

**NJCSCR 2008**



# NEW JERSEY COMMISSION ON SPINAL CORD RESEARCH

Annual Report State Fiscal Year 2008



Jon S. Corzine  
Governor



Heather Howard  
Commissioner



**Annual Report  
State Fiscal Year 2008  
January 30, 2009**





**NEW JERSEY COMMISSION ON  
SPINAL CORD RESEARCH  
2008 COMMISSION MEMBERS**

**2008 COMMISSION MEMBERS**

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The NJCSCR would like to express its sincere appreciation to all present and past Commission members, the New Jersey Department of Health and Senior Services for their expertise, time, and effort.

The NJCSCR also wishes to thank Katherine Hempstead, Director, Office of Injury Surveillance and Prevention, Center for Health Statistics, for the spinal cord injury surveillance statistics, Executive Director Gabriel B. Milton, and Commission staff members Christine Traynor and Mary Ray for their support.

This report is being submitted in fulfillment of the legislative mandate in the N.J.S.A. 52:9E-1 et seq. The report describes the implementation of the Spinal Cord Research Act and evaluates the benefit of the Act as evidenced in this report of grant awards for State Fiscal Year 2008.





## EXECUTIVE SUMMARY

**The New Jersey Commission on Spinal Cord Research (NJCSCR), established in 1999, funds spinal cord injury research projects in New Jersey.**

- ❖ Since 2001, the New Jersey Commission on Spinal Cord Research has awarded over \$26.1 million to 91 individual scientists at six academic and research institutions, and approved 121 separate scientific research projects
  - Since 2001, thirty-four NJCSCR research projects have been completed.
  - At least 87 scientific articles reporting on work funded by NJCSCR have appeared in peer-reviewed scientific publications, and additional articles are in preparation.
  - Progress made by NJCSCR researchers has been presented in abstracts, scientific conferences, symposia, and meetings.
  - NJCSCR programs have enabled wider scientific interaction and 18 research collaborations, many with out-of-state researchers.
  - Success in achieving NJCSCR funding has resulted in academic and career advancement for New Jersey researchers, including doctoral dissertations.
  - At least 45 applications to NIH, NSF and other organizations based on NJCSCR grants have been made. NJCSCR programs have enabled wider scientific interaction and at least 16 active research collaborations.
- ❖ NJCSCR offered two grant programs in SFY2008:
  - Individual Research Grants.
  - Postdoctoral and Graduate Fellowship Grants.
- ❖ NJCSCR 2008 Achievements:
  - Fifty-three applications requesting \$15.5 million were submitted from five institutions.
  - Seventeen awards were made in 2008 applications totaling over \$3.3 million.
  - Nine Individual Research Grants totaling \$2.7 million and eight Fellowships totaling \$560,000 were approved.
  - Commission outreach efforts continued through attendance and participation in conferences, work shops and symposia.

### **NJ Spinal Cord Registry:**

- ❖ NJCSCR supports a central registry of spinal cord injured persons in New Jersey in cooperation with New Jersey Department of Health and Senior Services ("NJDHSS") Center for Health Statistics.
- ❖ The database provides resources for research, evaluation, and information on spinal cord injuries.
- ❖ All Level 1 trauma centers now collect and submit comprehensive data electronically and soon an on-line system will allow all NJ acute care facilities to participate.
- ❖ Over the period 2003-2007, there have been 1,634 hospitalizations for spinal cord injury in New Jersey, with an overall incidence of 3.7 cases per 100,000 population.



## INTRODUCTION

Spinal cord injury and paralysis has been recognized by medical practitioners for literally thousands of years as catastrophic event with a poor long-term outlook and few treatment options. Only since World War II has this changed appreciably - life expectancy has improved from a matter of months to years and even decades. Many people with long-term injury are enjoying far more vital and productive lives.

Notwithstanding such advances, the economic, social, and human costs of these injuries are huge, and the need for therapies that can restore lost functionality is more acute than ever. Paralysis resulting from spinal cord injury may no longer be "a condition not to be treated," but the search for real cures remains among the greatest challenges to medical science and the healing arts.

### NEW JERSEY'S COMMITMENT TO SPINAL CORD RESEARCH

Established in 1999 under New Jersey's Spinal Cord Research Act, the New Jersey Commission on Spinal Cord Research represents the successful culmination of years of effort by New Jersey citizens and organizations determined to enlist New Jersey in the fight for a cure for paralysis and repair of spinal cord injuries.

The New Jersey Commission on Spinal Cord Research is an independent, state-supported organization. It is one of only nine such publicly-funded organizations nationwide that support the essential scientific research necessary to discover treatments and cures.

These organizations, together with the National Institutes of Health (NIH) and a handful of international entities provide the principal means for advancing the research and learning that will inevitably find the long-sought-for solutions to this devastating and, to date, incurable injury.

In operation since 1999, the New Jersey Commission on Spinal Cord Research has awarded over \$26.1 million to 91 individual scientists at six academic and research institutions, and approved 121 separate scientific research projects.

#### The Challenge

- ◆ More than 6,000 New Jersey residents now live with traumatic spinal cord injury - nationally the number totals 250,000.
- ◆ About 300 of the estimated 11,000 new spinal cord injury cases in the US are New Jersey residents.
- ◆ Direct medical costs can easily exceed tens or even hundreds of thousands dollars per year - lifetime costs can be in the millions.
- ◆ Indirect costs on victims and their families are hard to quantify, but place a significant burden on individuals, and state and local resources.
- ◆ The toll in emotional costs and quality of life is incalculable.





## **NJCSCR - DEDICATED TO SERVING A DIVERSE COMMUNITY**

Spinal cord injury impacts individuals and families across the state and nation. Though young men have been the most likely to be injured historically, the number of women and older people suffering spinal cord injury is increasing. Traffic accidents still account for the greatest share of trauma, but falls of the elderly and gunshot are placing seniors and individuals in violence-prone neighborhoods at greater risk.

The New Jersey Commission on Spinal Cord Research is made up of 11 Commissioners appointed by the Governor with the advice and consent of the Senate. Commissioners volunteer their time and energy, serving without pay for three-year terms. Any qualified person wishing to be considered for appointment may submit his or her name to the Governor's Office of Appointments.

Five Commission seats are designated by statute to represent specific organizations and stakeholders. Public members provide a diversity of backgrounds and interests united by a shared commitment to the cause of spinal cord research. The Commission will always have one or more members in each of these categories:

- ❖ The Commissioner of the New Jersey Department of Health and Senior Services, or designee (voting ex-officio member)
- ❖ University of Medicine and Dentistry of New Jersey
- ❖ Rutgers, The State University of New Jersey
- ❖ Federally designated Spinal Cord Injury Model System
- ❖ Christopher and Dana Reeve Foundation (American Paralysis Foundation.)
- ❖ Six public members including:
  - ❖ At least one New Jersey spinal cord physician
  - ❖ At least one New Jersey resident with a spinal cord injury

The Commission establishes and oversees the operations of the grants process and other activities which are implemented by its administrative staff.

The NJCSCR provides a range of funding opportunities for both established scientists and younger researchers committed to the goals of spinal cord injury research. Through its adherence to an impartial, professional, and scientifically rigorous application and review process, the NJCSCR has become a vital resource for New Jersey's best spinal cord researchers in their pursuit of answers and cures.

The Commission is also mandated to establish and maintain a central registry of all spinal cord injured patients within the state to serve as a resource for research evaluation and information on spinal cord injuries and available services.

