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Long working hours and risk of coronary heart disease and stroke:
a systematic review and meta-analysis of published and unpublished data for 603838 individuals

The Lancet impact factor：47.83

Journal Club
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前言

- Among member countries of the Organisation for Economic Cooperation and Development (OECD), Turkey has the highest proportion of individuals working more than 50 h per week (43%), and the Netherlands the lowest (<1%).
- For all OECD countries, a mean of 12% of employed men and 5% of employed women work more than 50 h per week.
- Long working hours might increase the risk of cardiovascular disease, but prospective evidence is scarce, imprecise, and mostly limited to coronary heart disease.

The Lancet , 19 August 2015
Volume 386 , Issue 10005 , 1710 - 1711

步驟 1:系統性文獻回顧探討的問題為何?

長時間工作是否會增加冠狀動脈心臟疾病與中風的風險

- 研究族群 (population)
  - 護理人員
- 介入措施(Intervention)
  - 長時間工作(≧55 h per week)
- 比較措施(Comparison)
  - 標準時間工作(35–40 h per week)
- 結果(Outcomes)
  - risk of incident coronary heart
  - disease and incident stroke

步驟2:系統性文獻回顧的品質如何?(FAITH)

F-研究是否找到所有的相關證據?

搜尋2個資料庫

文獻搜尋只限英語，無說明是否用 MESH Terms 及一般檢索詞彙

Method

We identified published studies through a systematic review of PubMed and Embase from inception to Aug 20, 2014. We obtained unpublished data for 20 cohort studies from the Individual-Participant-Data Meta-analysis in Working Populations (IPD-Work) Consortium and open-access data archives.

步驟2:系統性文獻回顧的品質如何?(FAITH)

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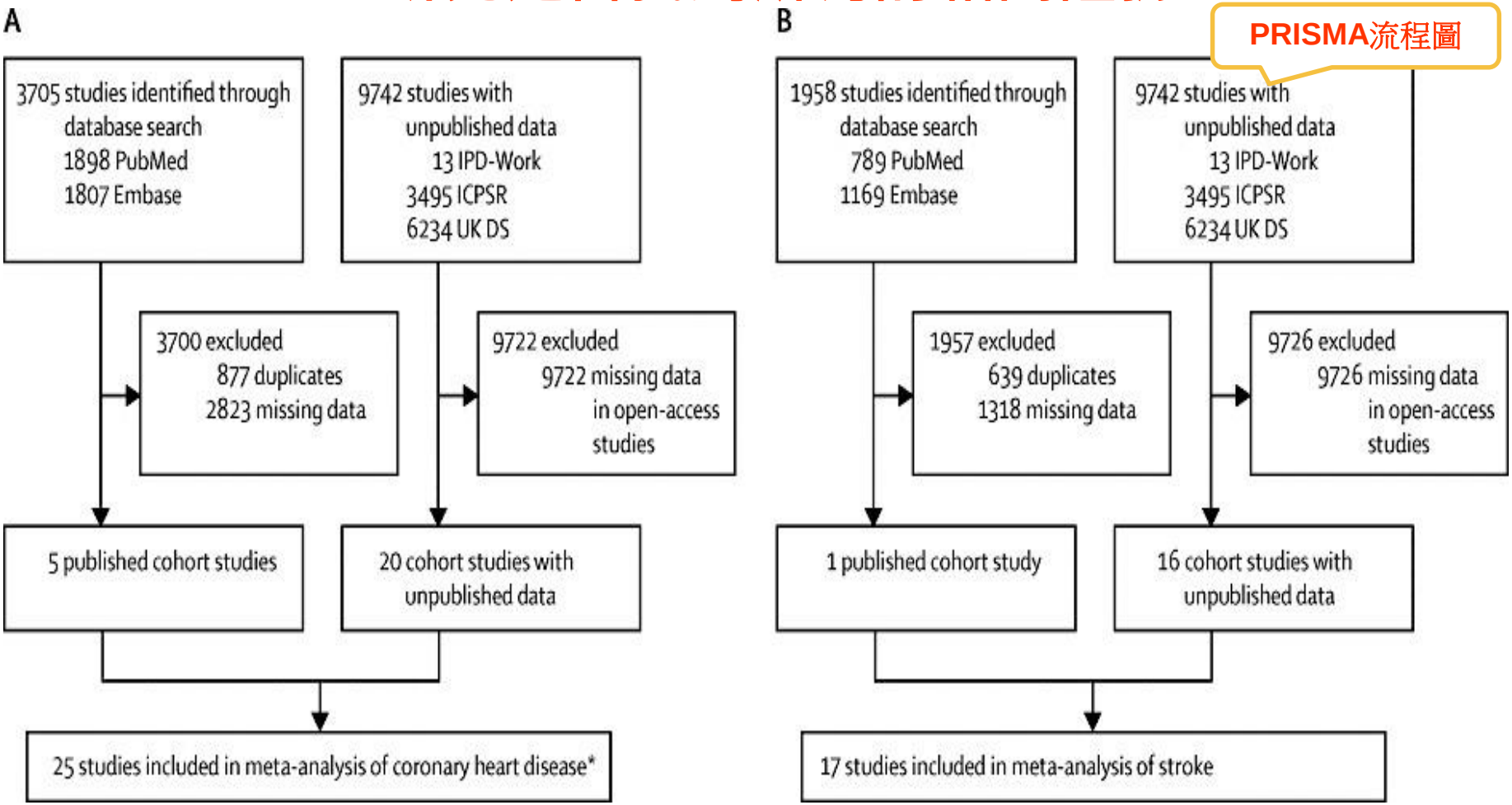

(A) Long working hours and coronary heart disease.
(B) Long working hours and stroke

評讀結果:☑是 ☐否 ☐不清楚

步驟2:系統性文獻回顧的品質如何?(FAITH)

A-文獻是否經過嚴格評讀 (Appraisal)?

Quality assessment

To assess the quality of included studies, we used the Cochrane Risk of Bias Tool for cohort studies.[42] We analysed selection of exposed and non-exposed groups, assessment of exposure, exclusion of the outcome of interest at study baseline, adjustment for confounding variables, assessment of confounding variables, assessment of outcome, and adequacy of the follow-up. The quality of the study was regarded as high if all domains were assessed favourably.

