Supplemental Material

Data S1.

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Table S1. Sensitivity analyses by removing studies one by one for unadjusted cross-sectional analysis.

Global cogniton						
Author	**es**	**ll**	**ul**	**I^2**	**Q-Cochrane**	**p**
Abbatecola et al., 2008 [23]	-0.53	-0.68	-0.39	74.1	30.86	<0.001
Angermann et al., 2017 [25]	-0.44	-0.53	-0.35	26.4	10.87	0.209
Fukuhara et al., 2006 [28]	-0.54	-0.70	-0.39	74.1	30.88	<0.001
Hanon et al., 2005 [30]	-0.53	-0.68	-0.38	73.5	30.15	<0.001
Lee et al., 2014 [35]	-0.49	-0.62	-0.36	66.4	23.83	0.002
Lim et al., 2016 [13]	-0.55	-0.70	-0.40	73.9	30.68	<0.001
Muela et al., 2018 [37]	-0.55	-0.70	-0.40	73.9	30.68	<0.001
Nilsson et al., 2014 [39]	-0.56	-0.72	-0.40	70.3	26.97	0.001
Triantafyllidi et al., 2009 [46]	-0.54	-0.69	-0.39	74.1	30.90	<0.001
Zhong et al., 2014 [50]	-0.56	-0.73	-0.38	73.6	30.32	<0.001
Executive function						
Author	**es**	**ll**	**ul**	**I^2**		
Abbatecola et al., 2008 [23]	-0.30	-0.41	-0.18	0.0	1.77	0.413
Kim et al., 2017 [33]	-0.42	-0.57	-0.26	0.0	2.00	0.368
Muela et al., 2018 [37]	-0.37	-0.59	-0.15	58.6	4.83	0.089
Zhong et al., 2014 [50]	-0.36	-0.59	-0.12	53.5	4.30	0.117
Memory						
Author	**es**	**ll**	**ul**	**I^2**		
Cooper et al., 2016 [11]	-0.53	-0.74	-0.32	56.3	2.29	0.130
Muela et al., 2018 [37]	-0.28	-0.61	0.06	95.2	20.82	<0.001
Zhong et al., 2014 [50]	-0.38	-0.94	-0.18	93.3	14.91	<0.001

Table S2. Sensitivity analyses by removing studies one by one for adjusted cross-sectional analysis.

Global cognition						
Author	**es**	**ll**	**ul**	**I^2**	**Q-Cochrane**	**p**
Elias et al., 2009 [27]	-0.22	-0.32	-0.12	77.6	49.19	<0.001
Fukuhara et al., 2006 [28]	-0.20	-0.30	-0.10	77.2	48.26	<0.001
Hanon et al., 2005 [30]	-0.21	-0.31	-0.11	77.9	49.72	<0.001
Karasavvidou et al., 2018 [31]	-0.21	-0.31	-0.11	77.9	49.78	<0.001
Kim et al., 2009 [32]	-0.13	-0.16	-0.09	0.0	9.10	0.613
Lamballais et al., 2018 [34]	-0.23	-0.35	-0.10	77.6	49.16	<0.001
Lee et al., 2014 [35]	-0.21	-0.31	-0.11	77.9	49.67	<0.001
Lim et al., 2016 [13]	-0.22	-0.32	-0.12	77.8	49.63	<0.001
Muela et al., 2018 [37]	-0.21	-0.30	-0.11	77.6	49.19	<0.001
Palta et al., 2019 [40]	-0.23	-0.34	-0.11	77.4	48.59	<0.001
Ryu et al., 2017 [43]	-0.19	-0.29	-0.10	76.2	46.18	<0.001
Singer et al., 2013 [45]	-0.22	-0.32	-0.12	77.5	48.87	<0.001
Zhong et al., 2014 [50]	-0.23	-0.33	-0.12	77.2	48.21	<0.001
Executive function						
Author	**es**	**ll**	**ul**	**I^2**		
Geijselaers et al., 2016 [29]	-0.10	-0.15	-0.04	52.5	18.95	0.026
Kim et al., 2017 [32]	-0.09	-0.14	-0.03	61.0	23.06	0.006
Lim et al., 2016 [13]	-0.07	-0.12	-0.02	49.5	17.83	0.037
Mitchell et al., 2011[S36]	-0.08	-0.13	-0.02	58.3	21.56	0.010
Muller et al., 2006 [38]	-0.08	-0.14	-0.02	60.9	23.01	0.006
Palta et al., 2019 [40]	-0.09	-0.16	-0.02	56.6	20.73	0.014
Pase et al., 2016 [41]	-0.08	-0.14	-0.02	59.7	22.32	0.008
Ryu et al., 2017 [43]	-0.06	-0.11	-0.02	44.1	16.10	0.065
Singer et al., 2013 [45]	-0.09	-0.14	-0.03	60.1	22.58	0.007
Tsao et al., 2013 [47]	-0.07	-0.13	-0.02	55.6	20.25	0.016
Zhong et al., 2014 [50]	-0.09	-0.16	-0.03	59.3	22.11	0.009
Memory						
Author	**es**	**ll**	**ul**	**I^2**		
Cooper et al., 2016 [11]	-0.13	-0.21	-0.05	81.7	60.18	<0.001
Elias et al., 2009 [27]	-0.14	-0.22	-0.06	81.9	60.74	<0.001
Geijselaers et al., 2016 [29]	-0.13	-0.21	-0.06	81.9	60.88	<0.001
Lim et al., 2016 [13]	-0.13	-0.20	-0.05	81.8	60.54	<0.001
Mitchell et al., 2011 [36]	-0.12	-0.20	-0.05	81.2	58.48	<0.001
Muela et al., 2018 [37]	-0.11	-0.18	-0.04	79.5	53.70	<0.001
Muller et al., 2006 [38]	-0.13	-0.021	-0.06	81.9	60.89	<0.001
Palta et al., 2019 [40]	-0.14	-0.22	0.05	81.8	60.40	<0.001
Pase et al., 2016 [41]	-0.14	-0.22	-0.06	77.6	49.20	<0.001
Ryu et al., 2017 [43]	-0.07	-0.12	-0.03	50.1	22.06	0.024
Singer et al., 2013 [45]	-0.13	-0.20	-0.05	81.8	60.30	<0.001
Tsao et al., 2013 [47]	-0.14	-0.22	-0.07	80.8	57.33	<0.001
Zhong et al., 2014 [50]	-0.13	-0.21	-0.06	81.9	60.91	<0.001

