Efficacy and Effectiveness in Interventions: The Case of Acupuncture

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Acupuncture Components

- Needling components (i.e., depth, stimulation, location)
- Specific (acupuncture theory-related) non-needling components that are traditionally considered to have therapeutic value, for example, in Chinese Medicine the physical components such as palpation.
- Generic, nonspecific non-needling components that are not unique to acupuncture treatments, such as belief and expectancy of the practitioner and patient, therapeutic setting, time and attention.

Langevin et al eCAM 2011

Comparative Effectiveness Research

- Generation and synthesis of evidence that compares the benefits and harms of alternative methods with the purpose to assist stakeholders to make informed decisions[1]
- Broad spectrum of study designs[2]
  - e.g. Pragmatic Trials [3]
    - Randomized studies
    - Less narrow eligibility criteria
    - Less standardized treatment protocol
    - Patient centered outcomes

[1]Institute of Medicine (IOM) 2009, USA, [2]Tunis et al Stat Med 2010, [3]Zwarenstein et al BMJ 2008

Practical Clinical Trials

Increasing the Value of Clinical Research
for Decision Making in Clinical and Health Policy

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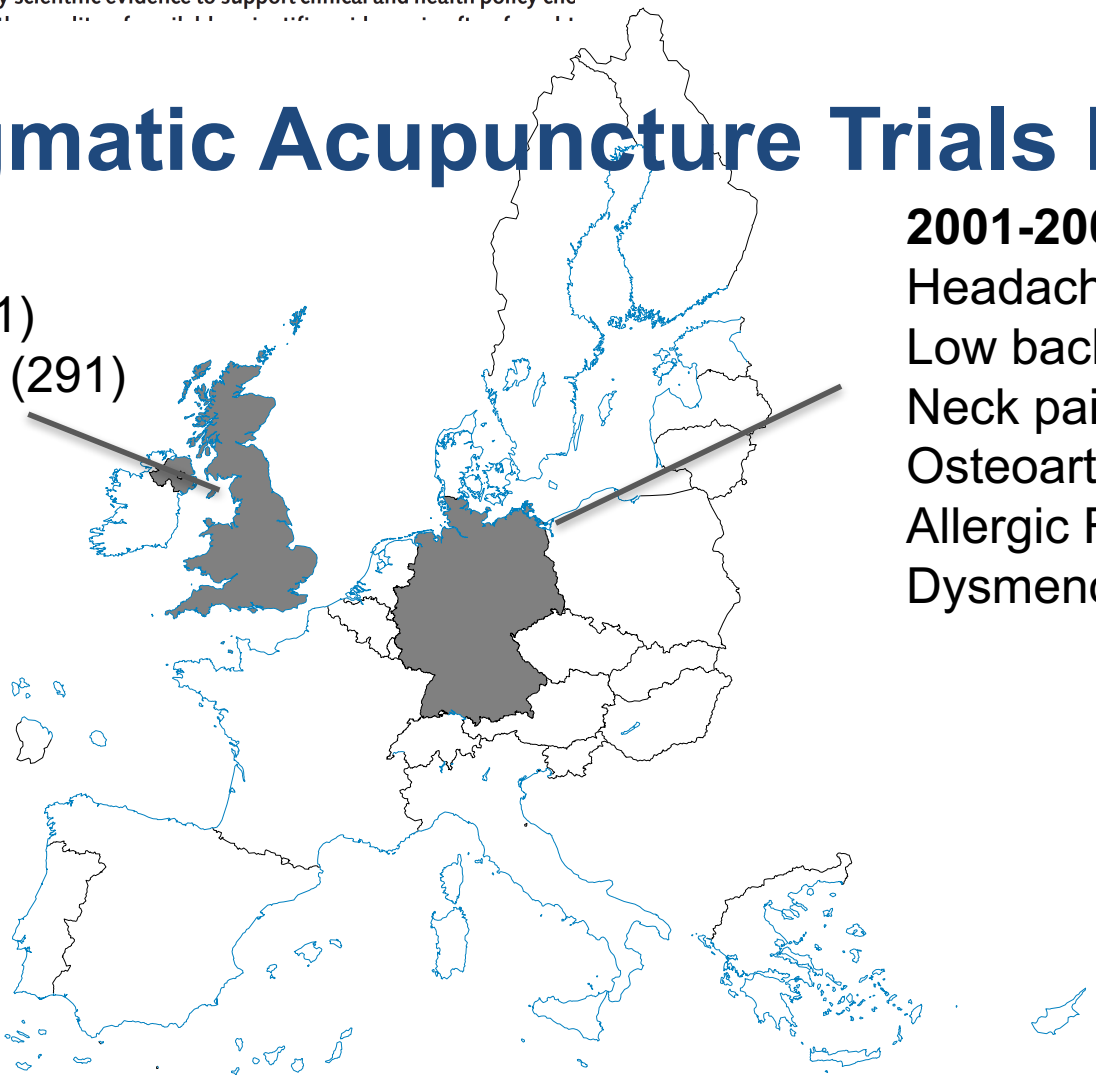
Decision makers in health care are increasingly interested in u
quality scientific evidence to support clinical and health policy cho

