

# Allowing Statistical Checks to Guide Survey Team Attention Toward Problems in Collected Data

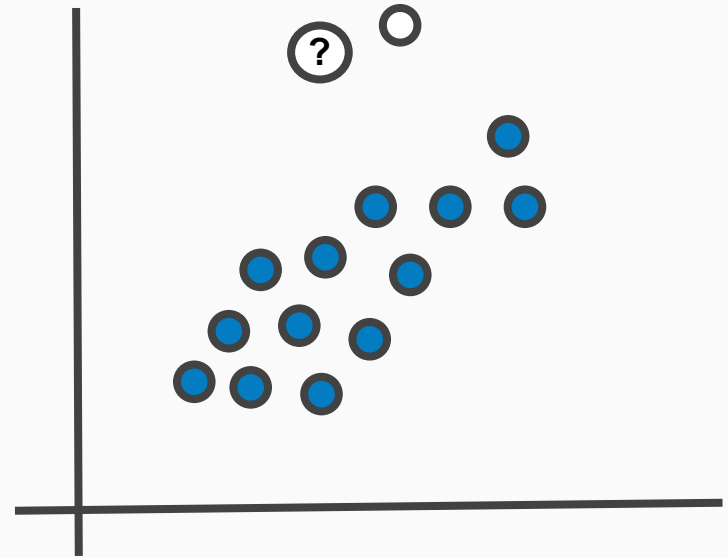
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**Dobility, Inc.**

# Outline

1. Summary
2. Background
3. Problem Statement and Questions
4. Experiment
5. Survey
6. Conclusion

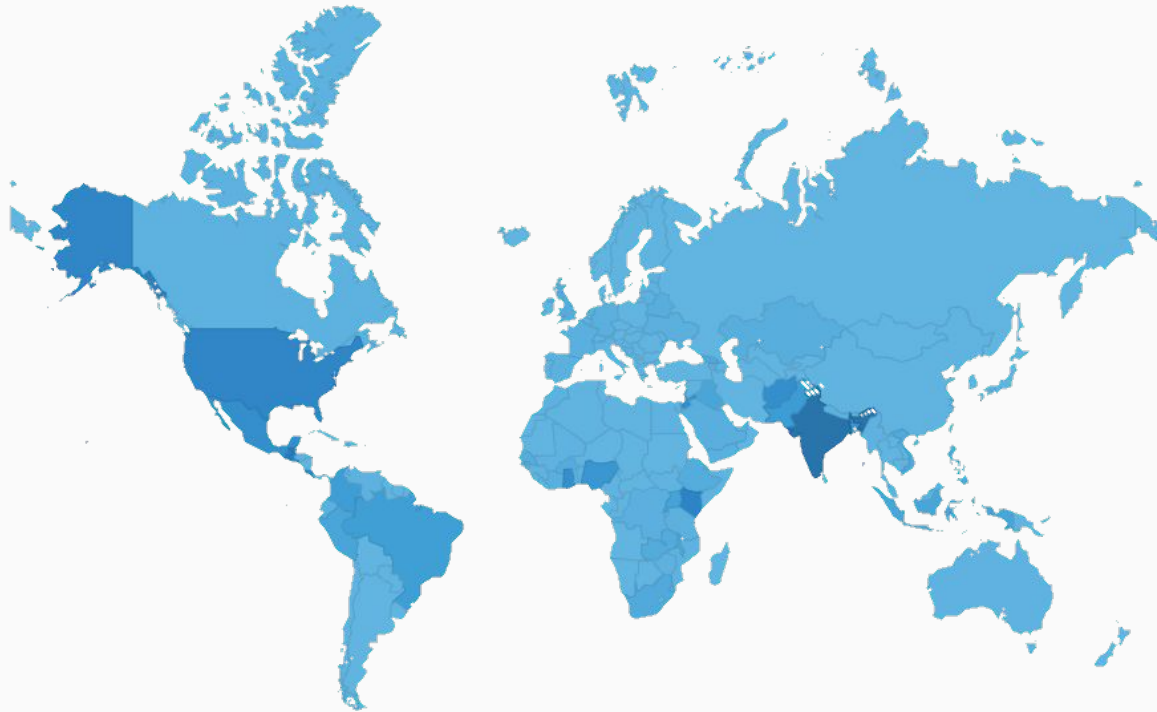
# 1. Summary

- Statistical checks for survey data quality assurance
- **Theory:** busy researchers sometimes don't configure quality checks in time
- **Survey results:** 40% don't use statistical checks
- **Experiment:** modest success with user nudges



## 2. Background

- SurveyCTO platform launched in 2013
- CAPI and CATI surveys
- Users in 165+ countries from different sectors



## 2. Background: Automated Quality Checks

- Statistical checks with user-defined thresholds
- Outliers, enumerator effects, high values
- Complement to field validation
- Creation process

### Create a new quality check

#### What type of check do you want to run?

**Value is too low**

Use this to check every record and warn for each one that has a field value below the threshold you specify.

