

# Traffic Safety Facts

## Traffic Tech – Technology Transfer Series

# Final Report of Polypharmacy and Older Drivers: Identifying Strategies to Study Drug Usage and Driver Functioning Among Older Drivers

With the aging population and the number of older drivers increasing, there is concern that polypharmacy, taking multiple medications, might inhibit older people's ability to drive safely. To understand the best methodologies to research the effects of multiple medications on older driver functioning, the National Highway Traffic Safety Administration (NHTSA) contracted with TransAnalytics, LLC to conduct a literature review, a brainstorming session with subject matter experts, and focus groups with older drivers. Separate chapters describe the results of each project activity and provide guidelines for continuing research developed from these efforts. This report examines four questions on research methodology.

### QUESTION #1

***“What is our current understanding of the effects of drugs and combinations of medications on crash risk or involvement, and which should be the focus of continuing research on polypharmacy and driving functioning?”***

Building on earlier work that identified the most potentially driver impairing (PDI) drugs prescribed to older persons (see *Traffic Tech*, Number 301, 2006), this project narrowed the priorities for further study according to classes of drugs, not individual medications. With an emphasis on their exposure in the older population, as well as their pharmacological actions, the emerging recommendations for continuing study focus on alpha blockers and other medications used to treat high blood pressure (anti-hypertensives); sedating drugs such as the benzodiazepines, tricyclic antidepressants, and opioids; and drugs that affect blood sugar levels (anti-diabetic agents and drugs that could potentiate hypoglycemic effects).

### QUESTION #2

***“What are the most feasible and reliable means of measuring and monitoring drug usage—including over-the-counter drugs—by older drivers?”***

To obtain complete and reliable information from older persons about their medication regimes, several factors must simultaneously be addressed: concerns about the privacy and confidentiality of the information revealed; the personal security of older study participants; the credibility of the research team; and the overall goals of the study. The recommended approach is a form of the “brown bag” method, where an older research participant is asked to bring all of his/her medications (including over-the-counter drugs) to an office or other neutral location to be inventoried by an appropriate professional. Pharmacists (active or retired) are the best choice, although nurses also may have sufficient perceived authority and offer a strong “comfort level.” A member of the research team who can provide assurances of privacy and confidentiality also should be present during the brown-bag interview.

Most desirable is to employ multiple approaches for measuring/monitoring drug usage among older research participants. A recommended strategy is to complement the brown-bag review by accessing an administrative claims (pharmacy) database in which the research participant is enrolled. This will provide a historical record of the individual's (prescription) drug regime that can serve as a screen in participant recruitment, and provide a valuable point for confirming a participant's expected drugs and dosages during a specific study period.

### QUESTION #3

***“What are the most practical and valid ways of assessing the impact of drug use on actual driving performance?”***

Information about driving functioning can be obtained through direct measurements of performance behind-the-wheel, in either the participant’s own vehicle or an evaluator’s (dual control) vehicle, on either a closed course or in actual traffic. Simulated driving performance can be measured using a wide range of devices, from desktop units to fully interactive systems with motion platforms, high resolution, and a 360-degree field of view. Indirect measures of the effects of medications on driving performance can be made using clinical assessments of functional abilities most important for safe vehicle control. Each alternative approach has strengths and limitations.

A measurement methodology utilizing a combination of approaches is recommended to obtain the most complete understanding of the (potentially) impairing effects of multiple medications, at the highest comfort levels and the lowest perceived risk by study participants. These include clinical assessments of functional abilities, using computer-based methods, if feasible, to promote standardization in test administration and scoring, and to permit the use of specialized cognitive tests (e.g., processing speed) that require precise timing. In-vehicle assessment on a closed course with a properly qualified driving evaluation specialist is recommended, using a dual control vehicle, as a safety precaution, and a standardized protocol for observation of critical driving skills. To gain an understanding of how an older person performs in actual traffic conditions while using medications that he or she normally takes, instrumenting the individual’s own vehicle with a data collection package that can unobtrusively record key measures of performance without an experimenter present is also recommended.

### QUESTION #4

***“What are the potential barriers to the participation of older persons in studies of drug use and driving functioning, and how might they be overcome?”***

This project revealed a number of concerns among older prospective research subjects. The participation of community-dwelling older persons in studies of the effects of drugs on driving functioning will be encouraged by a strong assurance of confidentiality; individuals must remain anonymous in reports of the study’s findings, and every protection possible under applicable State law to shield an individual’s driving performance measures from being made available to a licensing authority must be provided. Informed consent procedures should specify to study participants all of the parties to whom the results of their driving evaluations may be made available.

In addition, the benefits of research participation, for individuals and for society, should be clearly explained. There appears to be a general willingness on the part of older persons queried in this project to become involved in research that can improve safety, even if it requires them to divulge information about the drugs they are taking and/or to have their driving performance evaluated. Fair compensation for the amount of time a participant must commit to the study—preferably in cash—also is important.

### Conclusions

These guidelines provide a framework within which to develop research designs for continuing empirical investigations into the effects of drugs on driving performance.

### How to Order

For a copy of *Final Report of Polypharmacy and Older Drivers: Identifying Strategies to Study Drug Usage and Driver Functioning Among Older Drivers* write to the Office of Behavioral Safety Research, NHTSA, NTI-130, 400 Seventh Street SW., Washington, DC 20590 or send a fax to 202-366-7096 or download [www.nhtsa.dot.gov](http://www.nhtsa.dot.gov). John Siegler, Ph.D. was the task order manager.

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