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**HUMAN RESOURCES IN
SCIENCE AND TECHNOLOGY (HRST) AUSTRALIA**

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C O N T E N T S

	<i>page</i>
Notes	2
List of tables	3
Introduction	4
Main features	5
SECTIONS	
Stock of HRST	7
HRSTQ	9
HRSTO	15
Comparisons with population	21
ADDITIONAL INFORMATION	
Explanatory notes	28
Glossary	32

- For further information about these and related statistics, contact Derek Byars on Canberra 02 6252 5627, or any ABS office shown on the back cover of this publication.

NOTES

ABOUT THIS PUBLICATION

This publication presents data on Human Resources in Science and Technology (HRST) and follows the definitions and guidelines in the Organisation for Economic Co-operation and Development's (OECD) manual, *The Measurement of Scientific and Technological Activities—Manual on the Measurement of Human Resources Devoted to S&T* ('Canberra Manual').

DEFINING HRST

There are differing ways in which HRST can be defined. The OECD recommends concentrating on university-level HRST, which is defined as people who:

- have successfully completed education at the International Standard Classification of Education levels 6 or 7; or
- are not formally qualified as above, but employed in a Science and Technology (S&T) occupation where the above qualifications are normally required.

S&T in its broadest sense includes the fields of social sciences and humanities in addition to the natural sciences and engineering. Accordingly, the definition used in this publication includes all persons with tertiary qualifications regardless of their field of study, including fields such as social sciences and humanities.

Tertiary qualifications are defined as Undergraduate diplomas, Bachelor degrees, Postgraduate diplomas and Higher degrees. Associate diplomas and Vocational qualifications are excluded. All individuals with relevant qualifications are included regardless of age or occupational status.

S&T occupations have been defined as Professionals and Specialist managers. Generalist managers and Farm managers are excluded as tertiary qualifications are not normally required for these occupations.

Persons who meet the definition in terms of S&T qualifications are called Human Resources with Science and Technology Qualifications (HRSTQ) while those who meet the definition in terms of S&T occupations are called Human Resources in Science and Technology Occupations (HRSTO). Persons who fulfil both criteria for HRST (qualification and occupation) are termed Human Resources in Science and Technology Core (HRSTC).

The stock of HRST is the number of persons who meet the definition of HRST at a specified time.

Dennis Trewin
Acting Australian Statistician

LIST OF TABLES		Page	
STOCK OF HRST	1 Number of persons in S&T, 1991 and 1996	7	
	2 HRST as a proportion of population, 1996	8	
	3 GERD as a percentage of GDP, 1996	8	
HRSTQ	4 Persons with S&T qualifications, by age and sex, 1996	9	
	5 Persons with S&T qualifications, by field of study, 1996	10	
	6 Persons with S&T qualifications, by labour force status, 1996	11	
	7 Employed persons with S&T qualifications, by industry, 1996	12	
	8 Persons with S&T qualifications in 1996, year completed qualification	13	
	9 Average annual income of employed persons with S&T qualifications, 1996	14	
	HRSTO	10 Persons in S&T occupations, by age and sex, 1996	15
		11 Persons in S&T occupations, by industry, 1996	16
		12 Selected S&T occupations, 1996	17
13 Average annual income of persons in S&T occupations, 1996		18	
14 Duration of current job, by occupation, February 1998		19	
15 Job mobility, February 1998		20	
COMPARISONS WITH POPULATION	16 Persons, by occupation, age and qualification, 1996	22	
	17 Persons, by occupation, age and qualification, 1991	23	
	18 Males, by occupation and qualification, 1991 and 1996	24	
	19 Females, by occupation and qualification, 1991 and 1996	25	
	20 Persons, by labour force status and age, 1996	26	
	21 Persons, by location, 1996	27	

INTRODUCTION

This publication presents data on HRST in Australia. It is the first release of these data in this form and is primarily based on data collected in the 1991 and 1996 Censuses of Population and Housing. Both censuses were conducted in August.

For many years the Australian Bureau of Statistics (ABS) has been expanding its range of S&T indicators. These are generally based on standards and definitions developed by the OECD. The HRST statistics in this publication are based on an OECD manual released in 1995, *The Measurement of Scientific and Technological Activities—Manual on the Measurement of Human Resources Devoted to S&T* ('Canberra Manual'). As recommended in the manual, this publication concentrates on university-level HRST (see Explanatory Notes, paragraphs 3–4).

HRST statistics provide a measure of the size and growth in this important part of our workforce and society. Australia, like other countries, needs to be aware of the balance between the supply and demand for human resources in S&T.

The ABS has prepared this publication to assist in meeting the policy and analytical needs of users. Comments on the statistics contained in this publication and suggestions for further analyses are welcomed and should be forwarded to:

The Director
Small Business and Science and Technology Section
Australian Bureau of Statistics
PO Box 10
Belconnen ACT 2616

MAIN FEATURES

The analysis showed that:

PERSONS IN S&T

- the stock of HRST increased from 15% of the population aged 15 years and over in 1991 to 18% in 1996 (2.0 million to 2.5 million);
- the proportion with S&T qualifications (HRSTQ) increased from 11% in 1991 to 14% in 1996;
- the proportion who were employed in S&T occupations (HRSTO) increased from 10% in 1991 to 12% in 1996;
- the proportion who were both employed in an S&T occupation and had S&T qualifications (HRSTC) increased from 6% in 1991 to 7% in 1996;
- by State and Territory, HRST ranged from 15% to 19% in 1996, with the exception of the Australian Capital Territory where the proportion was 34%;
- HRST as a proportion of the population in Major Urban centres in 1996 was 21%, which was higher than in Other Urban (13%) and Other localities (14%);

QUALIFICATIONS

- the types of qualifications held by persons with S&T qualifications in 1996 were Bachelor degrees (56%), Undergraduate diplomas (25%), Higher degrees (10%) and Postgraduate diplomas (9%);
- of the persons with S&T qualifications in 1996, the most popular fields of study were Society and culture, Education and Health accounting for 21%, 20% and 19% respectively;

OCCUPATIONS

- persons in HRSTO in 1996 were most commonly employed in Education, Health and community services, and Property and business services industry groups, accounting for 23%, 20% and 17% of HRSTO respectively; Manufacturing accounted for 8% and Mining 1%;
- the industries with the highest proportion of their employment in S&T occupations were also Education (69%), Health and community services (44%) and Property and business services (36%);
- of the persons in HRSTO in 1996, 64% had S&T qualifications; while 69% of Professionals had S&T qualifications, only 42% of Specialist managers had such qualifications;

AGE AND SEX

- of the stock of HRST in 1996, 50% of persons were aged 35–54, compared with only 32% of the non-HRST population;
- females accounted for 50% of the stock of HRST in both 1991 and 1996, while their share of the population 15 years and over remained stable at 51%;
- the proportion of females in HRSTO increased from 45% in 1991 to 47% in 1996, while the proportion of females in HRSTQ remained stable at 54%;

- INCOME
- persons with S&T qualifications and employed in a S&T occupation earned \$47,000 on average in 1996, compared with \$36,000 earned by persons with S&T qualifications employed in other occupations and \$39,000 earned by persons in S&T occupations without S&T qualifications;
 - of the persons in S&T occupations, Specialist managers and Computing professionals earned the highest average annual incomes in 1996 (\$56,000 and \$51,000 respectively);
- LABOUR FORCE STATUS
- for persons with S&T qualifications the unemployment rate was 4% at August 1996, compared with 10% for persons without S&T qualifications;
 - for persons with S&T qualifications the participation rate (persons in the labour force as a proportion of the population aged 15 years and over) was 82% at August 1996, compared with 57% for persons without S&T qualifications;
- JOB MOBILITY
- approximately 241,000 persons in HRSTO in February 1998 had changed their jobs in the preceding 12 months. The proportion who had changed their jobs was similar across all occupations (around 14%);
 - on average, persons in HRSTO had been in their current job for longer than persons in other occupations;
- INTERNATIONAL COMPARISON
- Australia's HRST as a proportion of its population ranked fourth in comparison with nine European countries for which similar data are available; and
 - Gross Expenditure on Research and Development (GERD) as a proportion of Gross Domestic Product (GDP) (a recognised indicator of S&T activity) in 1996 shows a similar ranking for Australia relative to the same countries.

