

Stroke Rehabilitation

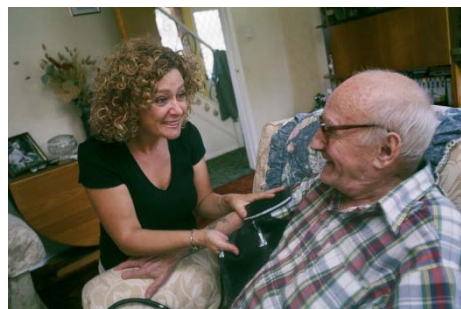
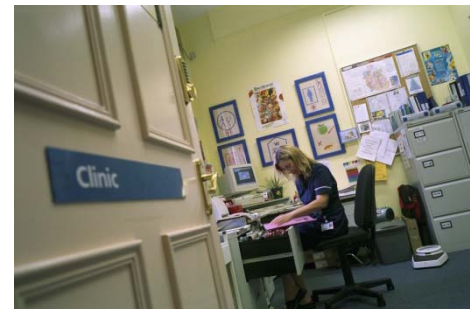
A National View

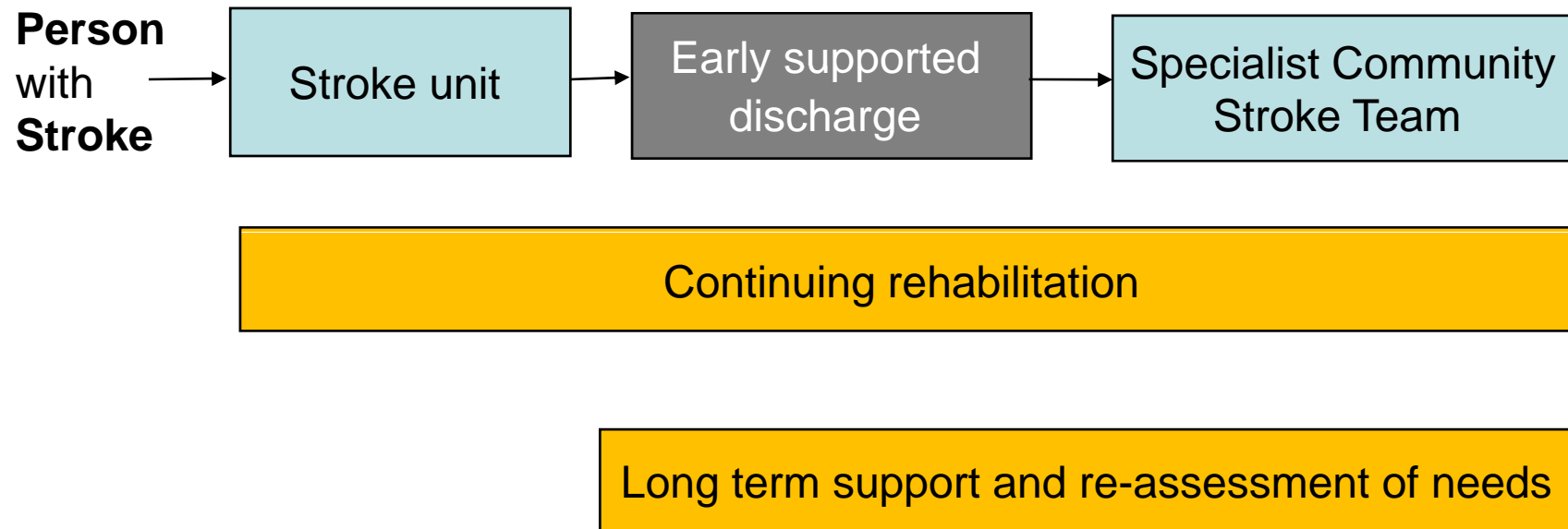
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NHS Stroke Improvement
Programme

Rehabilitation After Stroke





Stroke Rehabilitation Services

1. Stroke Units
2. Early Supported Discharge
3. Out Patient Stroke Services
4. Community Occupational Therapy

Stroke Interventions: Public Health Implications

| Intervention | Absolute Risk Reduction for death and dependency | Eligible proportion of stroke patients | Death and dependency avoided in all stroke |
|---------------------------|--|--|--|
| Stroke Unit | 5.6% | 100% | 5.6% |
| Early Supported Discharge | 5.5% | 40% | 2.2% |
| Aspirin <48h | 1.2% | 85% | 1.0% |
| rt-PA <3h | 13.1% | 10% | 1.3% |
| Hemicraniectomy <48h | 22.7% | 0.5% | 0.1% |

Adapted from Gilligan et al 2005

Stroke Unit Trialists' Collaboration

“Stroke patients who receive organised inpatient care in a Stroke Unit are more likely to be alive, independent, and living at home one year after the stroke.”

Cochrane Library 2006



What is organised Stroke Unit care?

All SUs

- Multidisciplinary meetings at least weekly to plan patient care
- Provision of information to patients about stroke
- Continuing education programmes for staff
- Formal links with patient and carer organisations
- Consultant physician with responsibility for stroke

Acute/Combined SUs

- Continuous physiological monitoring (ECG, oximetry, blood pressure)
- Access to scanning within 3 hours of admission
- Direct admission from A&E/front door
- Specialist ward rounds at least 5 times a week
- Acute stroke protocols/guidelines

Stroke Unit Care

- 23 trials
- Death at 1 year RR 0.86 (0.71-0.94)
- Death or dependence RR 0.78 (0.68-0.89)
- Death or institution RR 0.80 (0.71-0.90)

Independent of age, gender, severity

Stroke Rehabilitation Unit Evaluation

10 year Follow Up

At 10 years:

- Death RR 0.87 (0.78-0.97)
- Death or dependence RR 0.99 (0.94-1.05)
- Death or institution RR 0.91 (0.83-1.00)

All tended toward more favourable outcome for stroke unit participants.

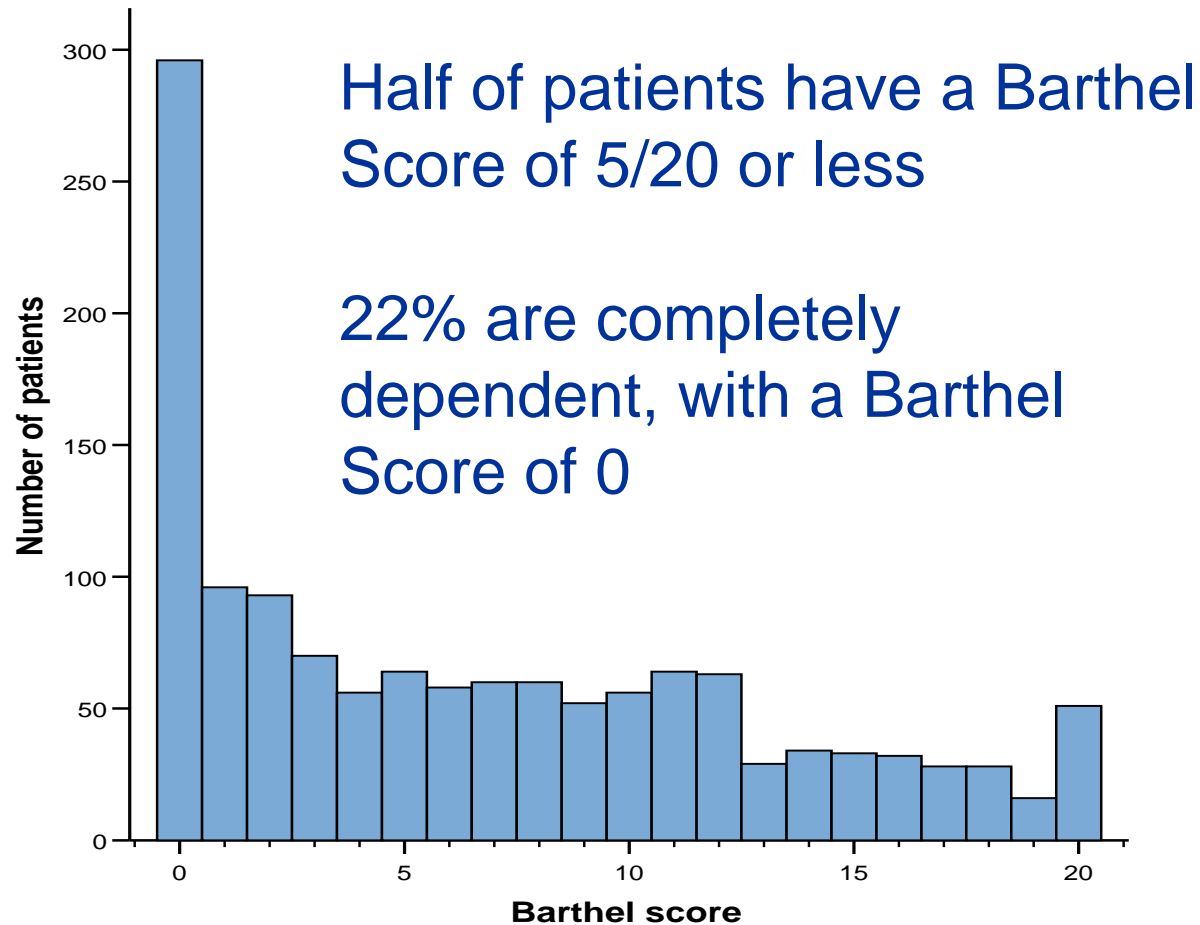
(Drummond et al, BMJ 2005)