評讀結果:☑是 ☐否 ☐不清楚

步驟2:系統性文獻回顧的品質如何?(FAITH)

I- 是否只納入(included)具有良好效度的文章?

eTable 2. Assessment of 7 domains of study quality and the overall quality score.

	1 Exposed and unexposed from the same population	2 Confidence in exposure assessment	3 Confidence in exclusion of prevalent cases	4 Comprehensive adjustments	5 Confidence in confounders assessment	6 Confidence in outcome assessment	7 Adequate follow-up	HIGH QUALITY
Published studies								
Holtermann[47]	+ +	+	+	+ +	+ +	+	+	Yes
Virtanen‡[41]	+ +	+	+	+ +	+ +	+ +	+ +	Yes
Netterstrom[49]	+ +	+	+	+ +	+	+ +	+ +	Yes
Toker[48]	+ +	+	+	+ +	+ +	+	+	Yes
O'Reilly[8]	+ +	+	-	-	+	+	+ +	No
Unpublished data								
IPD-Work consortium:								
Whitehall II[17]	+ +	+	+	+ +	+ +	+ +	+ +	Yes
WOLF S[18]	+ +	+	+	+ +	+ +	+ +	+ +	Yes
Belstress[19]	+	+	+	+ +	+ +	+ +	+ +	Yes
WOLF N[20]	+ +	+	+	+ +	+ +	+ +	+ +	Yes
IPAW[21]	+ +	+	+	+	+	+ +	+ +	Yes
COPSOQ-I[22]	+ +	+	+	+	+	+ +	+ +	Yes
HeSSup[23]	+	+	+	+	+	+ +	+ +	Yes
PUMA[24]	+ +	+	+	+	+	+ +	+ +	Yes
FPS[25]	+ +	+	+	+	+	+ +	+ +	Yes
HNR[26]	+	+	+	+ +	+ +	+ +	+ +	Yes
DWECS[27]	+ +	+	+	+	+	+ +	+ +	Yes
COPSOQ-II[28]	+	+	+	+	+	+ +	+ +	Yes
NWCS[29]	+	+	+	+	+	+ +	+ +	Yes
Open-access archives:								
Alameda[30]	+ +	+	+	+	+	-	+	No
NHANES-I[31]	+ +	+	+	+	+	-	+ +	No
ACL[32]	+ +	+	+	+	+	-	+ +	No
WLSG[33]	+ +	+	+	+	+	-	+ +	No
WLSS[34]	+	+	+	+	+	-	+	No
MIDUS[35]	+ +	+	+	+	+	-	+	No
HILDA[36]	+ +	+	+	+	+	-	+	No

Note. ++ = *definitely yes*; + = *probably/mostly yes*; - = *probably/mostly no*; - - = *definitely*

eTable 3. Response at baseline and loss to follow-up.

	Baseline year	Response at baseline, %	Loss to follow-up,%
Published studies			
Holtermann[47]	1970-01	87	<10
Virtanen‡[41]	1991-94	74	<10
Netterstrom[49]	1993-94	63	<10
Toker[48]	2003-08	92	24
O'Reilly[8]	2001	88	<10
Unpublished data			
IPD-Work consortium:			
Whitehall II[17]	1991-94	74	<10
WOLF S[18]	1992-95	76	<10
Belstress[19]	1994-98	48	<10
WOLF N[20]	1996-98	82	<10
IPAW[21]	1996-97	76	<10
COPSOQ-I[22]	1997	61	<10
HeSSup[23]	1998	40	<10
PUMA[24]	1999	80	<10
FPS[25]	2000	68	<10
HNR[26]	2000	56	<10
DWECS[27]	2000	75	<10
COPSOQ-II[28]	2004	59	<10
NWCS[29]	2005-06	30	<10
Open-access archives:			
Alameda[30]	1973	86	40
NHANES-I[31]	1982	93	<10
ACL[32]	1986	68	19
WLSG[33]	1992	82	17
WLSS[34]	1993	56	26
MIDUS[35]	1995	61	32
HILDA[36]	2005	66	20

17 (68%) of the 25 studies were assessed as being of high quality.

評讀結果:☑是 ☐否 ☐不清楚

步驟2:系統性文獻回顧的品質如何?(FAITH)

T- 作者是否以圖表及表格總結試驗結果?

eTable 1. Characteristics of participants from published and unpublished studies

	Year*	Country	Number of participants	Number (%) of women	Mean age at baseline (years)	Number (%) of participants with long working hours†	Person-years for CHD	Number of CHD events (incidence per 10 000 person-years)	Person-years for stroke	Number of stroke events (incidence per 10 000 person-years)
Published studies										
Holtermann[47]	2010	Denmark	4943	0 (0%)	48.6	922 (19%)	123 791	591 (47.7)	–	–
Virtanen‡[41]	2010	UK	6014	1752 (29%)	48.7	617 (10%)	68 893	159 (23.1)	–	–
Netterstrom[49]	2010	Denmark	1146	595 (52%)	47.0	135 (12%)	16 044§	104 (64.8)	–	–
Toker[48]	2012	Israel	8838	3126 (35%)	44.9	unknown	31 817	93 (29.2)	–	–
O'Reilly[8]	2013	Northern Ireland	414 949	144 938 (35%)	39.0	39 069 (9%)	3 610 056	957 (2.7)	2 617 534	215 (0.8)
Unpublished data										
IPD-Work consortium:										
		UK								.5)
WOLF S[18]	1992-95	Sweden								.1)
Belstress[19]	1994-98	Belgium								–
WOLF N[20]	1996-98	Sweden	4648	772 (17%)	44.0	55 (1%)	53 513	133 (24.9)	53 667	95 (17.7)
IPAW[21]	1996-97	Denmark	2021	1360 (68%)	41.2	6 (<1%)	27 603	43 (15.6)	26 019	57 (21.9)
COPSOQ-I[22]	1997	Denmark	1803	876 (49%)	40.6	109 (6%)	22 751	37 (16.3)	21 611	37 (17.1)
HeSSup[23]	1998	Finland	16 150	8971 (56%)	39.6	1417 (9%)	112 334	68 (6.1)	112 712	78 (6.9)
PUMA[24]	1999	Denmark	1783	1473 (83%)	42.7	17 (1%)	19 519	19 (9.7)	18 389	35 (19.0)
FPS[25]	2000	Finland	44 565	35 840 (80%)	44.6	1414 (3%)	429 886	221 (5.1)	428 873	333 (7.8)
HNR[26]	2000	Germany	1774	732 (41%)	53.3	295 (17%)	14 449	38 (26.3)	–	–
DWECS[27]	2000	Denmark	5535	2590 (47%)	41.8	440 (8%)	54 099	66 (12.2)	49 115	92 (18.7)
COPSOQ-II[28]	2004	Denmark	3389	1785 (53%)	42.7	177 (5%)	20 144	12 (6.0)	17 292	22 (12.7)
NWCS[29]	2005-06	Netherlands	43 510	22 178 (51%)	40.1	2893 (7%)	157 020	116 (7.4)	–	–
Open-access archives:										
			1585	666 (42%)	44.0	152 (10%)	34 634§	120 (34.6)	35924§	37 (9.9)
			4875	2800 (57%)	48.8	477 (10%)	44 005§	278 (63.2)	46310§	117 (26.0)
ACL[32]	1986	USA	1502	802 (53%)	44.5	181 (12%)	19 070§	144 (75.5)	19034§	79 (35.2)
WLSG[33]	1992	USA	5421	2883 (53%)	54.1	724 (13%)	60 538§	648 (107.0)	74295§	163 (20.5)
WLSS[34]	1993	USA	2366	1299 (55%)	52.4	324 (14%)	26 608§	243 (91.3)	37079§	90 (19.4)
MIDUS[35]	1995	USA	3303	1637 (50%)	44.2	464 (14%)	29 538§	331 (112.1)	26052§	23 (8.8)
HILDA[36]	2005	Australia	4879	2343 (48%)	41.4	541 (11%)	19 535§	86 (44.0)	–	–
Total			**603 838**	**220 210 (37%)**	**40.5**	**51 512 (9%)**	**5 127 325**	**4768 (9.3)**	**3 785 235**	**1722 (4.5)**

