Iranian Congress of Epidemiology

10th National, and

3rd International

The Role of Network Meta-analyses in Clinical and Health Decision-Making

Mohsen Dehghani, PhD
Assistant Professor of Epidemiology
Mashhad University of Medical Sciences (MUMS)
Mashhad, Iran

IrEA
انجمن علمی اپیدمیولوژیست‌های ایران

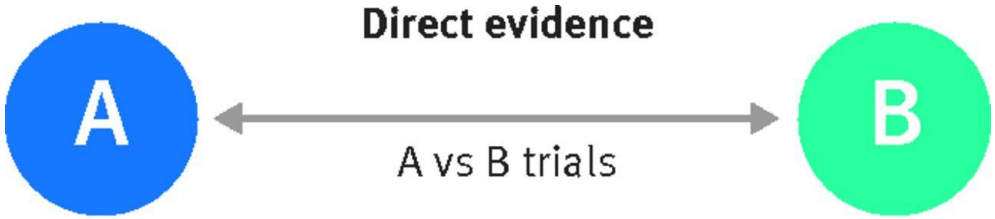
دانشگاه علوم پزشکی و خدمات بهداشتی، درمانی ایران

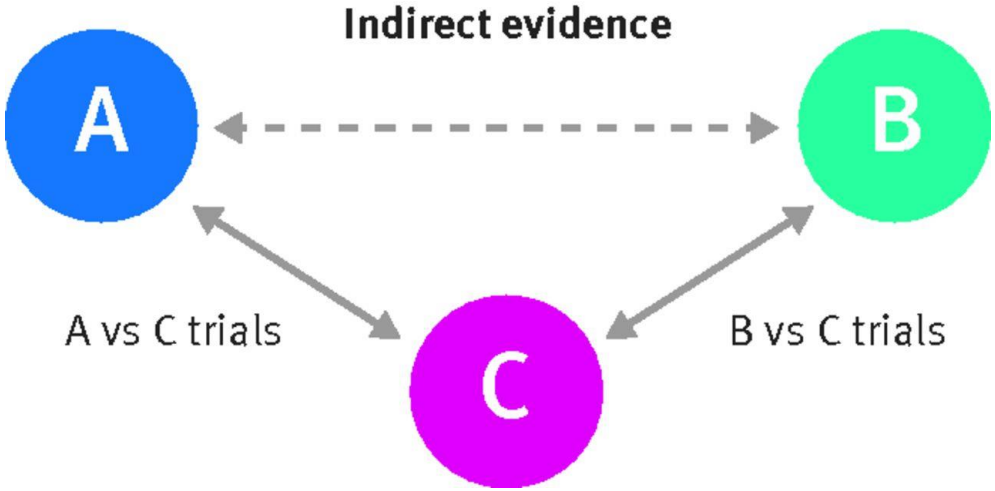
What is network meta-analysis?

Network meta-analysis (NMA), termed multiple treatment meta-analysis or mixed treatment comparisons (MTC), was developed as an extension of pairwise meta-analysis to allow comparisons of more than two interventions in a single, coherent analysis of all the relevant RCTs.

Main advantages:

consistent and precise estimates of the relative effects of all interventions compared with every other in a single analysis using both direct and indirect evidence.