**Value is too high**

Use this to check every record and warn for each one that has a field value above the threshold you specify.

**Value is an outlier**

Use this to check every record and warn for each one that has a field value more than x times outside the interquartile range (IQR).

**Mean is too low**

Use this to warn for each field that has a mean below the threshold you specify.

**Mean is too high**

Use this to warn for each field that has a mean above the threshold you specify.

**Value is too frequent**

Use this to check for a particular value's frequency and warn whenever it is above the threshold you specify.

**Value is too infrequent**

Use this to check for a particular value's frequency and warn whenever it is below the threshold you specify.

**Group mean is different**

Use this check to test for equality of means across groups using an ANOVA test.

**Group distribution is different**

Use this check to test for equality of distributions across groups using a chi-squared test.

Cancel

→ Next

## 2. Background: Automated Quality Checks

### Create a new quality check

Type of quality check: **Value is an outlier**

On which field(s) do you want to perform this check?

 Filter this list for me [?](#)

- 
- duration
  - enumerator\_team
  - enumerator
  - province
  - district
  - consent
  - respondent\_name
  - address
  - num\_in\_hh

Cancel

← Back

→ Next

## 2. Background: Automated Quality Checks

### Create a new quality check

Type of quality check: **Value is an outlier**

Field(s) to check: **num\_in\_hh**

\* Ignore special values

☰ Advanced options

Warn when field value this many times outside IQR:

1.5

1.5 is very common and works well for most checks.

Severity:

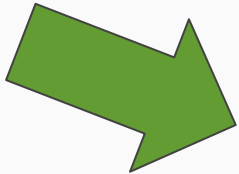
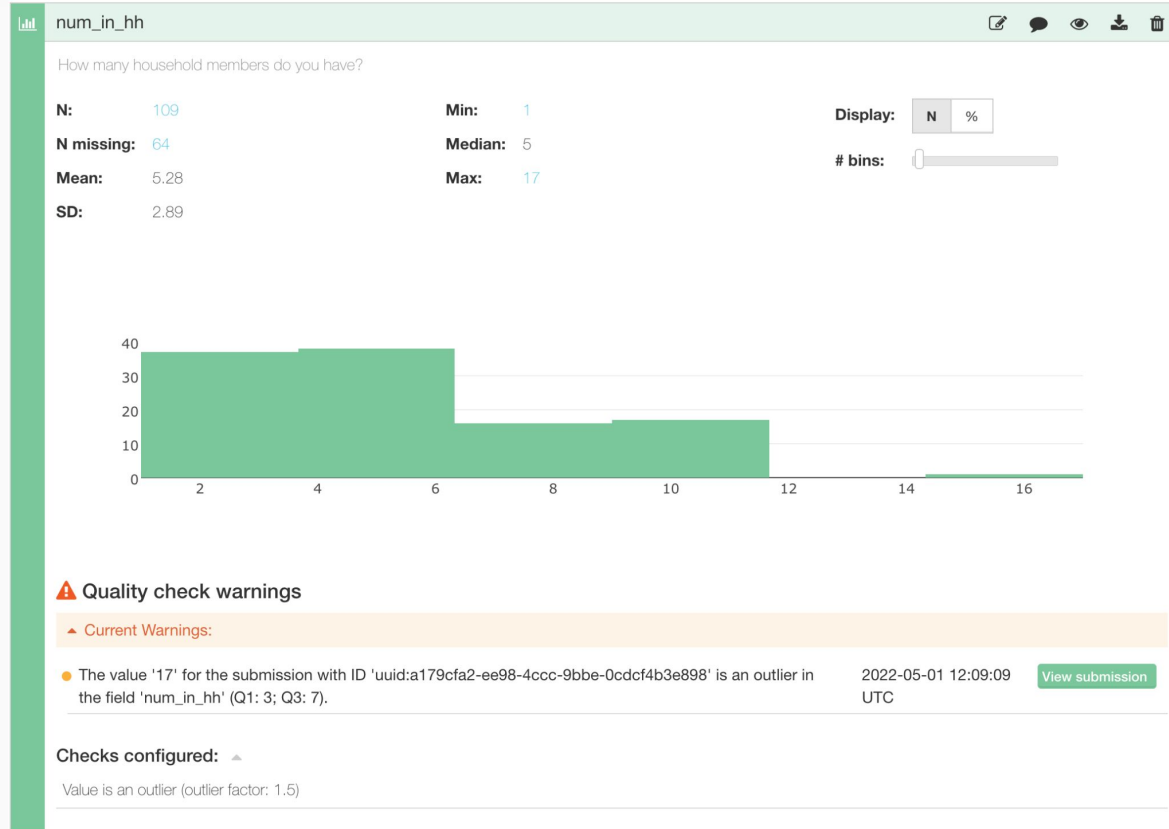
Critical quality check (flag warnings as high-priority)

