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February 23, 1998

NHTSA-98-3585-3

The Honorable Philip R. Recht
Deputy Administrator
NATIONAL HIGHWAY TRAFFIC
SAFETY ADMINISTRATION
400 Seventh Street, S.W., Room 5220
Washington, DC 20590

Dear Mr. Recht:

Re: **Settlement Agreement**
Section G. Impairment Research

Enclosed are proposed project descriptions and proposed Statements of Work for Year 3 for the following Section G. Impairment Research projects:

G.2 Self-Regulation as a Mechanism for Improving the Safety of Older Drivers
G.3 Understanding the Influence of Older Driver Disability on Mobility and Quality of Life
G.4 Improvement of Older Driver Safety Through Self-Evaluation
G.5 Reduction or Cessation of Driving Among Older Drivers
G.7 Factors Contributing to Premature Reduction or Cessation of Driving by Older Men and Women
G.8 Investigations of Crashes and Casualties Associated With Older Drivers

Please advise whether you concur in these proposed project descriptions and Statements of Work.

Sincerely,

David A. Collins
Attorney

c: James A. Durkin, Esq.

Enclosures

G. Impairment Research Projects - Year 3

2. Self-Regulation as a Mechanism for Improving the Safety of Older Drivers ($243,000)

The research effort will be continued. Visual processing deficits, including visual sensory impairment, slowed visual processing speed, and visual attention impairment, are associated with increased crash risk in older drivers. This project will conduct an intervention evaluation study to determine whether older drivers with visual processing deficits would avoid the most difficult and challenging driving situations, if made aware of these problems, thereby reducing their crash risk. The study will have a pre/post design with random assignment to the treatment and usual care control groups. Subjects in the treatment group will be visually and cognitively assessed, and through a carefully structured curriculum, will be educated about how identified impairments could impact driving performance, and how self-regulation could improve their safety. The usual care group will be provided information about visual processing impairment and its ramifications for everyday life, as typically provided by ophthalmologists and optometrists. Approximately 100 to 200 subjects will be enrolled per group. This study could demonstrate that a practical and inexpensive intervention of at-risk older drivers--namely informing them of visual processing limitations, including their ramification for driving, and suggesting ways to promote safety through self-regulation--may lead older drivers to self-regulate driving in such a fashion as to lower crash risk yet preserve mobility. The long-term goal of this research is to assist older drivers in staying on the road as long as it is safely possible for them to do so.

3. Understanding the Influence of Older Driver Disability on Mobility and Quality of Life ($204,000)

The research effort will be continued. A comprehensive survey will be conducted to understand older driver self-regulation measures undertaken and the impact such measures have on the total travel patterns and feelings of independence and autonomy. The survey methodology will include objective and attitudinal questions, as well as a travel diary. Older drivers will be surveyed and divided into four groups. Participants in three of the groups will receive interventions consisting of one of the following: (1) personalized information from a respected medical professional; (2) self-assessment instruments; or (3) older driver training courses. Participants in the fourth group will receive no intervention. All participants will be surveyed one year after the intervention to determine if any aspects of the driving task, travel decisions or travel patterns changed. Results will be

used to evaluate the effectiveness of the three intervention strategies and to develop programs to improve driver behavior without reducing mobility and independence.

4. Improvement of Older Driver Safety Through Self-Evaluation ($212,000)

The research effort will be continued. The major aim of this project is to assist older drivers in evaluating their own capabilities, thereby enabling them to make informed judgments about the kinds of driving they may undertake safely and to enhance their performance where possible. A literature review, the convening of a panel of experts, and focus groups will be used to determine what driving abilities can be reliably self-assessed. Assessment procedures will be determined through the literature review, expert panel, and focus groups. A self-assessment instrument will be developed, pilot tested with older drivers, and revised. The instrument will then be validated with older drivers in various performance measures. Further instrument revision, field-testing, and final completion of the self-assessment instrument will be done. At the end of the project, an instrument will be available for use by older drivers to assess their own driving and to provide a basis for informed judgments regarding safe driving decisions and/or measures to enhance performance.