Stroke Unit Workforce: Key facts

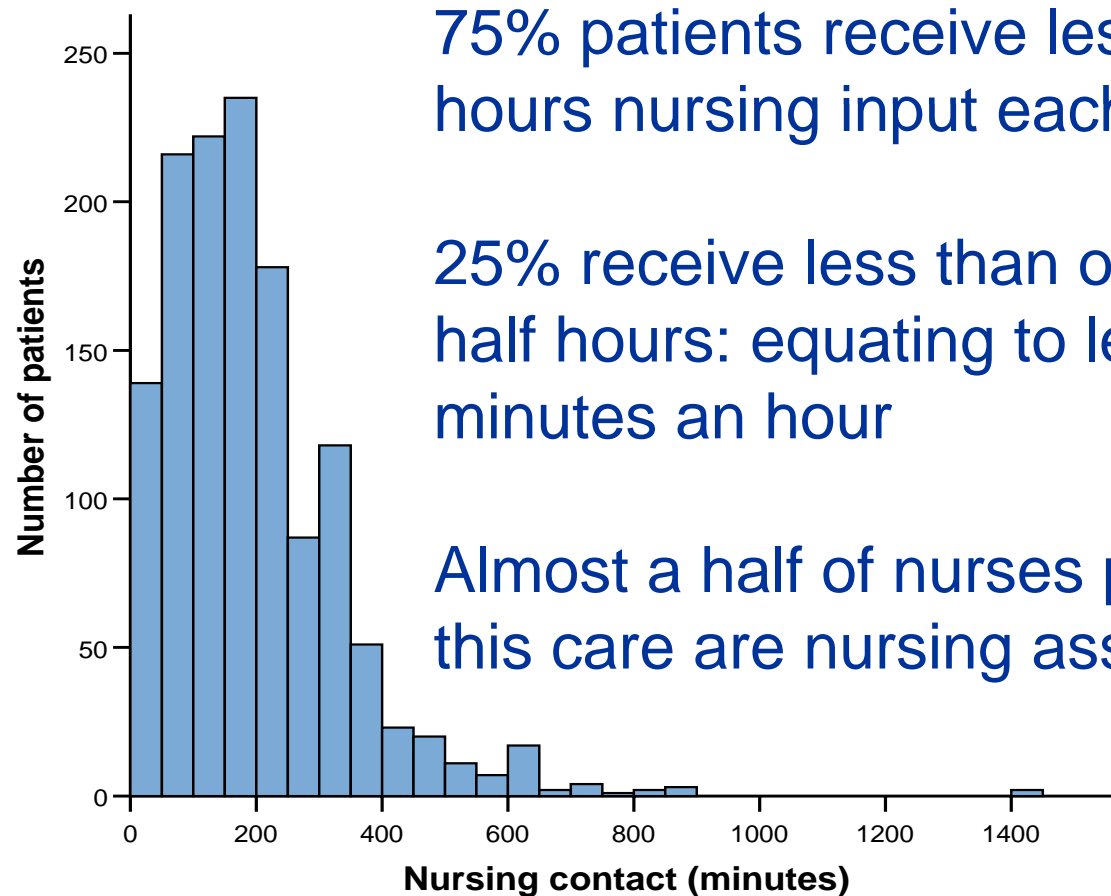
- Only 25% stroke units have adequate staff levels
- Patchy access to psychologists, dieticians and social care
- Only 20% recommended number of stroke physicians
- Until recently, no framework for nationally-recognised stroke-specialist courses or competences for nurses or AHPs
- Many staff in traditional unidisciplinary roles without training in leadership and effective teamworking



DH/RCP Survey of Staffing Levels and Patient Dependency in 92 English Stroke Units (1398 patients)



DH/RCP Survey of Staffing Levels and Patient Dependency in 92 English Stroke Units (1398 patients)



75% patients receive less than 4 hours nursing input each 24 hours

25% receive less than one and a half hours: equating to less than 4 minutes an hour

Almost a half of nurses providing this care are nursing assistants

DH/RCP Survey of Staffing Levels and Patient Dependency in 92 English Stroke Units

Proportion of patients receiving some contact from professions (%)

| Discipline | Units (no.) | Median | IQR |
|----------------------|-------------|--------|----------|
| Nursing | 85 | 100% | 100-100% |
| Physiotherapy | 85 | 74% | 59-90% |
| Occupational therapy | 85 | 46% | 33-63% |
| SLT | 85 | 25% | 9-41% |

DH/RCP Survey of Staffing Levels and Patient Dependency in 92 English Stroke Units (1398 patients)

Patient contact time for professions (minutes/day)

| Discipline | Patients (no.) | Median | IQR |
|----------------------|----------------|--------|--------|
| Nursing | 1338 | 170 | 90-250 |
| Physiotherapy | 897 | 40 | 30-60 |
| Occupational therapy | 614 | 45 | 20-60 |
| SLT | 328 | 30 | 20-45 |

Staff Establishment in English Stroke Units: Existing Levels

| Profession | No. Working Time Equivalents of each Profession per 10 Bed Ward | | | | | | |
|--------------------------------|---|----------------|------------|------------|-------------|-------------|-----------------|
| | SUTC* | NSA* | BASP – ASU | BASP – SRU | UCLan – ASU | UCLan – SRU | DH – Survey* |
| Nurses | 7-12 | 3.3 (2.9-3.7)^ | 8 | 10.1 | 8.5 | 12.8 | 10.9 (9.3-13.1) |
| Occupational Therapists | 0.6-1.7 (1-1.3) | 1 (0.7-1.3) | 0.7 | 0.6 | 0.3 | 1.2 | 1.3 (0.8-1.6) |
| Physiotherapists | 1.2-1.7 (1-2) | 1.3 (0.9-1.6) | 0.9 | 0.8 | 2 | 3 | 1.7 (1.2-2.1) |
| Speech and Language Therapists | 0.25-0.75 (0.2-0.6) | 0.3 (0.2-0.6) | 0.35 | 0.25 | 0.2 | 0.4 | 0.4 (0.2-0.6) |

*Median (IQR)

