

FIREARM INJURY PREVENTION

REPORT OF THE SPECIAL PANEL TO EVALUATE THE QUALITY OF RESEARCH ON FIREARM INJURY PREVENTION SUPPORTED BY THE NATIONAL CENTER FOR INJURY PREVENTION AND CONTROL CENTERS FOR DISEASE CONTROL AND PREVENTION

Report to the

**Science and Program Review Work Group
Advisory Committee on Injury Prevention and Control
National Center for Injury Prevention and Control
Centers for Disease Control and Prevention
United States Public Health Service
Atlanta, Georgia**

November 1995

CENTERS FOR DISEASE CONTROL FACSIMILE TRANSMISSION

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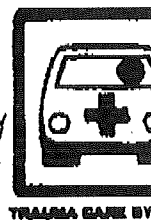
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Final - Lincum Report

DATE

11-13-95

NUMBER OF PAGES:

16

SUBJECT:

**Report of the Special Panel to Evaluate
The Quality of Research on Firearm Injury Prevention
Supported by the
National Center for Injury Prevention and Control
Centers for Disease Control and Prevention**

SUMMARY

A Special Panel of the Federal Advisory Committee on Injury Prevention and Control was charged with reviewing past and current activities of the National Center for Injury Prevention and Control's (NCIPC) extramural research grants focused on firearm injury prevention. The Panel found that despite the constraints of limited resources and the relative newness of the overall injury control program at the Centers for Disease Control and Prevention (CDC), the efforts of NCIPC in firearm injury prevention are laudable. These efforts have contributed to an increased public awareness of firearm injuries as a preventable public health problem and to the application of public health research methods as a way of gaining scientific understanding of firearm injury cause and prevention.

I. BACKGROUND AND INTRODUCTION

This report presents findings and recommendations related to firearm injury prevention research that is supported by grants from the National Center for Injury Prevention and Control (NCIPC) of the Centers for Disease Control and Prevention (CDC).

It is important to note that NCIPC does not have a specific "firearm injury prevention program." NCIPC provides funding for state-based surveillance systems and extramural research focused on the broad field of injuries--both intentional and unintentional. Inevitably, some portion of that effort is focused on intentional and unintentional firearm injury, since such injuries are such a larger part of the overall problem of fatal and non-fatal injuries. But CDC includes the study of firearm-related injury prevention within the broader context of injury prevention that also encompasses injuries associated with automobile crashes, water vehicles, drownings, falls, and domestic violence, among others. This special review only addresses that portion of CDC's overall injury prevention program that deals with research on firearm injury prevention.

The NCIPC has an Advisory Committee for Injury Prevention and Control (ACIPC), the members of which are external to CDC and appointed by the Director, CDC. The Advisory Committee provides programmatic oversight and advice to the NCIPC Director. As part of its usual processes, the Advisory Committee convened a Special Panel of experts to examine the Center's current extramural research activities related to firearm injury prevention. The Panel was specifically asked to review and report on both the process of announcing grant opportunities, proposal review, and grant awards, as well as the products, that is, the quality of the resulting research and publications. The panel also was charged with making specific recommendations to strengthen extramural research related to firearm injury prevention.

The Panel met in Atlanta on July 3, 1995. Panel members representing various relevant disciplines were Philip Cook, Ph.D. (Economics); Jennifer Kelsey, Ph.D. (Epidemiology); Mark Moore, Ph.D. (Criminal Justice); and Alvin R. Tarlov, M.D. (Health Promotion), Chair. The members' institutional affiliations and addresses are listed in Appendix A. Thomas Bartenfeld, Acting Executive Secretary, ACIPC, coordinated the Panel's activities.

Before their 1-day meeting, Panel members received and reviewed a substantial body of information related to NCIPC-funded firearm injury prevention research. It included background information on the extramural grant program, program announcements, applications submitted for firearm injury prevention grants, reports from grantees, and publications that resulted from NCIPC-supported research on firearm injuries. Additional information was made available by staff at the request of the panel. Panel members concluded that all of the relevant information was accessible to them. Following the meeting in Atlanta, the Panel reviewed several drafts of the report, added some material, and refined the report over a 4-month period. The outcomes of the Panel's deliberations form the body of this report and will be presented to the ACIPC at its fall meeting in November 1995.

