

## Supplementary 1:

### Supplementary 1.a . Associations between night-shift work characteristics and luminal A breast cancer subtype

Characteristics	Controls (N=1721)		Luminal A BC (N=860)		<sup>a</sup> Adjusted OR (95% CI)	<sup>b</sup> Adjusted OR (95% CI)
	N	%	N	%		
Night shiftwork status						
Had job but no NSW	1556	90.4	771	89.65		
Ever	165	9.6	89	10.35	1.10 (0.84-1.45)	1.09 (0.82-1.45)
Age at starting working nightshifts <sup>c</sup>						
≤30	86	5.0	50	5.81	1.18 (0.82-1.70)	1.16 (0.80-1.69)
>30	72	4.2	38	4.42	1.09 (0.73-1.64)	1.08 (0.71-1.63)
Number of day per week <sup>d</sup>						
1-5 days	77	4.5	44	5.12	1.20 (0.82-1.77)	1.16 (0.78-1.72)
> 5 days	66	3.9	33	3.84	0.99 (0.64-1.52)	0.98 (0.63-1.54)
Time starting NSW (clock time) <sup>e</sup>						
Before midnight	137	8.0	80	9.3	1.19 (0.89-1.60)	1.17 (0.87-1.59)
Midnight and after	7	0.4	3	0.35	0.91 (0.23-3.53)	0.74 (0.19-2.92)
Lifetime duration of night work (years) <sup>f</sup>						
≤ 10 years	139	8.1	74	8.6	1.09 (0.81-1.47)	1.08 (0.8-1.47)
> 10 years	21	1.2	15	1.74	1.43 (0.73-2.82)	1.29 (0.64-2.61)
p-trend						
Lifetime cumulative frequency of night work (hours) <sup>f</sup>						
≤ 10,000 hours	86	5.0	46	5.35	1.08 (0.75-1.57)	1.05 (0.72-1.54)
> 10,000 - ≤35,000 hours	59	3.7	32	3.72	1.14 (0.73-1.77)	1.15 (0.73-1.81)
>35,000 hours	15	0.6	11	1.28	1.45 (0.66-3.21)	1.32 (0.57-3.03)
p-trend						

N: number; OR: odd ratio; 95%CI: 95% confidence interval; <sup>a</sup> Adjusted for age, educational level, number of pregnancies and age at birth of first child. <sup>b</sup> Adjusted for age, educational level, number of pregnancies, age at birth of first child, body mass index, age at menarche, alcohol consumption, smoking, use of

female hormone treatment, and family history of breast cancer in first degree relatives; <sup>c</sup> 1 cases and 7 controls had missing information; <sup>d</sup> 12 cases and 22 controls had missing information; <sup>e</sup> 6 cases and 21 controls had missing information; <sup>f</sup> 0 cases and 5 controls had missing information;

Supplementary 1.b. Associations between night-shift work characteristics and luminal B breast cancer subtype

Characteristics	Controls		Luminal B BC		<sup>a</sup> Adjusted OR (95%CI)	<sup>b</sup> Adjusted OR (95%CI)
	(N=1721)		(N=134)			
	N	%	N	%		
Night shiftwork status						
Had job but no NSW	1556	90.4	116	86.6		
Ever	165	9.6	18	13.4	1.41 (0.83-2.39)	1.36 (0.79-2.33)
Age at starting working nightshifts <sup>c</sup>						
≤30	86	5.0	5	3.7	0.79 (0.31-2.00)	0.81 (0.32-2.10)
>30	72	4.2	12	9.0	2.05 (1.07-3.91)	1.86 (0.96-3.61)
Number of day per week <sup>d</sup>						
1-5 days	77	4.5	4	3.0	0.72 (0.26-2.02)	0.67 (0.24-1.91)
> 5 days	66	3.9	13	9.7	2.39 (1.27-4.5)	2.42 (1.25-4.69)
Time starting NSW (clock time) <sup>e</sup>						
Before midnight	137	8.0	16	11.9	1.51 (0.87-2.63)	1.45 (0.82-2.57)
Midnight and after	7	0.4	1	0.8	1.86 (0.23-15.42)	1.78 (0.21-15.16)
Lifetime duration of night work (years) <sup>f</sup>						
≤ 10 years	139	8.1	14	10.4	1.30 (0.73-2.34)	1.27 (0.70-2.30)
> 10 years	21	1.2	3	2.2	1.81 (0.53-6.24)	1.65 (0.45-5.98)
p-trend						
Lifetime cumulative frequency of night work (hours) <sup>f</sup>						
≤ 10,000 hours	86	5.0	8	6.0	1.26 (0.59-2.67)	1.20 (0.56-2.58)
> 10,000 - ≤35,000 hours	59	3.7	7	5.2	1.50 (0.67-3.39)	1.44 (0.63-3.31)
>35,000 hours	15	0.6	2	1.5	1.46 (0.33-6.55)	1.48 (0.31-7.05)
p-trend						

