Framework for Data Transformation & Visualization

By

Dhinakaran & Dhaneswar

CHILTERN

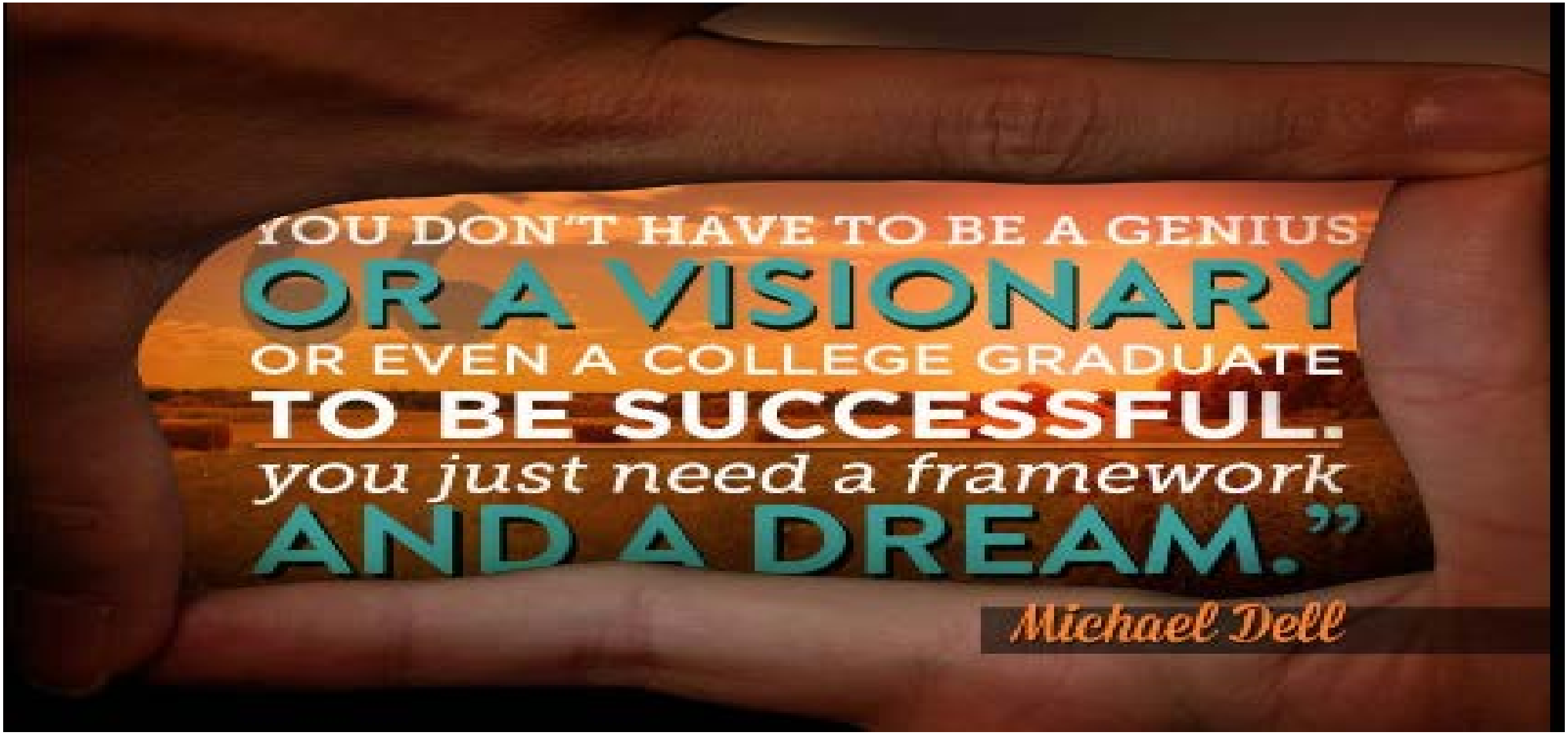
Designed Around You®

Agenda

CHILTERN
Designed Around You®

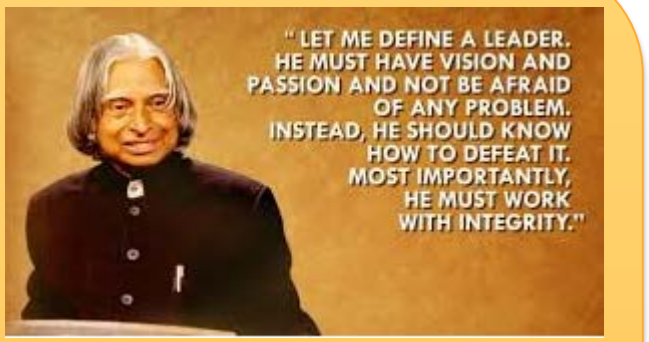
- Transformation
- Data Transformation
- Why
- Data Interpretation
- Data Standardization
- Data Understanding
- Data Types

- Data Visualizations
- Visualization Tools
- Sources & Transformation
- Transformation Methods
- Visualizations


YOU DON'T HAVE TO BE A GENIUS
OR A VISIONARY
OR EVEN A COLLEGE GRADUATE
TO BE SUCCESSFUL.
you just need a framework
AND A DREAM."
Michael Dell

Transformation…

CHILTERN
Designed Around You®



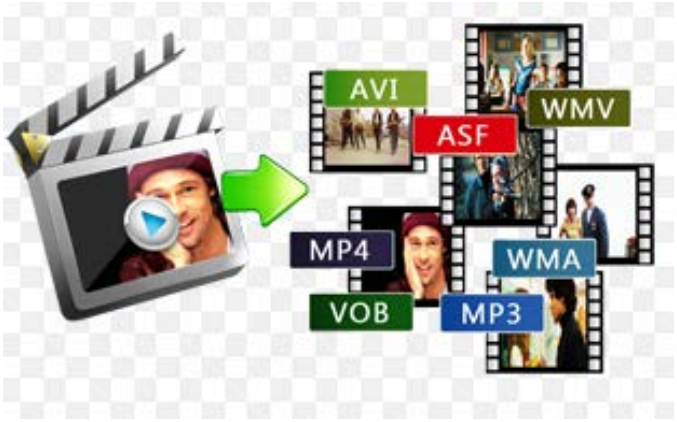
Transformation is Part of our Life

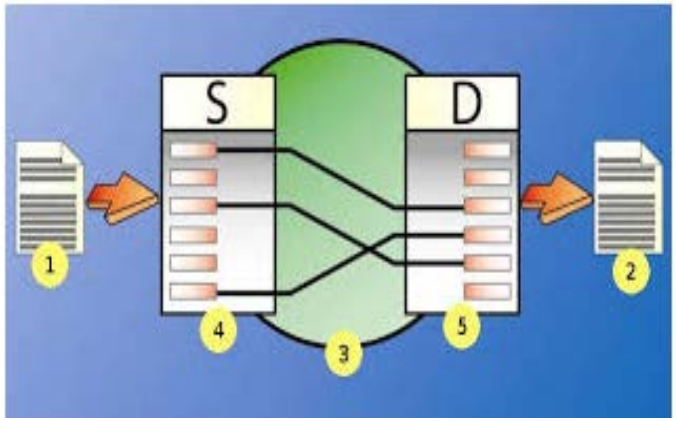
Data Transformation is…

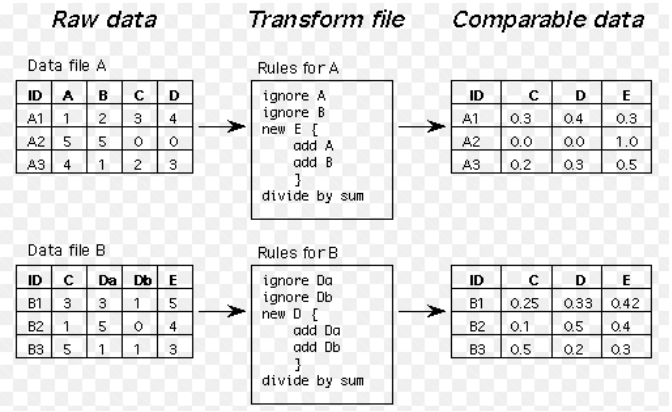
Process of converting **data** or **information** from **one format to another**

