



Injection Devices – How Do YOU Do It?

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DESIGNING THE PRODUCT



DESIGNING THE EXPERIENCE



SHL'S PATIENT-CENTRIC DESIGNS

We try to cover a range of diseases, symptoms, age groups, etc.

We look for the most “extreme” cases

Peo, 76



- Tetraplegia C6
- Can only move fingers on his right hand
- Low strength, no pincer grip, no key grip, no hand sweat
- Often uses two hands whereby the left hand is used as support only

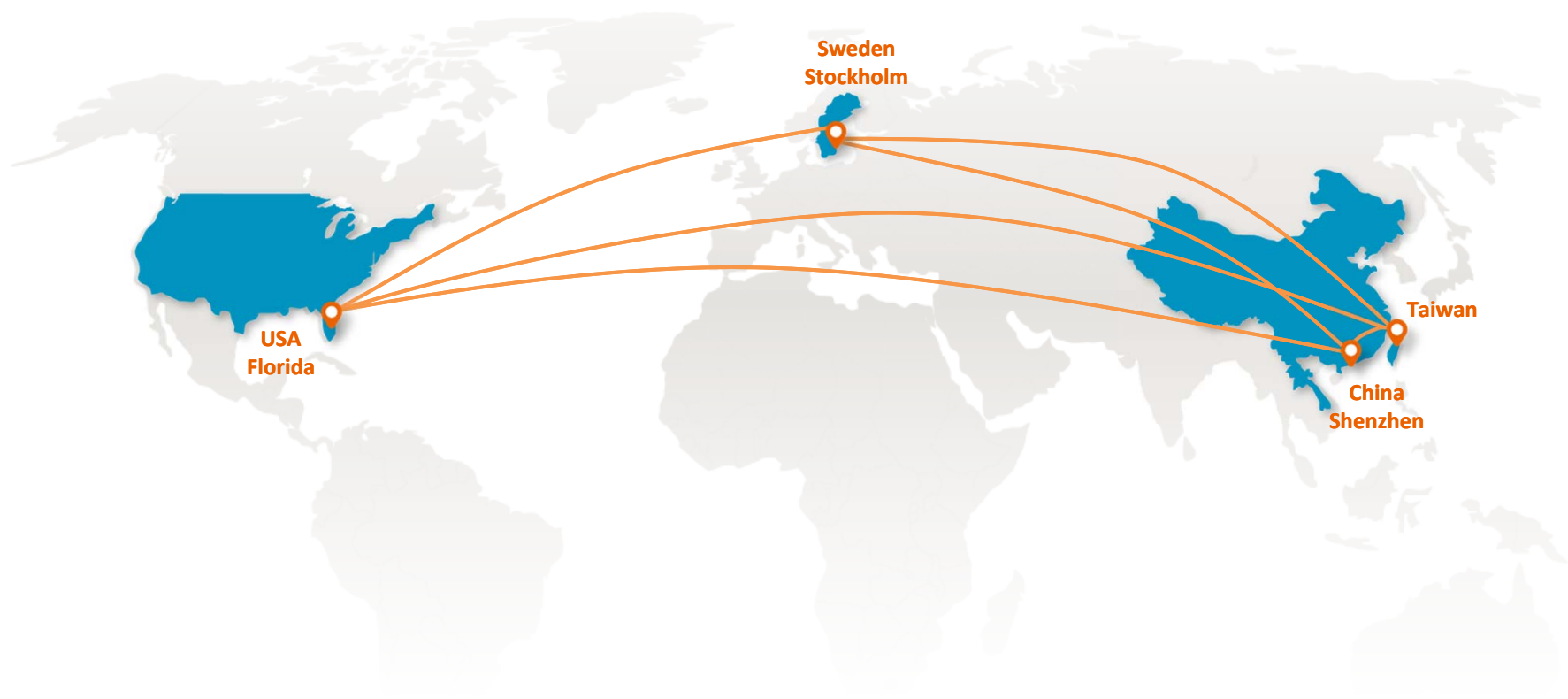
We try to cover a range of diseases, symptoms, age groups, etc.