### **The Spinal Cord Research Act**

- ◆ The Spinal Cord Research Act, N.J.S.A. 52:9E-1 et seq. (the "Act") created the New Jersey Commission on Spinal Cord Research and the New Jersey Spinal Cord Research Fund to support its activities.
- ◆ The Act was passed by the New Jersey State Legislature in September 1999 and signed into law by Governor Christine Whitman. Assembly members Nicholas Felice and Anthony Impreveduto and Senators Robert Singer and Jack Sinagra were the principal sponsors.



## MISSION AND GOALS

The New Jersey Commission on Spinal Cord Research embodies the commitment of New Jersey to the international quest for cures for catastrophic spinal cord injuries.

The NJCSCR enhances New Jersey's preeminence as a center of biomedical research and a leader in neuroscience, neurotrauma, and spinal cord research.

- ❖ The NJCSCR supports meritorious research projects that advance the understanding of spinal cord injury and explore potential therapeutic strategies.
- ❖ The NJCSCR supports the progression of research from laboratory to animal and clinical applications.
- ❖ The NJCSCR is creating a central data base on New Jersey spinal cord injured persons.
- ❖ The NJCSCR programs foster scientific interest and involvement in New Jersey, attract talented researchers, and enable access to additional sources of research funding.

## Objectives

The NJCSCR seeks to accelerate research that will deepen our understanding of spinal cord injury and open the way to interventions and cures for paralysis and associated conditions. The NJCSCR has identified the following objectives:

- ❖ Advance the field of spinal cord research in New Jersey by encouraging established scientists to apply their expertise to spinal cord research.
- ❖ Foster collaborative, interdisciplinary approaches to spinal cord research.
- ❖ Nurture future generations of spinal cord researchers by supporting young scientists and postdoctoral fellows.
- ❖ Prevent or treat secondary medical conditions resulting from spinal cord injury.





## PROGRAM AND ACTIVITIES

The NJCSCR offers a broad range of funding opportunities that:

- ❖ Support promising scientific research
- ❖ Enable the creation of new spinal cord injury research facilities
- ❖ Attract new researchers to spinal cord research via graduate and post-doctoral fellowships.

## Research Funding Priorities

NJCSCR currently offers an array of grant programs including individual research grants, fellowships, and exploratory research grants. Each of programs is designed to support and encourage spinal cord research in New Jersey in a unique way. The NJCSCR is continually evaluating its programs and seeking ways to improve performance and results.

**The New Jersey Commission on Spinal Cord Research Guidelines** provide detailed guidance and instruction on funding criteria and policies. The Guidelines embody scientific agenda and views on the critical issues confronting spinal cord research. The full text is available on the NJCSCR website.

([www.state.nj.us/health/spinalcord](http://www.state.nj.us/health/spinalcord))

### The NJCSCR Research Guidelines

New Jersey Commission on Spinal Cord Research will fund research activities that hold promise of developing effective interventions and cures for paralysis and other consequences of spinal cord injury and disease. The areas of research listed below highlight the focus of current NJCSCR emphasis and funding:

- ◆ Studying strategies to promote neuronal growth and survival, encourage the formation of synapses, enhance appropriate myelination, restore axonal conduction, replace injured cells, or otherwise improve function after spinal cord injury.
- ◆ Evaluating efficacy of drugs and other interventions that prevent or reduce secondary neuronal injury or providing insight into the mechanisms causing progressive damage.
- ◆ Defining anatomical characteristics of spinal cord injury or disease in well-defined animal models and in the human spinal cord, specifically documenting the cellular systems vulnerable to injury or disease and the functional losses which occur as a result thereof.
- ◆ Elucidating biological or physical mechanisms underlying approaches to improve functions compromised by spinal cord injury, e.g., bladder, bowel, and sexual function, and alleviate chronic pain, spasticity, and severe hypertension.
- ◆ Developing strategies to prevent or treat secondary complications arising from injury or disease to the spinal cord.
- ◆ Developing innovative restorative rehabilitation strategies to promote recovery of biological function.
- ◆ Translating basic and pre-clinical findings into clinical application.



## CURRENT GRANTS PROGRAMS

NJCSCR has offered several different kinds of grant programs that have been intended to provide different opportunities and benefits. The Individual Research Grant provides support for independent researchers, fellowships offer encouragement to graduate students and post-doctoral researchers. In past years, the NJCSCR explored the value of larger grants, such as Chairs for senior and junior faculty grants to attract bring major research talent to New Jersey, and the One-Time Start-up Costs Grant that provided support for establishing new centers of spinal cord research in state institutions. These latter two grants will not be offered in 2009.

New in 2009 will be the Exploratory Research Grant, which provides a two-year non-renewable grant of up to \$200,000 to enable independent investigators apply innovative ideas from other areas of science to spinal cord injury and repair. These grants are intended to enable the acquisition of preliminary data needed to successfully apply for larger grants from the NJCSCR, NIH, and elsewhere. Inter-institutional and/or inter-state collaboration is strongly encouraged. Complete details on all NJCSCR programs are posted on the commission's website.

### Individual Research Grants



- ❖ Individual Research Grants support senior scientists to explore meritorious novel scientific and clinical ideas.
- ❖ Up to \$600,000 for up to three years (\$200,000 per year)
- ❖ Key goal is to enable established researchers to test and develop pilot data needed for future funding.

### Fellowship Grants



- ❖ Postdoctoral and Graduate Student Fellowships engage promising young investigators in spinal cord research.
- ❖ All fellowships include an annual stipend, research allowance and travel budget.
- ❖ Post-doctoral run for three years with a total award of \$150,000; (\$50,000 per annum)
- ❖ Graduate Fellowships run for two years with a total award of \$60,000 (\$30,000 per annum)

### Exploratory Research Grants



- ❖ Enable independent investigators to apply their specific expertise to spinal cord research.
- ❖ Develop preliminary data needed to justify higher levels of funding.
- ❖ Apply innovative ideas from other areas to spinal cord research.
- ❖ Encourage inter-institutional and/or inter-state collaborations.
- ❖ Up to \$200,000 for a two-year non-renewable grant.



## THE NJCSCR APPLICATION AND REVIEW PROCESS

The NJCSCR application process is now completely electronic and web-based utilizing the **proposalCENTRAL** grants management system, accessible through the NJCSCR website.

The NJCSCR grants review process, modeled after NIH procedures, provides a thorough and rigorous review and has earned respect from grantees and applicants.

The on-line process ensures broad access, convenience, and flexibility, and greatly reduces administrative workloads for applicants, the NJCSCR office, and the Scientific Merit Review Panel.

The NJCSCR administrative staff reviews all applications for completeness and accuracy and assists applicants in correcting errors or omissions.

