

# Swiss public health conference - Basel

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### **Socioeconomic status, sleep duration and cardiometabolic disorders: Analyses of individual participant data from eight European cohorts**

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# Background

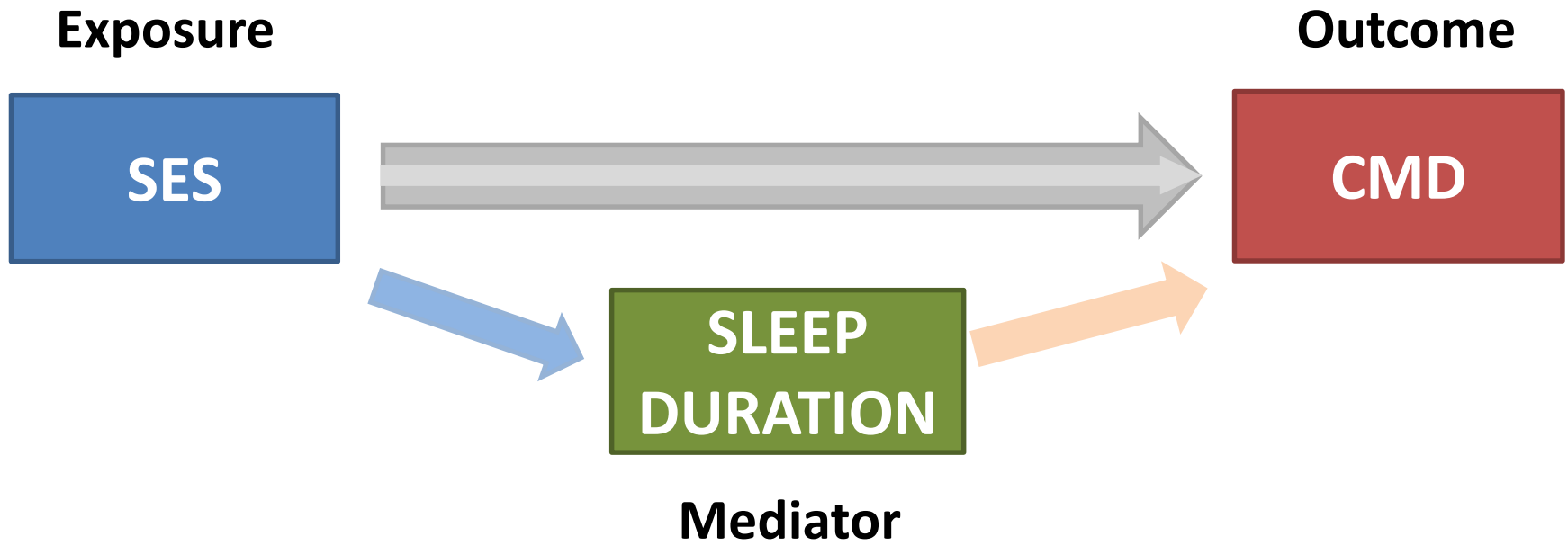
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- Sleep is an essential restoring process which has been linked to physiological functions and health outcomes (cardiovascular disease, neurological disorders, accident rates,...)
- Sleep presents strong social patterning and may act as a potential mediator of the association SES → Health

## ***AIM***

***To investigate the contribution of sleep duration to socioeconomic inequalities in cardiometabolic disorders (CMD)***

# Model



# Data and methods

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## Data

- 8 European cohorts: Constances, GAZEL, E3N, Whitehall II, ELSA, CoLaus, SKIPOGH, Epiporto (N=129'906)
- SES: Occupational position
- Health outcomes (CMD): Cardiovascular disease, hypertension, obesity, diabetes
- Potential Mediator: Sleep duration => 3 categories (Normal:  $\geq 6\text{h}-8.5/\text{n}$ , Long sleep  $>8.5\text{h}$ , Short:  $<6\text{h}/\text{night}$ )

## Methods

- Harmonization of data
- Multiple logistic regression models: SES-Sleep; Sleep-CMD
- Difference method (Proportion explained method): SES-Sleep-CMD
- Counterfactual mediation method
- Pooled analyses (all cohorts combined) / Individual cohort analyses

