

## Using Graphics to Present the Study Result as a Story

Shafi Chowdhury, Shafi Consultancy Limited, UK  
Md. Rajwanur Rahman, Shafi Consultancy Bangladesh, Bangladesh

### ABSTRACT

Too often we sit and listen to the final results of a study that has just been reported and think of how it can be more interesting. We are told that we need to see the numbers, the tables and the figures, so that we know the result of the study. However, when we sit and listen to the results of a study, what we are really after is a story. We want the data to be converted to knowledge; something we can walk away with. We don't walk away with tables and numbers, but we do remember a story told by a good storyteller, with all the pictures to visualize what had happened in the study. This paper will show how we can use graphics to tell a story; converting Data to Knowledge which the audience of any presentation can walk away with.

### INTRODUCTION

Clinical reports are presented in simple analytical presentations that usually consist of detailed analytical results in the form of tables and figures. A great deal of effort is placed to ensure the audience receives the maximum amount of information and detail about the results. This is, after all, the reason why everyone is at the presentation.

The results are presented multiple times to different audiences; some just to let others in the organization know the progress of a trial, some to let clinicians and managers know the final results and what they mean. There are also presentations to show how much better a new drug is compared to an existing one, in an attempt to persuade a change to using the new drug, or to suggest future possibilities. As a result, the clear communication of the outcome and impact of the results is essential.

Many organizations' internal and external clinical trial reporting are already beginning to evolve to reflect the demands of a changing world, and a broader set of drivers who value creation, easy understanding and interaction with the audiences. It is important to think outside the box when it comes to devising how the results can be reported in innovative and interesting ways.

This paper will demonstrate a new approach to presenting results to an audience which is focused on providing an insight into the various dimensions of clinical trial reporting. It will show how changing the presenter into a storyteller can leave the audience with a greater sense of knowledge about the trial results and their impact on patients.

### PRESENTING REPORTS AS A STORY

A presenter presents the results, but a storyteller leaves the audience with a clear idea of what happened from start to finish. 'A picture speaks a thousand words' is as true today as it ever was, and using graphics to show the changes in results over time can allow the audience to visualize the results of a trial. Using animation and interactive graphics to tell a story is not new, but having an easy method to develop an animation from trial results is, allowing more results to be presented as a story.

Using animation helps audiences to visualize the numbers, making it easier for them to see changes over time. However, if the audience needs to focus on the real numbers, then that should also be available in an interactive manner. Animation can leave a powerful image in the minds of the audience, one they can talk about after the presentation is over, and that is the power of storytelling - the ability to empower an audience to not just take home a message, but also to be to pass on that message. Using animation will also make the presentation more interesting and energize the audience, and the interactive aspect will not only allow the presenter to answer questions, but also demonstrate and show those results as and when required.

## DEVELOPING ANIMATED GRAPHICS

Raw and summarized results from existing analyses are used to create the interactive and animated figures. The data is restructured into a standard structure so that it can be presented in a form of comparison of different groups, or it can display the progress over different time periods. The structured data is then uploaded into a web application that generates the animated graphics, and different attributes are configured to support the presentation requirements. It is very important to configure the animation and interactive parts to reflect the aim of the presentation and to add more or less emphasis in different parts to reflect their relevance in the story. The story is the main objective, and how it is being told, and the animations used are the tools to help the audience visualize and remember the story once they leave the room.

## WEB APPLICATION

There are many applications and software that can generate animated graphics. The main aspects with any application are privacy, data security, integrity and ease of use. One should consider the following: is there any risk to the data, does the output produced reflect accurately the data it is representing, and is it easy for a user to take their data and develop the graphics they require?

The web application used here uses conventional technology, HTML5 and JavaScript, to create the frontend of this web-tool. As all of the processing is done at the user end, there is no need to use a backend for this tool. This ensures that the data does not transmit to another server and it means that it is also possible to make this application available offline to ensure the security of the data.

The application allows the attributes of particular variables to be updated by adjusting the different settings. Titles, footnotes, category labels, speed and legend settings can be defined or changed from the settings page if required. The final animated figure can also be downloaded and inserted into presentations, thus allowing the presenter to take full control of their presentation.

