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Optimizing Emergency Department Care Transitions to Outpatient Settings: A Systematic Review and Meta-analysis

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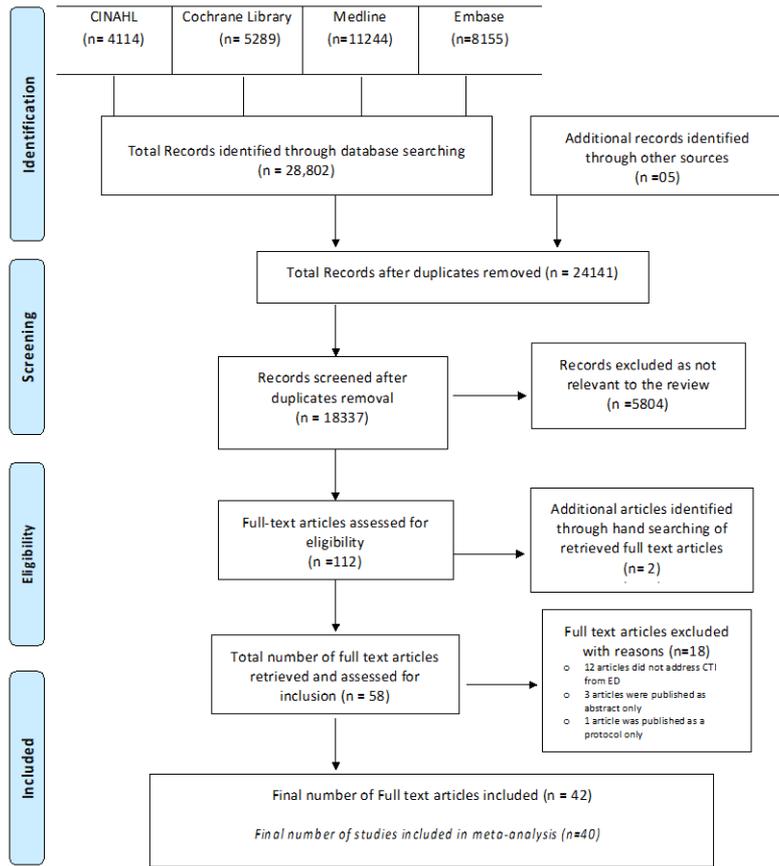
- Emergency department (ED) over-utilization has been a topic of interest over a decade
- ED visits in the United States (US) in 2015 reached 136.9 million per year, or 43.3 per 100 people—a 7 percent increase from 2006 on a per capita basis
- Similarly in Canada, ED visits account for 16 million per year, with about 85% to 90% ED discharges
- However, many of these patients receive inadequate follow-up care after their ED visit

- Suboptimal transitions from the ED to outpatient settings result in poor care continuity, manifested through:
 - duplicate testing
 - lack of communication on care planning for patients with complex health needs
 - higher costs to the healthcare system

- To address these barriers, several ED-based care transition interventions (CTI) have been designed and implemented to improve outpatient follow-up rates and ED/hospital re-admissions

We aimed to systematically review ED-based care transition interventions (CTI) to support coordination of care in adult patients

- Medline, EMBASE, CINAHL and Cochrane Central Register of Controlled Trials and ClinicalTrials.gov to search for RCTs
- CTI described as interventions that were initiated in the ED for promoting care transitions to outpatient settings
- Adult patients (≥ 18 years of age) of either sex, any ethnic group or clinical condition
- Primary outcomes included outpatient follow-up rates, ED readmission and hospital admission
- Secondary outcomes included patient's and provider's satisfaction and cost effectiveness



