

Assistance Publique  
Hôpitaux de Marseille

Mardi 24 septembre 2019



# La sédentarité au travail : un risque professionnel à part entière

Frédéric DUTHEIL

Santé Travail Environnement, CHU Clermont-Ferrand  
LaPSCo UMR CNRS 6024 « Stress physiologique et psychosocial »

## Key points

- Sedentary behavior kills
- We have sedentary behavior at work

## Sedentary behavior is an occupational risk

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- We have sedentary behavior at work

## Sedentary behavior is an occupational risk

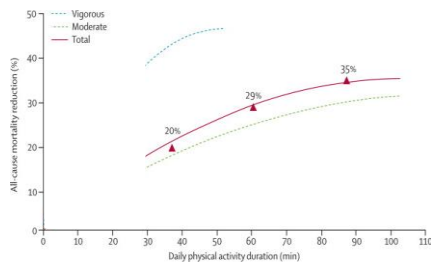
## Background

- Physical activity
- Sedentary behavior

### Minimum amount of physical activity for reduced mortality and extended life expectancy: a prospective cohort study

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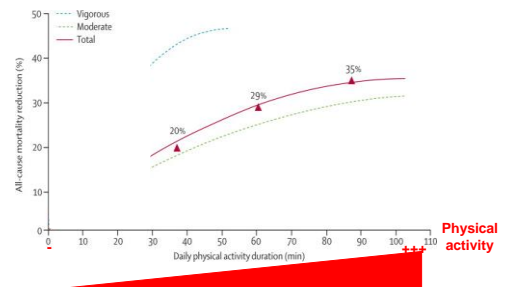
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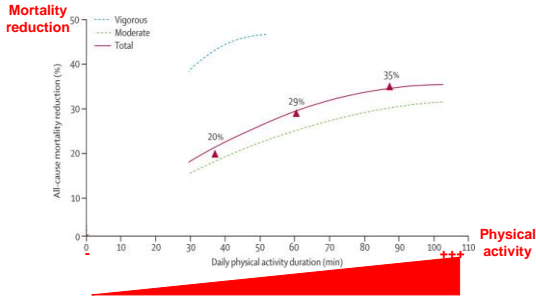
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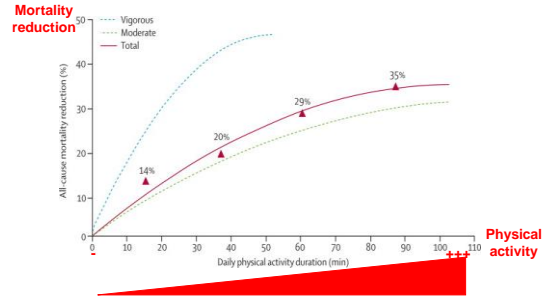
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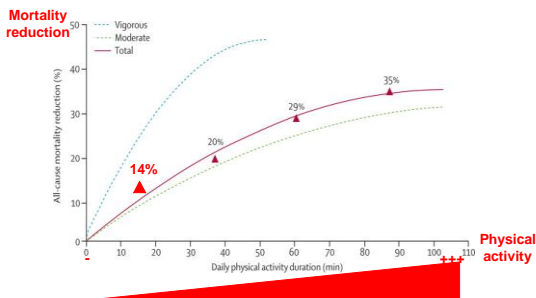
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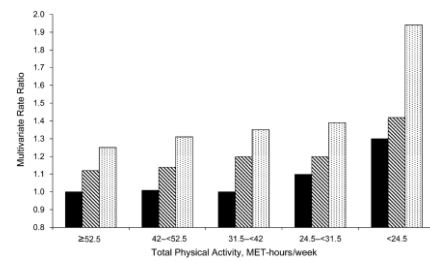
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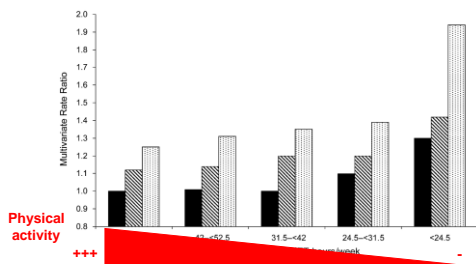
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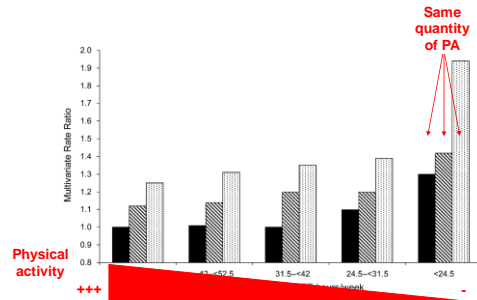
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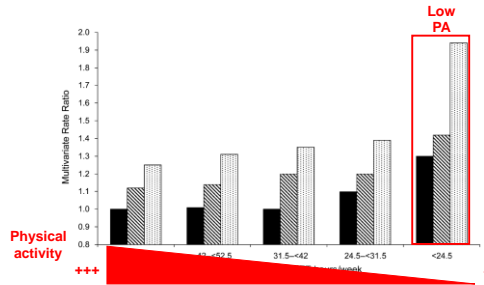