long working hours referred to 55+ hours of work per week, except in Netterstrom (50+ hours per week), Holtermann4(46+ hours per week) and Toker4(continuous variable)

* For published studies, year of publication. For unpublished studies, year of baseline examination.
† In all studies defined long working hours referred to 55+ hours of work per week, except in Netterstrom[49] (50+ hours per week), Holtermann[47] (46+ hours per week) and Toker[48] (continuous variable)
‡Overlapping dataset – only one of the two used in analyses.
§Calculated from the formula: number of participants x total follow-up time

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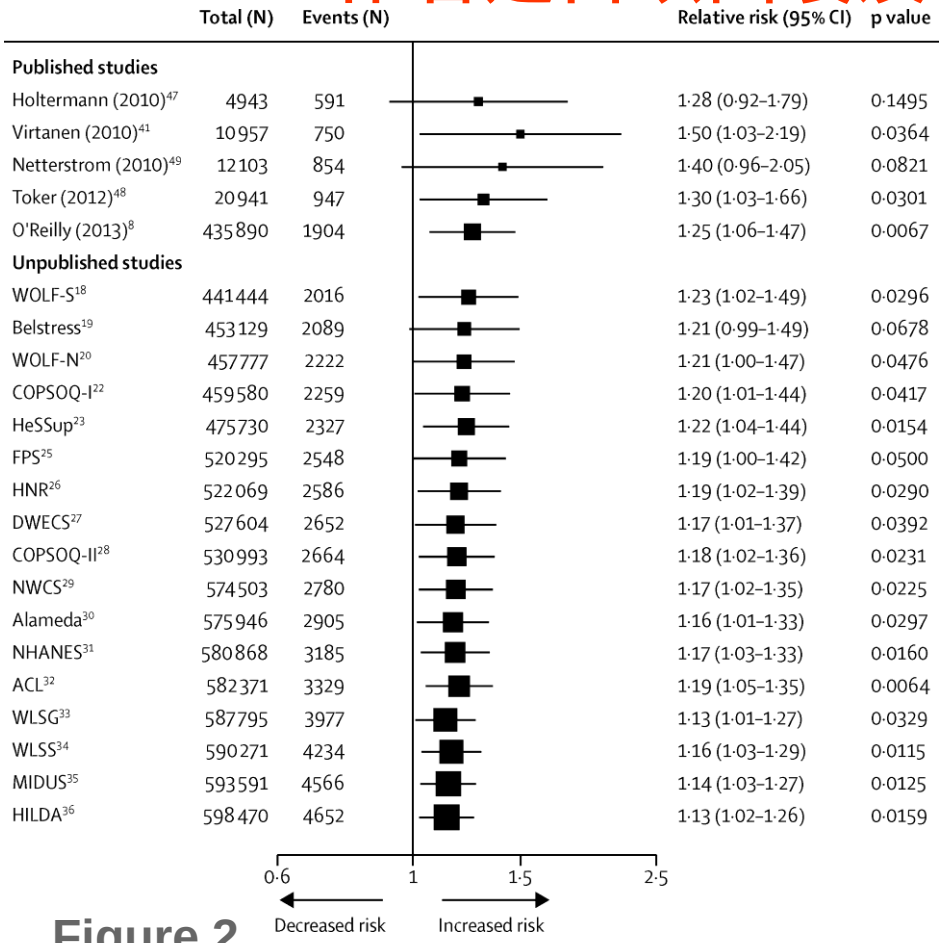
步驟2:系統性文獻回顧的品質如何?(FAITH)

T- 作者是否以圖表及表格總結試驗結果?



published and unpublished data of the association between long working hours and incident coronary heart disease

(I^2=0%, p=0·49)

評讀結果:☑是 □否 □不清楚

Figure 2

Cumulative meta-analysis of published and unpublished data of the association between long working hours and incident coronary heart disease

