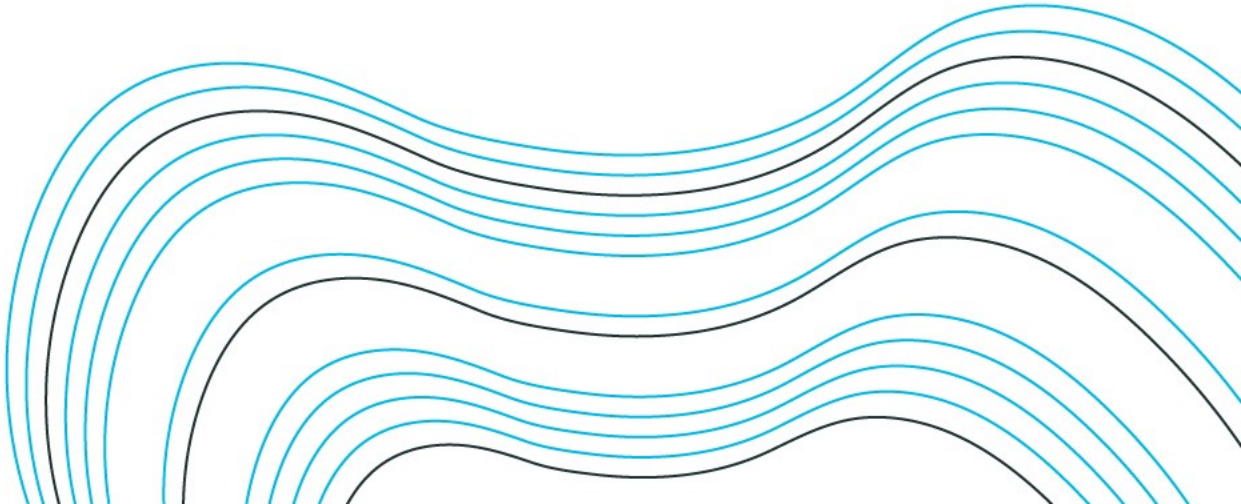
Using Matomo to collect data on intervention engagement within a research trial: the Wrapped project

University of Hertfordshire UH



Overview

- Why is it important to measure intervention engagement within a research trial?
- Brief intro to the Wrapped research project
- How we used Matomo to collect individual-level data on engagement
- Early insights from our analytics data
- Q&A

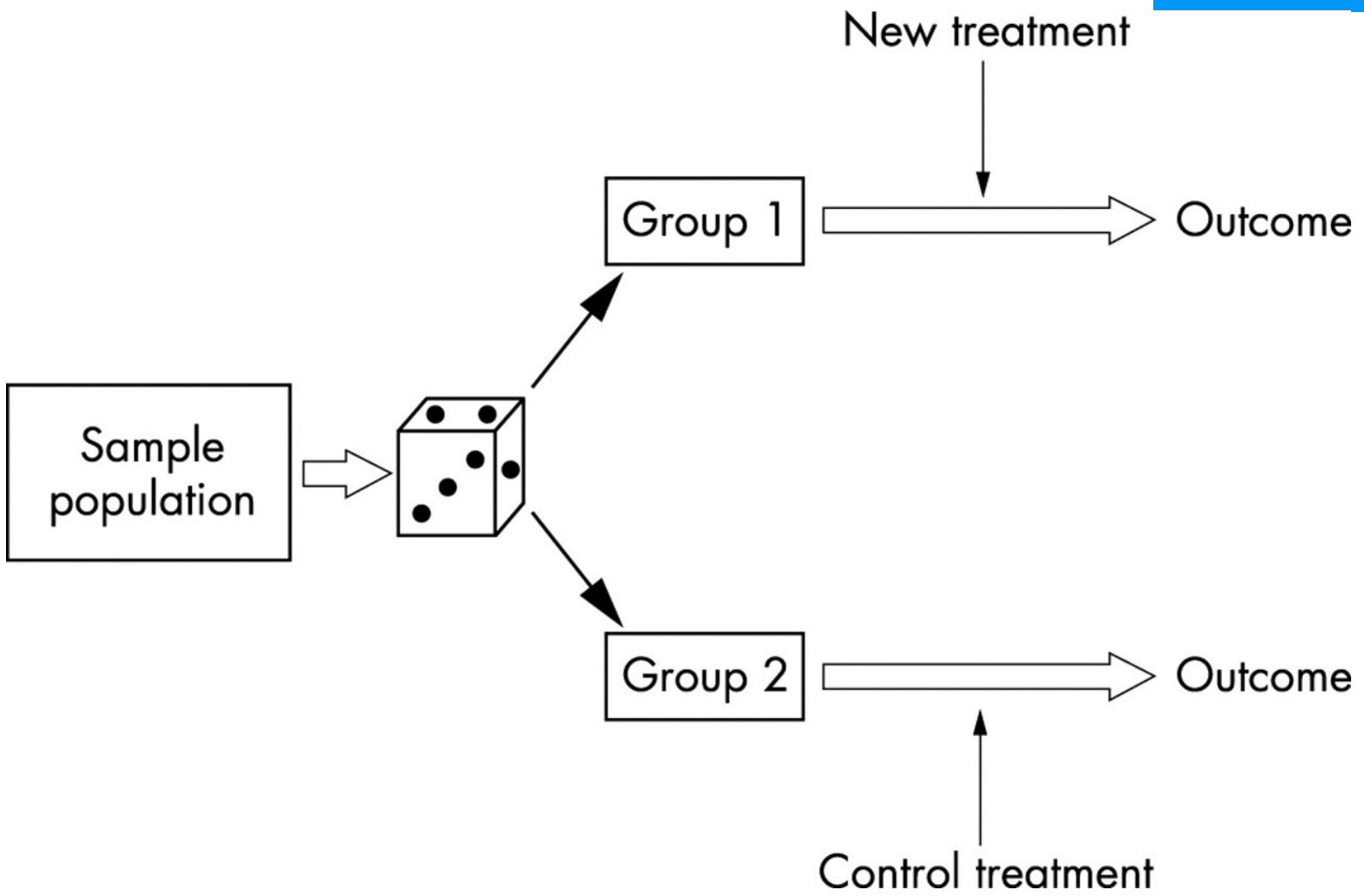
Why is it important to measure intervention engagement within a research trial?

- To minimize non-usage attrition
- To examine and control for dose

Minimising non-usage attrition

- Trials of new interventions are typically performed using Randomised Controlled Trials (RCTs)