Table S3. Sensitivity analyses by removing studies one by one for longitudinal analysis.

Global cognition						
Author	**es**	**ll**	**ul**	**I^2**	**Q-Cochrane**	**p**
Al Hazzouri et al., 2013 [24]	-0.15	-0.26	-0.04	62.2	10.59	0.032
Benetos et al., 2012 [26]	-0.22	-0.41	-0.03	89.9	39.73	<0.001
Palta et al., 2019 [40]	-0.22	-0.40	-0.04	89.9	39.73	<0.001
Poels et al., 2007 [42]	-0.26	-0.37	-0.16	54.8	8.86	0.065
Scuteri et al., 2007 [44]	-0.20	-0.36	-0.04	89.7	38.97	<0.001
Watson et al., 2011 [49]	-0.21	-0.39	-0.03	89.9	39.56	<0.001
Executive function						
Author	**es**	**ll**	**ul**	**I^2**		
Hajjar et al., 2016 [12]	-0.11	-0.25	0.02	64.0	5.55	0.062
Kim et al., 2017 [33]	-0.12	-0.23	-0.01	67.0	6.06	0.048
Poels et al., 2007 [42]	-0.18	-0.27	-0.09	0.0	0.39	0.822
Tsao et al., 2013 [48]	-0.06	-0.13	0.00	0.0	1.67	0.434
Memory						
Author	**es**	**ll**	**ul**	**I^2**		
Hajjar et al., 2016 [12]	-0.05	-0.17	0.07	46.8	1.88	0.170
Kim et al., 2017 [42]	-0.11	-0.23	0.03	0.0	0.18	0.675
Poels et al., 2007 [49]	-0.02	-0.09	0.04	0.0	0.79	0.375

Table S4. Subgroup analyses for the association between PWv and cognition domains by type of sample, PWv measured and device used.

