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Occupational and leisure-time physical activity have different relationships with health: a cross-sectional survey study of working nurses

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Authors and affiliations:

Helen M. Parker, PhD [1,2]; Robyn Gallagher, PhD [1,3]; Christine Duffield, PhD [4,5]; Ding Ding, PhD [1,6]; David Sibbritt, PhD [7]; Lin Perry, PhD [5]

[1] Charles Perkins Centre, The University of Sydney, NSW, Australia

[2] Sydney School of Health Sciences, Faulty of Medicine and Health, The University of Sydney, NSW, Australia

[3] Susan Wakil School of Nursing and Midwifery, Faculty of Medicine and Health, The University of Sydney, NSW, Australia

[4] School of Nursing and Midwifery, Edith Cowan University, WA, Australia

[5] School of Nursing and Midwifery, Faculty of Health, University of Technology Sydney, NSW, Australia

[6] Prevention Research Collaboration, Sydney School of Public Health, The University of Sydney, NSW, Australia

[7] School of Public Health, Faculty of Health, University of Technology Sydney, NSW, Australia

Email addresses: h.parker@sydney.edu.au; robyn.gallagher@sydney.edu.au; c.duffield@ecu.edu.au; melody.ding@sydney.edu.au; David.Sibbritt@uts.edu.au; Lin.Perry@uts.edu.au

Corresponding Author

Dr Helen Parker

Address: Level 2, Charles Perkins Centre, Faculty of Medicine and Health, University of Sydney, NSW Australia

Email: h.parker@sydney.edu.au

Phone: +61 2 8627 9864

Abstract

Background: Recent research has focussed on potential benefits of physical activity in occupational settings in addition to leisure time. However, occupational physical activity differs substantially for occupations that require heavy and repetitive physical work such as nursing. We explored associations between leisure time and occupational physical activity and health outcomes in working nurses and midwives. **Methods:** Nurses enrolled in the *Fit For the Future* study (New South Wales, Australia) who completed physical activity questionnaires (n=4343) were classified according to high (HO) or low (LO) occupational and high (HL) or low (LL) leisure time physical activity: HO performed walking/heavy labour most/all of the time at work; HL met the guidelines of 150min/week moderate-to-vigorous LTPA, creating four categories: HOLL, HOHL, LOHL, LOLL. **Results:** HL predicted better self-rated health (Unstandardized B=0.51, 95%CI:0.44-0.57), and lower likelihood of $\geq$3 sick days in the past 12 months (OR:0.71, 95%CI:0.61-0.83), whereas HO predicted higher likelihood of $\geq$3 sick days (OR:1.17, 95%CI:1.01-1.35), adjusting for all variables. **Conclusions:** Occupational physical activity may not confer the same health benefits as leisure time physical activity for nurses. Health promoting interventions should emphasise the importance of achieving adequate moderate-vigorous leisure time physical activity for all including those undertaking substantial occupational physical activity.

Introduction

Engaging in physical activity is important for achieving long-term health, avoiding illness and chronic disease, and increasing work productivity.[1] International guidelines for physical activity recommend that adults engage in at least 150 minutes of moderate to vigorous physical activity per week, progressing up to 300 minutes per week for optimal health benefits including prevention of unhealthy weight gain.[1] Despite the well-publicised benefits, and the inclusion of all forms of physical activity in these guidelines (not just physical activity in a leisure time setting), most adults do not meet this minimum recommended level.[2]

While the recommended levels of physical activity can be achieved through activity performed in both occupational and leisure settings, increasing evidence demonstrates that occupational physical activity (OPA) does not have the same health benefits as leisure time physical activity (LTPA).[3,4] This 'physical activity health paradox'[5] has been primarily associated with occupations that have high levels of activity that involve prolonged standing and repeated bending, lifting, pulling and pushing over multiple hours of the work day,[5] which can induce fatigue. Nurses' work typically includes these activities.[6] However, nurses' OPA varies markedly according to the context and role. A systematic review of 15 studies identified that the majority of nursing work is light-intensity physical activity and nurses' occupational activity predominantly involves standing and walking while delivering direct patient care.[7] Objectively measured physical activity has substantiated that nurses' physical activity is primarily accumulated via low intensity walking and that few nurses meet recommended guidelines for physical activity.[8] Physical activity was recorded by accelerometer in Canadian nurses (n=410), of whom only 23% met physical activity guidelines, with an average 96 mins moderate-vigorous physical activity accumulated/week.[8] An important contributing factor was nurses' work hours, with nurses who worked full-time rotating shifts significantly less likely to meet international recommendations.[8] Objectively measured postural and velocity movement using a combination of placement of accelerometers not only confirmed that nurses spent most of their time in light activity tasks but also identified that a small proportion of nurse time was spent in extreme postures with few

84 opportunities for recovery from those postures.[6] Thus while nurses may be active at work, their OPA
85 may not contribute to their health.

86 Previous work in the field of nurses' health and physical activity found that high OPA was a risk
87 factor for ischaemic heart disease among female nurses,[9] but that regular LTPA of ≥20min at least
88 once per week was associated with decreased risk of long-term sick leave.[10] Evidence indicates that,
89 in contrast to the well-documented health effects of physical activity undertaken for leisure, OPA may
90 have negative health outcomes,[11,12] and thus should be considered as a separate domain to LTPA
91 when considering how an individual meets the physical activity guidelines. There are limited data for
92 the relative benefits of the separate and combined effects of OPA and LTPA in nurses. Therefore, this
93 study sought to assess the relationships between physical activity undertaken in leisure time and in the
94 occupational setting, with self-rated health and sick days taken in the previous 12 months among
95 nurses.

96

97 **Methods**

98 **Study design and participants**

99 The nursing *Fit For The Future* study involved a cross-sectional survey of working nurses' health and
100 wellbeing in New South Wales (NSW), Australia; details of study methods have been reported.[13]
101 Briefly, a link to an online survey was distributed to all members of the NSW Nurses and Midwives
102 Association, the NSW professional organisation (membership approximately 63,000) and snowballed
103 via personal emails, professional organisations and magazines between June 2014 and February 2015.
104 The study was approved by hospital and university human research ethics committees
105 (LNR11/POWH/242; LR/2013000741). Participants indicated their informed consent by completing
106 the online survey. Participants were excluded from this secondary analysis if they had not completed
107 physical activity questionnaires.

108 **Procedures**

The electronic survey included assessment of physical activity, self-rated health and sick days taken in the previous year. LTPA was assessed using items from the International Physical Activity Questionnaire Short Form (IPAQ-SF).[14] Items regarding LTPA asked respondents to report the frequency and total duration (in minutes) of moderate (e.g. social tennis) and vigorous (e.g. Zumba, competitive sport, running) intensity physical activity undertaken in leisure time per week. Respondents were also asked to report the frequency and total duration in minutes per week of brisk walking "to get somewhere or for exercise", and vigorous household or garden chores.

OPA was assessed using a modified version of the single-item Occupational Physical Activity Questionnaire (OPAQ) used in the Centre for Disease Control's 'Behavioral Risk Factor Surveillance System'.[15-17] Respondents selected a radio button to nominate how much work time was spent sitting, standing, walking and performing heavy labour or physically demanding work from the categories "all of the time", "most of the time", "some of the time", "a little of the time", and "none of the time". The LTPA and OPA questions appeared on the same page of the survey, and therefore respondents were unlikely to double-report any activity, such as count any OPA as LTPA and vice versa.

