

Making Better Decisions

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Sciences*

-
- Quantitative Decision Making (QDM)
 - Our app
 - Impact
 - Technical takeaway
-

Acknowledgements



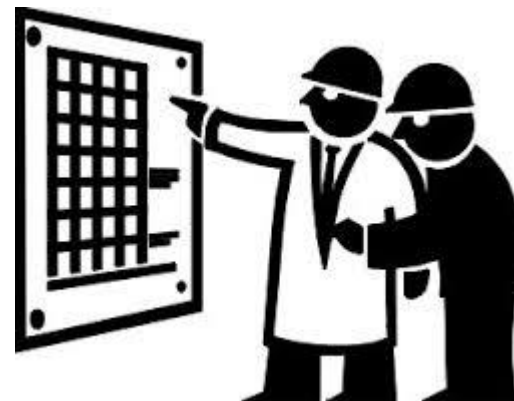
- QDM Core Team
 - Graeme Archer
 - Nicky Best
 - Jacquie Christie
 - Tim Montague
 - Inna Perevoskaya
 - Jon Robertson
 - Nikki Samson
 - Jane Temple
- App Team
 - Doug Thompson
 - Christina Fillmore

Quantitative Decision Making (QDM)

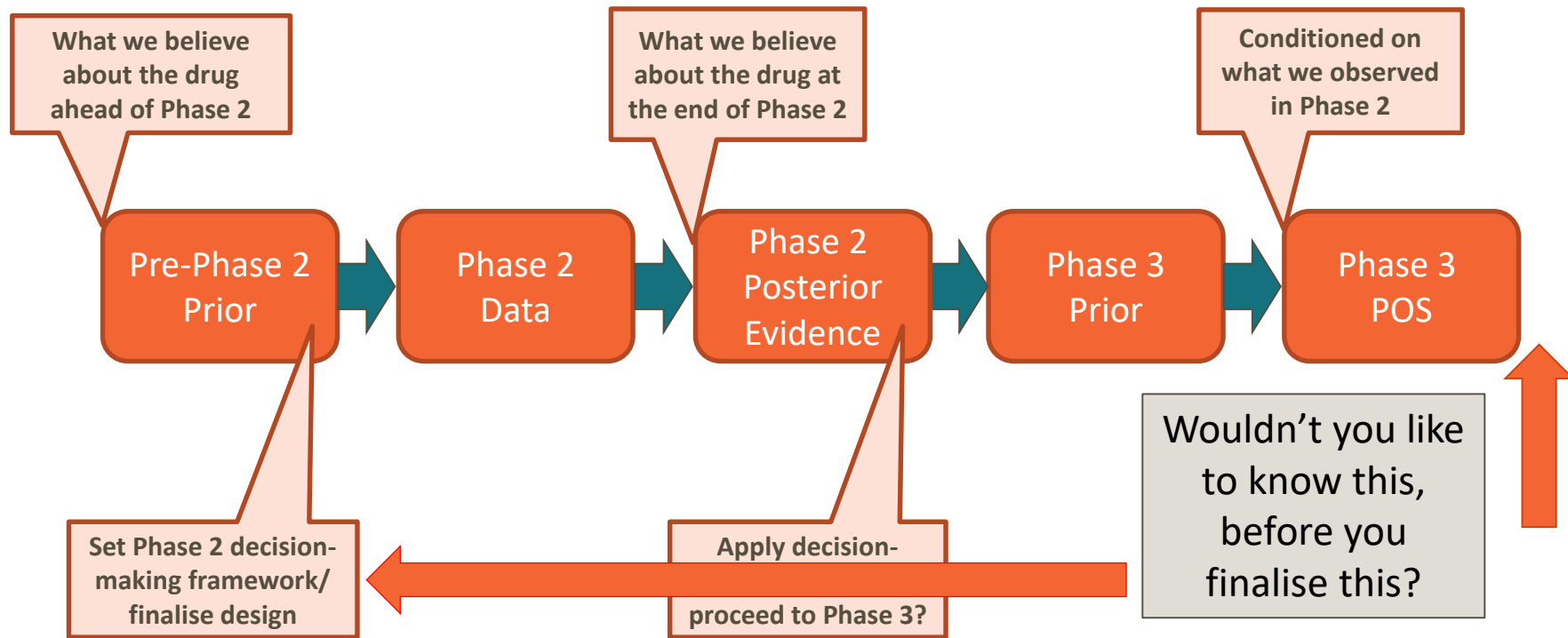
What do we mean by QDM?