The randomised control trial



J M Kendall Emerg Med J 2003;20:164-168

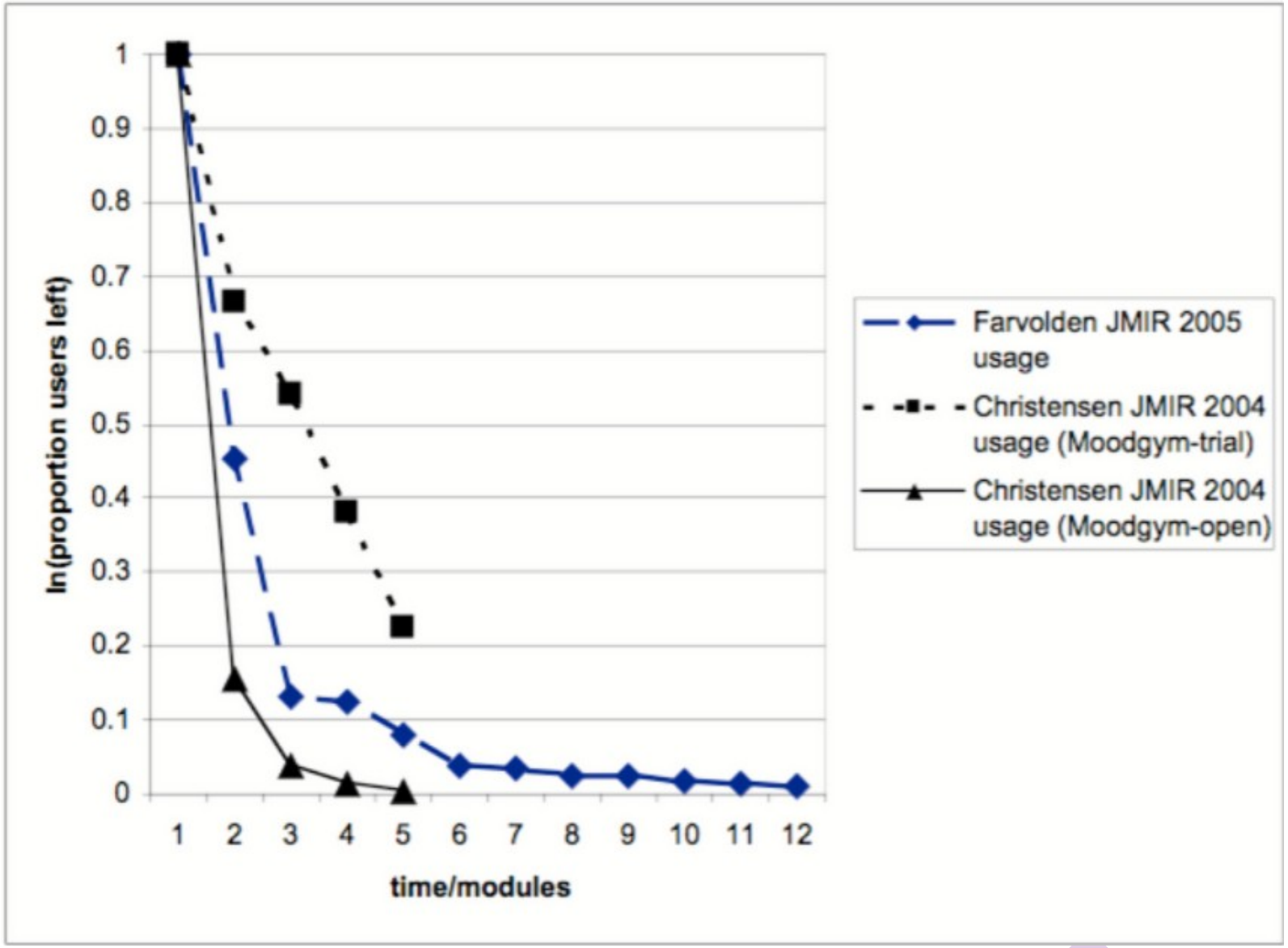
In a clinical context, where a new drug is being tested, adherence to the drug is not usually a problem:

- The drug is ‘prescribed’
- Participants are closely supervised, and
- They may experience observable and immediate health benefits in taking a drug

In contrast, adherence is a major problem in trials of eHealth interventions

- *eHealth intervention is any intervention delivered via the internet*

Here the intervention is neither prescribed nor critical to wellbeing


1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
ln(proportion users left)
1 2 3 4 5 6 7 8 9 10 11 12
time/modules
Farvolden JMIR 2005 usage
Christensen JMIR 2004 usage (Moodgym-trial)
Christensen JMIR 2004 usage (Moodgym-open)

The problem of non-usage attrition in trials (i.e. participants ceasing use of the intervention) is that if participants are not using the intervention then it makes it difficult to test whether it actually works

In trials, outcome data for *every* participant randomized will be included in the analysis

- Regardless of whether they adhered to the intervention or not – ITT analysis
- This has the effect of underestimating the effect of the intervention

It is therefore really important to do what we can to minimize non-usage attrition

It is usual practice to conduct a feasibility trial ahead of a main trial

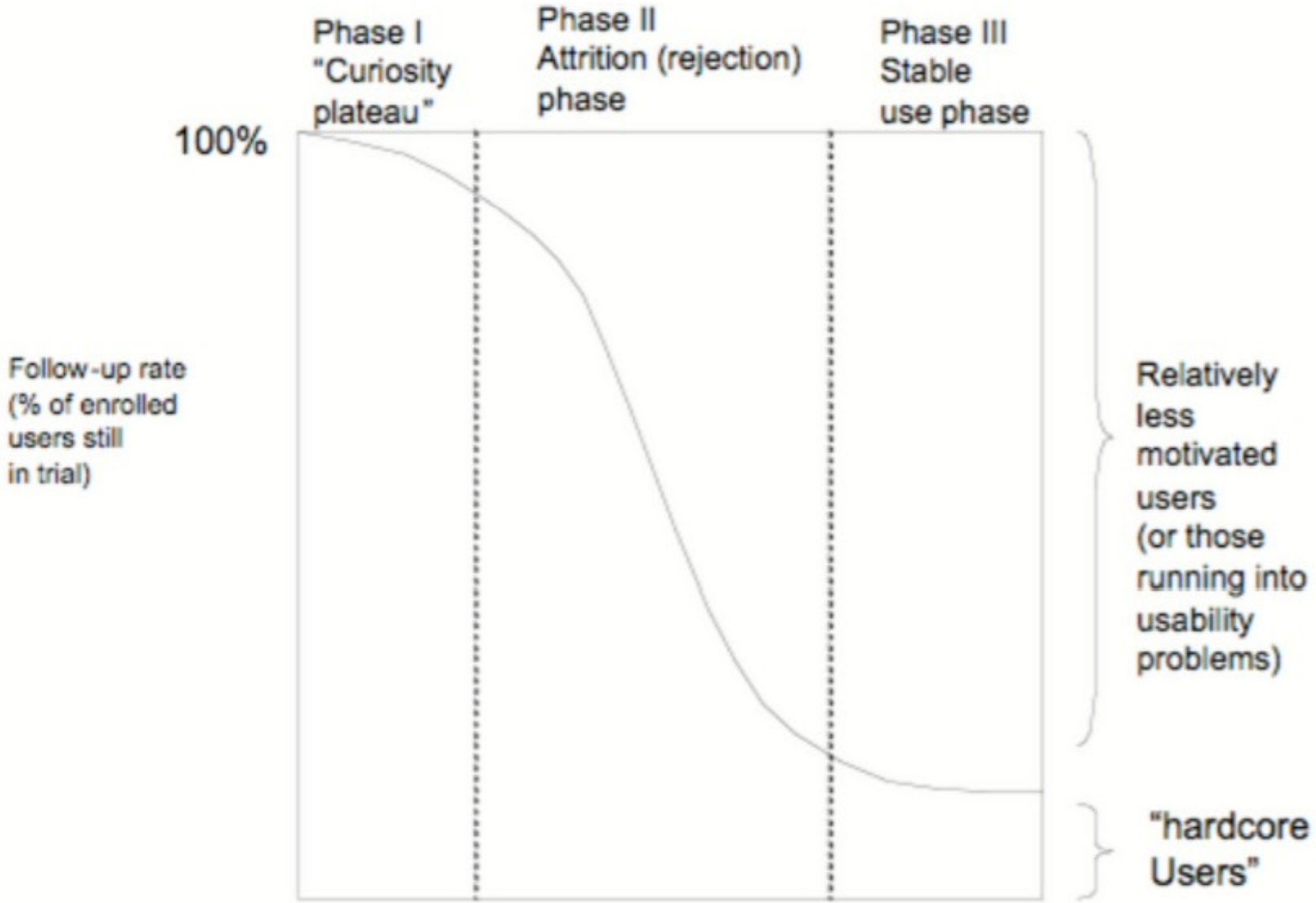
A fRCT is the same as an RCT in every way except the study is run with fewer participants