II. DEVELOPMENT OF CDC'S ROLE IN FIREARM INJURY PREVENTION RESEARCH

A. Evolution of CDC's Activity in Injury Prevention and Control

For more than 20 years, CDC has studied injuries as potentially preventable causes of disability and death. In 1983, Congress mandated a study to review the impact of injuries. The National Academy of Sciences (NAS) conducted this review, which culminated in the landmark 1985 report, *Injury in America*. The report recommended that CDC play a national leadership and coordinating role in injury research, and in 1986, a new Division of Injury Epidemiology and Control was created in the Center for

Environmental Health. This organization was elevated to the status of National Center for Injury Prevention and Control (NCIPC) in 1992 and was designated the lead federal agency to carry out a national injury research and prevention program. The Director of NCIPC was appointed in 1993.

NCIPC's mission encompasses both the prevention of unintentional and intentional injuries, as well as the consequences of those injuries related to acute care, disability, and rehabilitation. The Center's blend of research and programs is built on the public health model that begins with the health impact of disease or injury (surveillance) and envisions a systematic approach to prevention based on identifying the causes and evaluating preventive interventions. Exhibit A shows a graphic model of the public health approach to injury prevention that has been widely adopted by public health organizations worldwide.

B. NCIPC's Extramural Research Program in Injury Prevention and Application Review Process

The Office of Research Grants, NCIPC, directs a program for extramural research in injury prevention using three different grant types:

- Individual Research Grants (RO1s),
- Research Program Project Grants (RPPGs), a collection of related research projects having a common theme or conceptual framework, and
- Injury Control Research Centers (ICRCs), university-based centers that conduct research on a range of topics and also serve as training centers for injury control professionals.

Program announcements requesting grant proposals are developed by NCIPC with review by the ACIPC Science and Program Review Work Group. Grant applications submitted in response to the announcements undergo a rigorous evaluation by the Injury Research Grants Review Committee, a study section chartered by the U.S. Department of Health and Human Services to review to grant proposals for scientific merit and relevance to injury control. This process is identical to that used by the National Institutes of Health and other federal agencies. (See section III B for a more detailed description of the grants process.)

C. Extramural Research Related to Firearm Injury Prevention

Six categories are specified for RO1 grants in the broad field of injury prevention: intentional injury, epidemiology, prevention, biomechanics, acute care, and rehabilitation. There is no specific category set aside for firearm-related research; rather, it is conducted within the category of intentional injury. Over the past 7 years, several grant proposals related to firearm injury prevention have been awarded, but the total amount expended for that purpose accounts for less than 5% of the total NCIPC budget. (In addition, a portion of NCIPC's budget supports intramural research, and less than 10% of that budget goes to firearm injury prevention, all of it related to surveillance and epidemiology.) Extramural research grant funding related to firearms injury prevention is shown in Exhibit B.

III. PANEL'S FINDINGS AND RECOMMENDATIONS

A. General

It is important to note that injury prevention is a young field, firearm-related research within the context of a public health model is just starting, and NCIPC is a new center. Further, experts in the fields of public health, criminal justice, and medicine are only now coming together to forge a conceptual and programmatic model for prevention of intentional injuries involving firearms. Given that context, the panel commends NCIPC for designing and implementing its extramural research program in a relatively short time.

With respect to firearm-related injuries, NCIPC has expanded the scope of issues and added to the research methods used in the field. In that way, the Center's efforts add to and complement the work that has been contributed over the years by researchers in the field of criminal justice.

Even with the combined efforts from the fields of public health and criminal justice, the research on firearm injury is not commensurate with the size of the problem and the difficulties of undertaking research in this domain. For example, firearm-related injuries are the second leading cause of death for young people aged 10-24 and are among the top ten causes of death in every age category from age 1 to age 64 (see Exhibit C). In 1991 there were 38,317 deaths from firearm-related injuries. Firearm-related deaths in 1991 comprised the fourth leading cause of years of potential life lost before age 65 (see Exhibit D). Compared to other urgent health problems such as cancer, heart disease, stroke and HIV infection for which the annual research budgets can be expressed in billions of dollars a year, the less than \$1 million a year expended for firearm-related research seems paltry.

