

Research Material 148

# Survey on Trends in Career Paths of Postdoctoral Fellows at 8 Institutions

『Project for Promoting Diversification of the Career Paths of Human  
Resources in Science and Technology』  
“Survey on Career Paths of Postdoctoral Fellows”

November 2007

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Ministry of Education, Culture, Sports, Science and Technology (MEXT), JAPAN

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## **[Abstract]**

This survey was carried out with the cooperation of 8 institutions (Hokkaido University, Tohoku University, RIKEN, Waseda University, Nagoya University, Osaka University, Yamaguchi University, and Kyushu University; hereafter, “8 selected institutions”) selected in fiscal year 2006 for the “Project for Promoting Diversification of the Career Paths of Human Resources in Science and Technology” of the Ministry of Education, Culture, Sports, Science and Technology (MEXT) in order to clarify trends in the career paths of postdoctoral fellows (commonly called “post-docs”) affiliated with the institutions concerned during FY2005. This was the first survey which clarified the career paths (type of occupation, affiliated institution, etc.) of post-docs as a whole at multiple institutions in Japan.

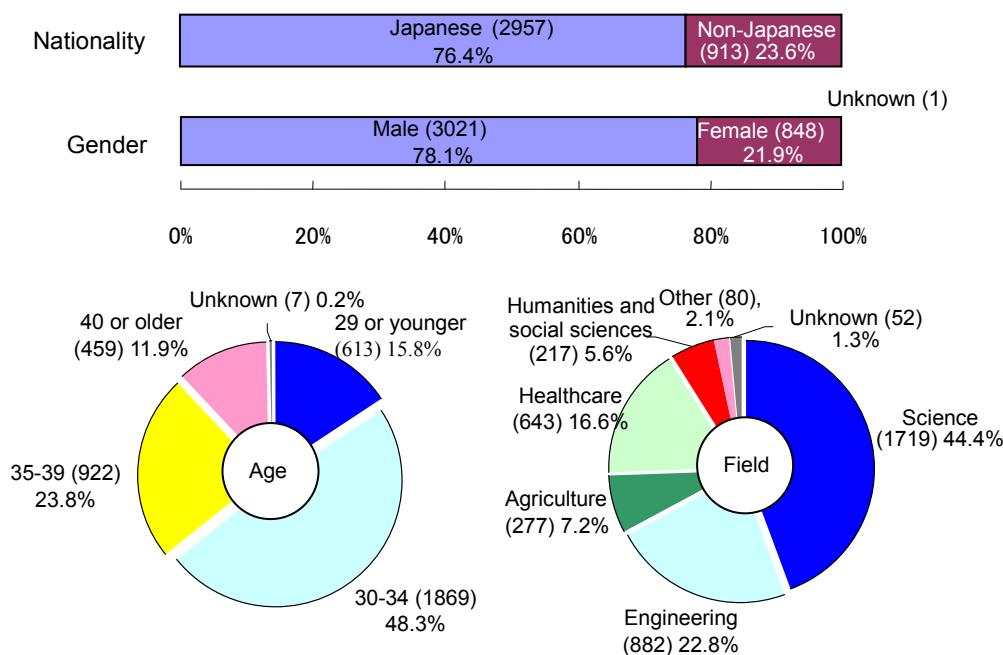
### **1. Survey Method**

Cooperation in the survey by related departments of the 8 selected institutions was requested. The departments collected and submitted information on career paths immediately after the end of FY2005 for post-docs affiliated with the institutions during FY2005. Representatives of each laboratory or similar unit were asked to complete the survey form in order to include persons who had transferred from the institution at the time of the survey.

### **2. Attributes of Survey Subjects**

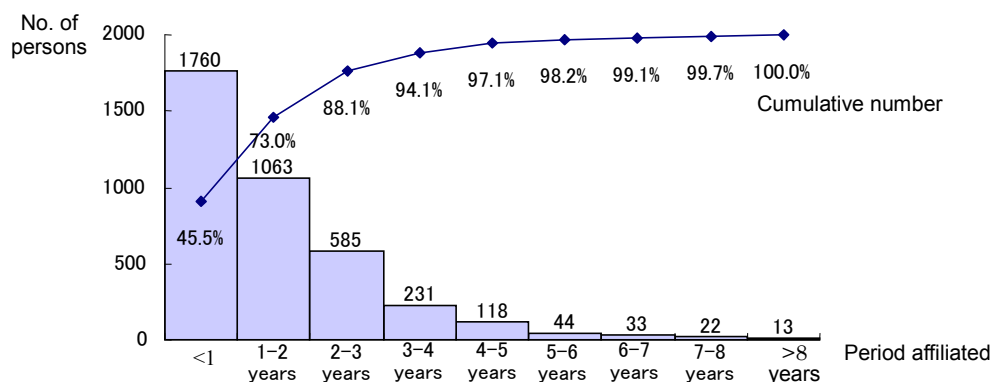
Information on career paths was obtained for a total of 3,870 post-docs. This corresponds to about one-quarter of the total of approximately 15,000 post-docs in Japan during the period.

Looking at the post-docs (survey subjects) for whom this information was obtained as a whole by attribute, the ratios by nationality and gender are roughly the same as in the “Survey on Postdoctoral Fellows and Research Assistants,”\* which investigated all post-docs. However, the age of the post-docs in the present survey was higher overall, and by field, the ratio of persons in the sciences was higher (Fig. 1).



**Fig. 1. Attributes of survey subjects (3,870 persons)**

Persons who had been affiliated with the 8 selected institutions for less than 3 years accounted for approximately 88% of the total (Fig. 2).



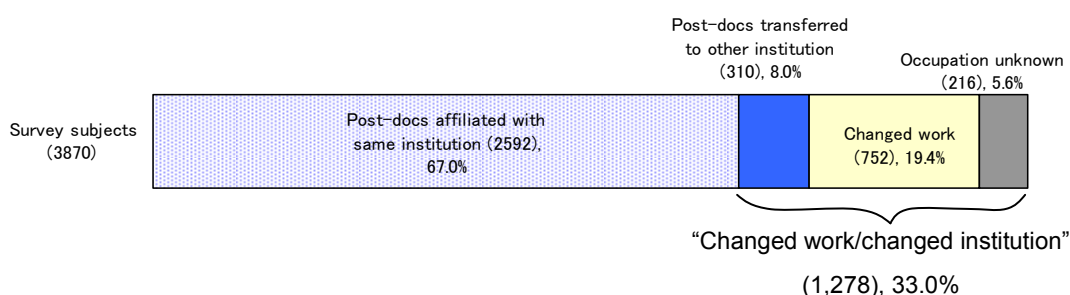
**Fig. 2. Length of affiliation of survey subjects (3,870 persons) with 8 selected institutions**

\* National Institute of Science and Technology Policy (NISTEP), Ministry of Education, Culture, Sports, Science and Technology (MEXT), in cooperation with the Knowledge Infrastructure Policy Division, Science and Technology Policy Bureau, MEXT (2007): "Survey on Postdoctoral Fellows and Research Assistants (FY2006)." <http://www.nistep.go.jp/achiev/ftx/jpn/mat137j/pdf/mat137j1.pdf> (original in Japanese; for the English translation, see <http://www.nistep.go.jp/index-e.html> : Research Material No. 128).



### 3. Trends in Career Paths of Survey Subjects Immediately after End of FY2005

Among the postdoctoral fellows (3,870 persons) for whom information on career paths was obtained, 67% (2,592) were affiliated with the same institution as post-docs immediately after the end of FY2005, 8% (310) had become post-docs at other institutions, 19% (752) had changed work (i.e., were engaged in work other than postdoctoral fellow), and the occupations of the remaining 6% (216) were unknown (Fig. 3). In the following, persons other than “post-docs affiliated with the same institution,” that is, post-docs who transferred to other institutions, persons who changed work, and persons whose occupations are unknown, are referred to collectively as “Changed work/changed institution.”



**Fig. 3. Trend in career paths of survey subjects immediately after end of FY2005**

① Occupations of persons who changed work (Fig. 4)

Regarding the occupations of the 752 persons who changed type of work, R&D personnel accounted for 82% of the total. In particular, researchers at academic research institutes in Japan (universities and public research institutes) accounted for 50%; in contrast, researchers at private corporations in Japan totaled only 9%. In addition, 9% of persons who changed work entered occupations requiring specialized knowledge (teachers, doctors, etc., occupations related to intellectual property, coordinators for industry-university collaboration, science and technology communicators, etc.).

② New institutions of persons who became post-docs at other institutions (Fig. 5)

Of the 310 persons who became post-docs at other institutions, half (50%) moved to institutions in Japan, while 42% moved overseas. In the breakdown by type of institution for post-docs who moved to other institutions in Japan, public research institutes and national university corporations accounted for 82% of the total.

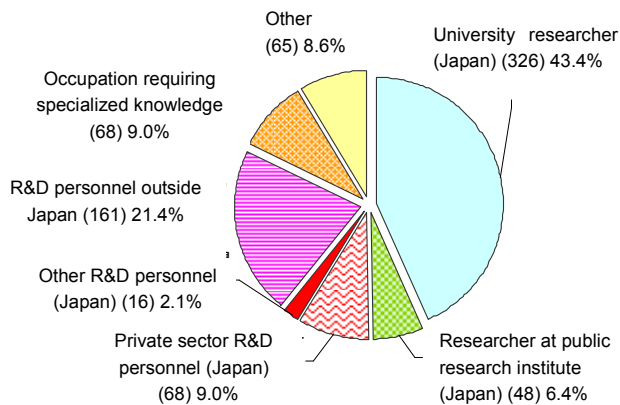


Fig. 4. Occupations of persons who changed work (752 persons)

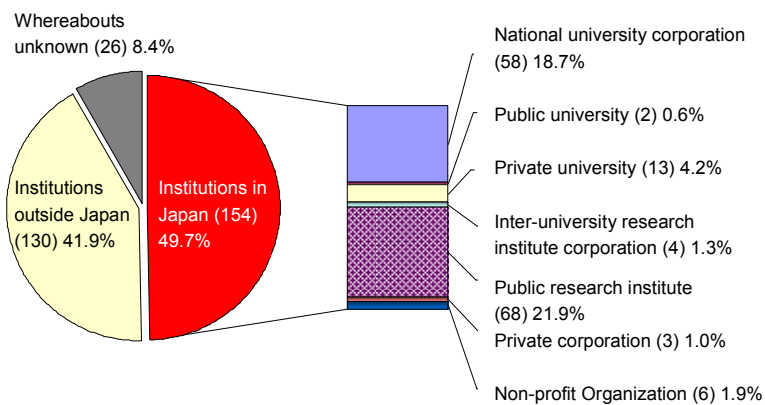


Fig. 5. New institutions of persons who became post-docs at other institutions (310 persons)

#### 4. Trends in Career Paths of Persons who Changed Work/Transferred by Attribute

The following presents the distinctive features of the trends in the career paths of the 1,278 persons who changed work/transferred by attribute.

##### ① By nationality (Fig. 6)

Comparing occupations by nationality, the percentages of persons employed as postdoctoral fellows and R&D personnel (other than post-docs) were substantially the same for Japanese nationals and persons of other nationalities. Looking at the new institutions of persons who moved to other institutions, among Japanese nationals, persons remaining in Japan accounted for 72%, followed by persons who moved to the United States (7%). Among non-Japanese nationals, persons remaining in Japan accounted for 24%, followed by persons who moved to China (20%).

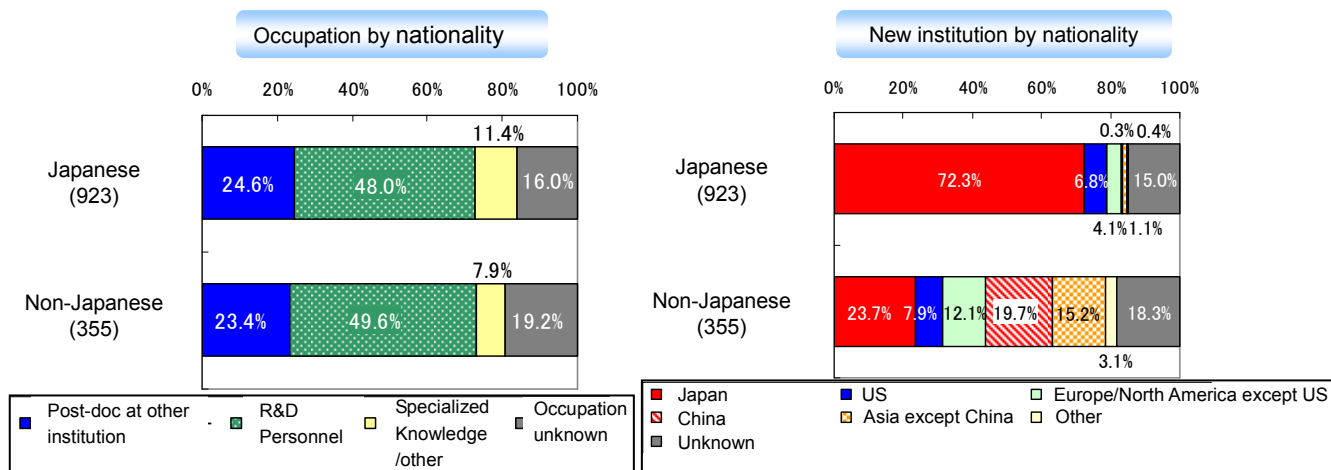


Fig. 6. Occupations and new institutions of persons who changed work/changed institution by nationality

##### ② By gender (Fig. 7)

In comparison with men, the ratio of women who became “University researcher (Japan)” was lower (9% difference), and the ratios of “Unknown” and “Unemployed” (which accounts for the larger part of the job classification “Other”) were higher (8% difference in “Unknown”).

③ By age (Fig. 8)

The ratio of persons who became post-docs at other institutions decreases with age.

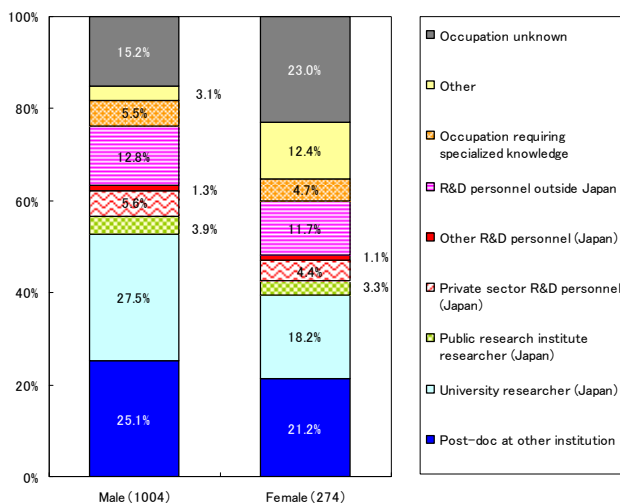


Fig. 7. Occupations of persons who changed work/changed institution by gender

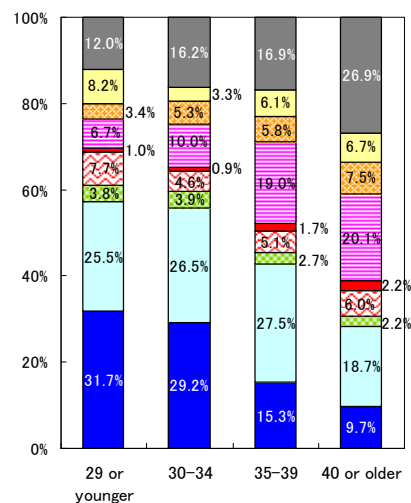


Fig. 8. Occupations of persons who changed work/changed institution by age

④ By field (Fig. 9)

- In the field of “Science,” the ratio of persons who become post-docs at other institutions is high (36%). In particular, the percentage of persons who become post-docs at institutions outside of Japan is high in comparison with other fields (see body of paper, p. 26).
- In “Engineering,” the ratios of persons who become R&D personnel outside Japan and persons who become private sector R&D personnel in Japan are high in comparison with other fields. Here, the large number of R&D personnel outside Japan is due to the number of persons of non-Japanese nationality who are engaged in R&D occupations at institutions outside Japan (see body, p. 26).
- In “Agriculture,” the ratio of persons whose occupations are unknown is high in comparison with other fields (30%).
- In “Healthcare,” the ratio of occupations requiring specialized knowledge is high (16%); however, virtually all of this number is “Doctors, etc.” (see body, p. 27).
- In “Humanities and social sciences,” the ratio of persons who become university researchers is high (57%).

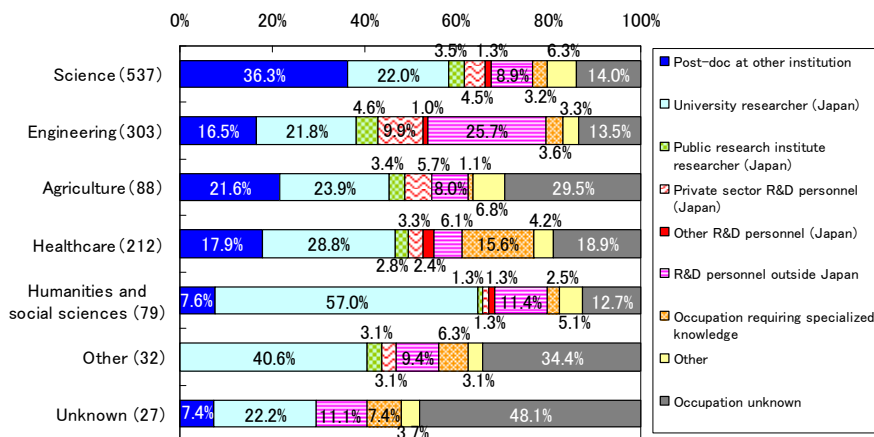


Fig. 9. Occupations of persons who changed work/changed institution by field



## Introduction

Training and securing creative, independent human resources in science and technology is an urgent matter for the future of science and technology in Japan and for maintaining and strengthening this country's international competitiveness.

Under Japan's 1<sup>st</sup> and 2<sup>nd</sup> Science and Technology Basic Plans, the country created a research environment which enables outstanding young researchers to demonstrate their capabilities to the fullest possible extent and improved its economic support for the young researcher cohort, including postdoctoral fellows ("post-docs") and others. As a result of these policies, young researchers, as represented by postdoctoral fellows, now play a key role in research activities in Japan.

The 3<sup>rd</sup> Science and Technology Basic Plan presents new recommendations, which propose "positioning postdoctoral fellow as a preliminary stage before young researcher with the ability to conduct independent research, and promoting transparency in the hiring process for young researchers and support for their independence" and, at the same time, "promotion of career paths for postdoctoral fellows which include paths other than academic research."

In the future, in addition to studying and implementing policies for "support for independence as researchers" and "support for diverse career paths," as proposed in the 3<sup>rd</sup> Science and Technology Basic Plan, organizing data for determining the current employment of persons who have experience as postdoctoral fellows, and assessing the actual situation of that employment, will be indispensable for assessing the effects of the policies implemented.

Therefore, this survey investigated the trends in the career paths of persons engaged in research activities as postdoctoral fellows at 8 institutions (Hokkaido University, Tohoku University, RIKEN, Waseda University, Nagoya University, Osaka University, Yamaguchi University, and Kyushu University; hereafter referred to as "8 selected institutions"), which were selected in fiscal year 2006 for the "Project for Promoting Diversification of the Career Paths of Human Resources in Science and Technology" of the Ministry of Education, Culture, Sports, Science and Technology (MEXT) and MEXT. This study was carried out under the leadership of the 1st Policy-Oriented Research Group of the National Institute of Science and Technology Policy with the cooperation of the 8 selected institutions. Because the survey was limited to these 8 selected institutions, and the survey asked the advisors of the post-docs and similar persons (head of laboratory, leader of research center), and not the postdoctoral fellows themselves, about the career paths of persons who were formerly affiliated with the institution, readers should note that the findings may be affected by these survey conditions.

In Japan, there are cases in which the career paths of postdoctoral fellows formerly affiliated with designated universities or other institutions are investigated by the institution concerned, as well as examples of follow-up surveys on trends in the career paths of postdoctoral fellows hired using special funds, such as post-docs (Research Fellows) of the Japan Society for the Promotion of Science (JSPS). However, the present survey is the first to compile and publish trends in the career paths of all postdoctoral fellows affiliated with multiple institutions and clarify the details of their career paths (type of occupation, affiliated institution, etc.) on this scale.