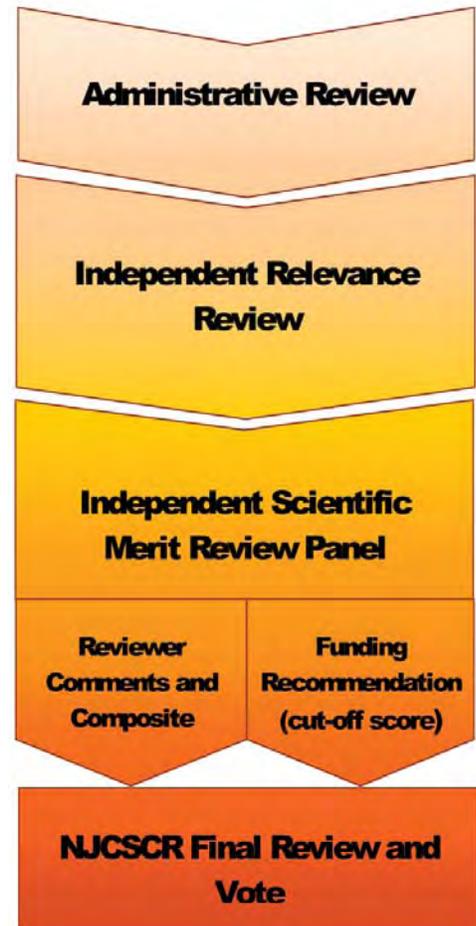
Relevance to the overall goals of the NJCSCR is assessed by an expert panel who also recommend reviewers for each grant from a pool of over 100 highly qualified scientists.

Each application is reviewed and scored independently by two or three peers prior to discussion at the Scientific Merit Review Panel meeting ("triaged" applications are not discussed or scored.)

The remaining applications are fully discussed and scored by the entire panel and given a composite score. The panel also suggests a cut-off point for funding. The scores, comments, and funding recommendations are delivered to the NJCSCR for final consideration and vote.

The NJCSCR makes the final decision whether to fund each application by majority vote. The Commissioners pay close attention to the results of the Independent Scientific Merit Review, but retain discretion to take other factors into consideration in judging the merit of each application.

All applicants, regardless of the decision, receive "blinded" reviewer comments. These are often valuable and may help a researcher rethink a project or reframe a future application.





## OTHER ACTIVITIES

NJCSCR supports the **New Jersey Spinal Cord Registry** through a Memorandum of Agreement with the NJDHSS' Center for Health Statistics ("CHS".) All hospitals and facilities now provide a standardized data set on each new case of spinal cord injury to a centralized data base created and administered by CHS.

The registry is mandated by statute as a resource for research, evaluation, and information on spinal cord injuries and available services. CHS provides an annual report on spinal cord injury in the state as well as periodic updates to the NJCSCR.

The **New Jersey Neuroscience Proposal Development Workshop Series** is an outreach program of the New Jersey Commission on Spinal Cord Research through which scientists interested in spinal cord research and related fields may meet, interact, and explore possibilities for projects and collaborations.

Each workshop consists of a small panel of 3-5 senior clinicians and researchers specially selected to provide a sharp and stimulating focus on key areas of interest in neuroscience. Participants are drawn from the medical, academic and research communities.

The NJCSCR maintains several active standing committees that meet on an ad hoc basis and provide an informal structure to discuss issues and proposals in advance of presenting them to the full NJCSCR.

- ❖ Research Committee
- ❖ Registry Committee
- ❖ Personnel and Finance Committee
- ❖ Bylaws and Legislative Committee
- ❖ Public Information Committee

The NJCSCR is also engaged, through the activities of its administrative staff, in promoting awareness and interest in spinal cord research, advanced technologies, and research.

## New Jersey Spinal Cord Research Fund

The work of the NJCSCR is supported by a one dollar surcharge imposed by statute on all traffic and motor vehicle fines or penalties. - Similar sources of funding have been implemented successfully by several other jurisdictions - vehicular accidents are a significant cause of spinal cord injury.

The monies are collected by the State Treasurer for deposit into the New Jersey Spinal Cord Research Fund. The NJCSCR funds all its grant programs and other activities entirely from this dedicated source, which may not be diverted to any other purpose. No portion of the NJCSCR's funds come from New Jersey's general tax revenue.



## **MANAGEMENT AND ADMINISTRATION**

In many ways the NJCSCR administrative office staff and the Executive Director are the public face of the NJCSCR. Grantees, applicants and other member of academia and the public interact with the NJCSCR staff at all stages of the grants process.

The NJCSCR office provides the vital linkages and machinery that implement the NJCSCR's programs and ensure the integrity of its operations.

All operations of the NJCSCR are managed by the office and its staff, from day-to-day housekeeping, to budgeting and financial matters, to arranging meetings and other activities, and maintaining its files and records.

The Executive Director, through outreach and other activities on behalf of NJCSCR, serves as its main spokesperson and advocate and liaison with NJDHSS, other state entities, outside institutions and third parties.

The Executive Director and the administrative staff are responsible for the management of the office of the Commission, monitoring, measuring, and reporting on performance and activities.

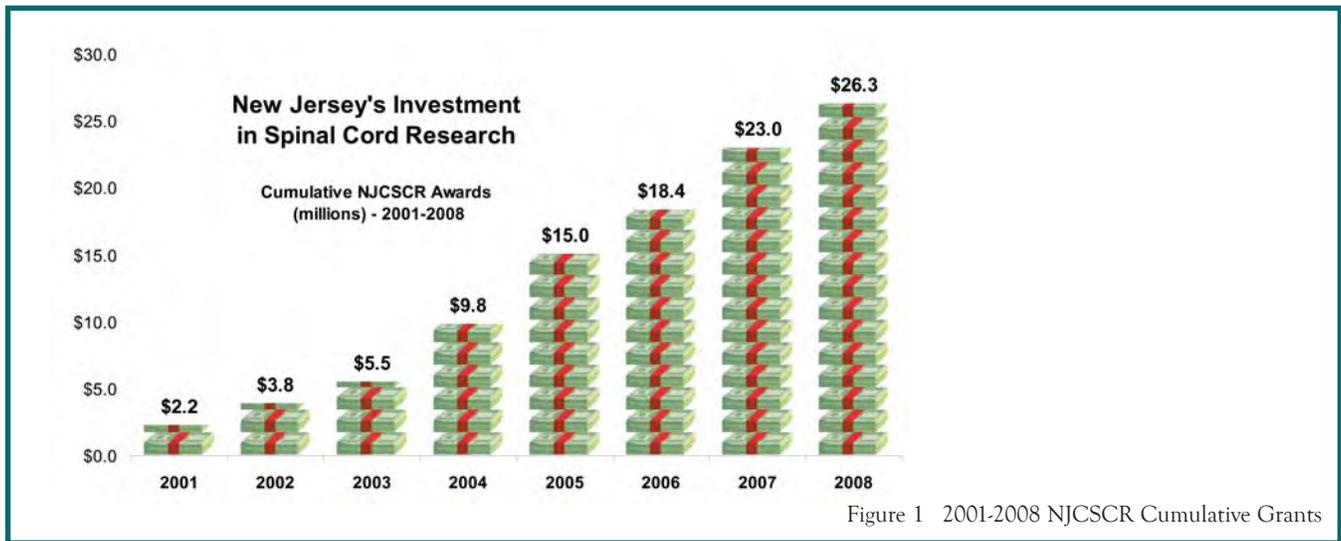
The Office is maintained in the Health and Agriculture Building complex in Trenton.