Cancel

← Back

Save

## 2. Background: Automated Quality Checks





## 2. Background: Automated Quality Checks

Example household listing form with example data

Monitor form data External viewers Review workflow Purge form data Look up by key Advanced mode

Form ID: hh\_listing\_example\_1, Complete submissions: 173 (latest Dec. 4, 2020 at 1:26:06PM)

### Review workflow settings

The review and correction workflow allows you to review submissions before they are released for publishing or export, making corrections, rejecting, or approving as appropriate. If this workflow is enabled, some or all submissions may need to be approved before they are published or exported. [Learn more...](#)

Enable review and correction workflow for this form?  YES

**Submissions to flag and hold for review**  None  Some  All

Choose which submissions will be held for review. These submissions will require approval before being exported or published to downstream systems. Some incoming submissions will be flagged for review

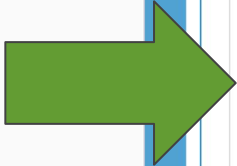
**Flag incoming submissions based on results of quality checks**  All  Only critical

Requires at least one quality check to be set up. [Click here to learn how to set up quality checks...](#)

- Flag any submission with a submission-specific QC warning (e.g., "value is too high")
- Flag any submission that is part of a *group* that triggered a QC warning during the last full evaluation (e.g., "group mean is different")
- Flag any submission that would further contribute to a field-specific QC warning raised during the last full evaluation (e.g., "value is too frequent")

**Flag a random percentage of submissions**

Select  percent at random

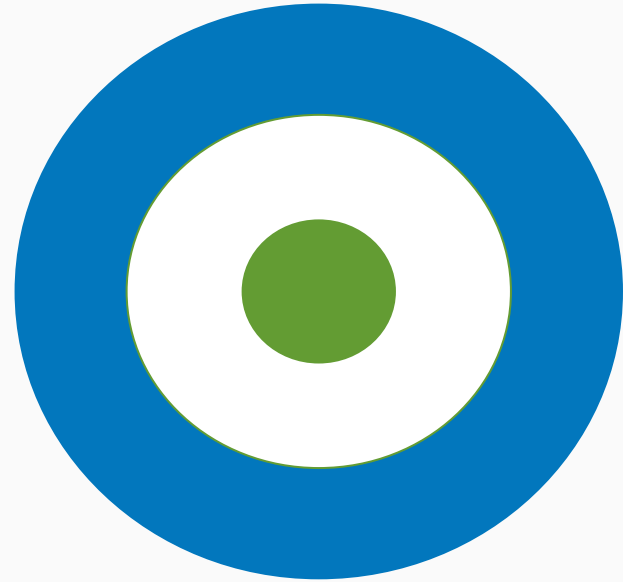


### 3. Motivation & Problem Statement

**Problem:** Low levels of statistical data quality check deployment.

**Question 1:** Why do relatively few users seem to use quality checks?

**Question 2:** Can we nudge users toward best practices and have them configure quality checks?



# 4. Experiment

# 4. Experiment Method

- Updated messaging to "nudge" users toward quality check creation
- Randomized experiment with three groups:
  - Control group
  - In-platform treatment
  - Email treatment
- Data collection with Google Analytics and a browser cookie

## Flag poor quality data automatically



Form uploaded successfully. Help ensure that you're collecting high-quality data by configuring **automated quality checks** before you have collected too much data.