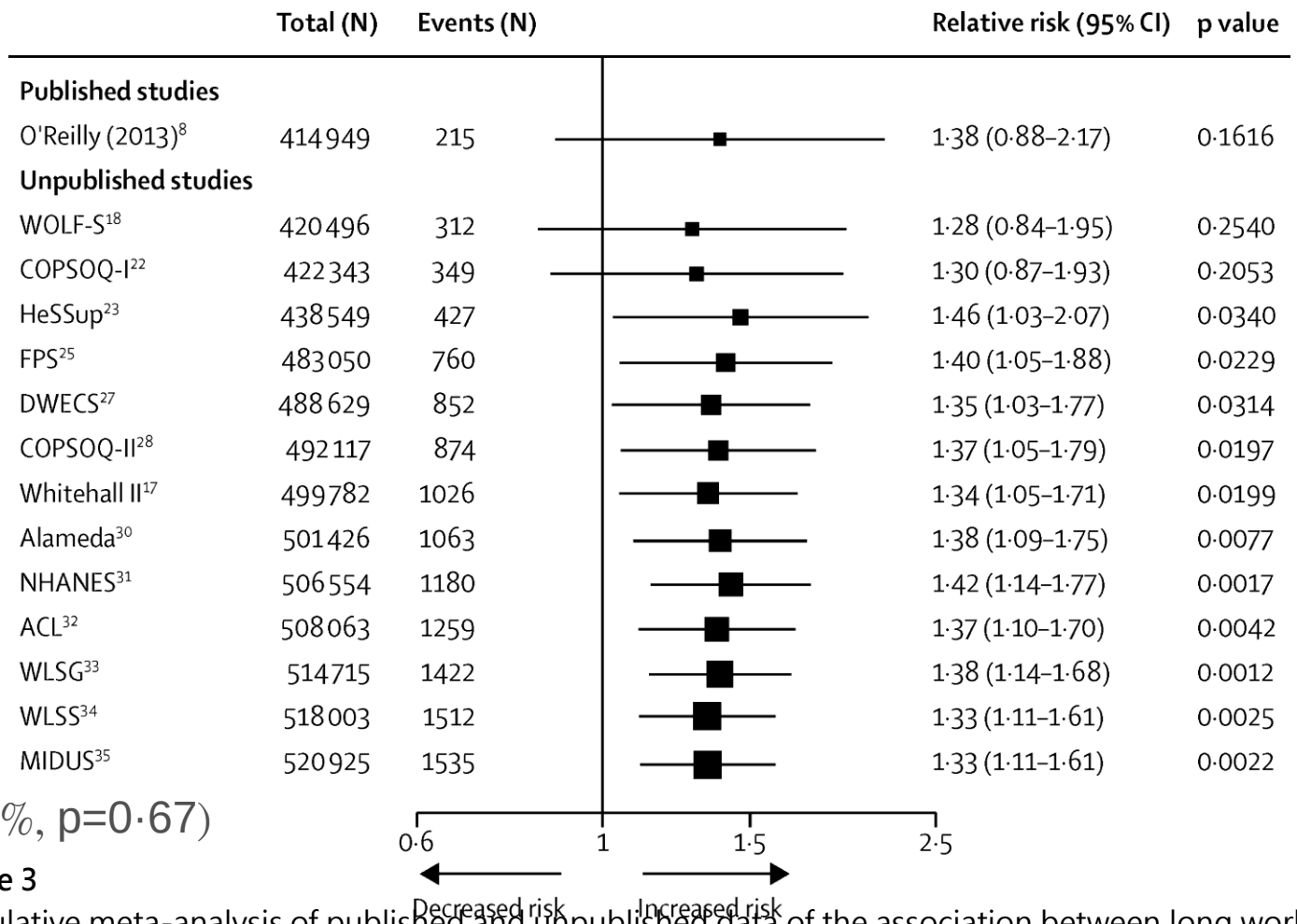
Estimates adjusted for age, sex, and socioeconomic status.

結果

- 603 838 men and women free from coronary heart disease at baseline contributed to the analysis of long working hours and incident coronary heart disease.
- 4768 of these individuals had an event during the mean follow-up of 8·5 years.
- 528 908 men and women free from stroke at baseline contributed to the analysis of long working hours and incident stroke.
- 1722 of these individuals had an event during mean follow-up of 7·2 years.

結果

long working hours and incident stroke



- **Figure 3**
- Cumulative meta-analysis of published and unpublished data of the association between long working hours and incident stroke

結果
dose–response association for stroke

RR值

- 工作小時, 與標準工作時間相比
  - 41-48　1·10（95%CI 0·94-1·28; p = 0.24）
  - 49-54　1·27（1·03-1·56; p = 0.03），
  - 55　1·33（1·11-1·61; p = 0.002）

- **長時間工作的員工中風風險較高**

***eTable 4*. Association of long working hours with incident coronary heart disease and stroke in subgroups.** Estimates are adjusted, when appropriate, for age, sex and socioeconomic status.