STOCK OF HRST

NUMBER OF PERSONS IN S&T

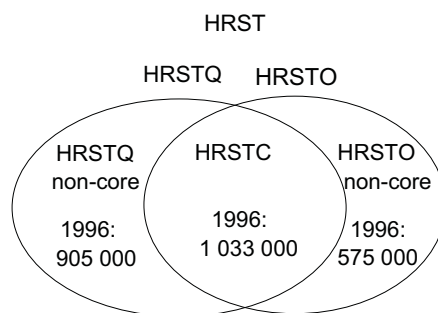
The number of persons in S&T (stock of HRST) as a proportion of the population aged 15 and over in Australia increased from 15% in 1991 to 18% in 1996.

Between 1991 and 1996, HRST defined in terms of qualifications (HRSTQ) increased from 11% of the population to 14%, while HRST defined in terms of occupations (HRSTO) increased from 10% to 12%. The largest increase was in persons with S&T qualifications but not employed in S&T occupations (HRSTQ non-core) which increased by 32%. Persons with S&T qualifications and in S&T occupations (HRSTC) increased by 27% while those without S&T qualifications but in S&T occupations (HRSTO non-core) only increased by 17%.

HRSTO has been defined as Specialist managers and Professionals. In 1996, only 125,000 (42%) of the 298,000 Specialist managers had S&T qualifications. If Specialist managers were excluded, HRSTC would be 908,000 in 1996 and HRSTO non-core 402,000.

Of those with S&T qualifications but not employed in S&T occupations (HRSTQ non-core) in 1996, 491,000 (54%) were employed in other occupations, 65,000 (7%) were unemployed and 346,000 (38%) were not in the labour force.

The following diagram illustrates the relationship between the components of HRST.



1

NUMBER OF PERSONS IN S&T

Year	<i>Stock of HRST</i>				<i>HRST as a proportion of population</i>	
	<i>HRSTQ non-core</i>	<i>HRSTC</i>	<i>HRSTO non-core</i>	<i>Total</i>	<i>Population(a)</i>	<i>%</i>
	'000	'000	'000	'000	'000	
1991	685	811	490	1 987	13 018	15
1996	905	1 033	575	2 512	13 915	18

(a) All persons 15 years and older, excluding overseas visitors.

Source: Unpublished data, 1991 and 1996 Censuses of Population and Housing.

HRST/POPULATION

Australia's HRST as a proportion of its population ranked fourth in comparison with nine European countries for which similar data are available.

To be consistent with the international figures, Specialist managers have been excluded and Associate diplomas included in the calculation of HRST. Population proportions were calculated on the basis of the entire population rather than population aged 15 and over as used elsewhere in this publication.

2

HRST AS A PROPORTION OF POPULATION—1996

<i>Countries</i>	%
Denmark	17.4
Netherlands	15.6
Ireland	14.9
Australia	14.4
Germany	13.9
France	11.6
Spain	11.4
Austria	7.0
Portugal	6.6
Italy	6.0

Source: Unpublished data, 1996 Census of Population and Housing; Eurostat, Community Labour Force Surveys.

GERD/GDP

A recognised indicator of S&T activity is Gross Expenditure on R&D (GERD) as a proportion of Gross Domestic Product (GDP). Australia's ranking relative to the other countries was similar to that in table 2.

3

GERD AS A PERCENTAGE OF GDP—1996

<i>Countries</i>	%
France	2.32
Germany	2.28
Netherlands(a)	2.08
Denmark	2.01
Australia	1.68
Austria	1.50
Ireland(a)	1.40
Italy	1.03
Spain	0.87
Portugal(a)	0.61

(a) For 1995.

Source: OECD, Main Science and Technology Indicators, 1998-1.

HRSTQ

AGE AND SEX

Persons aged 35–44 accounted for 29% of persons with S&T qualifications in 1996, while those aged 25–34 made up 27%; 20% were aged 45–54.

Females accounted for 54% of persons with S&T qualifications.

Of persons with S&T qualifications, 56% had Bachelor degrees, 25% Undergraduate diplomas, 10% Higher degrees and 9% Postgraduate diplomas.

4

PERSONS WITH S&T QUALIFICATIONS, BY AGE AND SEX—1996

Age group (years)	HRSTQ				Total '000
	Higher degree '000	Postgraduate diploma '000	Bachelor degree '000	Undergraduate diploma '000	
MALES					
15–24	1	2	53	9	64
25–34	21	15	162	28	226
35–44	41	27	151	43	262
45–54	38	17	97	42	194
55–64	16	6	39	22	84
65 and over	11	3	36	22	71
Total	127	70	538	165	899
FEMALES					
15–24	1	4	81	18	104
25–34	16	31	184	70	300
35–44	23	43	145	98	309
45–54	16	24	78	68	187
55–64	5	8	28	36	77
65 and over	3	4	23	32	61
Total	64	114	539	322	1 038
PERSONS					
15–24	2	6	134	26	168
25–34	36	45	346	98	526
35–44	64	70	296	141	570
45–54	54	42	175	110	381
55–64	22	13	67	59	161
65 and over	14	7	58	53	132
Total	191	183	1 077	487	1 938

Source: Unpublished data, 1996 Census of Population and Housing.

FIELD OF STUDY

Society and culture, Education and Health were the most common fields of study for HRSTQ. For males, Business and administration was the most popular, while for females, Education and Health were the most popular.

For all fields, a higher proportion of males were over 55 years old, and a lower proportion of males were 15–34, than for females.

Health had the highest proportion of persons over 55 (21%). Natural and physical sciences had the lowest (9%). Natural and physical sciences (46%) and Business and administration (44%) had the highest proportion of 15–34 year olds. Education had the lowest proportion of 15–34 year olds (27%).

