

Implementing an Adaptive Survey Design (ASD) for the Transformed Labour Force Survey (TLFS)

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Context

Transformed Labour Force Survey (TLFS):

- Transformation of the original Labour Force Survey (LFS)
- Focusing on the re-design of the survey for **online data collection**

Position in 2022

- TLFS response rate of **38%** from online/telephone modes = great start!
- BUT experiencing differential non-response bias (despite respondent centred re-design)
 - Responding sample biased towards **white, male, home-owners, aged 45+**
 - Unequal response distribution across **Region, Index of Deprivation and Output Area Classification**



Knock-to-Nudge and Adaptive Survey Design

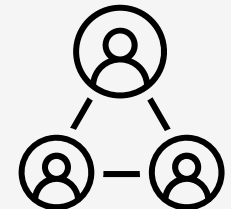
What is **Knock-to-Nudge (KtN)**?

- Interviewers visit addresses (remain on doorstep) to encourage response via a remote method (telephone or online survey mode)
 - interviewer can build **rapport**
 - **less expensive**
 - can leave a ‘**called today**’ card



What is **Adaptive Survey Design (ASD)**?

- *“Data-driven tailoring of data collection procedures to different sample members, often for cost and bias reduction” (Schouten, Peytchev & Wagner, 2018)**
 - divide your sample into smaller groups/**strata** that have similar characteristics
 - apply **alternative survey design features** to different groups
 - objective is to **improve targeted survey outcomes**