One Document to **another Document** Type

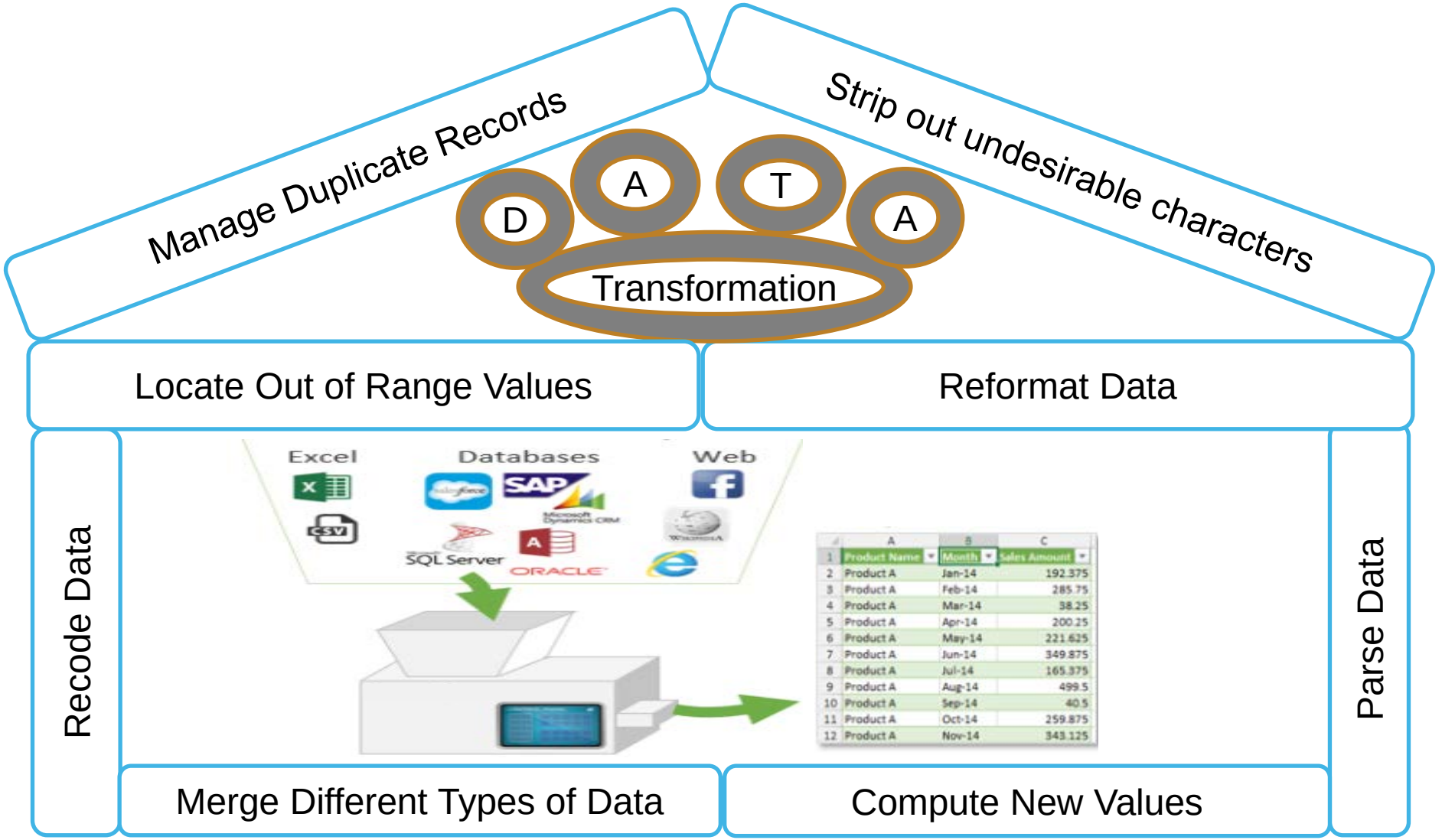
Format of **Source** system into the **Required Format**







Reason for Data Transformation….

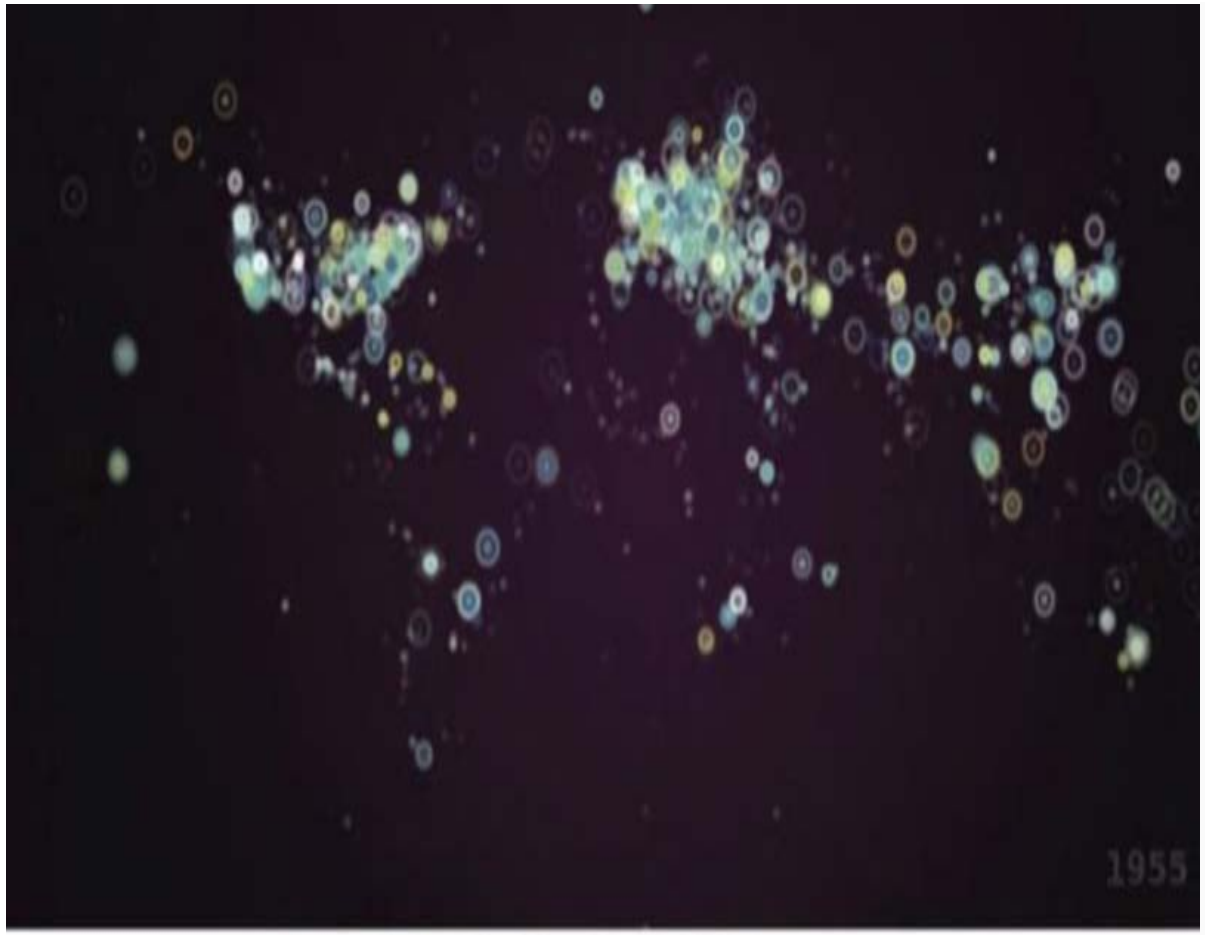


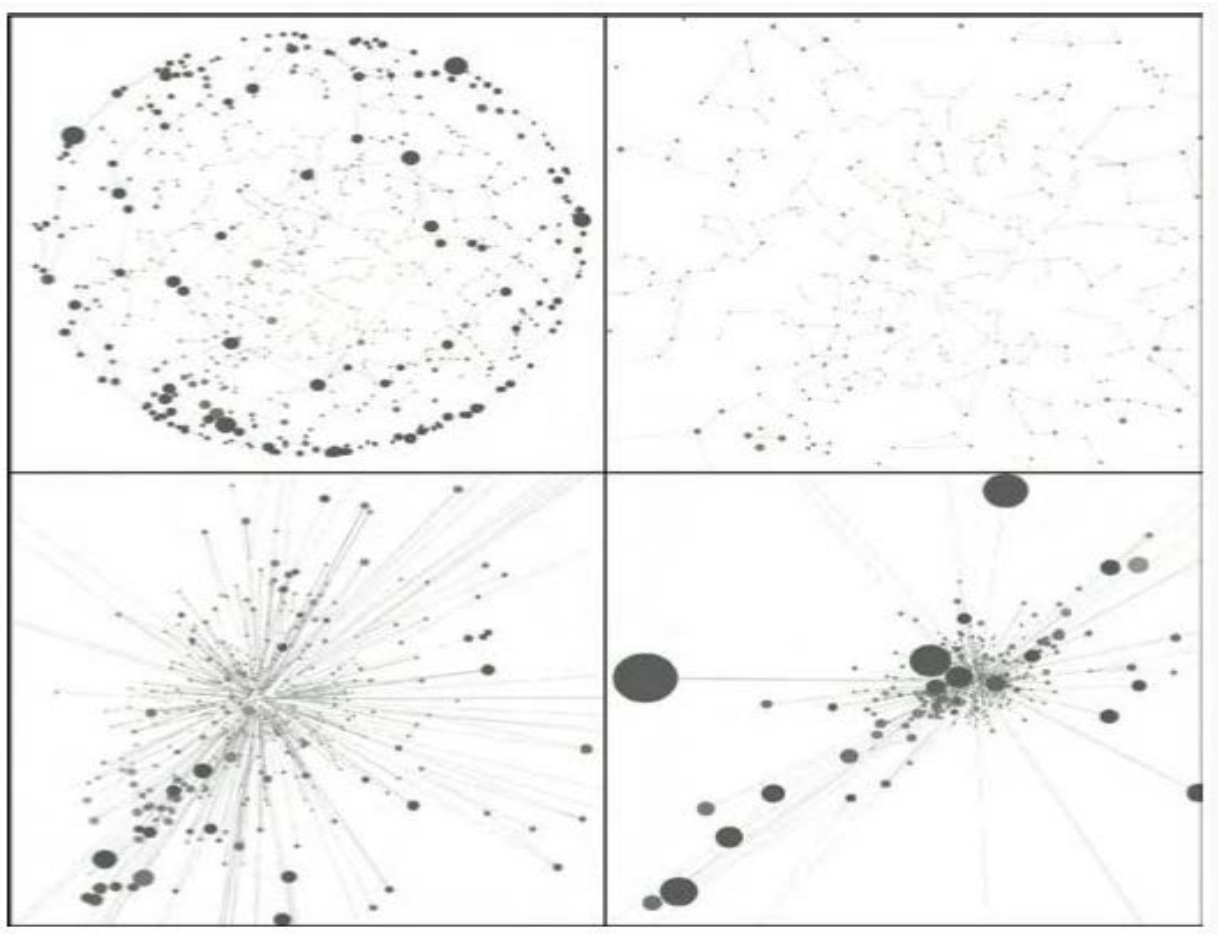
Interpretation of Data and Transformed Data

Why Data Standardization?

