# ANNOTATED QUESTIONNAIRE

The study was conducted for AARP’s Public Policy Institute via telephone by ICR, an independent research company. Interviews were conducted from July 9 – 15, 2008 among a nationally representative sample of 1006 respondents 50 years of age or older. The margin of error for total respondents is +/-3.09% at the 95% confidence level. More information about ICR can be obtained by visiting www.icrsurvey.com

<table>
<thead>
<tr>
<th>LC-1</th>
<th>How concerned are you about the recent rise in gas prices? Would you say you are…?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CONCERNED</td>
</tr>
<tr>
<td></td>
<td>NET</td>
</tr>
<tr>
<td>7/20/08</td>
<td>94</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LC-2</th>
<th>Have you modified your lifestyle in any of the following ways to accommodate for the high gas costs? Have you (INSERT ITEM)?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>a. Walked more frequently to get wherever you need to go</td>
<td>29</td>
</tr>
<tr>
<td>b. Limited your daily driving</td>
<td>67</td>
</tr>
<tr>
<td>c. Used public transportation (e.g. taking the bus or subway)</td>
<td>16</td>
</tr>
<tr>
<td>d. Rode a bicycle</td>
<td>15</td>
</tr>
<tr>
<td>e. Participated in carpools</td>
<td>13</td>
</tr>
<tr>
<td>f. Worked from home/teleworked</td>
<td>14</td>
</tr>
<tr>
<td>g. Cut back on other expenses</td>
<td>61</td>
</tr>
<tr>
<td>h. Postponed travel/vacations</td>
<td>46</td>
</tr>
</tbody>
</table>
LC-3  Cities and towns may have many features in their community that help make streets comfortable for all users including drivers, pedestrians, and bicyclists. For the most part, does your neighborhood have (INSERT ITEM)?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Don’t know</th>
<th>Refused</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Adequate sidewalks</td>
<td>61</td>
<td>39</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>b. Adequate bike accommodations (e.g., bike lanes or paths)</td>
<td>41</td>
<td>55</td>
<td>4</td>
<td>*</td>
</tr>
<tr>
<td>c. A comfortable place to wait for the bus</td>
<td>46</td>
<td>48</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>d. Accessible public transportation (e.g., bus, subway, train)</td>
<td>55</td>
<td>44</td>
<td>1</td>
<td>*</td>
</tr>
<tr>
<td>e. Intersections with safe crosswalks for pedestrians</td>
<td>59</td>
<td>39</td>
<td>2</td>
<td>*</td>
</tr>
<tr>
<td>f. A safe place for pedestrians to wait midway when crossing a wide street</td>
<td>48</td>
<td>47</td>
<td>4</td>
<td>*</td>
</tr>
<tr>
<td>g. Adequate street lighting</td>
<td>76</td>
<td>23</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>h. Adequate enforcement of posted speed limits</td>
<td>77</td>
<td>21</td>
<td>3</td>
<td>*</td>
</tr>
</tbody>
</table>

LC-4  Some cities and states across the country are implementing policies to ensure roads will be designed for all users, not only drivers, but also pedestrians, bicycle riders, and those using public transportation. How likely would you be to support such a policy in your community? Would you be…?

<table>
<thead>
<tr>
<th></th>
<th>LIKELY</th>
<th></th>
<th>NOT LIKELY</th>
<th></th>
<th>Don’t know</th>
<th>Refused</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NET</td>
<td>Extremely</td>
<td>Very</td>
<td>Somewhat</td>
<td>NET</td>
<td>Not very</td>
</tr>
<tr>
<td>7/20/08</td>
<td>78</td>
<td>22</td>
<td>34</td>
<td>22</td>
<td>18</td>
<td>8</td>
</tr>
</tbody>
</table>

LC-5  If the streets in your neighborhood were accommodating, how likely would you be to walk, ride a bike, or catch a bus to your destination? Would you be…?