	Longitudinal data					Cross-sectional data									
						Unadjusted					Adjusted				
	n	ES (95%CI)	I^2	Q-Cochrane	p	n	ES (95%CI)	I^2	Q-Cochrane	p	n	ES (95%CI)	I^2	Q-Cochrane	p
Global cognition															
Type of sample															
General population	5	-0.20 (-0.36, -0.04)	89.7	38.97	<0.001	4	-0.39 (-0.47, -0.32)	0.0	0.70	0.872	8	-0.19 (-0.31; -0.08)	84.5	45.22	<0.001
Specific disease population	1	-0.36 (-0.76, 0.04)	NA	NA	NA	6	-0.67 (-0.92, -0.41)	73.8	19.10	0.002	5	-0.25 (-0.38, -0.11)	0.0	2.42	0.659
Type pf PWv															
cfPWv	5	-0.21 (-0.39, -0.03)	89.9	39.56	<0.001	9	-0.55 (-0.70, -0.39)	74.1	30.88	<0.001	10	-0.12 (-0.16, -0.08)	0.0	2.98	0.965
baPWv	0	NA	NA	NA	NA	1	-0.42 (-0.70, -0.14)	NA	NA	NA	3	-0.56 (-0.88, -0.23)	76.6	8.55	0.014
aPWv	1	-0.22 (-0.39, -0.05)	NA	NA	NA	0	NA	NA	NA	NA	0	NA	NA	NA	NA
Type of device															
Sphygmocor	0	NA	NA	NA	NA	3	-0.52 (-0.81, -0.24)	78.0	9.11	0.011	5	-0.09 (-0.20, 0.02)	0.0	0.91	0.923
Complior	2	-0.13 (-0.45, 0.18)	63.6	2.75	0.097	4	-0.44 (-0.53, -0.35)	0.0	1.33	0.723	4	-0.13 (-0.17, -0.08)	0.0	1.73	0.210
Other	4	-0.26 (-0.37, -0.14)	65.7	8.74	0.033	3	-0.70 (-1.19, -0.22)	83.8	12.37	0.002	4	-0.43 (-0.81, -0.05)	92.9	42.25	<0.001
Executive function															
Type of sample															
General population	3	-0.12 (-0.23, -0.01)	67.0	6.06	0.048	3	-0.36 (-0.59, -0.12)	53.5	4.30	<0.001	9	-0.07 (-0.12, -0.01)	50.3	16.10	0.041
Specific disease population	1	-0.09 (-0.80,0.41)	NA	NA	NA	1	-0.39 (-0.60, -0.19)	NA	NA	NA	2	-0.16 (-0.38, 0.05)	70.7	3.41	0.065
Type of PWv															
cfPWv	4	-0.12 (-0.22, -0.02)	83.1	6.06	0.001	4	-0.35 (-0.51, -0.20)	38.4	4.87	0.182	10	-0.06 (-0.11, -0.02)	44.1	16.10	0.065
baPWv	0	NA	NA	NA	NA	0	NA	NA	NA	NA	1	-0.27 (-0.43, -0.11)	NA	NA	NA
aPWv	0	NA	NA	NA	NA	0	NA	NA	NA	NA	0	NA	NA	NA	NA
Type of device															
Sphygmocor	2	-0.15 (-0.29, 0.00)	0.0	0.04	0.836	1	-0.22 (-0.39, -0.05)	NA	NA	NA	5	-0.05 (-0.19, 0.08)	56.1	9.12	0.058
Complior	1	-0.04 (-0.11, 0.04)	NA	NA	NA	2	-0.38 (-0.54, -0.21)	0.0	0.05	0.819	1	-0.02 (-0.10, 0.06)	NA	NA	NA
Other	1	-0.20 (-0.31, -0.09)	NA	NA	NA	1	-0.72 (-1.18, -0.27)	NA	NA	NA	5	-0.12 (-0.19, -0.04)	67.0	12.11	0.017
Memory															
Type of sample															
General population	3	-0.05 (-0.12, 0.03)	13.8	2.32	0.314	2	-0.28 (-0.61, 0.06)	95.2	20.82	<0.001	11	-0.06 (-0.10, -0.02)	30.4	14.38	0.156
Specific disease population	0	NA	NA	NA	NA	1	-0.68 (-0.96, -0.41)	NA	NA	NA	2	-0.58 (-0.73, -0.43)	0.0	0.10	0.753
Type of PWv															
cfPWv	2	-0.02 (-0.09, 0.04)	0.0	0.79	0.375	3	-0.39 (-0.70, -0.10)	93.4	30.08	<0.001	12	-0.08 (-0.12, -0.03)	50.1	22.06	0.024
baPWv	0	NA	NA	NA	NA	0	NA	NA	NA	NA	1	-0.59 (-0.76, -0.43)	NA	NA	NA
aPWv	1	-0.14 (-0.31, 0.03)	NA	NA	NA	0	NA	NA	NA	NA	0	NA	NA	NA	NA
Type of device															
Sphygmocor	1	-0.09 (-0.25, 0.07)	NA	NA	NA	0	NA	NA	NA	NA	5	-0.07 (-0.15, 0.00)	0.0	1.18	0.881
Complior	1	-0.01 (-0.09, 0.07)	NA	NA	NA	2	-0.53 (-0.74, -0.32)	56.3	2.29	0.130	2	-0.27 (-0.72, 0.04)	84.6	6.48	0.011
Other	1	-0.14 (-0.31, 0.03)	NA	NA	NA	1	-0.11 (-0.20, -0.02)	NA	NA	NA	6	-0.14 (-0.25, -0.03)	90.5	52.52	<0.001

PWv: Pulse Wave Velocity; cf: carotid-femoral; ba: brachial-ankle; a: aortic; NA: Not Available

Table S5. Meta-regression of PWV and cognition domains by percentage of females and mean age, BMI, SBP and DBP of included studies.