JAMA. 2003;290:1624-1632

Early Pragmatic Acupuncture Trials Europe

1999-2001
Headache (401)
Low back pain (291)



2001-2004
Headache (3182)
Low back pain (3093)
Neck pain (3766)
Osteoarthritis (712)
Allergic Rhinitis (981)
Dysmenorrhea (208)

Vickers et al BMj 2004, Thomas et al BMJ 2005, Witt CM et al, Am J Epi 2006; Witt CM Arthritis&Rheumatism 2006, Witt CM et al, Pain 2006; Witt CM et al, Am J Obstet Gynecol 2008, Jena et al Cephalalgia 2008, Brinkhaus et al Ann Allerg 2008

Definitions

- **‘Efficacy’*** refers to the extent to which a specific intervention is beneficial under ideal conditions.
- **‘Effectiveness’*** is a ‘measure of the extent to which a specific intervention when deployed in the field in routine care does what it is intended to do for a specific population.

*Last J, Spasoff, RA, Harris S: A dictionary of epidemiology. Oxford University Press, 2001.

Which Trial When?

- **Randomized Controlled Trial**
    - Specific effect (e.g. single intervention)
    - Excluding as much bias as possible
    - Efficacy: knowing if it works in a controlled environment
- **Pragmatic (Randomized) Trial**
    - Overall effect (e.g. single and complex interventions)
    - Effectiveness: knowing if it works in routine care (typical patients, typical providers)