Although support from CDC and the National Institute for Justice (NIJ) for firearm injury prevention is useful, the amounts are extremely small, and funds for this purpose are not provided by other federal agencies, philanthropic foundations, or private sources. Although to date CDC's and NIJ's firearm injury prevention research programs are complementary and non-duplicative, the only way to assure that the two agencies continue to complement each other with work in this field is to develop a plan with clear objectives for further research by each agency. It is vital to continue to expand research on firearm injury prevention and to link the approaches used by the public health and criminal justice communities.

The panel noted that the number of applications and the number of awards granted in firearms injury are lamentably low, probably because potential applicants are discouraged by the small amount of money available. Mechanisms to overcome this deficiency should be developed.

B. Process of Awarding Grants in the Field of Injury Prevention

Description of the Process

The process of announcing and awarding funds for RO1 and RPPG research in injury prevention and control, including firearm-related research, consists of several steps:

- The NCIPC extramural research grant project officer develops each year's grant Program Announcement, with input from each of the Divisions and Offices in the Center. The draft announcement is then reviewed by the Science and Program Review Work Group of the ACIPC.

The Program Announcements include program priorities, number of grants to be awarded, eligibility, maximum award size, instructions for application, date for proposal submission, and date of award. The Program Announcements are relatively broad with respect to the areas of research to be funded. All grant proposals are investigator-initiated; that is, researchers develop their own research topics within the broad scope of interests expressed in the Program Announcement.

- The first level of grant application review is performed by staff of NCIPC and Procurement and Grants Office, CDC, staff to assure that the proposal research is responsive to the Program Announcement.
- The second level of review, for scientific and technical merit, is carried out by the Injury Research Grant Review Committee (IRGRC). The IRGRC is chartered through the U.S. Department of Health and Human Services (DHHS), and its

members are all non-governmental researchers who have been approved by DHHS, CDC, and the Director, NCIPC. IRGRC members' expertise covers the entire spectrum of injury control research in prevention of intentional and unintentional injuries, acute care, rehabilitation, and biomechanics. Depending on a particular application, expertise of the IRGRC may be supplemented by consultants. Members of the IRGRC have term limits and are encouraged to recuse themselves if they are reviewing in an area where there might be any conflict of interest. The reviewers provide summary statements (equivalent to the NIH "pink sheets") and score each proposal, indicating their recommendations for award.

- The third level of review, of those applications that are recommended by the IRGRC for further consideration, is then conducted by the ACIPC. The purpose of the ACIPC review is to consider available funds, extramural research program balance, and program priorities, as well as technical merit in making funding recommendations to the Director of NCIPC.

The ratio of awards to applications in injury prevention overall is low--only about 1 in 10 applications is funded. The strong response to injury prevention research grant announcements is both positive, suggesting a keen interest in this field, and also discouraging, in that many worthy applications are not funded. Potential future applicants are discouraged when they learn of the high rejection rate. In contrast to grant applications in the area of injury prevention as a whole, the requests for funding related to firearm injury have been few.

Findings

The basic process of grant review and award for injury research supported by the NCIPC deserves high marks. The process is in harmony with the institutionalized scientific process in the United States for awarding research funding, with review at multiple phases--both inside and outside of the funding agency--and the extensive use of scientific peers. The process has an appropriate concern for potential conflicts of interest. Although all grant review processes have imperfections, and peer review has some shortcomings, overall, the system devised to bring outside professional advice to bear on research funding is well accepted, considered to be fair, and functions remarkably well.

Participants in the scientific review of the grant proposals are professionals who are well regarded in their respective fields. However, the peer review has lacked representation from criminologists and could be strengthened by the addition of scientists whose research spans the broadest diversity of approaches to firearm injury prevention.

The field of firearm injury prevention research poses special challenges for a number of reasons: it is a new and evolving area of research; it can touch sensitivities that are fundamental to American values; it is politically sensitive; and it often seeks to forge a partnership between the domains of public health and criminal justice. For those reasons, it is important to assure that the process is open, that specific topics studied are broad and foster the greatest possible breadth of applicants to help build the field to assure diversity of viewpoints, and that the research is at a high standard consistent with what is expected of American science. The Panel's recommendations are intended to further develop the field of firearm-related research by clarifying research goals, broadening dissemination of the grant announcements, fostering more diversity in the reviewer group, and revising the funding levels of individual grants to provide some smaller grants for new investigators.

Recommendations on Process

Grant Announcements:

Recommendation 1. Use language that is more easily understood, attractive, and exciting.

