The New Zealand Physical Activity Questionnaires

Report on the validation and use of the NZPAQ-LF and NZPAQ-SF self-report physical activity survey instruments

JULY 2004

SPARC
ihi AOTEAROA
Sport & Recreation New Zealand

Published by SPARC, Wellington, New Zealand
With the support of the Ministry of Health, Wellington, New Zealand

Table of Contents

Foreword

In the last decade physical activity has emerged as a major public health issue both internationally and in New Zealand. Consequently, monitoring New Zealanders' physical activity levels is becoming increasingly important as strategies are developed to promote greater participation in physical activity.

The sport, recreation and health sectors have a shared interest in supporting, promoting and monitoring physical activity in the population. Both sectors rely on valid and reliable physical activity survey instruments in order to formulate and evaluate evidence-based 'physical activity and health promotion' policies and programmes.

Accordingly, SPARC (Sport and Recreation New Zealand) and the Ministry of Health, with input from Statistics New Zealand, have developed two new physical activity survey instruments – the NZPAQ Long and Short Forms – (NZPAQ-LF, NZPAQ-SF) to improve the monitoring of population physical activity levels in New Zealand. These instruments have been validated by researchers at the University of Auckland on behalf of SPARC and the Ministry.

The long form of the instrument will be used in SPARC's biennial sport and physical activity survey, and the short form in the Ministry's health survey; these instruments are also available for use by researchers in other surveys. The new instruments incorporate international good practice as to which dimensions of physical activity should be measured, and how this can best be done within the confines of a self-report survey.

This brief report provides the necessary background information for those intending to use the new physical activity questionnaires in their own surveys, as well as those users of the SPARC and Ministry surveys who need to understand the background to the physical activity estimates obtained from these national surveys. It includes a brief summary of the validation study carried out by the University of Auckland.

Nick Hill
Chief Executive
SPARC

Don Matheson
Deputy Director-General
Public Health Directorate
Ministry of Health

Acknowledgements

The authors of this report were Grant McLean, SPARC and Martin Tobias, Ministry of Health.

The work of the validation study researchers – Karen Moy, Robert Scragg, Stewart Robinson, and Kendra McFarlane from the University of Auckland – is gratefully acknowledged.

The work of the Hillary Commission, Ministry of Health, and Statistics New Zealand staff who designed the instruments is also acknowledged: Harriette Carr, Sue Walker, Martin Tobias, Grant McLean and Anne Spellerberg.

Special thanks also goes to Harriette Carr, Ministry of Health, and Adrian Bauman of the Centre for Physical Activity and Health, University of Sydney, for peer reviewing this report.

Background

Physical activity is recognised internationally as a key factor in the maintenance and improvement of health. In order to formulate and evaluate 'physical activity and health promotion' policy, Government needs acceptable, valid and reliable tools for measuring trends and variations in the level and distribution of physical activity in the New Zealand population.

In recent years the Hillary Commission (now SPARC) and the Ministry of Health have both collected data on physical activity levels (PALs)[1], SPARC through the biennial *New Zealand Sport and Physical Activity Survey* and the Ministry via the *New Zealand Health Survey.*

In 2001, the Hillary Commission, the Ministry of Health and Statistics New Zealand established a Physical Activity Joint Monitoring Group to develop better self-reported physical activity survey instruments for New Zealand, which incorporated international advances in physical activity measurement. Two instruments were developed: a 'long form' questionnaire for use in the dedicated New Zealand Sport and Physical Activity Survey (NZSPAS) run by SPARC, and a 'short form' questionnaire to be included in the New Zealand Health Survey (and related surveys).

Need for new instruments

Existing self-reported physical activity survey instruments are limited to capturing information on leisure-time physical activity (thereby overlooking important incidental daily-life physical activities, active commuting, and occupational activity). Furthermore, existing instruments generally do not take account of the intensity of activity (considered particularly important for health outcomes). The new questionnaires (NZPAQ) include both of these key dimensions of physical activity (in both the long and the short forms of the instrument).

Challenges in developing a self-reported physical activity survey instrument

The only practical way to measure physical activity levels (PALs) in representative population samples is through self-report surveys, despite the known tendency of such surveys to over-report active and under-report sedentary behaviours – a tendency that may be increasing over time because of increasing social desirability bias. Given the complexity of the behaviours involved, and their several dimensions (intensity, duration, frequency, type, context), an accurate PAL assessment is even more difficult if only a brief interview is possible.

SPARC and the Ministry of Health have developed two self-report questionnaires: both a more in-depth long form and a briefer short-form. A basic overview of the two questionnaires is provided in Table 1, on page 5. The short form builds on the work of an international consensus group that has already attempted to develop a valid and reliable self-report instrument for measuring PAL – the International Physical Activity Questionnaire (IPAQ). Both 'long form' and 'short form' versions of the IPAQ instrument have now been developed (see the IPAQ website for details: www.ipaq.ki.se). To date, validation studies of these instruments have been carried out in at least 12 countries, and the IPAQ-Short has recently (2003) been used to carry out an International Prevalence Study (IPS) involving 17 countries, including New Zealand.

For use in New Zealand, a modified version of the IPAQ-Short, the **NZPAQ-SF** has been developed. The modifications are intended to increase the relevance and cultural appropriateness of the instrument for New Zealand.

In addition, a long-form questionnaire, the **NZPAQ-LF**, has been developed which – rather than being based on the IPAQ-Long – uses a diary to gather more detailed (and reliable) information on all five dimensions of physical activity. Diary-based methods of recording data are recognised as the most accurate and precise method among self-report instruments.

The long form has been designed to be the main tool for measuring PAL in New Zealand. It will replace the existing physical activity questionnaire in the New Zealand Sport and Physical Activity Survey (the 'old NZSPAS instrument'), which was derived by taking items from pre-existing instruments and never fully validated.

Both the NZPAQ-LF and NZPAQ-SF have now been validated and the key findings of the validation study are summarised in this report. Both instruments are currently designed for use in face-to-face surveys (although an unvalidated telephone version of the NZPAQ-SF is available for trial).

[1] The acronym PAL as used here is not to be confused with the term 'PAL' used in some metabolic studies to reflect a unit of energy expenditure.

Table 1: Overview of the questionnaires

Questionnaires	NZPAQ – Long form	NZPAQ – Short form
Dimensions measured	Frequency, intensity, duration, type, context	Frequency, intensity, duration
Population	Adults (15 and over)	Adults (15 and over)
Delivery method	Face-to-face only	Face-to-face (validated), telephone (yet to be validated)
Time taken to complete questionnaire	Average 19 minutes (range 5–64 minutes)	Average 4 minutes (range 1–20 minutes)
Frequency of SPARC and Ministry of Health surveys using these instruments	Biennial	Two to three yearly
Suggested potential users	When detailed information on activity type and combination of activities is important eg SPARC, local authorities, sporting codes, tertiary institutions, physical activity researchers	When interested in comparing activity with other behaviours – can be incorporated as part of a larger survey, eg Ministry of Health, health researchers
Suggested Analysis Method	1 minute of vigorous physical activity equals 2 minutes of moderate physical activity	1 minute of vigorous physical activity equals 2 minutes of moderate physical activity
Other comments	Also asks about resistance activity and distribution of activity over the week including weekend	Walking is asked about separately and is the only specific activity type recorded

So where is New Zealand at with physical activity measurement?

While there are limitations in physical activity measurement due to overestimation of physical activity level with any self-report instrument, the validation study has demonstrated that the New Zealand instruments (NZPAQ Long and Short forms) are comparable to international survey instruments (ie, the IPAQ).

New Zealand is also now more generally aligned with global measurement good practice through both validation of the NZPAQ against the IPAQ, and through participation in the IPS study. In summary, New Zealand is now in a better position with regards to measurement than previously, although the inherent limitation of reliance on self-reported physical activity remains.

