



Ongoing Medical Review of Clinical Trial Data with TIBCO Spotfire & Beyond

08 June 2017

Phuse Single Day Event:
Transforming Data Visualization – A Peek into the Future of Clinical Data
Analysis

Presented by Yves Snoeckx

Donna Williams, *Discovery* Donna Williams, an autistic
artist, author
and renowned autism advocate, was
diagnosed with breast cancer in 2011

Agenda:

- Who's Talking?
- History
- SPOTFIRE Templates
- Great Features
- Data Source
- Beyond Spotfire
- Architecture Insight
- Challenges/Opportunities

Who's Talking

- Yves Snoeckx
- Pharmacist with passion for data visualization/data analysis
- US based Belgian citizen
- 10+ years at Janssen (mostly Global Medical Safety/Pharmacovigilance)
- >2 years Business owner/lead for iDARTs tool for medical review
- Proud father amazed at first grade homework:
 - Interpreting a histogram/bar chart

History/Background

- Good old excel listings
- A few separate smaller scale legacy systems
- Large portfolio with many clinical trials
- 2013-14: holistic initiative to further enhance clinical trials, including



a **validated medical review tool** for ongoing trials to

- 1) review subject and aggregate data
- 2) communicate about the findings

SPOTFIRE Templates

- TIBCO's Spotfire = cornerstone of our tool
 - Graphs/Tables
 - Filtering
 - Drill down
- Created Templates:
 - Master Template
 - TA specific Templates (eg, onco)
 - Select Disease-specific Templates
- Current setup = split build approach
 - Dedicated team of SPOTFIRE analysts & testers
 - Deliver template version to end-users within 2 weeks of data available
 - Subsequently create study-specific visualizations as needed
 - Formal change control process

Master Template

Navigation		
• Inquiry Overview - [Inquiries] • Review Status Overview - [Review Statuses] • Notes Overview - [Notes] • Multi Domain • SAEs with narratives from GMS - [SAETR] • Rave Queries (DCF's) Demographics • Summary Tables (Counts & %) - [DM (T)] • Summary Bar Charts - [DM (G)] Medical History • Listing • Listing with CM - [MH & CM (L)] • Bar Charts by Cat/Term - [MH (G)] • Frequency Table - [MH (T)] • Coding - [MH (C)] Vital Signs • Line Graphs Over Time - [VS (G)] • Cross Table per Patient & Visit - [VS (S)]	Inclusion/Exclusion Criteria • Bar Chart - [IE] • Frequency Table - [IE (T)] Disposition • Bar Charts - [DS (G)] • Frequency Tables - [DS (S)] Adverse Events • Listing • Listing with MH & CM - [AE & MH & CM (L)] • Summary Tables (Counts & %) - [AE (T)] • Summary Bar Charts - [AE (G)] Don't forget your basic listings ; even make them a bit more fancy • Bar Chart by Body System - [PE (G)] Labs • Listing • Listing With AE & MH - [LB & AE & MH (L)] • Line Graphs Over Time - [LB (G)] • Hy's Law Plot - [LB (Liver)] • Tox Grade 3 or 4 - [LB (Tox Grade)]	ECG • Line Graphs Over Time - [ECG (G)] • Bar Chart Interpretation - [ECG (I)] • Cross Table per Patient & Visit - [ECG (T)] Both Tables & Graphs • Listing • Listing With AE & MH - [CM & AE & MH (L)] • Frequency Table - [CM] • Coding - [CM (C)] Exposure • Listing with AE - [EX & AE (L)] • Frequency Table & Distribution Graph - [EX (G)] Patient Profile (AE, MH, CM & LB) • Graphical With Tables - [PP] • Graphical Only - [PP (G)]

Example: Lymphoma template

Navigation

- Comments
- Inquiry Overview
- Notes Overview
- Patient Data Browser
- Protocol Deviations
- Rave Queries
- Review Status
- SAEs with narratives from GMS

Coding

- Coding AE - [AE (C)]
- Coding ConMed - [CM (C)]
- Coding MedHis - [MH (C)]

