

CENSUS • RECENSEMENT

# Quality-driven collection operations during the 2021 Canadian Census of Population

International Total Survey Error Workshop – 2021  
Total Quality for Censuses

Christiane Laperrière  
Statistics Canada  
October 8, 2021

*The content of this presentation represents the position of the author  
and may not necessarily represent that of Statistics Canada.*



# The Canadian Census of Population

- Conducted every 5 years
  - In 2021: May to mid-August (extended to September for certain areas)
- Primary objective: count every person and dwelling in Canada
- Enumerates people based on where they usually live
- 35 million individuals enumerated in 2016
  - Majority of *population* concentrated in urban areas (mostly in the South)
  - Majority of *territory* is rural/remote areas

# The Canadian Census of Population Context & Challenges



CENSUS • RECENSEMENT

## Collection Methodologies

### Mail-out (86% of dwellings)

Urban areas where invitation/reminder letters can be delivered directly to the dwelling

### Mail-out with drop-off (>6% of dwellings)

Mix of mail delivery where possible (like mail-out) and enumerators dropping Census materials at remaining dwellings

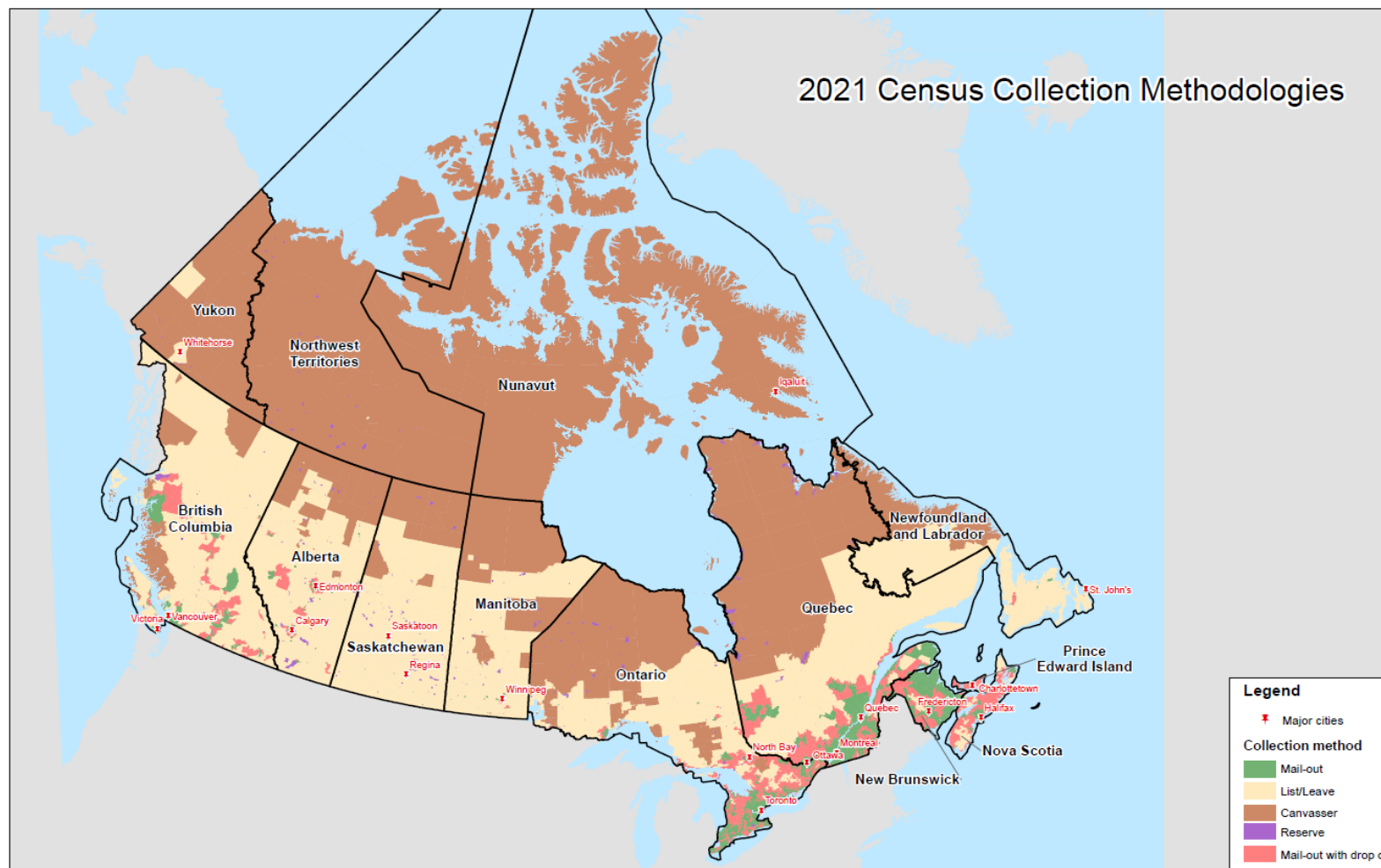
### List/leave (6% of dwellings)