Quantitative Decision Making (QDM) within GSK means to describe in full the quantitative characteristics of the proposed **study design**, to transparently show the **probability of being able to make a decision at the end of the trial** and showing how the proposed study de-risks the next stage of development



How this fits in with the development process...



Quantitative Decision Making



The highlights

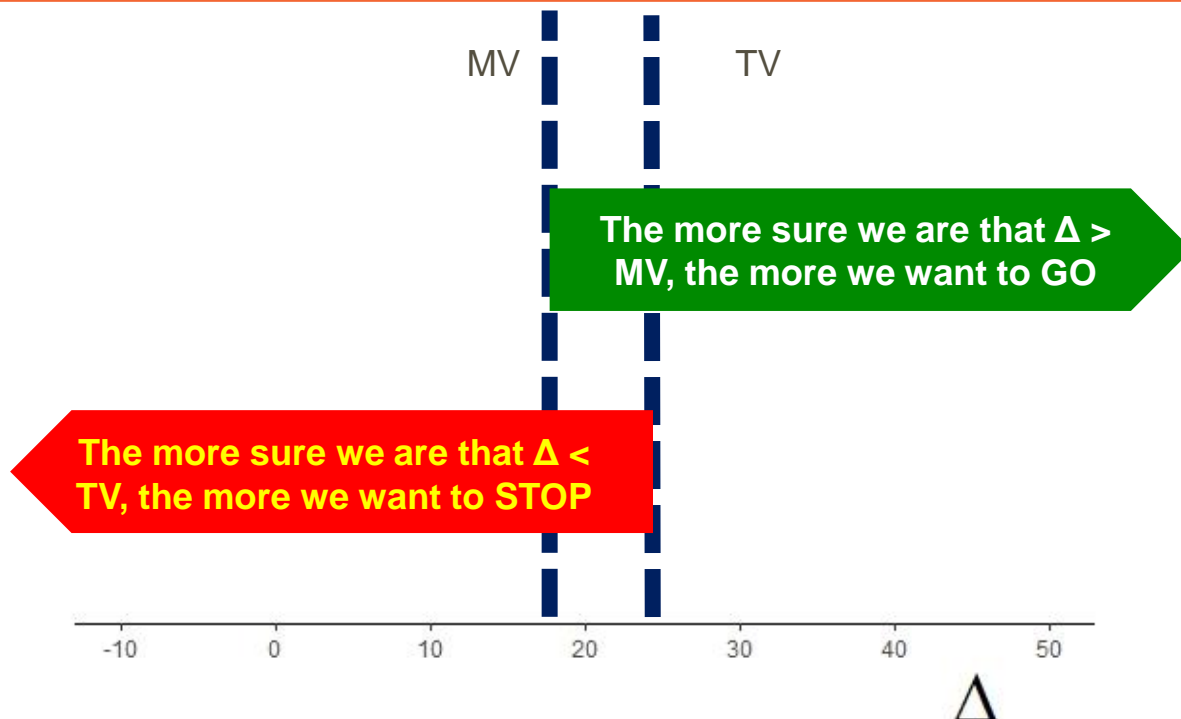
- Main aim
 - To estimate the Probability of Success at the end of pIII when planning pII study
- Key considerations
 - Need to make probabilistic statements
 - What is the probability that the true difference is greater than X?
 - Multiple endpoints

Bayesian

Conditional Operating Characteristics (Single Endpoint)



Minimum Value (MV) and Target Value (TV)