There are five parts used in the application:

- Upload data
- Assign role
- Customize settings
- Create chart
- Export feature

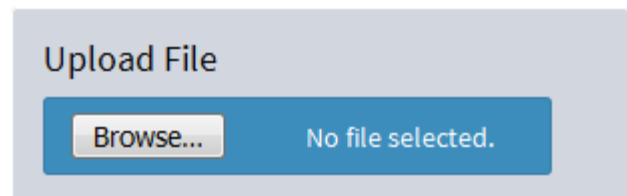
## DATA

It is important to note that interactivity and animation in reporting will require additional variables to the results data to help configure the final output. For example, interactivity can be implemented by combining all of the time variants of a specific figure into a single place. So, whereas in the old process there might have been several figures needed in order to explain the scenario, this new approach makes it such that interactivity squeezes all of these figures into one single figure. It is also possible to implement the interactivity in grouped figures, where a user can turn the groups on or off in order to get a better clarification of target reporting table or figure without leaving the presentation page.

Once the figure type is selected, the data can be uploaded via the "Upload File" button. As the data does not need to leave the users' computer, the upload time is extremely fast and only requires the browser to read the data. However, the size of the data is limited by the browser's capability and not by the tool itself. This tool is currently designed to only read CSV data format as it is the most simple and widely used data format in the web community. However, this tool can also be modified easily to read the data in excel format.

## UPLOAD DATA

In the 'Upload data' section, the user needs to upload data into the system. For simplicity and wider compatibility, only comma separated values (CSV) are allowed. The desired CSV file can be uploaded using the "Upload File" button in the tool. As soon as the data is uploaded it can be viewed in a new tab



# PhUSE 2015

seamlessly without leaving or scrolling the page often. There is also a search capability within the data that allows the user to check a particular condition by searching for that specific condition.

PTNO	TYPE	DAY	BLVALUE	VALUE
1001	A	0	35	35
1001	A	6	35	63
1001	A	12	35	63
1001	A	18	35	56
1001	A	24	35	37
1001	A	30	35	68
1001	A	36	35	53
1001	A	42	35	39
1001	A	48	35	64
1001	A	54	35	41

## ASSIGN ROLE

'Assign role' is a key section where the user can change the role of a variable to be used in the desired graph. Based on the graph type, multiple roles are assigned for a set of variables. It is also possible to assign a single variable in multiple roles, or in some cases the user may leave some of the roles blank. The assigned role will be used to create the figure axis, area and other characteristics.

### Assign role

Category	TYPE
Time	DAY
X axis	BLVALUE
Y axis	VALUE
Patient ID	PTNO

## CUSTOMIZE SETTINGS

To update labels, line or circle size, color and other customization options to the desired interactive figures, the 'Customize settings' section is used. From here, both axis labels can be set and customized, and reference lines can also be drawn. Marker size, opacity and the presence of lines can also be customized from here. There is an option available to select the background color of the figure, and the user can control the animation speed by controlling the 'speed' bar in this section.

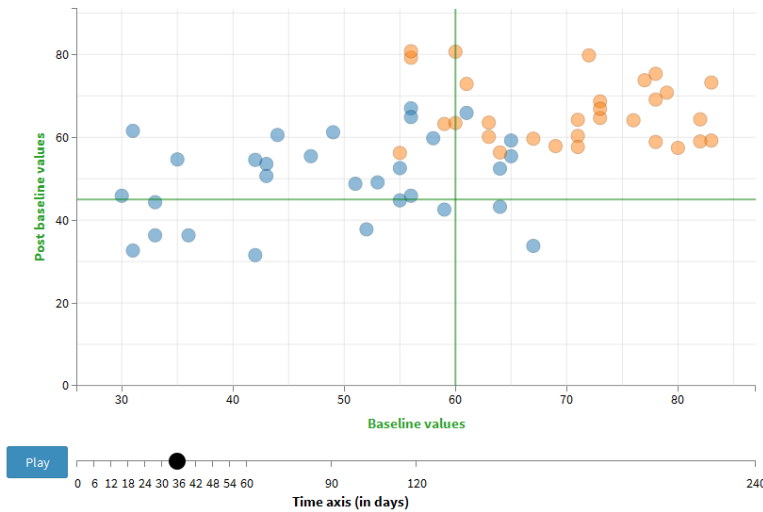
Show Reference Line at	X= 20	Y= 45
Circle size	<input type="range"/>	(Use N as circle size <input checked="" type="checkbox"/> )
Circle Opacity	<input type="range"/>	(Show lines <input checked="" type="checkbox"/> )
Speed	<input type="range"/>	10 sec
X-Axis Label	Weeks	(Press tab/enter after modification)
Y-Axis Label	EPT values	
Time-Axis Label		
Choose background color	FFFFFF	

