Using Hierarchical Data to Manage Sample and Contact Attempts in Microsoft Access

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Contact attempts differ by mode

• CATI and CAPI surveys
  • Interviewers
    • Telephone calls  ☏
    • In-person visits  🏠

• Mail and Web surveys
  • Advance letters and postcards  🏠
  • Email invitations and reminders  ✉
  • Paper questionnaires  🏠 📝
Mail and Web Surveys

• Self-administered surveys don’t administer themselves
  • No interviewers
    • Who initiates contact?
      • Is sample member eligible to be contacted?
      • What address or email should be used?
    • Who records outcome of contact attempt?
      • Is sample member still eligible?
      • Is address or email still usable?
  • What tools do they use?
    • No CATI or CAPI front-end
Project Operations Database (POD)

- Microsoft Access database
  - Front-end
    - Case Management
    - Contact Management
    - Progress reports
  - Users
    - Mail Department
    - Tracking & Locating Department
    - Project Directors
Project Operations Database (POD)

• Where are data stored?
  • **Microsoft Access Back-End**
    • Single-mode mail surveys
  • **MySQL Back-End**
    • In-house web surveys
    • CAPI surveys
    • Central data repository
      • Multi-mode surveys
      • Longitudinal studies
  • Open Database Connectivity (ODBC)
    • Link MySQL back-end and Access front-end
How are data stored?

How many peas are in a pod?
  - It depends on the variety
    - 2-3 snow peas
    - 6-7 green peas
Hierarchical Data
Hierarchical Database Structure
Data about Contact Attempts

Case

Mail Survey Components

Person

Address

Email

Telephone

Contact Attempt
Disposition Determines Eligibility for Contact

Case → Mail Survey Components → Person → Address → Email → Telephone → Contact Attempt
Outcome of Contact May Affect Disposition
Disposition and Outcome Code

- Common codes
  - Derived from AAPOR Final Disposition
  - Interim codes for Tracking & Locating

- Code Definitions Table
  - How does code affect disposition of…
    - People
    - Addresses
    - Email Addresses
    - Telephone Numbers
    - Mail Survey Components
Disposition

• More than just a code
• Contact Eligibility
  • Enabled
  • Disabled
  • Permanently Disabled (Final)
• Recency
  • When was contact last enabled?
• Tracking and Locating
  • Referred for Tracking & Locating
  • Referred for Review
  • Returned from Department
Telephone as Mode of Contact

Case

Mail Survey Components

Person

Address

Email

Telephone

Contact Attempt
Data Imported from Survey Instrument
Data Imported from Sample File

- Case
- Mail Survey Components
- Sample File
- Person
  - Address
  - Email
  - Telephone
Why use hierarchical data?

• A case can any number of records
• Records can be of any type
• Each record has its own disposition

• Why not just use “current home address”?
  • When was it current?
  • Possible addresses, not yet confirmed
  • Past addresses, confirmed as incorrect
The Life of a Case
Importing Sample
Importing Sample

• Sample Field Definition Table
  • Crosswalk

• Example:
  • Fields in sample file:
    • haddr1, haddr2, hcity, hstate, hzip
  • Fields in database:
    • street1, street2, city, state, zip
  • Type of data: address
  • Type of record: home
Case-Level Data Imported into MySQL

Case

SAQ
Enabled

Sample File

Diagram showing the relationship between Case, SAQ, and Sample File.
Person Data Imported
Home Address Data Imported
Alternate Address Data Imported
Email Data Imported