Diagnosis and baseline conditions

- Diagnosis - [Dx]
- Med His - [MH]
- Pr Tx

Disease assessments

- Assessable Lesions - [LESION-A]
- Bone Marrow Cytogenetics - [Cx]
- Bone Marrow Morphology - [Mx]
- Clinical Relapse - [RELAPSE]
- Immunoglobulin and B2Microglobulin - [Ig]
- Immunophenotyping - [IP]
- Lymphatic Physical Exam - [PE]
- Lymphoma Symptoms - [SYMP]
- Measurable Lesions - [LESION-M]
- New Lesions - [LESION-N]
- Overall Response - [OR]
- PD

Exposure

- Exp - [EX]

Overview tables and graphs

- All - AE - [AE (G)]
- All - Disp - [EOT (G)]
- Patient Profile - [PP]
- Patient Profile (G) - [PP (G)]
- Prot Dev - [MPD]

Patient status and follow up

- Death/SS - [D/SS]
- Discontinuation - [EOT]
- Pt Overview - [STATUS]
- Subs Tx

Safety assessments

- AE/ConMed - [AE/CM]
- All Labs - [LAB]
- ECG
- ECOG
- Lab Graphs - [LAB (G)]
- New Malignancy - [NM]
- Procedures - [PR]
- SAE
- Transfusions - [TR]
- Vitals - [VS]

Great Features: Power in Dynamic Tables & Graphs With Drill Down

Y-axis: Show by:

Adverse Event by SOC

		(Column Names)				
SOC-Preferred Term...	Body System or Organ Class	Dictionary-Derived Term	# of Subjects	% of Subjects	# of AEs	% of AEs
	BLOOD AND LYMPHATIC SYSTEM DISORDERS	LEUKOPENIA	1	0.16 %	1	0.07 %
		LYMPHADENITIS	1	0.16 %	1	0.07 %
		LYMPHADENOPATHY	2	0.32 %	2	0.15 %
		NEUTROPENIA	1	0.16 %	1	0.07 %
	CARDIAC DISORDERS	ATRIOVENTRICULAR BLOC...	2	0.32 %	3	0.22 %
		BRADYCARDIA	1	0.16 %	1	0.07 %
4 columns						

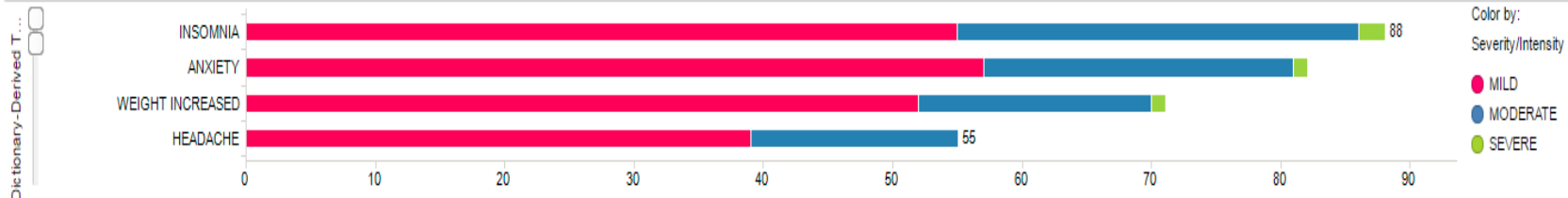
4 columns

Adverse Events (ae)

Subject ID	No.	Age	Sex	Dictionary-Derived Term	Reported Term for the Adverse Event	Study Day of	Study Day of	Du...	Start Date/Time	End Date/Ti...	Ser... Eve...	Category	Severit...	Causality
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Select the X-axis: Color by:

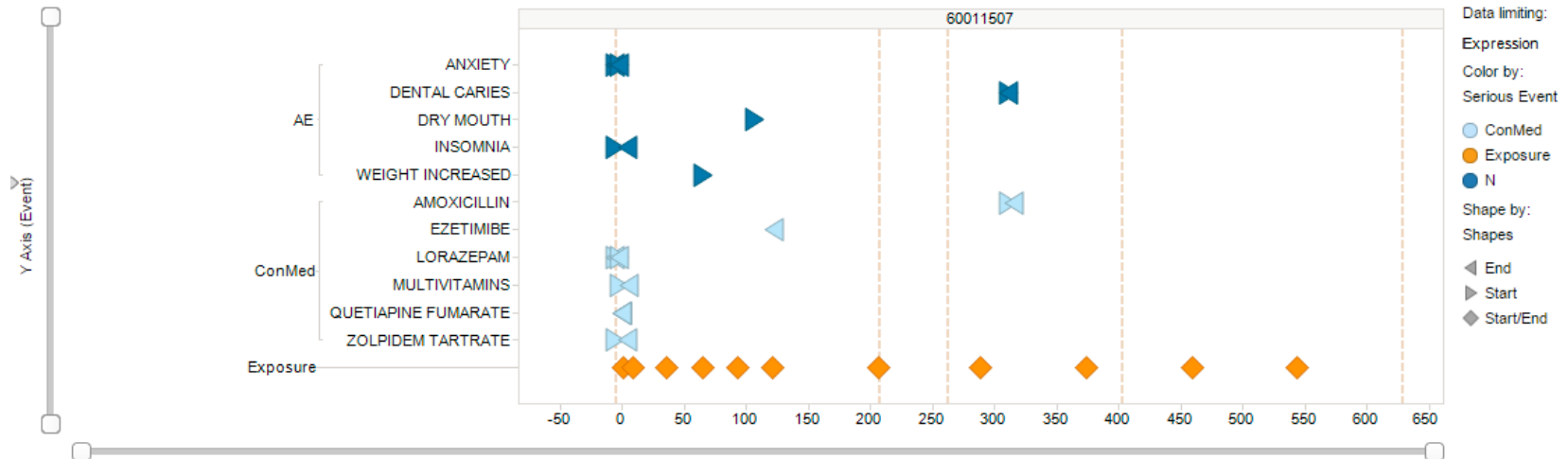
AE by Preferred Term



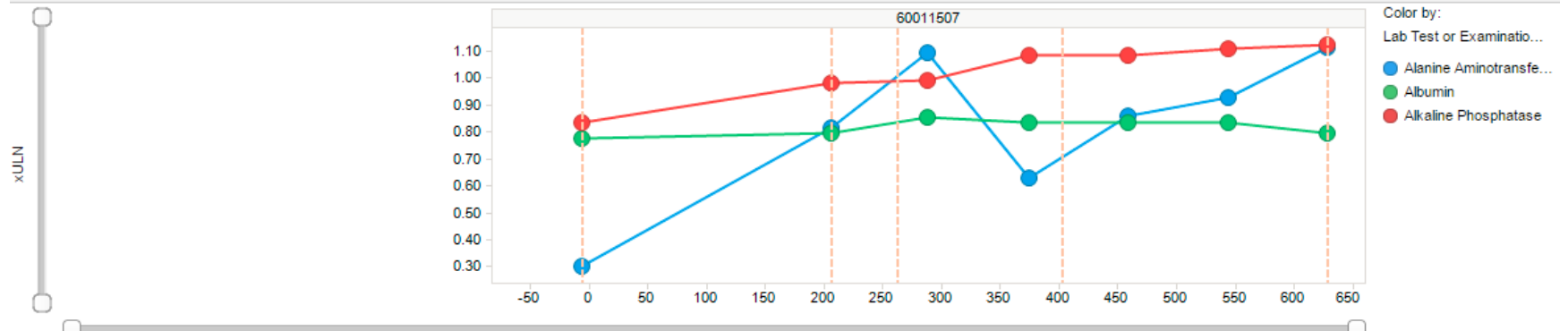
Adverse Events (ae)

Subject ID	No.	Age	Sex	Dictionary-Derived Term	Reported Term for the Adverse Event	Study Day of	Study Day of	Du...	Start Date/Time	End Date/Ti...	Ser... Eve...	Category	Severit...	Causality	Action Taken with Study Treatment	Outcome of Adverse Event	Cor
------------	-----	-----	-----	-------------------------	-------------------------------------	--------------	--------------	-------	-----------------	----------------	---------------	----------	------------	-----------	-----------------------------------	--------------------------	-----

Great Features: Patient Profile



Laboratory Test Results (Please select a subject to show the graph)



Data Source

- Large portfolio with many different data streams (vendors)
- Data source= integrated SAS datasets (SDTM format)

Pros

Integrates all data sources

Closer to your final database format/analysis

Higher lever of standardization

Cons

Data refresh rate (dependent on generation of SDTM datasets)