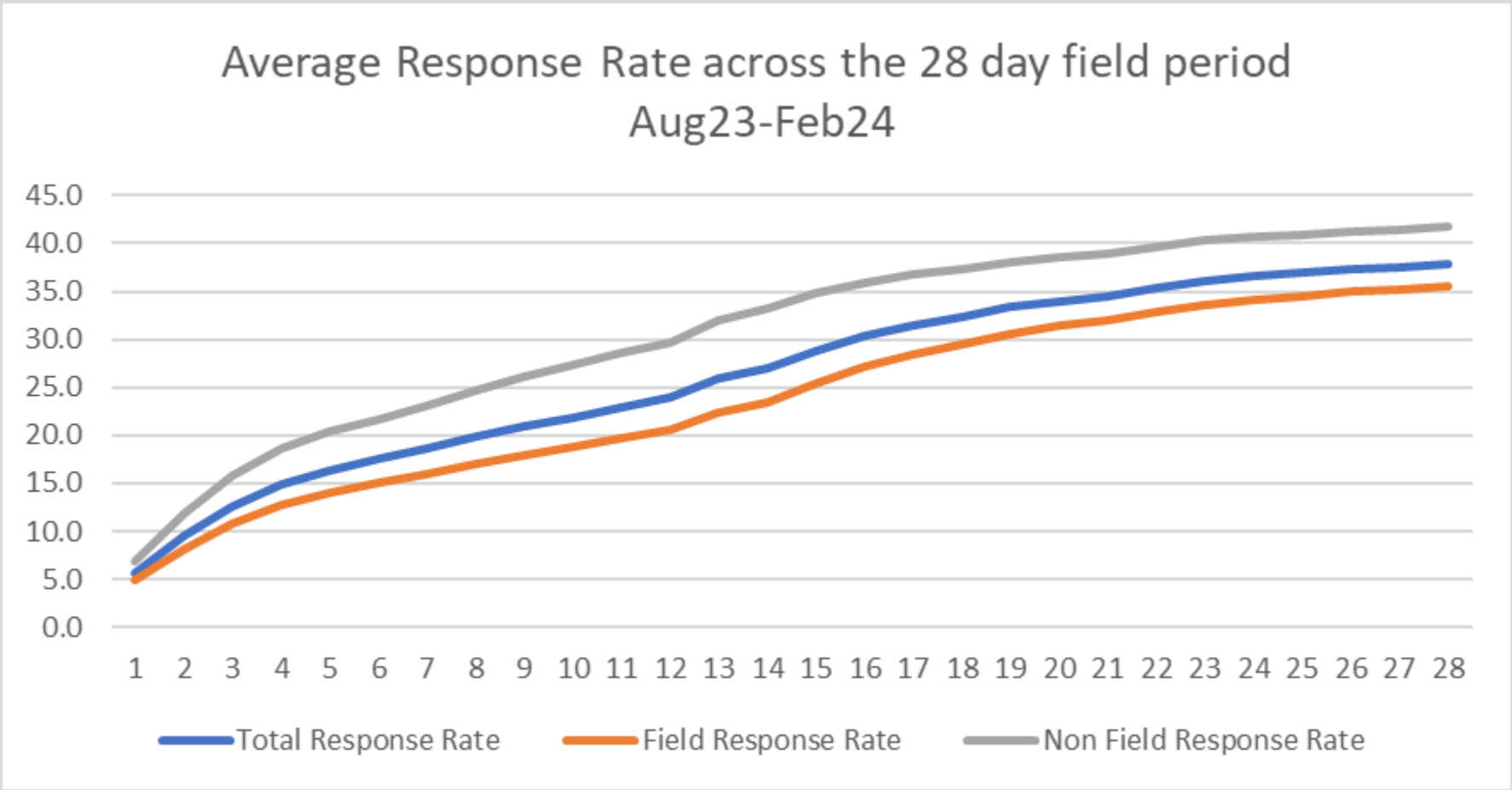
ASD Strategy and Methodology

- **Structured trial & error approach** using R-indicators** (Schouten and Shlomo, 2015)***

Methodology

- Used logistic regression, **CVs, R-Indicators and Partial R-Indicators** to identify the variables and categories of variables driving variation in response propensities
 - Strongest predictors of response
 - ✓ **Age (<45)**
 - ✓ **Urban/Rural Classification (Urban)**
 - ✓ **Index of Multiple Deprivation (IMD deciles 1-4)**
- Constructed **8 strata** based on these variables that were attached to the sampling frame

Overall response rate



R-indicators and CVs

	Pre-KtN		Post-KtN			
	Aug 22 - Oct 22	Nov 22 - Jan 23	Feb 23 - Apr 23	May 23 - Jul 23	Aug 23 - Oct 23	Nov 23 - Jan 24
R-indicator	0.85	0.89	0.90	0.90	0.91	0.90
CV	0.20	0.14	0.13	0.13	0.12	0.13

To see an improvement in the representativity of the data:

- ✓ Increase in Representativity indicator (R-indicator)
- ✓ Decrease in Coefficient of Variation (CV)

Sample composition

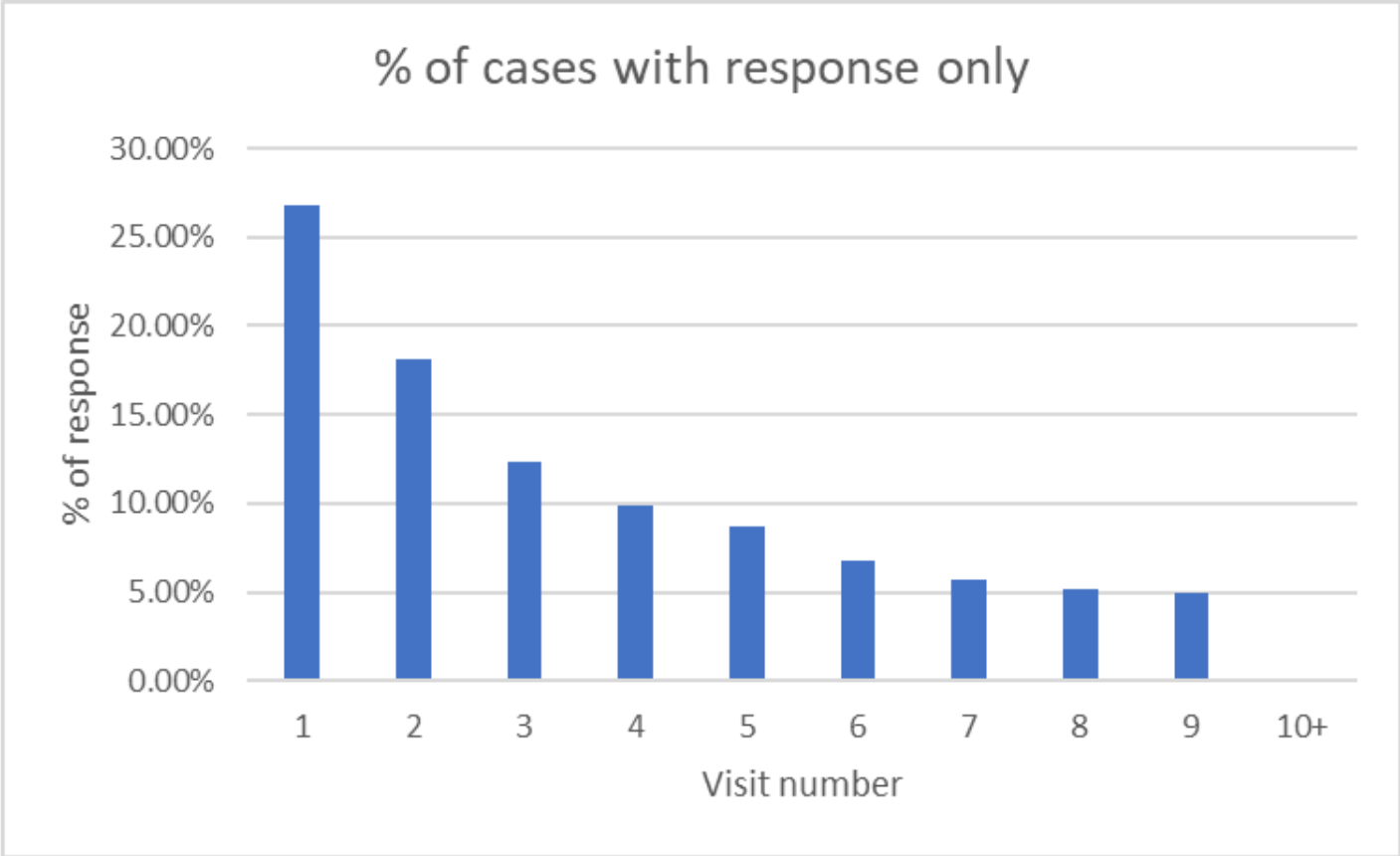
	TLFS Pre-ASD	TLFS Post-ASD
Age	Under 45 40.28% ***	42.63%
	45 and over 59.72%	57.37%