We look for the most “extreme” cases

Karin, 33



- Diagnosed with juvenile rheumatoid arthritis at the age of 9
- Injects HUMIRA using a prefilled syringe every second week
- Severe deformation of hands
- Low strength and pressure sensitive
- No power grip, no pincer grip, prefers pen grip

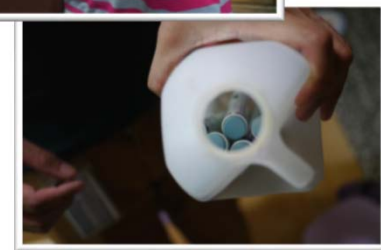




Packaging



Storage



Disposal

“

Each patient is different, and so is the way they handle the device. For this reason, it is important to offer safe, intuitive and robust options that can be accepted by the majority of patients.

”

– Jochen Ratjen, SHL Director of Industrial Design



- Easy-to-operate 2-step auto injector
- Enlarged needle shield remover cap
- Unique grip for enhanced control
- Full view of viewing window
- Large skin contact surface area
- Well balanced activation force
- Green needle cover to indicate injection status
- Permanently hidden needle for enhanced safety
- Cylindrical rear body optimized for mass production, high speed labeling and a material saving



Designs for usability, manufacturability and life-cycle management



OPPORTUNITIES AND CHALLENGES



*Sources: Amgen/Novartis/Sanofi/AbbVie/Janssen Biotech

Drug (Ranking in Top 50 drugs in 2022*)	2022 Sales Forecast* (Bn)
Humira (#2)	\$13.645
Enbrel (#7)	\$7.177
Repatha (#30)	\$4.280
Cosentyx (#33)	\$3.856
Simponi (#43)	\$3.139
Praluent (#46)	\$3.063

*Source: EvaluatePharma World Preview 2017. Outlook to 2022

*All product names, logos, and brands are property of their respective owners. Use of these names, logos, and brands does not imply endorsement.



BAXJECT III Reconstitution System – Designed to Reduce User Steps – Positioning It the Right Way and Following the IFUs Is Key



PRESS



SWIRL



FLIP & WITHDRAW



• Sterile Water for Injection (diluent)

• ADYNOVATE

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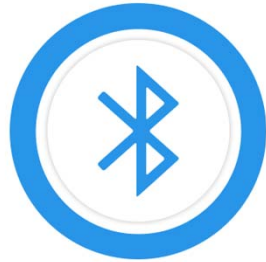
*Source: Shire





ADVANCEMENTS IN TECHNOLOGY

Low Power Bluetooth



Compact Sensors



Smaller Batteries



A winning combination!

 **fitbit flex**
WIRELESS ACTIVITY & SLEEP TRACKER



*Source: Fitbit / ??? / Swingbyte

- Tracks device usage and performance
- Allows design decisions based on measured evidence
- Applications include patient training and compliance monitoring
- Electronics still required additional footprint in 2014
- Keeps the UI as is – no extra steps





