How to set-up and Configure MA
Setting up Protocols and Dashboards
Agenda

1. Review of Moving Averages
2. Setting up Defaults
3. Setting up a Protocol
4. Calculating Mean, Standard Deviation and N
5. Setting up a Dashboard
Typical Practice – Quality Control (QC)

- Material with known (established) values
- Run at specified intervals (once per day, once per shift, every x patients)
- Results compared to acceptable range
- Assay is acceptable or not acceptable
- Limitations:
  - Only know the instrument performance at that time – what happens between QC?
  - Delay in identifying potentially inaccurate results which may have been acted on
  - Expensive – cost of reagents and cost of QC material itself.
Moving Averages – The Laboratory

• Provides Continual Monitoring between QC events.
• Identify issues more quickly
  – Faster resolution
  – Better Patient Care
  – Fewer corrected reports
• Uses patient results – no additional material or reagent costs
• Limitation
  – Not applicable to every analyte
• Compliment to current QC practice, does not replace them.
How does it work?
What does it look like?
MA Desktop – pre 8.16.00
MA Desktop – 8.16.00

Dashboard: RUG

<table>
<thead>
<tr>
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<th>A1c</th>
<th>Alb</th>
<th>BUN</th>
<th>Cort</th>
<th>ALKP</th>
<th>ALT</th>
<th>AMYL</th>
<th>ASO</th>
<th>AST</th>
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<th>FOL</th>
<th>FSH</th>
<th>FT3</th>
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<th>PGR</th>
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<th>LH</th>
<th>Mg</th>
<th>Na</th>
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<th>TBIL</th>
<th>Test</th>
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## General Configuration

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid Background Color</td>
<td>255; 255; 255</td>
</tr>
<tr>
<td>Grid Foreground Color</td>
<td>0; 0; 0</td>
</tr>
<tr>
<td>Chart Foreground Color</td>
<td>255; 255; 255</td>
</tr>
<tr>
<td>Chart Background Color</td>
<td>255; 255; 255</td>
</tr>
<tr>
<td>Chart Font Color</td>
<td>0; 0; 0</td>
</tr>
<tr>
<td>Chart Font Size</td>
<td>14</td>
</tr>
<tr>
<td>Chart Desktop Color</td>
<td>255; 255; 255</td>
</tr>
<tr>
<td>Mean Color</td>
<td>67; 172; 106</td>
</tr>
<tr>
<td>Warning Threshold Color</td>
<td>244; 180; 0</td>
</tr>
<tr>
<td>Error Threshold Color</td>
<td>240; 65; 36</td>
</tr>
<tr>
<td>Line Width</td>
<td>0.5</td>
</tr>
<tr>
<td>Refresh Interval (seconds)</td>
<td>0</td>
</tr>
<tr>
<td>Columns to be shown in data grid</td>
<td>MA Result Value, Result Date/Time, Collection Date/Time, Patient Age, Sex, Location - Ward, MA Violation</td>
</tr>
</tbody>
</table>
Columns to show in data grid

![Data Element Field Chooser](image)

- **Data Elements**:
  - ADMIS ID
  - Account Number
  - Address Lines
  - Address Location
  - Admission Date
  - Admitting Physician
  - Age Units
  - Allergy ID
  - Allquotted Date/Time
  - Alternate Patient ID
  - Attending Physician
  - B-Hemolytic Flag
  - Beta Lactamase Result
  - Biotype
  - R mike Whewell

- **Selected Data Elements**:
  - NA Result Value
  - Result Date/Time
  - Collection Date/Time
  - Patient Age
  - Sex
  - Location - Ward
  - MA Violation

Data Element List:

- MA Result Value, Result Date/Time, Collection Date/Time, Patient Age, Sex, Location - Ward, MA Violation