At present, the information resources which can be used to understand trends in the career paths of postdoctoral fellows are limited. Therefore, while again noting that these results may differ in some respects from the conditions for all postdoctoral fellows, the authors will be pleased if this survey provides a useful reference for readers.

# **1 Objectives and Methodology of the Survey**

## **1-1 Objectives**

The objectives of this survey are to clarify the trends in the career paths of persons engaged in research activities as postdoctoral fellows in fiscal year 2005 at 8 institutions selected in FY 2006 by “Project for Promoting Diversification of the Career Paths of Human Resources in Science and Technology” of the Ministry of Education, Culture, Sports, Science and Technology (MEXT), and to contribute to the creation and promotion of policy for science and technology-related human resources in the future.

## **1-2 Outline of the Survey**

### (a) Organization responsible

1st Policy-Oriented Research Group of the National Institute of Science and Technology Policy

### (b) Subjects

Persons engaged in research activities as postdoctoral fellows for 2 months or more during FY 2005 at the 8 institutions (Hokkaido University, Tohoku University, RIKEN, Waseda University, Nagoya University, Osaka University, Yamaguchi University, and Kyushu University; hereafter referred to as “8 selected institutions”) selected in FY 2006 by the “Project for Promoting Diversification of the Career Paths of Human Resources in Science and Technology” of MEXT

### (c) Period

November 2006 to February 2007\*

### (d) Method

In carrying out this survey, survey forms were distributed to departments (research cooperation sections and personnel sections) concerned with the “Project for Promoting Diversification of the Career Paths of Human Resources in Science and Technology” at the 8 selected institutions through the Knowledge Infrastructure Policy Division of MEXT. Information on the career paths of persons who had been affiliated with the institution for 2 months or longer during the FY 2005 was then collected through a process in which the departments concerned distributed the questionnaire to individual laboratories, provided personal data, etc., and the results were submitted to the National Institute of Science and Technology Policy (NISTEP), MEXT.

Regarding the survey methods used in each of the 8 selected institutions, because the composition of the organizations at the respective institutions differed, the survey was carried out by the method which allowed the easiest collection of information at each institution, for example, by sending the questionnaires to individual laboratories, etc.

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\*The final deadline for replies, including period for correction of omissions, etc., was April 2007.

(e) Collection of questionnaires

Survey form (see “B (Reference materials) Questionnaire”) were submitted by the respective institutions to the National Institute of Science and Technology Policy in the form of email attachments as electronic files in the Excel format.

(f) Effective number of replies (No. of survey subjects)

The effective number of replies was **3,870 persons**. This corresponds to **approximately 1/4 of the total of 15,496 postdoctoral fellows** in the “Survey of Postdoctoral Fellows and Research Assistants”\* (FY 2006; hereinafter, “Employment Survey”), which was carried out simultaneously with the present survey. Details are shown in Table 1–1.

**Table 1–1 Outline of Career Path Survey and Employment Survey**

	Career Path Survey	Employment Survey
Institutions surveyed	8	1232
Institutions replying	8 (100.0 %)	921 (74.8 %)
Effective replies (No. of subjects)	3870	15496

Numbers in parentheses show the effective reply ratio. The number of subjects in the Career Path Survey corresponds to 95% of the total number of postdoctoral fellows at the 8 selected institutions in the Employment Survey.

### 1-3 Definition of Postdoctoral Fellow

The definition of postdoctoral fellows who were the subjects of this survey conforms to that in the Employment Survey which was carried out at the same time, and was presented as shown below in the survey questionnaire.

For the purposes of this survey, postdoctoral fellows are persons who satisfy all of the following conditions.

- ① Persons who have received a doctoral degree or have terminated their student status upon completing the required years/credits for a doctoral degree.
  - ② Persons who are engaged in research work at a university or other research institute in a position with a fixed term (including persons who are not in an employment relationship with the institution and do not receive payment of a salary, persons who receive payment of monetary gift of thanks, and dispatches from temporary staffing agencies).
  - ③ Persons who do not hold a post as professor, associate professor, lecturer, or assistant.
  - ④ Persons who do not hold a post as leader or senior researcher in their research group.
- \* In addition to the above, the detailed definition follows that in the “Employment Survey.”

Persons who satisfied the above conditions at one institution for 2 months or longer during fiscal year 2005 were considered subjects in the present survey.

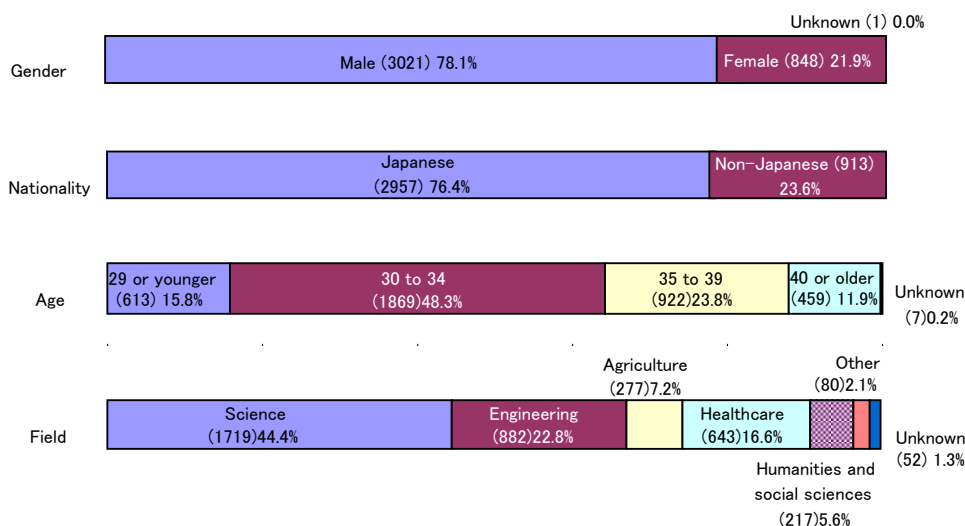
\* The definition of “postdoctoral fellow” used in the Employment Survey was also adopted for “postdoctoral fellow” in this report. For convenience, this includes persons who terminated their student status after completing the required number of years/credits to obtain a doctorate. It should be noted that the Employment Survey investigated the total number of persons employed during the fiscal year covered by the survey, whereas the present report investigates the actual number of career paths of postdoctoral fellows.



## 2 Attributes of Survey Subjects

A breakdown of the subjects (3,870 persons) of this survey by gender, nationality, age, and research field is shown in Fig. 2-1.

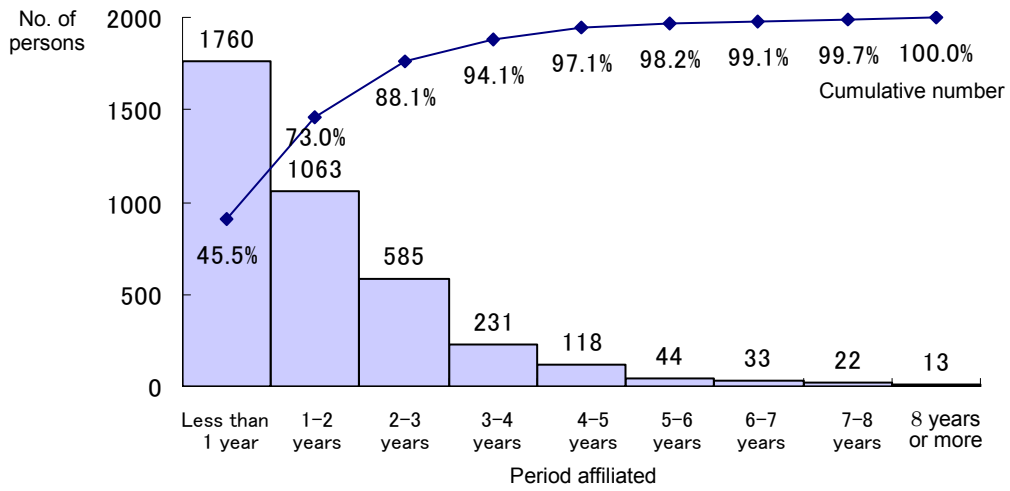
**Fig. 2-1 Attributes of survey subjects**



In comparison with the “Employment Survey” (survey investigating total number of post-docs) carried out simultaneously with this survey, the breakdowns by gender and nationality only differ by less than 1%. However, in the breakdown by age, the ratio of persons under 29 is low (15.8% vs. 26% in the Employment Survey), and overall, the age is high. The number of post-docs in the sciences is larger (44% vs. 31% in the Employment Survey), whereas the number in engineering is smaller (22.8% vs. 30%). Thus, the results of the present survey must be viewed considering the deviations in these attributes.

In addition to the four above-mentioned attributes, this survey also investigated “Year received degree,” “Year started affiliation,” and “Employment funding.” Among these, Fig. 2-2 shows the length of affiliation of the subjects at the 8 selected institutions, as calculated from “Year started affiliation.”

**Fig. 2-2 Length of affiliation of subjects**

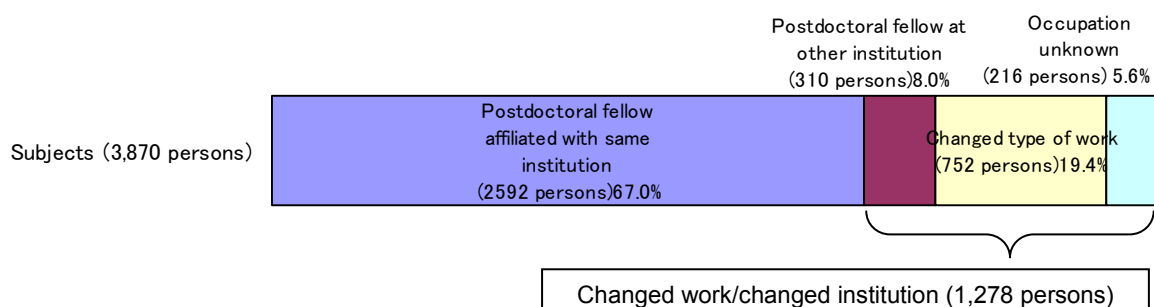


The persons in this survey became subjects in 2005. Among the subjects, **persons with affiliations of less than 3 years accounted for 88% of the total**, whereas persons with affiliations of 3 years or more were 12% of the total. Persons with affiliations longer than 5 years accounted for less than 2%.

### 3 Trends in Career Paths of Subjects

Among the subjects (3,870 persons) of this survey, Fig. 3–1 shows the breakdown of persons who were postdoctoral fellows and persons engaged in other occupations immediately after the end of FY 2005. (The actual questionnaire asked about the condition of affiliation at the institution concerned in “⑨ Affiliation” and occupation at the person’s current institution after the end of FY 2005 in “⑫ Occupation.” For details, see the reference materials in the appendix at the end of this report.)

**Fig. 3–1 Trends in career paths of all subjects**



\* In this figure, “Postdoctoral fellow affiliated with same institution” means persons who were post-docs at the same institution immediately after the end of FY2005 (as of April 1, 2006). “Postdoctoral fellow at other institution” means persons who were post-docs at another institution as of this date. “Changed type of work” means persons engaged in some work or activity other than postdoctoral fellow (including unemployed and student), whether at the same institution or another institution. “Occupation unknown” means persons who had left the original institution and whose current occupation was not known.

Of the 3,870 subjects, persons who were postdoctoral fellows immediately after the end of FY2005 accounted for 75% (2,902) of the total. Among these, persons registered as post-docs at the same institution numbered 2,592 (67% of all subjects), while 310 (8% of all subjects) were post-docs affiliated with another institution.

Persons who “Changed type of work” to some occupation other than post-doc (including students and unemployed) totaled 752 (19%), while “Occupation unknown,” who were not post-docs at the same institution but whose current occupation was unknown, numbered 216 (6%). (For details, see “A (Reference materials) Totals of Survey” in the appendix at the end of this report.) Where “Occupation unknown” is concerned, in some cases the trend in career paths could not be determined due to the limitations of the survey methodology. (In this survey, replies were given by the responsible persons in the laboratories with which post-docs had been affiliated or others, and not by the post-docs themselves, and were based on memory of roughly one year before the survey.)

This chapter will discuss persons who “Changed type of work,” “Postdoctoral fellows at other institutions,” and “Occupation unknown,” respectively. However, care is necessary in interpreting these results, as the survey covered only the 8 selected institution, and some deviations from the tendency for all postdoctoral fellows are possible.

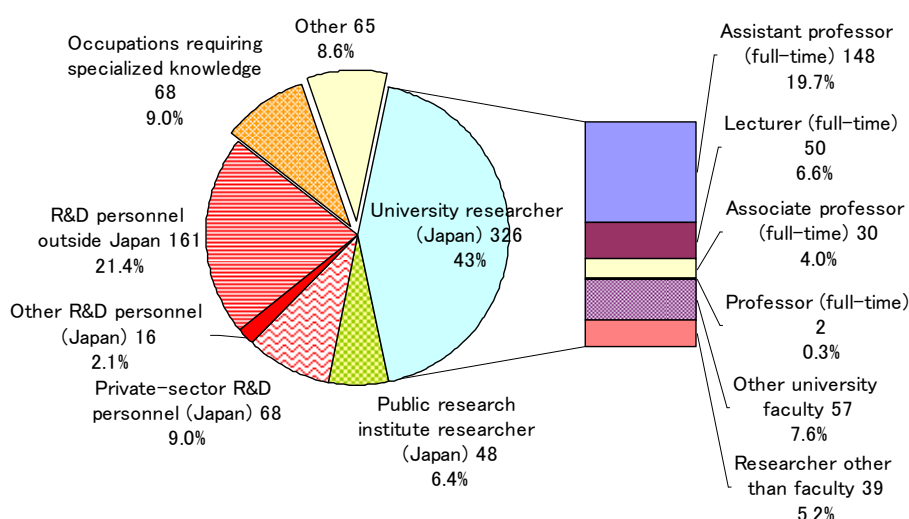
### 3-1 Persons who Changed Type of Work

#### (1) Occupations of persons who changed work

The occupations of the 752 persons engaged in work other than postdoctoral fellows (“Changed type of work”) are shown in Fig. 3–2.\*

Among persons who changed work, **“R&D personnel” reached 82%** (619 persons), and in particular, **“Researchers at academic research institutes (universities/public research institute) in Japan” accounted for 50% (374 persons) and “Private-sector R&D personnel in Japan” accounted for 9% (68 persons)**. In addition, 9% (68 persons) were engaged in “Occupations required specialized knowledge” (teachers, medical doctors, etc., occupations related to intellectual property, coordinators for industry-university collaboration, S&T communicators, etc.).

**Fig. 3-2 Occupations of persons who changed type of work**



\* Based on the survey results for the questions “⑫ Occupation” and “⑬ Full-time” in the questionnaire, the results were classified as “Full-time or part-time.” “Other university faculty” includes university faculty members whose status was part-time, whose full-time/part-time status was unknown, and whose status was full-time but whose occupational level was unknown. “Researcher other than faculty” includes persons who were not teaching faculty members and were counted as R&D personnel. (University administrative work, etc. is included in “Other.”) “R&D personnel outside Japan” refers to persons who were R&D personnel and answered question “⑪ Location” in the questionnaire as other than Japan (which includes other countries and location unknown).

\* These are not simple total results of the question “⑫ Occupation” in the questionnaire, but were recounted from the cross-tabulation results for “⑩ Affiliation,” “⑪ Location,” and “⑬ Full time.” For details, see “A-3, Regarding recounting, (1) Occupations of persons who changed work,” in the appendix.

## (2) Details of job classification

The breakdown of the items classified as “Occupations requiring specialized knowledge” and “Other” in Fig. 3–2, number of persons, and details, are shown in Table 3–1.

**Table 3–1 Details of occupations**

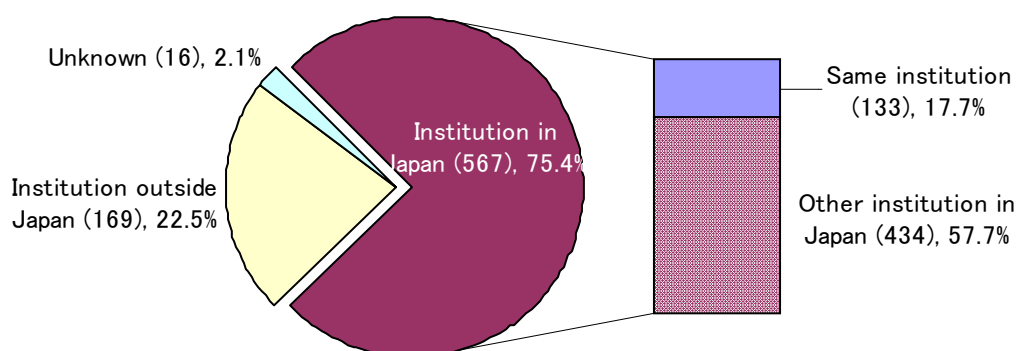
Occupational classification	Occupation	No. of persons (percentage of all persons who changed work)	Details
Occupations requiring specialized knowledge	Teachers (elementary, middle, and high school)	3 (0.4%)	(No details)
	Doctors, etc.	31 (4.1%)	Doctor, medical staff, dentist, physician in private practice
	Occupations related to intellectual property	5 (0.7%)	Patent technician, METI technical official, patent office work, etc.
	Coordinator for industry-university collaboration	1 (0.1%)	(No details)
	S&T communicator	2 (0.3%)	Historical museum history editorial assistant, S&T specialist
	Other occupations requiring specialized knowledge	26 (3.5%)	Weather forecasting company staff, geological consultant, technical staff, clinical psychologist, laboratory staff, etc.
Other	Other non-R&D occupations	14 (1.9%)	Private company employee, educational research support staff, family business, educational staff
	Entrepreneur	3 (0.4%)	Software development consulting
	Student	13 (1.7%)	Vocational school student, medical intern, graduate student, etc.
	Unemployed	35 (4.7%)	Child-raising, housework, under medical treatment, unemployed, preparing to seek work, etc.

“Unemployed” persons accounted for 5%, but this category included persons on leave from work for child care, full-time homemakers, and persons under medical treatment. Thus, the number actually unemployed or engaged in job-seeking was smaller than this. Among those included in the “Details” column, 10 of 17 were engaged in child-raising or housework. There were also cases of persons temporarily involved in activities other than “R&D personnel.”

## (3) Affiliations of persons who changed work

The institutions with which persons changing work (persons engaged in occupations other than postdoctoral fellow) were affiliated were classified as “Same institution” with which the person was affiliated as a post-doc in FY 2005, “Other institution in Japan,” or “Institution outside Japan,” as shown in Fig. 3–3.

**Fig. 3-3 Locations of persons who changed work (Japan/other countries)**

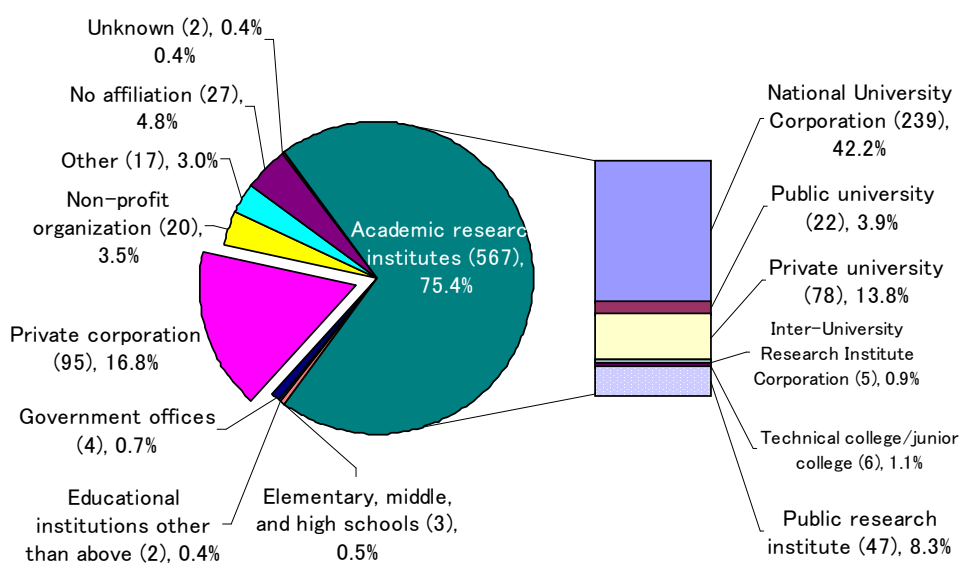


No. of persons who changed work: 752

Regarding the affiliations of persons who changed work, 75% (567 persons) were affiliated with institutions in Japan, while 23% (169 persons) were affiliated with institutions outside Japan. Persons engaged in occupations other than postdoctoral fellows at the institution with which they had been affiliated as post-docs accounted for 18% (133 persons).

