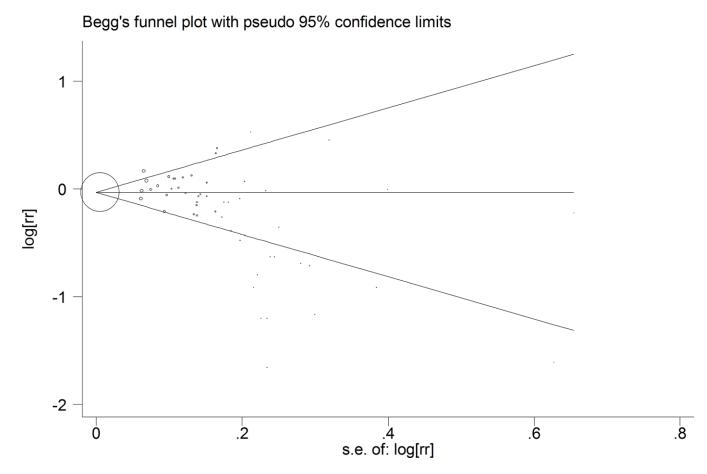
SUPPLEMENTARY FIGURES



Supplementary Figure 1. Funnel plot of meta-analysis of breast cancer risk in relation to highest vs lowest categories of vitamin C intake.

Study ID	Vitamin C Intake,per 100mg/d	RR (95% CI)	% Weight	
Lee (2012)		1.07 (0.72, 1.60)	3.35	
Yang (2010)	+	1.57 (0.84, 2.93)	1.72	
Adzersen (2009)		0.49 (0.28, 0.88)	1.98	
Li (2005)		0.80 (0.20, 2.60)	0.47	
Do (2003)		0.70 (0.69, 1.84)	2.52	
Bohlke (1999)		0.68 (0.47, 0.97)	3.79	
Potischman (1999)		1.13 (0.90, 1.50)	5.48	
Freudenheim (1) (1996)		0.53 (0.33, 0.86)	2.60	
Freudenheim (2) (1996)		0.98 (0.62, 1.54)	2.81	
Negri (1996)		0.81 (0.70, 1.01)	6.95	
Rohan (1) (1992)		0.88 (0.62, 1.26)	3.89	
Rohan (2) (1992)		1.46 (1.05, 2.01)	4.31	
Graham (1991)		0.62 (0.42, 0.91)	3.50	
Cadeau (2) (2016)		0.91 (0.81, 1.03)	8.31	
Pantavos (2014)		0.88 (0.63, 1.25)	4.06	
Nagel (1) (2009)		1.12 (0.92, 1.36)	6.69	
Nagel (2) (2009)		0.98 (0.87, 1.11)	8.28	
Cui (2008)		1.18 (1.04, 1.34)	8.18	
Zhang (1999)		1.04 (0.77, 1.42)	4.60	
Verhoeven (1997)		0.77 (0.55, 1.08)	4.13	
Kush (1996)	- • -	0.95 (0.72, 1.26)	5.03	
Hunter (1993)		1.03 (0.87, 1.21)	7.35	
Overall (I-squared = 59.1%	, p = 0.000) 🔇	0.94 (0.86, 1.03)	100.00	
NOTE: Weights are from random effects analysis				
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Supplementary Figure 2. Forest plot of meta-analysis of the association between vitamin C intake increment (per 100 mg/d) and breast cancer risk. Abbreviations: RR, relative risk; CI, confidence interval.