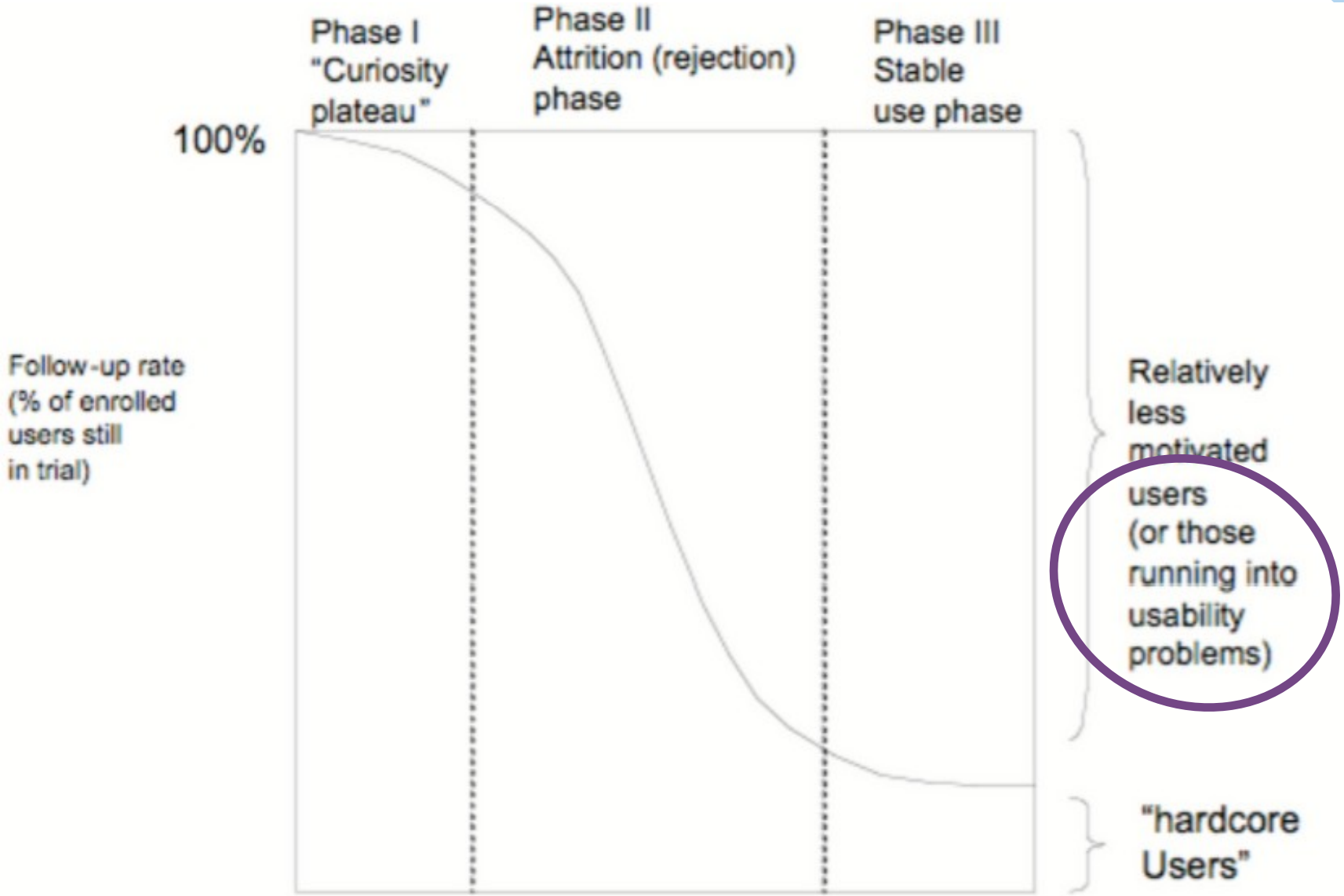
The purpose is to help the team prepare for the full RCT

- Resolve ‘unknowns’ e.g. what is the best method for recruitment, what level of incentive is required to keep participants in the trial until the end?

An fRCT can also be used to examine non-usage attrition

- Analyses can also tell us whether attrition is associated with demographic factors
- The shape of the attrition curve can tell us something about underlying causes


Phase I
"Curiosity plateau"
Phase II
Attrition (rejection) phase
Phase III
Stable use phase
100%
Follow-up rate (% of enrolled users still in trial)
Relatively less motivated users (or those running into usability problems)
"hardcore Users"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It is not uncommon for eHealth fRCTs to measure non-usage attrition, but measures of engagement are usually limited (not fine-grained) e.g. continued access to website, completing modules etc.

The use of analytics data rarely happens

- Aware can offer greater insight into usability issues*

  e.g. friction points

- Which can be further explored through qualitative research
- With aim of addressing any issues to reduce non-usage in the main trial

* Common place in web industry – expertise exists; we could gain a lot from collaboration

Examining and controlling for dose

The ‘amount’ (or dose) of intervention a participant receives in a trial may affect the strength of the outcome (assuming the intervention is indeed effective)

You can’t examine what you don’t measure

For each individual participating in a trial, we need to know ‘how much’ of the intervention they had

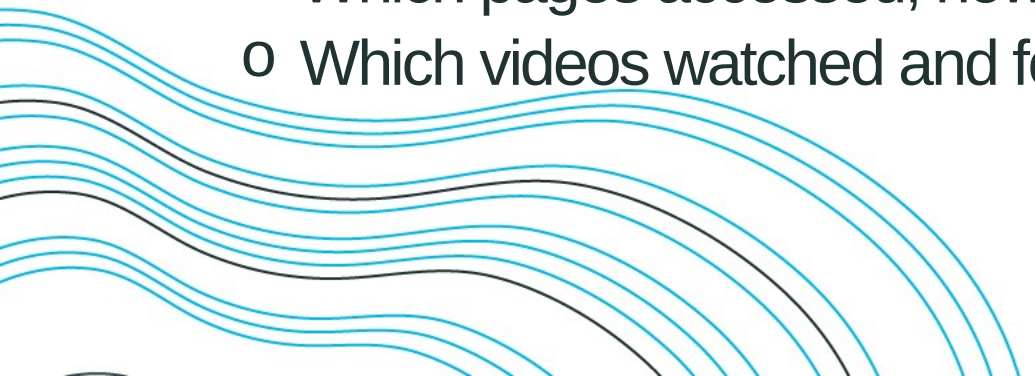
Examining and controlling for dose

This enables researchers to examine:

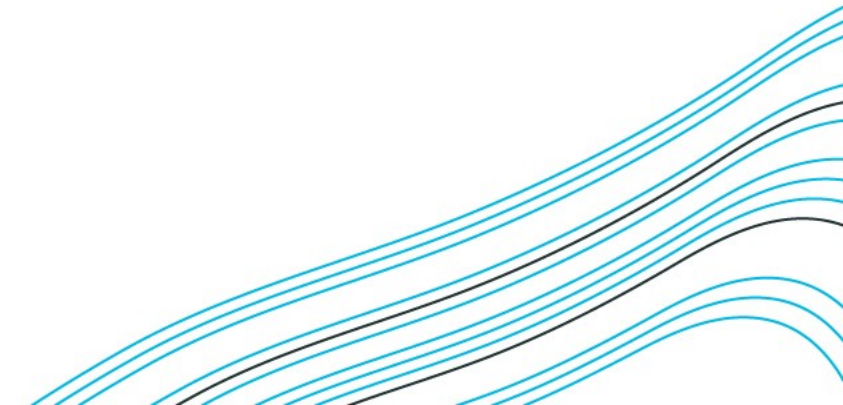
- Whether there is a linear relationship between dose and effect (the more you have, the greater the benefit)
- Or whether there is a non-linear relationship (point of saturation)
- Whether there is a minimum dose that is needed for the intervention to have an effect, and if so, what that minimum is

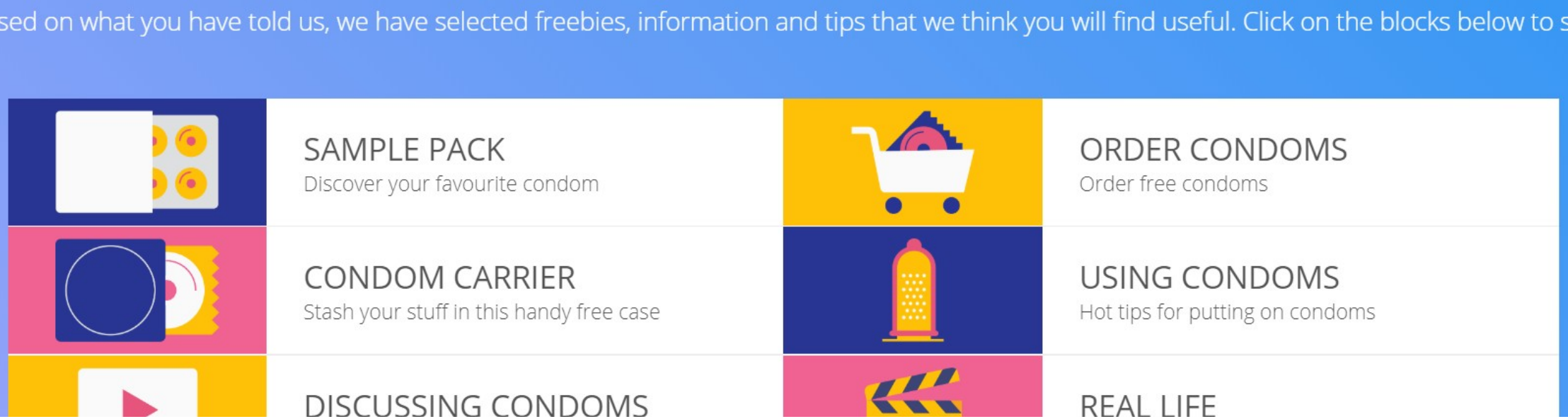
Analytics data is also therefore needed to provide precise and detailed measures of dose *for each individual* e.g.

- Which pages accessed, how long spent on page
- Which videos watched and for how long



A brief introduction to Wrapped





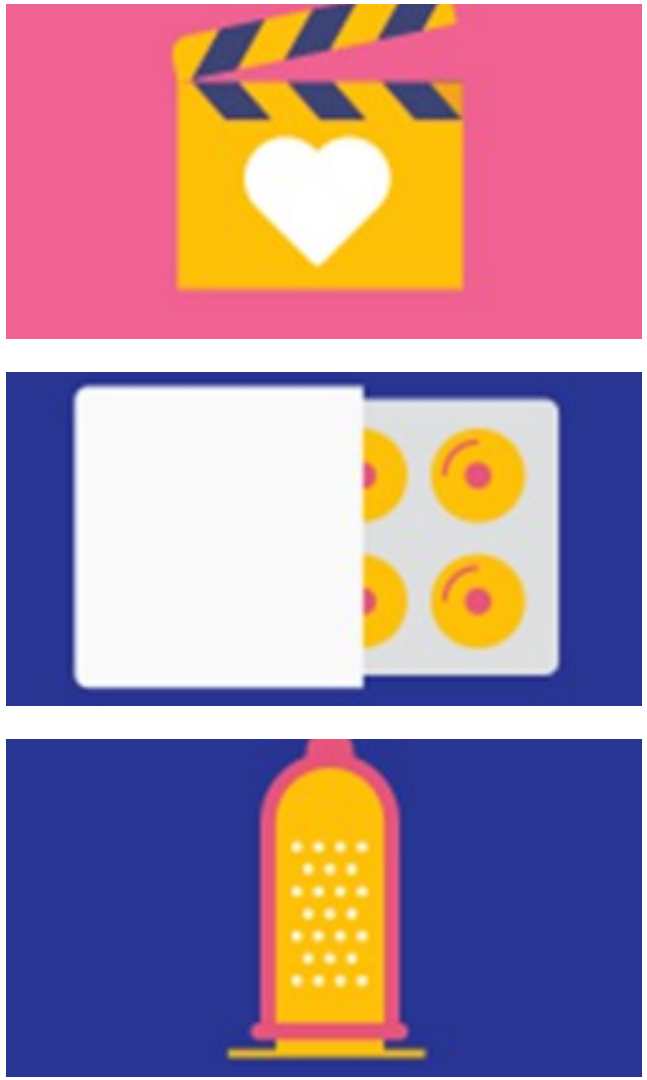
Our trial

Feasibility RCT

Aims to establish if main RCT is feasible & inform preparations

We are using analytics data to:

- better understand any possible usability issues so that they can be addressed ahead of the trial (incl. minimise non-usage attrition)
- learn how best to measure dose in the main RCT