^Relates to number of staff on duty at a particular time per 10 bed unit

Staff Establishment in English Stroke Units: Aspirational Levels

| | No. Working Time Equivalents of each Profession per 10 Bed Ward | | | |
|--------------------------------|---|-----------|-------------|-------------|
| | Consensus Statements | UCLan ASU | UCLan – SRU | DH – Survey |
| Nurses | 12.5 | 12.00 | 11.59 | 12.9 |
| Occupational Therapists | 1 (ASU) 2 (SRU) | 2.56 | 2.89 | 3.3 |
| Physiotherapists | 3.74 (ASU) 4.67 (RSU) | 3.22 | 3.40 | 3.7 |
| Speech and Language Therapists | 1 | 1.89 | 1.14 | 1.4 |
| Psychologists | | 0.92 | 0.92 | |

StrokeImprovement

Early Supported Discharge

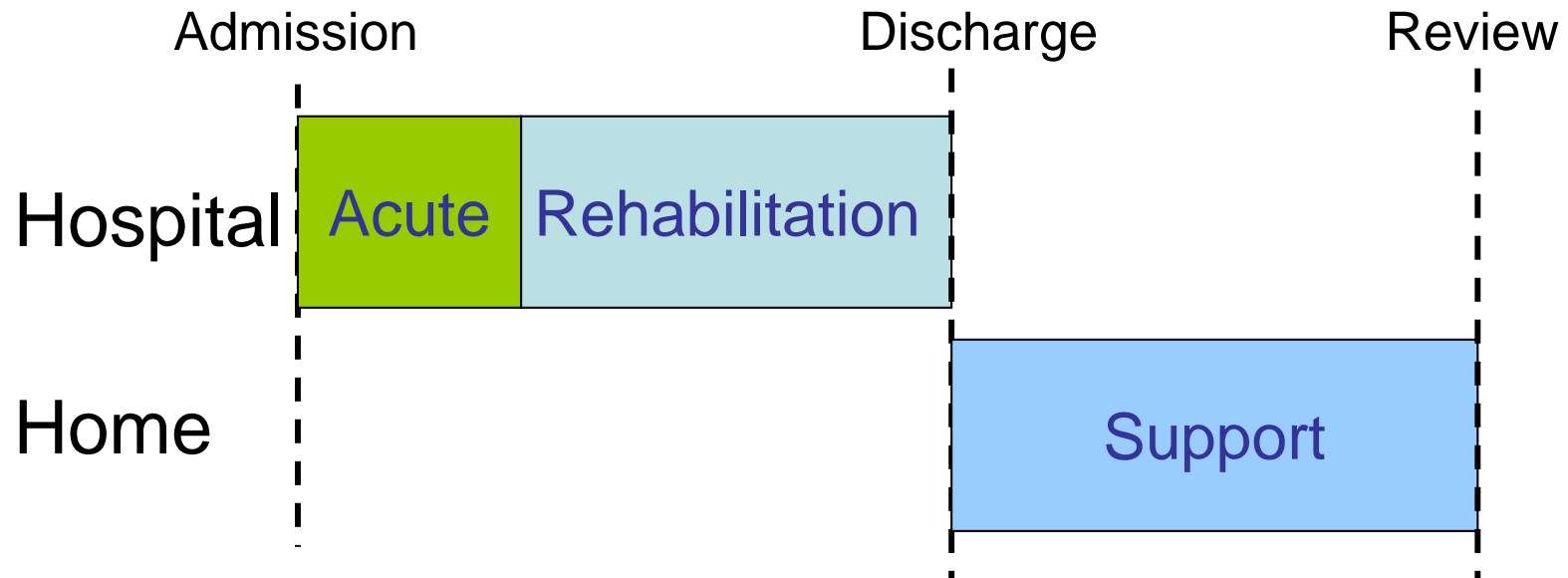
NHS Improvement 



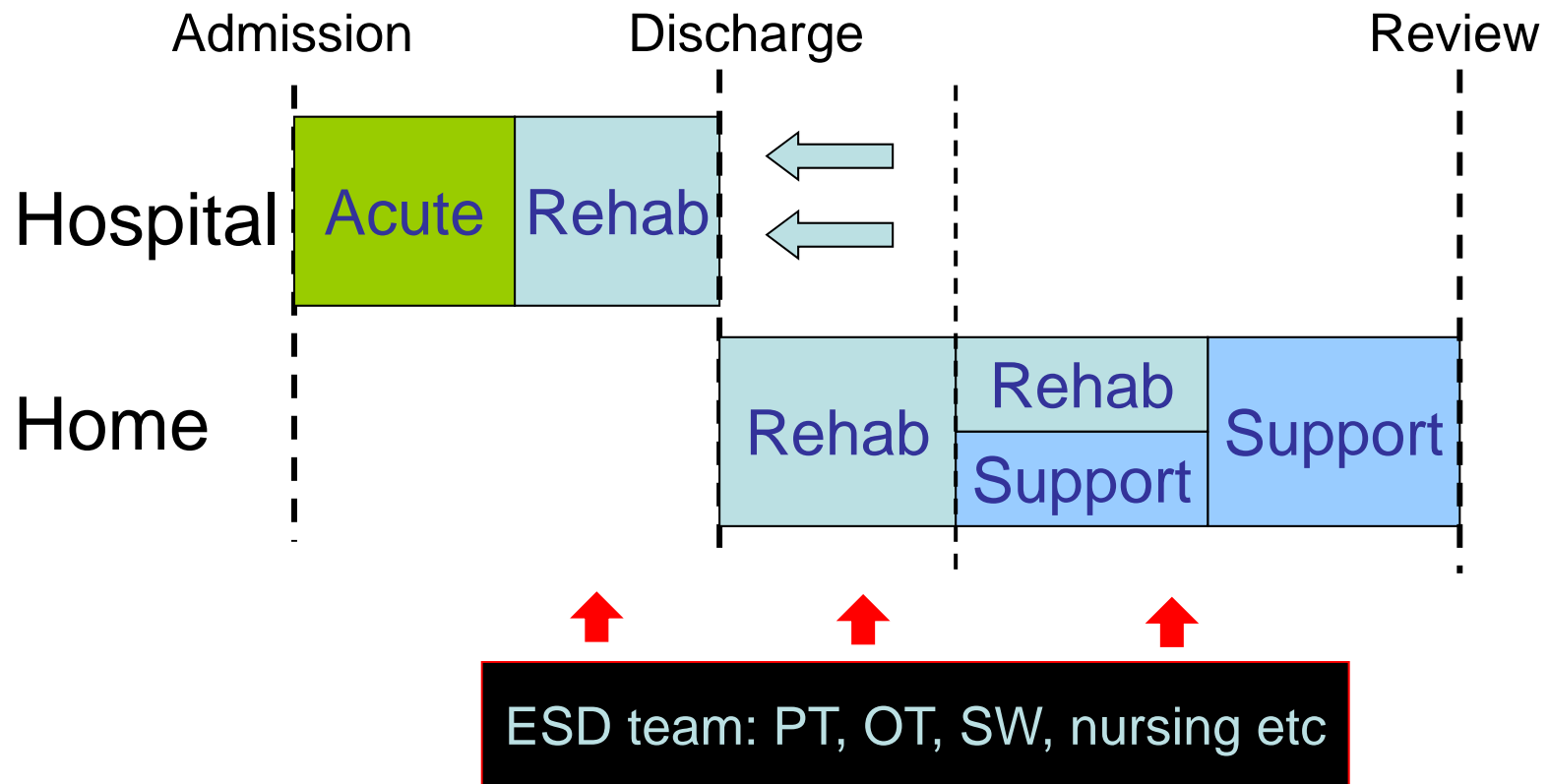
Early Supported Discharge Services for stroke patients: a meta-analysis of individual patient data.