Figures can be customized from this section at any time, even after producing the figure.

# PhUSE 2015

## CREATE FIGURE

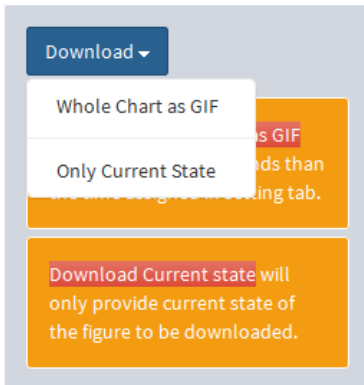
After customizing all of the settings and assigning the correct roles, the system is ready to produce the figure. “Update Chart” button will create a new interactive figure based on the settings and available data from the upload data section. If there is no data available then no figure will be produced.



If a time variable is provided, then a slider will appear to provide the control of the time-points shown in the figure. A “Play/ pause” button will allow the user to see the figure in different time-points via animation. The slider will also show the current time position.

## EXPORT FEATURE

To make these figures re-usable they can be exported out of the application. Both still and animated figures can be exported from the system. Still or static figures will only show the figure at a single time-point.



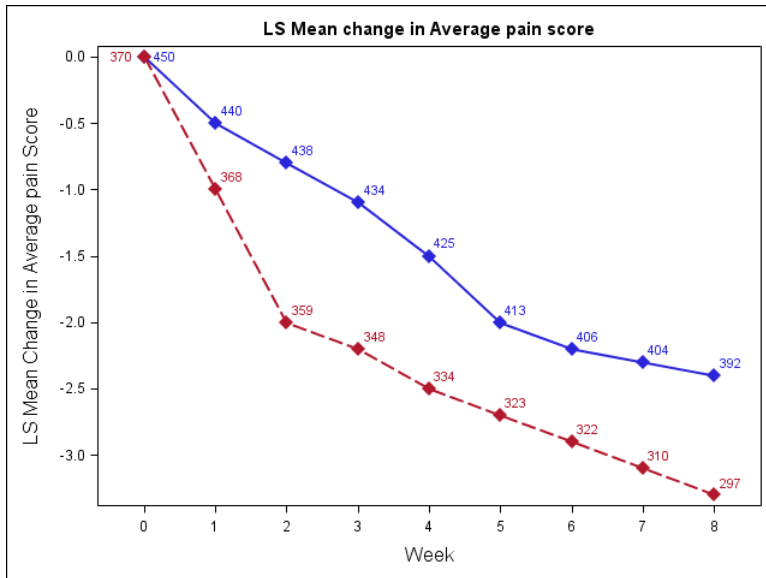
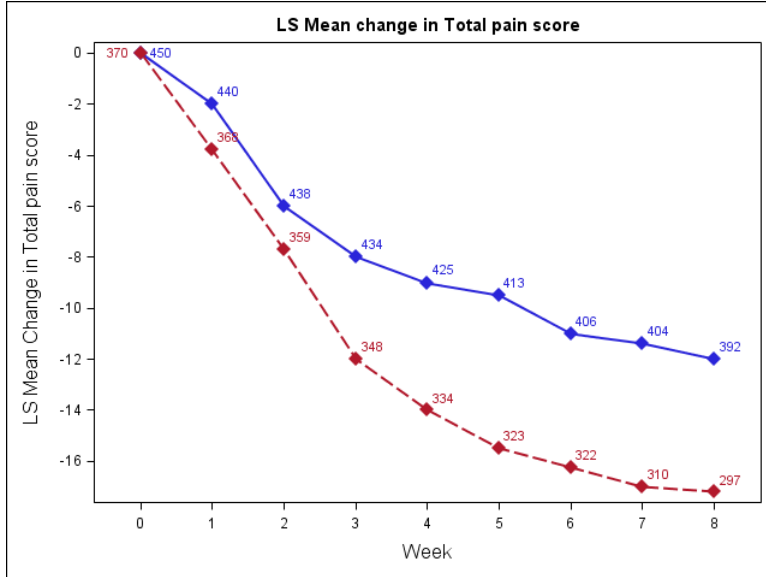
## VALIDATION

