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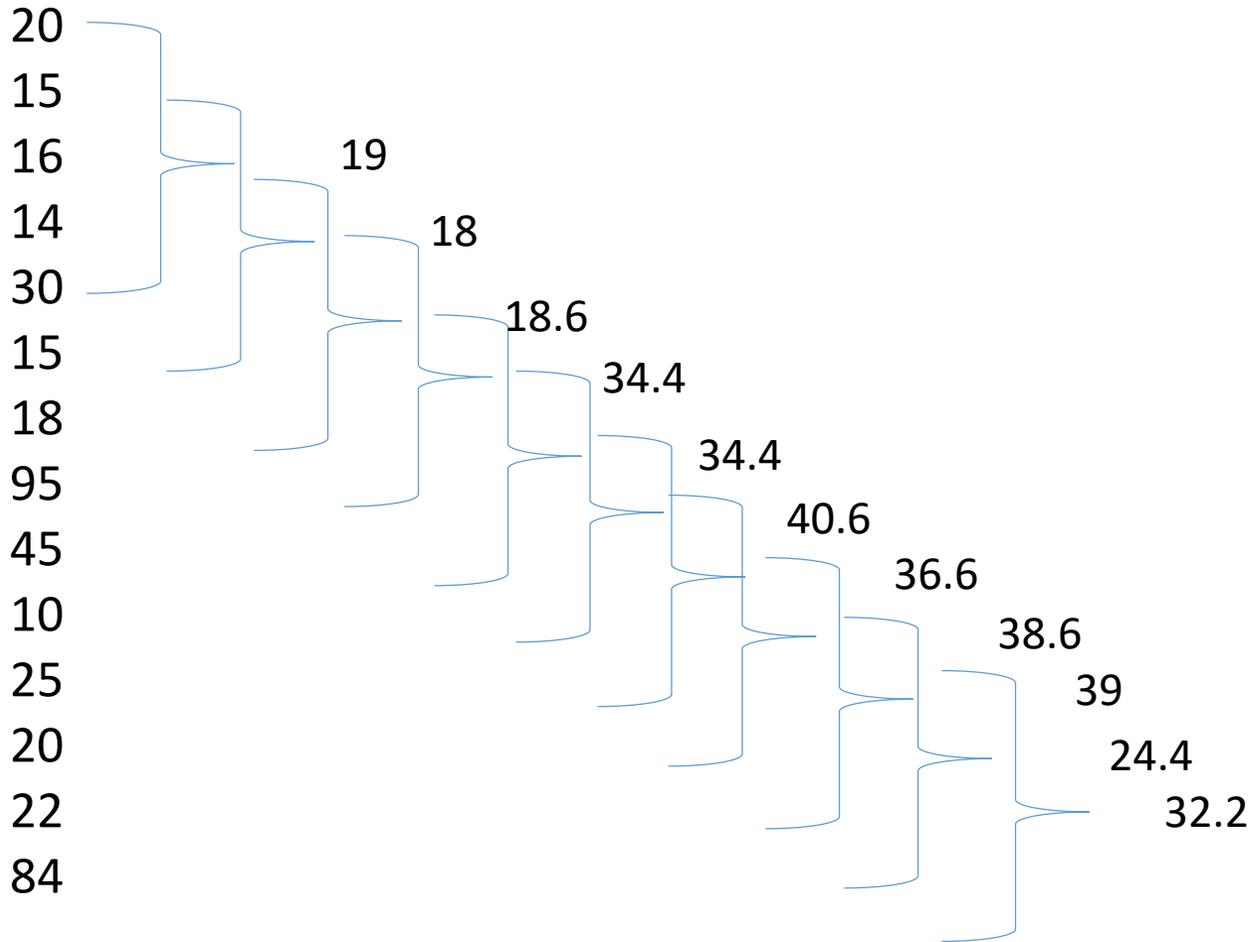
# Moving Averages – An Adjunct to QC

# Remember:

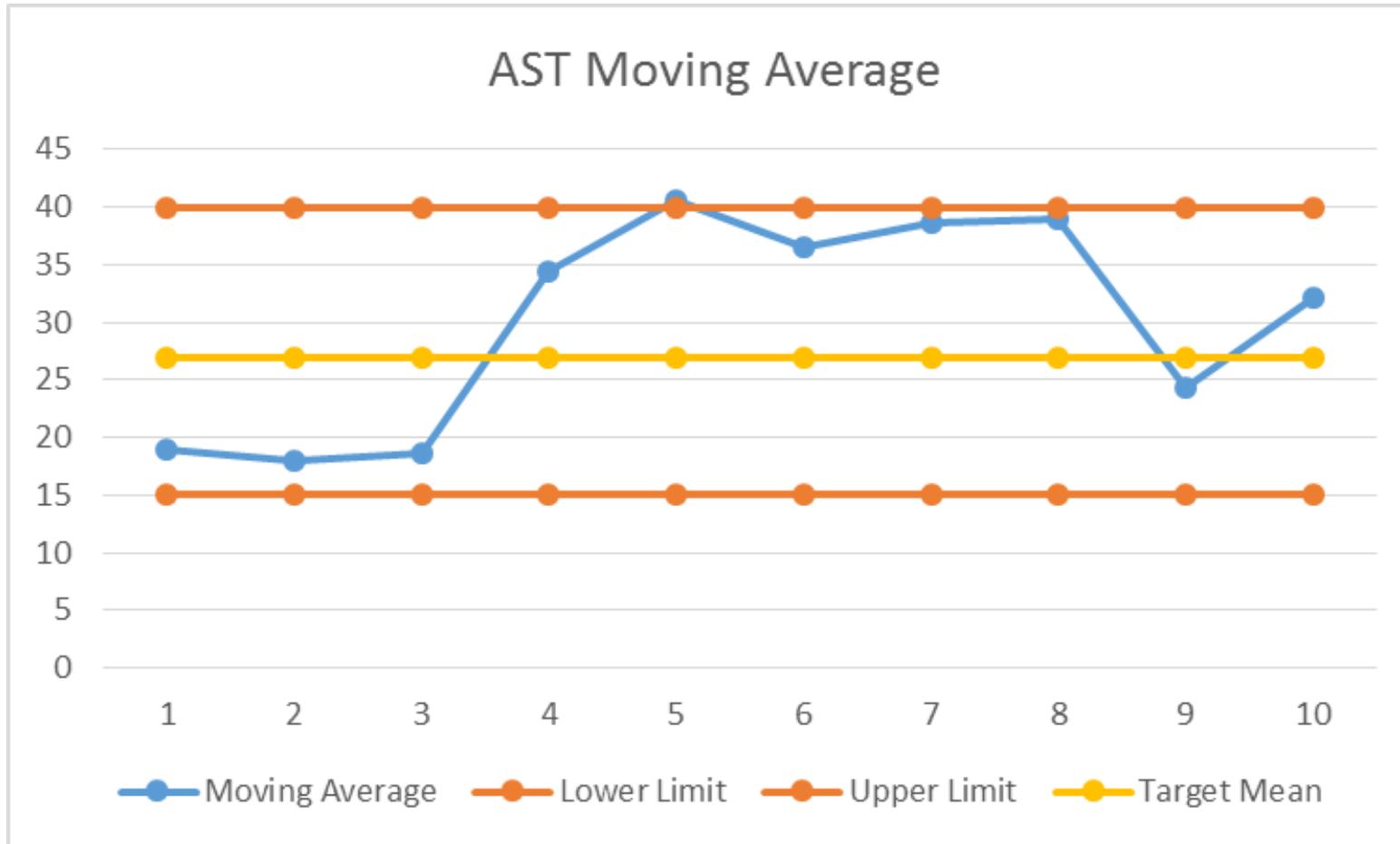
- Start Small and build on success
- Add other assays as you are ready
- Your population is unique to you
- Your Vendor may recommend assays to use

# How does it work?

AST Results



# What does it look like?



# QC vs. MA

MA and QC work together – MA does not replace QC

## QC

- Material with known values
- Run at specified intervals
- Results compared to acceptable range
- Limitations:
  - what happens between QC event?
  - Delay in identifying assay issues
  - Expensive – cost of reagents and cost of QC material itself.

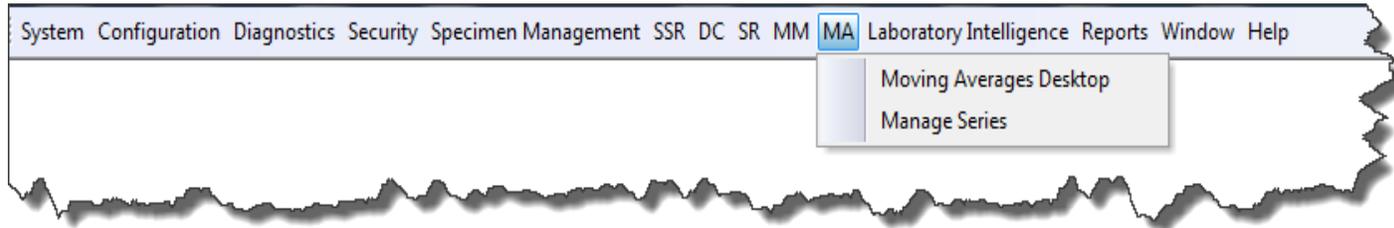
## MA

- Uses Patient Samples
- Run Continuously
- Results compared to expected ranges
- Advantages:
  - Early warning of Assay failure
  - Improved Patient Care, Faster resolution
  - “Free” as it uses results already being generated

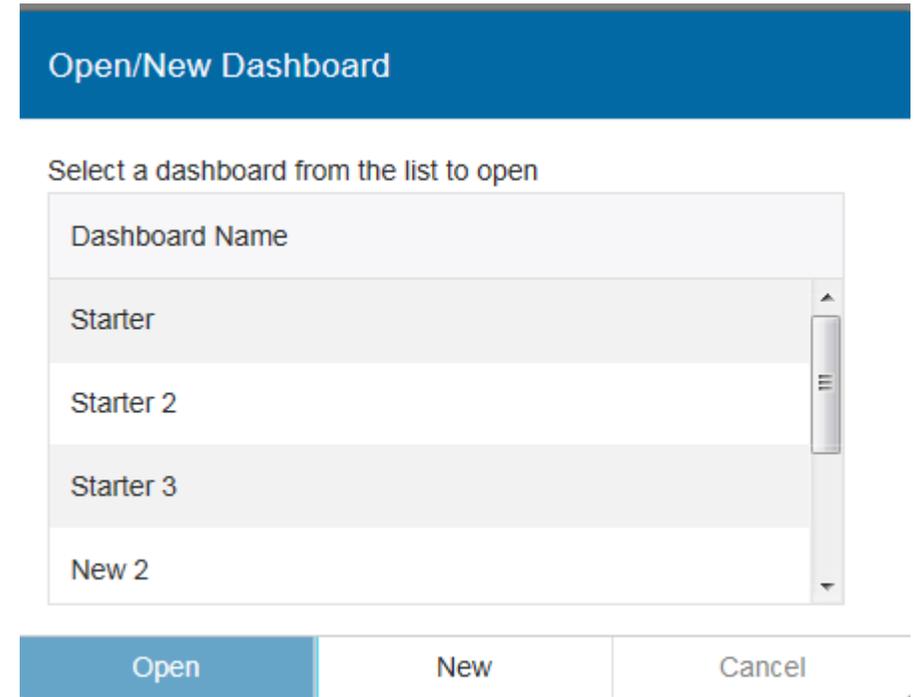
# Keep in Mind

- Not every analyte is a candidate for Moving Averages
- Analytes that don't work well include ones that:
  - Lack sufficient volume (e.g. TDM's, Amylase, Lipase)
  - Non-numeric results include > or < results (e.g. B12, TNI, TNT)
  - Are generally unstable. (e.g. pCO<sub>2</sub>, pO<sub>2</sub>, etc.)
  - Batched with QC at beginning and end of batch (e.g. Mass Spec testing)
  - Frequently require dilutions or special handling (e.g. hCG, Immunglobulins)
- Individual results can be excluded from MA by gender, location, age, diagnosis etc.
- Every lab has a unique patient population.

