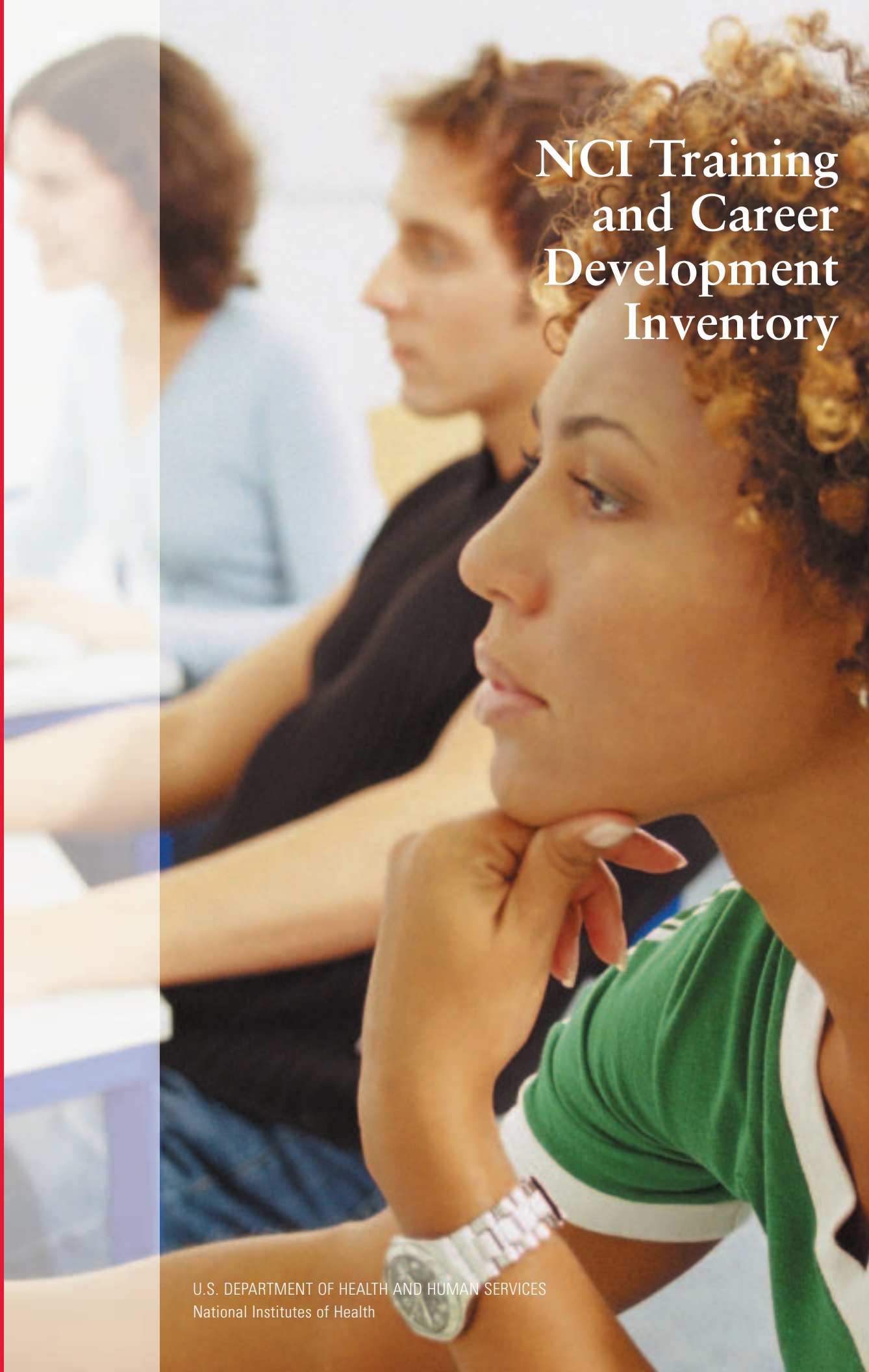
National Cancer Institute

NCI Training and Career Development Inventory



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
National Institutes of Health

NCI TRAINING AND CAREER DEVELOPMENT INVENTORY

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NCI Training and Career Development Inventory
Executive Summary

The National Cancer Institute (NCI) supports training programs in the basic, clinical, and population science disciplines to provide a base of personnel who can participate in basic and epidemiological research, clinical trials, and cancer treatment programs. These programs are a fundamental component of the NCI's effort against cancer. NCI Director Dr. Andrew C. von Eschenbach established the Training Commission to review training activities across NCI, and one of the many Training Commission tasks was to compile an inventory of training and career development programs.

This report captures the findings of the Training Commission's Inventory Subcommittee. For the purpose of this inventory, **training** activities are those activities that expose an individual to methodologies and/or didactics in a specific area of research. Whereas training activities do not have an implied promise of progression to independence, **career development** activities include a well-defined career development plan for helping individuals to progress to the independent phase of their research careers.

Multiple funding mechanisms are used to support trainees in the extramural and intramural programs. Data are provided for FY99 to FY04 for the NCI's five extramural training programs and activities, as well as the intramural training activities. This inventory demonstrates that NCI's financial support of training and career development increased substantially during FY99 to FY04.

Extramural Programs

NCI administers five extramural training programs:

- Cancer Training Branch (CTB)
- Comprehensive Minority Biomedical Branch (CMBB)
- Cancer Prevention Fellowship Program (CPFP)
- Specialized Programs of Research Excellence (SPOREs)
- Center to Reduce Cancer Health Disparities (CRCHD)

Cancer Training Branch: The CTB manages the NCI's research manpower development and cancer education programs. It manages NCI-funded grants in research training, career development, and cancer education; administers the Ruth L. Kirschstein National Research Service Award components (F32 and T32) of the CTB grant portfolio; and oversees the Loan Repayment contracts.

Between FY99 and FY04, the number of trainees ranged from a low of 1913 in 2000 to a high of 2195 in 2003. The funding steadily increased over that period from $84.35 million in 1999 to $161.28 million in 2004. The increase is explained by higher stipends, the rise in tuition and health insurance, allowable increases in salaries, and in certain cases, increases in research costs. [Please note that R25E program awards are captured in the dollar figures stated above but not in the number of trainees.]

Comprehensive Minority Biomedical Branch: The CMBB coordinates NCI's efforts to broaden participation in cancer-related research and training activities for underrepresented minorities, individuals with disabilities, and certain others. Between FY99 and FY04, the number of trainees grew steadily from 186 in 1999 to 377 in 2004. Dollars awarded increased from $11.56 million in 1999 to $42.52 million in 2004.

Cancer Prevention Fellowship Program: The CPFP offers scientists educational and scientific research opportunities in cancer prevention. Between FY99 and FY04, the number of fellows supported ranged between 36 in 1999 and 61 in 2003. Dollars awarded increased steadily from $1.15 million in 1999 to $2.66 million in 2003, dropping slightly to $2.38 million in 2004.

Specialized Programs of Research Excellence: SPOREs promote interdisciplinary research devoted to cancers or particular organs. The goal of SPOREs is to move basic research findings from the laboratory to the clinic. As of 2004, 61 SPOREs were funded to support about 120 individuals in translational projects.

Center to Reduce Cancer Health Disparities: The CRCHD was established in 2001 to develop and fund networks of minority investigators who can also provide training for students interested in a research career focused on cancer health disparities. The number of trainees increased from 18 in 2001 to 46 in 2004. Dollars awarded increased steadily from $0.9 million in 2001 to $2.3 million in 2004.

Intramural Programs

The NCI Intramural Research Program supports collaborative research in basic, translational, clinical, biostatistical and epidemiologic research. It supports training programs through the following:

- Visiting Fellow (VF) Program
- Cancer Research Training Award (CRTA) Program
- Full Time Employee (FTE) Basic Research and Clinical Fellows Programs
- Three summer student programs -
    - Summer Internship Program (SIP) in Biomedical Research
    - Summer Research Fellows Program (SRFP)
    - Introduction to Cancer Research Careers (ICRC) and other program, bringing students from diverse and/or disadvantaged backgrounds

The number of intramural CRTA trainees increased from 937 (329 foreign and 608 domestic) in 1999 to 1192 (535 foreign and 657 domestic) in 2004. Dollars awarded to CRTA trainees increased steadily from $28.4 million in 1999 to $47.4 million in 2004. The number of FTE intramural trainees increased from 206 in 1999 to 341 in 2004. Dollars awarded to FTE trainees steadily increased from $12.0 million in 1999 to $28.2 million in 2004. The number of CRTA and FTE trainees combined increased from 1999 to 2004 by 34% (1143 trainees in 1999 to 1533 trainees in 2004.) The total dollars awarded to intramural trainees (CRTA and FTE) increased 87% from 1999 to 2004 ($40.43 million to $75.64 million).

Increase in Overall Number of Trainees

The extramural and intramural programs have grown, albeit unevenly, on a year-by-year basis, between FY99 and FY03. All but two programs (CRCHD and CMBB) decreased between FY03 and FY04. The Cancer Training Branch and Intramural programs increased by 11.8% and nearly 33%, respectively, from FY99-FY04, while there was an approximate doubling in the Comprehensive Minority Biomedical Branch and a 58% increase in the Cancer Prevention Fellows programs. Overall, the totals supported in all programs increased by nearly 26% between FY99 and FY04.

Increase in Overall Dollars Awarded

Between FY99 and FY04, NCI's investment in training and career development increased steadily. The overall NCI funding for trainees, fellows, and K-awardees more than doubled from $136.3 million in FY99 to $281.7 million in FY04.

NCI TRAINING AND CAREER DEVELOPMENT INVENTORY

Chapter I: Introduction

This chapter presents the rationale for the current inventory of training and career development programs at the NCI, describes the methodologies used and factors inventoried, and outlines the report content.

Importance of Training at NCI

Research training and career development is a fundamental commitment of the NCI leadership and a fundamental component of NCI's overall scientific enterprise. (The legislative history covering NCI training authorities is included as Appendix C). It is a dynamic and changing enterprise influenced both by new scientific areas of opportunity and by the more practical considerations of changing patient needs and U.S. population and cancer demographics. Therefore, effective training must be forward-looking to anticipate scientific trends as well as the ever-changing workforce. Training composition exerts strong influence on the composition of the scientific workforce. The National Institutes of Health emphasis on multidisciplinary, translational and team science has been augmented by new training programs that support interdisciplinary scientists who are able to take advantage of developments in one area of science and apply them to another area and who are able to go beyond discipline-driven constraints to synthesize and integrate scientific findings.

Establishment of the NCI Training Commission

To take stock of NCI's training enterprise in terms of investment, scientific balance and dispersion of the training portfolio and training activities, Dr. Andrew C. von Eschenbach, Director, NCI, established a Training Commission (See membership roster in Appendix A). He charged the Commission to: 1) compile an inventory of training activities across the NCI, 2) promote existing training opportunities, 3) develop new opportunities (e.g., translational training, curricula), 4) integrate training activities for added value, 5) establish databases and tracking systems to monitor training activities, 6) coordinate fellowship/education offices, 7) promote mentoring, 8) increase training of underrepresented minority cancer researchers; and 9) continue support for new investigators. It was envisioned that the Training Commission would serve as a coordination team to integrate the various training initiatives and activities occurring throughout the Institute. As part of that Commission's work, an **"Inventory Subcommittee"** was established to provide descriptive and quantitative data on all training and career development programs and activities supported by the NCI (see Membership Roster in Appendix B). The current report describes the activities and findings of the Subcommittee.

Training Commission Inventory Subcommittee Process and Procedures

The Inventory Subcommittee conducted a series of meetings between June 10, 2004 and June 30, 2005. The initial meetings were focused on 1) identifying NCI research training and career development programs and activities, 2) establishing specific types of data needed, and 3) identifying sources of descriptive, fiscal and quantitative data. As a result of the initial Subcommittee discussions, the group solicited and obtained descriptive, fiscal and quantitative data from the NCI extramural and intramural training programs listed below. (See locations of these programs within the NCI organization on Chart 1, page 5).

Extramural

- NCI Cancer Training Branch (CTB)
- NCI Comprehensive Minority Biomedical Branch (CMBB)
- NCI Division of Cancer Prevention (DCP) – Cancer Prevention Fellowship Program (CPFP)*
- NCI Organs Systems Branch (SPORE Program)
- NCI Center to Reduce Cancer Health Disparities (CRCHD)

Intramural

- NCI Center for Cancer Research (CCR)
- NCI Division of Cancer Epidemiology and Genetics (DCEG) Research Fellows Program

In addition to the above sources, the NCI Extramural Financial Data Branch (EFDB), NIH Office of Extramural Research (OER) and the Office of Policy Analysis and Response also provided important data and descriptive information included in this report.

*This program is unique in that it is housed in the extramural DCP (Office of Preventive Oncology), but fellows may receive research training with either intramural or extramural scientists.

For each training component inventoried, the Subcommittee collated data and formulated guidelines for analysis and presentation of the data in the Subcommittee Report. The Subcommittee reviewed results of the data analyses and, where appropriate, proposed and adopted additional analyses and refinements in the presentations.

This report describes each training component with particular emphasis on goals and objectives. Quantitative information includes numbers of trainees, dollars awarded, and graphical and tabular representation of funding trends over several years. Data are categorized into predoctoral and postdoctoral awards for the National Research Service Award mechanisms and for special NCI institutional training programs for predoctoral and postdoctoral training. (Note that while minorities are being supported in other programs across NCI, no special sub-analysis has been conducted for this report.) Since minority training is an NCI priority area, the report includes data on the numbers of underrepresented minorities supported by mechanisms designed for these special populations and funded by the CMBB.

Chapter II provides information on a 1999 Extramural Strategic Plan which served as a blueprint for a substantial portion of extramural training supported over the last five years. The Plan covers the Cancer Training Branch (CTB) and the Comprehensive Minority Biomedical Branch (CMBB). The chapter describes training activities and includes trends in numbers of individuals trained as well as dollars invested over several years in the CTB and CMBB extramural programs. Chapter II also describes training activities in the three other extramural programs and their trends. These are the Cancer Prevention Fellowship Program, the SPORE Program, and the Center to Reduce Cancer Health Disparities.

Chapter III likewise describes training in the Intramural Programs of the Institute and reports numbers trained and dollars awarded over several years. Included in the intramural data are statistical trends and dollars invested in training US citizens, citizen Nationals and foreign trainees and a break-out of pre and postdoctoral trainees over five years.

Finally, Chapter IV summarizes the findings of the Inventory.

Definitions

For the purpose of this report, training activities are defined as those activities exposing an individual to methodologies and possibly didactics in a specific area of research without an implied promise of progression to independence; a career development experience also includes a well-defined career development plan for movement of an individual to the independent phase of their research careers by the end of the period of support.

Disclaimers

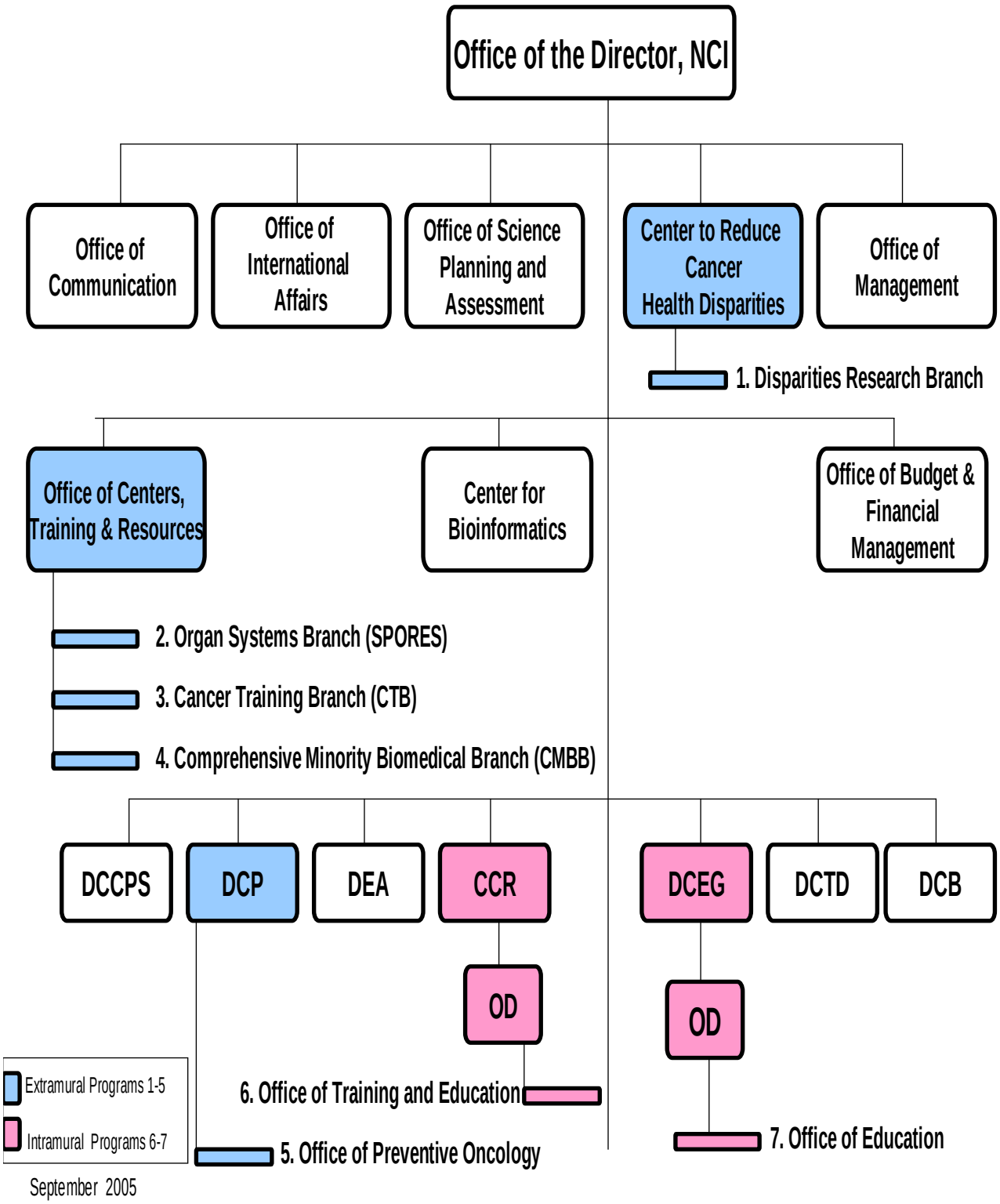
The inventory does not include training and career development activities supported by NCI- RPG (research project grant). Information on individual trainees on RPG funding is currently not collected and was therefore not available to the Subcommittee. The Subcommittee was not charged with attempting to investigate training on RPGs.

The inventory does not include the number of trainees supported by the NCI Cancer Education Grant Program (R25E). The NCI uses this funding mechanism to support the development, implementation and evaluation of educational programs for the lay community, high school and medical students, and health professionals. These programs also include scientific workshops. Data on the actual number of individuals “trained” by the R25E program are not available. The dollar investment in these R25E programs is available and has been included in the inventory.

The inventory additionally does not include the NIH Clinical Research Curriculum Award (K30). The K30 is an NIH-wide mechanism intended to support the improvement, expansion, or development of new didactic programs in clinical research. While the NCI has co-funded this Program for the past five years, information was not collected on the number of individuals who have actually used the curricula.

Finally, data on underrepresented minorities is not collected for all of the NCI training and career development activities. Therefore, the trends data on underrepresented minorities under-report the overall numbers being trained throughout all programs.

Chart 1*
NCI Training Programs



* **Colored boxes represent the location of training and career development programs across the NCI**

Chapter II: Extramural Training Programs/Activities

Introduction

The extramural grants portfolios are chiefly found in those branches that have a formal mandate for training – namely the Cancer Training Branch and the Comprehensive Minority Biomedical Branch, both housed in the Office of Centers, Training and Resources, Office of the Director. In addition, the Cancer Prevention Fellowship Program, though smaller, is a highly specialized extramural/intramural fellowship program. Finally, other NCI extramural programs that integrate research training as part of their sponsored activities are the extramural Specialized Programs of Research Excellence (SPOREs) and the Center to Reduce Cancer Health Disparities Special Population Networks activities (see Chart 1, Page 5).