Self-rated health was assessed on a scale from very poor to excellent (1-6), based on the SF12.[18] Sick days were assessed by asking respondents the number of sick days they had taken from work in the past 12 months. The inflection point of distribution of sick days was found to be at $\geq$3 sick days, which was used to dichotomise the data.

Additional data related to sociodemographic information were extracted, including metropolitan/regional work location, carer responsibilities, work situation including years of nursing experience, contract type, hours worked/week, shift work, and health factors including presence of chronic disease and self-reported anthropometry for calculation of body mass index (BMI).

Statistical analysis

The sample was described using frequencies and percentages, means and standard deviations. Respondents were categorised into high (HO) or low (LO) OPA based on whether they reported engaging in walking or performing heavy labour 'most' or 'all' of the time (HO) or lower levels of

activity at work (LO). They were further categorised into high (HL) or low (LL) LTPA based on whether they achieved at least (HL) or fewer than (LL) 150 minutes per week of moderate to vigorous physical activity in leisure time (not including transport or household chores/domestic tasks). Combining these classifications, we developed four activity categories: high occupation, low leisure activity (HOLL); high occupation, high leisure activity (HOHL), low occupation, high leisure activity (LOHL), and low occupation, low leisure activity (LOLL). Differences between these physical activity categories were compared via one-way ANOVA with Tukey post-hoc tests for continuous variables, and Chi-square test with z-test for independent proportions with Bonferroni adjustment for categorical variables. Stepwise and then backward linear regression analyses were conducted to examine predictors of self-rated health. Stepwise and then backward binary logistic regression analyses were conducted to examine predictors of reporting $\geq$3 sick days in 12 months. For each analysis, the first level of regression (Model 1) included OPA alone (HO versus LO); then Model 2 included LTPA alone (HL versus LL). Model 3 included OPA and LTPA together, as well as an interaction variable (OPA x LTPA). The final model for prediction of self-rated health or $\geq$3 sick days utilised forward (Model 4) and then backward (Model 4a) regression and included adjustment for age, gender, BMI, caring responsibilities, work location (metropolitan/regional), work hours, shift work, and chronic diseases (mood disorder, bone and joint disease, cardiovascular disease, respiratory disease, diabetes). The p-level was set at 0.05. Assumptions were tested for collinearity and no variable exceeded variance inflation factor of 1.5. Intensity of LTPA is an important consideration when exploring relationships between physical activity and health. Therefore, a sensitivity analysis was conducted where minutes of moderate- and vigorous-intensity LTPA were transformed into Metabolic Equivalent of Task (MET)-minutes per week, assuming an average of 4 METs per minute for moderate- and 8 METs per minute for vigorous-intensity LTPA; HL defined as achieving at least 500 MET-min/week LTPA. As some respondents, such as older individuals or those with chronic disease, may find that brisk walking raises the heart rate to the same degree as that usually associated with moderate-intensity physical activity, a further sensitivity analysis included brisk walking (3.3 METs per minute) plus moderate- and vigorous-intensity physical activity (MVPA) in the calculation of LTPA.

Results

Baseline characteristics for the n=4,343 respondents compared for categories of physical activity are shown in table 1. The sample mean age was 48.0 ± 11.4 years (range: 18 – 74 years); most respondents (90.8%) were female. Respondents were primarily engaged in full-time work (n=2,339, 53.9%), and worked 34.3 ± 9.8 hours per week; n=817 (18.8%) were a primary carer for a dependent, and n=2,279 (52.5%) were shift-workers. High OPA was reported by 49.5%, and high LTPA in 21.4%, with activity characterised respectively as HOLL 39.4%, HOHL 10.1%, LOHL 11.3% and LOLL 39.2%. Nurses in the LOLL category were significantly older and worked the longest hours compared to both high OPA groups (HOHL and HOLL), and had higher BMI, and the highest prevalence of chronic illness compared to all other activity groups.

Overall, 85.4% of respondents classified their health as "good" or better and 2,466 (56.8%) reported $\geq$3 sick days in the last 12 months. Differences between activity groups were present for both self-rated health and the odds of reporting taking $\geq$3 sick days in the past 12 months (Figure 1). High LTPA was associated with better self-rated health (ANOVA post-hoc comparisons: HOHL (4.86±0.91), LOHL (4.97±0.82) > HOLL (4.35±0.94), LOLL (4.34±0.92), $p<0.001$ for each comparison). When paired with low OPA, fewer nurses with high than low LTPA reported taking $\geq$3 sick days in the last 12 months (proportion reporting taking $\geq$3 sick days in the past 12 months: LOHL (48.3%) < LOLL (55.9%), HOLL (61.4%), $p<0.05$ for each comparison; HOHL (51.6%) not significantly different from LOHL and LOLL) than low LTPA. Conversely, those with high OPA tended to rate their health less well (self-rated health: high OPA 4.45±0.95 compared to low OPA 4.48±0.94, $p=0.029$). However, when considered with LTPA, differences between groups were non-significant. Similarly, a larger proportion of these individuals reported taking $\geq$3 sick days in the past year (59.4% of high OPA compared to 54.2% of low OPA nurses, $p=0.001$; when considered with LTPA: HOLL (61.4%) > all other activity groups, $p<0.05$ for each comparison). Both activity components, LTPA and OPA, appeared to influence these outcomes.

As some respondents, such as older individuals or those with chronic disease, may find that brisk walking raises the heart rate to the same degree as that usually associated with moderate-intensity physical activity, we reviewed findings derived from groups allocated on the basis of achieving 150minutes of leisure time physical activity from MVPA and brisk walking as a sensitivity analysis (Supplementary Table 1). The results were effectively unchanged and hence we retained the analysis as above. Similarly, the full regression model without chronic disease (Model 5 – stepwise regression; Model 5a – backwards regression) was not as informative, so this paper will discuss the results from Model 4 and Model 4a only.

Regression models exploring the relationships between LTPA and OPA activity components alone and in combination are presented in Table 2a (linear regression model summaries) and Table 2b (explanatory power for each variable included in linear and binary logistic regression). High OPA alone was associated with a 24% greater odds (OR for High OPA: 1.236, 95%CI 1.096 – 1.394) of reporting ≥3 sick days in the past year, and this likelihood changed very little when OPA was examined in combination with LTPA (OR for High OPA: 1.254, 95%CI 1.094 – 1.437), and when adjusted for age, gender, BMI, caring responsibilities, work location, work hours, shift work and chronic disease (model 4, 'fully adjusted model': OR for High OPA: 1.230, 95%CI 1.051 – 1.440). OPA was not a statistically significant predictor of self-rated health. LTPA was positively associated with self-rated health, and negatively associated with sick days: high LTPA was associated with 30% lower odds of reporting ≥3 sick days in the past year (OR for High LTPA: 0.700, 95%CI 0.605 – 0.810). This relationship was similar whether LTPA was examined alone, in combination with OPA (OR for High LTPA: 0.735, 95%CI 0.601 – 0.899), or in the fully adjusted model including other characteristics also understood to influence self-rated health and propensity to take sick days from work (OR for High LTPA: 0.784, 95%CI 0.635 – 0.967). The linear regression models were not substantially changed by examining full time workers only (fully adjusted model (model 4) R: 0.402, $p<0.001$), nor when including minutes spent in brisk walking plus MVPA in the categorisation of HL/LL (R: 0.420, $p<0.001$), using 500 MET-min MVPA as the cut-off for HL/LL (R: 0.417, $p<0.001$)

or 500 MET-min brisk walking plus MVPA as the cut-off for HL/LL (R: 0.425, p<0.001) (see Supplementary Tables 3a, 3b, 4 and 5 for full details of these analyses).