N: number; OR: odd ratio; 95%CI: 95% confidence interval; <sup>a</sup> Adjusted for age, educational level, number of pregnancies and age at birth of first child. <sup>b</sup>

Adjusted for age, educational level, number of pregnancies, age at birth of first child, body mass index, age at menarche, alcohol consumption, smoking, use of female hormone treatment, and family history of breast cancer in first degree relatives; <sup>c</sup> 1 cases and 7 controls had missing information; <sup>d</sup> 1 cases and 22 controls had missing information; <sup>e</sup> 1 cases and 21 controls had missing information; <sup>f</sup> 1 cases and 5 controls had missing information;

Supplementary 1.c. Associations between night-shift work characteristics and HER2-enriched breast cancer subtype

Characteristics	Controls		HER-2 Enrich BC		<sup>a</sup> Adjusted OR (95% CI)	<sup>b</sup> Adjusted OR (95% CI)
	(N=1721)		(N=187)			
	N	%	N	%		
Night shiftwork status						
Had job but no NSW	1556	90.4	168	89.8		
Ever	165	9.6	19	10.2	1.05 (0.63-1.75)	0.98 (0.58-1.66)
Age at starting working nightshifts <sup>c</sup>						
≤30	86	5.0	9	4.8	1.04 (0.51-2.14)	0.96 (0.46-1.99)
> 30	72	4.2	9	4.8	1.04 (0.51-2.14)	1.00 (0.48-2.08)
Number of day per week <sup>d</sup>						
1-5 days	77	4.5	7	3.7	0.92 (0.41-2.07)	0.89 (0.39-2.00)
> 5 days	66	3.9	11	5.9	1.38 (0.71-2.69)	1.24 (0.62-2.48)
Time starting NSW (clock time) <sup>e</sup>						
Before midnight	137	8.0	19	10.2	1.25 (0.75-2.09)	1.17 (0.69-1.98)
Midnight and after	7	0.4	0	0.0	-	-
Lifetime duration of night work (years) <sup>f</sup>						
≤ 10 years	139	8.1	15	8.0	0.99 (0.56-1.74)	0.92 (0.52-1.63)
> 10 years	21	1.2	4	2.1	1.63 (0.55-4.89)	1.60 (0.52-4.96)
p-trend						
Lifetime cumulative frequency of night work (hours) <sup>f</sup>						
≤ 10,000 hours	86	5.0	8	4.3	0.88 (0.42-1.86)	0.82 (0.38-1.76)
> 10,000 - ≤35,000 hours	59	3.7	8	4.3	1.22 (0.57-2.63)	1.16 (0.53-2.54)
>35,000 hours	15	0.6	3	1.6	1.53 (0.43-5.40)	1.36 (0.37-4.98)
p-trend						

N: number; OR: odd ratio; 95%CI: 95% confidence interval; <sup>a</sup> Adjusted for age, educational level, number of pregnancies and age at birth of first child. <sup>b</sup>

Adjusted for age, educational level, number of pregnancies, age at birth of first child, body mass index, age at menarche, alcohol consumption, smoking, use of female hormone treatment, and family history of breast cancer in first degree relatives; <sup>c</sup> 1 cases and 7 controls had missing information; <sup>d</sup> 1 cases and 22 controls had missing information; <sup>e</sup> 0 cases and 21 controls had missing information; <sup>f</sup> 0 cases and 5 controls had missing information;

Supplementary 1.d: Associations between night-shift work characteristics and triple-negative breast cancer breast cancer subtype

Characteristics	Controls (N=1721)		Triple-negative breast cancer (N=348)		<sup>a</sup> Adjusted OR (95%CI)	<sup>b</sup> Adjusted OR (95%CI)
	N	%	N	%		
Night shiftwork status						
Had job but no NSW	1556	90.4	309	88.8		
Ever	165	9.6	39	11.2	1.19 (0.81-1.73)	1.10 (0.74-1.62)
Age at starting working nightshifts <sup>c</sup>						
≤30	86	5.0	19	5.5	1.05 (0.62-1.78)	0.93 (0.54-1.60)
> 30	72	4.2	19	5.5	1.40 (0.82-2.40)	1.36 (0.79-2.36)
Number of day per week <sup>d</sup>						
1-5 days	77	4.5	25	7.2	1.55 (0.96-2.51)	1.44 (0.87-2.36)
> 5 days	66	3.9	14	4.0	1.11 (0.61-2.02)	1.02 (0.54-1.91)
Time starting NSW (clock time) <sup>e</sup>						
Before midnight	137	8.0	33	9.5	1.18 (0.78-1.77)	1.08 (0.71-1.65)
Midnight and after	7	0.4	3	0.9	1.88 (0.46-7.69)	1.57 (0.36-6.83)
Lifetime duration of night work (years) <sup>f</sup>						
≤ 10 years	139	8.1	30	8.6	1.12 (0.74-1.71)	1.03 (0.67-1.59)
> 10 years	21	1.2	8	2.3	1.52 (0.65-3.56)	1.34 (0.55-3.26)
p-trend						
Lifetime cumulative frequency of night work (hours) <sup>f</sup>						
≤ 10,000 hours	86	5.0	23	6.6	1.36 (0.84-2.21)	1.29 (0.78-2.12)
> 10,000 - ≤35,000 hours	59	3.7	9	2.6	0.78 (0.38-1.61)	0.68 (0.32-1.43)
>35,000 hours	15	0.6	6	1.7	1.66 (0.62-4.47)	1.42 (0.50-4.05)
p-trend						