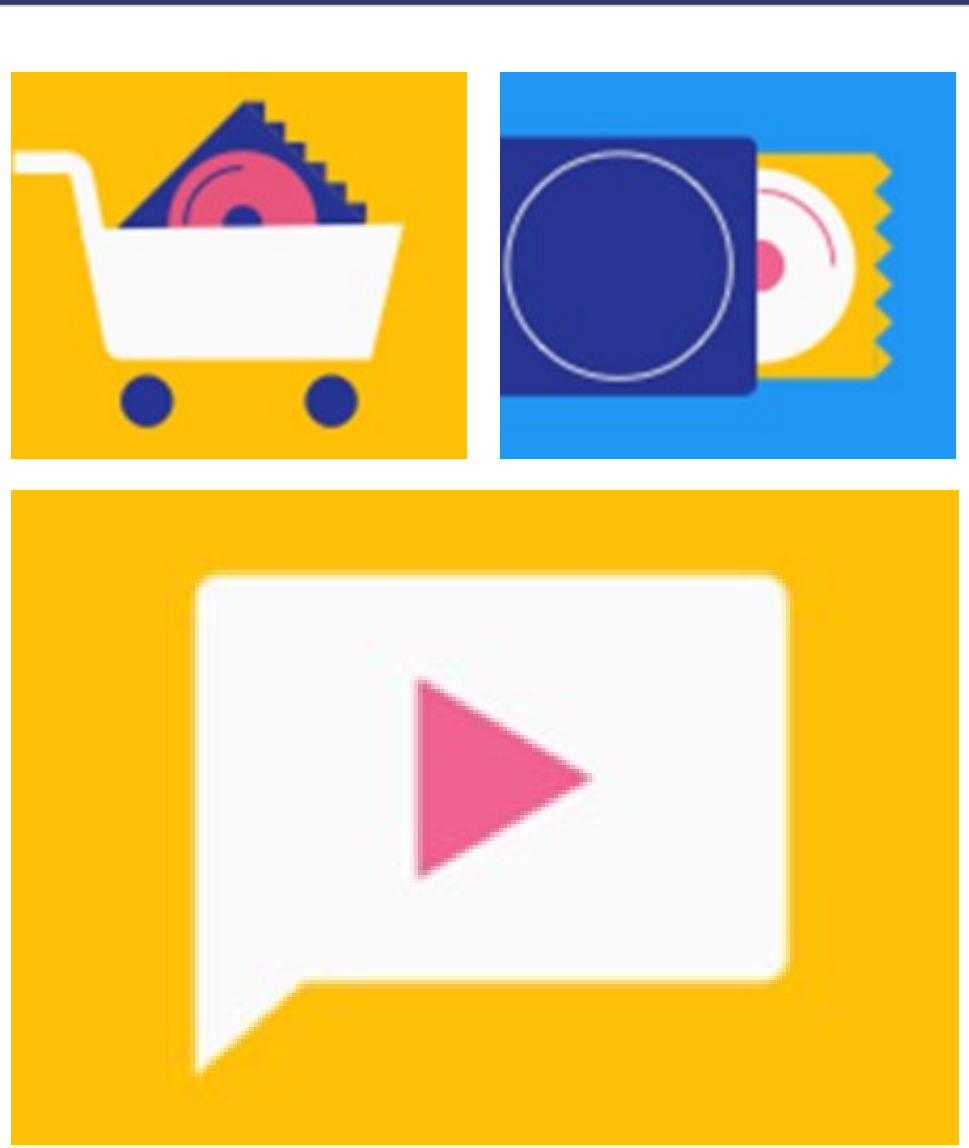
Wrapped intervention

Aims to increase condom use by addressing factors such as:

- Condom use attitude, self-efficacy for communication and use, and increasing access to condoms

Content includes 6 components – tailored to individual need (not all allocated)

- 3 products which can be ordered (trial pack, carrier, monthly supply)
- 3 lots of videos



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Data collection

- The study requires participants to complete activities over a 12 month period
- Database management software called REDCap is used to consent participants, prompt them to complete activities (email, SMS) and record their data (e.g. surveys, test results)
- REDCap is also used to direct participants to the intervention (Wrapped) and control websites after randomisation.
- Each participant has a unique ID against which all of their activity/data is logged

The problem

How do we collect individual-level analytics data?

The data collection part

- Technology used: CodeIgniter
- Number of parties involved within the project: 3 (the client, the agency, the analyst)
- Key aspects of the project:
  - few pages to track but critical in terms of data collection (advanced tracking code were necessary: events, custom dimensions).
  - insuring to have a consistent data layer.
  - have a clear QA process.
  - Use of custom dimensions and custom reports was of critical importance.

Working methodology example

04a - Technical specs - Pageview	**Question:** How is it tracked ?	**Audience :** IT people		
				Pre-p
	Page path	Action	Code to push when the action is made	Required variables	QA 1

1	/register	Pageload	var _mtm = _mtm || [];
			_mtm.push({
			'page_template': 'register',
			'page_step': '1'
			});
				'page_template'
				'page_step'
					NOK datalayer should be above the container

2	/register#2	New content is displayed	var _mtm = _mtm || [];
			_mtm.push({
			'page_template': 'register',
			'page_step': '2'
			});
				'page_template'
				'page_step'
					NOK page_step 2 is missing

3	/register#3	New content is displayed	var _mtm = _mtm || [];
			_mtm.push({
			'page_template': 'register',
			'page_step': '3'
			});
				'page_template'
				'page_step'
					NOK this part is missing

4	/register#4	New content is displayed	var _mtm = _mtm || [];
			_mtm.push({
			'page_template': 'register',
			'page_step': '4'
			});
				'page_template'
				'page_step'
					NOK page_step 4 is missing

Working methodology example

04b - Technical specs - Events | **Question:** How is it tracked ? | **Audience :** IT people

	Page path	Action	Code to push when the action is made	Required variables	Pre-QA 1

1	/register	Click on "Register" Button	var _mtm = _mtm || [];
			_mtm.push({
			'event': 'mtm_event',
			'event_category': 'Registration',
			'event_action': 'Button Click',
			'event_label': 'Step 1 - Register'
			});
				'event'
				'event_category'
				'event_action'
				'event_label'
					OK

2	/register#2	Click on "Progress" Button	var _mtm = _mtm || [];
			_mtm.push({
			'event': 'mtm_event',
			'event_category': 'Registration',
			'event_action': 'Button Click',
			'event_label': 'Step 2 - Progress'
			});
				'event'
				'event_category'
				'event_action'
				'event_label'
					OK

3	/register#3	Click on "Continue" Button	var _mtm = _mtm || [];
			_mtm.push({
			'event': 'mtm_event',
			'event_category': 'Registration',
			'event_action': 'Button Click',
			'event_label': 'Step 3 - Continue'
			});
				'event'
				'event_category'
				'event_action'
				'event_label'
					NOK missing

Working methodology example

05 - Variables Question: How are the required variables populated ? Audience: IT people

Users	Description	Type	Origin
user_id	User unique identifier	string	DataLayer
user_gender	User gender	string	DataLayer
user_status	User status: Is the user connected or not	string	DataLayer
user_items	User items: Name of the items assigned to the user	string	DataLayer

Pages	Description	Type	Origin
page_template	The type of page the user is visiting	string	DataLayer
page_step	The current step of a conversion path	string	DataLayer

Components	Description	Type	Origin
component_name	The name of the component	string	DataLayer

Events	Description	Type	Origin
event	The value used as a trigger for tags in Matomo Tag Manager	string	DataLayer
event_category	The category of user interaction	string	DataLayer
event_action	The description of the user's action	string	DataLayer
event_label	Additionnal description of user's action	string	DataLayer

Example of reports

Carrier - step 2 Place Order

USER ID - EVENT CATEGORY - SERVER TIME - DATE (END OF VISIT)	▼ VISITS
390 - Component 3 - 2021-10-01	1
425 - Component 3 - 2021-10-19	1
437 - Component 3 - 2021-10-04	1
457 - Component 3 - 2021-10-24	1
489 - Component 3 - 2021-10-18	1

1–5 of 5

Example of reports

Components allocated

USER ID - USER ITEMS - SERVER TIME - DATE (END OF VISIT)	VISITS
404 - Component 1 | Component 2 | Component 3 | Component 4 | Component 5 | Component 6 - 2021-10-04	3
473 - Component 1 | Component 2 | Component 3 | Component 4 | Component 5 | Component 6 - 2021-10-18	3
236 - Component 1 | Component 2 | Component 3 | Component 4 | Component 5 | Component 6 - 2021-10-08	2
425 - Component 1 | Component 2 | Component 3 | Component 4 | Component 5 | Component 6 - 2021-10-19	2
456 - Component 1 | Component 3 | Component 4 | Component 6 - 2021-10-21	2
1001 - Component 1 | Component 2 | Component 3 | Component 4 | Component 5 | Component 6 - 2021-10-18	2
80 - Component 1 | Component 2 | Component 3 | Component 4 | Component 5 | Component 6 - 2021-10-08	1
80 - Component 1 | Component 2 | Component 3 | Component 4 | Component 5 | Component 6 - 2021-10-10	1
143 - Component 1 | Component 2 | Component 3 | Component 4 | Component 5 | Component 6 - 2021-10-05	1
143 - Component 1 | Component 2 | Component 3 | Component 4 | Component 5 | Component 6 - 2021-10-12	1