LIKE-MINDED PIONEERS



DESIGNING THE PRODUCT



**How do
you
eat
yours?**

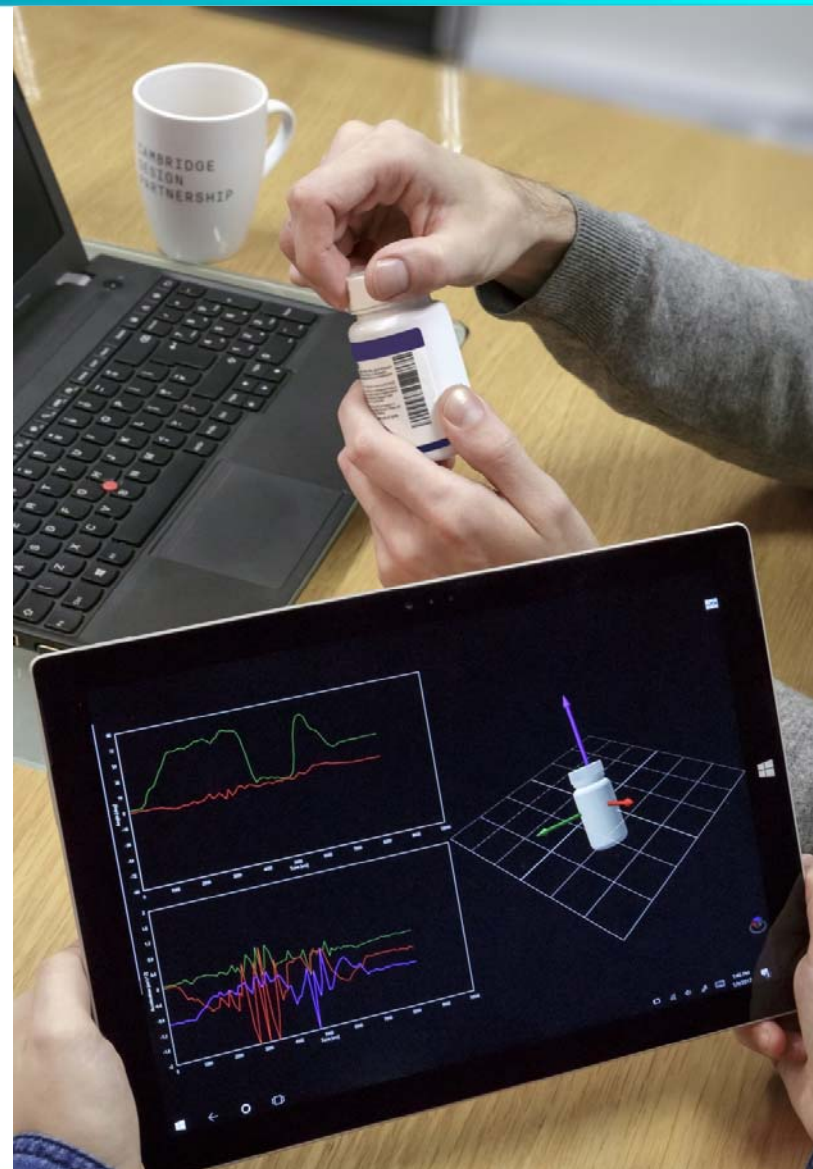
DESIGNING THE EXPERIENCE

dialog[™]

dialog is a service. It is a suite of connected electronic activity-logging platforms that can be integrated into packaging and devices

dialog captures actual user behaviour, providing valuable consumer insights

It enables a new interactive dialogue with users, complementing established user-trials methods





Healthcare



Consumer



Industrial



Energy



How?