Strategic Plan for the Cancer Training Branch (CTB) and the Comprehensive Minority Biomedical Branch (CMBB) Introduction

The training activities supported by the CTB and the CMBB over the last 5 years followed a blueprint spelled out in a Strategic Plan formulated in 1999 and phased in over several years. This Plan was developed with input from representatives of all of the NCI Extramural Divisions and focused particular attention on the recommendations of the NCI Review Groups in cancer control, prevention, and clinical trials. The plan also incorporated initial comments from scientists in a number of public settings, including a working group meeting that involved selected members of the Board of Scientific Advisors (BSA), a presentation and discussion before the NCI Clinical Trials Implementation Group, a discussion with the Associate Directors for Prevention and Control Research, Cancer Centers at a meeting of ASPO, commentary at the "NCI Listens" session at a meeting of AACR, and a presentation and discussion at an annual meeting of the American Urological Association.

Strategic Plan: Key Features

The Strategic Plan reflected three constant guiding principles: 1) The focus should be on investigator-initiated awards using PAs rather than on RFA-driven awards that involve set-aside funds (RFAs lack flexibility in terms of dollars and application cycles and generally do not allow revised applications); 2) Training and career development opportunities are fundamental and should be as accessible as possible; and 3) New career awards (K awards) should offer a continuum of opportunities from a mentored award, to a transition unmentored award, to an established investigator award. Within this spectrum of opportunities are embedded the ideas of "protected time" and "grant portability."

In the Plan, all of the "old" and new Career Awards called for increases in salary levels and basic expense levels that are more realistic compared to committed and actual costs. The Strategic Plan was presented at the National Cancer Advisory Board Meeting, which was held on September 11, and 12, 1998, at the NIH. The presentation notes can be viewed at the following webpage address: http://deainfo.nci.nih.gov/advisory/ncab/107_0998/ncab0998.pdf . On pages 23-25 of the notes, the presentation about "New Training Initiatives" is described.

CTB Career Tracks

Basic Research Career Track (primarily for Ph.D.s): The criteria for this career track did not change fundamentally compared to existing opportunities in 1999, because: a) Most of the 2000 positions available on National Research Service Awards (NRSA, T32s and F32s) go to basic scientists, and b) Nearly 50% of all the remaining basic scientists trained in cancer research receive their salaries on research grants and stipends for all NRSA awards were to have undergone (and did undergo) major increases. In addition, basic scientists have the greatest access to the research grant pool and generally have greater academic stability (e.g., tenure opportunities).

Although basic science is a training priority, NCI recognized the need to hasten the application of basic science knowledge to human cancer. Hence, there has been considerable emphasis within the basic science portfolio on translational research goals. The NCI Howard Temin Award (K01) was initiated to foster the research careers of junior scientists in basic research and later revised to emphasize training for those basic scientists who are committed to developing research programs in human cancer.

Basic Science Research Career Tracks for M.D.s (and other clinical professional degrees): Career tracks for M.D.s include opportunities for individuals to pursue a basic or a translational research career. In addition to the traditional NRSA awards (pre and postdoctoral) for basic science training, the NIH mentored Clinical Scientist Development Award (K08),

designed for individuals with M.D.s or other clinical professional degrees (including D.V.M.s) to become laboratory or field-based researchers, is also used by the NCI to develop translational researchers in human cancer.

Patient-Oriented Research Career Track for M.D.s (and other clinical professionals): Clinical patient-oriented research career tracks for clinician scientists include opportunities for individuals to pursue a basic or a translational research career. In addition to the K08 for basic science or translational research career development, the Strategic Plan called for the clinical scientists K12 training grant (now called the Calebresi Award in Clinical Oncology), to become a Program Announcement for an institutional grant rather than an RFA. Finally, new NIH individual career awards for clinical scientists, the K23 (a mentored award); the K22 (a transition award); and the K24 (mid-career investigator award) were incorporated as added opportunities in patient-oriented research.

Prevention/Control/Behavioral and Population Sciences Track: Career tracks for individuals wishing to pursue these sciences includes a unique institutional training mechanism, the R25T (cancer education grant) in addition to the traditional T32. One new concept focused on providing a transition (K22) award for newly independent investigators and a K05 award for established investigators. The K22 award provides additional protected time for newly independent investigators. The "old" K07 Preventive Oncology Award was expanded in scope to include cancer control, behavioral, and population sciences as a mentored award.

Career Tracks for Underrepresented Populations: The section of the Plan focused on underrepresented populations calls for a continuum of opportunities ranging from high school to undergraduate to graduate student, to postdoctoral researcher, to independent investigator. This plan is strategically linked to a number of other key NCI programs and award mechanisms as described below. The intent was that efforts of the NCI in the training and career development of underrepresented populations would be facilitated in all phases of training by intensive tracking and nurturing of individuals as well as by providing placement services in the best scientific environments possible. This proposed approach depends primarily on the use of the NIH program for minority supplements to P30 (center grants), research project grants (R01s, P01s), K12 (institutional career development programs for clinical scientists), T32 and R25T (training grants for population scientists), and a "mentored" K01 award.

The ultimate objective was to significantly increase the number of successful independent minority researchers in the basic, clinical, behavioral and population sciences. Because of the continued higher cancer incidence and mortality in underserved populations, there is a great need for scientists who are not only well trained but culturally sensitive.

Description of Programs in the Cancer Training Branch (CTB)

Introduction

The Cancer Training Branch (CTB) is one of four branches in the Office of Centers, Training, and Resources (OCTR). The CTB manages the NCI's research manpower development and cancer education programs, providing administration, guidance and leadership for extramural research training, career development, and education. These programs are aimed at developing well-trained investigators who will become the next generation of cancer researchers in the basic, clinical, prevention, control, population, and behavioral sciences.

Operationally, the CTB has three functions. The first is the management of NCI-funded grants in research training, career development, and cancer education. The second function is the administration of the Ruth L. Kirschstein National Research Service Award (NRSA) components (F32 and T32) of the CTB grant portfolio. This function is necessitated by the Congressionally mandated record-keeping requirements of the NRSA program, the large size of the NCI NRSA grant portfolio and the large number of NRSA trainees. Finally, the CTB oversees the Loan Repayment contracts in terms of scientific eligibility, award decisions, progress, continuations and terminations.

Chart 2, on page 8, lists the current programs for the CTB for each career stage. CTB Training mechanisms are described in Appendix D.

CHART 2

NCI Cancer Training Branch (CTB), December 2005 Program

Career Stage	Award Type	Mechanism	Program Title (science emphasis & degree requirements)
Predoctoral	Institutional	1. T32	NRSA Training Grants
		2. R25T	Cancer Education and Career Development Program (Cancer Prevention, Control, Behavioral and Population Sciences)
Mentored Postdoctoral or Junior Faculty	Institutional	1. T32	NRSA Training Grants
		2. R25T	Cancer Education and Career Development Program
		3. K12	Clinical Oncology Career Development Program
	Individual	4. F32	NRSA Fellowship
		5. K01	Howard Temin Award [1]
		6. K07	Cancer Prevention, Control, Behavioral and Population Sciences Career Development Award
		7. K08	Mentored Clinical Scientist Career Development Award
		8. K23	Mentored Patient-Oriented Research Career Development Award; clinical doctorates
		9. K25	Mentored Quantitative Scientist Career Development Award
Independent/Junior Faculty	Individual	1. K01	Howard Temin Award [1]
		2. K22	NCI Transition Career Development Award (Basic Research/Patient-Oriented Research/Cancer Prevention & Control)
Independent/Established (Senior)	Individual	1. K05	NCI Cancer Prevention, Behavioral and Population Sciences Established Investigator Award
		2. K24	Established Investigator Award in Patient-Oriented Research
		3. F33	Established Senior Investigator National Research Service Award
All Career Stages	Specialized Institutional	R25E	Cancer Education Grant Program[2]

[1] Two-phase award with an initial mentored phase followed by an Independent/Junior Faculty phase.
[2] Supports development of innovative cancer education and research dissemination projects; education for a variety of target audiences: science or health care students with an interest in cancer research careers; established cancer scientists seeking short-term educational updates in emerging cancer science areas such as genetics and molecular drug discovery; and health care providers in need of information on the latest developments in cancer prevention and control.

Training Progress and Funding Trends in the Cancer Training Branch

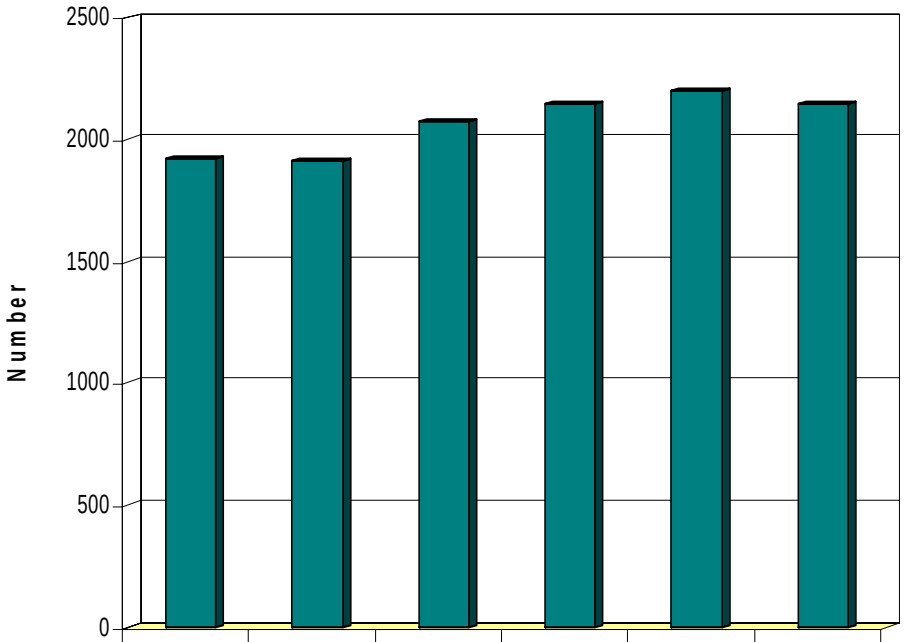
CTB Numbers of Trainees/Career Development Awardees Supported

Figure 1 shows the trends in support for trainees in each fiscal year FY99 - FY04. The numbers reflect individuals in training on all institutional training grants and individual career awards with one exception, the R25E. The R25E Cancer Education Grant numbers are not included because of the diversity in the nature of the training activities allowable under this mechanism. The education programs can range from very short time frames, such as workshops and conferences, to curriculum driven training for extended periods of time. Therefore, in any given fiscal year, the numbers of individuals in the funded R25E programs fluctuate according to the strategic goals under each grant.

FY00 was the first fiscal year that Program Announcements under the new Strategic Plan (described on page 6) were published and applications solicited by them were funded in FY01. The increase in numbers of trainees in FY01 is partially due to the increase in numbers of specific K-awards, not discernable by viewing Figure 1. The increase in FY02 and FY03 was considerably less; and in FY04, numbers of CTB funded trainees declined by 2.4% relative to FY03 (N=53). The decline was due to increased costs on training grants during a time of flat budgets.

Figure 1

Number of Research Training and Career Development Awardees/Training Appointments[a] Supported by the CTB , by Fiscal Year



	1999	2000	2001	2002	2003	2004
Number CTB Trainees	1916	1913	2076	2147	2195	2142
Yearly % Change		- 0.2	8.5	3.4	2.2	- 2.4

Fiscal Year

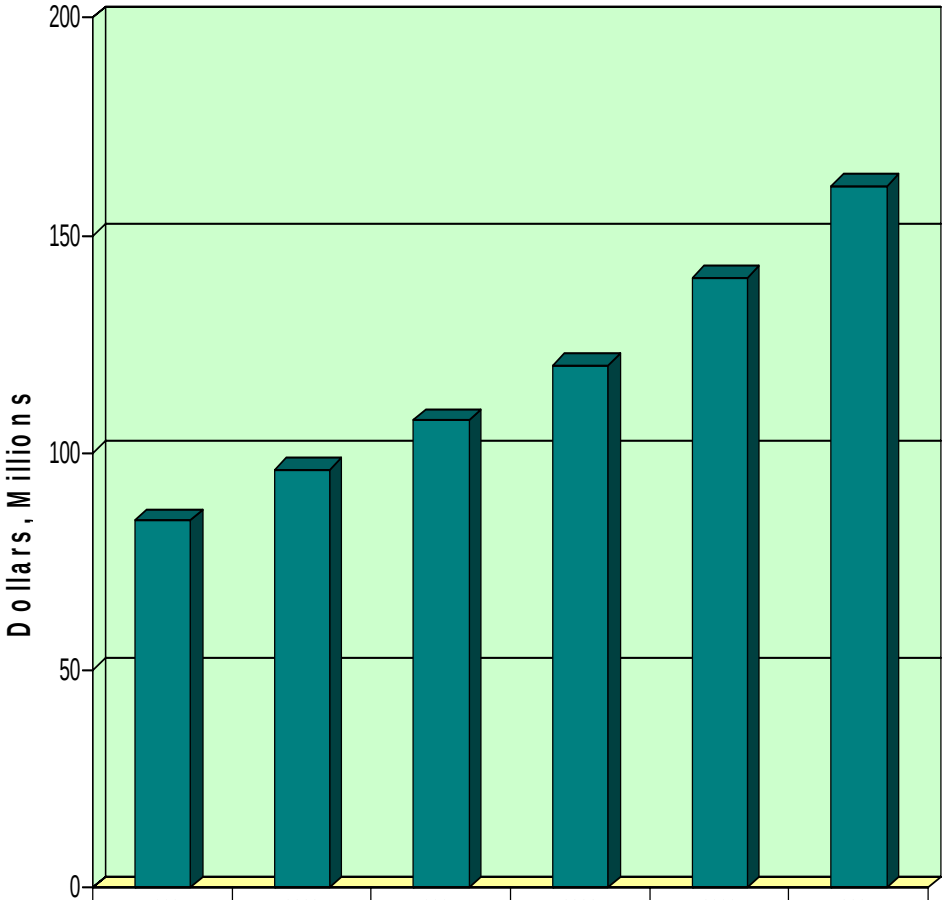
[a] Data excludes trainees on R25E grants (Cancer Education grants)

CTB Dollars Awarded for Training and Career Development

Although the number of trainees and Career Development Awards (CDAs) increased slowly from FY99 through FY03, and even declined in FY04, Figure 2 reflects the steady increase in dollars awarded throughout the fiscal years assessed. This increase in dollars reflects the increase in stipends and a rise in tuition and health insurance costs on NRSA grants as well as allowable increases in salaries and research costs on some career awards. Also, note that while R25E (Cancer Education) trainee numbers are not included in Figure 1, total dollars awarded to CTB training, as shown in Figure 2, do reflect the R25E program awards. The extramural dollars awarded to R25Es between FY99 and FY04 were $12M to $17M. Consequently, the increases seen in Figure 2 cannot be explained solely by the increase in R25E awards.

Figure 2

Extramural Dollars[a] Awarded to Training and Career Development by the NCI CTB, by Fiscal Year



	1999	2000	2001	2002	2003	2004
CTB Dollars (Millions)	84.35	96.25	107.41	120.14	140.11	161.28
Yearly % Change		14.1	11.6	11.9	16.6	15.1

[a] Data include dollars awarded to R25E grants (Cancer Education grants)

Fiscal Year

Description of Programs in the Comprehensive Minority Biomedical Branch (CMBB)

Introduction

The CMBB is one of the four branches in the Office of Centers, Training, and Resources (OCTR). The CMBB coordinates NCI's efforts to broaden participation in cancer-related research and training activities for underrepresented minorities, individuals with disabilities, individuals seeking re-entry into biomedical research, and other segments of the population that are underserved by the biomedical research enterprise. The CMBB's goal is to significantly increase the number of underrepresented minorities participating as competitive NCI/NIH-funded cancer researchers. The activities of well-trained, independent, competitive, and culturally sensitive researchers will unquestionably have a positive impact on our efforts to reduce the disproportionate burden of cancer incidence and mortality in underrepresented minority populations.

The CMBB utilizes three main strategies to achieve the NCI's objectives cited above. The first is the Continuing Umbrella of Research Experiences (CURE) for Underrepresented Minorities Program, which is involved in training and encouraging underrepresented minority individuals to become competitive cancer researchers. The second aims at raising the competitive research capacity of Minority-Serving Institutions (MSIs). The third strategy is aimed at making CMBB a national resource for programs and organizations with similar objectives.

Subsequent to the development of the Strategic Plan (described on page 6), additional mechanisms were added to the CMBB portfolio to help meet strategic objectives. All of the mechanisms supported by the CMBB are displayed in Chart 3, pages 12 and 13. Descriptions of the mechanisms are presented in detail in Appendix E.

Training and Career Development Programs Supported by the NCI Comprehensive Minority Biomedical Branch (CMBB)

Career Stage	Award Type	Mechanism	Program Title
High School	Individual	1. Research Supplements to Research Project Grants (RPGs, R01, R03, R15, R21, U01, P01)	CURE Supplements
Undergraduate		1. Research Supplements to Research Project Grants (RPGs, R01, R03, R15, R21, U01, P01)	CURE Supplements
		2. P30 Supplements	Cancer Center Core Grant CURE Supplements
Predoctoral	Individual	1. Research Supplements to Research Project Grants (RPGs, R01, R03, R15, R21, U01, P01)	CURE Supplements
		2. F31	The Ruth L. Kirschstein National Research Service Award - Individual Predoctoral Fellowship Award for Minority Students
			The Ruth L. Kirschstein National Research Service Award - Individual Predoctoral Fellowship Award for Students with Disabilities
	Institutional	1. P30 Supplements	Cancer Center Core Grant CURE Supplements
		2. T32 Supplements	Ruth L. Kirschstein National Research Service Award (CURE Supplement)
		3. R25T Supplements	Cancer Education and Career Development Program
Postdoctoral Trainee or Junior Faculty (mentored)	Individual	1. Research Supplements to Research Project Grants (RPGs, R01, R03, R15, R21, U01, P01)	CURE Supplements
		2. K01	Mentored Career Dev. Award for Underrepresented Minorities
		3. K08	Mentored Clinical Scientist Career Award for " "
		4. K23	Mentored Patient-Oriented Research Award for " "
		5. K22	NCI Transition Career Development Award for " "
	Institutional	1. T32 Supplements	Ruth L. Kirschstein National Research Service Award (CURE Supplement)
	Institutional	2. K12 Supplements	Clinical Oncology Career Development Program (CURE Supplement)

(CMBB continued)

Career Stage	Award Type	Mechanism	Program Title
Undergraduate	Institutional	P20 -- Planning Grant for Minority Institution/Cancer Center Collaboration	Planning Grant for Minority Institution/Cancer Center Collaboration
Predoctoral	Institutional	U56 -- Cooperative Planning Grant for Comprehensive Minority Institution/Cancer Center Partnership (U56). Planning grant for the implementation of U54s. For implementation of Comprehensive Minority Institution/ Cancer Center Partnerships between Minority Serving Institutions and NCI-designated Cancer Centers or Groups of Cancer Centers to develop a stronger national cancer program aimed at understanding the reasons behind the significant cancer disparities and impact on minority populations. U54 -- Comprehensive Minority Institution/Cancer Center Partnership. For implementation of Comprehensive Minority Institution/ Cancer Center Partnerships between Minority Serving Institutions and NCI-designated Cancer Centers or Groups of Cancer Centers in order to develop a stronger national cancer program aimed at understanding the reasons behind the significant cancer disparities and impact on minority populations.	Cooperative Planning Grant for Comprehensive Minority Institution/Cancer Center Partnership Comprehensive Minority Institution/Cancer Center Partnership
Postdoctoral trainee or Junior Faculty (mentored)	Institutional	U56 -- Cooperative Planning Grant for Comprehensive Minority Institution/Cancer Center Partnership. Planning grant for the implementation of U54s. (see above) U54 -- Comprehensive Minority Institution/Cancer Center Partnership. (see above)	Cooperative Planning Grant for Comprehensive Minority Institution/Cancer Center Partnership Comprehensive Minority Institution/Cancer Center Partnership

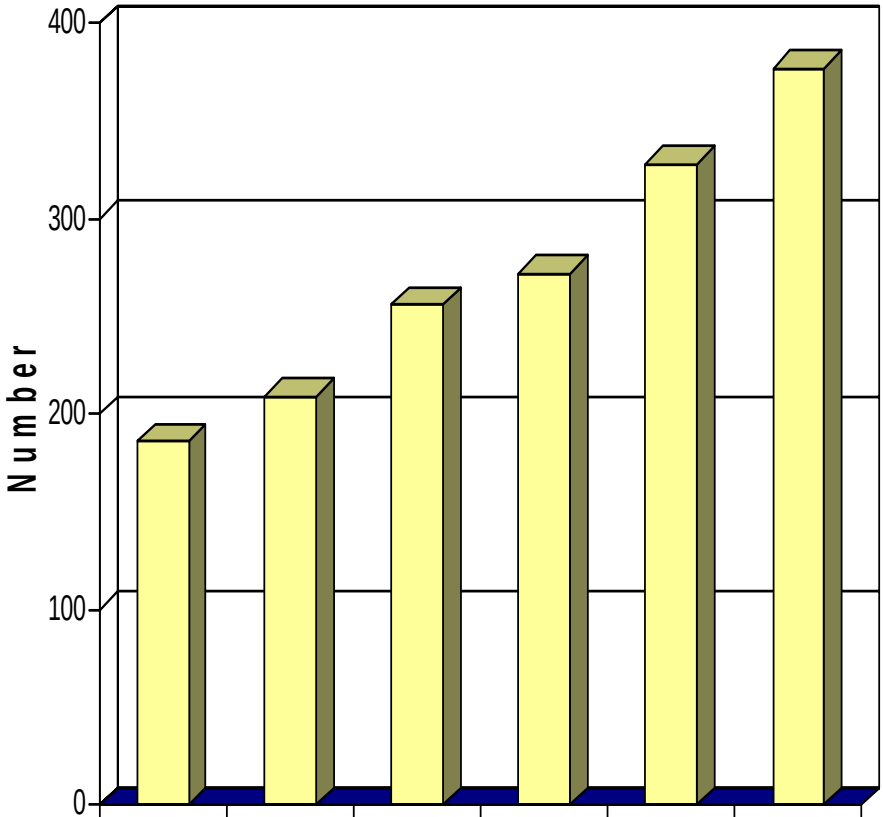
Training Progress and Funding Trends in the Comprehensive Minority Biomedical Branch (CMBB)

CMBB Numbers of Trainees/Career Development Awardees Supported

Figure 3 shows a steady increase in the number of underrepresented minorities supported by the CMBB over the years following the development and implementation of the Strategic Plan described earlier. The number of trainees would be higher if trainees under the CMBB cooperative planning grant programs (U54 and U56) were included. (These programs are being assessed.)