The classification by type of institution of persons who changed work was limited to post-docs in Japan (567 persons) because it was frequently impossible to classify the type of institution or this information was unknown when the person's location was "Outside Japan" or "Unknown." The breakdown by type of institution is shown in Fig. 3-4. (Persons whose locations were "Outside Japan" will be discussed in detail by country in which the post-doc's new institution was located in the following at section 4-1, "Trends in Career Paths and International Mobility.")

**Fig. 3-4 Affiliations of persons who changed work (Japan only)**



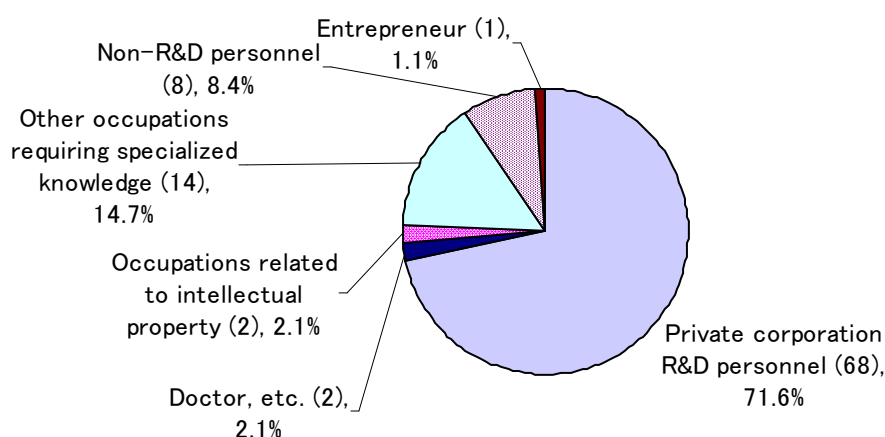
No. of persons who changed work to institutions in Japan: 567

**Employment at academic research institutes accounted for 70%** (397 persons), including National University Corporations, public universities, private universities, Inter-University Research Institute Corporations, technical colleges/junior colleges, and public research institutes. **Persons employed at private corporations accounted for 17%** (95 persons). In all cases, the occupations of persons who changed work to “Elementary, middle, or high school” were “Teacher,” and all persons who changed to “Educational institutions other than above” were “Students.”

#### **(4) Occupations in private corporations**

A breakdown of the 95 persons employed in private corporations is shown in Fig. 3–5. The occupations of persons who changed work to private corporations in Japan were “R&D personnel,” 72%, “Occupations requiring specialized knowledge” (doctor, etc., occupations related to intellectual property, other), 19%, and “Non-R&D occupations,” 8%.

**Fig. 3–5 Occupations in “Private corporations”**



No. of persons who changed work to private corporations (Japan): 95

#### **(5) Form of employment of persons who changed work**

Because various forms of employment exist in universities and research institutes, it is difficult to assess the actual condition of the employee simply by asking about his or her occupation. Therefore, the present survey investigated two points regarding the current institutions of former postdoctoral fellows, namely, the form of employment (full-time or part-time) and whether the person was employed under a fixed-term contract or not.

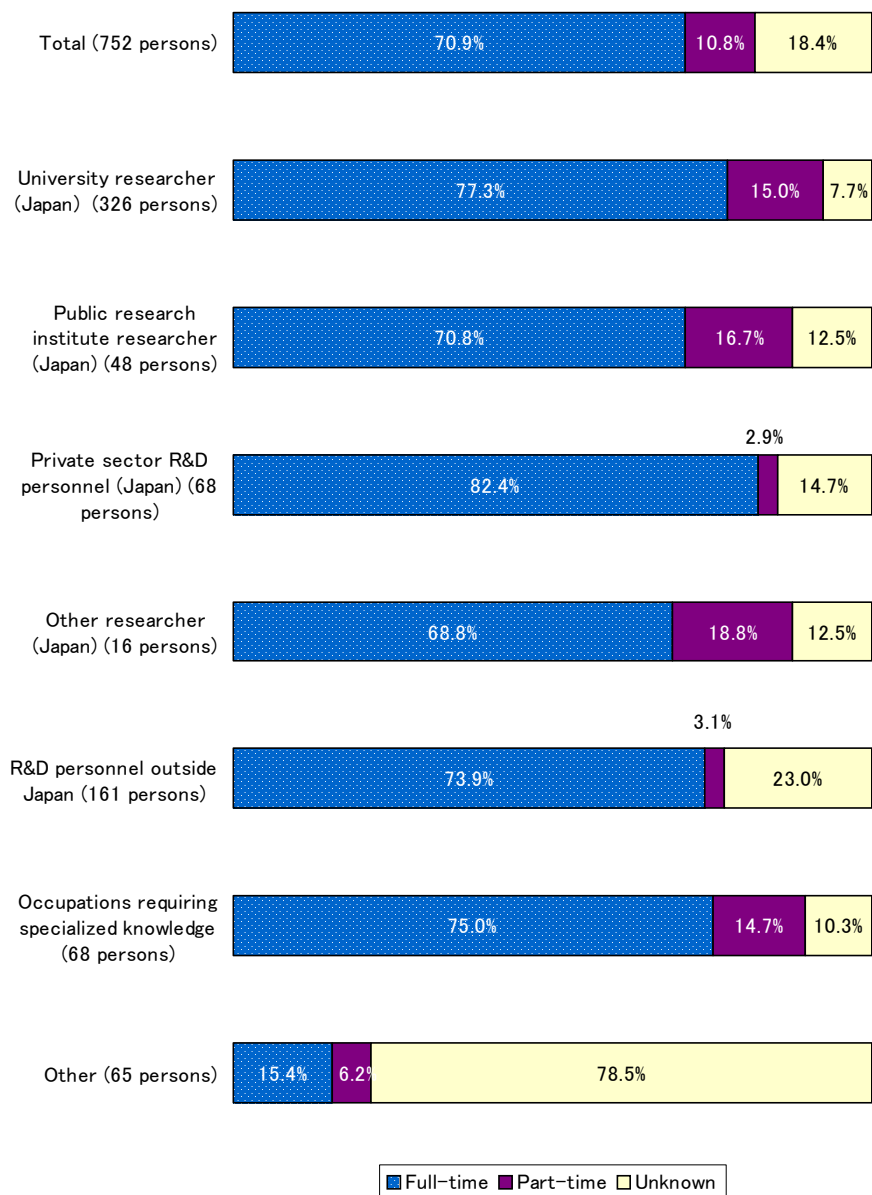
Fig. 3–6 shows the form of employment (full-time or part-time) by occupation. Because direct replies were not received from the subjects in this survey, the percentage of “Unknown” was high, at 18% of the total. (In particular, the type of occupations classified as “Other” include the unemployed, students, etc.; in this case, there is no “Form of employment” as such.) However, of the total number, “Full-time” accounted for 71% and “Part-time” for 11%.

Looking at the results by occupation, and excluding “Other researchers” and “Other,” **the percentages of part-time are low for “Private sector R&D personnel (Japan)” and “R&D personnel outside Japan,” whereas the percentages of part-time are high for researchers at academic research institutes (universities, public research institutes) and in “Occupations requiring specialized knowledge.”**

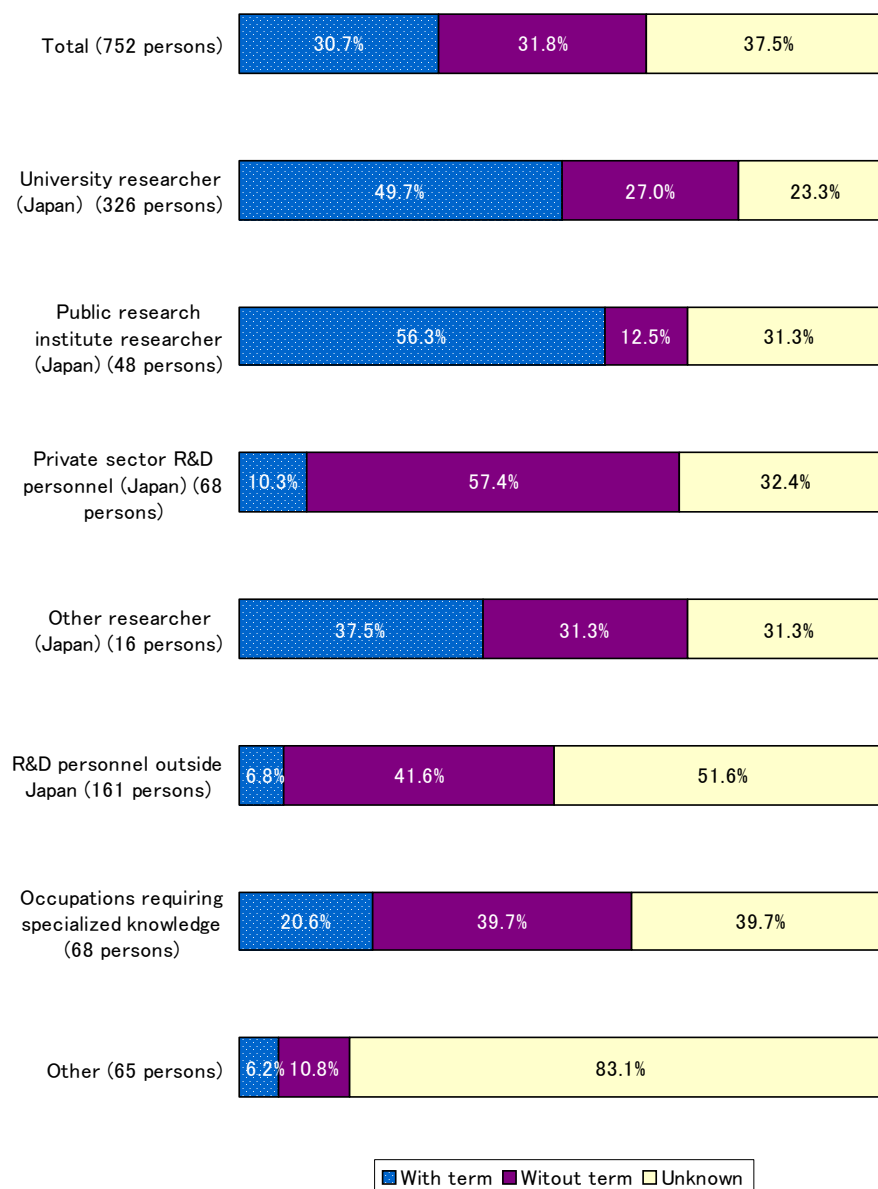
Fig. 3-7 shows the results for fixed-term contract employment by occupation for the persons who changed work (752 persons). It must be noted that the proportion of “Unknown” is higher than for “Form of employment.” However, for all persons who changed work, those employed under “Fixed-term contract” accounted for 31%, and those with “Without term” accounted for 32%. By type of occupation, the frequency of occupations under fixed-term contract, such as university researcher and public research institute researcher, etc., was high at academic research institutes in Japan. The number of university teaching posts under fixed-term contracts has shown an increasing tendency in recent years, and the results of this survey appear to reflect this situation.



**Fig. 3-6 Full-time and part-time work (persons who changed work)**



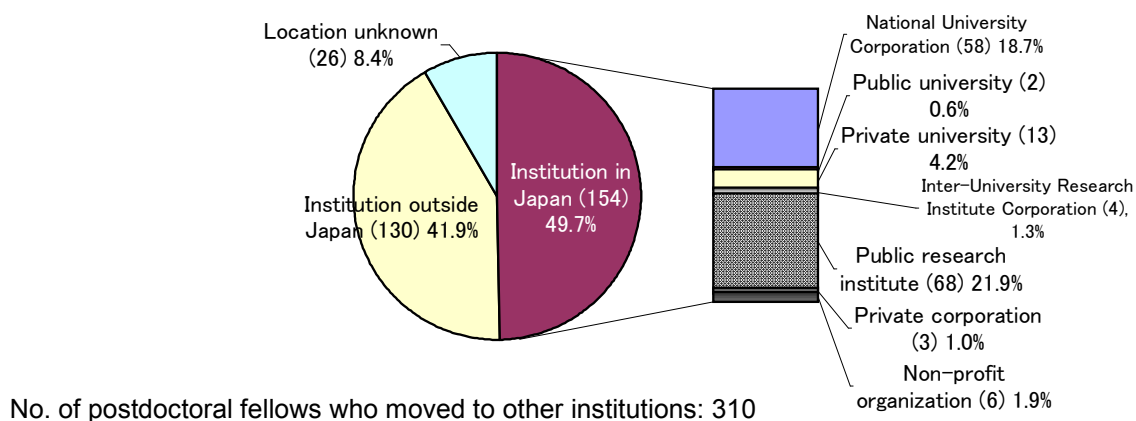
**Fig. 3-7 Employment under fixed-term contract (persons who changed work)**



### 3-2 Postdoctoral Fellows who Changed Institutions

The new affiliations of persons (310) who became postdoctoral fellows at another institution after the end of FY 2005 are shown in Fig. 3–8.

**Fig. 3–8 Locations of new institutions of postdoctoral fellows who moved to other institutions**



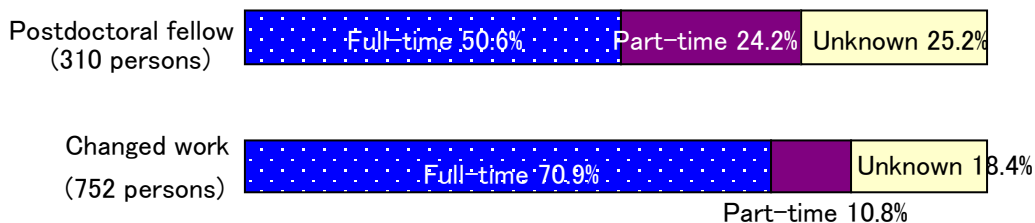
\* “Institution outside Japan” is indicated when the post-doc’s affiliation is known to be outside Japan; “Location unknown” is shown when the location of the institution is not known.

In comparison with all persons who changed type of work (Fig. 3–3), **a high percentage of the new institutions of postdoctoral fellows are located outside Japan** (23% for all persons who changed work, 42% for postdoctoral fellows who changed institutions). Limited to those who moved to institutions in Japan, public research institute (44% of total in Japan) and National University Corporations (38% of total in Japan) account for 82% (126 persons).\* However, a small number of persons continued as postdoctoral fellows at private corporations or non-profit organizations.

Fig. 3–9 shows the breakdown of the form of employment (full-time or part-time) for persons who became postdoctoral fellows at other institutions and, for comparison purposes, the breakdown for all persons who changed type of work. In comparison with all persons who changed type of work, the form of employment of persons who became post-docs at other institutions includes a high percentage of part-time work.

\* In the Employment Survey conducted during the same period, among all postdoctoral fellows, 35% were affiliated with public research institutes and 47% with National University Corporations; these two categories account for 82% of the total.

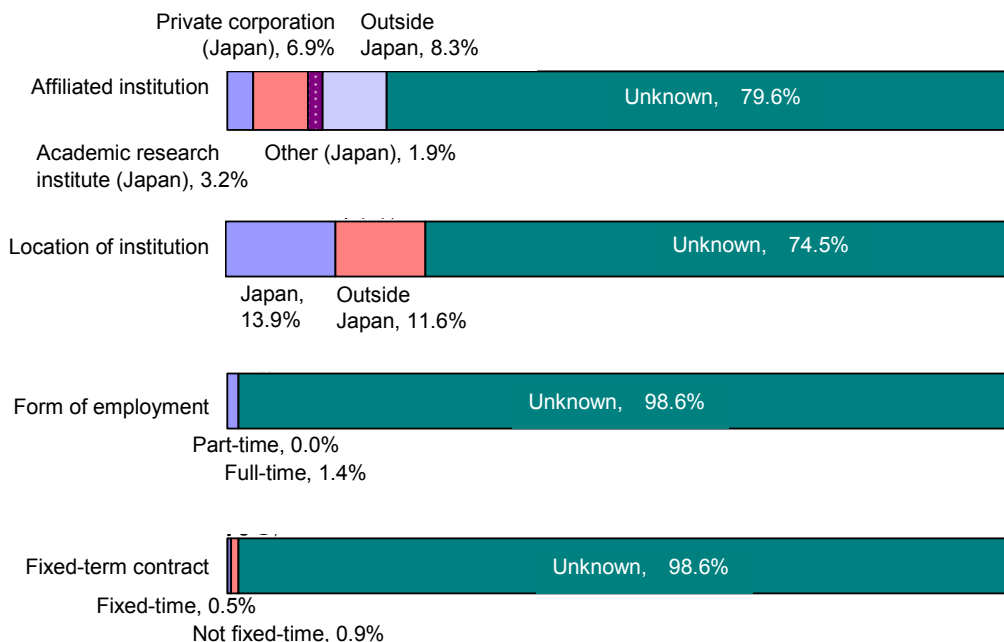
**Fig. 3–9 Form of employment of postdoctoral fellows who transferred to other institutions**



### 3-3 Persons Classified as “Occupation Unknown”

With regard to the 216 persons classified as “Occupation unknown,” there were cases in which these persons did not continue as post-docs at the same institution, but their occupations in the following fiscal year were not known. Looking at the question items concerning career path as a whole, in virtually all cases, the reply “Unknown” was given for these persons (Fig. 3–10).

**Fig. 3–10 Replies to questions about career paths for persons classified as “Occupation unknown”**



## 4 Career Paths by Attribute

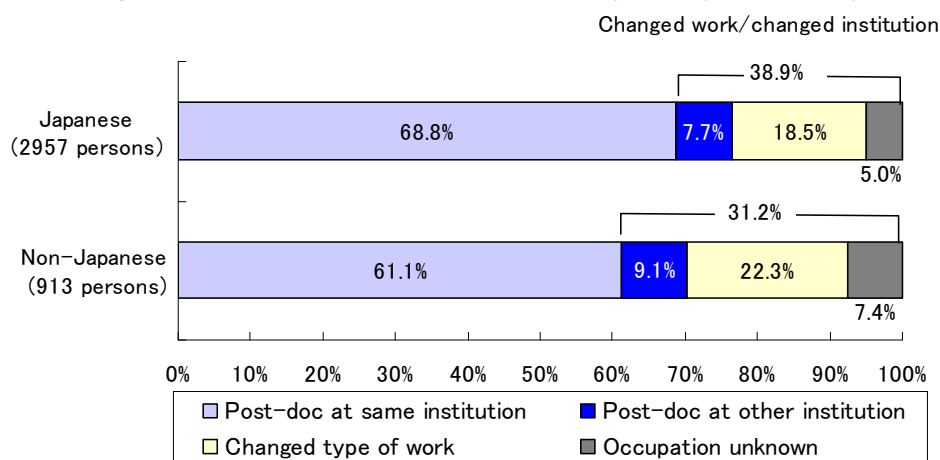
In this chapter, persons other than postdoctoral fellows at the same institution, that is, the 1,278 persons who were classified as “Changed type of work,” “Postdoctoral fellow at other institution,” or “Employment unknown” are termed collectively “Changed work/changed institution.” This chapter will examine these persons by attribute, i.e., by nationality, gender, age, and research field, focusing on the trends in their career paths.

