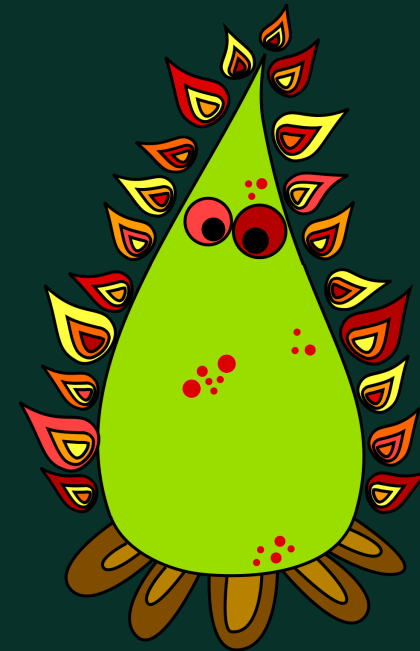


The Alienator App: “Unveiling Data Science in Clinical Trials to a Lay Audience”

Lars Andersen

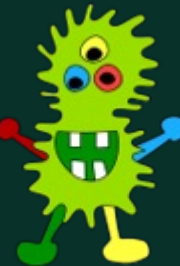
Disclaimer

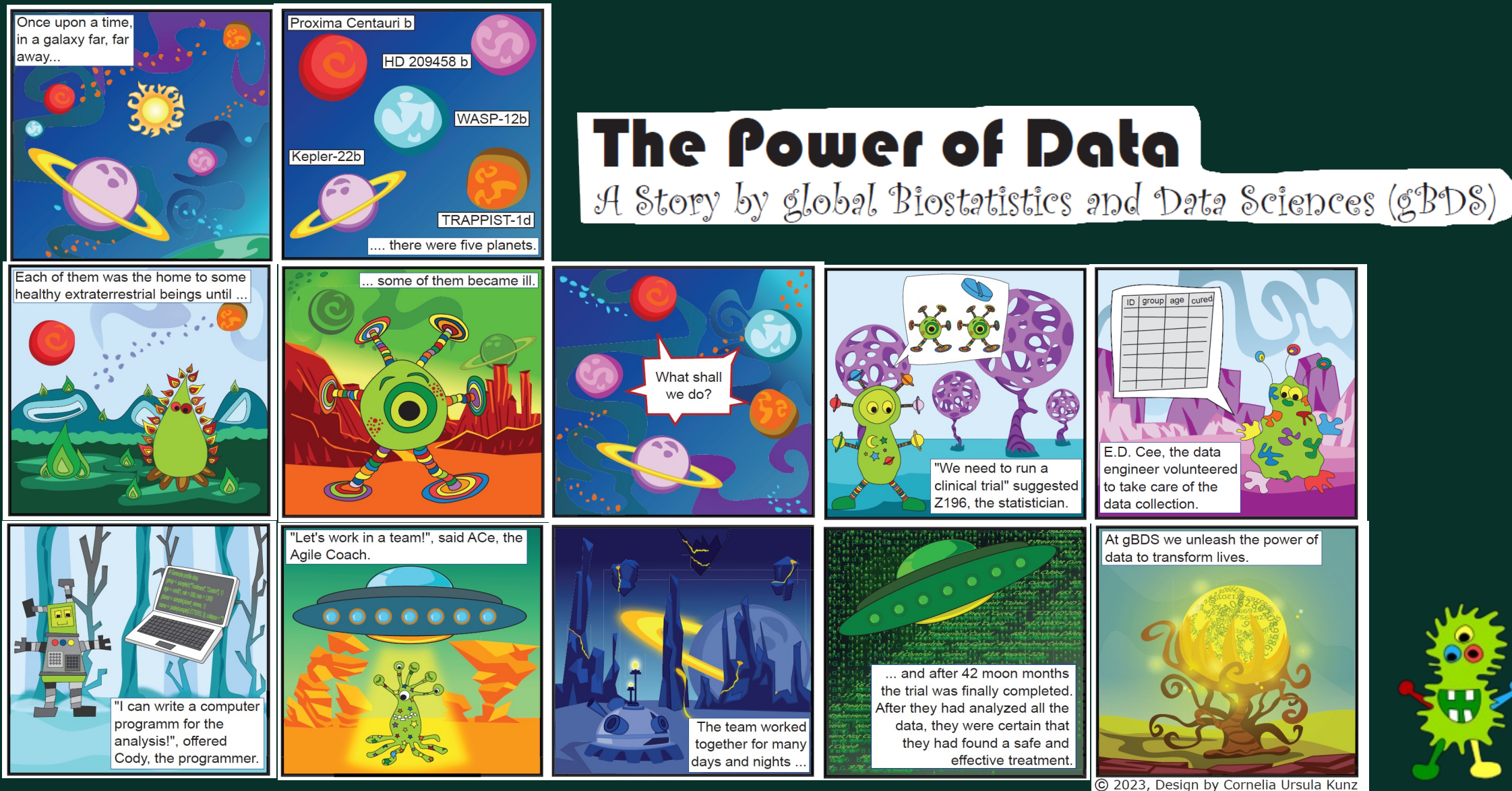
The views expressed are solely those of the presenter and do not necessarily reflect the opinions of Boehringer Ingelheim