PAL measurement is only one piece of the puzzle

Quantifying physical activity level and distribution provides information on only one aspect of the complex puzzle that is physical activity as a human behaviour. Physical activity prevalence data will not provide all the information useful in promoting physical activity behaviour change. Policy makers are also interested in *what* people's sport and physical activity preferences are (captured in the NZSPAS), and *why* people do or do not participate, i.e. barriers and motivators to physical activity.[2] Information about *who* and *how much* together with *what, when* and *why* is needed to formulate and evaluate physical activity and health promotion policies.

Contents of the report

The first section summarises the key findings of the validation study and highlights issues that are generic to both the NZPAQ Long and Short Forms.

The following section provides key results, recommendations and decisions concerning the **NZPAQ-Long Form** instrument.

The final section provides key results, recommendations and decisions concerning the **NZPAQ-Short Form** instrument.

The **Appendices** provide the revised versions of both instruments, together with their showcards and instructions for interviewers.

Note:

This report provides both:

(a) an overview of the entire validation study, its findings and recommendations; and,

(b) chapters on each physical activity questionnaire (the NZPAQ-LF and NZPAQ-SF) that can be read separately.

Therefore, relevant material is repeated in all three sections.

Glossary

PAL	Physical Activity Level
HRM	Heart Rate Monitoring
IPAQ-Long	International Physical Activity Questionnaire – Long Form
IPAQ-Short	International Physical Activity Questionnaire – Short Form
IPS	IPAQ International Prevalence Study (IPAQ – Short 2003)
MET	Metabolic Equivalent (unit of energy expenditure)
NZPAQ-LF	New Zealand Physical Activity Questionnaire – Long Form
NZPAQ-SF	New Zealand Physical Activity Questionnaire – Short Form
NZSPAS	New Zealand Sport and Physical Activity Survey
Old NZSPAS	Physical Activity Questionnaire used in NZSPAS to 2001
NZHS	New Zealand Health Survey

[2] Some of the answers to this latter question are being uncovered in SPARC and the New Zealand Cancer Society's recent study *Obstacles to Action: A study of New Zealanders's Physical Activity and Nutrition* (2003) conducted among 8000 New Zealanders.

Key Findings of the Validation Study

Design and purpose of the study

The Ministry of Health and the Hillary Commission (now SPARC) developed new physical activity questionnaires (in 2001), in both a short (NZPAQ-SF) and long (NZPAQ-LF) form.[3] The NZPAQ-SF is a modified version of the IPAQ-Short, and is designed to assess three dimensions of physical activity (frequency, duration and intensity). The NZPAQ-LF was designed to measure all contexts of physical activity (transportation, occupation, domestic work, organised sport, and informal leisure time and recreational pursuits), as well as to distinguish between moderate and vigorous intensity of each activity performed.

The purpose of this study was to determine the validity of both the NZPAQ-SF and NZPAQ-LF against an objective measure of physical activity (heart rate monitoring – HRM) before incorporating them into the New Zealand Health Survey (NZHS) and New Zealand Sport and Physical Activity Survey (NZSPAS), respectively.

The University of Auckland, School of Population Health, was contracted by SPARC in partnership with the Ministry of Health to conduct the validation study. The study began in October 2002 and was completed in October 2003.

The instruments tested were designed for face-to-face interview only. An unvalidated telephone version of the NZPAQ-SF is also being developed and will be trialled in 2004 or 2005.

Aims

1. Validate the NZPAQ-SF and NZPAQ-LF against monitoring of heart rate in a multi-ethnic, adult New Zealand sample.
2. Compare the NZPAQ-SF with the NZPAQ-LF to assess the robustness of the former.
3. Compare the NZPAQ-SF and NZPAQ-LF against the instrument used in the previous physical activity surveys ('old NZSPAS') to assess comparability with those Hillary Commission surveys.
4. Compare the NZPAQ-SF and NZPAQ-LF against the IPAQ-Long to assess comparability with international surveys.
5. Aims 1 to 3 will be repeated in subgroup analyses to determine whether the NZPAQ-SF and NZPAQ-LF are equally valid in ethnic-, gender- and age-subgroups.
6. Estimate MET (Metabolic Equivalent) values for New Zealand – specific cultural activities (eg, kapa haka), so these can be included in the NZPAQ or other survey instruments.
7. Determine the proportions of the sample who engaged in resistance training or reported split-intensity activities.
8. Compare MET values for occupational physical activity captured during heart rate monitoring against estimated MET values reported in the Compendium of Physical Activities.[4]
9. Compare different methods for analysis of NZPAQ data.
10. Translate the NZPAQ instruments into te reo Māori and a number of Pacific languages, and assess the impact of translation on instrument performance.

[3] Note that in the validation study report **Validation of MOH-Short and SPARC-Long Physical Activity Questionnaires. Final Report. November 2003** (Moy et al, 2003, report to SPARC) the NZPAQ-LF is referred to as SPARC-long and the NZPAQ-SF as MoH-short.

[4] Ainsworth et al. 2000. Compendium of Physical Activities: an update of activity codes and MET intensities.

Key findings

In brief, all three self-report instruments (NZPAQ-LF, NZPAQ-SF and IPAQ-Long) over-estimated PAL compared with HRM, but IPAQ-Long performed worst in this regard, with NZPAQ-LF performing best.

The NZPAQ-SF correlated more highly with the IPAQ-Long than did the NZPAQ-LF for most dimensions. Correlations between the NZPAQ short and long forms were reasonable except for moderate intensity activity, which was poor. Correlations were lower for Māori and Pacific ethnic groups than for the European/Other ethnic group. Participants in the validation study generally had a poor understanding of the definition of moderate intensity.

Despite the relatively modest Spearman correlation coefficients[5], when activity levels were grouped into categories, both NZPAQ short and long form instruments gave almost identical results. Best results were obtained when the data was analysed assuming the equivalence of one minute of vigorous activity with two minutes of moderate activity.

Correlation between the NZPAQ-LF and the old NZSPAS instrument was variable across age and ethnic groups. Use of adjustors to restore continuity to the time series is accordingly not recommended.

Meaningful correlations? The perennial problem of overestimation of self-reported physical activity

While the correlations of all three self-report instruments against the objective measure (ie, HRM) are modest at best, this is not unexpected. More importantly, the correlations with HRM are better for both NZPAQ instruments than for the IPAQ-Long.

A high level of overestimation of physical activity appears inherent in self-report methods, although attempts are continually being made to lessen the extent of overestimation (Rzenwnicki et al 2002). A combination of the complexity of physical activity behaviour, lack of comprehension of survey terminology, lack of experience with self-reporting level of physical activity, and social desirability bias, means that a degree of over-reporting is inevitable. Over-reporting of physical activity in New Zealand tends to be greater among less active individuals, people of non-European ethnicity, and older people.

The extent of overestimation is seen in Table 2 and Figure 1. Table 2 compares the NZPAQ-LF and SF with HRM by activity and results in overestimation as high as 400 percent over the objective measure (for example mean minutes walking: NZPAQ-SF 122.7; NZPAQ-LF 89.0; HRM 31.9). Overestimation was highest among Māori and Pacific peoples where correlations to HRM were poor in all physical activity components with the exception of brisk walking on the NZPAQ-LF which showed moderate correlation.

Table 2 also compares the NZPAQ-LF and SF with HRM in relation to the current New Zealand physical activity guidelines recommending (a) at least 30 minutes on most (five) days of moderate intensity physical activity and (b) at least a total of 150 minutes per week (even if on less than five days of activity). The table shows that many respondents categorise themselves as far more active than they actually are (as evidenced by HRM). While the NZPAQ-LF and SF respectively suggest that 77 and 78 percent of respondents are sufficiently active for health, only 43 percent appear to be so by HRM. Of course, HRM may underestimate PAL to some extent, especially at low intensity.