Direct evidence
A
B
A vs B trials


Indirect evidence
A
B
A vs C trials
C
B vs C trials

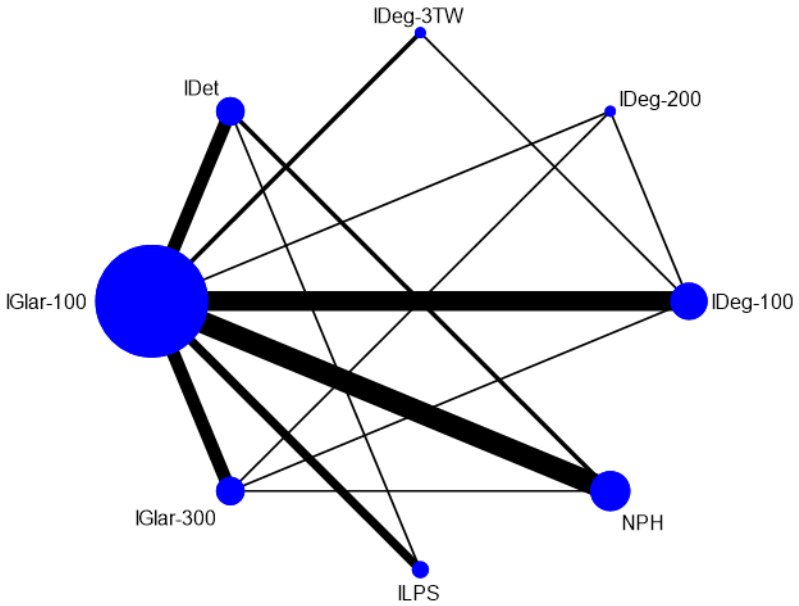


Figure: Network map of direct comparisons in randomized clinical trials related to investigating the effect of eight basal insulins on changes in HbA1c for type 2 diabetes.

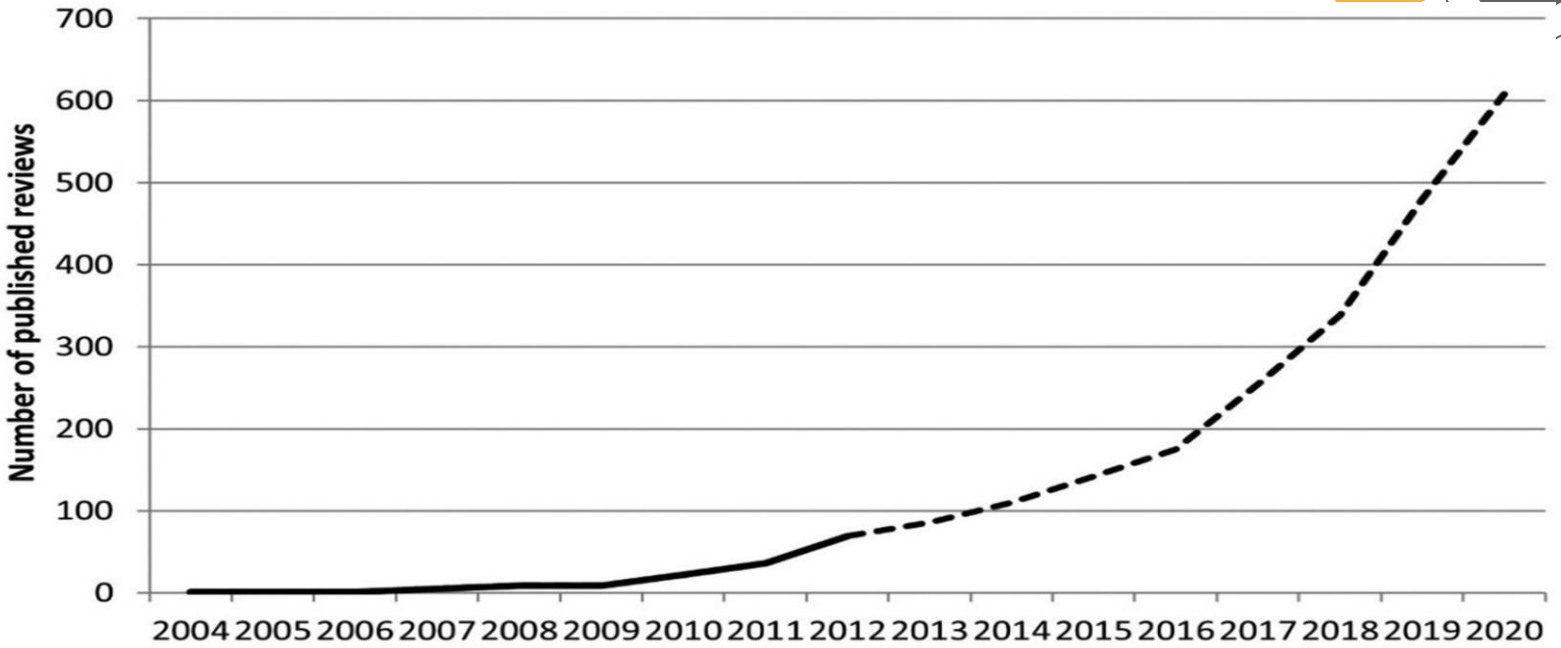
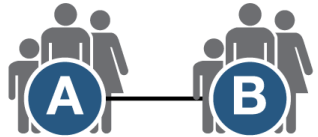
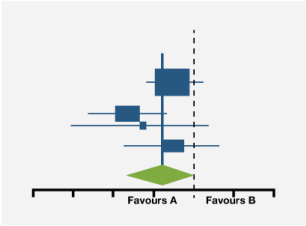