Recommendation 2. Consider involving firearm research experts from other federal agencies (National Institute of Justice, Bureau of Alcohol, Tobacco, and Firearms) in conceptualizing the announcements to provide added dimensions and a broader framework to the field.

Recommendation 3. Include a conceptual framework of injury cause and prevention upon which hypotheses can be made by applicants in their construction of fresh research approaches that probe fundamental causes.

Recommendation 4. Expand dissemination of announcements beyond the Federal Register. Consider using targeted mailing lists (Internet and other means) to evoke the interest of a broader pool of potential applicants.

Recommendation 5. Increase the number of small grants, even at the expense of reducing the number and amounts of large grants (such as Research Program Project Grants), to expand the number of scientists working on firearm-related injuries and to diversify the contextual frameworks.

Recommendation 6. Consider eliminating the requirement of a past record of publication in firearm-related injuries as a condition required for application.

Recommendation 7. Be more specific in the Program Announcement about the process of evaluating grant applications, especially the use of a study section and the third level of review by the ACIPC.

Recommendation 8. Consider modifying the application process to require a brief letter of intent as the first step. This could be followed by selection of a small number of applicants to submit a full grant application. This system would be more efficient from the applicants' point of view and might broaden the appeal to potential entrants to the field and thus promote diversity of applicants, while at the same time conserving the time of applicants whose approaches are unlikely to be funded.

Application Review Process:

Recommendation 9. Maintain the current three-level review process for grant applications.

Recommendation 10. Broaden representation of study section to include those with expertise in criminal justice and others whose scientific approaches span the broadest diversity of approaches to firearm injury prevention.

Award Process:

Recommendation 11. Emphasize a wider range of award sizes--many smaller to encourage young investigators, but some larger--to foster more comprehensive research projects for primary new data collection that do not have to rely on existing data collected for other purposes.

Recommendation 12. Shift some funding from Research Program Project Grants to RO1 grants to increase the number of investigators, if funds are not available from other budgetary sources for that purpose.

C. Quality of Research Products

Discussion of the Products

Extramural research conducted by several of the NCIPC-funded investigators has been published in prestigious, peer-reviewed, widely circulated journals, such as *The New England Journal of Medicine*, *the Journal of the American Medical Association*, *the Journal of the American Public Health Association*, *the Annual Review of Public Health*,

the American Journal of Epidemiology, the Journal of Preventive Medicine, and Health Affairs. This is one certain indicator that the research is of high quality and consistent with the scientific standards of the American scientific community.

Findings

Quite apart from the quality of research, the general level of productivity (with a single, possible exception) of the individual grantees has been high.

Despite the modest level of funding, NCIPC-funded extramural research on firearm injury has opened new areas of inquiry, provided opportunities to apply public health research methodology, and raised public awareness of the issue of firearm-injury prevention. Specific findings follow.

- The research illuminates the role of firearms in injuries other than homicide; guns also play substantial roles in unintentional injuries, suicides, and domestic violence.
- The firearm-related research supported by CDC uses innovative methodology that makes use of data and techniques not widely used previously in this field. Examples include using data from emergency rooms, information on non-fatal firearm injuries, and case-control methodology and other epidemiologic methods.
- NCIPC's research in the area of firearm injury has been successful in keeping the issues of guns, violence, and the prevention of firearm-related injuries in the minds of the medical community, an important constituency for legitimating the effort and for implementing some important interventions.

However, critical issues around causal factors and implementation of effective prevention programs need to be addressed.

- On the key question of the degree of instrumentality of guns as a contributor to violence (the percentage of homicides, suicides and accidents that would occur even in the absence of guns), the research has not yet provided a definitive answer. The challenge remains to disentangle the effect of the instrument of death (guns) from the intentions of those who wield the gun and from other background causes. "Disentanglement" is a key need upon which public policy formulation and other interventions depend.
- Research also has been limited, unfortunately, on devising new interventions and assessing the effectiveness of interventions to prevent firearm-related injuries.

The amount and quality of firearms-related research conducted by the Injury Control Research Centers has been limited and has not yet resulted in significant publications, even though the ICRCs have been highly productive in other domains of injury prevention.

In summary, although the products of the CDC-supported research on firearm injury prevention have not been perfect or definitive, they have added to our understanding of the field--a reasonable outcome for a young and modest research program.

Recommendations on Quality of Research Products

Recommendation 13. Continue to foster communication between researchers in the fields of public health and criminal justice researchers.