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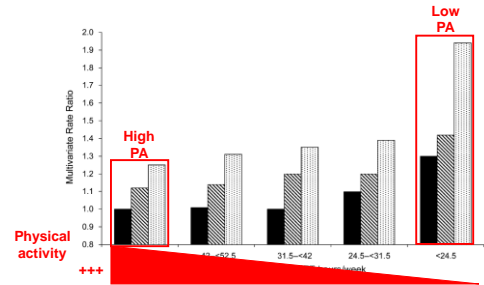
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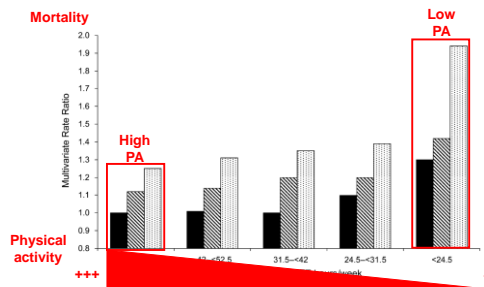
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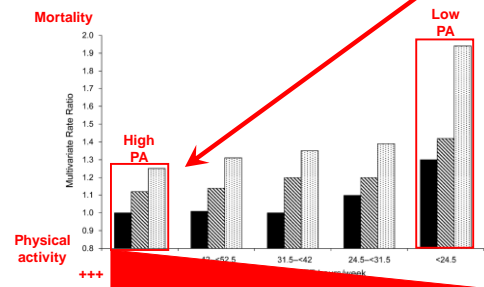
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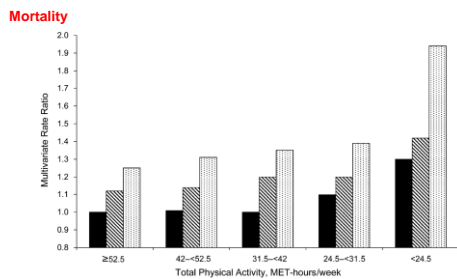
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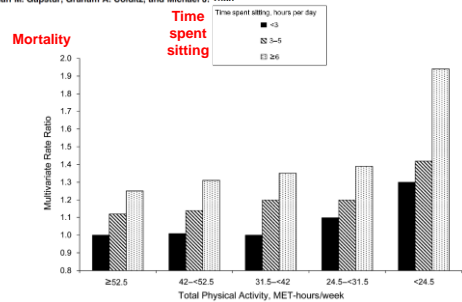
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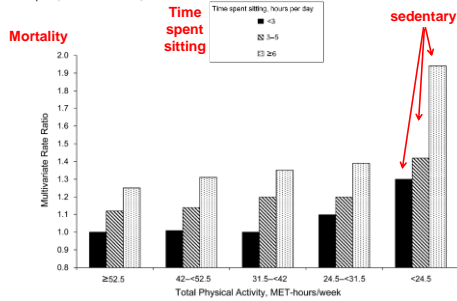
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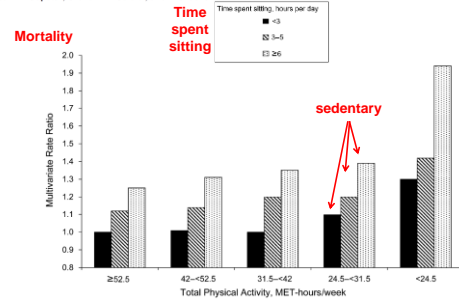
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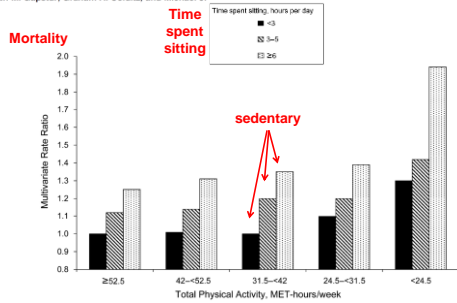
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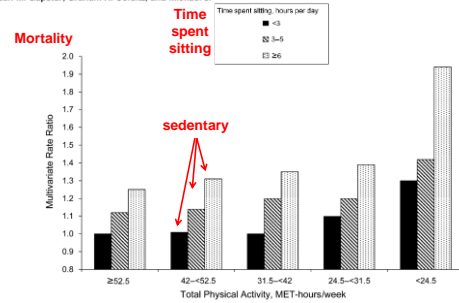
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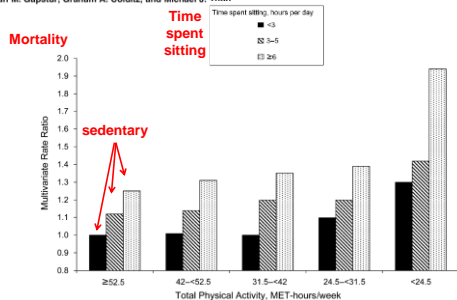
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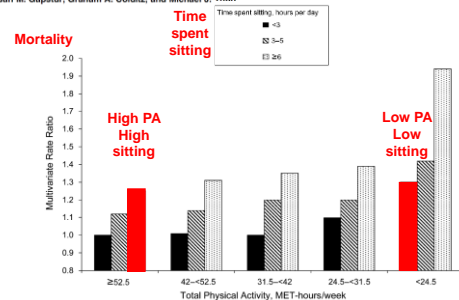
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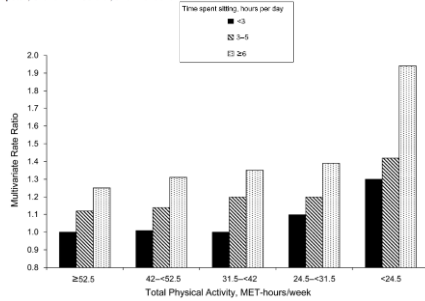
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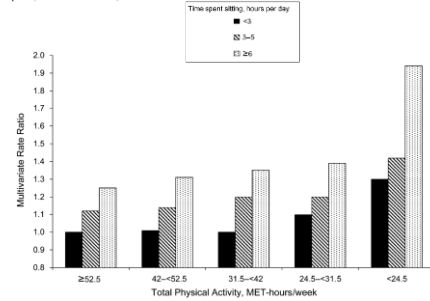
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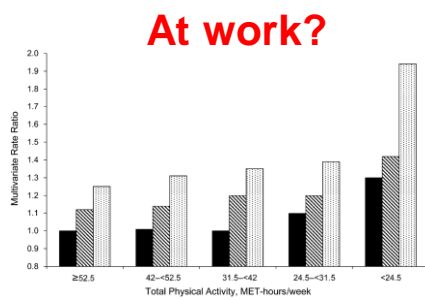
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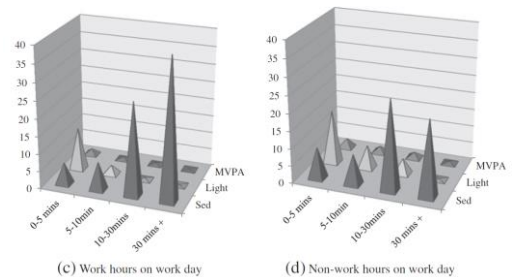
Epidemiology