[5] A correlation coefficient measures the degree to which two variables are related.

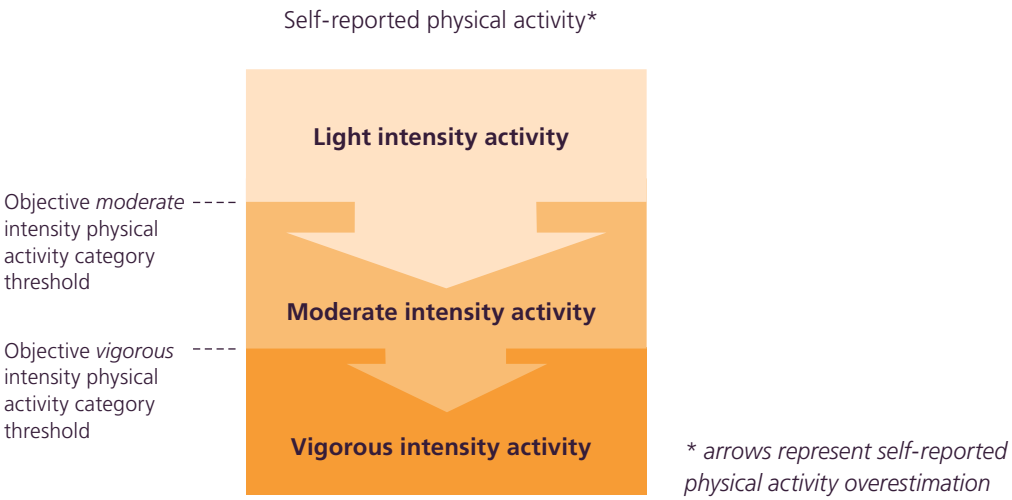
Table 2: NZPAQ-SF and NZPAQ-LF vs. HRM – analysed equivalising one minute vigorous to two minutes moderate intensity activity

	Mean minutes (95% CI) of activity over last 7 days		
Activity	NZPAQ-SF (n=186)	NZPAQ-LF (n=186)	HRM (n=180)
Walking	122.7 (81.3, 164.1)	89.0 (66.6, 111.4)	31.9 (19.3, 44.5)
Moderate	271.5 (180.9, 362.1)	313.7 (252.6, 374.8)	114.6 (78.4, 150.8)
Vigorous	211.0 (161.3, 260.7)	158.6 (122.7, 194.5)	93.3 (56.9, 129.7)
Total	605.2 (487.7, 722.7)	561.3 (478.2, 644.4)	239.8 (188.1, 291.5)
Current NZ Guidelines	**% Meeting Current Recommendations (n=180)**		
≥ 30 min/day on ≥ 5 days	34.4	42.2	5.6
≥ 150 min/week but < 5 days	43.9	35.0	37.8
Total active	78.3	77.2	43.4

Moderate intensity physical activity category inflated?

A primary reason for the overestimation of physical activity in the New Zealand instruments (and internationally) appears to be the inability of respondents to distinguish between light and moderate intensity activities (and to a lesser extent between moderate and vigorous activity). Consequently, 'spillover' occurs in reporting which inflates the physical activity reporting in the moderate category (see Figure 2). An example could be gardening, which many people probably do at a relatively light intensity, but believe they are being moderately active. In addition, the effects of social desirability bias and a basic lack of understanding and experience of reporting the intensity of activity among less active individuals may contribute to this spillover effect.

Figure 1: Over-estimation of physical activity categories



Time to complete questionnaires

The average time to complete the NZPAQ-LF questionnaire was 19 minutes (The shortest and longest time to completion was five and 64 minutes, respectively).

The average time to complete the NZPAQ-SF was four minutes (The shortest and longest time to completion was one and 20 minutes, respectively).

There appears to be no relationship between the time to completion and level of activity, ethnicity, or age.

Summary

To summarise the overall performance of both NZPAQ instruments, the key findings of the validation study were:

- The two instruments (NZPAQ-LF and SF) are acceptable for measuring population level physical activity prevalence in New Zealand adults (although accuracy is lower for Māori and Pacific peoples).
- The two instruments are highly correlated, except with regard to moderate intensity physical activity.
- Both instruments are significantly correlated with the IPAQ-Long.
- None of the instruments tested (NZPAQ-LF and SF, IPAQ-Long) accurately measures moderate intensity physical activity, with all three instruments substantially over-estimating physical activity compared to heart rate monitoring – a universal and expected finding for self-report physical activity survey instruments.

NZPAQ-Long Form

Introduction

The NZPAQ-LF has been designed as the 'primary' instrument for monitoring physical activity levels (PALs) among New Zealanders. It is intended for use mainly as part of a much larger face-to-face questionnaire about the physical activity, sport and recreation interests of the New Zealand population. This national survey is conducted by SPARC as the government agency responsible for the sport and recreation sector (including physical activity promotion).

The NZPAQ-LF was validated against:

- an objective measure (heart rate monitoring – HRM)
- an internationally validated instrument (IPAQ-Long)
- the old NZSPAS instrument (originally designed by the Hillary Commission) to calculate adjustment factors for time series analysis.

Performance of the NZPAQ-LF: overview

In brief, the NZPAQ-LF was found to have acceptable correlation with HRM (except for moderate activity) and was well correlated with the IPAQ-Long. Both NZPAQ-LF and SF instruments overestimated PAL as measured by HRM, but less so than did the IPAQ-Long. The NZPAQ-LF, however, is not closely comparable with the old NZSPAS (Hillary Commission), and adjusters for time series comparisons are accordingly not recommended. The validation study authors also suggested a number of minor improvements to the instrument, which may further improve its performance.

Provenance

The NZPAQ-LF was designed based on a review of national and international questionnaires that have been used to measure activity levels (and that had undergone validity and reliability testing (Hillary Commission, 2001). The long form is designed for use in the NZSPAS, a biennial household interviewer-administered survey (run since 1997) for the specific purpose of monitoring physical activity levels and sport and recreation participation (or similar dedicated, interview-based surveys). As such it can capture more detailed information on physical activity behaviours than is possible in 'generalist' surveys. The NZSPAS also records information on people's sport and recreation preferences (over seven days, four weeks and 12 months), involvement in clubs, coaching, competitions, and volunteer activity.

The fundamental design of the instrument is a diary. Rather than have respondents keep a diary prospectively, however, the diary is filled in retrospectively and therefore relies on participants accurately recalling their activities over the preceeding week. Activities of all types are recorded, whatever the level of intensity and context of the activity. Sedentary activities (including sleep) are also recorded – so the instrument is in fact essentially a seven-day time-use diary.

Validation

Study design

The NZPAQ-LF has been validated against an internationally validated self-report instrument (IPAQ-Long) and against HRM, an objective measure of energy expenditure. The validation study involved 186 adult volunteers recruited from the general public, including approximately equal representation of European, Māori and Pacific ethnic groups, and covering a wide range of physical activity and fitness levels. The validation study was carried out by the University of Auckland on behalf of SPARC and the Ministry of Health. The full report of the study is available from SPARC or the Ministry of Health on request.

Validation of the NZPAQ-LF (rather than the NZPAQ-SF) was considered the most important objective of the study, as this is the instrument designed to be used in future SPARC New Zealand Sport and Physical Activity surveys (NZSPAS), the primary mechanism for monitoring trends and variations in the distribution of PALs across the New Zealand population and its subgroups.

Validation against the IPAQ-Long was included as this is the instrument currently recommended for use in physical activity surveys internationally. Validation against the old NZSPAS instrument was also included, in an effort to develop 'adjustors' to allow the time series to be continued.

Validation against an objective measure of physical activity, such as accelerometry or HRM, is the 'gold standard'. However, it was known that self-report instruments tend to over-report PALs as objectively measured, so a high degree of correlation was not anticipated.

