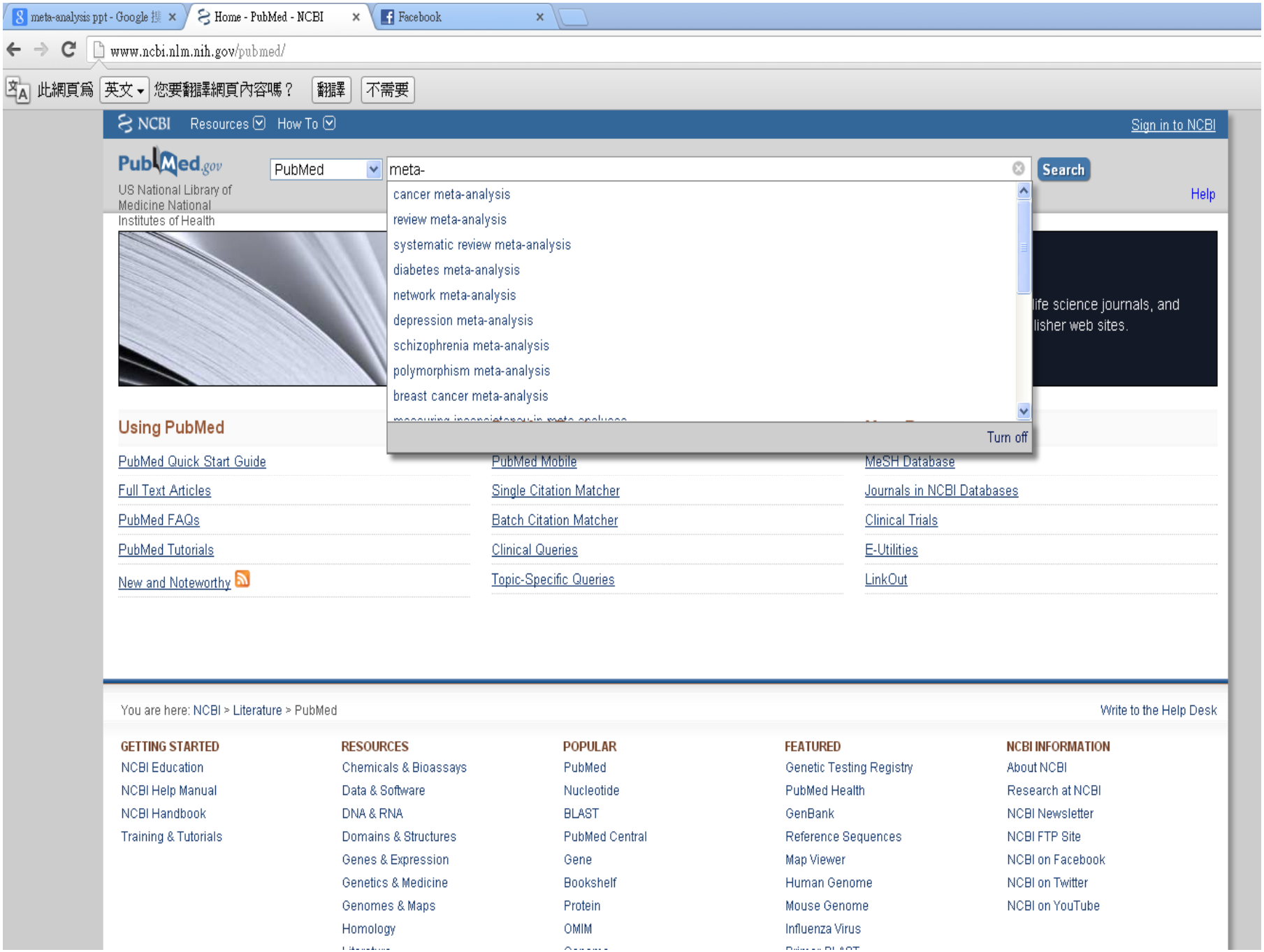
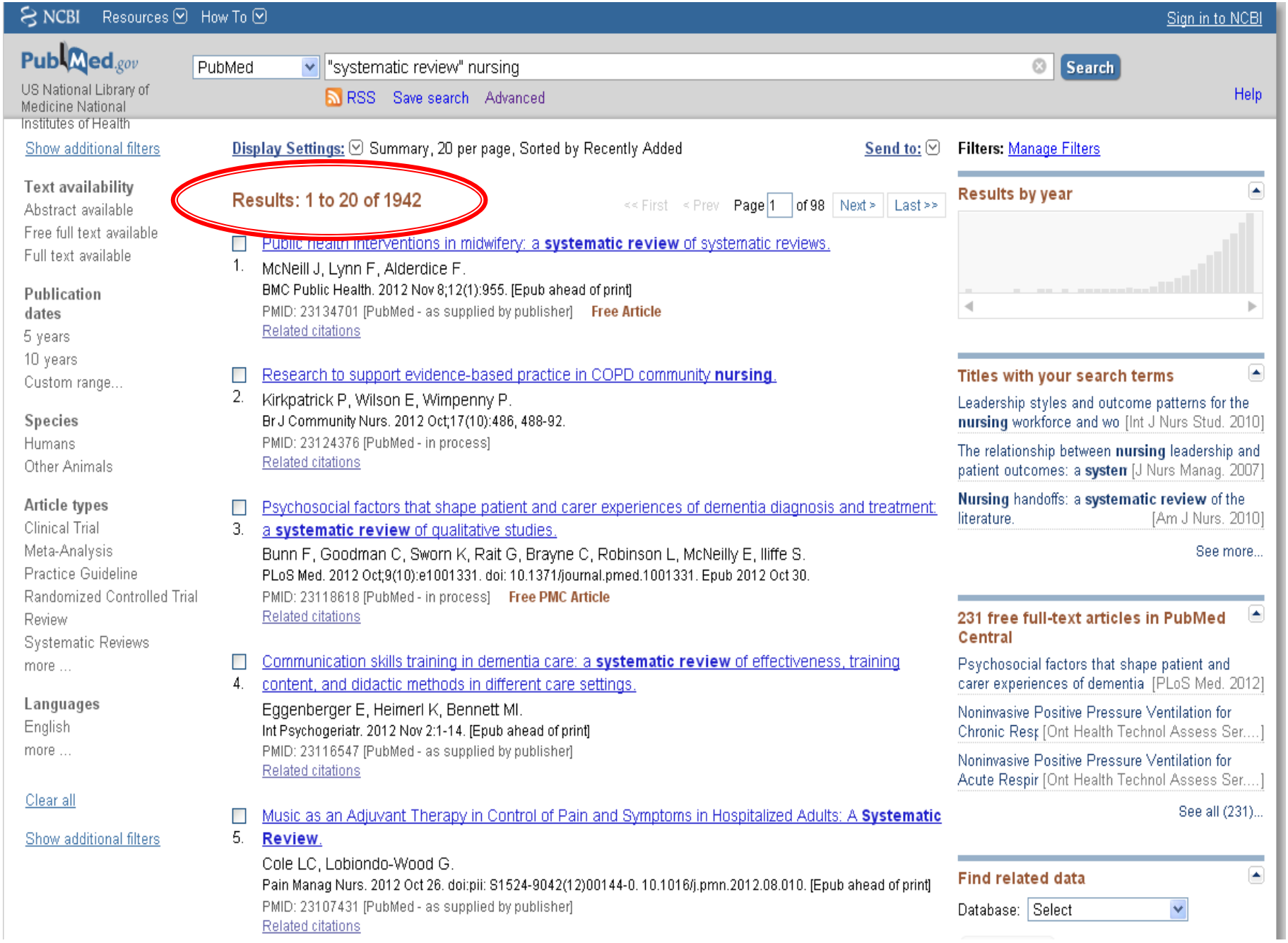
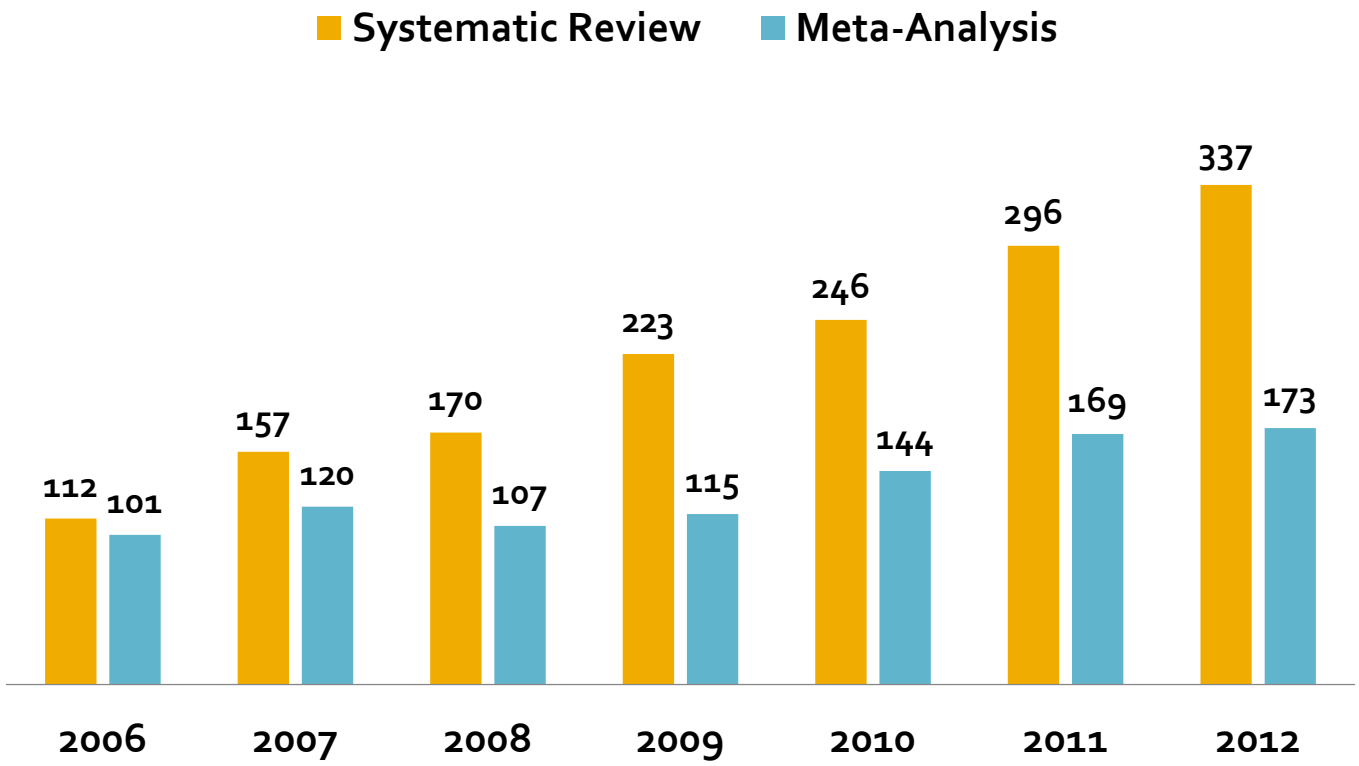
By
Chieh-Yu Liu PhD
Oct 11, 2013