## RESEARCH ARTICLE

Open Access

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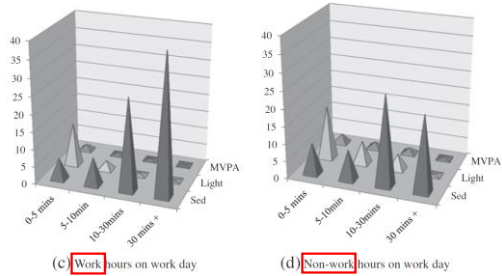
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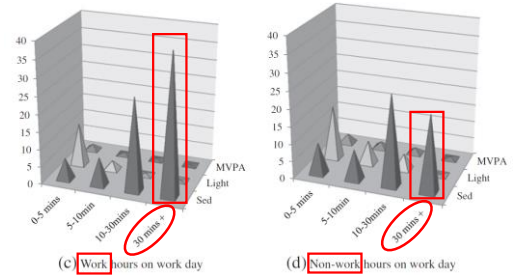
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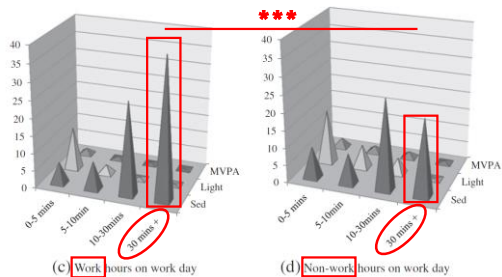
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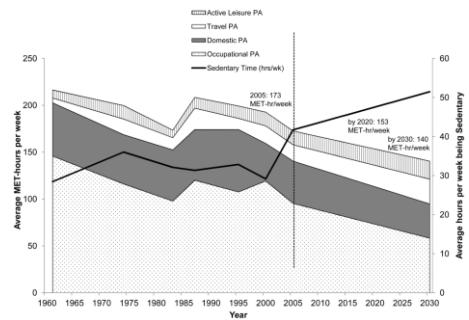
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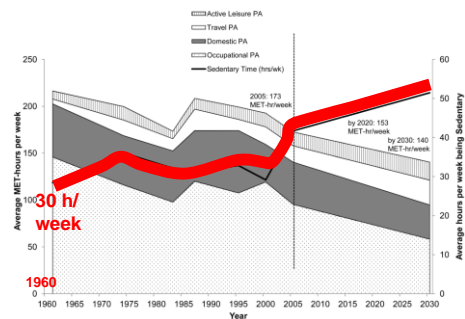
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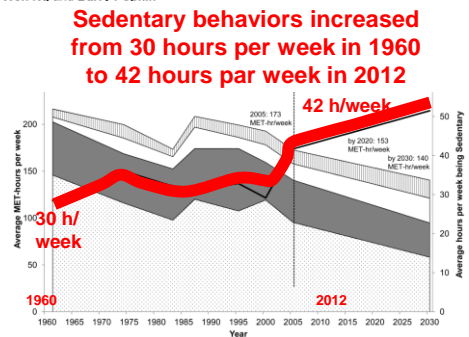
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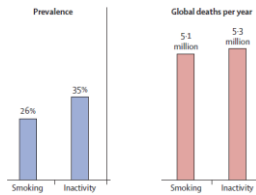
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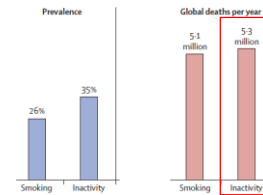
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Health  
outcomes

*The Journal of Nutrition, Health & Aging®*  
Volume 18, Number 3, 2014

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ALL	Smoker	1.41	1.17 1.70
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September 2013 | Volume 8 | Issue 9 | e73753

**Results:** In total there were 754 all-cause deaths. In women, a standing/walking occupation was associated with lower risk of all-cause (fully adjusted hazard ratio [HR]=0.68, 95% CI 0.52–0.89) and cancer (HR=0.60, 95% CI 0.43–0.85) mortality, compared to sitting occupations. There were no associations in men.