		% female			Age			BMI			SBP			DBP	
	n	**ß (95%CI)**	**p**	**n**	**ß (95%CI)**	**p**	**n**	**ß (95%CI)**	**p**	**n**	**ß (95%CI)**	**p**	**n**	**ß (95%CI)**	**p**
Global cognition															
Longitudinal data	4	-0.00 (-0.03, 0.02)	0.690	6	-0.01 (-0.04, 0.03)	0.643	6	-0.04 (-0.31, 0.24)	0.727	4	-0.02 (-0.07, 0.03)	0.227	3	-0.02 (-0.04, 0.01)	0.142
Cross-sectional data															
Unadjusted	9	0.00 (-0.01, 0.02)	0.497	10	0.00 (-0.02, 0.02)	0.649	8	0.02 (-0.02, 0.05)	0.338	8	0.02 (-0.00, 0.05)	0.062	8	0.03 (-0.03, 0.09)	0.256
Adjusted	13	-0.00 (-0.01, 0.01)	0.991	13	0.01 (-0.01, 0.02)	0.348	12	0.04 (-0.02, 0.11)	0.173	10	0.01 (-0.02, 0.04)	0.554	8	-0.01 (-0.13, 0.11)	0.878
Executive function															
Longitudinal data	4	-0.00 (-0.05, 0.05)	0.910	4	0.01 (-0.02, 0.03)	0.449	3	-0.05 (-0.79, 0.68)	0.512	3	-0.01 (-0.27, 0.25)	0.824	2	NA	NA
Cross-sectional data															
Unadjusted	3	-0.00 (-0.05, 0.05)	0.993	4	-0.01 (-0.03, 0.02)	0.286	3	0.06 (-1.19, 1.31)	0.640	2	NA	NA	2	NA	NA
Adjusted	11	-0.00 (-0.01, 0.00)	0.548	11	0.00 (-0.01, 0.01)	0.839	7	0.03 (-0.01, 0.08)	0.127	7	0.00 (-0.01, 0.01)	0.837	4	0.00 (-0.05, 0.06)	0.757
Memory															
Longitudinal data	3	0.00 (-0.12, 0.12)	0.949	3	0.00 (-0.06, 0.07)	0.833	3	-0.05 (-1.28, 1.18)	0.684	1	NA	NA	1	NA	NA
Cross-sectional data															
Unadjusted	3	0.01 (-0.06, 0.07)	0.404	3	0.02 (-0.11, 0.15)	0.492	3	-0.09 (-1.53, 1.35)	0.587	2	NA	NA	2	NA	NA
Adjusted	13	0.00 (-0.01, 0.01)	0.853	13	-0.00 (-0.01, 0.01)	0.584	10	0.01 (-0.02, 0.05)	0.343	10	-0.00 (-0.01, -0.00)	0.027	7	-0.01 (-0.03, 0.02)	0.653

NA: Not Available

Table S6. Risk of bias of cross-sectional and longitudinal included studies.