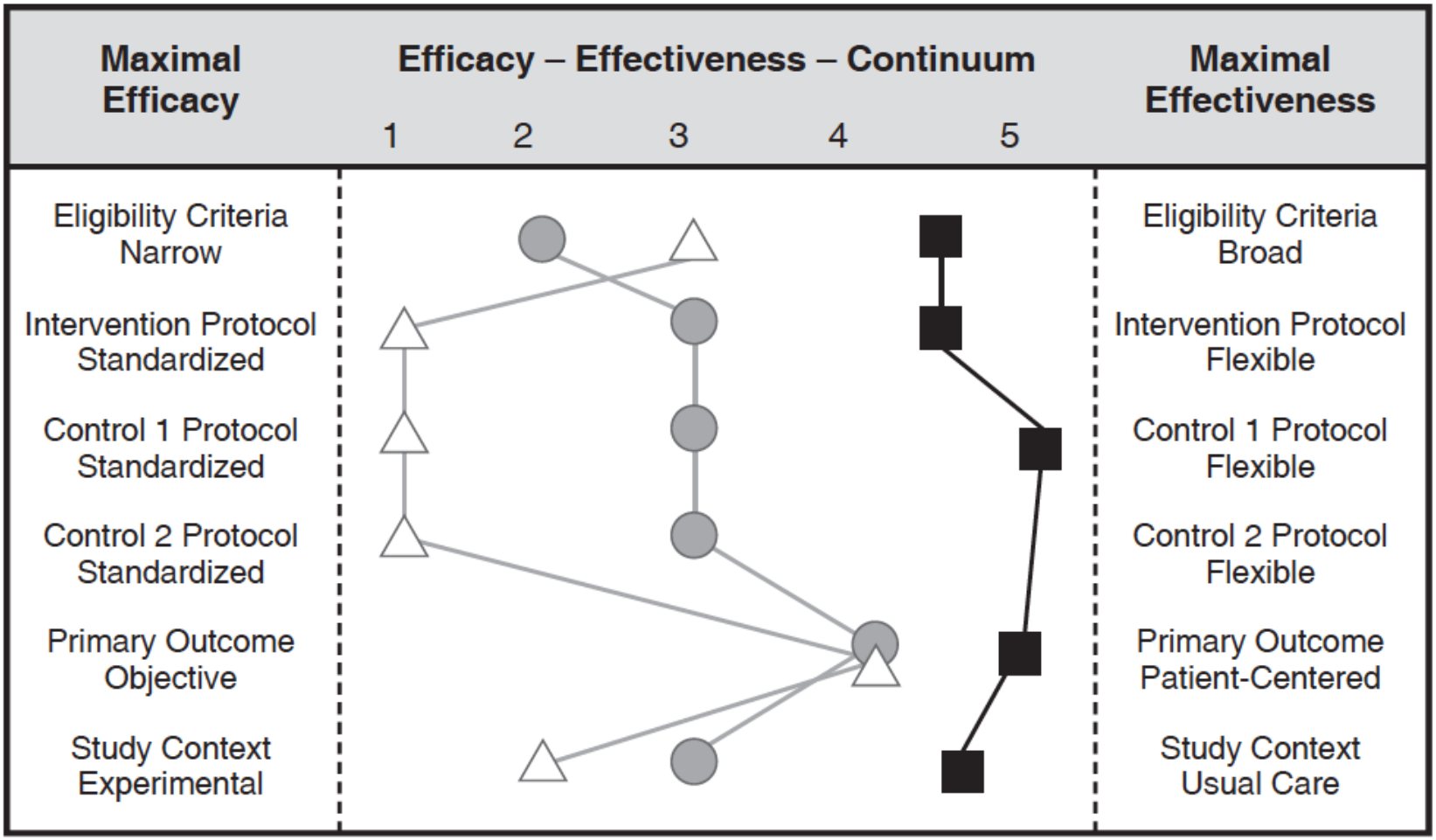
➔Both is important

Efficacy-Effectiveness-Continuum

Max. Efficacy		Max. Effectiveness
eligibility criteria **narrow**	EFFICACY-EFFECTIVENESS CONTINUUM	eligibility criteria **broad**
treatment protocol **standardized**		treatment protocol **flexible**
outcome **objective**		outcome **patient-centered**
study context **experimental**		study context **usual care**

Witt J of Ethnopharmacol 2013

Placement of 3 Migraine Trials in the Efficacy-Effectiveness Continuum



△ Li et al 2012 (specific acupuncture/control 1: sham-acupuncture/control 2: non-specific acupuncture)

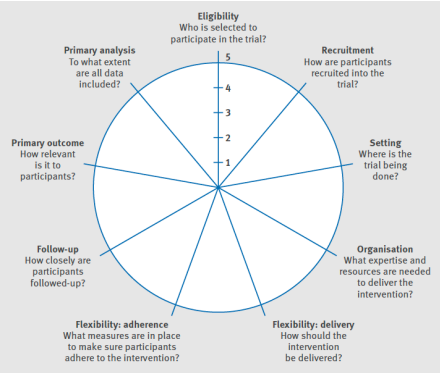
● Diener et al 2006 (acupuncture/control 1: sham-acupuncture/control 2: standard care)

■ Jena et al 2008 (acupuncture plus usual care/control 1: usual care only)

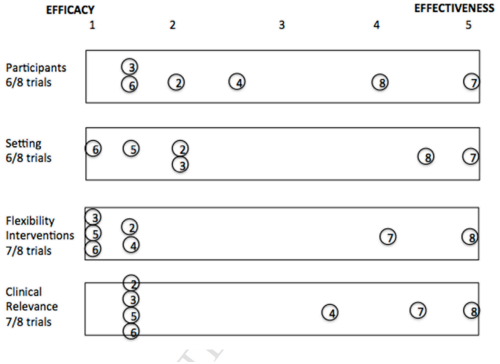
Witt Chin J Int Med 2012

Methodological Tools

- Trial Planning – PRECIS II[1]



- Systematic Reviews – RITES[2]