### 4-1 Nationality and International Fluidity

Fig. 4–1 shows the career paths of all subjects by nationality. Among persons of Japanese nationality, the percentage who “Changed work/changed institution” is 31%, while the percentage for persons of other nationalities is 39%. In other words, the percentage of non-Japanese who either changed type of work or changed institutions while continuing employment as postdoctoral fellows was somewhat higher than for Japanese.

The following compares the career paths of Japanese and non-Japanese in the category of “Changed work/changed institution” using “③ Nationality” in the questionnaire. Together with this, internationality in the career paths of postdoctoral fellows will be clarified using “① Location” of the new institutions of the persons concerned.

**Fig. 4–1 Trend in career paths of all subjects by nationality**

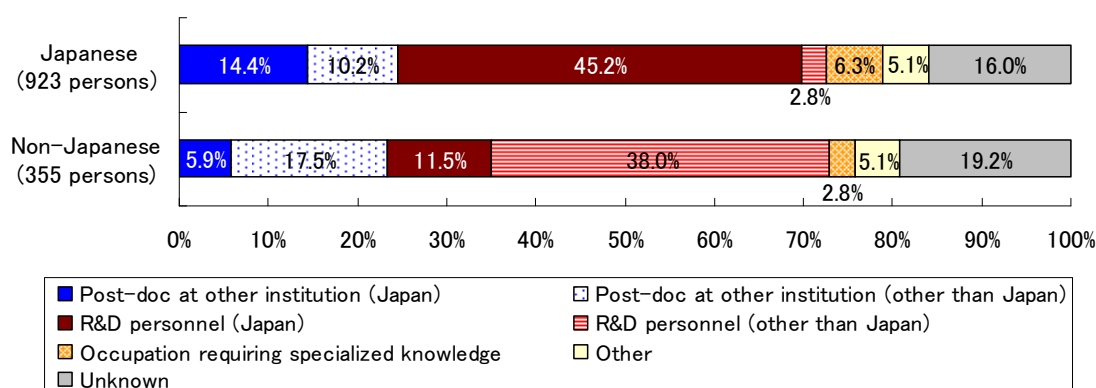


#### (1) Trends in persons who changed work/changed institution by nationality

Fig. 4–2 shows the breakdown of the occupations of the 1,278 persons who changed type of work or changed institution while continuing as post-docs by nationality.

Although there are some differences depending on whether the person’s affiliated institution is in Japan or outside Japan, the percentage of persons who became postdoctoral fellows and the percentage who became R&D personnel other than post-docs are basically similar for Japanese and non-Japanese. In other words, while there are differences in the country or region where the person’s new institution is located, **from the viewpoint of type of work, there are no substantial differences by nationality.**

**Fig. 4-2 Occupations of persons who changed work/changed institution by nationality**



\* Post-docs at other institutions and R&D personnel other than post-docs are classified by the location of the institution with which they are affiliated as “in Japan” or “other than Japan” (including other countries and location unknown).

## (2) Internationality of new institutions of persons who changed work/changed institutions

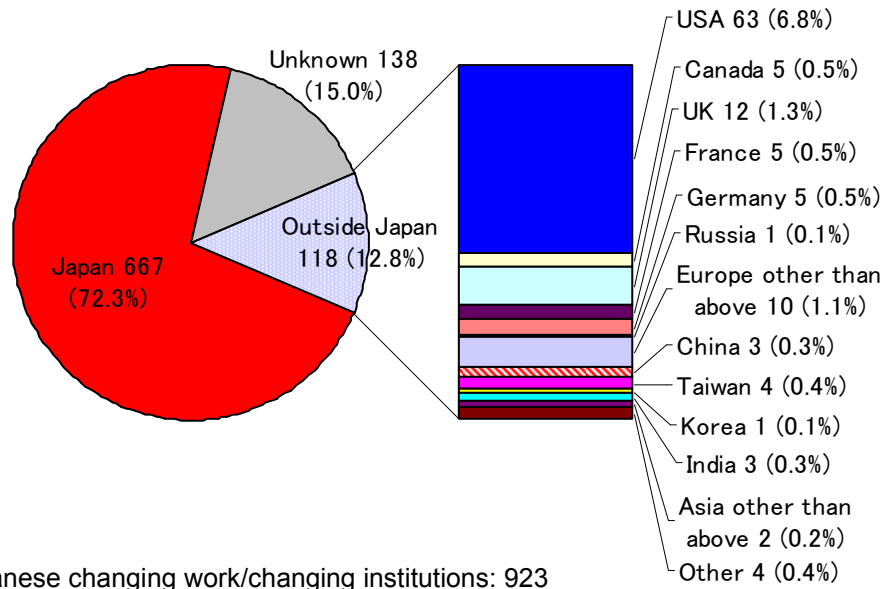
The ratio of the locations of institution of persons who changed type of work/changed institutions in Japan or other than Japan were presented in the previous chapter (persons changing type of work were discussed in Fig. 3-3; persons who became postdoctoral fellows at other institutions, in Fig. 3-8; and persons whose occupations were unknown, in Fig. 3-10). Here, we will look at the countries/regions of the institutions of persons who changed work/changed institutions by nationality. Fig. 4-3 shows the locations of the institutions of Japanese who changed work/changed institutions by country. Fig. 4-4 shows the institutions of non-Japanese.

Looking at the institutions of persons who changed work/changed institutions classified by Japan or other than Japan, 72% of persons of Japanese nationality moved to institutions in Japan, while 58% of non-Japanese moved to countries other than Japan. By country, the largest number of both Japanese and non-Japanese persons moved to institutions in Japan.

Next, when the new institution is other than Japan, a detailed examination shows that among Japanese who moved outside Japan, the percentage moving to institutions in the United States was high, whereas, a large number of non-Japanese moved to countries in the Asian region, and particularly China and Korea. Therefore, the following will examine the breakdowns of occupations of Japanese moving to the United States and non-Japanese moving to China (Fig. 4-5).

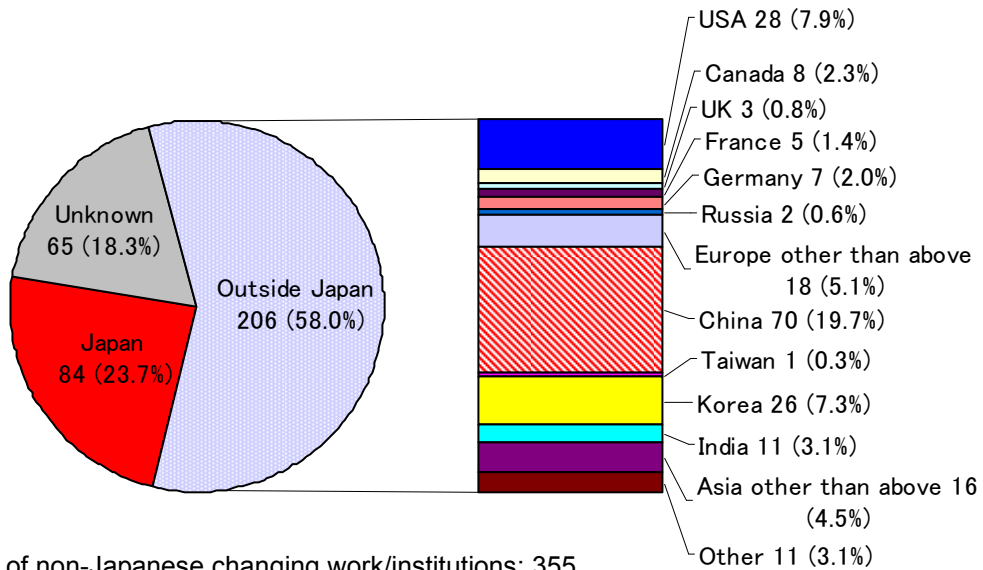
In the case of Japanese who moved to institutions in the United States, most (84%) became postdoctoral fellows in that country, and in the case of non-Japanese moving to institutions in China, R&D personnel other than post-docs comprised a large majority (80%). From these facts, it can be understood that as career paths outside Japan, most Japanese become postdoctoral fellows in the United States, while non-Japanese frequently move to China as R&D personnel other than postdoctoral fellows.

**Fig. 4-3 Location of institutions of Japanese who changed work/changed institutions**



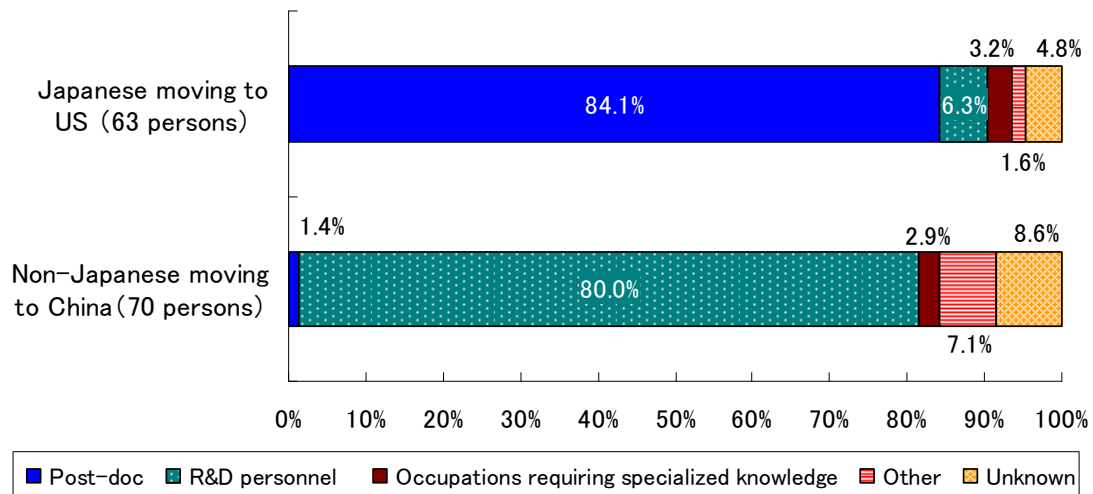
No. of Japanese changing work/changing institutions: 923

**Fig. 4-4 Locations of institutions of non-Japanese who changed work/changed institutions**



No. of non-Japanese changing work/institutions: 355

**Fig. 4-5 Occupations of persons who changed work/changed institutions moving to US and China**



\* Researchers other than postdoctoral fellows were included in R&D personnel due to the difficulty of detailed classification of the occupations of persons who moved outside Japan.

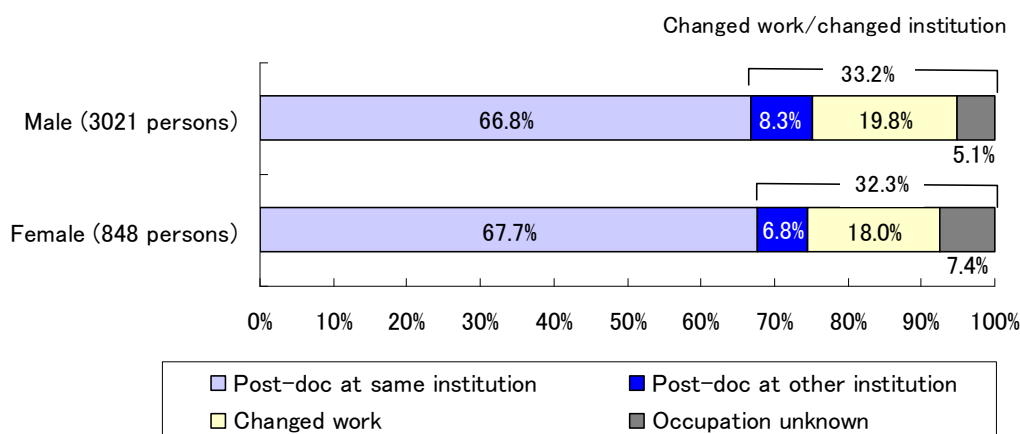


## 4-2 Differences in Career Path by Gender

Trends in the career paths of all subjects by gender are shown in Fig. 4–6. The ratios of persons who changed type of work or changed institution while continuing to work as postdoctoral fellows to all subjects are substantially the same by gender, and show virtually no difference.

The following examines differences in the career paths and form of employment (full-time or part-time, fixed-term contract or not) of persons who changed work/changed institution by gender.

**Fig. 4–6 Trends in career paths of all subjects by gender**

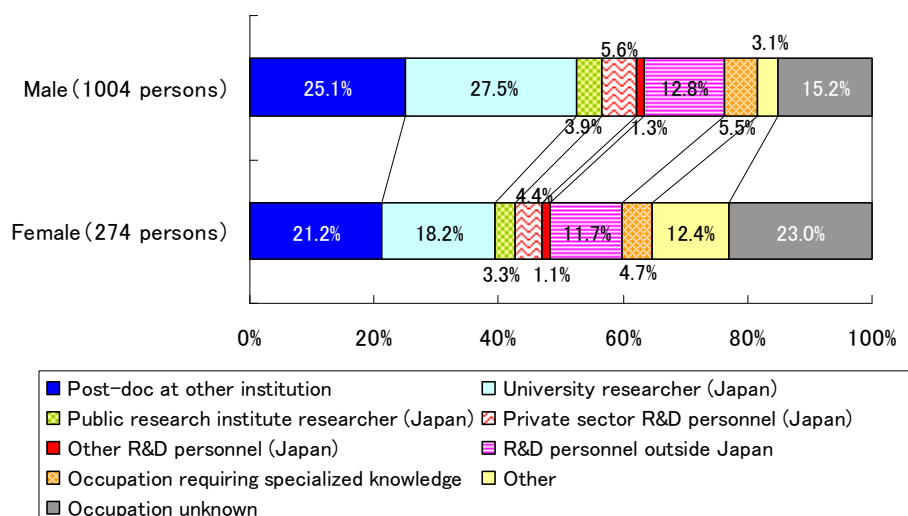


\* Excludes persons whose gender was unknown (1 person).

### (1) Occupations of persons who changed work/changed institution by gender

First, we would like to look at the occupations of persons who changed work/changed institution by gender. Fig. 4–7 shows the ratios of occupations of persons who changed work/changed institution by gender.

**Fig. 4–7 Ratios of occupations of persons who changed work/institution by gender**



When classified by gender, the ratios which show relatively large differences are “University researcher (Japan)” (9% larger for men), “Other” (9% larger for women), and “Unknown” (8% larger for women). Comparing the ratio of “Unemployed”, which is included in “Other,” the ratio for women is 7% larger than for men, the unemployment ratio being 8% of the total for women and 1% of the total for men. **In short, in comparison with men, women have a lower ratio of employment as “University researcher (Japan)” and have higher ratios of “Unemployed” and “Unknown.”** As shown previously in Table 3–1, the detailed data for “Unemployed” include persons engaged in childraising, homemaking, and the like, reflecting the fact that, age-wise, the period when women are postdoctoral fellows overlaps with the period of childraising.

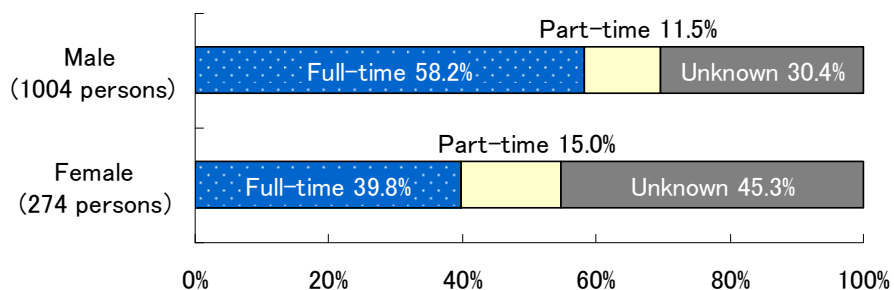
## **(2) Form of employment of persons who changed work/changed institution by gender**

Next, we will compare the form of employment of persons who changed work/changed institution by gender. The form of employment (full-time or part-time) is shown by gender in Fig. 4–8; whether persons were employed under a fixed-term contract or not is shown by gender in Fig. 4–9. For both men and women, “Unknown” accounted for a large percentage of replies to the questions about the form of employment (part-time or full-time) and fixed-term contract, but for both questions, the percentage of “Unknown” was higher for women. In explaining this difference, because the number of persons classified as “Occupation unknown” or unemployed was higher for women than for men, it is thought that the percentage of “Unknown” is also inevitably higher for questions about form of employment.

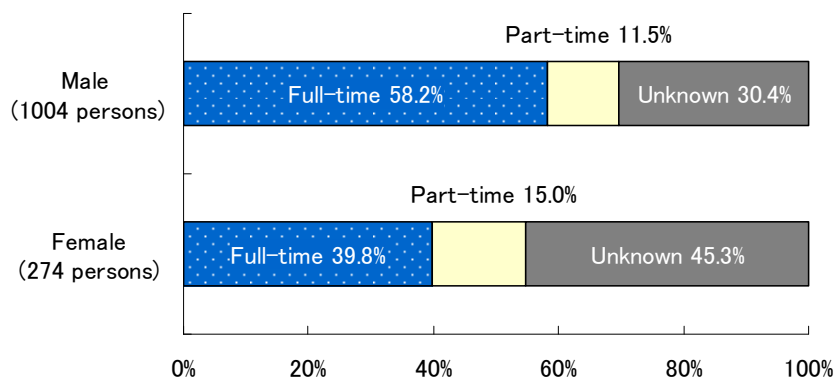
Where the form of employment is concerned, for men, persons engaged in “Full-time” work accounted for the highest percentage, at 58%, whereas the highest percentage for women was for “Unknown,” at 45%. However, when the ratio of full-time and part-time is compared for persons who became “Postdoctoral fellows at other institutions” and others, a different tendency can be seen (Fig. 4–10). For the persons who became “Postdoctoral fellows at other institutions,” the percentage whose form of employment is “Unknown” decreases, and in particular, the percentage of “Part-time work” is high for women (41% vs. 20% for “Part-time work” for men). One reason for this is considered to be that, as in the previous comparison of occupations, because the age of the subjects includes many persons in their 30s, many women chose “Part-time” work, either voluntarily or of necessity, in order to satisfy the demands of homemaking and childraising while also pursuing a career.

The results of this survey showed that, in comparison with men, the ratio of women who become “University researchers (Japan)” is low, and among persons who become “Post-docs at other institutions,” the ratio of “Part-time” is substantially higher for women.