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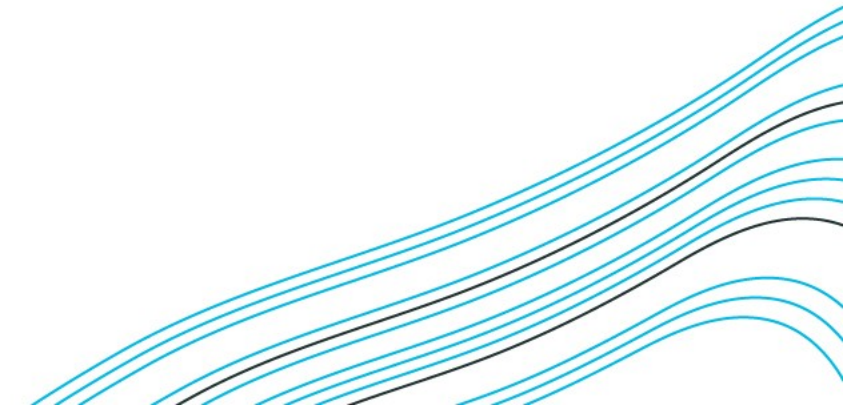
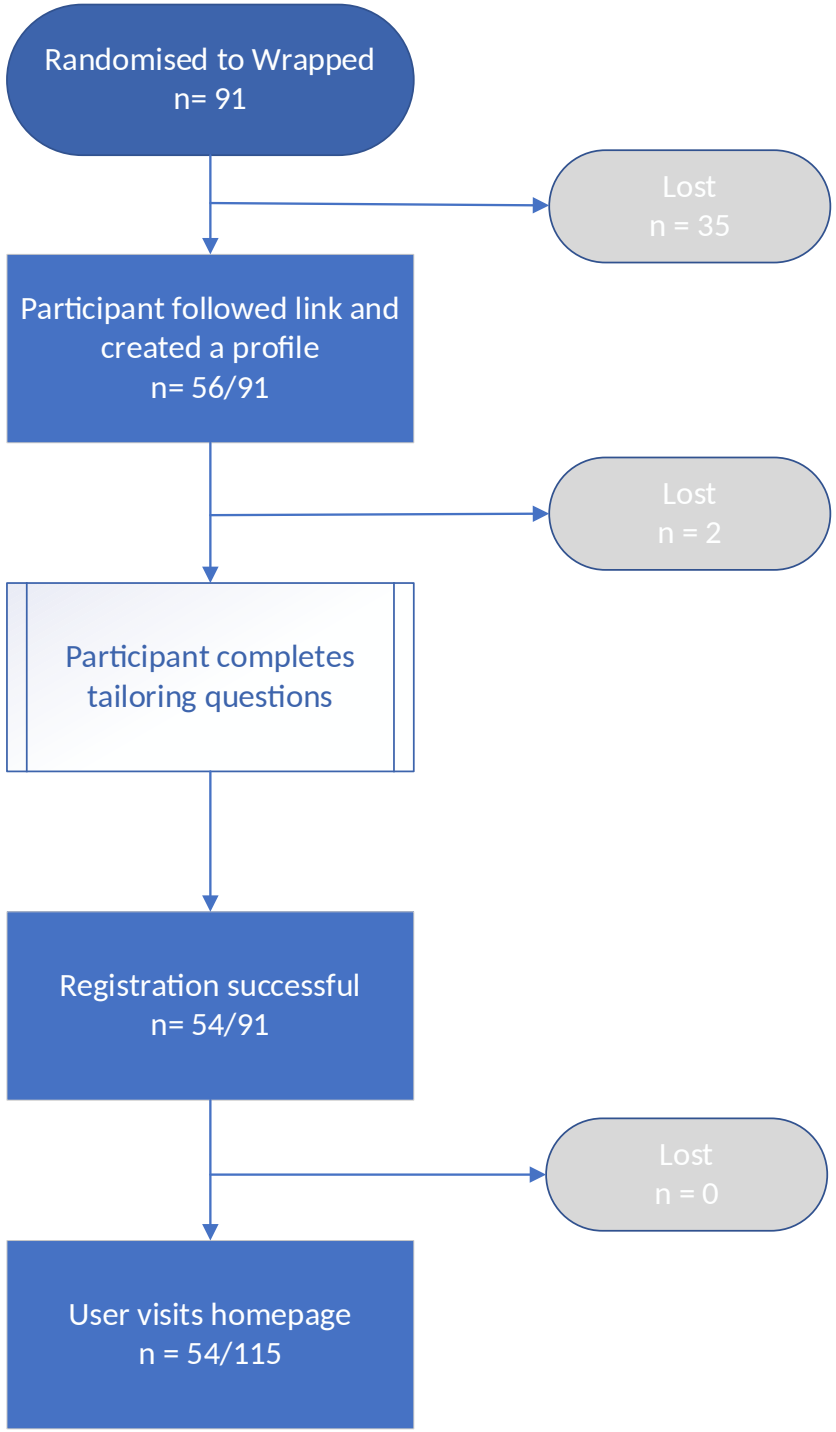
Early insights from our analytics data