Case

SAQ
   Enabled

Sample File

Sample Member
   Enabled

Home Address
   Enabled

Alternate Address
   Enabled

Personal Email
   Enabled
Telephone Data Imported

Case

Sample Member
Enabled

SAQ
Enabled

Home Address
Enabled

Alternate Address
Enabled

Personal Email
Enabled

Cell Phone #
Enabled

Sample File
In-House Web Survey

- Case
- SAQ: Enabled
- Web Survey: Enabled

Sample Member: Enabled

- Home Address: Enabled
- Alternate Address: Enabled

- Personal Email: Enabled
- Cell Phone #: Enabled
Record Selection

- Which address, email, or telephone should be used?
- More than one usable address?
  - Prioritize by **type**
  - Which type of address should we try first?
- Addresses of the same type?
  - Prioritize by **recency**
  - Which address was most recently enabled?
- Addresses enabled at same time?
  - Prioritize by **position**
  - Which record was created first?
Record Type Definitions Table

- Position of each unique record type in hierarchy
  - Which should be selected first?

- Hierarchy of Address Types:
  - Home Mailing
  - Home
  - Seasonal Mailing
  - Seasonal
  - Alternate Mailing
  - Alternate
  - Work
The Life of a Case

Contact Attempts
Contact Definition Table

• Defines each contact attempt
  • Who is the recipient?
  • What is the mode of contact?
  • Is a mails survey component attached?
  • Any conditions or pre-requisites?

• Other options
  • Resend materials returned undelivered
  • Attach incentives
  • Automate mail merges
Advance Letter Created and Sent
Advance Letter Returned Undelivered

Case

SAQ
   Enabled

Web Survey
   No Outcome

Sample Member
   Enabled

Home Address
   Returned Undelivered
   Disabled, Referred

Alternate Address
   Enabled

Personal Email
   Enabled

Cell Phone #
   Enabled

Advance Letter
   Returned Undelivered
Alternate Address Selected

Case
SAQ
Enabled
Web Survey
No Outcome

Sample Member
Enabled

Alternate Address
Enabled

Home Address
Returned Undelivered
Disabled, Referred

Personal Email
Enabled

Cell Phone #
Enabled

Advance Letter
Returned Undelivered
Email Invitation Created and Sent

Case

SAQ
Enabled

Web Survey
No Outcome

Sample Member
Enabled

Alternate Address
Enabled

Home Address
Returned Undelivered
Disabled, Referred

Personal Email
Enabled

Cell Phone #
Enabled

Email Invitation
No Outcome

Advance Letter
Returned Undelivered
Web Survey Break-off

Case

SAQ
  Enabled

Web Survey
  Break-off or partial

Sample Member
  Enabled

Alternate Address
  Enabled

Home Address
  Returned Undelivered
  Disabled, Referred

Personal Email
  Enabled

Cell Phone #
  Enabled

Email Invitation
  No Outcome

Advance Letter
  Returned Undelivered
SAQ Packet #1 Created
Assembly and Delivery

• Contact by mail is not instantaneous
  • **Step 1:** Create contact data records
    • Database evaluates eligibility
  • **Step 2:** Run mail merge
  • **Step 3:** Print and assemble materials
  • **Step 4:** Deliver materials
    • Recipients may no longer be eligible

• **Solution?**
  • Database re-evaluates eligibility
  • Mail Department removes materials
Web Survey Completed During Assembly