## 2001-2008 NJCSCR SUMMARY AND PERFORMANCE RECORD

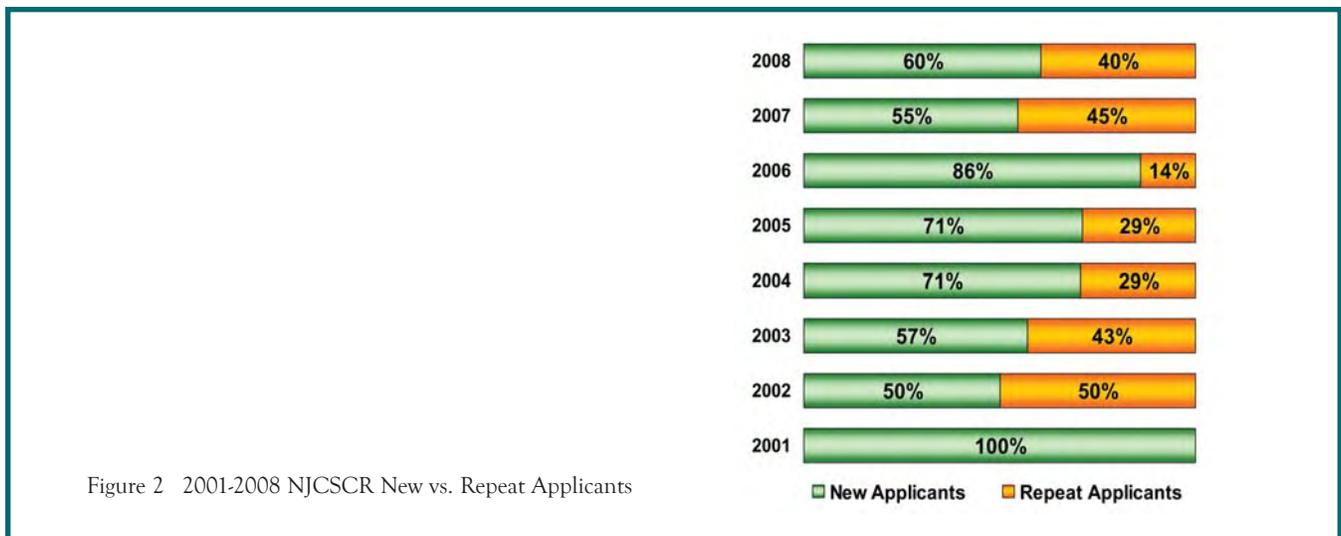
Since 2001, the New Jersey Commission on Spinal Cord Research has awarded over \$26.1 million to 91 individual scientists at six academic and research institutions, and approved 121 separate scientific research projects.

In recent years, the NJCSCR has reviewed an average of over 60 applications annually, approving 20 or more new awards, totaling between \$3.5 and \$4 million.



As NJCSCR continues to invest in spinal cord research, the number of New Jersey researchers attracted to the field is growing. The NJCSCR has been successful in attracting large numbers of new applicants to its programs every year.

First-time applicants represent a significant majority of applications received by the NJCSCR each year. These applications are an indication of the continued interest generated by the NJCSCR in participating in spinal cord research. See Figure 2.





## GRANT APPLICATIONS

In total the NJCSCR has received 352 applications from 188 professors, post-doctoral fellows, and graduate students at 14 New Jersey research institutions. These requests for funds exceed \$94.5 million. See Table 1.

<i>Program</i>	<i>2001</i>	<i>2002</i>	<i>2003</i>	<i>2004</i>	<i>2005</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>	<i>Total</i>
Individual Research	34	14	16	28	52	31	37	27	239
Fellowship				12	10	29	21	20	92
One-time Start-up				1	1	3	3	4	12
5-Yr. Named Chair				2	2	2	1	2	9
All Applications	34	14	16	43	65	65	62	53	352
<b><i>Funds Requested</i></b>									
Individual Research	\$5.3	\$3.0	\$3.4	\$8.2	\$17.5	\$10.9	\$12.8	\$9.2	\$70.3
One-time Start-up				\$0.9	\$0.8	\$2.3	\$2.6	\$3.0	\$9.5
5-Yr. Named Chair				\$2.1	\$2.0	\$1.3	\$1.0	\$2.0	\$8.4
Fellowship				\$0.9	\$0.6	\$1.9	\$1.4	\$1.4	\$6.2
All Applications	\$5.3	\$3.0	\$3.4	\$12.1	\$20.9	\$16.4	\$17.8	\$15.6	\$94.5

Table 1 2001-2007 NJCSCR Applications by Program

Individual research grant applications account for about two-thirds of the total. Since the introduction of additional grant programs in 2004, the percent of individual research grant applications has dropped around half of all applications each year. However, the total number of applications received has gone up dramatically. The expanded range of programs offerings seems to have stimulated interest broadly. See Figure 3.

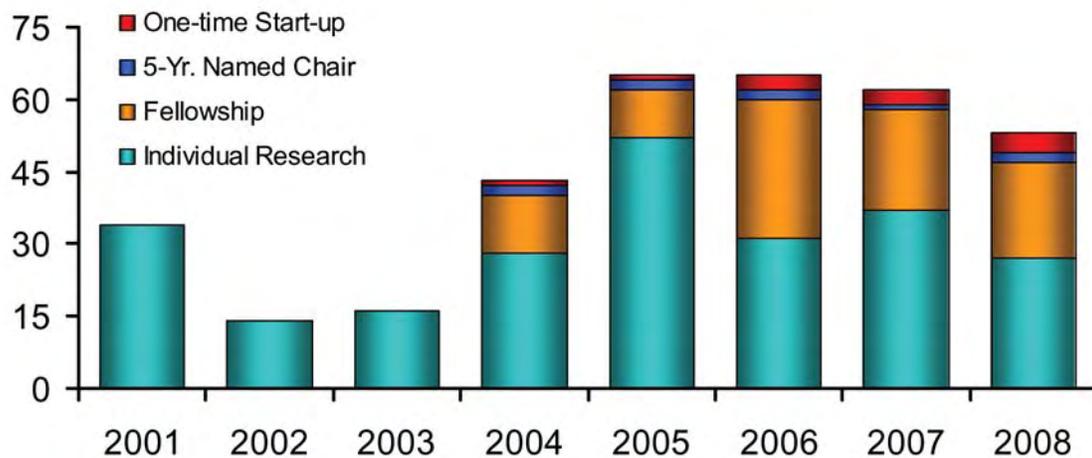


Figure 3 2001-2008 NJCSCR Applications by Program Type



## GRANT FUNDING

The NJCSCR has developed a range of grant programs that provide opportunities for both very senior and younger researchers, and larger programs for establishing new spinal cord research facilities and support for Professorships.

Funding rates vary among the programs offered by the Commission. Fellowships offer the advantage of engaging the greatest number of scientists in spinal cord research for the least cost. Fellowship applications have been funded at a high rate, nearly 46%. Just under one-third of all Individual Research Grant applications are approved. This is in contrast to much lower rates of approval for the NJCSCR's larger, more complex programs.

<i>Program</i>	<i>Individual Research</i>	<i>Fellowship</i>	<i>One-time Start-up</i>	<i>5-Yr. Named Chair</i>	<i>Grand Total</i>
Applications	239	92	12	9	352
Awards	80	42	2	1	125
Funding Rate	33.5%	45.7%	16.7%	11.1%	35.5%

Table 2 2001-2008 NJCSCR Funding Rates by Program

To date, NJCSCR has approved 125 of the 352 applications representing a 34.6% funding rate. This rate of approval is consistent with the NJCSCR's mission of encouraging spinal cord research in New Jersey and funding more early stage and exploratory projects.

