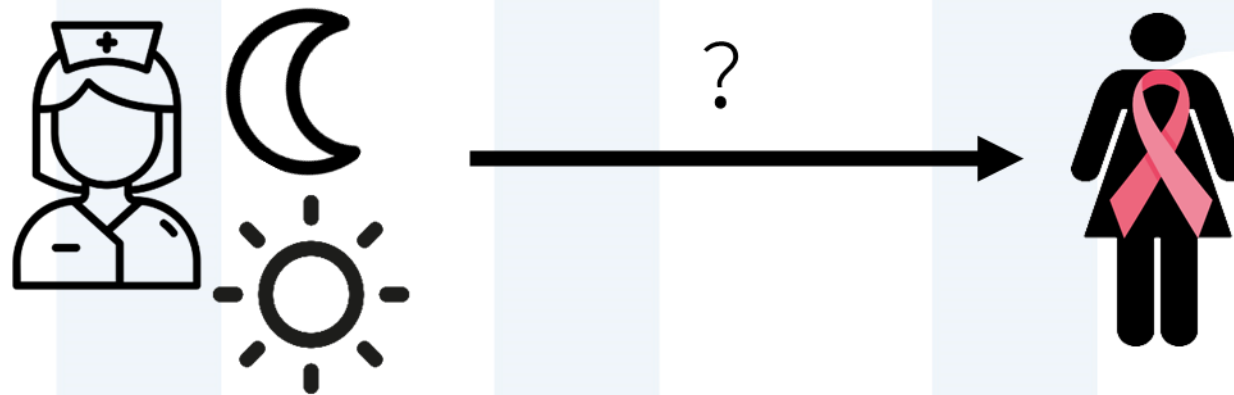


NIGHT SHIFT WORK AND BREAST CANCER RISK IN HEALTHCARE WORKERS: A SYSTEMATIC REVIEW AND META-ANALYSIS

Santucci C, Esposito G, Bravi F, Santucci C, Zunarelli C, Violante FS, La Vecchia C, Negri E, Turati F



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BACKGROUND

Nel 2019, l'Agencia Internazionale per la Ricerca sul Cancro (IARC) ha classificato il **lavoro notturno** con la categoria 2A, quella dei fattori «probabilmente cancerogeni» per l'uomo.

QUESITO DI RICERCA

METODI

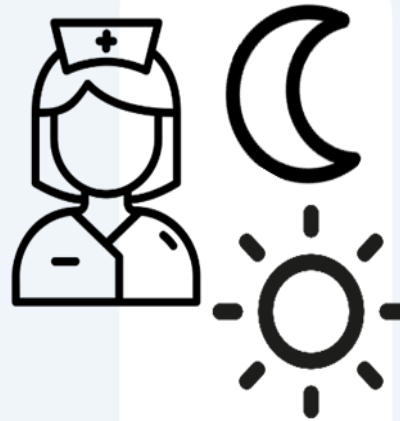
RISULTATI

LIMITI

International Agency for Research on Cancer



World Health Organization



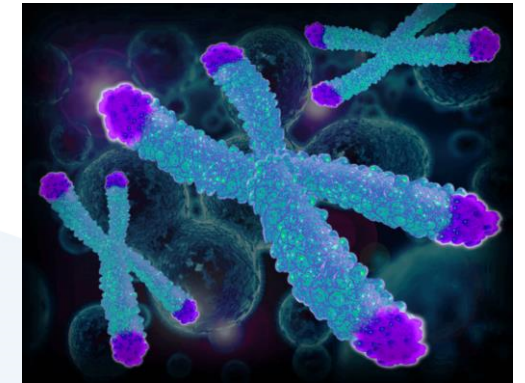
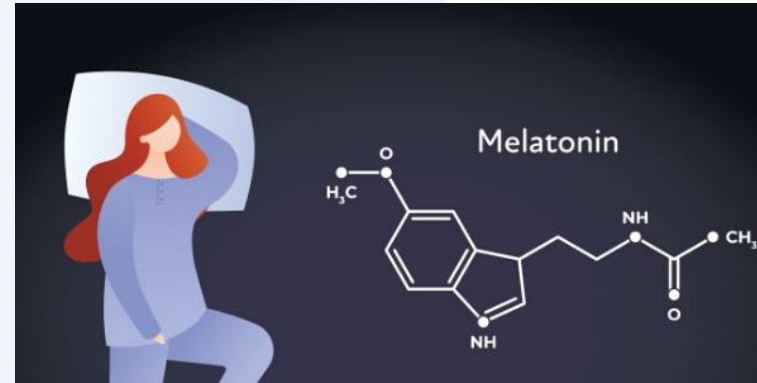
Articoli scientifici mostrano associazioni significative tra il **lavoro notturno** e lo **sviluppo del cancro** alla mammella, prostata, colon e retto.

BACKGROUND

IL LAVORO A TURNI NOTTURNI

AUMENTA IL RISCHIO DI TUMORE ALLA MAMMELLA?