[Configure automated quality checks now for the form with the ID, \[form ID\].](#)

[Click here to learn more about automated quality checks.](#)

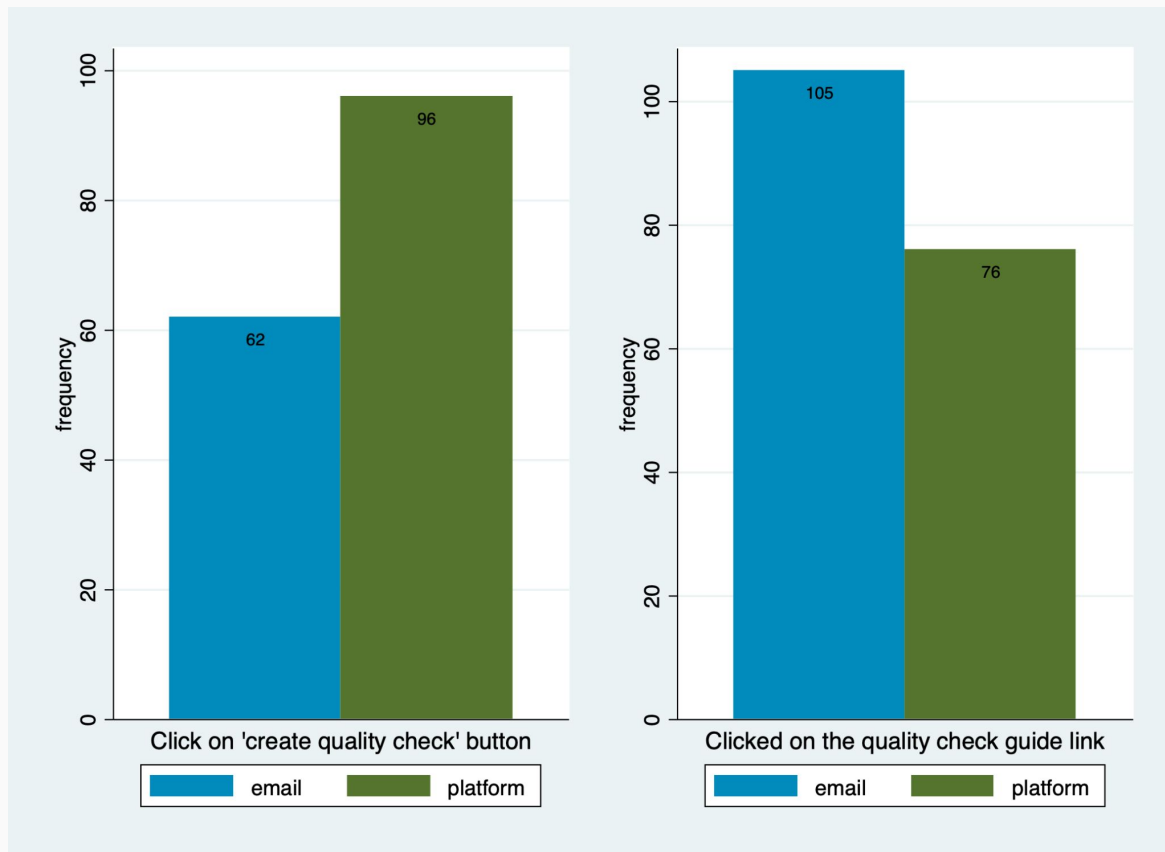
Number of optional support files: X.