Figure 3

Number of Research Training and Career Development Awardees/Appointments Supported by the Comprehensive Minority Biomedical Branch (CMBB)[a], by Fiscal Year



	1999	2000	2001	2002	2003	2004
Number CMBB Trainees	186	209	256	272	328	377
Yearly % Change		12.4	22.5	6.3	20.6	14.9

[a] Does not include number of trainees supported by U54 & U56 grants

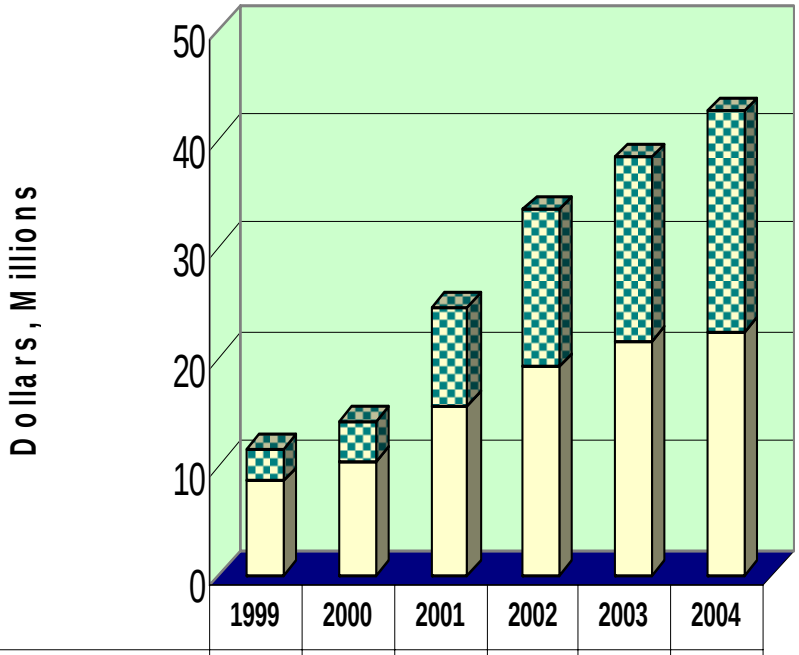
Fiscal Year

CMBB Dollars Awarded for Training and Career Development

Figure 4 reflects the total dollars awarded between FY99 and FY04, including U54 and U56 awards. The Figure shows a large and continuous rise (268%) in dollars awarded between FY99 and FY04. The dollar investment in the CMBB Centers and Partnership Programs increased 7-fold during this time interval, more than any other targeted training program.

Figure 4

Dollars Awarded to Training and Career Development by the Comprehensive Minority Biomedical Branch (CMBB), by Fiscal Year



	1999	2000	2001	2002	2003	2004
CMBB Centers[a] & Partnerships[b] Dollars (Millions)	2.88	3.66	8.94	14.39	16.73	20.12
CMBB Other Dollars (Millions)	8.68	10.50	15.61	19.06	21.53	22.40
Total Dollars[c] (Millions)	11.56	14.16	24.55	33.45	38.26	42.52
Yearly % Change		22.5	73.4	36.2	14.4	11.1

[a] Includes P20, P30 & P50 mechanisms
[b] Includes U54 & U56 mechanisms
[c] Includes dollars for all mechanisms

Fiscal Year

Combined Training Programs and Funding Trends for the CTB and CMBB

Numbers of NRSA Trainees Supported by CTB and CMBB

Figure 5 presents a breakout of predoctoral and postdoctoral trainees supported by CTB and CMBB over five fiscal years. The mechanisms include individual fellowships and Institutional T32's. [Note that the CMBB but not the CTB supports the F31 predoctoral fellowship. The F31 is only available for underrepresented minorities and disabled individuals (Figure 5a)].

Figure 5 shows that between FY99 and FY04, the numbers of NRSA-supported trainees has been steadily decreasing from N=1,586 in FY01 to N=1,471 in FY04. This figure also shows that over the years approximately 60% of NRSA trainees are postdoctoral (range: 61% to 63%).

Figure 5a shows an increase in underrepresented minorities on NRSA predoctoral (F31) fellowships over five years. The increase is substantial between FY02 and FY03 (55.2%).

Trainees Supported by K12 and R25T Grants

Figure 5b shows that both the total number of appointments to NCI R25T grants (including CMBB minority supplements) and funding continuously increased between FY00 and FY04 — from 87 to 273 appointments (313%) and from $4.1M to $15.5M (378%). This figure also shows that the number of postdoctoral appointments increased faster than the number of predoctoral appointments.

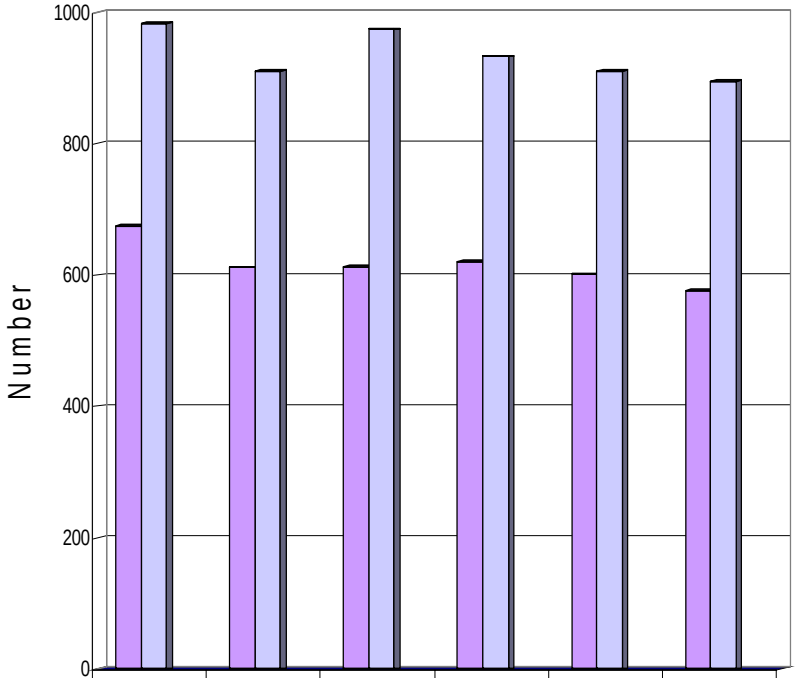
Figure 5c shows that the total number of appointments to K12 grants (including CMBB minority supplements) and the funding increased over the years, but more gradually than did the R25Ts.

Figure 5d shows that overall appointments to R25Ts and K12s increased 68% from FY00 to FY04; and that funding increased 106% from $11.7M to $24.1M in the same time interval.

Figure 5e shows the dollar investment in NRSA and the non-NRSA institutional training grants (K12 and R25T) has continuously increased from $68M in FY00 to $93M (37%) in FY04. The number of appointments to the R25T and K12 grants has increased 125% from 165 in FY00 to 371 in FY04. The number of NRSA appointments increased slightly between FY00 and FY01 (4.3%) but have been dropping since that time. Although the numbers have decreased slightly, the amount of support for the program increased. This steady percentage increase in overall dollars reflects the increases in salary/stipends, tuition and other training-related allowances.

Figure 5

Number of National Research Service Award Trainees[a] Supported by CTB and CMBB, by Fiscal Year



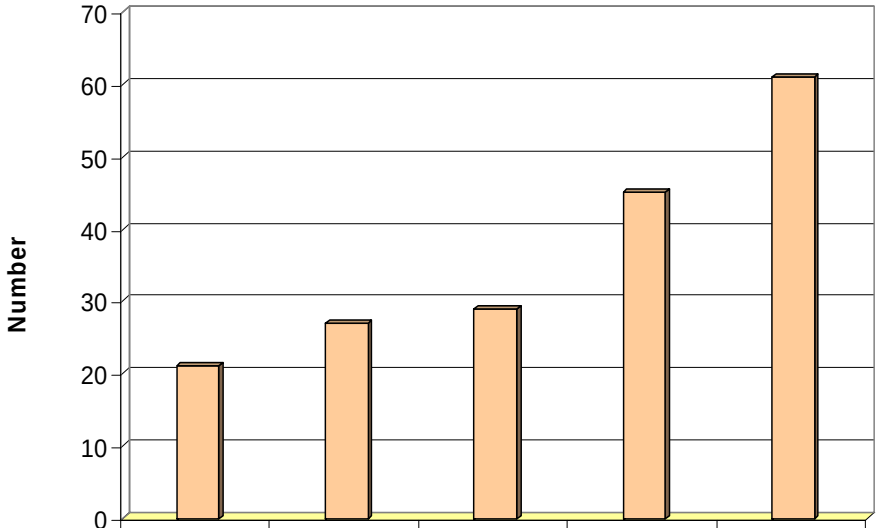
	1999	2000	2001	2002	2003	2004
Predoctoral Number	675	611	612	620	601	576
Postdoctoral Number	983	910	974	932	910	895
Total Number	1658	1521	1586	1552	1511	1471

[a] Includes T32, F31,F32 & F33 supported individuals

Fiscal Year

Figure 5a

Number of NRSA F31 Predoctoral Trainees Supported by CMBB, by Fiscal Year

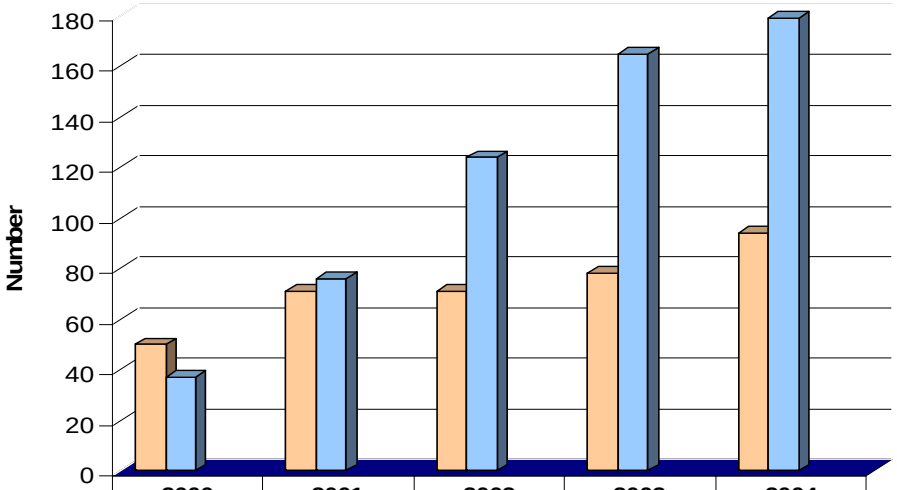


	2000	2001	2002	2003	2004
F31 (Predoctoral) Number	21	27	29	45	61

Fiscal Year

Figure 5b

Number of R25T[a] Predoctoral and Postdoctoral Trainees Supported by CTB and CMBB, by Fiscal Year



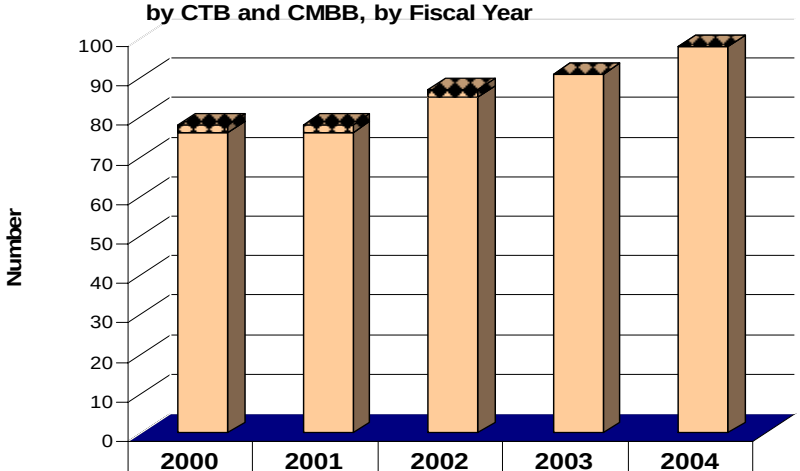
	2000	2001	2002	2003	2004
Predoctoral Number	50	71	71	78	94
Postdoctoral Number	37	76	124	165	179
Total Number	87	147	195	243	273
Total Dollars (Millions)	4.1	7.0	11.7	14.1	15.5

[a] R25Ts support Predoctoral and Postdoctoral trainees in Cancer Prevention, Control, Behavioral & Population Sciences

Fiscal Year

Figure 5c

Number of K12[a] Clinical Trainees and Dollars Awarded by CTB and CMBB, by Fiscal Year



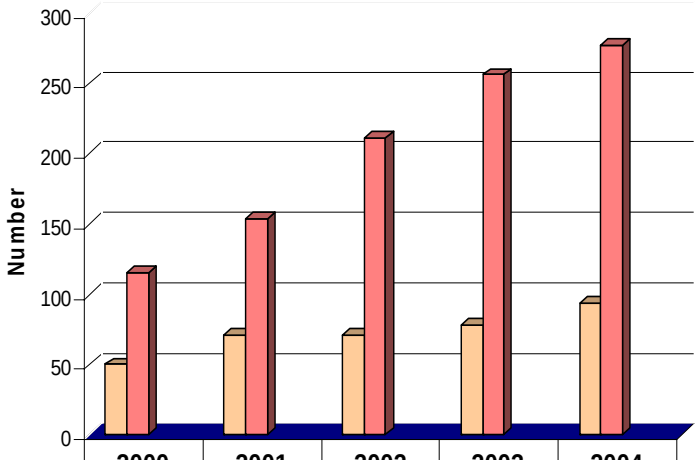
	2000	2001	2002	2003	2004
CMBB K12	2	2	2	0	0
CTB K12	76	76	85	91	98
Total Number	78	78	87	91	98
Dollars (Millions)	7.61	7.80	6.81	7.69	8.59

Fiscal Year

[a] K12s support Postdoctoral trainees in Clinical (Patient-Oriented) Research

Figure 5d

Number of Predoctoral and Postdoctoral Trainees on R25T and K12 Grants Supported by CTB and CMBB, by Fiscal Year

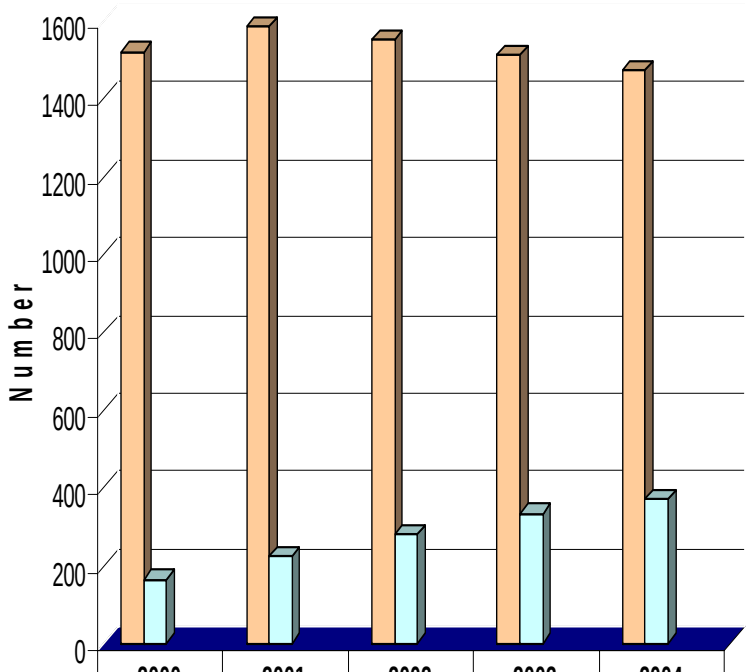


	2000	2001	2002	2003	2004
Predoctoral Number	50	71	71	78	94
Postdoctoral Number	115	154	211	256	277
Total Number	165	225	282	334	371
Total Dollars (Millions)	11.7	14.8	18.5	21.8	24.1

Fiscal Year

Figure 5e

Number of Trainees Supported by CTB and CMBB NRSA Awards and Non-NRSA Institutional Grants, by Fiscal Year



	2000	2001	2002	2003	2004
NRSA: F31, F32, F33, T32	1521	1586	1552	1511	1471
Institutional Non-NRSA: R25T, K12	165	225	282	334	371
Total Number	1686	1811	1834	1845	1842
Total Dollars (Millions)	67.9	72.7	82.2	87.7	93.1

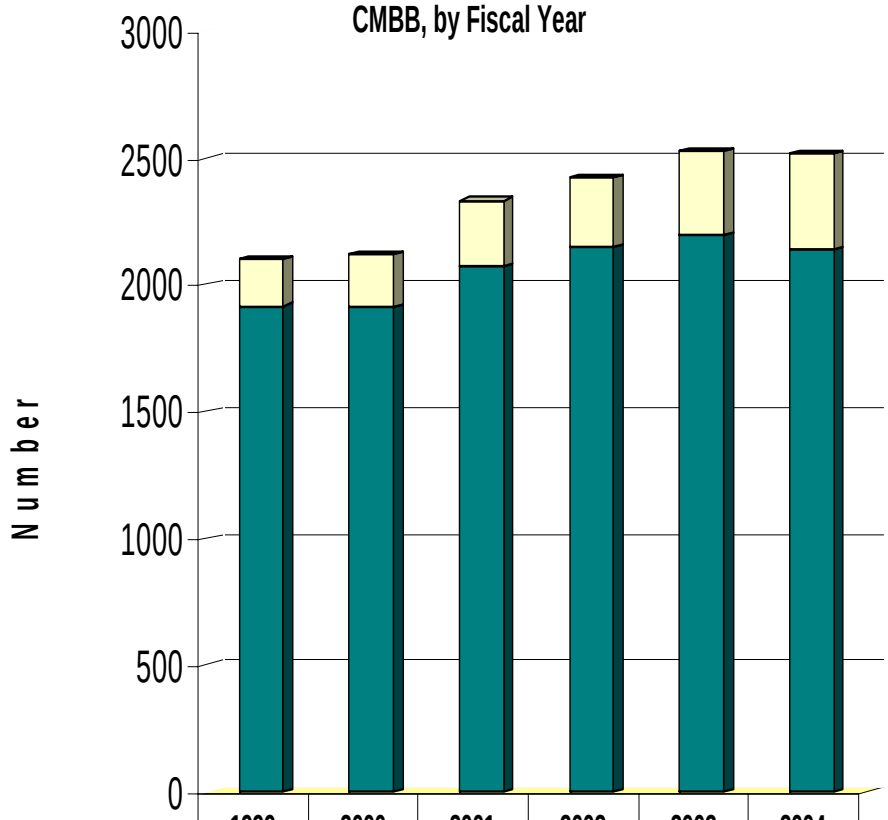
Fiscal Year

CTB and CMBB Numbers of Trainees/Career Development Awardees Supported

Figure 6 shows the numbers of CTB and CMBB trainees supported over the years except for those supported by the CTB R25E institutional grants and the CMBB CURE program mechanisms, U54 and U56. Even without these numbers, Figure 6 shows the sizeable increases overall in numbers of supported trainees, namely 2,102 in FY99, to 2,519 in FY04, an increase of nearly 20% over 5 years. Note that CTB programs also support underrepresented minorities; therefore, the progress reported here underestimates the overall number of minorities supported.