QUESITO DI RICERCA



METODI

RISULTATI

Valutazione dell'associazione tra lavoro a turni notturno e tumore alla mammella nella popolazione di **operatrici sanitarie**

LIMITI

REVISIONE SISTEMATICA & METANALISI

BACKGROUND

QUESITO DI RICERCA

METODI

RISULTATI

LIMITI

Ricerca bibliografica e selezione degli studi da includere

- Costruzione di una stringa di ricerca
- Ricerca e integrazione di più banche dati (Medline ed Embase)
- Definizione dei criteri di inclusione
- Screening dei lavori



Risk of Bias*

* Developed by the US National Toxicology Program's Office of Health Assessment and Translation (OHAT)

BACKGROUND

Estrazione dei dati

Stima del rischio relativo (es. OR e HR) di tumore della mammella rispetto all'esposizione al lavoro a turni notturno

QUESITO DI RICERCA

Analisi principale

- Ever *versus* Never
- Durata: ≥ 10 , ≥ 20 , ≥ 30 anni

METODI

Eterogeneità

- Test Chi-quadro di eterogeneità
- Scostamenti tra le stime puntuali degli effetti dei diversi studi
- Sovrapposizione degli intervalli di confidenza
- Indice I^2

RISULTATI

Bias di pubblicazione

- Funnel plot e Egger test
- Metodo Trim & Fill

LIMITI

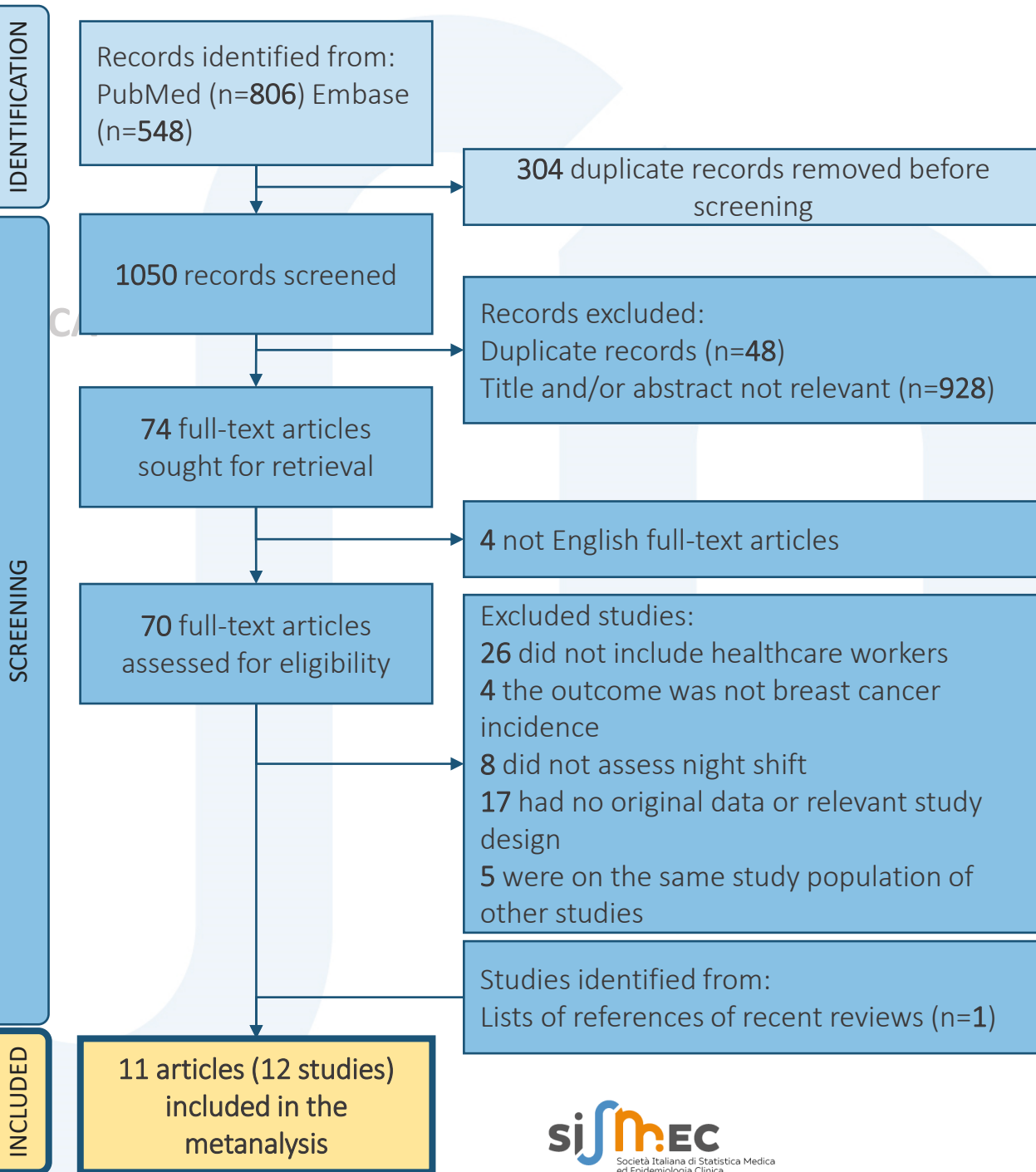
BACKGROUND

QUESITO DI RICERCA

METODI

RISULTATI

LIMITI



PubMed

("circadian disruption" OR "shift work" OR "night work" OR "night" OR "shift" OR "night-shift work" OR "rotating shift work" OR "shiftworking" OR "shift worker" OR "chronobiology disorders" OR "circadian clocks" OR "circadian rythms" OR "evening shift") AND ((breast AND (cancer* OR carcinoma* OR tumor* OR tumour* OR neoplasm*)) OR "Breast Neoplasms"[Mesh]) AND (work* OR occup*)