Recommendation 14. Continue to support research to disentangle the relative roles of intention, instrumentality, and circumstances in firearm injury.

Recommendation 15. Foster more research on evaluating and developing new interventions to prevent firearm-related injuries.

Recommendation 16. Encourage the Injury Control Research Centers to devote attention to research and training on firearm injury prevention.

Recommendation 17. Foster more collaborative funding with other federal agencies, e.g., National Institute of Justice, and with philanthropic foundations to amplify the research effort, to attract more scientists for firearm injury prevention, and to train more epidemiologists in this field.

Public Health Approach

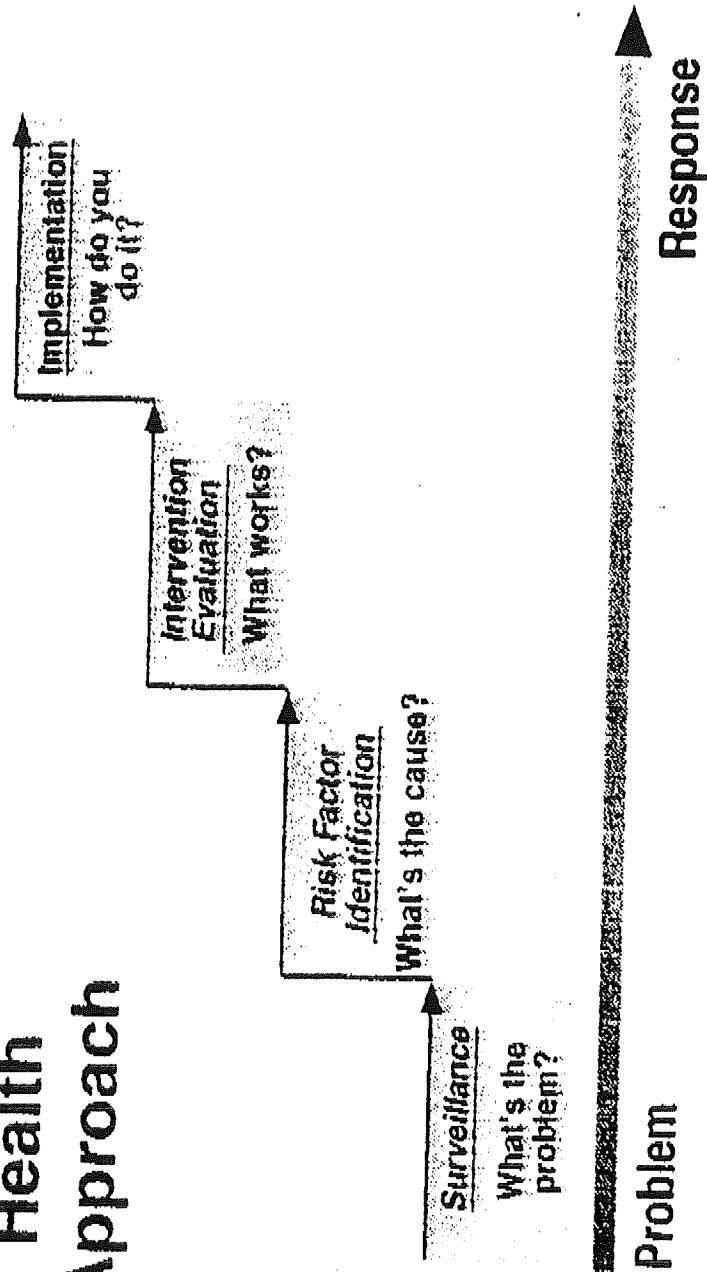


Exhibit A

Exhibit B

**NCIPC Extramural Research Funding
Related to Firearm Injury Prevention 1989-1994**

| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|-----------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| RO1/firearm-related | \$379,596 | \$454,453 | \$442,102 | \$637,909 | \$459,115 | ---- |
| RPPG/firearm-related | -- | --- | --- | \$150,000 | \$378,298 | \$648,296 |
| ICRC firearm-related* | * | * | * | * | * | * |
| Totals | \$379,596 | \$454,453 | \$442,102 | \$787,909 | \$837,413 | \$648,296 |