Study ID	RR (95% CI)	% Weight
Case-control study		
Alim (2016)	0.97 (0.96, 0.98)	3.41
Ronco (2016)	0.53 (0.33, 0.84) 1.07 (0.72, 1.60)	1.24 1.50
Pan (1) (2011)	0.65 (0.44, 0.98)	1.49
Pan (2) (2011)	0.78 (0.60, 1.03)	2.15
Lee (2010)	0.40 (0.30, 0.70)	1.40
Yang (2010)	1.57 (0.84, 2.93)	0.83
Adzersen (2009)	0.49 (0.28, 0.88)	0.94
Ronco (2009)	0.45 (0.29, 0.69)	1.36
Zhang (2009)	0.30 (0.19, 0.46)	1.33
Dorjgochoo (2008) Shen (1) (2008)	1.00 (0.80, 1.20) 1.39 (1.01, 1.92)	2.57 1.87
Shen (2) (2008)	0.91 (0.62, 1.34)	1.56
Nang (2008)	1.10 (0.89, 1.36)	2.51
Ahn (1) (2005)	0.93 (0.69, 1.25)	2.00
Ahn (2) (2005)	0.79 (0.61, 1.03)	2.20
ee (2005)	0.50 (0.30, 0.90)	1.00
Li (2005)	0.80 (0.20, 2.60)	0.24
Do (2003) Malin (2003)	0.70 (0.69, 1.84) 0.88 (0.67, 1.15)	1.17 2.15
Nissen (2003)	1.69 (1.12, 2.57)	1.43
Levi (2001)	0.19 (0.12, 0.30)	1.43
Bohlke (1999)	0.68 (0.47, 0.97)	1.66
Potischman (1999)	1.13 (0.90, 1.50)	2.24
Freudenheim (1) (1996)	0.53 (0.33, 0.86)	1.20
Freudenheim (2) (1996)	0.98 (0.62, 1.54)	1.28
Negri (1996)	0.81 (0.70, 1.01)	2.69
Landa (1994)	0.40 (0.20, 0.90) 0.62 (0.42, 0.91)	0.62 1.55
Zaridze (1991)	0.20 (0.06, 0.70)	0.26
Subtotal (I-squared = 83.9%, p = 0.000)	0.74 (0.65, 0.84)	47.12
Cohort study		
Cadeau (1) (2016)	1.08 (0.94, 1.23)	2.98
Cadeau (2) (2016) 🔶 🔶	0.91 (0.81, 1.03)	3.06
Pantavos (2014)	0.88 (0.63, 1.25)	1.76
Hutchinson (2010)	1.10 (0.89, 1.35)	2.53
Roswall (2010)	1.11 (0.88, 1.40) 1.12 (0.92, 1.36)	2.38 2.61
Nagel (2) (2009)	0.98 (0.87, 1.11)	3.05
Cui (2008)	1.18 (1.04, 1.34)	3.02
Cho (2003)	0.96 (0.75, 1.21)	2.34
Aaynard (2002)	0.99 (0.45, 2.15)	0.58
Aichels (2001)	0.94 (0.78, 1.14)	2.65
Zhang (1) (1999)	1.01 (0.81, 1.26)	2.45
Zhang (2) (1999) /erhoeven (1) (1997)	0.99 (0.85, 1.14) 0.77 (0.55, 1.08)	2.91 1.78
/erhoeven (2) (1997)	1.06 (0.79, 1.43)	2.00
(ush (1996)	0.95 (0.72, 1.26)	2.10
/uan (1995)	0.30 (0.20, 0.50)	1.27
Qi (1994)	0.31 (0.17, 0.55)	0.91
lunter (1993)	1.03 (0.87, 1.21)	2.80
Graham (1992)	0.81 (0.59, 1.12)	1.87
Rohan (1) (1992)	0.88 (0.62, 1.26) 1.46 (1.05, 2.01)	1.70
Rohan (2) (1992)	1.46 (1.05, 2.01) 0.86 (0.63, 1.08)	1.85 2.16
Shibata (1) (1992)	0.88 (0.83, 1.08)	2.18
Subtotal (I-squared = 66.0%, p = 0.000)	0.96 (0.89, 1.04)	52.88
Dverall (I-squared = 78.7%, p = 0.000)	0.86 (0.81, 0.92)	100.00
NOTE: Weights are from random effects analysis		

Supplementary Figure 3. Subgroup analyses of the associations between vitamin C intake and breast cancer risk stratified by study design. Abbreviations: RR, relative risk; CI, confidence interval.