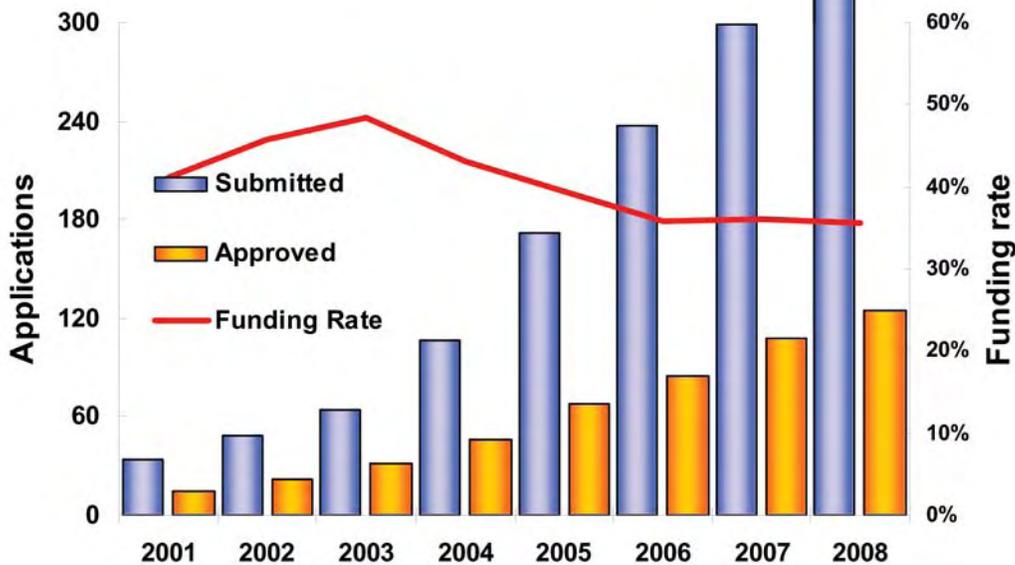


Figure 4 2001-2008 NJCSCR Funding Rates - Applications and Approvals



Historically, the NJCSCR has awarded the majority of its funds in support of established researchers for individual projects. Support for such activity is the mainstay of spinal cord research in New Jersey. This has been true both in numbers of grants funded as well as dollars awarded. However, in recent years the NJCSCR has awarded almost as many Fellowships as Individual Research Grants, reflecting the NJCSCR's recognition of the need to encourage the next generation of researcher and the cost-effectiveness of its Fellowship Grants program. (See Table 3 below.)

<i>Program</i>	<i>2001</i>	<i>2002</i>	<i>2003</i>	<i>2004</i>	<i>2005</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>	<i>Total</i>	<i>Total '04-08</i>
Individual Research	14	8	9	7	15	6	12	9	80	49
Fellowship				6	7	10	11	8	42	42
5-Yr. Named Chair				2					2	2
One-time Start-up						1			1	1
All Applications	14	8	9	15	22	17	23	17	125	94
<b><i>Funds Awarded</i></b>										
Individual Research	\$2.2	\$1.6	\$1.6	\$1.8	\$4.8	\$2.0	\$3.8	\$2.8	\$20.6	\$15.2
Fellowship				\$0.5	\$0.4	\$0.6	\$0.8	\$0.6	\$2.9	\$2.9
5-Yr. Named Chair				\$2.1					\$2.1	\$2.1
One-time Start-up						\$0.7			\$0.7	\$0.7
All Applications	\$2.2	\$1.6	\$1.6	\$4.4	\$5.2	\$3.3	\$4.6	\$3.3	\$26.3	\$20.8

Table 3 2001-2008 NJCSCR Awards by Program

## NEW JERSEY QUALIFIED RESEARCH INSTITUTIONS

Under The Spinal Cord Research Act, the NJCSCR funds may only go to researchers affiliated with "New Jersey Qualified Research Institutions" ("QRIs".)

Five institutions are named in the Spinal Cord Research Act and seven others have been designated by the NJCSCR. These organizations provide a continuing source of interest and applications for the NJCSCR funds.

### Statutory NJQRIs

- Rutgers, The State University of New Jersey
- University of Medicine and Dentistry of New Jersey
- Kessler Medical Rehabilitation, Research and Educational Corporation
- Princeton University
- Coriell Institute

### NJCSCR Designated NJQRIs

- New Jersey Institute of Technology
- Veteran's Biomedical Research Institute
- Stevens Institute
- Drew University
- JFK Medical Center, NJ Neuroscience Institute
- Progenitor Cell Therapy, LLC
- Seton Hall University
- Wyeth Research



## INSTITUTIONAL PERFORMANCE

Of the 352 applications received by the NJCSCR thus far, 157 have been submitted by researchers at Rutgers (all campuses) - over 44% of the total - followed by 117 for the UMDNJ system, more than 33% of the total. An additional 78 applications were submitted from 11 other institutions around the state, including Princeton University, Kessler Medical, Rehabilitation, Research and Education Corporation (KMRREC) and New Jersey Institute of Technology (NJIT).

Interest in NJCSCR programs has not been limited to just a few departments within each institution. At Rutgers, 16 separate departments have received funding from the NJCSCR; at UMDNJ 12 departments. In all, over 30 academic departments have applied for funds from 14 New Jersey institutions.

Institution	Applications	Percent
Rutgers	157	44.6%
UMDNJ	117	33.2%
KMRREC	29	8.2%
Princeton	18	5.1%
NJIT	7	2.0%
All others	24	6.8%
<b>Total</b>	<b>352</b>	<b>100.0%</b>

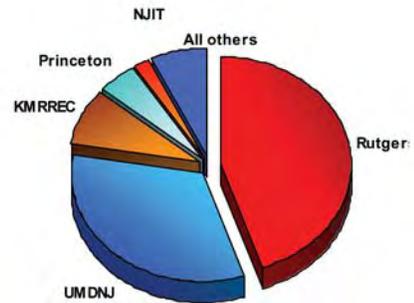


Table 4 2001-2008 NJCSCR Applications by Institution

The public universities, Rutgers and UMDNJ, have benefited substantially from NJCSCR grants. With a combined total of 104 grants and over \$21.7 million dollars in awards, these institutions have become the center of gravity for spinal cord research in the New Jersey, while applicants from Princeton University have been the most successful on a percentage basis, with 50% of its proposals approved for funding.

Institution	Grants	Funding Rate	Share of \$	Total Awards
Rutgers	70	44.6%	51.5%	\$13,528,074
UMDNJ	34	46.6%	31.1%	\$8,190,152
Princeton	10	22.7%	6.6%	\$1,738,024
KMRREC	8	27.6%	6.5%	\$1,696,695
NJIT	2	11.1%	2.8%	\$746,463
Veterans BRI	1	14.3%	1.5%	\$393,800
<b>Total</b>	<b>125</b>	<b>35.1%</b>	<b>100.0%</b>	<b>\$26,293,208</b>

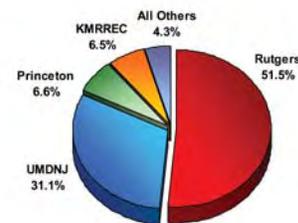


Table 5 Funding Rate by Institution and Share of Funds Awarded



## RESULTS AND ACHIEVEMENTS

Cure of spinal cord injury remains an elusive and frustrating goal. Years of intensive research and the investment of millions of dollars by NJCSCR and other organizations still leave much work to be done. The NJCSCR continues to pursue its mission, encouraging and supporting spinal cord research in New Jersey. Many of its researchers can point to significant accomplishments.

- ❖ Since 2001, thirty-four NJCSCR research projects have been completed.
- ❖ At least 87 scientific articles reporting on work funded by NJCSCR have appeared in peer-reviewed scientific publications, and additional articles are in preparation.
- ❖ Progress made by NJCSCR researchers has been presented in abstracts, scientific conferences, symposia, and meetings.
- ❖ NJCSCR programs have enabled wider scientific interaction and 18 research collaborations, many with out-of-state researchers.
- ❖ Success in achieving NJCSCR funding has resulted in academic and career advancement for New Jersey researchers, including doctoral dissertations.
- ❖ At least 45 applications to NIH, NSF and other organizations based on NJCSCR grants.