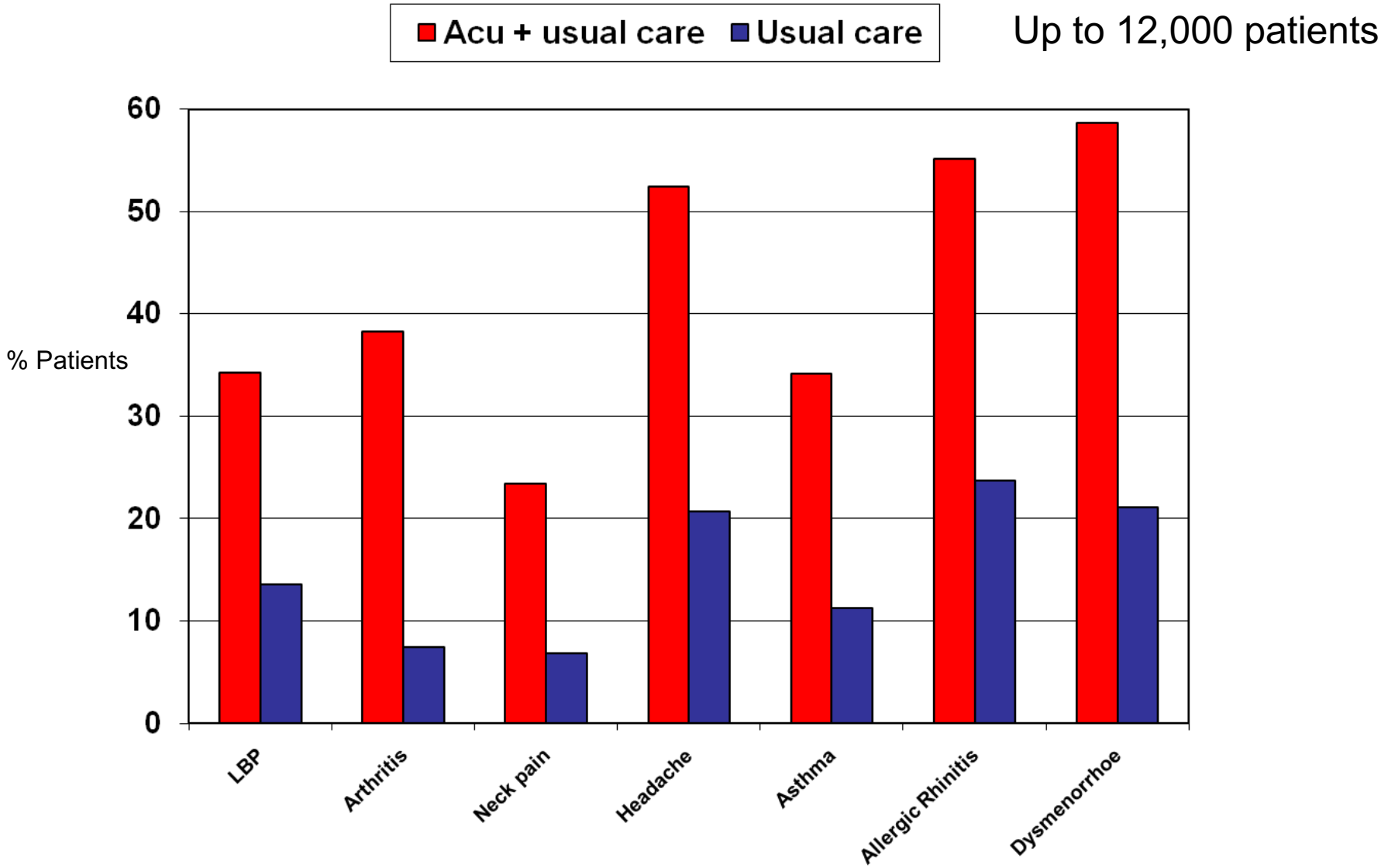


- Effectiveness Guidance Documents (e.g.[3,4])

[1]Loudon et al BMJ 2015, [2]Wieland et al Clin J Epi 2017,
[3]Witt et al BMC CAM 2012, [4]Witt et al Trials 2014

Acupuncture in Addition to Usual Care

Responderrates (≥ 50% improvement after 3 months)



Witt CM et al, Am J Epi 2006; Witt CM Arthritis&Rheumatism 2006, Witt CM et al, Pain 2006; Witt CM et al, Am J Obstet Gynecol 2008, Jena et al Cephalalgia 2008, Brinkhaus et al Ann Allerg 2008

Limitations

- Intervention not standardized
- No sham control – whole effect could be non-specific
- No blinding – data could be highly influenced by patients' and physicians' expectations

Example for Complex Intervention

Witt *et al. Trials* 2013, **14**:149
http://www.trialsjournal.com/content/14/1/149

STUDY PROTOCOL Open Access

Comparative effectiveness of a complex Ayurvedic treatment and conventional standard care in osteoarthritis of the knee – study protocol for a randomized controlled trial

Claudia M Witt[1,2*], Andreas Michalsen[1,3], Stephanie Roll[1], Antonio Morandi[4], Shivnarain Gupta[5], Mark Rosenberg[6], Ludwig Kronpaß[6,7], Elmar Stapelfeldt[3], Syed Hissar[8], Matthias Müller[9] and Christian Kessler[3]

Limitations II

- Intervention not standardized
- No sham control – whole effect could be non-specific
- No blinding – data could be highly influenced by patients' and physicians' expectations
- We don't know which part of the intervention contributes most to the outcome

Expectations

- Influences the acupuncture response (OR 1.6 for high vs. normal expectation)[1]
- 6 clusters of patient-doctor expectations (kappa > .90)[2]
- Review on expectations incl. outcomes[3]
- Need of valid measures :
  - Valid index instrument (for acupuncture EAT[4])
  - Inclusion as covariate in sensitivity analyses

[1]Linde, Witt et al. (2007) Pain, 264-71, [2]Barth, Schafroth, Witt (2016) Journal of Pain, 17, 685-693,
[3]Landolt et al Front Psychol 2017, [4]Witt & Barth

Conclusions

1. More effectiveness studies are needed to better reflect usual care
2. Non-blinding introduces relevant bias and measuring expectation might control for part of it, but better measures are needed