	TLFS Pre-ASD	TLFS Post-ASD
Ethnicity	White 88.74%	87.69%
	All Other 11.26% ***	12.31%

	TLFS Pre-ASD	TLFS Post-ASD
Tenure	Home Owner 77.67%	74.65%
	All Other 22.33% ***	25.35%

* Significant at p < .05
 ** Significant at p < .01
 *** Significant at p < .001

Field operations



Learnings

- Easy to **under-estimate the operational challenges** of implementing an ASD
 - Issues with recruiting/retaining interviewers – **under capacity**
 - New way of operating for ONS and interviewers – **culture change**
 - No in-home interviewing – just a 'nudge'
 - Only visiting 'hard-to-reach' cases – greater ability to persuade/overcome objections
- **Improvements in TLFS survey quality**
 - Increase in **representativity**
 - Reduction in **non-response bias**
 - Improved **granularity** of data – helps to meet external stakeholder expectations

Next steps

- Continue **working with field operational colleagues** to optimise ASD
 - Revisit interviewer guidance, communications, performance targets, allocation process, management information (MI)
- Begin work on the **next iteration of the ASD**
 - Explore alternative auxiliary data (e.g., admin data)
 - Explore additional design features (e.g., incentives, materials)
- Continue to **build expertise and knowledge** within the ONS
 - Working collaboratively with other teams
- Continue to **promote research**
 - Publish working papers, blogs, conferences

References

* Schouten, B., Peytchev, A., & Wagner, J. (2017). Adaptive survey design. Chapman and Hall/CRC.

** Schouten, B., & Shlomo, N. (2017).
Selecting adaptive survey design strata with
partial R-indicators. International Statistical Review, 85(1),
143-163.

*** [RISQ - Representative Indicators for Survey Quality -
Cathie Marsh Institute for Social Research \(CMI\) - The
University of Manchester](#)



Thank you for listening!