Rural areas where enumerators are sent to list all dwellings and deliver Census material

### Canvasser/Reserve (1% of dwellings)

Remote areas where Census questionnaires are typically completed via in-person interviews

Collecting in the brown and tan regions  
(where materials cannot be mailed)  
requires enumerators



Statistics  
Canada

Statistique  
Canada

Canada

# 2021 Census collection timelines



## Self-response

- Big push in **May**
- Several reminders (wave methodology)
- **Encourage Electronic Questionnaire (EQ)**
- Paper Questionnaire (PQ) available on request
- Census Help Line for questions

## Non-Response follow-up (NRFU)

- **June until August**
- By phone and in-person (PQ used by field enumerator)

## Dwelling Classification Survey

- **June until August**
- After NRFU is done in a given collection unit
- Sample of NR and unoccupied private dwellings
- Used to adjust Census counts (based on occupancy error)



# New Census plan in reaction to COVID-19



CENSUS • RECENSEMENT

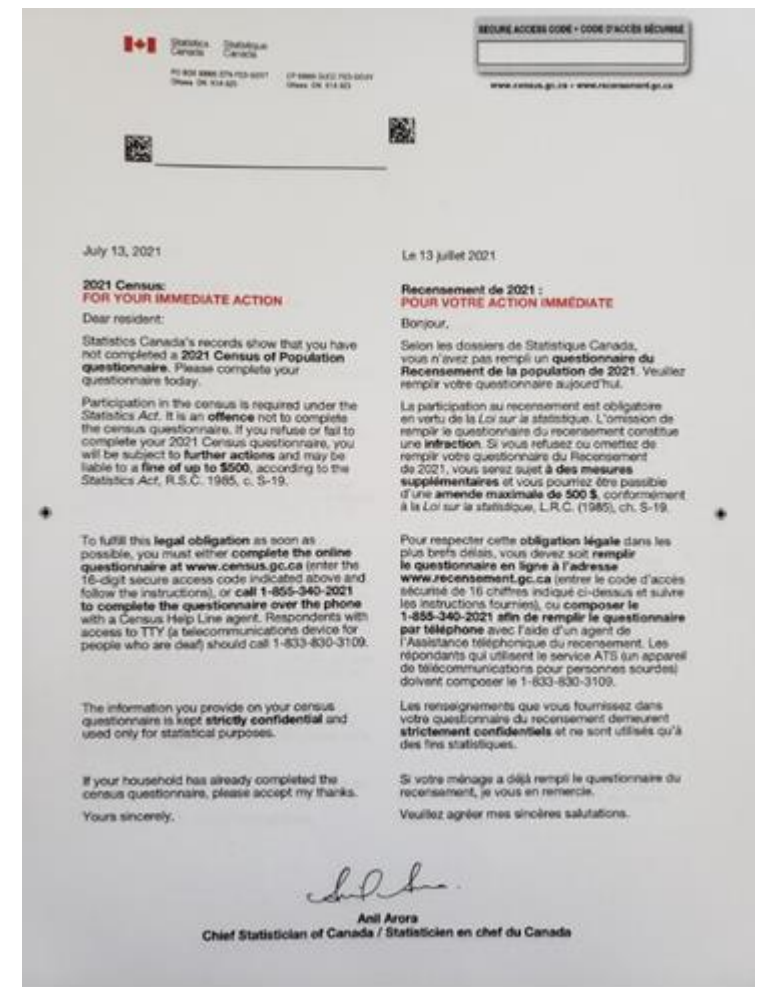
## Minimize in-person contacts

- More resources deployed for telephone attempts