The NJCSCR is committed to broadening its portfolio of institutional grantees and increasing the size and diversity of its funding activities. Through outreach activities, the NJCSCR encourages participation by all research organizations with an interest in spinal cord research.

NJCSCR grantees and, to a lesser extent, grantee institutions have capitalized on the opportunities afforded by the availability of Commission funding through advancement of individual careers, increased institutional investment, and applying for additional outside funding. The NJCSCR has been a major factor in fostering this interest and continued involvement in spinal cord research within the State of New Jersey.





## 2008 NJCSCR YEAR IN REVIEW

### 2008 NJCSCR SPINAL CORD RESEARCH GRANTS PROGRAM

The NJCSCR announced its grant programs for 2008 in May 2007. The NJCSCR provided up to four million dollars for spinal cord research. The grant funding cycle dates and programs appear below:

#### 2008 Cycle B

**Grant Application Deadline: June 8, 2007**

**Award Notification Date: November 30, 2007**

#### Available Grant Programs:

- ❖ Five-Year Named Chairs for Senior and Junior Faculty Grants
- ❖ One-Time Start-Up Costs Grants
- ❖ Individual Research Grants
- ❖ Fellowship Grants

#### 2008 Cycle A

**Grant Application Deadline: December 8, 2007**

**Award Notification Date: May 28, 2008**

#### Available Grant Programs:

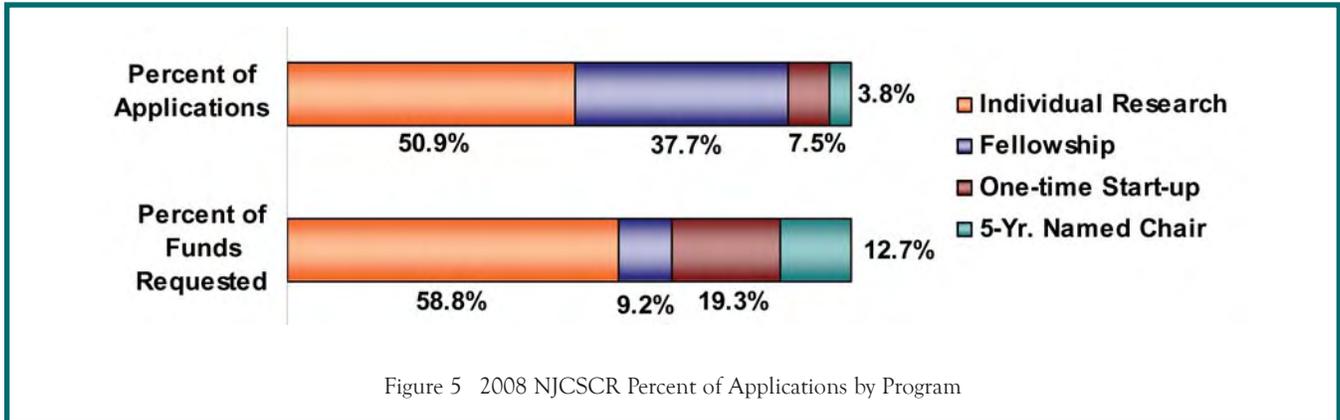
- ❖ Five-Year Named Chairs for Senior and Junior Faculty Grants
- ❖ One-Time Start-Up Costs Grants
- ❖ Individual Research Grants
- ❖ Fellowship Grants

### 2008 APPLICATIONS

2008 saw the New Jersey Commission on Spinal Cord Research in its ninth year of operation and its eleventh and twelfth cycle of grants. Fifty-three applications were submitted from five institutions. Total funds requested exceeded \$15.5 million.

<i>Type</i>	<i>Applications</i>	<i>Amount</i>
Individual Research	27	\$9,159,122
Fellowship	20	\$1,440,000
One-time Start-up	4	\$3,004,564
5-Yr. Named Chair	2	\$1,973,769
<b>Grand Total</b>	<b>53</b>	<b>\$15,577,455</b>

Table 6 2008 NJCSCR Grant Program Applications



More than 50% of these applications were for Individual Research Grants and more than 37% were for Fellowships. New Jersey scientists and students show widespread, multi-disciplinary interest in spinal cord research. 2007 NJCSCR applications came from 17 academic departments at seven institutions.

<b>Rutgers, The State University</b>	<b>28</b>	<b>UMDNJ-NJMS</b>	<b>8</b>
Biomedical Engineering	14	NJ Medical School	3
W.M. Keck Center	7	Neurology and Neuroscience	3
Cell Biology & Neuroscience	5	Neurological Surgery	1
Chemical Biology	1	Surgery	1
Molecular Biology & Biochemistry	1		
<b>UMDNJ-RWJMS</b>	<b>8</b>	<b>Princeton University</b>	<b>4</b>
Robt. Wood Johnson Medical School	3	Molecular Biology	3
Pathology and Laboratory Medicine	2	Biochemistry	1
Neurological Surgery	1	<b>UIMDNJ-School of Osteopathic Medicine</b>	<b>1</b>
Pharmacology	1	Molecular Biology	1
Neuroscience and Cell Biology	1		
		<b>KMRREC</b>	<b>1</b>

Table 7 2008 NJCSCR Grant Applications by Institution and Departments



## 2008 FUNDING

Seventeen applications were recommended for funding to the NJCSCR by the independent Scientific Merit Reviewers, as were 13 applications for continued funding. The NJCSCR voted to fund all grant applications recommended awarding a total of over \$3.5 million to 17 researchers at four institutions. Nine Individual Research Grants were approved for over \$2.7 million and eight Fellowships were awarded totaling \$560,000.

<i>Type</i>	<i>Grants</i>	<i>Amount</i>
Fellowship	8	\$560,000
Individual Research	9	\$2,791,186
<b>Grand Total</b>	<b>17</b>	<b>\$3,351,186</b>

Table 8 2008 NJCSCR Grant Awards by Program

Overall, the NJCSCR funded 39% of the applications submitted in 2008. Nearly 48% of Fellowship applications were funded and 40% of Individual Research projects. For the second consecutive year, no larger grants scored high enough for funding and the NJCSCR will review these programs in the coming year. The NJCSCR continues its support for well thought-out and properly mentored Fellowship grants, as well as independent individual researchers.

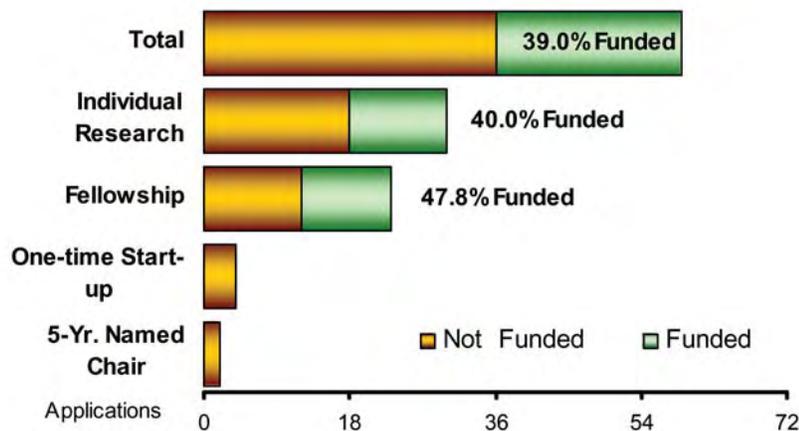


Figure 6 2008 NJCSCR Funding Percentages by Grant Program



## 2008 RESULTS BY INSTITUTION

The NJCSCR approved twelve applications from researchers at Rutgers, four for UMDNJ-NJMS, one for UMDNJ-RWJMS, and one for NJIT. Rutgers researchers will receive disbursements of over \$2.5 million and the UMDNJ system over \$700,000.

