Tip for data extraction for meta-analysis - 24
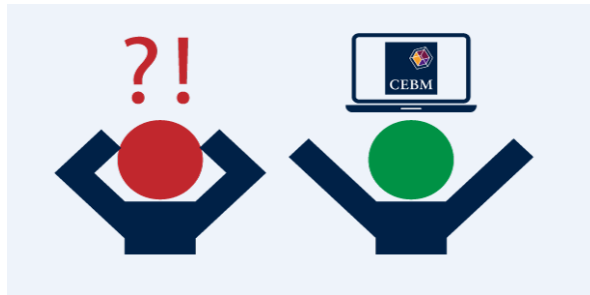

Obtaining summary statistics by using complementary equations

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In my last two posts I introduced equations for changing the time point (changed score equations and endpoint equations) and changing the group (group equations and rearranged group equations) of the summary statistics that are reported for continuous outcomes. These two sets of equations are complementary as they can be used sequentially. Let me show you an example.

Returning to the paper by Sawaki et al, they reported the effects of a trial of an anti-hypertensive, Losartan, compared to usual care on albumin excretion (albumin creatinine ratio), for the two treatment arms and also subgroups based on the level of albumin in the urine - normoalbuminuria (normal levels) and microalbuminuria (elevated levels).

Does this paper report a complete set of summary statistics for all patients, those with normomalbuminuria, and those with microalbuminuria?

Table A shows the summary statistics that are reported and where they are reported in Sawaki et al's paper.

Table A. Reported summary data

Group	n	Baseline		Endpoint		Change	
		mean	SD	mean	SD	mean	SD
Losartan							
All	Table 1	Table 1		?	?	Table 2	
Normoalbuminuria	Table 1	?	?	?	?	?	?
Microalbuminuria	Table 1	Main text		Main text		?	?
Usual care							
All	Table 1	Table 1		?	?	Table 2	
Normoalbuminuria	Table 1	Main text		Main text		?	?
Microalbuminuria	Table 1	?	?	?	?	?	?

All the numbers of patients are reported in their table of baseline characteristics (Table 1), which is what you would expect. Some other baseline summary statistics are reported in their table of results (Table 2) or the main text of their paper. A number of summary statistics are not reported.

What if you were only interested in endpoint or change from baseline summary statistics for the two groups with normoalbuminuria?

The equations that I introduced previously can be used to fill in the gaps (Table B).

Table B. Using equations to complete the table

Group	n	Baseline		Endpoint		Change	
		mean	SD	mean	SD	mean	SD
Losartan							
All	Table 1	Table 1		Endpoint		Table 2	
Normoalbuminuria	Table 1	Rearranged group		Rearranged group		Change score	
Microalbuminuria	Table 1	Main text		Main text		Change score	
Usual care							
All	Table 1	Table 1		Endpoint		Table 2	
Normoalbuminuria	Table 1	Main text		Main text		Change score	
Microalbuminuria	Table 1	Rearranged group		Rearranged group		Change score	

Note that you don't need to have access to Swaki et al's paper to follow this blog post. Just accept Table A as true and work through Table B. For example:

Looking at the 1st row - The summary statistics for all the Losartan patients at baseline and change from baseline are reported so the endpoint summary statistics can be calculated using the endpoint equations.
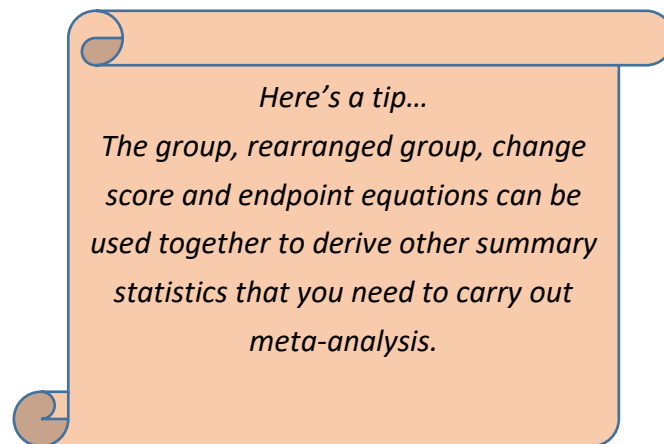
Looking at the 2nd column - Then, given the reported endpoint summary statistics for the microalbuminuria Losartan group and the endpoint data for all the Losartan patients that you've just calculated, you can calculate the endpoint summary statistics for the normoalbuminuria Losartan group using the rearranged group equations.

and so on….

The completed summary statistics are shown in Table C.

Table C. Completed summary statistics

	n	Baseline	Endpoint	Change
Losartan				
All	14	61.7 (79.9)	37.9 (97.9)	-23.8 (56.6)
Normoalbuminuria	8	10.3 (7.3)	12.3 (118.4)	2.0 (118.6)
Microalbuminuria	6	130.3 (81.5)	72.1 (53.3)	-58.2 (97.4)
Usual care				
All	15	19.3 (31.2)	35.2 (55.4)	15.9 (45.8)
Normoalbuminuria	12	6.7 (3.2)	15.1 (11.9)	8.4 (12.3)
Microalbuminuria	3	69.7 (44.7)	115.6 (92.7)	45.9 (102.9)

Here's a tip…
The group, rearranged group, change score and endpoint equations can be used together to derive other summary statistics that you need to carry out meta-analysis.

Dr Kathy Taylor teaches data extraction in Meta-analysis. This is a short course that is also available as part of our MSc in Evidence-Based Health Care, MSc in EBHC Medical Statistics, and MSc in EBHC Systematic Reviews.

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