

# Draft for Discussion

## UNIVERSITY OF CALIFORNIA ACCOUNTABILITY FRAMEWORK

### PART II. Universitywide Indicators with Campus Comparisons

#### Section 8. Research

##### Goals

UC is first and foremost a research university. Among California's public institutions, it is legally vested, via the Master Plan for Higher Education, with sole authority for doctoral education and the preparation of professionals;\* it also is granted responsibility as the state's primary academic agency for research.

Further, the vision of the University embraced by the Regents' Committee on Long Range Planning is of a research-intensive institution which by 2025 has a marked increase in the multidisciplinary, cross-disciplinary, intercampus and global nature of its efforts. And the first of three goals considered by the committee in 2007 is unparalleled quality and breadth in the University's research-intensive academic programs.

##### Measures

This section is an initial step at presenting the scope, size and quality of the University's research endeavors. It shows UC's total research expenditures, including both direct and indirect research costs associated with research carried out by UC campuses (without regard to the amount of indirect costs that were actually recovered). These data were used because they conform to the definitions used in the National Science Foundation Research and Development (R&D) Expenditures survey, which is a national benchmark, and because they portray the total cost of research conducted at UC.

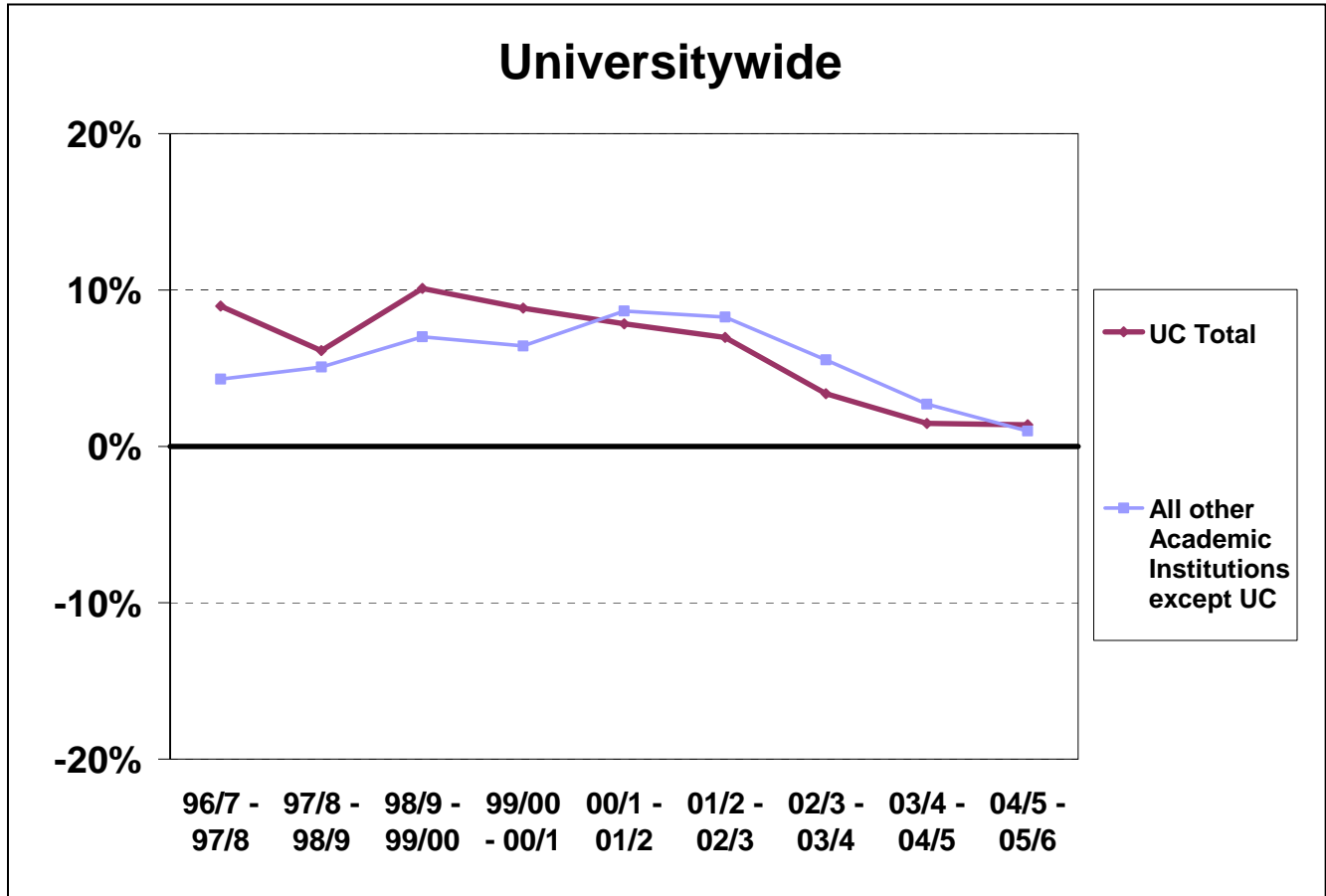
In addition, a second major measure of research output is the number of patents, inventions and licensing income resulting from UC research. Although these are currently widely used as indicators of research output, a national effort is under way to develop better metrics for demonstrating successful technology transfer outcomes.

\*In 2006 the California Legislature authorized the California State University to offer the doctorate in education. All other doctoral education and degrees for professionals remain within the purview of the University of California.

# Draft for Discussion

## Indicator 8.1

### Total Research and Development Expenditures, Annual Growth, 1996-97 to 2005-06



Figures are in constant 2005-06 dollars, adjusted for inflation.

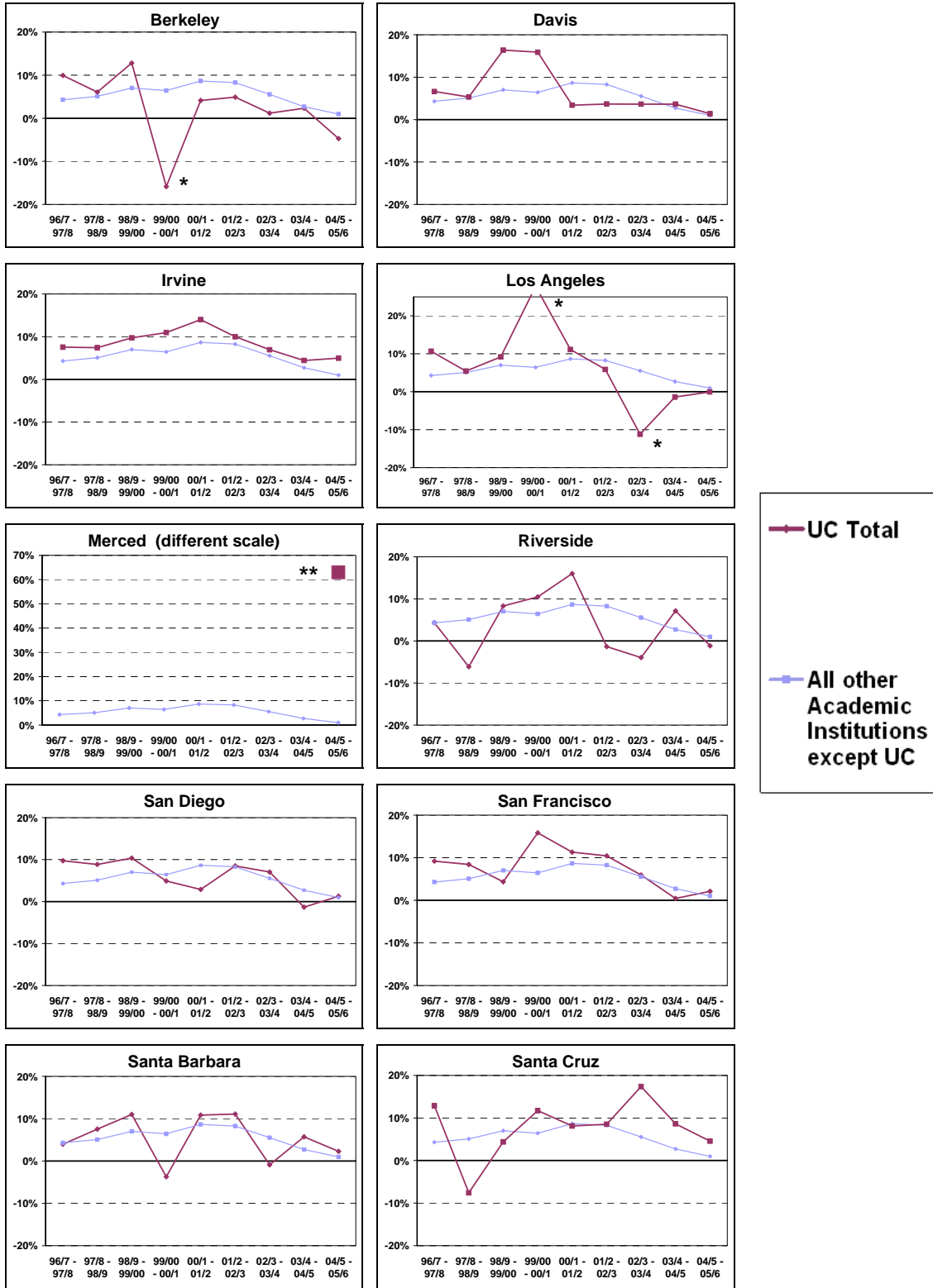
- These charts show real inflation-adjusted growth (or decline if the percentage is negative) of total research and development (R&D) expenditures from year to year.