Furthermore, while all three self-report instruments provide estimates of PAL on a continuous scale (eg in minutes of activity equivalised to moderate intensity per week), the complexity of human behaviour is such as to severely limit the accuracy of such estimates. Instead, a categorical analysis of the data (ie one in which the estimated PALs are grouped into a small number of categories) is preferred. As this is the way the data are intended to be used, most attention should be given to the correlations by activity category.

The preferred method for analysis of PALs was to equate one minute of vigorous with two minutes of moderate intensity activity. This is because most vigorous activities cluster around 7–9 METs, while most moderate intensity activities cluster around 3-4 METs (this refers to adults aged 25–64). Other methods of analysis were evaluated in the validation study as well; all gave very similar results, with the above method having slightly better performance than the others.

Study results (summary)

In brief, all three self-report instruments (NZPAQ-LF, NZPAQ-SF, IPAQ-Long) over-estimated PAL compared with HRM, but IPAQ-Long performed worst in this regard, with NZPAQ-LF performing best. Correlations between the NZPAQ short and long forms were reasonable except for moderate intensity activity, which was poor. Correlation between the NZPAQ-LF and the old NZSPAS instrument was reasonable, but not sufficient for use of 'adjustors' to be recommended.

Comparing the NZPAQ-LF and the IPAQ-Long with each other and HRM, the NZPAQ-LF appears the most valid self-reported physical activity survey instrument for use in New Zealand, in that it is the most accurate in assessing both walking and vigorous activity and equal to IPAQ-Long on total activity. It also performed best across all population subgroups.

Validation of NZPAQ-LF against HRM

The NZPAQ-LF was firstly compared to HRM, an objective measure of physical activity. HRM was only undertaken for three days while the surveys asked for information on the past seven days. Correlations between the NZPAQ-LF and HRM were moderate across walking and vigorous activity but poor for moderate intensity activity, when using a continuous measure of physical activity.

When comparing the NZPAQ-LF and HRM using the categorical measure of physical activity, the results were different. The NZPAQ-LF accurately categorises physical activity in the relatively active category (2.5 hours up to 5 hours) – that is, in the mid-range of activity levels. However, it performs poorly in categorising physical activity at either side of the middle category, under-reporting inactivity and over-reporting the high activity category.

Relating the PALS as measured by the NZPAQ-LF and HRM to the current New Zealand adult physical activity guidelines, the NZPAQ-LF is able to accurately reflect the proportion of respondents who meet the activity threshold (not taking regularity of activity into account). However, it greatly overestimates the proportion who are regularly physically active, relative to HRM (see Table 3).

Table 3: Validation Study: NZPAQ-LF vs HRM by activity category, equating one minute vigorous with two minutes moderate intensity activity

Activity category (total time equivalent to moderate activity over last 7 days)	**NZPAQ-LF** **% in activity group**	**HRM** **% in activity group**
Relatively inactive (<2.5 hrs)	22.8	56.7
Relatively active (2.5 – 4.9 hrs)	19.4	17.8
Highly active (5 or more hrs)	57.8	25.6
Current NZ guideline	**% meeting current guideline**	**% meeting current guideline**
>30 min/day on >5 days	42.2	5.6
>150 min/week but <5 days	35.0	37.8

Validation of NZPAQ-LF against the IPAQ-Long (and HRM)

The NZPAQ-Long has been found to be significantly correlated to the IPAQ-Long, an internationally validated measure of physical activity. The NZPAQ-LF was significantly correlated with the international instrument across all activity components.

Both NZPAQ-LF and the IPAQ-Long have a tendency to overestimate physical activity relative to HRM, but the IPAQ-Long values were at least 1.5 times greater than the NZPAQ-LF (and SF).

The NZPAQ-LF more accurately categorises respondents into discrete physical activity categories than does the IPAQ-Long: 82 percent of participants were categorised as 'highly active' by the IPAQ-Long, compared to only 58 percent by the NZPAQ-LF (using the recommended analysis mode i.e. equivalising one minute vigorous with two minutes moderate activity) (see Table 4).

Table 4: Validation Study: NZPAQ-LF vs IPAQ, HRM by activity category, equating one minute vigorous with two minutes moderate intensity activity

Activity category (total time equivalent to moderate activity over last 7 days)	**NZPAQ-LF** **% in activity group**	**IPAQ-Long** **% in activity group**	**HRM** **% in activity group**
Relatively inactive (<2.5 hrs)	22.0	9.7	56.7
Relatively active (2.5 – 4.9 hrs)	19.4	7.5	17.8
Highly active (5 or more hrs)	57.8	82.8	25.6

Assessment of short versus long forms of the NZPAQ

Although the main purpose of the validation study was to compare the NZPAQ-LF against HRM and the IPAQ-Long, the study also reinforces the notion that the NZPAQ-LF is the preferable instrument for PAL measurement for subgroup analyses in New Zealand (ie, preferable to the NZPAQ-SF). It should be used for this purpose in the biennial New Zealand Sport & Physical Activity surveys (NZSPAS).

NZPAQ-LF was a better measure of brisk walking, vigorous-intensity and total activity levels for the total sample, as well as for each population subgroup (defined by age, gender and ethnicity) separately, compared to the NZPAQ-SF. This is not surprising, as the diary-based NZPAQ-LF collects much more detailed and explicit information about physical activity behaviours than is possible in the brief NZPAQ-SF, which requires respondents to make their own judgements about intensity, frequency and duration of broad categories of activity types and across all contexts simultaneously. Comparison of the NZPAQ-SF with the LF is considered in more detail in the next section.

Ability to retain trend series between old NZSPAS and NZPAQ-LF

A key aim in monitoring population physical activity levels is to measure trends in the level and distribution of physical activity. As such, one objective of the validation study was to assess the degree of comparability between the new NZPAQ-LF and the old NZSPAS instrument.

The study found that there is only moderate comparability between the two instruments. Large and varied adjustment factors would need to be applied to provide any basis for continuation of the existing time series (ranging from 1.08 to 2.50). Therefore, the researchers recommend that the adjustment factors would have to be applied with caution. Adjustment factors are poorest across different ethnic groups.

From a practical point of view (as opposed to theoretical considerations), it might be argued that – given the identified level of overestimation of PAL relative to HRM of the new instrument compared with the old – SPARC should continue to use the old NZSPAS, as the actual PAL levels recorded may more closely reflect total physical activity.

However, this simply reflects the low sensitivity of the old NZSPAS instrument relative to other self-report instruments. The design of the old questionnaire imposes low sensitivity in that it does not take account of intensity. It is important (even if it increases overestimation relative to HRM) to collect data on patterns of intensity of physical activity at the population level (especially in relation to health benefit).

Also, the NZSPAS does not ask about all contexts of physical activity, particularly non-recreational activity. This aspect is important because the contextual patterns of physical activity are again of interest, especially in relation to intervention. Policy-makers need to have information on the full extent of *where* and *when* people are active, so interventions can be designed to encourage and support physical activity as an important part of everyday life. Therefore, if the new instrument more accurately represents the patterns of activity exhibited by the population (and subgroups), this is an advance in itself – even if it comes at the cost of apparently increased overestimation of PALs.

The new instrument also provides a better structure (a diary) for measuring regularity of activity, by providing people with the opportunity to recall more directly how many days per week they were active for 30 minutes or more. The old NZSPAS simply asks for an estimate of regularity, so requiring respondents to make their own implicit judgement on this important dimension of activity.

Given that the old NZSPAS included only recreational physical activity, its apparently better performance in relation to HRM may in fact be overstated. If non-recreational activity had also been measured, then PALs estimated by the old NZSPAS may have more closely matched those estimated by the NZPAQ-LF.

Lastly, given that other international measures are incorporating context and intensity of activity as standard features of physical activity measurement, it is important for New Zealand to do likewise, if only to permit international comparison of physical activity levels.