Langhorne et al,
Lancet 2005

Conventional Stroke Services



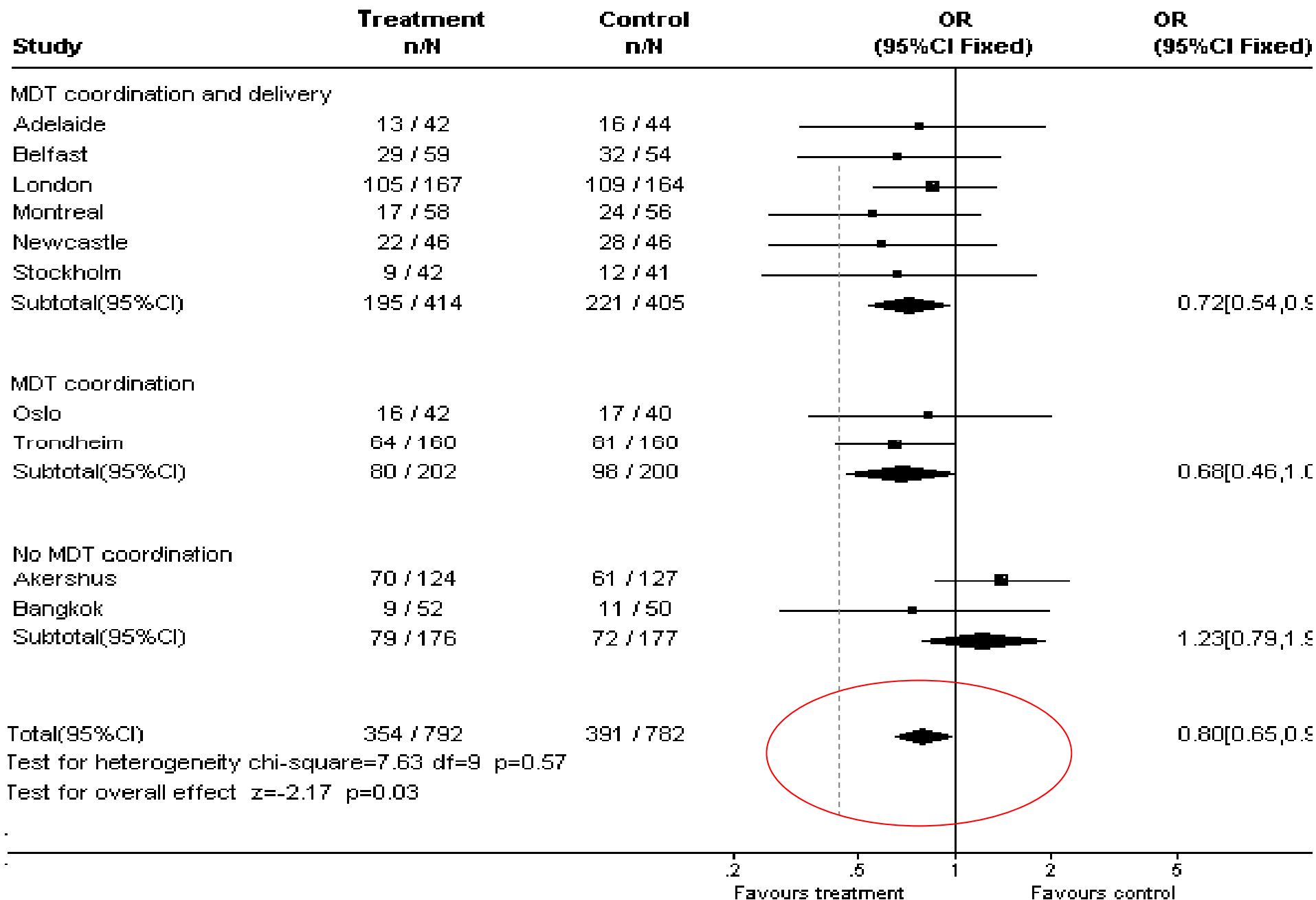
Early Supported Discharge (ESD)



Randomised trials of Early Supported Discharge services

- 12 completed randomised controlled trials
- Services aiming to accelerate discharge home and provide rehabilitation and/or support at home

Early supported discharge service vs Conventional care - Outcome Death or dependency



Early Supported Discharge services

- Can accelerate discharge home
- Not applicable to all stroke patients (40-50%)
- Economically viable
- Best results with ESD services
 - coordinated and provided by a multidisciplinary rehabilitation team and
 - targeted at mild-moderate stroke patients

Consensus statements: Team composition

- Team Composition
- Stroke specialist, multidisciplinary
- For 100 patients per year caseload:
 - OT (1.0) , Physio (1.0), SALT (0.4)
 - Physician (0.1), nurse (0-1.2), social worker (0-0.5),
 - Consensus not reached: *Rehab assistant*
- *Interpretation: role of assistant depends on model of rest of team and overall remit of team*

Consensus statements: Intervention

- Intervention
- Eligibility criteria
- Live safely at home, based on practicality and disability (Barthel score 10/20 to 17/20)
- Patients eligible for early supported discharge would be able to transfer safely from bed to chair **i.e. can transfer safely with one with an able carer, or independently if living alone.**
- Both hospital staff and ESD team staff should identify patients for ESD

Outpatient Service Trialists

To assess the effects of therapy based rehabilitation services targeted towards stroke patients resident in the community *within one year of stroke onset*

The exact form (e.g. domiciliary, day hospital, outpatient clinic) was recorded but not used as an exclusion criterion.

Compared with conventional care (i.e. normal practice or no routine intervention)

- 14 trials
- Heterogeneous interventions
- Including 1617 patients

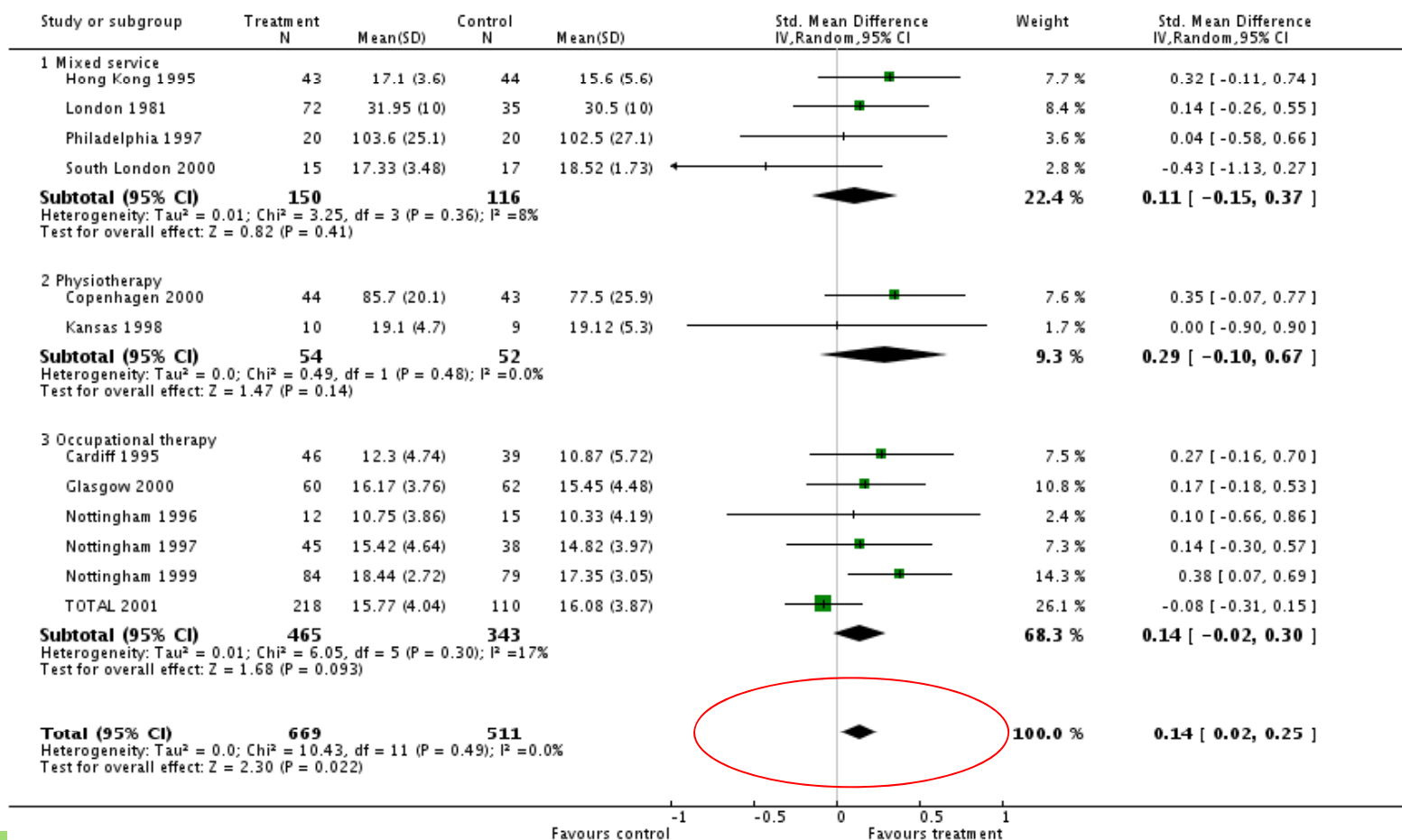
Outpatient Service Trialists

“Patients receiving rehabilitation at home within one year of stroke onset are more likely to have a better outcome, in terms of independence and achievement of maximum level of function in all aspects of daily life.”

