Charting household labour force statistical needs and priorities

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Abstract

This paper presents the future of Statistics NZ's household labour force statistics:

- a new Household Labour Force Survey (HLFS) sample design and sample of dwellings based on the 2013 Census of Population and Dwellings
- updated HLFS estimates following the 2013 Census
- innovations, progress, and next steps on the redevelopment of the HLFS
- a work plan of supplementary topics to be asked of respondents.

About the Household Labour Force Survey

The purpose of the HLFS is to produce a timely, relevant, and comprehensive range of statistics relating to the employed, unemployed, and those not in the labour force (NILF) who make up New Zealand's working-age population using international standards and guidelines. Information from the HLFS is used to develop and monitor labour market and social policy, support research, and help inform on the health and general well-being of the New Zealand economy.

The HLFS sample contains about 15,000 private households and about 30,000 individuals each quarter. We sample households on a statistically representative basis throughout New Zealand, and obtain information for each member of the household. The sample is stratified by geographic region, urban and rural areas, ethnic density, and socio-economic characteristics.

Households stay in the survey for two years. Each quarter, one-eighth of the households in the sample are rotated out and replaced by a new set of households. Therefore, up to seven-eighths of the same people are surveyed in adjacent quarters. This overlap improves the reliability of quarterly change estimates.

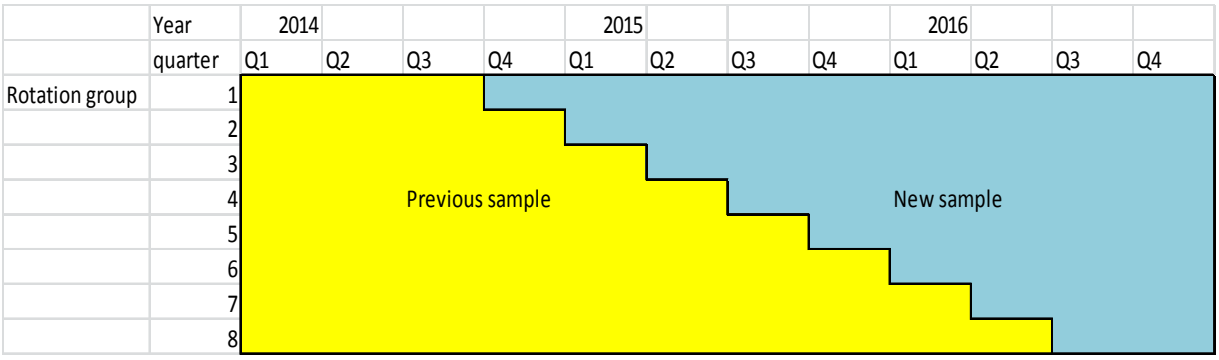
New sample based on the 2013 Census

After every census, we re-form the primary sampling units (PSUs) that are used to divide the country. This time we undertook an in-depth review of the sample design.

We will use a new sample design of the HLFS later this year. This design has an incremental change, with a couple of significant innovations.

The first set of respondents from the new design will be rotated in for the December 2014 quarter. The new sample will be introduced incrementally with the one-eighth of the sample that is rotated in each quarter. This means the new sample will be rolled in over two years as shown in figure 1.

Figure 1



New sample design

The new HLFS design can be described as an incremental change, with some significant innovations.

- It prioritises national estimates by moving to proportional allocation to 12 regions (those currently used in HLFS dissemination), rather than the current Kish allocation, which balances the sample between the optimal allocation for both regional and national. Regional estimates will instead be improved with regional benchmarks.
- It targets estimates for lower social-economic outcomes using a Neyman allocation (based on unemployment) to a stratification layer based on the New Zealand Deprivation Index (NZDep) groupings.
- It lowers the rate of over-sampling of main urban areas, which provides better national estimates, while still managing costs of collection.
- It has a new overlap control method, including management of overlap with selected surveys from other organisations
- It targets high- and low-NILF areas through proportional allocation to a new stratification layer based on the proportion within primary sampling units (PSUs) of the number of people not in the labour force (NILF).

Size of the new sample

The current sample size for the HLFS will remain the same: 1,768 selected PSUs with an average of 10 households per PSU.

We investigated the implications of changing the sample size, based on feedback from users who said increasing it might reduce some of the (apparent) volatility in the results. Increasing the sample size would reduce sampling errors, and to a lesser extent the volatility. However, the gains that would be made from increases to the sample size are well outweighed by the increases in respondent burden and collection costs.