# The New Look of MA in 8.16



- Will automatically bring up the last used Dashboard.
- If no Dashboard in history, will prompt to load an existing or create new dashboard.



# Creating a New Dashboard

Create a New Dashboard ×

Please enter the following information to create a new Dashboard.

**New Dashboard Name:**

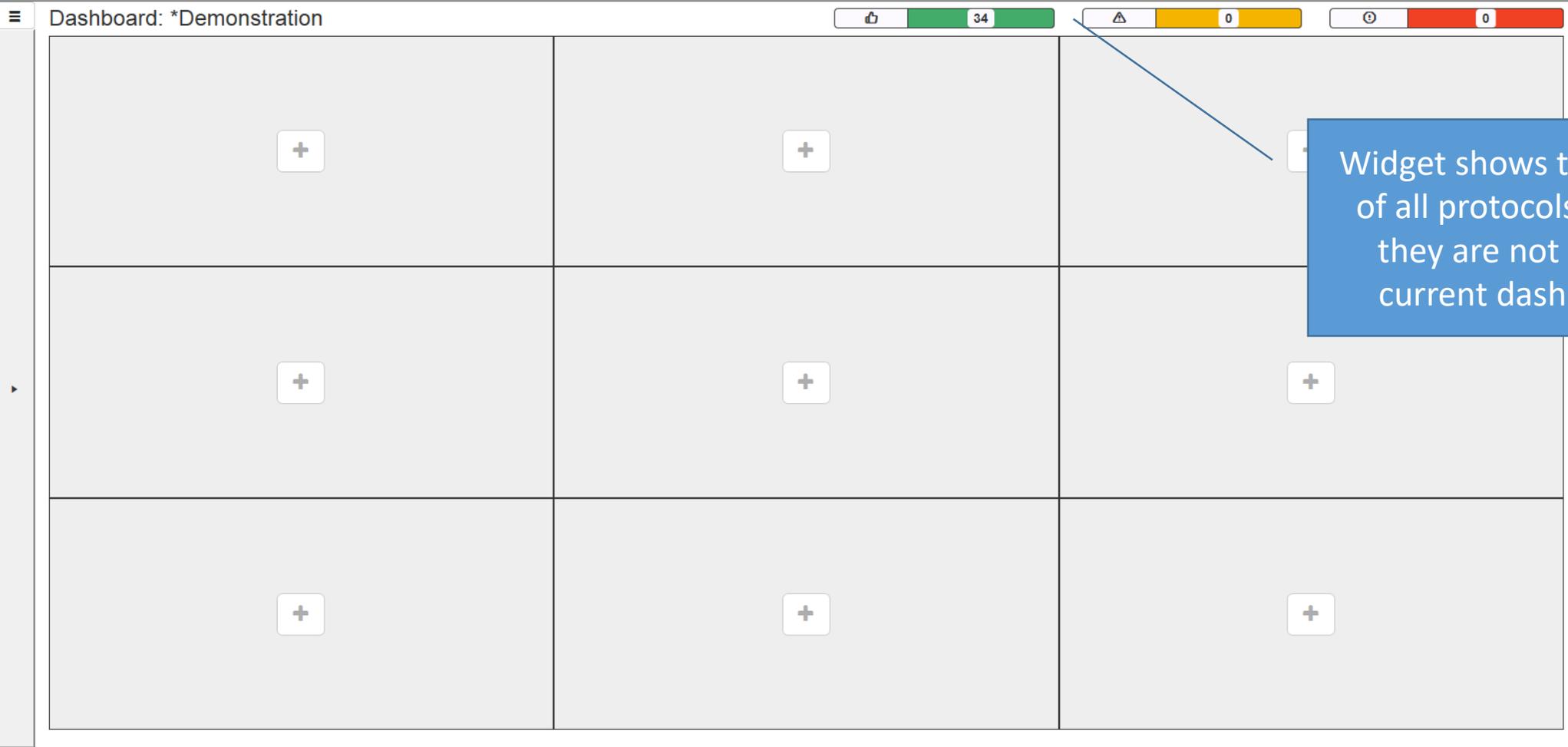
**Enter the number of columns (1-9):**  ▾

**Enter the number of rows (1-9):**  ▾

Create Dashboard Cancel

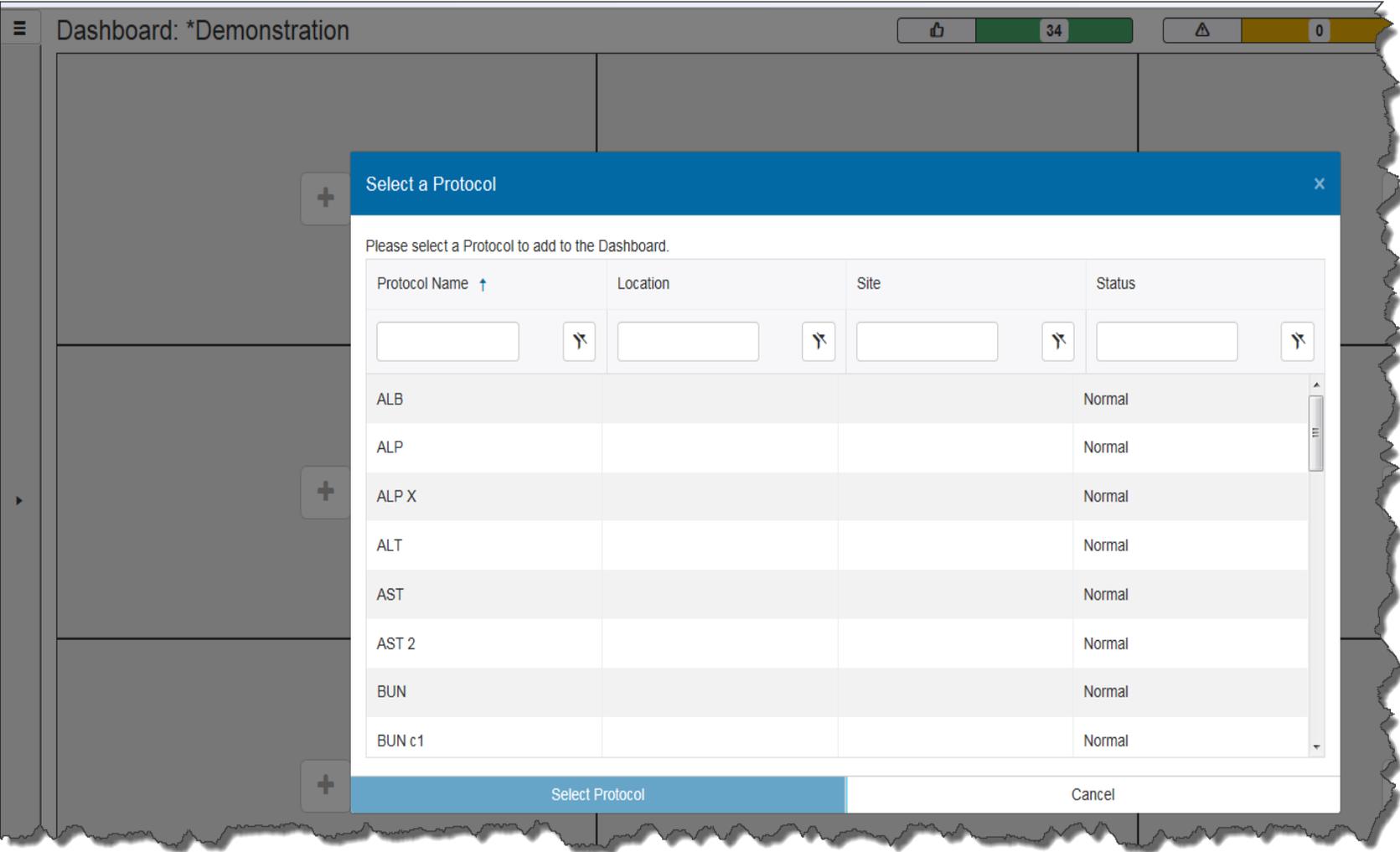
- Enter Name for dashboard (e.g. Chemistry-Day Shift, Evening Shift etc.)
- Choose the number of columns and rows. (1 to 81 charts)
- Number of rows or columns can be changed.

# Grid is displayed along with widget



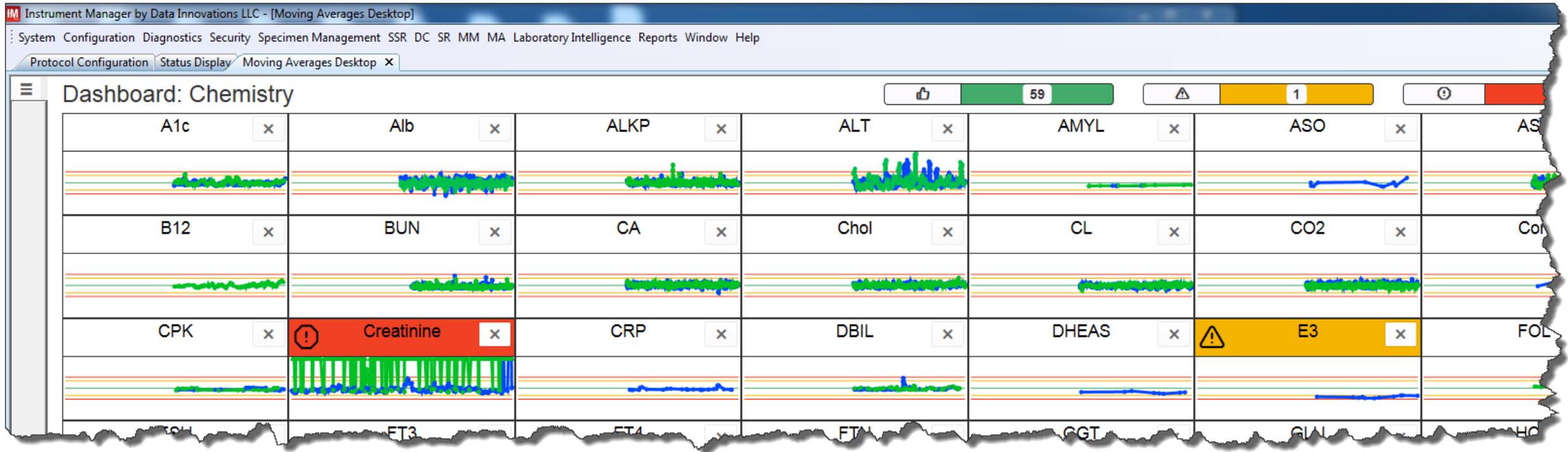
Widget shows the status of all protocols even it they are not on the current dashboard.