Lancet 2004; 363: 352-356

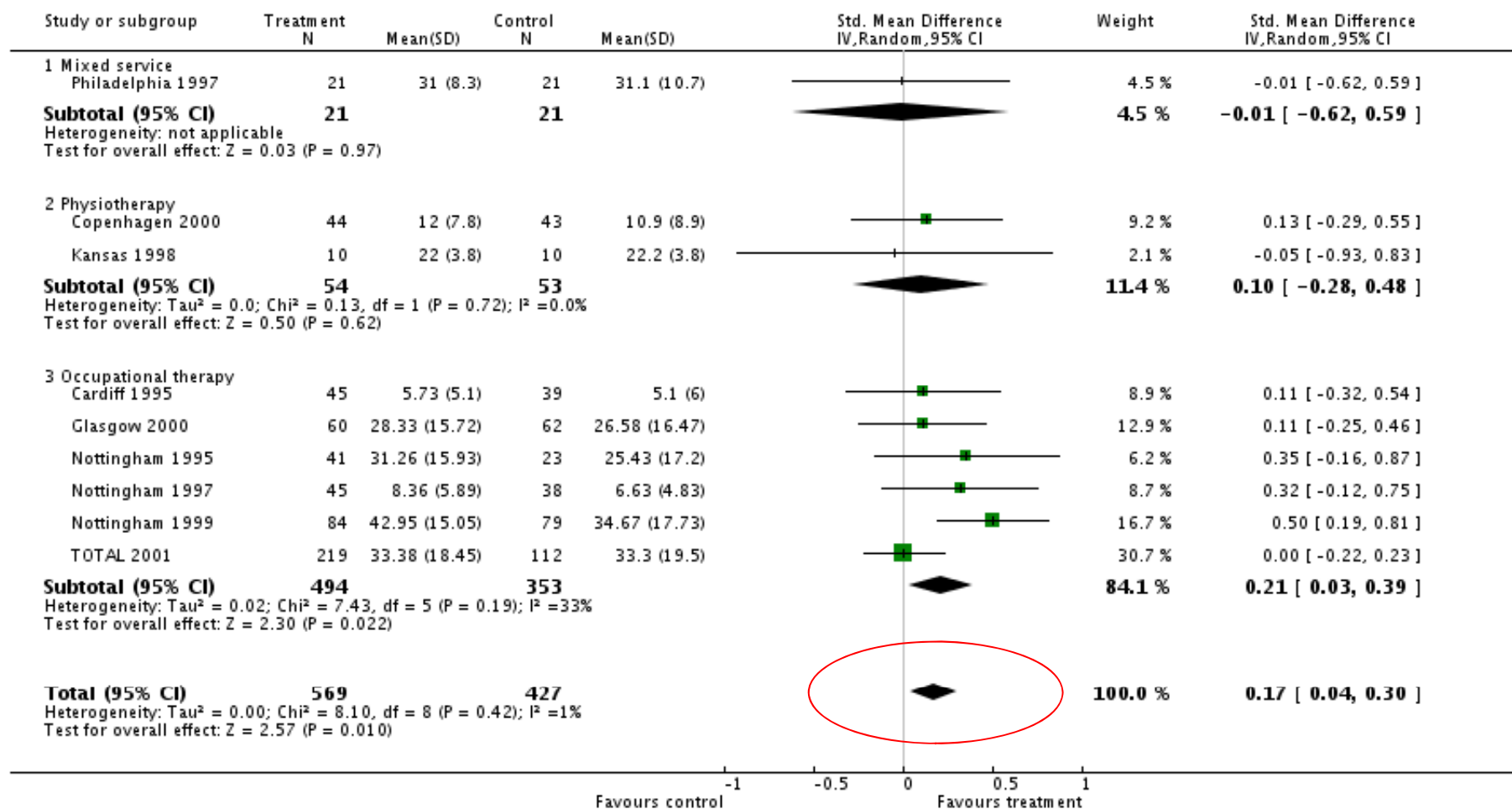
StrokeImprovement Outpatient Service Trialists Personal ADL

Review: Therapy-based rehabilitation services for stroke patients at home
Comparison: 1 Therapy-based rehabilitation versus no routine input
Outcome: 5 Activities of daily living score



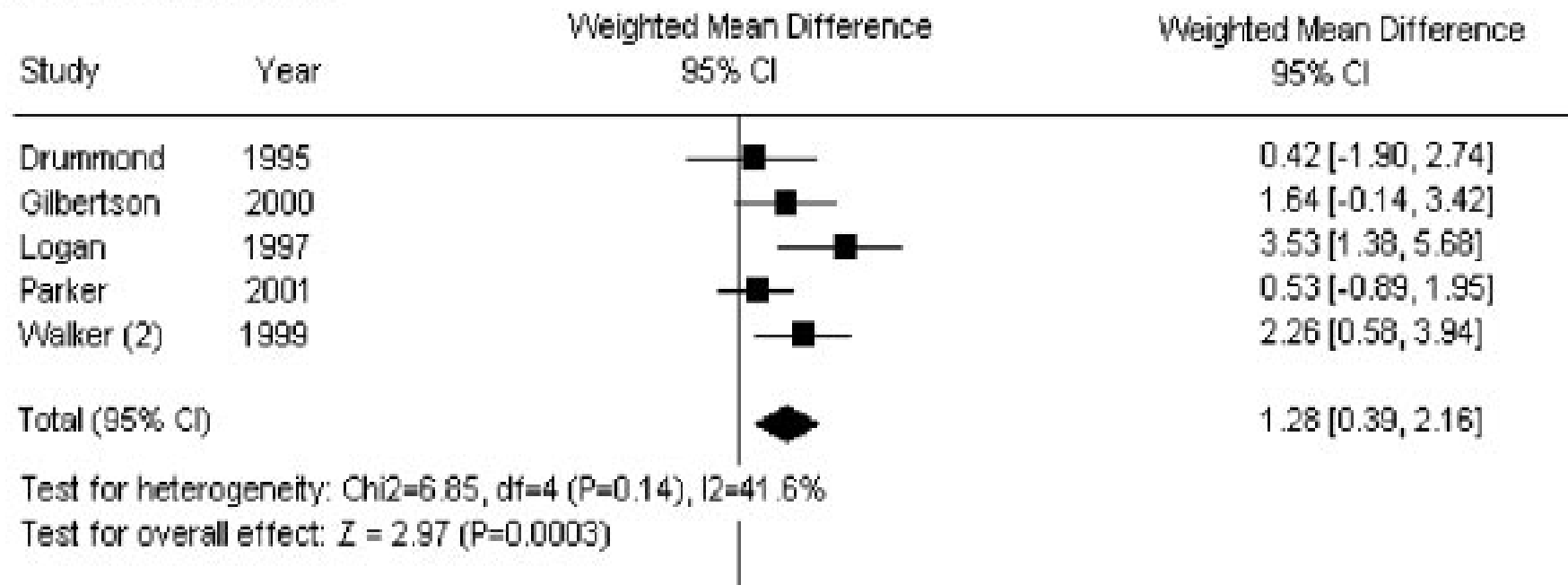
StrokeImprovement Outpatient Service Trialists Extended ADL