- When face-to-face visits were required:
  - Enumerators were provided with Personal Protective Equipment and practiced physical distancing
  - Soft approach used during the first contact to encourage self-response
- A final wave (reminder letter) was added towards the end of NRFU to encourage self-response

## Contingency strategy (imputation stage)

Administrative sources to list individuals living in Canada in May 2021 along with qualifying attributes like name, date of birth, sex and address.

→ Improve donor pool if NR is higher than expected





CENSUS • RECENSEMENT

# Sources of Errors

There are many. Only some will be covered today

→ **Focus on data collection period**

Type of error
Item non-response (measurement) and Total Nonresponse
Coverage (individuals and dwellings)



## Mitigation & Quality driven Operation

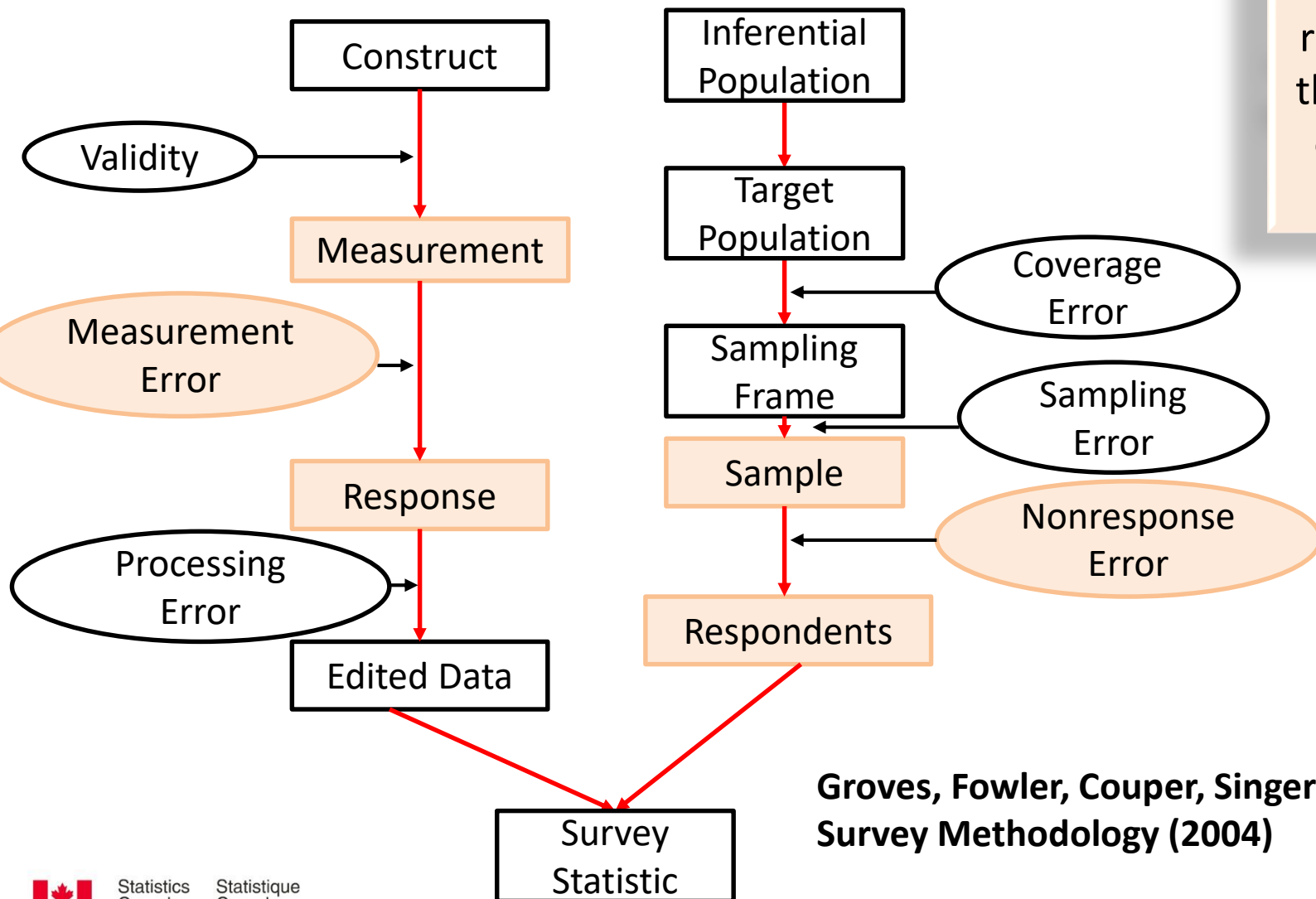
- Wave Methodology
- Publicity Campaign
- Push for EQ
- Improvement of coverage questions in the EQ
- Failed-Edit Follow-Up Operation
- Dwelling Occupancy Verification Operation
- Tolerance strategy
- Dwelling Classification Survey