5

PERSONS WITH S&T QUALIFICATIONS, BY FIELD OF STUDY—1996

Field of study(a)	Age group (years)			HRSTQ
	15–34	35–54	55 and over	Total
	'000	'000	'000	
MALES				
Business and administration	64	90	28	182
Health	24	43	20	87
Education	23	67	19	109
Society and culture	58	91	30	180
Natural and physical sciences	53	61	14	129
Engineering	44	68	28	139
Architecture and building	7	11	4	23
Agriculture and related fields	7	12	6	24
Other(b)	9	12	5	27
Total	289	456	155	899
FEMALES				
Business and administration	69	42	7	118
Health	88	140	58	286
Education	84	165	37	287
Society and culture	100	100	26	226
Natural and physical sciences	39	28	5	72
Engineering	7	5	1	13
Architecture and building	4	3	—	7
Agriculture and related fields	3	2	—	6
Other(b)	11	10	3	23
Total	404	496	138	1 038
PERSONS				
Business and administration	133	132	35	300
Health	113	183	78	374
Education	107	232	56	396
Society and culture	158	192	56	406
Natural and physical sciences	92	90	19	200
Engineering	51	73	29	152
Architecture and building	11	14	5	30
Agriculture and related fields	9	14	6	30
Other(b)	20	22	8	50
Total	694	951	293	1 938

(a) See ABS Classification of Qualifications (ABSCQ), 1993 (Cat. no. 1262.0).

(b) Includes miscellaneous fields, not stated and inadequately described.

Source: Unpublished data, 1996 Census of Population and Housing.

LABOUR FORCE STATUS

For persons with S&T qualifications, those with the field of study of Health had the lowest unemployment rate (2%). The highest unemployment rate, with the exception of Other, was for persons with qualifications in Society and culture (6%).

Persons with qualifications in the field of study Business and administration had the highest participation rate (86%). The lowest participation rate was for persons with qualifications in Health (78%).

6

PERSONS WITH S&T QUALIFICATIONS, BY LABOUR FORCE STATUS—1996

HRSTQ

Field of study	<i>Employed</i>					Not in the labour force	Not stated	Total	Unemployment rate	Participation rate
	HRSTQ	Other occupations(a)	Total	Unemployed						
	'000	'000	'000	'000	'000	'000	'000	%	%	
Business and administration	131	116	248	11	41	1	300	4.2	86.3	
Health	231	54	286	6	81	1	374	2.0	78.1	
Education	248	65	314	8	73	1	396	2.5	81.3	
Society and culture	190	121	310	19	75	1	406	5.9	81.2	
Natural and physical sciences	111	51	162	9	30	—	200	5.1	84.9	
Engineering	79	42	121	6	25	—	152	5.1	83.7	
Architecture and building	14	10	24	1	5	—	30	5.3	84.4	
Agriculture and related fields	9	15	23	1	5	—	30	5.2	81.9	
Other(b)	19	17	36	3	11	—	50	6.9	78.5	
Total	1 033	491	1 524	65	346	3	1 938	4.1	82.0	

(a) Includes not stated.

(b) Includes miscellaneous fields, not stated and inadequately described.

Source: Unpublished data, 1996 Census of Population and Housing.

INDUSTRY

The industries with the largest number of persons with S&T qualifications were Education (341,000), Health and community services (297,000), and Property and business services (240,000).

These industries also had the highest proportion of persons with S&T qualifications (63%, 41% and 32% respectively). The industries with the lowest proportion of persons with S&T qualifications were Construction (5%), Retail trade (7%) and Agriculture, forestry and fishing (8%).

Of all industries, the Education industry had the highest number of Higher degrees (48,000) and Postgraduate diplomas (69,000).

Industry	Employed HRSTQ					Proportion of employment	
	Higher degrees	Postgraduate diploma	Bachelor degree	Undergraduate diploma	Total		
	'000	'000	'000	'000	'000	%	
Not stated	1	1	6	3	11	7	
Agriculture, forestry and fishing	1	2	11	11	25	8	
Mining	2	1	9	2	13	15	
Manufacturing	8	6	62	21	96	10	
Electricity, gas and water supply	1	1	6	1	9	15	
Construction	1	1	15	8	25	5	
Wholesale trade	4	3	33	12	51	11	
Retail trade	3	5	42	18	68	7	
Accommodation, cafes and restaurants	2	2	18	10	31	9	
Transport and storage	2	2	17	12	33	10	
Communication services	2	2	13	3	20	13	
Finance and insurance	6	5	46	11	68	23	
Property and business services	28	16	162	33	240	32	
Government administration and defence	13	13	64	14	104	28	
Education	48	69	163	62	341	63	
Health and community services	27	19	151	100	297	41	
Cultural and recreational services	3	4	23	8	38	21	
Personal and other services	4	4	22	10	40	14	
Non-classifiable economic units	1	1	7	3	11	11	
Total	158	154	870	342	1 524	20	

Source: Unpublished data, 1996 Census of Population and Housing.

YEAR COMPLETED QUALIFICATION

Of persons who have completed an S&T qualification, 29% completed that qualification between 1991 and 1996, 31% between 1981 and 1990, 21% between 1971 and 1980 and 18% before 1971.

A higher proportion of females than males have completed S&T qualifications recently; 31% of females in HRSTQ entered the stock in the period 1991 to 1996, compared to 27% for males.

For those persons in HRSTQ who completed their S&T qualifications between 1971 and 1980, 1981 and 1990, and 1991 and 1996, the proportion who were employed was constant at about 84%.

Year completed	<i>Employed</i>			Unemployed	Not in the labour force	Not stated	Total
	HRSTQ	Other occupations (a)	Total				
NUMBER							
	'000	'000	'000	'000	'000	'000	'000
Males							
Before 1971	66	38	103	5	66	—	174
1971-80	124	56	179	6	15	—	200
1981-90	173	76	249	10	15	—	274
1991-96	138	71	210	13	20	—	244
Not stated	2	2	5	—	1	—	7
Total	504	243	747	34	118	1	899
Females							
Before 1971	52	35	87	3	85	—	175
1971-80	110	50	161	5	40	—	206
1981-90	176	75	250	9	62	1	322
1991-96	188	86	273	14	38	—	325
Not stated	3	3	6	—	3	—	10
Total	529	248	777	31	228	2	1 038
Persons							
Before 1971	118	73	191	7	151	1	349
1971-80	234	106	340	11	55	1	407
1981-90	348	151	499	19	77	1	596
1991-96	326	157	483	27	58	1	569
Not stated	6	5	11	1	5	1	17
Total	1 033	491	1 524	65	346	3	1 938
PROPORTION							
	%	%	%	%	%	%	%
Males							
Before 1971	38	22	59	3	38	—	100
1971-80	62	28	90	3	7	—	100
1981-90	63	28	91	3	6	—	100
1991-96	57	29	86	5	8	—	100
Not stated	36	34	71	5	20	4	100
All males	56	27	83	4	13	—	100
Females							
Before 1971	30	20	50	1	48	—	100
1971-80	53	24	78	2	20	—	100
1981-90	55	23	78	3	19	—	100
1991-96	58	26	84	4	12	—	100
Not stated	34	27	62	4	32	3	100
All females	51	24	75	3	22	—	100
Persons							
Before 1971	34	21	55	2	43	—	100
1971-80	58	26	84	3	13	—	100
1981-90	58	25	84	3	13	—	100
1991-96	57	28	85	5	10	—	100
Not stated	35	30	65	4	27	3	100
All persons	53	25	79	3	18	—	100

(a) Includes not stated.

Source: Unpublished data, 1996 Census of Population and Housing.

AVERAGE ANNUAL INCOME

In 1996, persons with S&T qualifications earned \$47,000 if employed in an S&T occupation compared with \$36,000 if employed in other occupations.