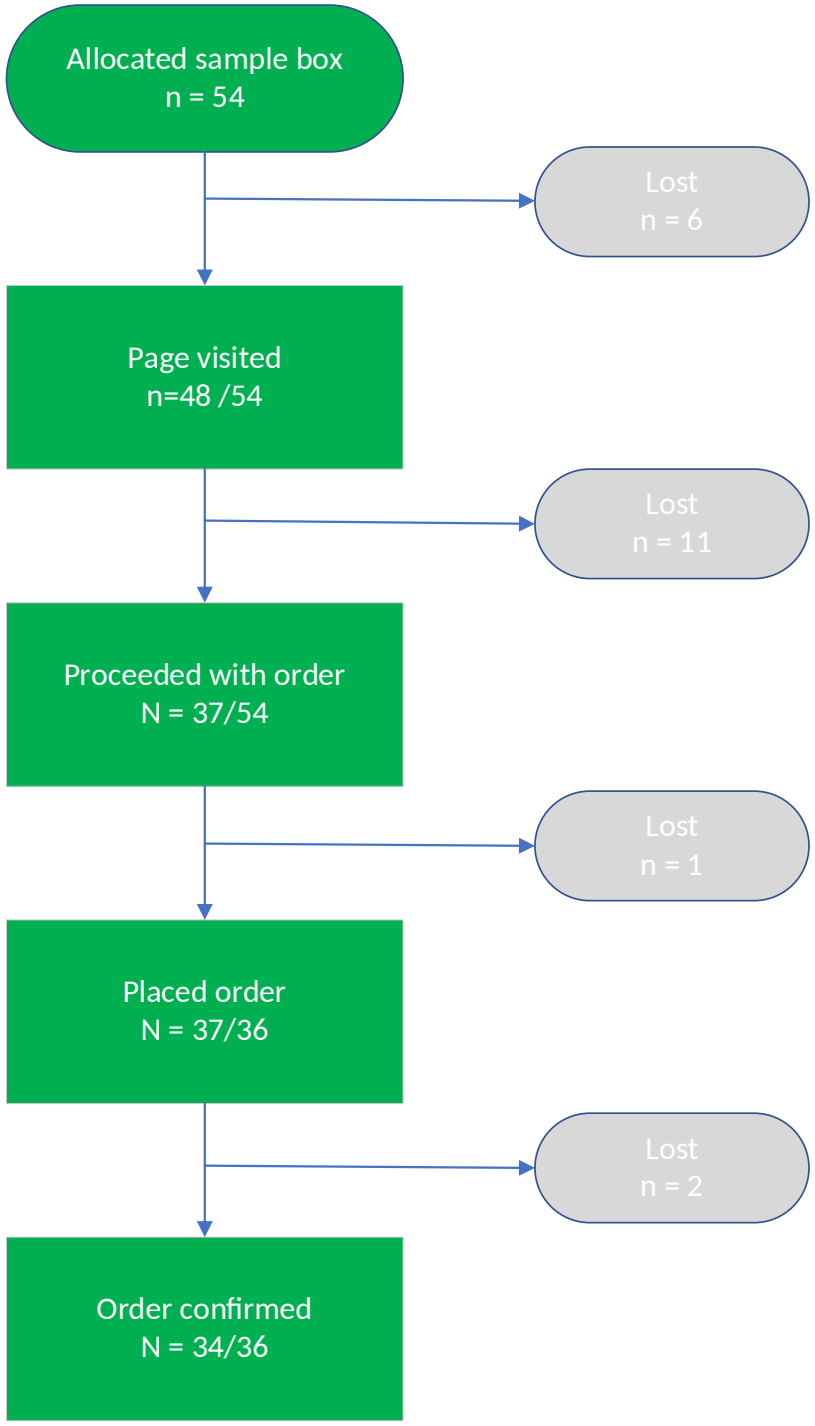
Acquisitions



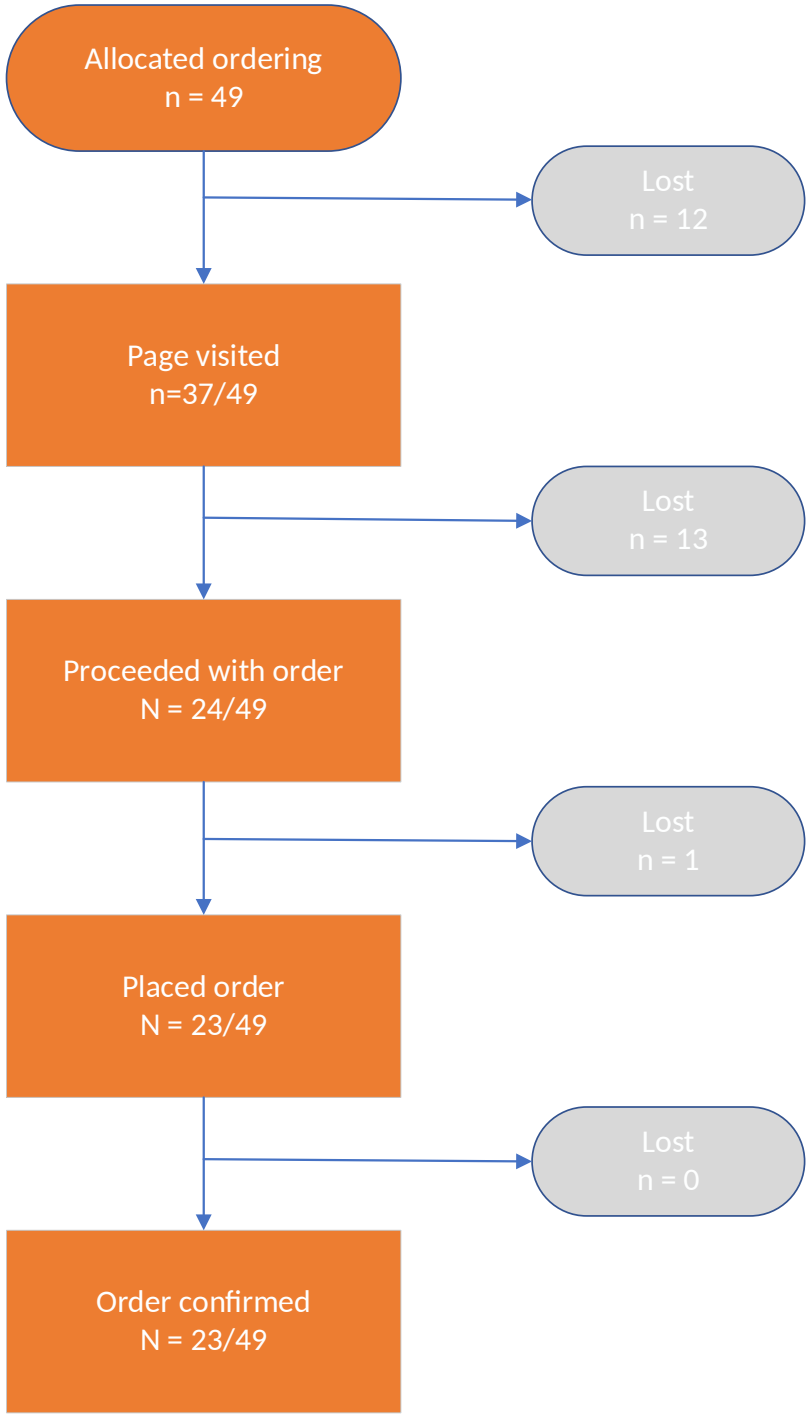
Proportion of users allocated one to six components

Number of components allocated	Number of users	% of users
1	0	0
2	4	7.4
3	4	7.4
4	2	3.7
5	16	29.6
6	28	51.8
Total	*54*	*100*