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Source: National Science Foundation Research and Development (R&D) Expenditures Survey. NSF R&D expenditure data include both direct and indirect costs.

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## 8.1 (continued) Total Research and Development Expenditures, Annual Growth, 1996-97 to 2005-06



\* Prior to 2000-01, UCOP's R&D expenditures were included in Berkeley NSF totals. From 2000-01 to 2003-04 they were included in Los Angeles' NSF totals. Starting in 2003-04, they were reported separately for UCOP.  
 \*\* The single data point for Merced represents the one-year change from 2004-05 to 2005-06.

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### Indicator 8.2

#### Total Research and Development Expenditures, 1996-97 to 2005-06

<b>Academic Year</b>	<b>Universitywide Total (thousands)</b>	<b>All Academic Institutions (thousands)</b>	<b>UC Total as % of All Institutions</b>
1996-97	\$2,547,584	\$29,574,088	<b>8.6%</b>
1997-98	\$2,776,054	\$30,963,927	<b>9.0%</b>
1998-99	\$2,946,015	\$32,564,129	<b>9.0%</b>
1999-00	\$3,243,809	\$34,938,419	<b>9.3%</b>
2000-01	\$3,530,510	\$37,260,601	<b>9.5%</b>
2001-02	\$3,807,530	\$40,456,793	<b>9.4%</b>
2002-03	\$4,072,577	\$43,752,970	<b>9.3%</b>
2003-04	\$4,210,168	\$46,085,429	<b>9.1%</b>
2004-05	\$4,272,176	\$47,280,035	<b>9.0%</b>
2005-06	\$4,331,346	\$47,760,402	<b>9.1%</b>

Figures are in constant 2005-06 dollars, adjusted for inflation.

## Draft for Discussion

### Indicator 8.3

#### Rankings of Total NSF Research and Development Expenditures, 1996-97 to 2006-07

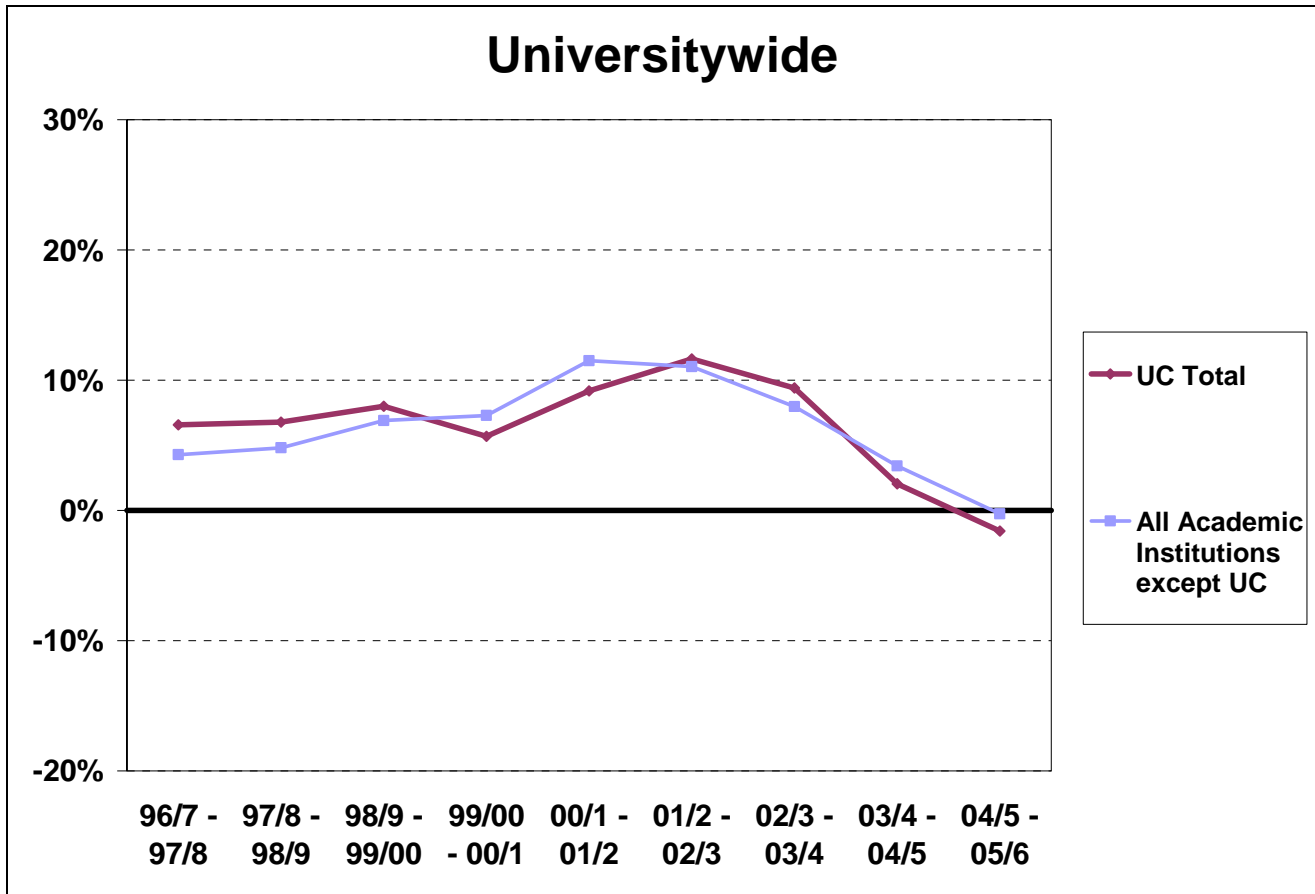
	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
<b>Berkeley</b>	11	6	7	7	12	13	14	13	15	19	20
<b>Davis</b>	24	21	23	17	15	14	18	17	17	16	16
<b>Irvine</b>	78	72	69	67	60	59	60	59	58	57	58
<b>Los Angeles</b>	8	3	4	4	2	2	2	2	4	3	4
<b>Merced</b>	-	-	-	-	-	-	-	-	329	295	270
<b>Riverside</b>	107	105	110	108	107	100	109	115	113	112	115
<b>San Diego</b>	7	7	6	6	6	7	7	7	6	7	6
<b>San Francisco</b>	14	11	10	9	7	6	6	5	5	5	2
<b>Santa Barbara</b>	88	88	90	88	91	91	93	96	97	98	89
<b>Santa Cruz</b>	128	121	130	128	129	128	131	124	123	121	117
<b>U of Illinois</b>	18	15	16	16	18	19	16	18	24	25	28
<b>U of Michigan (all campuses)</b>	2	2	2	3	4	3	3	3	2	4	5
<b>SUNY at Buffalo</b>	59	55	52	53	58	50	59	58	60	58	56
<b>U of Virginia (all campuses)</b>	77	71	57	58	78	69	67	67	69	72	75
<b>Harvard</b>	15	18	18	23	22	23	28	26	27	29	30
<b>MIT</b>	4	8	9	12	14	15	17	12	14	14	15
<b>Stanford</b>	6	9	8	8	8	8	8	8	7	8	10
<b>Yale</b>	26	27	27	29	29	30	30	29	30	27	31