Employed persons who held higher degrees had the highest average annual income (\$63,000). They earned slightly more (\$64,000) if they were also employed in a S&T occupation. Employed persons with Bachelor degrees had the second highest average annual income (\$44,000); \$48,000 if also employed in a S&T occupation.

Employed males with S&T qualifications earned on average \$55,000, whereas employed females with S&T qualifications earned \$33,000. Regardless of qualification or occupation, males earned more than females on average.

9 AVERAGE ANNUAL INCOME OF EMPLOYED PERSONS WITH S&T QUALIFICATIONS—1996

Occupation	HRSTQ				
	Higher degree \$'000	Postgraduate diploma \$'000	Bachelor degree \$'000	Undergraduate diploma \$'000	All S&T qualifications \$'000
HRSTO					
Males	72	52	58	50	59
Females	49	36	37	30	36
Persons	64	42	48	36	47
Other occupations					
Males	68	49	46	38	46
Females	39	29	27	23	26
Persons	59	38	36	29	36
All occupations					
Males	71	51	54	44	55
Females	47	35	33	27	33
Persons	63	41	44	33	44

Source: Unpublished data, 1996 Census of Population and Housing.

HRSTO

AGE AND SEX

In 1996, 32% of persons employed in S&T occupations were aged 35–44, 28% were aged 25–34 and 24% were aged 45–54.

In total, males accounted for 53% of persons employed in S&T occupations. Of Health professionals only 26% were male, while 92% of Building and engineering professionals were male.

10

PERSONS IN S&T OCCUPATIONS, BY AGE AND SEX—1996

Age group (years)	Professionals						Total '000
	Specialist managers	Natural and physical science	Building and engineering	Computing	Health	Other	
	'000	'000	'000	'000	'000	'000	
MALES							
15–24	7	2	8	7	3	30	57
25–34	45	8	23	25	17	100	217
35–44	73	8	24	21	21	124	272
45–54	64	6	19	9	16	100	214
55–64	19	2	8	1	8	37	75
65 and over	3	—	2	—	4	8	17
Total	210	27	82	63	69	399	851
FEMALES							
15–24	7	2	1	2	16	48	76
25–34	26	6	3	8	55	128	225
35–44	28	3	1	6	67	138	243
45–54	21	2	1	2	44	94	164
55–64	5	—	—	—	14	23	43
65 and over	1	—	—	—	1	3	6
Total	88	13	6	18	197	434	756
PERSONS							
15–24	14	4	9	9	19	78	133
25–34	71	14	25	33	72	227	442
35–44	101	12	25	26	89	262	515
45–54	85	8	20	11	59	194	378
55–64	24	2	8	2	22	60	117
65 and over	3	—	2	—	5	12	23
Total	298	40	89	81	266	833	1 607

Source: Unpublished data, 1996 Census of Population and Housing.

INDUSTRY

The industries with the largest numbers of persons in HRSTO were Education (373,000), Health and community services (317,000), and Property and business services (270,000).

These industries also had the highest proportion of persons in S&T occupations (69%, 44% and 36% respectively). The industries with the lowest proportion of persons in S&T occupations were Agriculture, forestry and fishing (2%), Accommodation, cafes and restaurants (3%) and Construction (4%).

Industry	Professionals						Total '000	Proportion of employment %
	Specialist managers '000	Natural and physical science '000	Building and engineering '000	Computing '000	Health '000	Other '000		
Not stated	1	—	—	—	1	4	7	5
Agriculture, forestry and fishing	2	2	—	—	—	3	8	2
Mining	5	4	4	1	—	3	16	19
Manufacturing	56	4	17	6	1	51	136	14
Electricity, gas and water supply	3	—	4	1	—	4	12	20
Construction	7	—	7	1	—	5	19	4
Wholesale trade	34	1	4	5	—	29	74	16
Retail trade	18	—	1	2	10	16	48	5
Accommodation, cafes and restaurants	4	—	—	—	—	7	12	3
Transport and storage	13	—	2	2	—	18	35	11
Communication services	6	—	3	5	—	7	21	14
Finance and insurance	18	—	1	9	1	21	50	17
Property and business services	39	11	35	34	3	149	270	36
Government administration and defence	27	4	7	7	4	53	102	27
Education	28	4	1	3	3	335	373	69
Health and community services	17	7	1	1	240	51	317	44
Cultural and recreational services	10	1	1	1	—	37	51	29
Personal and other services	7	—	—	1	1	33	43	15
Non-classifiable economic units	4	—	3	1	—	4	12	12
Total	298	40	89	81	266	833	1 607	21

Source: Unpublished data, 1996 Census of Population and Housing.

S&T OCCUPATIONS

Of the selected occupations, Medical practitioners had the highest proportion of S&T qualified personnel (93%). University and vocational education teachers had the highest proportion of personnel with Higher degrees (37%).

In total, 64% of persons in S&T occupations had S&T qualifications. Generally, females in S&T occupations were more likely to have S&T qualifications (70%) than males (59%). On the other hand, a higher proportion of males had Higher degrees in those occupations (10% compared to 5%).

Occupations(a)	Males			Females			Persons		
	Total	Proportion with S&T qualifications	Proportion with higher degrees	Total	Proportion with S&T qualifications	Proportion with higher degrees	Total	Proportion with S&T qualifications	Proportion with higher degrees
	'000	%	%	'000	%	%	'000	%	%
Specialist managers	210	40	7	88	47	6	298	42	6
Professionals									
Natural & physical science professionals									
Chemists	4	79	18	2	78	11	6	79	15
Environmental & agricultural science professionals	10	59	17	2	74	14	12	62	16
Medical scientists	4	90	42	6	86	19	10	88	28
Other natural & physical science professionals	10	87	32	3	87	23	13	87	30
<i>Total</i>	27	76	26	13	83	18	40	80	23
Building & engineering professionals									
Architects & landscape architects	9	83	6	2	86	6	11	83	6
Civil engineers	12	78	12	1	81	9	12	78	11
Electrical & electronics engineers	14	60	8	1	73	10	14	60	8
Other building & engineering professionals	48	59	9	3	66	8	51	59	9
<i>Total</i>	82	65	9	6	75	7	89	65	8
Computing professionals	63	57	7	18	56	5	81	57	6
Health professionals									
Medical practitioners	31	94	35	13	92	21	44	93	31
Nursing professionals	13	79	2	148	79	1	162	79	1
Miscellaneous health professionals	25	86	10	35	82	5	60	84	7
<i>Total</i>	69	88	20	197	80	3	266	82	7
Education professionals									
School teachers	68	91	7	167	89	3	236	90	4
University & vocational education teachers	34	84	44	27	83	28	61	84	37
Miscellaneous education professionals	11	58	11	27	59	6	36	59	8
<i>Total</i>	113	86	18	221	85	7	334	85	11
Other professionals	285	53	7	214	54	6	499	54	6
<i>Total professionals</i>	641	66	11	668	73	5	1 309	69	8
HRSTO	851	59	10	756	70	5	1 607	64	8

(a) See ASCO—Australian Standard Classification of Occupations, Second Edition (Cat. no. 1220.0).

Source: Unpublished data, 1996 Census of Population and Housing.

AVERAGE ANNUAL INCOME

The average annual income earned by persons in S&T occupations in 1996 was \$44,000. If those persons also had S&T qualifications they were paid more (\$47,000) than those without such qualifications (\$39,000).