### WOMEN

All-cause Mortality		
Predominant activity at work	Cases/total n	Model 3 <sup>†</sup> HR (95% CI)
Sitting	116/2090	1
Standing/walking about	149/3124	0.68 (0.52–0.89)
Trend p <sup>‡</sup>		0.005 (0.017) <sup>‡</sup>
Cancer mortality		
Sitting	77/2090	
Standing/walking about	83/3124	0.60 (0.43–0.85)
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Sitting	77/2090	
Standing/walking about	83/3124	0.60 (0.43–0.85)
Trend p		0.004 (0.014) <sup>‡</sup>

## Are Sitting Occupations Associated with Increased All-Cause, Cancer, and Cardiovascular Disease Mortality Risk? A Pooled Analysis of Seven British Population Cohorts

September 2013 | Volume 8 | Issue 9 | e73753

**Results:** In total there were 754 all-cause deaths. In women, a standing/walking occupation was associated with lower risk of all-cause (fully adjusted hazard ratio [HR]=0.68, 95% CI 0.52–0.89) and cancer (HR=0.60, 95% CI 0.43–0.85) mortality, compared to sitting occupations. There were no associations in men.

### WOMEN

All-cause Mortality		
Predominant activity at work	Cases/total n	Model 3 <sup>†</sup> HR (95% CI)
Sitting	116/2090	1
Standing/walking about	149/3124	0.68 (0.52–0.89)
Trend p <sup>‡</sup>		0.005 (0.017) <sup>‡</sup>
Cancer mortality		
Sitting	77/2090	
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Observational studies  
**At work?**

- Physical activity
- Sedentary behavior

Health  
outcomes

~~Observational studies~~  
**At work?**

- Physical activity
- Sedentary behavior

Health  
outcomes

## Interventional studies **At work?**

- Physical activity
- Sedentary behavior

Health  
outcomes

## Interventional studies ~~**At work?**~~

- Physical activity
- Sedentary behavior

Health  
outcomes

## Interventional studies **≈ Leisure**

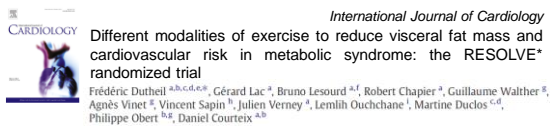
- Physical activity
- Sedentary behavior

Health  
outcomes

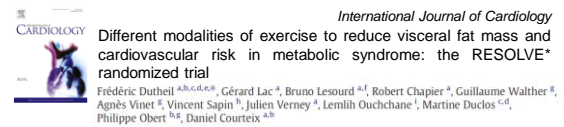
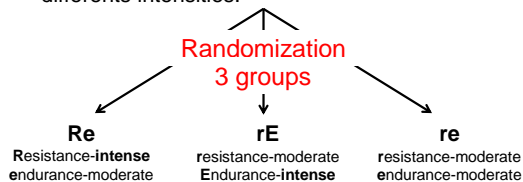
## Interventional studies **≈ Leisure**

- Physical activity
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Health  
outcomes



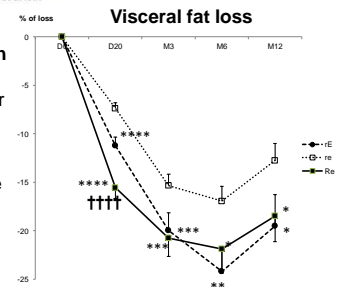
- MetS individuals randomized in 3 groups of combined PA (endurance + résistance) with different intensities:



**Combined training with high intensity in resistance induce faster results**

The 2 groups with high intensity training had the best visceral fat loss

\*\*\*\*p<.001, \*\*\*p<.001, \*\*p<.01, \*p<.05  
Re and rE vs. re.  
††††p<.0001 Re vs rE.