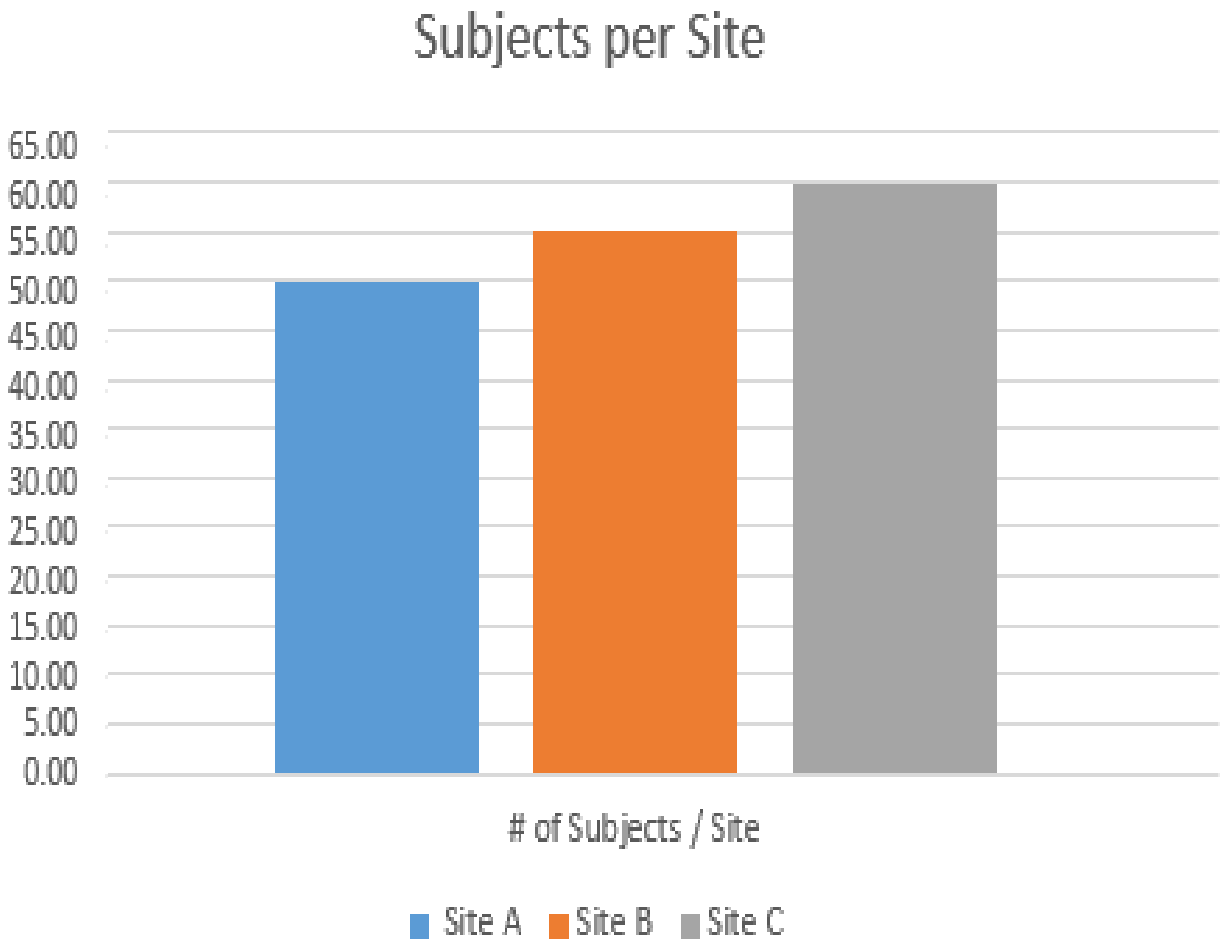
- Makes your data …

Understanding Data – Why Important

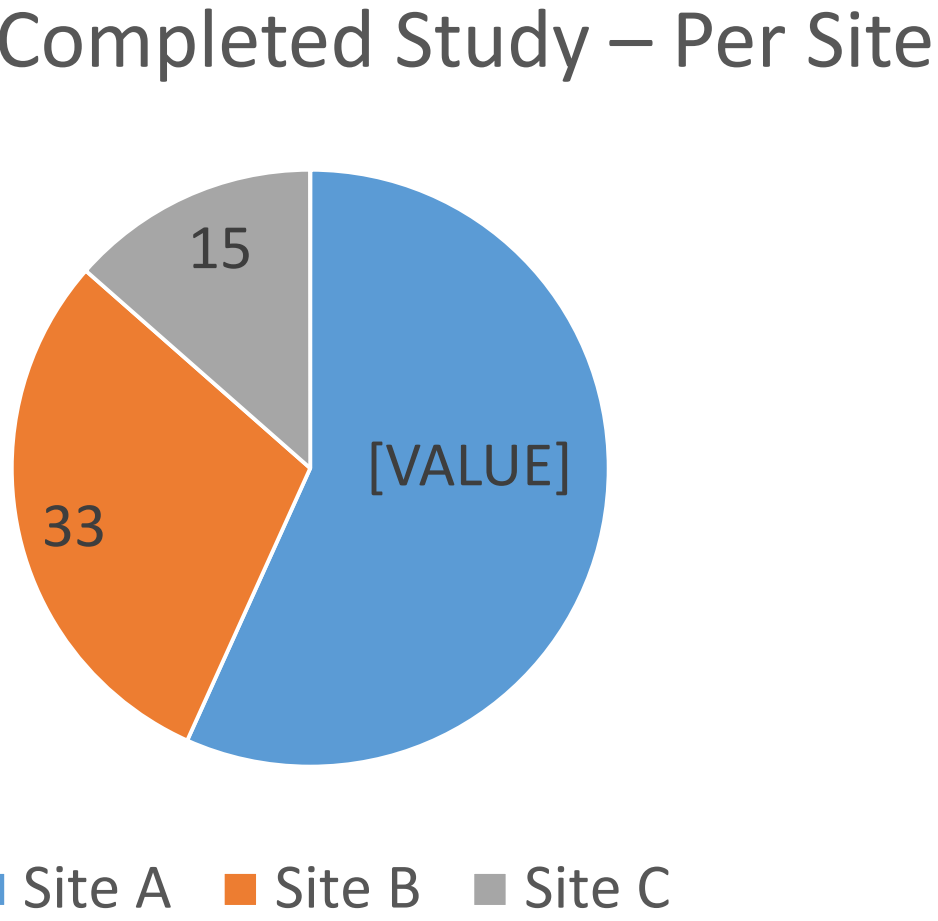




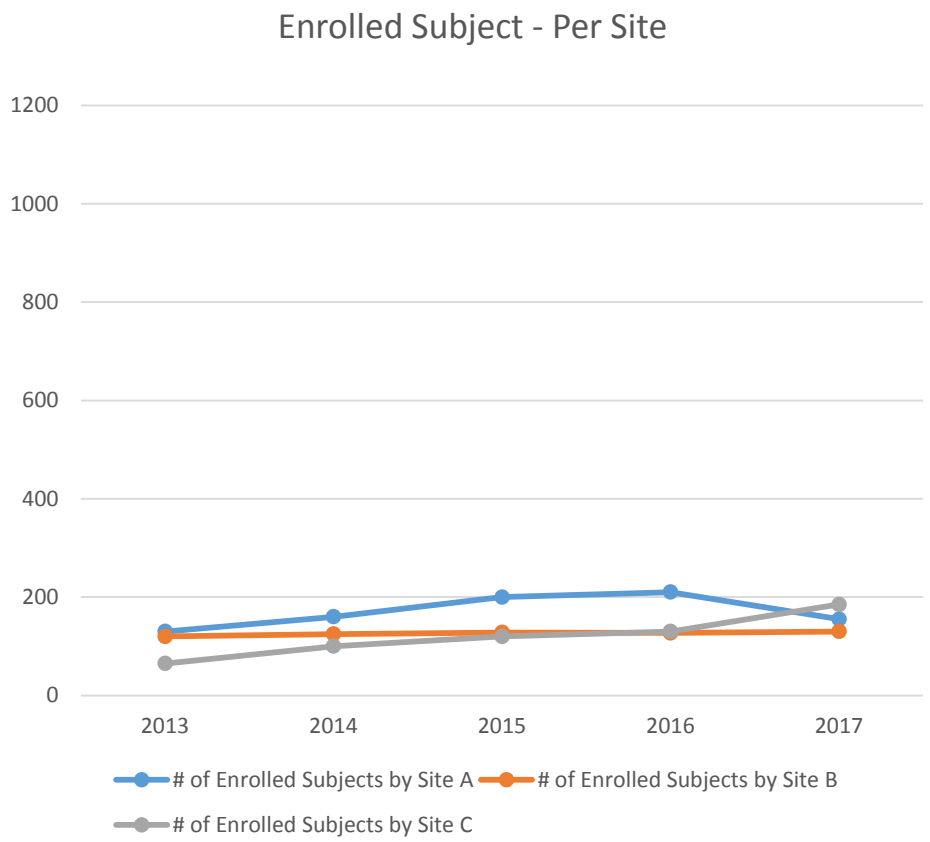
Understanding Data – Why Important

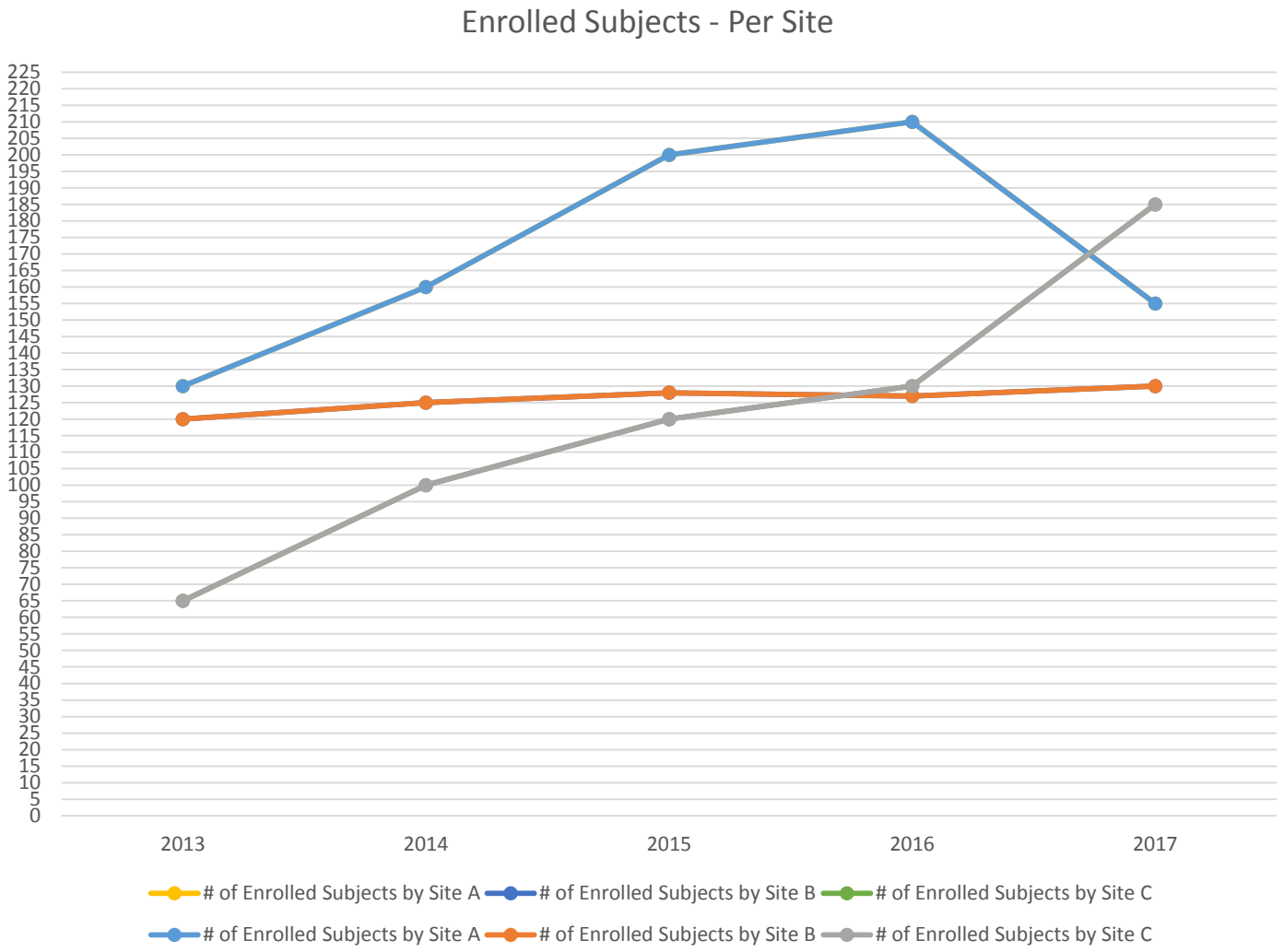


Understanding Data – Why Important

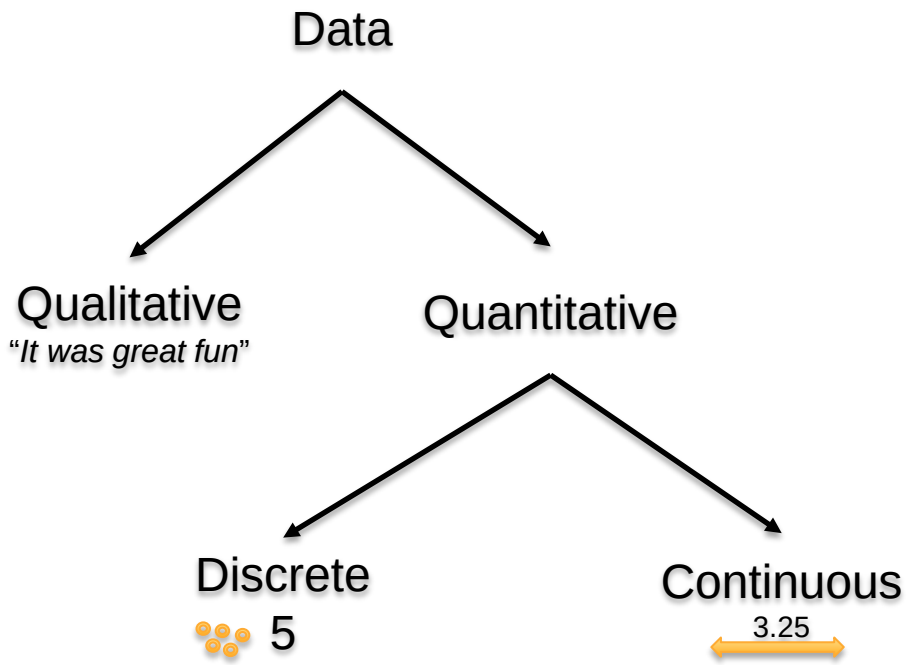


Understanding Data – Why Important



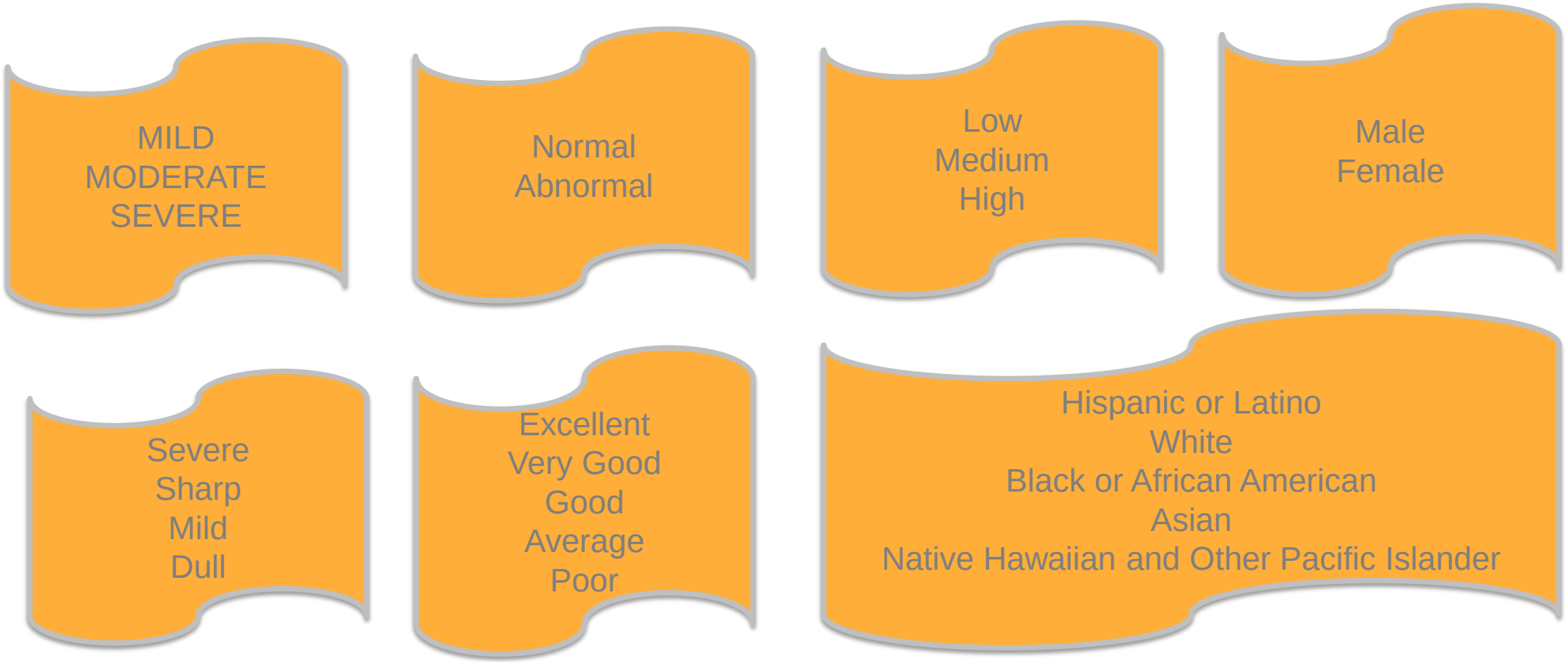


Types of Data



Qualitative Data	Quantitative Data
Overview: • Deals with descriptions. • Data can be observed but not measured. • Colors, textures, smells, tastes, appearance, beauty, etc. • Qualitative → Quality	**Overview:** • Deals with numbers. • Data which can be measured. • Length, height, area, volume, weight, speed, time, temperature, humidity, sound levels, cost, members, ages, etc. • Quantitative → Quantity