Meta-analysis: An Introduction


meta-analysis ppt - Google 搜
Home - PubMed - NCBI
Facebook
www.ncbi.nlm.nih.gov/pubmed/
此網頁爲 英文 您要翻譯網頁內容嗎？ 翻譯 不需要
NCBI Resources How To
Sign in to NCBI
PubMed.gov
US National Library of Medicine National Institutes of Health
PubMed
meta-
Search
Help
cancer meta-analysis
review meta-analysis
systematic review meta-analysis
diabetes meta-analysis
network meta-analysis
depression meta-analysis
schizophrenia meta-analysis
polymorphism meta-analysis
breast cancer meta-analysis
Turn off
life science journals, and
lisher web sites.
Using PubMed
PubMed Quick Start Guide
Full Text Articles
PubMed FAQs
PubMed Tutorials
New and Noteworthy
PubMed Mobile
Single Citation Matcher
Batch Citation Matcher
Clinical Queries
Topic-Specific Queries
MeSH Database
Journals in NCBI Databases
Clinical Trials
E-Utilities
LinkOut
You are here: NCBI > Literature > PubMed
Write to the Help Desk
GETTING STARTED
NCBI Education
NCBI Help Manual
NCBI Handbook
Training & Tutorials
RESOURCES
Chemicals & Bioassays
Data & Software
DNA & RNA
Domains & Structures
Genes & Expression
Genetics & Medicine
Genomes & Maps
Homology
POPULAR
PubMed
Nucleotide
BLAST
PubMed Central
Gene
Bookshelf
Protein
OMIM
FEATURED
Genetic Testing Registry
PubMed Health
GenBank
Reference Sequences
Map Viewer
Human Genome
Mouse Genome
Influenza Virus
NCBI INFORMATION
About NCBI
Research at NCBI
NCBI Newsletter
NCBI FTP Site
NCBI on Facebook
NCBI on Twitter
NCBI on YouTube


NCBI Resources How To
Sign in to NCBI
PubMed.gov
US National Library of Medicine National Institutes of Health
PubMed
"systematic review" nursing
Search
RSS Save search Advanced
Help
Show additional filters
Display Settings: Summary, 20 per page, Sorted by Recently Added
Send to:
Filters: Manage Filters
Text availability
Abstract available
Free full text available
Full text available
Publication dates
5 years
10 years
Custom range...
Species
Humans
Other Animals
Article types
Clinical Trial
Meta-Analysis
Practice Guideline
Randomized Controlled Trial
Review
Systematic Reviews
more ...
Languages
English
more ...
Clear all
Show additional filters
Results: 1 to 20 of 1942
<< First < Prev Page 1 of 98 Next > Last >>
1. Public health interventions in midwifery: a systematic review of systematic reviews.
McNeill J, Lynn F, Alderdice F.
BMC Public Health. 2012 Nov 8;12(1):955. [Epub ahead of print]
PMID: 23134701 [PubMed - as supplied by publisher] Free Article
Related citations
2. Research to support evidence-based practice in COPD community nursing.
Kirkpatrick P, Wilson E, Wimpenny P.
Br J Community Nurs. 2012 Oct;17(10):486, 488-92.
PMID: 23124376 [PubMed - in process]
Related citations
3. Psychosocial factors that shape patient and carer experiences of dementia diagnosis and treatment: a systematic review of qualitative studies.
Bunn F, Goodman C, Sworn K, Rait G, Brayne C, Robinson L, McNeilly E, Iliffe S.
PLoS Med. 2012 Oct;9(10):e1001331. doi: 10.1371/journal.pmed.1001331. Epub 2012 Oct 30.
PMID: 23118618 [PubMed - in process] Free PMC Article
Related citations
4. Communication skills training in dementia care: a systematic review of effectiveness, training content, and didactic methods in different care settings.
Eggenberger E, Heimerl K, Bennett MI.
Int Psychogeriatr. 2012 Nov 2:1-14. [Epub ahead of print]
PMID: 23116547 [PubMed - as supplied by publisher]
Related citations
5. Music as an Adjuvant Therapy in Control of Pain and Symptoms in Hospitalized Adults: A Systematic Review.
Cole LC, Lobiondo-Wood G.
Pain Manag Nurs. 2012 Oct 26. doi:pii: S1524-9042(12)00144-0. 10.1016/j.pmn.2012.08.010. [Epub ahead of print]
PMID: 23107431 [PubMed - as supplied by publisher]
Related citations
Results by year
Titles with your search terms
Leadership styles and outcome patterns for the nursing workforce and wo [Int J Nurs Stud. 2010]
The relationship between nursing leadership and patient outcomes: a systen [J Nurs Manag. 2007]
Nursing handoffs: a systematic review of the literature. [Am J Nurs. 2010]
See more...
231 free full-text articles in PubMed Central
Psychosocial factors that shape patient and carer experiences of dementia [PLoS Med. 2012]
Noninvasive Positive Pressure Ventilation for Chronic Resp [Ont Health Technol Assess Ser....]
Noninvasive Positive Pressure Ventilation for Acute Respir [Ont Health Technol Assess Ser....]
See all (231)...
Find related data
Database: Select

Systematic Review / Meta-Analysis of Nursing searched in PubMed: 2006-2012



airiti Library 華藝線上圖書館
(CEPS中文電子期刊資料庫暨平台服務+CETD中文碩博士論文資料庫暨平台服務)

會員登入 | 免費加入會員 | 購買點數 | 序號加值
國立臺北護理健康大學，您好

首 頁　瀏 覽　個人化服務　授權合作　使用說明 | 網站導覽

檢索結果再查詢　簡易查詢　進階查詢

查詢條件：(meta-analysis)=篇名.關鍵字.摘要
限制條件：臺灣

查 詢

期刊文章(159)　碩博士論文(148)　會議論文(0)　電子書(0)