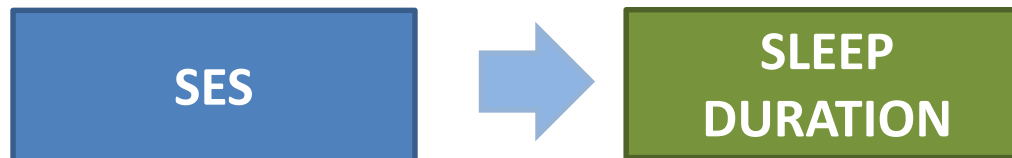
# General characteristics

	<b>Constances</b> N=56'564	<b>Gazel</b> N=9717	<b>E3N</b> N=46'062	<b>Whitehall II</b> N=6359	<b>ELSA</b> N=5019	<b>CoLaus II</b> N=3144	<b>Skipogh II</b> N=868	<b>Epiporto</b> N=2173
<b>Percentage women</b>	29791 (53%)	2309 (24%)	46062 (100%)	1874 (29%)	2813 (56%)	1614 (51%)	441 (51%)	1282 (59%)
<b>Age (<math>\mu \pm SD, y</math>)</b>	48.4 ( $\pm 13$ )	68.9 ( $\pm 3.4$ )	64.1 ( $\pm 6.3$ )	55.9 ( $\pm 6$ )	72.2 ( $\pm 8.8$ )	54.6 ( $\pm 8.9$ )	50.2 ( $\pm 16.2$ )	52.8 ( $\pm 14.2$ )
<b>Occupation</b>								
High	18586 (33%)	2752 (28%)	5948 (13%)	3587 (56%)	1368 (27%)	478 (15%)	188 (22%)	429 (20%)
Middle	18242 (32%)	5184 (53%)	32888 (71%)	1943 (31%)	2135 (43%)	1281 (41%)	299 (34%)	455 (21%)
Low	19736 (35%)	1781 (18%)	7226 (16%)	829 (13%)	1516 (30%)	1385 (44%)	381 (44%)	1289 (59%)
<b>Sleep duration (mean<math>\pm</math>SD, h/n)</b>	7.2 ( $\pm 1.2$ )	7.3 ( $\pm 1.1$ )	7.6 ( $\pm 1.1$ )	6.7 ( $\pm 1$ )	6.9 ( $\pm 1.3$ )	6.9 ( $\pm 1.1$ )	6.9 ( $\pm 1.1$ )	7.9 ( $\pm 1.7$ )
<b>Sleep duration (3 categories)</b>								
Normal (6h-8.5h/n)	45036 (80%)	7367 (76%)	36955 (80%)	5774 (91%)	3818 (76%)	2694 (86%)	739 (85%)	1411 (65%)
Long sleep (>8.5h/n)	6712 (12%)	1546 (16%)	7826 (17%)	98 (2%)	452 (9%)	169 (5%)	43 (5%)	665 (31%)
Short sleep (<6h/n)	4816 (9%)	804 (8%)	1281 (3%)	487 (8%)	749 (15%)	281 (9%)	86 (10%)	97 (4%)
<b>Health outcomes</b>								
CVD	4020 (7%)	705 (7%)	5107 (11%)	849 (13%)	138 (3%)	439 (14%)	53 (6%)	369 (25%)
Hypertension	15952 (29%)	2226 (23%)	7937 (28%)	2210 (37%)	1552 (35%)	1243 (40%)	202 (23%)	1081 (53%)
Diabetes	1955 (3%)	1271 (13%)		171 (3%)	412 (12%)	295 (9%)	46 (5%)	298 (14%)
Obesity	6498 (12%)	1307 (14%)	3155 (7%)	692 (14%)	1316 (31%)	456 (15%)	127 (15%)	475 (22%)

# Results I : SES – Sleep duration

- Association between occupational position and sleep duration

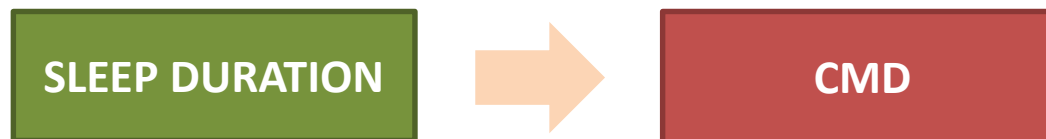
		OR (95 %CI) <sup>a</sup>	P-value <sup>b</sup>	N
<b>Men</b>	Short sleep (0h-6h)	2.4 [2.21;2.6]	<0.001	43720
	Normal sleep (6h-8.5h) (ref)	1.00		
	Long sleep (>8.5h)	1.85 [1.72;1.98]	<0.001	
<b>Women</b>	Short sleep (0h-6h)	1.97 [1.83;2.13]	<0.001	86186
	Normal sleep (6h-8.5h) (ref)	1.00		
	Long sleep (>8.5h)	1.26 [1.2;1.33]	<0.001	



# Results II : Sleep duration - CMD

- Association between sleep duration and cardiometabolic disorders (**MEN**)