## Interventional studies ≈ **Leisure**

- Physical activity
- Sedentary behavior

Health  
outcomes

## Interventional studies

### Only on sedentary behaviors ?

- Physical activity
- Sedentary behavior

Health  
outcomes

## Interventional studies **Laboratory**

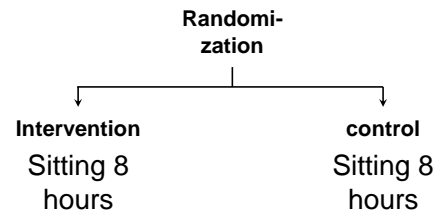
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Health  
outcomes

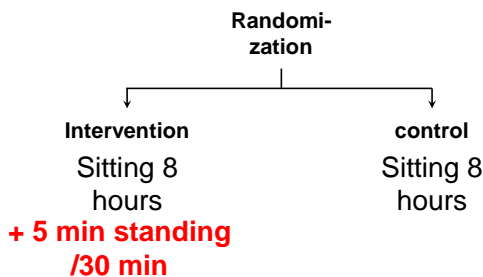
Benefits for Type 2 Diabetes of  
Interrupting Prolonged Sitting  
With Brief Bouts of Light Walking  
or Simple Resistance Activities

**Diabetes Care.**  
2016 Paddy C. Dempsey,<sup>1,2</sup> Robyn N. Larsen,<sup>1</sup>  
Parneet Sethi,<sup>1</sup> Julian W. Sacks,<sup>1</sup>  
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and David W. Dunstan<sup>1,3,5</sup>



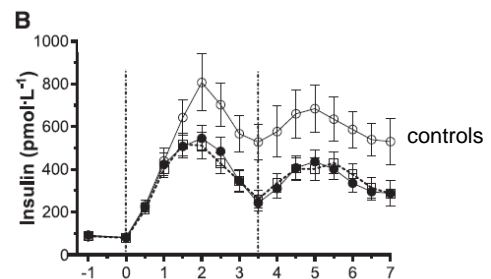
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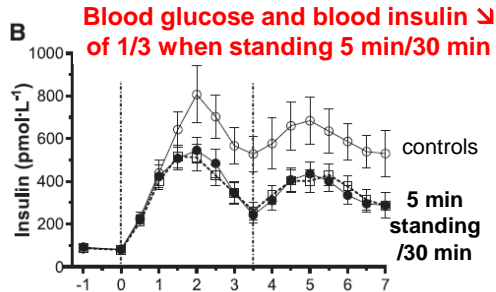
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## Interventional studies

- Physical activity
- Sedentary behavior

Health  
outcomes

## Interventional studies **At work?**

- Physical activity
- Sedentary behavior

Health  
outcomes

## Interventional studies **At work?**

**Only on sedentary behaviors ?**

- Physical activity
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Health  
outcomes

## Interventional studies **At work?**

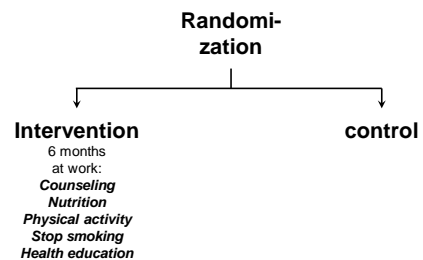
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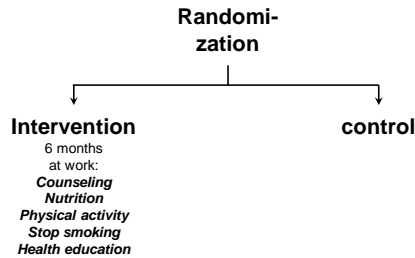
Health  
outcomes

*The American Journal of Cardiology* 2009  
Impact of Worksite Wellness Intervention on Cardiac Risk Factors  
and One-Year Health Care Costs

Richard V. Milani, MD\*, and Carl J. Lavie, MD



The American Journal of Cardiology 2009

Impact of **Worksite Wellness Intervention** on Cardiac Risk Factors and One-Year Health Care CostsRichard V. Milani, MD<sup>a</sup>, and Carl J. Lavie, MD

The American Journal of Cardiology 2009

Impact of **Worksite Wellness Intervention** on Cardiac Risk Factors and One-Year Health Care Costs

Change in health parameters in active participants after worksite health intervention (n = 185)

Variable	Baseline	After Intervention	Change	p Value
Anxiety (U)	3.7 ± 4.2	2.5 ± 3.6	-32%	0.0001
Depression (U)	2.4 ± 3.7	1.6 ± 3.1	-33%	0.0002
Somatization (U)	5.2 ± 4.1	3.5 ± 3.3	-33%	0.0001
Hostility (U)	3.6 ± 4.0	1.9 ± 2.8	-47%	0.0001
Quality of life (U)	117 ± 12	128 ± 14	10%	0.001
CAGE (U)	0.17 ± 1.1	0.09 ± 0.08	-47%	NS
Body mass index (kg/m <sup>2</sup> )	28.5 ± 5.7	28.3	-1%	0.08
Fat (%)	26.7	24.4	-9%	0.001
Smoker (%)	17%	15%	-12%	NS
Sedentary (%)	79%	72%	-9%	0.14
Total cholesterol (mg/dl)	190	184	-3%	NS
HDL cholesterol (mg/dl)	47	53	13%	0.0001
TC/HDL (U)	4.2	3.6	-14%	0.0001
Systolic blood pressure (mm Hg)	124	122	-2%	0.08
Diastolic blood pressure (mm Hg)	81	79	-2%	0.01
Health habits (U)	2.0	0.8	-60%	0.0001
Total health risk score (U)	7.2 ± 5.1	5.4 ± 4.0	-25%	0.0001

The American Journal of Cardiology 2009

Impact of **Worksite Wellness Intervention** on Cardiac Risk Factors and One-Year Health Care Costs