Source: National Science Foundation

## Draft for Discussion

### Indicator 8.4

#### Federal Research and Development Expenditures, Annual Growth, 1996-97 to 2005-06



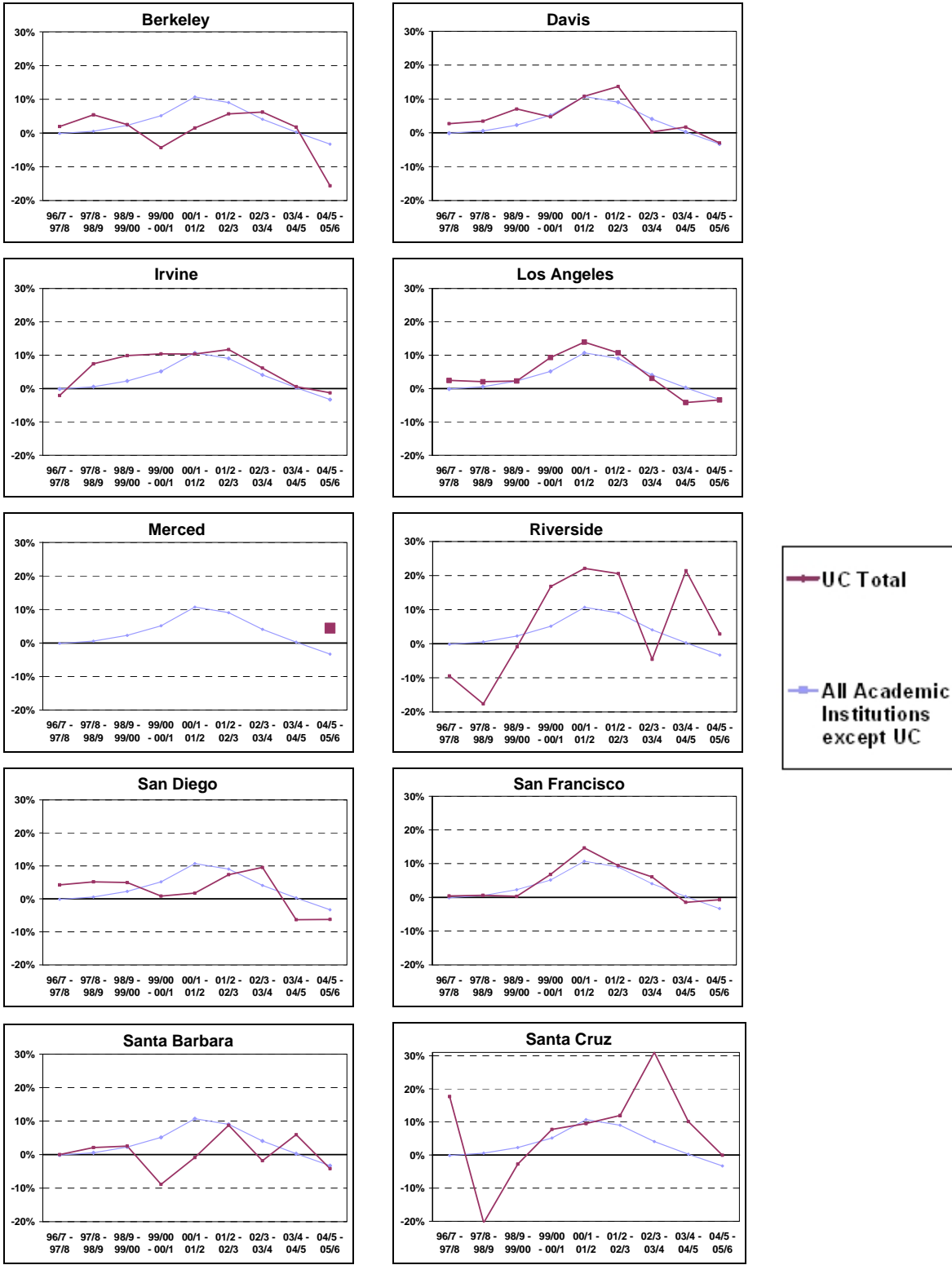
Figures are in constant 2005 -06 dollars, adjusted for inflation.

- Changes federal research and development expenditures at UC closely track changes in R&D expenditures at all academic institutions.

Source: National Science Foundation Research and Development Expenditures Survey; NSF R&D expenditure data includes both direct and indirect costs.

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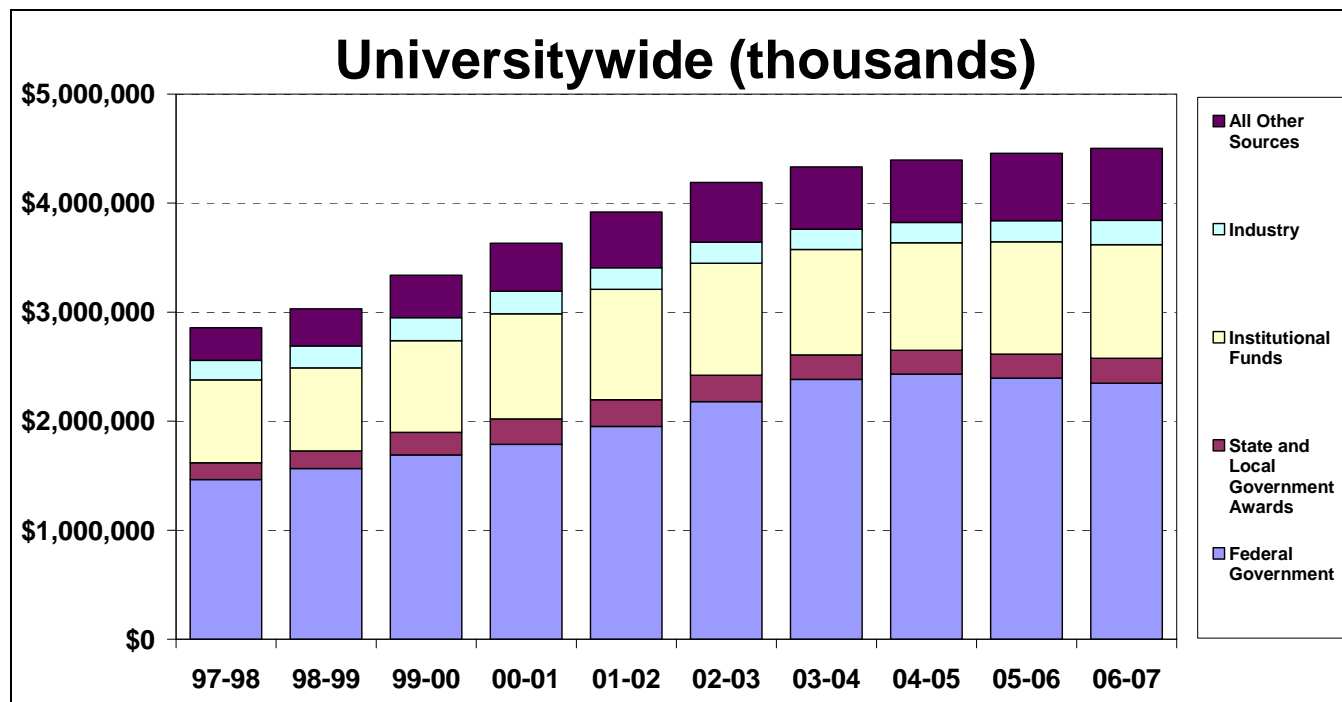
## 8.4 (continued) Federal Research and Development Expenditures, Annual Growth, Universitywide and by Campus, 1996-97 to 2005-06



## Draft for Discussion

### Indicator 8.5

#### Research and Development Expenditures by Source, 1997-98 to 2006-07



Figures are in constant 2006-07 dollars, adjusted for inflation.