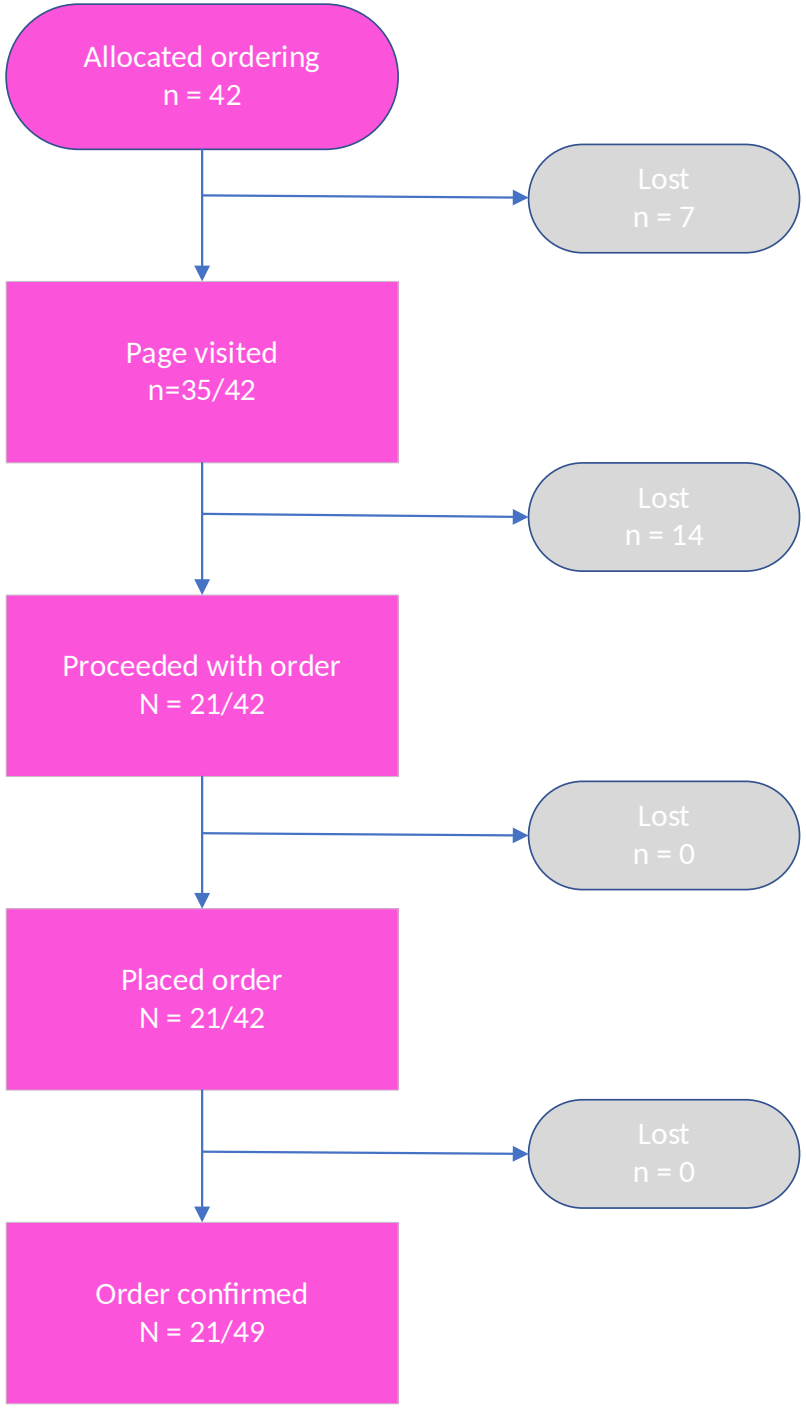
Sample box


Allocated sample box
n = 54
Lost
n = 6
Page visited
n=48 /54
Lost
n = 11
Proceeded with order
N = 37/54
Lost
n = 1
Placed order
N = 37/36
Lost
n = 2
Order confirmed
N = 34/36

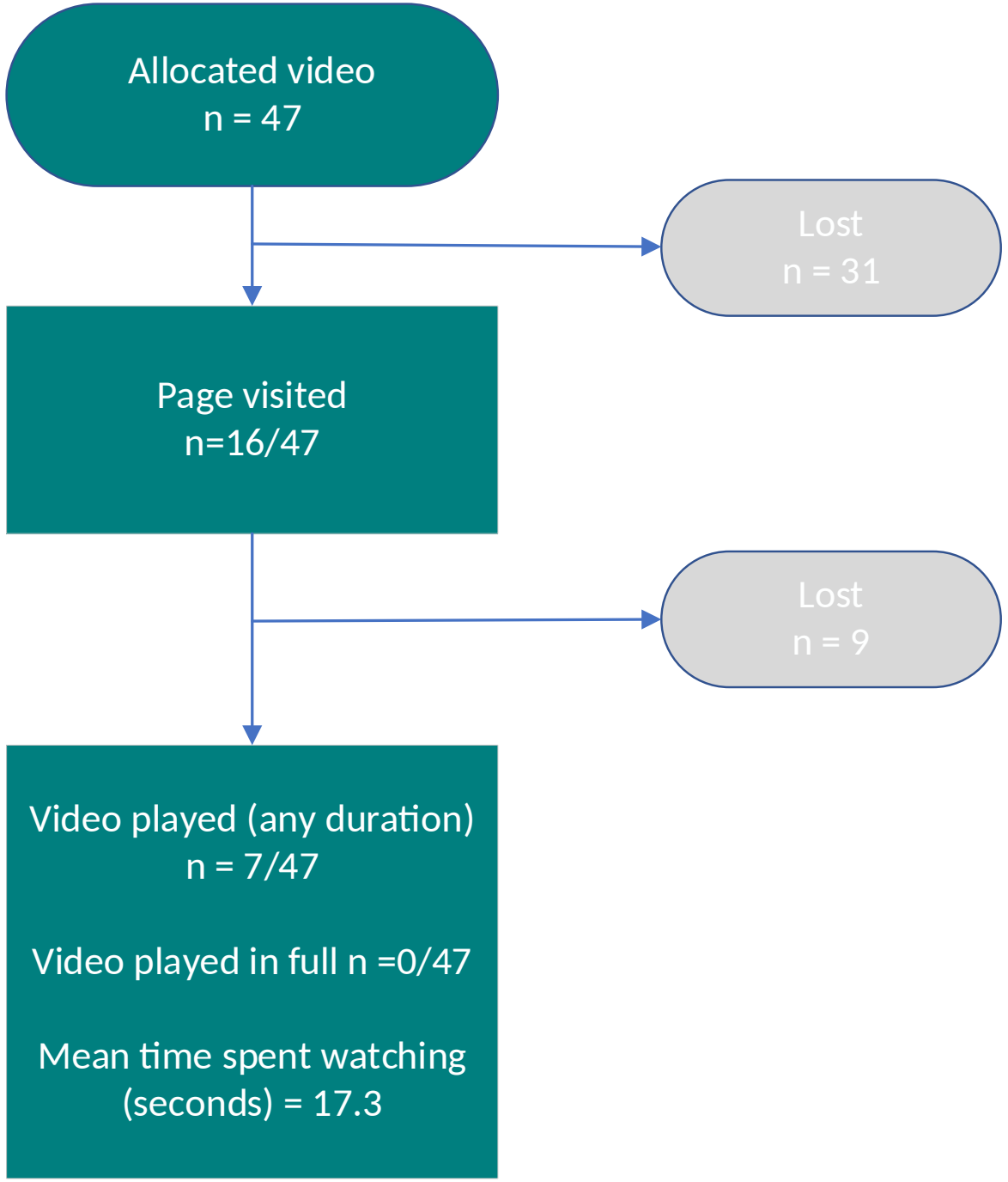
Condom ordering



Carrier


Allocated ordering
n = 42
Lost
n = 7
Page visited
n=35/42
Lost
n = 14
Proceeded with order
N = 21/42
Lost
n = 0
Placed order
N = 21/42
Lost
n = 0
Order confirmed
N = 21/49

Demo video


Allocated video
n = 47
Lost
n = 31
Page visited
n=16/47
Lost
n = 9
Video played (any duration)
n = 7/47
Video played in full n =0/47
Mean time spent watching
(seconds) = 17.3

What we've learnt…

We can use analytics data to gain insights into non-usage attrition

We will use to make improvements

- Home page attracts users to visit components 1-3
- Once on component pages 1-3, good conversion to ordering
- No issues with ordering process (few drop out here)
- Home page does not attract users to video content (components 4-6)
- Component pages also not working to encourage users to then watch videos
- Videos themselves not being watched for very long

We still have lots to learn in this field about what is possible!

What we've learnt continued…

Our solution for linking capturing individual level participant analytics data successful

This means that it is possible to measure dose using analytics data gathered

We will likely use in main trial to create a standardised score based on:

- whether products allocated are ordered
- the % time allocated videos are watched for

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Questions?

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