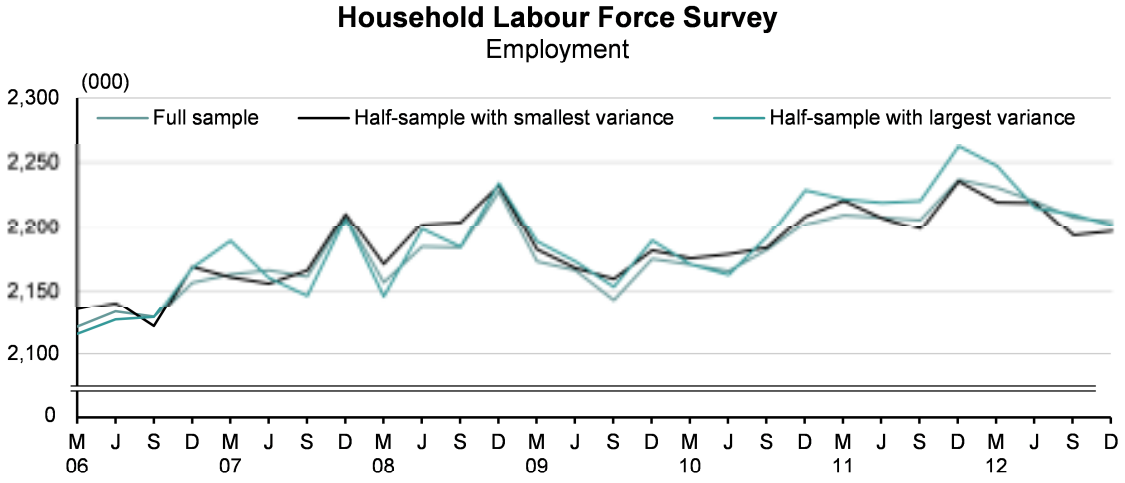
The expected decrease in sampling error for larger samples is given in table 1.

Table 1

Achieved sample size	Impact on sampling error
Increase by 20% (36,000)	9%
Increase by 50% (45,000)	18%
Increase by 100% (60,000)	29%

Sampling error is only one source of volatility. We can estimate crudely the effect of a changing sample size by taking subsamples within the existing sample. For example, we could halve the sample size and see whether the resulting time series are any more 'volatile' than those from the full sample. This provides a rough approximation of how sample size can translate into 'volatility.' We can see that survey estimates are dynamic by nature and that estimates do track each other well even if the half-sample selected has the highest variance (see figure 2).

Figure 2



Source: Statistics New Zealand

Changes in estimates benefit from the fact that most of the sample was interviewed in adjacent quarters – an overlap of up to 7/8 of the sample in quarterly changes and up to half the sample in annual changes. We will have some change in the estimates from the one-eighth of the sample that rotates each quarter (and other changes to dwelling occupants via internal migration), but apparent volatility in changes in the estimates should be addressed by the survey design rather than the size of the sample.

Stratification

Stratification, all else equal, produces less variable estimates of totals that are related to strata (including the strata themselves). The current sample has the following levels of stratification – the first three make up the 'superstratum, while the last strata is a 'substratum':

1. regional council
2. urban / rural
3. ethnicity
    - high / low Māori
    - high / low Pacific peoples
    - high / low Asian
4. socio-economic.

Socio-economic variables can include highest qualification, proportion of solo parents, or the proportion of older persons.

The actual amount of ethnic and socio-economic stratification depends on the number of PSUs within a strata. Cells within a strata of PSUs will have some categories collapsed if the number of PSUs within it does not reach a given threshold. Currently, only 26 of our superstratum are large enough to allow stratification by substratum.

The new stratification is detailed in table 2.

Table 2

Stratification layer	Details
Region	The 12 regions used for HLFS dissemination will be used for the stratification, instead of the current 14. West Coast will be combined with Tasman/Nelson/Marlborough; Gisborne and Hawke's Bay will be combined.
Main urban areas/Other	PSUs in main urban areas will form one strata while those in secondary urban, minor urban, rural centre, and rural or other areas will form the 'other' strata. Previously, secondary urban and minor urban were included in the urban strata.
High/Low NILF	The high NILF strata is made up of PSUs with an NILF density greater than 36 percent.
NZDep quintiles	Superstrata are split equally based on values of NZDep 2013 (up to a maximum of 10 groups, with a target size of 200 PSUs). If this results in any strata with less than 100 PSUs, the superstrata (region by main urban area/other if the NILF density strata was not applied, OR region by main urban area/other by NILF strata) is not split.

Rather than using ethnicity as a stratification layer for ethnic groups (Māori, Pacific peoples, and Asian), we will instead target Māori by employing a Probability Proportional to Size (PPS) design for selecting PSUs. This will be based on the density

of Māori within PSUs. This allows us to obtain a similar Māori oversample, but with less impact on national estimates.