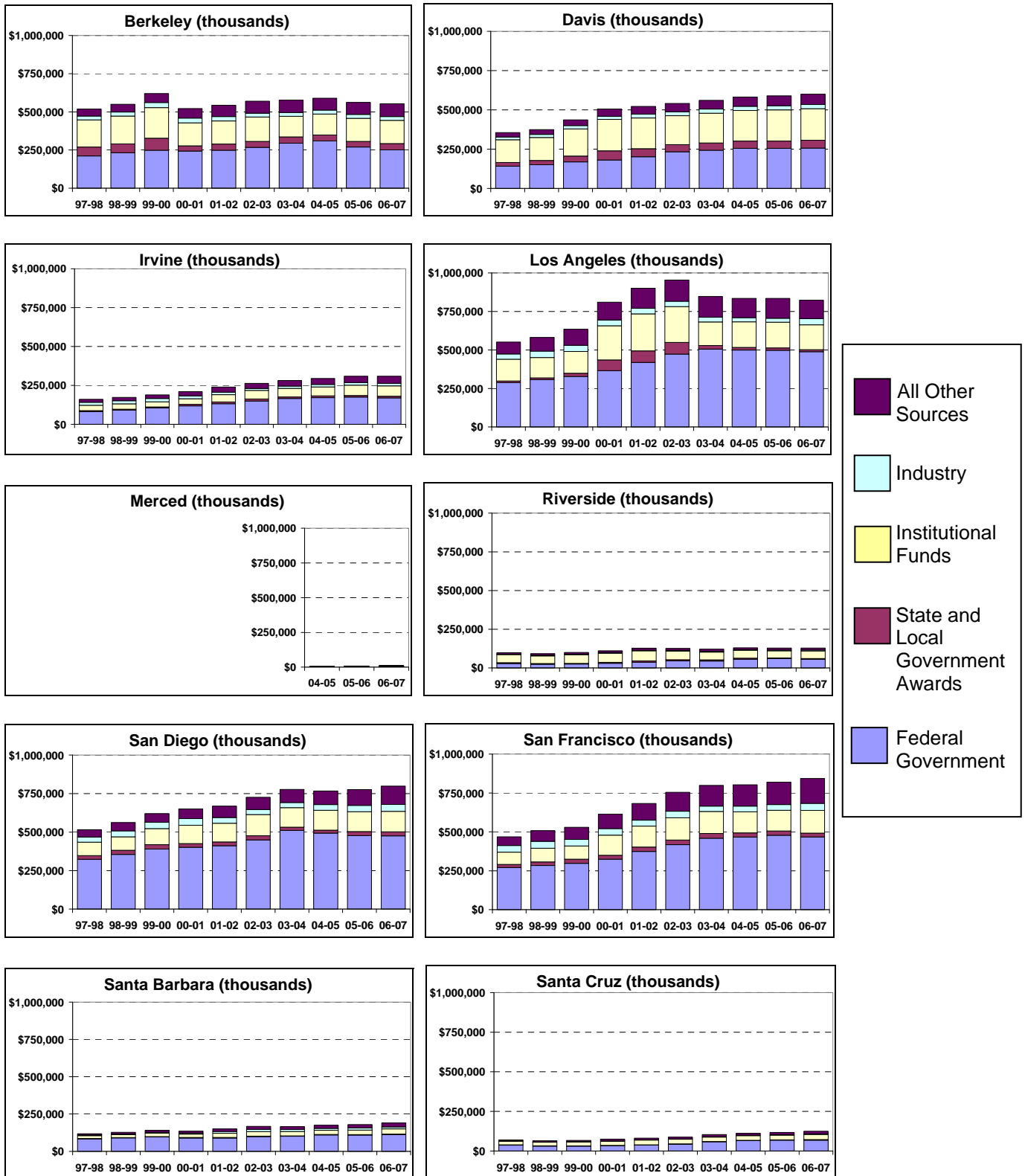
- Federal funds account for the majority of R&D expenditures, providing about 60 percent of actual reimbursed costs of research and about 52 percent of all R&D expenditures.
- The majority of federal funds come from Health and Human Services and represent National Institutes of Health funding given to medical schools. Campuses with medical schools (Davis, Irvine, Los Angeles, San Diego and San Francisco) garner a large amount of federal funding from NIH (see Indicator 8.6).
- Institutional R&D expenditures come from a variety of sources, including state government appropriations, general-purpose awards from industry and foundations, endowment income and unreimbursed indirect costs.
- The “all other sources” category includes awards from nonprofit foundations and voluntary health agencies and gifts from individuals that are restricted by the donor to research.

Note: In order to gauge the relative size of contributions to the University’s research expenditures from various external sponsors, it is useful to look only at direct R&D expenditures plus associated indirect costs funded by an external sponsor (money actually paid by the source to the University). By way of comparison, while the University’s total FY 2007 R&D expenditures as reported on the NSF survey (which includes both direct and indirect costs) were over \$4.5 billion, the direct cost of research was about \$3.3 billion and UC’s actual revenue received for research totaled approximately \$3.9 billion.

Source: National Science Foundation Research and Development Expenditures Survey; data include both direct and indirect costs.

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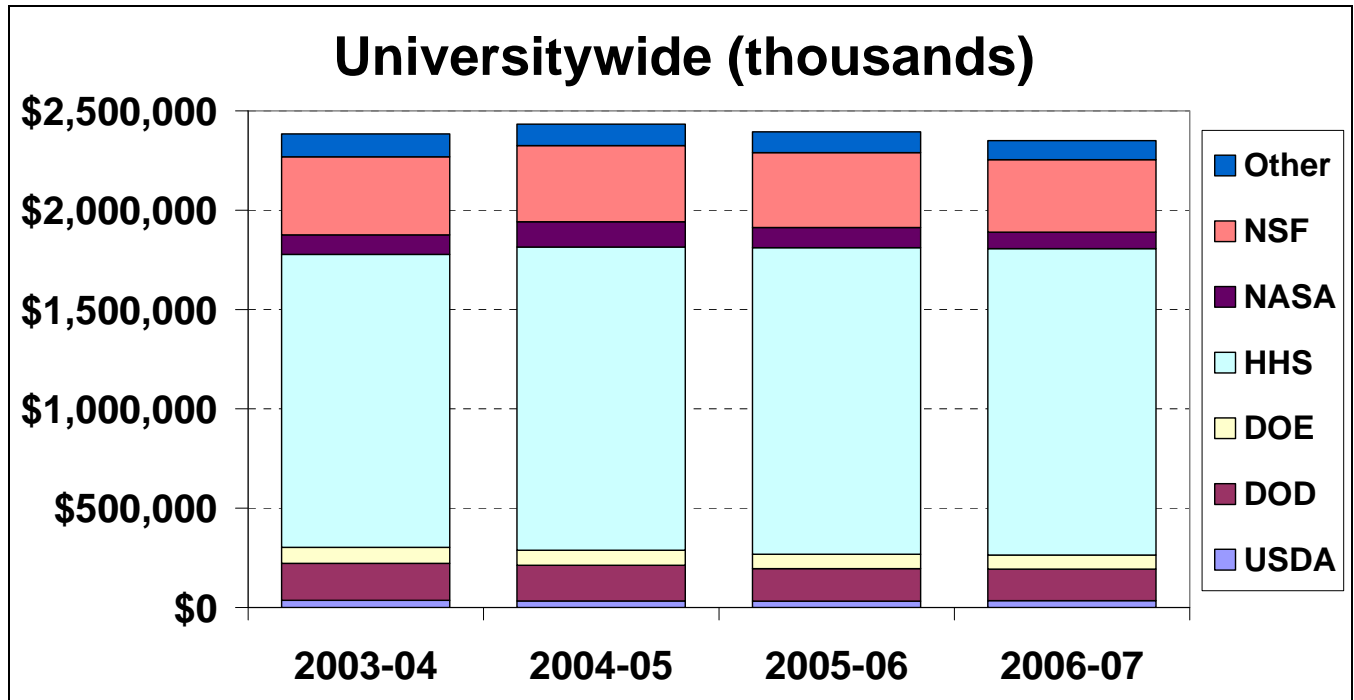
## 8.5 (continued) Research and Development Expenditures by Source, 1997-98 to 2006-07