The Process



Client
Question



Quantify
Challenge



Define
Approach



Design, Build
& Test



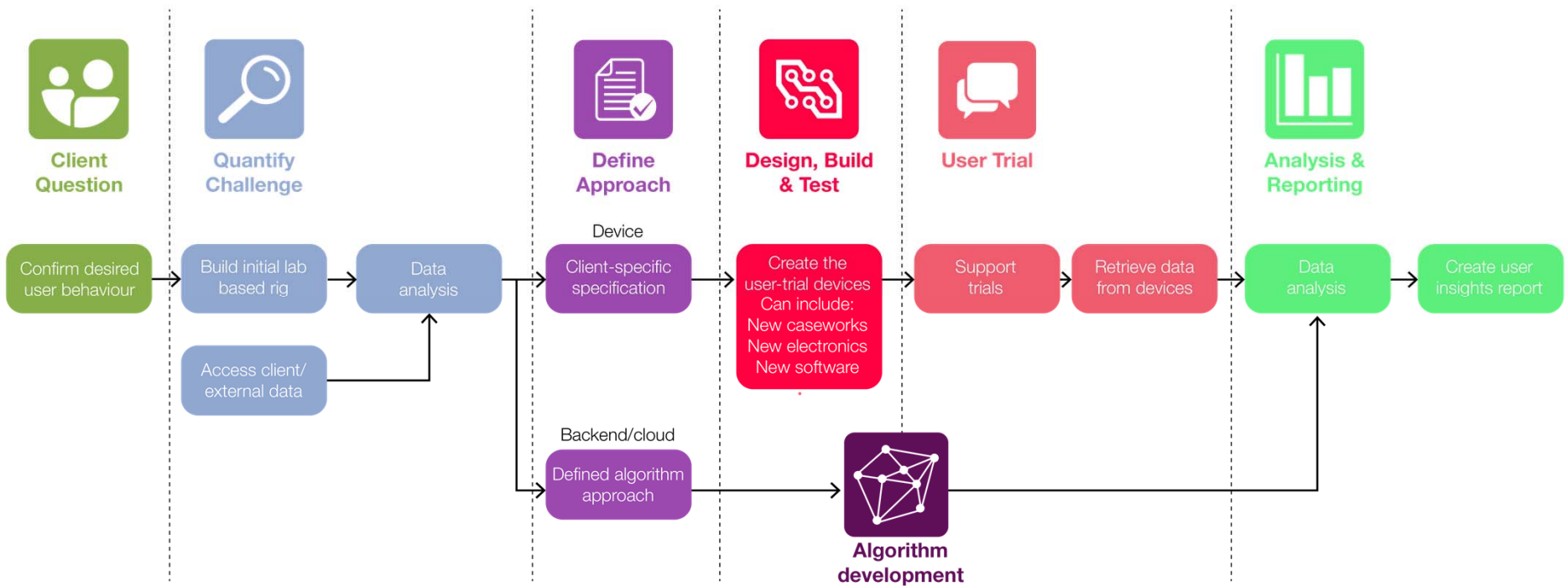
User
Trial



Analysis &
Reporting



Algorithm
Development





CASE STUDY

Case study

Objective

Do users remember to rotate their double-ended dispenser each week?

Regime trials details

- Double end cream dispenser
- Use end 1 on odd weeks
- Use end 2 on even weeks
- 4 week trial
- 10 users
- Previous trials relied on written feedback





1.

Client Question

Objective

Do users remember to rotate their double-ended dispenser each week?

What do we need to understand in order for us to answer this?

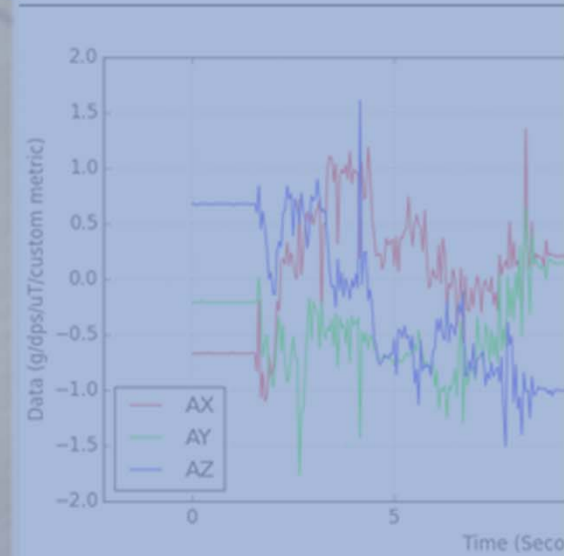
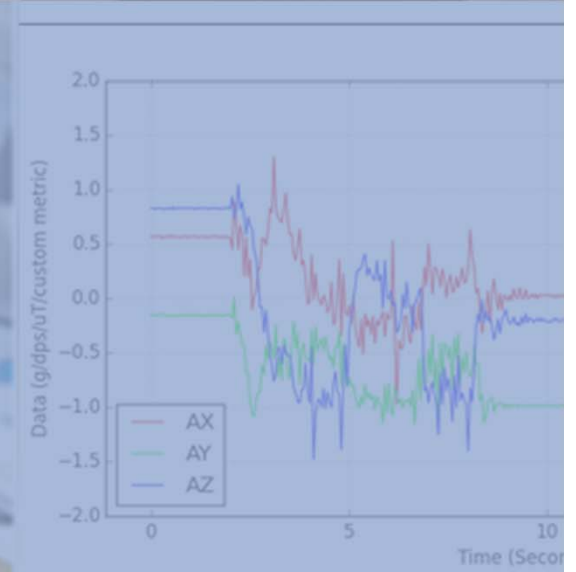
- Capture bottle orientation at time of actuation
- Understand user characteristics (does everyone dispense in the same/similar way?)
- Can we log (only) usage and actuation, and ignore everything else?
- Can we house our standard platform on or in the dispense device so that it doesn't impact user behaviour?



2.