## Measurement

## Representation



CENSUS • RECENSEMENT



Item NR is reduced when the EQ is used, compared to the PQ

Census data is essential in providing granular quality data. Total nonresponse must be minimised



Encourage self-response via the Internet using the Wave Methodology strategy and a strong Publicity Campaign

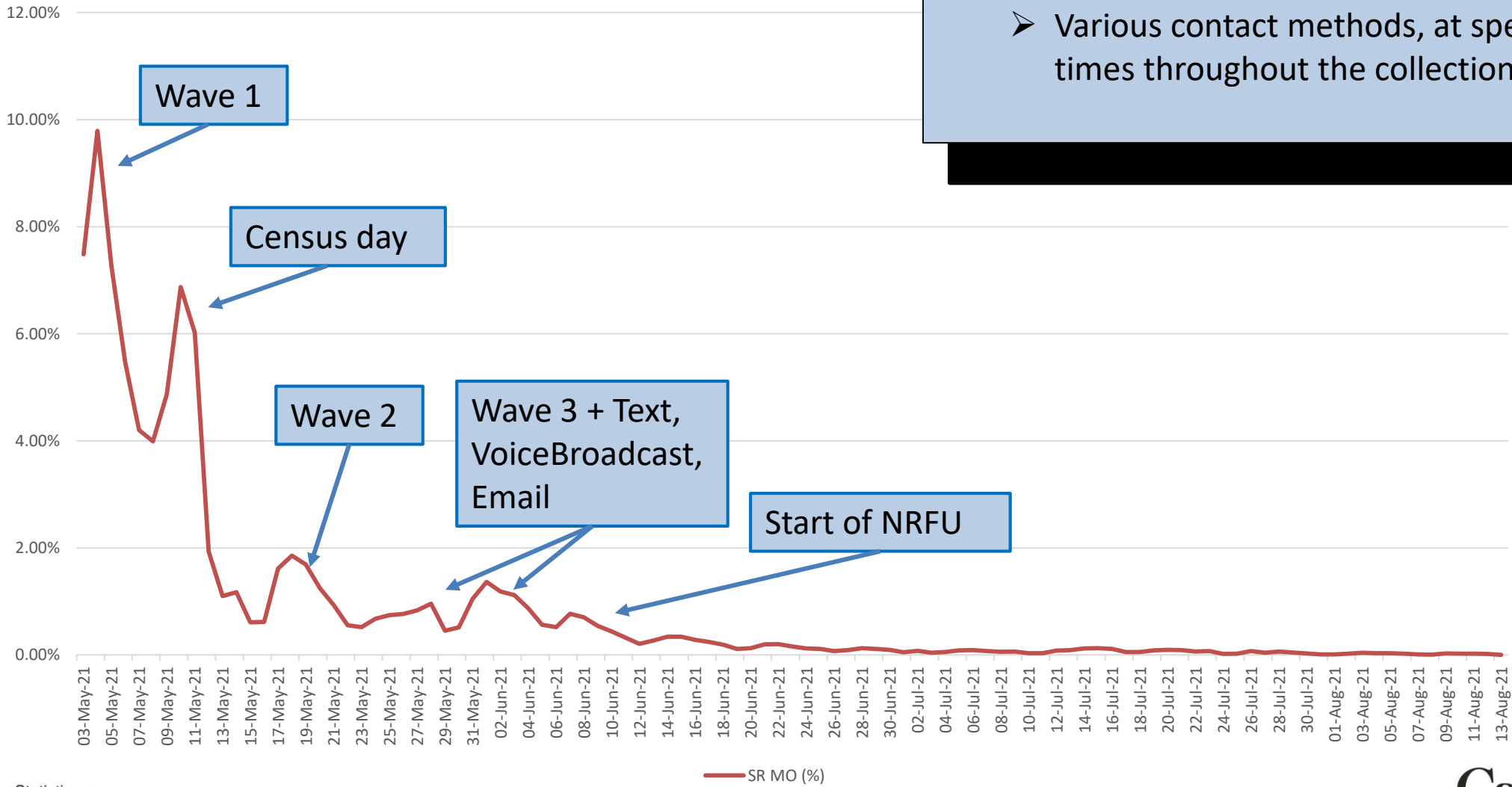
**Groves, Fowler, Couper, Singer and Tourangeau  
Survey Methodology (2004)**



# Self-response in mail-out areas



- **Wave methodology:**
- Prompt **self-response** and **Internet** response through a series of contacts with households
  - Various contact methods, at specific times throughout the collection period





## Measurement

## Representation



CENSUS • RECENSEMENT

Construct

Validity

Measurement

Measurement  
Error

Response

Processing  
Error

Edited Data

Inferential  
Population

Target  
Population

Coverage  
Error

Sampling  
Frame

Sampling  
Error

Sample

Nonresponse  
Error

Respondents

Survey  
Statistic

Groves, Fowler, Couper, Singer and Tourangeau  
Survey Methodology (2004)

Person-level coverage errors can occur when households are not sure who to include on their Census questionnaire



Improve the EQ to build-in clarifications in the flow of the questionnaire



Follow-up with households with remaining uncertainties



Statistics  
Canada

Statistique  
Canada

Statistics Canada • Statistique Canada

Canada

# Improvements to the EQ to reduce coverage errors



If respondent goes back in the questionnaire to **reduce the household size**:

- Reason must be provided

For individuals listed as **residents of another country visiting Canada**:

- Ask follow-up questions to determine if the person is in-scope

After the respondent lists the members of the household (**roster section**):

- Ask if they listed someone who they were unsure should be listed
- If so, ask follow-up questions to determine if the person is in-scope

**Goal: Help the respondent determine who should be included on the Census questionnaire**

- If uncertainties remain, telephone follow-up calls will be made to confirm who should be included
- This is the Failed-Edit Follow Up operation (FEFU)