Institution	Individual Research		Fellowships		Total	
	#	\$	#	\$	#	\$
Rutgers	7	\$2,206,092	5	\$380,000	12	\$2,586,092
UMDNJ-NJMS	2	\$585,094	1	\$60,000	3	\$645,094
UMDNJ-RWJMS			1	\$60,000	1	\$60,000
NJIT			1	\$60,000	1	\$60,000
<b>Grand Total</b>	<b>9</b>	<b>2,791,186</b>	<b>8</b>	<b>560,000</b>	<b>17</b>	<b>3,351,186</b>

Table 9 2008 NJCSCR Grant Program Awards by Institution

Rutgers received 78% Individual Research grants and UMDNJ-NJMS 22%. 63% of the Fellowship awards went to Rutgers researchers and the remainder divided equally among UMDNJ-RWJMS, UMDNJ-NJMS, and NJIT.

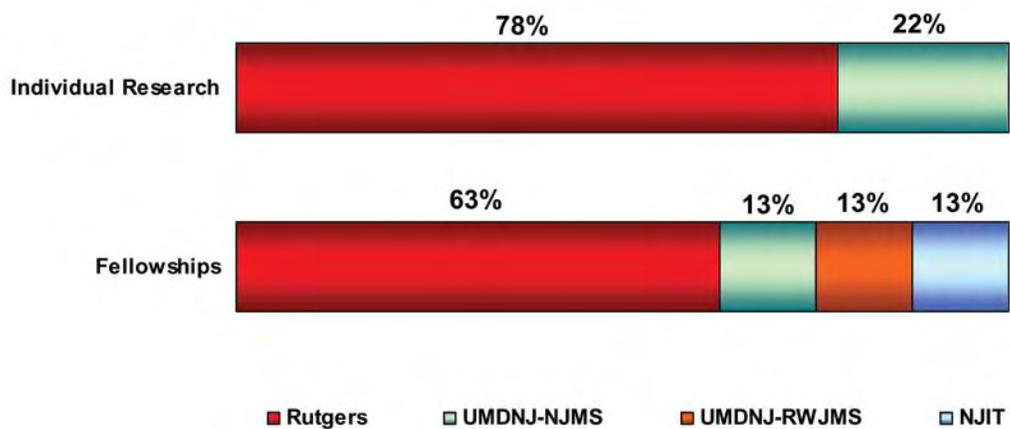


Figure 7 2008 NJCSCR Program Awards - Percentages by Institution



## OUTREACH EFFORTS

Expanding scientific research in spinal cord injury is a major goal of the NJCSCR. Activities and initiatives undertaken in 2008 are undertaken by the administrative office of the NJCSCR and the Executive Director through personal contacts, attendance at events and meetings with researchers and potential applicants. Website and publication resources are also used to promote the NJCSCR grant opportunities and other activities throughout the state.

### Publication of Grant Programs

Formal Notices of Grant Availability are the official means of notifying interested parties of NJCSCR grant programs. In 2008, these so-called "NOGAs" were published in the New Jersey Register and the NJDHSS' Directory of Grant Programs together with advertisements placed in leading scientific journals, announcing the 2008B and 2008A grant programs.

### New Jersey Neuroscience Proposal Development Workshop Series

The New Jersey Neuroscience Proposal Development Workshop Series (described earlier) held an event at Rutgers School of Bioengineering in June 2008. The workshop featured a select panel of 3-5 senior clinicians and researchers and 20-30 participants from the medical, academic and research communities.

Nearly 200 students, fellows, and researchers have participated in these workshops to date. Attendees exchanged ideas and developed connections that may advance spinal cord research in New Jersey.

## GRANTS PROGRAM FOR FY2009

Departing from its practice of prior years, the NJCSCR announced only a single cycle of grants in 2009. The NJCSCR has allocated up to four million dollars for spinal cord research projects in 2009 but is not required to award any or that entire sum. The NJCSCR will announce two funding cycles and will accept applications for the grant programs. The grant funding cycle dates and programs appear below:

### 2009 Grants Cycle

**Grant Application Deadline: December 8, 2008**

**Award Notification Date: May 29, 2010**

### Available Grant Programs:

- ❖ Individual Research Grants
- ❖ Fellowship Grants



## NEW JERSEY SPINAL CORD INJURY REGISTRY

The Spinal Cord Research Act mandates the establishment and maintenance of a central registry of persons who sustain spinal cord injuries throughout the State. NJCSCR has been supporting the work of the NJDHSS' Center for Health Statistics to create the mechanism for the collection and analysis of spinal cord injury data.

In 2007, NJCSCR and NJDHSS Center for Health Statistics entered into a second three-year Memorandum of Agreement to further this effort. All Level 1 trauma centers are now equipped to collect and submit comprehensive data electronically. Plans are underway to enable an on-line system allowing all New Jersey acute care facilities to participate.

When fully established, the registry will provide a database indicating the incidence and prevalence of spinal cord injuries and will serve as a resource for research, evaluation, and information on spinal cord injuries. CHS publishes an annual report providing data on spinal cord and brain injury in New Jersey.

An overview of non-fatal hospitalizations for spinal cord injury in New Jersey appears below, based on data supplied by CHS. Over the period 2003-2007, there have been 1,634 such admissions, with an overall incidence of 3.7 cases per 100,000 population.

Rates vary among ethnic groups, age brackets, and gender. Blacks have the highest incidence at 5.9 per 100,000 population, and black males have the highest incidence of any group at 10.2 per 100,000. Clear trends are not apparent among any of the age groups, though the incidence of spinal cord injury among older persons appears to be growing.

Groups	2003		2004		2005		2006		2007		2003-2007	
	N	Rate	N	Rate								
<b>Males</b>	179	4.3	209	5.0	249	6.0	219	5.2	250	5.8	1,106	5.3
<b>Females</b>	98	2.0	91	1.8	103	2.1	120	2.4	116	2.3	528	2.2
<b>Under 15 years</b>	12	**	15	**	21	1.2	9	**	12	**	69	0.8
<b>15-24 years</b>	39	3.6	43	3.9	65	5.7	38	3.3	71	6.3	256	4.6
<b>25-44 years</b>	83	3.3	93	3.7	99	4.0	83	3.4	67	2.8	425	3.4
<b>45-64 years</b>	80	3.8	72	3.3	76	3.4	97	4.3	117	5.1	442	4.0
<b>65 years and older</b>	63	5.6	77	6.8	91	8.1	112	9.9	99	8.7	442	7.8
<b>White non-Hispanic</b>	162	2.6	177	3.0	208	3.5	188	3.0	210	3.4	945	3.1
<b>Black non-Hispanic</b>	55	4.8	55	4.9	69	6.1	82	7.5	70	5.9	331	5.9
<b>Native American</b>	-	-	1	**	1	**	-	-	-	-	2	**
<b>Asian/Pacific Islander</b>	5	**	3	**	7	**	12	**	9	**	36	1.5
<b>Hispanic</b>	30	2.5	42	3.9	38	3.2	34	2.8	47	3.9	191	3.3
<b>Other race/ethnicity</b>	13	-	16	-	17	-	17	-	13	**	76	-
<b>Unknown race/ethnicity</b>	12	-	6	-	12	-	6	-	16	**	53	-
<b>Total</b>	277	3.1	300	3.4	352	4.0	339	3.8	366	4.0	1,634	3.7

Hospitalization for spinal cord injuries for New Jersey residents where the patient was discharged alive.  
 Rates are per 100,000 population and are either age-specific or age-adjusted using the 2000 US Standard Population.  
 Data sources: New Jersey Discharge Data Collection System; NCHS Bridged Race Estimates for population.