Figure 6

Research Training and Career Development Awardees/Appointments[a] Supported by CTB and CMBB, by Fiscal Year



	1999	2000	2001	2002	2003	2004
CMBB Number	186	209	256	272	328	377
CTB Number	1916	1913	2076	2147	2195	2142
Total Number	2102	2122	2332	2419	2523	2519
Yearly % Change		0.9	9.9	3.7	4.3	- 0.2

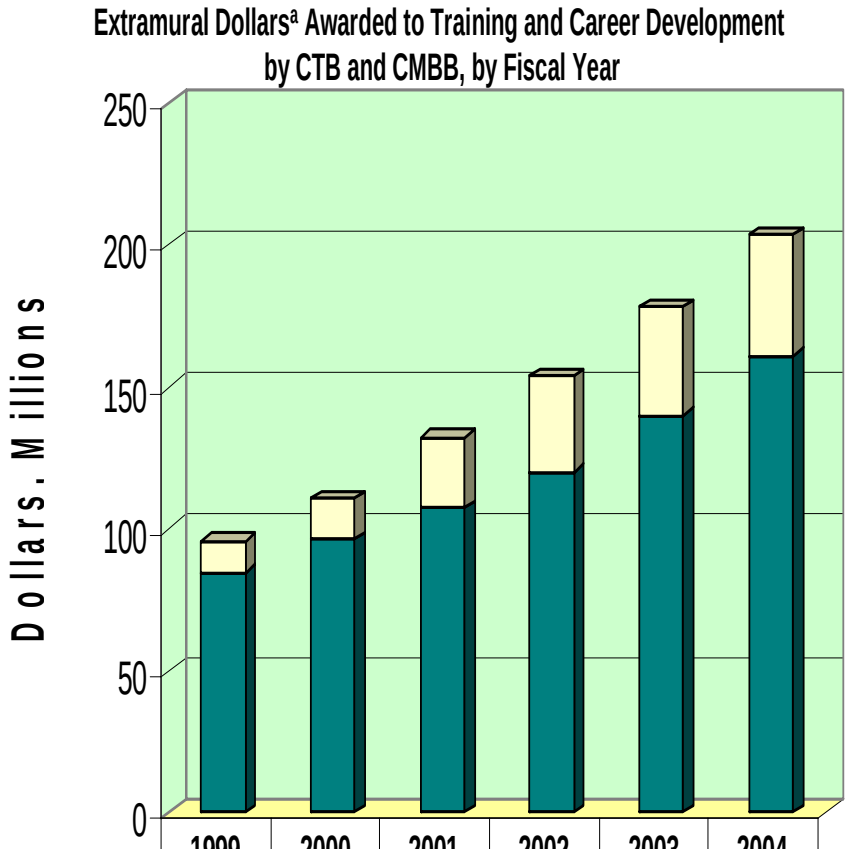
[a] Does not include CTB R25E, CMBB U54 and U56 numbers

Fiscal Year

CTB & CMBB Dollars Awarded for Training and Career Development

Figure 7 shows the total dollars awarded over six fiscal years by the two major extramural training and career development programs, including those for which numbers of trainees were not included in Figure 6 (CTB R25E, CMBB U54 and U56 awards). The steady percentage increase in overall dollars reflects increases in salary/stipends, tuition and other training-related allowances, as well as an overall growth in numbers of trainees. There was a 112.5% increase in dollars awarded from FY99 to FY04.

Figure 7



	1999	2000	2001	2002	2003	2004
CMBB Dollars (Millions)	11.56	14.16	24.55	33.45	38.26	42.52
CTB Dollars (Millions)	84.35	96.25	107.41	120.14	140.11	161.28
Total Dollars (Millions)	95.91	110.41	131.96	153.59	178.37	203.80
Yearly % Change		15.1	19.5	16.4	16.1	14.3

[a] Dollars include all CTB and CMBB training and career development mechanisms

Training and Educational Opportunities Sponsored by the Division of Cancer Prevention's Office of Preventive Oncology Cancer Prevention Fellowship Program

Introduction

The Cancer Prevention Fellowship Program (CPFP), established in 1987, was created within the Division of Cancer Prevention and Control (currently, the Division of Cancer Prevention) to intensify efforts in cancer prevention and control by attracting scientists from a multiplicity of health science disciplines. It was envisioned that with this training, scientists and clinicians would become leaders in the field of cancer prevention at NCI and other institutions.

The CPFP offers multidisciplinary educational and scientific research opportunities in cancer prevention. The Program strives to select the most qualified and talented fellows and is committed to fully supporting them. During their first year, fellows without a prior degree in public health or epidemiology obtain didactic training in the fundamentals of public health and research methodology during their Master in Public Health (MPH) program. In their second year, upon arrival at the NCI, fellows attend a one-week orientation followed by the five-week ***Summer Curriculum in Cancer Prevention***, which encompasses the four-week *Principles and Practice of Cancer Prevention and Control Course*, the one-week *Molecular Prevention Course*, and the two-day *Molecular Prevention Laboratory Course*. During the summer months, fellows begin contacting potential preceptors at the NCI.

Although the CPFP is housed in an extramural division (i.e., Division of Cancer Prevention), Cancer Prevention Fellows – all of whom are Cancer Research Training Award (CRTA) Fellows – can match with preceptors engaged in cancer prevention and control research anywhere at the NCI, whether intramural or extramural.

By September, fellows are planning original research projects, and in the two years that follow, they concentrate on developing their research program, writing manuscripts, publishing results in leading journals, and making scientific presentations. Participation in CPFP activities is encouraged, including attendance at weekly Fellows' Research Meetings, the Cancer Prevention Colloquia Series, and the Annual Fellows' Scientific Symposium, to ensure exposure to the most recent advances in the diversity of disciplines that comprise the field of cancer prevention. Training in presentation skills, grant-writing, time management, and other professional development activities further strengthen the foundation upon which fellows' careers are built.

Fellows are offered training in molecular prevention, including a one-week course on this topic in the *Summer Curriculum in Cancer Prevention* and two-day hands on *Molecular Prevention Laboratory Course*. In addition, CPFP participates in a joint training effort between the NCI and the Food and Drug Administration and has established two specialty tracks: the Ethics of Prevention and Public Health Track and the Clinical Cancer Prevention Research Track. Fellows entering the specialty tracks participate in all of the activities of the "parent" program and have additional opportunities for experiences related to public health ethics and clinical research, respectively.

Molecular Cancer Prevention Training in the CPFP

As the techniques of molecular biology research become increasingly integrated into cancer prevention research, the CPFP has sought to provide Cancer Prevention Fellows with advanced training in laboratory techniques that they can apply to their research in cancer prevention. The Molecular Prevention Laboratory provides logistical support to the Molecular Prevention Laboratory Course (see section, Molecular Prevention Laboratory Course). Some fellows have used the Laboratory for short-term training to learn specific techniques, such as cell culture methods. Others, lacking access to a "wet lab" in their primary research group, have used the facility longer-term to process tissue samples and to perform specific assays (e.g., hormone assays for epidemiologic studies).

The Molecular Prevention Laboratory provides opportunities for intermediate and long-term mentored research experiences for fellows interested in basic nutrition and cancer prevention research. The focus of ongoing work in the Molecular Prevention Laboratory is the integration of experiments using transgenic animal models and advanced molecular biologic approaches with epidemiologic and in vitro studies to identify and characterize diet-gene interactions relevant to cancer prevention.

The Molecular Prevention Laboratory is jointly funded by DCP, CCR, and peer-reviewed grant funding. DCP provides the majority of support for the Laboratory's materials, supplies, and services. CCR provides the laboratory and office space at the NCI at Frederick and access to CCR-shared services (e.g., pathology and histotechnology; animal production; technical services; a dedicated module for experiments in the animal facility (Building 539); and molecular biology core facilities, including facilities for microarray and immunohistochemistry).

Molecular Prevention Laboratory Course

All incoming Cancer Prevention Fellows participate in a hands-on laboratory course that is open only to fellows. This two-day practicum organized by the Molecular Prevention Laboratory takes place at the NIH Foundation for Advanced Education in the Sciences facility in Building 60 ("The Cloisters") on the main NIH campus in Bethesda, MD. The goal of this course is to provide fellows, especially those with limited laboratory experience, tangible reference points for understanding laboratory applications commonly used in cancer prevention research. The course consists of brief explanatory lectures interwoven with laboratory demonstrations. Each exercise is designed to demonstrate laboratory techniques that are frequently referenced in the ***Summer Curriculum in Cancer Prevention*** lectures.

NCI *Summer Curriculum in Cancer Prevention*

Organized by the NCI DCP Office of Preventive Oncology, the ***Summer Curriculum in Cancer Prevention*** is a series of courses geared toward clinicians, research scientists, and other professionals interested in cancer prevention and control. Of the 100 participants each year, approximately 15-20 are Cancer Prevention Fellows. There is no cost to register or participate; however, room, board, and transportation expenses are the responsibility of the participant. The Summer Curriculum evolved from the DCPC Cancer Prevention and Control Academic Program, a 3-month didactic program in cancer prevention and control first offered in 1985 that was designed originally for Cancer Prevention Fellows to provide an overview of NCI-supported cancer prevention and control activities and insight into the administrative procedures at the NIH. With the incorporation of the MPH degree option into the CPFP in 1991, the Cancer Prevention and Control Academic Program, renamed the ***Summer Curriculum in Cancer Prevention***, was shortened to five weeks and was modified to provide a more in-depth focus on the principles of cancer prevention and on recent advances in the field.

Faculty

The faculty for the *Principles and Practice of Cancer Prevention and Control Course* is comprised of approximately 60 expert lecturers from the NCI, the NIH, and academic institutions world-wide. For the *Molecular Prevention Course*, fifteen expert lecturers from the NCI and from various academic institutions within the U.S. serve as faculty.

Principles and Practice of Cancer Prevention and Control

The *Principles and Practice of Cancer Prevention and Control Course*, held in July each year, provides specialized instruction in the concepts, methods, issues, and applications related to the field of cancer prevention and control. The structure of this four-week course is based on modules, with lectures in each module covering different aspects of a specific topic. In general, modules have included:

- Introduction to the Cancer Problem
- Biometric Methodology
- Prevention and Control of Organ Specific Tumors
- Diet and Chemoprevention
- Behavioral Science and Community Interventions
- Ethics, Law, and Policy in Cancer Prevention and Control
- Occupational Cancer and the Environment
- Health Disparities and Special Populations
- Cancer Prevention Outside of the NCI

Given the large number of international participants, most of whom are accomplished scientists, one day, International Day, is set aside to provide an opportunity for these participants to share their expertise with other course attendees through presentations on issues related to cancer prevention in their native land.

Beginning in 2000, the *Principles and Practice of Cancer Prevention and Control Course* has included a special keystone *Annual Advances in Cancer Prevention Lecture*, which is held on the main NIH campus in Bethesda, MD and is open to the entire NIH community.

Molecular Prevention Course

The *Molecular Prevention Course*, a one-week course on the molecular aspects of cancer prevention, follows the *Principles and Practice of Cancer Prevention and Control Course*. It provides a strong background in the molecular biology and genetics of cancer and an overview of the basic laboratory approaches and technologies applied to cutting-edge research in the fields of molecular epidemiology, bionutrition, chemoprevention, biomarkers, and translational research.

Training Progress and Funding Trends in the Cancer Prevention Fellowship Program

Overall Number of Cancer Prevention Fellows Supported and Dollars Awarded

As shown in Figure 8, the number of Cancer Prevention Fellows increased from 36 in FY99 to 57 in FY04. This increase in the total number of fellows supported each FY has coincided with a 36% increase in the number of fellows entering CPFP each year (an increase from 11 fellows in FY99 to 15 fellows in FY04). From FY99 to FY03, the number of dollars awarded to Cancer Prevention Fellows increased approximately 24% (20% to 28%) annually, and between FY03 and FY04, the dollars awarded decreased by 10.5% (see Figure 9).

Figure 8

Number of Cancer Prevention Fellows Supported, by Fiscal Year

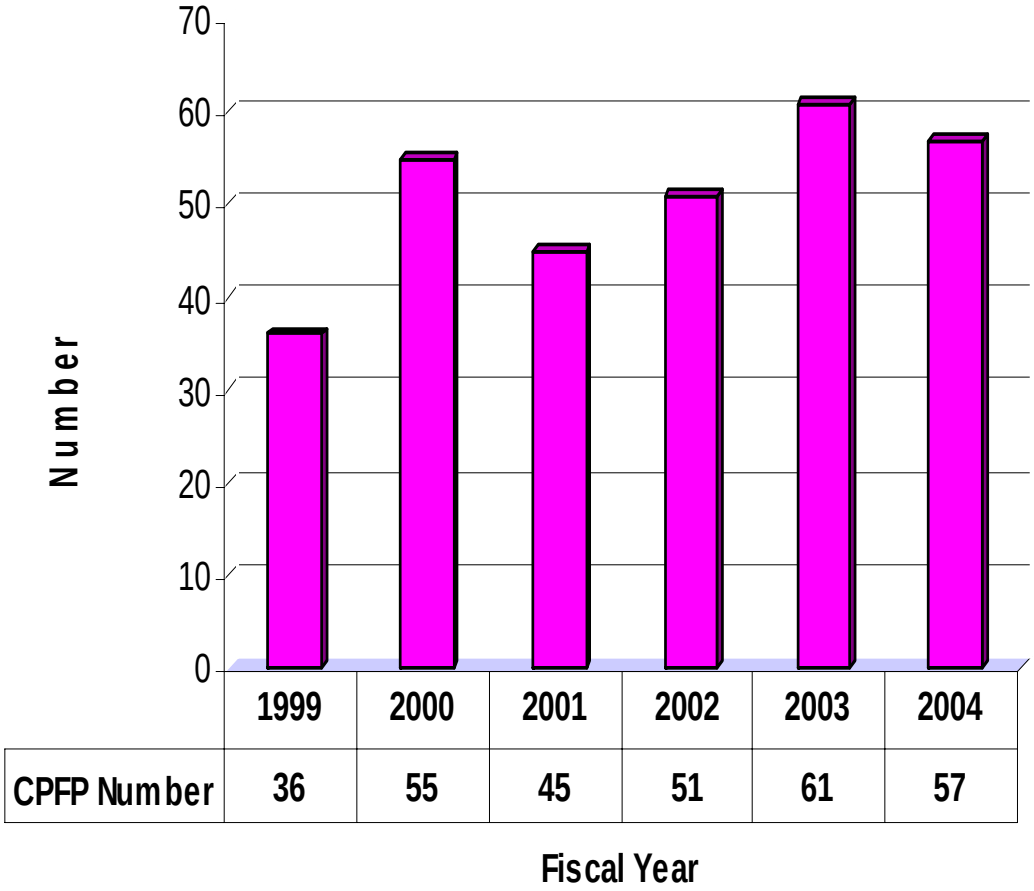
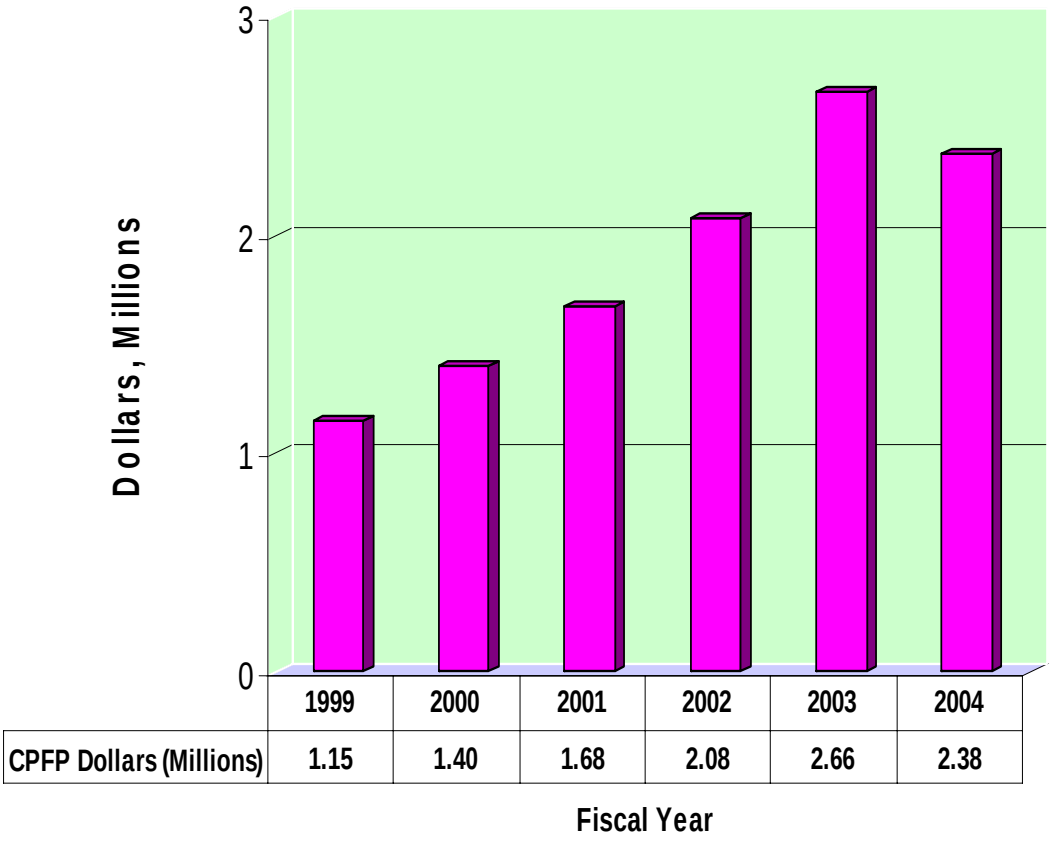


Figure 9

Dollars Awarded to Cancer Prevention Fellows, by Fiscal Year



	1999	2000	2001	2002	2003	2004
CPFP Dollars (Millions)	1.15	1.40	1.68	2.08	2.66	2.38

Fiscal Year

Career Development in Specialized Programs of Research Excellence (SPOREs)

Introduction

The NCI established the Specialized Programs of Research Excellence (SPOREs) in 1992 to promote interdisciplinary research devoted to cancers of particular organs and to speed the bi-directional exchange between basic and clinical science to move basic research findings from the laboratory to applied settings involving patients and populations. Each of the NCI's SPOREs develops and maintains specialized resources that benefit all scientists working on the specific cancer site, as well as SPORE scientists.

Each SPORE has a career development program that recruits scientists both within and outside the SPORE institution to enlarge the cadre of laboratory and clinical scientists dedicated to translational research on human cancer. The SPORE career development program is designed to accommodate scientists with a wide variety of prior research experience and at different stages in career development. As a consequence, all aspects of this program are designed to be highly flexible and are tailored to the individual needs of the candidate as well as that of the SPORE. Eligible candidates may be in the postdoctoral phase of their careers or may be established investigators who wish to develop or refocus their careers on translational cancer research. Predoctoral individuals are not eligible candidates. The process and criteria for candidate selection as well as the duration of the individual career development experiences are determined by each of the individual SPOREs. The SPOREs provide support for salary and research, but these costs are not fixed as is the case for the NIH career (K) awards. A list of funded SPOREs can be found in Appendix F.

Training Progress by SPOREs

The 61 funded SPOREs, as of FY04, were supporting approximately 120 individuals in special translational projects. Since the training program experiences are determined by each SPORE and costs are not fixed, trends are not reported. The program is included here to inform the reader about the nature of opportunities for career development within the SPORE program.