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Annex

Background on the transformation of the Labour Force Survey

- Purpose:

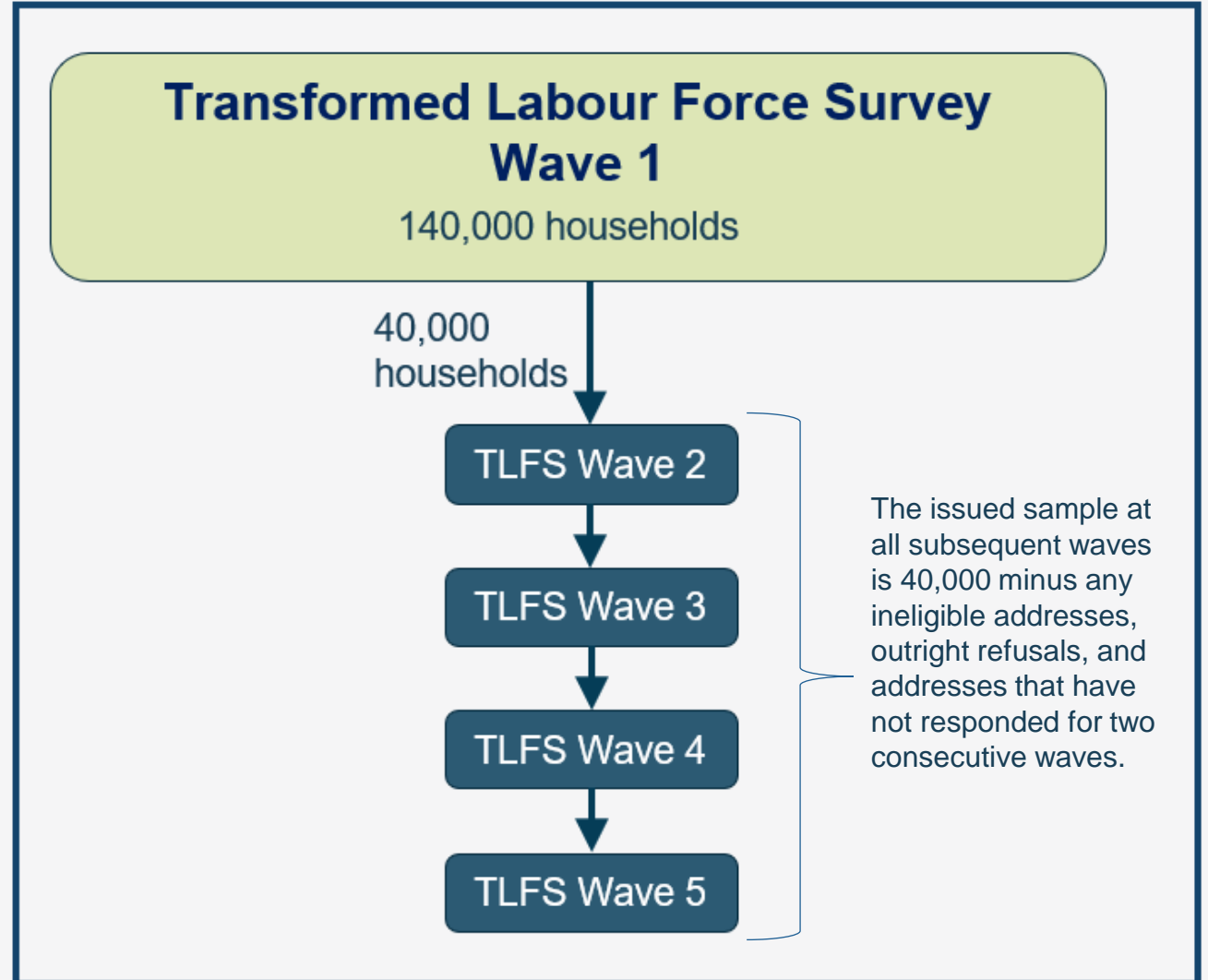
- Labour Force Survey (LFS) = survey of **households** living at private addresses in the **UK**
- Provides information on the UK **labour market** to help develop, manage, evaluate and report on labour market policies

- Transformed Labour Force Survey (TLFS):