N: number; OR: odd ratio; 95%CI: 95% confidence interval; <sup>a</sup> Adjusted for age, educational level, number of pregnancies and age at birth of first child. <sup>b</sup>

Adjusted for age, educational level, number of pregnancies, age at birth of first child, body mass index, age at menarche, alcohol consumption, smoking, use of female hormone treatment, and family history of breast cancer in first degree relatives; <sup>c</sup> 1 cases and 7 controls had missing information; <sup>d</sup> 0 cases and 22 controls had missing information; <sup>e</sup> 3 cases and 21 controls had missing information; <sup>f</sup> 1 cases and 5 controls had missing information;

Supplementary 2

Supplementary 2.a. Associations between NSW characteristics and pre-menopausal breast cancer

	Controls (N=1,444)		Pre-menopausal women (N=954)		<sup>a</sup> Adjusted OR (95% CI)	<sup>b</sup> Adjusted OR (95% CI)
	N	%	N	%		
<b>Night-shift work status</b>						
Never	1303	90.4	855	89.6	ref	ref
Ever	141	9.6	99	10.4	1.14 (0.85-1.52)	1.18 (0.85-1.65)
<b>Lifetime duration of night work (years) <sup>c</sup></b>						
≤ 10 years	120	5.0	80	8.4	1.09 (0.80-1.50)	1.17 (0.81-1.68)
> 10 years	17	4.2	19	2.0	1.60 (0.80-3.24)	1.47 (0.67-3.25)
<b>p-trend</b>						
<b>Lifetime cumulative frequency of night work (hours) <sup>c</sup></b>						
≤ 10,000 hours	76	5.3	56	5.9	1.12 (0.77-1.64)	1.09 (0.71- 1.66)
> 10,000 - ≤35,000 hours	51	3.5	31	3.3	1.04 (0.64-1.69)	1.23 (0.70- 2.17)
>35,000 hours	10	0.7	12	1.3	2.12 (0.86-5.21)	2.92 (0.79- 10.76)
<b>p-trend</b>						

N: number; OR: odd ratio; 95%CI: 95% confidence interval; <sup>a</sup> Adjusted for age, educational level, number of pregnancies and age at birth of first child. <sup>b</sup>

Adjusted for age, educational level, number of pregnancies, age at birth of first child, body mass index, age at menarche, alcohol consumption, smoking, use of female hormone treatment, and family history of breast cancer in first degree relatives; <sup>c</sup> 0 cases and 4 controls had missing information

Supplementary 2.b. Associations between NSW characteristics and post-menopausal breast cancer

	Controls (N=1,444)		Post-menopausal women (N=721)		<sup>a</sup> Adjusted OR (95%CI)	<sup>b</sup> Adjusted OR (95%CI)
	N	%	N	%		
Night-shift work status						
Never	1303	90.4	640	88.8	ref	ref
Ever	141	9.6	81	11.2	1.19 (0.87-1.62)	1.16 (0.81-1.64)
Lifetime duration of night work (years)						
≤ 10 years	120	5.0	64	8.9	1.10 (0.79-1.55)	1.05 (0.71-1.53)
> 10 years	17	4.2	15	2.1	1.71 (0.80-3.66)	1.79 (0.72-4.47)
p-trend						
Lifetime cumulative frequency of night work (hours)						
≤ 10,000 hours	76	5.3	38	5.3	1.10 (0.72-1.69)	1.05 (0.65-1.71)
> 10,000 - ≤35,000 hours	51	3.5	30	4.2	1.19 (0.73-1.93)	1.16 (0.67-2.02)
>35,000 hours	10	0.7	11	1.5	1.58 (0.65-3.86)	1.37 (0.50-3.73)
p-trend						

N: number; OR: odd ratio; 95%CI: 95% confidence interval; <sup>a</sup> Adjusted for age, educational level, number of pregnancies and age at birth of first child. <sup>b</sup>

Adjusted for age, educational level, number of pregnancies, age at birth of first child, body mass index, age at menarche, alcohol consumption, smoking, use of female hormone treatment, and family history of breast cancer in first degree relatives; <sup>c</sup> 2 cases and 4 controls had missing information