End-users think in CRF pages

Not an ideal format for analysis

Beyond SPOTFIRE: Review Status

Part of Custom Built Extensions

- Review status: How do you keep track of your review?
 - Reviewers can mark records as reviewed with name & timestamp
 - Next data load: system will flag records as not reviewed, modified, or reviewed based
 - Get a summary overview of review status

Vital Signs (vs)

Subject ID	Visit	Date	Day ▲	Test	Result	Standard ...	We Ter	Review Status	Open Inquiries	Review Date (...)	Reviewed By	Date/Time of ...
00000003	SCREENING	2014-05-07	-14.00	A1	dummy STRESC...	mmHg		Reviewed		2017-06-05T17:...	Snoeckx, Yves [...]	2018-11-10T09:...
00000003	SCREENING	2014-05-07	-14.00	A2	dummy STRESC...	cm		Reviewed		2017-06-05T17:...	Snoeckx, Yves [...]	2015-12-10T11:...
00000003	SCREENING	2014-05-07	-14.00	A3	dummy STRESC...	BEATS/MIN		Reviewed		2017-06-05T17:...	Snoeckx, Yves [...]	2018-11-10T09:...
00000003	SCREENING	2014-05-22	-14.00	A4	dummy STRESC...	BREATHS/M...		Reviewed		2017-06-05T17:...	Snoeckx, Yves [...]	2018-11-10T09:...
00000003	SCREENING	2014-05-07	-14.00	A5	dummy STRESC...	mmHg		Reviewed		2017-06-05T17:...	Snoeckx, Yves [...]	2018-11-10T09:...
00000003	SCREENING	2014-05-07	-14.00	A6	dummy STRESC...	C		Reviewed		2017-06-05T17:...	Snoeckx, Yves [...]	2018-11-10T09:...
00000003	SCREENING	2014-05-22	-14.00	A7	dummy STRESC...	kg		Reviewed		2017-06-05T17:...	Snoeckx, Yves [...]	2018-11-10T09:...
00000003	CYCLE 1	2014-06-05	1.00	A1	dummy STRESC...	mmHg		Reviewed		2017-06-05T17:...	Snoeckx, Yves [...]	2018-11-10T09:...
00000003	CYCLE 1	2014-06-05	1.00	A3	dummy STRESC...	BEATS/MIN		Reviewed		2017-06-05T17:...	Snoeckx, Yves [...]	2018-11-10T09:...
00000003	CYCLE 1	2014-05-21	1.00	A4	dummy STRESC...	BREATHS/M...		Reviewed		2017-06-05T17:...	Snoeckx, Yves [...]	2018-11-10T09:...
00000003	CYCLE 1	2014-06-05	1.00	A5	dummy STRESC...	mmHg		Reviewed		2017-06-05T17:...	Snoeckx, Yves [...]	2018-11-10T09:...
00000003	CYCLE 1	2014-06-05	1.00	A6	dummy STRESC...	C		Reviewed		2017-06-05T17:...	Snoeckx, Yves [...]	2018-11-10T09:...
00000003	CYCLE 1	2014-05-21	1.00	A7	dummy STRESC...	kg		Reviewed	1	2017-06-05T17:...	Snoeckx, Yves [...]	2018-11-10T09:...
00000003	CYCLE 2	2014-06-18	29.00	A1	dummy STRESC...	mmHg		Not Reviewed				2015-12-10T11:...
00000003	CYCLE 2	2014-06-18	29.00	A3	dummy STRESC...	BEATS/MIN		Not Reviewed				2015-12-10T11:...
00000003	CYCLE 2	2014-07-03	29.00	A4	dummy STRESC...	BREATHS/M...		Not Reviewed				2015-12-10T11:...
00000003	CYCLE 2	2014-06-18	29.00	A5	dummy STRESC...	mmHg		Not Reviewed				2015-12-10T11:...