The strata for main urban areas is a cost-consideration that is built into the sample design. Collection costs are greater for those areas that are more remote (due to travel time and costs for conducting initial interviews). As such, main urban areas are selected at a higher rate than more rural locations. With the new sample design, we reviewed the rate at which non-urban areas are over-sampled (as this over-sampling moves us further away from an optimal sample design) and have reduced the rate. This will lead to a more effective sample design.

The NZDep was developed by the University of Otago (Wellington School of Medicine and Health Science) and has been produced after each census since 1991. The index is formed using the Principle Components Analysis over nine census socio-economic variables.

NZDep has become a standard measure of relative deprivation in New Zealand.

Allocation to strata

Under the current allocation, the number of PSUs selected from each region is based on the Kish allocation method, which balances the sample between the optimal allocation for both regional and national estimates. For producing optimal regional estimates, the sample size in each region would be equal, while for optimal national estimates the sample size in each region would be proportional to the size of the region. The Kish allocation method is a compromise between the two allocation methods.

Introducing regional benchmarks will also help improve regional estimates and offset some of the loss of moving to a proportional allocation for smaller regions. However, the benchmarks will be most effective for estimates of the number employed, while some small deterioration is expected in estimates of unemployed and not in the labour force.

We will use a Neyman allocation of PSUs to the socio-economic strata, based on the unemployed. Neyman allocation is a method used to allocate sample to a strata based on the strata variances and similar sampling costs in the strata. A Neyman allocation scheme provides the most precision for estimating a population mean given a fixed total sample size.

Using unemployment results in an over-sampling of more highly deprived areas and improves the precision of our estimates of the unemployed.

The final numbers of strata are given in appendix 1.

New national population benchmarks after the 2013 Census

To improve survey estimates, we apply benchmarks. This ensures our HLFS estimates align with published population totals. The HLFS estimated working-age population is currently based on national resident population estimates, which are adjusted to be consistent with the scope of the HLFS.

The national resident population estimates are currently based on the 2006 Census of Population and Dwellings.

We apply two sets of benchmarks: sex by five-year age bands, and Māori by sex for the 15–29 and 30-years-and-over age groups.

Applying benchmarks improves not only the estimate being benchmarked, but also the estimates correlated with the benchmark being applied. Given that labour force status estimates are correlated with the working-age population, a benchmark for working-age will also improve estimates of the numbers of people employed, unemployed, and not in the labour force.

Following each census, estimates from the HLFS are rebased using information from the census. This is called a population rebase and occurs when new national population estimates are released, as these are the source of the HLFS working-age population estimates.

We expect the next HLFS population rebase to be in early 2015. This date may change as work plans are firmed up soon. The rebase follows the first release of the 2013-based national population estimates in August and subnational population estimates in October.

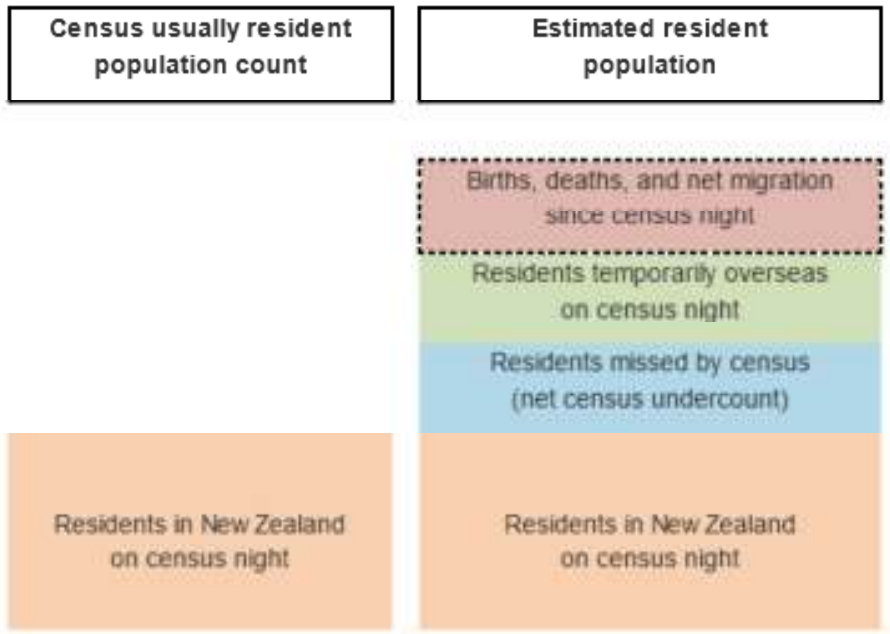
Differences between census and HLFS estimates

Our HLFS estimates and national population estimates differ from the census night counts of people.

Our estimates begin with the census night counts, which are adjusted for net undercount of people on census night, then augmented with those temporarily overseas on census night, and then updated using estimates of births, deaths, and net permanent and long-term migration.

