

Physical Activity– Revised for Survey 1

Age Cohorts	1973-78, 1946-51 and 1921-26 cohorts
Surveys	Survey 1
Derived Variable	RevExStat
Definition	Revised measure of recreational physical activity at Survey 1
Source Items (Index numbers)	EX1& EX2 (EXER-001& EXER-002)
Statistical form	Continuous variable
Derived Variables	RevPAGp
Definition	Revised measure of recreational physical activity at Survey 1
Source Items	RevExStat
Statistical form	Categorical variable
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Note that this revised derived variable is not included in the ALSWH data sets. The variable included is the ExStat_old (See Physical Activity – Survey 1 in the DDS)

Source items

EX1: In a NORMAL week, how many times do you engage in VIGOROUS exercise lasting for 20 minutes or more? (exercise which makes you breathe harder or puff and pant, such as netball, squash, jogging, aerobics, vigorous swimming, etc.)

EX2: In a NORMAL week, how many times do you engage in LESS VIGOROUS exercise which lasts for 20 minutes or more? (exercise which does not make you breathe harder or puff and pant, like walking, gardening, swimming and lawn bowls)

Code	Re-code	Response
1	0	Never
2	1	Once a week
3	2.5	Two or three times a week
4	5	Four, five or six times a week
5	7	Once every day

6 10 More than once every day

Derived Variables

The goal is to define a PA score describing the long-term PA levels of individual women across 3 ALSWH surveys as accurately as possible. This requires comparability between the measure at Survey 1 and the measure used in Surveys 2 and 3. This is difficult, as there is no measure of the duration of exercise at Survey 1.

The derivation of the original physical activity score (ExStat) from EX1 and EX2 has been described in Section 2 (see Index Number EXER-015). A revised physical activity score, based on the same items but more comparable with the PA measure at Surveys 2 and 3 is described here. Items are re-coded to estimate the number of times per week each type of activity is undertaken; mostly the mid-point of the response categories (as in the derivation of ExStat).

Duration of 20 minutes was assumed for all activity sessions and all re-coded responses were multiplied by 20. As the survey items provide no information on the duration of exercise sessions, 20-minutes was chosen as this was the duration of activity required to solicit a frequency response.

Responses were then weighted to reflect the metabolic cost (MET) of these activities. One MET is equivalent to resting metabolic rate or sitting quietly; 4 METs is used as the generic value for moderate activity and 7.5 METs is used as the generic value for vigorous activity.¹

A revised recreational physical activity variable (RevExStat) is calculated as the weighted sum of the re-coded values for EX1 and EX2.

$$\text{RevExStat} = (7.5 * 20 * \text{EX1}) + (3 * 20 * \text{EX2})$$

It is important to note that, while this measure can be regarded as being measured in METs mins (the units of the measure used in Surveys 2 and 3, see previous section, Index Number EXER-016), the cut points for the categories are different from those used in Surveys 2 and 3 because a uniform duration of 20 minutes is assumed for each reported activity session. Accordingly the cut-points are based on 20 minutes duration of exercise.

The resulting physical activity scores were categorized as shown below.

Code	Cut points	Category - <i>Rationale</i>
1	0-<80	None <i>A score of 80 is equivalent to one x 20 minute session of exercise per week, at a less vigorous intensity (4 MET).</i>
2	80-<400	Low <i>A score of 400 is equivalent to five x 20 minute sessions (100 minutes) of less vigorous intensity (4 MET).</i>
3	400-<560	Moderate <i>A score of 560 is equivalent to seven x 20 minute sessions (140 minutes) of exercise at a less vigorous intensity (4 MET).</i>
4	≥560	High

Table 1 Number and percent for revised physical activity at Survey 1, compared with various measures at Surveys 1, 2 & 3