Case

SAQ
Enabled

Web Survey
Complete

Sample Member
Enabled

Alternate Address
Enabled

Home Address
Undeliverable
Disabled, Referred

Personal Email
Enabled

Cell Phone #
Enabled

Packet #1 (with SAQ)
No Outcome

Email Invitation
No Outcome

Advance Letter
Returned Undelivered
SAQ Packet #1 Pulled from Mailing

Sample Member
- Enabled

Alternate Address
- Enabled

Personal Email
- Enabled

Cell Phone #
- Enabled

Packet #1 (with SAQ)
- Pulled from Mailing
- No Outcome

Web Survey
- Complete

Home Address
- Returned Undelivered
- Disabled, Referred

Email Invitation
- No Outcome

Advance Letter
- Returned Undelivered
New Home Address Imported From Web Survey

Case

SAQ
   Enabled

Web Survey
   Complete

Sample Member
   Enabled

Alternate Address
   Enabled

Home Address
   New Information
   Enabled, Referred

Home Address
   Returned Undelivered
   Disabled, Referred

Personal Email
   Enabled

Cell Phone #
   Enabled

Packet #1 (with SAQ)
   Pulled from Mailing
   No Outcome

Email Invitation
   No Outcome

Advance Letter
   Returned Undelivered
New Home Address Selected

Case

SAQ
Enabled

Web Survey
Complete

Sample Member
Enabled

Home Address
New Information
Enabled, Referred

Alternate Address
Enabled

Home Address
Returned Undelivered
Disabled, Referred

Personal Email
Enabled

Cell Phone #
Enabled

Packet #1 (with SAQ)
Pulled from Mailing
No Outcome

Email Invitation
No Outcome

Advance Letter
Returned Undelivered
New Home Address Reviewed

Case

SAQ
Enabled

Web Survey
Complete

Sample Member
Enabled

Home Address
Confirmed as Correct
Enabled, Returned

Alternate Address
Enabled

Home Address
Returned Undelivered
Disabled, Referred

Personal Email
Enabled

Cell Phone #
Enabled

Packet #1 (with SAQ)
Pulled from Mailing
No Outcome

Email Invitation
No Outcome

Advance Letter
Returned Undelivered
Thank You Letter Created and Sent

- Case
- SAQ: Enabled
- Web Survey: Complete
- Sample Member: Enabled
- Home Address
  - Confirmed as Correct
  - Enabled, Returned
- Alternate Address
  - Enabled
- Personal Email: Enabled
- Cell Phone #: Enabled

- Thank You Letter
  - No Outcome
- Packet #1 (with SAQ)
  - Pulled from Mailing
  - No Outcome
- Email Invitation
  - No Outcome
- Advance Letter
  - Returned Undelivered
Data Duplication
What makes the data “hierarchical”

• Each case is self-contained
  • Sample members who live together cannot share the same data
    • Data stored in separate cases

• What if sample members live together?
  • May share the same address
  • But cannot share the same address record
Address Duplicated Across Cases
Address Duplicated Within Case
Why is Data Duplication Problematic?

• Each record has own disposition
  • Ambiguous if recorded twice
    • Which record should we use?
    • Current address or a past address?
    • Confirmed correct or incorrect?
• Loss of functionality
  • Is the address eligible for selection or not?
• Increased complexity for users
  • Which record should be updated?
  • Identifying and disabling duplicates takes time
Standardizing Address Data

Address #1:
10 West Sunshine Ave
AL 12345

Address #2:
10 W. Sunshine Avenue
Alabama 12345

Standardized Value:
10WSUNSHINEAVEAL12345
Hierarchical Data

Advantages and Disadvantages
Advantages of Hierarchical Data

• Scalable
  • Any **number** of addresses
  • Projects of varying size and complexity
• Adaptable
  • Different **types** of addresses
  • Complex or unpredictable sample files
• Comprehensive
  • Old addresses are not overwritten with new
Advantages of Hierarchical Data

• Central Data Repository
  • Multiple Departments and Users
    • Mail Department
    • Tracking & Locating Department
    • Project Directors
  • Multiple Applications
    • Email delivery scripts
    • CAPI survey instruments
  • Multi-mode projects
  • Longitudinal studies
Disadvantages of Hierarchical Data

- Increased complexity for users
  - Each record has its own disposition
  - What is the overall disposition of the case?
    - Multi-mode projects
      - Sample member
      - Mail survey
      - Web survey
  - Data duplication
    - Coding and cleaning
    - More prevalent if multiple people per case
Thank You!