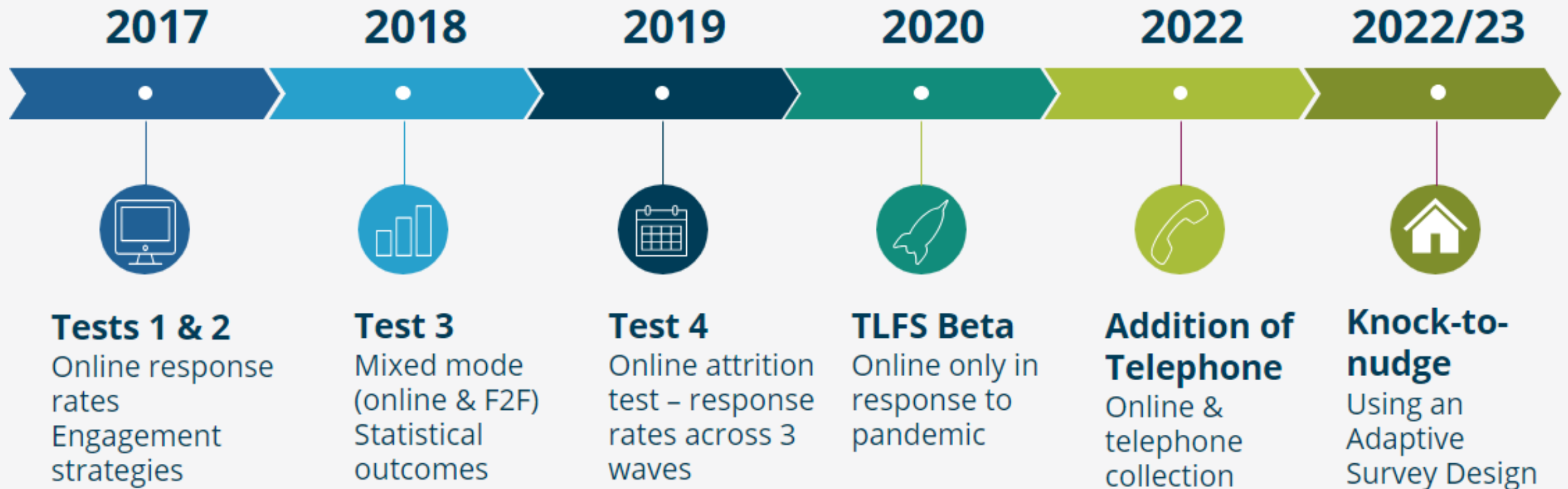
- **Transformation** of the Labour Force Survey (LFS) – in response to the COVID-19 pandemic
- Focusing on the re-design of the survey for online data collection
- Underlying principles:
 - **Digital by default**
 - **Statistical redesign and rationalisation** – not ‘lift and shift’
 - ‘**Respondent Centred Design**’ – putting the respondent back at the heart of the design (see [Wilson, L & Dickinson, E \(2021\) Respondent Centred Surveys](#))

Key aspects of the TLFS design

- **Large W1:** Issued sample size 140,000 addresses per quarter
- Sample **residents in GB in private households**. No communal establishments
- Sample drawn from **AddressBase Premium** – database comprised of local authority data, Royal Mail data, and Ordnance Survey data
- **Systematic random sample:** sample ordered by geography and addresses are selected at regular intervals
- **Longitudinal** survey element – 5 waves
- **Mixed mode:** online first (2020), telephone (Feb 2022), face-to-face (Nov 2022)
- **Adaptive Survey Design** (2022)
- [TLFS User Guidance](#)



The transformation journey so far...



The transformation journey so far...(papers)

[Test 1](#)

[Test 2](#)

Publications from the mixed mode (online and F2F) in 2018:

- [Technical report](#)
- [Characteristics report](#)
- [Comparative estimates report](#)

[Attrition test](#)

TLFS Wave 1 Respondent Timeline



Week 0

Pre-notification letter
(1)



Week 1

Invitation letter (2)
Online data collection starts
Respondents can request a telephone interview via SEL



Week 2

Reminder letter (3)
Online data collection
Telephone interview by request



Week 3

Knock-to-nudge starts
Respondents can still complete online



Week 4

'Hard' completion deadline (Sunday)

What does the TLFS Adaptive Survey Design look like?

- TLFS data collection strategy was the same for all sampled addresses
 - Experiencing differential non-response bias
 - One size does not fit all!
- Introduced ASD and KtN in Nov 2022
- ASD strategy based on Statistics Netherlands work
 - Structured trial and error approach using R-indicators
- 4 week data collection
 - If no response from web/telephone in first 2 weeks KtN data collection begins
- KtN is only targeted at non-respondents most likely to reduce bias

ASD Methodology

Step 1. Create sample strata using auxiliary data:

- Logistic regression model was applied to historical TLFS data to identify auxiliary variables strongly associated with response in order to formulate the ASD strata.
 - Variables considered were **Index of Multiple Deprivation, Urban/Rural Classification, Country of Birth, Age & Ethnicity** (limited by available data).
 - Derived and examined **CVs, R-Indicators and Partial R-Indicators** to identify the variables and categories of variables driving variation in response propensities.
-
- Strongest predictors of response:
 - **Age (<45)**
 - **Urban/Rural Classification (Urban)**
 - **Index of Multiple Deprivation (IMD deciles 1-4)**



Constructed 8 strata based on these variables that were attached to the sampling frame

ASD Strata

- Ran simulations to assess the effect of improving response across these strata.
- Simulations showed we could reduce the CV and increase the R-indicator by focussing our efforts on **strata 2-5**.