OK

## 4. Experiment Interaction

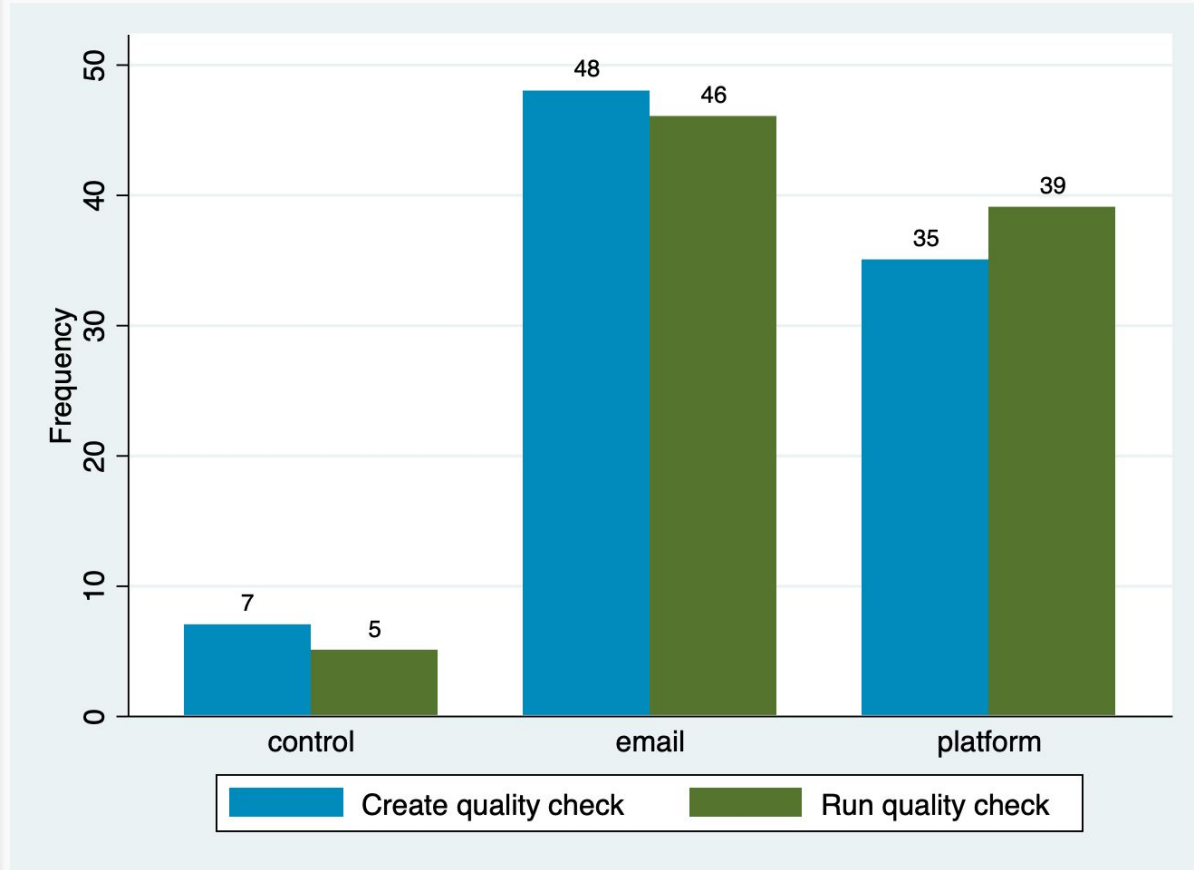
- Users in experiment: 1,181.
- Quality check experiment engagement:
  - In-platform: 96 engagements (22.8%\*)
  - Email: 62 engagements (15.7%\*)

\* Percentages are response rates to treatments.



## 4. Experiment Results

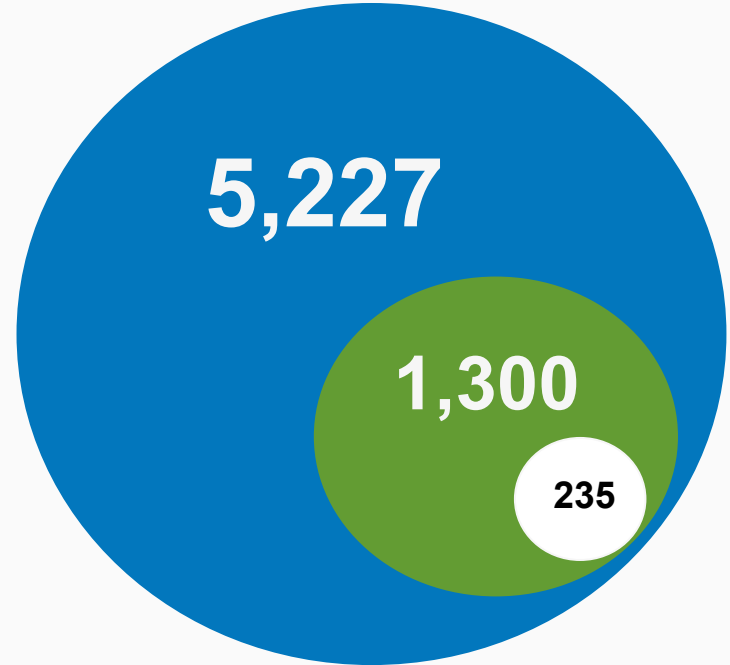
- Both treatments outperformed control.
- Less significant difference between treatments, with email slightly ahead.
- Both event distributions significant at  $p < 0.0001$ .