Discussion

The results of this study demonstrate the positive potential of LTPA for nurses' health. High LTPA was associated with better self-rated health and fewer sick days regardless of how much OPA was undertaken. The positive relationship between LTPA and health, however, is not capitalised on by the majority of nurses, with more than 80% not achieving recommended physical activity guidelines in their leisure time. Conversely, high OPA, reported by almost half (49.5%) the respondents, was found to have a negative relationship with overall health and was associated with greater sickness absence. Addressing the potential negative effects of OPA represents a challenge for optimising health for the nursing workforce given the physically demanding nature of many nurses' work.

The health promoting benefits of LTPA are well-established and include lower risk of obesity, diabetes and cardiovascular disease.[19] The present study findings support the theory that when physical activity is sufficient (meets guideline recommendations) additional benefits accrue for mental health and self-rated health[19-21] with other gains including lower likelihood of nurses taking sick days from work. However, our study also revealed that the relationship between LTPA and health is complex in nurses, and must take account of OPA. When low LTPA is coupled with high OPA this appears to strengthen the relationship between low LTPA and health. A previous study found that nurses reporting this combination of physical activity were most likely to take sick days 'because of their health' as well as having difficulty sleeping 'most of the time',[20] indicating the negative relationship between high OPA and health may be more pervasive and possibly self-perpetuating given its potential to reduce motivation to engage in LTPA.[22,23] The mechanisms underpinning the varying health effects of LTPA versus OPA are not completely understood. However, insufficient time to recover between episodes of occupational activity (also seen in overtraining), chronic elevation of 24-hour heart rate, blood pressure and inflammation resulting from chronic high levels of OPA have been suggested as potential explanations why OPA may not have the anticipated benefit on

health.[5] Our study also highlights that negative relationships between OPA and health are occurring regardless of other established factors such as age and work hours, known to influence self-rated health and sick days.[24]

A physically demanding job such as nursing presents several barriers to LTPA. The fatiguing nature of high OPA can reduce motivation to engage in LTPA outside work hours. Nursing is also mentally and emotionally challenging, which may increase the risk of depression and psychological fatigue,[25] also reducing motivation for exercise. Furthermore, rotating shift-work, which is common in nursing roles and reported by over half (52.5%) the nurses in this study, occurs in relation to direct patient care and where OPA is high.[25] Indeed, in the current study, a high proportion of shift workers (70.8%) also reported having high OPA. Rotating shift-work also results in accumulated sleep deficit[22] which can negatively impact health[20,23] and reduce motivation to exercise outside work hours. Nonetheless, some nurses in the current study reported high LTPA even in the presence of high OPA, so the relative importance of barriers and motivations for LTPA will vary for each individual. Programs intended to increase LTPA in nurses should focus on minimising or eliminating barriers to LTPA including, but not limited to, managing fatigue, depression and insufficient sleep, and nurse managers ensuring reasonable rotating work schedules and night-time work.

The group with the highest proportion of chronic diseases, LOLL, along with HOLL, also had the poorest self-rated health. Chronic disease may influence self-rated health and sick days differently between the physical activity groups in this study: for some, chronic disease may be a motivator towards engaging in physical activity as part of disease management, whereas for others disease may be a substantial barrier to physical activity through increasing pain and discomfort.[26] Therefore, in this study we controlled regression analyses for age and chronic diseases (Table 2b, model 4a), and found that even outside of these possible confounders high LTPA was associated with better self-rated health (Unstd B: 0.507, 95%CI 0.442 – 0.572) and lower likelihood of reporting $\geq$3 sick days (OR 0.709, 95%CI 0.609 – 0.827). However, this was a cross-sectional study, so the association between health status and types of physical activity may be bidirectional. A longitudinal study design or the

addition of qualitative data regarding the reasons for respondents' decisions on exercise during their leisure time will be important for future study.

Many factors influence nurses' roles and associated OPA. Some individuals, perhaps due to social or economic circumstances, may have work roles directed by necessity rather than choice, or may not have the option to select a low OPA role. Such limitations to perceived autonomy may negatively affect perceived health.[27] However, as a nurse's career advances, widening job opportunities with increasing experience may enable greater choice over their OPA, to reduce fatigue and risk of injury. This capacity to choose may also influence their perception of their health and motivation to take sick days.[28] Furthermore, while it could be proposed that part-time and casual nurses may be able to achieve more LTPA simply because they work fewer hours in their nursing role, there are many reasons a nurse may work part-time which may influence their capacity to achieve the physical activity guidelines. For example, individuals may choose to work part-time due to caring responsibilities or health status, etc.; alternatively, they may wish to work full-time but have not been able to secure full-time work, or may work a second part-time nursing or non-nursing role. Furthermore, the hours worked by part-time/casual nurses are variable, ranging from 4 to 40+ hours per week, depending on the individual's propensity to take extra shifts or work double shifts when available. We controlled for this variability by including Work Hours in the current analysis, however each of these factors will influence engagement in physical activity in different ways for different individuals. Future research should explore the reasons nurses work particular work contracts (e.g. full- or part-time) and collect qualitative data on how other aspects of life affect engagement in physical activity, in and outside of work.

Strengths of this study include the large sample size and diversity of nursing workforce respondents, and the use of validated tools to assess LTPA and OPA. Study limitations include the cross-sectional design and the self-reported nature of physical activity, health and sick days, which may be open to respondent bias. Potential confounding factors including annual personal income, household income and ethnicity were not collected, or not collected in a way amenable to use in this analysis. These factors may influence the capacity, motivation, and resources available to an individual to utilise non-

work time for physical activity. As the IPAQ-SF does not collect transport-related physical activity beyond walking, any such activity was likely missed. The different attitudes individuals may have to domestic chores precluded identification of that aspect of lifestyle physical activity as leisure or occupational activity; consequently, domestic chores were not included in our assessment of LTPA or OPA. Future work in this area should incorporate longitudinal data, better account for causality and collect qualitative data, for example, on the reasons for taking sick days and factors underpinning perceived health.

In conclusion, the findings from this study indicate that LTPA has important beneficial effects that must be distinguished from OPA for nurses and future work should examine other occupations that entail heavy labour including difficult or repetitive lifting, reaching and bending tasks. High levels of OPA may have important negative effects on health and implications for nursing productivity. However, there is a strong potential that LTPA when undertaken at sufficient intensity and duration may offset some of the negative effects of OPA. This study shows that even in the face of high OPA, some individuals are able to achieve and/or exceed the national guidelines for LTPA whilst other do not. While a number of physical activity promotion schemes are provided by some employers and in some occupational settings, such as subsidised gym memberships for workers, these schemes are not universally utilised, and future research should examine the factors that facilitate and hinder their uptake. Health promotion interventions for nurses and midwives and other workforces characterised by high OPA are urgently needed and should emphasise the potential benefits of LTPA, the non-equivalence of OPA for delivering health benefits from physical activity, and, while encouraging all individuals to reach recommended guidelines, should selectively target those engaged in high OPA occupations for intervention and support.