Idea and Aim

- easy to use and interactive
- gamification aspect to make it more fun for children
- make biostatistics approachable and tangible
- show the different skillsets and profiles needed in biostatistics
- demonstrate the innovate spirit of the pharmaceutical industry





Why Shiny?

- hosted app can be used via touchscreen by visitors
- show the abilities and power of R and Shiny
- great interactive option to explain complex statistical concepts to a lay audience
- ability to show clinical trial process from data collection to data analysis





Landing Page

Generator

Visualization

Database

Code

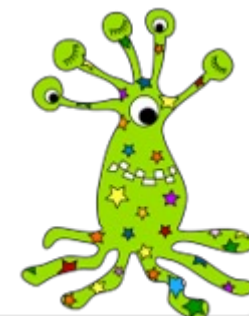
Summary Statistics

App for the open door Day 2023

At gBDS we unleash the power of data to transform lives.



© 2023, Design by Cornelia Ursula Kunz





Enter code

h10b10f10

Generate Alien



Landing Page

Generator

Visualization

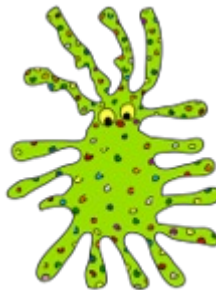
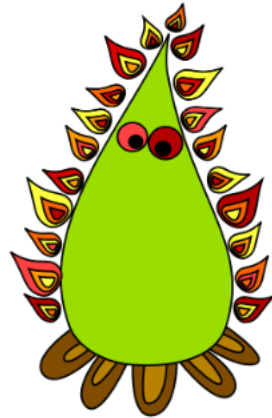
Database

Code

Summary Statistics

Profile :