Figure: Estimate for the number of published network meta-analyses 2004 to 2020

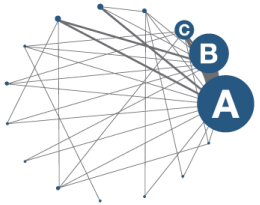
Network Meta-analysis – Knowledge Translation Program



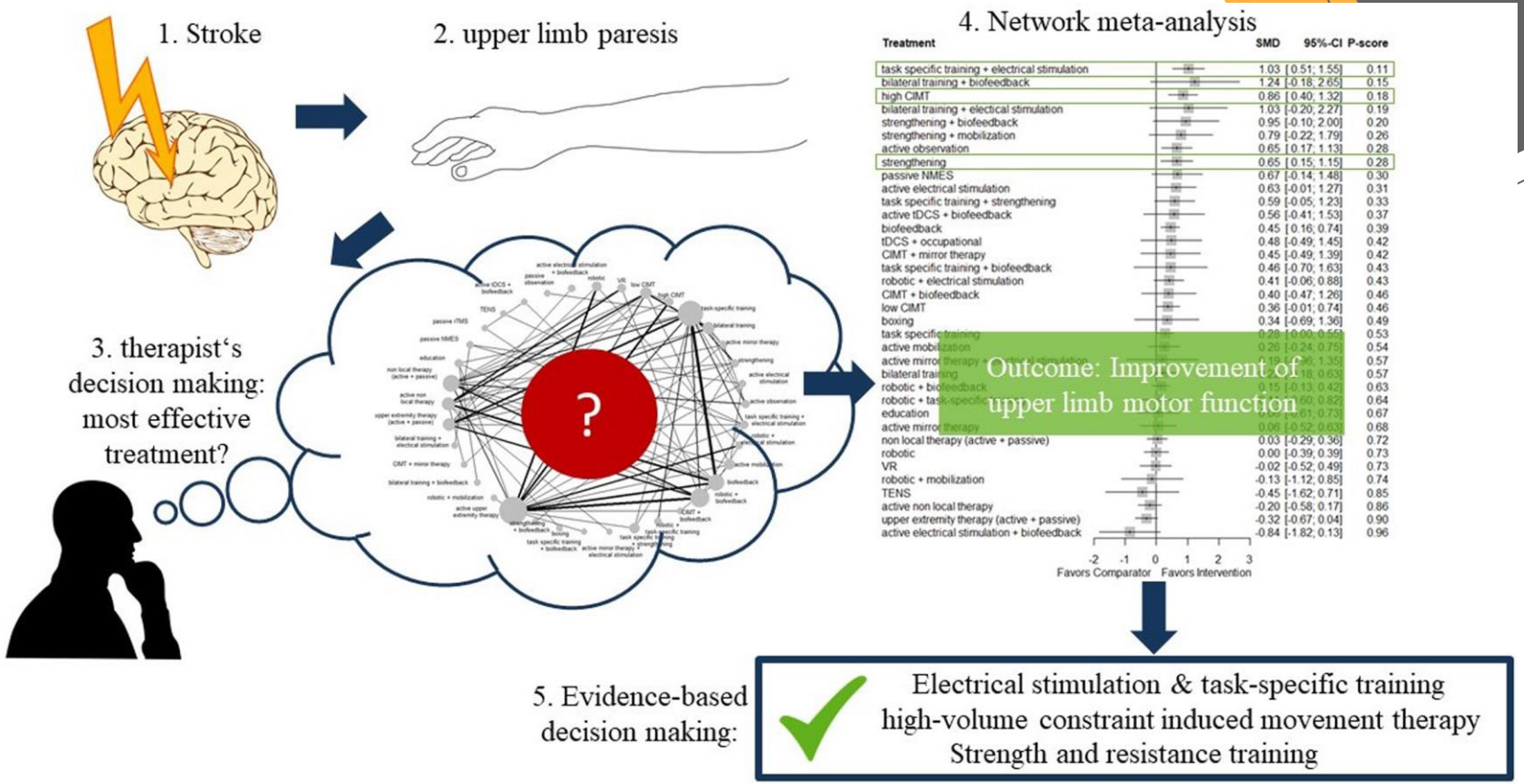
Direct evidence from a trial