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Declaration of interests None to declare

Data Sharing Data collected for the *Fit For The Future* study will be made available on publication of this manuscript. Request for access to study data and data dictionary can be made by emailing the chief investigator, L. Perry: Lin.Perry@uts.edu.au.

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399 **Tables**

400 **Table 1.** Demographic and health characteristics of survey respondents according to activity category.

Occupational Physical Activity:	**High OPA**		**Low OPA**		
Leisure Time Physical Activity:	**Low LTPA**	**High LTPA**	**High LTPA**	**Low LTPA**	**p-value^**
	(HOLL) (n=1685)	**(HOHL) (n=433)**	**(LOHL) (n=489)**	**(LOLL) (n=1680)**	
Age (years)	46.10 ± 12.29[c,d]	44.71 ± 12.40[c,d]	49.19 ± 10.07[a,b]	50.41 ± 10.01[a,b]	<0.001
Female gender (n, %)	1589 (93.0%)[b,c]	378 (86.7%)[a,d]	420 (85.7%)[a,d]	1549 (91.0%)[b,c]	<0.001
BMI (kg/m^2)	27.85 ± 6.20[b,c,d]	25.77 ± 4.84[a,d]	26.10 ± 5.15[a,d]	28.87 ± 6.59[a,b,c]	<0.001
Work location: Metropolitan (n, %)	1089 (64.4%)	284 (65.7%)	340 (69.7%)	1130 (67.0%)	0.140
Work hours per week (hr)	32.60 ± 9.43[c,d]	33.21 ± 8.92[c,d]	35.95 ± 10.35[a,b]	35.92 ± 9.83[a,b]	<0.001
Carer 6hr+ per week (n, %)	343 (20.1%)	79 (18.0%)	73 (14.9%)	322 (18.9%)	0.074
Shift work (n, %)	1268 (74.2%)[c,d]	346 (79.2%)[c,d]	147 (29.9%)[a,b]	518 (30.4%)[a,b]	<0.001
Leisure time MVPA (minutes per week)	27.56 ± 42.15[b,c]	291.17 ± 146.51[a,c,d]	269.96 ± 119.98[a,b,d]	28.39 ± 42.00[b,c]	<0.001
Health Conditions:					
Mood Disorder	456 (26.7%) [c]	99 (22.6%) [d]	91 (18.5%) [a,d]	505 (29.6%) [b,c]	<0.001
Bone and joint disease	328 (19.2%) [d]	65 (14.8%) [d]	91 (18.5%)	399 (23.4%) [a,b]	<0.001
Cardiovascular disease	308 (18.0%) [b,d]	54 (12.3%) [a,d]	69 (14.1%) [d]	414 (24.3%) [a,b,c]	<0.001
Respiratory disease	328 (19.2%)	70 (16.0%)	80 (16.3%)	362 (21.2%)	0.018

Diabetes	136 (8.0%) [d]	21 (4.8%) [d]	26 (5.3%) [d]	183 (10.7%) [a,b,c]	<0.001

Data presented as mean ± SD, or n (%). [^]Continuous variables compared using one-way ANOVA with Tukey post-hoc tests; categorical variables compared using Chi-square test, proportions compared without Bonferroni adjustment. BMI=body mass index. MVPA=moderate and vigorous physical activity.

Superscripts: significantly different from [a]HOLL, [b]HOHL, [c]LOHL, [d]LOLL.

Table 2a. Model summaries for prediction of self-rated health (linear regression).

Model (linear regression)	R	R-square	Standard error of the estimate	P-value (model)
Model 1: OPA	0.015	0.0002	0.945	0.311
Model 2: Meets LTPA guidelines	0.247	0.061	0.916	<0.001
Model 3: OPA and LTPA	0.248	0.061	0.916	<0.001
Model 4: fully adjusted model – Enter	0.406	0.162	0.868	<0.001
Model 4a: fully adjusted model – Backward regression	0.405	0.162	0.867	<0.001
Model 5: fully adjusted model (excl. chronic disease) – Enter	0.274	0.073	0.912	<0.001
Model 5a: fully adjusted model (excl. chronic disease) – Backward regression	0.272	0.074	0.913	<0.001

Abbreviations: LTPA, leisure-time physical activity; OPA, occupational physical activity.

Model 1: prediction of self-rated health by high OPA alone; Model 2: prediction of self-rated health by high LTPA (i.e. meets LTPA guidelines of at least 150min/week moderate to vigorous physical activity) alone; Model 3: prediction of self-rated health by high OPA and high LTPA; Model 4: prediction of self-rated health by high OPA and high LTPA, adjusted for age, gender, BMI, caring responsibilities, work location (metropolitan/regional), work hours, shift work, and chronic disease (mood disorder, bone and joint disease, cardiovascular disease, respiratory disease, diabetes), Model 4a all variables entered into the model, 4b via backward regression, final predictors: achieves at least 150min moderate- to vigorous-intensity physical activity in leisure time, age, female gender, caring responsibilities, shift work, chronic diseases (mood disorder, bone and joint disease, cardiovascular disease, respiratory disease, diabetes); Model 5: prediction of self-rated health by high OPA and high LTPA, adjusted for age, gender, BMI, caring responsibilities, work location (metropolitan/regional), work hours and shift work (not chronic disease); model 5a: backward regression (variables excluded: work hours, female gender, interaction between OPA and LTPA).

419 **Table 2b.** Predictors of self-rated health and ≥3 sick days taken in past 12 months for working nurses
420 and midwives in New South Wales, Australia.

Variable	**Self-rated Health**		**Sick days 3+ in 12 months**	
Final adjusted model	**Unstandardised B (95%CI)**	**T-statistic**	**Exp(B) Odds Ratio (95% CI)**	**Percentage Correct**
Model 1: Occupation-based PA				
High OPA	-0.029 (-0.085, 0.027)	-1.014	**1.236 (1.096, 1.394)**	**56.8%**
Model 2: Leisure-time PA				
Meets LTPA guidelines	**0.568 (0.502, 0.635)**	**16.748**	**0.700 (0.605, 0.810)**	**56.9%**
Model 3: OPA and LTPA				
High OPA	0.006 (-0.055, 0.068)	0.205	**1.254 (1.094, 1.437)**	**57.2%**
Meets LTPA Guidelines	**0.623 (0.531, 0.715)**	**13.264**	**0.735 (0.601, 0.899)**	
OPA * LTPA	-0.116 (-0.249, 0.018)	-1.701	0.911 (0.681, 1.220)	
Model 4: fully adjusted model (All variables entered)				
High OPA	0.039 (-0.026, 0.105)	1.177	**1.230 (1.051, 1.440)**	**61.3%**
Meets LTPA Guidelines	**0.538 (0.449, 0.626)**	**11.863**	**0.784 (0.635, 0.967)**	
OPA * LTPA	-0.063 (-0.191, 0.065)	-0.964	0.795 (0.586, 1.079)	
Age	**0.009 (0.007, 0.012)**	**7.007**	**0.978 (0.972, 0.984)**	
Female gender	**-0.099 (-0.191, -0.007)**	**-2.110**	0.860 (0.689, 1.075)	
Carer for dependent	**-0.119 (-0.188, -0.051)**	**-3.407**	1.175 (0.996, 1.386)	
Metropolitan work location	0.033 (-0.023, 0.090)	1.166	**1.283 (1.122, 1.467)**	
Work hours per week	0.001 (-0.002, 0.004)	0.891	**1.027 (1.020, 1.034)**	
Shiftwork (Yes)	**-0.101 (-0.161, -0.042)**	**-3.347**	**1.194 (1.036, 1.376)**	
Mood disorder	**-0.285 (-0.346, -0.224)**	**-9.147**	**1.502 (1.294, 1.743)**	
Bone and joint disease	**-0.362 (-0.432, -0.292)**	**-10.124**	**1.429 (1.207, 1.692)**	