# Add a Protocol



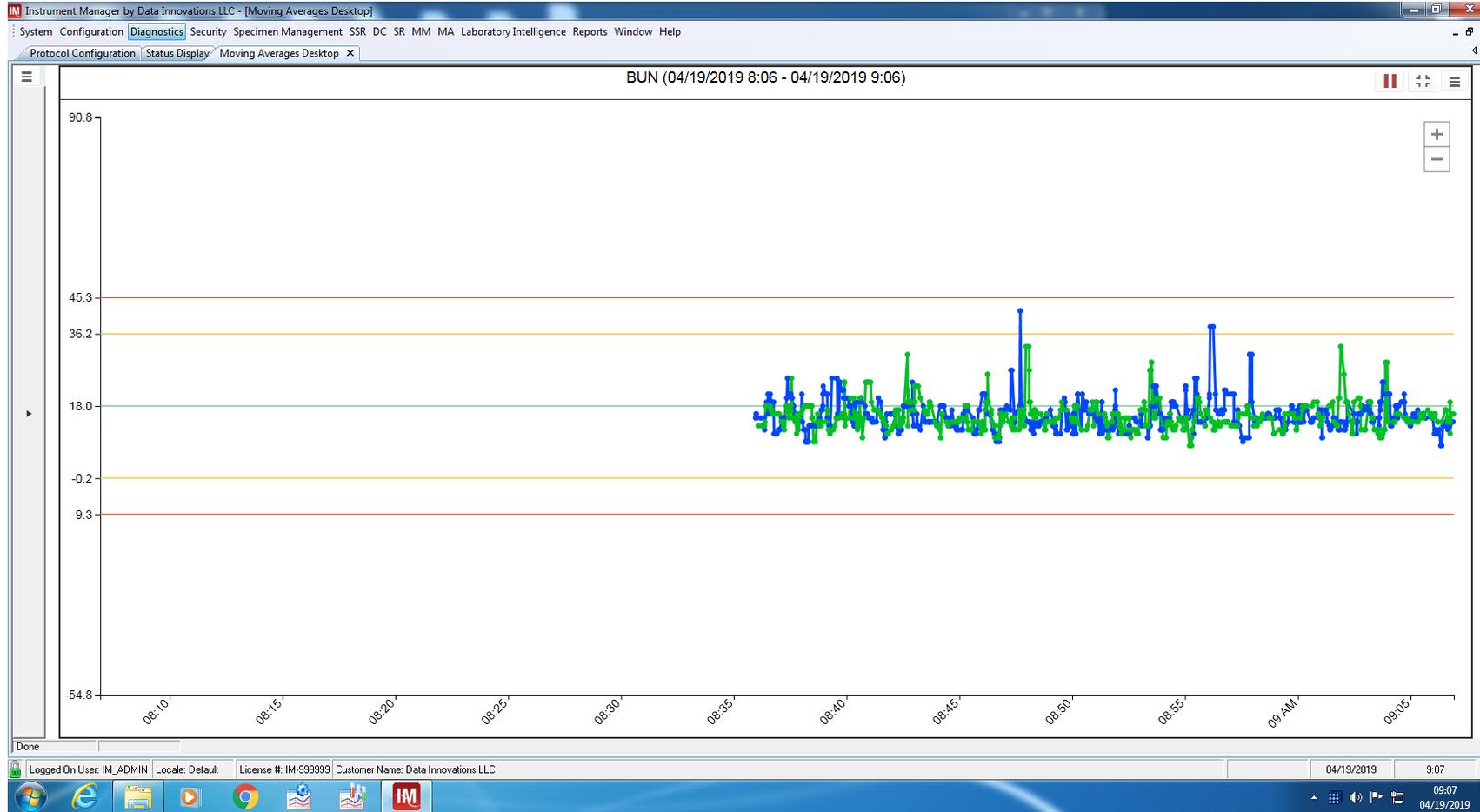
- Press any + symbol
- List of available protocols will be displayed
- Top row allows for filtering of list.
- Highlight desired protocol and press Select Protocol button

# Warnings and Errors



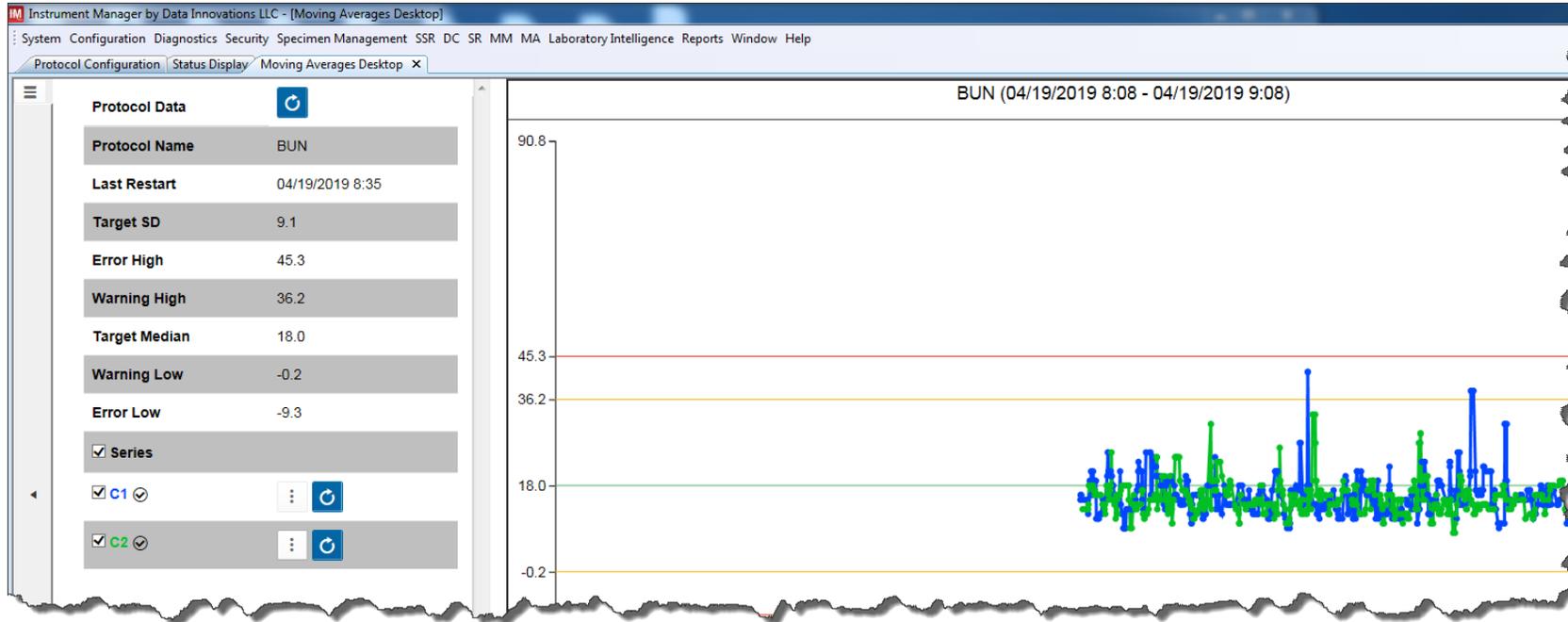
- Banner color and symbol will change if a warning or error level is exceeded.

# Expand the Chart



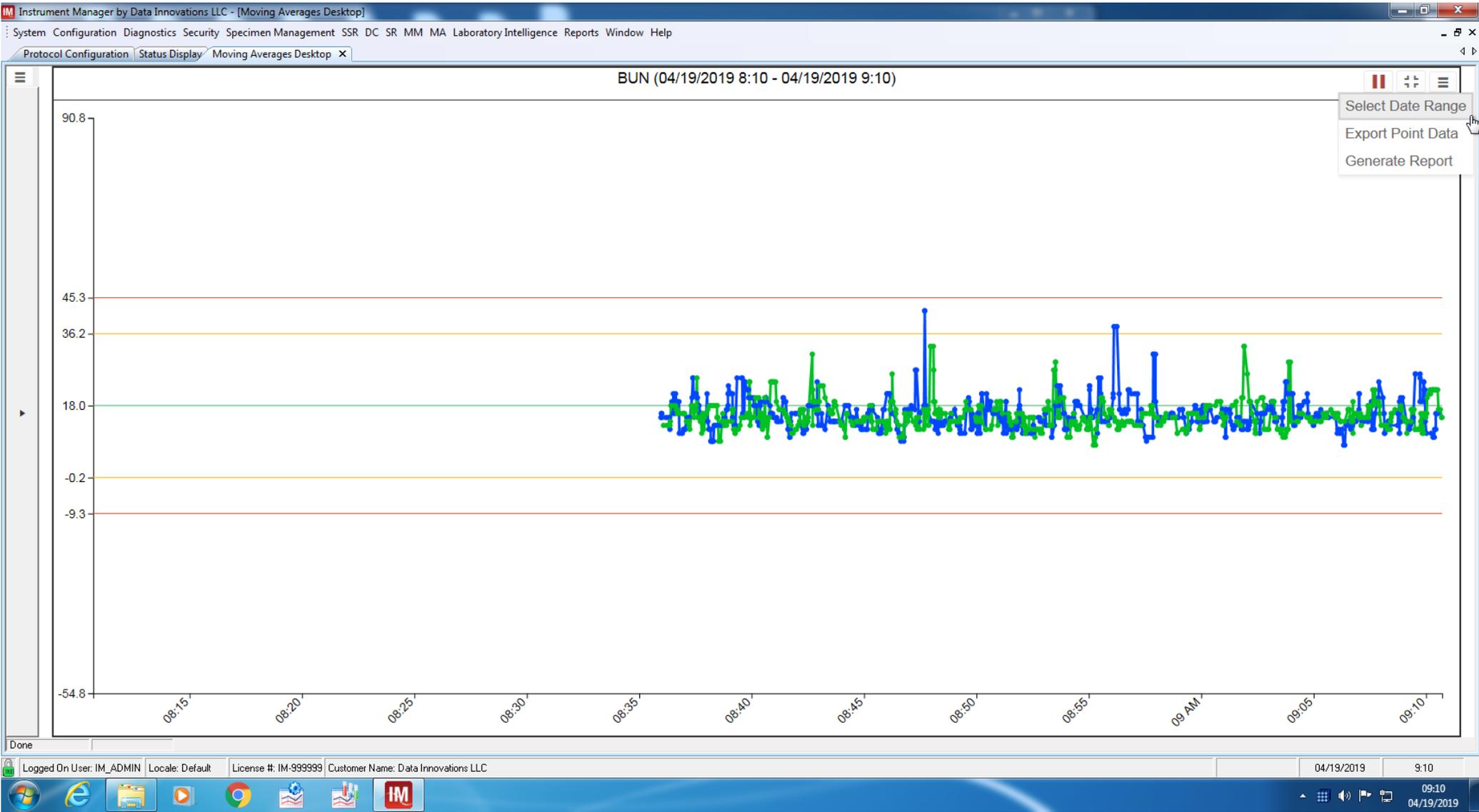
- Clicking anywhere in a chart will enlarge that chart.