Group:	Treatment	Outcome:	Cured
Age:	862	Planet:	TRAPPIST-1d
SUBJID:	MCNDE		





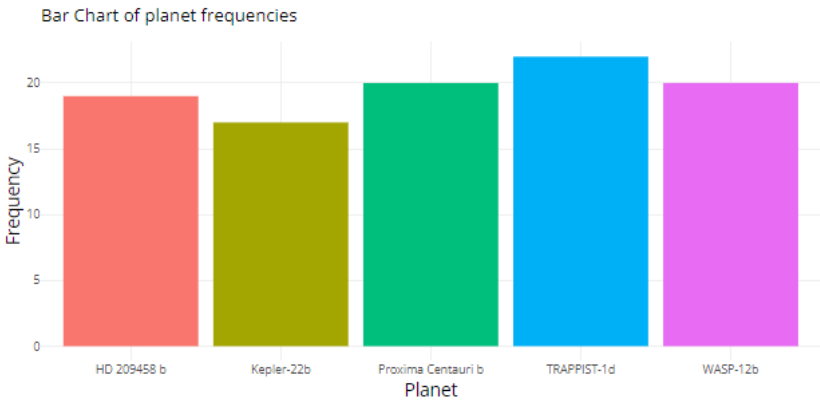
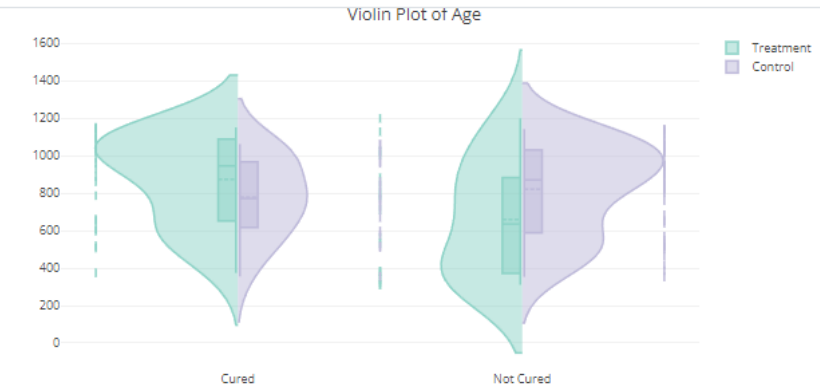
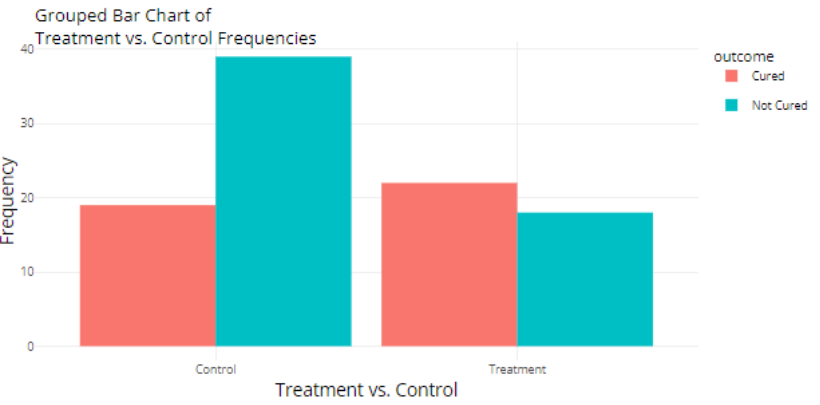
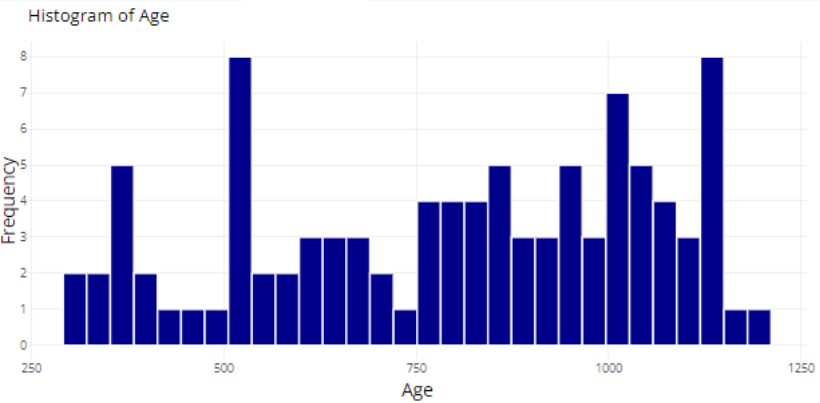
Enter code

h10b10f10

Generate Alien



Landing Page Generator Visualization Database Code Summary Statistics

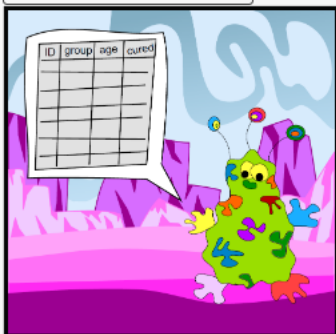




Enter code

h10b10f10

Generate Alien



	Landing Page	Generator	Visualization	Database	Code	Summary Statistics	
Show	10	entries					Search: _____
	Group	Outcome	Age	Planet	SUBJID		
1	Treatment	Cured	375	Kepler-22b	WGHZO		
2	Control	Cured	842	Proxima Centauri b	COPTD		
3	Control	Cured	761	WASP-12b	ZYHSV		
4	Control	Not Cured	826	HD 209458 b	YESZU		
5	Control	Not Cured	514	Kepler-22b	HTBFL		
6	Control	Not Cured	814	WASP-12b	ETLYW		
7	Control	Not Cured	1082	HD 209458 b	AMZNE		
8	Control	Cured	959	WASP-12b	TUAWG		
9	Control	Not Cured	802	HD 209458 b	SCNZU		
10	Treatment	Not Cured	380	TRAPPIST-1d	CUXBJ		

Showing 1 to 10 of 98 entries

Previous 1 2 3 4 5 ... 10 Next

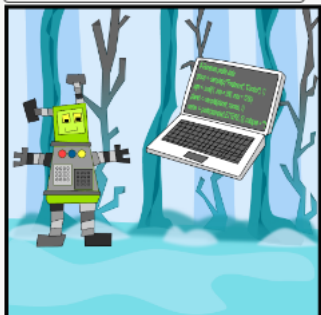




Enter code

h10b10f10

Generate Alien



Landing Page

Generator

Visualization

Database

Code

Summary Statistics

Show/Hide Code

```

1 # Additional libraries
2 library(shiny)
3 library(dplyr)
4 library(plotly)
5 library(shinyjs)
6 library(stringr)
7 library(DT) # gt
8 library(ggplot2)
9 library(shinyWidgets)
10 library(shinyAce)
11
12 # test deployment
13
14 # Planet names for demonstration purposes (you can replace this with actual planet names or use a generator)
15 planet_names <- c("Proxima Centauri b", "Kepler-22b", "WASP-12b", "HD 209458 b", "TRAPPIST-1d")
16
17 # Define language labels
18 lang <- list(
19   EN = list(
20     title = "Alien Generator",
21     generate = "Generate Alien",
22     enter_code = "Enter code",
23     tab_gen = "Generator",
24     visualization = "Visualization",
25     landing_page = "Landing Page",
26     randomization = "Randomization",
27     code = "Code",
28