Cardiovascular disease	**-0.260 (-0.330, -0.189)**	**-7.240**	**1.188 (1.004, 1.407)**	
Respiratory disease	**-0.215 (-0.283, -0.148)**	**-6.247**	**1.352 (1.146, 1.595)**	
Diabetes	**-0.369 (-0.465, -0.273)**	**-7.518**	1.230 (0.973, 1.556)	
Model 4a: fully adjusted				**61.2%**
model (Backward regression)				
High OPA	(term removed)		**1.167 (1.011, 1.346)**	
Meets LTPA Guidelines	**0.507 (0.442, 0.572)**	**15.373**	**0.709 (0.609, 0.827)**	
OPA * LTPA	(term removed)		(term removed)	
Age	**0.009 (0.006, 0.012)**	**6.826**	**0.978 (0.972, 0.984)**	
Female gender	-0.096 (-0.188, 0.005)	-2.069	(term removed)	
Carer for dependent	**-0.119 (-0.187, -0.050)**	**-3.396**	1.169 (0.991, 1.379)	
Metropolitan work location	(term removed)		**1.283 (1.122, 1.467)**	
Work hours per week	(term removed)		**1.027 (1.020, 1.034)**	
Shiftwork (Yes)	**-0.097 (-0.150, -0.043)**	**-3.533**	**1.194 (1.036, 1.376)**	
Mood disorder	**-0.288 (-0.349, -0.228)**	**-9.291**	**1.495 (1.289, 1.735)**	
Bone and joint disease	**-0.362 (-0.432, -0.292)**	**-10.117**	**1.420 (1.200, 1.681)**	
Cardiovascular disease	**-0.261 (-0.331, -0.190)**	**-7.276**	**1.191 (1.007, 1.410)**	
Respiratory disease	**-0.218 (-0.286, -0.151)**	**-6.334**	**1.349 (1.143, 1.592)**	
Diabetes	**-0.370 (-0.467, -0.274)**	**-7.547**	1.228 (0.971, 1.554)	
Model 5: fully adjusted model				
(no chronic diseases; All				
variables entered)				
High OPA	0.082 (0.013, 0.151)	2.335	**1.172 (1.003, 1.369)**	**60.1%**
Meets LTPA Guidelines	**0.631 (0.538,0.724)**	**13.317**	**0.719 (0.584, 0.884)**	
OPA * LTPA	-0.108 (-0.243, 0.026)	-1.577	0.835 (0.617, 1.129)	
Age	**0.004 (0.001, 0.007)**	**3.044**	**0.982 (0.976, 0.988)**	
Female gender	-0.076 (-0.172, 0.021)	-1.537	0.889 (0.714, 1.108)	

Carer for dependent	**-0.184 (-0.256, -0.113)**	**-5.030**	**1.255 (1.066, 1.477)**	
Metropolitan work location	0.055 (-0.004, 0.114)	1.830	**1.244 (1.090, 1.420)**	
Work hours per week	0.002 (-0.001, 0.005)	1.243	**1.025 (1.018, 1.032)**	
Shiftwork (Yes)	-0.118 (-0.181, -0.056)	-3.721	**1.214 (1.055, 1.397)**	
Model 5a: fully adjusted model (no chronic diseases; Backward regression)				
High OPA	0.057 (-0.006, -.119)	1.782	(term removed)	**60.4%**
Meets LTPA Guidelines	**0.576 (0.508, 0.643)**	**16.740**	**0.662 (0.569, 0.769)**	
OPA * LTPA	(term removed)		(term removed)	
Age	**0.004 (0.001, 0.006)**	**3.011**	**0.981 (0.976, 0.987)**	
Female gender	(term removed)		(term removed)	
Carer for dependent	**-0.184 (-0.256, -0.112)**	**-5.026**	**1.256 (1.068, 1.478)**	
Metropolitan work location	0.056 (-0.003, 0.115)	1.851	**1.241 (1.087, 1.416)**	
Work hours per week	(term removed)		**1.025 (1.018, 1.031)**	
Shiftwork (Yes)	**-0.124 (-0.186, -0.061)**	**-3.898**	**1.273 (1.120, 1.447)**	

Abbreviations: CI, confidence interval; LTPA, leisure time physical activity; MVPA, moderate- and vigorous-intensity physical activity; OPA, occupational physical activity; PA, physical activity.

Regression models: 1: prediction of self-rated health or ≥3 sick days by high OPA alone; 2: prediction of self-rated health or ≥3 sick days by high LTPA alone (high LTPA: achieves at least 150min/week MVPA in leisure time); 3: prediction of self-rated health or ≥3 sick days by high OPA and high LTPA, adjusted for the interaction between high OPA and high LTPA; 4: prediction of self-rated health or ≥3 sick days by high OPA and high LTPA, adjusted for age, gender, BMI, caring responsibilities, work location (metropolitan/regional), work hours, shift work, and chronic disease (mood disorder, bone and joint disease, cardiovascular disease, respiratory disease, diabetes), 4a: backward regression for model 4 (all variables including chronic disease); 5: prediction of self-rated health or ≥3 sick days by high OPA and high LTPA, adjusted for age, gender, BMI, caring responsibilities, work location (metropolitan/regional), work hours and shift work; 5a: backward

433 regression for model 5 (all variables entered excluding chronic disease). Bold font indicates statistically

434 significant predictors of self-rated health or ≥3 sick days.