There are two types of validation required to ensure error-free interactive figures. The validation needs to be done on source data level and output level. It is assumed that the source data used for the figures is final and validated using appropriate validation methods as specified in the company Standard Operating Procedures (SOPs). Although the web application is a validated system, and it has been checked that the figures produced reflect the data accurately, after producing any figures, it is still good practice to manually check the context, values, related texts and the points in the figure against the raw data.

SHARING A STORY

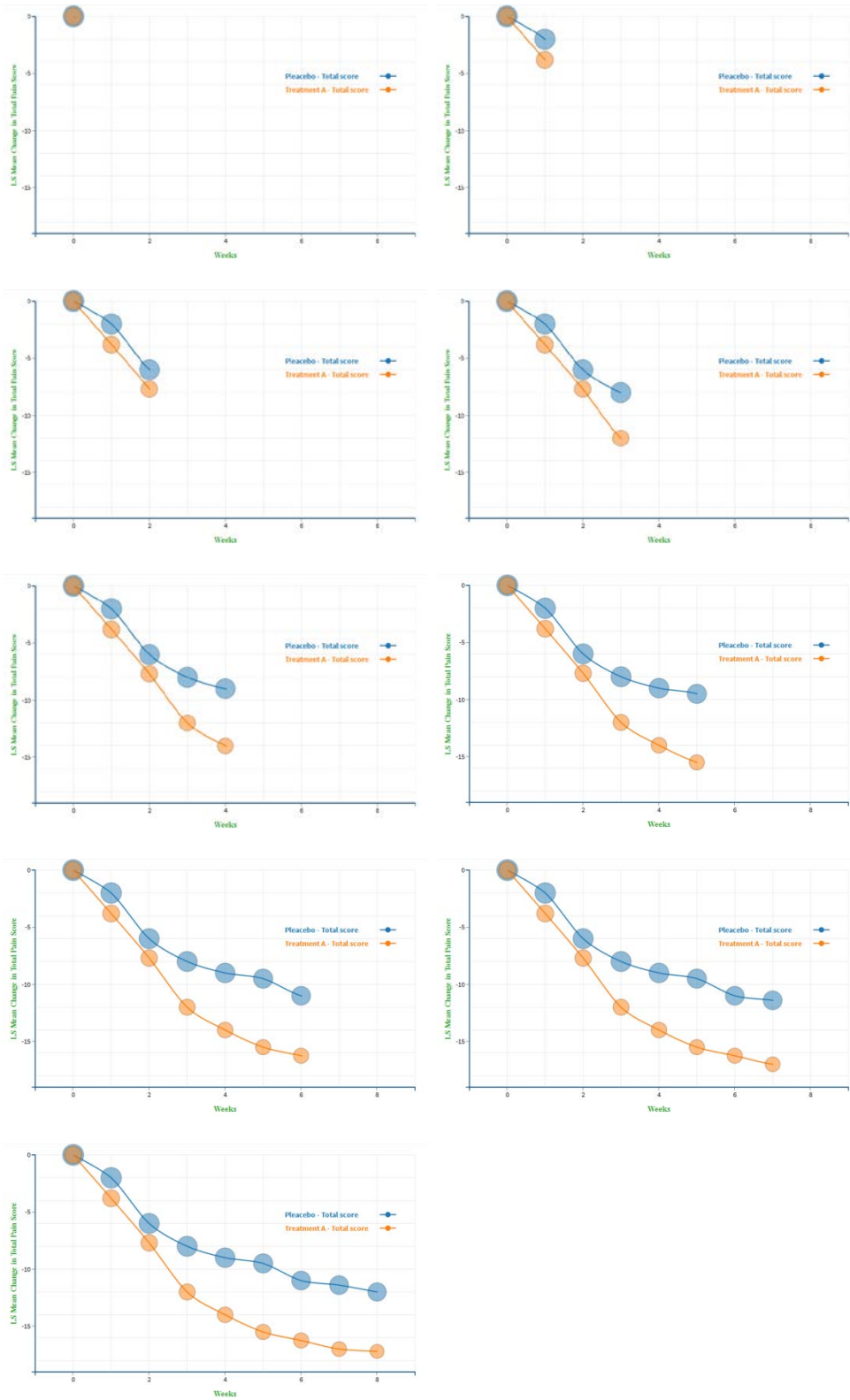
Although the key to storytelling is in the delivery, and only so much can be demonstrated within a written paper, the traditional and new animation presentations are shown here using dummy data to highlight the improvement.