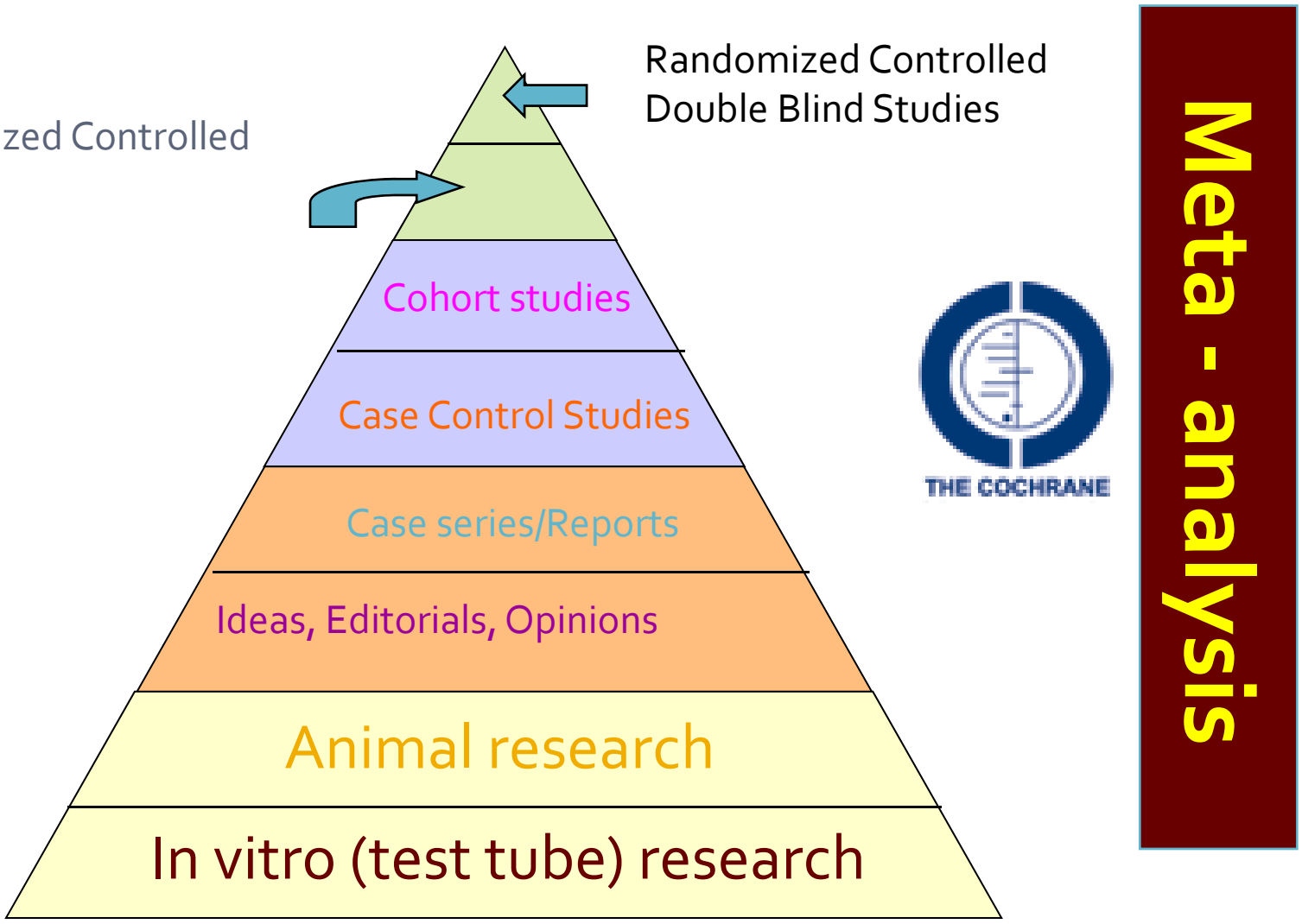
*書目匯出僅針對單頁有效

排序方式： 相關程度高在前

共8頁 1 2 3 4 5 6 7 8 下一頁

	序號	簡易書目	其他服務
☐	1	篇 名 ： Effectiveness of Pyridoxine in the Treatment of Premenstrual Syndrome: Meta-analysis of Controlled Trials 作 者 ： 林隆堯(Long-Yan Lin);何黎星(Li-Hsing Ho);林靜儀(Ching-Yi Lin) 來 源 ： 中山醫學雜誌 14卷1期(2003/01) ：p45 -54 關鍵字： 經前徵候群；premenstrual syndrome (PMS)	全文下載 加入追蹤清單 加入購物車
☐	2	篇 名 ： A Meta-Analysis of the Relationship between Social Support and Well-Being 作 者 ： 王秀紅(Hsiu-Hung Wang) 來 源 ： The Kaohsiung Journal of Medical Sciences 14卷11期(1998/11) ：p717 -726 關鍵字： meta-analysis；social support；well-being	全文下載 加入追蹤清單 加入購物車
☐	3	篇 名 ： 運用整合分析法探討顧客導向前因與後果變數 作 者 ： 葉英斌(Ying-Pin Yeh);楊惠文(Hui-Wen Yang) 來 源 ： 育達科大學報 30期(2012/03) ：p157 -179 關鍵字： 顧客導向；整合分析；內部行銷；Customer orientation；meta-analysis；internal marketing	全文下載 加入追蹤清單 加入購物車
☐	4	篇 名 ： 員工工作滿意、組織承諾與離職意圖關係的統合分析修正模式 作 者 ： 張火燦(Huo-Tsan Chang);謝廷壕(Ting-Huo Hsieh);劉嘉雯(Jia-Wen Liou) 來 源 ： 台灣管理學刊 7卷1期(2007/02) ：p25 -41 關鍵字： 工作滿意；組織承諾；離職意圖；統合分析；Job satisfaction；Organization commitment；Intention to leave；Meta-analysis；Partial correlation NEW 參考文獻(65)	被引用文獻(0)	全文下載 加入追蹤清單 加入購物車

The Evidence-Based Medicine Pyramid



Why conduct a meta-analysis?

- Summarize published literature
  - A **more objective summary** of literature than narrative review
  - Estimate **average effect** from all available studies
- **Increase statistical power** → more precise estimate of effect size
- **Identify between study heterogeneity**
- **Identify research needs**

Meta-Analysis is …

- *Meta-Analysis refers to methods for the **systematic review** of a set of **individual studies** with the aim to **combine their results**.*
- *Meta-analysis has become popular for a number of reasons:*
  - The adoption of **evidence-based medicine (EBM)** which requires that all reliable information is considered.
  - The desire to avoid **narrative reviews** which are often misleading.
  - The desire to interpret the **large number of studies that may have been conducted about a specific treatment.**
  - The desire to increase the **statistical power** of the results be combining many small-size studies.

實證醫學的五個進行步驟

1. 由個案的臨床資料尋找能解答、且具體的臨床問題。〔asking an answerable question〕

2. 尋找相關的醫學證據〔包括各種文獻及醫學資料庫，發表及未發表的研究成果〕。〔searching the best evidence〕

3. 評估各種醫學報告的可信度及臨床相關性，並作成結論。〔critical appraisal the evidence〕

4. 將結論應用於實際患者的治療。〔臨床應用〕

5. 評估治療的效果。〔evaluation〕

在這五個步驟後  **Meta-Analysis**

Outline for Conducting Meta-Analyses

- 研究目的、研究假設：Objective, hypothesis
- Define outcome, intervention, population
  - 所收集的文章，要使用一樣的**outcome measurement**
- Study inclusion criteria: 是文章的**inclusion criteria**
  - Quality assessment : 文獻品質評估 by EBM/EBN methods
- Search strategy : PubMed, Cochrane…
- Data extraction :
  - 看文章裏是使用**mean± SD, Response rate (proportion)…**
- Statistical analysis

Meta-Analyses: Data Extraction

- Sort your paper by
  - Publication year
  - Study design
  - Characteristics of study population
    - Sample size, age, sex
- Assessment procedures
- Risk estimate and variance
- Determine Covariates

Meta-Analyses: Statistical Analyses

- Define analytic strategy
- Investigate between study heterogeneity
- Decide whether results can be combined
- Estimate summary effect, if appropriate
- Conduct sensitivity analysis
  - Stratification
  - Meta-regression analyses

The goal of Meta-Analysis

- The goals of meta-analysis may be summarized as follows:
- A meta-analysis seeks to **systematically review all pertinent evidence**, **provide quantitative summaries, integrate results across studies,** and **provide an overall interpretation of these studies.**

An example: Dietary Cadmium Intake and the Risk of Cancer: A Meta-Analysis
PLoS One. 2013 Sep 17;8(9):e75087

Abstract

Background: Diet is a major source of cadmium intake among the non-smoking general population. Recent studies have determined that cadmium exposure may produce adverse health effects at lower exposure levels than previously predicted. We conducted a meta-analysis to combine and analyze the results of previous studies that have investigated the association of dietary cadmium intake and cancer risk.

Methods: We searched PubMed, EMBASE, and MEDLINE database for case-control and cohort studies that assessed the association of dietary cadmium intake and cancer risk. We performed a meta-analysis using eight eligible studies to summarize the data and summary relative risks (RRs) and 95% confidence intervals (CIs) were calculated using a random effects model.

Results: Overall, dietary cadmium intake showed no statistically significant association with cancer risk (RR = 1.10; 95% CI: 0.99–1.22, for highest vs. lowest dietary cadmium group). However, there was strong evidence of heterogeneity, and subgroup analyses were conducted using the study design, geographical location, and cancer type. In subgroup analyses, the positive associations between dietary cadmium intake and cancer risk were observed among studies with Western populations (RR = 1.15; 95% CI: 1.08–1.23) and studies investigating some hormone-related cancers (prostate, breast, and endometrial cancers).

Conclusion: Our analysis found a positive association between dietary cadmium intake and cancer risk among studies conducted in Western countries, particularly with hormone-related cancers. Additional experimental and epidemiological studies are required to verify our findings.

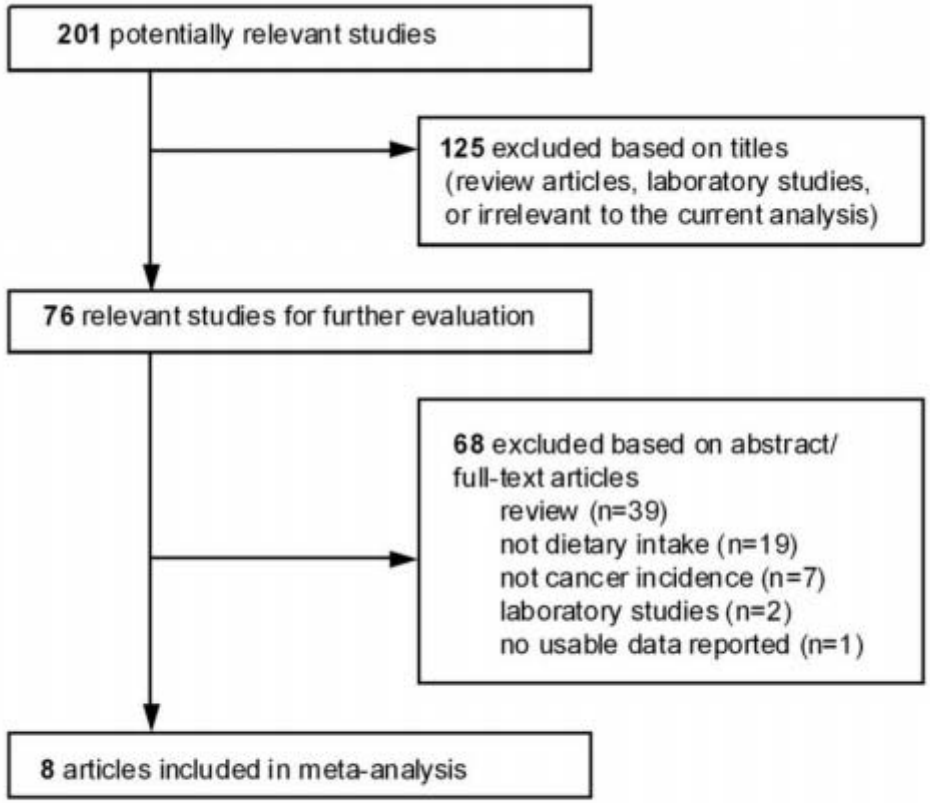


Figure 1. Study flow chart depicting literature search and selection.

doi: 10.1371/journal.pone.0075087.g001

Table 2. Characteristics of published cohort studies on the association between dietary cadmium intake and cancer risk in this meta-analysis.