The differences between the national resident population estimates and the census night counts are shown in figure 3.

Figure 3



To illustrate the potential size of adjustments, the following adjustments were made after the 2006 Census. These were made to arrive at the June 2006 quarter estimated resident population. We added the number of temporarily overseas (about 65,000 people) to the census night counts, and we added the net census undercount (about 81,000 people, which was an undercount of 92,000 minus an overcount of 11,000). The full adjustments made are detailed in table 3.

Table 3

Base estimated resident population at 30 June 2006	
Census usually resident population count	4,027,947
Net census undercount	+ 80,100
Residents temporarily overseas	+ 64,500
Population change 8 March–30 June	+ 8,700
Demographic reconciliation (0–4 years)	+ 3,400
Equals estimated resident population at 30 June 2006	4,184,600

The previously published estimated resident population at 30 June 2006 based on the 2001 Census was significantly lower at 4,139,500. The 45,100 difference can be largely explained by 'category jumping' in migration. In migration statistics, each passenger is classified based on their response on their arrival or departure card to the question on intended or actual length of stay/absence. If their intention changes later during the trip,

they may also change their migrant category and thus become a ‘category jumper’. Between 30 June 2001 and 30 June 2006, the net increase in population change due to migration was higher than published permanent and long-term migration figures.

Results from the 2013 Post-enumeration Survey showed the net undercount was 103,800 people. This number will be used with migration and population change from 5 March 2013 to 30 June 2013, and with other demographic adjustments, to produce our national population estimates (2013 base) in August 2014.

Introducing regional benchmarks

For the coming population rebase, we will improve our estimation methodology by implementing regional population benchmarks. These benchmarks will complement the current sets of benchmarks: sex by five-year age bands, and Māori by sex for the 15–29 and 30-years-and-over age groups. The new benchmarks will be subnational working-age population estimates for the regional council areas currently published in the HLFS.

The major benefit of regional benchmarks is that they remove the sampling error from working-age population estimates and improve the coherence with our subnational population estimates.

Importance of benchmarks when introducing a new sample

Another significant benefit of regional benchmarks is during sample transitions. The HLFS generally moves to a new sample of surveyed geographical areas following each census. As mentioned above, the HLFS will introduce a new sample from the December 2014 quarter, and over 2015 and 2016.

When we introduce a new sample, the regional estimates will differ from the earlier sample. This is because the nature of one sample differs from another. The current regional estimates show the effect of introducing the new HLFS sample over 2004–05, based on the 2001 Census.

We had earlier sample transitions:

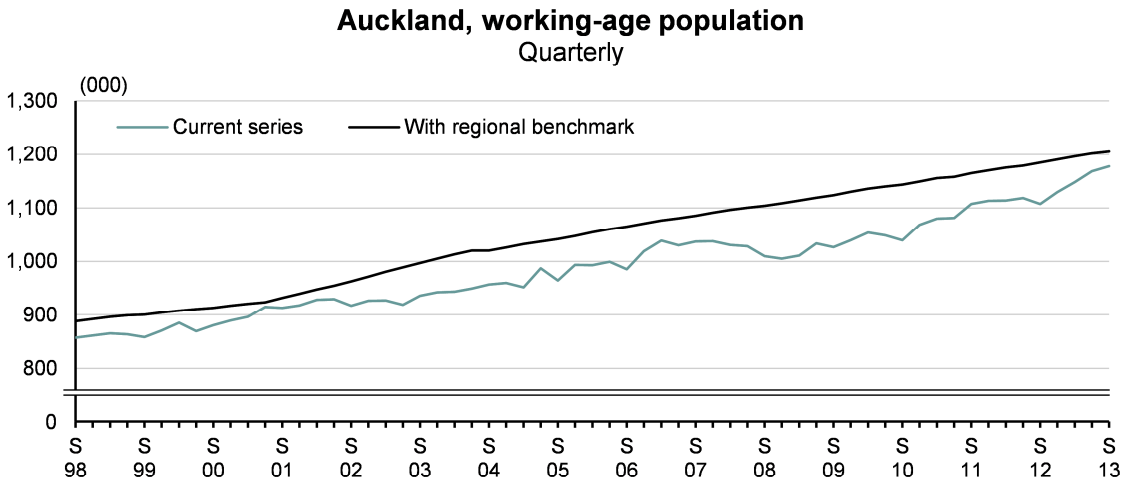
- after the 1991 Census – from the December 1993 to the September 1994 quarter
- after the 1996 Census – from the March 1999 quarter to the December 1999 quarter
- after the 2001 Census – from the March 2004 quarter to the December 2005 quarter.