Regardless of occupation or qualification, males consistently earned more than females on average.

Male Health professionals with S&T qualifications earned the highest average annual income (\$76,000) while female Health professionals without such qualifications earned the lowest (\$24,000).

13

AVERAGE ANNUAL INCOME OF PERSONS IN S&T OCCUPATIONS—1996

HRSTO

Qualification	Professionals						All S&T occupations
	Specialist managers	Natural and physical science	Building and engineering	Computing	Health	Other	
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
HRSTQ							
Males	74	51	55	55	76	51	59
Females	51	36	38	47	34	34	36
Persons	66	46	53	53	45	42	47
Other qualifications							
Males	52	35	41	50	48	38	45
Females	36	27	26	39	24	26	29
Persons	48	33	41	47	28	33	39
All qualifications							
Males	61	48	51	53	73	47	53
Females	43	35	35	44	32	32	34
Persons	56	44	50	51	43	39	44

Source: Unpublished data, 1996 Census of Population and Housing.

DURATION OF CURRENT JOB

Generally, persons in S&T occupations stay in the same job for longer than persons in other occupations. Only 18% of persons in S&T occupations had been in their current job for under a year, while 30% had been in their current job for longer than 10 years. For persons in other occupations, 23% had been in their current job for under a year and 23% had been in their current job for longer than 10 years.

Of the persons in S&T occupations, computing professionals had the shortest time in their current job with 54% having been in their job for less than three years.

Duration	HRSTO								
	Professionals							Other occupations	Total
	Specialist managers	Natural and physical science	Building and engineering	Computing	Health	Other	Total		
NUMBER									
	'000	'000	'000	'000	'000	'000	'000	'000	'000
Under 1 year	44	11	24	32	39	161	310	1 526	1 835
1 and under 3 years	43	10	23	36	62	184	359	1 559	1 917
3 and under 5 years	37	8	14	20	39	100	217	961	1 178
5 and under 10 years	52	14	23	17	62	170	337	1 094	1 431
10 and under 20 years	63	8	18	15	56	167	327	1 009	1 336
20 years and over	34	6	16	5	25	106	191	529	721
Total	273	57	117	125	283	888	1 742	6 677	8 419
PROPORTION									
	%	%	%	%	%	%	%	%	%
Under 1 year	16	19	20	25	14	18	18	23	22
1 and under 3 years	16	18	20	29	22	21	21	23	23
3 and under 5 years	14	13	12	16	14	11	12	14	14
5 and under 10 years	19	24	20	14	22	19	19	16	17
10 and under 20 years	23	14	15	12	20	19	18	15	16
20 years and over	12	11	14	4	9	12	11	8	9
Total	100	100	100	100	100	100	100	100	100

Source: Labour Mobility, Australia, February 1998 (Cat. no. 6209.0); unpublished data, February 1998 Labour Mobility Survey.

JOB MOBILITY

Approximately 241,000 persons now in HRSTO changed their jobs in the 12 months prior to February 1998. Of these 48,000 (20%) were inflows from other occupations and 193,000 (80%) were internal flows (were already part of the stock).

Of persons currently in other occupations who changed their jobs in the 12 months prior to February 1998, 34,000 (4%) came from S&T occupations.

Of Building and engineering professionals who changed jobs, 93% remained Building and engineering professionals. Similarly, of Health professionals who changed jobs, 92% remained Health professionals, and 89% of those who were Computing professionals remained Computing professionals.

The proportion of persons who changed their job was similar (around 14%) across all occupations.

Job mobility	HRSTO									
	Specialist managers	Professionals						Other occupations	Total	
		Natural and physical science	Building and engineering	Computing	Health	Other	Total			
NUMBER										
	'000	'000	'000	'000	'000	'000	'000	'000	'000	'000
Changed job(a)										
Occupation of last job										
Specialist managers	29	—	*1	*1	—	*3	33	9	42	
Professionals										
Natural and physical science	*—	5	—	—	—	—	7	*—	7	
Building and engineering	*—	—	14	—	—	—	14	*1	15	
Computing	*1	—	—	17	—	—	18	*—	19	
Health	*—	—	—	—	23	—	24	*2	25	
Other	*3	*1	—	*2	—	93	98	22	120	
Other occupations	6	*2	*4	*4	*4	28	48	875	922	
<i>Total</i>	39	8	19	23	27	125	241	909	1 150	
Did not change job	234	49	98	102	255	763	1 501	5 767	7 269	
Total	273	57	117	125	283	888	1 742	6 677	8 419	
	PROPORTION									
	%	%	%	%	%	%	%	%	%	%
Changed job(a)										
Occupation of last job										
Specialist managers	11	—	1	1	—	—	2	—	—	
Professionals										
Natural and physical science	—	9	—	—	—	—	—	—	—	
Building and engineering	—	—	12	—	—	—	1	—	—	
Computing	—	—	—	14	—	—	1	—	—	
Health	—	—	—	—	8	—	1	—	—	
Other	1	2	—	2	—	10	6	—	1	
Other occupations	2	4	3	3	1	3	3	13	11	
<i>Total</i>	14	14	16	18	10	14	14	14	14	
Did not change job	86	86	84	82	90	86	86	86	86	
Total	100	100	100	100	100	100	100	100	100	

(a) Persons who ceased a job during the year ending February 1998 and were working at February 1997 and February 1998.

Source: Unpublished data, 1998 Labour Mobility Survey.

COMPARISONS WITH POPULATION

QUALIFICATIONS, OCCUPATIONS AND AGE

For persons with S&T qualifications (HRSTQ) in 1996, 53% were working in S&T occupations, down from 54% in 1991.

In 1996, 64% of those persons in HRSTO also held S&T qualifications, up from 62% in 1991. The proportion of Building and engineering professionals with S&T qualifications increased from 59% in 1991 to 65% in 1996. Similarly, Computing professionals with S&T qualifications increased from 52% to 57%, while Health professionals with S&T qualifications fell from 86% to 82%.

Of the stock of HRST in 1996, 50% of persons were aged 35–54. Only 32% of the non-HRST population were in this age group. These age proportions were similar in 1991.

In 1996, of those persons in HRSTO the most qualified were aged 15–34 and 35–54 with 65% of each holding S&T qualifications. The least qualified were aged 55 and over with 56% holding S&T qualifications.

Of those with S&T qualifications in 1996, 54% of those aged 15–34 and 61% of those aged 35–54 worked in S&T occupations. Only 27% of those aged 55 and over worked in S&T occupations.