Study ID	RR (95% CI)	% Weight
Asia Alim (2016) Lee (2012) Lee (2010) Yang (2010) Zhang (2009) Dorjgochoo (2008) Lee (2005) Li (2005) Do (2003) Malin (2003) Yuan (1995) Qi (1994) Zaridze (1991) Subtotal (I-squared = 88.0%, p = 0.000)	0.97 (0.96, 0.98) 1.07 (0.72, 1.60) 0.40 (0.30, 0.70) 1.57 (0.84, 2.93) 0.30 (0.19, 0.46) 1.00 (0.80, 1.20) 0.50 (0.30, 0.90) 0.80 (0.20, 2.60) 0.70 (0.69, 1.84) 0.88 (0.67, 1.15) 0.30 (0.20, 0.50) 0.31 (0.17, 0.55) 0.20 (0.06, 0.70) 0.62 (0.48, 0.80)	3.41 1.50 1.40 0.83 1.33 2.57 1.00 0.24 1.17 2.15 1.27 0.91 0.26 18.02
Europe Cadeau (1) (2016) Cadeau (2) (2016) Pantavos (2014) Hutchinson (2010) Roswall (2010) Adzersen (2009) Nagel (1) (2009) Nagel (2) (2009) Nissen (2003) Maynard (2002) Michels (2001) Levi (2001) Bohlke (1999) Verhoeven (1) (1997) Verhoeven (2) (1997) Negri (1996) Landa (1994) Subtotal (I-squared = 81.0%, p = 0.000)	$\begin{array}{c} 1.08 \ (0.94, 1.23) \\ 0.91 \ (0.81, 1.03) \\ 0.88 \ (0.63, 1.25) \\ 1.10 \ (0.89, 1.35) \\ 1.11 \ (0.88, 1.40) \\ 0.49 \ (0.28, 0.88) \\ 1.12 \ (0.92, 1.36) \\ 0.98 \ (0.87, 1.11) \\ 1.69 \ (1.12, 2.57) \\ 0.99 \ (0.45, 2.15) \\ 0.94 \ (0.78, 1.14) \\ 0.19 \ (0.12, 0.30) \\ 0.68 \ (0.47, 0.97) \\ 0.77 \ (0.55, 1.08) \\ 1.06 \ (0.79, 1.43) \\ 0.81 \ (0.70, 1.01) \\ 0.40 \ (0.20, 0.90) \\ 0.88 \ (0.77, 1.00) \end{array}$	2.98 3.06 1.76 2.53 2.38 0.94 2.61 3.05 1.43 0.58 2.65 1.27 1.66 1.78 2.00 2.69 0.62 33.99
America Ronco (2016) Pan (1) (2011) Pan (2) (2011) Ronco (2009) Cui (2008) Shen (1) (2008) Shen (2) (2008) Wang (2008) Ahn (1) (2005) Cho (2003) Potischman (1999) Zhang (1) (1999) Zhang (2) (1999) Freudenheim (2) (1996) Freudenheim (2) (1996) Kush (1996) Hunter (1993) Graham (1992) Rohan (2) (1992) Shibata (2) (1992) Shibata (2) (1992) Shibata (1) (1993) Shibata (1) (1993) Shiba	0.53 (0.33, 0.84) 0.65 (0.44, 0.98) 0.78 (0.60, 1.03) 0.45 (0.29, 0.69) 1.18 (1.04, 1.34) 1.39 (1.01, 1.92) 0.91 (0.62, 1.34) 1.10 (0.89, 1.36) 0.93 (0.69, 1.25) 0.79 (0.61, 1.03) 0.96 (0.75, 1.21) 1.13 (0.90, 1.50) 1.01 (0.81, 1.26) 0.99 (0.85, 1.14) 0.95 (0.72, 1.26) 1.03 (0.87, 1.21) 0.81 (0.59, 1.12) 0.88 (0.62, 1.54) 0.95 (0.72, 1.26) 1.03 (0.87, 1.21) 0.81 (0.59, 1.12) 0.88 (0.62, 1.26) 1.46 (1.05, 2.01) 0.86 (0.63, 1.08) 0.93 (0.71, 1.23) 0.62 (0.42, 0.91) 0.92 (0.83, 1.00)	1.24 1.49 2.15 1.36 3.02 1.87 1.56 2.51 2.00 2.20 2.34 2.24 2.45 2.91 1.20 1.28 2.10 2.80 1.87 1.70 1.85 2.16 2.13 1.55 47.98
Overall (I-squared = 78.7%, p = 0.000) NOTE: Weights are from random effects analysis	0.86 (0.81, 0.92)	100.00