# Failed-Edit Follow-up



- Telephone Follow-up for households **who responded to the Census**
- To resolve flagged uncertainties about who should be enumerated
- To address item non-response (e.g. persons on the questionnaires with missing date of birth)



Follow-up



To reduce **coverage errors** and **item NR errors** during Census collection

## Measurement

## Representation



CENSUS • RECENSEMENT

Construct

Inferential Population

Validity

Measurement

Target Population

Measurement Error

Sampling Frame

Coverage Error

Response

Sample

Sampling Error

Processing Error

Edited Data

Respondents

Nonresponse Error

Survey  
Statistic

Dwelling Occupancy Errors can occur during NRFU



Before NRFU

Conduct the Dwelling Occupancy Verification Operation



During NRFU

Verify suspicious dwelling counts and occupancy rates during the tolerance process



After NRFU

Conduct Dwelling Classification Survey to measure error

# Dwelling Occupancy Categories



CENSUS • RECENSEMENT

Incorrect dwelling occupancy status leads to coverage errors

## OCCUPIED

Occupied by one or more residents on Census day (even if temporarily away on Census day)

## UNOCCUPIED

Has no occupants on Census day, and is not occupied by anyone temporarily away on Census day

House for sale (owners moved out), empty apartment (not rented)

## CANCELLED

Dwelling that no longer exists on Census day or structure that does not meet definition of private dwelling on Census day and has no occupant

Dwelling undergoing major renos not fit for habitation, business



Statistics  
Canada

Statistique  
Canada

Canada

# Before NRFU:

## Dwelling Occupancy Verification Operation



Improving dwelling  
occupancy status



- **Dwelling Occupancy Verification (DOV):** Field operation which consists in visiting selected dwellings to determine the occupancy status.  
→ To identify as many as possible unoccupied and cancelled dwellings close to Census Day
- **Dwelling Occupancy Model (DOM):** Classification algorithm that predicts the probability of a dwelling of being occupied, unoccupied or cancelled.  
→ To select dwellings for DOV (i.e. most likely to be unoccupied and/or cancelled)