5. Reduction or Cessation of Driving Among Older Drivers ($247,000)

The research effort will be continued. Older drivers are generally reluctant to give up driving, but circumstances, such as deterioration of physical and cognitive abilities and loss of confidence, may cause them to reduce or stop driving. Individuals vary widely and the phenomenon of driving reduction and cessation is not well understood. This research will address why and when older drivers stop driving, the factors that contribute to their decision to reduce or stop driving, and the differences between the genders in the reduction or cessation of driving. The driving cessation process will be explored through a series of focus groups of older drivers who are still driving, those who have stopped driving in the past two years, and adult children of older drivers and former drivers. Findings from the focus group interviews will be used to develop a questionnaire and a list of variables to be assessed. Samples for a telephone survey will be drawn from appropriate populations in two states which differ in climate conditions. The survey will include questions on past driving experience, crash history, confidence in driving ability, present driving patterns, health status, availability of alternatives for transportation, and other topics relating to driving reduction or cessation. Survey data will be analyzed by gender to identify relationships between various factors and driving reduction behavior. Focus groups will be conducted to help interpret the survey findings.

7. Factors Contributing to Premature Reduction or Cessation of Driving by Older Men and Women ($134,000)

The research effort will be continued. This project will identify the range of factors contributing to driving reduction or cessation by each gender and will explore which of the factors identified are most amenable to remediation through adaptive devices, vehicle design, rehabilitation, exercise and wellness, or education. The project will also examine the potential benefits to be derived from interventions to counteract premature reduction or cessation of driving.

8. Investigations of Crashes and Casualties Associated With Older Drivers ($105,000)

The research effort will be continued. This project will systematically examine the at-fault crashes and related injuries associated with older drivers using a variety of data sources over a ten-year historical time period. The analysis will use detailed crash data from North Carolina. FARS and GES (General Estimated System) data will also be utilized to contrast the findings from North Carolina with those seen nationally. This project will also analyze data in the North Carolina driver history file to examine cumulative crash and violation records of a sample of drivers 65 and older with a comparison of drivers age 45 to 64 to further examine at-fault crash involvement rates over a four-year period.

Project G.2

Statement of Work

Year 3

GM/DOT Project Number, Title and Budget:

G.2 Self-Regulation as **a** Mechanism for Improving the Safety of Older Drivers

($243,000)

Project Description:

The research effort will be continued. Visual processing deficits, including visual sensory impairment, slowed visual processing speed, and visual attention impairment, are associated with increased crash risk in older drivers. This project will conduct an intervention evaluation study to determine whether older drivers with visual processing deficits would avoid the most difficult and challenging driving situations, if made aware of these problems, thereby reducing their crash risk. The study will have a pre/post design with random assignment to the treatment and usual care control groups. Subjects in the treatment group will be visually and cognitively assessed, and through a carefully structured curriculum, will be educated about how identified impairments could impact driving performance, and how self-regulation could improve their safety. The usual care group will be provided information about visual processing impairment and its ramifications for everyday life, as typically provided by ophthalmologists and optometrists. Approximately 100 to 200 subjects will be enrolled per group. This study could demonstrate that a practical and inexpensive intervention of at-risk older drivers--namely informing them of visual processing limitations, including their ramification for driving, and suggesting ways to promote safety through self-regulation--may lead older drivers to self-regulate driving in such a fashion as to lower crash risk yet preserve mobility. The long-term goal of this research is to assist older drivers in staying on the road as long as it is safely possible for them to do so.

GM Project Manager: Annette L. Irwin, Ph.D.
GM Safety Research
Mail Code 480-I 03-001
30500 Mound Road
Warren, MI 48090-9055

Principal Investigator: Cynthia Owsley, Ph.D.
Department of Ophthalmology
School of Medicine
University of Alabama at Birmingham
Birmingham, AL 35294-0009

Research Plan: This is a continuation of a project started in the second year of the settlement agreement. The tasks to be undertaken in the third year of the settlement agreement are:

1. Recruitment and initial screening of study subjects.
2. Referral of subjects to an eye care specialist for a comprehensive eye exam.
3. Assignment of subjects into one of the two study groups.
4. Conducting educational intervention with the treatment group.
5. Conducting 6- and 12-month follow-up interviews.
6. Piloting of an autologger device as an objective measure of driving mobility.