Types of Data - Qualitative



Types of Data - Quantitative

BMI
Height
Weight
Temperature

Tumor Diameters
Drug Accountability

Lab Values

Age
Days
Start Date
Stop Date
Date of Birth

ECG
Test Values
Vital Signs

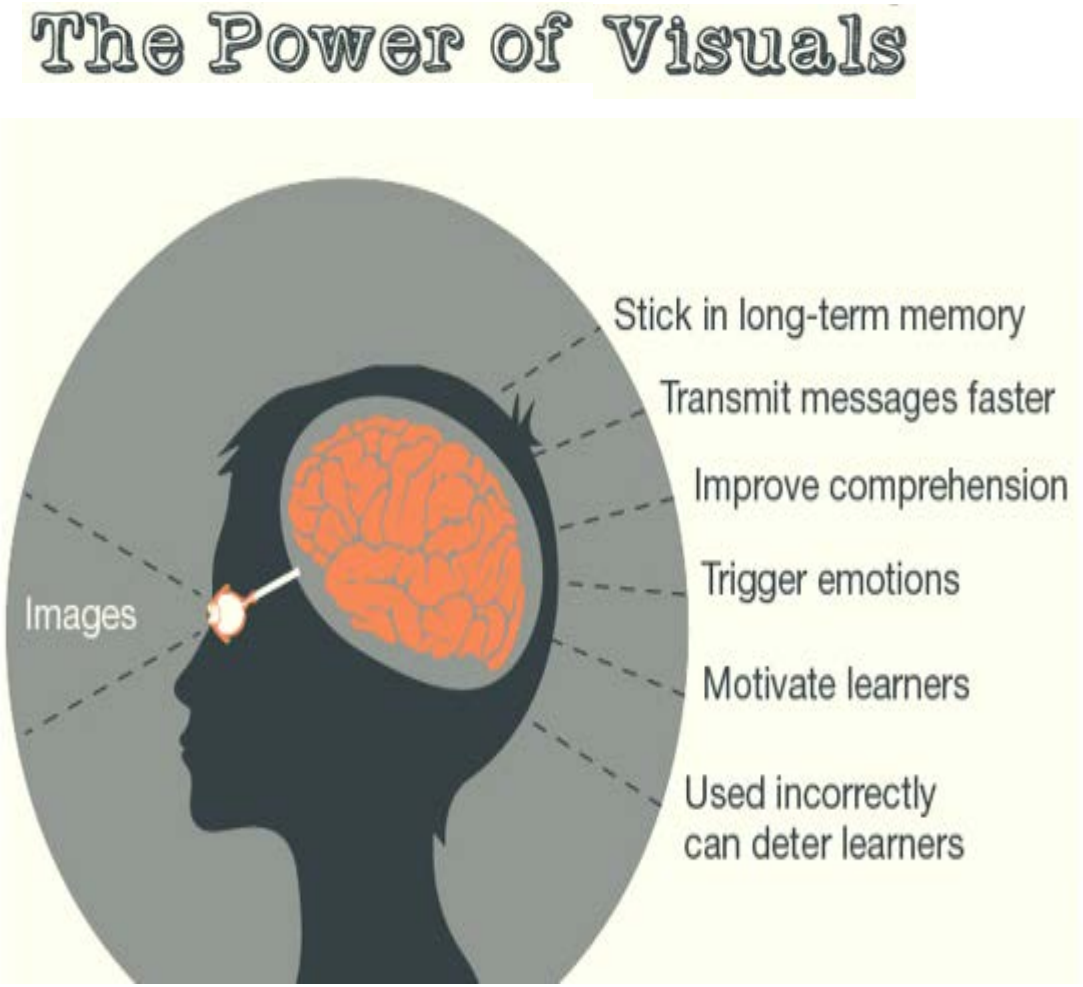
Total Subjects Enrolled
Total Subject Screen Failed
Total Subjects Completed
Total Subjects Withdrawn
Total Subjects Lost to Follow-up
Total Subjects till End of Study

Data Type and Visualizations

CHILTERN
Designed Around You®

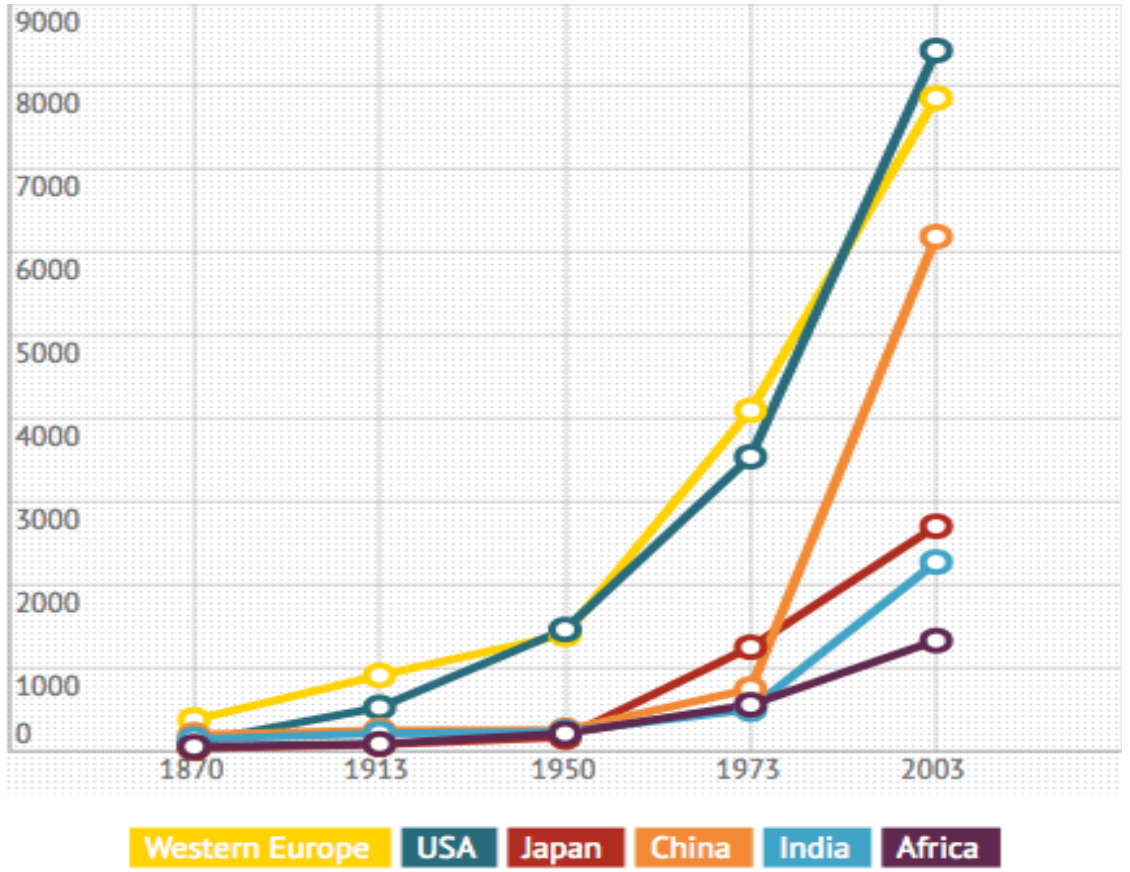
Visualization Type	Best Fit to Analyze (? Data)	Type of Data
Bar Chart	Categorical	Qualitative & Quantitative
Pie Chart	Percentage or Propotional	Quantitative
Line Chart	Continuous	Quantitative
Map chart	Geographical	Qualitative
Tree Map	Hierarchichal Data - Large Numbers	Qualitative & Quantitative
Heat Map	Categorical - Outliers	Quantitative
Parallel Plot	Connect Multivariate Series of Values	Qualitative & Quantitative
Combinational Chart	Combination of Bar and Line charts	Quantitative
Box Plot	Statistical Measures	Quantitative
Graphical Table	Categories, Graphical Trends and Data comparing Targeted Values	Quantitative
Cross Table	Structure, Summarize and Display Larage amount	Quantitative
Summary Table	Summarizes Statistical Information	Quantitative
Table	Compare Precise Individual Values	Quantitative
WaterFall	Commulative Effect of a Sequence	Quantitative
KPI Chart	Communicate Immediate Attention	Quantitative
2D Scatter Plot	Comparable Data - Relationship	Qualitative & Quantitative
3D Scatter Plot	Comparable Data - Relationship	Qualitative & Quantitative
Radar/Spider Plot	Compare Categorical of Multivariate	Qualitative & Quantitative
Bullet Graph	Compare Metrics against Target Values	Quantitative
Kaplan-Meier	Estimate the fraction of Subjects Living	Quantitative

Why Data Visualization ?



Why Data Visualization Contd…

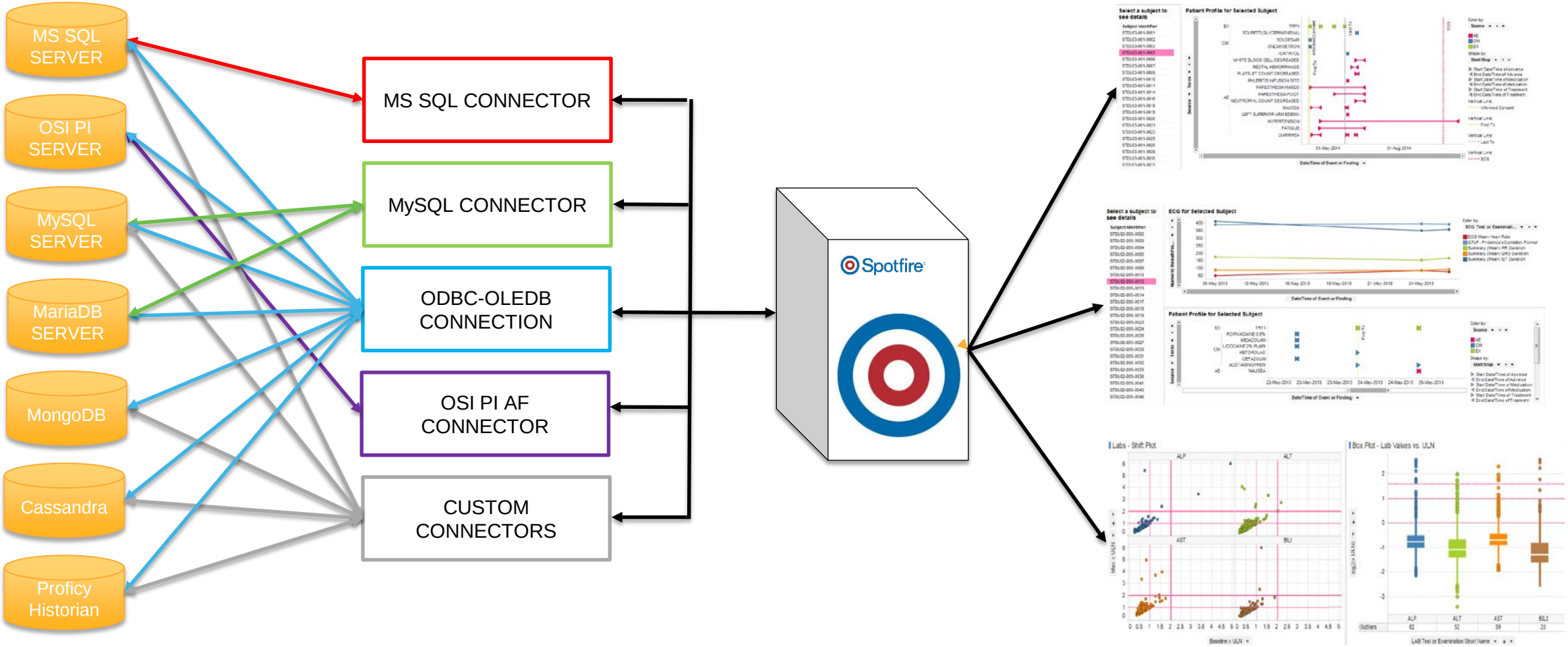
Past GDP	1870	1913	1950	1973	2003
Western Europe	367	902	1396	4096	7857
USA	98	517	1455	3536	8430
Japan	25	71	160	1242	2699
China	189	241	244	739	6187
India	134	204	222	494	2267
Africa	45	79	203	549	1322