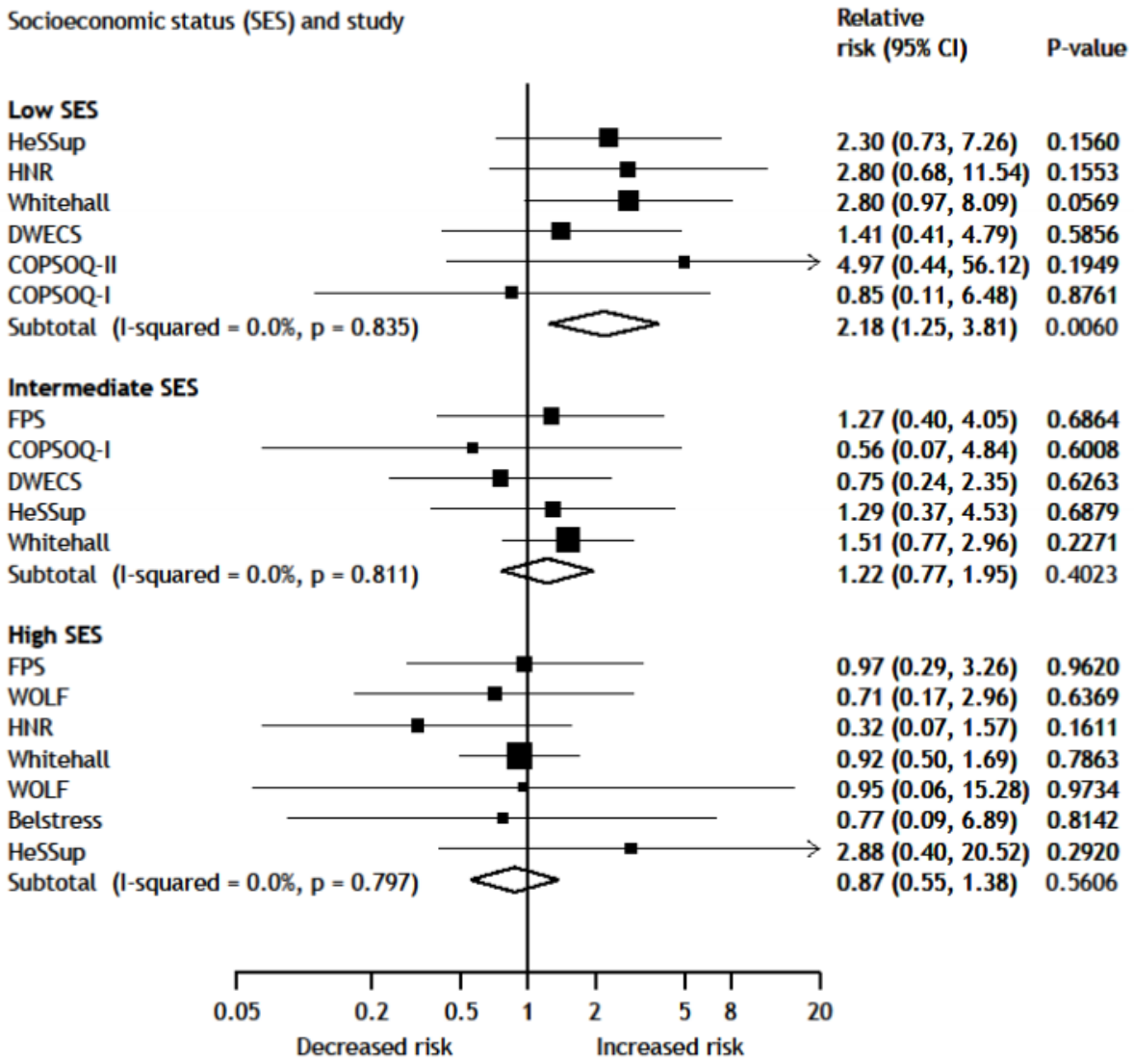
	N of events	Relative risk (95% CI)	P-value	Meta-regression p-value
Outcome: Incident coronary heart disease				
Sex				
Men	1928	1.09 (0.94-1.26)	0.2391	0.48
Women	868	1.20 (0.89-1.63)	0.2379	
Age group				
<50 years	682	1.19 (0.91-1.57)	0.2004	0.50
≥50 years	2071	1.06 (0.90-1.24)	0.4952	
Socioeconomic status				
High	868	1.02 (0.85-1.23)	0.0210	0.15
Intermediate	729	1.14 (0.87-1.50)	0.3476	
Low	833	1.30 (1.04-1.62)	0.8202	
Outcome: Incident stroke				
Sex				
Men	723	1.29 (1.04-1.60)	0.0192	0.31
Women	509	1.63 (1.10-2.43)	0.0151	
Age group				
<50 years	396	1.14 (0.78-1.67)	0.4857	0.34
≥50 years	924	1.43 (1.11-1.84)	0.0057	
Socioeconomic status				
High	325	1.29 (0.93-1.80)	0.1297	0.39
Intermediate	466	1.79 (1.21-2.65)	0.0035	
Low	478	1.59 (1.15-2.19)	0.0048	

CHD

Stroke

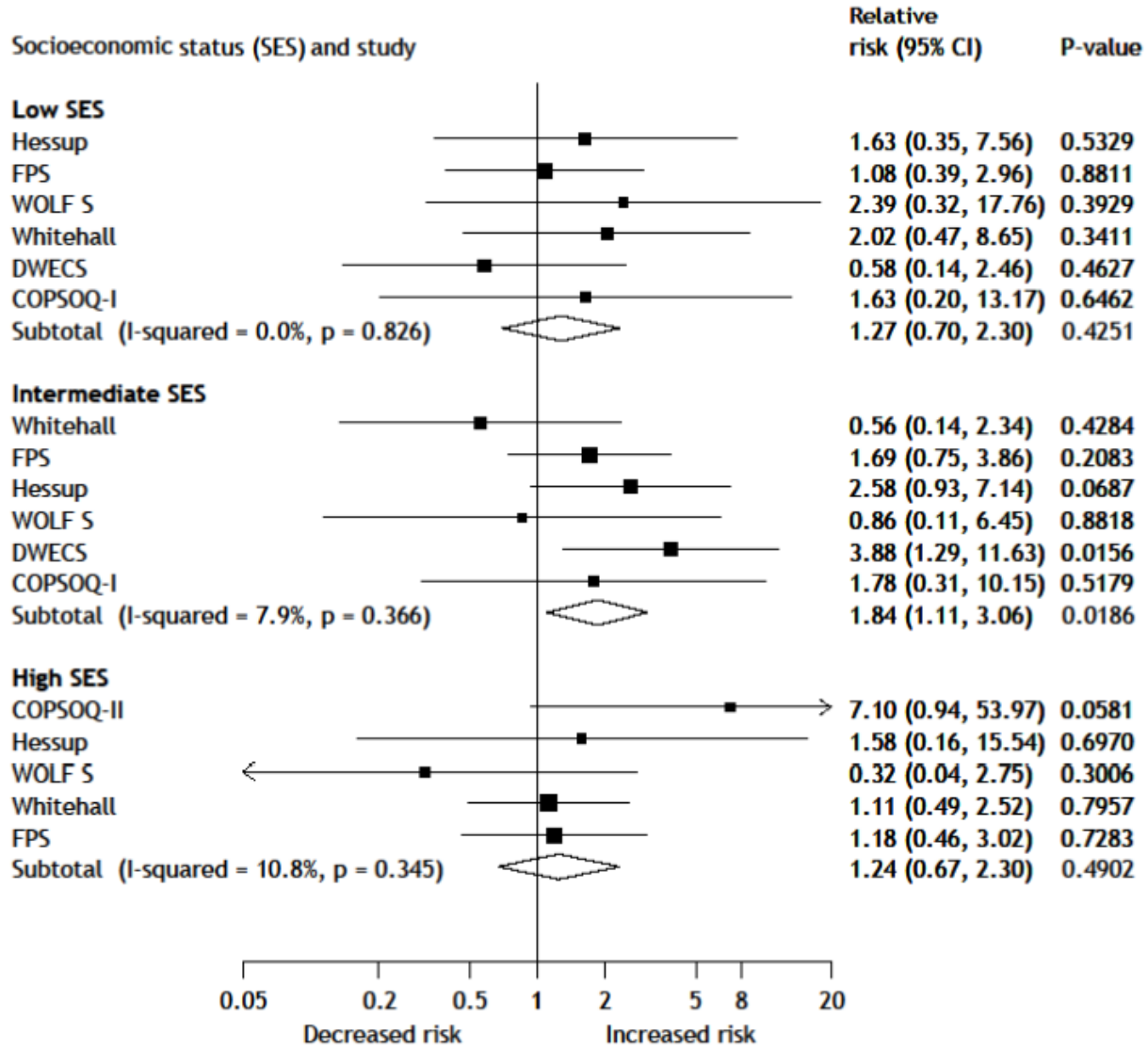
eFigure 4. Age- and sex-adjusted random-effects meta-analysis of long working hours and incident coronary heart disease in low, intermediate and high-SES groups