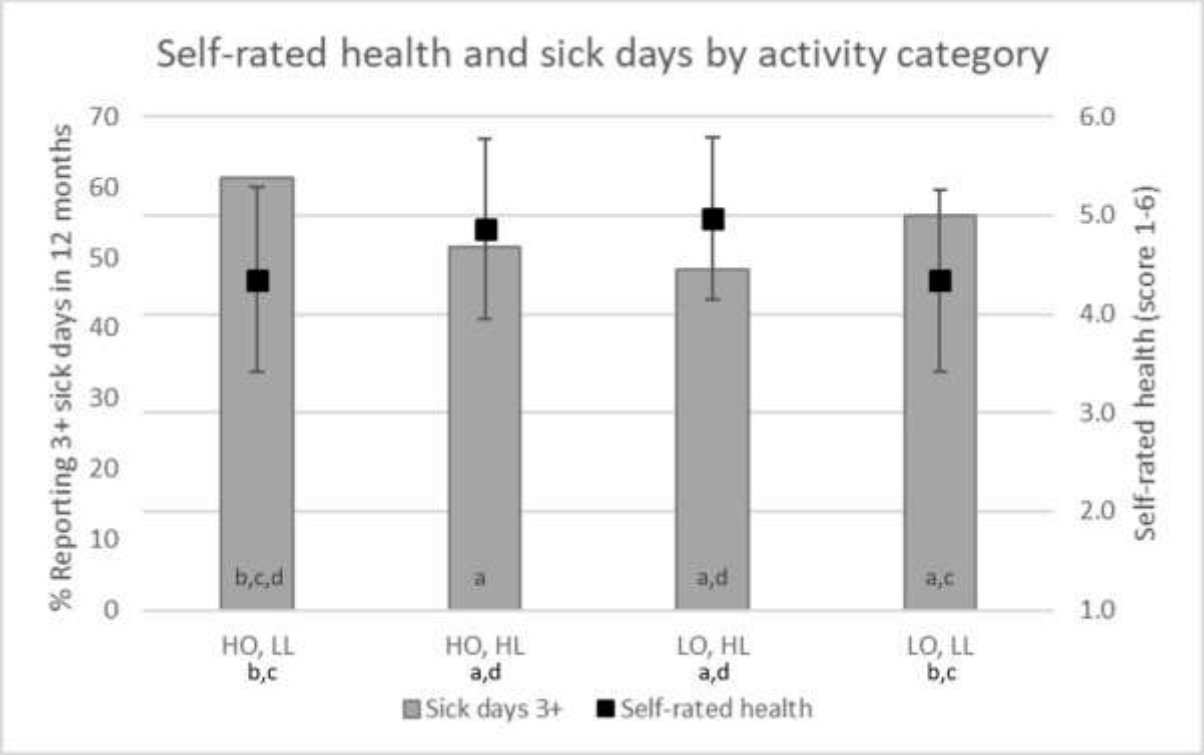

Figure 1. Self-rated health and proportion of workforce taking ≥3 sick days in the previous 12 months by leisure and work activity category. Letters below graph indicate statistical differences between groups for self-rated health, letters inside data bars indicate differences between proportions of respondents taking ≥3 sick days in 12 months: statistically different from [a]HOLL, [b]HOHL, [c]LOHL, [d]LOLL.

Supplementary Table 1. Demographic and health characteristics of survey respondents according to activity category, with LTPA including moderate- and vigorous-intensity physical activity undertaken in leisure time plus brisk walking.

Occupational Physical Activity:	**High OPA**		**Low OPA**		
Leisure Time Physical Activity:	**Low LTPA**	**High LTPA**	**High LTPA**	**Low LTPA**	**p-value^**
	(HOLL) (n=1191)	**(HOHL) (n=957)**	**(LOHL) (n=1054)**	**(LOLL) (n=1136)**	
Age (years)	45.56 ± 12.34[c,d]	46.13 ± 12.30[c,d]	50.24 ± 9.75[a,b]	50.06 ± 10.29[a,b]	<0.001
Female gender (n, %)	1106 (92.9%)[c]	861 (90.2%)	926 (88.0%)[a,d]	1039 (91.5%)[c]	0.001
BMI (kg/m^2)	28.40 ± 6.48[b,c,d]	26.22 ± 5.12[a,d]	26.67 ± 5.47[a,d]	29.73 ± 6.85[a,b,c]	<0.001
Work location: Metropolitan (n, %)	764 (64.7%)[c]	609 (64.6%)	732 (70.0%)[a]	734 (65.2%)	0.023
Work hours per week (hr)	32.79 ± 9.24[c,d]	32.64 ± 9.44[c,d]	36.04 ± 10.06[a,b]	35.82 ± 9.85[a,b]	<0.001
Carer 6hr+ per week (n, %)	247 (20.7%)	175 (18.3%)	190 (18.0%)	205 (18.0%)	0.270
Shift work (n, %)	882 (74.1%)[c,d]	732 (76.6%)[c,d]	298 (28.3%)[a,b]	365 (32.1%)[a,b]	<0.001
Leisure time MVPA (minutes per week)	14.60 ± 28.79[b,c]	164.32 ± 157.67[a,d]	156.09 ± 138.13[a,d]	13.53 ± 27.23[b,c]	<0.001
Leisure time MVPA plus brisk walking (minutes per week)	44.68 ± 44.90[b,c]	348.75 ± 209.35[a,c,d]	324.65 ± 173.21[a,b,d]	47.11 ± 45.37[b,c]	<0.001
Health Conditions:					
Mood Disorder	325 (27.3%) [c]	230 (24.0%) [d]	231 (21.9%) [a,d]	364 (32.0%) [b,c]	<0.001
Bone and joint disease	226 (19.0%) [d]	167 (17.5%) [d]	202 (19.2%) [d]	287 (25.3%) [a,b,c]	<0.001
Cardiovascular disease	198 (16.6%) [d]	164 (17.1%) [d]	195 (18.5%) [d]	286 (25.2%) [a,b,c]	<0.001
Respiratory disease	227 (19.1%)	171 (17.9%) [d]	184 (17.5%) [d]	257 (22.6%) [b,c]	0.009
Diabetes	107 (9.0%) [b]	50 (5.2%) [a,d]	72 (6.8%) [d]	137 (12.1%) [b,c]	<0.001
Self-rated health	4.27 ± 0.96[b,c]	4.68 ± 0.90[a,c,d]	4.80 ± 0.85[a,b,d]	4.19 ± 0.82[b,c]	<0.001

Data presented as mean ± SD, or n (%). ^Continuous variables compared using one-way ANOVA with Tukey post-hoc tests; categorical variables compared using Chi-square test, proportions compared without Bonferroni adjustment. BMI=body mass index. MVPA=moderate and vigorous physical activity. HL=achieves at least 150min of combined moderate- and vigorous-intensity physical activity in leisure time and brisk walking. Superscripts: significantly different from [a]HOLL, [b]HOHL, [c]LOHL, [d]LOLL.

Supplementary Table 2. Demographics and health characteristics of nurses according to leisure time moderate- and vigorous-intensity physical activity.

Leisure Time Physical Activity:	Low MVPA (0-149min/wk)	Moderate MVPA (150-299min/wk)	High MVPA (300+min/wk)	p-value^
Age (years)	48.25 ± 11.41[c]	47.39 ± 11.17	46.56 ± 11.89[a]	0.013
Female gender (n, %)	3138 (92%)[b,c]	515 (87.7%)[a]	283 (83.5%)[a]	<0.001
BMI (kg/m^2)	28.36 ± 6.42[b,c]	26.24 ± 4.90[a]	25.44 ± 5.16[a]	<0.001
Work location: Metropolitan (n, %)	2219 (65.7%)	410 (70.1%)	214 (63.9%)	0.078
Work hours per week (hr)	34.26 ± 9.77	34.26 ± 9.74	35.37 ± 9.87	0.137
Carer 6hr+ per week (n, %)	665 (19.5%)	96 (16.3%)	56 (16.5%)	0.098
Shift work (n, %)	1786 (52.3%)	307 (52.0%)	186 (55.0%)	0.617
Leisure time MVPA (minutes per week)	27.97 ± 42.07[b,c]	202.22 ± 35.46[a,c]	415.26 ± 133.53[a,b]	<0.001
Health Conditions:				
Mood Disorder	961 (28.1%)[b,c]	124 (21.0%)[a]	66 (19.5%)[a]	<0.001
Bone and joint disease	727 (21.3%)[b]	99 (16.8%)[a]	57 (16.8%)	0.010
Cardiovascular disease	722 (21.1%)[b,c]	88 (14.9%)[a]	35 (10.3)[a]	<0.001
Respiratory disease	690 (20.2%)[b]	92 (15.6%)[a]	58 (17.1%)	0.018
Diabetes	319 (9.3%)[b,c]	35 (5.9%)[a]	12 (3.5%)[a]	<0.001
Self-rated health	4.35 ± 0.93[b,c]	4.87 ± 0.87[a]	4.99 ± 0.86[a]	<0.001

Abbreviations: BMI, body mass index; MVPA, moderate- to vigorous-intensity physical activity. Data presented as mean ± SD, or n (%). ^Continuous variables compared using one-way ANOVA with Tukey post-hoc tests; categorical variables compared using Chi-square test, proportions compared without Bonferroni adjustment; group differences indicated by superscript letters: a=different to Low MVPA; b=different to moderate MVPA; c=different to high MVPA.