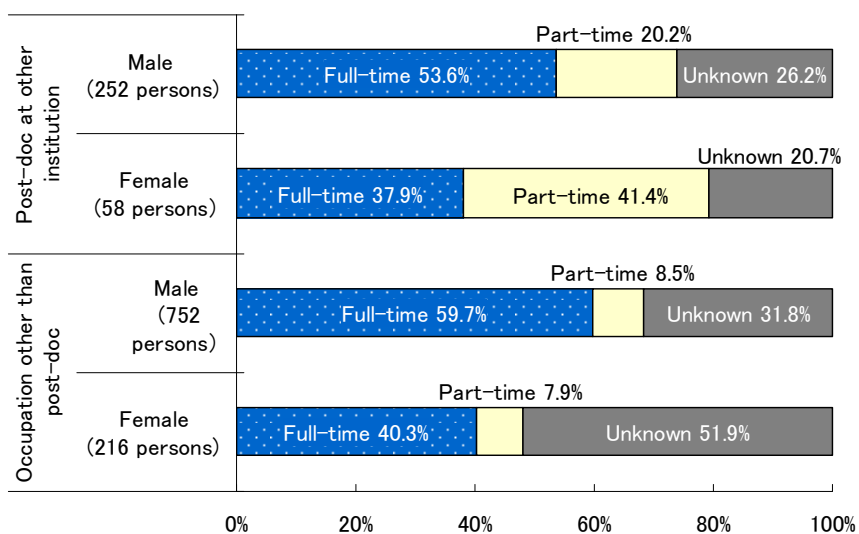
**Fig. 4–8 Form of employment of persons who changed work/changed institution by gender**



**Fig. 4–9 Employment under fixed-term contract for persons who changed work/changed institution by gender**



**Fig. 4–10 Form of employment of persons who changed work/changed institution for post-docs and other occupations by gender**

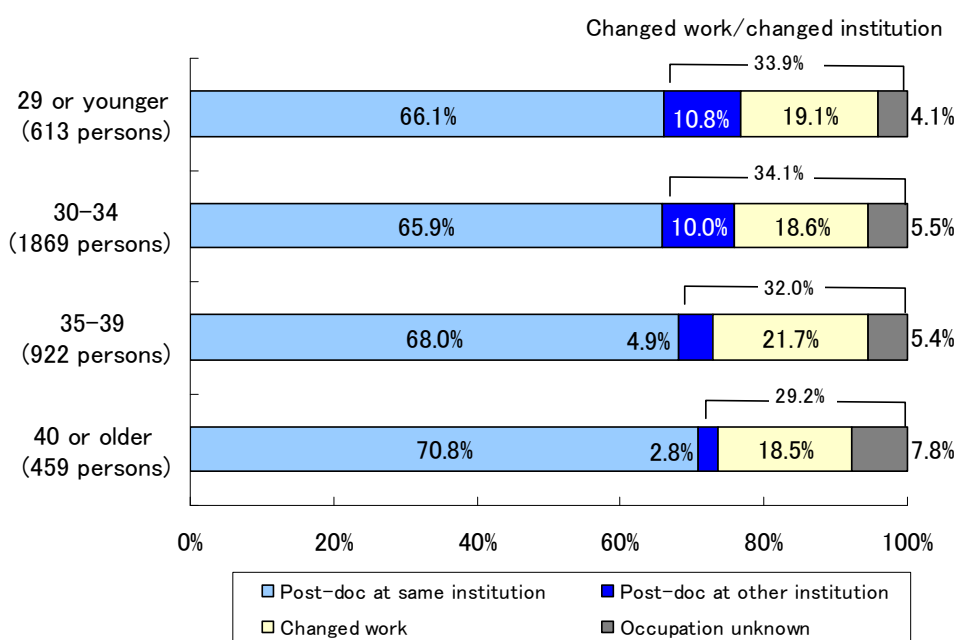


### 4-3 Trends in Career Paths by Age

The breakdown of all subjects by age has already been presented in Fig. 2-1. Fig. 4-11 shows the ratios by age group for persons affiliated with the same institution as postdoctoral fellows, persons who became post-docs at other institutions, persons who changed type of work to an occupation other than post-doc, and persons whose occupations were unknown for all survey subjects.

With increasing age, the percentage of persons who are post-docs at the same institution increases slightly. However, persons who become post-docs at other institutions shows a large decrease. As a result, the percentage of post-docs relative to all subjects decreases with age. Based on this fact, the following will examine the career paths of persons who changed work/changed institution (including post-docs at other institutions, persons who changed type of work, and persons of unknown occupation).

**Fig. 4-11 Trend in career paths of all subjects classified by age**



\* Excludes persons whose age was unknown (7 persons).

#### (1) Occupations of persons who changed work/changed institution by age

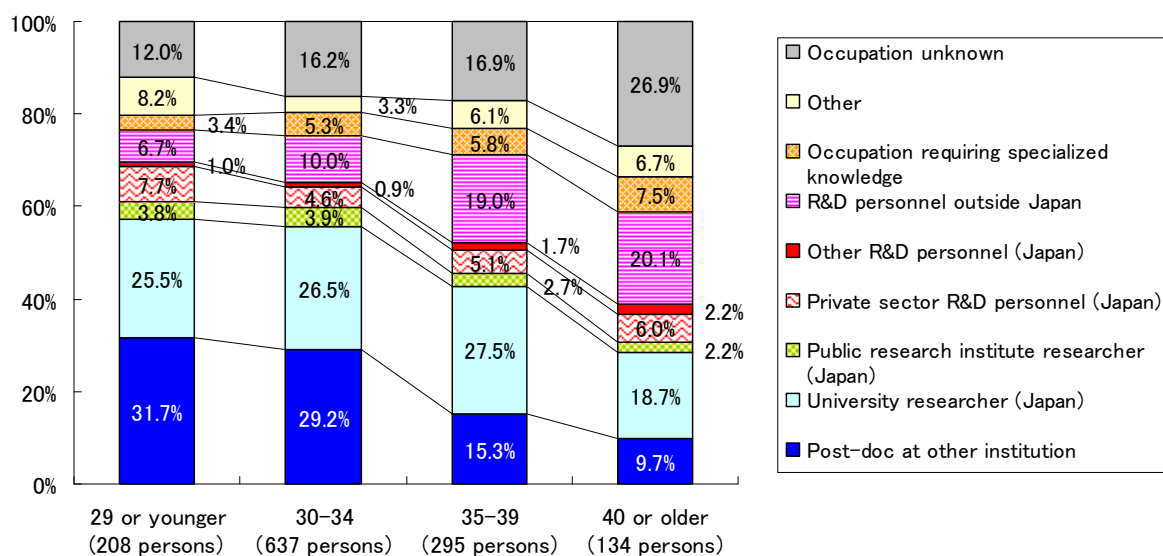
Fig. 4-12 shows the occupations of persons who changed work/institution in each age group.

As distinctive features, **with increasing age, the percentage of “Post-doc at other institution” decreases from 32% to 10%, while the percentage of “R&D personnel other than Japan” increases from 7% to 20% and that of “Occupation unknown” increases from 12% to 27%.** However, as shown in Fig. 4-11, because the ratio of “Post-doc at same institution” tends to increase with age, if persons who are affiliated with the same institution are also included, the decrease in the ratio of post-docs as a whole is not particularly large. It may also be noted that **the**

**percentage of “Occupations requiring specialized knowledge” increases from 3% to 8% with increasing age, but this is attributable to an increase in “Doctors, etc.”**

At the age of 40 or older, the percentage of “University researcher (Japan)” decreases. However, this shows the effect of the decrease in the percentage of “Assistant professor (full-time)” to 9% among persons in their later 30s, and to 4% among those 40 or older.

**Fig. 4–12 Occupations of persons who changed work/changed institution by age**

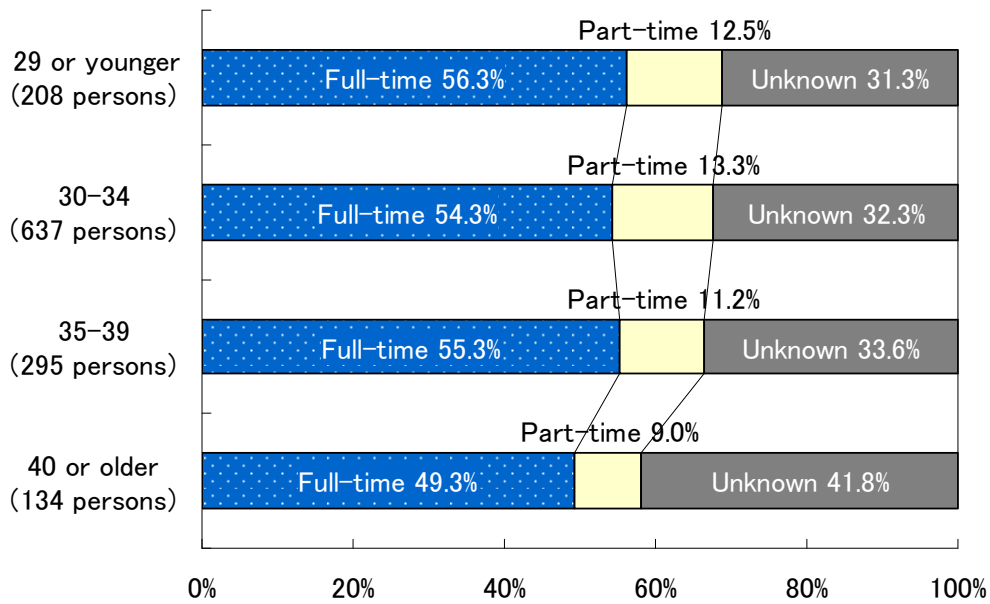


\* Excludes persons whose age was unknown (4 persons).

**(2) Relationship between age and form of employment of persons who changed work/institution**

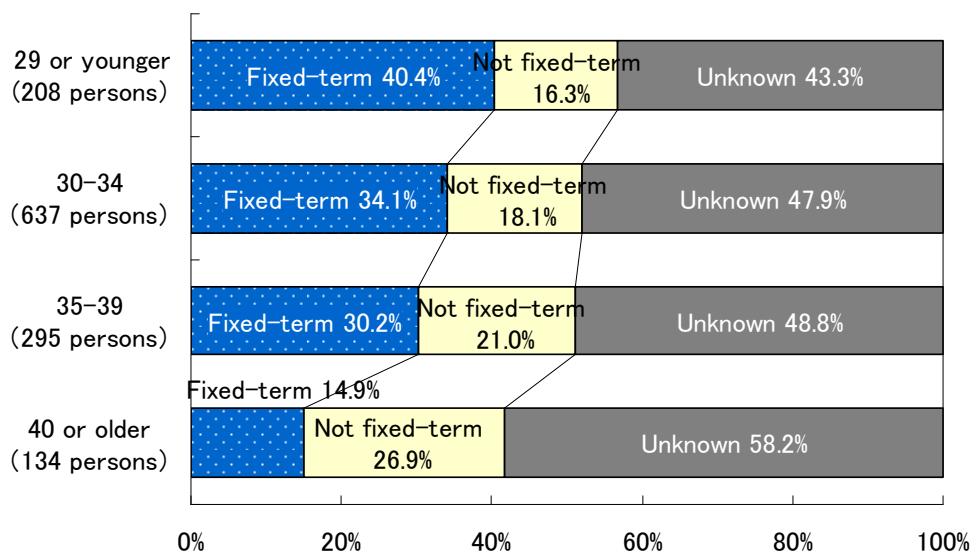
Fig. 4–13 and Fig. 4–14 show the form of employment (full-time or part-time) and whether employment was under a fixed-term contract or not by age group, respectively. The percentages of persons for whom the form of employment and whether under fixed-term contract or not was “Unknown” increases with age, and it therefore becomes difficult to assess the form of employment at new institutions in the higher age groups. Because the proportion of “Unknown” is high in both cases, it is not possible to identify distinct features of the correlation with age. However, the percentage of persons employed under fixed-term contracts tends to decrease with age.

**Fig. 4–13 Form of employment of persons who changed work/changed institution by age**



\* Excludes persons whose age was unknown (4 persons).

**Fig. 4–14 Employment under fixed-term contract of persons who changed work/changed institution by age**



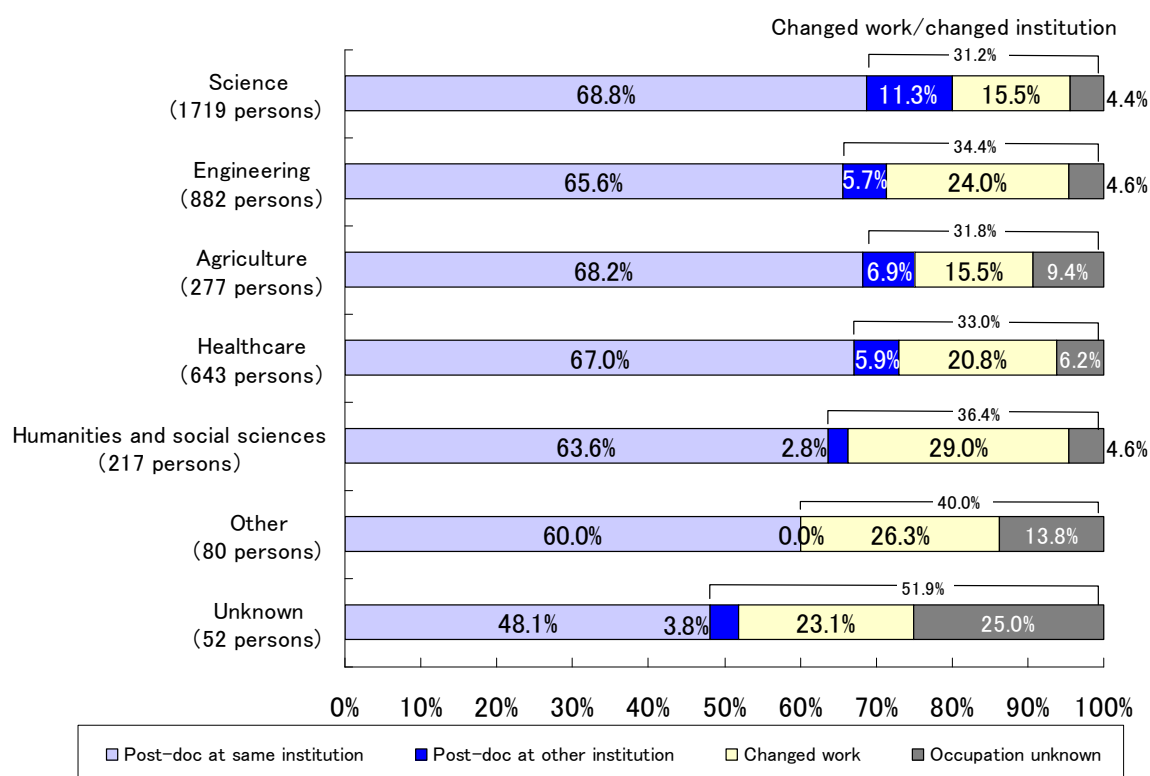
\* Excludes persons whose age was unknown (4 persons).

#### 4-4 Trends in Career Paths by Research Field

Although the research fields of the postdoctoral fellows in this survey were diverse, there is perhaps a relationship between these research fields and the career paths of the post-docs. (For details of the research field of all subjects, see the appendix, “Table A–7”.)

First, the breakdown of career paths of all subjects by field is shown in Fig. 4–15. Excluding “Other” research fields and persons whose research field was “Unknown,” the percentages of persons who changed work/changed institution are somewhat lower in science and agriculture and somewhat higher in the humanities and social sciences, but no large differences can be seen between fields. However, in science, the total of all post-docs, that is, including both “Post-doc at same institution” and “Post-doc at other institution,” is high in comparison with other fields.

**Fig. 4–15 Trends in career paths of all subjects by research field**



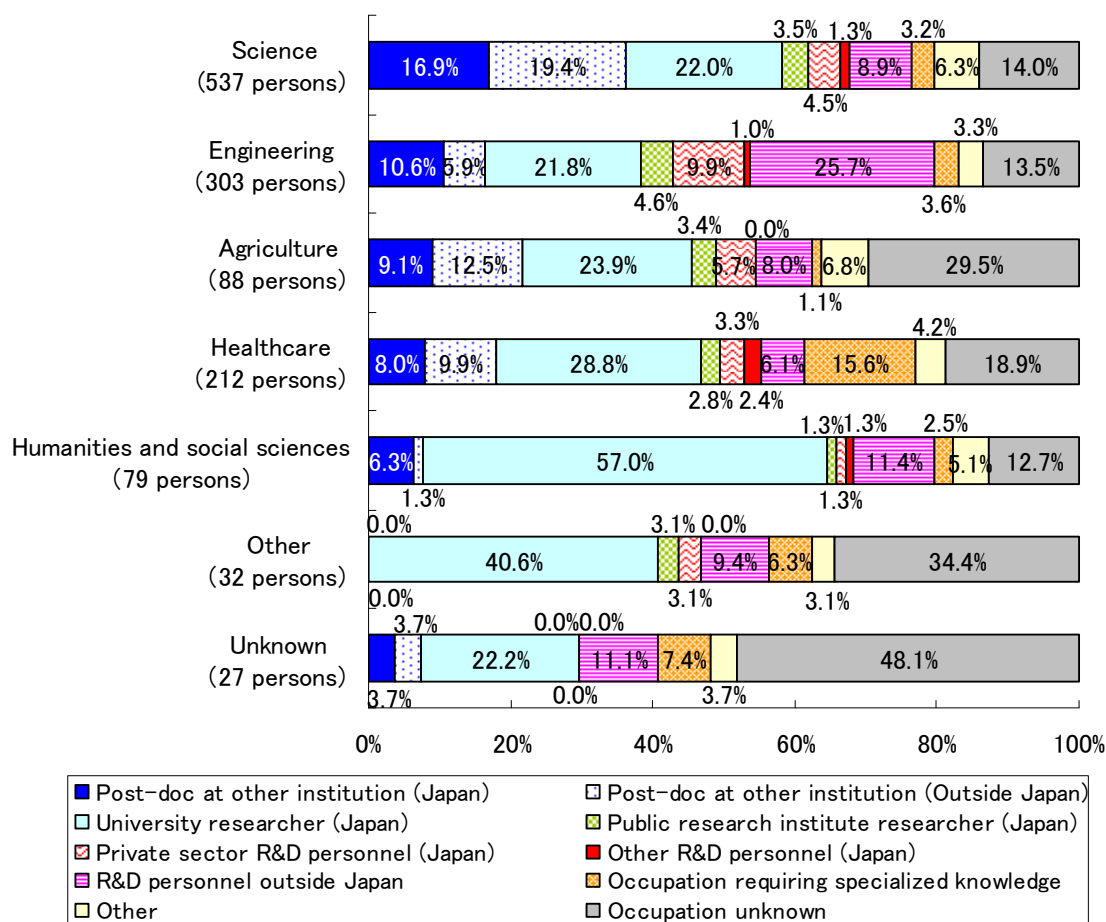
\* The research field “Other” includes education, the arts, and others.

Next, the breakdown of occupations of persons who changed work/changed institution by research field is shown in Fig. 4-16. The distinctive features by research field are as follows.

- **In “Science,” the percentage of post-docs among persons who changed work/changed institution is high. (The total for post-docs in Japan and other countries is 36%.)** In particular, the percentage of persons who become post-docs outside Japan is remarkable in comparison with other fields.
- **In “Engineering,” the percentages of private sector R&D personnel in Japan (10%) and R&D personnel outside Japan (26%) are high,** and the ratio of post-docs at other institutions is comparatively low.
- **“Agriculture” has the largest number of persons whose occupation is unknown (30%),** following persons whose research field is “Unknown” and “Other.”
- **In “Healthcare,” the percentage of occupations requiring specialized knowledge is high (16%) in comparison with other research fields.**
- **In “Humanities and social sciences,” the percentage of “University researcher (Japan)” is high (57%).**
- **In the research field “Other” (education, arts, etc.), the percentage of occupation unknown is also high (34%), but the percentage of “University researcher (Japan)” is high (41%).** (However, it should be noted that the number of persons as such is small in the field “Other.”)



**Fig. 4–16 Occupations of persons who changed work/changed institution by research field**



\* “Other” includes education, the arts, etc.

The following will clarify the details of the fields “Science,” “Engineering,” “Healthcare,” and “Humanities and social sciences,” in which distinctive features were noted.

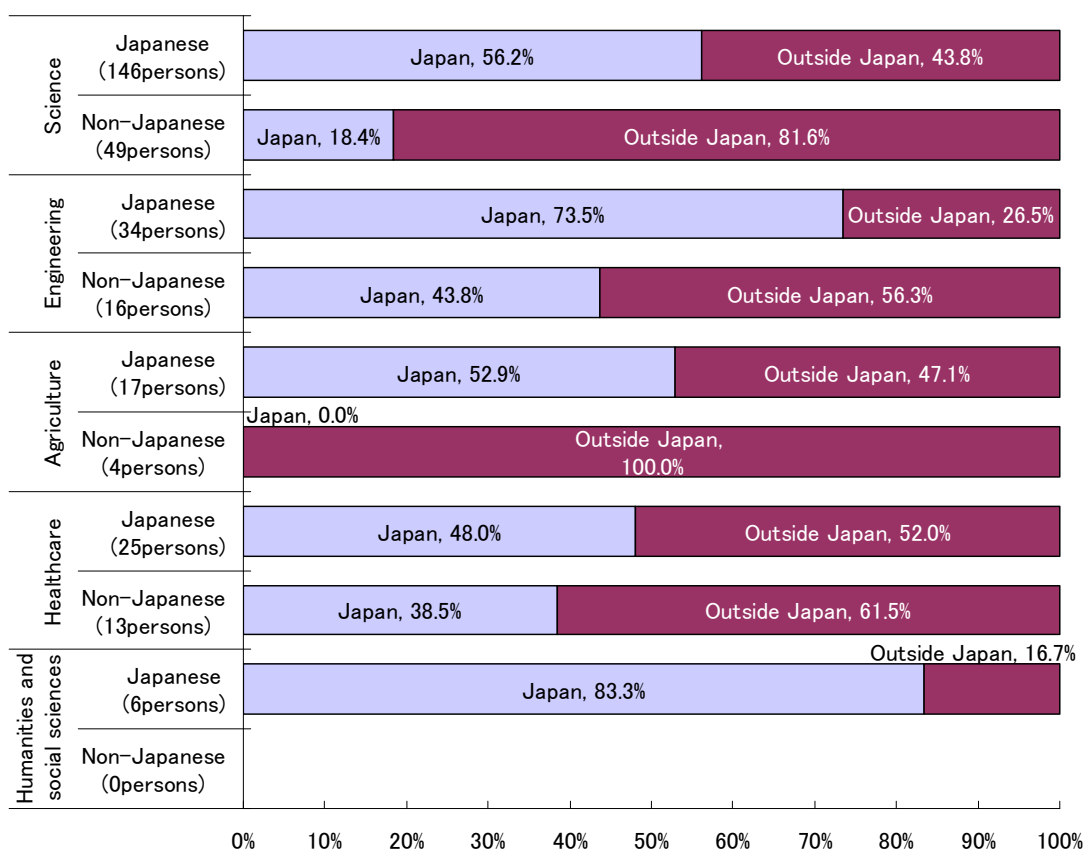
### (1) Science

The distinctive features noted in the field of “Science” were a high percentage of post-docs among persons who changed work/changed institution, and in particular, a high percentage of persons who became post-docs outside Japan. Here, we wish to clarify the content of these features.