CHD

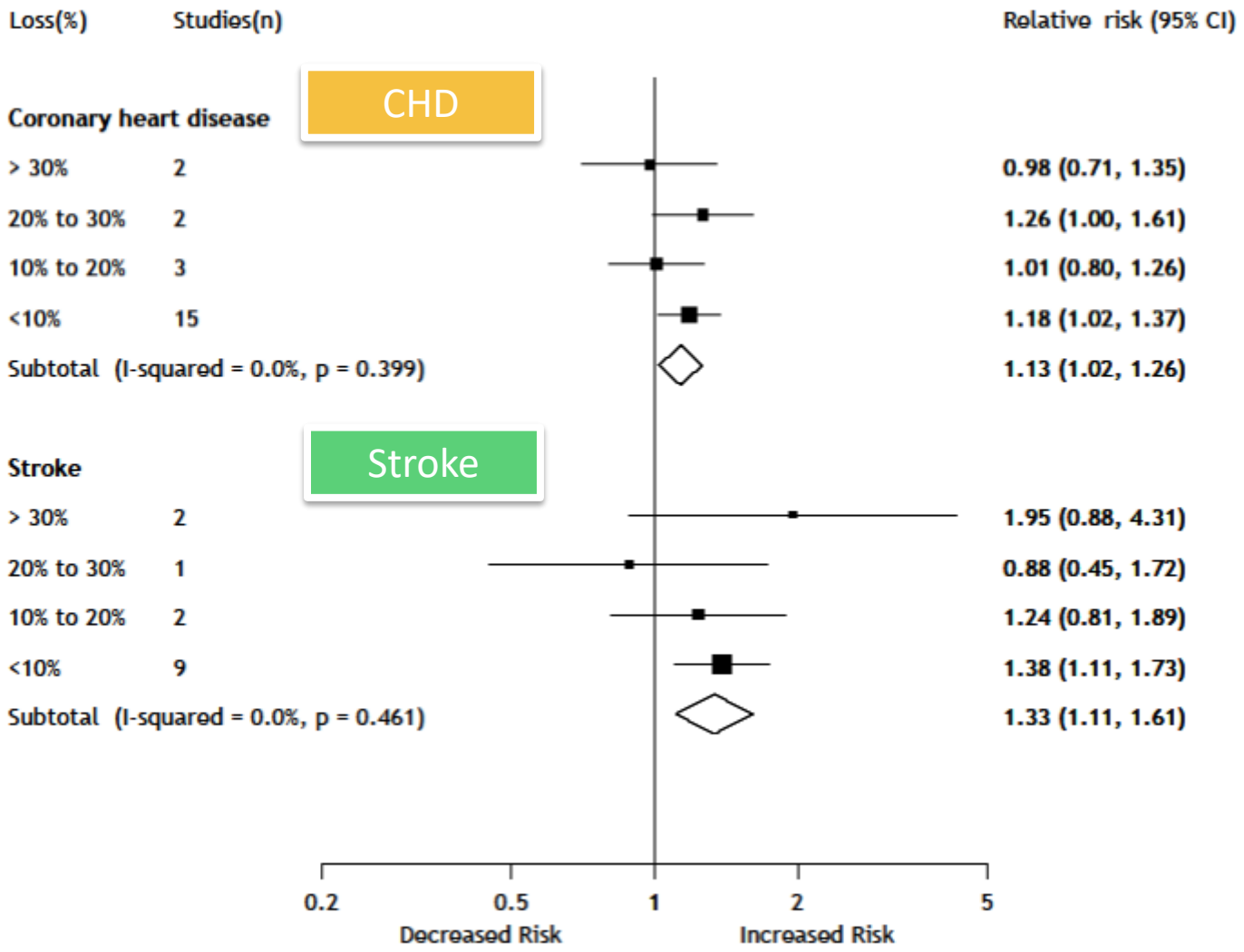


eFigure 5. Age- and sex-adjusted random-effects meta-analysis of long working hours and incident stroke in low, intermediate and high-SES groups

Stroke



eFigure 7. Association of long working hours (55+ per week) with incident coronary heart disease and stroke by loss to follow-up, adjusted for age, sex and SES.



Association of categories of weekly working hours with incident coronary heart disease and stroke