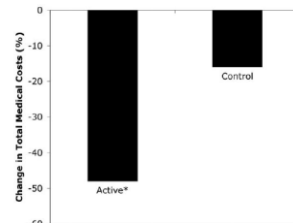
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Impact of **Worksite Wellness Intervention** on Cardiac Risk Factors and One-Year Health Care CostsRichard V. Milani, MD<sup>a</sup>, and Carl J. Lavie, MD

## One-year change in total medical cost



\*p=0.002

Salud Pública Mex 2012, 54:20-27

## A workplace physical activity program at a public university in Mexico can reduce medical costs associated with type 2 diabetes and hypertension

Pablo Méndez-Hernández, D Sc.<sup>(1,2,3)</sup> Darina Dosamantes-Carrasco, MSc.<sup>(1,4)</sup> Carole Siani, D Sc.<sup>(1)</sup> Yvonne N Flores, D Sc.<sup>(4,5)</sup>  
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each dollar invested in a recreational PA program might translate into a healthcare cost reduction of 2.2 USD for type 2 diabetes, 2.1 USD for HBP and 5.3 USD for both.

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## Interventional studies **At work?**

- Physical activity
- Sedentary behavior

Health  
outcomes

## Interventional studies **At work?**

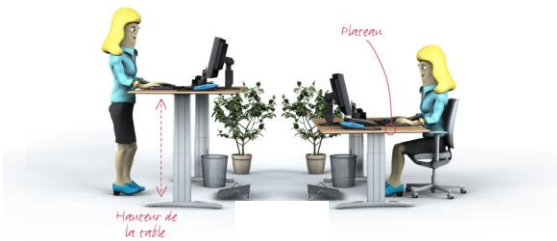
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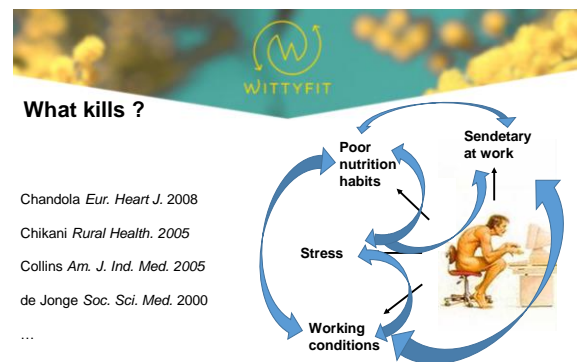
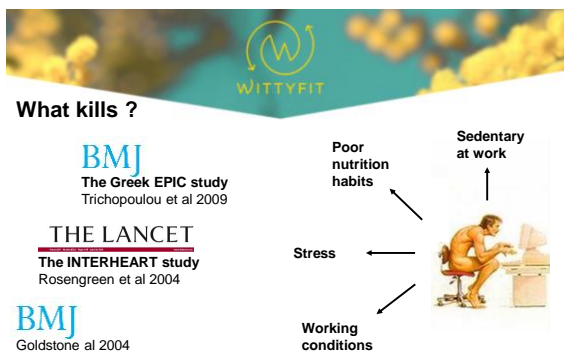
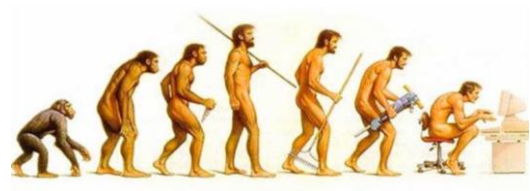
Health  
outcomes

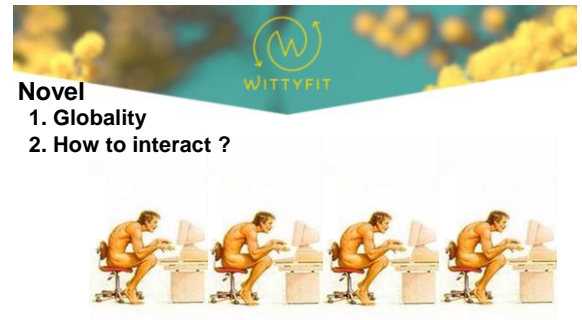
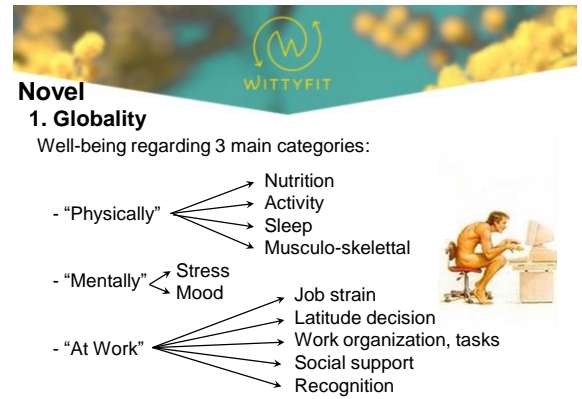
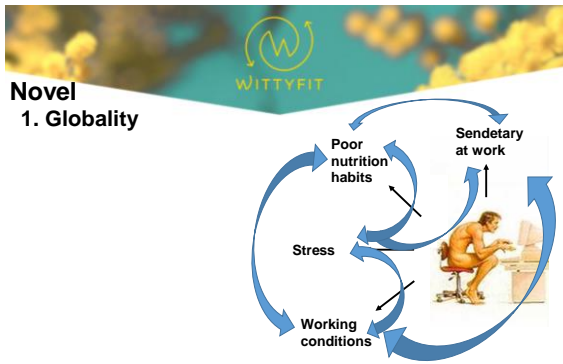
BMC Public Health.