# Draft for Discussion

## Indicator 8.6

### Federally Funded Research and Development Expenditures by Agency, 2003-04 to 2006-07

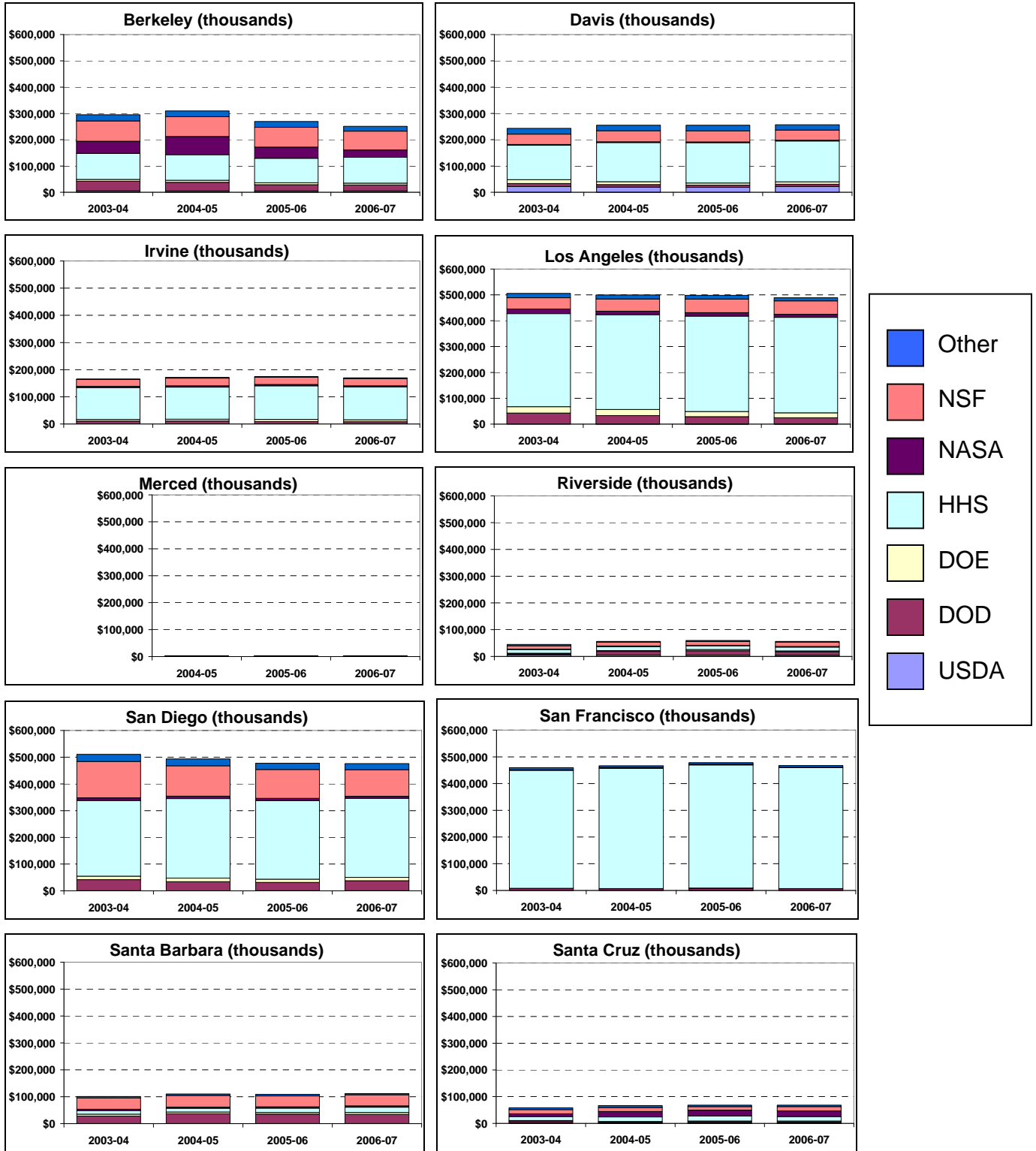


Figures are in constant 2006-07 dollars, adjusted for inflation.

Source: National Science Foundation Research and Development Expenditures Survey; NSF began collecting information by federal agency in FY 2003-04.

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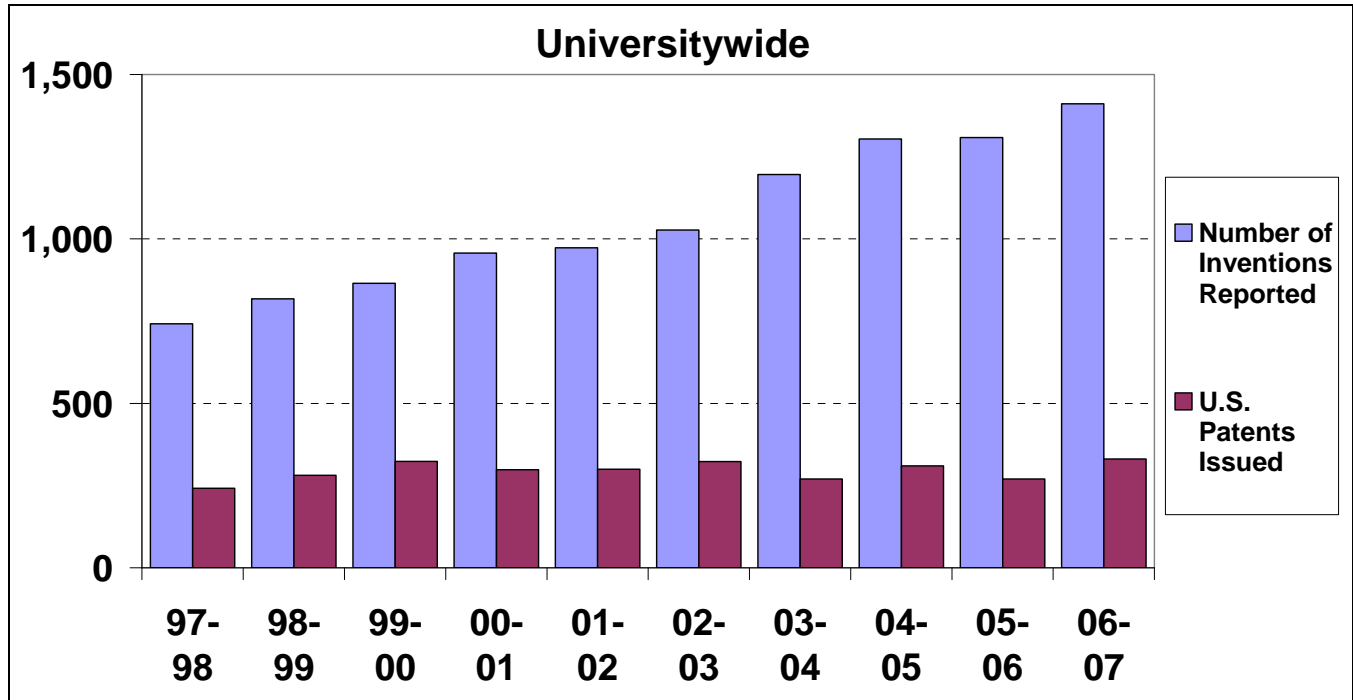
## 8.6 (continued) Inflation-Adjusted Federally Funded Research and Development Expenditures by Agency, 2003-04 to 2006-07