Review: Therapy-based rehabilitation services for stroke patients at home
Comparison: 1 Therapy-based rehabilitation versus no routine input
Outcome: 6 Extended activities of daily living scores



Individual Patient Data Meta-analysis of Community OT trials

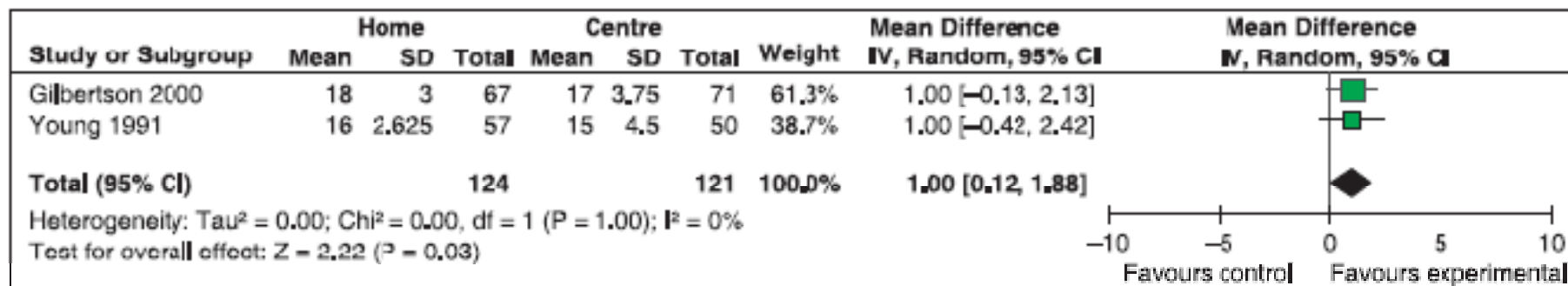
Nottingham Extended Activities of Daily Living at end of intervention



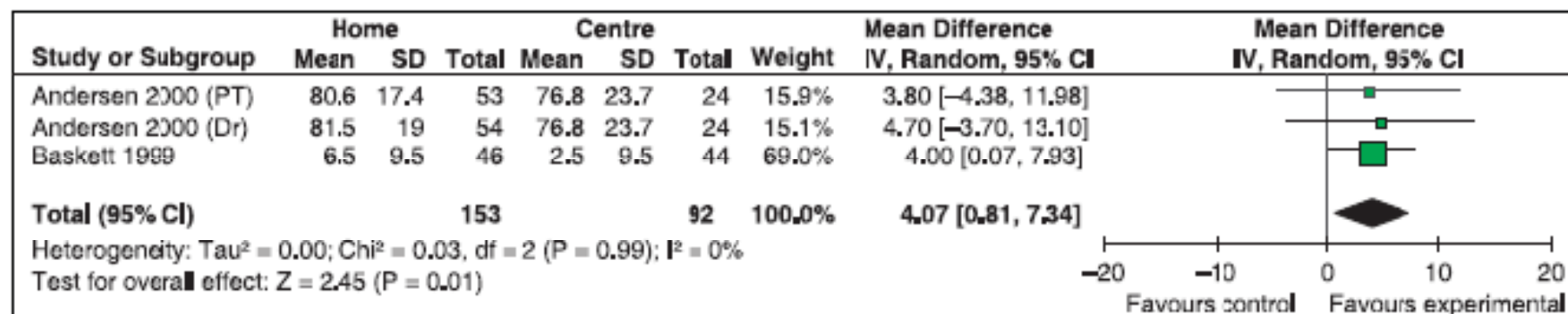
(Walker et al, Stroke 2004)

Home-Based or Centre-Based Rehabilitation for Community Dwellers?

Barthel Index at 6-8 weeks post-intervention



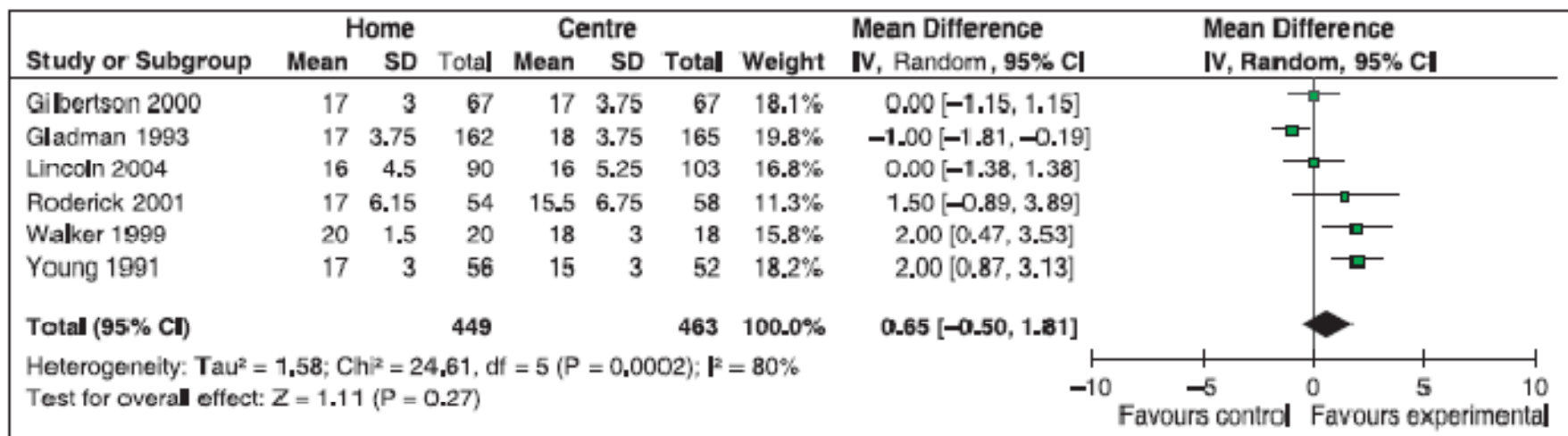
Barthel Index at 3-6 months post-intervention



Hillier and Inglis-Jassiem, 2010, Int J Stroke

Home-Based or Centre-Based Rehabilitation for Community Dwellers?

Barthel Index at 6/12 post-intervention



Effects of Augmented Exercise Therapy Time After Stroke

- 20 trials, n=2686
- Small but significant effect in ADL function in first 6 months after stroke
- 5% change in outcome in Barthel Index
- No ceiling effect for therapeutic intensity

Kwakkel et al, 2004

“Patients should be given the opportunity to repeatedly practice functional skills and activities”