<table>
<thead>
<tr>
<th></th>
<th>LIKELY</th>
<th></th>
<th>NOT LIKELY</th>
<th></th>
<th>Don’t know</th>
<th>Refused</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NET</td>
<td>Extremely</td>
<td>Very</td>
<td>Somewhat</td>
<td>NET</td>
<td>Not very</td>
</tr>
<tr>
<td>7/20/08</td>
<td>56</td>
<td>13</td>
<td>21</td>
<td>23</td>
<td>40</td>
<td>16</td>
</tr>
</tbody>
</table>

AM-1  Are you or your spouse or partner currently a member of AARP (IF NECESSARY: formerly known as the American Association of Retired Persons)?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Don’t know</th>
<th>Refused</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/20/08</td>
<td>45</td>
<td>54</td>
<td>*</td>
<td>1</td>
</tr>
</tbody>
</table>

For a full analysis of the survey results please see:

Skufca, Laura. *Is the Cost of Gas Leading Americans to Use Alternative Transportation?* AARP Knowledge Management, August 2008

http://www.aarp.org/research/housing-mobility/transportation/gas_costs.html
APPENDIX D

SUMMARY OF STATES’ PROGRESS IN IMPLEMENTING THE FHWA HANDBOOK

To determine the extent to which states, counties, and cities have implemented a variety of older driver safety projects based on certain design elements included in FHWA’s Highway Design Handbook for Older Drivers and Pedestrians, the following reports were reviewed.

- GAO Report to the Special Committee on Aging, U.S. Senate Older Driver Safety, GAO-07-413, April 2007
- NCHRP Synthesis 348: Improving the Safety of Road Users, 2005

The GAO report presents a fairly pessimistic view. When asked, “To what extent has your department invested resources in older driver safety projects?” 80 percent of the states reported little or no extent. However, a number of states have taken steps to accommodate the older driver through a number of categories, including signs and pavement markings, automated enforcement and traditional enforcement, signal operational changes, geometric and design changes, policy and education, and pedestrian and bicycle improvements. Within each category, several strategies specifically speak to the needs of accommodating all road users, including older drivers and older pedestrians. They are as follows:

Design

- Consider realigning intersections to 90 degrees to improve safety.
- Construct roundabouts.
- Construct offset left- and right-turn lanes.
- Construct exclusive left-turn lanes (with exclusive signal phases).

Signal Operations

- Improve signal timing by adding phases, lengthening clearance intervals, eliminating or restricting higher-risk movements, and coordinating signals.
- Prohibit right turns after a complete stop at a red traffic light.
• Install 12” LED signal heads.

Signs and Markings
• Call attention to intersections by installing rumble strips on intersection approaches.
• Improve intersection lighting.
• Install highly reflective sheeting on signs to improve legibility.

Pedestrian and Bicycle
• Increase length of signal timing at crosswalks.
• Construct median refuge islands.
• Use pedestrian countdown signals.
• Install sidewalks.
• Use audible pedestrian countdown signals.

Policy and Education
• Control and manage roadway access points, particularly in the vicinity of intersections, to reduce driver-pedestrian conflicts and improve traffic flow.
• Increase enforcement of intersection violations, such as red light running, with such as regulatory signs and cameras.
• Improve sight distances at both signalized and unsignalized intersections. For example, remove parking that restricts sight distance, and clear sight distance triangles of shrubs and trees.

States worthy of mention include California, Florida, Iowa, and Michigan.

California

The Transportation Safety Task Force was charged with incorporating components of the Federal Highway Administration’s “Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians” into state and local traffic engineering design manuals. The task force prioritized more than 125 recommendations that specifically assist older drivers (and all roadway users) for eventual introduction into California’s Manual on Uniform Traffic Control Devices and Caltrans HDM (Highway Development Manual). During 2006 the work group made presentations to the California Traffic Control Devices Committee (CTCDC), which approved almost all the recommendations for incorporation into the manuals. An example of such adoption includes the CTCDC-approved use of the 2.8’/second signal timing where older pedestrians are present.
Florida

Florida is recognized as a leader in making its roadways safe for older road users. The state identified short-term and long-term improvements as part of its 1991 Florida Elder Road User Program. Short-term improvements include:

- Reflective pavement markers
- Overhead street name signs
- Wider pavement markings
- Advance street name signs
- Improved pedestrian crossings
- Improved work zone safety

Long-term improvements include:

- Increasing sign visibility
- Providing advance notice
- Improving intersection design and operation

Iowa

The Iowa Department of Transportation has undertaken several initiatives to enhance the road environment for older drivers. They include:

- Using more durable pavement markings on selected roads and servicing all pavement markings on a performance-based schedule to maintain their brightness
- Adding paved shoulders with the edge line painted in a shoulder rumble strip to increase visibility and alert drivers when their vehicles stray from the travel lane
- Converting four-lane undivided roads to three-lane roads with a dedicated left-turn lane to simplify turning movements
- Encouraging the use of more dedicated left-turn arrows on traffic signals on high-speed roads
- Installing larger street name signs
- Replacing warning signs with ones that have fluorescent yellow background to increase visibility
- Converting to Clearview fonts on interstate signs to increase sign readability
- Demonstrating older driver and pedestrian-friendly enhancements on a roadway corridor in Des Moines
- Using the older driver as the “design driver” when designing Iowa roadways
Michigan

More than $27 million was spent upgrading intersections in the cities of Detroit and Grand Rapids. Changes have included:

- Brighter stop lights
- Bigger street name signs
- Brighter reflective markings
- Upgraded walk lights
- New left-turn lanes
- Brighter sign legends, high-visibility reflective sheeting for signs
- Enlarged fonts on guide signs
- Brighter warning signs
- Increased edge line and gore pavement markings
- Phase-in of 12” LED signal heads
FHWA DESIGN ELEMENT B. RECEIVING LANE (THROAT) WIDTH FOR TURNING OPERATIONS

Recommendation

One of the greatest challenges with implementing this recommendation is the fact that the land use context is not addressed. In most urban areas, the FHWA recommendation does not apply because additional travel lanes, bike lanes, or on-street parking provide the indirect benefit of additional throat width for a left-turning vehicle. In these areas, the standard should be refined to accommodate a 10’–11’ receiving lane with a 5’ bicycle lane adjacent to the receiving lane, wherever practical.

AASHTO Green Book, p. 312: In urban areas where pedestrian crossings, right-of-way, or existing development become stringent controls, the use of 11’ lanes is acceptable. Lanes 10’ wide are acceptable on low-speed facilities.

Recommendation

It may also be useful to specify that the 12’ receiving lane with 4’ shoulder recommendation is a rural standard and may be accompanied by “share the road” signage where bicycle activity is expected.

AASHTO Green Book, p. 100: Improvements such as the following, which generally are of low to moderate cost, can considerably enhance the safety of a street or highway and provide for bicycle traffic: paved shoulders.

AASHTO Green Book, p. 314: Where bicyclists and pedestrians are to be accommodated on the shoulders, a minimum usable shoulder width (i.e., clear of rumble strips) of 4’ should be used.

MUTCD, Section 2C.51: In situations where there is a need to warn drivers to watch for other slower forms of transportation traveling along the highway, such as bicycles, golf carts, horse-drawn vehicles, or farm machinery, a “Share the Road” W16-1) plaque may be used.

FHWA DESIGN ELEMENT C. CHANNELIZATION

Recommendation

If a channelized right turn is present in a pedestrian-oriented area, a raised curb is
recommended with an at-grade crosswalk to provide refuge for crossing pedestrians, rather than demarcating the channelization with surface paint alone.

AASHTO Green Book, p. 622: Under certain conditions, painted, flush medians and islands or traversable type medians may be preferable to the raise curb islands. These conditions include the following: lightly developed areas that will not be considered for access management; intersections where approach speeds are relatively high; areas where there is little pedestrian traffic

**Recommendation**

Contrast paint may be added to the curb side to make it more visible at all times of the day and under all driving conditions. The surface and sides of the median refuge should also be reflectively painted to increase visibility.

CSS, p. 141: Islands should be sufficiently large to command attention. … Medians expected to be used as pedestrian refuges should be surrounded by vertical curbs to delineate the pedestrian refuge from the surrounding roadway.

**Recommendation**

The driver’s cone of vision should be considered in designing the angle of a channelized turn. Pedestrian visibility to drivers should be the priority to keeping roadways safe and navigable.