RO1: Individual research grants

RPPG: Research program project grants

ICRC: Injury Control Research Centers

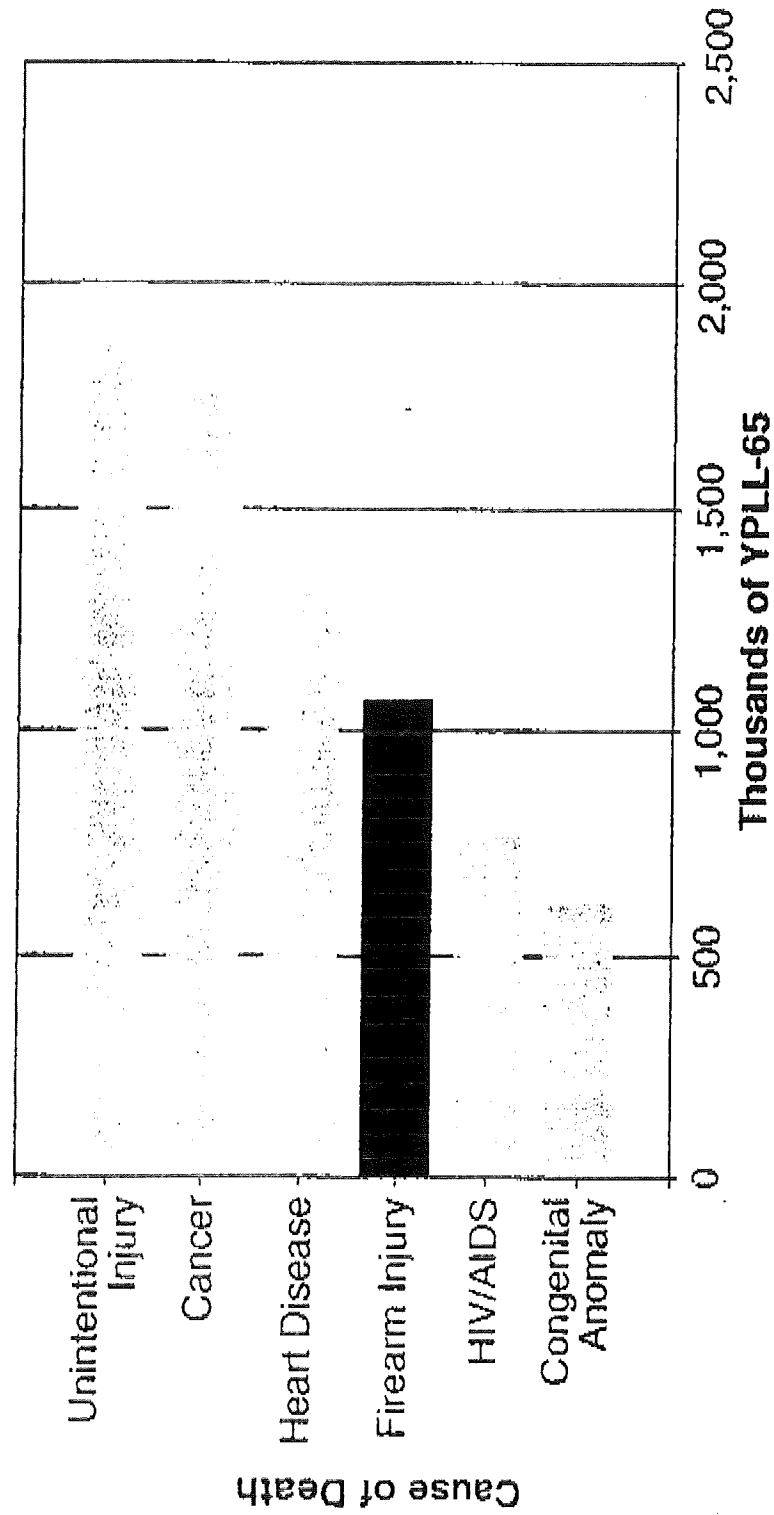
* Although \$5-7 M has been awarded yearly to Injury Control Research Centers (ICRC) since 1989, none of the ICRCs has a research program in firearm-related injury prevention. Firearm-related research funding in the ICRCs has been practically zero.