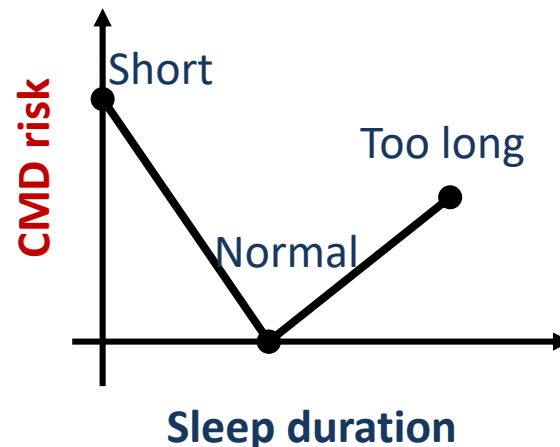
Outcome		OR (95%CI) <sup>a</sup>	P-value <sup>a</sup>
CVD	Short sleep (0h-6h)	1.44 [1.29;1.61]	<0.0125
	Normal sleep (6h-8.5h) (ref)	1.00	
	Long sleep (>8.5h)	1.12 [1;1.24]	0.043
Hypertension	Short sleep (0h-6h)	1.34 [1.24;1.44]	<0.0125
	Normal sleep (6h-8.5h) (ref)	1.00	
	Long sleep (>8.5h)	1.09 [1.02;1.17]	0.017
Diabetes	Short sleep (0h-6h)	1.47 [1.3;1.66]	<0.0125
	Normal sleep (6h-8.5h) (ref)	1.00	
	Long sleep (>8.5h)	1.15 [1.03;1.28]	<0.0125
Obesity	Short sleep (0h-6h)	1.6 [1.46;1.76]	<0.0125
	Normal sleep (6h-8.5h) (ref)	1.00	
	Long sleep (>8.5h)	1.07 [0.98;1.18]	0.125



# Results II : Sleep duration - CMD

- Association between sleep duration and cardiometabolic disorders (**WOMEN**)

Outcome		OR (95%CI) <sup>a</sup>	P-value <sup>a</sup>
CVD	Short sleep (0h-6h)	1.32 [1.2;1.46]	<0.0125
	Normal sleep (6h-8.5h) (ref)	1.00	
	Long sleep (>8.5h)	1.06 [0.99;1.13]	
Hypertension	Short sleep (0h-6h)	1.22 [1.13;1.31]	<0.0125
	Normal sleep (6h-8.5h) (ref)	1.00	
	Long sleep (>8.5h)	1.15 [1.09;1.21]	
Diabetes	Short sleep (0h-6h)	1.43 [1.2;1.71]	<0.0125
	Normal sleep (6h-8.5h) (ref)	1.00	
	Long sleep (>8.5h)	1.55 [1.33;1.81]	
Obesity	Short sleep (0h-6h)	1.55 [1.42;1.68]	<0.0125
	Normal sleep (6h-8.5h) (ref)	1.00	
	Long sleep (>8.5h)	1.27 [1.19;1.35]	