CSS, p. 165: Place crosswalks so that a motorist has a clear view of pedestrians. A well-illuminated crossing point should be placed where drivers and pedestrians have good sight distance and can see each other in advance of the crossing point.

CSS, p. 166: If vehicle-pedestrian conflicts are a significant problem in the channelized right-turn lane, it might be appropriate to provide signing to remind drivers of their legal obligation to yield to pedestrians crossing the lane in the marked crosswalk. Regulatory signs such as “Turning Traffic Must Yield to Pedestrians” (R10-15) or warning signs such as “Pedestrian Crossing” (W11-2) could be placed in advance of or at the crossing location.

**Recommendation**

Tighter turn angles can reduce driver speeds and open the driver’s vision to the potential presence of a crossing pedestrian. In addition to reducing the likelihood of vehicle-pedestrian conflicts, tighter-angled channelized turns reduce the vehicle speed and the degree to which the driver’s head must turn left in order to look for oncoming traffic. These attributes are particularly important for older drivers.

CSS, p. 165: Provide a low-angle right turn (about 112 degrees). This angle slows down the speed of right-turning vehicles and improves driver visibility of pedestrians within and approaching the crosswalk.
**Recommendation**

Reducing the lane width of the approach lane for the channelized turn can also help to reduce vehicle speed.

CSS, pp. 165–66: Unless he turning radii of large vehicles, such as tractor-trailers or buses, must be accommodated, the pavement in the channelized right-turn lane should be no wider than 16’. For any width right-turn lane, mark edge lines and cross-hatching to restrict the painted width of the travel way of the channelized right-turn lane to 12’ to slow smaller vehicles.

**Recommendation**

Crosswalks should be located 15’–20’ behind the edge of the median on the receiving side to allow adequate space for a vehicle to stop and look left for oncoming traffic without blocking the path of pedestrians.

CSS, p. 165: Unless no other choices are available, the crossing point should not be placed at the point where right-turning drivers must yield to other vehicles and therefore might not be watching for pedestrians.

**Recommendation**

Landscaping low prickly shrubs along the curb will confine pedestrians to crossing at the safest location.

AASHTO Green Book, p. 96: Pedestrian actions are less predictable than those of motorists. Many pedestrians consider themselves outside the law in traffic matters, and in many cases, pedestrian regulations are not fully enforced. This makes it difficult to design a facility for safe and orderly pedestrian movements.

**Recommendation**

If at all possible, consideration should be given to removing channelization in urban and suburban settings, because of the potentially dangerous obstacles it can present to the older pedestrian.

CSS, p. 164: Avoid using channelized right-turn lanes where pedestrian activity is significant. If a channelized right-turn lane is unavoidable, use design techniques described to lessen the impact on pedestrians.

CSS, p. 165: Removing channelized right-turn lanes also makes it possible to use signing, such as “No Turn on Red” or turn prohibition signs.

CSS, p. 164: If an urban channelized right-turn lane is justified, design it for low speeds (5–10 mph) and high-pedestrian visibility.
**FHWA DESIGN ELEMENT E. OFFSET (SINGLE) LEFT-TURN LANE GEOMETRY, SIGNING, AND DELINEATION**

**Recommendation**

A solution that provides a benefit to both drivers and pedestrians would be to implement a phasing plan with a protected left-turn lag phase instead of providing positive offset for the left-turn lane. This would reduce the crossing distance for pedestrians, while providing an exclusive phase for drivers to make a left turn with no conflicts.

MUTCD, Section 4D.09: No movement that creates an unexpected crossing of pathways of moving vehicles or pedestrians should be allowed during any green or yellow interval, except when all three of the following conditions are met:

- The movement involves only slight conflict.
- Serious traffic delays are substantially reduced by permitting the conflicting movement.
- Drivers and pedestrians subjected to the unexpected conflict are effectively warned thereof by a sign.

**Recommendation**

Determining if left turns should be allowed during the general phase is dependent upon the context of the intersection. Generally, if opposing through vehicular traffic is heavy, or if opposing pedestrian volumes are high, it may be best to restrict left turns to the protected-only phase.