# 5. Survey

# 5. Survey Method

- **Population:** 5,227 paid administrative users logging in during a two-week period.
- **Sampled:** 1,300 users (~25%).
- **Responded:** 235 (~18%).

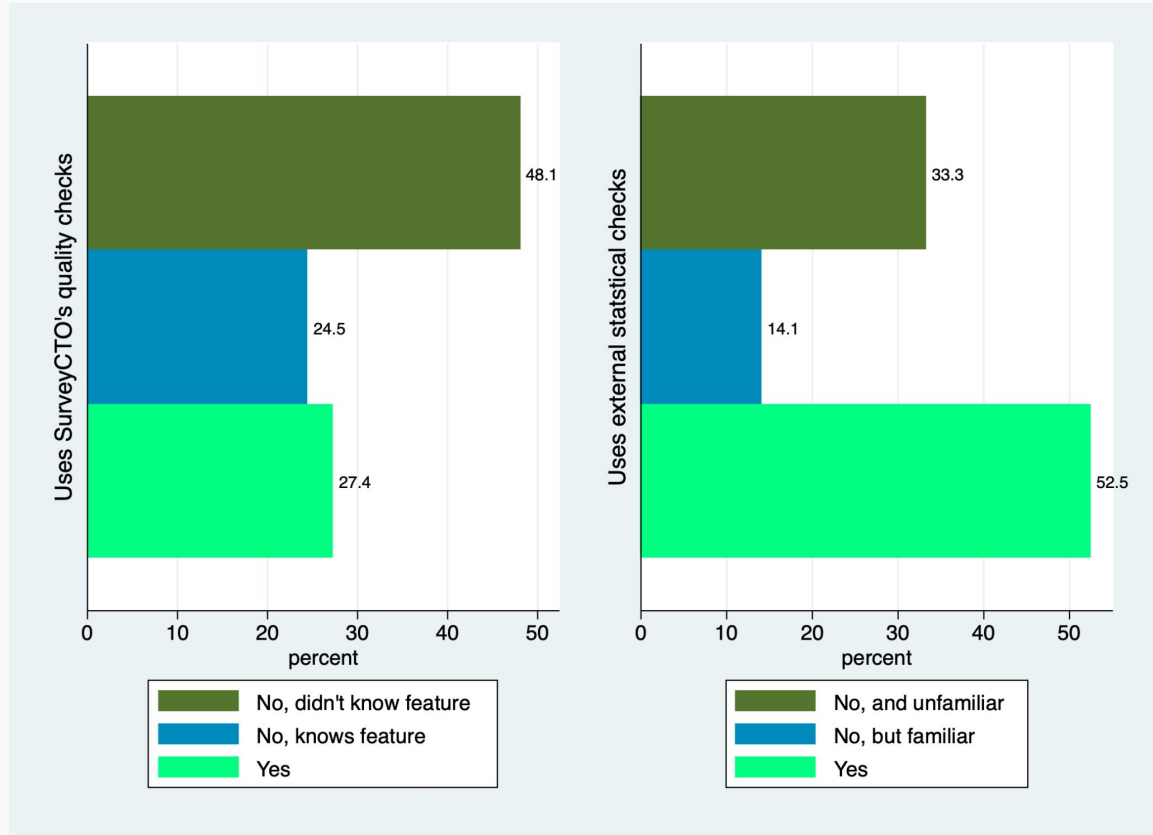




# 5. Survey Results

- 48.1% weren't aware of automated quality checks [41.3%, 54.9%].
- 52.5% used third party tools [45.5%, 59.5%].