Training in NCI Networks: Center to Reduce Cancer Health Disparities (CRCHD)

Introduction

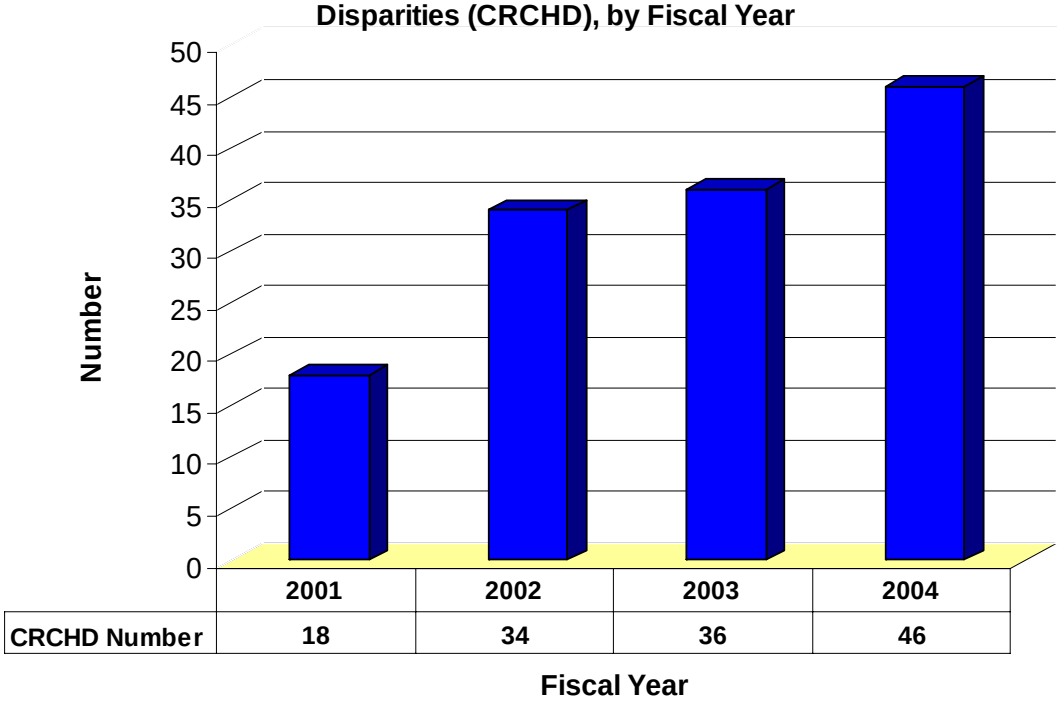
The Center to Reduce Cancer Health Disparities was established in March 2001. A major emphasis in the Center is on the development and funding of networks of minority investigators who can also provide training for students interested in the pursuit of a biomedical research career focused on cancer health disparities. One aspect of the Special Population Network Program is the training of junior researchers to do community-based research for special populations. The junior investigators write research proposals, which are evaluated as "mini" R01 grants. The meritorious proposals are funded, and the researcher performs the study and presents the results in a research paper. The support of their K award applications establishes a continuum from our pilot program to the NCI/NIH research community. The ultimate goal is for these researchers to obtain R01 research grants. The funding of their K awards is an important step in that direction.

Training Progress and Funding Trends in NCI Networks: Center for Cancer Health Disparities (CRCHD)

As shown in Figure 10, the number of trainees supported by the CRCHD increased between FY01 and FY04, with the largest increase occurring between FY01 and FY02 (89%). Likewise, the number of dollars awarded, as shown by Figure 11, steadily increased over the same time period; the most dramatic increase was between FY01 and FY02 (89%).

Figure 10

Number of Trainees Supported by the Center to Reduce Cancer Health Disparities (CRCHD), by Fiscal Year

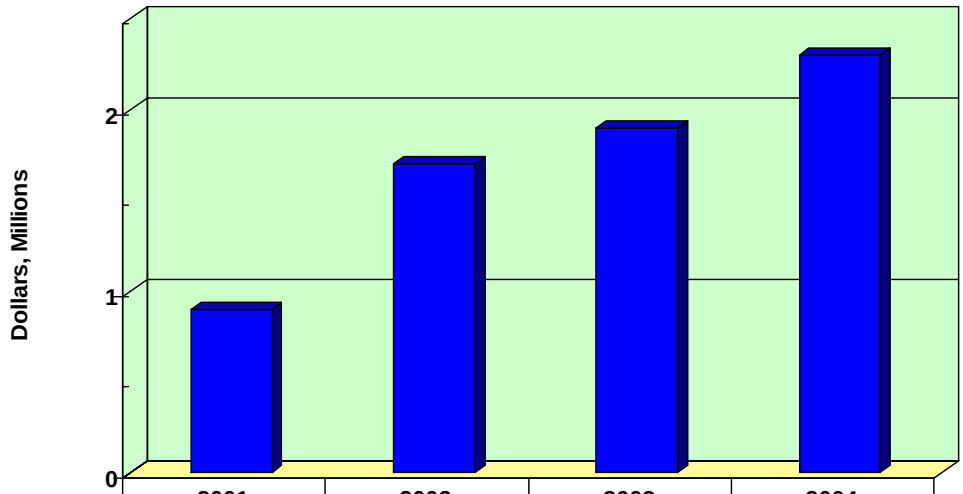


	2001	2002	2003	2004
CRCHD Number	18	34	36	46

Fiscal Year

Figure 11

Extramural Dollars Awarded to New Pilot Projects by the Center to Reduce Cancer Health Disparities (CRCHD), by Fiscal Year



	2001	2002	2003	2004
CRCHD Dollars (Millions)	0.9	1.7	1.9	2.3

Fiscal Year

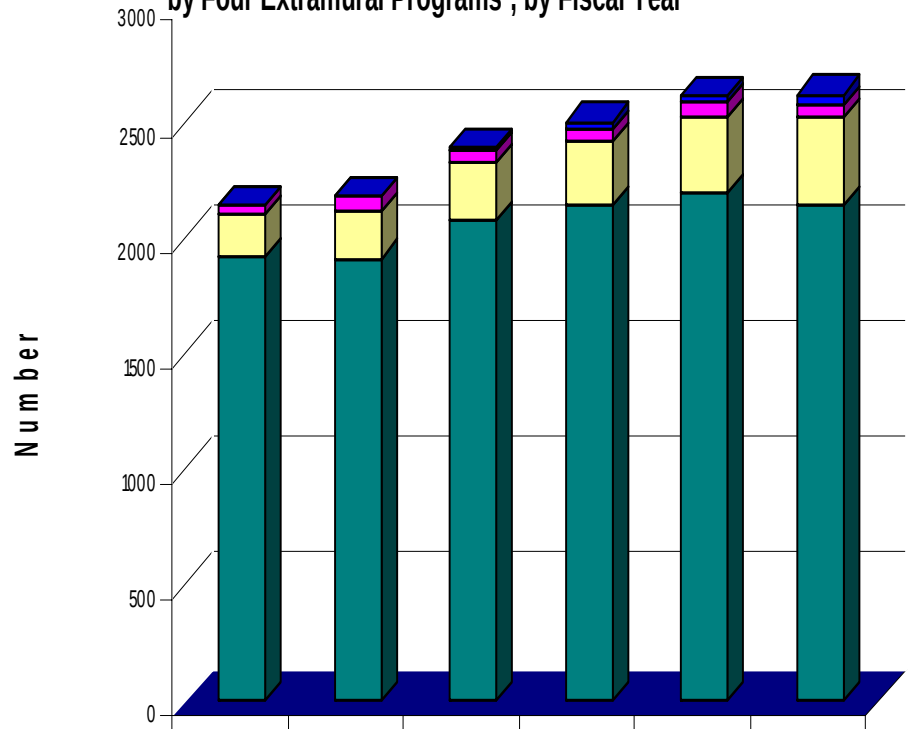
Numbers of Trainees/Fellows/Career-Development Awardees and Funding Trends in Four Extramural Programs

Overall Trends in Support for Extramural Trainees

The overall number of individuals in the four extramural training programs for FY99 through FY04 are shown in Figure 12 (the R25E, U54 and U56 numbers are not included in these data). This figure shows that following the beginning of the implementation of the Strategic Plan in FY00, the numbers have steadily increased from 2,177 to 2,620 in FY03 (20.4% increase) and then stabilized. Virtually all of the awardees were supported by the CTB and CMBB programs.

Figure 12

Number of Research Training and Career Development Awards/Trainees Appointments Supported by Four Extramural Programs[a], by Fiscal Year



	1999	2000	2001	2002	2003	2004
CRCHD Number	0 [b]	0 [b]	18	34	36	46
CPFP Number	36	55	45	51	61	57
CMBB Number	186	209	256	272	328	377
CTB Number	1916	1913	2076	2147	2195	2142
Total Number	2138	2177	2395	2504	2620	2622

Fiscal Year

[a] Does not include CTB R25E, CMBB U54 & U56 numbers

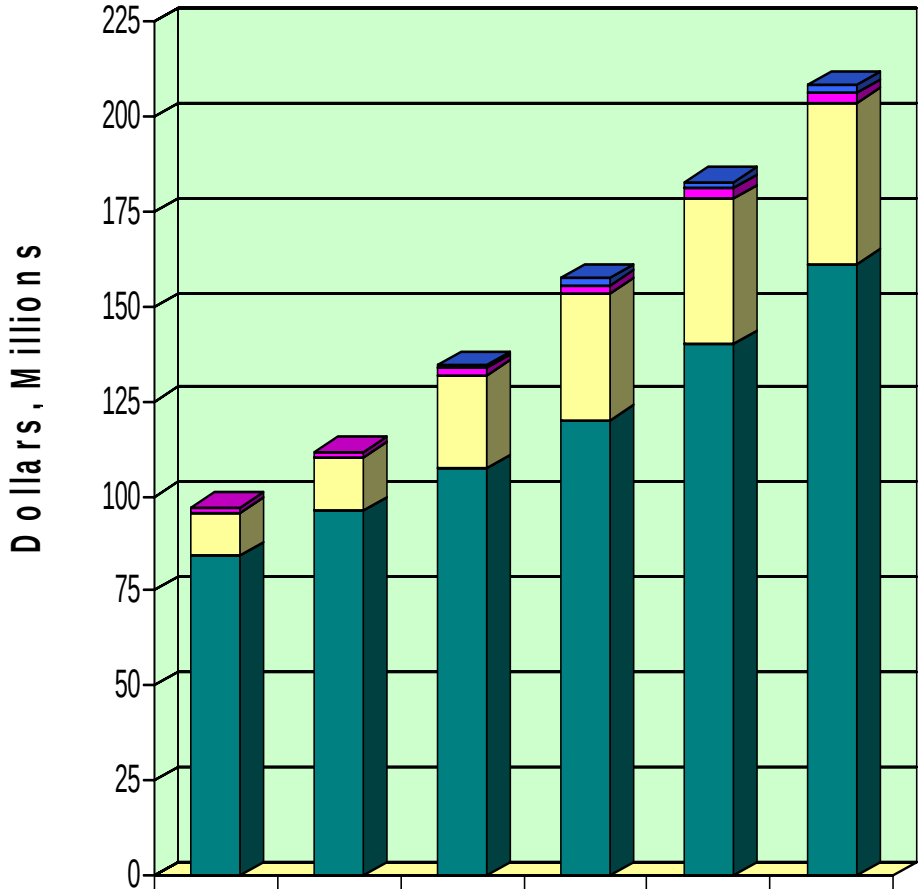
[b] CRCHD was not established until 2001

Overall Trends of Extramural Dollars Awarded By Four Extramural Programs

Figure 13 shows a steady increase in dollars awarded by all extramural programs from $97M in FY99 to $208M (115% increase). This figure also shows that virtually all the extramural training and career development dollars (98%) have gone to support CTB and CMBB programs. Note that the dollars for all of the CTB R25E, CMBB U54 & U56 dollars are included in Figure 13.

Figure 13

NCI Dollars Awarded to Training and Career Development by Extramural Programs, by Fiscal Year



	1999	2000	2001	2002	2003	2004
CRCHD Dollars (Millions)	N/A[a]	N/A[a]	0.9	1.7	1.9	2.3
CPFP Dollars (Millions)	1.15	1.4	1.68	2.08	2.66	2.38
CMBB Dollars (Millions)	11.56	14.16	24.55	33.45	38.26	42.52
CTB Dollars (Millions)	84.35	96.25	107.41	120.14	140.11	161.28
Total Dollars (Millions)	97.06	111.81	134.54	157.37	182.93	208.48

[a]CRCHD was not established until 2001

Fiscal Year

Chapter III: Intramural Training Programs

Introduction

Outstanding training and an excellent training environment are essential for developing national leaders in cancer research and for distinguishing the Intramural Program. The NCI Intramural Research Program fosters interdisciplinary research training through the recruitment of excellent scientists and provides programs supporting collaborative research in basic, translational, clinical, epidemiologic and biostatistical research. The Intramural Program provides access to novel approaches, cutting-edge technologies, and an international program of population-based studies to provide maximal opportunities for career advancement.

The educational objectives are as follows:

- Develop transdisciplinary training that emphasizes physician-scientist training in translational research,
- Create scholarly tracks for medical researchers (e.g. clinical research, molecular medicine),
- Conduct interdisciplinary investigations that incorporate molecular and biochemical techniques into epidemiology studies,
- Recognize and foster intramural roles for researchers as educators and mentors,
- Provide support and career guidance (e.g. Office of Training and Education, CCR and the DCEG Office of Education),
- Collaborate with the NIH Office of Graduate Partnerships Program in establishing and expanding pre-doctoral programs, including the pilot TU2 program,
- Support trainees through the Fellows and Young Investigators Organization,
- Foster career development programs for women and minorities,
- Provide an environment that fosters the independence of the trainee,
- Develop excellence in mentoring for IP trainees.

The NCI Intramural Program supports training programs through the Visiting Fellow (VF) Program, the Cancer Research Training Award (CRTA) Program, the Research Fellows Programs and three summer student programs, the Summer Internship Program (SIP) in Biomedical Research, the Summer Research Fellows Program (SRFP), and the Introduction to Cancer Research Careers, a program bringing students from diverse and/or disadvantaged backgrounds to NCI for an overview of our scientific training programs. The intramural program targets and attracts quality trainees and recruits by developing innovative new training partnerships with leading Universities and Research Institutes. The traditional training programs and newly formed training partnerships focus on training interdisciplinary and translational researchers. Graduate training programs were established in areas identified as key to meeting the Institute's challenge goal, such as those that facilitate translational research. Program areas being considered for development are those in pathology, comparative molecular pathology, chemistry, and epidemiology. New and existing fellowship opportunities will be designed to respond to the Institute's and the Nation's need for trained researchers.

The intramural program also fosters the training of clinical investigators through ACGME accredited Clinical Residencies, ACGME accredited Clinical Fellowships and other Clinical Fellowships.

Fellowships

ACGME-accredited Clinical Residencies

Residency in Anatomic Pathology provides both broad and in-depth exposure to anatomic pathology and emphasizes clinical correlation, relationships to disease mechanisms, and exposure to investigational opportunities. The resident learns the newest molecular diagnosis techniques. The residency training program is an intense experience in postmortem pathology, surgical pathology, and cytopathology diagnosis with additional sub-specialty rotations during the program.

Residency in Dermatology Fellowships are offered to all physicians to investigate a wide range of basic science and clinically oriented studies. Fellows acquire a comprehensive knowledge of a specific area and develop the skills necessary to design and initiate clinical or laboratory-based research projects.

Residency in Radiation Oncology is offered by the NCI and the National Capital Consortium for a 4-year program in clinical, translational, and basic research in radiation oncology with established programs in stereotactic radiosurgery, brachytherapy, and bone marrow transplantation. At the forefront of technologic development with clinical availability of IMRT and conformal radiotherapy, the program is expanding into

radioimmunotherapy and intraoperative MRI brachytherapy.

ACGME-accredited Clinical Fellowships

Clinical Fellowship in Medical Oncology is a unified fellowship experience in clinical oncology and research conducted at both the NCI and the National Naval Medical Center. This fellowship provides a unique opportunity for physicians interested in academic careers to develop and integrate both their clinical and basic research interests. Fellows are responsible for the clinical care of inpatients and outpatients with a broad spectrum of adult malignancies, while being introduced to designing and conducting clinical trials.

Clinical Fellowship in Pediatric Hematology/Oncology is a joint program with Johns Hopkins University that provides experience toward developing sub-specialist academicians adept in laboratory and/or clinical research. The first year has a clinical focus, with inpatient and outpatient rotations at Johns Hopkins University and the NIH. The final years are focused toward research, allowing for training in laboratory and/or clinical research.

Clinical Fellowship in Hematology/Pathology is a broad exposure to the diagnostic and investigative aspects of neoplastic hematopathology to the fellows. Intrinsic in the program is a research component with fellows having an opportunity to pursue interests related to experimental hematopathology and immunology including functional and molecular aspects of human leukemia and lymphoma.

Clinical Fellowship in Cytologic Pathology program goals are to develop a strong foundation in diagnostic cytopathology through service responsibilities and to introduce clinically oriented physicians to current research techniques. The frequency of pathologic findings combined with the diversity of types of exfoliative and fine needle aspirates seen provide a broad experience in diagnostic cytopathology.

Surgical Oncology Fellowship Program is designed to train surgeons committed to academic careers in the field of surgical oncology. The program instructs surgical oncologists in combined modality approaches, such as the combination of primary surgical treatment, chemotherapy, immunotherapy, and/or radiation therapy. The program provides a solid basis to conduct clinical and laboratory research.

Urologic Oncology Fellowship Program is developed in collaboration with the American Foundation for Urologic Diseases to train urologic surgeons committed to academic careers in urologic oncology. Fellows receive the opportunity to participate in diverse training experiences including clinical and basic research of urologic malignancies.

Neuro-oncology Fellowship Program is an established collaboration between NCI and NINDS for the training of fellows in neuro-oncology. The program involves research in the design and testing of new methodologies for the treatment of neurologic tumors.

HIV and AIDS Malignancy Fellowship Program is offered for clinical training with an emphasis on developing new antiretroviral drug approaches in children and adults, studying immunomodulatory therapy, and developing novel approaches for treating Kaposi's sarcoma.

NCI Fellowship in Gynecologic Oncology is a program allowing recipients to spend 2 years at the NCI performing basic research. Two additional years focus on clinical training at the parent institution.

Translational Fellowships

Postdoctoral Fellowships in Radiation Sciences Program trains recent Ph.D. graduates in physics, health physics, physical chemistry, cancer epidemiology, public health policy, and genetics in the techniques needed to study dose and dose-rate effects, molecular mechanisms of cellular radiation response, and the use of radiation epidemiology to evaluate the comparative risks from low-dose radiation and the health risk from oxidative by-products of normal physiological processes. The faculty is a collaboration of scientists from the NCI, Johns Hopkins University, and the University of Maryland.

Comparative Molecular Pathology Research Training Program

Translational research is critical for the discovery, development, and delivery of therapies and interventions for combating cancer. A key component of this research process is the ability to translate findings from animal models to the clinical setting. The CCR has recognized a need for investigators capable of integrating molecular mechanisms of disease within the complexity of whole living biosystems that have been designed and validated as predictive models of human disease. A foundation for training this kind of translational research investigator incorporates education in animal clinical medicine with training in human biomedical research. To respond to this national research training priority,

the CCR has developed a comprehensive NCI Comparative Molecular Pathology Research Training Program to enhance the integration and extrapolation of animal models to the study of human cancer.

The overall goal of the Program is to partner with universities to provide training for outstanding candidates preparing for careers in comparative and experimental pathology. The training initiative provides for multidisciplinary training in:

- Animal pathophysiology
- Rodent pathology
- Human cancer pathology
- Molecular biology
- Medical research

A comprehensive, interdisciplinary six-month training curriculum focused on comparative and molecular pathology constitutes the centerpiece of all facets of the program.

Fellowships in Cancer Epidemiology and Genetics

DCEG fellows design, conduct, and analyze and publish research studies related to the etiology of cancer in human populations. Fellows gain experience with interdisciplinary and multi-center collaborations. Investigations include cohort and case-control studies in the United States and international locations. Fellows participate in protocol development; feasibility studies; case-control and prospective cohort studies; family studies; genetic and biochemical assays; data collection and analysis; and manuscript preparation and publication. Opportunities exist to initiate new investigations and to compete for funding, including, for example, DCEG Intramural Research Awards.

Professional skills development and preparation for a future career in epidemiology are an integral part of the DCEG fellowships. Didactic courses are tailored to the unique research needs in cancer and genetic epidemiology. Topics include molecular epidemiology and genetics, radiation epidemiology, clinical pathology applied to epidemiology research, and career development, including grant writing, preparing scientific publications, communicating, negotiating, and interviewing. Research opportunities include the full range of cancer risk factors, including nutrition, environmental exposures, occupation, genetics, infectious agents, radiation and hormones, as well as methods development.

Fellows have full access to the many outstanding research resources in DCEG including:

The NCI Core Genotyping Facility which is designed to meet the genotyping and DNA sequencing needs for molecular epidemic-logic studies.

The Biospecimen Inventory Processing System provides downloadable tracking of DCEG biorepository samples for research.

The online, interactive DCEG Atlas of Cancer Mortality in the U.S. includes maps and graphs for exploring associations between environmental and occupational factors affecting cancer risk.