On balance, the recommendation is to substitute the NZPAQ-LF for the existing instrument in future NZSPAS surveys. However, it is further recommended that SPARC does not attempt to adjust the earlier results obtained using the old NZSPAS (using the adjustment ratios estimated in the validation study) in an attempt to make these results comparable to those obtained using the new instrument and so preserve the integrity of the time series. Instead, a new physical activity time series will commence with the next NZSPAS. Importantly, in future comparability will be possible for results from the NZPAQ-LF and those obtained from the NZPAQ-SF (for domestic comparability across different surveys) and the IPAQ (for international comparison).

Key recommendations and revisions for the NZPAQ-LF

Beyond the analysis of agreement or correlation between instruments, the authors of the *Validation Study* made several recommendations as to how the NZPAQ-LF could be improved. Key recommendations and their disposition (decided jointly by the Ministry of Health and SPARC) are summarised in Table 5.

Revised NZPAQ-LF

The revised NZPAQ-LF (identified as "version 1") is provided (questionnaire, instructions and showcards) in Appendix A. No other version of the instrument should be used. If further experience with this instrument necessitates further revisions, this document will be updated to include the new version, together with full justification for the change(s).

Table 5: Summary of recommendations and disposition: NZPAQ-LF

Recommendation	Justification	Disposition
Clarify the definition of 'moderate' intensity	Would improve agreement between instruments and reduce over-estimation of PAL	Agreed (wording change made to showcards and interviewer instructions)
Define the concept of 'active'	Would reduce misunderstanding, especially among certain ethnic groups	Agreed (added to introductory statement read by interviewer)
The adjustment factors for NZPAQ-LF vs. NZSPAS should be applied with caution, as there are obvious differences between age, gender and ethnic subgroups	Wide variation in adjustment factors was found, ranging from 1.08 to 2.50 for different subgroups. In particular the large discrepancy in values for the 40-59 year age group, and for Pacific people of all ages, suggests that comparison with the old NZSPAS would be problematic for these groups	Noted. Comparisons between the 'old' and the 'new' NZSPAS will not be attempted. Instead, a new time series will commence with first use of the new instrument

Add cultural activities to showcards as appropriate	Would enhance the cultural relevance of the instrument and improve performance among Māori and Pacific ethnic groups	Agreed. One of the objectives of the study was to obtain MET values for cultural activities (eg, kapa haka, waka ama, taiaha) added to appropriate showcards
Use analysis method that equates one minute vigorous with two minutes moderate activity	This method of analysis found to provide best agreement between short and long form instruments	Agreed (instruments were designed with this in mind)
Occupational physical activities should be defined by job tasks (based on Compendium of activities)[6]	Occupational physical activity levels found to be poorly assessed by job titles, more accurately assessed by MET levels listed in the Compendium of Physical Activities	Noted. Amend physical activity diary in the NZPAQ-LF to take account of job tasks, not job titles
A standard definition of resistance training should be created	Resistance training is associated with positive health outcomes and should be included in physical activity assessments (duration, frequency, intensity)	Noted. However, the NZPAQ-LF will not be altered to include a definition of resistance training at this stage Instead, a separate project will be designed to develop a definition and add a sub-category on resistance training to the instrument
Split intensities	48 percent of respondents reported one or more split intensity activity	Noted. Utilise this method of analysis in the field through the NZPAQ-LF
Translation of questionnaires: no recommendation Note the questionnaires were not translated into Māori (although one participant required an interpreter) Similar to the English versions key wording ('moderate intensity activity', 'active') was poorly interpreted through translated questionnaires. Poorly understood questions required lengthy dialogue through the interpreter		The questionnaires should be translated into Māori Modifications to wording of the instruments will need to be reflected in translated questionnaires (ie, Samoan and Tongan) and incorporated into a Māori translation

[6] Ainsworth et al, 2000. Compendium of Physical Activities: update of activity codes and MET intensities.

NZPAQ – Short Form

Introduction

Long form physical activity instruments are applicable only in dedicated physical activity surveys. There is also a need for short form instruments that can be included in general health and related surveys. For use in New Zealand, the Physical Activity Joint Monitoring Group (comprising the Ministry of Health, SPARC and Statistics New Zealand) has developed a modified version of the IPAQ-Short, the NZPAQ-SF. The modifications are intended to increase the relevance and cultural appropriateness of the instrument for New Zealand.

The NZPAQ-SF has now been validated against the NZPAQ-LF (the instrument of choice for the NZSPAS, the main monitoring tool for PAL in New Zealand) in a study conducted by the University of Auckland on behalf of the Ministry of Health and SPARC. The opportunity was also taken to check the performance of the NZPAQ-SF against the IPAQ-Long (the international standard self-report instrument) and an objective measure of energy expenditure, heart rate monitoring (HRM). However, it is the correlation with the NZPAQ-LF that is of most importance.

In brief, the NZPAQ-SF was found to correlate reasonably well with the NZPAQ-LF, especially at lower and higher activity levels, although correlation was relatively modest for moderate activity. Both instruments overestimated PAL as measured by heart rate monitoring (HRM), but less so than the IPAQ-Long (see previous section). The validation study has also suggested a number of minor improvements to the instrument, which may further improve its performance.

This report thus provides full documentation for anyone contemplating use of the NZPAQ-SF. Surveys in which this instrument is likely to be used include the New Zealand Health Surveys (NZHS), the Health Behaviour Survey (HBS), the National Nutrition Survey (NNS), SoFIE-Health, the postcensal Disability Survey, and surveys fielded by territorial authorities.

PAL data collected through these (and other) surveys will provide complementary information to the 'core' monitoring of New Zealanders' PALs through the NZSPAS, which will use the NZPAQ-LF. Hence the key validity issue is the correlation of PALs measured with the two forms of the NZPAQ. This is discussed in more detail below.

Provenance

The NZPAQ-SF was based closely on the IPAQ-Short, modified to reflect New Zealand conditions and to align better with the proposed NZPAQ-LF. Similarities and differences between the NZPAQ-SF and the IPAQ-Short from which it was derived are summarised below.

Similarities between the NZPAQ-SF and the IPAQ-Short

Both instruments are typical brief self-report questionnaires covering a seven-day recall period, designed to be interviewer administered and to be completed in under five minutes.

Neither collects data on type of activity, but both are intended to capture activities carried out in all contexts – although in practice it appears that both capture mainly leisure time physical activity and commuting activity.

Both attempt (not very successfully) to exclude light intensity activity (ie <3 METs), as such low level activity does not confer any cardiovascular benefit (although it still contributes to energy balance).

Both attempt to distinguish moderate (3–4 METs) from vigorous (>7 METs) intensity activity, and are designed to be analysed by equating one minute of vigorous with two minutes of moderate intensity activity. However, both are not completely successful in making this distinction, leading to over-estimation of PAL as objectively measured.

Both distinguish walking from other activities, because walking is by far the most common activity engaged in, can occur in a wide variety of settings and contexts, and can vary widely in intensity (from light to vigorous).

Differences

The most important difference is that the IPAQ-Short does not attempt to measure the frequency of activity. Without this dimension, the regularity of activity cannot be measured, so compliance with guidelines couched in frequency terms (eg 30 minutes/day of activity equivalent to moderate intensity on five or more days per week) cannot be determined using this instrument. By contrast, the NZPAQ-SF includes an extra item to tap this dimension of physical activity, albeit with incomplete success (as indicated by the validation study).

The order of items in the IPAQ-Short begins with vigorous activity, then moves on to moderate activity, and finally ends with items on walking. The NZPAQ-SF initially was arranged similarly, but early in the validation study it became obvious that this led to double counting of activity by some respondents, so over-estimating PAL. Accordingly, the order of items in the NZPAQ-SF was reversed, with beneficial results, as can be seen in the validation study.