Study (Country)	Study description	Dietary cadmium intake (μg/day)	Outcome	Variables used in multivariate model
Akesson et al. (2008) Sweden	Endometrial cancer; the Swedish Mammography Cohort, 30,210 postmenopausal women; 16yr F/U, 378 cases	FFQ; 67-item, 96-item FFQ; The average estimated dietary cadmium intake = 15 μg/day (80% from cereals and vegetables); T1 (<13.7), T2 (13.7–16), T3 (≥16)	[T3 vs. T1] RR = 1.39 (1.04–1.86) for all women; RR = 1.86 (1.13–3.08) for non-smoker & BMI <27 kg/m^2; RR = 2.42 (1.12-5.21) for non-smoker, BMI <27 kg/m^2 and nonusers of postmenopausal hormones	Age, education, parity, age at menarche, age at menopause, leisure time physical inactivity, BMI, postmenopausal hormones use and smoking status.
Julin et al. (2011) Sweden	Ovarian cancer; the Swedish Mammography Cohort; 60,889; women; 18.9yr F/U; 409 cases	FFQ; 67-item, 96-item FFQ; T1 (<14), T2 (14–16), T2 (>16)	[T3 vs. T1] RR = 0.89 (0.70–1.14) for all subjects; None of the subgroup analyses were significant (BMI, smoking, postmenopausal hormone use, oral contraceptive use)	Age, BMI, education, age at menarche, use of oral contraceptives, age at menopause, postmenopausal hormone use, parity and age at first birth.
Admas et al. (2012) USA	Breast cancer; 30, 543 postmenopausal women; 7.5yr F/U 1,026 cases; VITamins And Lifestyle (VITAL) cohort	FFQ; 120-item FFQ; dietary cadmium intake=10.9 μg/day (vegetable 44%, grain 22%); Q1 (<7.48), Q2 (7.48–10.05), Q3 (10.06–13.30), Q4 (>13.30)	[Q4 vs. Q1] HR = 1.00 (0.72–1.41) for all subjects; None of the subgroup analyses were significant (smoking, HRT use, BMI, parity, vegetable consumption, multivitamin use, zinc, iron, calcium, ER status)	Age, total energy intake, education, race, HRT use, smoking, vegetable consumption, BMI, physical activity, alcohol consumption, age at first childbirth, multivitamin use, and mammography
Julin et al. (2012a) Sweden	Prostate cancer; the cohort of Swedish Men;41,089 men, 45-79yr; 10.8yr F/U; 3,085 cases	FFQ ; 96-item FFQ; The mean estimated energy-adjusted cadmium intake = 19 μg/day (33% bread, 18% potatoes 15% other cereals than bread); T1 (<17), T2 (17–20), T3 (>20)	[T3 vs. T1] RR = 1.13 (1.03–1.24) for total; RR = 1.29 (1.08–1.53) for all localized prostate cancer; RR = 1.55 (1.16–2.08) or RR = 1.45 (1.15–1.83) for localized prostate cancer with a small waist circumference (<94 cm) or smoking, respectively	Age, family history of prostate cancer, education, BMI, waist circumference, physical activity, smoking, total energy intake, alcohol consumption, selenium, lycopene and calcium.

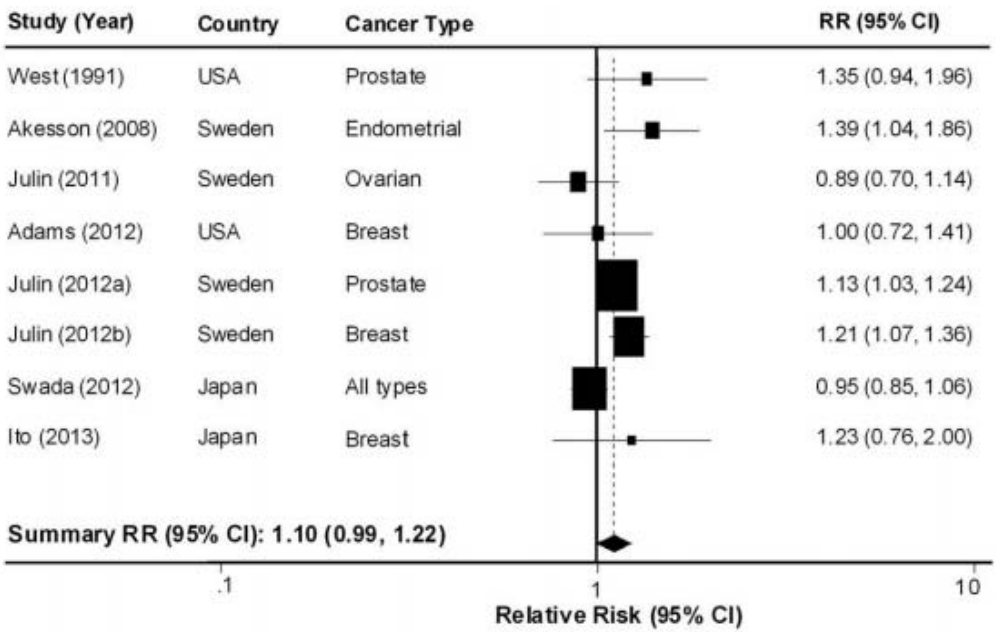
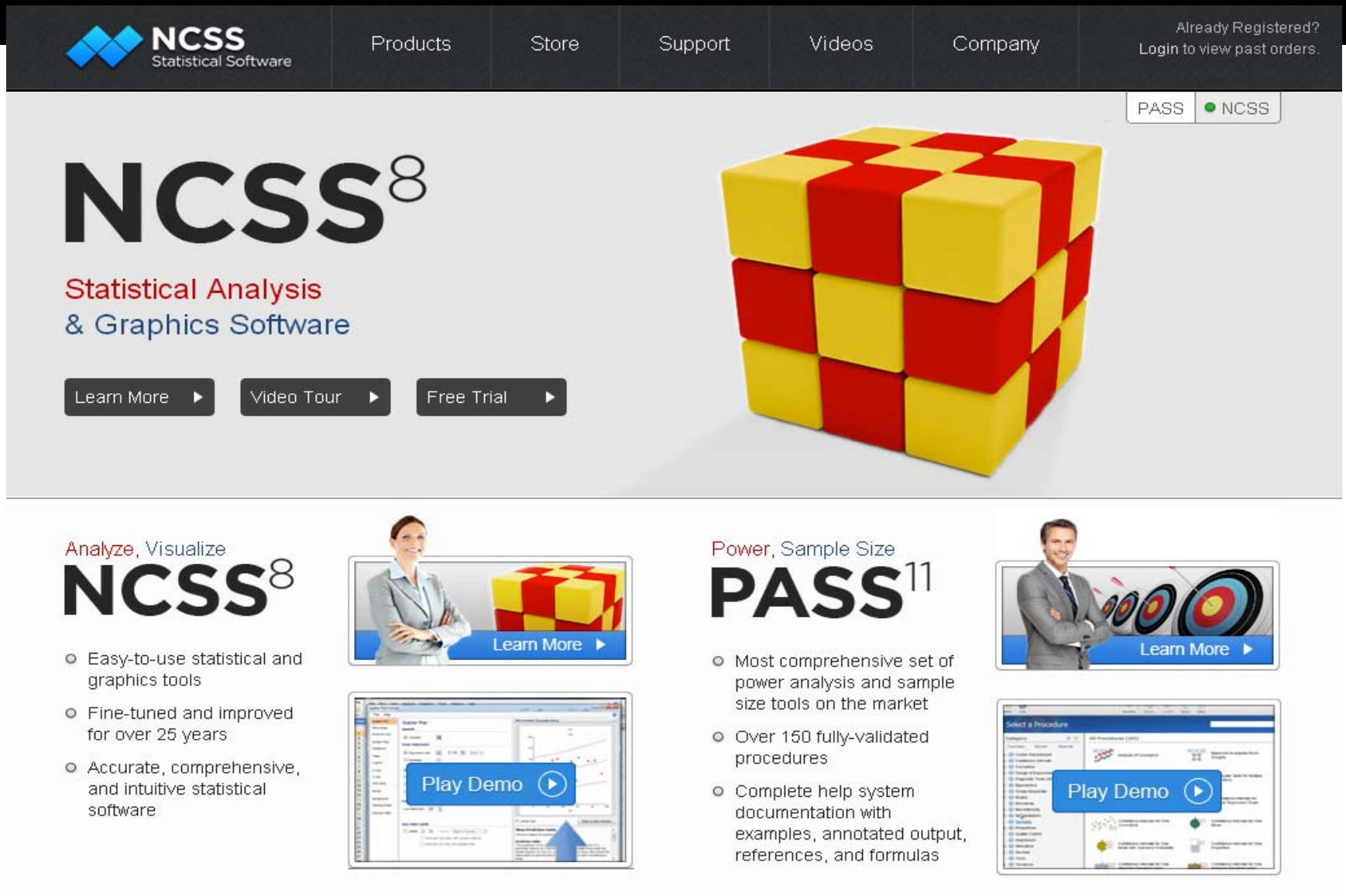
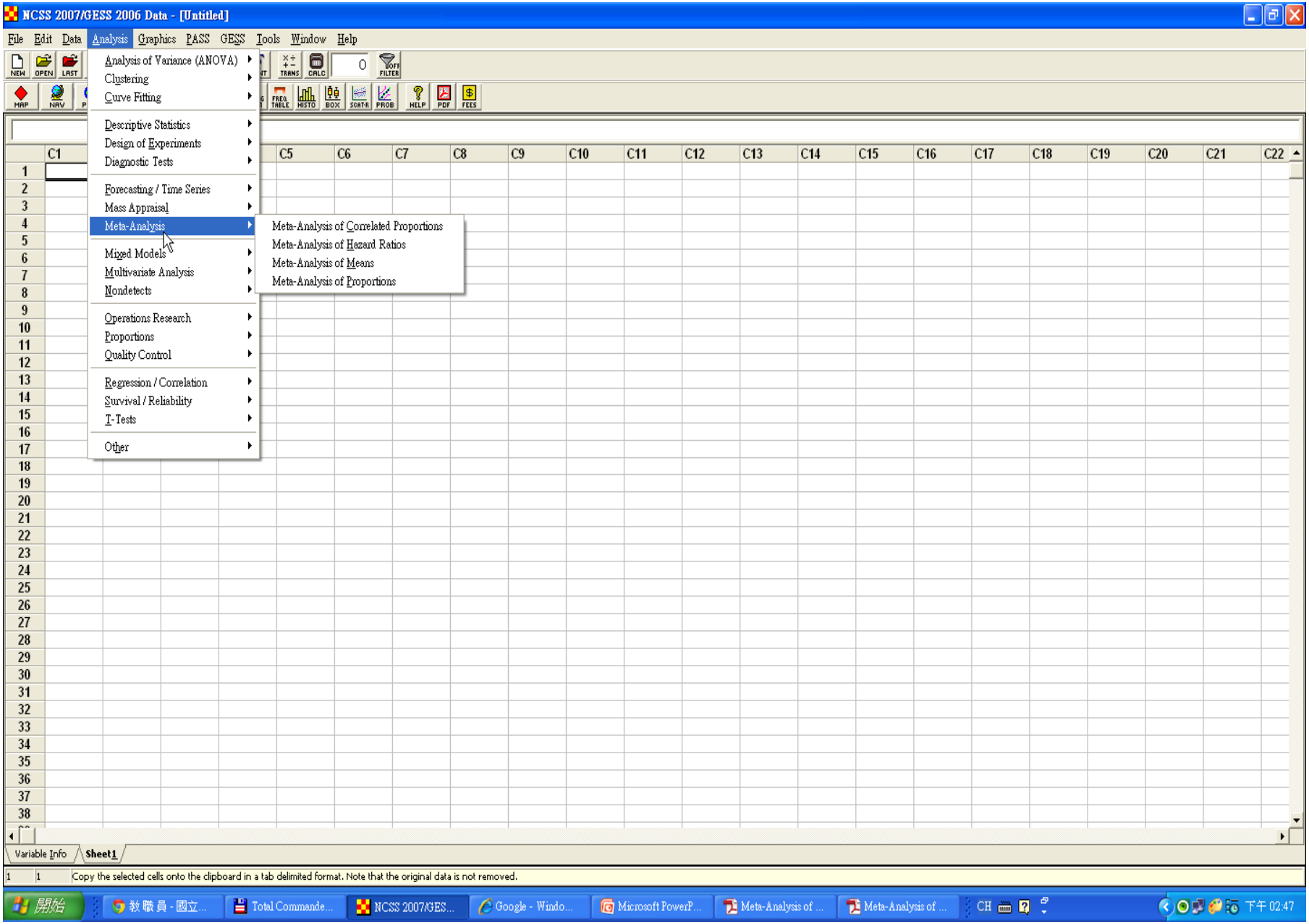