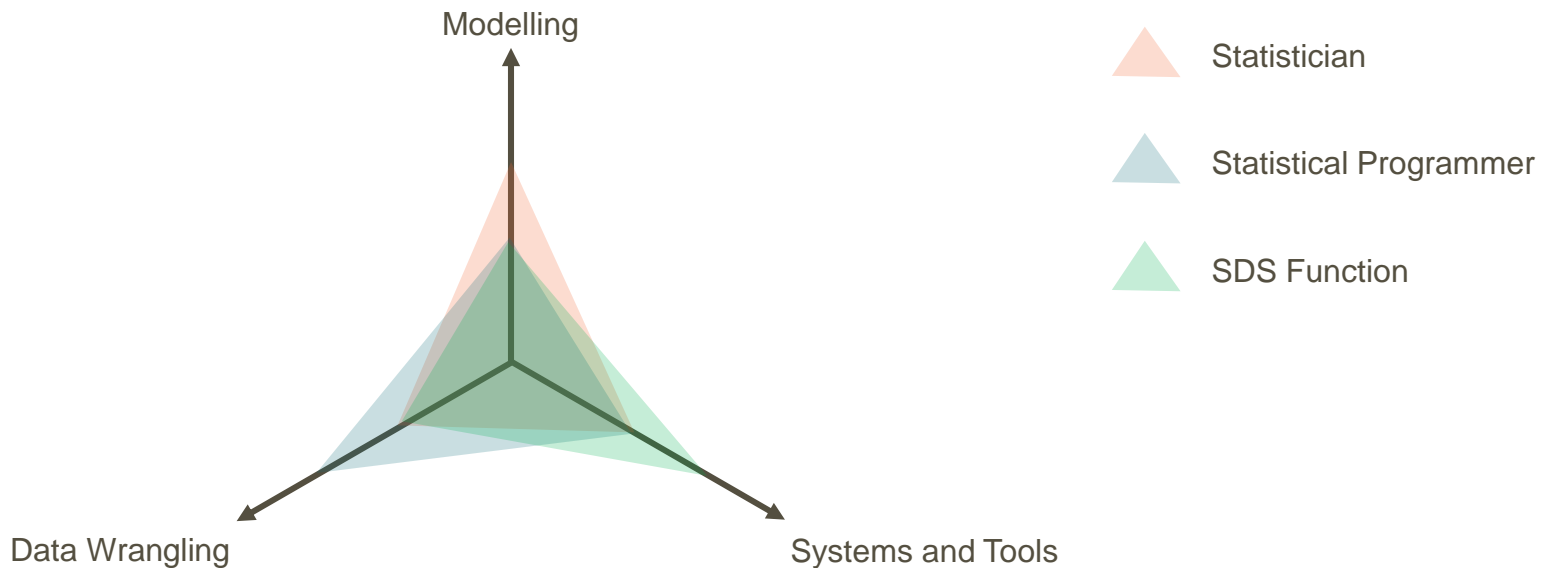
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- Aim to train all clinicians in QDM methodology
 - ~450 clinicians trained to date
 - And all of our clinical statisticians
 - ~100 trained in Predictive Inference for Study Design and Decision-Making
 - ~100 trained in Dynamic Borrowing methods for data re-use
 - Additional dose response training planned for future

**What has all this got to do with
R and Shiny?**

Statistical Data Sciences



Our vision for Biostatistics



How this came about (ish)

Can we build an app for one of our workshop exercises?

Sure

App gets built

Here you go...

That's great, I didn't realise it was possible to do all that in RShiny!

Yeah, it's just called Shiny but you're welcome

Pilot training courses takes place...

How this came about (ish)

That's great, I didn't realise it was possible to do all that in RShiny!

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Pilot training courses takes place...

