study	reported effect	variance	weights	weighted effects
1	d_1	$var(d_1)$	$w_1 = (1/var(d_1)) / \Sigma\, 1/var(d_i)$	$w_1 d_1$
2	d_2	$var(d_2)$	$w_2 = (1/var(d_2)) / \Sigma\, 1/var(d_i)$	$w_2 d_2$
$\vdots$	$\vdots$	$\vdots$	$\vdots$	$\vdots$
n	d_n	$var(d_n)$	$w_n = (1/var(d_n)) / \Sigma\, 1/var(d_i)$	$w_n d_n$
			column sum = 1	column sum = d_+ (summary)

$var(d_+) = (\Sigma\, 1/var(d_i))^{-1}$

95% CI: $d_+ \pm 1.96\sqrt{var(d_+)}$

Same type, eg, SMD, log odds, risk ratio, etc. May need to transform (see Olkin handout on estimating one statistic when study reports another)

Test for heterogeneity:

$$Q = \Sigma\, d_i^2/var(d_i) - \left(\Sigma\, d_i/var(d_i)\right)^2 / \Sigma\left(1/var(d_i)\right)$$

$$Q \sim \chi^2_{df = n-1}$$

$Q > \chi^2_\alpha$? yes, no

random effects

$var(d_i) = var_w(d_i) + \tau^2$

$var_w(d_i) \to$ see fixed effects

$\tau^2 \to$ estimate using DerSimonian-Laird, MLE, etc.

$$DL: \tau^2 = (Q-(n-1)) / \left[\Sigma \frac{1}{var_w(d_i)} - \left(\Sigma (var_w(d_i))^{-2}\right) / \Sigma \frac{1}{var_w(d_i)}\right]$$

fixed effects

Use within-study variance $var_w(d_i)$, whatever study i reports, or estimate it based on type of statistic

$d_i = p_1 - p_2 \Rightarrow var_w\, d_i = \frac{p_1(1-p_1)}{n_1} + \frac{p_2(1-p_2)}{n_2}$

$d_i = \log p_1/p_2 \Rightarrow var_w\, d_i = \frac{1-p_1}{n_1 p_1} + \frac{1-p_2}{n_2 p_2}$

$d_i = \mu_T - \mu_C \Rightarrow var_w\, d_i = sd_C^2 + sd_T^2$