Supplementary Figure 4. Subgroup analyses of the associations between vitamin C intake and breast cancer risk stratified by geographic locations. Abbreviations: RR, relative risk; CI, confidence interval.

Study ID	RR (95% CI)	% Weight
Postmenopausal Cadeau (1) (2016) Cadeau (2) (2016) Hutchinson (2012) Pan (2011) Lee (2010) Roswall (2010) Nagel (2009) Cui (2008) Wang (2008) Lee (2005) Malin (2003) Levi (2001) Bohlke (1999) Zhang (1999) Kush (1996) Graham (1992) Zaridze (1991) Subtotal (I-squared = 82.2%, p = 0.000)	$\begin{array}{c} 1.08 \ (0.94, 1.23) \\ 0.91 \ (0.81, 1.03) \\ 1.08 \ (0.72, 1.59) \\ 0.78 \ (0.60, 1.03) \\ 0.20 \ (0.10, 0.50) \\ 1.11 \ (0.88, 1.40) \\ 0.98 \ (0.87, 1.11) \\ 1.18 \ (1.04, 1.34) \\ 1.06 \ (0.85, 1.32) \\ 0.50 \ (0.30, 0.90) \\ 0.95 \ (0.61, 1.50) \\ 1.69 \ (1.12, 2.57) \\ 0.22 \ (0.14, 0.36) \\ 0.80 \ (0.51, 1.26) \\ 1.02 \ (0.92, 1.14) \\ 0.95 \ (0.72, 1.26) \\ 0.73 \ (0.57, 0.93) \\ 0.20 \ (0.06, 0.70) \\ 0.88 \ (0.77, 1.00) \end{array}$	5.31 3.00 4.04 1.20 4.38 5.30 5.27 4.49 2.08 2.64 2.87 2.50 2.62 5.40 3.95 4.27 0.59
Premenopausal Pan (2011) Lee (2010) Nagel (2009) Wang (2008) Cho (2003) Malin (2003) Levi (2001) Bohlke (1999) Zhang (1999) Freudenheim (1) (1996) Freudenheim (2) (1996) Subtotal (I-squared = 55.1%, p = 0.014) Overall (I-squared = 76.5%, p = 0.000) NOTE: Weights are from random effects analysis	0.65 (0.44, 0.98) 0.70 (0.40, 1.30) 1.12 (0.92, 1.36) 0.91 (0.66, 1.24) 0.96 (0.75, 1.21) 0.87 (0.62, 1.21) 0.56 (0.32, 0.98) 0.45 (0.24, 0.85) 1.01 (0.86, 1.18) 0.53 (0.33, 0.86) 0.98 (0.62, 1.54) 0.84 (0.72, 0.98) 0.86 (0.78, 0.95)	1.90 4.71 3.64 4.32 3.48 2.03 1.72 5.03 2.46 2.61 34.88

Supplementary Figure 5. Subgroup analyses of the associations between vitamin C intake and breast cancer risk stratified by menopausal status. Abbreviations: RR, relative risk; CI, confidence interval.

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