Table 10 Non-fatal spinal cord injury hospitalizations, New Jersey, 2003-2007



## 2008 NJCSCR INDIVIDUAL RESEARCH GRANTS

*"Control of Olig2 Expression in Spinal Cord Development and Regeneration"*, Li Cai, Ph.D. - \$400,000  
Biomedical Engineering, Rutgers, The State University

*"Novel Targets for Neuroprotection in the Spinal Cord"*, Stella Elkabes, Ph.D. - \$197,562; Neurology and Neuroscience, University of Medicine and Dentistry of New Jersey-NJMS

*"Acute Treatment of siRNA for RhoA in Spinal Cord Injury"*, Martin Grumet, Ph.D. - \$342,064; W.M. Keck Ctr for Collaborative Neuroscience, Rutgers, The State University of New Jersey

*"Neural Precursor Control by ECM for Spinal Cord Regeneration"*, Noshir Langrana, Ph.D. - \$393,158; Biomedical Engineering, Rutgers, The State University of New Jersey

*"The Role for Pak4 in Motor Neuron Development"*, Audrey Minden, Ph.D. - \$200,000; Chemical Biology, Rutgers, The State University of New Jersey

*"Spinal Cord Injury in MS: Biomarkers and Therapy"*, Andrew Pachner, M.D. - \$378,532; Neurology and Neuroscience, University of Medicine and Dentistry of New Jersey-NJMS

*"Identification of Genes Contributing to Neuronal Necrosis in Physiological Injury"*, Dewey Royal, Ph.D. - \$200,000; Cell Biology & Neuroscience, Rutgers, The State University of New Jersey

*"Spinal Cord Intrinsic Regulation of Regeneration - Proactive g"*, Melitta Schachner, Ph.D. - \$395,870; W.M. Keck Ctr for Collaborative Neuroscience, Rutgers, The State University of New Jersey

*"Glycan-Mediated Improvement of Spinal Cord Regeneration"*, Melitta Schachner, Ph.D. - \$275,000; W.M. Keck Ctr for Collaborative Neuroscience, Rutgers, The State University of New Jersey



## 2008 NJCSCR FELLOWSHIP GRANTS

*"Neuroprotective effects of Cypin After SCI"*, Damien Carrel - \$100,000; Cell Biology & Neuroscience, Rutgers, The State University of New Jersey

*"Neurite Guidance Using Photonically Derived Durotactic Gradients"*, Ian Gaudet- \$60,000; Biomedical Engineering, Rutgers, The State University of New Jersey

*"YY1 in Schwann Cell Proliferation and Myelination"*, Ye He - \$60,000; Neuroscience and Cell Biology, Robt. Wood Johnson Medical School, University of Medicine and Dentistry of New Jersey.

*"Spinal Cord Motor Neuron-Based Neural Interface Design"*, Christopher Langhammer - \$60,000; Cell Biology & Neuroscience, Rutgers, The State University of New Jersey

*"Nano-fibrous Scaffold for Functional Recovery after Spinal Cord Injury"*, Yee-Shuan Lee - \$60,000; Bioengineering, New Jersey Insititute of Technology

*"IGF-1 Mediated Oligodendrocyte Progenitor Survival in SCI"*, Kedar Mahajan - \$60,000; Neurology and Neuroscience, University of Medicine and Dentistry of New Jersey-NJMS

*"Molecular Mechanisms of Neuroprotection and Regeneration"*, Marton Toth, Ph.D. - \$100,000; Molecular Biology & Biochemistry, Rutgers, The State University of New Jersey

*"Notch Promotes Radial Glial Phenotype in Neural Progenitors"*, Evangeline Tzatzalos - \$60,000; Biomedical Engineering, W.M. Keck Ctr for Collaborative Neuroscience, Rutgers, The State University of New Jersey



## FINANCIAL STATEMENTS

The activities and programs of the NJCSCR are supported by the New Jersey Spinal Cord Research Fund as established by the Act. A one dollar (\$1.00) surcharge is imposed on all fines or penalties levied under the provisions of Title 39 of the Revised Statutes or any other motor vehicle or traffic violation. The revenue surcharge is collected and forwarded to the State Treasurer and deposited annually in an interest-bearing account designated as the New Jersey Spinal Cord Research Fund.

The Fund opened SFY 2008 with a balance of \$6.1 million. Revenues and interest of \$4.8 million brought the total to \$10.9 million.

Disbursements and expenses for SFY2008 were \$3.8 million, considerably less than the projected total of \$7.7 million. Disbursements to grantees amounted to \$3.6 million. \$426,000 was spent for office and administrative expenses. The Fund closed the year with a balance of \$7.1 million.

The NJCSCR is committed to granting a substantial majority of the Fund each year to support as much meritorious research as possible, while retaining the ability to meet expenses. SFY2009 disbursements to grantees of \$7.6 million and expenses of \$611,226 are projected for budgeting purposes.

	SFY 2008 <i>Projected</i>	SFY 2008 Actual	SFY 2009 <i>Projected</i>
<b>Opening Fund Balance (July 1)</b>	\$5,880,000	\$6,130,000	\$7,148,000
<b>Revenues</b>			
Assessments <sup>1</sup>	\$4,200,000	\$4,195,000	\$4,200,000
Investments Earnings - Interest <sup>2</sup>	\$750,000	\$608,000	\$600,000
<b>Total Revenue:</b>	<b>\$4,950,000</b>	<b>\$4,803,000</b>	<b>\$4,800,000</b>
<b>Total Funds Available</b>	<b>\$10,830,000</b>	<b>\$10,933,000</b>	<b>\$11,948,000</b>
<b>Disbursements and Expenses</b>			
Disbursements to Grantees	\$7,035,000	\$3,359,000	\$7,035,000
<b>Total disbursements</b>	<b>\$7,035,000</b>	<b>\$3,359,000</b>	<b>\$7,035,000</b>
<b>Expenses</b>			
Administrative & Office expense	\$450,000	\$314,000	\$476,226
Professional Review Panel	\$80,000	\$54,000	\$60,000
NJCSCR Registry	\$100,000	\$58,000	\$75,000
<b>Total expenses</b>	<b>\$630,000</b>	<b>\$426,000</b>	<b>\$611,226</b>
<b>Total Disbursements and Expenses</b>	<b>\$7,665,000</b>	<b>\$3,785,000</b>	<b>\$7,646,226</b>
<b>Closing Fund Balance (June 30)</b>	<b>\$3,165,000</b>	<b>\$7,148,000</b>	<b>\$4,301,774</b>

<sup>1</sup> Net revenue variance

<sup>2</sup> Funds plus interest deposited annually in Jan.

Table 11 NJCSCR Fund Balance Summary