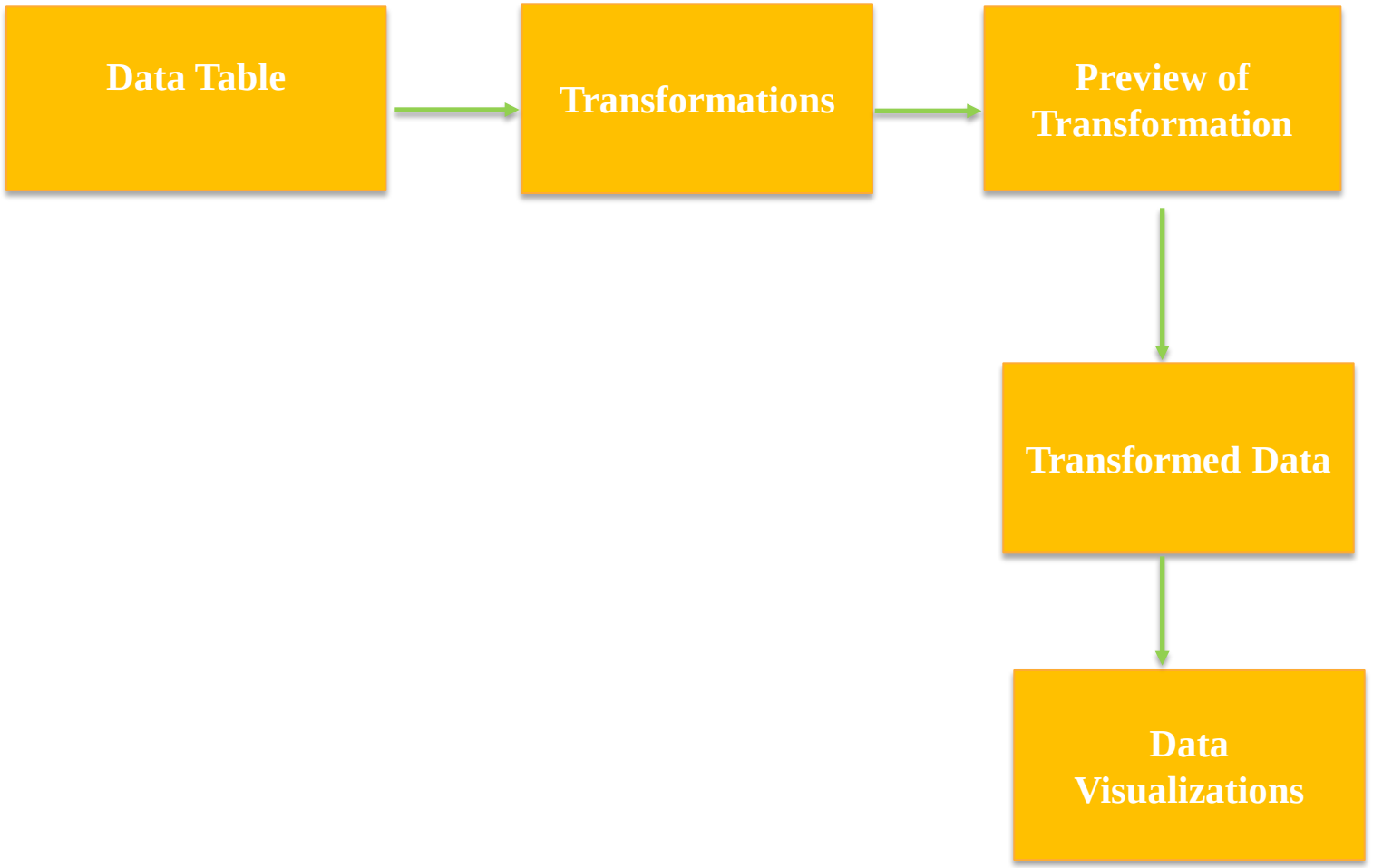
Visualization Tools

CHILTERN
Designed Around You®

Data Sources and Transformation



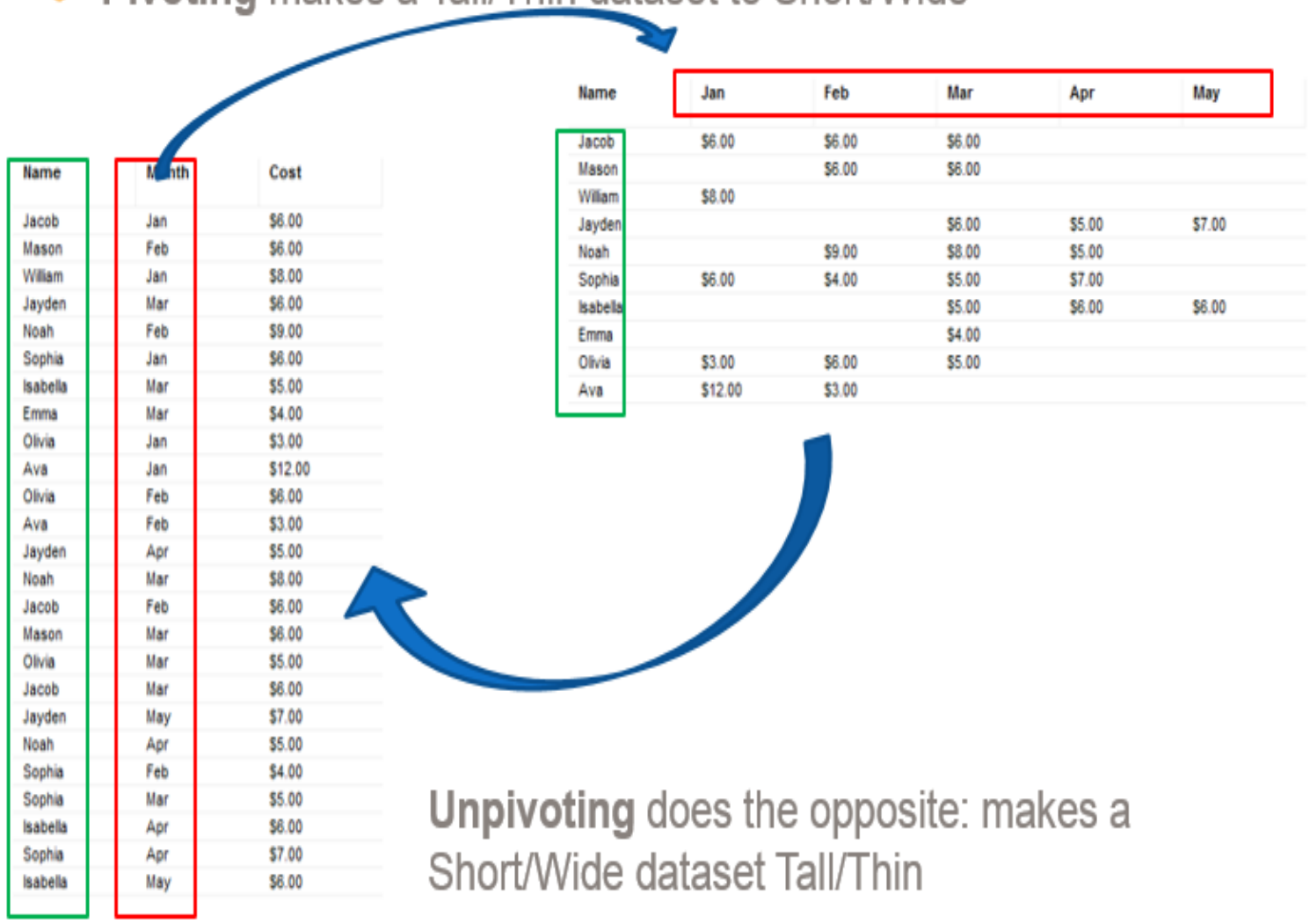
Data Transformation - How



Types of Transformation

- ✓ Calculate and replace column
- ✓ Calculate new column
- ✓ Change column names
- ✓ Change data types
- ✓ Data function
- ✓ Exclude columns
- ✓ Normalization
- ✓ Pivot
- ✓ Unpivot

- **Pivoting** makes a Tall/Thin dataset to Short/Wide



Name	Month	Cost
Jacob	Jan	$6.00
Mason	Feb	$6.00
William	Jan	$8.00
Jayden	Mar	$6.00
Noah	Feb	$9.00
Sophia	Jan	$6.00
Isabella	Mar	$5.00
Emma	Mar	$4.00
Olivia	Jan	$3.00
Ava	Jan	$12.00
Olivia	Feb	$6.00
Ava	Feb	$3.00
Jayden	Apr	$5.00
Noah	Mar	$8.00
Jacob	Feb	$6.00
Mason	Mar	$6.00
Olivia	Mar	$5.00
Jacob	Mar	$6.00
Jayden	May	$7.00
Noah	Apr	$5.00
Sophia	Feb	$4.00
Sophia	Mar	$5.00
Isabella	Apr	$6.00
Sophia	Apr	$7.00
Isabella	May	$6.00

Name	Jan	Feb	Mar	Apr	May
Jacob	$6.00	$6.00	$6.00		
Mason		$6.00	$6.00		
William	$8.00				
Jayden			$6.00	$5.00	$7.00
Noah		$9.00	$8.00	$5.00	
Sophia	$6.00	$4.00	$5.00	$7.00	
Isabella			$5.00	$6.00	$6.00
Emma			$4.00		
Olivia	$3.00	$6.00	$5.00		
Ava	$12.00	$3.00			