Meta-analysis of 4 trials for A vs. B

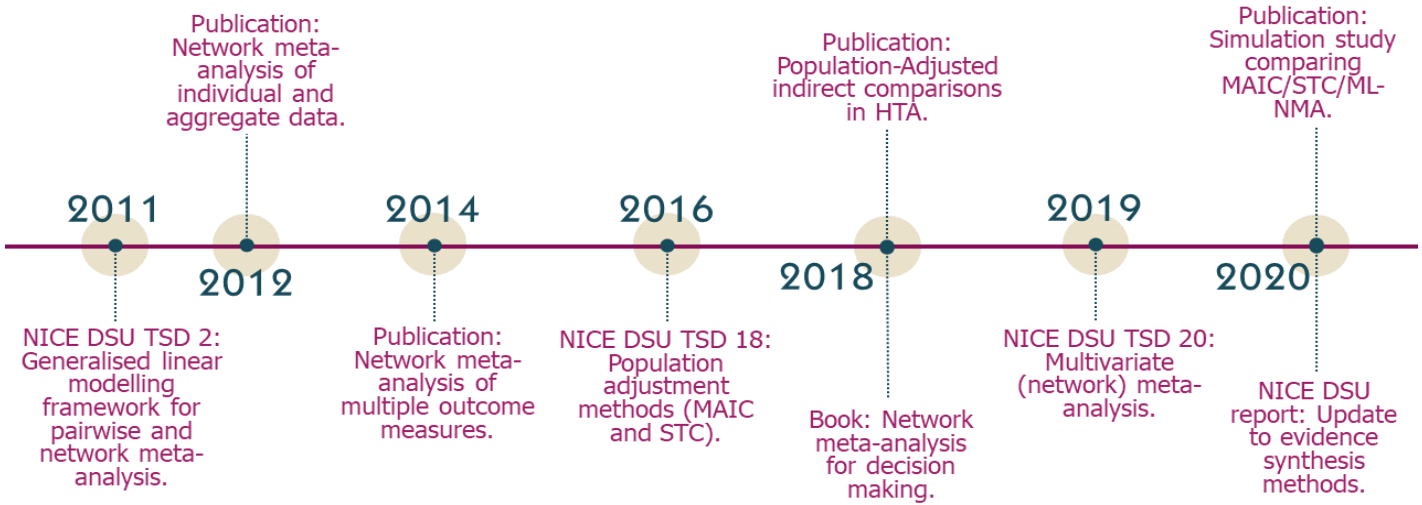


Network meta-analysis of multiple trials and interventions



Comparative Effectiveness of Upper Limb Exercise Interventions in Individuals With Stroke: A Network Meta-Analysis