Supplementary Table 3a. Summary statistics for linear regression (fully adjusted model, 'model 4') for prediction of self-rated health using different PA classifications and subsets of the population

Model (linear regression)	R	R-square	Standard error of the estimate	P-value (model)
Original analysis (model 4): fully adjusted model, all variables entered; HL: 150+ min/week from MVPA only in leisure time, all respondents regardless of contract type	*0.406*	*0.165*	*0.868*	*<0.001*
Fully adjusted model, all variables entered; HL: 150+ min/week from MVPA in leisure time and/or brisk walking	0.420	0.176	0.862	<0.001
Fully adjusted model, all variables entered; HL: 500+ MET-min/week from MVPA only in leisure time	0.417	0.174	0.863	<0.001
Fully adjusted model, all variables entered; HL: 500+ MET-min/week from MVPA in leisure time and/or brisk walking	0.425	0.181	0.859	<0.001
Full time workers only: fully adjusted model, all variables entered; HL: 150+ min/week MVPA only in leisure time	0.402	0.161	0.866	<0.001

Linear regression model summaries for prediction of self-rated health by high occupational physical activity and high leisure time physical activity (LTPA), modelled using different definitions of high LTPA (HL) or different sub-set of the population (e.g. full time workers only), adjusted for age, gender, BMI, caring responsibilities, work location (metropolitan/regional), work hours, shift work and chronic disease (mood disorder, bone and joint disease, cardiovascular disease, respiratory disease and diabetes). Abbreviations: HL, high leisure time physical activity; MET, metabolic equivalent of task; min, minutes; MVPA, moderate-to-vigorous physical activity.

Supplementary Table 3b. Linear regressions for the prediction of self-rated health (all respondents) using different PA classifications

Variable Model 4: fully adjusted model (All variables entered)	Self-rated Health Unstandardised B (95%CI)	T-statistic	Self-rated Health Unstandardised B (95%CI)	T-statistic
Meets LTPA Guidelines:	***150+ min/week MVPA only in leisure time (Original analysis)***		**150+ min/week MVPA in leisure time + brisk walking**	
High OPA	*0.039 (-0.026, 0.105)*	*1.177*	-0.013 (-0.067, 0.050)	-0.408
Meets LTPA Guidelines	***0.538 (0.449, 0.626)***	***11.863***	**0.417 (0.359, 0.474)**	**14.213**
OPA * LTPA	*-0.063 (-0.191, 0.065)*	*-0.964*	**0.183 (0.082, 0.284)**	**3.554**
Age	***0.009 (0.007, 0.012)***	***7.007***	**0.008 (0.006, 0.011)**	**6.212**
Female gender	***-0.099 (-0.191, -0.007)***	***-2.110***	**-0.092 (-0.184, -0.001)**	**-1.977**
Carer for dependent	***-0.119 (-0.188, -0.051)***	***-3.407***	**-0.122 (-0.190, -0.054)**	**-3.511**
Metropolitan work location	*0.033 (-0.023, 0.090)*	*1.166*	0.026 (-0.030, 0.081)	0.899
Work hours per week	*0.001 (-0.002, 0.004)*	*0.891*	0.001 (-0.001. 0.004)	0.906
Shiftwork (Yes)	***-0.101 (-0.161, -0.042)***	***-3.347***	**-0.098 (-0.157, -0.039)**	**-3.250**
Mood disorder	***-0.285 (-0.346, -0.224)***	***-9.147***	**-0.281 (-0.342, -0.221)**	**-9.106**
Bone and joint disease	***-0.362 (-0.432, -0.292)***	***-10.124***	**-0.348 (-0.418), -0.278)**	**-9.778**
Cardiovascular disease	***-0.260 (-0.330, -0.189)***	***-7.240***	**-0.277 (-0.347, -0.207)**	**-7.788**
Respiratory disease	***-0.215 (-0.283, -0.148)***	***-6.247***	**-0.217 (-0.284, -0.150)**	**-6.336**
Diabetes	***-0.369 (-0.465, -0.273)***	***-7.518***	**-0.345 (-0.440, -0.249)**	**-7.054**
Meets LTPA guidelines:	**500+ MET-min/week MVPA only in leisure time**		**500+ MET-min/week brisk walking + MVPA in leisure time**	
High OPA	-0.016 (-0.047, 0.080)	0.507	-0.013 (-0.075, 0.050)	-0.404
Meets LTPA Guidelines	**0.479 (0.411, 0.548)**	**13.718**	**0.435 (0.378, 0.491)**	**15.052**
OPA * LTPA	0.054 (-0.056, 0.165)	0.969	**0.191 (0.092, 0.290)**	**3.767**
Age	**0.010 (0.008, 0.013)**	**7.691**	**0.009 (0.006, 0.012)**	**6.754**
Female gender	**-0.100 (-0.192, -0.009)**	**-2.148**	**-0.098 (-0.189, -0.007)**	**-2.106**
Carer for dependent	**-0.118 (-0.186, -0.050)**	**-3.391**	**-0.120 (-0.188, -0.052)**	**-3.451**
Metropolitan work location	0.034 (-0.022, 0.089)	1.179	0.020 (-0.035, 0.076)	0.722
Work hours per week	0.001 (-0.001, 0.004)	0.964	0.002 (-0.001, 0.004)	1.163
Shiftwork (Yes)	**-0.105 (-0.164, -0.045)**	**-3.468**	**-0.096 (-0.155, -0.037)**	**-3.189**
Mood disorder	**-0.276 (-0.337, -0.215)**	**-8.907**	**-0.279 (-0.339, -0.218)**	**-9.045**
Bone and joint disease	**-0.352 (-0.422, -0.283)**	**-9.897**	**-0.341 (-0.410, -0.271)**	**-9.596**
Cardiovascular disease	**-0.260 (-0.330, -0.190)**	**-7.301**	**-0.273 (-0.343, -0.204)**	**-7.699**
Respiratory disease	**-0.209 (-0.276, -0.142)**	**-6.089**	**-0.216 (-0.283, -0.149)**	**-6.330**
Diabetes	**-0.350 (-0.445, -0.254)**	**-7.150**	**-0.342 (-0.438, -0.247)**	**-7.032**

Linear regression, all variables listed entered into each model. Bold font indicates statistically significant predictors of self-rated health. Abbreviations: CI, confidence interval; LTPA, leisure time physical activity; OPA, occupational physical activity; PA, physical activity. Definition for "Meets LTPA Guidelines" given above each analysis.