Unpivoting does the opposite: makes a Short/Wide dataset Tall/Thin

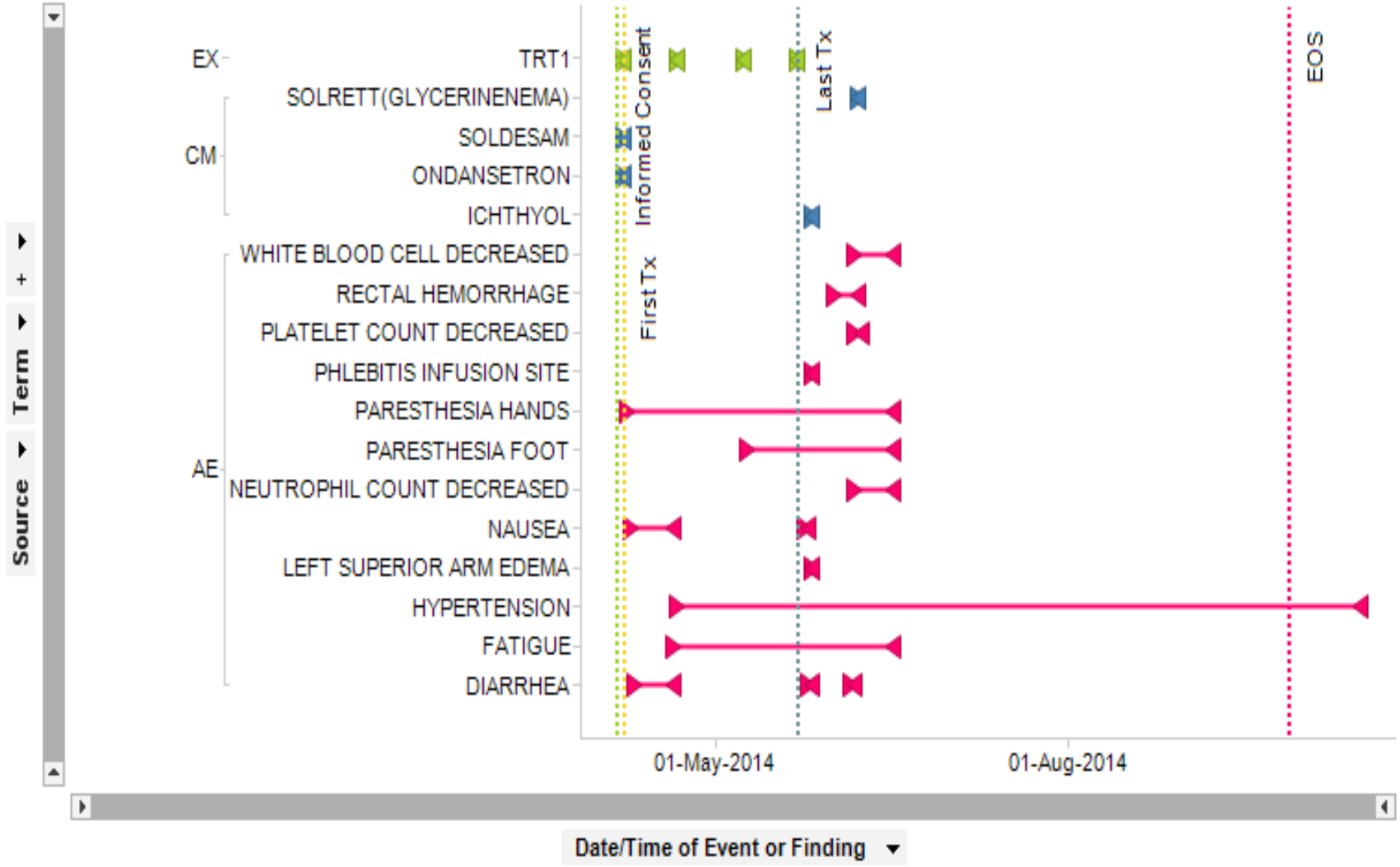
Efficient Visualizations

CHILTERN
Designed Around You®

Select a subject to see details

Subject Identifier
STDU03-001-0001
STDU03-001-0002
STDU03-001-0003
STDU03-001-0005
STDU03-001-0006
STDU03-001-0007
STDU03-001-0009
STDU03-001-0010
STDU03-001-0011
STDU03-001-0014
STDU03-001-0016
STDU03-001-0018
STDU03-001-0019
STDU03-001-0020
STDU03-001-0021
STDU03-001-0023
STDU03-001-0025
STDU03-001-0028
STDU03-001-0029
STDU03-001-0030
STDU03-001-0031

Patient Profile for Selected Subject



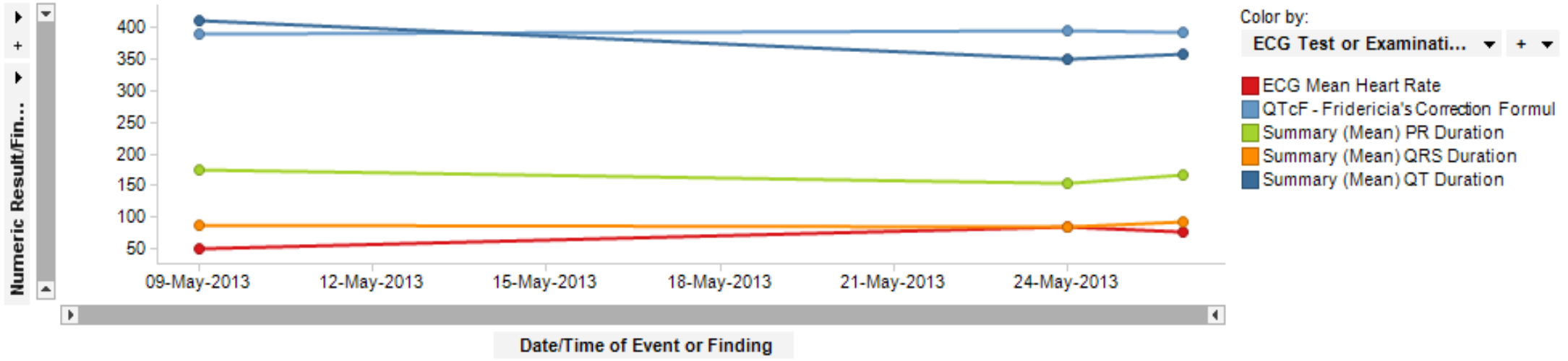
Efficient Visualizations Contd…

CHILTERN
Designed Around You®

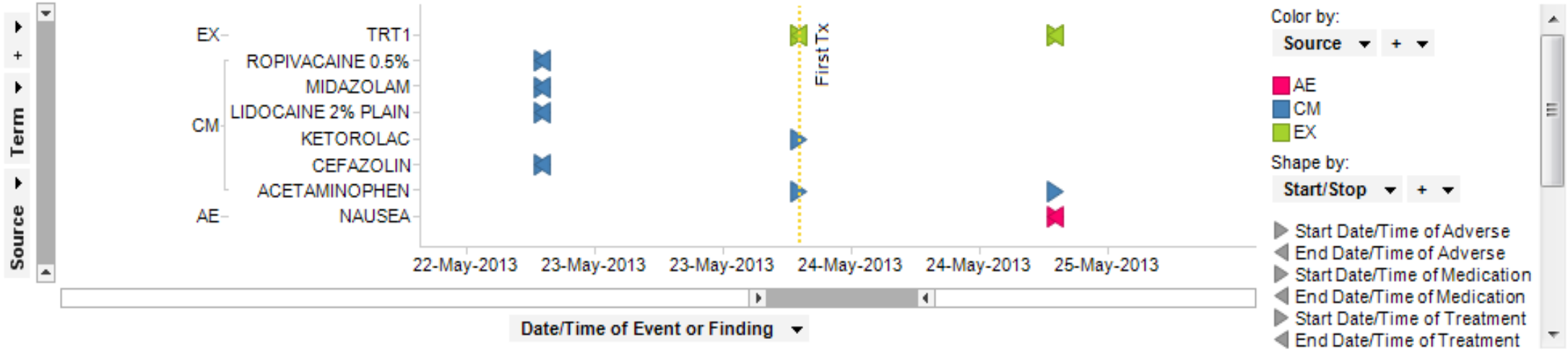
Select a subject to see details

Subject Identifier
STDU02-005-0002
STDU02-005-0003
STDU02-005-0004
STDU02-005-0005
STDU02-005-0007
STDU02-005-0009
STDU02-005-0010
STDU02-005-0012
STDU02-005-0013
STDU02-005-0014
STDU02-005-0017
STDU02-005-0018
STDU02-005-0019
STDU02-005-0023
STDU02-005-0024
STDU02-005-0026
STDU02-005-0027
STDU02-005-0030
STDU02-005-0031
STDU02-005-0032
STDU02-005-0033
STDU02-005-0036
STDU02-005-0041
STDU02-005-0043
STDU02-005-0046