Figure 2. Forest plot for the association between dietary cadmium intake and cancer risk using a random effects model.

doi: 10.1371/journal.pone.0075087.g002

Meta-Analysis by using NCSS




NCSS 2007/GESS 2006 Data - [Untitled]
File Edit Data Analysis Graphics PASS GESS Tools Window Help
Analysis of Variance (ANOVA)
Clustering
Curve Fitting
Descriptive Statistics
Design of Experiments
Diagnostic Tests
Forecasting / Time Series
Mass Appraisal
Meta-Analysis
Mixed Models
Multivariate Analysis
Nondetects
Operations Research
Proportions
Quality Control
Regression / Correlation
Survival / Reliability
T-Tests
Other
Meta-Analysis of Correlated Proportions
Meta-Analysis of Hazard Ratios
Meta-Analysis of Means
Meta-Analysis of Proportions
Variable Info
Sheet1
Copy the selected cells onto the clipboard in a tab delimited format. Note that the original data is not removed.

Example 1: Meta-Analysis of Means

- This module performs a meta-analysis on a set of **two-group**, **continuous-scale**, studies.
- These studies have **a treatment group** and **a control group.**
- Each study's result may be summarized by the sample size, mean, and standard deviation of each of the two groups.
- The NCSS provides a complete set of numeric reports and plots to allow the investigation and presentation of the studies.
- The plots include the *forest plot, radial plot, and L'Abbe plot. Both fixed-, and random-, effects models are available for analysis.*

Notations

Suppose you have obtained the results for k studies, labeled $i = 1,\ldots,k$. Each study consists of a treatment group (T) and a control group (C). The results of each study are summarized by six statistics:

n_{Ti} the number of subjects in the treatment group.

n_{Ci} the number of subjects in the control group.

$\bar{x}_{Ti}$ the sample mean of the treatment group which estimates the treatment mean μ_{Ti}.

$\bar{x}_{Ci}$ the sample mean of the control group which estimates the control mean μ_{Ci}.

s_{Ti} the sample standard deviation of the treatment group.

s_{Ci} the sample standard deviation of the control group.

Mean Difference for Each Study

The scales (e.g. blood pressure, pulse rate, volume, etc.) of all studies must be the same. If the logarithm has been taken in one study, it must be taken in all studies. You cannot combined studies with different scales using this program!

The measure of treatment effect for study *i* is

$$\theta_i = \mu_{Ti} - \mu_{Ci}$$

which is estimated by

$$\hat{\theta}_i = \bar{x}_{Ti} - \bar{x}_{Ci}$$

The standard deviation of the difference is

$$V\left(\hat{\theta}_i\right) = \sigma_i^2\left(\frac{1}{n_{Ti}} + \frac{1}{n_{Ci}}\right)$$

The value of σ^2 is estimated by the pooled sample standard deviation given by

$$s_i^2 = \frac{(n_{Ti}-1)s_{Ti}^2 + (n_{Ci}-1)s_{Ci}^2}{n_{Ti}+n_{Ci}}$$

so that

$$\hat{V}\left(\hat{\theta}_i\right) = s_i^2\left(\frac{1}{n_{Ti}} + \frac{1}{n_{Ci}}\right)$$

Defining the Study Parameters

Confidence intervals based on the *t* distribution may be defined for θ_i in the usual manner.

$$\hat{\theta}_i \pm t_{n_{Ti}+n_{Ci}-2,1-\alpha/2}\sqrt{\hat{V}\left(\hat{\theta}_i\right)}$$

It will be useful in the sequel to make the following definition of the weights.

$$v_i = \hat{V}\left(\hat{\theta}_i\right)$$

$$w_i = 1/v_i$$

Overall Null Hypothesis

Two statistical tests have been devised to test the overall null hypothesis that all treatment effects are zero. The null hypothesis is written

$$H_0 : \theta_i = 0 \quad i = 1, \cdots, k$$

Nondirectional Test

The nondirectional alternative hypothesis that at least one $\theta_i \neq 0$ may be tested by comparing the quantity

$$X_{ND} = \sum_{i=1}^{k} w_i \hat{\theta}_i^2$$

with a χ_k^2 distribution.

Directional Test

A test of the more interesting directional alternative hypothesis that $\theta_i = \theta \neq 0$ for all i may be tested by comparing the quantity

$$X_D = \frac{\left(\sum_{i=1}^{k} w_i \hat{\theta}_i \right)^2}{\sum_{i=1}^{k} w_i}$$

with a χ_1^2 distribution. Note that this tests the hypothesis that all effects are equal to the same nonzero quantity.

Effect-Equality (Heterogeneity) Test

When the overall null hypothesis is rejected, the next step is to test whether all effects are equal, that is, whether the effects are homogeneous. Specifically, the hypothesis is

$$H_0 : \theta_i = \theta \quad i = 1, \cdots, k$$

versus the alternative that at least one effect is different, that is, that the effects are heterogeneous. This may also be interpreted as a test of the study-by-treatment interaction.

This hypothesis is tested using Cochran's Q test which is given by

$$Q = \sum_{i=1}^{k} w_i \left(\hat{\theta}_i - \hat{\theta} \right)^2$$

where

$$\hat{\theta} = \frac{\sum_{i=1}^{k} w_i \hat{\theta}_i}{\sum_{i=1}^{k} w_i}$$

The test is conducted by comparing Q to a χ^2_{k-1} distribution.

Fixed versus Random Effects

- If the effects are be assumed to be **equal (homogeneous)**, either through testing or from other considerations, **a *fixed effects model*** *may be used to construct a combined confidence interval.*
- *However, if the effects* ***are heterogeneous****, a* ***random effects model*** *should be used to construct the combined confidence interval.*

Fixed Effects Model

The fixed effects model assumes homogeneity of study results. That is, it assumes that $\theta_i = \theta$ for all i. This assumption may not be realistic when combining studies with different patient pools, protocols, follow-up strategies, doses, durations, etc.

If the fixed effects model is adopted, the *inverse variance-weighted* method as described by Sutton (2000) page 58 is used to calculate the confidence interval for θ. The formulas used are

$$\hat{\theta} \pm z_{1-\alpha/2}\sqrt{\hat{V}\left(\hat{\theta}\right)}$$

where $z_{1-\alpha/2}$ is the appropriate percentage point from the standardized normal distribution and

$$\hat{\theta} = \frac{\sum_{i=1}^{k} w_i \hat{\theta}_i}{\sum_{i=1}^{k} w_i}$$

$$\hat{V}\left(\hat{\theta}\right) = \frac{1}{\sum_{i=1}^{k} w_i}$$

Random Effects Model

The random effects model assumes that the individual θ_i come from a random distribution with fixed mean $\overline{\theta}$ and variance σ^2. Sutton (2000) page 74 presents the formulas necessary to conduct a random effects analysis using the *weighted* method. The formulas used are

$$\hat{\overline{\theta}} \pm z_{1-\alpha/2}\sqrt{\hat{V}\left(\hat{\overline{\theta}}\right)}$$

where $z_{1-\alpha/2}$ is the appropriate percentage point from the standardized normal distribution and

$$\hat{\overline{\theta}} = \frac{\sum_{i=1}^{k} \overline{w}_i \hat{\theta}_i}{\sum_{i=1}^{k} \overline{w}_i}$$

$$\hat{V}\left(\hat{\overline{\theta}}\right) = \frac{1}{\sum_{i=1}^{k} \overline{w}_i}$$

$$\overline{w}_i = \frac{1}{\frac{1}{w_i} + \hat{\tau}^2}$$

$$\hat{\tau}^2 = \begin{cases} \dfrac{Q-k+1}{U} & \text{if } Q > k-1 \\ 0 & \text{otherwise} \end{cases}$$

$$Q = \sum_{i=1}^{k} w_i \left(\hat{\theta}_i - \hat{\theta}\right)^2$$

$$U = (k-1)\left(\overline{w} - \frac{s_w^2}{k\overline{w}}\right)$$

$$s_w^2 = \frac{1}{k-1}\left(\sum_{i=1}^{k} w_i^2 - k\overline{w}^2\right)$$

$$\overline{w} = \frac{1}{k}\left(\sum_{i=1}^{k} w_i\right)$$

Graphical Displays

- A number of plots have been devised to display the information in a meta-analysis.
- These include the
  - forest plot,
  - radial plot,
  - L'Abbe plot.

