

# CAUSAL, PRACTICAL AND METHODOLOGICAL REASONS TO AVOID ATTRIBUTABLE CASELOAD ESTIMATES: THE EXAMPLE OF OCCUPATIONAL CANCERS ATTRIBUTED TO SHIFT-WORK

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**Objectives** In 2007, IARC concluded that “shift-work that involves circadian disruption is probably carcinogenic” (Group 2A). In 2010, Rushton *et al* reported that “54% of cancer registrations in women are attributable to shift work (breast cancer)”.

**Methods** Methods to estimate attributable fractions (AF) will be reviewed and their application to shift-work and cancer tested with examples.

**Results** Our synthesis shows that (a) causal, (b) practical and (c) methodological reasons should deter us from publishing attributable caseload estimates of cancers or deaths due to shift-work. Regarding (a), we should avoid such calculations as long as causal links between shift-work and internal cancers are not established. Regarding (b), we should avoid such calculations as long as we lack an alternative to shift-work or effective means to intervene. Regarding (c), at least four methodological pitfalls - which were raised in public at the EPICOH Conferences in Banff and San José - can make AF calculations uninterpretable. (i) The use of Levin’s 1953 formula in case of adjusted relative risks. (ii) The use of broad definitions (eg, binary exposure) in calculations of AFs. (iii) The non-additivity of AFs across exposures and covariates. (iv) The fact that deaths may occur advanced or may be postponed but there are neither extra nor avoided deaths.

**Conclusions** Causal, practical and methodological reasons should disallow publishing analytical results which - at least today - are not defensible. To reliably decide whether shift-work causes cancers and, if so, to then assess an attributable burden, requires unambiguous evidence and analyses.