A web-based collection of fully tested Questionnaire Modules (QMOD) for a wide-range of potential cancer risk factors.

Cancer Health Disparities

Fellows gain experience in descriptive and analytic studies of cancer health disparities. DCEG senior researchers provide fellows high-quality scientific and career mentoring. DCEG's research portfolio includes a broad range of studies that target special populations and seek to uncover the underlying reason for cancer-related health disparities. The study of racial patterns, geographic variation, and temporal trends in cancer rates has provided important clues to the role of lifestyle and other environmental factors that affect cancer risk. Case-control, cohort, and intervention studies are conducted to elucidate the causes of cancer health disparities and suggest methods of prevention.

Molecular Epidemiology

All fellows may receive training in molecular epidemiology, from an interdisciplinary approach of combining epidemiologic and laboratory research methods, including high throughput genotyping. Molecular epidemiology opportunities include access to large population-based studies with biological specimens, validation of biomarkers determined by new molecular techniques, and application of new biomarkers to large epidemiological studies.

Biostatistics

Fellows are mentored by DCEG biostatisticians, working to develop statistical methods and data resources to strengthen observational studies, intervention trials, and laboratory investigations of cancer. Fellows may work on obtaining information on cancer rates to generate etiologic leads and develop study designs. Fellows also work with investigators on planning and conducting independent and collaborative descriptive and analytic studies of cancer etiology. Research opportunities exist in statistical methods for epidemiologic research, genetic epidemiology, risk assessment, and for projects in analytic and descriptive epidemiology. Post-doctoral fellows also have opportunities to collaborate on important epidemiologic studies, many of which include molecular and genetic components.

Radiation Epidemiology

Fellows receive training in radiation epidemiology, biostatistics, radiation biology, and risk assessment of cancer from radiation exposure. Fellows have abundant opportunities to study large databases of populations exposed to varied sources of radiation. Fellows may work on large-scale international studies of the late carcinogenic effects of radiotherapy and chemotherapy. These studies serve as an interface between molecular genetics, epidemiology, biostatistics, and clinical and radiation oncology. A unique opportunity is available for fellows to spend up to 2 years at the Radiation Effects Research Foundation in Japan, pursuing studies of atomic bomb survivors and their offspring. This is the largest and most comprehensive data set for radiation exposure in the world.

Viral Epidemiology

DCEG viral epidemiologists explore the epidemiology and natural history of cancer-associated viruses. Fellows participate in ongoing interdisciplinary research to identify the determinants of infection and cancer and other diseases resulting from infection. Fellows also have the opportunity to design their own projects. Training includes working closely with a dedicated virology laboratory. Major areas of interest are HIV-1, HTLV-1, HCV, KSHV, EBV, Kaposi's sarcoma, non-Hodgkin lymphoma, and genetic polymorphisms that affect risk of infection or disease.

Nutritional Epidemiology

DCEG nutritional epidemiologists aim to clarify the role of diet and nutrition in the etiology of human cancer. Research emphasis areas include the roles of energy balance (e.g. obesity and physical activity), micronutrients (e.g. vitamin E and folate), and meat, as well as methodological studies. Fellows may work on a wide range of interdisciplinary investigations, including observational epidemiologic studies (both case-control and cohort); experimental epidemiologic studies (clinical trials); and metabolic and methodological studies. Investigators integrate biospecimen collections in their studies to explore the physiologic, cellular, and molecular processes linking nutrition and cancer.

Occupational and Environmental Epidemiology

In occupational and environmental epidemiology, fellows work with researchers on etiologic investigations to identify occupational, environmental, and genetic causes of cancer. The research philosophy is to meld epidemiology, quantitative exposure assessment, and biologic and genetic components in multi-disciplinary investigations to identify occupational and other causes of cancer, to develop a better understanding of carcinogenic mechanisms, and to improve epidemiologic resources and methods. Fellows' research may focus on specific exposures, selected tumors, occupationally related cancer, and development of methods for quantitative assessment of exposures.

Hormonal and Reproductive Epidemiology

Fellows focus on hormonal and reproductive epidemiology work with scientists who aim to identify risk factors for hormonally related tumors, by assessing reproductive and family histories, endogenous hormones, exogenous hormones (oral contraceptives and menopausal hormones), hormonal correlates of risk, and conditions related to marked hormonal perturbations, such as fertility and endometriosis. Another major research opportunity for fellows is focusing on the role of the human papillomaviruses in the etiology of genital tumors. Emphasis is also being given to defining risk factors for several rare malignancies, including cancers of the nasopharynx and biliary tract.

Genetic Epidemiology

Researchers in genetic epidemiology are involved in designing and conducting interdisciplinary clinical, epidemiologic, genetic, and laboratory studies of persons, families, and populations at high risk of cancer. Fellows work on a variety of studies including identifying and mapping genes, defining exposures, conferring cancer predisposition, and exploring interactions between genetic predisposition and scientific exposures. Fellows work on epidemiologic studies to identify the risk of cancer among mutation carriers, clarify the modifying effects of lifestyle and other environmental risk factors, quantify late effects of exposures to therapeutic radiation or chemotherapy, and elucidate mechanisms of cancer susceptibility.

Clinical Genetics

Clinical genetics researchers aim to integrate clinical observations into an interdisciplinary approach involving clinical, genetic, epidemiologic, statistical, and laboratory methods to define the role of susceptibility genes in cancer etiology. Fellows work with investigators on projects to translate molecular genetics advances into evidence-based management strategies for persons at increased genetic risk of cancer. Fellows have a unique opportunity to consult and work with a multi-disciplinary team comprised of physicians, a nurse, a clinical social worker, and a genetic counselor.

Biostatistics/Mathematics Training Fellowship (Informatics Training Program) offers opportunities for training candidates in all aspects of biostatistics, but with an emphasis on genomics, microarray data analysis, and proteomics to provide an interdisciplinary program attracting statisticians, mathematicians, and biologists. The training format includes rotations through several NIH programs in basic biologic research, the National Human Genome Research Institute, and the National Center for Biotechnology Information.

Program for Interdisciplinary Training in Chemistry (PITC) provides a unique environment for postdoctoral fellows to develop projects in biologically oriented chemistry. The general orientation of the program is toward the biological sciences and biomedical research at the interface with biology. The PITC serves as a focal point for providing chemistry expertise to large-scale collaborative efforts such as the Molecular Targets Initiative and to enhance the interdisciplinary nature of the program. The Faculty include biological scientists whose research requires interaction with chemists.

Basic Science and Epidemiology Fellowship Support

Cancer Research Training Award (CRTA) Visiting Fellows (VF) Program

The major mechanisms of support for postdoctoral trainees are these programs. Participants in these programs train in scientific disciplines enhancing public health efforts to prevent, diagnose, or treat cancer, AIDS or other diseases. Fellows select a mentor who works with them to develop a research program and guides them through their training experience. Fellows may work with multiple researchers on a variety of projects, conduct studies independently, participate in all NCI activities, and attend and present at scientific meetings.

Intramural (FTE) Research Fellows Program

A Research Fellow is an NIH scientist with a doctoral degree, employed on a time-limited appointment renewable subject to the five-year/eight year rule. Research Fellows provide service relevant to the IC's program needs. The appointment gives the fellow experience in laboratory-based or population-based biomedical research. Scientists with considerable experience beyond postdoctoral training may be designated Senior Research Fellows.

The purpose of a Research Fellowship is to provide junior-level scientists with doctoral degrees experience in biomedical research while they provide a service relevant to the NIH's program needs. The Research Fellow spends the entire fellowship in laboratory research, while supporting the performance of NIH intramural research.

To be eligible for the Research Fellowship, a candidate must have demonstrated outstanding scholastic achievement and the ability to conduct successfully, with minimal supervision, a pre-established program in laboratory research.

Initial appointments are approved by the IC Scientific Director for 2 to 3 years. The maximum length of this fellowship is 8 years - the duration is determined by the length of time spent at NIH in all fellowship capacities - unless the scientist is approved for tenure-track or another permanent NIH appointment. Because Research Fellows perform services for NIH in addition to the training experience, these positions apply against the IC's FTE ceiling. Appointments are made either through the Civil Service/Title 42 or the PHS Commissioned Corps.

Clinical Science (FTE) Fellowships

Intramural (FTE) Clinical Fellows Program

A Clinical Fellow is a doctoral-level health professional with interest in biomedical research relevant to NIH program needs, who is employed on a time-limited FTE appointment renewable subject to the five-year/eight-year rule. Clinical Fellows participate in protocol-based clinical research as well as laboratory research.

The purpose of a Clinical Fellowship is to provide junior-level physicians experience in biomedical research relevant to NIH's program needs. This position has both clinical and laboratory components, with some time spent in direct patient contact supporting the performance of clinical protocols and the rest in laboratory research related to these protocols. In some cases, Clinical Fellows may receive approved credit toward residency training, advanced sub-specialty training, or Board certification.

To be eligible for the Clinical Fellowship, a candidate must be a graduate of an accredited medical or osteopathic school and have satisfactorily completed an internship approved by the Council on Medical Education and Hospitals, the American Medical Association, or the American Osteopathic Association. The candidate must have demonstrated outstanding scholastic achievement and the ability to conduct successfully, with minimal supervision, pre-established programs in both clinical and laboratory research.

Initial appointments are approved by the IC Scientific Director for 2 to 3 years. The maximum length of this fellowship is 8 years - the duration is determined by the length of time spent at NIH in all fellowship capacities - unless the scientist is approved for tenure-track or another permanent NIH appointment. Because Clinical Fellows perform services for NIH in addition to the research experience, these positions apply against the IC's FTE ceiling. Appointments are made either through the Civil Service/Title 42 or the PHS Commissioned Corps. Title 38 provisions may be applicable.

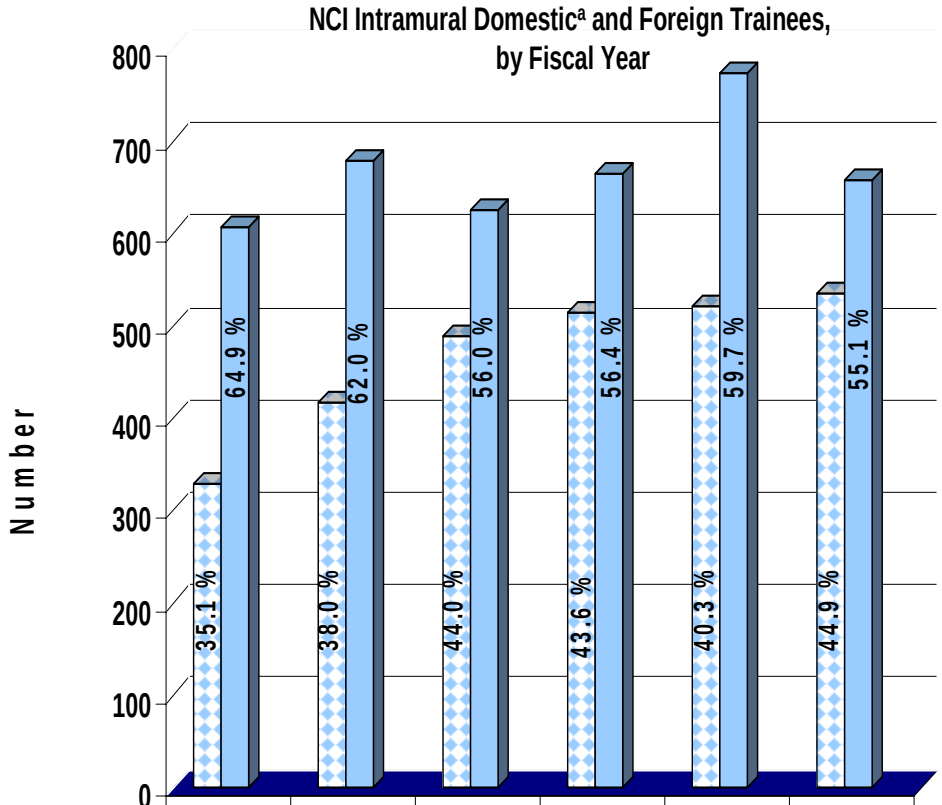
Intramural Training Progress and Funding Trends

Number of Intramural Trainees Supported

Figure 14 shows the distribution of foreign and domestic Intramural trainees from FY99 through FY04. While the number of domestic trainees fluctuated slightly, the number of foreign trainees increased from FY99 to FY04. There was a 38.2% increase in total Intramural trainees between FY99 and FY03 before the total dropped by about 8% (100 trainees) in FY04.

Figure 15 also shows the number of Intramural Program predoctoral and postdoctoral individuals supported between FY99 and FY04. Because Cancer Prevention Fellows receive their research training onsite at the NCI, similar to trainees in the Intramural Program, fellows from the CPFP are included in Figures 14 and 15. Cancer Prevention Fellows are also presented in a separate figure on page 25 (Figure 8). The proportion of postdoctoral trainees increased from 56% in FY99 to 64% in FY04.

Figure 14



	1999	2000	2001	2002	2003	2004
Foreign Number[b]	329	417	490	514	522	535
Domestic Number[c]	608	679	625	666	773	657
Total Number	937	1096	1115	1180	1295	1192

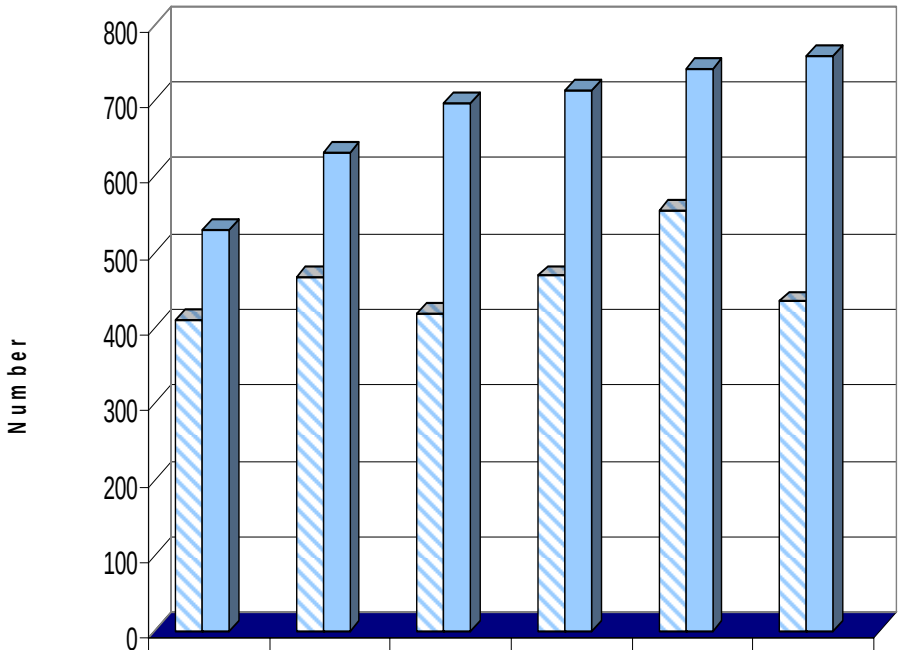
[a] CPFP numbers are included here because Cancer Prevention Fellows receive their research training onsite at the NCI similar to trainees in CCR and DCEG. To review CPFP numbers separately, refer to Figure 8.

[b] Foreign trainees includes pre and post doc trainees

[c] Domestic trainees include summer pre doc, domestic pre doc and domestic post doc trainees

Figure 15

NCI Intramural[a] Predoctoral and Postdoctoral Trainees, by Fiscal Year



	1999	2000	2001	2002	2003	2004
Predoctoral Number	409	466	418	468	555	434
Postdoctoral Number	528	630	697	712	740	758
Total Number	937[b]	1096[b]	1115	1180	1295	1192

Fiscal Year

[a] CPFP numbers are included here because Cancer Prevention Fellows receive their research training onsite at the NCI similar to trainees in CCR and DCEG. To review CPFP numbers separately, refer to Figure 8.

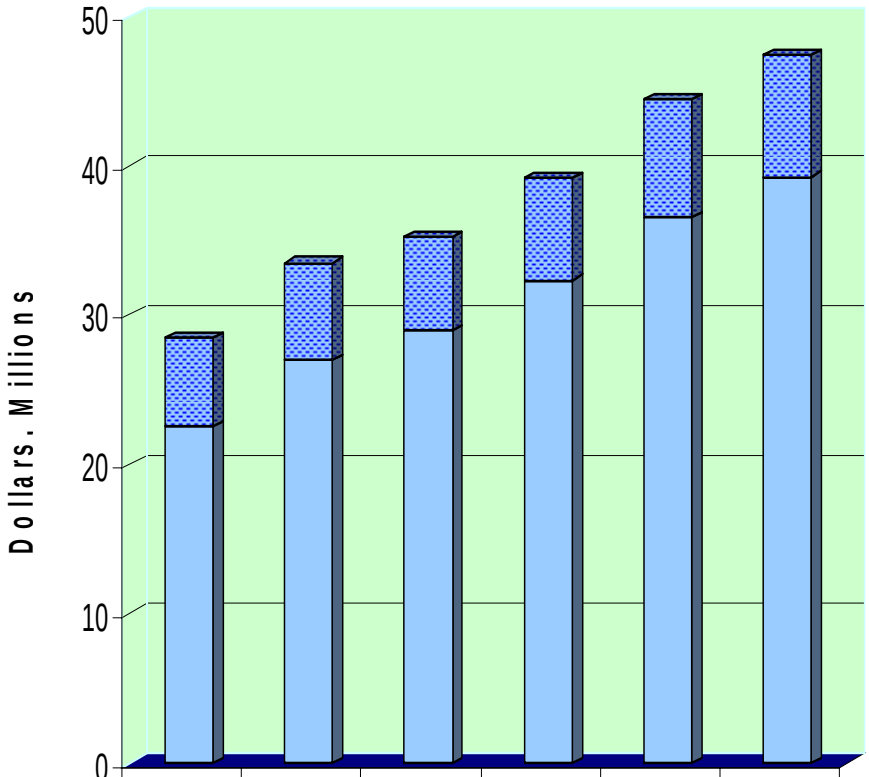
[b] For FY99 & FY00, CCR did not exist; Data are therefore from the Division of Basic Science, Division of Clinical Science and DCEG.

Dollars Awarded to Intramural Trainees

Figure 16 presents the Intramural dollars awarded in FY99 through FY04 and indicates the distribution of dollars between predoctoral and postdoctoral fellows. The dollars awarded to predoctoral and postdoctoral fellows increased from FY99 to FY04 by nearly 67.0%. The postdoctoral dollars awarded increased by approximately 74% from FY99 to FY04 while the predoctoral dollars awarded increased by 39%. Even though Cancer Prevention Fellows are supported through the CRTA mechanism, these fellows are also shown again in Figure 9 (page 26) to reflect that program's stand-alone trends.

Figure 16

NCI Intramural Dollars[a] Awarded to Training and Career Development for Predoctoral and Postdoctoral Doctoral Fellows, by Fiscal Year



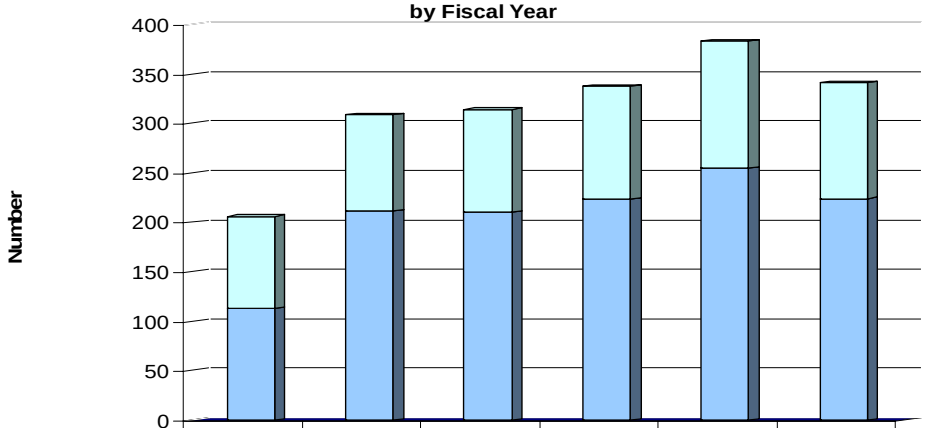
	1999	2000	2001	2002	2003	2004
Dollars (Millions): Predoctoral	5.88	6.49	6.23	6.87	7.9	8.18
Dollars (Millions) : Postdoctoral	22.55	26.98	28.99	32.33	36.59	39.26
Total Dollars (Millions)	28.43	33.47	35.22	39.20	44.49	47.44

[a] CPFP dollars are included here because Cancer Prevention Fellows receive their research training onsite at the NCI similar to trainees in CCR and DCEG. To review CPFP dollars separately, refer to Figure 9

Number of (FTE) Intramural Clinical and Research Fellows Supported and Dollars Awarded

The overall increase in the number of FTE Fellows from FY99 to FY04 was 65.5%, with a slight decrease (11%) from FY03 to FY04. The sharpest increase, 50%, in the numbers (N=103), occurred between FY99 to FY00 (Figure 16a). The overall increase in the dollars awarded to FTE Fellows was 135% from FY99 to FY04 (Figure 16b). The dollars awarded remained the same from FY03 to FY04. As expected, the sharpest increase of dollars awarded, 48%, correlates to the sharpest increase in number of Fellows seen in FY99 to FY00, namely 50%. Since FY99, there has been a greater number of Basic Research Fellows than Clinical Fellows. This fact is demonstrated in FY04 where 66% of the Fellows were Basic Research Fellows and 34% were Clinical Fellows. In FY04, the proportion of dollars awarded to basic Research Fellows was 62%; 38% was awarded to the Clinical Fellows.