Expected Results: It is expected that this study could demonstrate that **a** practical and inexpensive intervention aimed at at-risk drivers -- namely informing them of visual processing limitations and promoting self-regulation of driving habits -- may lead to older drivers adjusting their driving in such a **way** to enhance their safety. In terms of the design of the study, more evidence of self-regulation (e.g., avoiding challenging driving situations) and a reduction in crash risk is expected in the intervention group as compared to the usual care group. The outcomes/products of this project are expected to include a curriculum and training manual for eye care specialists and their staffs to promote self-regulation of driving among visually impaired older adults, a pamphlet which eye care specialists can distribute to patients with visual processing impairments, and publication in a professional journal and/or presentation at a professional meeting.

Allocation of Budget: It is estimated that $241,020 will be spent for the work performed at the University of Alabama at Birmingham, and the balance will be for the work performed by the GM Project Manager.

Expected Duration: This project is expected to end in Year 5 of the GM/DOT Settlement Agreement.

Project G.3

Statement of Work

Year 3

GM/DOT Project Number, Title and Budget:

G.3 Understanding the Influence of Older Driver Disability on Mobility and Quality of Life ($204,000)

Project Description:

The research effort will be continued. A comprehensive survey will be conducted to understand older driver self-regulation measures undertaken and the impact such measures have on the total travel patterns and feelings of independence and autonomy. The survey methodology will include objective and attitudinal questions, as well as a travel diary. Older drivers will be surveyed and divided into four groups. Participants in three of the groups will receive interventions consisting of one of the following: (1) personalized information from a respected medical professional; (2) self-assessment instruments; or (3) older driver training courses. Participants in the fourth group will receive no intervention. All participants will be surveyed one year after the intervention to determine if any aspects of the driving task, travel decisions or travel patterns changed. Results will be used to evaluate the effectiveness of the three intervention strategies and to develop programs to improve driver behavior without reducing mobility and independence.

GM Project Manager: Annette L. Irwin, Ph.D.
GM Safety Research
Mail Code 480-I 03-001
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Principal Investigator: Sandra Rosenbloom, Ph.D.
The Drachman Institute
The University of Arizona
819 E. First Street
Tucson, AZ 85721

Research Plan: This is a continuation of a project started in the second year of the settlement agreement. The tasks to be undertaken in the third year of the settlement agreement are:

1. Continue to use survey instruments and travel diaries with new respondents continually taken into the project, to identify self-regulatory behaviors of older drivers.

2. Continue to divide new respondents into four groups and provide three types of interventions, a different one for each of the three groups (the fourth group will be the control); each intervention is designed to improve driver performance and awareness of difficulties in the driver task.
3. Contact all respondents mid-year to remind them that they will be re-surveyed at the end of one year.
4. Survey all second year respondents one year after their intervention in order to determine if their travel patterns have changed, and/or if they are employing more or different self-regulatory measures.
5. Prepare an initial assessment (based on before and after of Year 2 respondents) of the impact of various intervention strategies on older driver behavior.

Expected Results: It is expected that the proposed research will indicate what compensating measures older drivers might take to address declining physical skills, how those measures translate into changes in their total travel patterns, and the effectiveness of three major types of intervention strategies in making older drivers aware enough of potential driving problems to induce them to adopt self-regulatory measures/behavior. With this information, the research is expected to indicate the best way to induce a range of older drivers to adopt potentially effective self-regulatory measures, measures which themselves have the fewest negative implications for the overall mobility and ultimately quality of life of older drivers. The outcomes/products of this project are expected to include programs for improving driver behavior, publication in a professional journal and/or presentation at a professional meeting.

Allocation of Budget: It is estimated that $202,644 will be spent for the work performed at the Drachman Institute of the University of Arizona, and the balance will be for the work performed by the GM Project Manager.