# Protocol Details



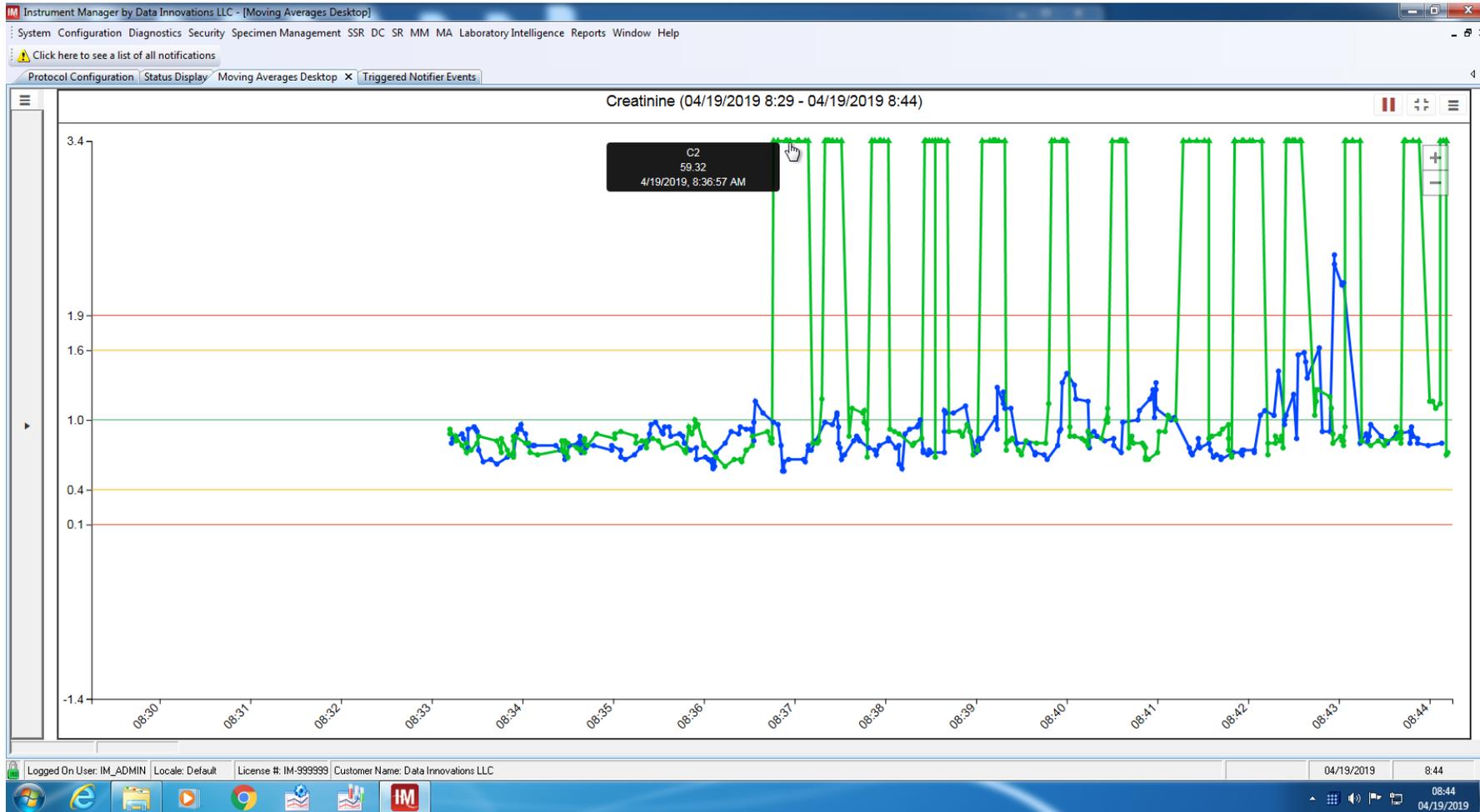
- Left side arrow allows for the display of the protocol details.
- Protocol can be restarted as a whole or just individual series.
- Can also chose which series to display if more than one series is in protocol.

# Right Side Menu Provides Options



# Point Value

- Hover over a point provides the point value and the date and time it was generated.



# Point Details

Instrument Manager by Data Innovations LLC - [Moving Averages Desktop]

System Configuration Diagnostics Security Specimen Management SSR DC SR MM MA Laboratory Intelligence Reports Window Help

Click here to see a list of all notifications

Protocol Configuration Status Display Moving Averages Desktop X Triggered Notifier Events

Protocol Data Creatinine (04/19/2019 8:27 - 04/19/2019 8:42)

### Point Information

#### Creatinine

Series

Name: C2  
Running Mean: 13.39 (7 days)  
Last Restart: 04/19/2019 8:27  
Running SD: 12.72 (7 days)  
Status: Error

Point

Time: 04/19/2019 8:36  
Value: 59.32

Results Export to Excel

Specimen ID	Result Date/Time	MA Result Value	Specimen Type	Fluid	Sex	Test Status	Exclude Test From MA C...
B784113.02	04/19/2019 8:36	74	R	Urine	F	Held for Verification	
B789556.01	04/19/2019 8:36	1	R	Serum	F	Held for Verification	
B794823.02	04/19/2019 8:36	188.5	R	Urine	M	Held for Verification	
B787737.01	04/19/2019 8:36	0.8	R	Serum	F	Held for Verification	
B789724.01	04/19/2019 8:36	32.3	R	Serum	F	Held for Verification	

Close

Logged On User: IM\_ADMIN | Locale: Default | License #: IM-939393 | Customer Name: Data Innovations LLC | 04/19/2019 | 8:42

- Individual results are listed
- Color coded based on how that point compares to the thresholds
- Trashcan allows a point to be deleted.

# Deleted Results

- If a result is deleted, the points that had used that result are marked with a Star.



# Notification – Pop-up

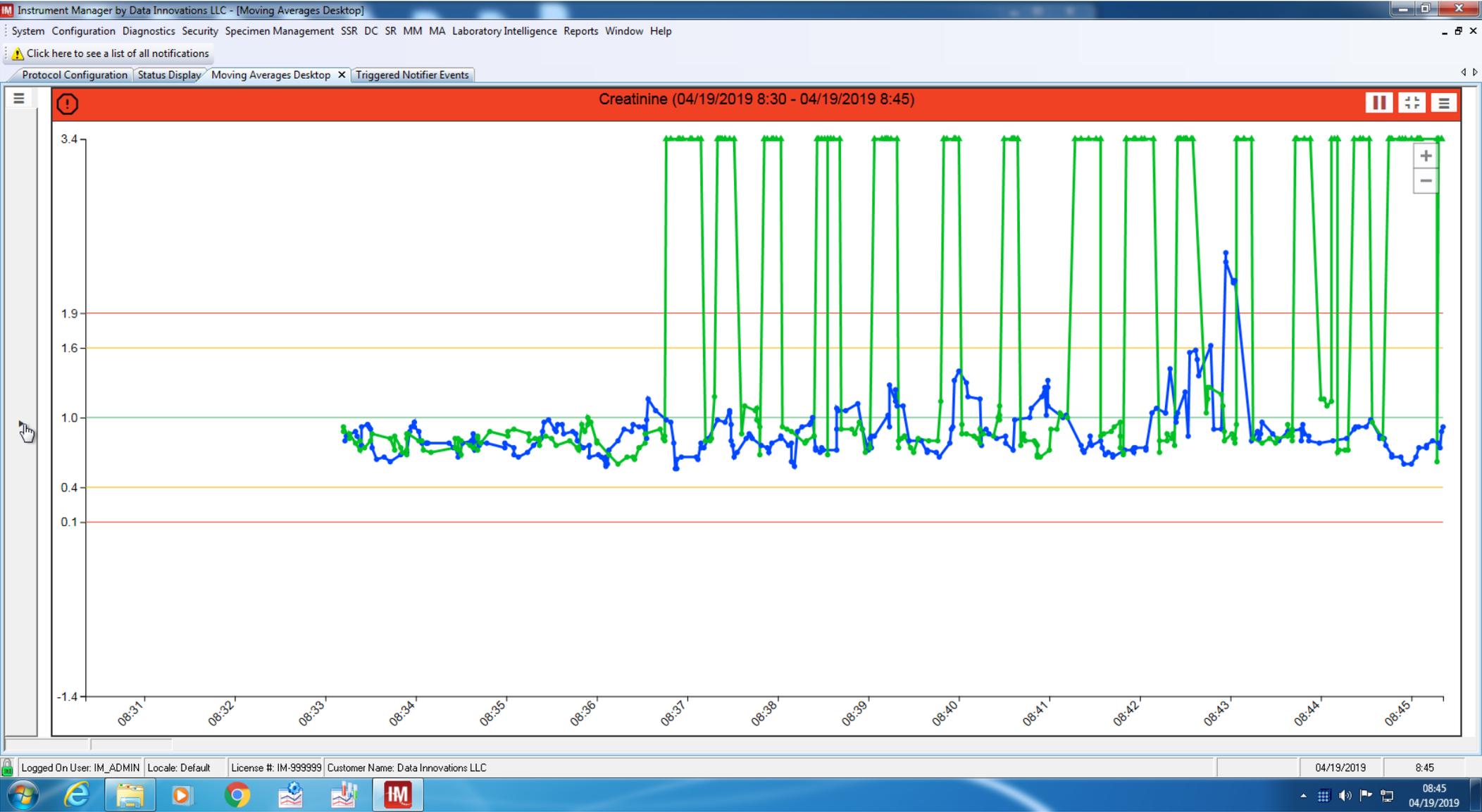
The screenshot displays the 'Instrument Manager' software interface. At the top, a notification pop-up is visible with the text: 'Click here to see a list of all notifications'. Below this, the main dashboard is titled 'Dashboard: Chemistry'. It features a grid of 84 individual test result panels, arranged in 12 rows and 7 columns. Each panel contains a small line graph showing data trends over time. The tests included are: A1c, Alb, ALKP, ALT, AMYL, ASO, AST, B12, BUN, CA, Chol, CL, CO2, Cort, CPK, Creatinine, CRP, DBIL, DHEAS, E3, FOL, FSH, FT3, FT4, FTN, GGT, GLU, HCG, HDL, IgA, IgG, IgM, LDH, LH, Mg, Na, PALB, PGR, PHOS, Potassium, Prolactin, PSA, RF, TBIL, Total Protein, Transferrin, TRIG, TSH, and WBC. The interface also shows a status bar at the bottom with system information: 'Logged On User: IM\_ADMIN', 'Locale: Default', 'License #: IM-999999', 'Customer Name: Data Innovations LLC', and the date/time '04/19/2019 8:37'. The Windows taskbar is visible at the very bottom.