Quantify Challenge

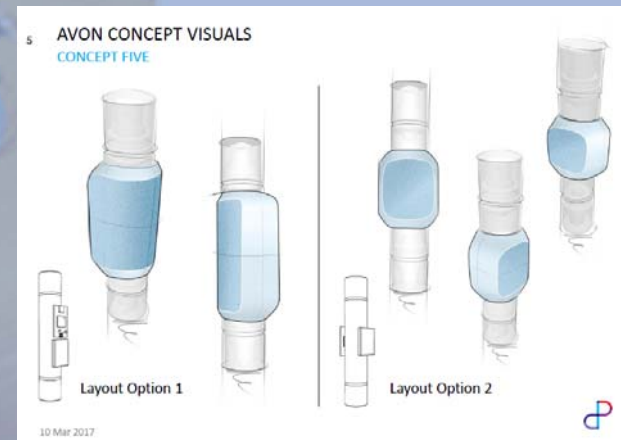
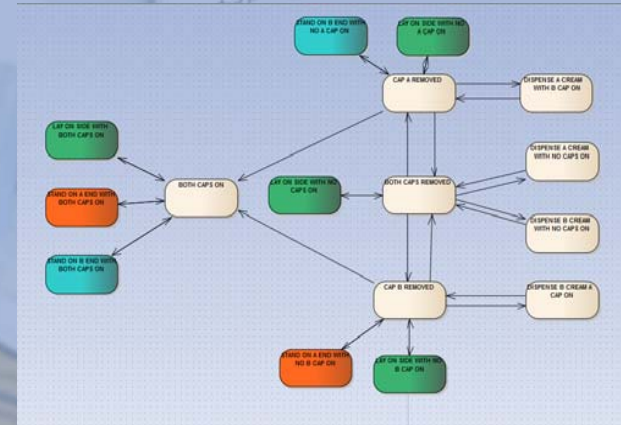
- Build initial lab based rig
- Access client/external data





3. Define Approach

- Initial concept visuals
- Power budgeting
- Systems thinking





4.

Design, Build & Test: Device

Create the user-trial devices

Can include:

- New caseworks
- New electronics
- New software



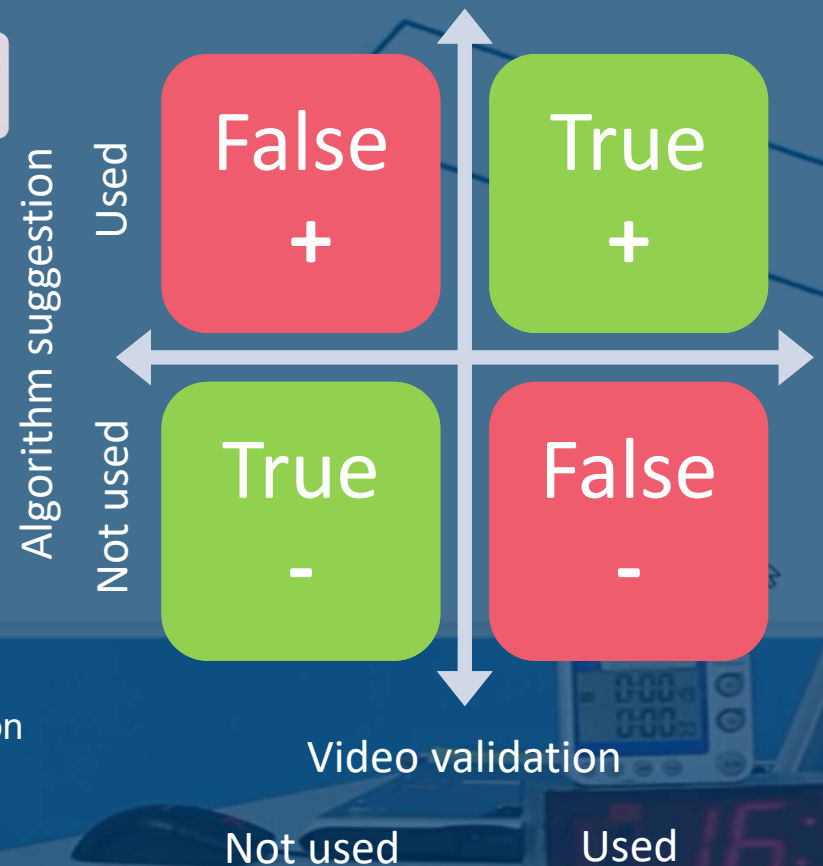


5.
Algorithm Development

Refine and optimise backend data analytics engine

Iteration of our in-house algorithm approach
Algorithm team initially not provided with our own video evidence