Expected Duration: This project is expected to end in Year 5 of the GM/DOT Settlement Agreement.

Project G.4

Statement of Work

Year 3

GM/DOT Project Number, Title and Budget:

G.4 Improvement of Older Driver Safety Through Self-Evaluation ($212,000)

Project Description:

The research effort will be continued. The major aim of this project is to assist older drivers in evaluating their own capabilities, thereby enabling them to make informed judgments about the kinds of driving they may undertake safely and to enhance their performance where possible. A literature review, the convening of a panel of experts, and focus groups will be used to determine what driving abilities can be reliably self-assessed. Assessment procedures will be determined through the literature review, expert panel, and focus groups. A self-assessment instrument will be developed, pilot tested with older drivers, and revised. The instrument will then be validated with older drivers in various performance measures. Further instrument revision, field-testing, and final completion of the self-assessment instrument will be done. At the end of the project, an instrument will be available for use by older drivers to assess their own driving and to provide a basis for informed judgments regarding safe driving decisions and/or measures to enhance performance.

GM Project Manager: Annette L. Irwin, Ph.D.
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Warren, Ml 48090-9055

Principal Investigator: Jean Shope, Ph.D.
University of Michigan Transportation Research Institute
2901 Baxter Road
Ann Arbor, Ml 48109-2150

Co-Principal Investigator:

David W. Eby, Ph.D.
University of Michigan Transportation Research Institute
2901 Baxter Road
Ann Arbor, Ml 48109-2150

Research Plan: This is a continuation of a project started in the second year of the settlement agreement. The tasks to be undertaken in the third year of the settlement agreement are:

1. Complete the analysis of older driver focus group discussion content.
2. Identify several potential self-assessment instruments. Rank the concepts in terms of ease of self administration, cost of administration, and other factors. Generate a framework for a self-assessment instrument.
3. Develop a pilot self-assessment instrument. Pilot test and revise the instrument.
4. Begin to validate the self-assessment instrument with older drivers for a variety of performance measures.

Expected Results: It is expected this project will create an instrument for use by older drivers to assess their own driving and to provide a basis for informed judgments regarding safe driving decisions and/or measures to enhance performance. Additional outcomes/products of this project are expected to include publication in a professional journal, a technical report, and/or presentation at a professional meeting.

Allocation of Budget: It is estimated that $210,000 will be spent for the work performed at the University of Michigan Transportation Research Institute, and the balance will be for the work performed by the GM Project Manager.

Expected Duration: This project is expected to end at the end of Year 5 of the GM/DOT Settlement Agreement.

Project G.5

Statement of Work

Year 3

GM/DOT Project Number, Title and Budget:

G.5 Reduction or Cessation of Driving Among Older Drivers ($247,000)

Project Description:

The research effort will be continued. Older drivers are generally reluctant to give up driving, but circumstances, such as deterioration of physical and cognitive abilities and loss of confidence, may cause them to reduce or stop driving. Individuals vary widely and the phenomenon of driving reduction and cessation is not well understood. This research will address why and when older drivers stop driving, the factors that contribute to their decision to reduce or stop driving, and the differences between the genders in the reduction or cessation of driving. The driving cessation process will be explored through a series of focus groups of older drivers who are still driving, those who have stopped driving in the past two years, and adult children of older drivers and former drivers. Findings from the focus group interviews will be used to develop a questionnaire and a list of variables to be assessed. Samples for a telephone survey will be drawn from appropriate populations in two states which differ in climate conditions. The survey will include questions on past driving experience, crash history, confidence in driving ability, present driving patterns, health status, availability of alternatives for transportation, and other topics relating to driving reduction or cessation. Survey data will be analyzed by gender to identify relationships between various factors and driving reduction behavior. Focus groups will be conducted to help interpret the survey findings.