Effect of regional benchmarks

Figures 4–7 show the effect of applying regional benchmarks to the regional working-age population of Auckland. These estimates have been produced using the 2006-based subnational population estimates, which will be updated to 2013-based estimates in August. As such, this provides an indication of what the impact of the regional benchmarks will be, and only when we have the 2013-based estimates will we know the final impact. We will update users with an information paper before introducing regional benchmarks to the quarterly HLFS release.

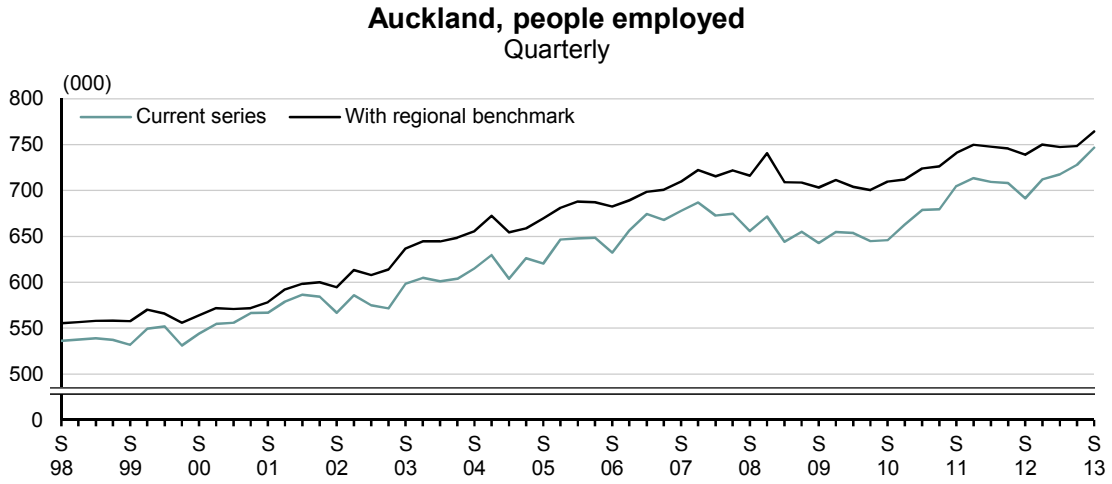
We can see that the working-age population estimates from the HLFS move in line with the estimates produced using a regional benchmark, but new series does not demonstrate the variation around the upward trend. This change in the level of the working-age population translates into slightly higher series for employment, unemployment, and those not in the labour force. The associated rates for these series are unaffected.