Occupations/age group (years)	HRSTQ						Total
	Higher degree	Post-graduate diploma	Bachelor degree	Under-graduate diploma	Total	Other(a)	
	'000	'000	'000	'000	'000	'000	'000
HRSTO							
Specialist managers							
15-34	3	3	25	4	35	50	84
35-54	14	11	43	13	81	106	186
55 and over	2	1	4	2	9	18	27
Total	19	14	72	19	125	173	298
Professionals							
Natural and physical science							
15-34	3	1	11	—	15	3	18
35-54	6	1	7	1	15	4	19
55 and over	1	—	1	—	2	1	3
Total	9	2	19	1	32	9	40
Building and engineering							
15-34	2	1	21	1	24	11	34
35-54	5	2	19	4	29	16	45
55 and over	1	—	3	1	5	4	9
Total	8	2	43	5	58	31	89
Computing							
15-34	2	1	20	2	25	17	42
35-54	3	2	13	2	21	17	38
55 and over	—	—	—	—	1	1	2
Total	5	4	34	4	46	35	81
Health							
15-34	3	4	51	22	79	12	91
35-54	12	6	55	46	119	29	148
55 and over	4	1	9	7	21	6	27
Total	19	11	114	75	219	47	266
Other							
15-34	13	25	142	20	199	106	305
35-54	46	57	152	59	313	143	456
55 and over	9	5	18	9	40	31	72
Total	67	86	313	87	553	280	833
Total							
15-34	25	34	270	48	376	199	575
35-54	86	78	289	124	577	315	892
55 and over	17	7	35	20	79	61	140
Total	127	119	595	192	1 033	575	1 607
Other(b)							
15-34	13	17	210	76	317	4 423	4 740
35-54	32	34	182	127	375	3 698	4 073
55 and over	19	13	91	92	213	3 283	3 496
Total	64	64	482	295	905	11 402	12 308
Total							
15-34	38	51	480	124	693	4 622	5 315
35-54	118	112	471	251	952	4 013	4 964
55 and over	36	20	125	112	292	3 343	3 635
Total	191	183	1 077	487	1 938	11 977	13 915

(a) Includes other qualifications, not applicable, not stated and inadequately described.

(b) Includes other occupations, unemployed, not in the labour force, not stated and inadequately described.

Source: Unpublished data, 1996 Census of Population and Housing.

Occupations/age group (years)	HRSTQ						Total
	Higher degree	Post-graduate diploma	Bachelor degree	Under-graduate diploma	Total	Other(a)	
	'000	'000	'000	'000	'000	'000	'000
HRSTO							
Specialist managers							
15–34	2	2	17	4	25	50	74
35–54	8	6	30	13	56	103	159
55 and over	1	—	3	2	6	16	22
Total	10	8	50	19	87	169	256
Professionals							
Natural and physical science							
15–34	2	—	9	—	12	3	15
35–54	5	—	5	1	11	3	14
55 and over	1	—	0	—	1	1	2
Total	7	1	15	2	25	7	31
Building and engineering							
15–34	1	—	17	1	19	12	31
35–54	4	1	15	4	24	17	41
55 and over	—	—	2	1	4	4	8
Total	5	1	34	6	47	33	80
Computing							
15–34	1	1	15	2	19	17	37
35–54	2	1	7	1	11	12	23
55 and over	—	—	—	—	—	1	1
Total	3	2	22	3	31	30	60
Health							
15–34	3	2	34	46	84	11	95
35–54	9	2	32	51	94	16	111
55 and over	3	1	6	7	17	4	21
Total	15	4	72	103	195	32	227
Other							
15–34	8	24	104	36	173	89	262
35–54	31	38	105	54	228	109	337
55 and over	5	2	12	6	25	23	48
Total	44	65	222	96	426	221	647
Total							
15–34	16	30	197	89	332	182	514
35–54	58	48	194	125	425	260	685
55 and over	10	3	24	16	53	49	102
Total	85	81	415	230	811	490	1 302
Other(b)							
15–34	9	15	144	85	252	4 584	4 836
35–54	20	22	118	114	273	3 400	3 673
55 and over	12	7	60	80	159	3 048	3 208
Total	40	44	321	279	685	11 032	11 716
Total							
15–34	25	45	341	174	585	4 766	5 350
35–54	78	70	312	239	698	3 660	4 359
55 and over	22	10	84	96	212	3 097	3 310
Total	125	125	736	509	1 496	11 522	13 018

(a) Includes other qualifications, not applicable, not stated and inadequately described.

(b) Includes other occupations, unemployed, not in the labour force, not stated and inadequately described.

Source: Unpublished data, 1991 Census of Population and Housing.

SEX

Males made up 50% of the HRST stock in 1996, the same as in 1991.

Males made up 53% of persons in HRSTO in 1996, down from 55% in 1991.

In 1996, 46% of persons in HRSTQ were male, the same as in 1991. There were nearly twice as many male holders of Higher degrees as females in 1996. Females held an even smaller proportion in 1991.

18

MALES, BY OCCUPATION AND QUALIFICATION

Occupations	HRSTQ				Total	Other(a)	Total
	Higher degree	Post-graduate diploma	Bachelor degree	Under-graduate diploma			
	'000	'000	'000	'000	'000	'000	'000
1996							
HRSTO							
Specialist managers	14	8	50	12	84	127	210
Professionals							
Natural and physical science	7	1	12	1	21	6	27
Building and engineering	7	2	39	5	53	29	82
Computing	4	3	26	3	36	27	63
Health	14	3	37	7	61	8	69
Other	41	29	146	33	249	150	399
Total	87	46	310	61	504	348	851
Other(b)	40	24	228	104	396	5 569	5 966
Total	127	70	538	165	899	5 917	6 817
1991							
HRSTO							
Specialist managers	8	5	38	11	62	127	189
Professionals							
Natural and physical science	6	1	10	1	18	5	23
Building and engineering	5	1	33	6	45	31	76
Computing	2	2	17	3	23	22	45
Health	12	2	29	9	52	8	60
Other	30	22	115	33	200	118	318
Total	63	32	241	63	400	312	711
Other(b)	27	15	161	82	284	5 403	5 688
Total	90	47	402	145	684	5 715	6 399

(a) Includes other qualifications, not applicable, not stated and inadequately described.

(b) Includes other occupations, unemployed, not in the labour force, not stated and inadequately described.

Source: Unpublished data, 1991 and 1996 Censuses of Population and Housing.

Occupations	HRSTQ				Total '000	Other(a) '000	Total '000
	Higher degree '000	Post- graduate diploma '000	Bachelor degree '000	Under- graduate diploma '000			
1996							
HRSTO							
Specialist managers	5	6	23	7	41	47	88
Professionals							
Natural and physical science	2	1	8	—	11	2	13
Building and engineering	—	—	4	—	5	2	6
Computing	1	1	8	1	10	8	18
Health	6	8	77	68	158	39	197
Other	26	57	166	54	304	130	434
Total	41	73	285	131	529	227	756
Other(b)	23	41	254	191	510	5 832	6 342
Total	64	114	539	322	1 038	6 059	7 098
1991							
HRSTO							
Specialist managers	2	3	12	8	25	42	67
Professionals							
Natural and physical science	1	—	5	—	7	2	9
Building and engineering	—	—	2	—	2	1	4
Computing	—	1	5	1	7	8	15
Health	3	3	43	94	143	23	166
Other	14	42	107	63	227	103	329
Total	22	49	174	167	411	179	590
Other(b)	13	29	160	198	400	5 628	6 028
Total	35	78	334	365	811	5 807	6 618

(a) Includes other qualifications, not applicable, not stated and inadequately described.

(b) Includes other occupations, unemployed, not in the labour force, not stated and inadequately described.

Source: Unpublished data, 1991 and 1996 Censuses of Population and Housing.

LABOUR FORCE STATUS

There were 772,000 persons unemployed at August 1996, which accounted for 9% of the labour force. The unemployment rate for persons with S&T qualifications was 4% compared to 10% for persons without those qualifications. For males, it was 4% compared to 11% and for females, it was 4% compared to 10%.