The IPAQ-Short includes an item on sedentary behaviour. By contrast, the NZPAQ-SF is a pure activity (as opposed to inactivity) instrument and does not include items on sedentary behaviour (which correlates poorly with PAL, albeit being of interest in its own right).

The NZPAQ-SF includes an item on stage of change, as the distribution of the population across stages of readiness to modify behaviour is important for both design and evaluation of physical activity health promotion interventions and programmes. The IPAQ-Short does not include such items. (Note: this item can be considered optional and omitted if respondent burden is of critical concern).

Validation

Study design

The NZPAQ-SF has been validated against two self-report instruments (the NZPAQ-LF and IPAQ-Long) and HRM, an objective measure of energy expenditure. The validation study, carried out on behalf of the Ministry of Health and SPARC by the University of Auckland, involved 186 adult volunteers recruited from the general public, including approximately equal representation of European, Māori and Pacific ethnic groups, and covering a wide range of physical activity and fitness levels. The full report of the study is available from the Ministry of Health or SPARC on request.

Validation against the NZPAQ-LF is considered of greatest moment, since this is the instrument likely to be used in future SPARC NZSPAS surveys, the core mechanism for monitoring trends and variations in the distribution of PALs across the New Zealand population and its subgroups.

Validation against the IPAQ-Long was included as this is the instrument currently recommended for use in physical activity surveys internationally. The IPAQ-Short has been validated against the IPAQ-Long in international studies, and it was of interest to see whether the correlation was maintained with the NZPAQ-SF. The NZPAQ-SF was not validated against the IPAQ-Short directly, since as a variant of the latter, the correlation would inevitably be very high.

Validation against an objective measure of physical activity, such as accelerometry or HRM, is the ‘gold standard’. However, it was known that self-report instruments tend to over-report PALs as objectively measured, so a high degree of correlation was not anticipated. Given the intended application of the NZPAQ-SF – namely, as a substitute for the NZPAQ-LF in surveys where the long form cannot itself be used due to respondent burden – the most important correlation is in fact that between the two forms of the NZPAQ.

Furthermore, while all three self-report instruments provide estimates of PAL on a continuous scale (eg, in minutes of activity equivalised to moderate intensity per week), the complexity of human behaviour is such as to severely limit the accuracy of such estimates. Instead, a categorical analysis of the data (ie, one in which the estimated PALs are grouped into a small number of categories) is preferred. As this is the way the data are intended to be used, most attention should be given to the correlations by activity category.

Study results

In brief, all three self-report instruments over-estimated PAL compared with HRM, but IPAQ-Long performed worst in this regard, with NZPAQ-LF performing best. The NZPAQ-SF correlated more highly with the IPAQ-Long than did the NZPAQ-LF for most dimensions. Correlations between the NZPAQ short and long forms were reasonable except for moderate intensity activity, which was poor. Correlations were lower for Māori and Pacific ethnic groups than for the European/Other ethnic group.

Despite the relatively modest Spearman correlation coefficients (not shown), when activity levels were grouped into categories, both short and long form instruments gave almost identical results. Best results were obtained when the data was analysed assuming the equivalence of one minute of vigorous activity with two minutes of moderate activity. The results by activity category using this method of analysis for NZPAQ short vs long form are summarised below (Table 6).

Table 6: Validation Study: NZPAQ-SF vs NZPAQ-LF, by activity category, equating one minute vigorous with two minutes moderate intensity activity

	NZPAQ-SF	NZPAQ-LF
Activity category (total time equivalent to moderate activity over last 7 days)	**% in activity group**	**% in activity group**
Relatively inactive (<2.5 hrs)	21.7	22.8
Relatively active (2.5 – 4.9 hrs)	21.7	19.4
Highly active (5 or more hrs)	56.7	57.8

The agreement between the short and long forms would be expected to be less when frequency of activity is included, as the short form relies on the participant making a judgement about regularity, whereas the long form creates what is in effect a retrospective diary of time use. Nevertheless, the agreement remains impressive (Table 7).

Table 7: Validation Study: NZPAQ-SF vs NZPAQ-LF by current guideline, equating one minute vigorous with two minutes moderate intensity activity

	NZPAQ-SF	NZPAQ-LF
Current NZ guideline	**% meeting current guideline**	**% meeting current guideline**
>30 min/day on >5 days	34.4	42.2

Revision of the NZPAQ-SF

Beyond the analysis of agreement or correlation between instruments, the authors of the *Validation Study* also made several recommendations as to how the NZPAQ-SF could be improved. These recommendations and their disposition (decided jointly by the Ministry of Health and SPARC) are summarised in Table 8.

Table 8: Recommendations for revision of the NZPAQ-SF and their disposition

Recommendation	Justification	Decision
Rearrange the order of items to begin with walking, followed by moderate and then vigorous intensity	Would reduce extent of over-reporting of activity	Agreed (implemented after first phase of validation study)
Define the concept of 'active'	Would reduce misunderstanding, especially cultural	Agreed (added to introductory statement read by interviewer)
Clarify the definition of 'moderate' intensity	Would improve agreement between instruments and reduce overestimation of PAL	Agreed (wording change to item 3)
Insert headings 'Frequency of Activity' and 'Stage of Behaviour Change' before Q7 and Q8 respectively	Would help interviewer and respondent understand that a new topic is being raised	Agreed (headings inserted)
Compartmentalise Q7 as shown on page 50 of Validation Study report	Would increase comprehension of what was found by respondents to be a complex task	Agreed (wording change made to Q7)
Add cultural activities to showcards as appropriate	Would enhance the cultural relevance of the instrument and improve performance among Māori and Pacific ethnic groups	One of the objectives of the study (cultural activities added to appropriate showcards)
Use analysis method that equates one minute vigorous with two minutes moderate activity	This method of analysis provides best agreement between short and long form instruments	Agreed (instruments were designed with this in mind)
Frequency measurement error: In the NZPAQ-SF reported frequencies are simply summed – which could result in overestimation of physical activity for some individuals (counting both frequency and duration)	The occurrence of frequency measurement error should be minimised	Noted. The presence of this error will be noted as a limitation of the instrument at this stage Further assessment required of how to minimise this bias in future
Translation of questionnaires: no recommendation Note the questionnaires were not translated into Māori (although one participant required an interpreter) Similar to the English versions key wording ('moderate intensity activity', 'active') was poorly interpreted through translated questionnaires. Poorly understood questions required lengthy dialogue through the interpreter		The questionnaires should be translated into Māori Modifications to wording of the instruments will need to be reflected in translated questionnaires (ie, Samoan and Tongan) and incorporated into a Māori translation

Revised NZPAQ-SF

The revised NZPAQ-SF (NZPAQ-SF v1) is provided (questionnaire, instructions and showcards) in Appendix B. No other version of the instrument should be used. If further experience with this instrument necessitates further revisions, this document will be updated to include the new version(s) together with full justification for the change(s).

References

Ainsworth BE, Haskell WL, Whitt MC, et al. 2000. Compendium of Physical Activities: as update of activity codes and MET intensities. *Medicine Science Sports Exercise;* 32: S498-S516.

IPAQ. 2001. *The International Physical Activity Questionnaire: Summary Report of the Reliability and Validity Studies.* Prepared by Alison Marshall and Adrian Bauman for the IPAQ Executive Committee. Website:http://www.ipaq.ki.se/IPAQ.asp?mnu_sel=BBA&pg_sel=

Moy, K., McFarlane K, Scragg R and Robinson S. 2003. *Validation of MoH-short and SPARC-long Physical Activity Questionnaires.* Final Report. November 2003. Report prepared for SPARC. Auckland: Auckland UniServices. Unpublished.