Figure 4



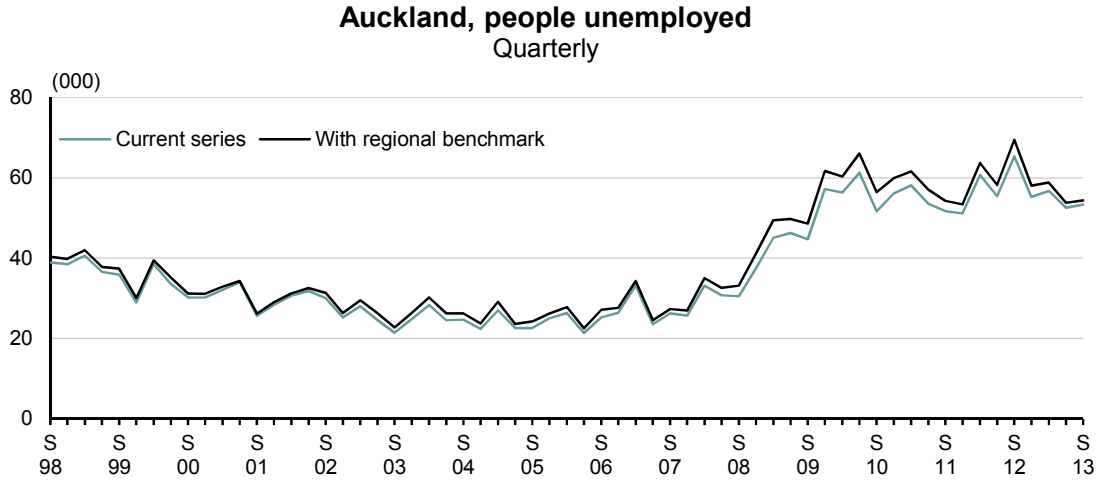
Source: Statistics New Zealand

Figure 5



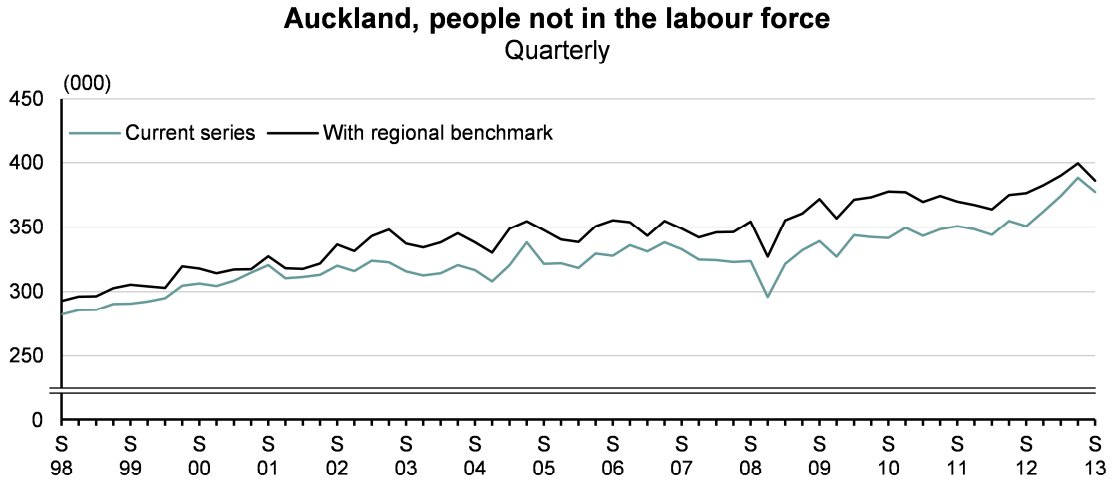
Source: Statistics New Zealand

Figure 6



Source: Statistics New Zealand

Figure 7



Source: Statistics New Zealand

Redevelopment of the HLFS

The HLFS is currently undergoing a significant redevelopment. The redevelopment project is progressing well, and redesigned content will be tested with survey respondents late this year. This is called a ‘Field Test’, which we will conduct over several quarters to ensure our new content is well designed and accurate and robust data is collected. This will also allow us to inform users of the direction and possible

magnitude of changes. This paper presents the proposed content, with the final content published once it has been determined.

In addition to new content that will be asked of respondents quarterly, periodic topics will be included at less regular frequency to inform on broader questions relevant to labour market characteristics, performance, or functioning.

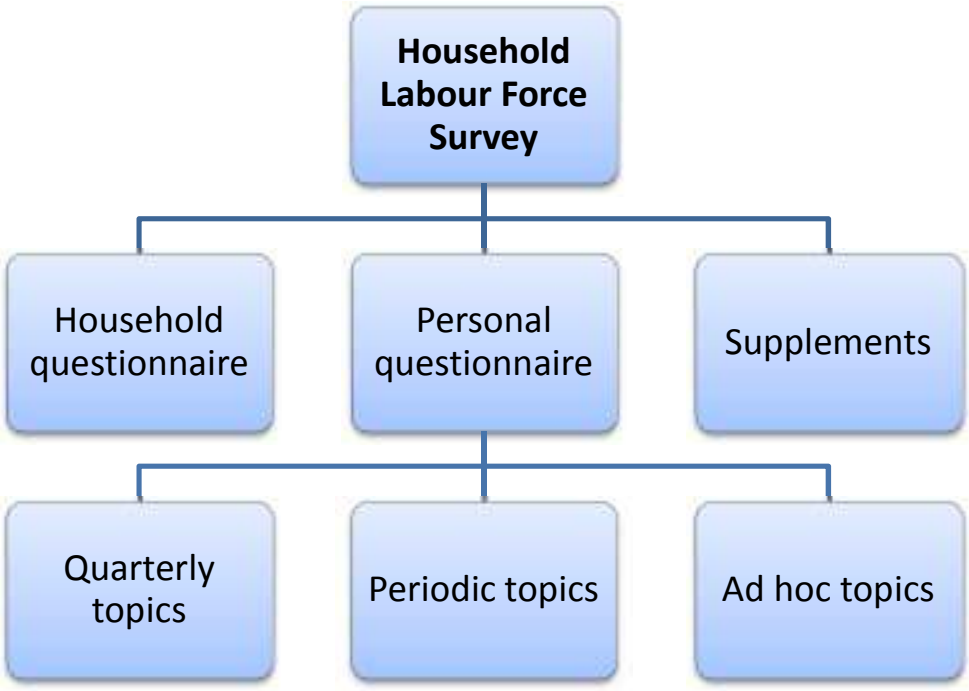
Periodic topics

As part of redeveloping the HLFS, we intend to include periodic content and ad hoc topics. These periodic topics would consist of short blocks of related questions and would be included in the survey either at regular intervals, such as annual, or an ad hoc basis as required. These should make the HLFS more flexible and responsive in meeting user needs, and allow it to collect a wider range of information without significantly increasing respondent burden.