Figure: A selection of key publications in evidence synthesis over the past 10 years, NICE



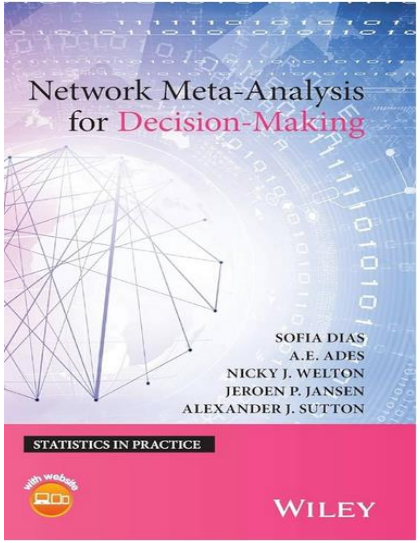
1. Dias S, Welton NJ, Sutton AJ, Ades A. NICE DSU technical support document 2: a generalised linear modelling framework for pairwise and network meta-analysis of randomised controlled trials. 2011.
2. Jansen JP. Network meta-analysis of individual and aggregate level data. 2012 (1759-2879 (Print)).
3. Achana FA, Cooper Nj Fau - Bujkiewicz S, Bujkiewicz S Fau - Hubbard SJ, Hubbard Sj Fau - Kendrick D, Kendrick D Fau - Jones DR, Jones Dr Fau - Sutton AJ, et al. Network meta-analysis of multiple outcome measures accounting for borrowing of information across outcomes. 2014 (1471-2288 (Electronic)).
4. David M. Phillippo AEA, Sofia Dias, Stephen Palmer, Keith R. Abrams, Nicky J. Welton. NICE DSU Technical Support Document 18: Methods for Population-Adjusted Indirect Comparisons in Submissions to NICE. Report by the Decision Support Unit. 2016.
5. Phillippo DM, Ades AE, Dias S, Palmer S, Abrams KR, Welton NJ. Methods for Population-Adjusted Indirect Comparisons in Health Technology Appraisal. 2018 (1552-681X (Electronic)).
6. Dias S, Ades AE, Welton NJ, Jansen JP, Sutton AJ. Network meta-analysis for decision-making: John Wiley & Sons; 2018.
7. Bujkiewicz S, Achana, F, Papanikos, T, et al. NICE DSU Technical Support Document 20: Multivariate meta-analysis of summary data for combining treatment effects on correlated outcomes. 2019.
8. Phillippo DA-O, Dias SA-O, Ades AE, Welton NJ. Assessing the performance of population adjustment methods for anchored indirect comparisons: A simulation study. 2020 (1097-0258 (Electronic)).
9. Welton NJ PD, Owen R, Jones H, Dias S, Bujkiewicz S et al. . NICE Decision Support Unit: CHTE2020 sources and synthesis of evidence: update to evidence synthesis methods. 2020:p98.

Review Article

Network Meta-analysis to Synthesize Evidence for Decision Making in Cardiovascular Research

Leonardo Roever[1] and Giuseppe Biondi-Zoccai[2,3]

Universidade Federal de Uberlândia – Departmento de Pesquisa Clínica[1], Uberlândia, MG - Brazil; Department of Medico-Surgical Sciences and Biotechnologies, Sapienza University of Rome[2], Latina – Italy; Department of AngioCardioNeurology, IRCCS Neuromed[3], Pozzilli – Italy



Some Published Network meta-analyses

RESEARCH

OPEN ACCESS

Check for updates

Comparative efficacy of interventions for reducing symptoms of depression in people with dementia: systematic review and network meta-analysis

Jennifer A Watt,[1,2] Zahra Goodarzi,[3,4,5] Areti Angeliki Veroniki,[1,6,7] Vera Nincic,[1] Paul A Khan,[1] Marco Ghassemi,[1] Yonda Lai,[1] Victoria Treister,[1] Yuan Thompson,[1] Raphael Schneider,[8,9,10] Andrea C Tricco,[1,11] Sharon E Straus[12,11]

For numbered affiliations see end of the article.