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Please visit us at:
www.uwsc.wisc.edu
Access Database

Forms and Tables
# Sample Field Definitions

<table>
<thead>
<tr>
<th>sequence</th>
<th>element</th>
<th>field_name</th>
<th>record_type</th>
<th>record_source</th>
<th>sample_field_name</th>
<th>default_value</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>survey</td>
<td>caseid</td>
<td>Production</td>
<td>sample</td>
<td>caseid</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>person</td>
<td>person_caseid</td>
<td>Respondent</td>
<td>sample</td>
<td>caseid</td>
<td></td>
</tr>
<tr>
<td>201</td>
<td>person</td>
<td>name_last</td>
<td>Respondent</td>
<td>sample</td>
<td>name_last</td>
<td></td>
</tr>
<tr>
<td>202</td>
<td>person</td>
<td>name_first</td>
<td>Respondent</td>
<td>sample</td>
<td>name_first</td>
<td></td>
</tr>
<tr>
<td>203</td>
<td>person</td>
<td>relationship</td>
<td>Respondent</td>
<td>sample</td>
<td></td>
<td>Respondent</td>
</tr>
<tr>
<td>301</td>
<td>address</td>
<td>street1</td>
<td>Home</td>
<td>sample</td>
<td>home_street1</td>
<td></td>
</tr>
<tr>
<td>302</td>
<td>address</td>
<td>street2</td>
<td>Home</td>
<td>sample</td>
<td>home_street2</td>
<td></td>
</tr>
<tr>
<td>303</td>
<td>address</td>
<td>city</td>
<td>Home</td>
<td>sample</td>
<td>home_city</td>
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<td>304</td>
<td>address</td>
<td>state</td>
<td>Home</td>
<td>sample</td>
<td>home_state</td>
<td></td>
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<tr>
<td>305</td>
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<td>Alternate</td>
<td>sample</td>
<td>home_zip</td>
<td></td>
</tr>
<tr>
<td>311</td>
<td>address</td>
<td>street1</td>
<td>Alternate</td>
<td>sample</td>
<td>alternate_address</td>
<td></td>
</tr>
<tr>
<td>313</td>
<td>address</td>
<td>city</td>
<td>Alternate</td>
<td>sample</td>
<td>alternate_city</td>
<td></td>
</tr>
<tr>
<td>314</td>
<td>address</td>
<td>state</td>
<td>Alternate</td>
<td>sample</td>
<td>alternate_state</td>
<td></td>
</tr>
<tr>
<td>315</td>
<td>address</td>
<td>zip</td>
<td>Alternate</td>
<td>sample</td>
<td>alternate_zip</td>
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</tr>
<tr>
<td>401</td>
<td>telephone</td>
<td>telephone</td>
<td>Cell</td>
<td>sample</td>
<td>cell_phone</td>
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<tr>
<td>501</td>
<td>email</td>
<td>email</td>
<td>Personal</td>
<td>sample (email1)</td>
<td>email1</td>
<td></td>
</tr>
<tr>
<td>502</td>
<td>email</td>
<td>email</td>
<td>Personal</td>
<td>sample (email2)</td>
<td>email2</td>
<td></td>
</tr>
</tbody>
</table>
# Record Type Definitions

<table>
<thead>
<tr>
<th>Element</th>
<th>record_type</th>
<th>sequence</th>
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</thead>
<tbody>
<tr>
<td>address</td>
<td>Home Mailing</td>
<td>1</td>
</tr>
<tr>
<td>address</td>
<td>Home</td>
<td>2</td>
</tr>
<tr>
<td>address</td>
<td>Seasonal Mailing</td>
<td>3</td>
</tr>
<tr>
<td>address</td>
<td>Seasonal</td>
<td>4</td>
</tr>
<tr>
<td>address</td>
<td>Alternate Mailing</td>
<td>5</td>
</tr>
<tr>
<td>address</td>
<td>Alternate</td>
<td>6</td>
</tr>
<tr>
<td>address</td>
<td>Work</td>
<td>7</td>
</tr>
<tr>
<td>email</td>
<td>Personal</td>
<td>1</td>
</tr>
<tr>
<td>email</td>
<td>Alternate</td>
<td>2</td>
</tr>
<tr>
<td>email</td>
<td>Work</td>
<td>3</td>
</tr>
<tr>
<td>person</td>
<td>Respondent</td>
<td>1</td>
</tr>
<tr>
<td>person</td>
<td>Other</td>
<td>2</td>
</tr>
<tr>
<td>person</td>
<td>Relative</td>
<td>3</td>
</tr>
<tr>
<td>telephone</td>
<td>Cell</td>
<td>1</td>
</tr>
<tr>
<td>telephone</td>
<td>Home</td>
<td>2</td>
</tr>
<tr>
<td>telephone</td>
<td>Alternate</td>
<td>3</td>
</tr>
<tr>
<td>telephone</td>
<td>Work</td>
<td>4</td>
</tr>
</tbody>
</table>
## Contact Definitions