Fig. 4–17 shows a breakdown by nationality of the percentages of persons who became post-docs in Japan and outside Japan, among those who changed work/changed institution. In science, the percentage of Japanese who became post-docs outside of Japan was high, at 44%, and thus was close to the levels for healthcare (52%) and agriculture (47%). However, this does not mean that a large number of people are simply repeating employment as post-docs; rather, it suggests that **the possibility that a career path of “Post-doc in Japan” followed by “Post-doc**

**in other countries” has been established.** (For the occupations of persons who changed work/changed institution by field and by nationality, see “Table A–20” in the appendix.)

**Fig. 4–17 Locations of postdoctoral fellows who moved to other institutions by nationality**



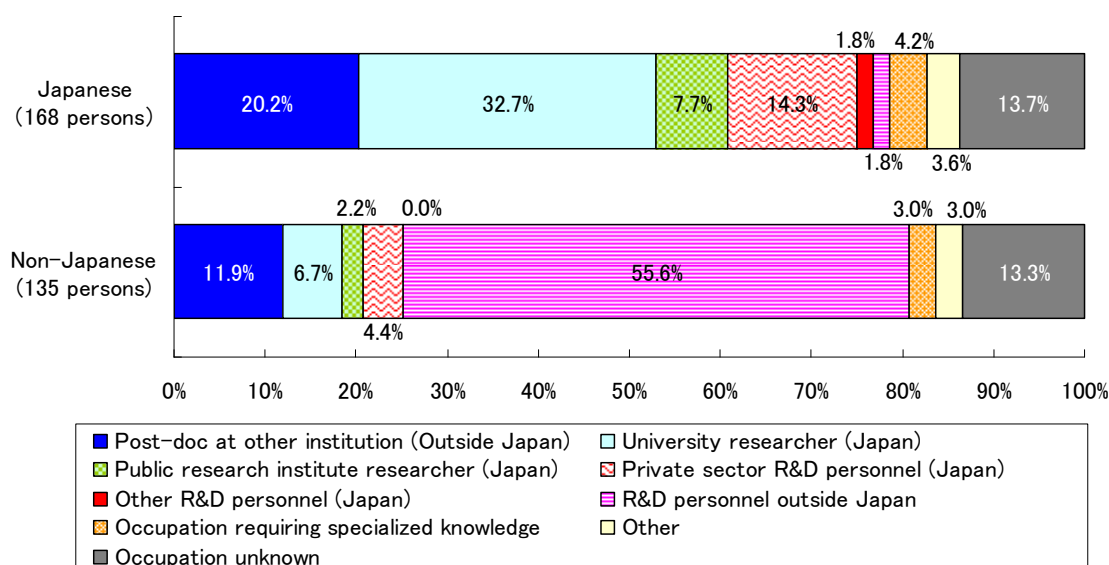
\* Excludes persons whose research field was unknown (2 persons). There were no applicable persons in the field “Other.”

## (2) Engineering

Engineering, due to its nature as an applied science, can be expected to have a high percentage of “Private sector R&D personnel (Japan)” in comparison with other research fields. However, the reason for the high percentage of “R&D personnel outside Japan” must be examined.

Looking at the occupations of persons who changed work/institution in the field of engineering by nationality (Fig. 4–18), it can be understood that **the reason for the high percentage of “R&D personnel outside Japan” in engineering is due to employment of non-Japanese in R&D occupations by institutions outside of Japan.**

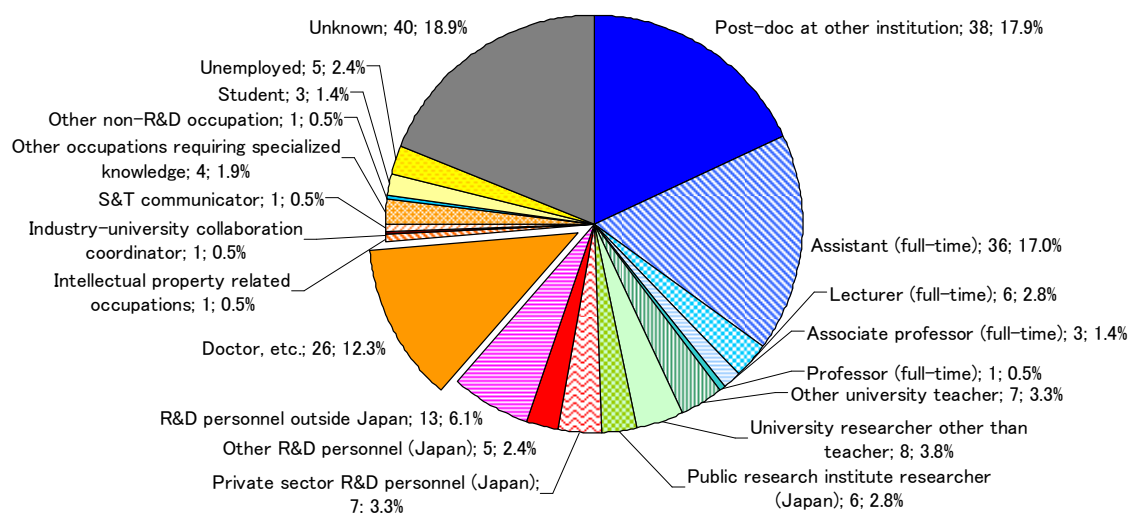
**Fig. 4–18 Occupations of persons who changed work/changed institution by nationality (engineering only)**



### (3) Healthcare

In the field of healthcare, Fig. 4–17 shows that the percentage of persons employed in “Occupations requiring specialized knowledge” is high in comparison with other fields. However, virtually all of these persons are “Doctors, etc.” (Fig. 4–19). This field also includes many occupations which require specialized knowledge, such as intellectual property related occupations, industry-university collaboration coordinator, and S&T communicator, which account for only very small percentages of the total field.

**Fig. 4–19 Details of occupations of persons who changed work/changed institution (healthcare only)**

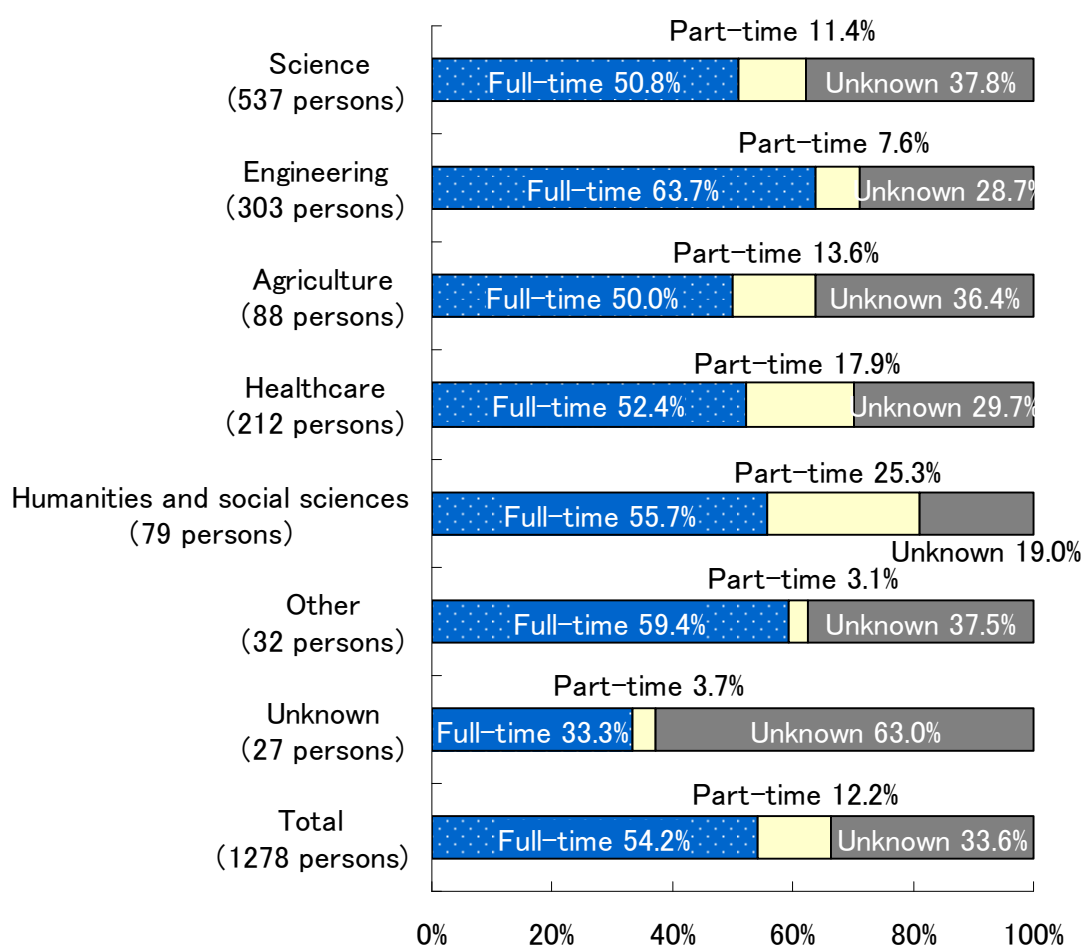


No. of persons who changed work/changed institution in healthcare field: 212

#### (4) Humanities and social sciences

In the humanities and social sciences, Fig. 4-16 showed that the percentage of “University researcher (Japan)” is high in comparison with other fields. Looking only at this percentage, it can appear as though a career path to academic research institutions is open in the humanities and social sciences. On the other hand, however, looking at the form of employment of persons who changed work/changed institution by field (Fig. 4-20), a high trend in part-time employment can be seen, as the percentage of part-time work in the humanities and social sciences is 25% in contrast to only 12% for all persons who changed work/changed institution.

**Fig. 4-20 Form of employment of persons who changed work/changed institution by field**



## 5 Conclusions

### [Trends in career paths of survey subjects]

Information related to career paths was obtained for 3,870 postdoctoral fellows. Of this number, 67% (2,592 persons) were affiliated as postdoctoral fellows with the same institution immediately after the end of fiscal year 2005, 8% (310 persons) had become postdoctoral fellows at other institutions, 19% (752 persons) had changed type of work (i.e., were engaged in occupations other than postdoctoral fellow), and 6% (216 persons) had changed type of work but their present occupations were unknown. In other words, 75% (2902 persons) continued employment as postdoctoral fellows in the following year.

#### ① Persons who changed type of work (persons employed in occupations other than post-doc)

**Of the 752 persons who changed type of work, R&D personnel accounted for 82% of the total.** In particular, persons who became researchers at academic research institutes (universities or public research institutes) in Japan accounted for 50%, and researchers at private sector companies in Japan, for 9%. Persons engaged in occupations requiring specialized knowledge (teachers, doctors, etc., occupations related to intellectual property, industry-university collaboration coordinators, science and technology communicators, etc.) also accounted for 9%. Thus, persons engaged in occupations which appear to have a deep relationship with research experience as a post-doc, such as R&D personnel and occupations requiring specialized knowledge, etc., accounted for 91% of all persons who changed type of work from postdoctoral fellow.

Looking next at the affiliations of the 567 persons who changed work and moved to other institutions in Japan (75% of all persons who changed work), 70% were employed in academic research institutes (universities or public research institutes), and 17% were employed in private companies.

Among the occupations of the 95 persons employed in private companies in Japan, 72% were “R&D personnel” and 19% were in “Occupations requiring specialized knowledge” (mainly doctors, etc.). Thus, 91% were engaged in occupations having a deep relationship with research experience as post-docs.

Looking at the form of employment (full-time or part-time) of persons who changed work, in comparison with researchers in private companies or other countries, **the percentage of persons employed on a part-time basis was extremely high in academic research institutes in Japan and occupations requiring specialized knowledge. Furthermore, at academic research institutes in Japan, a large number of persons were employed under fixed-term contracts.**

#### ② Postdoctoral fellows who changed institution

Among the 310 persons who became post-docs at other institutions, 50% of the subjects moved to other institutions in Japan, and 42% moved to other countries. In comparison with persons who changed type of work, **the percentage of persons who became post-docs at other institutions outside Japan was high.**

#### [Trends in career paths by attribute]

By attribute, the trends in the career paths of the 1,278 persons who changed work or changed institution (including persons who changed type of work, persons became post-docs at other institutions, and persons of unknown occupation) are as follows.

#### ① Nationality and international Mobility

**Classified by Japanese nationality and other nationalities, there were no significant differences in the percentages of persons who became postdoctoral fellows and R&D personnel. The main overseas career path for Japanese was post-doc in the United States. Non-Japanese frequently became R&D personnel in other countries in Asia.**

#### ② Differences in career paths by gender

**Among women, the percentage who became “University researcher” was lower than for men (9% difference), and the percentages of “Unemployed” and “Unknown” were higher (7% difference for unemployed, 8% difference for unknown). Women also had a lower rate of “Full-time” employment than men.** In particular, the difference was remarkable in the case of persons who became postdoctoral fellows at other institutions.

#### ③ Trends in career paths by age

**With increasing age, the number of persons who became “Postdoctoral fellows at other institution” decreases (from 32% to 10%), the number who became “R&D personnel outside Japan” increases (from 7% to 20%), and the percentage of “Occupation unknown” increases (from 12% to 27%).** With increasing age, the number of persons employed under fixed-term contracts decreases.

#### ④ Trends in career paths by research field

**In the field of “Science,” the percentage of persons who become postdoctoral fellows at other institutions is high (36%).** In particular, the percentage who become post-docs at institutions outside Japan is high in comparison with other fields.

**In “Engineering,” the percentages of R&D personnel outside Japan and private sector R&D personnel in Japan are high** in comparison with other fields. This is attributable to the fact that many persons classified as “R&D personnel outside Japan” are non-Japanese engaged in R&D occupations at institutions outside Japan.

**In “Humanities and social sciences,” the percentage who become university researchers (Japan) is high (57%).** However, the percentage of part-time work also tends to be high in comparison with other fields.

In healthcare, the percentage of occupations requiring specialized knowledge is high (16%), but doctors, etc. account for virtually all of this number.

In agriculture, the percentage of persons whose occupation is unknown is high (30%) in comparison with other fields.

### **[Future directions]**

Ultimately, this survey was limited to “8 selected institutions,” and the object institutions were not selected at random. Therefore, it must be noted that there are features that differ somewhat in comparison with all postdoctoral fellows in the “Employment Survey.” (See “A (Reference materials) Totals of Survey,” which is attached as an appendix to this report.)

Given the current circumstances of postdoctoral fellows in Japan, it is not possible to conduct follow-up surveys of the post-docs themselves. Therefore, this survey adopted a methodology under which the heads of the laboratories or administrative persons in each institution were asked to complete a questionnaire, as this was one of the few techniques available for investigating trends in career paths. Because the object institutions had a strong interest in the problem of postdoctoral fellows, it was possible to assess almost all postdoctoral fellows who had been affiliated with those institutions. Replies of “Unknown” were frequent because the survey relied on memory. However, under the current circumstances, there is no means of reducing the number of “Unknown” replies, even if the range of subject is expanded.

In order to obtain more detailed data on the career paths of postdoctoral fellows, the following measures are necessary.

- Creation of databases on postdoctoral fellows by all institution which have post-docs (or establishment of an organization with general administrative responsibility for post-docs and creation of a database by that organization). It will also be necessary to establish a system under which postdoctoral fellows are registered in the database when they become post-docs, including information on their prior occupations and the like, and information on their new affiliations is also registered when they change institutions.
- Disclosure and enabling use of information (except personal information) for surveys and similar purposes.

Among the 8 selected institutions, there were institutions which had internal databases on researchers prior to selection for the “Project for Promoting Diversification of the Career Paths of Human Resources in Science and Technology,” and others which created databases for postdoctoral fellows after selection. In order to assess the career paths of postdoctoral fellows in greater detail over a longer timeframe, databases of this type are indispensable.

Providing information to persons who have received doctorates, persons in doctoral courses, and persons aspiring to continue their education will not only assist these persons in decision-making on their career paths, but will also enable the persons responsible for hiring postdoctoral fellows to fulfill their responsibility to explain the available career paths to postdoctoral fellows.

## **Acknowledgements**

In this survey, questionnaires were distributed to the 8 institutions (Hokkaido University, Tohoku University, RIKEN, Waseda University, Nagoya University, Osaka University, Yamaguchi University, and Kyushu University) selected in fiscal year 2006 for the “Project for Promoting Diversification of the Career Paths of Human Resources in Science and Technology” of the Ministry of Education, Culture, Sports, Science and Technology (MEXT), and replies were received regarding virtually all subjects of the survey. This high effective reply rate was attributable to the strong interest in the “post-doc problem” of all concerned at the 8 selected institutions, as well as the efforts of those who actually distributed and collected the questionnaires, including the Research Cooperation Section, Academic International Department, Hokkaido University, Research Cooperation Section, Research Cooperation Department, Tohoku University, Career Support Group, Personnel Department, RIKEN, Research Planning Section, Research Promotion Department, Waseda University, Personnel and Labor Section, General Affairs Department, Nagoya University, Research Promotion Section, Research Promotion and International Department, Osaka University, Research Cooperation Section, Academic Research Department, Yamaguchi University, and Research Strategy Section, Planning Department, Kyushu University. Here, we wish to express our deep appreciation to all concerned for their generous cooperation. We will be pleased if those with an interest in the “post-doc problem”, including the 8 selected institutions, are able to make use of this report.

In addition, during the design of this survey, the authors received several survey proposals from Associate Prof. Wataru Matsumoto of the Statistical Research Institute. Here, we would also like to express our sincere thanks to Prof. Matsumoto.



## A (Reference materials) Totals of Survey

### A-1 Attribute Items in Questionnaire

The following presents the simple totals for all survey subjects for the attribute items in the survey questionnaire. The attributes examined are “② Gender,” “③ Nationality,” “④ Age,” “⑤ Year received degree,” “⑥ Year started affiliation,” “⑦ Research field,” “⑧ Source of funding for employment,” and “⑨ Condition of affiliation” (continued affiliation as post-doc at the same institution or not). Comparisons with the “Employment Survey” are given for “Gender,” “Nationality,” “Age,” and “Research field.”

From the following results, it can be understood that, **among the attributes of the subjects in this survey, the condition of the survey subjects by gender and nationality are substantially the same as for all postdoctoral fellows; however, the age of the subjects tends to be high, and a larger percentage are employed in the field of “Science.”**

#### (1) Gender

The breakdown of survey subjects by gender is shown in Table A–1. Where gender is concerned, the deviation between this survey and the Employment Survey is less than 1%.