GM Project Manager: Annette L. Irwin, Ph.D.
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Principal Investigator: Jean Shope, Ph.D.
University of Michigan Transportation Research Institute
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Co-Principal Investigator:

Lidia P. Kostyniuk, Ph.D.
University of Michigan Transportation Research Institute
2901 Baxter Road
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Research Plan: This is a continuation of a project started in the second year of the settlement agreement. The tasks to be undertaken in the third year of the settlement agreement are:

1. Complete the analysis of the older driver focus group discussion content.
2. Complete development of an instrument for telephone interview of older drivers and former drivers. Pilot test and revise the survey instrument.
3. Develop an instrument for telephone interview of adult children of older drivers and former drivers. Pilot test and revise the survey instrument.
4. Finalize the sampling plan.
5. Conduct the telephone interviews.

Expected Results: It is expected that this project will provide a better understanding of the factors which influence older individuals' decisions to reduce or cease driving. The outcomes/products of this project are expected to include a publication in a professional journal and/or a presentation at a professional meeting.

Allocation of Budget: It is estimated that $245,000 will be spent for the work performed at the University of Michigan Transportation Research Institute, and the balance will be for the work performed by the GM Project Manager.

Expected Duration: This project is expected to end in Year 5 of the GM/DOT Settlement Agreement.

Project G.7

Statement of Work

Year 3

GM/DOT Project Number, Title and Budget:

G.7 Factors Contributing to Premature Reduction or Cessation of Driving by Older Men and Women ($134,000)

Project Description:

The research effort will be continued. This project will identify the range of factors contributing to driving reduction or cessation by each gender and will explore which of the factors identified are most amenable to remediation through adaptive devices, vehicle design, rehabilitation, exercise and wellness, or education. The project will also examine the potential benefits to be derived from interventions to counteract premature reduction or cessation of driving.

GM Project Manager: Annette L. Irwin, Ph.D.
GM Safety Research
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Principal Investigator: Jane C. Stutts, Ph.D.
Highway Safety Research Center
University of North Carolina
730 Airport Road, Bolin Creek Suite 300
Chapel Hill, NC 27599-3430

Research Plan: This is a continuation of a project started in the second year of the settlement agreement. The tasks to be undertaken in the third year of the settlement agreement are:

1. Continue to identify and review literature on factors associated with reduction or cessation of driving by older men and women, attempts at remediation, and potential benefits from counteracting premature driving reduction or cessation. Review surveys employed in other older driver studies and identify areas of overlap.
2. Conduct two additional focus groups in the Raleigh-Durham area targeting a subgroup of women who have reduced or ceased driving, although they have no clear medical reason for not driving. Discussion topics will include whether they enjoyed driving, were comfortable with perceived changes in the driving environment (increased congestion, increased heavy truck traffic, more complex intersections and interchanges, faster speeds, and lack of courtesy by other drivers), have a close individual willing to drive them, and have readily available alternative

transportation. Possible economic constraints on car ownership will also be discussed.

3. Drawing from the results of the focus groups and the detailed literature review, develop a national telephone survey to gather information on the prevalence of factors contributing to driving reduction and cessation among those age 65 and above, and the likelihood that intervening could counteract premature driving reduction or cessation.
4. Ask panel members of the project to review and provide input to the survey questionnaire.
5. Pilot test the survey on a sample of 20 older adults. Modify and reevaluate the survey as needed.
6. Conduct a national telephone survey with a target goal of 2500 completed interviews with men and women ages 65 and older.
7. Conduct an in-depth driving evaluation of several of the women recruited for the focus groups described in task 2. During the hour-long behind-the-wheel evaluation, the instructor will provide specific feedback on the individual's driving strengths and weaknesses. The instructor will discuss with the individual whether the evaluation indicates either that the driver should not resume driving, or resume driving only after appropriate preparation, such as additional instruction and/or training. Follow-up interviews will be used to determine the women's reactions to the program and its likely impact on their driving.
8. Compile and analyze the survey data. Present results at appropriate forums and prepare one or more papers for publication in a professional journal.