MUTCD, Section 4D.06: In areas having a high percentage of elderly drivers, special consideration may be given to the use of protected-only mode left-turn phasing, when appropriate.

**FHWA DESIGN ELEMENT G. CURB RADIUS**

**Recommendation**

In all cases, the context of the roadway and appropriate vehicle speed should be considered in determining the appropriate size of the curb radius for the particular condition where it is located. Smaller curb radii in the 10’–15’ range, combined with lower vehicle speeds, are useful traffic calming devices and are most appropriate in urbanized areas where there is a greater mixture of users sharing the roadway. This is true for small town and suburban mixed-use areas and any other areas where communities wish to encourage pedestrian and bicycle travel.

AASHTO Green Book, p. 621: Guidelines for right-turning radii into minor side streets
in urban areas usually range from 5’ to 30’ and most are between 10’ and 15’. Where a substantial number of pedestrians are present, the lower end of the ranges described below may be appropriate. Most passenger cars operating at very low speed on lanes 10’ or more in width are able to make a right turn with a curb radius of about 15’ with little encroachment on other lanes. However, operation of these vehicles at increased speeds or of larger vehicles even at a very low speed generally results in substantial encroachment on adjacent lanes at either the beginning or the end of the turn, or both.

**Recommendation**

A 25’ curb radius may be appropriate, however, for urban boulevards, parkways, and less urbanized areas where the dominant form of mobility is the automobile.

AASHTO Green Book, p. 614: The “Bus” and WB-50 design vehicles will encroach onto the opposing lanes in making a turn unless the turning radius is at least 25’ and parking is restricted at the far end of the turn for at least 40’ beyond the radius.

AASHTO Green Book, p. 621: To ensure efficient traffic operation on arterial streets carry heavy traffic volumes, it is desirable to provide corner radii of 15’–25’ for passenger vehicles and 30’–50’ for most trucks and buses, provided there are no significant pedestrian conflicts.

**Recommendation**

At this radius, a refuge island should be constructed whenever pedestrians are expected so that they may cross the street in two segments. In all cases, the designer should aim for the smallest curb radius possible with consideration given to the nearby land uses, design speed, and types of road users.

AASHTO Green Book, p. 619: Where larger radii are used, an intermediate refuge or median island is desirable, or crosswalks may need to be offset so that the crosswalk distances are not objectionable.

**FHWA DESIGN ELEMENT P. PEDESTRIAN CROSSING DESIGN, OPERATIONS, AND CONTROL**

**Recommendation**

According to the research conducted by ITE, reducing signal timing to accommodate a longer pedestrian clearance interval (PCI) using a walk speed of 3.5’/second would have minimal operational impacts in most cases. Increased vehicle delays would occur most often on the major street approaches, which tend to be wider and, thus, have longer crossing distances, requiring a longer PCI. A careful balance between the needs of pedestrians and drivers is necessary; attention to the context and operational capacity of the intersection is critical in determining pedestrian crossing time.
AASHTO Green Book, p. 97: Because pedestrians have a broad range of walking speeds, the speeds at which they may cross a street is significant in design. Average pedestrian walking speeds range from approximately 2.5 to 6.0/second. The Manual on Uniform Traffic Control Devices for Streets and Highways uses a normal walking speed of 4.0/second. Older people will generally walk at speeds in the lower end of this range.

**Recommendation**

The signals should be large enough to be clearly visible from the opposite side of the street and may be best when combined with an audible signal to assist persons with visual impairment with crossing the street.

MUTCD, Section 4E.04: Pedestrian signal head indications should be conspicuous and recognizable to pedestrians at all distances from the beginning of the controlled crosswalk to a point 3 m (10') from the end of the controlled crosswalk during both day and night.

MUTCD, Section 4E.06: The primary technique that pedestrians who have visual disabilities use to cross streets at signalized locations is to initiate their crossing when they hear the traffic in front of them stop and the traffic alongside them begin to move, corresponding to the onset of the green interval. This technique is effective at many signalized locations. The existing environment is often sufficient to provide the information that pedestrians who have visual disabilities need to operate reasonably safely at a signalized location. Therefore, many signalized locations will not require any accessible pedestrian signals.