

Levin's formulae for $E_0 F_0$
(Ecologic fraction)

$E F$ in exposed (1)

... "what if" not exposed

EF in exposed (1)

$$\frac{I_1 - I_0}{I_1}$$

=

actual - "what if" not exposed

actual

$$= \frac{I_1/I_0 - I_0/I_0}{I_1/I_0}$$

on dividing top & bottom
by I_0

$$= \frac{RR - 1}{RR}$$

RR = rate ratio

= Inc. Density ratio

entire result is OVERALL

$$\frac{I - I_0}{I} = \text{actual} - \text{what if none exposed and unexposed}$$

"OVERALL" EF

I is a mix of $\underbrace{P I_1 + (1-P) I_0}$ where P = fraction of poplⁿ exposed

So $I - I_0 = \underbrace{P I_1 + I_0 - P I_0} - I_0 = P(I_1 - I_0)$

and I can be re expressed as $I_0 + P(I_1 - I_0)$

So

$$\frac{I - I_0}{I} = \frac{P(I_1 - I_0)}{I_0 + P(I_1 - I_0)}$$

$$= \frac{P(RR - 1)}{1 + \quad \quad \quad}$$

, which on dividing above & below by I_0 , becomes

QED

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