Data format for NCSS Meta-Analysis

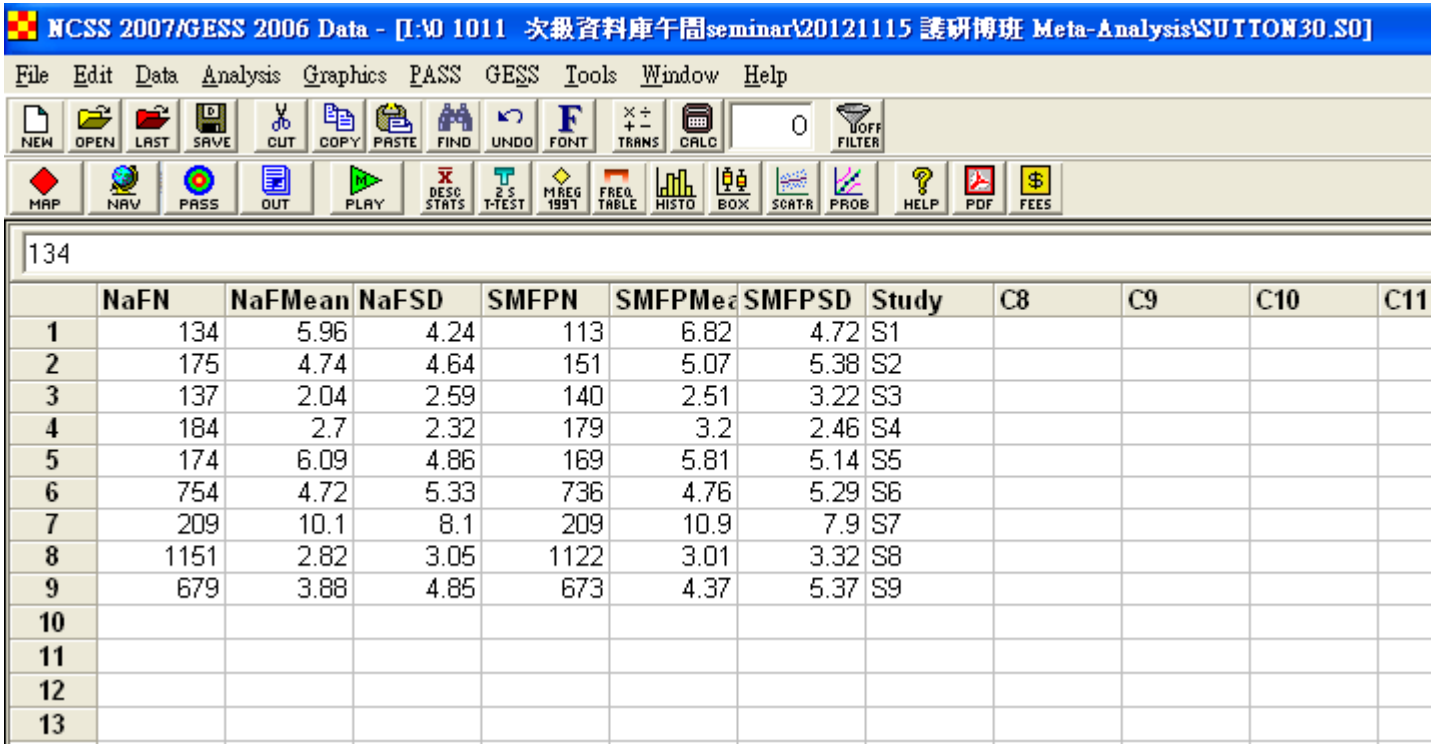
- The data are entered into a dataset using one row per study.
- Six variables are required:
  - sample size,
  - Mean,
  - standard deviation (SD)

  of both Treatment group and Control group.
- In addition to these, an additional variable is usually used to represent a short (3 or 4 character) label.
- Another variable may be used to define a grouping variable.

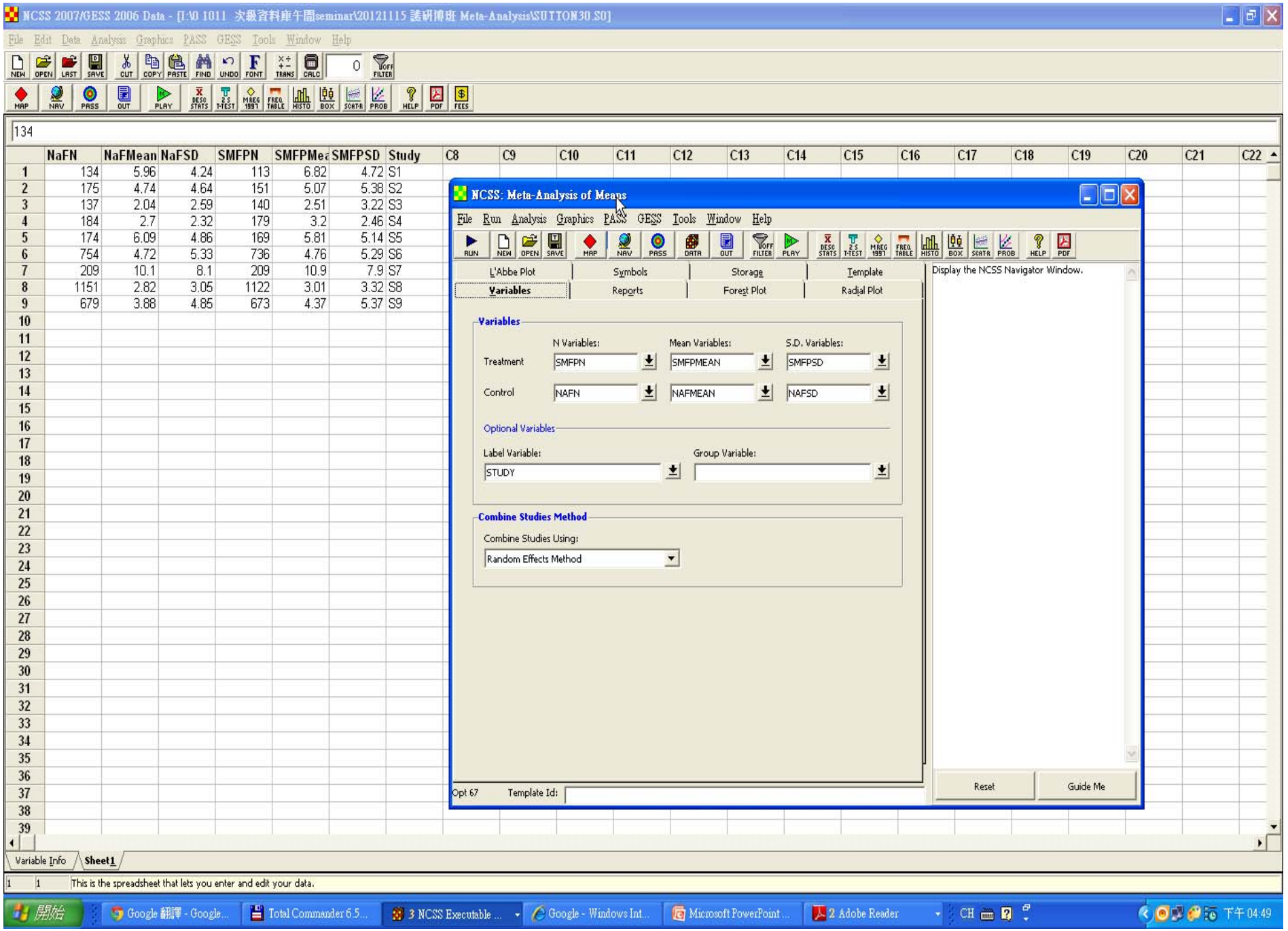
A Numeric Example

- Sutton (2000) page 30 as the dental dataset.
- This dataset reviews **9** randomized clinical trials (RCTs) that were conducted to study the effects of sodium fluoride (NaF, 氟化鈉) with sodium monofluorophosphate (SMFP, 單氟磷酸鈉).
  - These nine studies were all on the same continuous scale, so their results could be analyzed using the meta-analysis.
  - This dataset contains data for nine randomized clinical trials that were conducted to study the effect of fluoridation.
- The **NaF data** represent the **control group** and the **SMFP** represent the **treatment group.**