## Draft for Discussion

### Indicator 8.7

#### Number of Patents and Inventions, 1997-98 to 2006-07



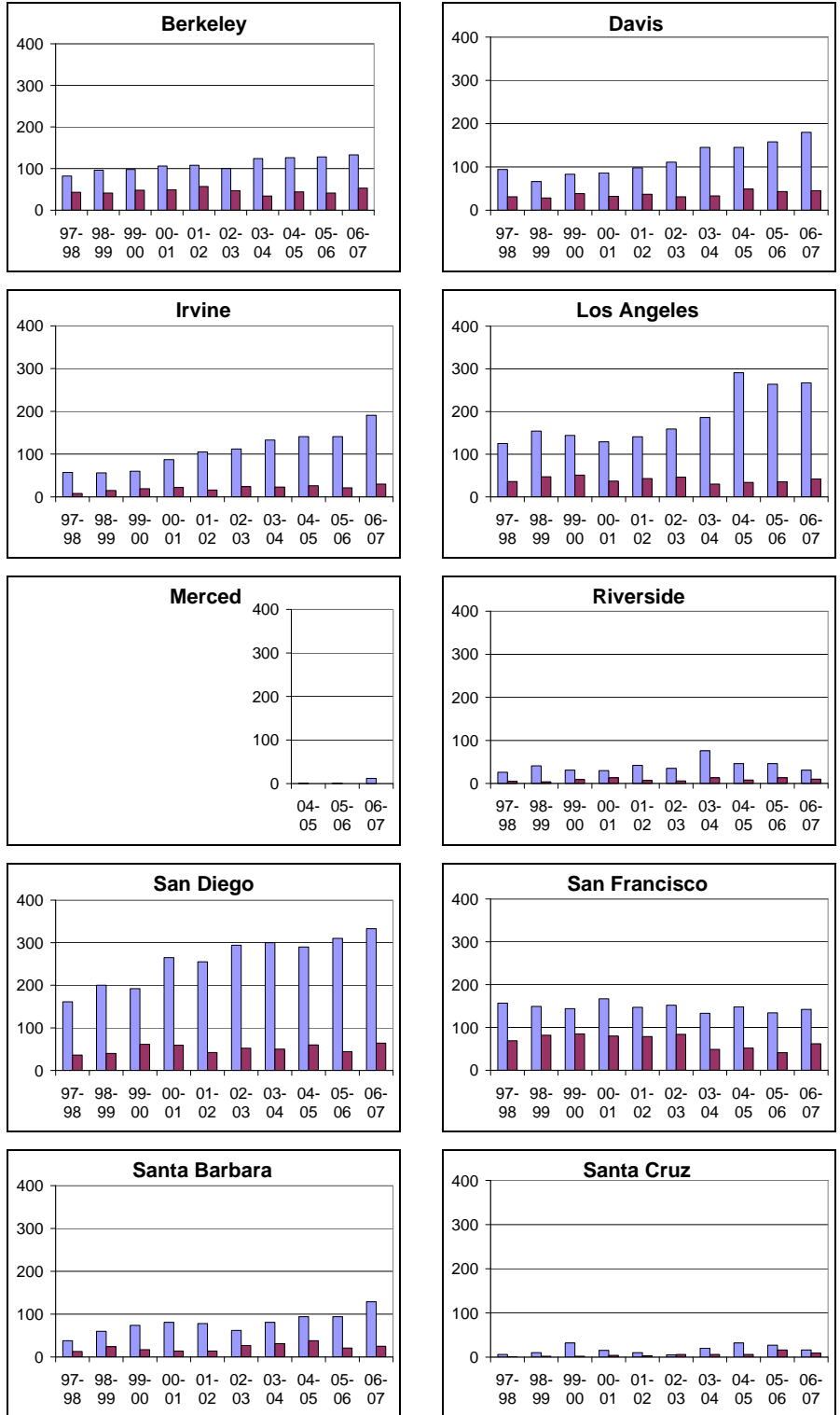
- For the past 12 years, the UC system has led the nation in the number of U.S. patents awarded to a university system.
- In recent years, UC has spawned more than 30 companies in the clean/green technology sector, evidencing the system's leadership in the renewable energy and sustainable development sector of California's economy.
- Inventions reported are those reported to each of the ten campuses' technology transfer office. Foreign patents are not reported here.

Note: These are currently the most readily available and widely used indicators of research output related to technology transfer. There is an effort under way nationally and at UC to develop additional measures of technology transfer success that better reflect the important goal of fostering relationships. As alternate metrics are developed, they will be included in future accountability reports.

Source: UCOP Office of Technology Transfer Annual Reports.

# Draft for Discussion

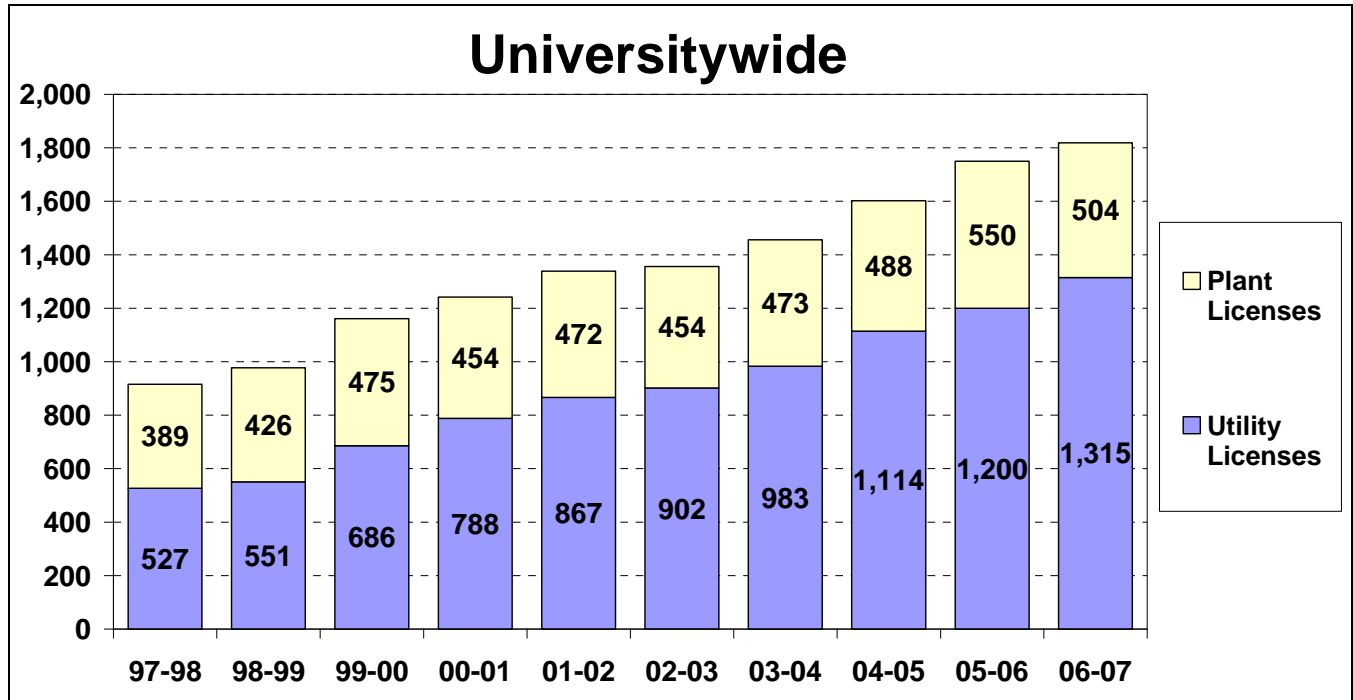
## 8.7 (continued) Number of Patents and Inventions, 1997-98 to 2006-07



