

# Background Quality Report for the Continuous Working Patterns (CWP) Survey

July 2017

## 1. Introduction

### 1.1 Overview

The Continuous Working Patterns (CWP) Survey is a seven day diary completed by trained, regular UK Armed Forces personnel to record the number of hours spent at work, on call, on breaks and off duty. The CWP report is produced annually and contains information about the working patterns of trained, regular UK Armed Forces personnel over the last five years, with comparisons made between the current survey and the previous survey.

### 1.2 Background and context

The Chief of Defence People (CDP) sponsors the survey under a remit from the Armed Forces Pay Review Body (AFPRB), which provides advice to the Prime Minister and the Secretary of State for Defence on the remuneration and charges for members of the UK Armed Forces.

Defence Statistics have been providing the AFPRB with information about the working patterns of trained, regular UK Armed Forces personnel since 1987/88. Since 1987/88, a number of changes have been made to the survey. For example, prior to 1995/96 the survey excluded Officers, and prior to 1996/97, Royal Marines were excluded. The locations for the Army and RAF have changed over the years depending on where trained, regular UK Armed Forces personnel have been stationed or deployed. The analysis methodology has also changed, moving from substitution to calculating a notional week, based upon the average Monday, the average Tuesday, ....., the average Sunday.

### 1.3 Methodology and production

Stage 1: Questionnaire design

Single Service questionnaires are used for the Naval Service (Royal Navy and Royal Marines), the Army and RAF. All three single Service questionnaires contain a seven day diary, with each day divided into four periods of six hours. Respondents are asked to record the number of hours they spend at work, on breaks, on call and off duty for all four periods of each day. Guidance on how different activities should be recorded are provided.

CWP 2016/17 questionnaires are published as a separate document and can be found on the [CWP webpage](#)<sup>1</sup>.

Stage 2: Sample

The target population was regular members of the UK Armed Forces who were full time, trained strength. It excluded untrained personnel, those on long term absence, Special Forces, Gurkhas, reservists and personnel ranked above OF6. There were a number of other minor exclusions arising from the practicalities of running the survey e.g. those with invalid address data. Address data for personnel in the sample were obtained from the Joint Personnel Administration System (JPA).

CWP is designed as a stratified sample survey. Stratification is by:

- Service: Naval Service (Royal Navy and Royal Marines), Army and RAF.
- Rank group: Senior Officers (OF3 to OF6), Junior Officers (OF1 to OF2), Senior Ranks/Rates (OR6 to OR9) and Junior Ranks/Rates (OR1 to OR4).
- Broad location:
  - Naval Service: sea and shore.
  - Army: United Kingdom, Germany, overseas Operations and elsewhere abroad.
  - RAF: United Kingdom, overseas Operations and elsewhere abroad.

### Stage 3: Distribution

This survey is conducted using paper questionnaires. Questionnaires are packed by external contractors and dispatched via the British Forces Post Office, RAF Northolt.

For surveys prior to 2012/13, questionnaires were batched and sent to Commanding Officers who then distributed them to their staff. Reminders were also sent to Commanding Officers who had a unit response rate of less than 50%, and at least 4 non-respondents. In 2012/13, time constraints in the packing process meant that questionnaires were sent to individuals directly. Cost constraints meant that reminders were not sent.

Due to poor response rates in the 2012/13 survey (17%), questionnaire distribution was reviewed. The decision was made to batch questionnaires and send to Commanding Officers, but not send any reminders. This distribution process has been in place since the 2013/14 survey.

For the 2016/17 survey, a total of 18,450 surveys were distributed. A response is considered valid if at least one day within the seven day diary is useable. 3,796 of the returned surveys were considered valid, which equated to a response rate of 21%.

### Stage 4: Analysis

Many respondents returned questionnaires which included leave days or days that had to be discarded because of inconsistent or missing data. If analysis was restricted to only those questionnaires that cover a full working week, results would be based on much less data and confidence intervals would be considerably wider. Therefore, the methodology used is based upon a 'notional' week made up of the average Monday, the average Tuesday, ....., the average Sunday. By calculating the average working hours separately for each day, as much of the data as possible is used.