Beyond SPOTFIRE: Communication Module

Part of Custom Built Extensions

Let's centralize communications around what we see:

- Raise Inquiries on Records (single/multiple)
- Reply/Close Inquiries
- Assign Appropriate Responders/Responder group

Create Inquiry

Inquiry type:

Data quality

Topic:

Inquiry to:

Responder Groups

Responders

Also Send email to:

Priority:

Medium

Description:

Here's my question

Send Mail:

☐

Attachments:

Page

Vitals

Visualization

Results over time

Attach Visualization

Page

Vitals

Data Visualization

Vital Signs (vs)

Attach Data

Attach Marked Rows

Choose File

No file chosen

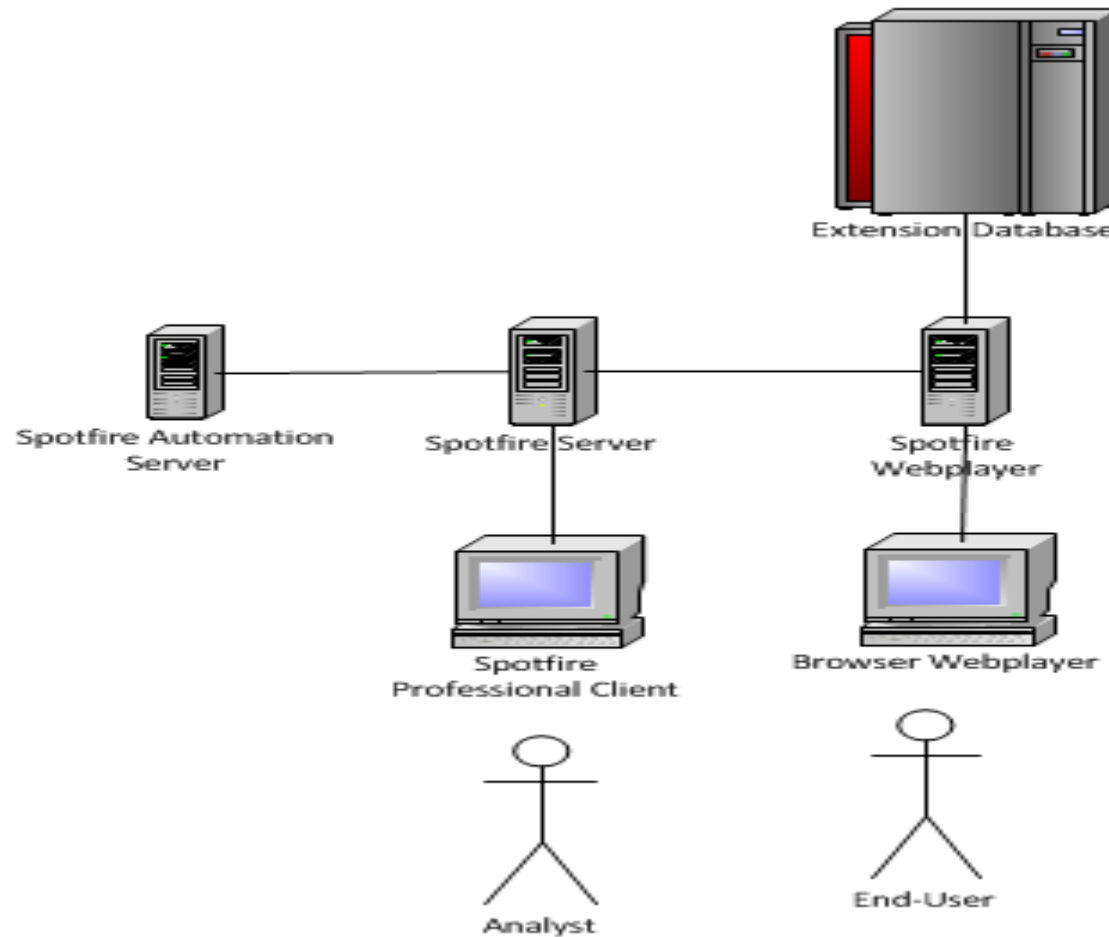
Attach File

#	Attachment	Type
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OK

Cancel

Architecture Insight



Challenges

- Recent Speed/Performance Issues (especially with large volume trials)
- Change Management:
 - Very diverse group of end-users (technical skills/interest)
- Scope/Definition of Medical Review
 - Mainly around aggregate safety & medical integrity of data
 - Possible overlap with other groups looking at data (eg, reviews by Data Management & Analytical Risk Based Monitoring)
- Data Changes:
 - Currently at record level
 - Strong desire from medical reviewers to see at even more granular level
- More Real-time Data With New Data Model (SDTM Like)