## Draft for Discussion

### Indicator 8.8

#### Trend in Number of Active Licenses

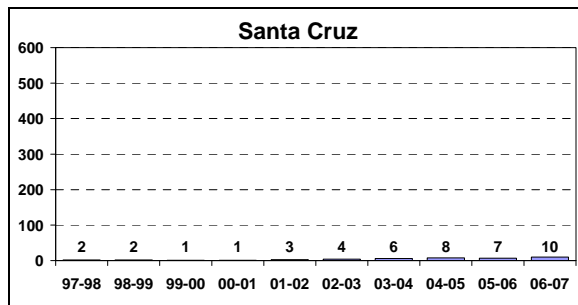
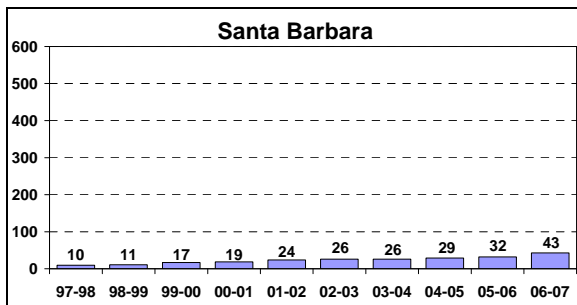
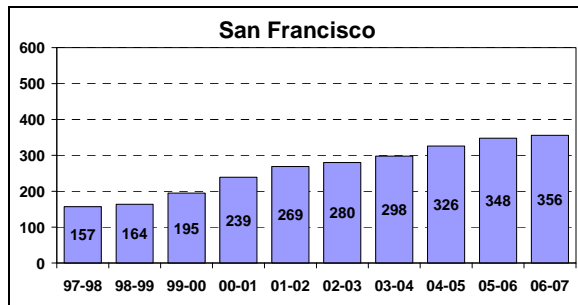
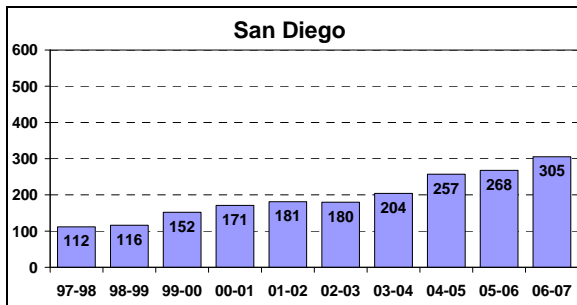
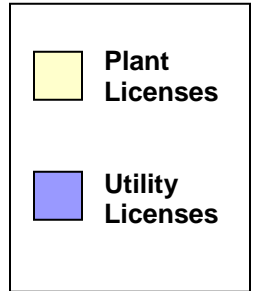
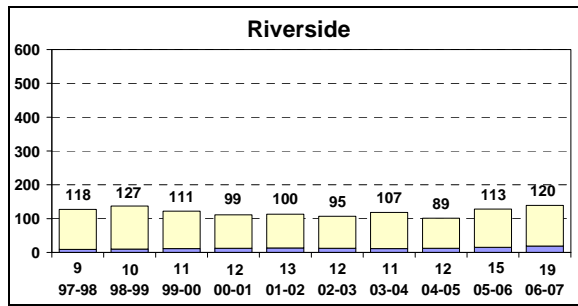
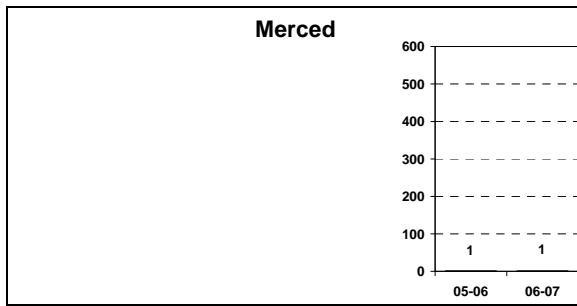
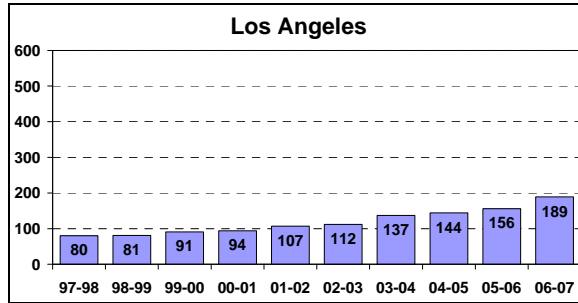
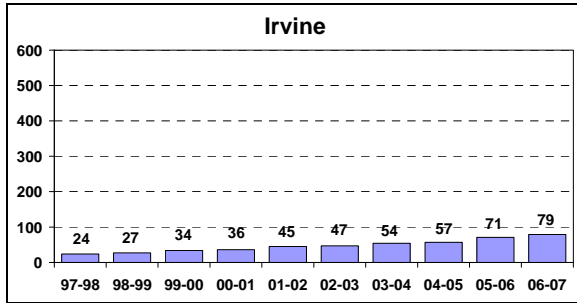
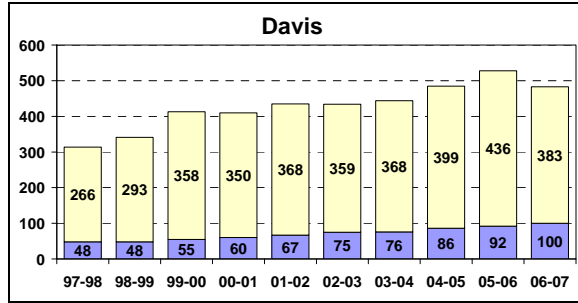
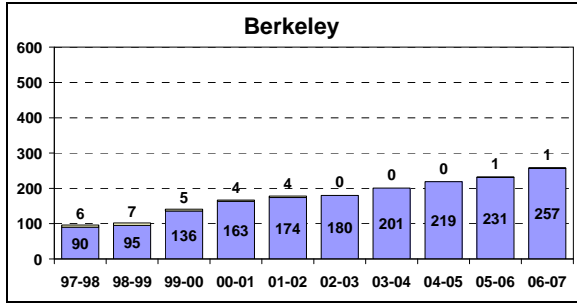


- A license agreement grants a licensee access to a university's invention in exchange for the licensee's commitment to further develop and commercialize the invention. Utility licenses cover processes, machines, manufactured items and compositions of matter. Plant licenses cover sexually and asexually reproduced plant varieties.
- The graphs show the number of licenses in effect at the end of each fiscal year. Each year new agreements are added to the portfolio and some expire or are terminated. In general, the total number of agreements continues to rise each year due to an increase in activity with industry.
- Examples of commercialized inventions are hepatitis-B vaccine, a treatment for intracranial aneurysms, nicotine patch, atomic microscope, and the camarosa, ventana and albion strawberry varieties, which were released from the UC Davis Strawberry Variety Program.
- UC Riverside's contribution to UC's plant licensing activities can be traced back to its founding in 1906 as the California Citrus Research Station. UCR is still a major contributor to the California citrus industry, especially with the recent release of five seedless mandarin cultivars.

Source: UCOP Office of Technology Transfer

# Draft for Discussion

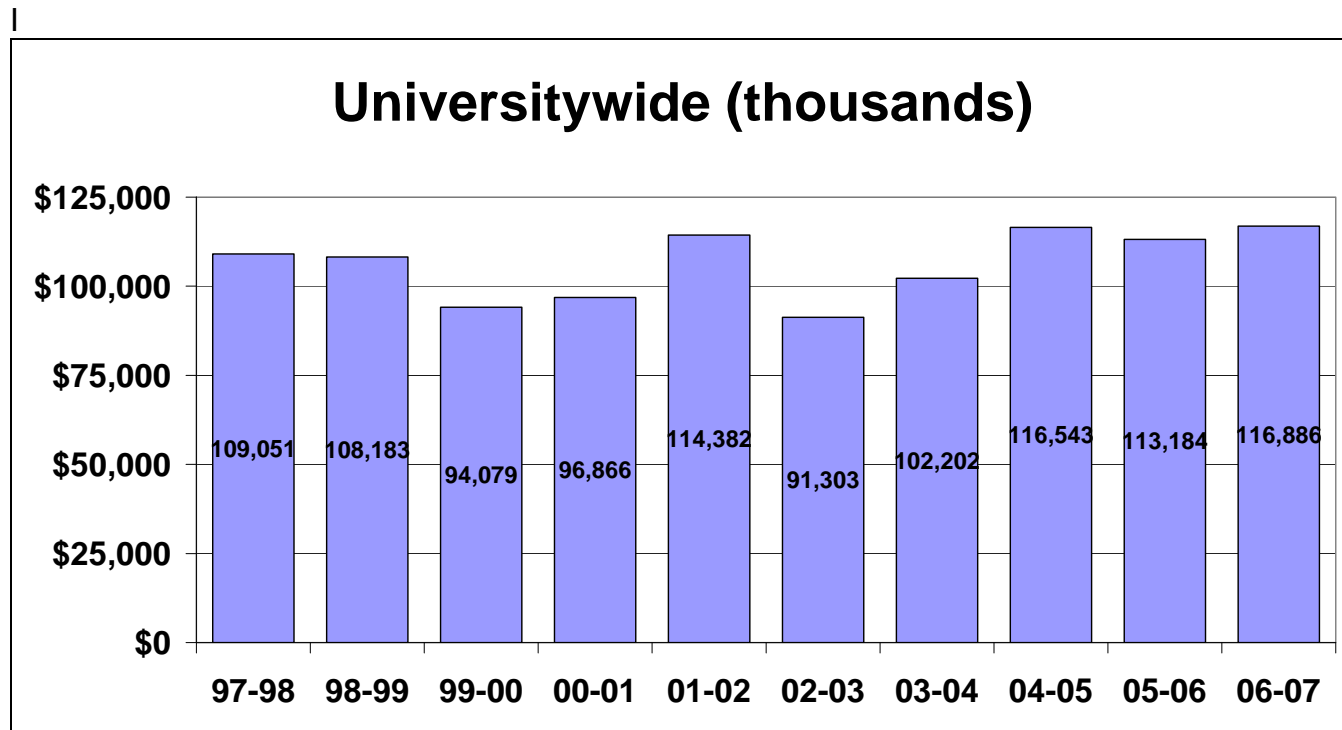
## 8.8 (continued) Trend in Number of Active Licenses



