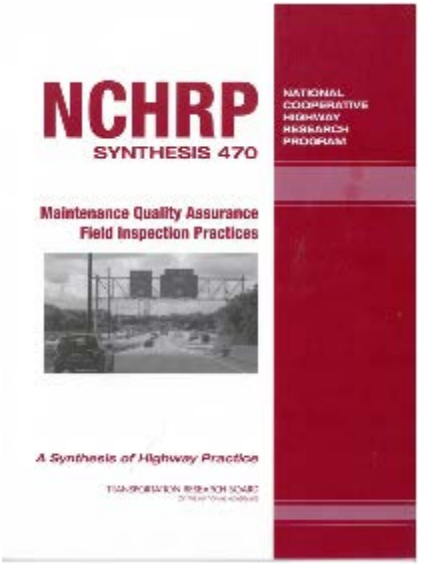
A Summary of Maintenance Quality Assurance (MQA) Field Inspection Practices



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Synthesis Objectives

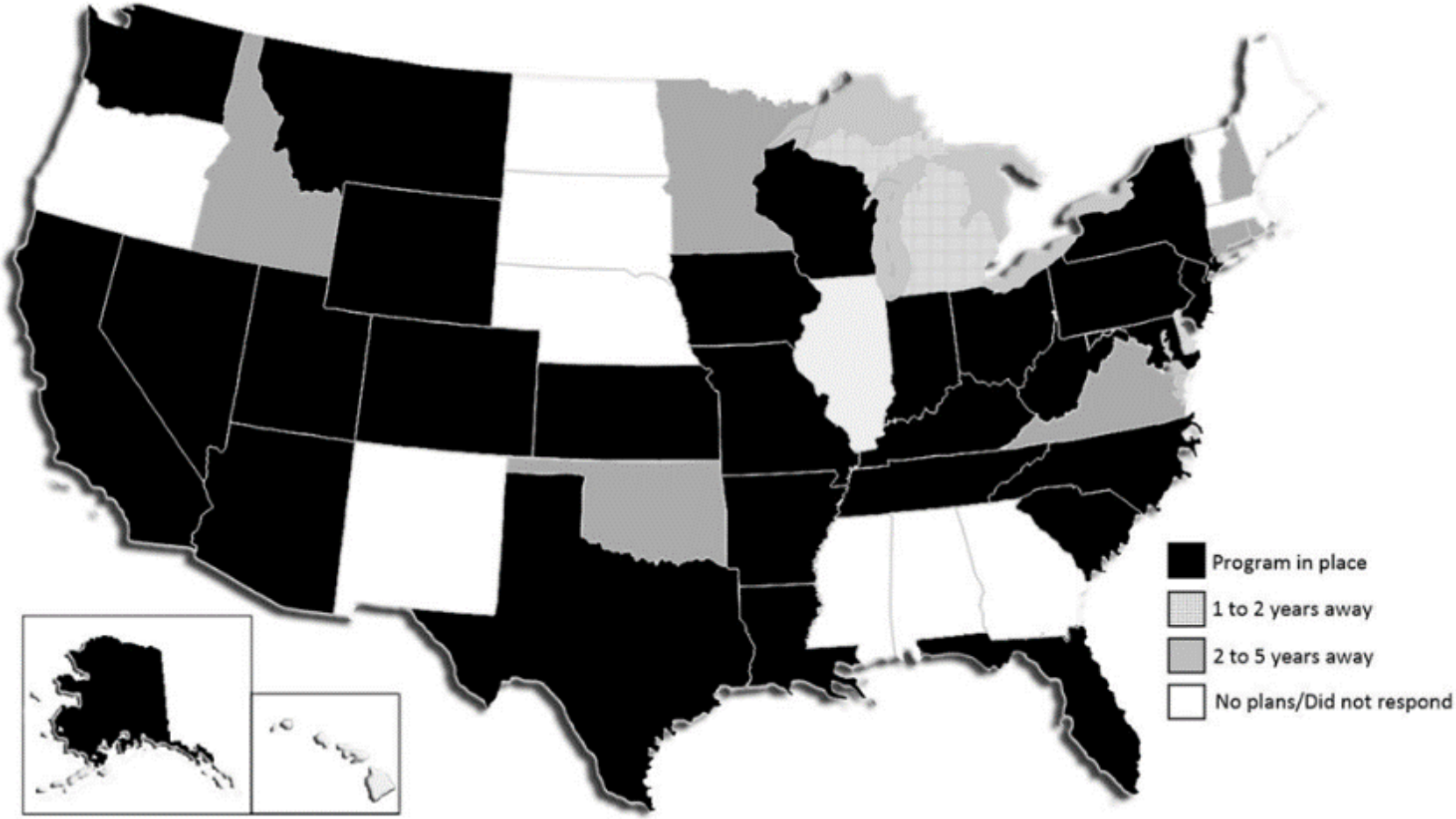
- To document the use of MQA field inspection practices to support maintenance investments
  - Types of data collected
  - Methodology used to asses condition
  - Processes used to ensure data quality
  - Use of data for budgeting and reporting
  - Rationale and motivation behind the adoption of the MQA program

Data Sources

- Literature review
- Survey of state practice
- Interviews with representatives from:
  - Alaska DOT
  - Florida DOT
  - Kentucky Transportation Cabinet
  - Montana DOT
  - North Carolina DOT
  - Utah DOT
  - Washington DOT
  - Wisconsin DOT