# Shows when violation took place

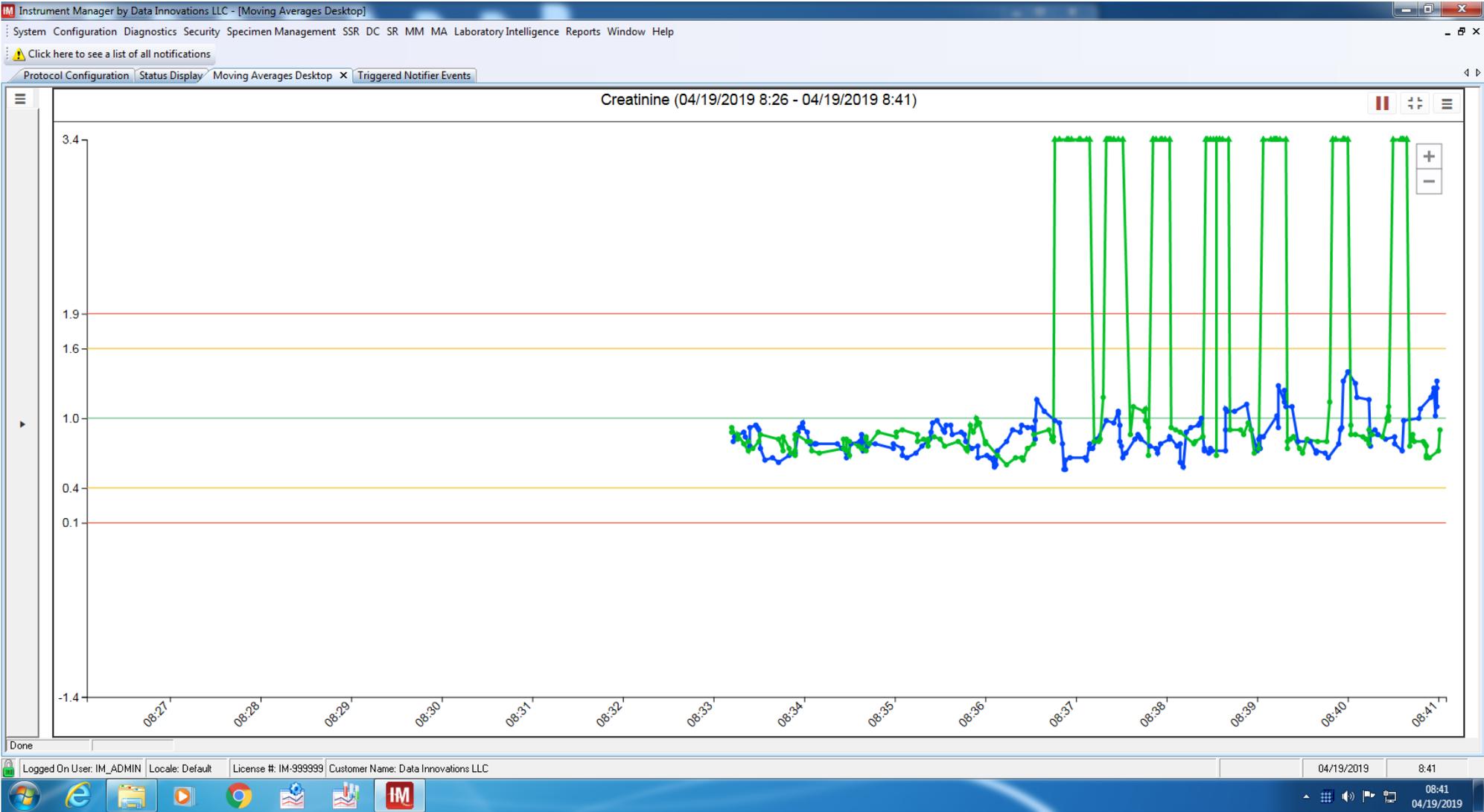
The screenshot displays the 'Instrument Manager by Data Innovations LLC' interface. The main window is titled 'Triggered Notifier Events' and contains a table with the following columns: Title, Created, Text, Type, and Connection. The table lists 40 events, all with the title 'MA High' and the connection 'RUG Chemistry'. The text for each event describes a violation of the error threshold for the Moving Averages protocol for Creatinine. The 'Created' column shows timestamps from 2019-04-19 08:36:54.019 to 2019-04-19 08:39:19.709. The 'Type' column for all events is 'User Defined'. At the bottom of the window, there are buttons for 'Clear User Defined Events', 'Refresh', and 'Close'. The system tray at the bottom shows the user is logged on as 'IM\_ADMIN', the date is '04/19/2019', and the time is '8:39'.

Title	Created	Text	Type	Connection
MA High	2019-04-19 08:36:54.019	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:36:55.828	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:36:57.856	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:37:02.989	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:37:03.113	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:37:07.31	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:37:09.001	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:37:20.244	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:37:21.757	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:37:22.381	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:37:23.957	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:37:25.095	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:37:28.215	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:37:31.897	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:37:51.085	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:37:53.534	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:37:56.358	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:37:57.2	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:37:59.712	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:38:02.099	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:38:26.357	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:38:27.028	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:38:29.524	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:38:31.115	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:38:33.002	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:38:35.42	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:38:37.012	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:38:41.489	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:39:04.234	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:39:09.07	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:39:11.878	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:39:12.19	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:39:13.219	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:39:15.778	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry
MA High	2019-04-19 08:39:19.709	A result created a point above the error threshold for Moving Averages protocol: Creatinine, on series: C2, from	User Defined	RUG Chemistry

# Banner color and symbol match level



# Reflect current status

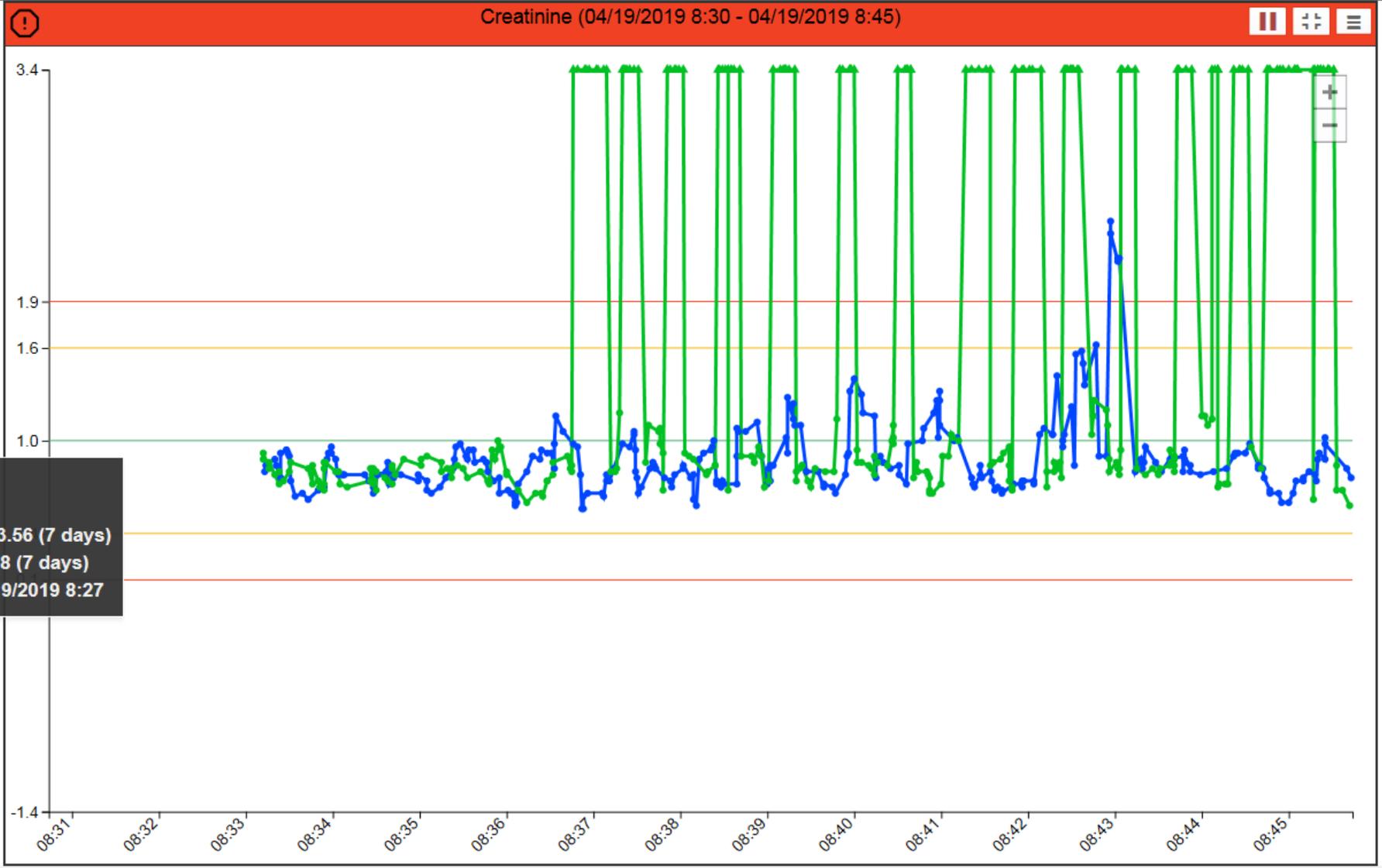


Click here to see a list of all notifications

Protocol Data	
Protocol Name	Creatinine
Last Restart	04/19/2019 8:27
Target SD	0.3
Error High	1.9
Warning High	1.6
Target Mean	1.0
Warning Low	0.4
Error Low	0.1
<input checked="" type="checkbox"/> Series	
<input checked="" type="checkbox"/> C1	
<input checked="" type="checkbox"/> C2	

**C2**

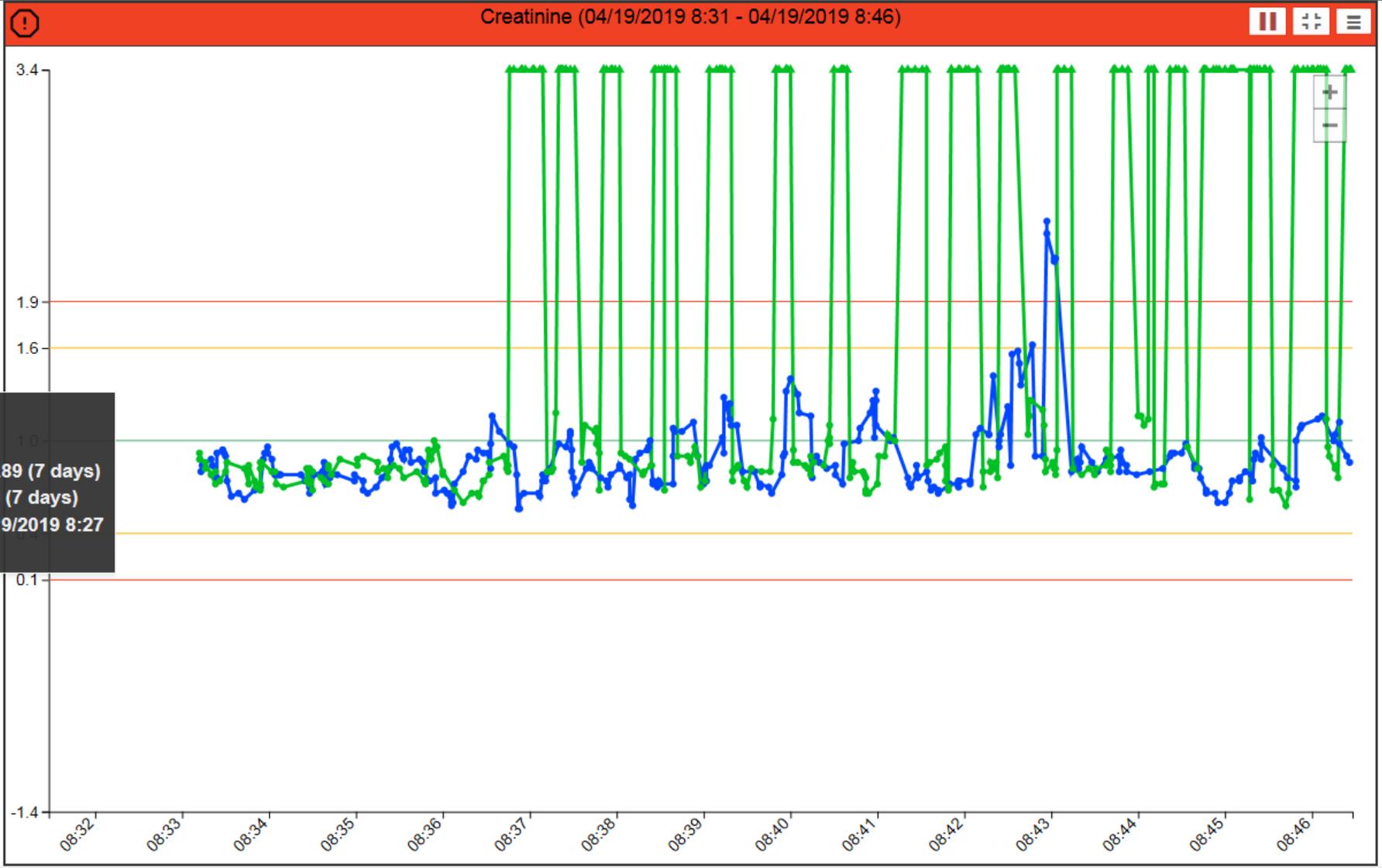
- Running Mean: 13.56 (7 days)
- Running SD: 12.88 (7 days)
- Last Restart: 04/19/2019 8:27