<table>
<thead>
<tr>
<th>sequence</th>
<th>contact</th>
<th>contact_label</th>
<th>component</th>
<th>recipient_type</th>
<th>contact_mode</th>
<th>contact_condition</th>
<th>attachment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AL</td>
<td>Advance Letter</td>
<td></td>
<td>respondent</td>
<td>address</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>E1</td>
<td>Email #1</td>
<td></td>
<td>respondent</td>
<td>email</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>S1</td>
<td>SAQ #1</td>
<td>saq</td>
<td>respondent</td>
<td>address</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>TY</td>
<td>Thank You</td>
<td></td>
<td>respondent</td>
<td>address</td>
<td>code=1100</td>
<td>post_incentive</td>
</tr>
</tbody>
</table>
Contact Definition

Identifier: AL
Label: Advance Letter

Recipient: Sample Member
Mode of contact: Address
Mail Survey Component? No
Conditions or pre-requisites? No *

* Default rule for in-house web surveys:
  Ineligible if web survey complete (code=1100) unless overridden
Contact Definition

Identifier: TY
Label: Thank You

Recipient: Sample Member
Mode of contact: Address
Mail Survey Component? No
Incentive: $10
Conditions or pre-requisites? code=1100 *

* Default rule for in-house web surveys:
  Ineligible if web survey complete (code=1100) unless overridden
Contact Management Form
Case Management Form
Case Management Form (Contact Attempts)
Case Management Form (Addresses)
Code Definitions
# Code Definitions