[OK] [Cancel]
Starting a new Protocol
General Options
Override Defaults

- Override General Appearance Settings
  - Grid Background Color: 255; 255; 255
  - Grid Foreground Color: 0; 0; 0
  - Chart Foreground Color: 255; 255; 255
  - Chart Background Color: 255; 255; 255
  - Chart Font Color: 0; 0; 0
  - Chart Font Size: 14
  - Mean Color: 67; 172; 106
  - Warning Threshold Color: 244; 186; 0
  - Error Threshold Color: 240; 85; 36
  - Line Width: 0.5

- Override General Columns to Be Shown in Data Grid
  - Columns to be shown in grid: MA Result Value, Result Date/Time, Collection Date/Times, Patient Age, Sex, Location - Ward, MA Violation

- Protocol Details
  - Column Meta Data: Metrics, Reports, Meta Data, Events
Setting Target, SD, N and Calculation Method

<table>
<thead>
<tr>
<th>Protocol Details</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculation Method</td>
<td>Moving Average</td>
</tr>
<tr>
<td>Automatically calculate Target Mean and Target SD</td>
<td>Never</td>
</tr>
<tr>
<td>Target Mean</td>
<td></td>
</tr>
<tr>
<td>Target SD</td>
<td></td>
</tr>
<tr>
<td>Number of results to use in calculation</td>
<td>0</td>
</tr>
<tr>
<td>Automatically Release Results</td>
<td>No</td>
</tr>
</tbody>
</table>
## Adding a Series

<table>
<thead>
<tr>
<th>Series</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Series Name</td>
<td></td>
</tr>
<tr>
<td>Instrument ID</td>
<td></td>
</tr>
<tr>
<td>Test Code(s)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Line Color</th>
<th>0; 0; 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ignore errors and warnings for this series</td>
<td>No</td>
</tr>
</tbody>
</table>

### Warnings and Errors

<table>
<thead>
<tr>
<th>Number of errors that require attention</th>
<th>0</th>
</tr>
</thead>
</table>
Adding a Series

Connection Name: Chemistry 01

Instrument ID:
- Test1
- Test2
Select Connection and Instrument ID

Connection Name: Chemistry 01
Instrument ID: Test1

[OK] [Cancel]
Adding A test
## Setting Target, SD, N and Calculation Method

<table>
<thead>
<tr>
<th>Protocol Details</th>
<th>Moving Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculation Method&quot;</td>
<td>Moving Average</td>
</tr>
<tr>
<td>Automatically calculate Target Mean and Target SD</td>
<td>Never</td>
</tr>
<tr>
<td>Target Mean</td>
<td>Never</td>
</tr>
<tr>
<td>Target SD</td>
<td>No</td>
</tr>
<tr>
<td>Number of results to use in calculation&quot;</td>
<td>0</td>
</tr>
<tr>
<td>Automatically Release Results</td>
<td>No</td>
</tr>
</tbody>
</table>
Determine Protocol Values – Starting Points

• Mean, SD, and Number to use in point (N)

• Automated Methods
  – IM 8.16 – built in calculator
  – IM 8.12-8.15 – calculate using microsite

• Other Options
  – Use center of reference range for Mean
  – Use the Mean as the SD
  – Use 50 for N – varies based on volume.
• Must have at least 1 series defined.
• Will honor the exclusions and filters.
• There must be patient data in SM database.
Date Range

- 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

- 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

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

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

- 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 Mean, Median and SD are displayed.
Review Statistics

• 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

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

- Additional information that shows the raw statistics

![Image of Protocol Calculator](image.png)

<table>
<thead>
<tr>
<th>Start Date</th>
<th>02/21/2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>SD for QC Level</td>
<td>2.9</td>
</tr>
<tr>
<td>Confidence Level</td>
<td>95%</td>
</tr>
<tr>
<td>Mean</td>
<td>25.0</td>
</tr>
<tr>
<td>Mean SD</td>
<td>15.0</td>
</tr>
<tr>
<td>% Exclusions</td>
<td>1%</td>
</tr>
<tr>
<td>Results Included</td>
<td>3939</td>
</tr>
<tr>
<td>Number of results to use in calculation</td>
<td>100</td>
</tr>
</tbody>
</table>