Embase

((('night'/exp OR night) AND ('shift'/exp OR shift)) OR (('circadian'/exp OR circadian) AND ('rhythm'/exp OR rhythm))) AND (work* OR occup*) AND ('breast cancer'/exp OR 'breast cancer' OR (('breast'/exp OR breast) AND ('cancer'/exp OR cancer OR 'neoplasm'/exp OR neoplasm OR 'tumor'/exp OR tumor))) AND ('article'/it OR 'article in press'/it OR 'chapter'/it OR 'conference paper'/it OR 'conference review'/it OR 'editorial'/it OR 'letter'/it OR 'note'/it OR 'review'/it OR 'short survey'/it)

BACKGROUND

QUESITO DI RICERCA

METODI

RISULTATI

LIMITI

Ever vs never

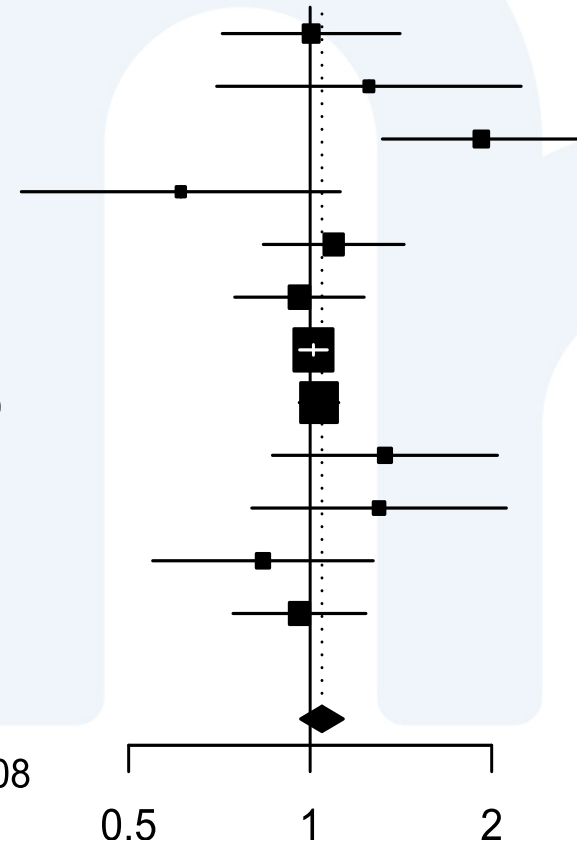
First author, year

- Lie et al., 2006
- Lie et al., 2011
- Hansen & Stevens, 2012
- Grundy et al., 2013
- Koppes et al., 2014
- Travis et al., 2016 (MWS)
- Wegrzyn et al., 2017 (NHS)
- Wegrzyn et al., 2017 (NHS II)
- Jones et al., 2019
- Traversini et al., 2020
- Härmä et al., 2023
- Gustavsson et al., 2023

Random effects model

Heterogeneity: $I^2 = 39\%$, $p = 0.08$

Relative risk



RR [95% CI] Weight

RR	[95% CI]	Weight
1.00	[0.71; 1.41]	4.9%
1.25	[0.70; 2.24]	1.9%
1.92	[1.32; 2.81]	4.1%
0.61	[0.33; 1.12]	1.7%
1.09	[0.84; 1.43]	7.2%
0.96	[0.75; 1.23]	8.2%
1.01	[0.96; 1.07]	29.1%
1.03	[0.96; 1.12]	25.8%
1.33	[0.87; 2.05]	3.3%
1.30	[0.80; 2.12]	2.6%
0.83	[0.55; 1.27]	3.4%
0.96	[0.74; 1.24]	7.9%

