

# Spreadsheet for estimating the effects of changes in P.E. Policy on Physical Activity Levels

(PE\_spreadsheet\_REV\_11Aug08.xls)

## Documentation

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## Overview

This spreadsheet estimates average changes in students' levels of moderate-to-vigorous physical activity (MVPA) for user-defined physical education (P.E.) scenarios, comparing minutes of MVPA at baseline with minutes after a change in policies. Possible scenarios include:

1. Increasing compliance with requirements for a minimum amount of weekly P.E instruction,
2. Limiting exemptions from P.E.,
3. Increasing activity levels in P.E. by capping P.E. class sizes.

### **Application to other populations**

While the spreadsheet was developed to examine the effects of changes to state physical education requirements in California public schools in kindergarten through 12<sup>th</sup> grade, it could be applied to the analysis of a smaller population, such as students in a particular county, school district or grade level.

### **Stratification and user inputs**

The analysis is stratified by grade level categories (i.e. K-3, 4-6, 7-8, 9-10, 11-12). Users of the spreadsheet need to specify the following inputs for each grade level category:

1. Total number of students;
2. Percentage of students with individual-level exemptions from P.E. requirements (e.g. medical exemption, or the statutory exemption generally given to 11<sup>th</sup> and 12<sup>th</sup> graders);
3. Percentage of students for whom P.E. is not offered (e.g. in some elementary schools);
4. Approximate number of weekly minutes of P.E. for students who are enrolled in P.E. classes;
5. Estimated percent of P.E. class time in moderate-to-vigorous physical activity.

### **Default baseline values**



The spreadsheet tables contain default baseline values based on research conducted by our research group and others. Users can change these defaults or leave them the same. Users can then specify changes for different policy scenarios (e.g. increased compliance with current standards, more instructional minutes, more time in MVPA, etc.). Rather than just specifying a single mean value for each grade level input, users may specify a distribution where some students are assigned a value less than the average and some students are assigned a value less than the average. For example, if the average amount of class time in MVPA is 30%, a user could specify the following distribution to account for students who are more or less active than the class average:

#### **Sample inputs for Table 4: Percent of class time in MVPA (grades 7-8)**

<b>% class time in MVPA</b>	<b>Students (%)</b>
20%	15%
30%	70%
40%	15%
50%	0%

Average % class time in MVPA = 30%

## Inputs, functions and results by table

The spreadsheet consists of a series of linked tables. Blue-highlighted sections  of the tables indicate values where users may input their own data. Yellow-highlighted sections indicate calculated values. Altering formulas or values in the yellow-highlighted sections  of the tables will corrupt the tables and invalidate results.

**Table 1: Number of students by grade and percentages exempt from P.E. or for whom no P.E. is offered**

In Table 1 users indicate the number of students, estimated percentages of students who have exemptions from P.E. and percentages of students for whom no P.E. is offered. Exemptions include individual exemptions for medical and other reasons, and the exemption generally given to 11th and 12th graders who have already completed two years of P.E. in senior high school.

**Table 1 baseline default values:**

Variable	Grade level	Value (% of all students)
Exemption rate:	Grades K-6	3%
	Grades 7-8	1%
	Grades 9-10	18%
	Grades 11-12	100%
No P.E. offered:	Grades K-6	40%
	Grades 7-12	0%

**Table 2: Weekly minutes of P.E. instruction as a proportion of required minimum instructional minutes (among students enrolled in P.E.)**

In Table 2 users indicate the actual minutes of P.E. instruction for students enrolled in P.E. as a proportion of the required minimum minutes of P.E. instruction (currently 100 minutes per week for grades K-6 and 200 minutes per week for grades 7-12. Estimates of minutes of P.E. instruction should not include students for whom no P.E. is offered. If some students do not have P.E., this should be indicated in Table 1.