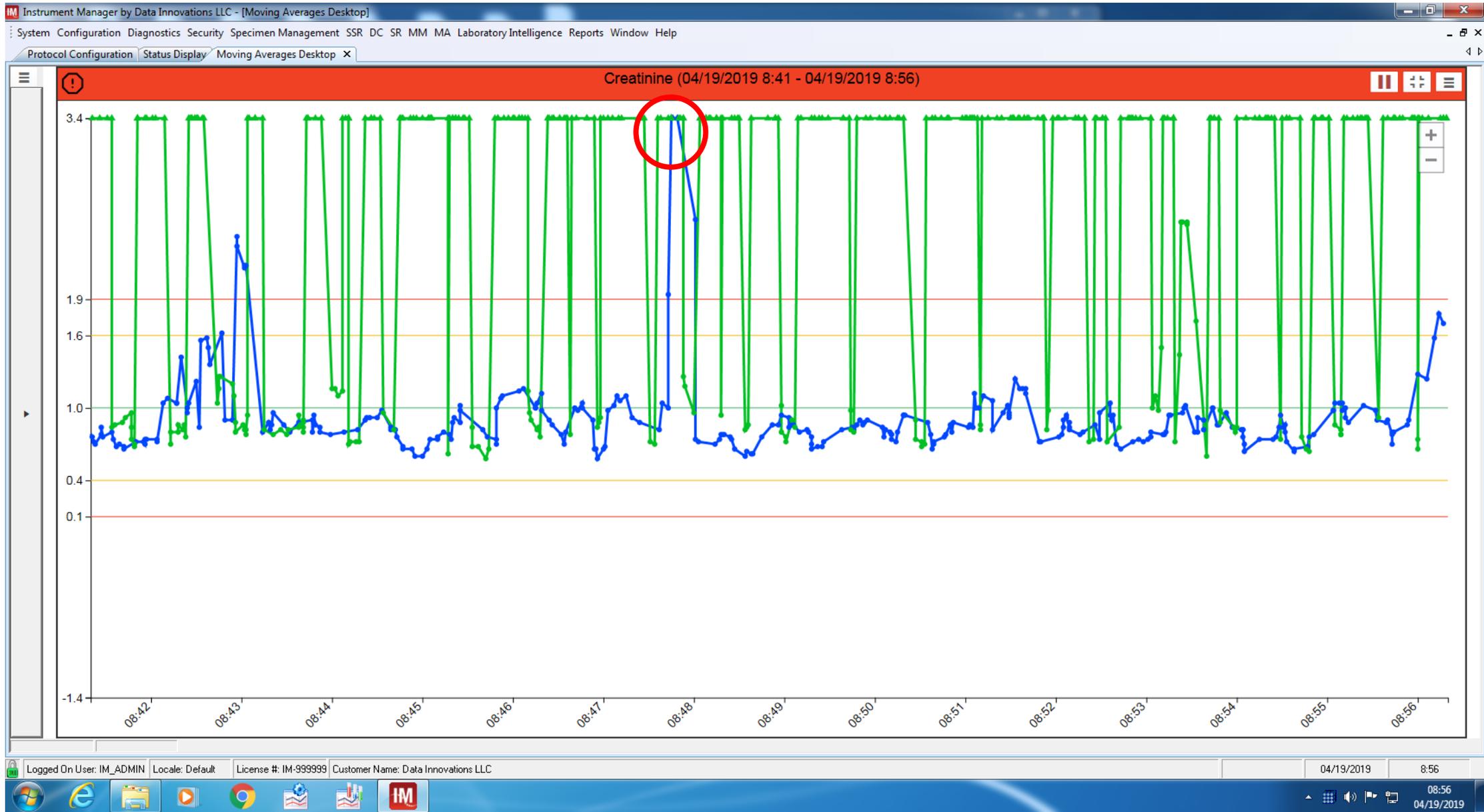


Protocol Data	
Protocol Name	Creatinine
Last Restart	04/19/2019 8:27
Target SD	0.3
Error High	1.9
Warning High	1.6
Target Mean	1.0
Warning Low	0.4
Error Low	0.1
<input checked="" type="checkbox"/> Series	
<input checked="" type="checkbox"/> C1	
<input checked="" type="checkbox"/> C2	

**C1**

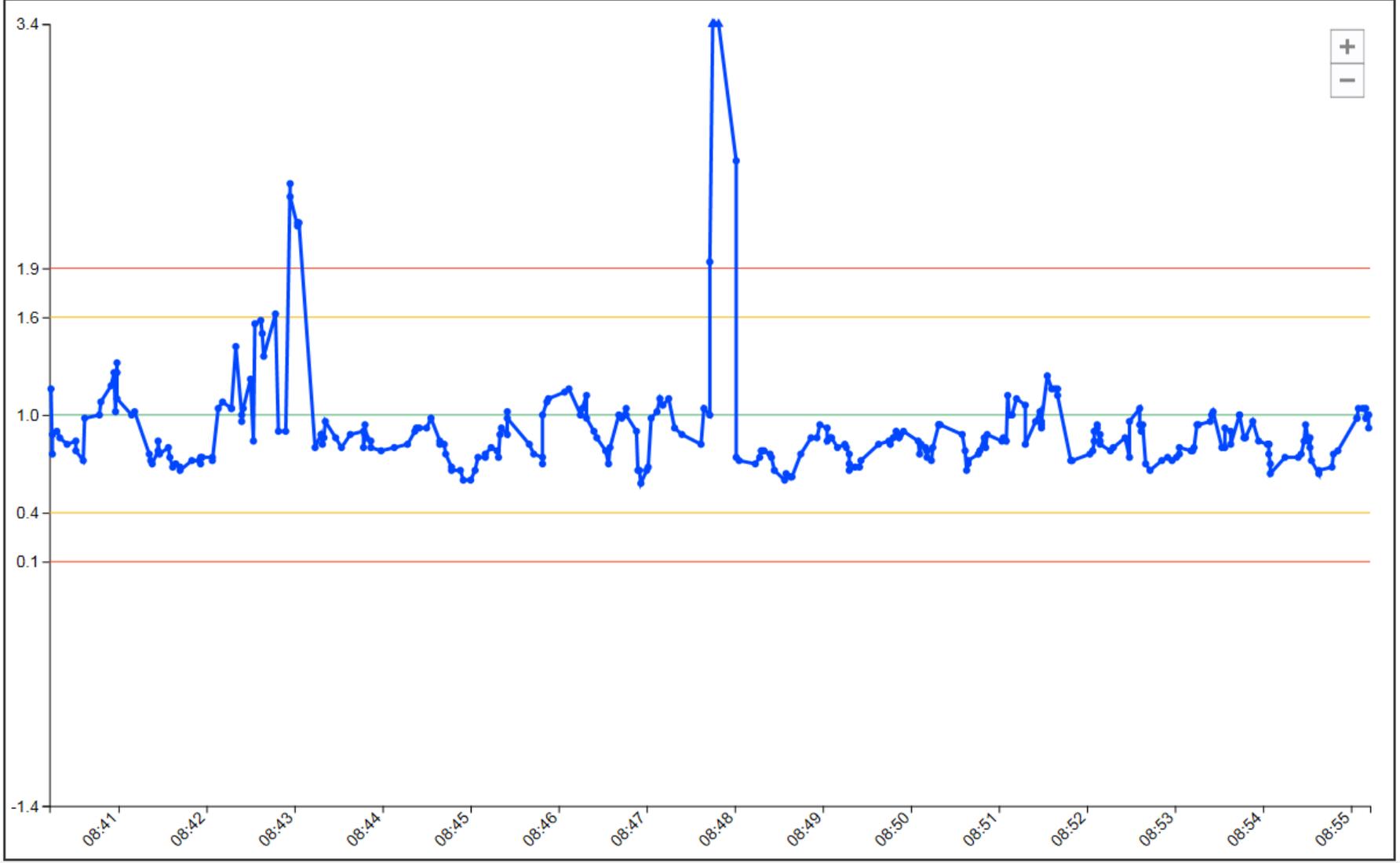
- Running Mean: 0.89 (7 days)
- Running SD: 0.39 (7 days)
- Last Restart: 04/19/2019 8:27





Protocol Data	
Protocol Name	Creatinine
Last Restart	04/19/2019 8:27
Target SD	0.3
Error High	1.9
Warning High	1.6
Target Mean	1.0
Warning Low	0.4
Error Low	0.1
<input checked="" type="checkbox"/> Series	
<input checked="" type="checkbox"/> C1	
<input type="checkbox"/> C2	

Creatinine (04/19/2019 8:40 - 04/19/2019 8:55)



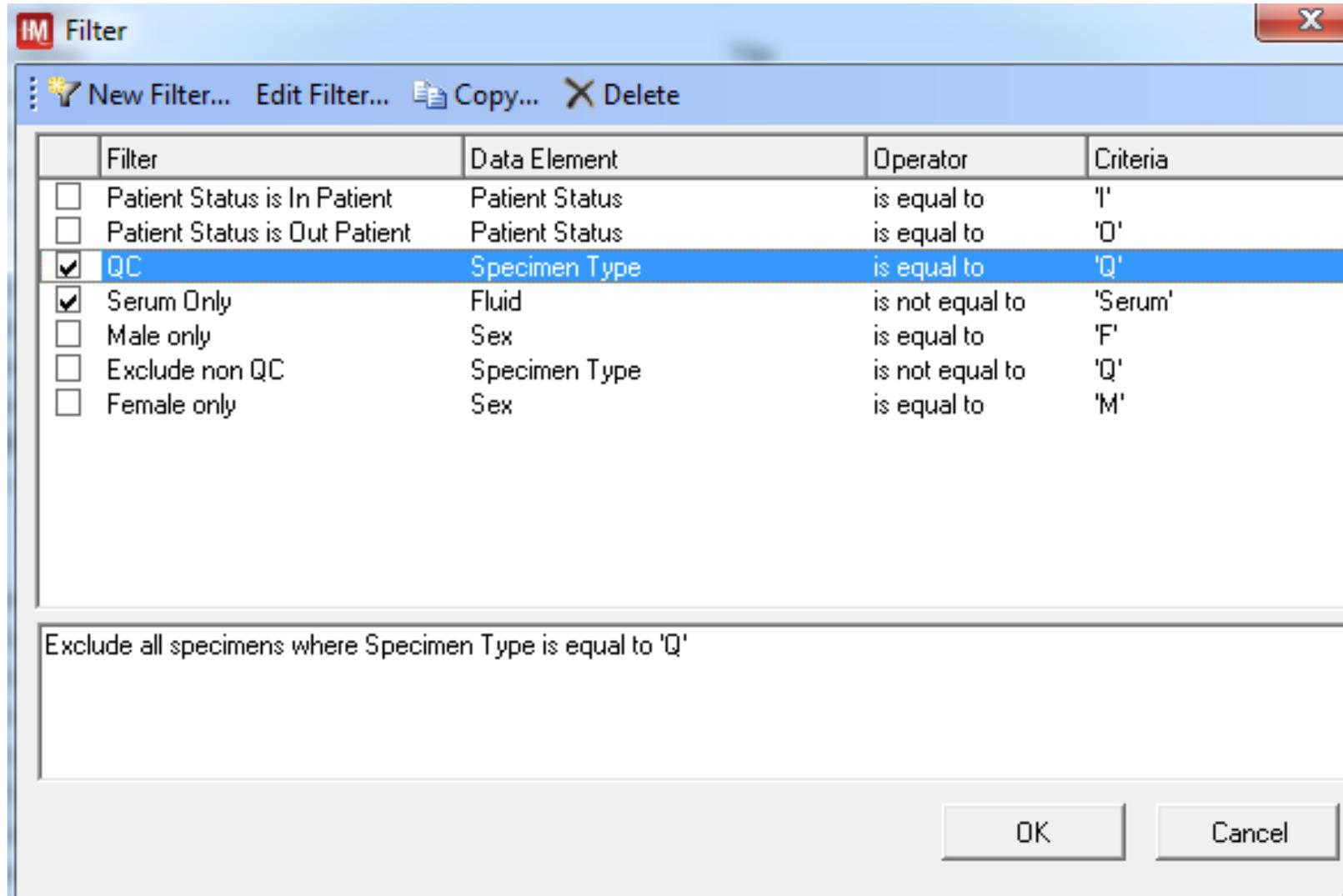
# The use of Filters

The screenshot shows the 'Protocol Configuration' window with the following settings:

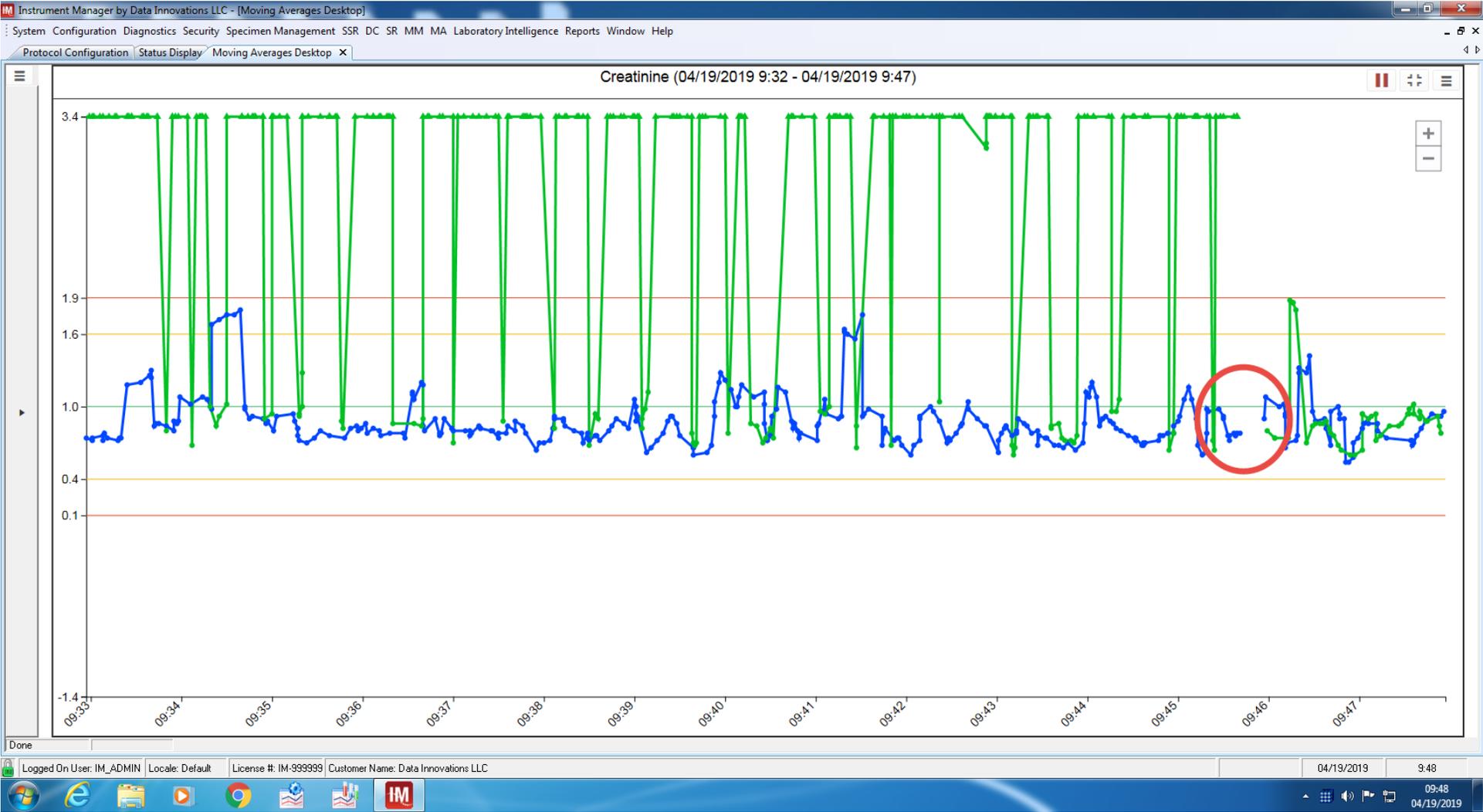
Section	Property	Value	
General Protocol Options	Name	Creatinine	
	Description	Test for the RUG data	
	Site	South	
	Location		
	Enabled	Yes	
	Days to keep raw result data	3	
	Days to keep averaged points	3	
	Automatically Restart Protocol	Never	
	X-Axis Time Range - Value	15	
	X-Axis Time Range - Units	Minute(s)	
	Graph minimum value		
	Graph maximum value		
	Graph major unit		
	Graph Y-axis label		
	Filter*	Applied Filters: 1	
Automatic result exclusion	Exclusion Low*	Do not automatically exclude results	
	Exclusion High*	Do not automatically exclude results	
	Decimal Separator	.	
	Trigger Notifier Event on Removal of Result	- None -	
	Trigger Notifier Event on Series Restart	- None -	
	Override General Appearance Settings	No	
Override General Columns To Be Shown In Data Grid	No		
Protocol Details	Calculation Method**	Moving Average	
	Automatically calculate Target Mean and Target SD	Never	
	Target Mean	1.0	
	Target SD	0.3	
	Number of results to use in calculation**	5	
	Automatically Release Results	No	
	Series	C1	Series Name
Instrument ID			RUG Chemistry: C1
Test Code(s)			CREA
Line Color			0; 70; 255
Ignore errors and warnings for this series			No
C2		Series Name	C2
		Instrument ID	RUG Chemistry: C2
		Test Code(s)	CREA
		Line Color	0; 192; 36
		Ignore errors and warnings for this series	No
Warnings and Errors	Number of consecutive points required to trigger error or warning	1	
	Error Low		

Changing items marked with \*\* will require a restart. Changing items marked with \* will suggest a restart.

# Available filters are listed

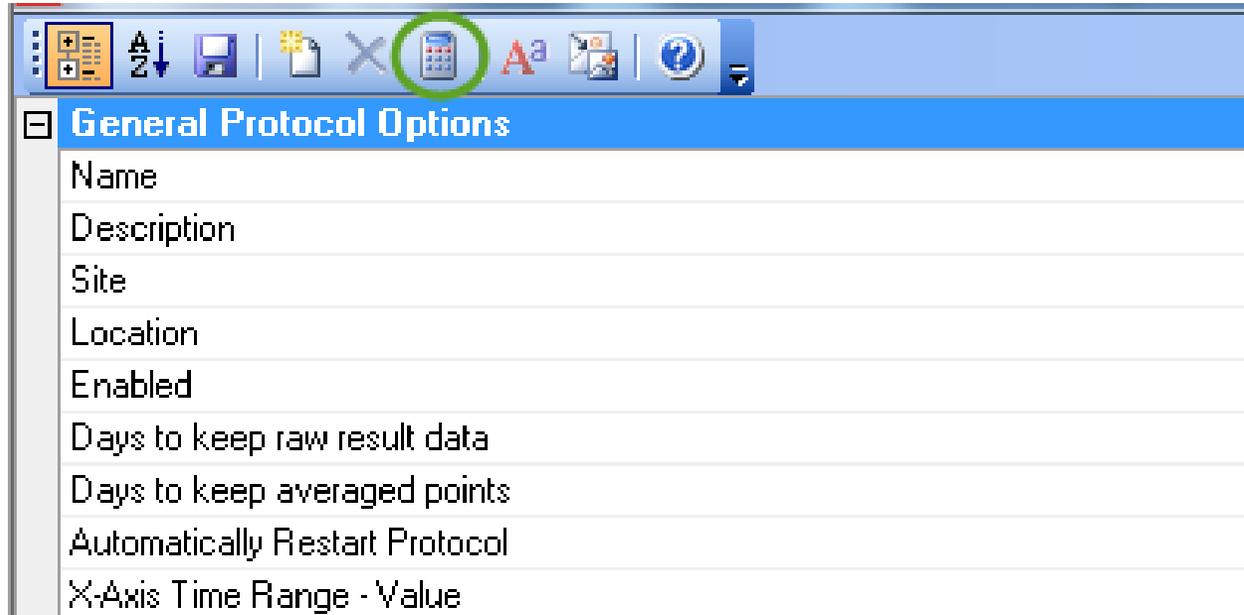


# Effect of Filter



If a protocol is restarted there is a gap between data points

# Calculator button



- Must have at least 1 series defined.
- Will honor the exclusions and filters.
- There must be patient data in SM database.

# Date Range

Protocol Calculator

Start Date: 02/21/2018      End Date: 02/28/2018

SD for QC Level:       False Positive Rate (%):

Confidence Level:       Calculate:

Mean:       Median:

Mean SD:       Median SD:

% Exclusions:       % Exclusions:

Results Included:       Results Included:

Number of results to use in calculation:       Number of results to use in calculation:

Apply Mean:       Apply Median:

Close:

- Defaults to the last week.
- Data range can be adjusted to suit your data.
- More than 200 data points does not significantly improve the statistics.

# Enter QC SD

IM Protocol Calculator

Start Date: 02/21/2018      End Date: 02/28/2018

SD for QC Level:       False Positive Rate (%):

Confidence Level:       Calculate:

Mean:       Median:

Mean SD:       Median SD:

% Exclusions:       % Exclusions:

Results Included:       Results Included:

Number of results to use in calculation:       Number of results to use in calculation:

Apply Mean:       Apply Median:

Close:

- Use SD from 'normal' QC or one near the normal range.
- May average SD from multiple QC.
- Used to calculate the Number of results to use in calculation.

# Enter False Positive Rate

The screenshot shows the 'Protocol Calculator' window with the following fields and controls:

- Start Date: 02/21/2018
- End Date: 02/28/2018
- SD for QC Level: [Empty]
- Confidence Level: [Empty]
- Mean: [Empty]
- Mean SD: [Empty]
- % Exclusions: [Empty]
- Results Included: [Empty]
- Number of results to use in calculation: [Empty]
- Apply Mean: [Button]

On the right side of the window:

- False Positive Rate (%): [Empty] (highlighted with a green oval)
- Calculate: [Button]
- Median: [Empty]
- Median SD: [Empty]
- % Exclusions: [Empty]
- Results Included: [Empty]
- Number of results to use in calculation: [Empty]
- Apply Median: [Button]
- Close: [Button]

- Statistically there will always be a certain level of false positives.
- Enter any value between 1 and 25
- 5% is typical

# Enter Confidence Level

IM Protocol Calculator

Start Date: 02/21/2018

End Date: 02/28/2018

SD for QC Level: [ ]

False Positive Rate (%): [ ]

**Confidence Level: [ ]**

Mean: [ ]

Median: [ ]

Mean SD: [ ]

Median SD: [ ]

% Exclusions: [ ]

Results Included: [ ]

Number of results to use in calculation: [ ]

Number of results to use in calculation: [ ]

Apply Mean

Apply Median

Close

- Enter Confidence Level.
- Choices are 90%, 95% and 99%.
- 95% is typical.