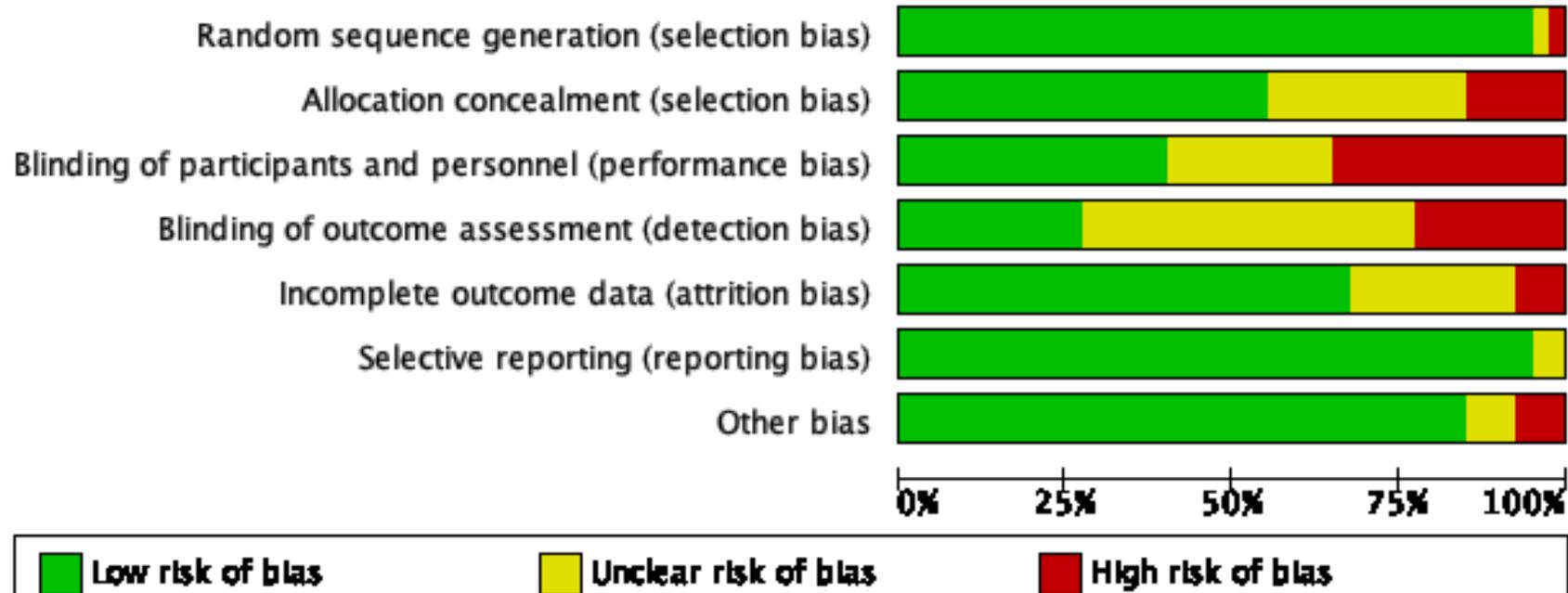
- **Information**, focused on the quality of information shared between providers or between providers and patients
- **Communication**, focused on transmission of messages between patients and providers or between providers with an intended purpose
- **Coordination of care**, focused on explicit management of interdependencies between ED and outpatient settings, planning and meeting patient transitional needs to avoid fragmentation of care

| Author, Year | CTI deliverers | Care Continuity Functions | | |
|--------------------------|-----------------------|---------------------------|---------------|----------------------|
| | | Information | Communication | Coordination of care |
| Afilalo, 2007 (59) | Physician | x | x | – |
| Barren, 2006 (66) | Research assistant | x | x | x |
| Basic, 2005 (39) | Nurse | x | x | – |
| Batel, 1995 (50) | Physician | – | x | – |
| Bell, 2016 (37) | Pharmacist | x | x | x |
| Biese, 2014 (67) | Nurse | x | x | x |
| Brown, 2006 (51) | | x | x | x |
| Caplan, 2004 (52) | Nurse | x | x | x |
| Cossette, 2015 (53,74) | Nurse | x | x | x |
| Currier, 2010 (54) | Nurse | – | – | x |
| Edgren, 2016 (23) | Nurse | – | x | x |
| Eisenstein, 2017 (24) | Care Manager | x | x | x |
| Griffey, 2015 (70) | Research Assistant | x | x | – |
| Harvard, 2015 (58) | Research Assistant | x | x | – |
| Jesudason, 2012 (55) | Physiotherapist | x | x | x |
| Jones, 1987 (56) | Research Nurse | x | x | – |
| Jones, 1990 (57) | Research Nurse | x | x | – |
| Kolbasovsky, 2007 (41) | Case Manager | x | x | x |
| Kyriacou, 2005 (40) | Research Assistant | x | x | x |
| Lee, 2007 (42) | Nurse | x | x | x |
| Lightboy, 2003 (43) | Nurse | x | x | x |
| McCusker, 2003 (60,75) | Nurse | x | x | x |
| Mion, 2003 (61) | Nurse | x | x | x |
| Neven, 2016 (62) | Case Manager | – | x | x |
| Patel, 2011 (71) | Physician | – | x | – |
| Rathlev, 2016 (25) | Physician | – | x | x |
| Richards, 2007 (68) | Physician | – | x | – |
| Ritchie, 2000 (72) | Research Nurse | – | x | – |
| Rosted 2013(44) | Nurse | – | – | x |
| Runciman 1996 (47) | Nurse | x | – | x |
| Sharp 2015 (45) | Physician | x | x | x |
| Shumway, 2008 (46) | Research Assistant | x | x | x |
| Spooren, 1998 (63) | Multidiciplinary Team | x | x | x |
| Stergiopoulos. 2017 (64) | Case Manager | x | x | x |
| Townsend, 1996 (38) | Case Manager | – | – | x |