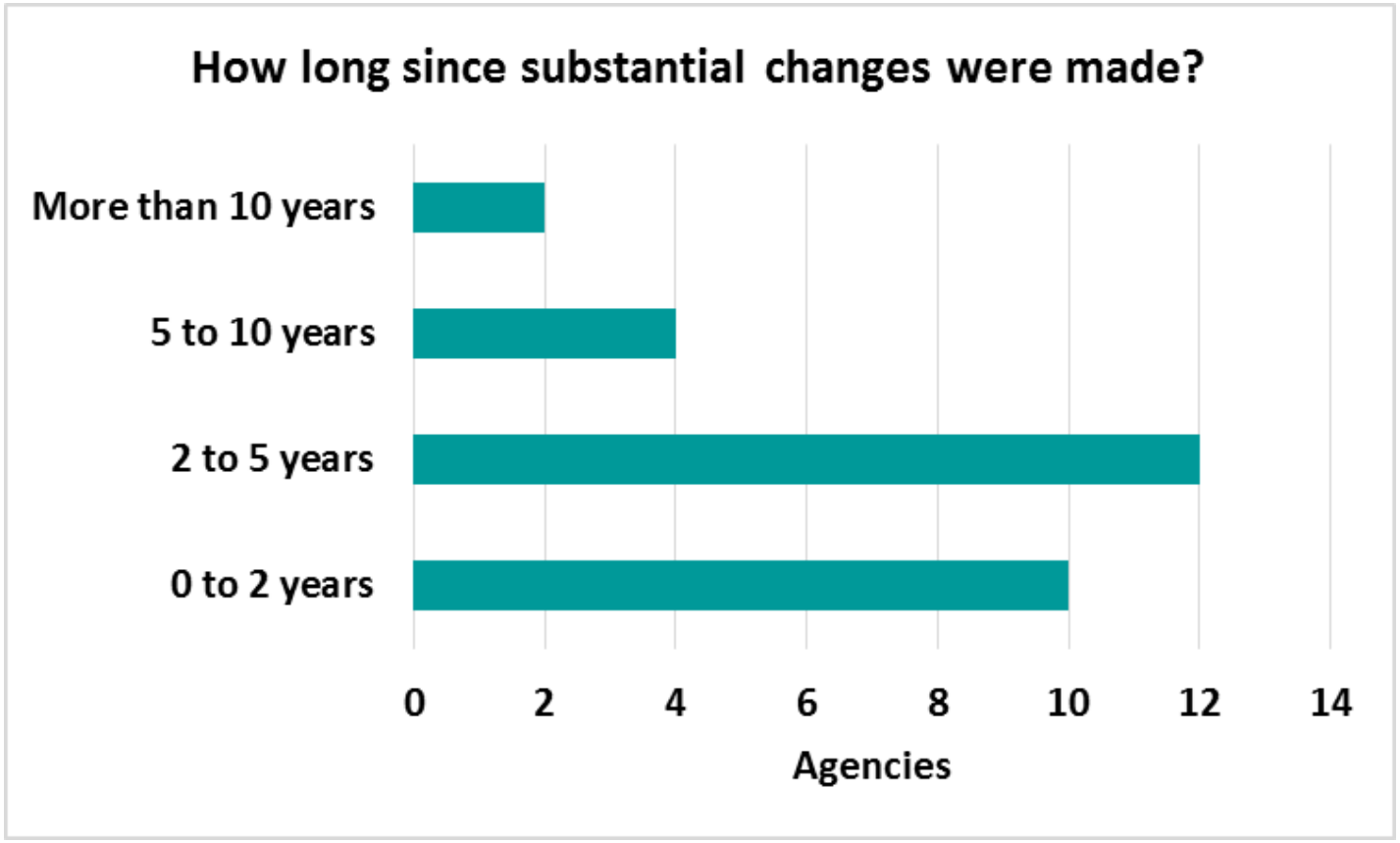
Findings – MQA Program Status

- 28 of 40 states have a program in place



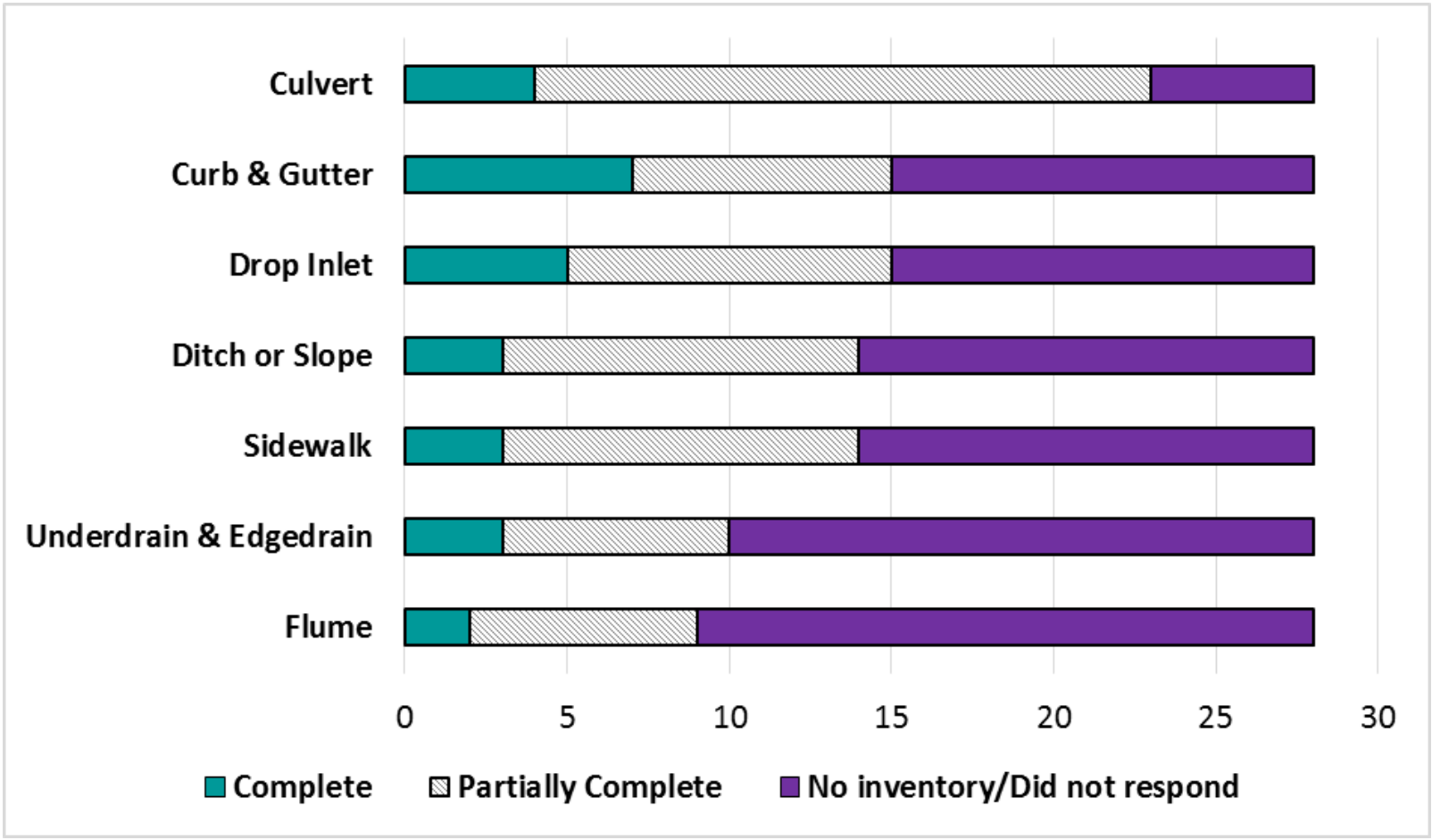
Findings – Program Status

- Most programs have undergone substantial changes since originally implemented



Findings – Data Collection

- Drainage Assets

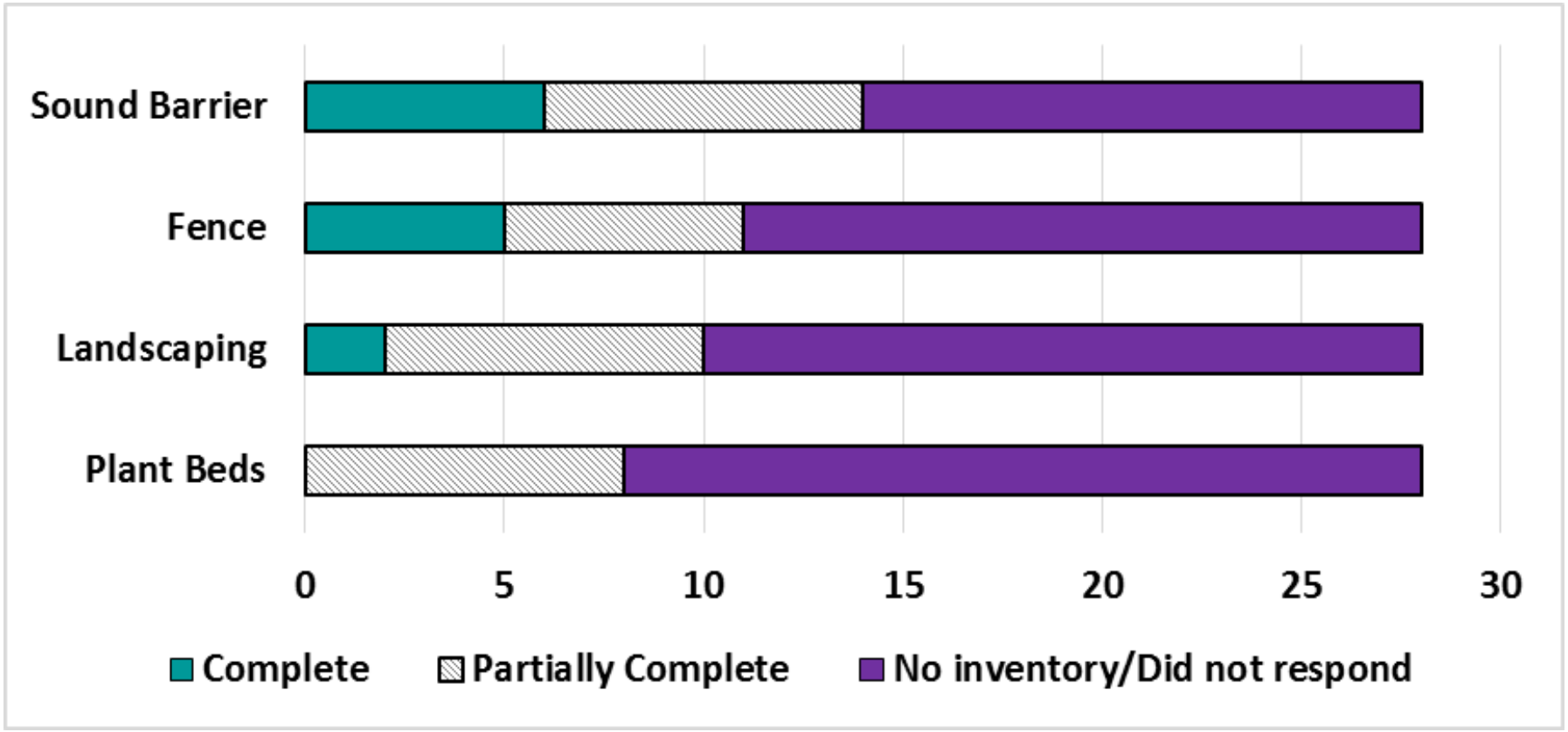


Most Common Condition Attributes - Drainage

- Culverts: Channel condition (22), culvert condition (18), erosion (13)
- Flume: Channel & flume condition (7 each)
- Curb & Gutter: Flowline interrupted (12), structural damage/spalling (10)
- Sidewalk: Displacement/heaving (5)
- Ditch: Inadequate drainage (21), erosion (16)
- Slope: Erosion (16)
- Drop Inlet: Blockage (20), grate broken/missing (16), structural deficiency (13)
- Underdrain and Edgedrain: Pipe blocked (8), end protection damage (7), pipe crushed (6)