Prediction models repeatedly enhanced until usage prediction aligns with video truth data





6.
User Trial

- Support user trials
- Retrieve data from devices

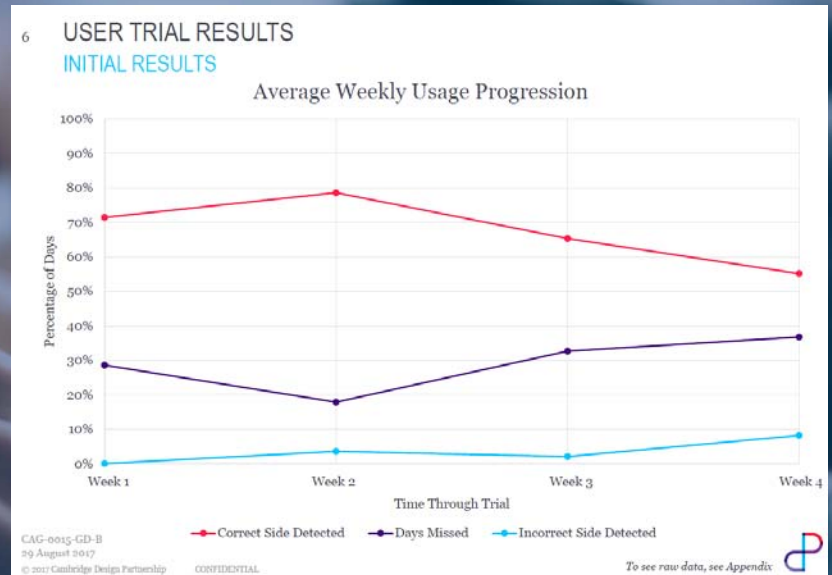
*The Most Exciting
Phrase in Science Is
Not 'Eureka!' But
'That's funny ...'*

Isaac Asimov



7. Analysis & Reporting

- Raw data shared
- Tuned algorithms deployed to robustly translate data into insights
- Our observations are compared to client's own written user feedback
- Opportunities for innovation are uncovered (often in surprising areas...)



Conclusions...

Don't rely on user diaries

We were able to highlight a potential issue, consistent with our other work with topical creams.

We also see similar behaviour evidence from our Pharma work, wherever a repeated regimen is required to gain long-term benefits

This behaviour was not reported in the feedback questionnaires completed by all participants

Conclusions...

Launch De-Risked

The main objective of the trial was met.

We were able to demonstrate, with robust accuracy, that users were able to successfully adhere to the desired regimen

We spotted very few cases of users forgetting which end of the device to use

The device has received a very positive reception globally

We've highlighted strengths and watch outs, helping Avon to quantify future risks

Discussion

Tensions

- Are you too reliant on written user-trial consumer feedback?
- Have you ever launched a product based on positive user-trial research, to then find the market response is poor?
- Have you cancelled a potentially disruptive new development programme because you felt the risks were too high, and not quantifiable?
- How could you better embrace smart packaging to help unpick business opportunities?



CONCLUSION

Summary

Digitally Smart

Successful smart packaging should deliver:

Clear gains in better understanding user context

A credible route to a digital strategy

This is not the time for gizmo-centric solutions that have little, if any, scalable relevance

Smart doesn't mean technology, it refers instead to the consumer perception of it, and its success at meeting/exceeding success criteria

Don't wait until electronics costs are low enough to enable adoption- make sure you're already on the curve of embracing your consumer interactions

Your consumer is already making the transition from a product to an experiential experience.

Are you?...



Improving Patients' Outcomes with Innovative Drug Delivery

- New technology enables even deeper understanding of human factors in design
- It provides insight into real use without adding extra steps for the user
- The more complex a product gets (e.g. connected products), the more important it is to make real-world data-based design decisions