1.05 [0.96; 1.14] 100.0%

BACKGROUND

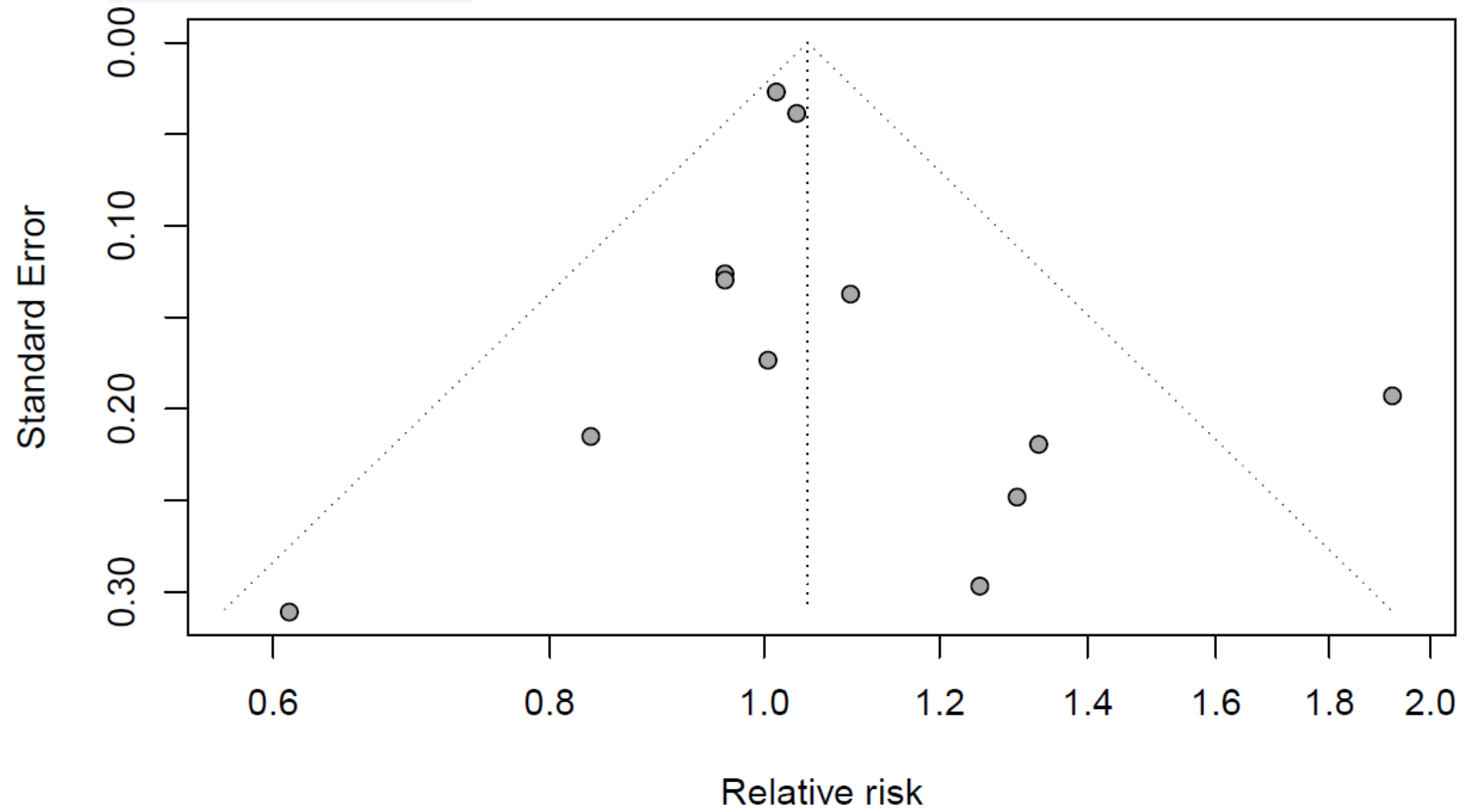
QUESITO DI RICERCA

METODI

RISULTATI

LIMITI

FUNNEL PLOT



Egger's test (p value=0.473)

BACKGROUND

QUESITO DI RICERCA

METODI

RISULTATI

LIMITI

≥10 years vs never

First author, year

Lie et al., 2006
Lie et al., 2011
Hansen & Stevens, 2012
Grundy et al., 2013
Travis et al. 2016 (MWS)
Wegrzyn et al., 2017 (NHS)
Wegrzyn et al., 2017 (NHS II)
Traversini et al., 2020
Härmä et al., 2023

Random effects model

Heterogeneity: $I^2 = 62\%$, $p < 0.01$

≥20 years vs never

First author, year

Lie et al., 2006
Hansen & Stevens, 2012
Grundy et al., 2013
Wegrzyn et al., 2017 (NHS)
Wegrzyn et al., 2017 (NHS II)
Travis et al. 2016 (MWS)
Traversini et al., 2020

Random effects model

Heterogeneity: $I^2 = 59\%$, $p = 0.02$

≥30 years vs never

First author, year

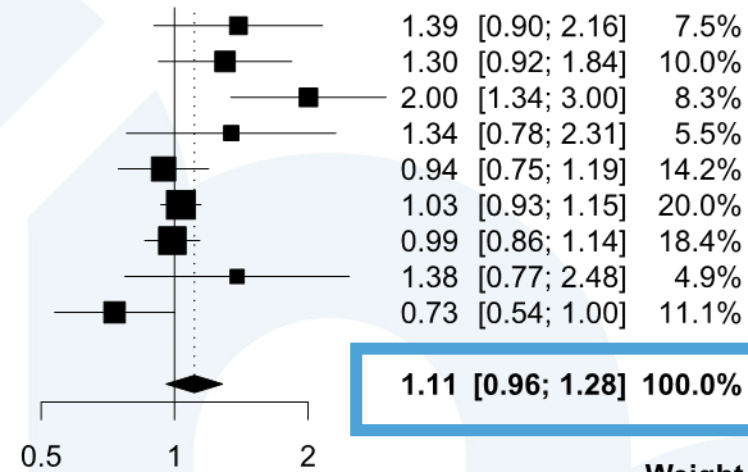
Lie et al., 2006
Grundy et al., 2013
Wegrzyn et al., 2017 (NHS)