Findings – Data Collection

- Roadside Assets

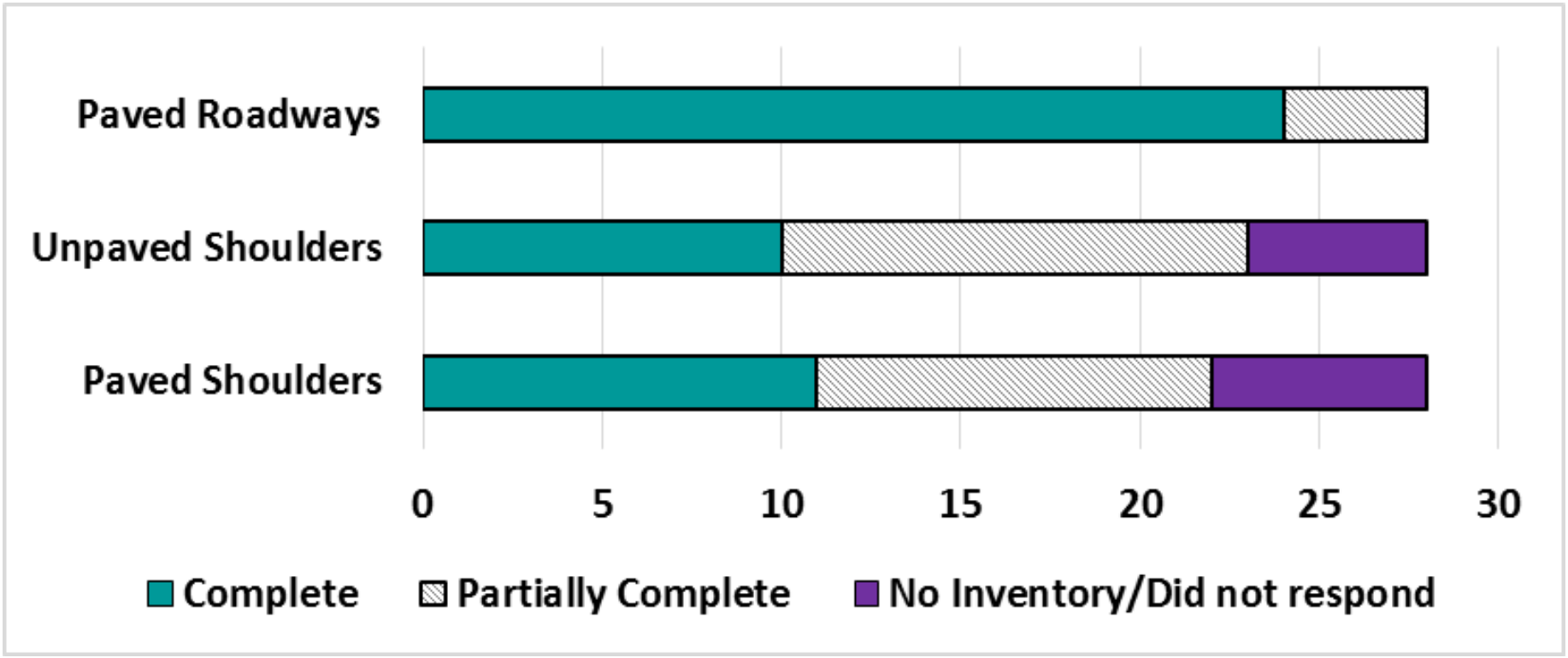


Most Common Condition Attributes – Roadside Assets

- Fence: Length of damaged or missing (13)
- Grass Mowing: Grass height (17)
- Brush: Vision obstructions (10)
- Litter: Volume within a certain length (18)
- Weed Control: Amount within a certain area (13)
- Landscaping: Appearance (7)
- Plant Beds: Appearance or Presence of undesirable vegetation (3 each)
- Sound Barrier: No measure used by more than 1 agency

Findings – Data Collection

- Pavements



Most Common Condition Attributes - Pavements

- Paved Shoulders: Drop-off (14), structural distress (12), functional distress (10)
- Unpaved Shoulders: Drop-off (17)
- Paved Roadway: Cracking (16), rutting (15), structural distress (14), roughness (12), use PMS results (12)

Findings – Data Collection

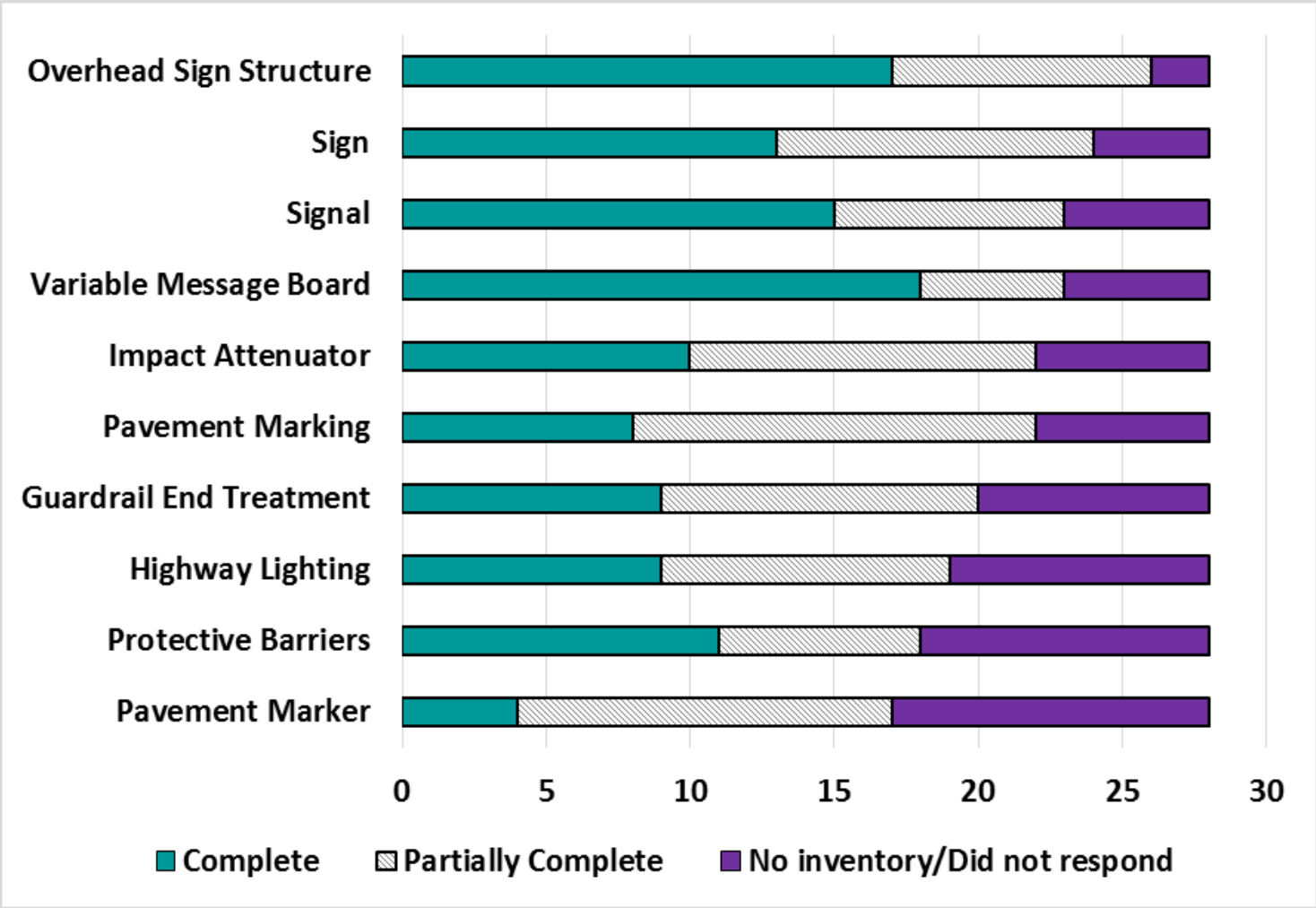
- Bridges
  - 27 of the 28 agencies reported having a complete bridge inventory

Most Common Condition Attributes - Bridges

- Bridge Management Inspections (14), deck condition rating (13), joint condition rating (11), bearing condition rating (10), structural adequacy (10)