<table>
<thead>
<tr>
<th>Code</th>
<th>Label</th>
<th>Contact</th>
<th>Person</th>
<th>Address</th>
<th>Email</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Uncoded</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>1100</td>
<td>Complete</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes Finalized</td>
</tr>
<tr>
<td>2110</td>
<td>Explicit refusal</td>
<td>Yes</td>
<td>Yes Finalized</td>
<td>No</td>
<td>No</td>
<td>Yes Finalized</td>
</tr>
<tr>
<td>2111</td>
<td>Other person refusal</td>
<td>Yes</td>
<td>Yes Finalized</td>
<td>No</td>
<td>No</td>
<td>Yes Finalized</td>
</tr>
<tr>
<td>2112</td>
<td>Known respondent-level refusal</td>
<td>Yes</td>
<td>Yes Finalized</td>
<td>No</td>
<td>No</td>
<td>Yes Finalized</td>
</tr>
<tr>
<td>2113</td>
<td>Blank questionnaire mailed back, implicit refusal</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes Finalized</td>
</tr>
<tr>
<td>2260</td>
<td>Respondent was unavailable during field period</td>
<td>Yes</td>
<td>Yes Finalized</td>
<td>No</td>
<td>No</td>
<td>Yes Finalized</td>
</tr>
<tr>
<td>2270</td>
<td>Completed, but not returned during field period</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes Finalized</td>
</tr>
<tr>
<td>2310</td>
<td>Deceased</td>
<td>Yes</td>
<td>Yes Finalized</td>
<td>No</td>
<td>No</td>
<td>Yes Finalized</td>
</tr>
<tr>
<td>2320</td>
<td>Physically or mentally unable or incompetent</td>
<td>Yes</td>
<td>Yes Finalized</td>
<td>No</td>
<td>No</td>
<td>Yes Finalized</td>
</tr>
<tr>
<td>2330</td>
<td>Language barrier</td>
<td>Yes</td>
<td>Yes Finalized</td>
<td>No</td>
<td>No</td>
<td>Yes Finalized</td>
</tr>
<tr>
<td>2400</td>
<td>Mailing forwarded by USPS with address update</td>
<td>Yes</td>
<td>No</td>
<td>Yes Disabled</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>3190</td>
<td>Nothing ever returned</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>3191</td>
<td>Email returned with automatic response</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>3300</td>
<td>Mailing returned undelivered</td>
<td>Yes</td>
<td>No</td>
<td>Yes Disabled</td>
<td>Refer Yes Disabled</td>
<td>Refer Yes</td>
</tr>
<tr>
<td>3313</td>
<td>No such address</td>
<td>Yes</td>
<td>No</td>
<td>Yes Disabled</td>
<td>Refer No</td>
<td></td>
</tr>
<tr>
<td>3314</td>
<td>Vacant</td>
<td>Yes</td>
<td>No</td>
<td>Yes Disabled</td>
<td>Refer No</td>
<td></td>
</tr>
<tr>
<td>3400</td>
<td>Mailing returned with forwarding information</td>
<td>Yes</td>
<td>No</td>
<td>Yes Disabled</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>4700</td>
<td>No eligible respondent</td>
<td>Yes</td>
<td>Yes Finalized</td>
<td>No</td>
<td>No</td>
<td>Yes Finalized</td>
</tr>
<tr>
<td>4910</td>
<td>Duplicate complete (survey already complete)</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes Finalized</td>
</tr>
<tr>
<td>4911</td>
<td>Duplicate complete (mail survey already complete)</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>8000</td>
<td>Request resend or reprint</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
# Code Definitions

<table>
<thead>
<tr>
<th>Code</th>
<th>Label</th>
<th>Contact</th>
<th>Person</th>
<th>Address</th>
<th>Email</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>910</td>
<td>Refer to tracking and locating</td>
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<td>Refer</td>
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<td>911</td>
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<td>Yes</td>
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<td>920</td>
<td>No new information</td>
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<td>923</td>
<td>Confirmed as incorrect</td>
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<td>Yes</td>
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</tr>
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<td>942</td>
<td>New information, Review</td>
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<td>Yes</td>
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<td>Review</td>
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<td>951</td>
<td>Confirmed as incorrect, Refer</td>
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<td>Yes</td>
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<td>Partial or break-off with sufficient information</td>
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<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
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<td>2100</td>
<td>Break-off or partial with insufficient information</td>
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<td>No</td>
<td>No</td>
<td>No</td>
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<td>2121</td>
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<td>No</td>
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<td>Selected respondent screened out of sample</td>
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<td>Yes</td>
<td>Finalized</td>
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<td>9001</td>
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</table>
Code 3300: Returned Undelivered

Contact Outcome? Yes

Applicable to Person? No

Applicable to Address? Yes
Effect on Address: Disable, Refer for Tracking & Locating

Applicable to Email? Yes
Effect on Email: Disable, Refer for Tracking & Locating

Applicable to Telephone? No

Applicable to Mail Survey Component? Yes
Effect on Mail Survey Component: none
Code 920: No New Information

- Applicable to Person? Yes
  Effect on Person: Return from Tracking & Locating

- Applicable to Address? Yes
  Effect on Address: Return from Tracking & Locating

- Applicable to Email? Yes
  Effect on Email: Return from Tracking & Locating

- Applicable to Telephone? Yes
  Effect on Telephone: Return from Tracking & Locating

- Applicable to Mail Survey Component? No
Entity Association Records
Non-Hierarchical Data

Case 1210

Person
John Doe

Address
66 River Street

Person
Jane Doe

Address
123 Sunshine Drive

Case 3424