Correspondence to: J A Watt jennifer.watt@utoronto.ca (or @jennamnwatt on Twitter; ORCID 0000-0002-5296-6013)

Additional material is published online only. To view please visit the journal online.

Cite this as: *BMJ* 2021;372:n532 http://dx.doi.org/10.1136/bmj.n532

Accepted: 15 February 2021

ABSTRACT

OBJECTIVE

To describe the comparative efficacy of drug and non-drug interventions for reducing symptoms of depression in people with dementia who experience depression as a neuropsychiatric symptom of dementia or have a diagnosis of a major depressive disorder.

DESIGN

Systematic review and meta-analysis.

data posed the greatest risk to review findings. In the network meta-analysis of studies including people with dementia without a diagnosis of a major depressive disorder who were experiencing symptoms of depression (213 studies; 25 177 people with dementia; between study variance 0.23), seven interventions were associated with a greater reduction in symptoms of depression compared with usual care: cognitive stimulation (mean difference −2.93, 95% credible interval −4.35 to −1.52), cognitive stimulation combined with a cholinesterase inhibitor

Review > BMJ. 2017 Nov 28:359:j5058. doi: 10.1136/bmj.j5058.

Oral anticoagulants for prevention of stroke in atrial fibrillation: systematic review, network meta-analysis, and cost effectiveness analysis

José A López-López [1], Jonathan A C Sterne [2 3], Howard H Z Thom [1], Julian P T Higgins [1 3], Aroon D Hingorani [4], George N Okoli [1], Philippa A Davies [1 5], Pritesh N Bodalia [6 7], Peter A Bryden [1], Nicky J Welton [1 3], William Hollingworth [1], Deborah M Caldwell [1], Jelena Savović [1 5], Sofia Dias [1], Chris Salisbury [1], Diane Eaton [8], Annya Stephens-Boal [9], Reecha Sofat [4]

Meta-Analysis > Lancet. 2019 Sep 14;394(10202):939-951. doi: 10.1016/S0140-6736(19)31135-3. Epub 2019 Jul 11.

Comparative efficacy and tolerability of 32 oral antipsychotics for the acute treatment of adults with multi-episode schizophrenia: a systematic review and network meta-analysis

Maximilian Huhn [1], Adriani Nikolakopoulou [2], Johannes Schneider-Thoma [3], Marc Krause [4], Myrto Samara [3], Natalie Peter [3], Thomas Arndt [3], Lio Bäckers [3], Philipp Rothe [5], Andrea Cipriani [6], John Davis [7], Georgia Salanti [2], Stefan Leucht [3]

FULL TEXT LINKS

full text provider logo

FREE Full text PMC

ACTIONS

Cite

Collections

Meta-Analysis > Lancet. 2022 Jul 16;400(10347):170-184. doi: 10.1016/S0140-6736(22)00878-9.

Comparative effects of pharmacological interventions for the acute and long-term management of insomnia disorder in adults: a systematic review and network meta-analysis

Franco De Crescenzo [1], Gian Loreto D'Alò [2], Edoardo G Ostinelli [1], Marco Ciabattini [3], Valeria Di Franco [4], Norio Watanabe [5], Ayse Kurtulmus [6], Anneka Tomlinson [1], Zuzana Mitrova [7], Francesca Foti [8], Cinzia Del Giovane [9], Digby J Quested [10], Phil J Cowen [10], Corrado Barbui [11], Laura Amato [7], Orestis Efthimiou [12], Andrea Cipriani [13]

FULL TEXT LINKS

full text provider logo

ACTIONS

Cite

Collections

SHARE

Thanks

Mohsen Dehghani, PhD
Assistant Professor of Epidemiology
Mashhad University of Medical Sciences
(MUMS), Mashhad, Iran
mohsendehghani.ir@yahoo.com