Rzewnicki R, Vanden Anweele Y and De Bourdeaudhuij. 2002. Addressing Over reporting on the International Physical Activity Questionnairre (IPAQ) telephone survey with a population sample. *Public Health Nutrition; 6(3),* 299-305.

Appendices

Appendix A: NZPAQ-Long Form (instrument, showcards, instructions)

Physical Activity Table (version 1) - Activities performed in the last 7 days (Record time spent on each activity each day)

Date of Day 1:			Day of Week: Notes:				Start Time:				Finish Time:							
Context	Activity Code	TOTAL TIME (min) (L, M, V)	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7		TOTAL TIME (hrs/mins)	
			Mod	Vig	Mod	Vig	Mod	Vig	Mod	Vig	Mod	Vig	Mod	Vig	Mod	Vig	Mod	Vig
Physical Recreation & Sport																		
Transport																		
Occupation																		
Job Task																		
Other																		
	TOTAL																	
	Inactivity		Day 1 (hrs/mins)		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7		TOTAL TIME (hrs/mins)	
	Sitting or standing still or lying down																	
	Sleeping																	
	Total Inactivity																	
	Resistance Training																	

New Zealand Physical Activity Questionnaire – Long Form (Version 1)

'I am going to ask you about the time you spent being physically active in the last 7 days, *from* last xxx (day of the week; eg, if the interview is Monday, then this will be *from* and *including* last Monday) up to and including yesterday (in this example Sunday). Important: do not include activity undertaken today'.

'By 'active' I mean doing anything using your muscles.

'Please look at the Physical Activity Table. Firstly I am going to ask you about sport and physical recreation.'

Sport and Recreation – Showcard 1

'On this card is a list of sports and physical recreation activities ***(Showcard 1 – Sport and Recreation).*** Would you please tell me whether you have taken part in any of these in the last 7 days? Please don't count any activities linked to your job, activity for transport, teaching, coaching, refereeing, or sports administration.'

Write the sport and recreation activities column (and code) on the Physical Activity Table.

Add up and write in total activities (moderate/vigorous).

'Are there any other sports or physical activities that are **not** shown on this card, that you've taken part in during the **last 7 days?** Again please don't count activities linked to your job, activity for transport, teaching, coaching, refereeing, or sports administration.'

Write the activity and the code (47). If no additional activities mentioned for the last 7 days, GO TO Transport section of the Physical Activity Table.

Add up and write in total activities column (moderate/vigorous).

Transport – Showcard 2

'On this card is a list of different types of non-motorised transport activities ***(Showcard 2 – Transport).*** Think about all the non-motorised transport that you have used in the last 7 days. Transport includes from home to work return, transport to the shops and for chores and for getting from place to place. Count only those performed for a minimum of 10 minutes that have not already been reported on this chart.

'Try to estimate how much time is spent in moderate and vigorous intensity activity on each of the last 7 days.'

Write the transport activities and the time active and intensity each day on the Physical Activity Table.

Add up and write in total activities column (moderate/vigorous).

Occupation – Showcard 3

Ask for participant's job title and record in table.

'This show card ***(Showcard 3 – Occupation)*** provides some examples of activities and how intense they may be. Many jobs will have some components that are of moderate or vigorous intensity and some time that is of light intensity.

'Please explain the job task that involves physical activity'

'Try to estimate how much time is spent in moderate and vigorous intensity activity on each of the last 7 days.'

Write the occupational tasks and the time active and intensity each day on the Physical Activity Table.

Add up and write in total activities column (moderate/vigorous).

Cultural/Other/Incidental Activity – Showcard 4

'This show card ***(Showcard 4 – Cultural/Other/Incidental)*** provides some examples of cultural/other/incidental activities. Count only those activities performed in the last 7 days for a minimum of 10 minutes that have not already been reported.

'Try and estimate how much time on these activities was spent in moderate and vigorous intensity activity on each of the last 7 days.'

Write the cultural/incidental activities and the time active and intensity on each day on the Physical Activity Table.

Add up and write in total activities column (moderate/vigorous).

Inactivity– Showcard 5

'This show card ***(Showcard 5 – inactivity)*** provides some examples of inactivity. Not counting time spent at work, try to estimate how much time was spent being inactive for each of the last 7 days.'

Write the inactivity on the Physical Activity Table. Add up and write in total inactivity column.

NZPAQ-Long Form showcards

Showcard 1 – Sport and Physical Recreation Activities

1.	Aerobics	30.	Softball
2.	Aquarobics	31.	Squash
3.	Athletics (track and field)	32.	Surfing/body boarding
4.	Badminton	33.	Surf life saving
5.	Basketball	34.	Swimming
6.	Bowls – outdoor/lawn	35.	Tennis
7.	Bowls – indoor	36.	Tramping
8.	Cricket – outdoors	37.	Triathlon
9.	Cricket – indoors	38.	Volleyball
10.	Cycling – competitive	39.	Yachting/sailing/dinghy sailing
11.	Cycling – recreational (not mountain biking)	40.	Walking for enjoyment or exercise (10–30mins)
12.	Exercise classes/going to the gym (other than aerobics work)/weight training	41.	Walking for enjoyment or exercise (>30mins)
13.	Exercising at home		
14.	Fishing		
15.	Gardening		*Māori Activities*
16.	Golf	42.	Kapa haka/practice
17.	Hockey	43.	Taiaha
18.	Horse riding/equestrian	44.	Mau rakau
19.	Motor sports (motorcycling, trail biking, motor racing)	45.	Waka
20.	Mountain biking	46.	Waiata-a-ringa
21.	Netball	47.	Other (specify)
22.	Rowing		
23.	Rugby Union		
24.	Rugby League		
25.	Rugby – Touch		
26.	Running/jogging/cross-country		
27.	Shooting (rifle & pistol)		
28.	Skiing		
29.	Soccer		

Light Activity: Light activity is activity that does **not** cause you to 'huff and puff'.
Moderate Activity: Makes you breathe harder than normal, **but only a little.**
Vigorous Activity: Vigorous activity is activity that makes you 'huff and puff'.

Showcard 2 – Transport

1.	Walking
2.	Cycling[a]
3.	Running
4.	Other[b]

a) Cycling includes riding a tandem, recumbent or mountain bike to work.

b) Other may include roller-blading, non-motorised scooter, skateboarding, rowing/kayaking, skiing or horse riding.

Showcard 3 – Occupation

Light Intensity	Moderate Intensity	Vigorous Intensity
Tailor	Heavy cleaning	Carrying heavy loads
Office work	Farming	Forestry
Standing – bartending, store clerk, filing, photocopying	Machine tooling – operating lathe, punch press, drilling, welding	Heavy construction
Light cleaning	Massage	Digging ditches
Driving	Carrying light loads	Chopping or sawing wood
Sitting at computer	Gardening	
	Plumbing	
	Plastering	
	Electrical work	
	Welding	

Showcard 4 – Cultural/Other/Incidental Activity

Cultural Activities	Home Activities	Voluntary Work
Māori Cultural Dance – Kapa haka Haka Waiata-a-ringa	Sweeping	Playing with children
Taiaha	Heavy cleaning	Walking at a moderate speed
	Mopping	Cleaning church/other
Traditional games	Vacuuming	
	Carrying boxes/moving	
	Carpentry	
	Painting, papering	
	All home repairs	
	All gardening	
	Lawn mowing	

Showcard 5 – Inactivity

Examples of Inactivity
Watching TV or movie
Doing nothing
Lying in bed awake
Listening to music
Reading
Talking on phone
Meditating
Kneeling, eg, praying
Writing
Standing in a line or queue
Vehicle passenger

Interviewer Instructions: NZPAQ-LF (Version 1)

1. Administer the questionnaire only by face-to-face interview.
2. Do not use with children (<15 years).
3. Use translations when necessary (so far, Tongan and Samoan versions are available – please request these from the Ministry of Health or SPARC if needed).
4. Record the date of the interview, day of the week (eg, Monday) and interview start time in the box provided. Also note **Day 1** (which in this example will be the preceding Monday before the interview). Do not include activity undertaken on the day of the interview.