Figure 8 shows the proposed structure of the HLFS.

Figure 8

Proposed structure of HLFS personal questionnaire



Secondary content should be seen as distinct from supplements such as the Survey of Working Life and the Childcare Survey. The HLFS would continue to serve as a vehicle for supplementary surveys, and the periodic content programme would complement

rather than replace the supplement programme. Compared with full supplements, periodic and ad hoc topics would be shorter in length and narrower in scope.

Potential periodic content

In developing an initial programme of secondary content, identifying and prioritising periodic topics are being guided by three considerations:

1. information needs identified during consultation with users of the HLFS
2. Statistics NZ broader strategies for economic statistics and the framework for work and labour market statistics
3. recommendations of international organisations of which New Zealand is a member, in particular the ILO.

Most potential periodic topics have already been identified. The following is a selection of these. The list is not exhaustive and not necessarily in order of priority.

a) Voluntary work

Identified by the United Nations and the ILO as a topic requiring more systematic and regular measurement, measures of voluntary work are needed in order to recognise the important economic and social contribution made by unpaid work. The ILO Manual on the measurement of volunteer work which is "intended to guide countries in generating systematic and comparable data on volunteer work via regular supplements to labour force surveys". This would form the basis for content around voluntary work.

b) Labour market transitions

Better information is required on the transition of young people from education into employment, and of older people from employment into retirement. A periodic topic could provide information on the trajectories people follow in making these transitions, including intermediate steps through different types of work such as part-time, temporary, unpaid, and lower-skilled work, and the difficulties and barriers they encounter in making those transitions. Given high rates of unemployment among young people and increasing levels of labour force participation among the growing population of older people, both these groups are of considerable policy interest.

c) Skill-related underemployment

The HLFS already gathers information on time-related underemployment, and this could be complemented by information on skill-related underemployment, which refers to situations where workers' skills are under-utilised in their current job. This would provide valuable information on whether New Zealand is properly using its human capital and identify sectors in which there are skills mismatches. To be properly measured this topic requires more questions than can be accommodated in the standard PQ, but it would be suited to a periodic topic included annually or biennially.

d) Education and training

The new questionnaire would broaden the current quarterly question on participation in formal study to include non-formal education and training. In addition we'd ask more in-

depth questions on qualifications, such as type of institution providing the qualification. However, this will still provide limited information which does not tell us about the types of skills people are acquiring, how they are acquiring them and the opportunities they have to utilise and develop their skills. A periodic topic potentially asked biennially or triennially would provide a more detailed picture of the nature and adequacy of skills training in New Zealand.

e) Job search experience

The HLFS currently collects information on job search methods in the last four weeks and reasons for not looking for work. There is scope for more detailed periodic questions about job search methods over a longer period of time, for example, difficulties and barriers in searching for work, and reasons people become discouraged from job seeking. This would enhance our understanding of the experience of joblessness and may help to identify issues which can be addressed by policy makers and service providers.

f) Union membership and employment agreements

Information on whether employees belong to a union and whether they have individual or collective employment agreements is currently collected in the Survey of Working Life. This information should be collected more frequently, preferably every year. There is also potential for a greater range of questions as part of a periodic topic, for instance, how long union members have belonged to a union, whether non-members have belonged to a union in the past, barriers to union membership, and perceptions about the benefits of union membership and collective bargaining.

g) Secondary jobs

Currently we collect information on whether people are multiple job holders but we have no information on the nature of their secondary jobs. Collecting the industry, occupation, and employment status of those jobs would provide us with a more complete picture of the distribution of employment and a better understanding of the patterns of multiple job holding. This could be asked annually or biennially, and could include the reasons for holding multiple jobs and the difficulties encountered in this type of employment.

h) Last job

The HLFS currently asks people each quarter for details of their last job (industry, occupation, and employment status) if they are not currently employed but have been employed within the last five years. While the information can be useful for understanding the characteristics of surplus labour and skills mismatches associated with structural unemployment, it is not widely used at present and does require several questions. Details of last job will be asked annually rather than quarterly. This will make room for other additional periodic content.

i) Remote working

In combination with other topics, questions on working from home or other remote locations would help the HLFS provide a more complete picture of non-standard work and trends in working arrangements. As these arrangements are unlikely to change much on a quarterly basis, it is more suited to periodic and could be collected annually

or perhaps biennially. This could also enable the collection of additional information, such as the reasons for working remotely, the role information technology plays in facilitating this, and how work in different locations such as homes and offices is combined.

i) Disability

A quarterly disability indicator is being proposed. However, this is likely to be a fairly rudimentary indicator. It could be used to select people with disabilities for a more detailed set of questions on the type and severity of their disabilities and the ways in which these affect their labour force participation. This would provide information which would be of value in identifying and addressing barriers to full participation by disabled people. It could potentially be included in the survey on a biennial or triennial basis.