The sample design and the difference in non-response between single Services, rank groups and broad locations mean that the distribution of characteristics of respondents do not reflect their distribution in the trained, regular, UK Armed Forces. This means that some types of personnel were over-represented in the data and others underrepresented in the data. The survey data are weighted by single Service, rank group and broad location to ensure that the respondent profile matched the known population profile by these characteristics. The weights are calculated simply by:

$$\text{Weight} = \frac{\text{Population size within weighting class (p)}}{\text{Number of responses within weighting class (r)}}$$

Weighting in this way assumes missing data are missing at random (MAR) only within strata. This means we assume that within a single strata, the working patterns of non-respondents are similar (on average) to the working patterns of respondents. If trained, regular UK Armed Forces personnel who did not respond to the CWP survey have different working patterns to those who did, than the CWP survey results will be biased.

Non-response that is directly related to individual working patterns will lead to bias within the survey results. For example, those busiest and hence working longer hours may be less likely to complete the survey.

In order to detect any statistical differences in working patterns between the current year and the previous year, a series of z-tests were conducted with an alpha level of 5%. A statistically significant difference means there is a less than 5% probability that the difference is the result of chance alone.

If a statistical difference is found it means that the difference between years is unlikely to be the result of random variation and is therefore indicative of a genuine change in hours spent at work, on duty or on call. It does not mean that the change is necessarily large or substantively "important". It is important to note that the absence of a statistically significant difference between years does not necessarily mean that no difference is expected to exist between populations. Simply that, given the number of respondents, the detected difference is too small for us to

be confident that a difference of this size could not have arisen due to chance variation in the survey process.

## 2. Relevance

The principal users of CWP are the Chief of Defence People (CDP) policy team, who sponsors the survey, and the Armed Forces Pay Review Body (AFPRB). The AFPRB uses the information about the working patterns of Service personnel in CWP when providing advice to the Prime Minister and the Secretary of State for Defence on the remuneration and charges for members of the UK Armed Forces.

The statistics and information in the CWP report can be used to answer parliamentary questions and Freedom of Information requests; they can also be used by the general public and media to monitor the working hours of trained, regular Armed Forces personnel.

## 3. Accuracy

CWP collects data about working patterns of trained, regular UK Armed Forces personnel from a stratified sample of approximately 18,500 personnel. The sample is stratified by Service (Naval Service (Royal Navy and Royal Marines), Army and RAF), rank group and broad location. Please see Table 1 and Table 2 below for more information about these strata's.

**Table 1: Stratification by rank group**

Rank group	NATO Rank
Senior Officers	OF3 - OF6
Junior Officers	OF1 - OF2
Senior Ranks/Rates	OR6 - OR9
Junior Ranks/Rates	OR1 - OR4

**Table 2: Stratification by broad location**

Service	Broad location
Naval Service	Ship / sea
	Shore
Army	United Kingdom
	Germany
	Overseas Operations
	Elsewhere abroad
RAF	United Kingdom
	Overseas Operations
	Elsewhere abroad

The survey is designed to achieve a margin of error of +/- 0.5 hours for each single Service average hours worked estimate and +/- 1.0 hours for each rank group and broad location average hours worked estimate. For the average weekly hours worked margins of error, please see Tables 3 and 4 on the next page.

Table 3 shows that the average hours worked for the Naval Service and the RAF failed to meet the desired margin of error of +/- 0.5 hours. The average hours worked for Senior Officers, Senior Ranks/Rates and Junior Ranks/Rates in the Naval Service also failed to meet the desired margin of error of +/- 1.0 hours, as did the RAF Junior Officers.

Table 4 shows that the only locations that achieved the desired margin of error of +/- 1.0 hours were shore based Naval Service personnel and Army and RAF personnel based in the United Kingdom.

**Table 3: Margins of error for average hours worked 2016/17 by rank group**

	UK Armed Forces margin of error (in hours)	Naval Service margin of error (in hours)	Army margin of error (in hours)	RAF margin of error (in hours)
<b>All ranks</b>	+/- 0.37	+/- 0.69	+/- 0.58	+/- 0.47
Senior Officers	+/- 0.52	+/- 1.06	+/- 0.79	+/- 0.89
Junior Officers	+/- 0.59	+/- 1.00	+/- 0.90	+/- 1.10
Senior Ranks/Rates	+/- 0.61	+/- 1.07	+/- 0.97	+/- 0.85
Junior Ranks/Rates	+/- 0.58	+/- 1.14	+/- 0.85	+/- 0.73

**Table 4: Margins of error for average hours worked 2016/17 by broad location**

Service	Broad location	Margin of error (in hours)
Naval Service	Ship / sea	+/- 1.56
	Shore	+/- 0.70
Army	United Kingdom	+/- 0.64
	Germany	+/- 1.13
	Overseas Operations	+/- 3.04
	Elsewhere abroad	+/- 1.05
RAF	United Kingdom	+/- 0.51
	Overseas Operations	+/- 2.03
	Elsewhere abroad	+/- 1.21

For all three Services, rank groups and broad locations, levels of precision were lower (wider confidence intervals) for on duty and on call averages.