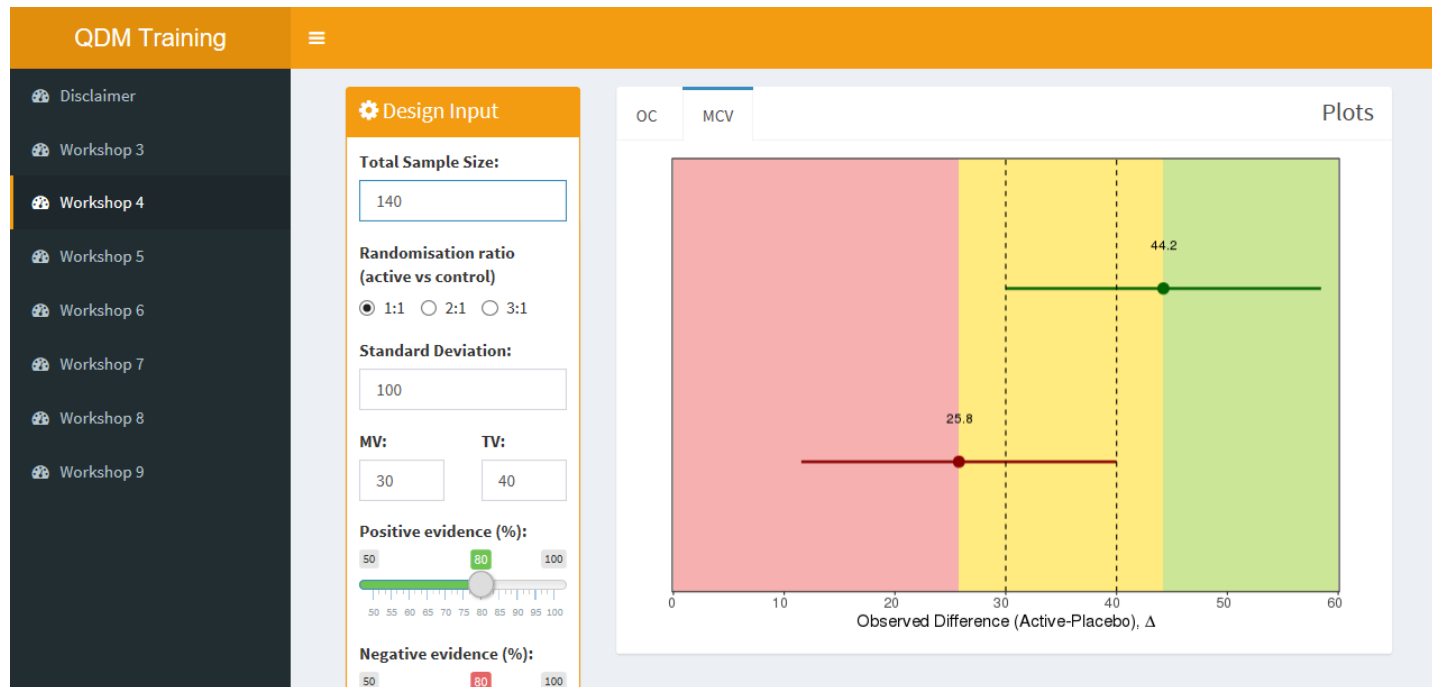
Hey, how did the training go?

Everyone loved the app ... can you build one for every exercise?

And when you're done, could you build another for real-life use?

The App

Demonstration



The App

Demonstration



QDM Training

Disclaimer

Workshop 3

Workshop 4

Workshop 5

Workshop 6

Workshop 7

Workshop 8

Workshop 9

Workshop 5

Endpoint Decisions

Probabilities

Decision Flow (Variable 1 followed by Variable 2)

Positive

Consider

Negative

Positive

Consider

Negative

Positive

Consider

Negative

Go

Go

Consider

Consider

Consider

Consider

Consider

Consider

Stop

Overall Outcome

Positive, Positive

Positive, Consider

Positive, Negative

Consider, Positive

Consider, Consider

Consider, Negative

Negative, Positive

Negative, Consider

Negative, Negative

✓ Go

✗ Consider

✗ Stop

✓ Go

✗ Consider

✗ Stop

✗ Go

✓ Consider

✗ Stop

✗ Go

✓ Consider

✗ Stop

✗ Go

✓ Consider

✗ Stop

✗ Go

✓ Consider

✓ Stop

✗ Go

✓ Consider

✗ Stop

✗ Go



✗ Consider

✓ Stop

Impact

QDM Success


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Joint winners of 2019 pharmaceutical award announced

Written by Web News Editor on 04 June 2019. Posted in [News](#)




Congratulations to this year's winners of the annual PSI/RSS Statistical Excellence Awards in the Pharmaceutical Industry.

This year, two joint winners were announced as follows:

Mike Smith (pictured above) for his work on 'Excellence in research around population modelling in drug development' and its 'pioneering practical Bayesian methods with drug development in the context of optimising decision making within trials and modelling dose response with pharmacokinetic/pharmacodynamic modelling'.

Graeme Archer and Jacquie Christie (pictured below) were recognised for their work, 'Quantitative Decision-Making for clinical development', which was deemed to be 'at the cutting edge of revolutionising data driven decision making within the industry'.

The awards were presented by RSS director of membership and professional membership, Nicola Emmerson, and PSI membership secretary Tim Rolfe, at the annual PSI Conference Gala Dinner at The QEII Centre, London on Tuesday 4 June.