**Table A–1 Gender (comparison with Employment Survey)**

Gender	Career Path Survey		Employment Survey	
	No. of persons	%	No. of persons	%
Male	3021	78.1	12180	78.6
Female	848	21.9	3316	21.4
Unknown	1	0.0		
<b>Total</b>	<b>3870</b>	<b>100.0</b>	<b>15496</b>	<b>100.0</b>

#### (2) Nationality

The breakdown of the survey subjects by nationality (Japanese nationality or other nationality) is shown in Table A–2. Nationality shows even closer agreement with the Employment Survey than gender.

**A–2 Nationality (comparison with Employment Survey)**

Nationality	Career Path Survey		Employment Survey	
	No. of persons	%	No. of persons	%
Japanese	2957	76.4	11839	76.4
Non-Japanese	913	23.6	3,657	23.6
<b>Total</b>	<b>3870</b>	<b>100.0</b>	<b>15496</b>	<b>100.0</b>

### (3) Age

The results of the ages of the survey subjects, totaled in 5 year groups, are shown in Table A–3. As single age group, the 30-34 year cohort is overwhelming large, at 49%, and persons 39 years of age and younger account for 88% of the total. The age group under 27 years includes a small number of postdoctoral fellows, but these are persons who skipped grades in school, finished school early, received degrees overseas, and the like. Persons older than 50 account for only 2% of the total.

In this survey, the age distribution tended to toward higher ages; the percentage of persons under 29 years of age was low (16%, in comparison with 26% in the Employment Survey).

**Table A–3 Age distribution (comparison with Employment Survey)**

Career Path Survey				Employment Survey			
Age classification	No. of persons	%	Cumulative %	Age classification	No. of persons	%	Cumulative %
24 or younger	1	0.0	0.0	24 or younger	3985	25.7	25.7
25 to 29	612	15.8	15.8	30 to 34	7095	45.8	71.5
30 to 34	1869	48.3	64.1	35 to 39	2754	17.8	89.3
35 to 39	922	23.8	88.0	40 or older	1590	10.3	99.5
40 to 44	288	7.4	95.4				
45 to 49	84	2.2	97.6				
50 to 54	27	0.7	98.3				
55 to 59	23	0.6	98.9				
60 to 64	19	0.5	99.4				
65 or older	18	0.5	99.8				
Unknown	7	0.2	100.0	Unknown	72	0.5	100.0
<b>Total</b>	<b>3870</b>	<b>100.0</b>			<b>15496</b>	<b>100.0</b>	

### (4) Year received degree

Table A–4 shows the year in which the survey subjects received their degrees or withdrew from school upon completing the degree requirements. This number peaks in fiscal year 2004 and decreases with time in earlier years. Persons who had received their degrees 5 or more years previously account for 22% of the total. It should be noted that “FY 2005” shows persons who became post-docs immediately after receiving their degrees, and “FY 2006” shows persons who received degrees in FY 2006, which was the year of the survey, after withdrawing from school upon completion of the degree requirements.

**Table A-4 Year received degree (details)**

Fiscal year	No. of persons	%	Fiscal year	No. of persons	%	Fiscal year	No. of persons	%
2006	25	0.6	1991	15	0.4	1976		
2005	271	7.0	1990	9	0.2	1975	5	0.1
2004	775	20.0	1989	15	0.4	1974	2	0.1
2003	647	16.7	1988	6	0.2	1973	1	0.0
2002	513	13.3	1987	9	0.2	1972	2	0.1
2001	388	10.0	1986	3	0.1	1971	3	0.1
2000	279	7.2	1985	7	0.2	1970	2	0.1
1999	231	6.0	1984	4	0.1	1969	2	0.1
1998	156	4.0	1983	4	0.1	1968		
1997	113	2.9	1982	1	0.0	1967		
1996	82	2.1	1981	3	0.1	1966	1	0.0
1995	50	1.3	1980	4	0.1	1965	2	0.1
1994	38	1.0	1979	1	0.0	Unknown	140	3.6
1993	31	0.8	1978	2	0.1	Total	3,879	100.0
1992	23	0.6	1977	5	0.1			

**(5) Year started affiliation**

Table A-5 shows the fiscal year in which the survey subjects began their affiliation as a postdoctoral fellows with the institutions surveyed. Tracing the results backward by year, the number of persons decreases in earlier years. Persons who had been affiliated with the same institution for more than 3 years represented approximately 12% of the total.

**Table A-5 Year started affiliation (details)**

Fiscal year	No. of persons	%	Cumulative %
2005	1760	45.5	45.5
2004	1063	27.5	72.9
2003	585	15.1	88.1
2002	231	6.0	94.0
2001	118	3.0	97.1
2000	44	1.1	98.2
1999	33	0.9	99.1
1998	22	0.6	99.6
1997	7	0.2	99.8
1996	2	0.1	99.9
1993	2	0.1	99.9
1990	1	0.0	99.9
1988	1	0.0	100.0
Unknown	1	0.0	100.0
Total	3870	100.0	

### (6) Research field

The research fields of the survey subjects are shown in Table A–6. In comparison with the results of the Employment Survey, at the 8 selected institutions which were the objects of this survey, the number of postdoctoral fellows in the field of Science was larger and the number in Engineering was smaller.

**Table A–6 Research fields of survey subjects (comparison with Employment Survey)**

Field	Career Path Survey		Employment Survey	
	No. of persons	%	No. of persons	%
Science	1719	44.4	4853	31.3
Engineering	882	22.8	4601	29.7
Agriculture	277	7.2	1618	10.4
Healthcare	643	16.6	2334	15.1
Humanities and social sciences	217	5.6	1121	7.2
Other	80	2.1	660	4.3
Unknown	52	1.3	309	2.0
Total	3870	100.0	15496	100.0

The number of persons and percentages of survey subjects by detailed research field are shown in Table A–7.

**Table A-7 Research fields of survey subjects (details)**

Category	Subcategory	No. of persons	%	Category	Subcategory	No. of persons	%	
Science	Mathematics	67	1.7	Healthcare	Medicine	497	12.8	
	Physics	390	10.1		Dentistry	84	2.2	
	Chemistry	200	5.2		Pharmacy	60	1.6	
	Biology	736	19.0		Other healthcare	2	0.1	
	Earth sciences	81	2.1	Humanities and social sciences	Literature	29	0.7	
	Other science	245	6.3		History	35	0.9	
Engineering	Mechanical engineering/naval architecture	90	2.3		Philosophy	12	0.3	
	Electrical/telecommunications	158	4.1		Other humanities	40	1.0	
	Civil engineering/architecture	18	0.5		Law/political science	25	0.6	
	Applied chemistry	133	3.4	Commerce and management/economics	34	0.9		
	Applied physics	87	2.2	Sociology	23	0.6		
	Nuclear power	6	0.2	Other social sciences	19	0.5		
	Materials	161	4.2	Other	Education	37	1.0	
	Textiles	2	0.1		Arts/other	43	1.1	
	Aerospace	10	0.3	Unknown		52	1.3	
	Industrial engineering	3	0.1	Total		3870	100.0	
	Other engineering	214	5.5					
	Agriculture	Agriculture	128	3.3				
Agricultural chemistry		42	1.1					
Agricultural engineering		10	0.3					
Agricultural economics		8	0.2					
Forestry		22	0.6					
Veterinary medicine/animal husbandry		33	0.9					
Fisheries		30	0.8					
Other agriculture		4	0.1					

**(7) Source of funding for employment**

The breakdown of sources of funding for employment of the survey subjects is shown in Table A-8.

**Table A–8 Sources of funding for survey subjects**

Source of funding	No. of persons	%
Postdoctoral Research Fellow (PD) of Japan Society for the Promotion of Science	495	12.8
RIKEN Special Post-Doctoral Researchers Program	210	5.4
21 <sup>st</sup> Century COE	509	13.2
Other (including unsalaried post-docs)	2656	68.6
<b>Total</b>	<b>3870</b>	<b>100.0</b>

**(8) Condition of affiliation**

The breakdown of the survey subjects by condition of affiliation is shown in Table A–9. This question examines whether persons continued their affiliation as post-docs with the same institution or not. “Continued affiliation” means persons who were affiliated as postdoctoral fellows after April 1, 2006 with the same institution as in FY 1005. “Not affiliated” includes both persons who moved from one of the 8 selected institutions to some other institution (including persons who moved to another institution as post-docs) and persons who changed work to an occupation other than post-doc, including persons who remained at the same institution. The meaning of “Changed work/changed institution” in the body of the report is same as “Not affiliated” in this table.

**Table A–9 Condition of affiliation**

Condition of affiliation	No. of persons	%
Continued affiliation	2592	67.0
Not affiliated	1278	33.0
<b>Total</b>	<b>3870</b>	<b>100.0</b>

**A-2 Questionnaire items in connection with career paths**

Among the total of 3,870 valid survey subjects in this survey, as of April 1, 2006, persons who were postdoctoral fellows at another institution, persons engaged in occupations other than postdoctoral fellow (including at the same institution as in FY 2005), and persons of unknown occupation were classified as “Changed work/changed institution.” This indicates persons classified as “Not affiliated” in “⑨ Condition of affiliation” and included a total of 1,278 persons (33%). In the questionnaire, the questions concerning the career paths of these persons in new positions/other institutions were “⑩ Affiliation,” “⑪ Location,” “⑫ Occupation,” “⑬ Full-time,” and “⑭ Fixed term.” It should be noted that various recalculations were attempted in the body of the report, and for this reason, the results differ from the simple totaled results for the questions items given here.

### (1) Affiliation

The breakdown of the new institutions with which persons who changed work/changed institution were affiliated is shown in Table A–10. However, because these are the simple totaled results for the question item “⑩ Affiliation,” the classifications of institutions include a mix of domestic, foreign, and unknown locations.

In the case of foreign institutions, certain problems were anticipated in the survey design stage, including possibility that the classifications in this survey might be inapplicable to foreign institutions, and the respondent (not the actual post-doc, but the representative of the laboratory or his/her assistant) might be unable to make a proper classification. Therefore, an alternative of “Foreign institution” was provided in the questionnaire (see the appendix “B (Reference materials) Questionnaire”). For the treatment of this reply category, see “A-3 Regarding recounting (2) Location of affiliation” in the following.

**Table A–10 Affiliation (before recounting)**

Classification of affiliated institution	No. of persons	%
Same institution	133	10.4
National University Corporation	186	14.6
Public university	21	1.6
Private university	89	7.0
Inter-University Research Institute Corporation	9	0.7
Technical college/junior college	6	0.5
Elementary, middle, or high school	3	0.2
Educational institutions other than above	2	0.2
Public research institute	146	11.4
Government office	4	0.3
Private corporation	121	9.5
Non-profit organization	28	2.2
International institution	9	0.7
Foreign institution	279	21.8
Other institution	20	1.6
No affiliation	45	3.5
Unknown	177	13.8
Total	1278	100.0

## (2) Location

The locations (by country/region) of the new institutions of persons who changed work/changed institution are shown in Table A-11. In the body of the report, mainly, replies indicating “Japan” are given as “Japan” and “Unknown” as “Unknown.” The reply categories other than Japan and unknown (that is, from “United States” to “Other”) are termed “Outside Japan.,” and the combined category including “Unknown” and “Outside” is termed “Other than Japan.”

**Table-11 Location of new institutions of persons who changed work/changed institution (by country/region)**

Location of institution	No. of persons	%
Japan	751	58.8
United States	91	7.1
Canada	13	1.0
UK	15	1.2
France	10	0.8
Germany	12	0.9
Russia	3	0.2
Europe other than above	28	2.2
China	73	5.7
Taiwan	5	0.4
Korea	27	2.1
India	14	1.1
Asia other than above	18	1.4
Other	15	1.2
Unknown	203	15.9
Total	1278	100.0



### (3) Occupations

The occupations at new institutions of persons who changed work/changed institution are shown in Table A-12. However, these are the simple totaled results of question “⑫ Occupation.” In the body of the report, the reply category “Post-doc” is given as “Postdoctoral fellow who moved to another institution” and “Unknown” as “Unknown occupation.” Here, assistant, lecturer, associate professor, and professor include “Persons not employed full-time.” However, in the body of the report, these occupations were changed to include only persons employed full-time after recounting. For details of the recounting procedure, see “A-3 Regarding recounting, (1) Occupations of persons who changed work.”

**Table A-12 Occupations of persons who changed work/changed institution  
(before recounting)**

Occupation	No. of persons	%
Postdoctoral fellow	310	24.3
Assistant	171	13.4
Lecturer	94	7.4
Associate professor	76	5.9
Professor	17	1.3
University teacher	38	3.0
R&D personnel	221	17.3
Teacher	3	0.2
Education-related occupations	3	0.2
Doctors, etc.	31	2.4
Intellectual property related occupations	5	0.4
Coordinator for industry-university collaboration	1	0.1
S&T communicator	2	0.2
Other occupations requiring specialized knowledge	26	2.0
Other non-R&D occupations	13	1.0
Entrepreneur	3	0.2
Student	13	1.0
Unemployed	35	2.7
Unknown	216	16.9
<b>Total</b>	<b>1278</b>	<b>100.0</b>

#### (4) Full-time

As the form of employment of persons who changed work/changed institution, the question “⑬ Full-time” examines whether employment was full-time or part-time. The simple totaled results are shown in Table A–13.

**Table A–13 Full-time/part-time employment  
(persons who changed work/changed institution)**

Form of employment	No. of persons	%
Full-time	693	54.2
Part-time	156	12.2
Unknown	429	33.6
Total	1278	100.0

#### (5) Fixed term

As a second item regarding the form of employment, the question “⑭ Fixed term” examines whether employment was under a fixed term contract or not under a fixed term. The simple totaled results are shown in Table–14.

**Table A–14 Fixed term contract (persons who changed work/changed institution)**

Fixed term contract	No. of persons	%
Fixed term	411	32.2
Not fixed term	247	19.3
Unknown	620	48.5
Total	1278	100.0

### A-3 Regarding recounting

#### (1) Occupations of persons who changed work

In order to clarify the job classifications of persons who changed type of work, a recount was made by performing four operations on the results of question “⑫ Occupation.” (The results of this recount are shown in the body of the report at “Fig. 3–2, Occupation of persons who changed type of work.”)

First, persons who were listed as assistants, lecturers, associate professors and professors in “⑫ Occupation” were classified as full-time, part-time, or unknown using the results of “□ Full time” (see Table A–15), and person who were classified as part-time and unknown, together with “University teachers of unknown position,” were reclassified in a single category of “Other university teacher.”

**Table A–15 Occupation and form of employment/fixed term**

	Form of employment			Fixed term contract			Total
	Full-time	Part-time	Unknown	Fixed term	Not fixed term	Unknown	
Postdoctoral fellow	157	75	78	179	6	125	310
Assistant	156	<u>8</u>	7	91	49	31	171
Lecturer	72	<u>15</u>	7	24	41	29	94
Associate professor	67	<u>3</u>	6	14	37	25	76
Professor	15	<u>1</u>	1	3	8	6	17
University teacher of unknown position	10	10	18	6	6	26	38
R&D personnel other than above	152	28	41	73	64	84	221
Teacher	3				2	1	3
Education-related occupations		2	1	2		1	3
Doctors, etc.	21	5	5	8	11	12	31
Intellectual property related occupations	4		1	1	1	3	5
Coordinator for industry-university collaboration	1			1			1
S&T communicator	1		1			2	2
Other occupations requiring specialized knowledge	21	5		4	13	9	26
Other non-R&D occupations	7	2	4	4	3	6	13
Entrepreneur	3				2	1	3
Student		1	12			13	13
Unemployed		1	34		2	33	35
Unknown	3		213	1	2	213	216
<b>Total</b>	<b>693</b>	<b>156</b>	<b>429</b>	<b>411</b>	<b>247</b>	<b>620</b>	<b>1278</b>

The classification of occupations is that used in the questionnaire and is different from the classification in the body the report (Fig. 3–2, etc.). The underlined numbers and the numbers for university teachers of unknown position were combined and are shown in the body as “Other university teachers.”

Second, using “<sup>10</sup> Affiliation, “R&D personnel other than above” (R&D personnel other than university teachers) in “<sup>12</sup> Occupation” was divided into four categories. Persons whose affiliation was a university were classified as “University researcher,” persons at public research institutes, as “Public research institute researcher,” persons at private corporations, as “Private sector researcher,” and persons at other institutions, as “Other R&D personnel.” (See Table A–16; even when the person is classified as “Same institution,” cases in which the institution concerned is a university are classified as “University researcher,” and cases of public research institutes were classified as “Public research institution researcher.” One person classified as an “Associate professor” was employed at a public research institute; this person was included in “Public research institute researcher.”

**Table A–16 Occupations and affiliations**

	Same institution	National Research Corporation	Public university	Private university	Inter-University Research Institute Corporation	Technical college/junior college	Elementary, middle, or high school	Educational institutions other than above	Public research institute	Government office	Private corporation	Non-profit organization	International institution	Foreign institution	Other institution	No affiliation	Unknown
Postdoctoral fellow		62	2	14	4				92		4	6	4	119	1		2
Assistant	86	51	4	18	2	2								8			
Lecturer	14	15	7	31		4								23			
Associate professor	6	17	3	9					1				3	37			
Professor				2									1	14			
University teacher	2	7	2	9										17		1	
R&D personnel	<u>12</u>	<u>24</u>	<u>3</u>	<u>2</u>	<u>2</u>				<u>46</u>	<u>2</u>	<u>72</u>	<u>8</u>	<u>1</u>	<u>41</u>	<u>7</u>		<u>1</u>
Teacher							3										
Education-related occupations	2	1															
Doctors, etc.	3	2		1							2	13		1	8	1	
Intellectual property related occupations										1	2				2		
Coordinator for industry-university collaboration		1															
S&T communicator									1	1							
Other occupations requiring specialized knowledge	4				1				1		16			1	1		2
Other non-R&D occupations	3								1		8					1	
Entrepreneur											1			1		1	
Student	1	3		1				2						6			
Unemployed																35	
Unknown		3		2					4		16	1		11	1	6	172

Due to space limitations, the names of occupations have been simplified. “R&D

personnel” in this table corresponds to “R&D personnel other than above” in Table A–15. In the body of the report, this classification is divided into “University researcher,” “Public research institute researcher,” “Private sector researcher,” and “Other R&D personnel,” depending on the affiliation of the person.

Third, among persons falling under R&D personnel, all persons who were classified as other than Japan in “⑪ Location” were considered to be “R&D personnel other than Japan.” This was done because there is a possibility that the educational system differs from that in Japan, and the authors therefore judged that assistants, lecturers, associate professors, and similar persons should not be included in the same categories as their Japanese counterparts.

Fourth, among the persons (3 persons) who were classified as “Education related occupations other than above (administrative, etc.)” in “⑫ Occupation,” for two of these persons, the reply for “⑮ Details” was “Part-time lecturer.” Because their “⑩ Affiliation” was universities, these two persons were classified as “Other university teacher.” Simultaneously with this, the one remaining person under “Education related occupations other than above (administrative, etc.)” was included under “Other non-R&D personnel (administrative, etc.)”

## **(2) Location of affiliated institution**

In the question on the affiliated institutions of person who changed work/changed institution, a reply category of “Foreign institution (excluding international institutions)” was provided in question “⑩ Affiliation” because there are countries/regions where the classification of institutions is different from that in Japan, and classification by these types of foreign institutions was not possible. Furthermore, because a reply category of “Unclassified (other)” is provided in the body of the report, there are places whether this category is unified with “Other institution.” In cases where the affiliation is other than Japan or unknown, there were a small number of cases in which the reply was “National University Corporation” or “Public research institute.” However, persons whose affiliation is other than an institution in Japan were treated as “Other than Japan” (category including outside Japan and unknown). Table A–17 shows the affiliations of persons who were postdoctoral fellows, including those employed as post-docs at a different institution, classified as Japan, outside Japan, and unknown.