For the Army and RAF, the CWP survey measures the working patterns of personnel deployed on overseas Operations. On the 27th October 2014, the UK Armed Forces ceased all combat Operations in Afghanistan and withdrew the last of its combat troops ([MOD Annual Report and Accounts 2014-2015](#))<sup>2</sup>. The end of combat Operations in Afghanistan has led to a reduction in the number of personnel deployed on overseas Operations, which in turn has led to a decrease in the number of personnel deployed on overseas Operations being sampled to complete the CWP survey. Therefore, the Army and RAF figures for the location category overseas Operations should be treated with caution.

For the Army, the CWP survey measures the working patterns of personnel based in Germany. In 2013 the [Army Basing Programme \(ABP\)](#)<sup>3</sup> was set up to implement the [Army Basing Plan](#)<sup>4</sup> - to withdraw all Army units from Germany by 2020. This withdrawal of Army units from Germany may have had an impact on the working patterns of Army personnel still based in Germany and as such, figures for the location category Germany should be treated with caution.

It should be noted that response rates for Naval Service personnel are particularly low in 2016/17 (15%) - this is largely due to poor response rates from Naval Service personnel based on ships. For the Army, response rates for personnel deployed on overseas Operations, based in Germany and elsewhere abroad are lower than response rates from personnel based in the UK. For RAF personnel, response rates were highest for personnel based in the UK and lowest for personnel deployed on overseas Operations. With regards to rank group, response rates were highest for Senior Officers and lowest for Junior Ranks/Rates across all Services.

## 4. Timeliness and punctuality

### 4.1 Timeliness

Although the 2016/17 CWP results are published in July 2017, it is important to note the data was collected between September 2016 and April 2017 and therefore, the statistics represent working patterns during this period. Once the data has been collected, it takes Defence Statistics staff approximately 8 weeks to produce and publish the statistical report.

## 4.2 Punctuality

As an Official Statistic, the release date for the CWP report was pre-announced on the [gov.uk statistical release calendar](#)<sup>5</sup> section of GOV.UK in accordance with the guidance set out in the [Code of Practice for Official Statistics](#)<sup>6</sup>.

## 5. Accessibility and clarity

### 5.1 Accessibility

The CWP report is published on the [Statistics at MOD](#)<sup>7</sup> area of the gov.uk website as a PDF document. Alongside this report, this Background Quality Report is published as a PDF document whilst the background tables are available in excel format.

### 5.2 Clarity

In addition to this background quality report, the start of the CWP report contains a key points and trends section that summarises the main CWP findings and an introduction that provides information about response rates and the statistical tests used. After the results sections, there is a methodology section that contains more detailed information about the target population, the questionnaire, weighting, cleaning and analysing the data. A glossary is also provided which defines the terms used throughout the report.

Tables, graphs and commentary are used to illustrate trends in the working patterns of trained, regular, UK Armed Forces personnel over the past five years, and to highlight significant differences between the 2015/16 and the 2016/17 surveys. Where there have been issues with the data or time series comparisons, or revisions made, this has been noted in the relevant section of the report.

## 6. Coherence and comparability

### 6.1 Coherence

In February 2014, the Army's Family Federation produced a Working Hours Survey. However, neither the content nor the methodology is harmonised with CWP. Information about the working patterns of Army personnel were obtained by asking families of Service personnel multiple choice questions such as 'in the last two years, have your soldier's working hours increased?' and 'on average, how many hours a day does your soldier work for?'. The Working Hours Survey was conducted using online questionnaires and face to face interviews.

### 6.2 Comparability

CWP surveys are considered to be comparable over time. However, there have been changes to the location categories for the Army and RAF to reflect where Army and RAF personnel are stationed or deployed. Where possible, revisions have been made to figures from previous surveys to ensure comparability over time.

Since the 2012/13 CWP survey, questionnaires have been issued in two waves. Prior to the 2012/13 survey, questionnaires were issued in three or four waves. The reader should be aware that if responses do vary systematically (depending on the period of data collection) then the change in the number of waves may impact on the comparability of responses between surveys as well as the accuracy of our estimates.