- **Test Logist Fit 1**
  - RAW Mean: 25.9
  - RAW Mean SD: 20.7
  - RAW Mean N: 3931
  - RAW Mean 5 SD: 103.6
  - Mean +5SD: 129.5
  - Mean -5SD: 77.7
  - Mean N: 3971
  - Exclusion High: 89
  - Exclusion Low: 39

- **Test Logist Fit 1**
  - RAW Median: 21.0
  - RAW Median SD: 20.7
  - RAW Median N: 3931
  - RAW Median 5 SD: 103.6
  - Median +5SD: 124.4
  - Median -5SD: -82.6
  - Median N: 3970
  - Exclusion High: 85
  - Exclusion Low: 43
Apply values

- 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

- Mean, SD and Number of results to use in calculation are entered.
- Values can be edited.
- Median requires additional calculations be to licensed.
If you don’t have 8.16...

<table>
<thead>
<tr>
<th>Test Code</th>
<th>Result</th>
<th>Result Date/Time</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
</table>

**Instructions:**

**Minimum information required on Raw Data Tab**
1. Enter the Test Code (test name) in Column A starting on row 2
2. Enter patient results in Column B starting on row 2

Note: Any number of patient results may be used however at least 200 are recommended.

**Additional information if chart plots are desired.**
Date and time must be entered in one of the two formats.

If the date and time are in the **YYYYMMDDHHMMSS** format:
Place them in column C starting at row 2. The dates and time will be extracted and placed in columns D and E.

If the date and time are in separate **MM/DD/YYYY** and **HH:MM:SS** XM formats:
Place the Date in column D starting in row 2 and place the time in column E starting in row 2. Column C may be left blank.
If you don’t have 8.16...
### Warnings and Errors

<table>
<thead>
<tr>
<th>Number of consecutive points required to trigger error or warning</th>
<th>1</th>
</tr>
</thead>
</table>
| **Error Low**  
| **Threshold Value**  | 2 [Standard Deviations Below mean] |
| **Notifier Event**  | None |
| **Start Holding for Verification**  | Do not hold tests |
| **Mask out of service**  | No |
| **Warning Low**  
| **Threshold Value**  | 1 [Standard Deviations Below mean] |
| **Notifier Event**  | None |
| **Start Holding for Verification**  | Do not hold tests |
| **Mask out of service**  | No |
| **Warning High**  
| **Threshold Value**  | 1 [Standard Deviations Above mean] |
| **Notifier Event**  | None |
| **Start Holding for Verification**  | Do not hold tests |
| **Mask out of service**  | No |
| **Error High**  
| **Threshold Value**  | 2 [Standard Deviations Above mean] |
| **Notifier Event**  | None |
| **Start Holding for Verification**  | Do not hold tests |
| **Mask out of service**  | No |

- Allows user to require more than one consecutive point before an event is triggered.

- Thresholds may be set using Standard Deviation, Percent, Absolute number or SD Prime (SD divided by the square root of the number of observations).

- Initially set them very wide and narrow as filters are put into place.

- Allows flagging if too many results are excluded.
Copying a Protocol

- Once a protocol has been set up, it can be copied.
Copying a Protocol

- Copy will be labeled Copy [X] of Protocol Name. (e.g. Copy [1] of ALT)
- Additional copies will be [2], [3] etc.
- Useful when doing multiple analytes for the same series.
- Only select items need to be edited. (e.g. name, test code, Mean, SD, N etc.)
Summary

• Moving Averages is used to enhance QC, not replace it.
• Defaults control the general look of the Dashboard
• Defaults can be overridden within individual protocols
• Set-up a few protocols to start
• Calculator available to establish starting Mean, SD, N
• Set-up Dashboards in IM8.16.00

• Next time: Testing, deploying, and Refining Protocols
Questions?

Thank you for your time!

Movingaverages.datainnovations.com