Strata	Urbanicity	Deprivation	Age group
1	Urban	Less deprived	45+
2	Urban	More deprived	16-44
3	Urban	Less deprived	16-44
4	Urban	More deprived	45+
5	Non-urban	More deprived	16-44
6	Non-urban	More deprived	45+
7	Non-urban	Less deprived	16-44
8	Non-urban	Less deprived	45+

ASD Methodology

Step 2. Identify design features to allocate to the strata:

- Potential to include numerous interventions in the ASD (e.g. mode, incentive, materials...)
- Keeping it simple
- 1 intervention = **'Knock to Nudge' follow up**
- Our ASD targets KtN data collection at **under-represented strata** based on response propensities in order to **reduce the variation in response propensities** for a selected set of auxiliary variables.
- This will ensure that data collection resources are used in the most efficient way whilst increasing response from historically under-represented population groups.

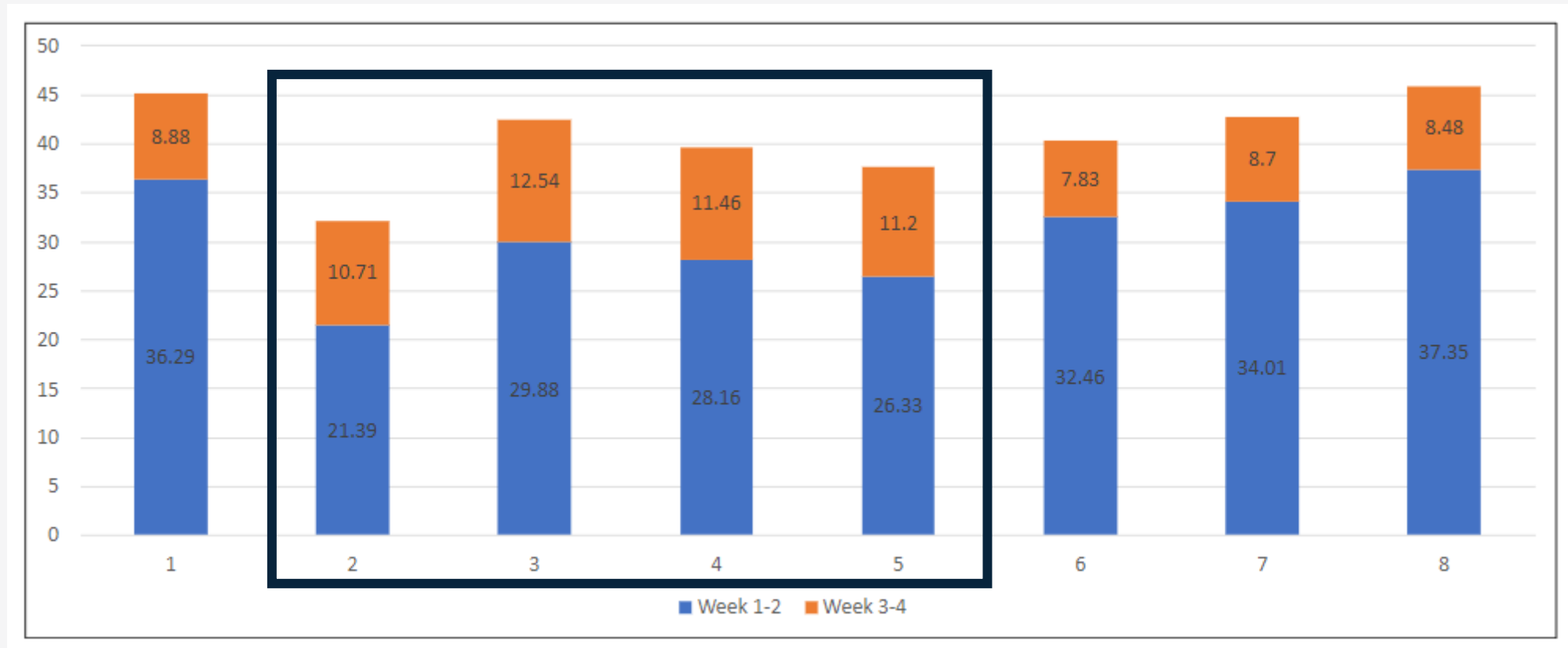
ASD Methodology

Step 3. Identify quality and cost indicators to support decisions:

- Well-established in the survey literature that survey response rates as single indicators provide insufficient information about the quality of estimates based upon respondent data.
- There is a need for indicators that complement the response rate and measure the contrast between non-respondents and respondents.
- Therefore, we assess a number of quality indicators:
 - **Response rate**
 - **Coefficient of Variation (CV) of response propensities and R-Indicators**
 - **Characteristic profile of responding sample**
 - **Survey estimates**

Response rate by ASD strata

Response rate increase from weeks 3 & 4 is greater among the strata that received KtN visits.



Variable level partial R-indicator

	Unconditional Partial Indicator						Conditional Partial Indicator					
	Aug 2022 - Oct 2022 Pre-KtN			Nov 2022 – Jan 2023 Post-KtN			Aug 2022 - Oct 2022 Pre-KtN			Nov 2022 – Jan 2023 Post-KtN		
	Estimate	CI_LB	CI_UB	Estimate	CI_LB	CI_UB	Estimate	CI_LB	CI_UB	Estimate	CI_LB	CI_UB
U/R	0.032587	0.032587	0.034853	0.022448	0.020088	0.024808	0.008207	0.007639	0.0053733	0.004703	0.002343	0.007062
IMD	0.06489	0.062743	0.067037	0.051085	0.048789	0.053381	0.046816	0.046872	0.0447243	0.039345	0.037049	0.041641
Age	0.054932	0.052701	0.057162	0.03711	0.034767	0.039453	0.029551	0.028596	0.0263655	0.016422	0.014079	0.018765

Unconditional partial R-indicator:

- Reduced for all variables, meaning the **variables impact on response has reduced.**
- **Deprivation** had the greatest impact on response pre-KtN and post-KtN

Conditional partial R-indicator:

- Measures **impact of a variable conditional on all other variables**
- **Deprivation** had the greatest impact

Recommendation: deprived areas could receive more focus in future iterations of ASD

Category level partial R-indicator

	Unconditional Partial Indicator						Conditional Partial Indicator					
	Aug 2022 - Oct 2022 Pre-KtN			Nov 2022 – Jan 2023 Post-KtN			Aug 2022 - Oct 2022 Pre-KtN			Nov 2022 – Jan 2023 Post-KtN		
	Estimate	CI_LB	CI_UB	Estimate	CI_LB	CI_UB	Estimate	CI_LB	CI_UB	Estimate	CI_LB	CI_UB
Urban	-0.0141	-0.01481	-0.0134	-0.00975	-0.01051	-0.00898	0.004232	0.002977	0.005487	0.0026	0.00128	0.003921
Rural	0.029377	0.027914	0.03084	0.020222	0.018637	0.021806	0.006359	0.004468	0.008251	0.0039	0.001925	0.005911
IMD 1-4	-0.0501	-0.05093	-0.04927	-0.03947	-0.04045	-0.03848	0.035162	0.033557	0.036767	0.029	0.00541	0.030944
IMD 5-10	0.04124	0.040556	0.041924	0.032436	0.031627	0.033245	0.030993	0.029559	0.032428	0.026	0.02478	0.027865
Age 16-44	-0.03346	-0.03429	-0.03263	-0.02249	-0.0234	-0.02158	0.018891	0.017426	0.020356	0.0107	0.009215	0.012273
Age 45+	0.043565	0.042489	0.04464	0.02952	0.028327	0.030713	0.021468	0.01978	0.023155	0.0122	0.010642	0.014197



Unconditional partial R-indicator:

- Positive value = category is over-represented, negative value = category is under-represented

Conditional partial R-indicator:

- Impact of that category on the deviation from representative response after conditioning on the other variables

Rural, IMD 1-4, Age 45+ has a greater impact on the deviation of response after conditioning on other variables

IMD 1-4 has **largest negative unconditional value** and **largest conditional value** = more effort is needed here