PA Measure at Survey 1	Original	Revised		Unmodified		Alternate Revised ^a
		Survey 1		Survey 2	Survey 3	Survey 1
	Percent	Number	Percent	Percent	Percent	Percent
1973-78 cohort	(n=14 779)	(n=14 779)		(n=9 600)		
None	15.2	1 017	6.9	10.5		
Low	28.9	5 452	37.2	34.4		
Moderate	25.7	1 907	13.0	23.3		
High	30.2	6 291	42.9	31.7		
Total Classified	100.0	14 667	100.0	99.9		
<i>Missing</i>	168	112		168		
1946-51 cohort	(n=14 099)	(n=14 099)		(n=11 648)	(n=11 196)	(n=14 099)
None	27.7	1 777	12.7	18.2	18.7	12.7
Low	30.6	6 370	45.6	30.7	36.5	45.6
Moderate	25.4	1 880	13.5	22.1	20.3	29.7
High	16.4	3 955	28.3	28.9	24.5	12.0
Total Classified	100.0	13 982	100.0	99.9	100.0	100.0
<i>Missing</i>	0.8	117	0.8	3.8	4.9	0.8
1921-26 cohort	(n=12 940)	(n=12 940)		(n=9 501)		
None	29.8	2 425	19.5	33.2		
Low	28.5	4 827	38.8	29.4		
Moderate	29.4	1 786	14.4	16.3		
High	12.3	3 405	27.4	21.0		
Total Classified	100.0	12 443	100.1	99.9		
<i>Missing</i>	3.8	4 977	3.8	443		

^a Alternate revision of the PA calculation based on exercise duration of 30 minutes

A score of 400 is equivalent to the current national PA guidelines of 5 bouts of less vigorous (moderate) activity per week. Because a duration of 20 minutes is assumed, a score of 400 METs mins (based on 5 sessions) is thought to be equivalent to a score of 600 METs mins at surveys 2 and 3 (i.e. 5x30 minutes = 150mins x4 METs = 600 METs mins). In both cases this is equivalent to the five sessions recommended in the US Surgeon General's report.²

The distributions of the revised PA variables and the original Survey 1 measure (ExStat) are compared in Table 1. The distribution of PA scores at Surveys 2 and 3 are also shown for the cohorts for which they are available.

Sensitivity to the assumed duration of 20 minutes

The revised measure was re-calculated using an assumption of 30 minutes duration for each activity session, with the cut points for this variable the same as the cut points used for Surveys 2 and 3, in order to evaluate whether or not this explained the differing distribution of PA at Survey 1 compared with Surveys 2 and 3 (Table 1). Varying this assumption made little change to the percent in the 'none' and 'low' categories, increased the percentage in the 'moderate' category and decreased the percentage in the 'high' category.

Sensitivity to differences in group size

Analysis was restricted to women from the 1946-51 cohort with PA measures available at all 3 surveys (Table 1). This group showed the same patterns in relation to both estimates of duration and in relation to across-survey comparisons.

Table 2 Percent for both revised physical activity measures at Survey 1, based on both 20 and 30 minutes duration of activity, and measures at Survey 2 and 3 among 9 575 1946-51 cohort women categorised at all 3 surveys

PA categories	Survey 1	Survey 1 (20)	Survey 2	Survey 3
None	10.	10.	17.5	18.1
Low	46.	46.	30.7	36.4
Moderate	31.	14.	22.4	20.7
High	11.	28.	29.4	24.8

The SAS code defining the revised PA variable at surveys 1:

```
/*assign each response to EX1 and EX2 a weighted
value equal to the mid point of the frequency of
exercise per week*/;
if EX1 = . then EX1wt = .;
else if EX1 = 1 then EX1wt=
0; else if EX1 = 2 then
EX1wt = 1; else if EX1 = 3
then EX1wt = 2.5; else if
EX1 = 4 then EX1wt = 5; else
if EX1 = 5 then EX1wt = 7;
else if EX1 = 6 then EX1wt =
10;

if EX2 = . then EX2wt= . ;
else if EX2 = 1 then EX2wt=
0; else if EX2 = 2 then
EX2wt = 1; else if EX2 = 3
then EX2wt = 2.5; else if
EX2 = 4 then EX2wt = 5; else
if EX2 = 5 then EX2wt = 7;
else if EX2 = 6 then EX2wt =
10;

RevExStat = (EX1wt*20*7.5) + (EX2wt*20*4);

/*Categorize revised survey one exercise status into four groups
1= None
2= Low
3= Moderate
4= High */;

if RevExStat = . then RevPAGrp = .;
else if RevExStat<80 then RevPAGrp = 1;
else if 80<=RevExStat<400 then RevPAGrp = 2;
else if 400<=RevExStat<560 then RevPAGrp = 3;
else if RevExStat>=560 then RevPAGrp = 4
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References

1. Brown WJ, Bauman A. Comparison of estimates of population levels of physical activity using two measures. *Australian and New Zealand Journal of Public Health* 2000;24:520-525
2. U.S. Department of Health and Human Services. *Physical activity and health: A report of the Surgeon General*. Washington, DC.; 1996