References	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total
Abbatecola et al., 2008 [23]	Y	Y	NR	Y	NR	NR	Y	N	Y	Y	Y	NR	Y	Y	9
Al Hazzouri et al., 2013 [24]	Y	Y	Y	Y	NR	Y	Y	Y	Y	Y	Y	Y	Y	Y	12
Angermann et al., 2017 [25]	Y	Y	NR	Y	NR	Y	-	Y	Y	-	Y	NR	-	N	7
Benetos et al., 2012 [26]	Y	Y	NR	Y	NR	Y	Y	Y	Y	N	Y	NR	N	Y	9
Cooper et al., 2016 [11]	Y	Y	Y	Y	NR	NR	-	N	Y	-	Y	NR	-	Y	7
Elias et al., 2009 [27]	Y	Y	Y	Y	NR	Y	-	Y	Y	-	Y	NR	-	Y	9
Fujiwara et al., 2005 [51]	Y	Y	N	Y	NR	NR	-	Y	Y	-	Y	NR	-	Y	7
Fukuhara et al., 2006 [28]	Y	Y	Y	Y	NR	NR	-	N	Y	-	Y	NR	-	Y	7
Geijselaers et al., 2016 [29]	Y	Y	Y	Y	NR	NR	-	Y	Y	-	Y	NR	-	Y	8
Hajjar et al., 2016 [12]	Y	Y	NR	Y	NR	NR	Y	Y	Y	Y	Y	NR	Y	Y	10
Hanon et al., 2005 [30]	Y	Y	NR	Y	NR	NR	-	Y	Y	-	Y	Y	-	Y	8
Karasavvidou et al., 2018 [31]	Y	Y	Y	Y	NR	NR	-	Y	Y	-	Y	NR	-	Y	8
Kearney-Schwartz et al., 2009 [52]	Y	Y	Y	Y	Y	NR	-	Y	Y	-	Y	Y	-	Y	10
Kim et al., 2009 [32]	Y	Y	N	Y	NR	NR	-	N	Y		N	NR	-	N	4
Kim et al., 2017 [33]	Y	Y	Y	Y	NR	NR	Y	Y	Y	Y	Y	NR	Y	Y	11
Lamballais et al, 2018 [34]	Y	Y	Y	Y	NR	NR	-	N	Y	-	Y	NR	-	Y	7
Lee et al., 2014 [35]	Y	Y	Y	Y	NR	NR	-	N	Y	-	Y	NR	-	Y	7
Lim et al., 2016 [13]	Y	Y	NR	Y	NR	NR	-	N	Y	-	Y	NR	-	Y	6
Meyer et al, 2017 [53]	Y	Y	N	Y	N	NR	-	Y	Y	-	Y	NR	-	Y	7
Mitchell et al., 2011 [36]	Y	Y	N	Y	NR	NR	-	Y	Y	-	Y	NR	-	Y	7
Muela et al., 2018 [37]	Y	Y	NR	Y	NR	NR	-	Y	Y	-	Y	Y	-	Y	8
Muller et al., 2006 [38]	Y	Y	N	Y	NR	NR	-	Y	Y	-	Y	NR	-	Y	7
Nilson et al., 2014 [39]	Y	Y	N	Y	NR	NR	-	Y	Y	-	Y	NR	-	Y	7
Nilson et al., 2017 [54]	Y	Y	N	Y	NR	NR	-	Y	Y	-	Y	NR	-	Y	7
Palta et al., 2019 [40]	Y	Y	Y	Y	NR	Y	Y	Y	Y	N	Y	NR	N	Y	10
Pase et al., 2016 [41]	Y	Y	Y	Y	NR	NR	-	Y	Y	-	Y	Y	-	Y	9
Poels et al., 2007 [42]	Y	Y	N	Y	NR	NR	Y	N	Y	Y	Y	Y	N	Y	9
Ryu et al., 2017 [43]	Y	Y	NR	Y	NR	NR	-	N	Y	-	Y	N	-	N	5
Scuteri et al., 2007 [44]	Y	Y	Y	Y	NR	NR	-	N	Y	-	Y	Y	-	Y	8
Singer et al., 2013 [45]	Y	Y	N	Y	NR	NR	-	Y	Y	-	Y	NR	-	Y	7
Sugawara et al., 2010 [55]	Y	Y	Y	Y	NR	NR	-	Y	Y	-	Y	NR	-	Y	8
Taniguchi et al., 2014 [56]	Y	Y	Y	Y	NR	NR	-	Y	Y	-	Y	Y	-	Y	9
Triantafyllidi et al., 2009 [46]	Y	Y	Y	Y	NR	NR	-	Y	Y	-	Y	Y	-	Y	9
Tsao et al., 2013 [47]	Y	Y	Y	Y	NR	NR	-	N	Y	-	Y	Y	-	Y	8
Tsao et al., 2016 [48]	Y	Y	Y	Y	NR	Y	Y	Y	Y	N	Y	Y	Y	Y	12
Tuttolomondo et al., 2017 [57]	Y	Y	NR	Y	NR	NR	-	Y	Y	-	Y	NR	-	Y	7
Watson et al., 2011 [49]	Y	Y	NR	Y	NR	Y	Y	Y	Y	N	Y	NR	Y	Y	10
Zhong et al., 2014 [50]	Y	Y	NR	NR	NR	NR	-	Y	Y	-	Y	NR	-	Y	6

Y: Yes; N: No; NR: Not Reported