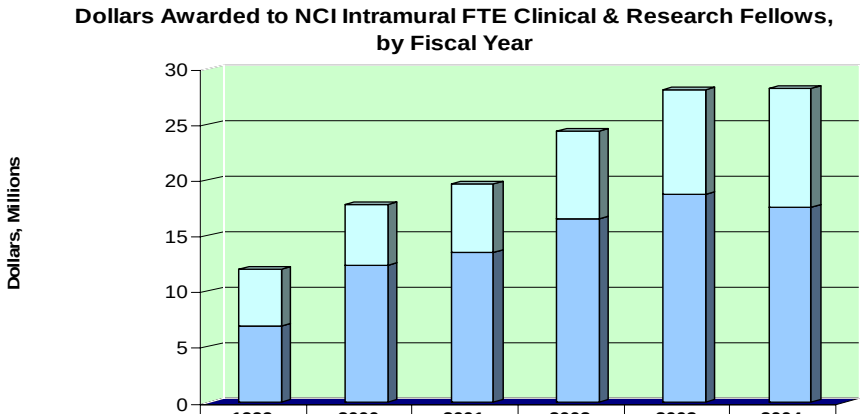
Figure 16a



	1999	2000	2001	2002	2003	2004
Number (FTE) Clinical Fellows	93	98	104	115	128	117
Number (FTE) Research Fellows	113	211	210	223	255	224
Total Number	206	309	314	338	383	341

Fiscal Year

Figure 16b



	1999	2000	2001	2002	2003	2004
Dollars Awarded (FTE) Clinical Fellows	5.1	5.5	6.2	7.9	9.4	10.6
Dollars Awarded (FTE) Research Fellows	6.9	12.3	13.5	16.5	18.7	17.6
Total Dollars (Millions)	12.0	17.8	19.7	24.4	28.1	28.2

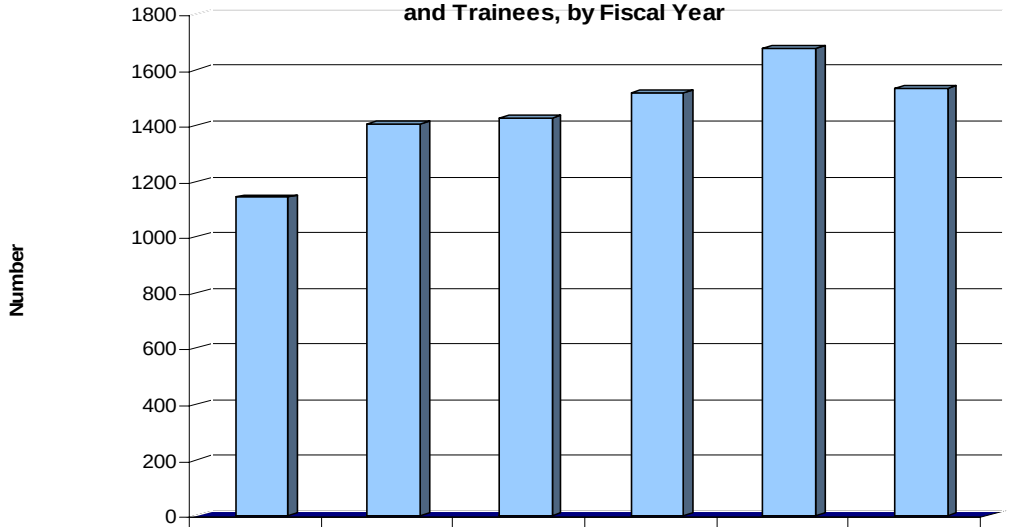
Fiscal Year

Combined Overall Number of Intramural Trainees and (FTE) Fellows Supported and Combined Dollars Awarded

Figure 16c shows that the total number of Intramural (FTEs) Research and Clinical Fellows and Trainees has steadily increased by 535 awardees from FY99 to FY03. This 47% increase was followed by a slightly over 8% decrease from FY03 to FY04 (103 Trainees and 42 FTE Fellows). Figure 16d shows an 87% increase in dollars awarded to (FTE) Fellows and Trainees from FY99 to FY04.

Figure 16c

Number[a] of NCI Intramural (FTEs) Clinical & Research Fellows and Trainees, by Fiscal Year



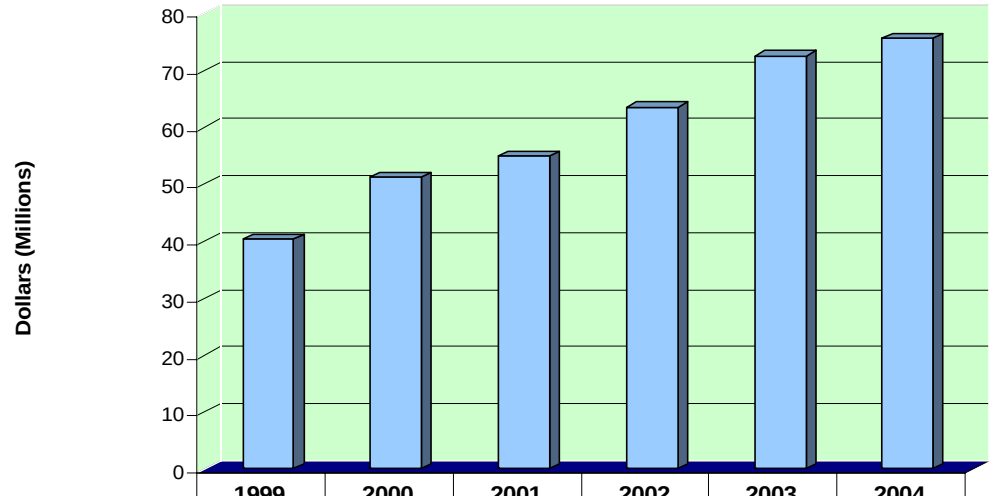
	1999	2000	2001	2002	2003	2004
Number (FTEs) Fellows & Trainees	1143	1405	1429	1518	1678	1533

[a] Numbers for the Intramural Program, for the purposes of this report, include the numbers for CPFP Fellows represented as Intramural/Extramural in Figure 17; CPFP numbers are also shown separately in Figure 8.

Fiscal Year

Figure 16d

NCI Intramural Dollars[a] Awarded to Intramural Fellows (FTEs) and Trainees, by Fiscal Year



	1999	2000	2001	2002	2003	2004
Intramural Dollars (Millions)	40.43	51.27	54.92	63.60	72.59	75.64

[a] Dollars for the Intramural Program, for the purposes of this report, include the dollars for CPFP Fellows represented as Intramural/Extramural in Figure 18; CPFP dollars are also shown separately in Figure 9.

Fiscal Year

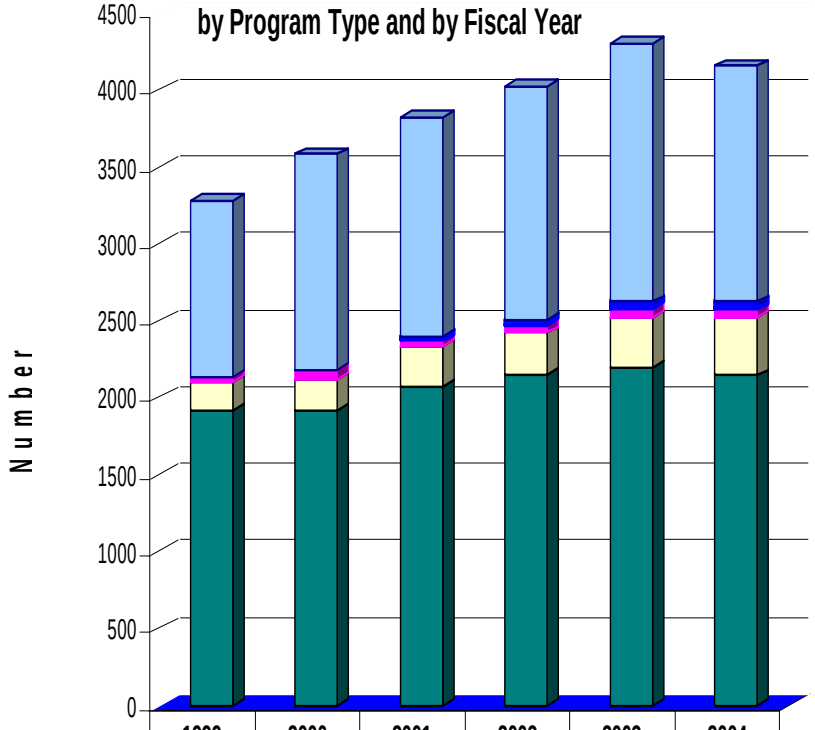
Overall Training Progress and Funding Trends in NCI Intramural and Extramural Programs

Overall Number of Individuals Supported

The total number of trainees, fellows, and K-awardees supported by NCI is shown in Figure 17. While growth of these programs has not always been even across the years, between FY99 and FY04 the number of trainees in the Cancer Training Branch increased by 11.8% and in the Intramural programs, by 34%. The number of Intramural trainees (not counting the Clinical and Research Fellows) increased by 27%. At the same time, there was an approximate doubling (100%) in the number of trainees supported in the Comprehensive Minority Biomedical Branch and a 58% increase in the number of individuals supported by the Cancer Prevention Fellows Program. Overall, the total number of individuals supported in all programs including FTEs, increased by nearly 26% between FY99 and FY04. In FY04, the CTB and CMBB extramural programs combined supported 61.5% of total number of individuals and the intramural programs supported 37.4%. The CTB alone supported 52.3% of individuals.

Figure 17

Numbers of Trainees/Fellows and Awardees Supported by NCI Intramural and Extramural Programs by Program Type and by Fiscal Year



	1999	2000	2001	2002	2003	2004
Intramural Trainees[a]	1143	1405	1429	1518	1678	1533
CRCHD Numbers	N/A[b]	N/A[b]	18	34	36	46
CPFP Numbers[c]	(36)	(55)	(45)	(51)	(61)	(57)
CMBB Numbers	186	209	256	272	328	377
CTB Numbers	1916	1913	2076	2147	2195	2142
Total Number[d]	3245	3527	3779	3971	4237	4098

Fiscal Year

[a] Numbers for the Intramural Program, for the purposes of this report, include the numbers of CPFP Fellows (Intramural/Extramural); CPFP numbers are shown separately here & in Figure 8.

[b] The CRCHD program was not established until 2001

[c] For the purposes of this report, the CPFP (Intramural/Extramural) numbers are shown separately in this figure. However, these "(numbers)" are not part of the Total Number of this graph, because they have already been included in the Intramural Trainees numbers.

[d] Does not include numbers for the CTB R25E, CMBB U54 & U56 grants

Overall Intramural and Extramural Dollars Awarded To Training and Career Development Programs Inventoried

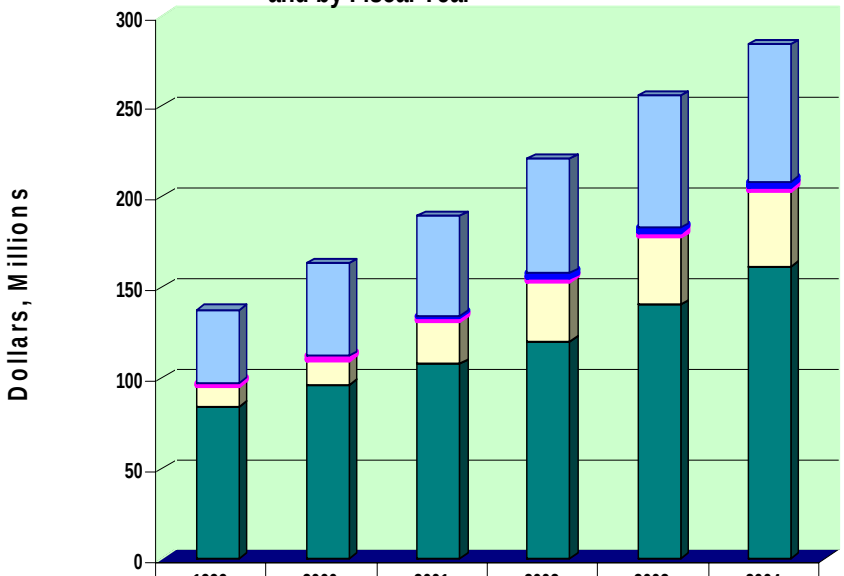
Overall Dollars Awarded

Figure 18 shows the total dollars awarded by NCI to trainees, fellows, and career development awardees. There has been a steady increase in dollars awarded between FY99 and FY04. This increase has been led by the Comprehensive Minority Biomedical Branch (268% increase) and the Cancer Prevention Fellows Program (107% increase). The Cancer Training Branch nearly doubled its dollars awarded (91% increase) between FY99 and FY04 while the Intramural program showed an 87% increase during the same time period. The Intramural training dollars alone, (not counting the dollars awarded to the Clinical and Research Fellows), increased by 67% and the FTE dollars increased by 135%. With these large increases plus the addition of CRCHD extramural awards starting in FY01, the overall NCI dollars awarded for trainees, fellows, and K-awardees more than doubled from FY99 to FY04. CPFP increased dollars awarded to Fellows by 107% between FY99 and FY04.

The CTB and CMBB extramural programs combined supported 61.5% of individuals (Figure 17) and awarded 72.3% of the overall training dollars in FY04. The Intramural programs supported 37.4% of individuals and awarded 26.8% of the total dollars in FY04. The CTB alone supported 52.3% of individuals, awarding 57.2% of the total FY04 training dollars.

Figure 18

NCI Dollars Awarded to Training and Career Development by Intramural and Extramural Programs and by Fiscal Year



	1999	2000	2001	2002	2003	2004
Intramural Dollars (Millions)[a]	40.43	51.27	54.92	63.60	72.59	75.64
CRCHD Dollars (Millions)	N/A[b]	N/A[b]	0.90	1.70	1.90	2.30
CPFP Dollars (Millions)[c]	(1.15)	(1.40)	(1.58)	(2.08)	(2.66)	(2.38)
CMBB Dollars (Millions)	11.56	14.16	24.55	33.45	38.26	42.52
CTB Dollars (Millions)	84.35	96.25	107.41	120.14	140.11	161.28
Total Dollars (Millions)[d]	136.34	161.68	187.78	218.89	252.86	281.74

[a] Dollars for the Intramural Program, for the purposes of this report, include the dollars for CPFP Fellows represented as Intramural/Extramural; CPFP dollars are shown separately here & in Figure 9.
[b] The CRCHD program was not established until 2001
[c] For the purposes of this report, the CPFP (Intramural/Extramural) dollars are shown separately in this figure. However, these "(dollars)" are not part of the Total Dollars of this graph, because they have already been included in the Intramural Dollars.
[d] Does include dollars awarded for CTB R25E, & CMBB U54 & U56 grants

Chapter IV: Summary Results of Inventory

Introduction

The charge of the Training Commission Inventory Subcommittee was to compile an inventory of the training and career development activities across the NCI.

The Subcommittee found that the training and career development activities were initiated and administered through the extramural and intramural components of the NCI. Five extramural and two intramural units house and manage the support structures for these activities (see organizational structure for location of training programs, Chart 1, page 5).

As the organizational chart shows, the extramural CTB and the CMBB are components of the Office of Centers, Training and Resources (OCTR). Included in the OCTR are also the Cancer Centers Program and the Organ Systems Branch (OSB). The OSB administers the extramural NCI SPOREs (Specialized Programs of Research Excellence) whose role is the support of training of laboratory and clinical scientists in translational research on human cancer. In addition to the CTB, CMBB and the SPOREs, the extramural Cancer Prevention Fellowship Program (CPFP) in the Division of Cancer Prevention, specifically targets training in cancer prevention and control research; and the Center to Reduce Cancer Health Disparities (CRCHD) targets research training on health disparities. It should be noted that the Cancer Prevention Fellowship Program, though housed in an extramural Division, supports postdoctoral fellows who can match with preceptors engaged in cancer prevention and control research in the NCI extramural or intramural divisions.

Summary Description of Extramural Programs

The NCI Strategic Plan for Training, released in FY99 and implemented in FY01, was identified as the blueprint for the research training focus in the current CTB and CMBB Branches. The Plan is the primary determinant of the current composition of the CTB and CMBB grant portfolios. The current CTB portfolio was found to make use of a combination of 14 NIH and NCI specific funding mechanisms (4 institutional training mechanisms; 10 individual award funding mechanisms including 8-K award and 2-F award mechanisms) to support research training and career development. This array of funding mechanisms (See chart 2, page 8) provides a continuum of support throughout career development (including career transitions) in basic research, patient-oriented research, translational research, transdisciplinary research, and cancer prevention, control, behavioral and population sciences. For mid-career and established investigators, these mechanisms provide protected time to enhance their research programs and to mentor junior investigators.

The CMBB also makes use of a broad array of funding mechanisms and to provide a continuum of support throughout the career development of individuals underrepresented in biomedical research, including career transitions. CMBB provides funding for basic, patient-oriented, translational, and transdisciplinary research, and cancer prevention, control, behavioral and population sciences. Among the funding mechanisms are 5 individual awards (1-F award, 4-K awards). However, to ensure a Continuing Umbrella of Research Experiences (the CURE Program) from high school through junior faculty status, the CMBB additionally makes use of administrative research supplements to RPGs to promote diversity in health-related research (formerly referred to as “Research Supplements For Underrepresented Minorities”); and administrative supplements to T32, K12, and R25T institutional training/career development funding mechanisms. Additionally, the CMBB directly involves the NCI Cancer Centers in their training activities through CURE administrative supplements to P20 and P30 Center grants; and the partnering of cancer centers with minority-serving institutions using the NIH U54 and U56 funding mechanisms. (See chart 3, pages 12 and 13.)

The Cancer Prevention Fellowship Program supports a *Summer Curriculum in Cancer Prevention*, completion of an MPH degree for trainees not already having this degree, and a research experience in Cancer Prevention at the NCI. Support for these training activities is through CRTAs, which may be intramural or extramural.

Summary Description of Intramural Training Programs

Intramural training activities were found to be initiated and supported in the Center for Cancer Research (CCR) and the Division of Cancer Epidemiology and Genetics (DCEG). The training activities of the CCR and the DCEG are supported through 4 fellowship programs [Clinical Fellowships; Translational Fellowships; Fellowships in Cancer Epidemiology and Genetics; Biostatistics/Mathematics Training Fellowships], and a Program for Interdisciplinary Training in Chemistry. Support for these intramural training positions derives from two non-FTE mechanisms (CRTAs, and a Visiting Fellows Program) and two FTE-based programs (Research and Clinical Fellowships).

Summary of NCI Training Trends

Extramural Programs

The Inventory Subcommittee also examined trends in NCI-supported training activities. The NCI dollar investment in these activities was found to have substantially increased between FY99 and FY04 from $136M to $282M. The cumulative NCI dollar investment in training activities during this period was $1.24B dollars. This dollar investment supported 3,245 individuals in FY99 and steadily increased to 4,098 individuals in FY04. This growth in dollars and trainees is primarily a result of the growth in the CTB and CMBB support of training and career development activities.