RCP Stroke Clinical Guidelines 2004

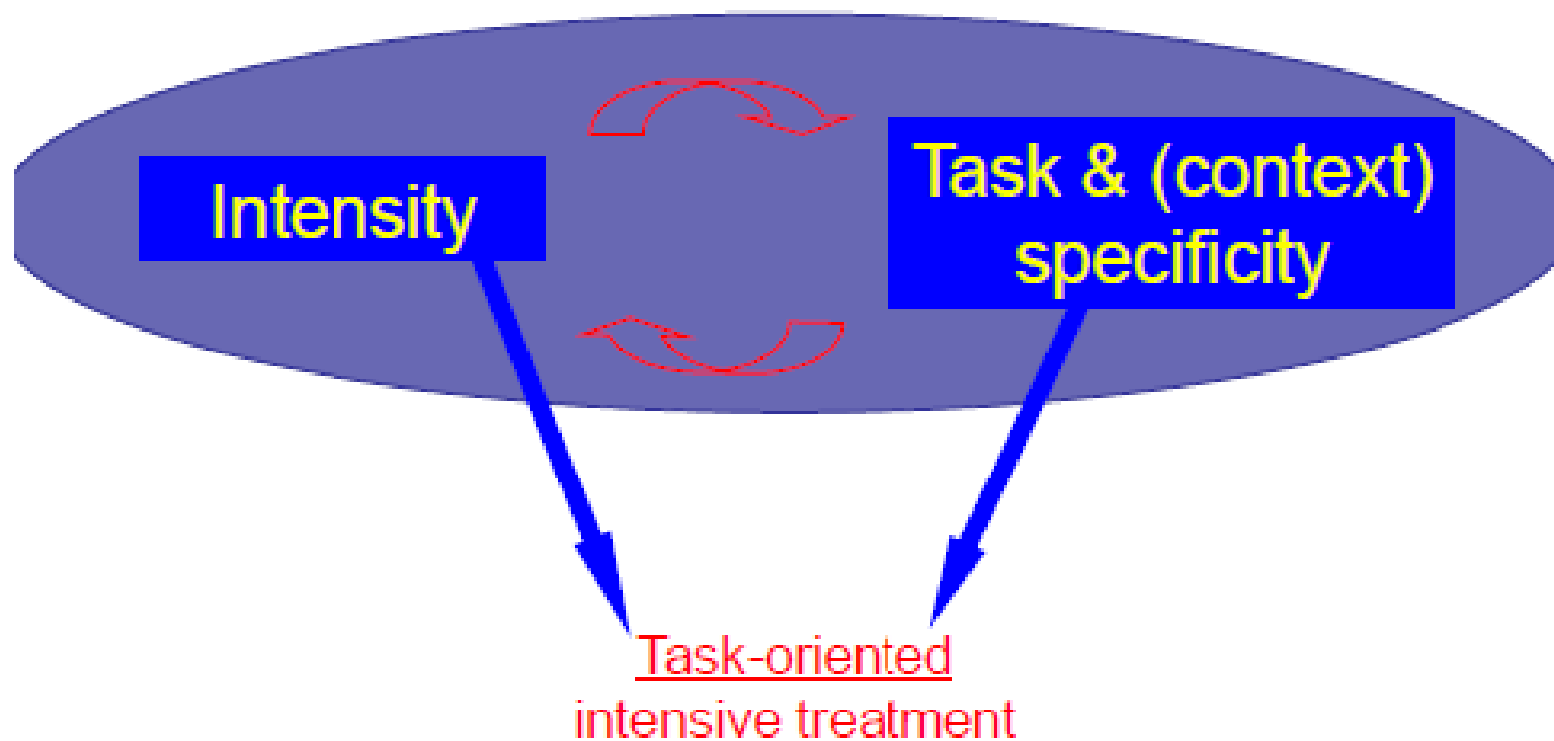
Results: Independence at 3 months

- Greater proportion of VEM patients were independent at three months than the Standard Care (SC) group
- Patients who underwent VEM were 3-4 times more likely to be independent at three months than SC patients

| Independence | Unadjusted OR (95%CI) | Adjusted OR (95%CI) |
|--------------------------------|--------------------------|------------------------|
| Modified Rankin Score (0-2) | 2.02 (0.89, 4.60) | 3.11(1.03, 9.33) |
| Barthel Index (18-20) | 2.90 (1.24, 7.15) | 4.41 (1.36,14.32) |

*A Very Early Rehabilitation Trial (AVERT) phase II

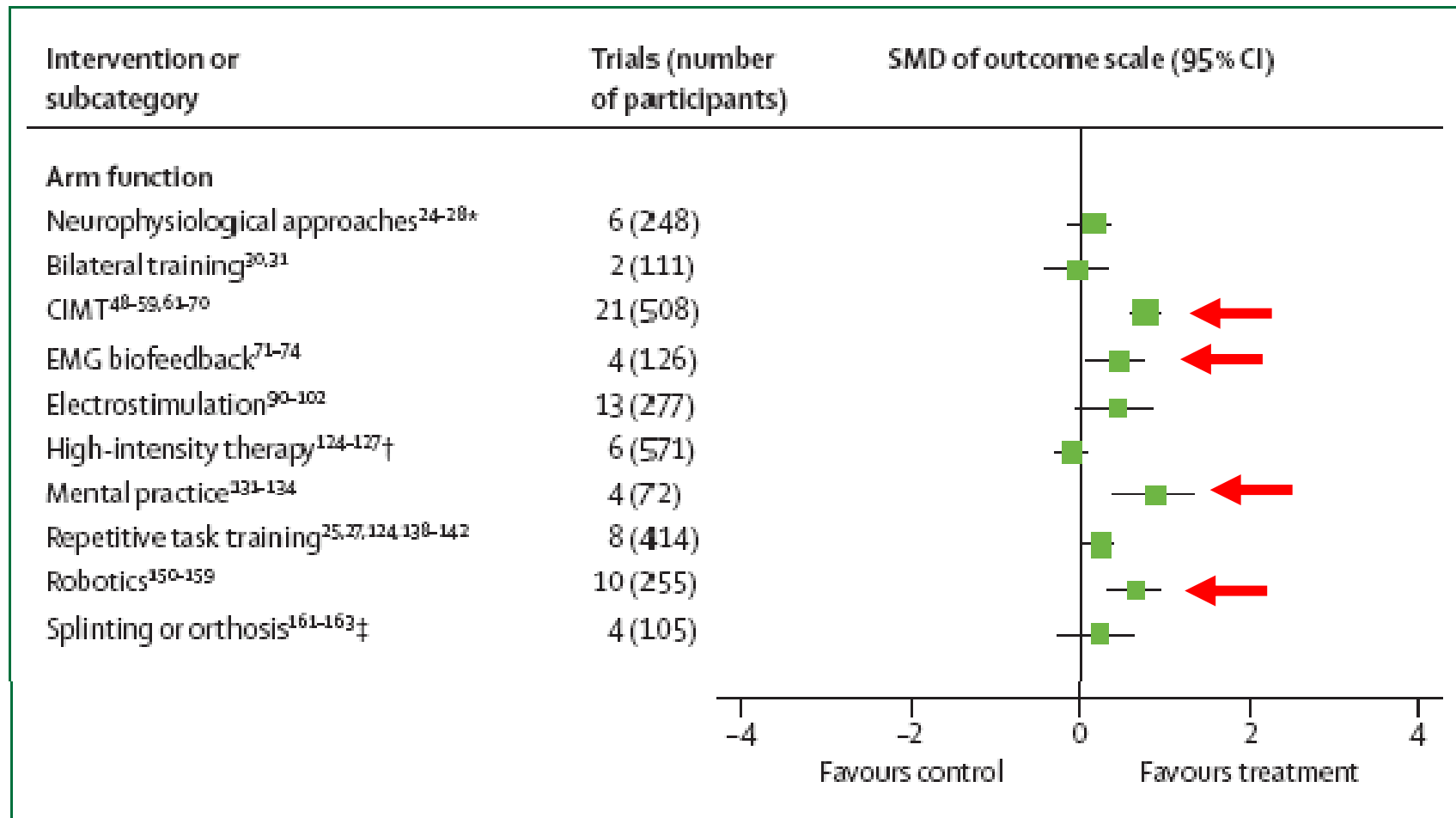
*Very Early Rehabilitation or Intensive Telemetry after Stroke (VERITAS)



- ✓ Meaningful
- ✓ Challenging
- ✓ Targeted on a specific functional goal
- ✓ Feasible (i.e., not too easy, but also not too difficult)
- ✓ Sufficient dose or intensity
- ✓ Graduated over time

Motor Recovery After Stroke: Systematic Review

Arm function



Langhorne, Coupar, Pollock. Lancet Neurol 2009

Constraint Induced Movement Therapy

Comprises

1. Forced use of the affected arm by restraining the unaffected arm, during dedicated exercise sections
2. Massed practice of the affected arm through a shaping method