Findings – Data Collection

- Traffic Assets

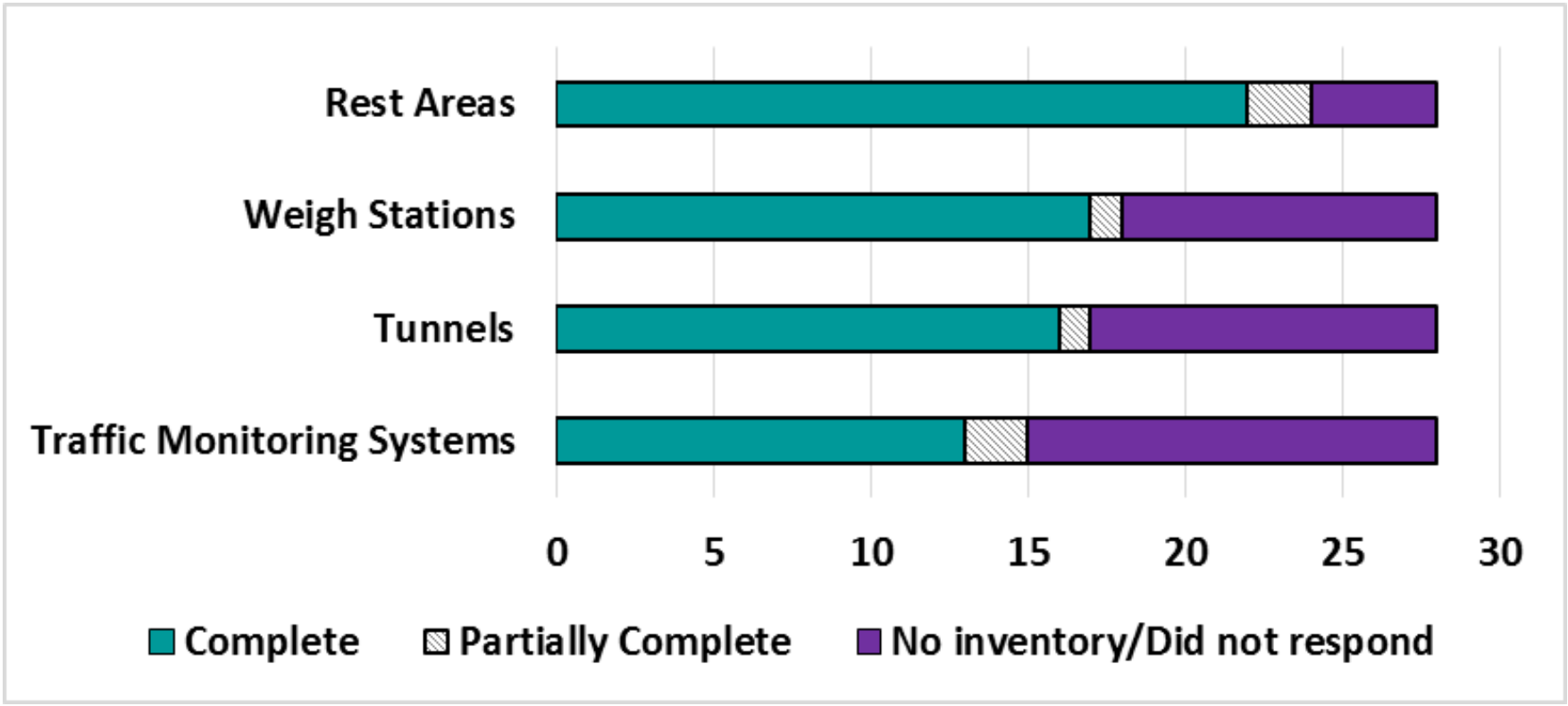


Most Common Condition Attributes – Traffic Assets

- Signal: No metric used by more than 1 agency
- Signs: Panels damaged (22), legibility (20), post damage (17), sign orientation (15), obstructions (14), visibility (13)
- Pavement Marking: Missing/damaged (18), day visibility (16), night retroreflectivity (10)
- Pavement Marker: Number missing, damaged, or obstructed (15)
- Guardrail End Treatment: End treatment damage (18), post damage (15), functionality (11), end treatment alignment (10)
- Overhead Sign Structure: Structural integrity (9)
- Impact Attenuator: Structurally damaged (16), functionality (15)
- Protective Barriers: Structurally damaged (18), functionality (14), misaligned (11)
- Variable Message Board: No metric used by more than 1 agency
- Highway Lighting: % Operational (7)

Findings – Data Collection

- Special Facilities

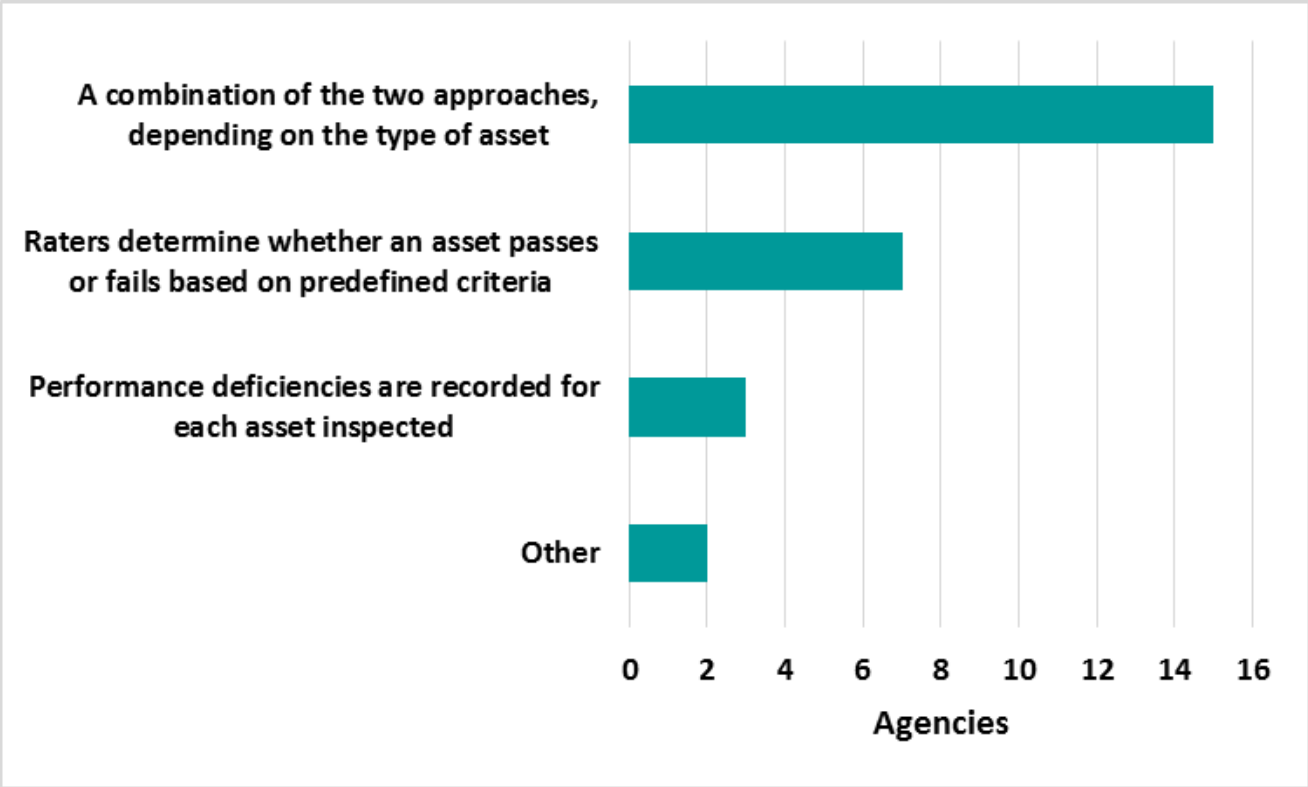


Most Common Condition Attributes – Special Facilities

- Rest Areas: Working properly, appearance, landscaping, & cleanliness (10 each)
- Tunnels: Lighting, debris, & drainage (4 each)
- Weigh Stations: Functionality (2)
- Traffic Monitoring Systems: No metrics reported