Supplementary Table 4. Binary logistic regression for prediction of reporting taking ≥3 sick days in 12 months

Variable Final adjusted model	Sick days 3+ in 12 months Exp(B) Odds Ratio (95% CI)	Percentage Correct	Sick days 3+ in 12 months Exp(B) Odds Ratio (95% CI)	Percentage Correct
Meets LTPA guidelines:	**150+ min/week from MVPA in leisure time (Original analysis)**	**61.3%**	**150+ min/week from MVPA in leisure time and/or brisk walking**	**61.6%**
High OPA	**1.230 (1.051, 1.440)**		**1.235 (1.060, 1.438)**	
Meets LTPA Guidelines *("high LTPA")*	**0.784 (0.635, 0.967)**		**0.719 (0.626, 0.825)**	
OPA * LTPA	0.795 (0.586, 1.079)		**0.782 (0.614, 0.996)**	
Age	**0.978 (0.972, 0.984)**		**0.979 (0.973, 0.985)**	
Female gender	0.860 (0.689, 1.075)		0.858 (0.686, 1.072)	
Carer for dependent	1.175 (0.996, 1.386)		1.179 (0.999, 1.391)	
Metropolitan work location	**1.283 (1.122, 1.467)**		**1.291 (1.129, 1.477)**	
Work hours per week	**1.027 (1.020, 1.034)**		**1.027 (1.020. 1.034)**	
Shiftwork (Yes)	**1.194 (1.036, 1.376)**		**1.188 (1.030. 1.370)**	
Mood disorder	**1.502 (1.294, 1.743)**		**1.487 (1.281, 1.726)**	
Bone and joint disease	**1.429 (1.207, 1.692)**		**1.409 (1.190. 1.670)**	
Cardiovascular disease	**1.188 (1.004, 1.407)**		**1.190 (1.005, 1.410)**	
Respiratory disease	**1.352 (1.146, 1.595)**		**1.347 (1.141, 1.590)**	
Diabetes	1.230 (0.973, 1.556)		**1.201 (0.949, 1.520)**	
Meets LTPA guidelines:	**500+ MET-min/week from MVPA only in leisure time**	**61.4%**	**500+ MET-min/week from MVPA in leisure time and/or brisk walking**	**61.5%**
High OPA	**1.217 (1.043, 1.419)**		**1.233 (1.059, 1.436)**	
Meets LTPA Guidelines *("high LTPA")*	**0.725 (0.616, 0.854)**		**0.700 (0.610, 0.802)**	
OPA * LTPA	0.824 (0.633, 1.072)		**0.783 (0.616, 0.994)**	
Age	**0.977 (0.971, 0.984)**		**0.978 (0.972, 0.984)**	
Female gender	0.853 (0.683, 1.066)		0.853 (0.682, 1.066)	
Carer for dependent	1.173 (0.994, 1.384)		1.177 (0.997, 1.390)	
Metropolitan work location	**1.284 (1.123, 1.469)**		**1.298 (1.134, 1.485)**	
Work hours per week	**1.027 (1.020, 1.033)**		**1.026 (1.019, 1.033)**	
Shiftwork (Yes)	**1.196 (1.037, 1.379)**		**1.186 (1.028, 1.368)**	
Mood disorder	**1.486 (1.280, 1.725)**		**1.483 (1.277, 1.721)**	
Bone and joint disease	**1.420 (1.199, 1.681)**		**1.402 (1.183, 1.661)**	
Cardiovascular disease	1.182 (0.998, 1.399)		**1.187 (1.002, 1.406)**	
Respiratory disease	**1.344 (1.139, 1.586)**		**1.345 (1.140, 1.588)**	
Diabetes	1.208 (0.954, 1.528)		1.197 (0.945, 1.516)	

Binary logistic regression, all variables listed entered into each model. Bold font indicates statistically significant predictors of ≥3 sick days in 12 months. Abbreviations: CI, confidence interval; LTPA, leisure time physical activity; OPA, occupational physical activity; PA, physical activity. Definition for "Meets LTPA Guidelines" given in the header for each analysis.

Supplementary Table 5. Full time workers only: linear and binary logistic regression models for prediction of self-rated health and ≥3 sick days in 12 months.

Variable Final adjusted model	Self-rated Health Unstandardised B (95%CI)	T-statistic	Sick days 3+ in 12 months Exp(B) Odds Ratio (95% CI)	Percentage Correct
Model 1: Occupation-based PA				
High OPA	-0.032 (-0.109, 0.045)	-0.820	**1.506 (1.269, 1.788)**	**62.3%**
Model 2: Leisure-time PA				
Meets LTPA guidelines	**0.550 (0.461, 0.639)**	**12.159**	**0.651 (0.535, 0.793)**	**62.3%**
Model 3: OPA and LTPA				
High OPA	-0.010 (-0.095, 0.075)	-0.232	**1.575 (1.293, 1.919)**	**62.3%**
Meets LTPA Guidelines	**0.573 (0.457, 0.689)**	**9.696**	**0.711 (0.551, 0.918)**	
OPA * LTPA	-0.058 (-0.238, 0.122)	-0.631	0.815 (0.544, 1.219)	
Model 4: fully adjusted model (All variables entered)				
High OPA	0.036 (-0.058, 0.130)	-0.757	1.238 (0.982, 1.562)	**63.6%**
Meets LTPA Guidelines (150+ min/week from MVPA in leisure time)	**0.508 (0.395, 0.620)**	**8.853**	**0.751 (0.576, 0.980)**	
OPA * LTPA	-0.029 (-0.203, 0.145)	-0.322	0.748 (0.493, 1.135)	
Age	**0.008 (0.004, 0.011)**	**4.278**	**0.985 (0.976, 0.994)**	
Female gender	-0.092 (-0.199, 0.015)	-1.692	0.845 (0.650, 1.098)	
Carer for dependent	-0.088 (-0.186, 0.011)	-1.750	**1.341 (1.048, 1.715)**	
Metropolitan work location	0.048 (-0.031, 0.127)	1.189	1.128 (0.931, 1.366)	
Work hours per week	0.000 (-0.008, 0.007)	-0.128	**0.969 (0.951, 0.988)**	
Shiftwork (Yes)	**-0.149 (-0.235, -0.064)**	**-3.431**	**1.330 (1.080, 1.638)**	
Mood disorder	**-0.258 (-0.344, -0.172)**	**-5.893**	**1.373 (1.107, 1.703)**	
Bone and joint disease	**-0.350 (-0.450, -0.249)**	**-6.831**	**1.363 (1.064, 1.745)**	
Cardiovascular disease	**-0.277 (-0.373, -0.181)**	**-5.652**	1.219 (0.962, 1.544)	
Respiratory disease	**-0.221 (-0.314, -0.129)**	**-4.679**	**1.268 (1.004, 1.600)**	
Diabetes	**-0.424 (-0.557, -0.291)**	**-6.261**	1.135 (0.816, 1.579)	

Meets LTPA guidelines = achieves at least 150min MVPA in leisure time. Abbreviations: CI, confidence interval; LTPA, leisure time physical activity; MVPA, moderate-to-vigorous physical activity; OPA, occupation