## 7. Trade-offs between output quality components

The main trade-off is between comparability over time, costs and accuracy. From 2012/13, CWP questionnaires moved from being issued in three or four waves to being issued in two waves – this was to lower the administration costs. The rationale for distributing questionnaires in several waves during the year was to obtain survey estimates that were more representative of the entire year and less influenced by seasonal variations, events or announcements. If responses do vary systematically (depending on the period of data collection) the change in number of waves may impact on the accuracy of our estimates and comparability of responses between surveys.

## **8. Assessment of user needs and perceptions**

Defence Statistics work closely with the main customer and survey sponsor, Chief of Defence People (CDP) to ensure that the statistics in the CWP report are relevant to policy requirements. In addition, the MOD invites all users to provide feedback on the contents of CWP and provides contact details on the front page of the report.

## **9. Performance, cost and respondent burden**

### **9.1 Performance and cost effectiveness**

The external contractor cost for the 2016/17 survey is approximately £38,000 (including VAT) and includes packing, distributing and data processing of the CWP questionnaires. Costs are closely monitored and Defence Statistics strive to balance quality and timeliness against costs.

### **9.2 Respondent burden**

Response to CWP is voluntary. Participant information is provided within the questionnaire to encourage informed consent. The CWP questionnaire is currently estimated to take between ten and thirty minutes to complete every day. Therefore, this survey could take between one hour and ten minutes and three hours and thirty minutes to complete over the seven day period.

## **10. Confidentiality, transparency and security**

### **10.1 Confidentiality**

Confidentiality protocols are adhered to, as set out in the Defence Statistics Disclosure and Confidentiality Policy – Identifiable Survey Data. CWP is a confidential survey rather than anonymous. The raw data is not seen by anyone outside of Defence Statistics which ensures that no person from any respondents' chain of command is able to access individual level data. Only aggregated results are provided to anyone not directly involved with the analysis. The results are only presented for groups containing at least 30 respondents.

### **10.2 Transparency**

The production process is considered to be transparent. Each questionnaire is distributed with a participant information sheet to ensure that respondents make an informed decision before completing the survey. The CWP report is published with details of the methodology and a background quality report so that users are aware of potential data issues and quality of the output. A list of those that require 24hr pre-release access to the statistical results are published on the [Defence Statistics pre-release access list](#)<sup>8</sup> section of the gov.uk website.

### **10.3 Security**

All staff involved in the CWP production process adhere to the MOD and Civil Service data protection regulations. In addition, all members of the survey analysis team have to follow the relevant codes of practice for the Government Statistical Services (GSS). All data is stored, accessed and analysed using the MOD's restricted network and IT system.

## 11. References

	Reference	Website Location
1	CWP webpage	<a href="https://www.gov.uk/government/collections/armed-forces-continuous-working-patterns-survey-index">https://www.gov.uk/government/collections/armed-forces-continuous-working-patterns-survey-index</a>
2	MOD Annual Report and Accounts 2014/15	<a href="https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/482894/19_MOD_ARAc_combined_at_02_Dec_2015_for_web.pdf">https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/482894/19_MOD_ARAc_combined_at_02_Dec_2015_for_web.pdf</a>
3	Army Basing Programme (ABP)	<a href="http://www.army.mod.uk/structure/33834.aspx">http://www.army.mod.uk/structure/33834.aspx</a>
4	Army Basing Plan	<a href="http://www.army.mod.uk/structure/27886.aspx">http://www.army.mod.uk/structure/27886.aspx</a>
5	Gov.uk statistical release calendar	<a href="https://www.gov.uk/government/statistics/announcements">https://www.gov.uk/government/statistics/announcements</a>
6	Code of Practice for Official Statistics	<a href="http://www.statisticsauthority.gov.uk/assessment/code-of-practice/code-of-practice-for-official-statistics.pdf">http://www.statisticsauthority.gov.uk/assessment/code-of-practice/code-of-practice-for-official-statistics.pdf</a>
7	Statistics at MOD homepage	<a href="https://www.gov.uk/government/organisations/ministry-of-defence/about/statistics">https://www.gov.uk/government/organisations/ministry-of-defence/about/statistics</a>
8	Defence Statistics pre-release access list	<a href="https://www.gov.uk/government/statistics/defence-statistics-pre-release-access-list">https://www.gov.uk/government/statistics/defence-statistics-pre-release-access-list</a>

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