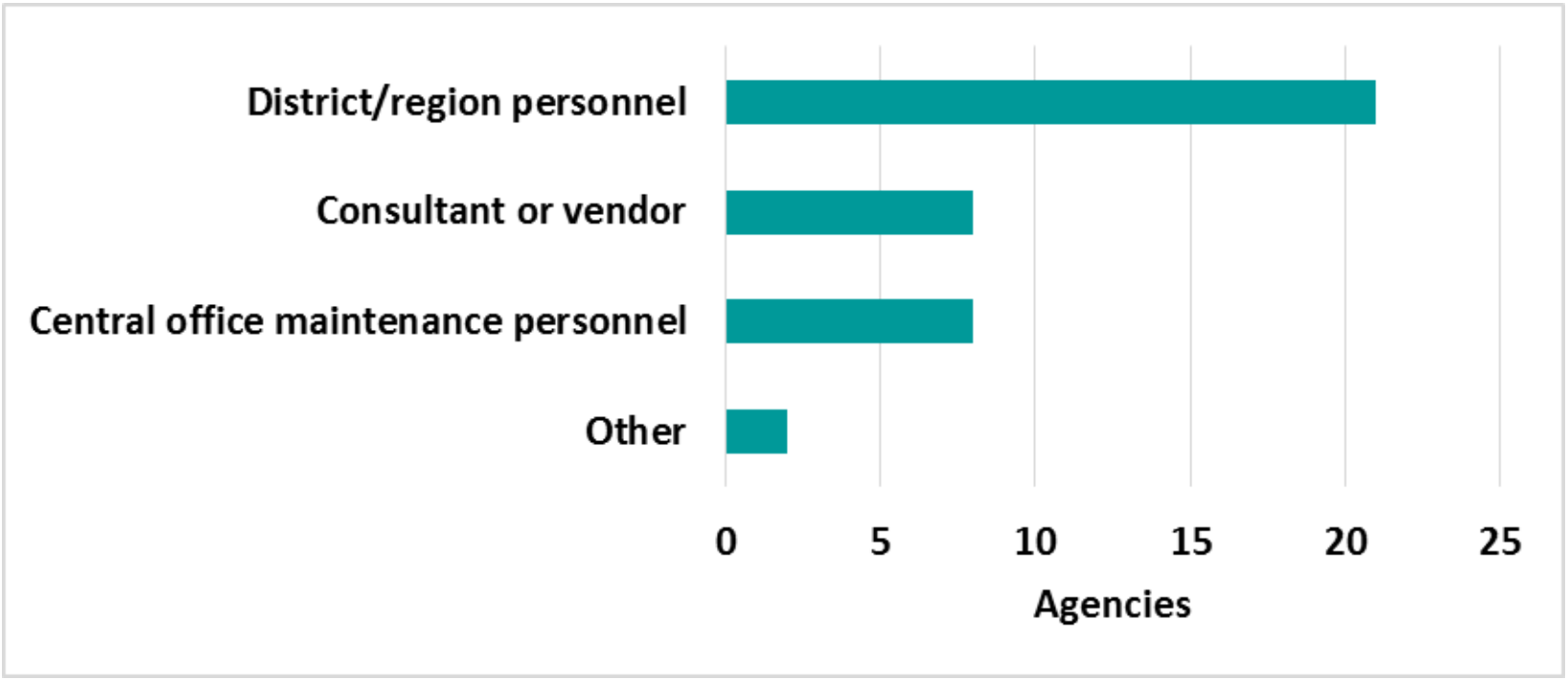
Findings – Survey Methods

- MQA programs are generally classified as a pass/fail approach, a graded approach, or a combination of the two



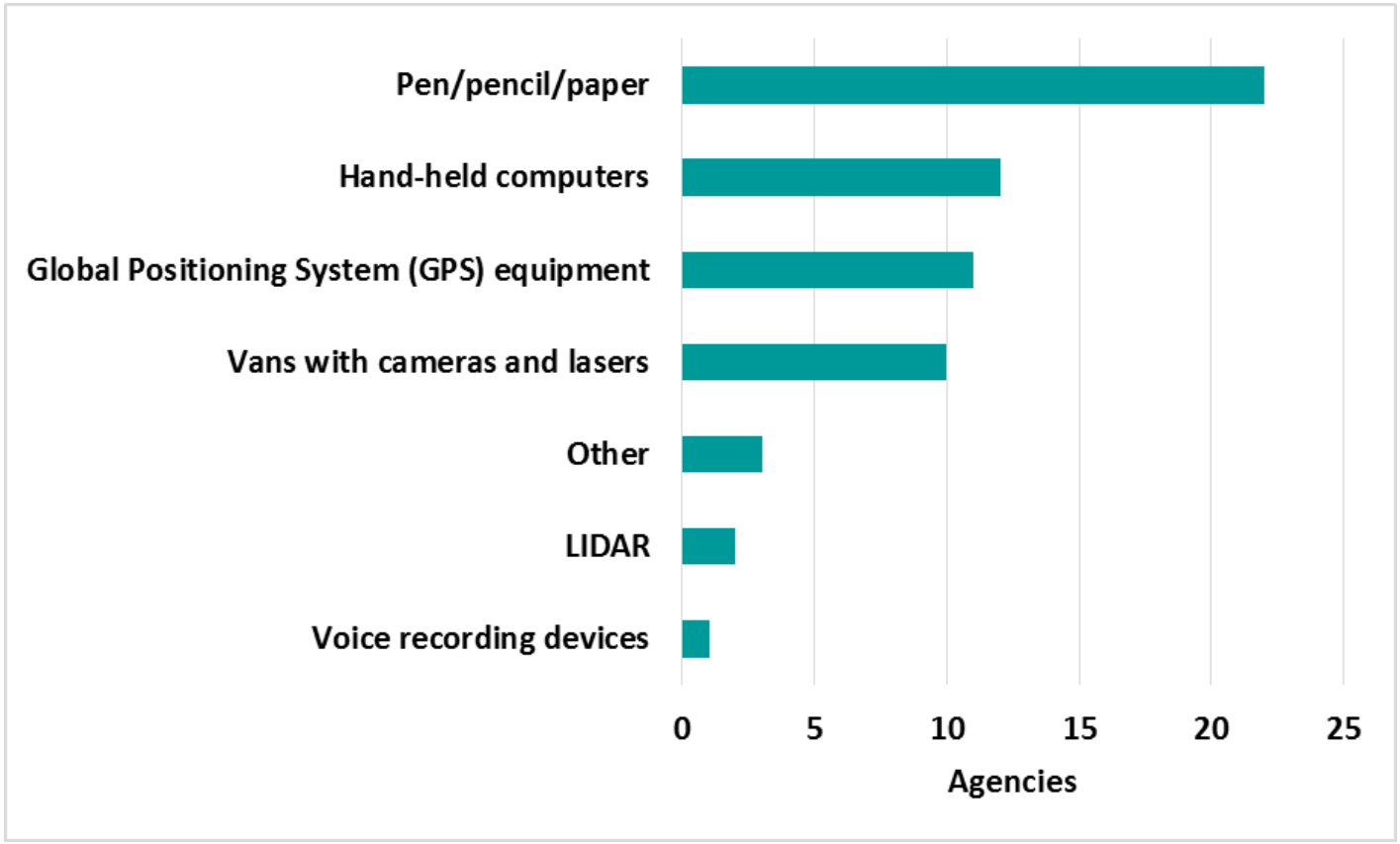
Findings - MQA Survey Approaches

- The majority of state DOTs rely on district or regional personnel to conduct surveys
- Annual surveys are most common