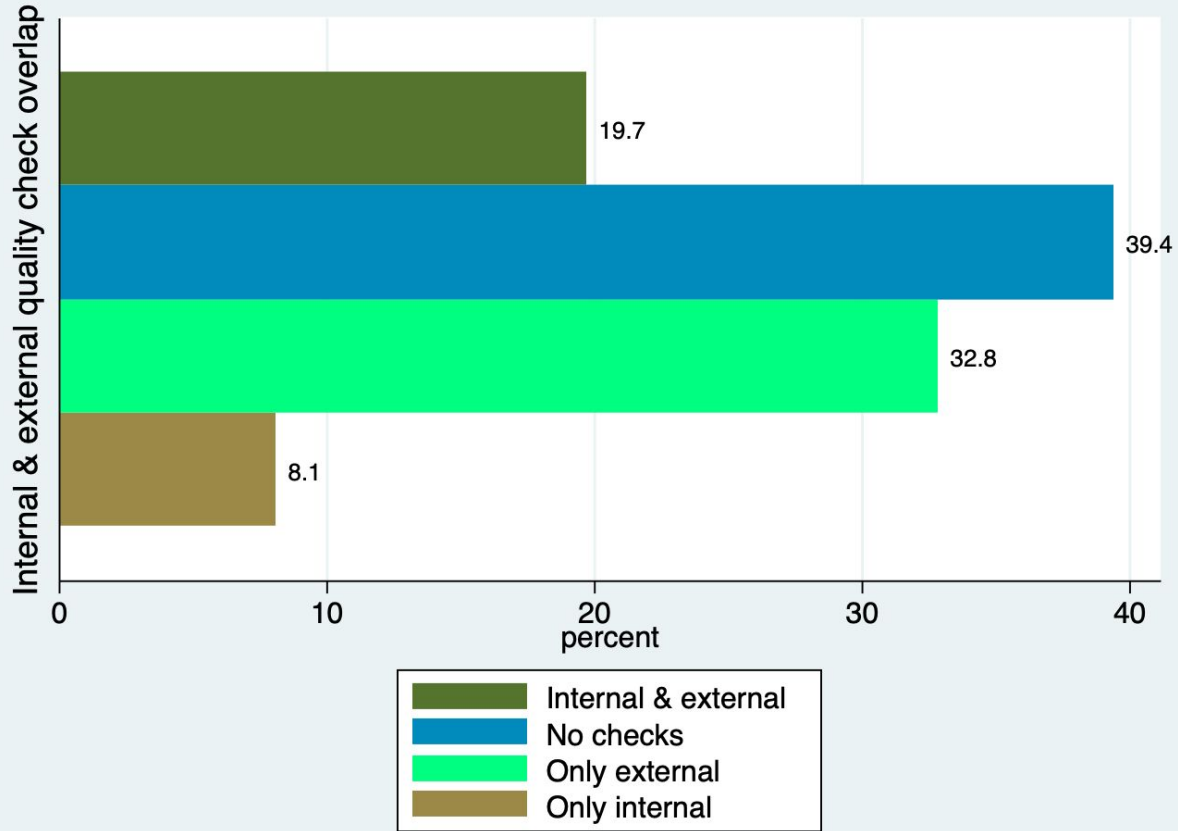
Confidence intervals at 95%



## 5. Survey Results

- Almost 20% use both [14.1%, 25.28%]
- 8.1% exclusive internal checks [4.25%, 11.9%]
- 39.4% use no checks [32.5%, 46.2%]