Most of the investment in training activities was found to reside in the combined NCI extramural CTB and CMBB. The fastest growing component of the NCI investment in training activities was found to be the CMBB. Between FY99 and FY04, the dollar investment in CMBB activities increased almost 4-fold from $11.6M in FY99 to $42.5M in FY04; and the number of trainees supported by the CMBB increased a little over two-fold from 186 (FY99) to 377 (FY04). The number of trainees supported by the CMBB's U54 and U56 Partnerships is currently being evaluated. Since the dollar investment in these Partnerships is large, increasing almost 7-fold from $2.4M in FY99 to $17.8M in FY04, it is likely that the data on trainees supported through the Partnerships will show a more dramatic increase over time. The science focus of the research training and career development activities supported by the CTB were found to have changed substantially between FY99 to FY04. The historic NCI support of basic cancer research remained a key element of the CTB activities. However, by FY04 funding mechanisms supporting training activities in patient-oriented research (K12), cancer prevention, control, behavioral and population sciences (R25T), transdisciplinary research and translational research had become major components of the CTB grant portfolio.

It was found that in any given fiscal year 59-61% of individuals supported by the CTB and CMBB through the NRSA program were in the postdoctoral phase of their research career. A little more than one-half (57%, 50/87) of the trainees supported by the R25T during the initial funding year (FY00) were in the predoctoral phase of their career development. However, by FY04, in the R25T programs two-thirds of the trainees (66%, 179/273) were in the postdoctoral phase of their careers. The Institutional R25T and K12 programs added substantial numbers of predoctoral and postdoctoral trainees to the NCI cadre of cancer research trainees. (See Fig. 5e for additive impact of the K12 and R25T institutional training program on overall numbers of predoctoral and postdoctoral trainees supported).

The remaining extramural programs supporting training and career development activities and for which data are currently available (CPFP, CRCHD) were found to represent minor components of the NCI extramural portfolio in terms of the number of supported individuals and NCI dollar investment. Taken in combination, in FY04, these programs supported 103 individuals (2.5% of all supported individuals accounted for in the report) and represented a dollar investment of $4.7M (1.7% of the total NCI investment in training and career development activities). The CPFP also experienced considerable growth between FY99 and FY00 (from 36 to 55 supported individuals), but appears to have achieved a steady state since that time (50 to 60 supported individuals in any given fiscal year). This constitutes an overall increase of 58% (from 36 fellows in FY99 to 57 in FY04). At the same time, the dollar investment in the CPFP increased 70% from $1.40M in FY00 to $2.38M in FY04, reflecting in part the increasing number of physicians trained in the CPFP during this period. In contrast, the number of individuals supported through the CRCHD program has increased 2.5 times from 18 in FY01 to 46 in FY04; the dollar investment in this Program has increased during the same time interval in proportion (2.5 times) to the increase in the number of supported individuals.

Intramural Programs

The NCI dollar investment in intramural training activities was $75.6M in FY04 and had increased 87% from $40.4M in FY99. The number of individuals supported through the intramural program was 1,533 in FY04 and had increased 34% from 1,143 in FY99. The largest proportion of individuals (56-64%) supported between FY99 and FY04 was found to be in the postdoctoral stage of their career development. In FY99, 35% of postdoctoral intramural trainees were of foreign origin. By FY01, the proportion of foreign national trainees had risen to 44% and has since stabilized at between 41-45% of all NCI supported intramural trainees. The apparent lack of correlation between the increase in number of trainees (34%) and dollar investment (87%) is explained by a five-year plan to raise the level of stipend support. In general, the increase per year was 6% for postdoctoral fellows and varied for other levels of trainees, i.e., predoctoral and summer interns. The plan was instituted in FY99 and continued until FY04.

Intramural and Extramural Programs Combined

There was sustained and continuous growth in the extramural and intramural training and career development programs. The dollar investment in these programs doubled from $136M in FY99 to $282M in FY04; and the number of supported individuals increased 26% from 3245 in FY99 to 4098 in FY04. The largest proportional increase in number of individuals supported and dollars awarded were found to be in the CMBB programs (discussed earlier).

Between FY99 and FY04, 68% to 73% of awarded dollars went to the extramural training programs. The remaining dollars went to the intramural programs. Almost three-fourths, 72%[a], of the individuals supported through the NCI Intramural program in FY04 were postdoctoral (Figures 15 and 16a). Between FY99 and FY01, the number of individuals who were of foreign origin increased; this proportion has since stabilized at 40% to 45%.

[a] 72%=1,099/1,533; 1,099= all supported postdoctoral and 1,533= all trainees supported in the Intramural Program in FY04.

Appendices

Appendix A — NCI Training Commission

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Appendix B

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Appendix C

Legislative History of NCI Training Authorities

The National Cancer Institute Act of 1937 [PL 75-244 SEC 2(d)]

- This Act established the authority for the Surgeon General through the National Cancer Institute "*to provide training and instruction in technical matters relating to the diagnosis and treatment of cancer*."

The National Cancer Act of 1971 [PL 92-218 SEC 407(b)(7)]

- This Act amended the Public Health Service Act to strengthen the National Cancer Institute of Health in order to more effectively carry out the national effort against cancer.
- The expanded authorities of the NCI and NIH include the ability to "*support appropriate manpower programs of training in fundamental sciences and clinical disciplines to provide an expanded and continuing manpower base from which to select investigators, physicians, and allied health professions personnel, for participation in clinical and basic research and treatment programs relating to cancer, including where appropriate the use of training stipends, fellowships, and career awards*."

NCI Current Authorities as Authorized in the Public Health Service Act 2001:

- It is within the authority of all the Directors of the National Research Institutes to "*conduct and support research training for which fellowship support is not provided under [National Research Service Awards] and which is not a residency training of physicians or other health professionals*." [42 USC § 284(c)]

- The Director of the Institute, in carrying out the National Cancer Program, "*shall, in consultation with the advisory council for the Institute, support appropriate programs of education and training (including continuing education and laboratory and clinical research training).*" [42 USC § 285a-2(2)(b)(3)]

The Authorities of the NIH Director as authorized by the Public Health Service Act 2001:

- The Secretary, acting through the Director of NIH, "*may conduct and support research training for which fellowship support is not provided for by the National Research Service Awards; and which does not consist of residency training of physicians or other health professionals*." [42 USC § 282(b)(13)]

- The Secretary shall provide National Research Service Awards for *"training at the National Institutes of Health […] of individuals to undertake biomedical, behavioral and health services research."* [42 USC § 288(a)(1)(A)(ii)].

Appendix D

NCI Training Branch Funding Mechanisms

1. National Research Service Awards to Individuals

F32 Postdoctoral Fellowships: (mentored)

For individuals with doctoral degrees. The award provides non-renewable support for up to three years of up to $50,808 annual stipend for full-time effort for mentored postdoctoral research primarily in the basic sciences.

F33 Senior Postdoctoral Fellowships:

For established senior researchers with at least seven years of relevant research experience after receipt of doctoral or professional degree. The award provides non-renewable support for up to two years of up to $50,808 annual stipend for full-time effort to acquire new research capabilities or make major changes in the direction of their research careers (e.g., during sabbatical leave).

2. Career Awards (Mentored and Transitional)

K07 Cancer Prevention, Control and Population Sciences Career Development Award:

For individuals with Ph.D.s and M.D.s who wish to make the field of cancer prevention, control, behavioral and the population sciences the focus of their careers. Provides non-renewable support for five years of up to $75,000 annual salary for 75% effort and up to $30,000 annually for career development costs for a mentored career development research experience including a didactic learning component.

K08 Mentored Clinical Scientist Career Development Award:

For individuals with a professional degree (e.g., M.D., D.V.M.) committed to a career in laboratory or field-based research. Provides non-renewable support for up to five years of up to $75,000 annual salary for 75% effort and up to $30,000 annually for career development costs. This experience could include a period of phasing involving didactic coursework and rotation through various laboratories to acquire needed laboratory skills followed by a period of intensive research focus.

K23 Mentored Patient Oriented Research Career Development Award:

For M.D.s, doctorally prepared nurses and other individuals with a Ph.D. degree who can perform clinic duties and who have made a commitment to focus their research endeavors on patient-oriented research. Provides non-renewable support for up to five years of up to $75,000 annual salary for 75% effort and up to $30,000 annually for career development-related costs for mentored career development in patient-oriented research. This experience could include a period of phasing involving a designated period of didactic training followed by a period of closely supervised research.

Appendix D Cont'd

K25 Mentored Quantitative Research Career Award:

For individuals with Ph.D.s in a quantitative area of science or engineering outside of biology or medicine (mathematics, statistics, physics, etc.). Applicants should have junior faculty status and intend to use the K25 award in order to apply themselves to problems in biomedical research. Provides non-renewable support for three to five years of up to $75,000 annual salary for 75% effort and up to $40,000 annually for research support costs for mentored career development in biomedical, behavioral or bioengineering research.

K01 Howard Temin Award:

For outstanding junior scientists in basic research who are committed to developing research programs directly relevant to the understanding of human biology and human disease as it relates to the etiology, pathogenesis, prevention, diagnosis, and treatment of human cancer. This award provides a mechanism for bridging the transition from a mentored research environment to an independent research career. The award provides non-renewable support for five years of up to $75,000 annual salary for 75% effort and up to $30,000 annually for career development costs during the mentored phase of the award (one to three years) and up to $50,000 annually for research costs during the independent phase of the award.

NCI K22 Transition Career Development Award:

For individuals who are currently receiving support in a mentored postdoctoral appointment and who have completed two years or more of support in this capacity, or who have been in an independent position for less than two years with continuous previous postdoctoral cancer research training at the time of application and who are doctorally degreed individuals educated as clinicians or as prevention, control, behavioral or population scientists. Also for postdoctoral scientists working in basic research as Federal employees who have at least three years of mentored postdoctoral research experience at the time of award and who propose research directly relevant to human cancer. Provides non-renewable support for up to three years of up to $75,000 annual salary for 75% effort and up to $50,000 annually for career development costs for unmentored career development in basic research (clinical doctoral degree; Federal employee Ph.D.s working in research directly relevant to human cancer), patient-oriented research (doctoral degree); or in cancer prevention, control, behavioral or population sciences (and doctoral degree).

3. Career Awards (Independent)

K24 Mid-career Investigator Award in Patient-Oriented Research:

For clinicians with professional degrees including doctorally prepared nurses and Ph.D.s practicing in the clinic, who have an outstanding record of independent patient-oriented research, who are approximately 15 years past their specialty training, and

who can demonstrate a need for protected time for patient-oriented research and for mentoring beginning clinical investigators. Provides one-time renewable support for up to five years of salary for the award recipient for levels of effort between 25 and 50 percent. The actual salary provided by the award is based on the candidate's full-time, 12-month institutional salary and the level of effort requested up to the maximum legislated salary rate in effect at the time of award. Also provides up to $25,000 annually for research development support.

K05 NCI Cancer Prevention, Control and the Population Sciences Established Investigator Award:

For investigators with a doctoral or professional degree (including doctorally prepared nurses and Ph.D.s practicing in the clinic) and an outstanding record of independent research support in cancer prevention, control, behavioral and the population sciences and who can demonstrate a need for protected time for research and for mentoring beginning investigators. Provides one-time renewable support for up to five years of salary for the award recipient for levels of effort between 25 and 50 percent. The actual salary provided by the award is based on the candidate's full-time, 12-month institutional salary and the level of effort requested up to the maximum legislated salary rate in effect at the time of award. Also provides up to $25,000 annually for research development support.

4. Institutional Training grants

T32 National Institutes of Health National Research Service Award:

Grants to eligible institutions to develop or enhance predoctoral and postdoctoral research training opportunities in biomedical and behavioral research. The award provides 5 years of renewable support to institutions. Candidates apply to the program for up to 5 years (predoctoral) or up to 3 years (postdoctoral) of supervised training for annual stipends of $19,968 (predoctoral) or annual stipends from $34, 200 to $50,808 (postdoctoral) depending upon the years of research experience past the Ph.D. degree.

K12 Clinical Oncology Research Career Development Program:

Grants to eligible institutions to develop or enhance research training opportunities to medical doctors (M.D.'s , D.O.'s), and Nurses selected by the institution, to: (1) perform clinical-translational oncology research; (2) design and test hypothesis-based clinical protocols and manage all phases of cancer clinical trials; and (3) communicate and collaborate with basic research scientists in order to expedite the translation of basic/behavioral research discoveries into patient-oriented therapeutic cancer research. This is achieved with multiple mentors and core didactic and laboratory requirements in basic research and in patient-oriented research. Provides up to 5 years of renewable support. Clinician candidates apply to the individual programs for a minimum of 2 and up to 7 years of mentored career development at salaries up to $75,000 annually for 75% effort commitment and up to $30,000 annually for research costs for mentored career development.

Appendix D Cont'd

5. Non-NRSA Training and Education Awards

R25(T) Cancer Education and Career Development Program (Institutional):

Grants to eligible institutions to train predoctoral and postdoctoral candidates in cancer research settings that are highly interdisciplinary and collaborative. This Program requires specialized curriculum development and implementation, interdisciplinary research environments, and more than one mentor per trainee to achieve career development research and education objectives. Areas of research particularly applicable but not all inclusive to interdisciplinary training are cancer prevention and control, nutrition, population sciences, behavioral sciences, imaging and molecular diagnostics. Provides up to 5 years of renewable support up to $500,000 direct costs annually for curriculum-based, multidisciplinary didactic research training experiences for predoctoral and postdoctoral researchers. Support includes salaries for predoctoral (up to $20,000 annually) and postdoctoral (up to $75,000 annually) candidates; up to $20,000 annually (predoctoral) or up to $30,000 annually (postdoctoral) for research costs; and salaries to key faculty.

R25(E) Cancer Education Grant Program:

This is a flexible, curriculum-driven investigator-initiated grant program aimed at developing and sustaining innovative educational approaches that ultimately will have an impact on reducing cancer incidence, mortality and morbidity. Grants provide support for up to 5 years ($300,000 direct costs per year) for curriculum development and/or the development and provision of short-term educational and training experiences, including courses, national forums, seminars, and/or hands-on workshops. Target audiences are typically health care professionals and biomedical and clinical scientists in training, but may include lay health care providers and patients or high-risk persons. Emphasis in the R25 is on education and educational innovation in rapidly evolving areas or priority areas of NCI for which training is not routinely available. The R25 proposal must outline a plan for sustainability of the program after an initial five-year period of NCI support.

Appendix E

Funding Mechanisms Sponsored by the Comprehensive Minority Biomedical Branch (CMBB)

1. National Research Service Awards

F31 - Ruth L. Kirschstein National Research Service Award Individual Predoctoral Fellowship for Minority Students

To provide up to five years of support for underrepresented minorities to engage in a program of research training leading to the Ph.D. or equivalent research degree; the combined M.D./Ph.D. degree; or other combined professional doctorate/research Ph.D. degree in biomedical or behavioral sciences.

F31 - Ruth L. Kirschstein National Research Service Award Individual Predoctoral for Students with Disabilities

To provide up to five years of support for research training leading to the Ph.D. (or equivalent research degree), or the combined M.D./Ph.D. degree (or other combined professional research doctoral degrees) in the biomedical or behavioral sciences. The intent of this Predoctoral Fellowship Program is to encourage students with disabilities to seek graduate degrees and thus further the goal of increasing the number of scientists with disabilities who are prepared to pursue careers in biomedical and behavioral research.

2. Career Development Awards: Underrepresented Minorities

K01 - NCI Mentored Career Development Award for Underrepresented Minorities

This award provides an extended period of sponsored research as a way to gain scientific expertise while bridging the transition from a mentored research environment to an independent research/academic career. This unique award provides the opportunity for the recipients to participate in peer-review related activities at the NCI throughout the duration of the award.

K22 - NCI Transition Career Development Award for Underrepresented Minorities

To provide an extended period of protected time and support for underrepresented minority individuals who are advanced postdoctoral and/or newly independent research scientists who have been in an independent position for less than two years at the time of the application.

K08 - Mentored Clinical Scientist Award for Underrepresented Minorities

To provide an intensive, supervised research experience for underrepresented minority health professionals with M.D., D.C., D.D.S., D.O., O.D., D.V.M., or N.D. degrees to acquire the research expertise to pursue a career in laboratory-based biomedical cancer research.

K23 - Mentored Patient-Oriented Research for Underrepresented Minorities

To encourage research-oriented minority clinicians to develop independent research skills and gain experience in advanced methods and experimental approaches needed to conduct patient-oriented research.

Appendix E cont'd

3. RPG and T32 Supplements for Special Populations (NIH wide)

Research Supplements for Underrepresented Minorities

a) To provide scientific opportunities to Minority High School Students (MHS), Underrepresented Undergraduate Students (MUS), Minority Graduate Research Assistants (MGRA), Minority Individuals in Postdoctoral Training (MIPT), and Minority Investigators (MIS) in biomedical and behavioral research careers.

b) To provide support to NCI Cancer Centers for underrepresented clinicians who wish to participate in ongoing clinical research projects in the cancer center, either as postdoctoral researchers or as investigators developing their own independent research careers.

c) Research Supplements for Underrepresented Minorities
To provide support to SPORE grantees for underrepresented, qualified postdoctoral fellows, junior faculty members, or M.D.s interested in transitional research.

Research Supplements for Individuals with Disabilities

To support individuals with disabilities from each of the following population groups: High School Students; Undergraduate Students; Graduate Research Assistants; Individuals in Postdoctoral Training; and Investigators Developing Independent Research Careers.

Supplements to Promote Reentry into Biomedical and Behavioral Research Careers

To support individuals with high potential to reenter an active research career after taking time off to care for children or parents or to attend to other family responsibilities.

T32 - Minority Supplement to the NCI-Supported Ruth L. Kirschstein National Research Service Award Institutional Research Training Grant

To provide up to five years of funding for predoctoral students and three years funding for postdoctoral fellows for the purpose of increasing the number of trainees from underrepresented minority populations who are interested in pursuing a long-term career in cancer research.

4. **CURE Supplements**

P30 - NCI Cancer Center Supplements for High School and Undergraduate Student Research Experiences

To take full advantage of the community outreach and research capabilities of NCI-supported Cancer Centers to engage the scientific curiosity and promote the potential cancer research careers of promising young high school and undergraduate students.

R25T - Minority Supplements to the NCI Cancer Education and Career Development Program

To include individuals from underserved populations in grants that are focused on the training and career development of prevention, control and populations scientists. Level: Pre/postdoctoral.

Appendix E cont'd

K12 - Minority Supplements to Institutional Clinical Oncology Research Development Awards

To include individuals from underserved populations in grants that are focused on the training and career development of clinical scientists. Level: Postdoctoral

P30 - Supplements to Cancer Center Support Grants for Physicians from Underrepresented Populations Performing Patient Oriented Research

To provide support to NCI Cancer Centers for underrepresented clinicians who wish to participate in ongoing clinical research projects in the cancer center, either as postdoctoral researchers or as investigators developing their own independent research careers.

P50 - Supplements to Specialized Program of Research Excellence

To provide support to SPORE grantees for underrepresented, qualified postdoctoral fellows, junior faculty members, or M.D.s interested in translational research onto P50 grants.

U54 - Comprehensive Minority Institution/Cancer Center Partnership

For implementation of Comprehensive Minority Institution/ Cancer Center Partnerships between Minority Serving Institutions and NCI-designated Cancer Centers or Groups of Cancer Centers in order to develop a stronger national cancer program aimed at understanding the reasons behind the significant cancer disparities and impact on minority populations

U56 - Cooperative Planning Grant for Comprehensive Minority Institution/Cancer Center Partnership

Planning grant for the implementation of U54s (above).

Appendix F

NCI FUNDED SPORE PROGRAMS

[----------RFA----------][----------PAR----------]

	1992-93	1995-96	1999	2000	2001	2002	2003	2004
Breast	**4**	**6**	**6**	**9**	**9**	**10**	**10**	**10**
Prostate	**2**	**3**	**3**	**4**	**8**	**11**	**11**	**11**
Lung	**2**	**3**	**3**	**3**	**6**	**6**	**7**	**7**
GI	**1**	**2**	**2**	**2**	**2**	**4**	**4**	**4**
Ovary	**-**	**-**	**4**	**4**	**4**	**4**	**4**	**5**
GU	**-**	**-**	**-**	**-**	**1**	**1**	**2**	**2**
Skin	**-**	**-**	**-**	**-**	**1**	**2**	**2**	**3**
Brain	**-**	**-**	**-**	**-**	**-**	**2**	**2**	**5**
H & N	**-**	**-**	**-**	**-**	**-**	**3**	**3**	**4**
Lymphoma	**-**	**-**	**-**	**-**	**-**	**2**	**2**	**3**
GYN	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**2**
Leukemia	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**
Myeloma	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**
Pancreas*	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**3**
Total Programs	**9**	**14**	**18**	**22**	**31**	**45**	**54**	**61**
Totals Budget (Dollars in Millions)	**$20**	**$30**	**$39**	**$48**	**$68**	**$112**	**$128**	**$135**

***Special initiative in response to Pancreatic Cancer Program Working Group**

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