Expected Results: It is expected that the results of the focus groups will yield qualitative information on factors that contribute to premature reduction or cessation of driving by older men and women. The focus groups will also help to identify those factors that have the greatest potential for remediation. These results will feed directly into the nationwide telephone survey, which will yield national prevalence data on the prevalence of risk factors for premature driving reduction or cessation, along with information on the importance of driving to the elderly and the potential benefits to be derived from selected interventions to counteract premature driving reduction or cessation. The outcomes/products of this project are expected to include publication in a professional journal and/or presentation at a professional meeting.

Allocation of Budget: It is estimated that $132,000 will be spent for the work performed at the University of North Carolina, and the balance will be for the work performed by the GM Project Manager.

Expected Duration: This project is expected to end about the end of Year 4 of the GM/DOT Settlement Agreement.

Project G.8

Statement of Work

Year 3

GM/DOT Project Number, Title and Budget:

G.8 Investigations of Crashes and Casualties Associated With Older Drivers ($105,000)

Project Description:

The research effort will be continued. This project will systematically examine the at-fault crashes and related injuries associated with older drivers using a variety of data sources over a ten-year historical time period. The analysis will use detailed crash data from North Carolina. FARS and GES (General Estimated System) data will also be utilized to contrast the findings from North Carolina with those seen nationally. This project will also analyze data in the North Carolina driver history file to examine cumulative crash and violation records of a sample of drivers 65 and older with a comparison of drivers age 45 to 64 to further examine at-fault crash involvement rates over a four-year period.

GM **Project Manager:** Annette L. Irwin, Ph.D.
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Warren, MI 48090-9055

Principal Investigator: Donald W. Reinfurt, Ph.D.
Highway Safety Research Center
University of North Carolina
730 Airport Road, CB #3430
Chapel Hill, NC 27599-3430

Research Plan: This is a continuation of a project started in the second year of the settlement agreement. The tasks to be undertaken in the third year of the settlement agreement are:

1. Complete the contingency table analysis and the logistic/log linear modeling of the North Carolina accident data for the period 1987-96. The driver and environmental factors that have been found to be most strongly associated with at-fault crashes involving older drivers will be incorporated into the final models for predicting the distribution of older driver crashes by fault and severity.
2. Link the accident (1987-96) data with the driver history file data so that driver fault for the crashes on each driver's record can be assessed on the basis of contributing factors (or violations) indicated on the accident reports.

3. Develop models for the probability of crashes and at-fault crashes per licensed driver as a function primarily of driver age, gender, race, and population density.
4. Apply the results of the North Carolina crash data analysis to explore the 1987-96 FARS data and the 1988-96 GES data. This will involve fitting new models to the national data and comparing results.
5. Utilize the 1995 National Personal Transportation Survey (NPTS) data to develop refined mileage crash rates by age and other characteristics available in the NPTS.
6. Examine at-fault indications from the police report ("contributing circumstances" and "driver charged") to the court records (convictions) as a function of driver age, accident type, rural/urban location, etc. The conviction information is available in the driver history data.
7. Use North Carolina's unique narrative search computer system to examine special problems with older drivers such as "problems with rear and side view mirrors." There is a wealth of computerized police officer narrative descriptions for examining such issues.

Expected Results: It is expected that estimates of the numbers of crash involvements for a given population of older drivers based on the distribution by age, gender, and area of residence of these drivers will be developed. Fault prediction models will also be developed. Models will be evaluated at multiple time points to estimate how the predictions are changing over time.

Information concerning characteristics of older driver crash involvements and relationships between these characteristics, crash fault, and injury will be developed. The analyses will also examine how these characteristics have been changing over time. Models developed will also provide estimates of the numbers and proportions of at-fault and not at-fault crashes by levels of injury severity given an overall number (or projected number) of crash involvements.

The results of these analyses will feed directly into the subject areas that would be investigated in the second phase of this project, namely a comparison of the North Carolina results with national findings using FARS and GES (General Estimates System) data. The outcomes/products of this project are expected to include publication in a professional journal and/or presentation at a professional meeting.

Allocation of Budget: It is estimated that $100,000 will be spent for the work performed at the University of North Carolina, and the balance will be for the work performed by the GM Project Manager.

Expected Duration: This project is expected to end in Year 5 of the GM/DOT Settlement Agreement.