Approximately 8.4 million persons out of a population of 13.9 million persons 15 years and over were either employed at August 1996 or looking for work, representing a participation rate of 60%. The participation rate for persons with S&T qualifications (82%) was far higher than that for persons without qualifications (57%). For males, this rate was 87% compared to 67%. For females, it was 78% compared to 47%.

Of all employed persons with S&T qualifications, 51% were female. Only 42% of employed persons without S&T qualifications were female.

Similarly, of all unemployed persons with S&T qualifications 48% were female, compared to 39% for persons without those qualifications.

Labour force status/age group (years)	HRSTQ			Other			Total		
	Males	Females	Persons	Males	Females	Persons	Males	Females	Persons
NUMBER									
	'000	'000	'000	'000	'000	'000	'000	'000	'000
Employed									
HRSTO									
15-34	164	213	376	110	88	199	274	301	575
35-54	291	287	577	195	120	315	486	406	892
55 and over	49	29	79	42	19	61	91	48	140
Total	504	529	1 033	348	227	575	851	756	1 607
Other									
15-34	88	114	202	1 430	1 102	2 532	1 518	1 216	2 735
35-54	129	117	246	1 387	1 074	2 461	1 516	1 191	2 707
55 and over	26	17	43	361	184	544	387	201	587
Total	243	248	491	3 178	2 360	5 538	3 421	2 608	6 029
Total									
15-34	252	327	579	1 540	1 191	2 731	1 792	1 517	3 310
35-54	420	404	824	1 582	1 194	2 776	2 002	1 598	3 599
55 and over	75	47	122	403	203	606	478	249	727
Total	747	777	1 524	3 525	2 587	6 112	4 272	3 364	7 636
Unemployed									
15-34	15	16	31	248	168	416	263	184	447
35-54	15	13	28	141	92	232	156	105	261
55 and over	4	2	6	45	14	58	49	15	64
Total	34	31	65	434	273	707	468	304	772
Not in the labour force									
15-34	22	61	83	502	817	1 319	524	878	1 402
35-54	20	77	98	230	644	873	250	721	971
55 and over	75	90	165	1 048	1 588	2 636	1 123	1 678	2 801
Total	118	228	346	1 779	3 049	4 828	1 897	3 277	5 174
Not stated									
15-34	—	1	1	85	71	155	85	72	157
35-54	1	1	2	67	65	132	67	66	134
55 and over	—	—	—	27	15	42	27	15	42
Total	1	2	3	178	151	329	180	153	332
Total									
15-34	289	404	694	2 375	2 247	4 621	2 664	2 651	5 315
35-54	456	496	951	2 020	1 994	4 013	2 475	2 489	4 965
55 and over	155	138	293	1 523	1 819	3 342	1 677	1 957	3 635
Total	899	1 038	1 938	5 917	6 060	11 977	6 817	7 098	13 915
RATE									
	%	%	%	%	%	%	%	%	%
Unemployment rate									
15-34	5.6	4.7	5.1	13.9	12.4	13.2	12.8	10.8	11.9
35-54	3.4	3.1	3.3	8.2	7.2	7.7	7.2	6.2	6.8
55 and over	5.1	4.1	4.7	10.0	6.5	8.7	9.3	5.7	8.1
All labour force	4.4	3.8	4.1	11.0	9.5	10.4	9.9	8.3	9.2
Participation rate									
15-34	92.4	84.9	87.9	75.3	60.5	68.1	77.1	64.2	70.7
35-54	95.4	84.1	89.6	85.3	64.4	75.0	87.2	68.4	77.8
55 and over	51.0	35.5	43.7	29.4	11.9	19.9	31.4	13.5	21.8
All persons	86.9	77.8	82.0	66.9	47.2	56.9	69.5	51.7	60.4

Source: Unpublished data, 1996 Census of Population and Housing.

LOCATION

The Australian Capital Territory had the highest proportion of its population (34%) in HRST in 1996. State and Territory proportions varied from 15% to 19%.

There was a higher proportion of HRST in Major Urban centres (21%) than in Other Urban (13%) and Other areas (14%).

21

PERSONS, BY LOCATION—1996

<i>State and Territory</i>	<i>Stock of HRST</i>				<i>Population</i>	<i>HRST as a proportion of population</i>
	<i>HRSTQ non-core</i>	<i>HRSTC</i>	<i>HRSTO non-core</i>	<i>Total</i>		
	<i>'000</i>	<i>'000</i>	<i>'000</i>	<i>'000</i>	<i>'000</i>	<i>%</i>
New South Wales	323	359	204	886	4 720	19
Victoria	246	274	141	661	3 486	19
Queensland	135	160	94	390	2 524	15
South Australia	62	75	45	183	1 142	16
Western Australia	89	97	53	239	1 321	18
Tasmania	18	22	13	54	360	15
Northern Territory	6	10	6	22	128	17
Australian Capital Territory	26	35	17	78	232	34
Other Territories(a)	—	—	—	—	2	16
Australia	905	1 033	575	2 512	13 915	18
Major Urban(b)	675	763	412	1 850	8 878	21
Other Urban(c)	133	169	102	404	3 159	13
Other(d)	97	101	61	258	1 878	14

(a) Includes Cocos (Keeling) Islands, Christmas Island and Jervis Bay Territory.

(b) All Urban centres with a population of 100,000 and over.

(c) All Urban centres with a population of 1,000 to 99,999.

(d) Includes 'localities'—all population clusters of 200 to 999 people, 'rural balance'—the rural remainder, and 'Off-shore, shipping and migratory Collection Districts'—people who are enumerated on off-shore oil rigs, drilling platforms and the like, aboard ship in Australian waters, or on an overnight journey by train or bus.

Source: Unpublished data, 1996 Census of Population and Housing.

EXPLANATORY NOTES

INTRODUCTION

1 This publication presents data on HRST. It follows the definitions and guidelines in the OECD's manual, *The Measurement of Scientific and Technological Activities—Manual on the Measurement of Human Resources Devoted to S&T ('Canberra Manual')*.

DEFINITIONS

2 The OECD initially outlines a broad definition of HRST by including people who fulfil one or other of the following conditions:

- successfully completed education at the third level; or
- not formally qualified as above, but employed in an S&T occupation where the above qualifications are normally required.

3 The OECD then goes on to split the above definition into university-level HRST (i.e. university qualification or, if not so qualified, an occupation normally requiring the same) and technician-level HRST (only requires education at the equivalent of an Institute of Technical and Further Education or, if not so qualified, an occupation normally requiring the same). This publication, as recommended by the OECD, concentrates on university-level HRST.

4 University-level HRST has been interpreted for this publication as persons who have completed formal post-secondary school qualifications levels 1 to 4 ABS Classification of Qualifications (ABSCQ); are currently employed in occupations classified to sub-major group 12 and major group 2 Australian Standard Classification of Occupations (ASCO); or both.

5 Coverage of HRST in terms of educational qualifications (HRSTQ) are persons who have completed post-school qualification levels 1–4 ABSCQ (Undergraduate diploma, Bachelor degree, Postgraduate diploma or a Higher degree). The minimum entry requirement for courses in levels 1–4 is usually the completion of Year 12. Excluded are persons with levels 5 (Associate diploma), 6 (Skilled vocational qualifications) and 7 (Basic vocational qualifications); levels which do not require the completion of Year 12. Once a person has achieved a qualification of this type, he or she remains part of the stock of HRST for life regardless of age or occupation status.