Dummy pain score data is used here and a change in the Least Square (LS) mean score over different weeks has been plotted for both placebo and active treatment. The endpoints of "Total pain score" and "Average pain score" by different pain measurement methods are used for this example.



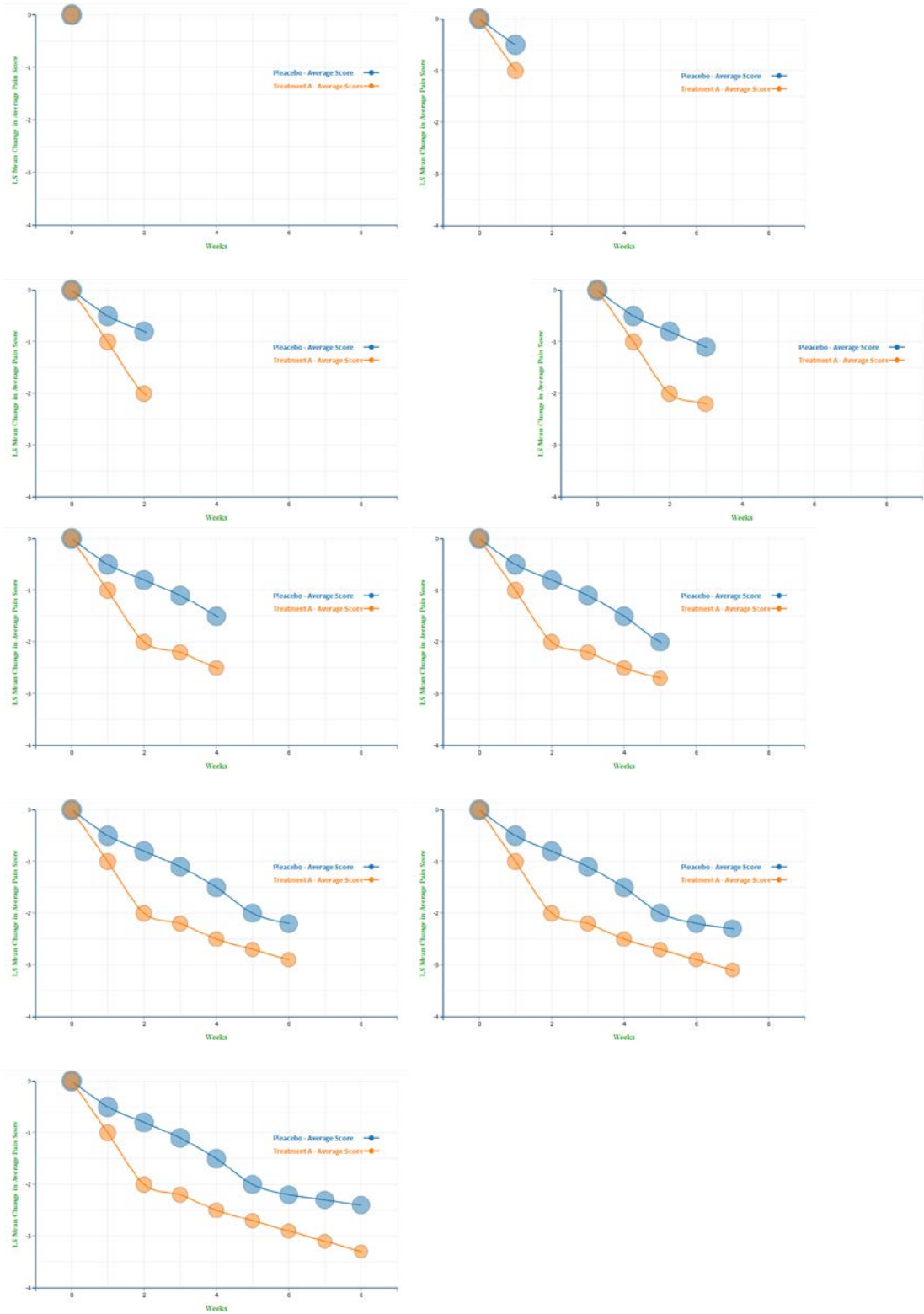
# PhUSE 2015

As the new figures are animated, they are plotted gradually over time. The following charts are at different stages of the animation process.