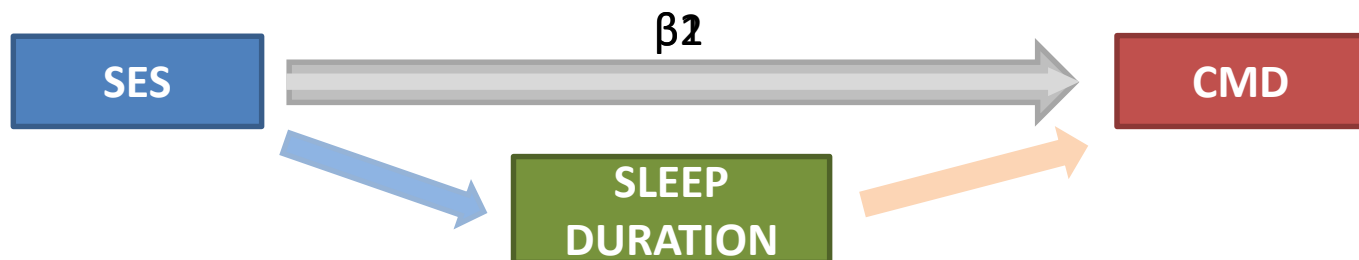




# Results III : SES - Sleep duration - CMD

- Association between occupational position - sleep duration – CMD

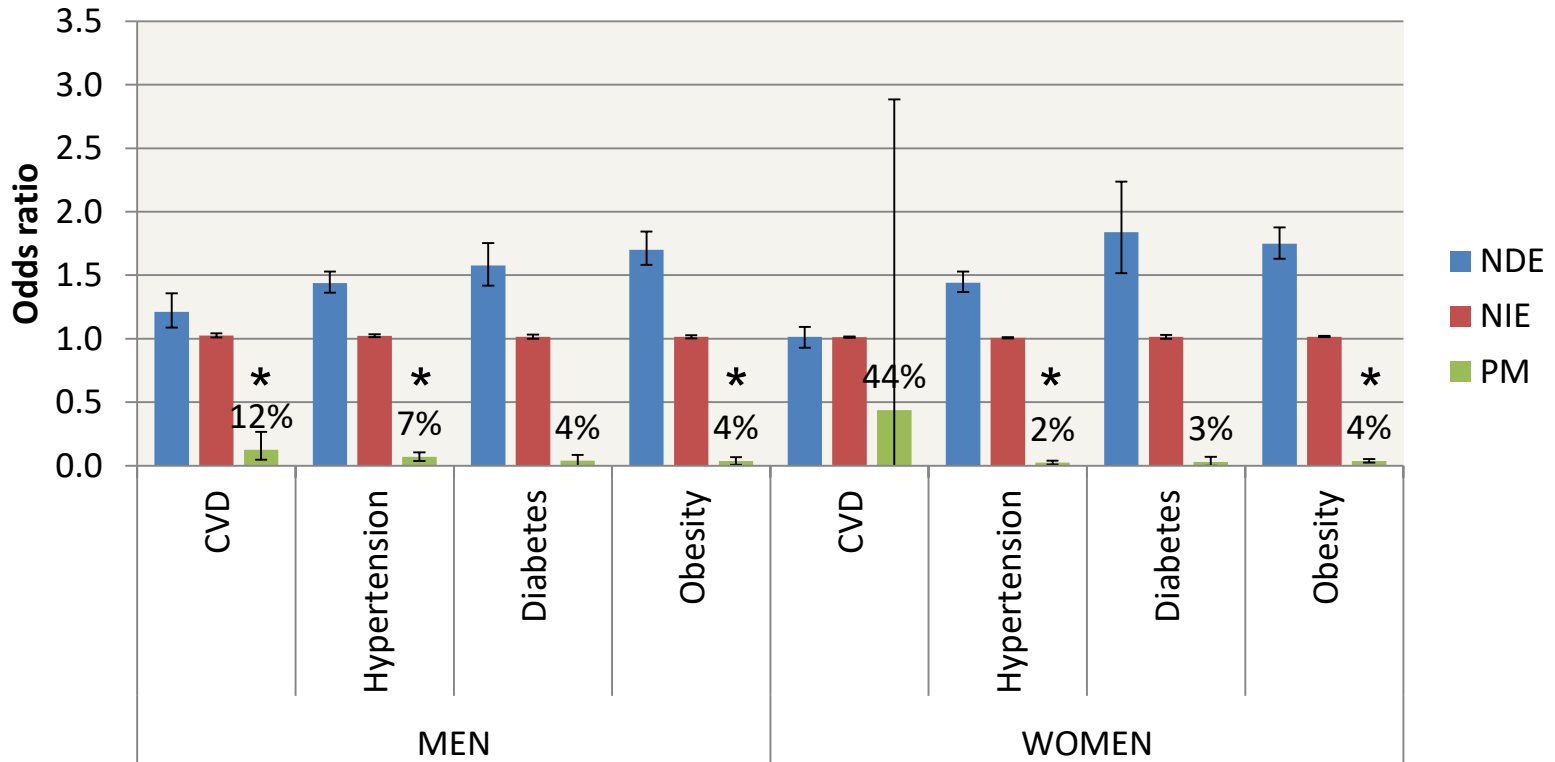
	Health outcome	Adjusted for age and cohort	Adjusted for age, cohort and sleep duration	Attenuation by sleep duration (%)	N
<b>Men</b>	CVD	1.24 [1.14;1.36]	1.22 [1.11;1.33]	12	42885
	Hypertension	1.49 [1.41;1.57]	1.46 [1.39;1.55]	4	42575
	Diabetes	1.65 [1.50;1.83]	1.62 [1.47;1.79]	4	42189
	Obesity	1.81 [1.68;1.95]	1.76 [1.64;1.89]	5	41634
<b>Women</b>	CVD	1.04 [0.97;1.12]	1.03 [0.96;1.11]	.	85188
	Hypertension	1.45 [1.37;1.53]	1.44 [1.36;1.52]	2	66775
	Diabetes	2.03 [1.72;2.40]	2.00 [1.70;2.37]	4	38525
	Obesity	1.87 [1.75;2.01]	1.84 [1.72;1.98]	4	83886



# Results IV : Mediation by short sleep duration

- Counterfactual mediation by short sleep duration of the association between occupational position and cardiometabolic disorder

Mediation of the association between occupational position and cardiometabolic disorders by short sleep duration



# Conclusion

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## Summary

- Low occupational position is associated with abnormal sleep duration
- Abnormal sleep duration is associated with increased risk of CMD
- Short sleep duration slightly mediates the association between occupational position and cardiometabolic disorders, with stronger mediation in men

## Challenges and limitations

- Acquisition and harmonization of data
- Methodology to assess mediating effect by sleep duration

## Perspectives

- Explore the role of other sleep related factors (quality, disturbances)

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**Thank you for your attention!**