6 It should be noted that the above definition of HRSTQ includes all persons with tertiary qualifications regardless of their field of study, including fields such as social sciences and humanities. In terms of fields of study, the OECD considers the humanities to be the least relevant.

7 Coverage of HRST in terms of occupations (HRSTO) are persons employed in occupations classified as ASCO sub-major group 12 Specialist managers and major group 2 Professionals. These occupations are defined in ASCO as the most highly skilled in the workforce and come under skill level 1.

DEFINITIONS *continued*

8 Persons who fulfil both criteria for HRST (qualification and occupation) are defined as Human Resources in Science and Technology Core (HRSTC).

9 The stock of HRST should be seen as a potential stock only. It includes those categories of qualified persons and persons in certain occupations which have been assumed are likely to contribute to S&T development in Australia.

DATA SOURCES

10 Data for this publication were obtained from the ABS 1991 and 1996 Population Censuses and 1998 Labour Mobility Survey.

11 For all Population Census tables, the population was all persons aged 15 and over in place of usual residence. Persons classified as overseas visitors were excluded. Australians overseas were out of scope and there was no adjustment for underenumeration.

12 The Population Census aims to count every person who spent census night in Australia. This includes Australian residents in Antarctica and people in the Territories of Jervis Bay, Cocos (Keeling) Islands and Christmas Island. The other Australian External Territories, Norfolk Island and minor islands such as Heard and McDonald Islands, are outside the scope of the Australian Census. The only group of people who spend census night in Australia but are excluded from the Census are foreign diplomats and their families.

13 The 1998 Labour Mobility Survey was conducted as a supplement to the Labour Force Survey (LFS). Respondents to the LFS who fell within the scope of the supplementary survey were asked further questions. The LFS includes all persons aged 15 and over except:

- members of the permanent defence forces;
- certain diplomatic personnel of overseas governments, customarily excluded from census and estimated populations;
- overseas residents in Australia; and
- members of non-Australian defence forces (and their dependants) stationed in Australia.

14 The Labour Mobility Survey was restricted to persons aged 15–69 years who had worked at some time during the year ending February 1998. Details of last job and job held at February 1998 may relate to jobs outside Australia.

INCOME

15 Income data in the 1996 Population Census were collected in ranges, not actual dollars, as this has proven to be the most reliable way to collect income data. Average annual incomes were calculated using the range data and mean values from the Survey of Income and Housing Costs.

DATA QUALITY

16 The errors that can occur in data from Population Censuses are termed non-sampling errors. In an estimate based on a sample survey, such as the Labour Mobility Survey, two types of error are possible: sampling error and non-sampling error.

17 Non-sampling error arises from inaccuracies in collecting, recording and processing the data. The most significant of these errors are: misreporting of data items; deficiencies in coverage; non-response; and processing errors. Every effort is made to minimise reporting error by the careful design of questionnaires, intensive training and supervision of interviewers, and efficient data processing procedures.

18 Sampling error occurs because a sample, rather than the entire population, is surveyed. One measure of the likely difference resulting from not including all dwellings in the survey is given by the standard error. There are about two chances in three that a sample estimate will differ by less than one standard error from the figure that would have been obtained if all dwellings had been included in the survey, and about nineteen chances in twenty that the difference will be less than two standard errors. Details of sampling error in the Labour Mobility Survey can be found in *Labour Mobility, Australia, February 1998* (Cat. no. 6209.0).

COMMENTS ABOUT THIS PUBLICATION

19 Suggestions and comments, particularly on future ABS publications, would be greatly appreciated.

RELATED PUBLICATIONS

20 Users may also wish to refer to the following publications:

ABS publications

ABS Classification of Qualifications (ABSCQ), 1993 (Cat. no. 1262.0)

ASCO—Australian Standard Classification of Occupations, Second Edition (Cat. no. 1220.0)

Labour Mobility, Australia, February 1998 (Cat. no. 6209.0)

Non-ABS publications

Eurostat, *Community Labour Force Surveys*.

OECD, *Main Science and Technology Indicators, 1998–1*.

OECD, *The Measurement of Scientific and Technological Activities—Manual on the Measurement of Human Resources Devoted to S&T ('Canberra Manual')*, OECD Paris, 1995.

ROUNDING

21 Where figures have been rounded, discrepancies may occur between sums of the component items and totals.

SYMBOLS AND OTHER
USAGES

ABS	Australian Bureau of Statistics
ABSCQ	ABS Classification of Qualifications
ASCO	Australian Standard Classification of Occupations
GDP	Gross Domestic Product
GERD	Gross Expenditure on Research and Development
HRST	Human Resources in Science and Technology
HRSTC	Human Resources in Science and Technology Core
HRSTO	Human Resources in Science and Technology Occupations
HRSTQ	Human Resources with Science and Technology Qualifications
LFS	Labour Force Survey
OECD	Organisation for Economic Co-operation and Development
S&T	Science and Technology
*	This estimate has a relative standard error of greater than 25%. Care should be exercised when using it.
—	nil or rounded to zero

GLOSSARY

Bachelor degree	A qualification which provides individuals with a systematic and coherent introduction to a broad body of knowledge, emphasising the underlying principles and concepts.
Current job	The job in which the person worked for an employer/business in the week before the survey. Where the person worked in more than one job during this period, the main job, i.e. the job in which most hours were usually worked, was regarded as the current job.
Higher degree	A qualification which involves in-depth study in a particular field, and builds on the knowledge and skills gained in previous study in the same area. There is usually emphasis on original research. This qualification level includes doctorates and master degrees, either by research or course work.
Human Resources in Science and Technology Core	Persons who have fulfilled both the qualification and occupation criteria for Human Resources in Science and Technology.
Non-Core Human Resources in Science and Technology Occupations	Those persons in a Science and Technology occupation, but without a Science and Technology qualification.
Non-Core Human Resources in Science and Technology Qualifications	Those persons with Science and Technology qualifications, but not in a Science and Technology occupation.
Participation rate	Persons in the labour force as a proportion of the population aged 15 years and over. The labour force comprises persons employed or unemployed.
Postgraduate diploma	A qualification which usually builds on undergraduate studies, and is designed to broaden or develop professional knowledge and skills in a related or new area of study. This qualification level also includes graduate certificates.
Professionals	Persons who perform analytical, conceptual and creative tasks through the application of theoretical knowledge and experience in the fields of science, engineering, business and information, health, education, social welfare and the arts.
Specialist managers	Persons who coordinate the administration and operation of specialised functions or fields of activity within an organisation. Under broad direction from the General manager, they plan, administer and review the financial, corporate, personnel, supply and distribution, information technology, sales and marketing, and other specialised activities of an organisation.

Undergraduate diploma A qualification which provides individuals with the detailed knowledge and skill base necessary for practice in a professional or associate-professional occupation.

Unemployment rate Unemployed persons as a proportion of the labour force. The labour force comprises persons employed or unemployed.

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POST Client Services, ABS, PO Box 10, Belconnen ACT 2616

EMAIL client.services@abs.gov.au



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