# PhUSE 2015

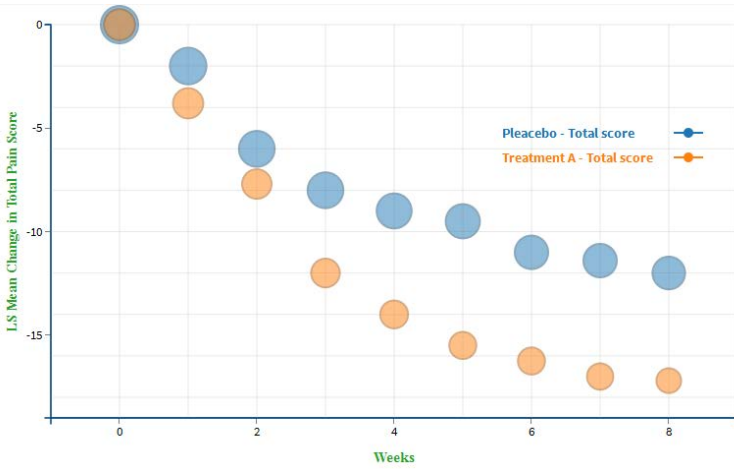
Different stages of Average pain score using the interactive figure:



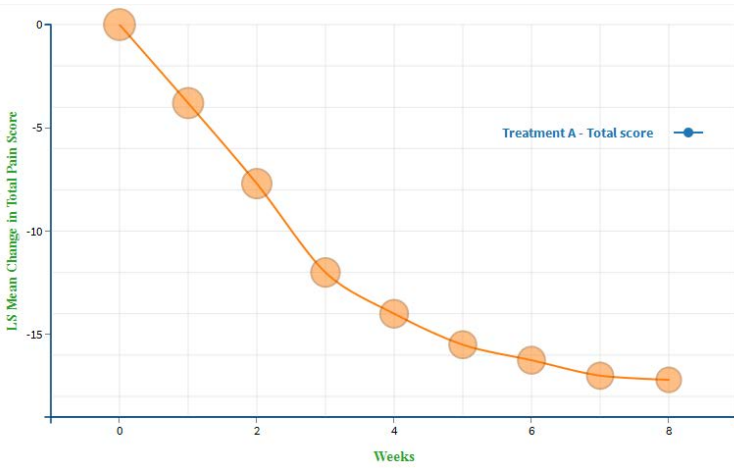
During the presentation, these figures appear sequentially one after another and form an animated figure which is much more appealing and explanatory than the original chart.

# PhUSE 2015

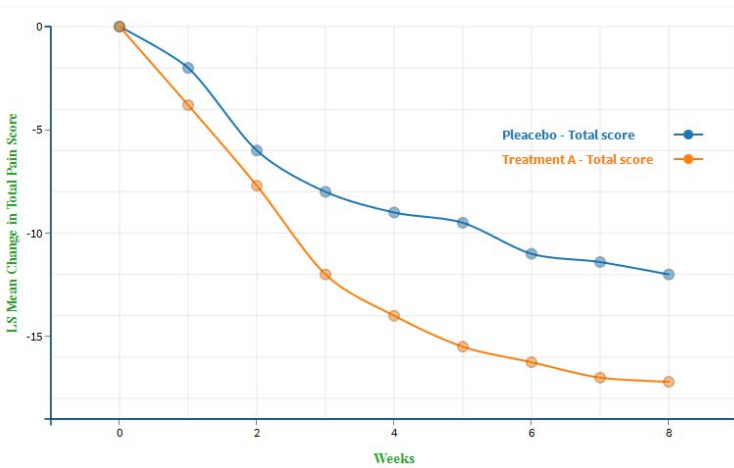
In other examples, it is possible to hide the lines without reproducing the figure from scratch, as shown below:



It is also possible to hide a single category in order to present another category exclusively:

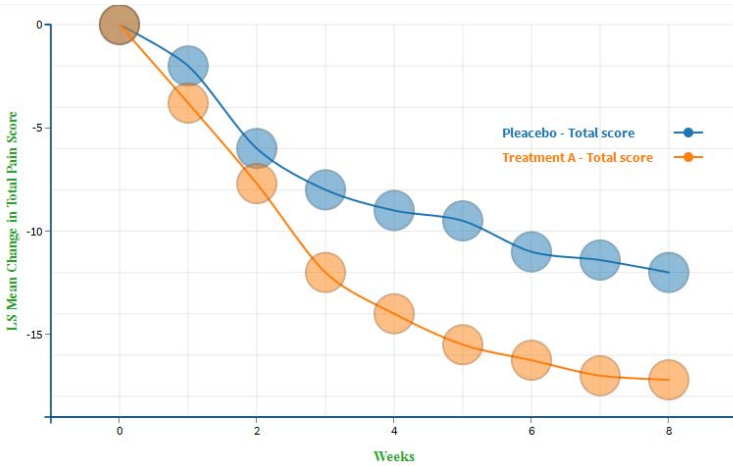


Circle sizes can also be adjusted:

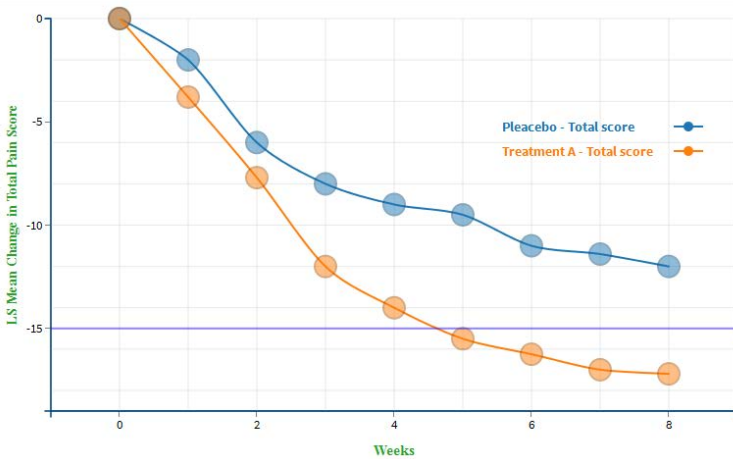




# PhUSE 2015



Reference lines can also be added to make it easier to see if and when certain thresholds are reached.



## CONCLUSION

Researchers always look for a new way to present their report without compromising the meaning of the message. A presentation always needs interactivity and simplicity to captivate and pique the interest of the audience. These animated and interactive figures can help a presenter to show their results with a great viewing experience. Rather than the traditional method of presenting the static results, interactive presentations help researchers give the audience the core idea of the research much more easily. Also these interactive figures are not limited to one type of data. Safety and other data can be added in the same figure to show the safety, efficacy, and possible relationships. It is this combination of the two types of data that allows the presenter to tell a story much more effectively.

## PhUSE 2015

### CONTACT INFORMATION

Your comments and questions are valued and encouraged. Contact the author at:

Shafi Chowdhury  
Shafi Consultancy Limited  
Regus House  
Highbridge  
Oxford Road  
Uxbridge  
Middlesex  
UB8 1HR  
United Kingdom

Mobile: +44 (0)770 288 7219

Tel: +44 (0)1895 876 533

Email : [shafi@shaficonsultancy.com](mailto:shafi@shaficonsultancy.com)

Website : [www.shaficonsultancy.com](http://www.shaficonsultancy.com)

Brand and product names are trademarks of their respective companies.