10 Leading Causes of Death by Age Group - 1991

| Rank | Age Groups | | | | | | | | | | Total |
|------|------------------------------------|---------------------------------|--------------------------------------|--------------------------------------|----------------------------------|----------------------------------|----------------------------------|---|--|--|--|
| | <1 | 1-4 | 5-9 | 10-14 | 15-24 | 25-34 | 35-44 | 45-54 | 55-64 | 65+ | |
| 1 | Congenital Anomalies 7,685 | Unintentional Injuries 2,665 | Unintentional Injuries 1,739 | Unintentional Injuries 1,921 | Unintentional Injuries 15,278 | Unintentional Injuries 14,774 | Malignant Neoplasms 16,909 | Malignant Neoplasms 39,922 | Malignant Neoplasms 94,195 | Heart Disease 597,267 | Heart Disease 720,862 |
| 2 | SIDS 5,349 | Congenital Anomalies 871 | Malignant Neoplasms 580 | Firearm Injuries 614 | Firearm Injuries 10,502 | HIV 9,488 | Heart Disease 12,397 | Heart Disease 30,374 | Heart Disease 74,985 | Malignant Neoplasms 354,768 | Malignant Neoplasms 514,657 |
| 3 | Short Gestation 4,139 | Malignant Neoplasms 526 | Congenital Anomalies 279 | Malignant Neoplasms 526 | Malignant Neoplasms 1,814 | Firearm Injuries 9,455 | HIV 12,259 | Unintentional Injuries 7,137 | Bronchitis Emphysema Asthma 10,432 | Cerebro-vascular 125,139 | Cerebro-vascular 143,481 |
| 4 | Respiratory Distress Synd 2,569 | Non-Firearm Homicide 357 | Heart Disease 128 | Congenital Anomalies 208 | Non-Firearm Suicide 1,642 | Malignant Neoplasms 5,319 | Unintentional Injuries 11,752 | HIV 4,728 | Cerebro-vascular 9,744 | Bronchitis Emphysema Asthma 76,412 | Bronchitis Emphysema Asthma 90,650 |
| 5 | Maternal Complications 1,536 | Heart Disease 332 | Firearm Injuries 94 | Heart Disease 153 | Non-Firearm Homicide 1,445 | Heart Disease 3,425 | Firearm Injuries 6,189 | Cerebro-vascular 4,720 | Diabetes 7,011 | Pneumonia & Influenza 68,962 | Unintentional Injuries 89,347 |
| 6 | Placenta Cord Membranes 962 | Pneumonia & Influenza 207 | Non-Firearm Homicide 86 | Non-Firearm Suicide 109 | Heart Disease 990 | Non-Firearm Suicide 2,914 | Liver Disease 3,591 | Liver Disease 4,450 | Unintentional Injuries 6,556 | Diabetes 36,528 | Pneumonia & Influenza 77,860 |
| 7 | Unintentional Injuries 961 | HIV 155 | HIV 69 | Non-Firearm Homicide 93 | HIV 613 | Non-Firearm Homicide 2,272 | Non-Firearm Suicide 2,740 | Firearm Injuries 3,690 | Liver Disease 6,047 | Unintentional Injuries 26,444 | Diabetes 48,951 |
| 8 | Perinatal Infections 881 | Perinatal Period 140 | Pneumonia & Influenza 68 | Bronchitis Emphysema Asthma 78 | Congenital Anomalies 449 | Liver Disease 858 | Cerebro-vascular 2,530 | Diabetes 3,034 | Pneumonia & Influenza 3,736 | Nephritis 17,963 | Firearm Injuries 38,317 |
| 9 | Pneumonia & Influenza 607 | Firearm Injuries 93 | Bronchitis Emphysema Asthma 44 | Pneumonia & Influenza 67 | Pneumonia & Influenza 256 | Cerebro-vascular 813 | Non-Firearm Homicide 1,511 | Bronchitis Emphysema Asthma 2,337 | Firearm Injuries 2,701 | Athero-sclerosis 16,588 | HIV 29,555 |
| 10 | Intrauterine Hypoxia 599 | Septicemia 91 | Benign Neoplasms 39 | Cerebro-vascular 52 | Cerebro-vascular 219 | Pneumonia & Influenza 759 | Diabetes 1,553 | Pneumonia & Influenza 1,738 | Nephritis 1,695 | Septicemia 15,888 | Liver Disease 25,429 |

Exhibit C

Years of Potential Life Lost Before Age 65 Leading Causes of Death, U.S. 1991



NCHS underlying cause of death files

Exhibit D

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APPENDIX A