Random effects model

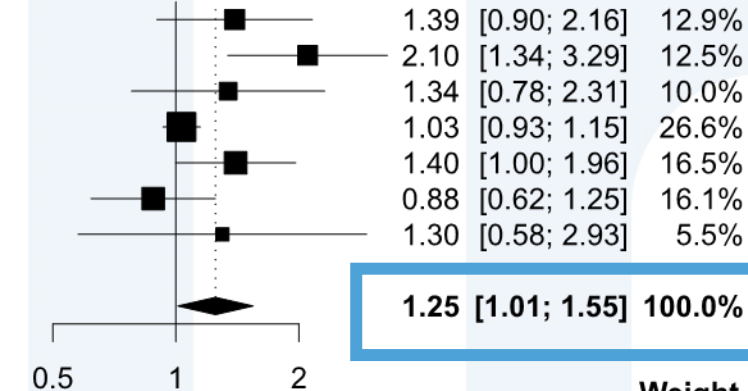
Heterogeneity: $I^2 = 79\%$, $p < 0.01$

Relative risk

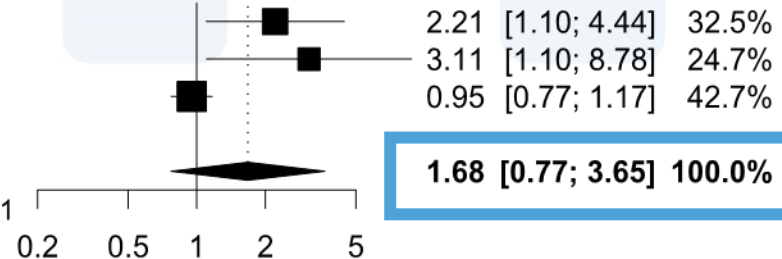
Weight



Weight



Weight



ANALISI STRATIFICATE

	Ever versus never			≥10 years versus never			≥20 years versus never		
	N. studi	RR (95% IC)	I ² ; p _{het}	N. studi	RR (95% IC)	I ² ; p _{het}	N. studi	RR (95% IC)	I ² ; p _{het}
Geographic area									
Europe	9	1.12 (0.96-1.30)	43%; 0.08	6	1.20 (0.89-1.60)	74%; <0.01	4	1.34 (0.88-2.03)	67%; 0.03
North America	3	1.02 (0.95-1.08)	31%; 0.23	3	1.02 (0.94-1.11)	0%; 0.55	3	1.16 (0.93-1.44)	43%; 0.17
Study design									
Cohort	7	1.02 (0.98-1.06)	0%; 0.78	4	0.97 (0.88-1.08)	32%; 0.23	3	1.07 (0.87-1.31)	48%; 0.15
Case-control	5	1.17 (0.82-1.68)	66%; 0.08	5	1.48 (1.21-1.80)	0%; 0.57	4	1.57 (1.21-2.03)	0%; 0.49
Assessment of occupational history									
Lifetime	6	1.12 (0.90-1.40)	66%; 0.01	6	1.21 (0.97-1.51)	65%; 0.01	5	1.34 (0.98-1.83)	57%; 0.05
Partial	5	1.01 (0.96-1.07)	0%; 0.59	2	0.90 (0.65-1.25)	76%; 0.04	1	1.03 (0.93-1.15)	-

IC, intervallo di confidenza; RR, rischio relativo.