```

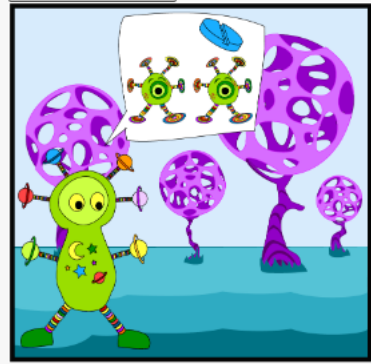




Enter code

h10b10f10

Generate Alien



Landing Page Generator Visualization Database Code Summary Statistics

Age:
Min. 1st Qu. Median Mean 3rd Qu. Max.
311.0 572.5 836.5 795.2 1021.8 1200.0
Group:

Control Treatment
58 40

Proportions of Group:

Control Treatment
0.5918367 0.4081633

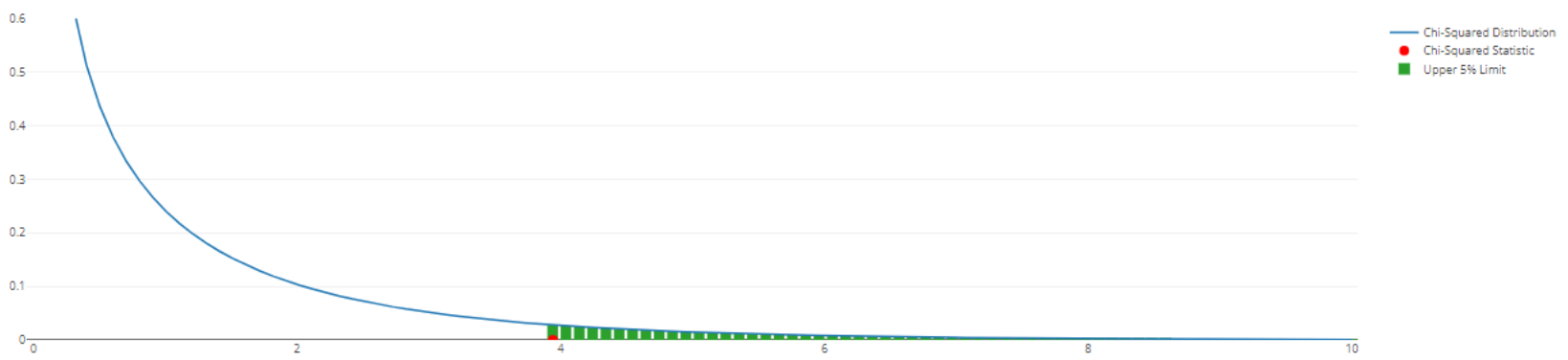
Group vs. Outcome:

	Cured	Not Cured
Control	19	39
Treatment	22	18

Chi-Squared Test:

Pearson's Chi-squared test with Yates' continuity correction

```
data: table(alien_data$data$group, alien_data$data$outcome)
X-squared = 3.942, df = 1, p-value = 0.0471
```



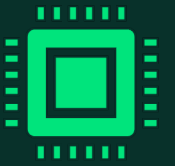
Technical Information



- dockerized R Shiny application
- hosted on an AWS cloud service
- Multiple parallel user on the same backend -> only one container log
- CI/CD used for seamless hosting
- GPT 4.0 used for most of code generation



Can LLMs be used to create R Shiny Apps?



- Pros:
 - worked surprisingly well
 - very helpful tool for skeleton creation, inclusion of multiple languages and string manipulation
 - very fast & easy prototyping
 - close to no prior knowledge of R Shiny required for prototyping
- Cons:
 - some errors are only fixable with in depth knowledge of Shiny and Reactivity
 - complex features or additions are better to be coded without an LLM
 - lots of iterations and patience needed to fix some bugs/errors



Lessons Learned



- gamification is a great tool to bring the complexity and abstract work of biostatistics closer to children and non-statisticians
- fun experience and great starting point for several great discussions with visitors
- the app was used on two different occasions and received very positive feedback – from parents and their children as well as colleagues from other departments.

-> colorized stories with interactive technologies can aid in bringing our profession to live for a general audience



Q & A