**Table A-17 Affiliated institutions of persons who changed type of work  
(Japan, outside Japan)**

	Japan		Outside Japan		Unknown		Total	
	No. of persons	%	No. of persons	%	No. of persons	%	No. of persons	%
Same institution	133	23.5					133	17.7
National Research Corporation	115	20.3	1	0.6	5	31.3	121	16.1
Public university	18	3.2	1	0.6			19	2.5
Private university	73	12.9					73	9.7
Inter-University Research Institute Corporation	5	0.9					5	0.7
Technical college/junior college	6	1.1					6	0.8
Elementary, middle, or high school	3	0.5					3	0.4
Educational institutions other than above	2	0.4					2	0.3
Public research institute	47	8.3	2	1.2	1	6.3	50	6.6
Government office	4	0.7					4	0.5
Private corporation	95	16.8	6	3.6			101	13.4
Non-profit organization	20	3.5	1	0.6			21	2.8
International institution	0	0.0	4	2.4	1	6.3	5	0.7
Unclassified (other)	17	3.0	144	85.2	6	37.5	167	22.2
No affiliation	27	4.8	9	5.3	3	18.8	39	5.2
Unknown	2	0.4	1	0.6			3	0.4
<b>Total</b>	<b>567</b>	<b>100</b>	<b>169</b>	<b>100</b>	<b>16</b>	<b>100</b>	<b>752</b>	<b>100</b>

**Table A-18 Affiliations of post-docs who changed institution (Japan, outside Japan)**

	Japan		Outside Japan		Unknown	
	No. of persons	%	No. of persons	%	No. of persons	%
National Research Corporation	58	37.7	3	2.3	1	3.8
Public university	2	1.3				
Private university	13	8.4	1	0.8		
Inter-University Research Institute Corporation	4	2.6				
Public research institute	68	44.2	3	2.3	21	80.8
Private corporation	3	1.9	1	0.8		
Non-profit organization	6	3.9				
International institution			4	3.1		
Foreign institution			117	90.0	2	7.7
Other institution			1	0.8		
Unknown					2	7.7
<b>Total</b>	<b>154</b>	<b>100.0</b>	<b>130</b>	<b>100.0</b>	<b>26</b>	<b>100.0</b>

### (3) Nationality by research field

Table A–19 shows nationality (Japanese or non-Japanese) by research field for all survey subjects, and the nationalities of post-docs at the same institution and persons who changed work/changed institution, respectively.

**Table A–19 Nationality by research field**

	Nationality	Science	Engineering	Agriculture	Healthcare	Humanities and social sciences	Other	Unknown	Total
All survey subjects	Japanese	1405	527	221	535	173	63	33	2957
	Non-Japanese	314	355	56	108	44	17	19	913
	Total	1719	882	277	643	217	80	52	3870
Post-docs at same institution	Japanese	990	359	154	367	107	38	19	2034
	Non-Japanese	192	220	35	64	31	10	6	558
	Total	1182	579	189	431	138	48	25	2592
Persons who changed work/changed institution	Japanese	415	168	67	168	66	25	14	923
	Non-Japanese	122	135	21	44	13	7	13	355
	Total	537	303	88	212	79	32	27	1278

Table A–20 shows occupations by research field and occupations by nationality for persons who changed work/changed institution.

**Table A-20 Occupations by research field/nationality  
(persons who changed work/changed institution)**

	Science		Engineering		Agriculture		Healthcare		Humanities and social sciences		Other		Unknown	
	Japanese	Non-Japanese	Japanese	Non-Japanese	Japanese	Non-Japanese	Japanese	Non-Japanese	Japanese	Non-Japanese	Japanese	Non-Japanese	Japanese	Non-Japanese
Post-doc	146	49	34	16	15	4	25	13	6				1	1
Assistant (full-time)	53	2	32	3	8		32	4	9	1	2		2	
Lecturer (full-time)	11		6	2	4		6		12		5	1	3	
Associate professor (full-time)	10		7	2			3		5	1		2		
Professor (full-time)	1						1							
Other university teacher	21	2	6		1	1	7		15	1	3			
Teachers other than university researcher	15	3	6	2	7		7	1	1					1
Public research institute researcher	19		11	3	3		6		1		1			
Private sector R&D personnel	22	2	24	6	5		6	1	1		1			
Other R&D personnel	7		3				5		1					
R&D personnel other than Japan	13	35	3	75	2	5	6	7	1	8		3	1	2
Teacher	2		1						1					
Doctors, etc.	3	1	2				24	2						
Intellectual property related occupations	2		4	4			1							
Coordinator for industry-university collaboration							1							
S&T communicator								1	1					
Other occupations requiring specialized knowledge	8	1		1		1	4				2		2	
Other non-R&D occupations	6	2		1	3		1			1				
Student	6	1	2		2		3		1					
Unemployed	12	7	4	2	1		3	2	2		1			1
Unknown	58	17	23	18	16	10	27	13	9	1	10	1	5	8
<b>Total</b>	<b>415</b>	<b>122</b>	<b>168</b>	<b>135</b>	<b>67</b>	<b>21</b>	<b>168</b>	<b>44</b>	<b>66</b>	<b>13</b>	<b>25</b>	<b>7</b>	<b>14</b>	<b>13</b>



#### (4) Location of new institution by research field

The locations of the new institutions of persons who changed work/changed institution by research field are shown in Table A-21.

**Table A-21 Location of new institution by research field  
(persons who changed work/changed institution)**

	Science	Engineering	Agriculture	Healthcare	Humanities and social sciences	Other	Unknown	Total
Japan	311	165	46	139	59	18	13	751
United States	51	10	6	23	1			91
Canada	4	5	1	1	2			13
UK	7	4		4				15
France	7	1		1	1			10
Germany	6	4	1		1			12
Russia	2	1						3
Europe other than above	15	8	5					28
China	22	40	1	4	2	1	3	73
Taiwan	5							5
Korea	6	15	1	1	2	2		27
India	8	6						14
Asia other than above	4	11		2	1			18
Other	7	4	2	2				15
Unknown	82	29	25	35	10	11	11	203
Total	537	303	88	212	79	32	27	1278

## B (Reference materials) Questionnaire

### Procedure for Reply to “Survey on Career Paths of Postdoctoral Fellows”

Survey conducted by: 1st Policy-Oriented Research Group,  
National Institute of Science and Technology Policy (NISTEP)

The purpose of this survey is to assess the employment/condition of persons who have experience as postdoctoral fellows, including the degree to which former postdoctoral fellows have become independent researchers (regular positions including professors, associate professors, lecturers, and similar positions), other occupations in which former postdoctoral fellows are engaged, and related information. The results will be used as basic information for framing policy. Information on individuals and information specific to laboratories will not be disclosed outside of this organization.

For the purposes of this survey, postdoctoral fellows are defined as persons who satisfy all of the following conditions.

- ① Persons who have received a doctoral degree or have terminated their student status upon completing the required years/credits for a doctoral degree.
- ② Persons who are engaged in research work at a university or other research institute in a position with a fixed term (including persons who are not in an employment relationship with the institution and do not receive payment of a salary, persons who receive payment of monetary gift of thanks, and dispatchees from temporary staffing agencies).
- ③ Persons who do not hold a post as professor, associate professor, lecturer, or assistant.
- ④ Persons who do not hold a post as leader or senior researcher in their research group.

\* In addition to the above, the detailed definition follows that in the “Employment Survey.”

#### [To the person in charge of the survey]

Please reply using the questionnaire form (hard copy) or Excel file for persons who were affiliated as postdoctoral fellows with your institution (laboratories, research centers, etc. included in your institution) for 2 months or more during fiscal year 2005 (April 1, 2005 to March 31, 2006).

- \* The person in charge of the “Survey of Postdoctoral Fellows and Research Assistants” (“Employment Survey”) should complete the questionnaire for this survey. Depending on the survey item, there may be cases in which items must be completed by the department (research division, laboratory/research center) with which the post-doc was affiliated. In such cases, please distribute the questionnaire to each unit and collect the completed questionnaires.

**[Notes regarding completion of the questionnaire]**

**Please reply using one line for each post-doc affiliated with your institution.**

- ① The space “Name, etc. (for reference)” should be used in arranging/confirming information when making inquiries with individual laboratories (same for information such as laboratory name, etc.). This information is not necessary for the purposes of this survey. When submitting the completed questionnaire, please delete this information before returning the questionnaire (if using the hard copy, cut and discard the part showing names).
- ② For “Gender,” please enter the appropriate code number from “Gender” in the code table.
- ③ For “Nationality,” enter the appropriate code number from “Nationality” in the code table.
- ④ For “Age,” enter the subject’s age as of April 1, 2006 using Arabic numerals.
- ⑤ For “Year received degree,” enter the year (western calendar) in which the subject received his/her doctorate (or terminated student status upon completing the degree requirements).
- ⑥ For “Year started affiliation,” enter the fiscal year in which the subject started his/her affiliation with your institution (corporation) as a postdoctoral fellow (western calendar, Arabic numerals).
- \* If a subject has been affiliated with your institution (corporation) as a postdoctoral fellow discontinuously two or more times (due to change of affiliated institution, employment at your institution in a position other than postdoctoral fellow, etc.), enter the year when the postdoctoral fellow started his/her affiliation most recently (prior to March 31, 2006). Consider changes in the source of funding for the post-doc’s employment at your institution as discontinuous employment.
- ⑦ For “Research field,” enter the most appropriate research field for the subject’s work while a postdoctoral fellow using a code number from “Research field” in the Code Table.
- ⑧ For “Source of funding for employment,” enter the item corresponding to the main source of funding for employment for FY 2005 (April 1, 2005 to March 31, 2006) using a code number from “Source of funding for employment” in the Code Table. In cases where the main source of funding was a monetary gift of thanks or the post-doc was unsalaried, indicate “Other.”
- ⑨ For “Condition of affiliation,” indicate the subject’s condition of affiliation as a postdoctoral fellow as of April 1, 2006 using the corresponding code number from “Condition of affiliation” in the Code Table. “Continued affiliation” means persons who were affiliated continuously with your institution (corporation) as postdoctoral fellows as of April 1 2006 (i.e., continuous employment as post-doc from FY 2005), even if unsalaried. (Continuous affiliation also includes cases in which the subject’s affiliation was terminated temporarily as of April 1, 2006 for procedural reasons such as the term of the persons’s employment contract or administrative handling.) Persons whose status as postdoctoral fellows was terminated (persons who changed area of employment at your institution), persons who left your institution (including persons who continued as post-docs at other institutions), and persons whose status of affiliation cannot be confirmed should be considered “Not affiliated.”

The following items concern persons who changed type of work or changed institution. These items should be completed **only for subjects listed as “Not affiliated” in item ⑨ above.**

- ⑩ For “Affiliation,” enter the corresponding code number from “Affiliation” in the Code Table. If only the subject’s position (rank) changed, enter “Same institution.”
- ⑪ For “Location,” enter the location of the head office or center, etc. of the institution with which the subject was affiliated using a code number from the Code Table.
- ⑫ For “Occupation,” chose the most appropriate item from “Occupation” in the Code Table.
- ⑬ For “Full-time,” indicate whether the subject’s occupation was full-time or part-time using a code number from the Code Table. For the purposes of this survey, persons employed on a daily basis are considered “Part-time” if their actual weekly working time is less than three-quarters that of full-time employees.
- ⑭ For “Fixed term,” select the corresponding code number from “Fixed term” in the Code Table.
- ⑮ In the “Details” column, enter details such as position (rank) and type of work in cases such as the following:
  - (i) If the subject’s affiliation is a university or public research institute, and the job classification is “Adjunct Associate Professor,” “Researcher (Young Researcher Training),” “Project Leader,” or the like, indicate the position, etc.
  - (ii) If “Unemployed,” indicate the reason (childraising, medical treatment).
  - (iii) If the detailed area of employment, type of work, etc. is known (e.g., patent attorney, historical museum curator, science writer, biotechnology venture entrepreneur, financial consultant, stock analysis, etc.), indicate the specific information.

\* In case the subject had multiple affiliations, reply concerning the one main affiliation. If the same person changed work/changed institution multiple times during FY 2005, reply for the institution with which the person was affiliated immediately after terminating postdoctoral fellow status at the point in time closest to April 1, 2006.

**Code Table**

② Gender		⑦ Research field*1		⑩ Affiliation			
Male	1	Science	Mathematics	101	Same institution (including persons who changed only position (rank))	11	
Female	2		Physics	102	National University Corporation (including university-affiliated hospitals)	21	
③ Nationality			Chemistry	103	Public university (including university-affiliated hospitals)	22	
Japanese	1		Biology	104	Private university (including university-affiliated hospitals)	23	
Non-Japanese	2		Earth sciences	105	Inter-University Research Institute Corporation	24	
⑧ Source of funding			Other science	109	Technical college/junior college	25	
Postdoctoral Research Fellow (PD) of JSPS	1		Engineering	Mechanical engineering/naval architecture	201	Elementary, middle, or high school	26
RIKEN Special Post-Doctoral Researcher	2			Electrical/telecommunications	202	Educational institutions other than above *2	29
21 <sup>st</sup> Century COE	3			Civil engineering/architecture	203	Public research institute *3	30
Other (including unsalaried post-docs)	9			Applied chemistry	204	Government office	40
⑨ Condition of affiliation		Applied physics		205	Private corporation	50	
Continued affiliation	1	Nuclear power		206	Non-profit organization (public-interest corporation, NPO, medical corporation, or similar)	60	
Not affiliated	2	Materials		207	International institution	71	
⑪ Location (Japan/outside)		Textiles		208	Foreign institution (excluding international institution)	72	
Japan	11	Aerospace		209	Other institution	81	
North America		Industrial engineering		210	No affiliation	82	
United States	21	Other engineering	299	Unknown	99		
Canada	22	Agriculture	Agriculture	301	⑫ Occupation		
Europe			Agricultural chemistry	302	R&D occupations		
UK	31		Agricultural engineering	303	Postdoctoral fellow	11	
France	32		Agricultural economics	304	University teacher (including technical school, junior college, Inter-University Research Institute Corporation)		
Germany	33		Forestry	305	Assistant	12	
Russia	34		Veterinary medicine/animal husbandry	306	Lecturer	13	
Europe other than above	39		Fisheries	307	Associate professor	14	
Asia (including Middle East)			Other agriculture	309	Professor	15	
China	41		Healthcare	Medicine	401	University teacher of unknown position	16
Taiwan	42			Dentistry	402	R&D personnel other than above	17
Korea	43	Pharmacy		403	Non-R&D occupations		
India	44	Nursing		404	Education-related occupations		
Asia other than above	49	Other healthcare	409	Teacher (limited to elementary, middle, and high school)	21		
Other	80	Humanities and social sciences	Humanities (liberal arts)	Literature	501	Other educational occupations (kindergarten, etc.)	22
Unknown	99			History	502	Education-related occupations other than above (administrative, etc.)	23
⑬ Full-time				Philosophy	503	Occupation requiring specialized knowledge	
Full-time	1		Other humanities	509	Doctor, dentist, veterinarian, pharmacist	31	
Part-time	2		Social sciences	Law/political science	511	Intellectual property related occupations (lawyer, patent attorney, etc.) *4	32
Unknown	9			Commerce and management/economics	512	Management specialties (CPA, tax attorney, etc.)	33
⑭ Fixed term				Sociology	513	Coordinator for industry-university collaboration *5	34
Fixed term	1			Other social sciences	519	S&T communicator (S&T reporter, etc.)	35
Not fixed term	2		Other	Home economics	601	Other non-R&D occupations requiring specialized knowledge	36
Unknown	9			Education	602	Other non-R&D occupations (administrative, etc.)	37
⑮ Other		Arts, other		609	Entrepreneur (venture, etc.)	40	
Fixed term	1	Unknown		999	Student	50	
Not fixed term	2			Unemployed	60		
Unknown	9			Unknown	99		

\*1 Codes under "Research field" follow the classification under "Specialties of Researchers" in the "Survey Report on Science and Technology" by the Ministry of Internal Affairs and Communications.

\*2 Includes historical museums, colleges, vocational schools, supplementary ("gram") schools, etc.

\*3 Means Independent Administrative Institutions, semigovernmental corporations, and regional public research institutes.

\*4 Indicates lawyers, patent attorneys, patent examiners (assistants), and persons in charge in intellectual property departments of universities, public research institutes, private corporations, etc.

\*5 Indicates specialized occupations as coordinator, etc. responsible for identifying high potential research results at universities, etc. and coordinating joint development/business with private corporations/regional governments.

\*6 Indicates occupations in which a person is responsible for communication between specialists, beginning with science and technology-related researchers, and the general public. For example, science reporters, science writers, science/history museum-related persons, and public relations persons in universities, research institutes, private corporations, etc. fall under this category. However, in this survey, science teachers are classified under "Education-related occupations."

**Survey of Career Paths of Postdoctoral Fellows – Questionnaire Form**

Name of laboratory  
( )  
No. of postdoctoral fellows  
( ) persons

	① Name, etc. (for reference)	② Gender	③ Nationality	④ Age	⑤ Year received degree	⑥ Year started affiliation	⑦ Research field	⑧ Source of funding for employment	⑨ Condition of affiliation	New institution (complete if ⑨ is "Not affiliated")					
										⑩ Affiliation	⑪ Location	⑫ Occupation	⑬ Full-time	⑭ Fixed term	⑮ Details
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															

Names, reference Nos., etc. are for use when making inquiries to individual departments. These are not survey items. Please cut along this line and detach the section at the left before submitting your reply.

- \* Fill in the "Details" column in cases such as the following.
- ① The subject's affiliation is a university or public research institute, and the job classification is "Adjunct Associate Professor," "Researcher (Young Researcher Training)," "Project Leader," or the like.
- ② If "Unemployed," indicate the reason (childraising, medical treatment).
- ③ If the detailed area of employment, type of work, etc. is known (patent attorney, historical museum curator, science writer, biotechnology venture entrepreneur, financial consultant, stock analysis, etc.).

**Example of entries**

Name of laboratory  
 ( Monbu )  
 No. of postdoctoral fellows  
 ( 5 ) persons

**Survey of Career Paths of Postdoctoral Fellows – Questionnaire Form**

	① Name, etc. (for reference)	② Gender	③ Nationality	④ Age	⑤ Year received degree	⑥ Year started affiliation	⑦ Research field	⑧ Source of funding for employment	⑨ Condition of affiliation	New institution (complete if ⑨ is "Not affiliated")					⑮ Details
										⑩ Affiliation	⑪ Location	⑫ Occupation	⑬ Full-time	⑭ Fixed term	
1	Kagaku, Hanako	2	1	29	2003	2004	104	9	2	23	11	11	1	1	Academic researcher (equivalent of postdoctoral fellow)
2	Gijutsu, Taro	1	1	28	2004	2005	104	2	1						
3	Seisaku, Jiro	1	1	31	2002	2003	403	1	2	29	11	35	1	2	Museum curator
4	Kenkyu, Saburo	1	1	35	1999	2001	403	9	2	81	11	11	2	9	
5	David Sho	1	2	34	2001	2004	307	9	2	72	31	16	1	9	Teacher at private university in UK (exact position unknown)
6															
7															
8															
9															
10															

Names, reference Nos., etc. are for use when making inquiries to individual departments. These are not survey items. Please cut along this line and detach the section at the left before submitting your reply.

- \* Fill in the "Details" column in cases such as the following.
- ① The subject's affiliation is a university or public research institute, and the job classification is "Adjunct Associate Professor," "Researcher (Young Researcher Training)," "Project Leader," or the like.
- ② If "Unemployed," indicate the reason (childraising, medical treatment).
- ③ If the detailed area of employment, type of work, etc. is known (patent attorney, historical museum curator, science writer, biotechnology venture entrepreneur, financial consultant, stock analysis, etc.).

**Questionnaire for Persons in Charge of Work Related to  
“Survey on Career Paths of Postdoctoral Fellows”**

\_\_\_\_\_, 2006

1st Policy-Oriented Research Group  
National Institute of Science  
and Technology Policy

We wish to express our sincere thanks for your cooperation. The results of this survey will be used as reference data for study and implementation of policies for supporting the independence and career paths of postdoctoral fellows.

In order to improve our analysis of the survey results, we would like to ask all those in charge of work related to this survey to kindly inform us of any points that you noted when filling out the questionnaire form, problems in the distribution or collection of the questionnaire, matters which you felt in the survey process, or other comments.

(1) Please describe any problems, etc. which occurred when filling out the questionnaire form.

(2) Please describe any obstacles, problems, etc. which occurred when distributing/collecting the questionnaire.

(3) Please mention any opinions, requests, etc. that you may have.