   Note: Interviewers need to have a calendar at hand to ensure the correct date is recorded for Day 1.
5. Begin with introductory statements, then proceed with questionnaire, referring throughout to the **Physical Activity Table** (as a prompt) and the showcards as appropriate.

   After coding each activity from the showcards, ask:

   - 'On which days in the last 7 days did you participate in (coded activity)?' ***Place a mark in the appropriate cells of the table.***
   - ***For each day the activity was performed, ask*** 'How many minutes was (coded activity) performed at a moderate intensity and how many minutes were performed at a vigorous-intensity?' ***Record the total time reported in the appropriate boxes.***
   - If walking (code 40 or 41) is reported, the interviewer should confirm that the walking was not performed to get from place to place: that is, walking for transportation if in fact it was for enjoyment/exercise.
6. Give the respondent time as needed to think about each question and formulate his or her response.
7. If the respondent requests clarification of a question, first read the question again. Then if clarification is still needed, try to use the definitions or examples provided
   in questionnaire and showcards.
8. Once the questionnaire is complete, note the finish time in the space provided in the form (likely to be longer for older people, less educated people and for those with English as a second language).
9. Also note (in the box at the top of the form) if the information is possibly unreliable, together with the reason for this eg lack of rapport, English as a second language, cognitive defect, hearing/speaking/communicating difficulty, lack of relevance (eg, severe mobility disability).

Appendix B: NZPAQ-Short Form (instrument, showcards, instructions)

New Zealand Physical Activity Questionnaire – Short Form (Version 1)

'I am going to ask you about the time you spent being physically active in the last 7 days, from last xxx to yesterday. Do not include activity undertaken today.

By 'active' I mean doing anything using your muscles.

'Think about activities at work, school or home, getting from place to place, and any activities you did for exercise, sport, recreation or leisure.

'I will ask you separately about brisk walking, moderate activities, and vigorous activities.'

Start Time:

Ask questions 1–7 (8 is optional)

Walking

1. During the last 7 days, on how many days did you ***walk at a brisk pace*** – a brisk pace is a pace at which you are breathing harder than normal? This includes walking at work or school, while getting from place to place, at home and at any activities that you did solely for recreation, sport, exercise or leisure.

   Think *only* about brisk walking done for at least 10 minutes at a time.

   ☐ _____ days per week (GO TO 2)

   ☐ None (GO TO 3)

2. How much time did you typically spend walking at a brisk pace on **each** of those days?

   ☐ _____ hours _____ minutes

Moderate physical activity

3. During the last 7 days, on how many days did you do **moderate** physical activities? 'Moderate' activities make you breathe harder than normal, **but only a little** – like carrying light loads, bicycling at a regular pace, or other activities like those on this card ***(Showcard 1 – Moderate Physical Activity).*** Do not include walking of any kind.

   Think *only* about those physical activities done for at least 10 minutes at a time.

   ☐ _____ days per week (GO TO 4)

   ☐ None (GO TO 5)

4. How much time did you typically spend on **each** of those days doing moderate physical activities?

   ☐ _____ hours _____ minutes

Vigorous physical activity

5. During the last 7 days, on how many days did you do **vigorous** physical activities? 'Vigorous' activities make you breathe **a lot** harder than normal ('huff and puff') – like heavy lifting, digging, aerobics, fast bicycling, or other activities like those shown on this card ***(Showcard 2 – Vigorous Physical Activity)***?

   Think only about those physical activities done for at least 10 minutes at a time.

   ☐ _____ days per week (GO TO 6)

   ☐ None (GO TO 7)

6. How much time did you typically spend on **each** of those days doing vigorous physical activities?

   ☐ _____ hours _____ minutes

Frequency of Activity

7. Thinking about all your activities over the last 7 days (including brisk walking), on how many days did you engage in:
   - At least 30 minutes of moderate activity (including brisk walking) that made you breathe a little harder than normal, OR
   - At least 15 minutes of vigorous activity that made you breathe a lot harder than normal ('huff and puff')?

   ☐ _____ days per week

   ☐ None

Stage of Change

Note: This question is optional

8. Describe your regular physical activity over the past six months. Regular physical activity means at least 15 minutes of vigorous activity (makes you 'huff and puff') or 30 minutes of moderate activity (makes you breathe slightly harder than normal) each day for 5 or more days each week. Include brisk walking.

   ☐ I am not regularly physically active and do not intend to be so in the next 6 months

   ☐ I am not regularly physically active but am thinking about starting in the next 6 months

   ☐ I do some physical activity but not enough to meet the description of regular physical activity

   ☐ I am regularly physically active but only began in the last 6 months

   ☐ I am regularly physically active and have been so for longer than 6 months

Finish Time:

Notes:

NZPAQ - Short Form Showcards

Showcard 1: Moderate Physical Activity

Carrying light loads	
Electrical work	Badminton (social)
Farming	Ballroom dancing
Heavy gardening (digging, weeding, raking, planting, pruning, clearing section)	Bowls (indoor, outdoor/lawn)
Heavy cleaning (sweeping, cleaning windows, moving furniture)	Cricket (outdoors – batting and bowling)
House renovation	Cycling (recreational – less than 15 km/hr – not mountain biking)
Machine tooling (operating lathe, punch press, drilling, welding)	Deer hunting
Lawn mowing (manual mower)	Doubles tennis
Plastering	Exercising at home (not gym)
Plumbing	Golf
	Horse riding/equestrian
Kapa haka practice	Kayaking – slow
Waiata-a-ringa	Skate boarding
	Surfing/body boarding
	Yachting/sailing/dingy sailing

Showcard 2: Vigorous Physical Activity

Carrying heavy loads	Boxing
Forestry	Aerobics
Heavy construction	Kayaking – fast
Digging ditches	Athletics (track and field)
Chopping or sawing wood	Aquarobics
	Skiing
Taiaha	Badminton (competitive)
Haka	Basketball
	Mountain biking
Soccer	Cricket – indoors (batting and bowling)
Rowing	Cycling – competitive
Rubgy League	Cycling – recreational (not mountain biking) – more than 15 km/hr
Rugby Union	Rock climbing
Hockey	Exercise classes / going to the gym (other than for aerobics) / weight training
Race walking	Netball
Running/jogging/cross country	Judo, karate, other martial arts
Table tennis (competitive)	Softball (running and pitching only)
Singles tennis	Squash
Touch rugby	Surf life saving
Tramping	Swimming – competitive
Triathlon	Waterpolo
Volleyball	

Interviewer Instructions: NZPAQ-SF (Version 1)

1. Administer the questionnaire only by face-to-face interview.
2. Do not use with children (<15 years).
3. Use translations when necessary (so far, Tongan and Samoan versions are available – please request these from Ministry of Health or SPARC if needed).
4. Note the start time for the interview in the box provided.
5. Begin with introductory statements, then proceed with the questionnaire, following the routing of questions as appropriate and showing the respondent the relevant showcard at the appropriate times.
6. Give the respondent the time they need to think about each question and formulate their response.
7. If the respondent requests clarification of a question, first read the question again. Then if clarification is still needed, try to use definitions or examples provided in the questionnaire and the showcards.
8. Once the interview has been completed, note the finishing time in the box provided (this is likely to be longer for older people, less educated people and those for whom English is a second language).
9. Also note (in the **Notes** box provided) if the information is possibly unreliable, together with reason for this, eg, lack of rapport, English is second language, cognitive defect, hearing/ speaking/communicating difficulty, lack of relevance (eg severe mobility disability).


MINISTRY OF
HEALTH
MANATŪ HAUORA


SPARC
ihi AOTEAROA
Sport & Recreation New Zealand