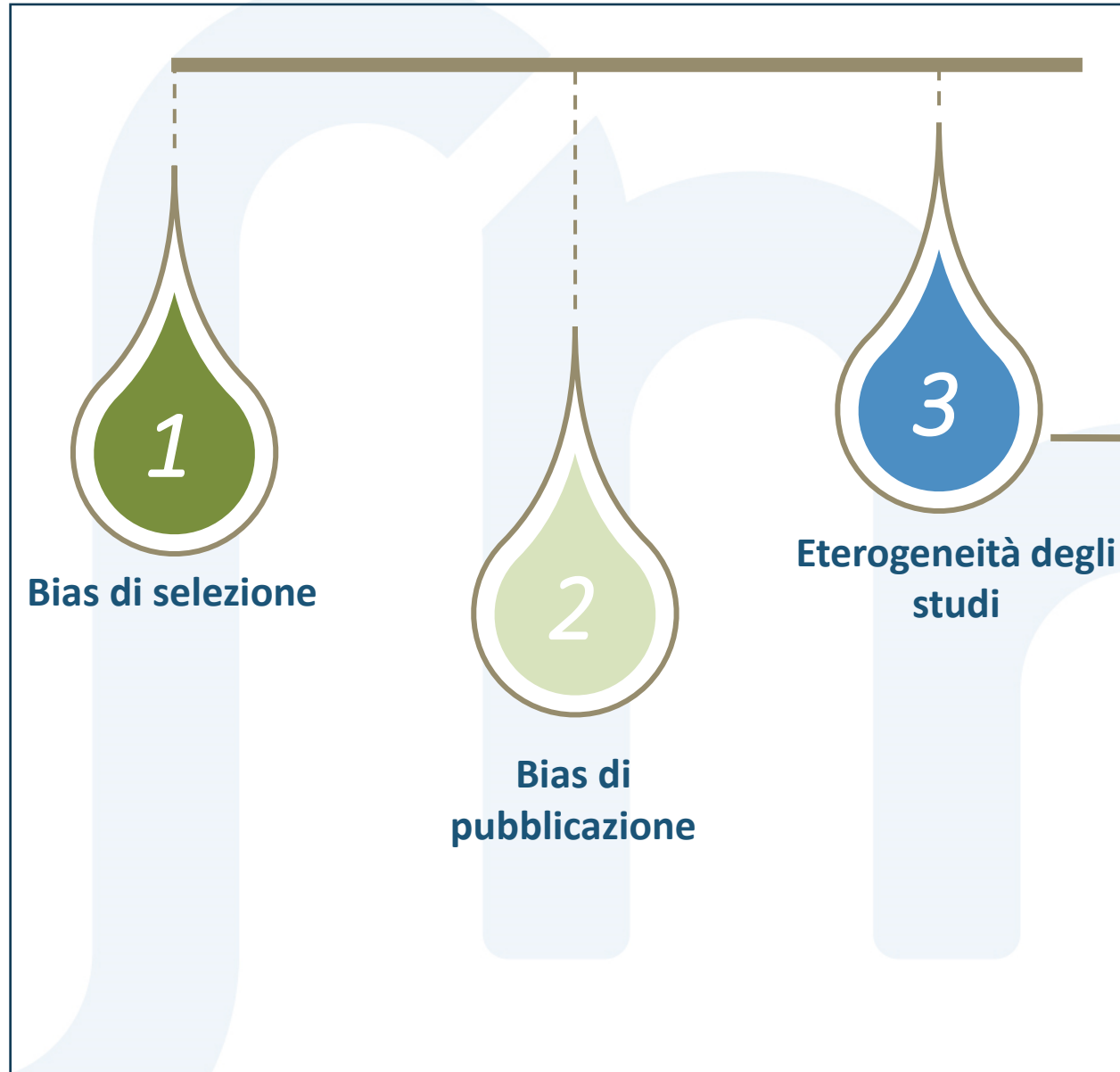
BACKGROUND

QUESITO DI RICERCA

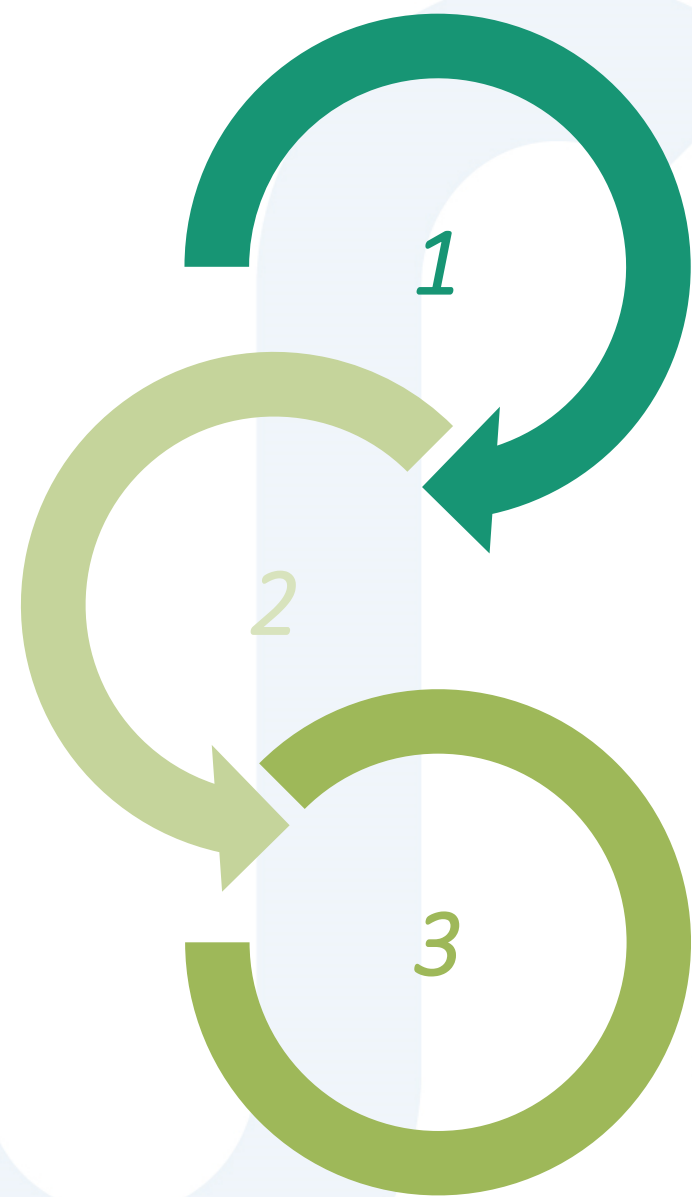

METODI

RISULTATI

LIMITI



CONCLUSIONI



L'evidenza epidemiologica suggerisce un possibile ruolo del lavoro a turni notturni a lungo termine nel rischio di cancro alla mammella