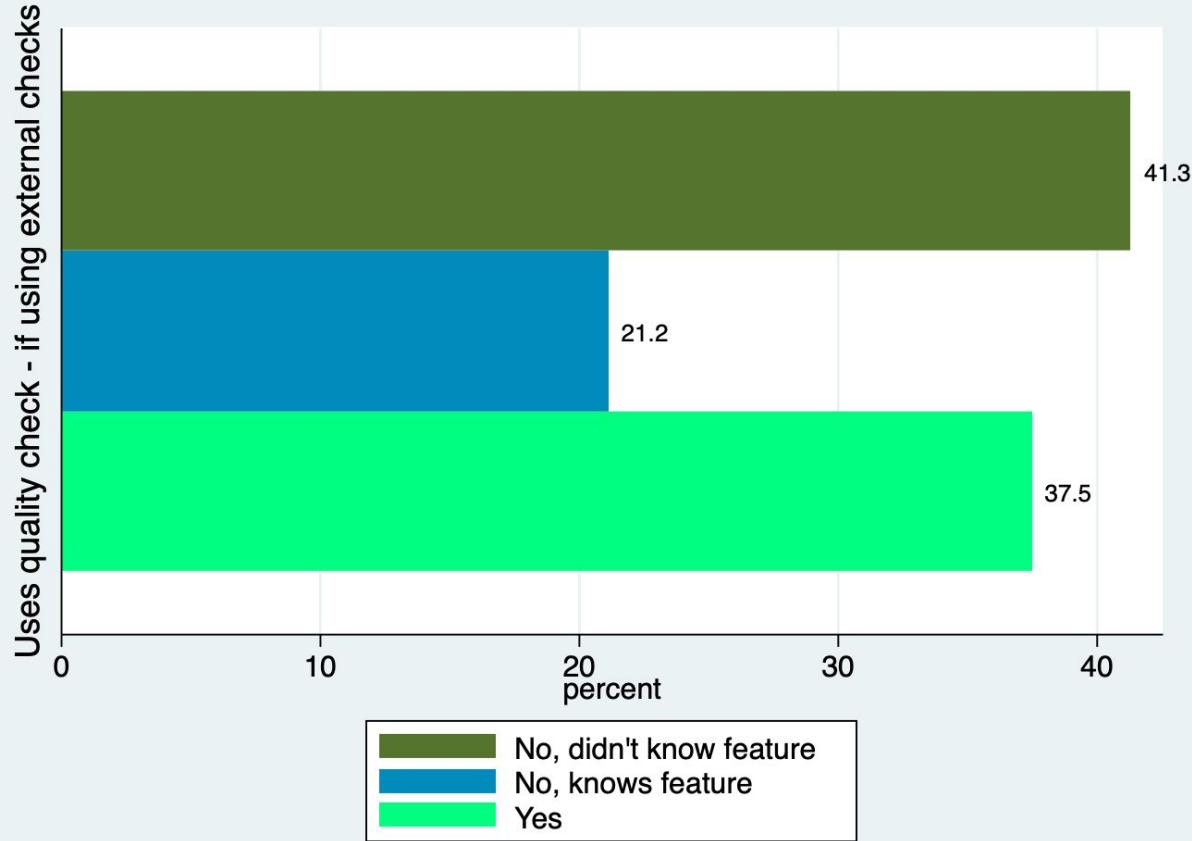
Confidence intervals at 95%



## 5. Survey Results

- 37.5% of external check users used internal checks too [28%, 46.9%]

Confidence intervals at 95%



# 6. Conclusions

- Statistically significant experiment results
- Treatment effectiveness rate: 9.27% vs 19% engagement rate
- Absolute effect: 71 net surplus quality checks
- 6 month history: 58.83 avg, std dev 51.84.
- Improved design in future, with better targeting?

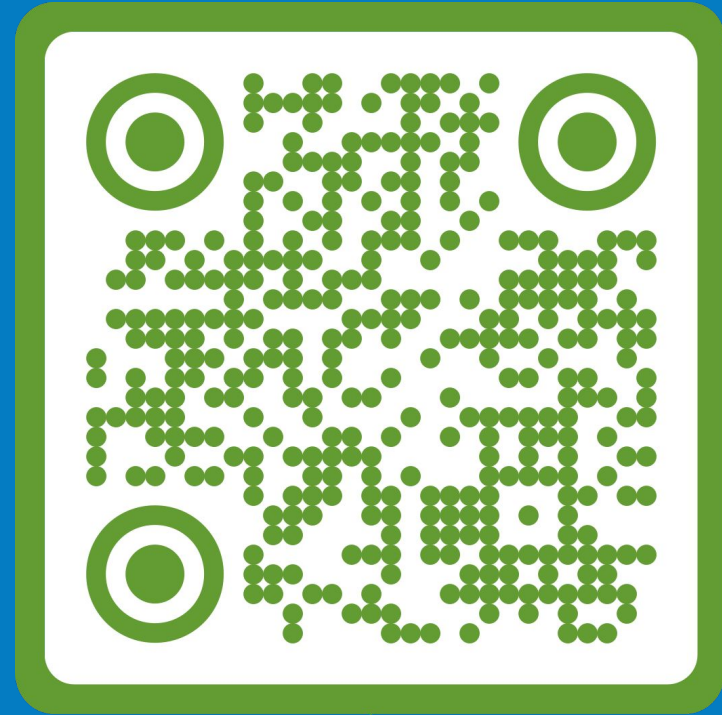
- 40% of users don't use checks [32.5%, 46.2%]
- Internal quality check usage overlap 70.9% with external quality check usage [58.51%, 83.3%]

Confidence intervals at 95%.

# Thank you!

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SCAN TO GET SLIDES