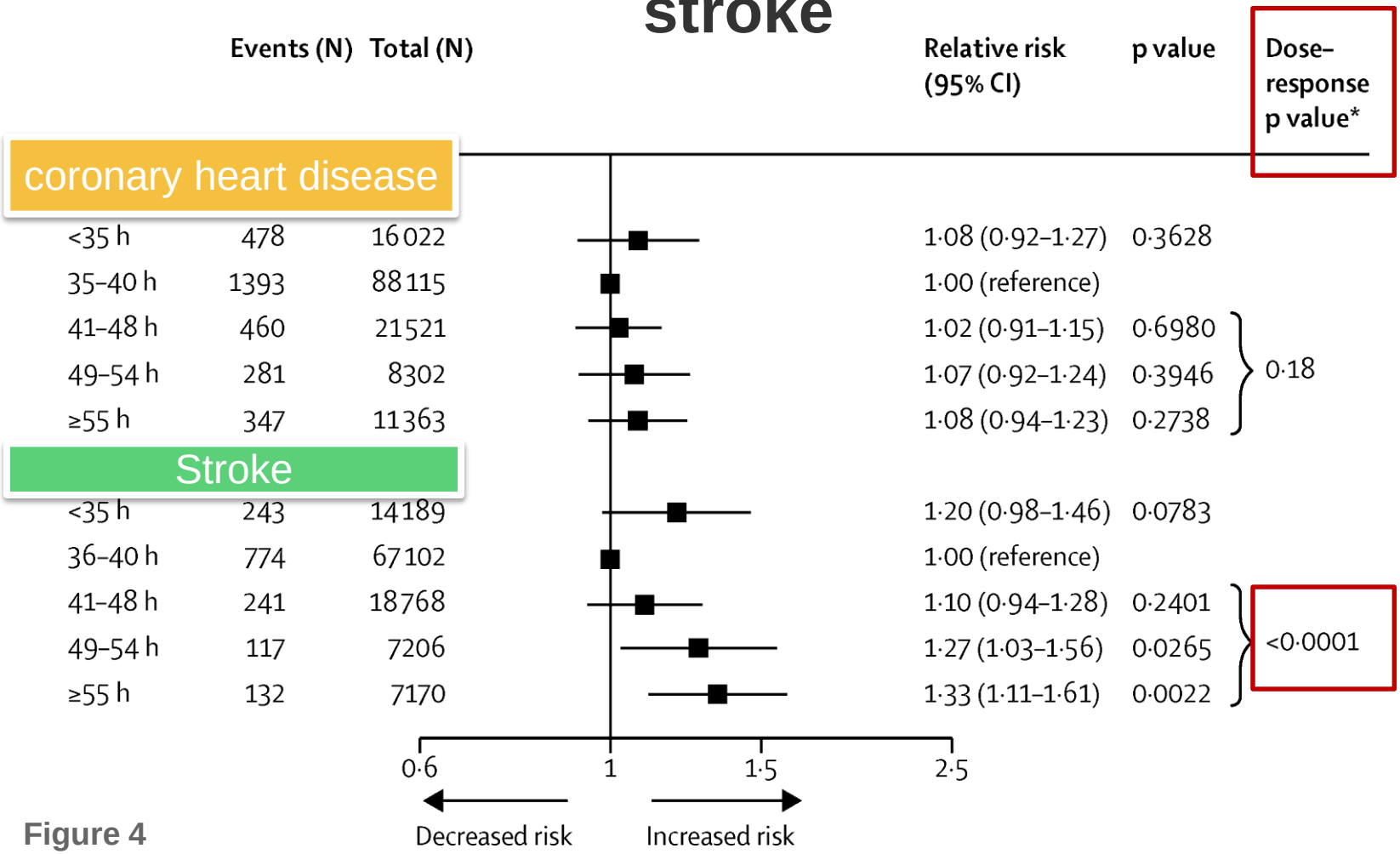


Figure 4

Association of categories of weekly working hours with incident coronary heart disease and stroke
Estimates adjusted for age, sex, and socioeconomic status. *For trend from standard to long working hours.

結果

long working hours and coronary heart disease

- low SES group
  - RR of 2.18 (95% CI 1.25–3.81; p=0·006)
- intermediate SES group
  - 1.22 (0.77–1.95; p=0.40)
- high SES group
  - 0.87 (0.55–1.38; p=0.56)

(p=0·001 for difference between groups)

Association of categories of weekly working hours with incident coronary heart disease

CHD

A

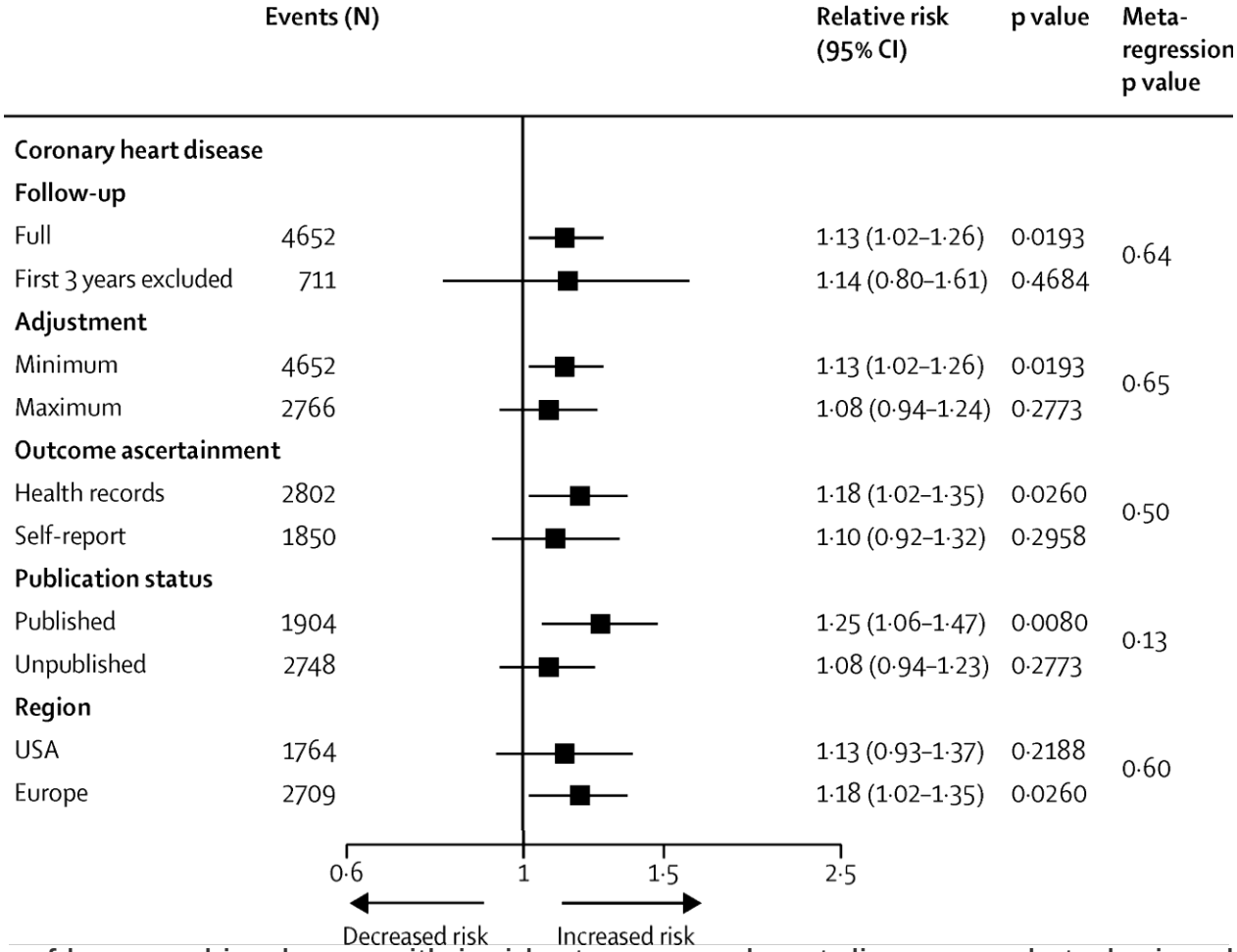


Figure 5

Association of long working hours with incident coronary heart disease and stroke in relation to study follow-up, adjustments, outcome ascertainment, publication status, and region

(A) Coronary heart disease. (B) Stroke. Estimates adjusted, when appropriate, for age, sex, and socioeconomic status.