Tale associazione non è ancora stata stabilita con chiarezza

Data l'alta prevalenza di turni di lavoro notturni tra le operatrici sanitarie, qualsiasi eccesso di rischio, se reale, potrebbe contribuire a un numero sostanziale di diagnosi di cancro alla mammella

BACKGROUND pt 2

STEP FUTURI

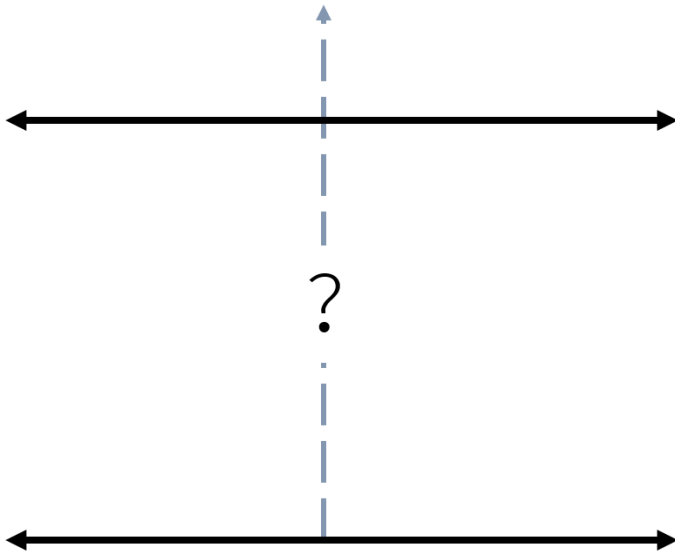
University of Milan
Department of Clinical Sciences and Community Health