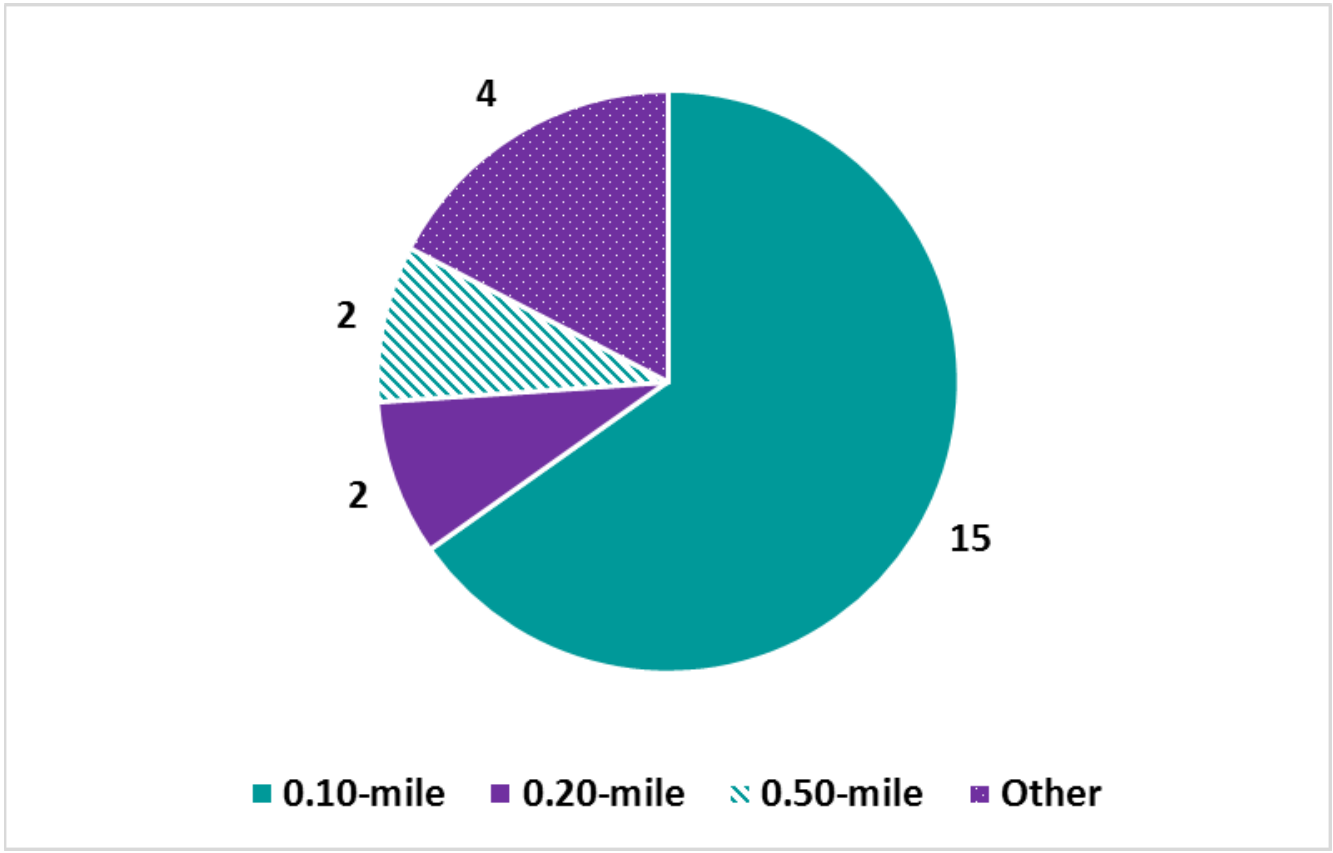
Findings - Type of Equipment Use

- Most states conduct manual surveys using low-tech tools for collecting MQA data