## the Stand Up Victoria cluster randomized trial

Dunstan DW, Wiesner G, Eakin EG, Neuhaus M, Owen N, LaMontagne AD, Moodie M, Winkler EA, Fjeldsoe BS, Lawler S, Healy GN.





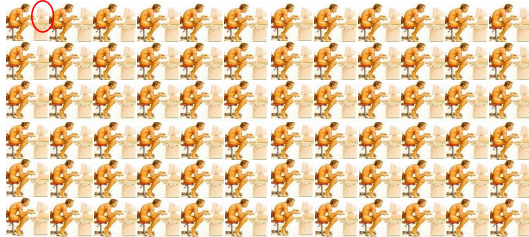






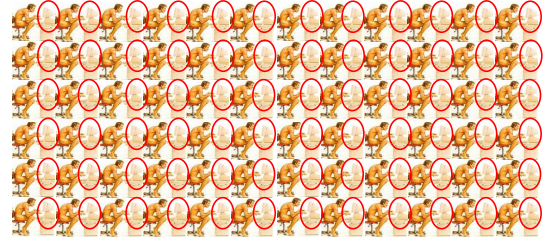
## Novel

1. Globality
2. How to interact ?



## Novel

1. Globality
2. How to interact ?



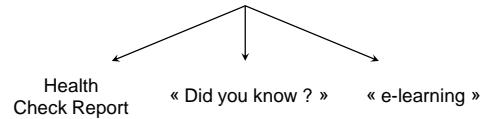
## Novel

1. Globality
2. Digital world
3. Personalized feedback



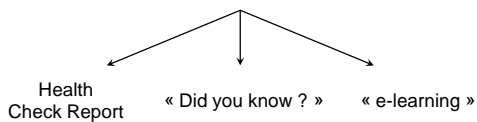
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## Novel

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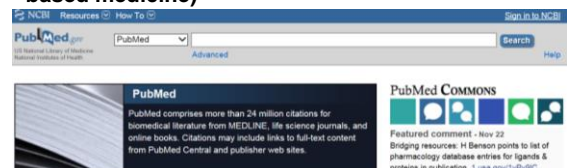


You eat 15 grams of salt per day.  
An excess of salt increases blood pressure



## Novel

1. Globality
2. Digital world
3. Personalized feedback
4. Up-to-date scientific knowledge (evidence based medicine)





### Novel

1. Globality
2. Digital world
3. Personalized feedback
4. Up-to-date EBM
5. A feedback for managers



### Novel

1. Globality
2. Digital world
3. Personalized feedback
4. Up-to-date EBM
5. A feedback for managers
6. Collaboration with Occupational Medicine



### Novel

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7. WittyFit... → behavior data



### Novel

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WittyFit Research → medical data



### Novel

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3. Personalized feedback
4. Up-to-date EBM
5. A feedback for managers
6. Collaboration with Occupational Medicine
7. WittyFit Research
8. Connected objects



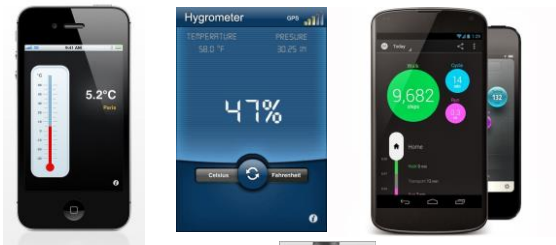
8. Connected objects



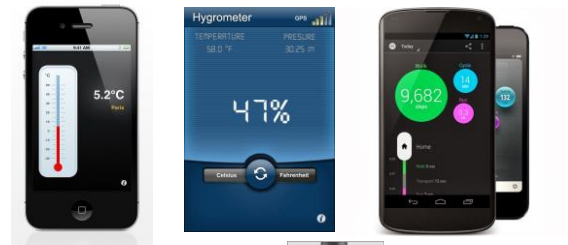
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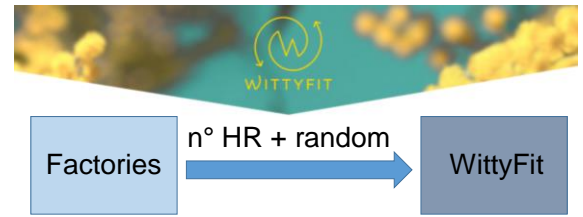


#### Novel

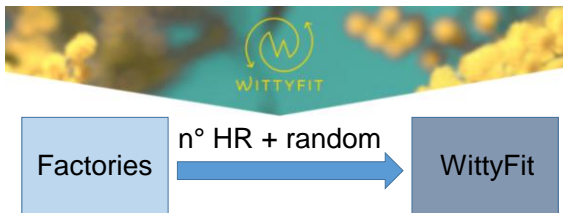
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9. Anonymous