Association of categories of weekly working hours with incident coronary stroke

Stroke

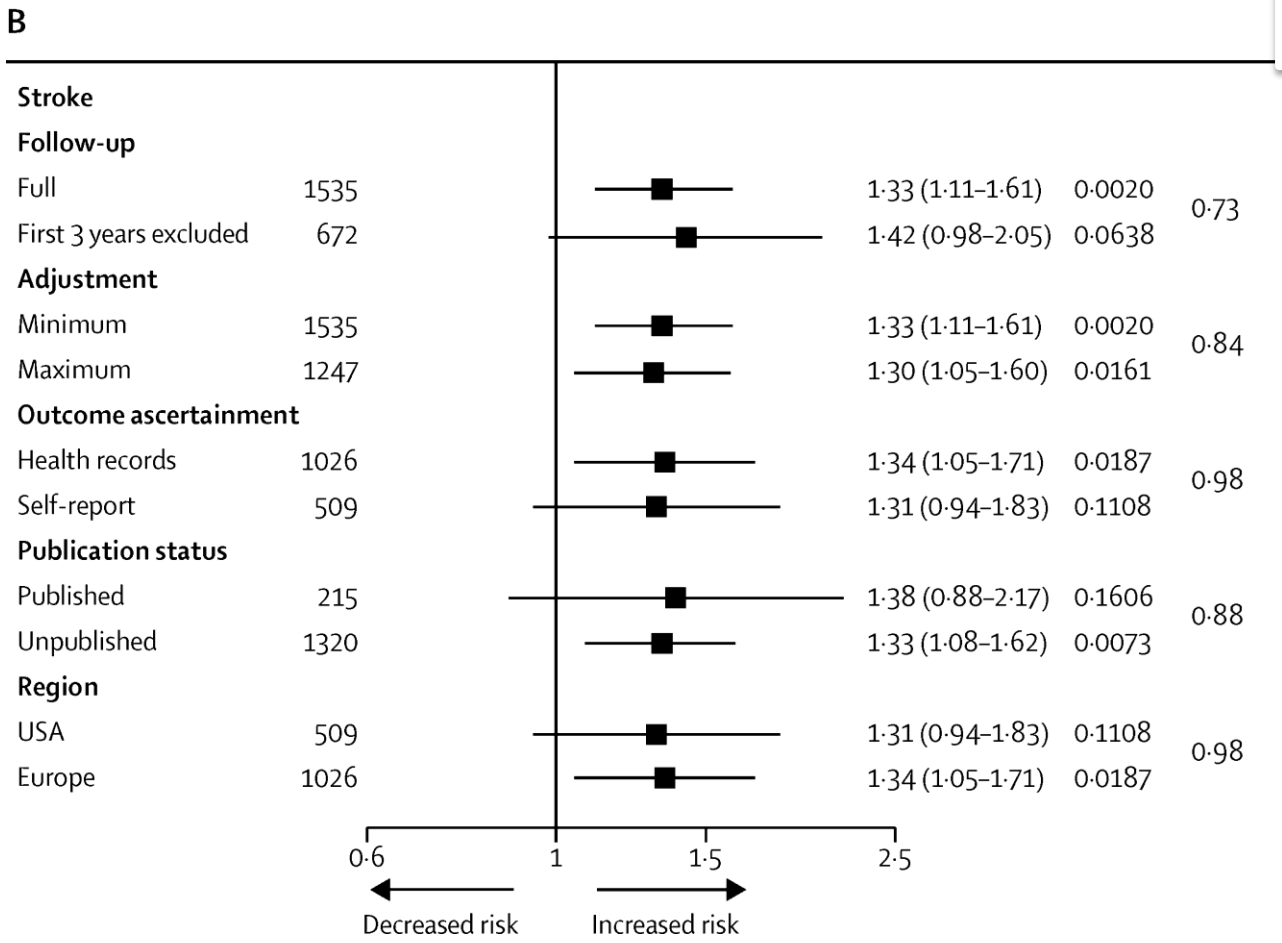


Figure 5

Association of long working hours with incident coronary heart disease and stroke in relation to study follow-up, adjustments, outcome ascertainment, publication status, and region

(A) Coronary heart disease. (B) Stroke. Estimates adjusted, when appropriate, for age, sex, and socioeconomic status.

步驟2:系統性文獻回顧的品質如何?(FAITH)

H-試驗結果是否相近-異質性?

- ***Figure 2:*** **Cumulative meta-analysis of published and unpublished data of the association between long working hours and incident coronary heart disease**
  - no significant heterogeneity (*I*2=0%, p=0.49; appendix).
- ***Figure 3:*** **Cumulative meta-analysis of published and unpublished data of the association between long**
- **working hours and incident stroke**
  - no significant heterogeneity (*I*2=0%, p=0・67; appendix).

- There was no evidence of between-study heterogeneity, reverse causation bias, or confounding.
- The absence of heterogeneity in the study-specific estimates, and the uniform findings in the analyses stratified by method of ascertainment, suggest that this misclassification is not a major source of bias.

評讀結果:☑是 □否 □不清楚

結論

- Employees who work long hours have a higher risk of stroke than those working standard hours.
- However, the evidence for coronary heart disease is less persuasive.
- More attention should be paid to the management of vascular risk factors in individuals who work long hours.

- 是否相信本研究的結果：每週工時大於55小時，會增加冠狀動脈心臟疾病與中風的發生?

同意 10票

懷疑25票

不同意2票


Thank You