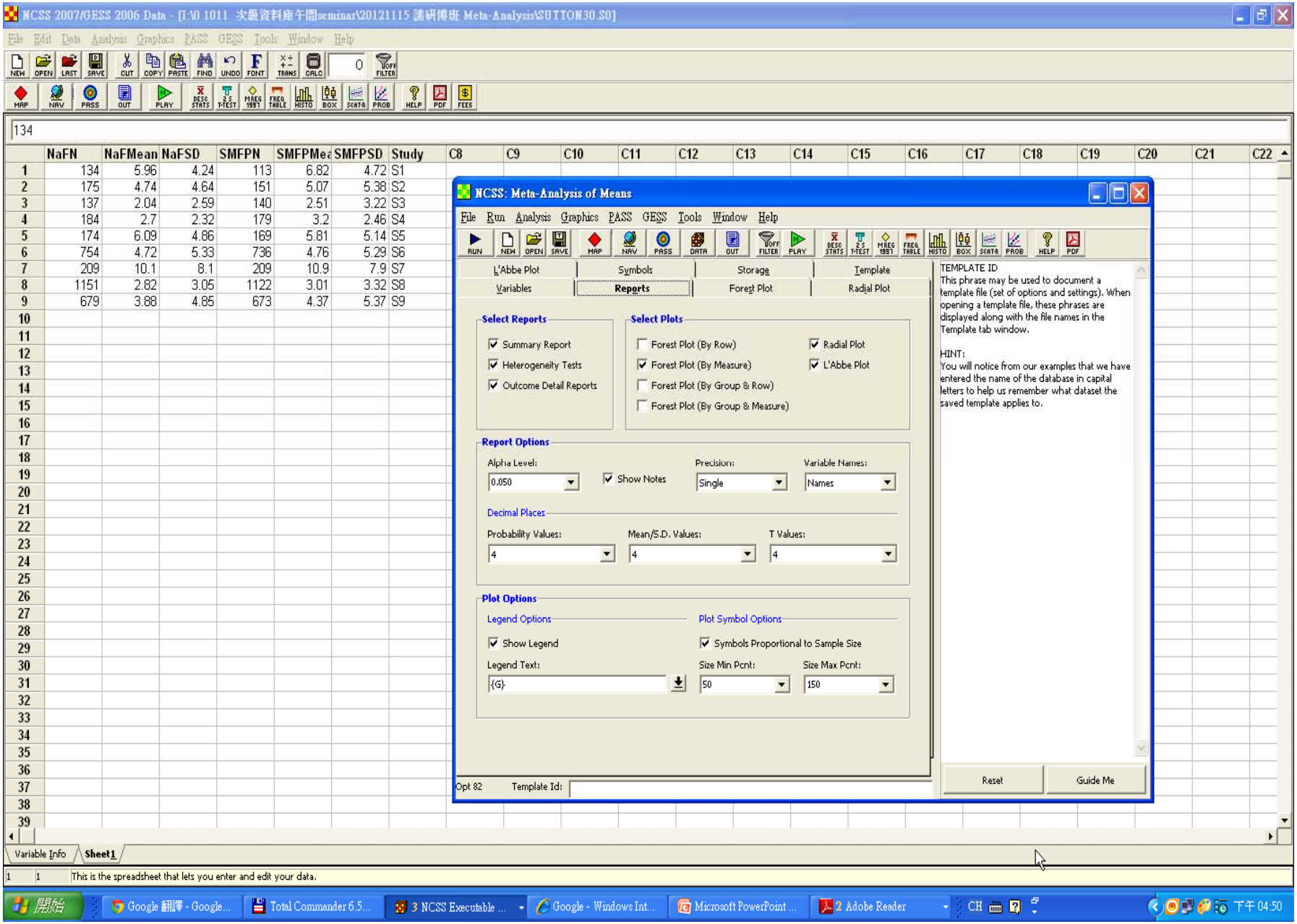
Data Format in NCSS



	NaFN	NaFMean	NaFSD	SMFPN	SMFPMea	SMFPSD	Study	C8	C9	C10	C11
1	134	5.96	4.24	113	6.82	4.72	S1				
2	175	4.74	4.64	151	5.07	5.38	S2				
3	137	2.04	2.59	140	2.51	3.22	S3				
4	184	2.7	2.32	179	3.2	2.46	S4				
5	174	6.09	4.86	169	5.81	5.14	S5				
6	754	4.72	5.33	736	4.76	5.29	S6				
7	209	10.1	8.1	209	10.9	7.9	S7				
8	1151	2.82	3.05	1122	3.01	3.32	S8				
9	679	3.88	4.85	673	4.37	5.37	S9				
10											
11											
12											
13											



	NaFN	NaFMean	NaFSD	SMFPN	SMFPMea	SMFPSD	Study
1	134	5.96	4.24	113	6.82	4.72	S1
2	175	4.74	4.64	151	5.07	5.38	S2
3	137	2.04	2.59	140	2.51	3.22	S3
4	184	2.7	2.32	179	3.2	2.46	S4
5	174	6.09	4.86	169	5.81	5.14	S5
6	754	4.72	5.33	736	4.76	5.29	S6
7	209	10.1	8.1	209	10.9	7.9	S7
8	1151	2.82	3.05	1122	3.01	3.32	S8
9	679	3.88	4.85	673	4.37	5.37	S9


NCSS 2007/GESS 2006 Data - [I:\0 1011 次級資料庫午間seminar\20121115 諮研博班 Meta-Analysis\SUTTON30.S0]
File Edit Data Analysis Graphics PASS GESS Tools Window Help
NCSS: Meta-Analysis of Means
File Run Analysis Graphics PASS GESS Tools Window Help
L'Abbe Plot
Symbols
Storage
Template
Variables
Reports
Forest Plot
Radial Plot
Select Reports
Summary Report
Heterogeneity Tests
Outcome Detail Reports
Select Plots
Forest Plot (By Row)
Forest Plot (By Measure)
Forest Plot (By Group & Row)
Forest Plot (By Group & Measure)
Radial Plot
L'Abbe Plot
Report Options
Alpha Level:
0.050
Show Notes
Precision:
Single
Variable Names:
Names
Decimal Places
Probability Values:
4
Mean/S.D. Values:
4
T Values:
4
Plot Options
Legend Options
Show Legend
Legend Text:
{G}
Plot Symbol Options
Symbols Proportional to Sample Size
Size Min Pcnt:
50
Size Max Pcnt:
150
TEMPLATE ID
This phrase may be used to document a template file (set of options and settings). When opening a template file, these phrases are displayed along with the file names in the Template tab window.
HINT:
You will notice from our examples that we have entered the name of the database in capital letters to help us remember what dataset the saved template applies to.
Reset
Guide Me
Opt 82
Template Id:
Variable Info
Sheet1
This is the spreadsheet that lets you enter and edit your data.

Numeric Summary Section Using Random Effects Model

Study	NT/NC	Mean T	Mean C	Difference	SD T	SD C
S1	113/134	6.8200	5.9600	0.8600	4.7200	4.2400
S2	151/175	5.0700	4.7400	0.3300	5.3800	4.6400
S3	140/137	2.5100	2.0400	0.4700	3.2200	2.5900
S4	179/184	3.2000	2.7000	0.5000	2.4600	2.3200
S5	169/174	5.8100	6.0900	-0.2800	5.1400	4.8600
S6	736/754	4.7600	4.7200	0.0400	5.2900	5.3300
S7	209/209	10.9000	10.1000	0.8000	7.9000	8.1000
S8	1122/1151	3.0100	2.8200	0.1900	3.3200	3.0500
S9	673/679	4.3700	3.8800	0.4900	5.3700	4.8500
[Combined]						
Average				0.2835		

Note: This report shows the input data for each study in the analysis. The 'Average' values are actually weighted averages with weights based on the effects model that was selected.

重要: Combine 後 Trt group 與 Control group之差

Nondirectional Zero-Effect Test Using Random Effects Model

Rows	Outcome Measure	Chi-Square	DF	Prob Level
Combined	Mean Difference	14.8417	9	0.0954

Note: This chi-square value tests the null hypothesis that all effects are zero versus the alternative that at least one study had a non-zero effect.

Prob Level

This is the significance level of the test. If this value is less than the nominal value of alpha (usually 0.05), the test is statistically significant and the alternative is concluded. If the value is larger than the specified value of alpha, no conclusion can be drawn other than that you do not have enough evidence to reject the null hypothesis.

Directional Zero-Effect Test Using Random Effects Model

Rows	Outcome Measure	Chi-Square	DF	Prob Level
Combined	Mean Difference	9.4395	1	0.0021

Note: This chi-square value tests the null hypothesis that all effects are zero versus the alternative that all studies had the same, non-zero effect.

This reports the results of the directional zero-effect chi-square test designed to test the overall null hypothesis that all treatment effects are zero. The null hypothesis is written

$$H_0: \theta_i = 0 \quad i = 1, \cdots, k$$

The alternative hypothesis is that $\theta_i = \theta \neq 0$ for all i, that is, that all effects are equal to the same, non-zero value.

存在一個非o的差異, θ

Effect-Equality (Heterogeneity) Test

Treatment	Outcome Measure	Cochran's Q	DF	Prob Level
Combined	Mean Difference	5.4022	8	0.7139

This reports the results of the effect-equality (homogeneity) test. This chi-square test was designed to test the null hypothesis that all treatment effects are equal. The null hypothesis is written

$$H_0: \theta_i = \theta \quad i = 1, \cdots, k$$

The alternative is that at least one effect is different, that is, that the effects are heterogeneous. This may also be interpreted as a test of the study-by-treatment interaction. This test may help you determine whether to use a Fixed Effects model (used for homogeneous effects) or a Random Effects model (heterogeneous effects).

Cochran's Q

This is the computed chi-square value for Cochran's Q statistic. The formula was presented earlier.

虛無假設(Ho): 所有研究中，實驗組與對照組的效果(effect)差為常數, θ
以此例中，不拒絕此Ho, 故資料適合使用一固定效果模型(fixed effect model)
若是拒絕此Ho, 則需要使用隨機效果模型(random effect model)