Supplements programme

Distinct from periodic content, supplements provide the flexibility of providing more in-depth understanding of areas of interest.

Consultation is under way to develop a plan for larger, ad hoc labour market topics. These supplements will be asked of HLFS respondents, but will be larger modules than periodic topics and allow greater depth in understanding.

Since 1997, the New Zealand Income Survey has been run as a supplement to the HLFS every June quarter. However, this content will likely be more closely aligned to a periodic topic (supplemented strongly with administrative data). This will make room for other supplements.

Past, and likely future, supplements include the Survey of Working Life, Education and Training, and Childcare.

All past supplements are listed in table 4.

Table 4

Supplements to the HLFS	
Supplement	**Quarter**
Childcare	September 1998 and September 2009
Cultural experiences	March 2002
Dynamics and motivations of migration	March 2007
Education and training	September 1996
Health	June 1992–March 1993
Household Use of Information and Communication Technology	December 2006, December 2009, and September 2012
Iwi Affiliation Survey	June 1990
Marine Recreational Fishing Survey	June 1987
New Zealand Income Survey	June quarters of 1997 to present
Older people	March 2000
Retirement income	March 1992
Survey for the Royal Commission on Social Policy	December 1987
Survey of Working Life	March 2008 and December 2012

Proposed calendar for future supplements

Publishing a calendar of future supplements will allow researchers to contribute to developing their content and questions, and schedule their research plans close to publishing dates.

After some initial consultation, we have arrived at the following draft calendar of supplements to the HLFS. This is given in table 5. For reference, proposed supplements to our other surveys are also given.

Table 5

Year	HLFS supplements	Other social surveys
2014/15	None	Household Economic Survey (Savings) General Social Survey: Social networks and support
2015/16	None – transition to new HLFS content	Household Economic Survey (Expenditure)
2016/17	Childcare	General Social Survey: Civic and Cultural Participation
2017/18	Working Life	Household Economic Survey (Savings) Post-censal survey: Māori well-being
2018/19		General Social Survey: Housing and Physical Environment Household Economic Survey (Expenditure)
2019/20	Education and Training	

Appendix 1

Number of selected PSUs by strata

Region	Urban/other	High/Low NILF	NZDep
Northland 61	Areas other than main urban 34	Low NILF 19	9
			10
		High NILF 15	7
			8
	Main urban 27	Low NILF 14	14
		High NILF 13	13
Auckland 512	Areas other than main urban 31	Low NILF 22	8
			14
		High NILF 9	9
	Main urban 481	Low NILF 367	26
			32
			35
			34
			36
			38
			37
			42
			44
			43
		High NILF 114	13
			15
			16
			19
			23
			28
Waikato 178	Areas other than main urban 75	Low NILF 49	14
			15
			20
		High NILF 26	12
			14

	Main urban 103	Low NILF 82	22
			17
			20
			23
		High NILF 21	10
			11
Bay of Plenty 101	Areas other than main urban 28	Low NILF 20	10
			10
		High NILF 8	8
	Main urban 73	Low NILF 53	12
			20
			21
		High NILF 20	8
			12
Gisborne/Hawkes Bay 91	Areas other than main urban 16	Not split 16	8
			8
	Main urban 75	Low NILF 53	16
			18
			19
		High NILF 22	9
			13
Taranaki 52	Areas other than main urban 23	Not split 23	12
			11
	Main urban 29	Not split 29	13
			16
Manawatu-Wanganui 108	Areas other than main urban 45	Low NILF 28	11
			17
		High NILF 17	7
			10
	Main urban 63	Low NILF 44	17
			27
		High NILF 19	7
			12
Wellington 204	Areas other than main urban 17	Low NILF 11	6
			5
		High NILF 6	6

	Main urban 187	Low NILF 157	12
			13
			14
			18
			17
			20
			17
			24
			22
		High NILF 30	12
			18
Tasman/Marlborough/Nelson/West Coast 78	Areas other than main urban 42	Low NILF 33	13
			20
		High NILF 9	9
	Main urban 36	Not split 36	15
			21
Canterbury 235	Areas other than main urban 67	Low NILF 52	15
			10
			11
			16
		High NILF 15	8
			7
	Main urban 168	Low NILF 135	10
			15
			15
			15
			18
			19
			21
			22
		High NILF 33	16
			17
Otago 103	Areas other than main urban 38	Low NILF 30	12
			18
		High NILF 8	8
	Main urban 65	Low NILF 47	18
			29

		High NILF 18	18
Southland 45	Areas other than main urban 18	Not split 18	7 11
	Main urban 27	Not split 27	11 16
			1768