Clinically effective in short term,
but long term effects not yet clear

Stroke Improvement Robotics



Arm Guide



MIT MANUS



InMotion Shoulder Arm



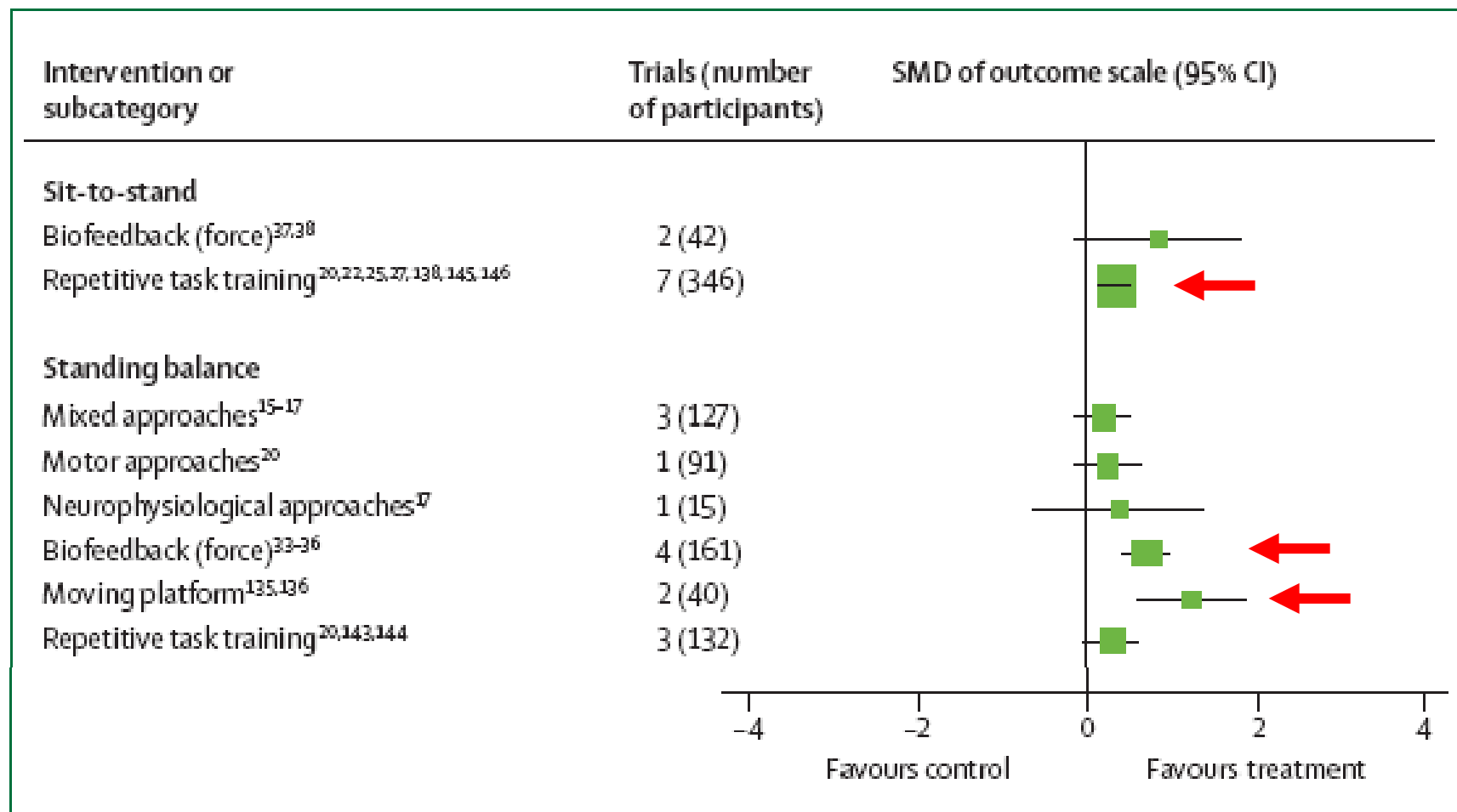
Bi-Manu Track



MIMe

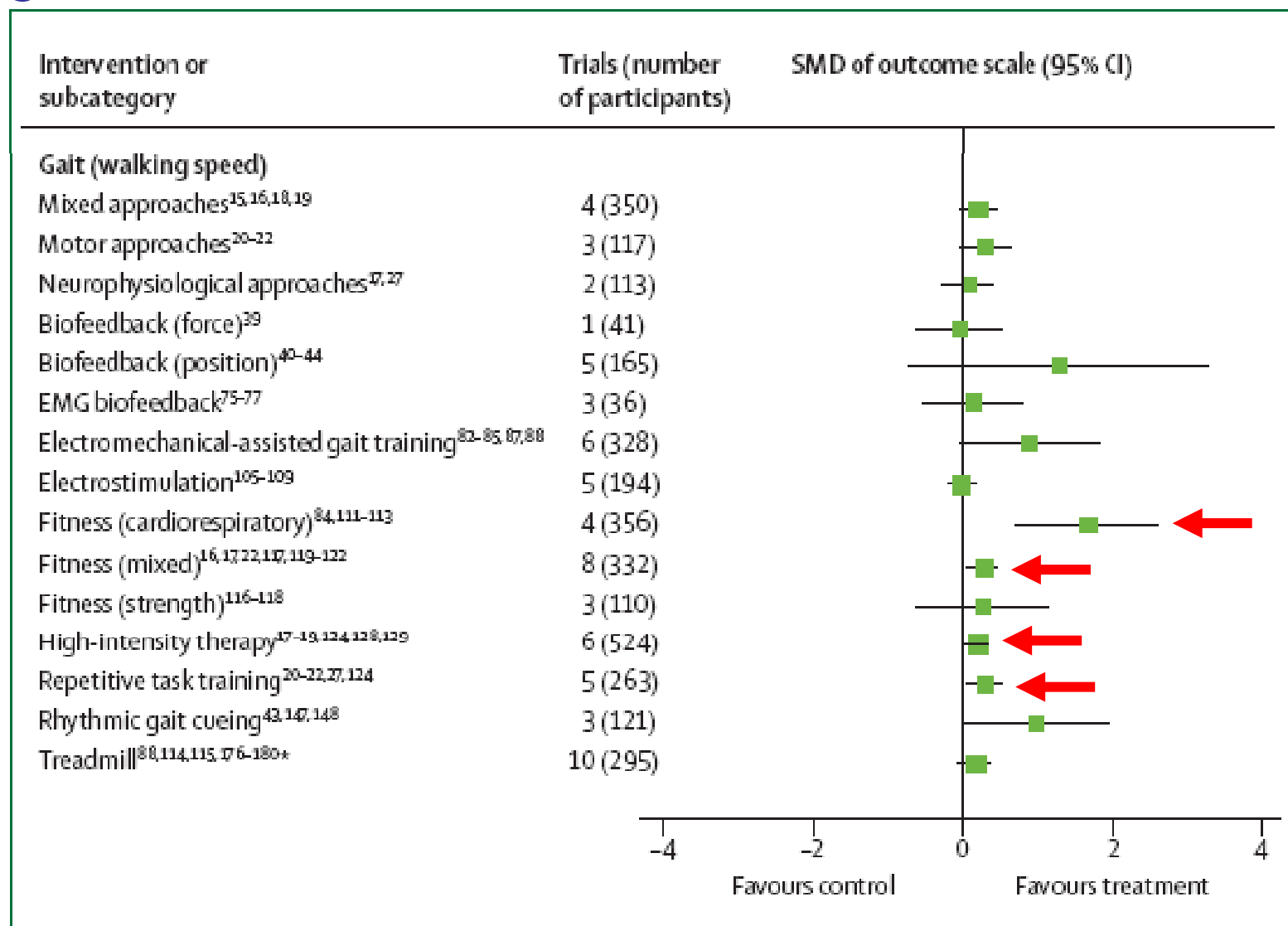
Motor Recovery After Stroke: Systematic Review

Leg function



Motor Recovery After Stroke: Systematic Review

Leg function



Stroke Rehabilitation - A National View

- Stick to the evidence base
- Emphasise intensive, task-orientated therapy
- **Be Innovative!**