Mean Difference Detail Section Using Fixed Effects Model

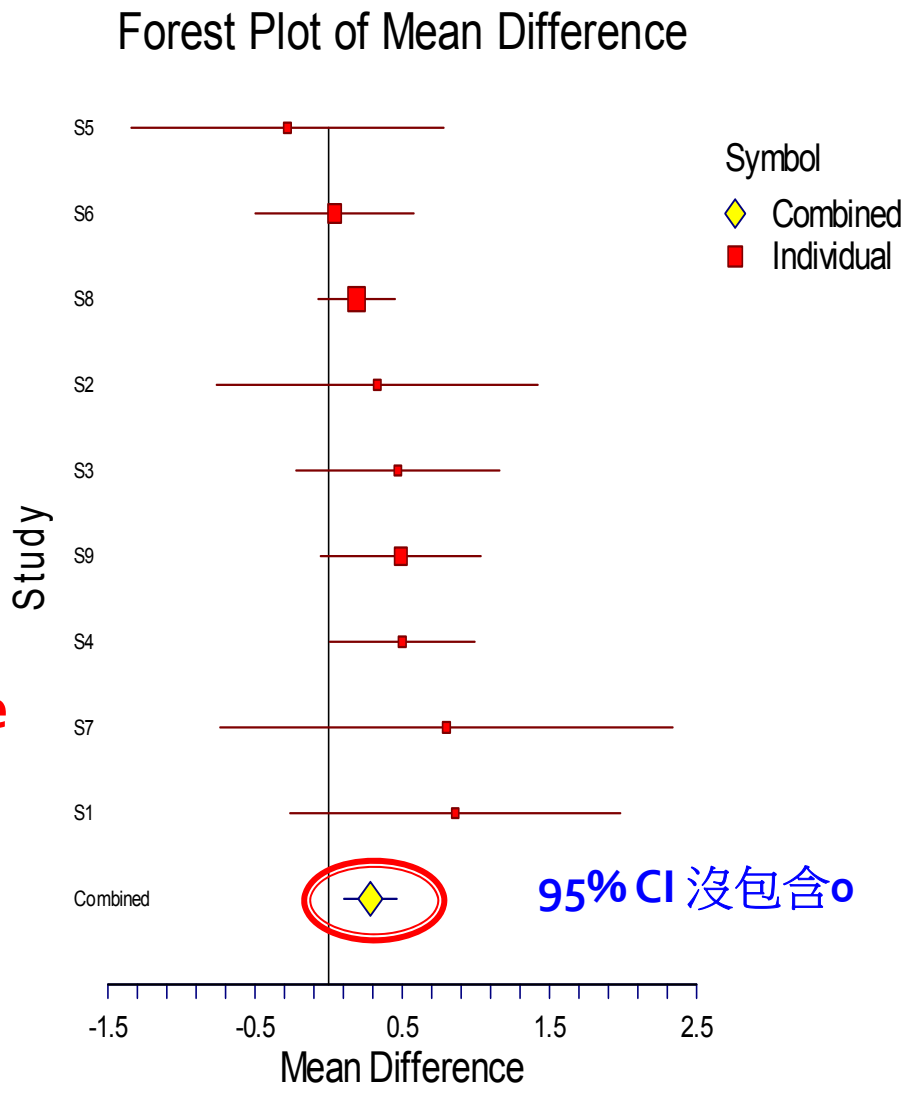
Study	Mean Difference	Standard Error	95.0% Lower Confidence Limit	95.0% Upper Confidence Limit	Percent Fixed Effects Weight
S1	0.8600	0.5704	-0.2635	1.9835	2.6172
S2	0.3300	0.5549	-0.7617	1.4217	2.7648
S3	0.4700	0.3516	-0.2221	1.1621	6.8887
S4	0.5000	0.2509	0.0066	0.9934	13.5238
S5	-0.2800	0.5400	-1.3421	0.7821	2.9199
S6	0.0400	0.2752	-0.4993	0.5793	11.2455
S7	0.8000	0.7826	-0.7384	2.3384	1.3900
S8	0.1900	0.1337	-0.0720	0.4520	47.6529
S9	0.4900	0.2782	-0.0554	1.0354	10.9974
[Combined]					
Average	0.2835	0.0923	0.1026	0.4643	

Note: This report presents the difference's value and a confidence interval.
The 'Average' line presents the combined estimates for the group. The weights let you determine the influence of each study on the combined results.

- **Confidence Limits**
  - These are the lower and upper confidence limits
- **Weights**
  - The last column gives the relative (percent) weight used in creating the weighted average.
  - Using these values, you can decide how much influence each study has on the weighted average.

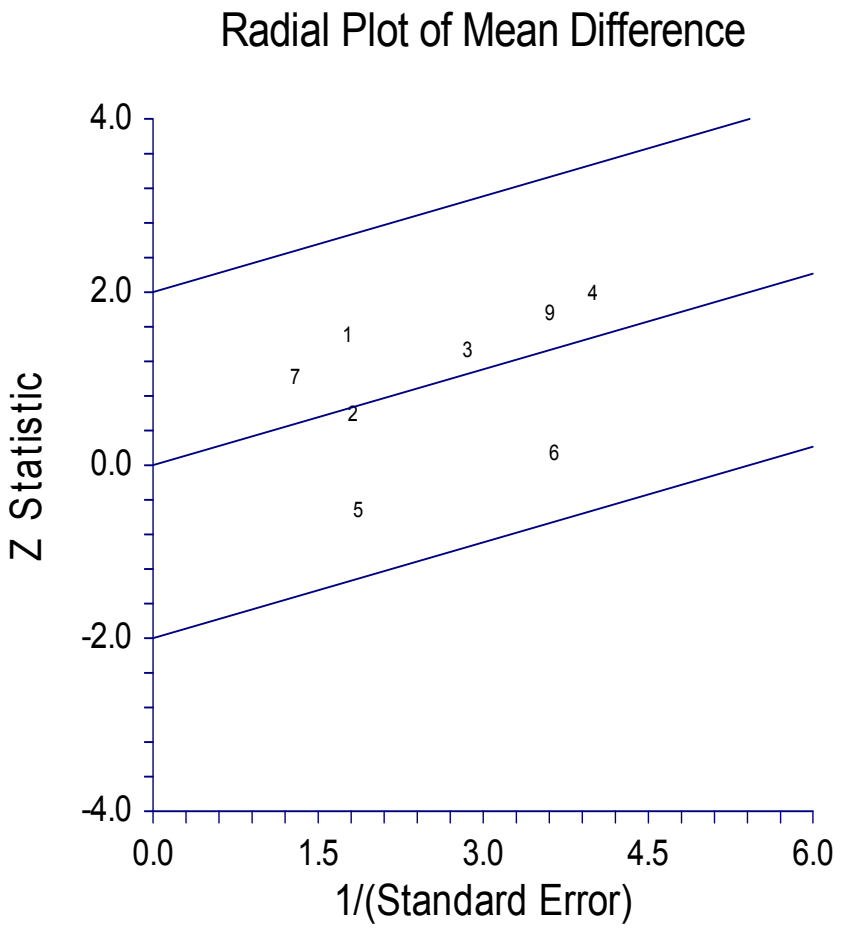
Forest Plot (森林圖)

- The size of the plot symbol is proportional to the sample size of the study.
- The points on the plot are **sorted by the mean difference.**
- **The lines** represent the **confidence intervals** about the mean differences.
- Note that **the narrower** the confidence limits, **the better.**
- **Conclusion is focused on the Combined point.**
- **Also, we can determine which study did not show significant results.**



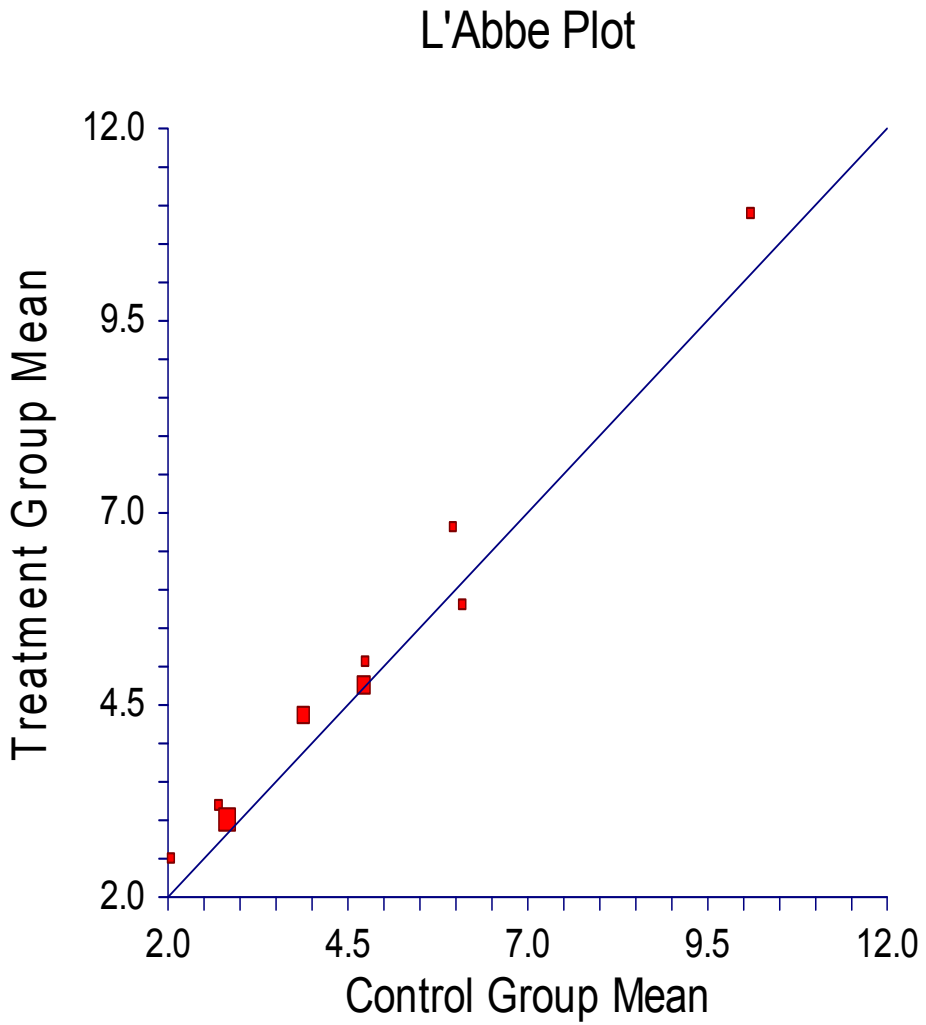
Radial plot (徑向圖)

- The radial (or Galbraith) plot shows the z-statistic (outcome divided by standard error) on the vertical axis and a measure of weight on the horizontal axis.
- Studies **within the limits** are interpreted as **homogeneous.**
- Studies **outside the limits** may be **outliers.**



L'Abbe plot

- The L'Abbe plot displays the treatment mean on vertical axis versus the control mean on the horizontal axis.
- Homogenous studies will be arranged along the diagonal line.
- This plot is especially useful in determining **if the relationship between the treatment group and the control group is the same** for all values of the control group risk.



一個Free的Meta-Analysis Software

- **MIX 2.0**
  - MIX 2.0 is a statistical add-in for performing meta-analysis in Excel.
  - 執行前需要安裝「規劃求解」(Solver)增益集(Add-in)
  - The free Lite version is for educational purposes and contains datasets used in the most authoritative books on meta-analysis.
  - The paid Pro version has additional features enabling users to create and edit their own datasets.
- 下載網址:
- http://www.meta-analysis-made-easy.com/download/index.html

Thank you for your attention!!