ECG for Selected Subject



Patient Profile for Selected Subject



Efficient Visualizations Contd…

CHILTERN
Designed Around You®

Go Home KPI Metrics Definition

All Studies

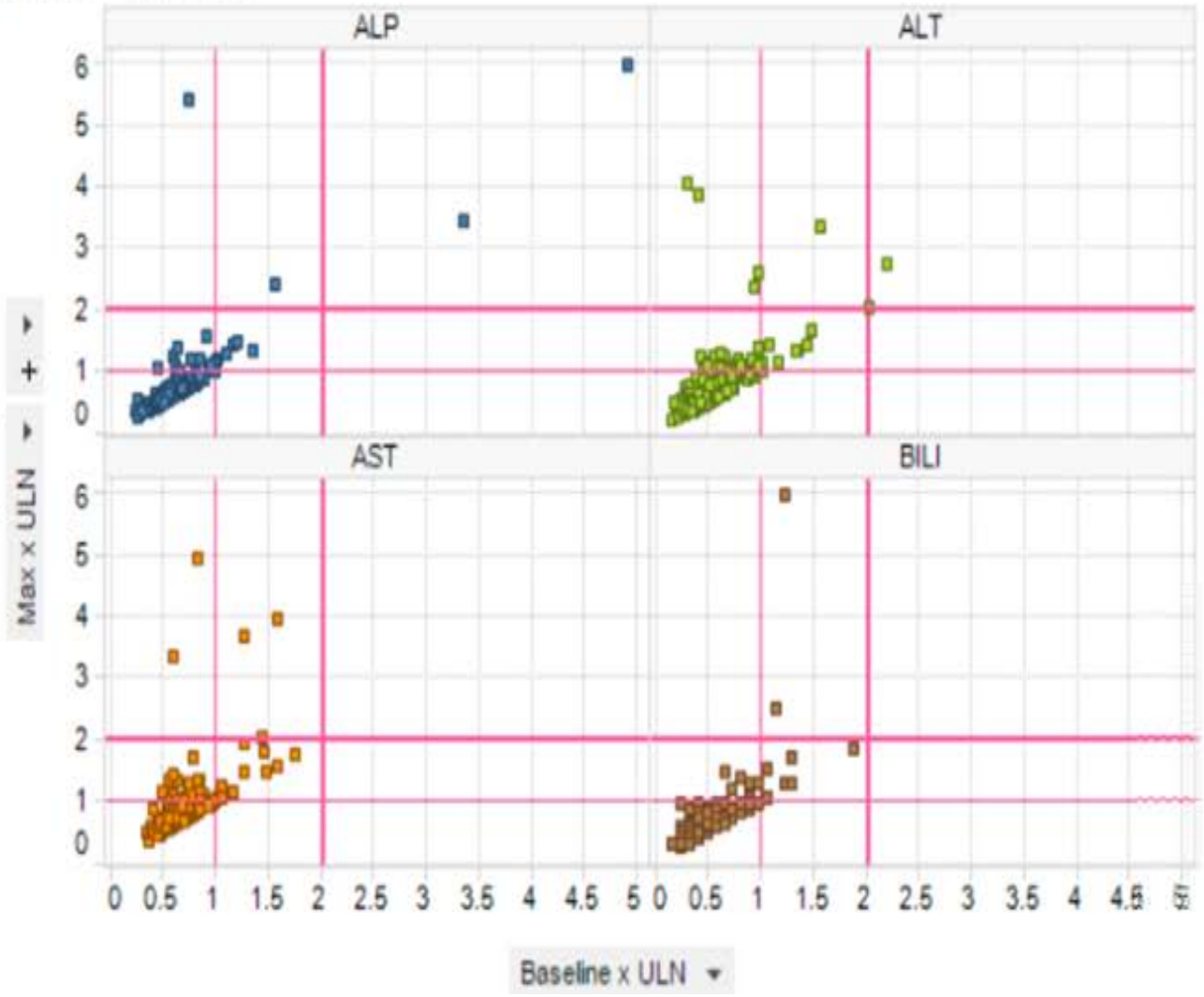
Metrics Name	Current Reporting Period					Previous Reportiong Period				Threshold		
	Q2' 2015					Quarters						
	Flag	Value	Min	Median	Max	Q1' 2015	Q4' 2014	Q3' 2014	Q2' 2014	Green	Amber	Red
% of Queries Requiring Re-Query	🟢	1.20	0.35	0.79	2.96	1.13	1.28	---	---	<2%	2-5%	>5%
Answered Query Aging	🔴	90.16	74.00	89.00	118.00	152.50	196.00	259.00	322.00	<6days	6-15days	>15days
Approved Specification to Complete Release DB (Forms, Matrices and all edit check...	...	---	---	---	---	---	---	---	9.57	<=12wks	12.1-16...	>16wks
Approved Specification to Partial release DB (Forms, matrices, dynamics) in 2 stage...	...	---	---	---	---	---	3.43	---	---	<=6wks	6.1-8wks	>8wks
Data Review Cycle Time	🟡	9.27	0.00	6.00	162.00	2.00	4.00	3.00	5.00	<8days	8-14days	>14days
Database Build UAT Findings	...	---	---	---	---	---	1.98	---	1.70	0-2%	2.1-3%	>3%
Edit Check UAT (Rave and Custom Function Checks)	...	---	---	---	---	---	0.56	---	1.51	0-3%	3.1-5%	>5%
Migrations	🟢	1.62	0.86	1.86	2.14	---	2.79	7.14	---	<=12wks	12.1-16...	>16wks
Opened Query Aging	🔴	87.44	74.00	84.00	118.00	140.00	198.00	294.00	325.00	<6days	6-15days	>15days
Resource Allocation Assignments	🟢	100.00	100.00	100.00	100.00	100.00	100.00	100.00	---	>98%	95-98%	<95%
Time from initial WRF received at Chiltern to partially executed contract sent to Client	🟡	45.00	45.00	45.00	45.00	2.50	19.00	18.00	---	<30days	30-60days	>60days
Time from Partial to Complete release of edit checks in 2 stage DB release	...	---	---	---	---	---	8.29	---	---	<=6wks	6.1-10wks	>10wks
Time from partially executed contract at Client to P.O. number received at Chiltern.	🟢	12.00	12.00	12.00	12.00	23.50	28.50	9.00	---	<=21days	(Empty)	>21days
Turnover Rate	🟢	11.56	0.00	14.29	14.29	16.67	22.22	4.76	2.78	<15%	15-25%	>25%

Label

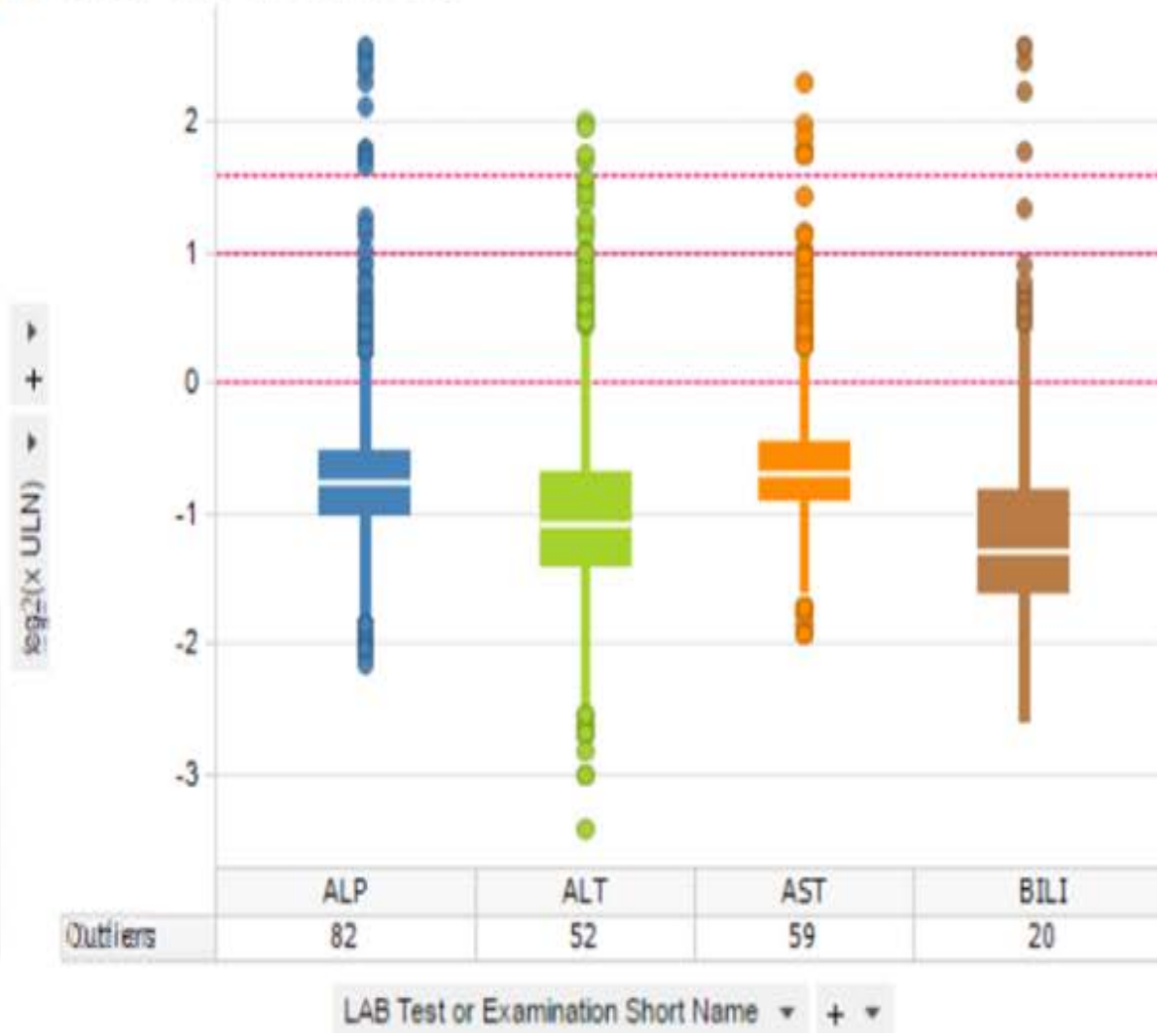
Efficient Visualizations Contd…

CHILTERN
Designed Around You®

Labs - Shift Plot



Box Plot - Lab Values vs. ULN



THANK YOU…!

CHILTERN
Designed Around You®

For further information contact

Dhinakaran Manoharan
Manager, Clinical Programming, CDM
Dhinakaran.Manoharan@Chiltern.com
Mobile:+91 8884142115

Dhaneswar Moharana
Team Lead, Clinical Programming, CDM
Dhaneswar.Moharana@Chiltern.com
Mobile:+91 9743411761