# Press Calculate

IM Protocol Calculator

Start Date: 02/21/2018      End Date: 02/28/2018

SD for QC Level:       False Positive Rate (%):

Confidence Level:       **Calculate**

Mean:       Median:

Mean SD:       Median SD:

% Exclusions:       % Exclusions:

Results Included:       Results Included:

Number of results to use in calculation:       Number of results to use in calculation:

Apply Mean      Apply Median

Close

- Use SD from 'normal' QC or one near the normal range.
- May average SD from multiple QC.
- Used to calculate the Number of results to use in calculation.

# Values are shown

The screenshot shows the 'Protocol Calculator' window with the following input fields and results:

Input Field	Value
Start Date	02/21/2018
End Date	02/28/2018
SD for QC Level	2.9
False Positive Rate (%)	5
Confidence Level	95%
Calculate	Button
Mean	25.0
Median	21.0
Mean SD	16.0
Median SD	16.0
% Exclusions	1%
% Exclusions	2%
Results Included	3939
Results Included	3910
Number of results to use in calculation	100
Number of results to use in calculation	100
Apply Mean	Button
Apply Median	Button

Test Code(s): ALI	Test Code(s): ALI
<b>RAW Mean:</b> 25.9	<b>RAW Median:</b> 21.0
<b>RAW Mean SD:</b> 20.7	<b>RAW Median SD:</b> 20.7
<b>RAW Mean N:</b> 3991	<b>RAW Median N:</b> 3991
<b>RAW Mean 5 SD:</b> 103.6	<b>RAW Median 5 SD:</b> 103.6
<b>Mean +5SD:</b> 129.5	<b>Median +5SD:</b> 124.6
<b>Mean -5SD:</b> -77.7	<b>Median -5SD:</b> -82.6
<b>Mean N:</b> 3971	<b>Median N:</b> 3970
<b>Exclusion High:</b> 89	<b>Exclusion High:</b> 85
<b>Exclusion Low:</b> -39	<b>Exclusion Low:</b> -43

- The Mean, Median and SD are displayed.

# Review Statistics

The screenshot shows the 'IM Protocol Calculator' window. At the top, there are input fields for 'Start Date' (02/21/2018) and 'End Date' (02/28/2018). Below these are 'SD for QC Level' (2.9) and 'False Positive Rate (%)' (5). A 'Confidence Level' dropdown is set to '95%'. A 'Calculate' button is present. Below the calculation fields, there are two columns of results: 'Mean' (25.0) and 'Median' (21.0); 'Mean SD' (16.0) and 'Median SD' (16.0). A green box highlights the '% Exclusions' and 'Results Included' fields for both columns. The left column shows 1% exclusions and 3939 results included. The right column shows 2% exclusions and 3910 results included. Below these are 'Number of results to use in calculation' (100) and 'Apply Mean'/'Apply Median' buttons. At the bottom, two scrollable text boxes show detailed statistics for 'Test Code(s): ALI'. The left box shows 'RAW Mean: 25.9', 'RAW Mean SD: 20.7', 'RAW Mean N: 3991', 'RAW Mean 5 SD: 103.6', 'Mean +5SD: 129.5', 'Mean -5SD: -77.7', 'Mean N: 3971', 'Exclusion High: 89', and 'Exclusion Low: -39'. The right box shows 'RAW Median: 21.0', 'RAW Median SD: 20.7', 'RAW Median N: 3991', 'RAW Median 5 SD: 103.6', 'Median +5SD: 124.6', 'Median -5SD: -82.6', 'Median N: 3970', 'Exclusion High: 85', and 'Exclusion Low: -43'. A 'Close' button is at the bottom right.

- The % exclusion shows the percent of the results that were rejected based on exclusions and filters.
- A default exclusion of +/- 5 SD is used to removed extreme results.
- A large % exclusion might indicate a need to review filters and exclusions
- A small number of included results may indicate a need to adjust exclusions or filters or this may not be a good candidate for moving averages.

# Number of results to use in calculation

IM Protocol Calculator

Start Date: 02/21/2018 End Date: 02/28/2018

SD for QC Level: 2.9 False Positive Rate (%): 5

Confidence Level: 95%

Calculate

Mean: 25.0 Median: 21.0

Mean SD: 16.0 Median SD: 16.0

% Exclusions: 1% % Exclusions: 2%

Results Included: 3939 Results Included: 3910

Number of results to use in calculation: 100 Number of results to use in calculation: 100

Apply Mean Apply Median

Test Code(s): ALI

RAW Mean: 25.9  
RAW Mean SD: 20.7  
RAW Mean N: 3991

RAW Mean 5 SD: 103.6  
Mean +5SD: 129.5  
Mean -5SD: -77.7  
Mean N: 3971

Exclusion High: 89  
Exclusion Low: -39

Test Code(s): ALI

RAW Median: 21.0  
RAW Median SD: 20.7  
RAW Median N: 3991

RAW Median 5 SD: 103.6  
Median +5SD: 124.6  
Median -5SD: -82.6  
Median N: 3970

Exclusion High: 85  
Exclusion Low: -43

Close

- This is N
- Truncated at 100 (can be much higher but that is impractical)

# Informational Statistics

**IM Protocol Calculator**

Start Date: 02/21/2018      End Date: 02/28/2018

SD for QC Level: 2.9      False Positive Rate (%): 5

Confidence Level: 95%      **Calculate**

Mean: 25.0      Median: 21.0

Mean SD: 16.0      Median SD: 16.0

% Exclusions: 1%      % Exclusions: 2%

Results Included: 3939      Results Included: 3910

Number of results to use in calculation: 100      Number of results to use in calculation: 100

**Apply Mean**      **Apply Median**

---

**Test Code(s): ALI**

<b>RAW Mean:</b> 25.9 <b>RAW Mean SD:</b> 20.7 <b>RAW Mean N:</b> 3991	<b>RAW Median:</b> 21.0 <b>RAW Median SD:</b> 20.7 <b>RAW Median N:</b> 3991
<b>RAW Mean 5 SD:</b> 103.6 <b>Mean +5SD:</b> 129.5 <b>Mean -5SD:</b> -77.7 <b>Mean N:</b> 3971	<b>RAW Median 5 SD:</b> 103.6 <b>Median +5SD:</b> 124.6 <b>Median -5SD:</b> -82.6 <b>Median N:</b> 3970
<b>Exclusion High:</b> 89 <b>Exclusion Low:</b> -39	<b>Exclusion High:</b> 85 <b>Exclusion Low:</b> -43

**Close**

- Additional information that shows the raw statistics

# Apply values

The screenshot shows the 'Protocol Calculator' window with the following input fields and values:

- Start Date: 02/21/2018
- End Date: 02/28/2018
- SD for QC Level: 2.9
- False Positive Rate (%): 5
- Confidence Level: 95%
- Calculate button
- Mean: 25.0
- Median: 21.0
- Mean SD: 16.0
- Median SD: 16.0
- % Exclusions: 1%
- % Exclusions: 2%
- Results Included: 3939
- Results Included: 3910
- Number of results to use in calculation: 100
- Number of results to use in calculation: 100

Below the input fields are two buttons: 'Apply Mean' and 'Apply Median', both highlighted with a green border.

Two summary panels are shown below the buttons, both for 'Test Code(s): ALI':

**Left Panel (Mean):**

- RAW Mean: 25.9
- RAW Mean SD: 20.7
- RAW Mean N: 3991
- RAW Mean 5 SD: 103.6
- Mean +5SD: 129.5
- Mean -5SD: -77.7
- Mean N: 3971
- Exclusion High: 89
- Exclusion Low: -39

**Right Panel (Median):**

- RAW Median: 21.0
- RAW Median SD: 20.7
- RAW Median N: 3991
- RAW Median 5 SD: 103.6
- Median +5SD: 124.6
- Median -5SD: -82.6
- Median N: 3970
- Exclusion High: 85
- Exclusion Low: -43

A 'Close' button is located at the bottom right of the window.

- Allows for the Mean or Median and the associated, SD and Number of results to use in calculation to be entered automatically.
- Values can be edited after they are put into the protocol.

# Applying Values

The screenshot shows the 'IM Protocol Configuration' window. The 'General Protocol Options' section includes fields for Name (ALT), Description (ALT), Site, Location, Enabled (Yes), Days to keep raw result data (9999), Days to keep averaged points (9999), Automatically Restart Protocol (Never), X-Axis Time Range - Value (15), X-Axis Time Range - Units (Minute(s)), Graph minimum value (0), Graph maximum value (60), Graph major unit (5), Graph Y-axis label (ALT), and Filter\* (Click to edit filters). The 'Automatic result exclusion' section includes Exclusion Low\* (4 (Standard Deviations)), Exclusion High\* (4 (Standard Deviations)), Decimal Separator (.), Trigger Notifier Event on Removal of Result (- None -), and Trigger Notifier Event on Series Restart (- None -). The 'Override General Appearance Settings' and 'Override General Columns To Be Shown In Data Grid' are both set to No. The 'Protocol Details' section includes Calculation Method\*\* (Moving Average), Automatically calculate Target Mean and Target SD (Never), Target Mean (22.9), Target SD (15.3), Number of results to use in calculation\*\* (100), and Automatically Release Results (No). The 'Series' section includes ALT Chem 1 with Series Name (ALT Chem 1), Instrument ID (Chemistry 01), Test Code(s) (ALT), Line Color (255; 0; 255), and Ignore errors and warnings for this series (No). ALT Chem 2 and ALT Chem 3 are also listed but not expanded.

General Protocol Options	
Name	ALT
Description	ALT
Site	
Location	
Enabled	Yes
Days to keep raw result data	9999
Days to keep averaged points	9999
Automatically Restart Protocol	Never
X-Axis Time Range - Value	15
X-Axis Time Range - Units	Minute(s)
Graph minimum value	0
Graph maximum value	60
Graph major unit	5
Graph Y-axis label	ALT
Filter*	Click to edit filters
Automatic result exclusion	
Exclusion Low*	4 (Standard Deviations)
Exclusion High*	4 (Standard Deviations)
Decimal Separator	.
Trigger Notifier Event on Removal of Result	- None -
Trigger Notifier Event on Series Restart	- None -
Override General Appearance Settings	No
Override General Columns To Be Shown In Data Grid	No
Protocol Details	
Calculation Method**	Moving Average
Automatically calculate Target Mean and Target SD	Never
Target Mean	22.9
Target SD	15.3
Number of results to use in calculation**	100
Automatically Release Results	No
Series	
ALT Chem 1	
Series Name	ALT Chem 1
Instrument ID	Chemistry 01
Test Code(s)	ALT
Line Color	255; 0; 255
Ignore errors and warnings for this series	No
ALT Chem 2	
ALT Chem 3	

- Mean, SD and Number of results to use in calculation are entered.
- Values can be edited.
- Median requires additional calculations be to licensed.

# Impact of N



Thank you for your time.