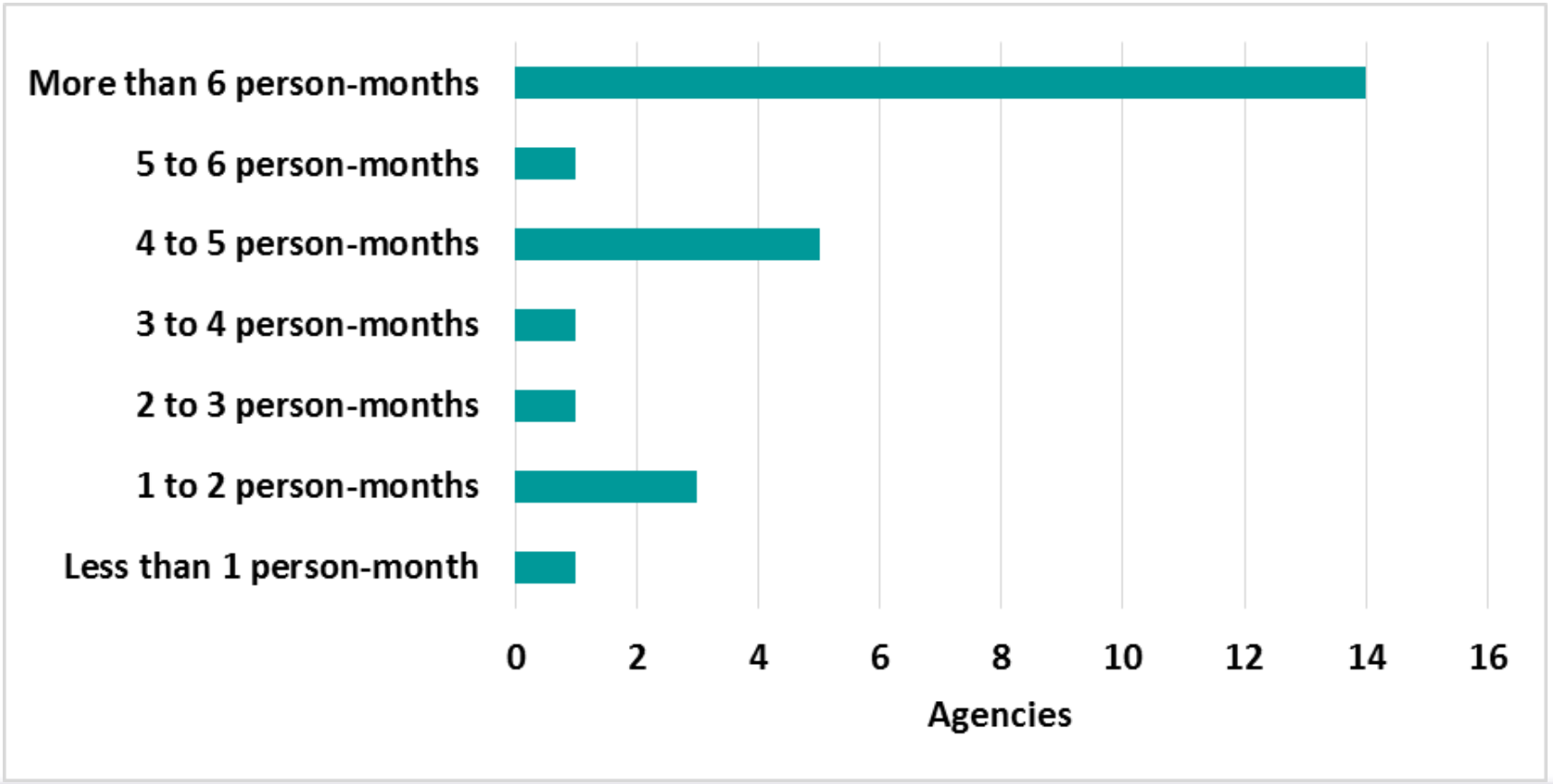
Findings - Sampling

- 23 of the 28 states use sampling
- Most states use 0.10-mile samples



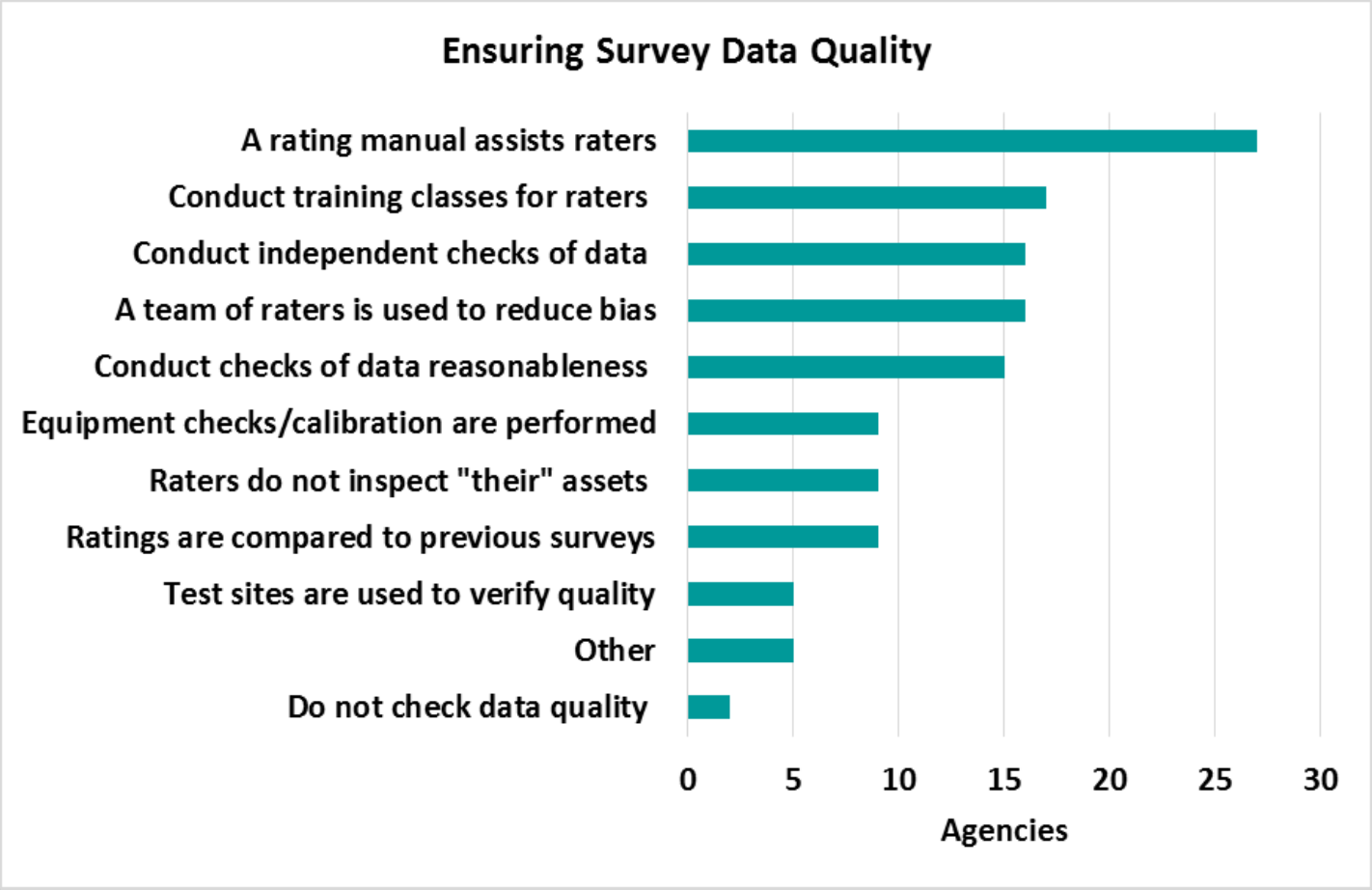
Findings – Resource Requirements

- The total number of samples inspected varies from 100 to 22,000 samples



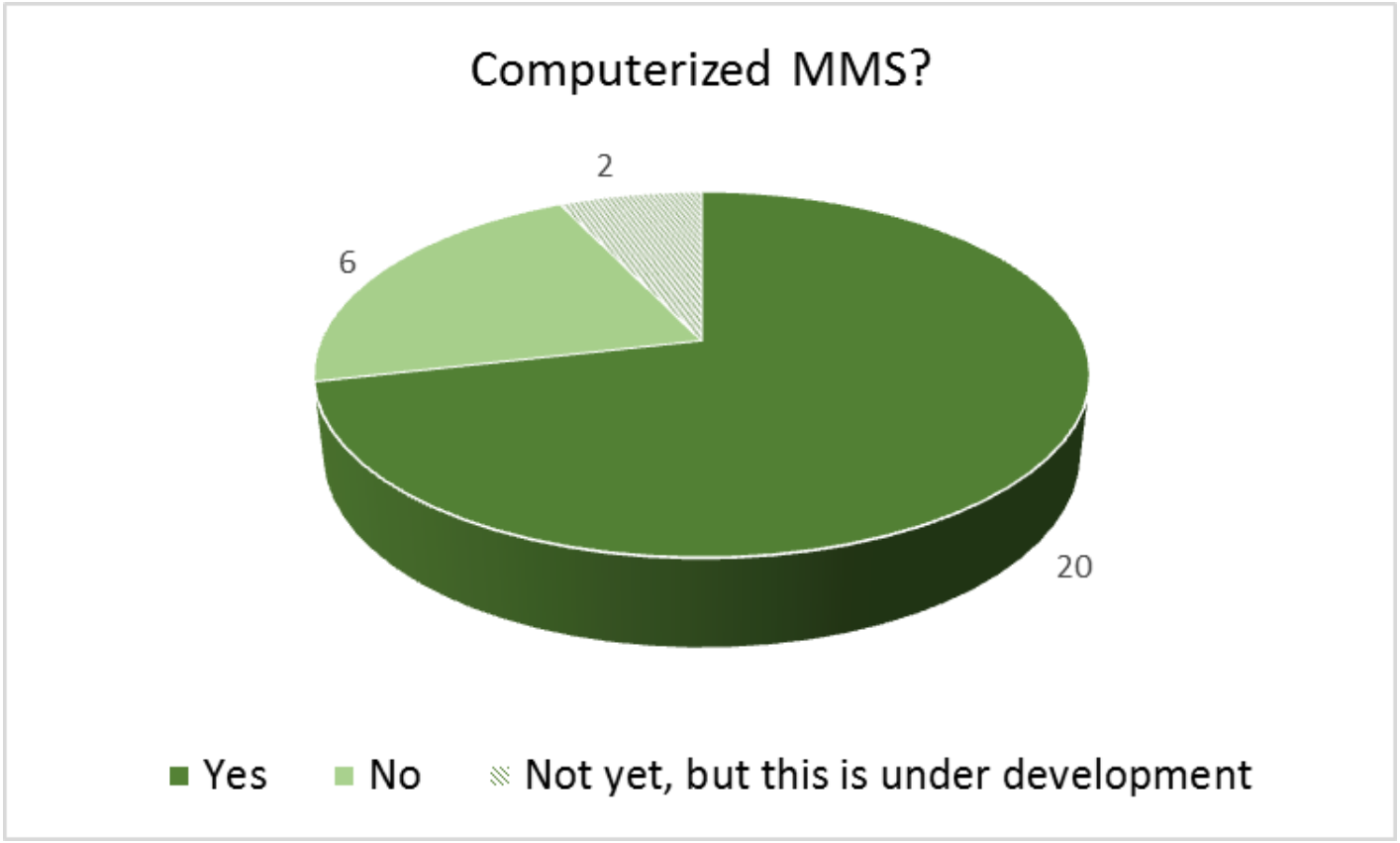
Findings – Methods Used to Ensure Quality