[RSS Excellence Awards](#) [Statisticians in the Pharmaceutical Industry Ltd \(PSI\)](#)

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The Future of Shiny at GSK



- SDS has recently doubled in size



- Biostatistics commitment to embed Shiny as a key skill

- In-house training program
- Shiny SMEs
- Development standards
- WARP Drive initiative



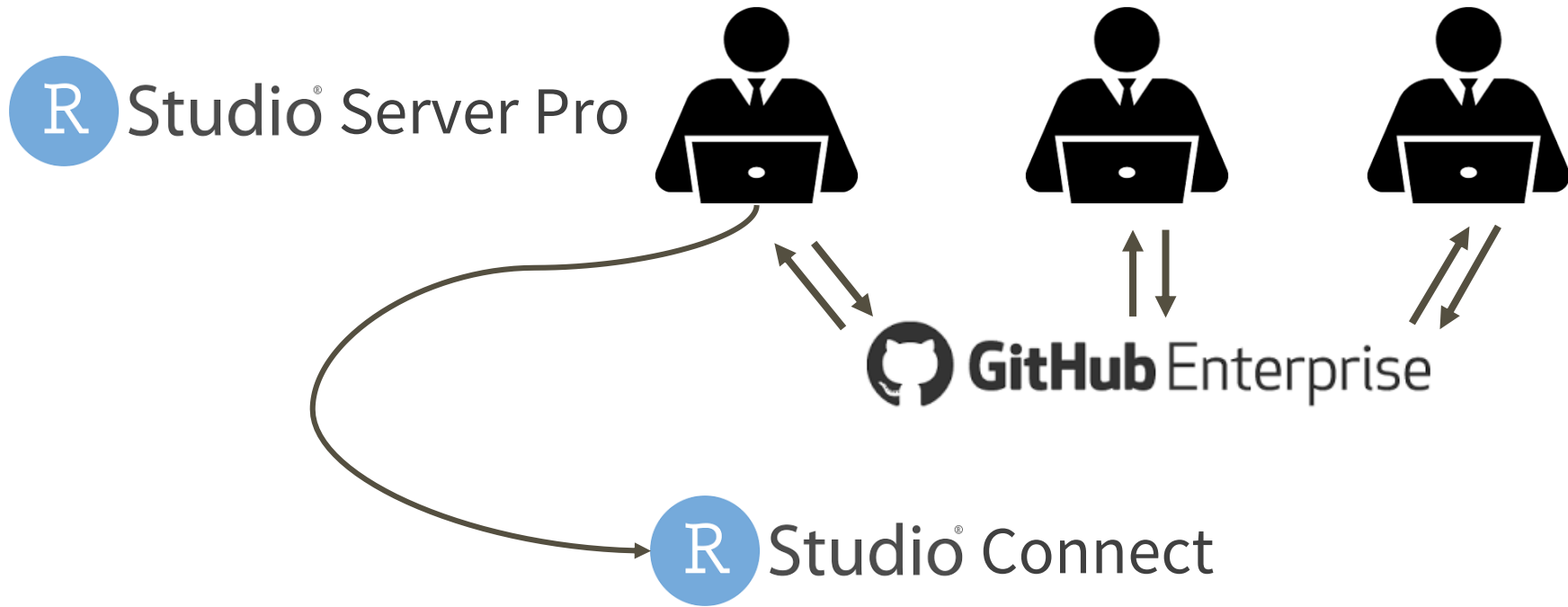
Technical Takeaway



Some Technical Info



Our (not so) sophisticated development process



Start using
modules now!

```
w5_ui <- function(id) {
```

```
  # Create a namespace function using the provided id
```

```
  ns <- NS(id) ← Add this
```

```
  navbarPage("Workshop 5",  
    tabPanel("Endpoint Decisions",  
      fluidRow(  
        box(width = 11, status = "warning",  
          grVizOutput(ns("plot1"), height = 250)),  
        box(width = 11, status = "warning",  
          h4("Overall Outcome"),  
          lapply(seq_len(nrow(scenarios)), function(x){  
            col_width <- if_else(x %% 3 == 0, 2, 1)  
            column(col_width,  
              radioGroupButtons(  
                inputId = ns(scenarios$short[x]),
```

Wrap input object
names in ns()

```
server <- function(input, output) {  
  callModule(w3_server, "w3")  
  callModule(w4_server, "w4")  
  callModule(w5_server, "w5")  
  callModule(w6_server, "w6")  
  callModule(w7_server, "w7")  
  callModule(w8_server, "w8")  
  callModule(w9_server, "w9")  
}
```

Summary



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- QDM is changing the way GSK develops drugs
 - The QDM app is the star of the show when training clinical colleagues
 - Shiny is set to become a core Biostatistics skill at GSK