## During NRFU: Tolerance Process

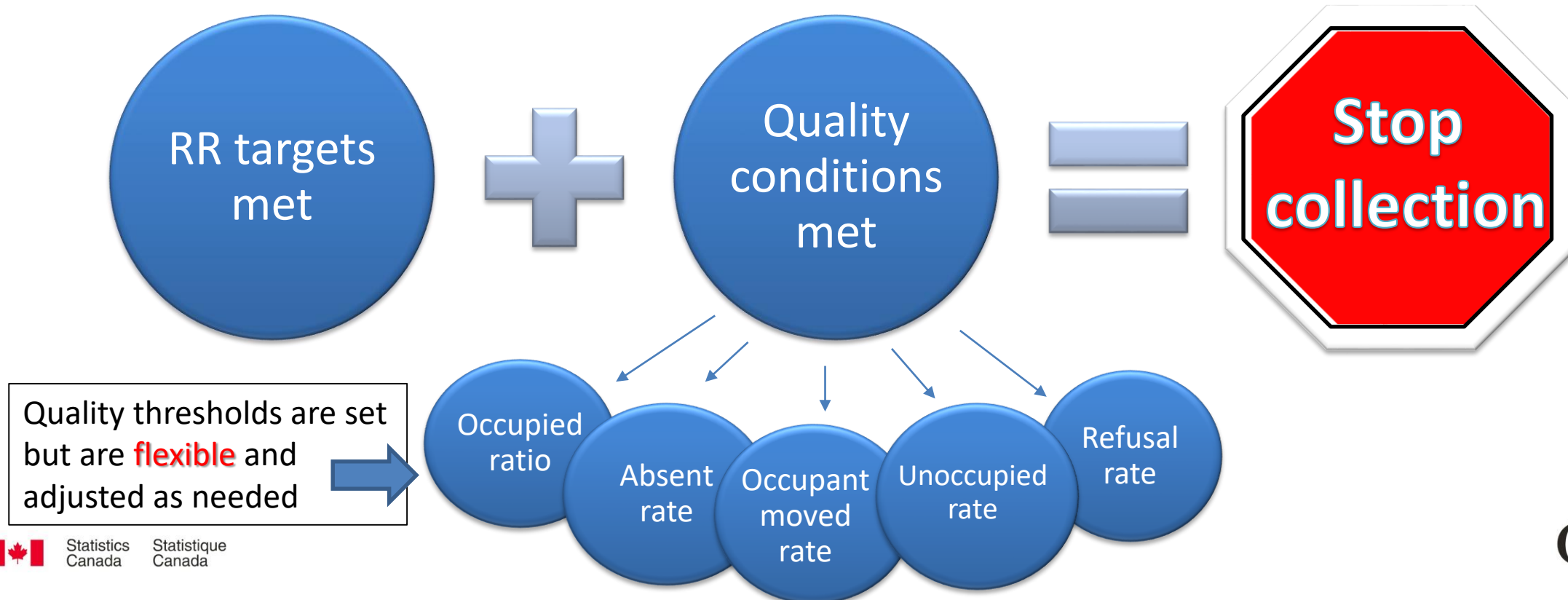


Flag suspicious collection areas and  
follow-up with field enumerators



Many errors found and corrected

To **stop collection** Response Rates must meet targets **and** additional Quality Indicators





## After NRFU:

### Dwelling Classification Survey



Estimate dwelling  
occupancy error rates



- 1) **Some dwellings classified as unoccupied are actually occupied (e.g. field staff classified them as unoccupied in error)**
    - This leads to **Census population undercoverage**
  - 2) **Not all non-respondent dwellings are occupied (e.g. field staff did not classify them as unoccupied in error). If we assume, they were all occupied, this would**
    - Lead to **Census population overcoverage**
- **Goal of DCS:** Re-visit sample of unoccupied and non-respondent dwellings to determine occupancy on Census day and estimate occupancy error rates to adjust the Census database accordingly



CENSUS • RECENSEMENT

# Sources of Errors

Next step: Evaluating performance of these quality-driven operations

## Type of error

Item non-response  
(measurement) and  
Total Nonresponse

Coverage  
(individuals and dwellings)



## Mitigation/Quality driven Operation

- Wave Methodology
- Publicity Campaign
- Push for EQ
- Improvement of coverage questions in the EQ
- Failed-Edit Follow-Up Operation
- Dwelling Occupancy Verification Operation
- Tolerance strategy
- Dwelling Classification Survey



CENSUS • RECENSEMENT

Thank you! / Merci!

Questions?

[christiane.laperriere@statcan.gc.ca](mailto:christiane.laperriere@statcan.gc.ca)

# Publicity Campaign and Outreach

## Awareness phase: April 19 - May 2, 2021

- In early May you will be receiving your census in the mail
- Completing the census online will be fast and easy
- By completing your census you will help transform your community

## Call-to-action phase: May 3- May 18, 2021

- Go online now and complete your census
- Completing the census online will be fast and easy
- By completing your census you are helping transform your community

## Reminder phase: After May 19, 2021

- Completing the census is mandatory



Statistics  
Canada

Statistique  
Canada



Langley Meals on Wheels Services Society

15 mins · 🌐

#Census data can help organizations and communities in Canada plan, develop and expand programs, services and infrastructure. Here's how we can all help support the #2021Census: <https://bit.ly/3iXqfDR>



FCM @FCM\_online · 20h

Census 2021 is still open, so make sure you complete yours today if you haven't already! Municipalities rely on accurate and complete data to inform local decisions, and there is still time to be counted. [census.gc.ca/index-eng.htm](https://census.gc.ca/index-eng.htm) #cdnmuni #2021Census 🍁



🗨️ 5 ❤️ 6 ↗️