- Most states have procedures in place to ensure data quality



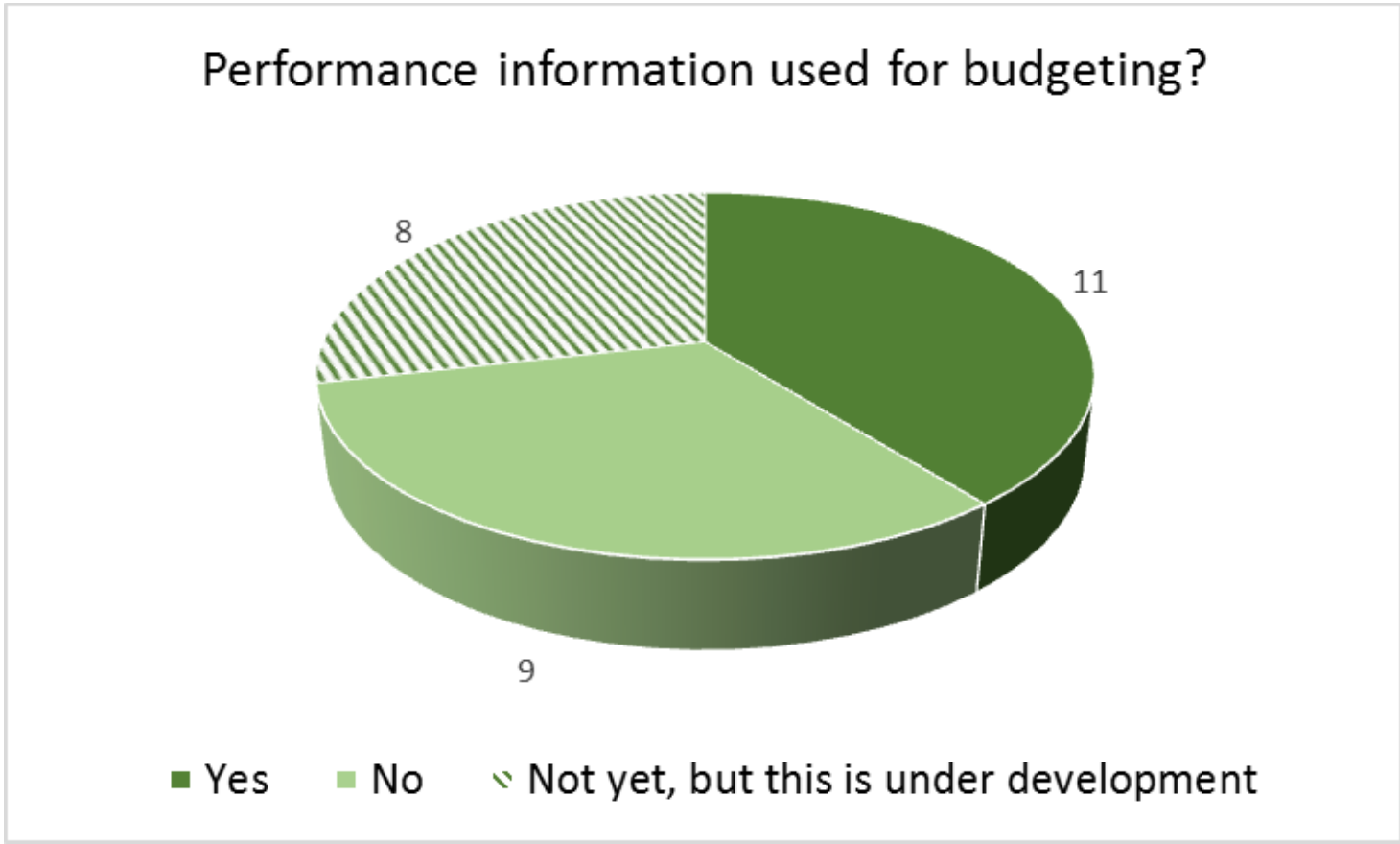
Findings – Availability of a MMS

- Most states with an MQA program have a computerized MMS in place



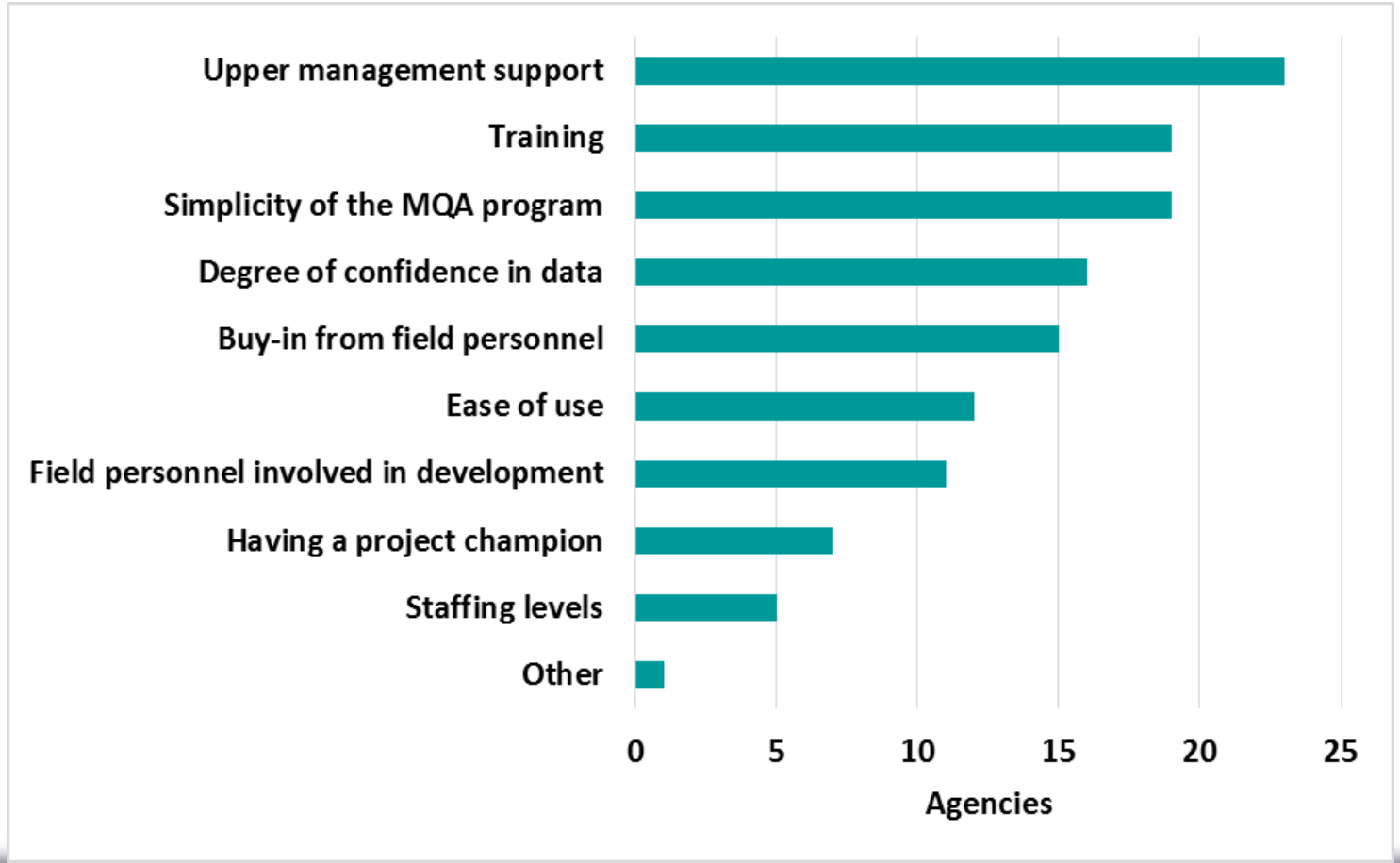
Findings – Use of MQA Data for Budgeting

- States are interested in using MQA data for budgeting activities



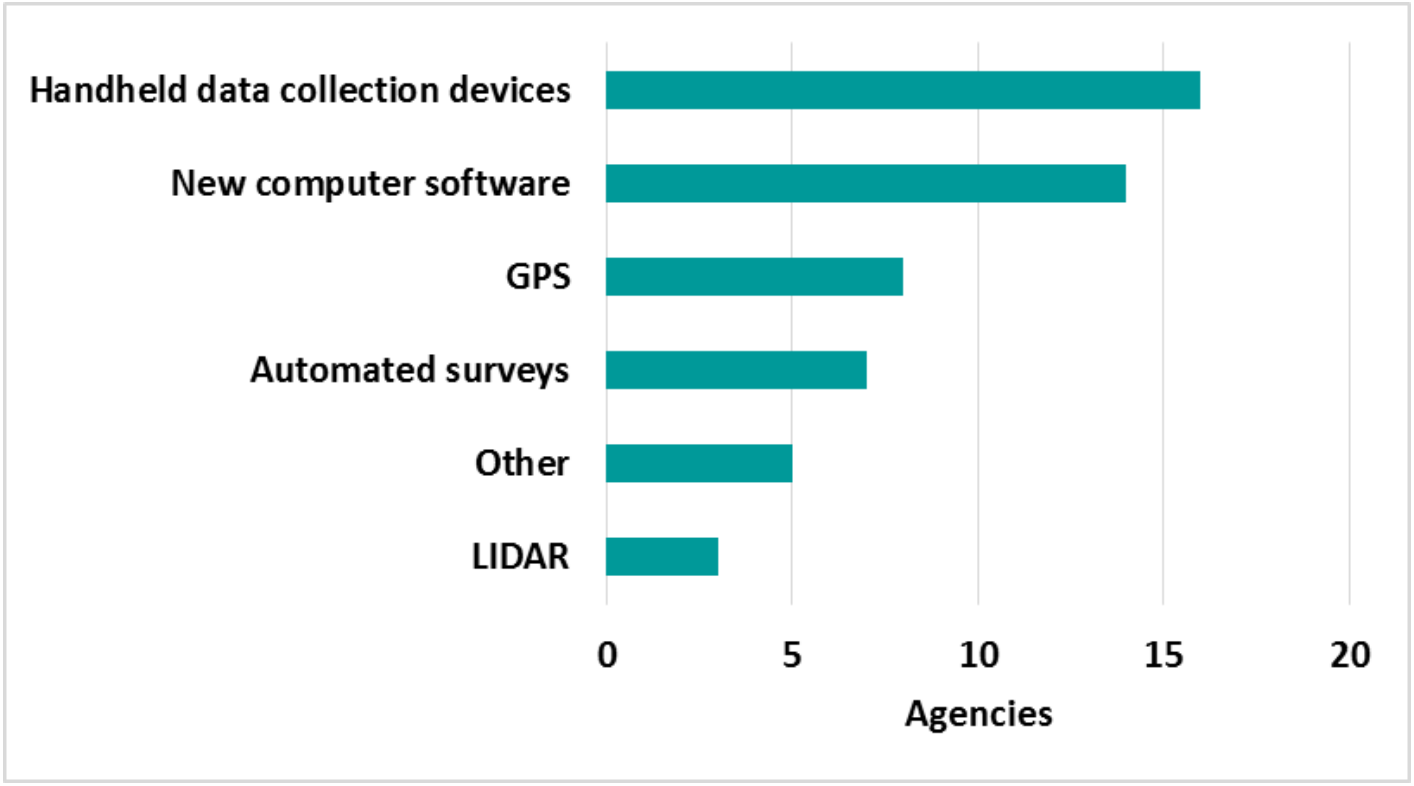
Findings – Keys to Success

- Upper management support is a key success factor



Findings – Initiatives and New Technology

- Many states are considering these new initiatives or technologies



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