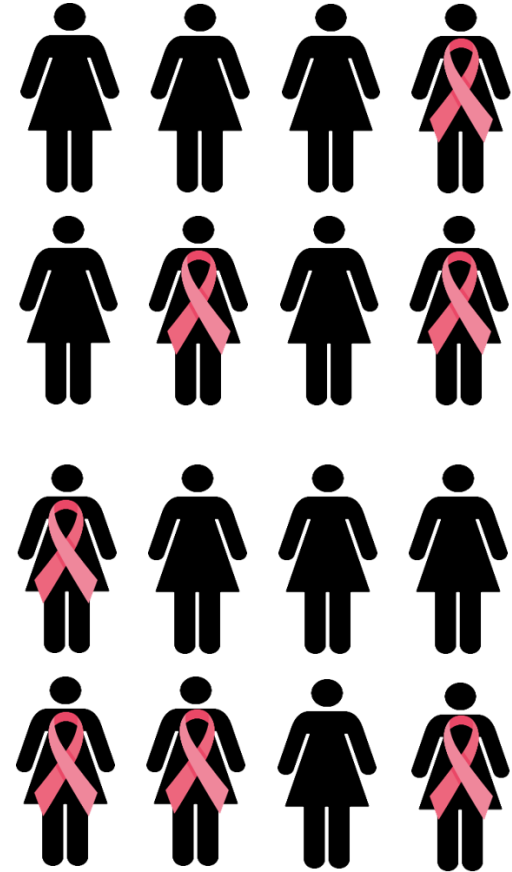
Unexposed



Exposed

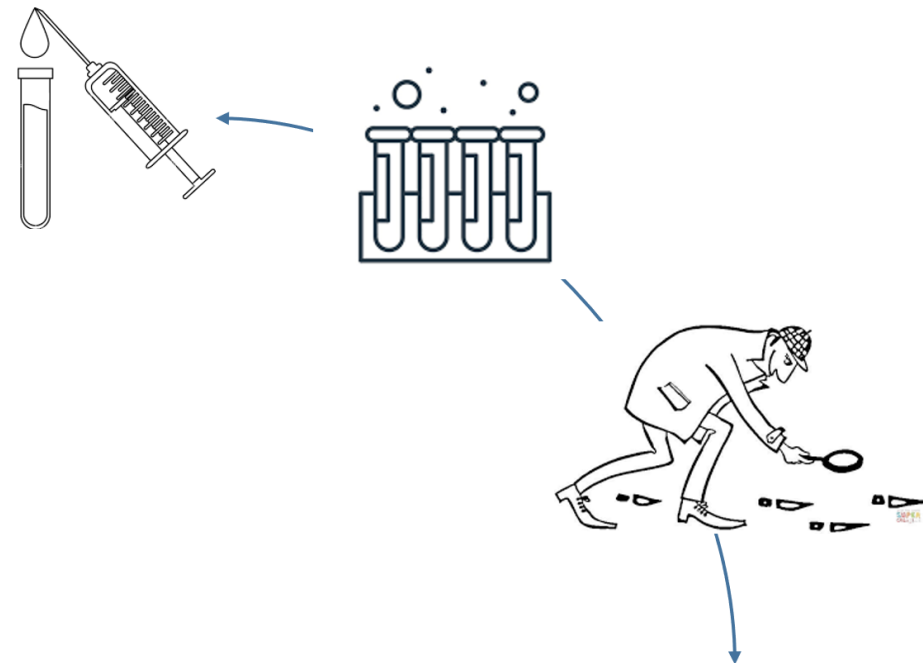
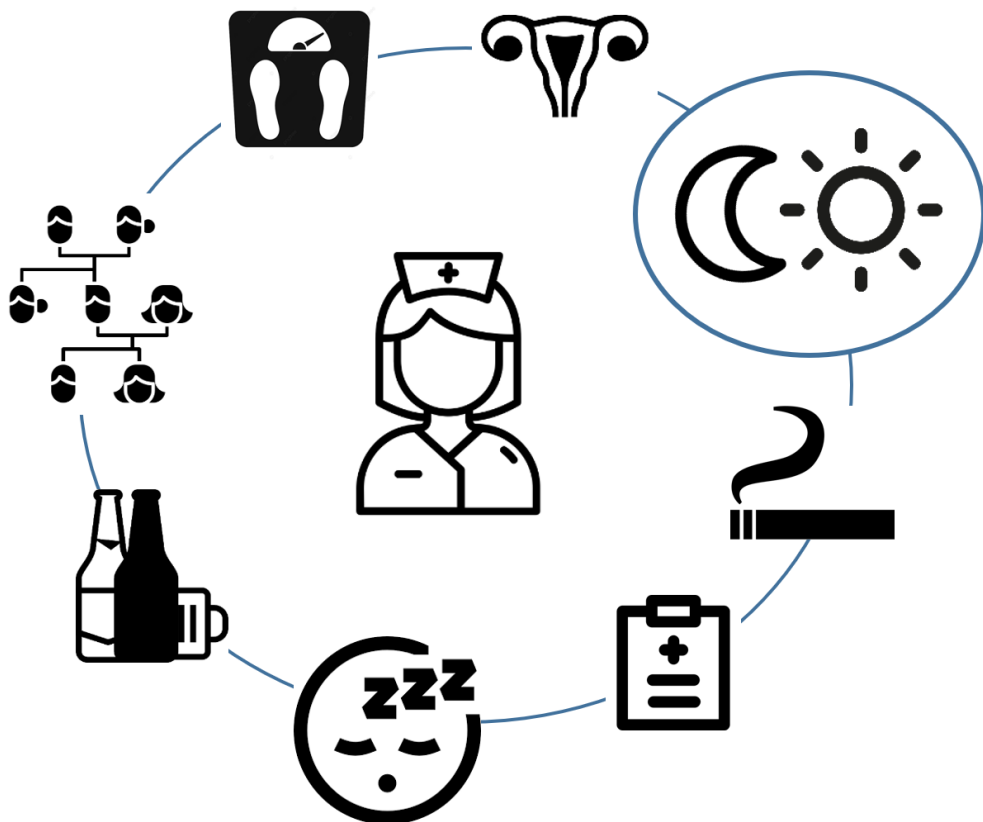


- 1. Cohort study
- 2. Case-control study
- 3. Biological markers 



BACKGROUND pt 2

STEP FUTURI



- DNA methylation
- DNA changes
- Telomere length



GRAZIE PER L'ATTENZIONE

DEPARTMENT OF CLINICAL SCIENCES AND COMMUNITY HEALTH

University of Milan



Selection bias

Assessed by the OHAT Risk of Bias Rating Tool for Human and Animal Studies

Study	Item 3 Selection bias
Lie et al., 2006	Definitely low
Lie et al., 2011	Definitely low
Hansen & Stevens, 2012	Definitely low
Grundy et al., 2013	Probably high
Koppes et al., 2014	Definitely low
Travis et al., 2016 (MWS)	Definitely low
Wegrzyn et al., 2017 (NHS)	Definitely low
Wegrzyn et al., 2017 (NHS II)	Definitely low
Jones et al., 2019	Definitely low
Traversini et al., 2020	Definitely high
Härmä et al., 2023	Definitely low
Gustavsson et al., 2023	Definitely low

THE POOLED RR was

- 1.03 (95% CI: 0.99-1.07) by a fixed effect model
- 1.05 (95% CI: 0.94-1.17, $I^2=58.1%$, p heterogeneity= 0.019) by pooling the 8 studies accounting for a measure of body weight and parity
- 1.18 (95% CI: 0.88-1.58, $I^2=80.9%$, p heterogeneity=0.005) by pooling the 3 studies scored as “definitely” or “probably” low risk of bias