## Draft for Discussion

### Indicator 8.9

#### Licensing Income, 1997-98 to 2006-07



Figures are in constant 2006-07 dollars, adjusted for inflation.

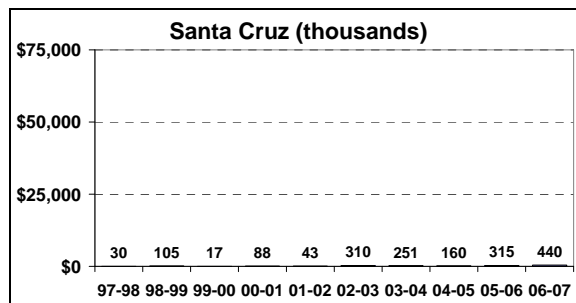
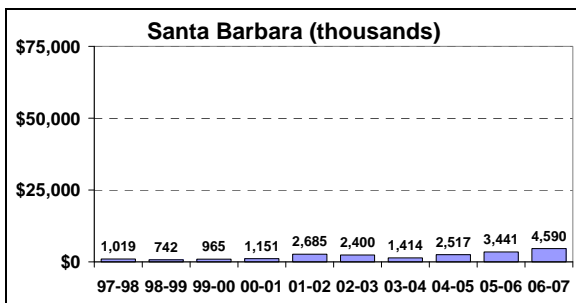
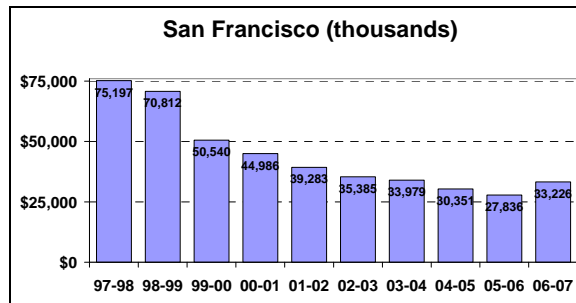
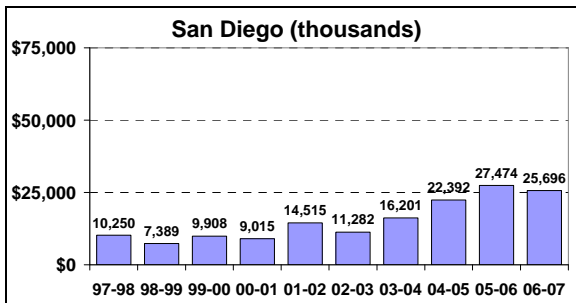
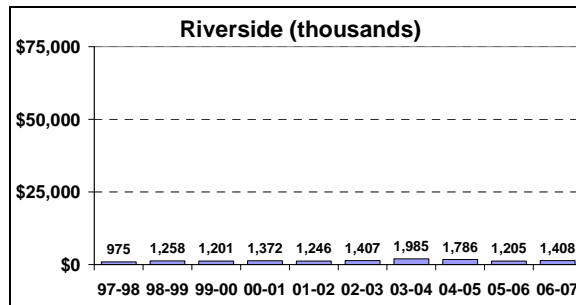
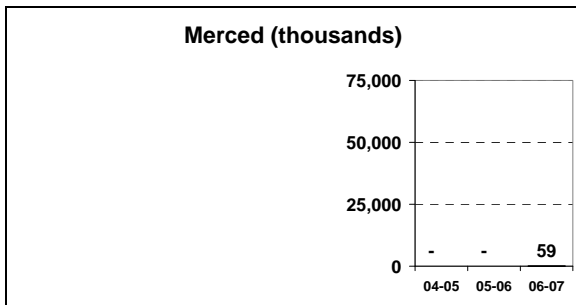
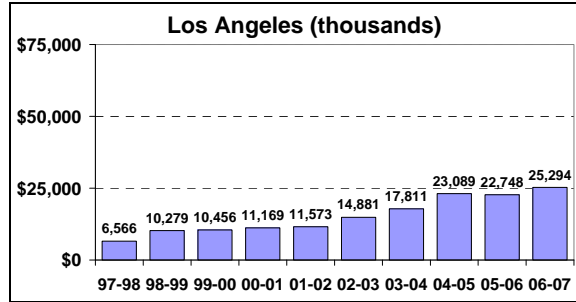
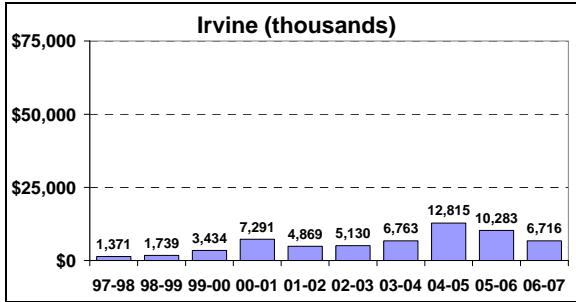
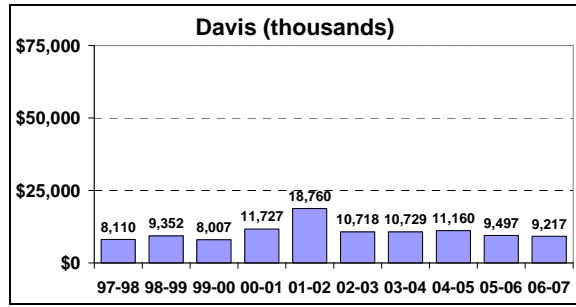
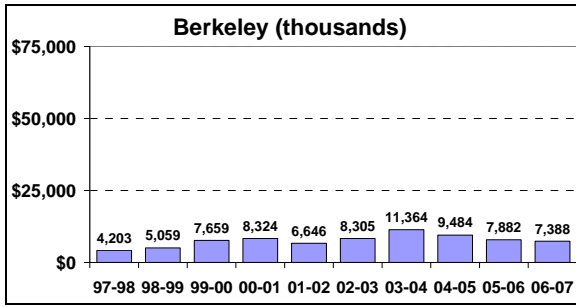
- The 2006 Milken Institute report “Mind to Market: A Global Analysis of University Biotechnology Transfer and Commercialization” ranked the UC system second (after MIT) in its technology transfer and commercialization index.
- In biotechnology, UC has created through licensing more than 200 biomedical and biotechnology-related start-ups in the past 20 years, over 85 percent of which are still in business today. Also, one in six public biotechnology companies nationally — and one in three in California — were founded by a UC scientist.

Note: In 1999-2000, the University received a \$200 million payment as settlement for a long-standing infringement suit involving the University’s human growth hormone patent. In 2005-06, the University received a \$100 million payment as a partial settlement of a patent infringement suit involving bovine growth hormone patents. Because of the unique nature and magnitude of these settlements, monies attributable to them are excluded from the Universitywide and San Francisco campus trend data shown here.

Source: UCOP’s Office of Technology Transfer Annual Reports

# Draft for Discussion

## 8.9 (continued) Licensing Income, 1997-98 to 2006-07



# Draft for Discussion