toolbar to access Helps.
The Annotated Index will navigate to the full Helps list.

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Innovations in Clinical Education

Diversatek University Online

Our online training platform contains free content on esophageal and anorectal manometric studies, as well as impedance/pH reflux monitoring studies. Included are tutorials providing step-by-step guidance to develop skills in data acquisition, study review and report generation. Simply go to **DiversatekHealthcare.com** to request log-in information.

Denver Training Center

Our Technical Research & Training Center offers a number of product training courses to provide clinical users with the knowledge and skills necessary to effectively acquire and analyze High Resolution Impedance manometry studies, impedance/pH reflux monitoring studies and High Resolution Anorectal manometry studies. Email us at **clinicaleducation@diversatekhc.com** or visit us online to learn more about our Denver course offerings.

Webinars

Diversatek Healthcare is proud to present a series of live, interactive discussions on topics related to esophageal function testing, impedance/pH reflux monitoring studies and anorectal manometry. Each webinar includes a didactic session followed by an open discussion. All webinars are recorded and posted to the Diversatek U online portal for easy reference. Access **DiversatekHealthcare.com** for upcoming webinar announcements.

The Diversatek Healthcare Review

The Diversatek Healthcare Review e-newsletter features what's new at Diversatek University along with up-to-date product information. Every issue also includes our Clinical Insights, providing educational tips for Z/pH and HRiM analysis as well as answers to the most frequently asked questions.

Personalized Clinical Support

Onsite Training

Diversatek Healthcare Clinical Specialists deliver product support to suit your specific needs—on your schedule. Specialists are onsite at your facility to train and support you on your Diversatek Healthcare manometry or reflux monitoring equipment as you work through patient cases, acquire and analyze patient data, and create patient reports.

Virtual Coaching

Online and in real-time, Diversatek Healthcare Clinical Specialists work with you via screen sharing to provide study-specific data review and report generation coaching for your more difficult studies. Email us at **clinicalsupport@diversatekhc.com** to schedule a one-on-one session.

Diversatek™
Healthcare

Advancing GI care by driving science, developing and delivering solutions, and providing unmatched clinical support.

DiversatekHealthcare.com

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clinicaleducation@diversatekhc.com

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