**Table 2 baseline default values:**

Variable	Grade level	Category (proportion of minutes)	Value (% of students enrolled in P.E.)
Proportion of actual vs. required minutes P.E. per week	Grades K-6	0.5	25%
		0.9	25%
		1.0*	50%**
	Grades 7-12	0.5	0%
		0.9	0%
		1.0*	100%***

\* Proportion of minutes = 1.0 for grades K-6 is 100 actual minutes per week/100 required minutes, 200 actual minutes per week/200 required minutes (grades 7-12)

\*\* distribution of P.E. non-compliance in elementary schools inferred from the reports "Dropping the Ball" from the California Center for Public Health Advocacy (<http://www.publichealthadvocacy.org/droppingtheball.html>) and "Failing Fitness" from Samuels and Associates and the UCLA School of Public Health ([http://www.samuelsandassociates.com/altruesite/files/samuels/Failing\\_Fitness.pdf](http://www.samuelsandassociates.com/altruesite/files/samuels/Failing_Fitness.pdf)).

100% of students in category (1.0) implies that if students are enrolled in P.E., 100% of required instructional minutes are provided

**Table 3: P.E. participation as a proportion of required minutes of P.E. instruction by grade level (hidden but associated graphs shown)**

This hidden table combines data from Tables 1 and 2. There are no user inputs. The results are displayed in graphs.

**Table 4: Percent of P.E. period in moderate-to-vigorous physical activity\***

In Table 4 users indicate the estimated percent of class time in moderate-to-vigorous physical activity (MVPA), ranging from an equivalent of a brisk walk to a sprint. Valid values for MVPA inputs range from 10% to 50% of class time. Although the National Association of Sport and Physical Education (NASPE) recommends that 50% of class time be spent in MVPA, levels are typically about 25%-30%. Since there is little or no evidence that MVPA levels vary significantly within the traditional school grouping of grades (elementary, middle and high school), the grade categories for this input table have been reduced from five categories (i.e. K-3, 4-6, 7-8, 9-10, 11-12) to three (i.e. K-6, 7-8, 9-12).

**Table 4 baseline default values:**

Variable	Grade level	Category (% time in MVPA)	Value (% of students enrolled in P.E.)
Percent class time in MVPA	Grades K-6	10%	0%
		20%	0%
		30%	100%
		40%	0%
		50%	0%
	Grades 7-12	10%	0%
		20%	0%
		30%	0%
		40%	100% **
		50%	0%

**Table 5: Calculation of aggregate student-minutes MVPA/week by grade, compliance level and percent time in MVPA (hidden)**

This table calculates weekly student-minutes of MVPA for different combinations of grade levels and categories of weekly minutes of P.E. and levels of MVPA based on inputs from Tables 1, 2 and 4. This table is composed of 100 strata (5 grade categories x 4 categories of weekly minutes of P.E. x 5 levels MVPA). Calculations for minutes of MVPA in each strata are based on the following formula:

$$\text{Student-Minutes MVPA/week} = \text{No. students} \times \text{Minutes P.E./week} \times \text{percent class time in MVPA}$$

This table does not require any user inputs and is hidden. The data in Table 5 are aggregated and used to calculate weighted averages which are displayed in Table 6.

**Table 6: Change in average minutes MVPA/week by grade level (and associated graphs)**

This table displays the results of the calculations. It uses inputs specified in previous tables. The aggregated results of this table are also displayed in three graphs – minutes per week of MVPA for elementary, secondary and all students.

## Inputs used for the analysis of scenarios

**Scenario 1:** Increase the *percent time in moderate-to-vigorous physical activity* (MVPA) to 50% in secondary grades where P.E. is mandatory (e.g. grades 7-10) as shown in **table 4**;

**Scenario 2:** Increase *compliance with state P.E. requirements* in secondary grades where P.E. is mandatory (e.g. 200 minutes per week /400 minutes every 10 school days, grades 7-10) as shown in **table 2**;

**Scenario 3a:** *Eliminate P.E. exemptions* in 11th and 12th grades (assuming that P.E. is required for 11<sup>th</sup> and 12<sup>th</sup> graders, however students are exempt) as shown in **table 1 and 2**;

**Scenario 3b:** Increase the percent time in MVPA during P.E. to 50% while at the same time eliminating P.E. exemptions in the 11th and 12th grades, as shown in **tables 1 and 4**.