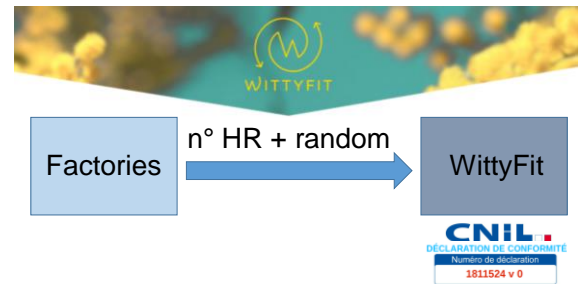
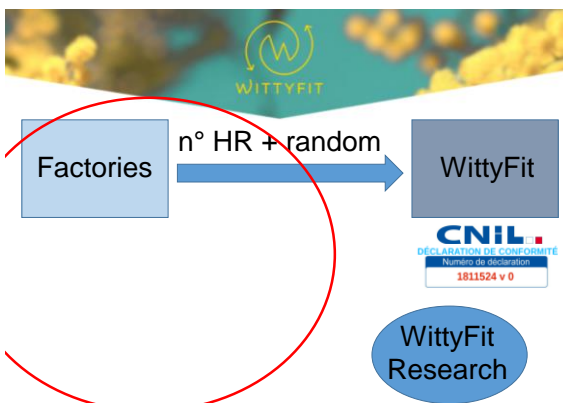
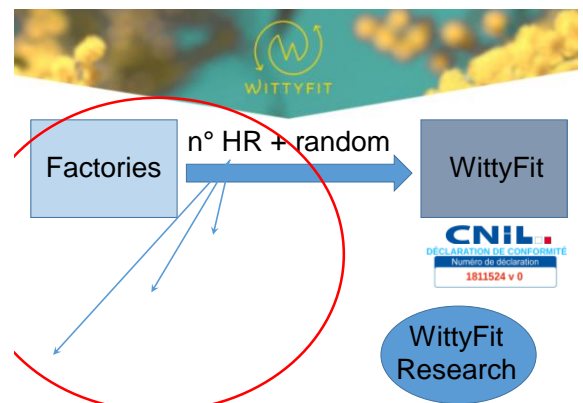
9. Anonymous

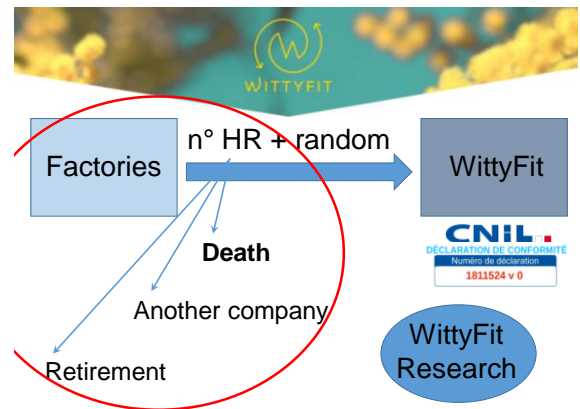
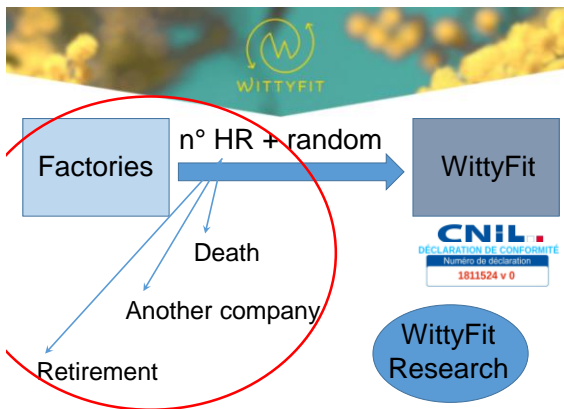


9. Anonymous



9. Anonymous

WittyFit  
ResearchWittyFit  
ResearchWittyFit  
ResearchWittyFit  
Research



**Death**

The main outcome:

**Death**



#### Novel

1. Globality
2. Digital world
3. Personalized feedback
4. Up-to-date EBM
5. A feedback for managers
6. Collaboration with Occupational Medicine
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9. Anonymous



#### Novel

1. Globality
2. Digital world
3. Personalized feedback
4. Up-to-date EBM
5. A feedback for managers
6. Collaboration with Occupational Medicine
7. WittyFit Research
8. Connected objects
9. Anonymous
10. A powerful epidemiological database

## Key points

- Sedentary behavior kills
- We have sedentary behavior at work

**Sedentary behavior is an occupational risk**

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- Sedentary behavior kills
- We have sedentary behavior at work

**Sedentary behavior is an occupational risk**

## Key points

- Sedentary behavior kills
- We have sedentary behavior at work

**Sedentary behavior is an occupational risk**

A massive area for future research

Assistance Publique  
Hôpitaux de Marseille



Mardi 24 septembre 2019



# La sédentarité au travail : un risque professionnel à part entière

Frédéric DUTHEIL

Santé Travail Environnement, CHU Clermont-Ferrand  
LaPSCo UMR CNRS 6024 « Stress physiologique et psychosocial »