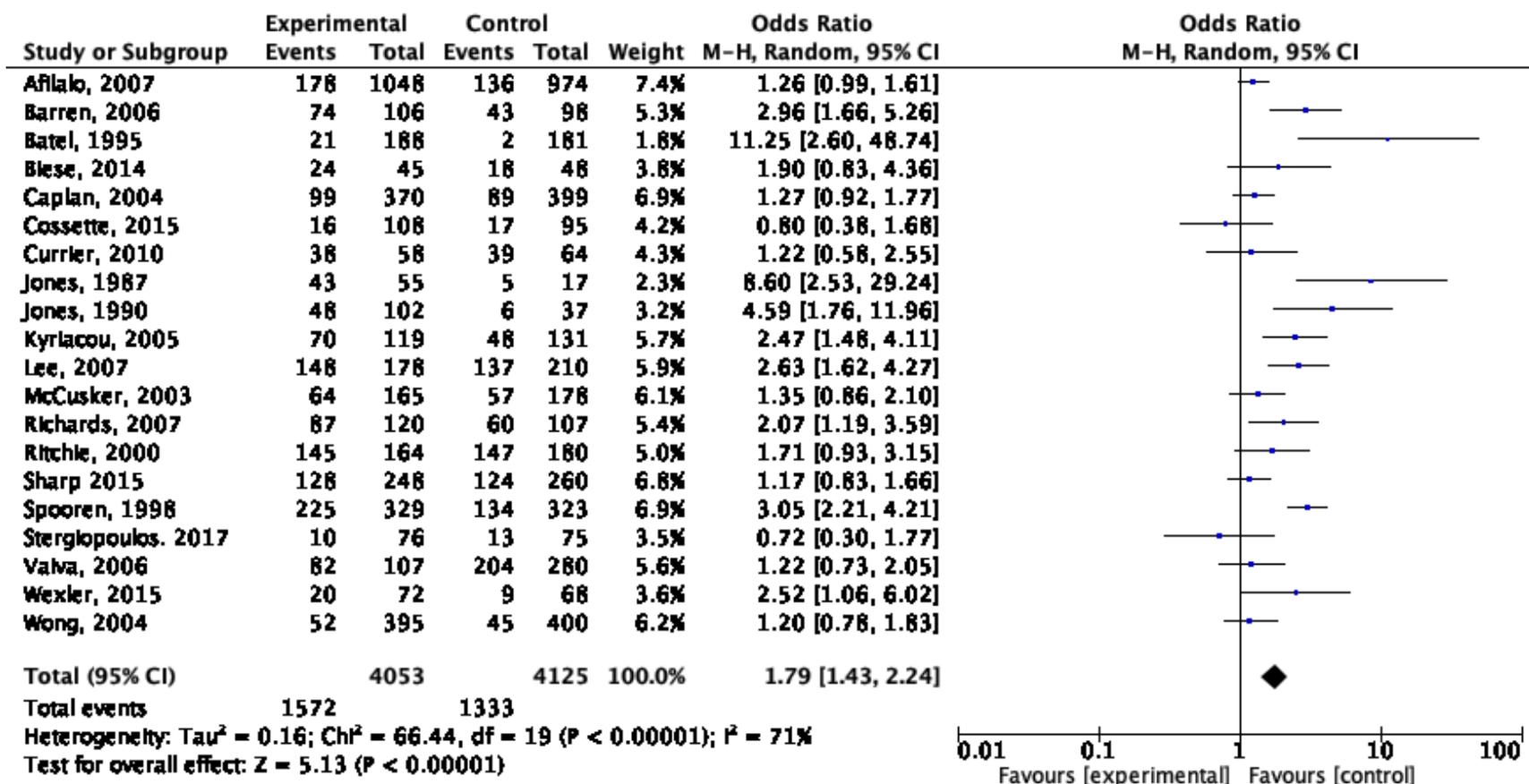
- The total participants: 23,851
 - Intervention groups: 14,014
 - Control groups: 9,837

- Age range: 24 and 93 y.

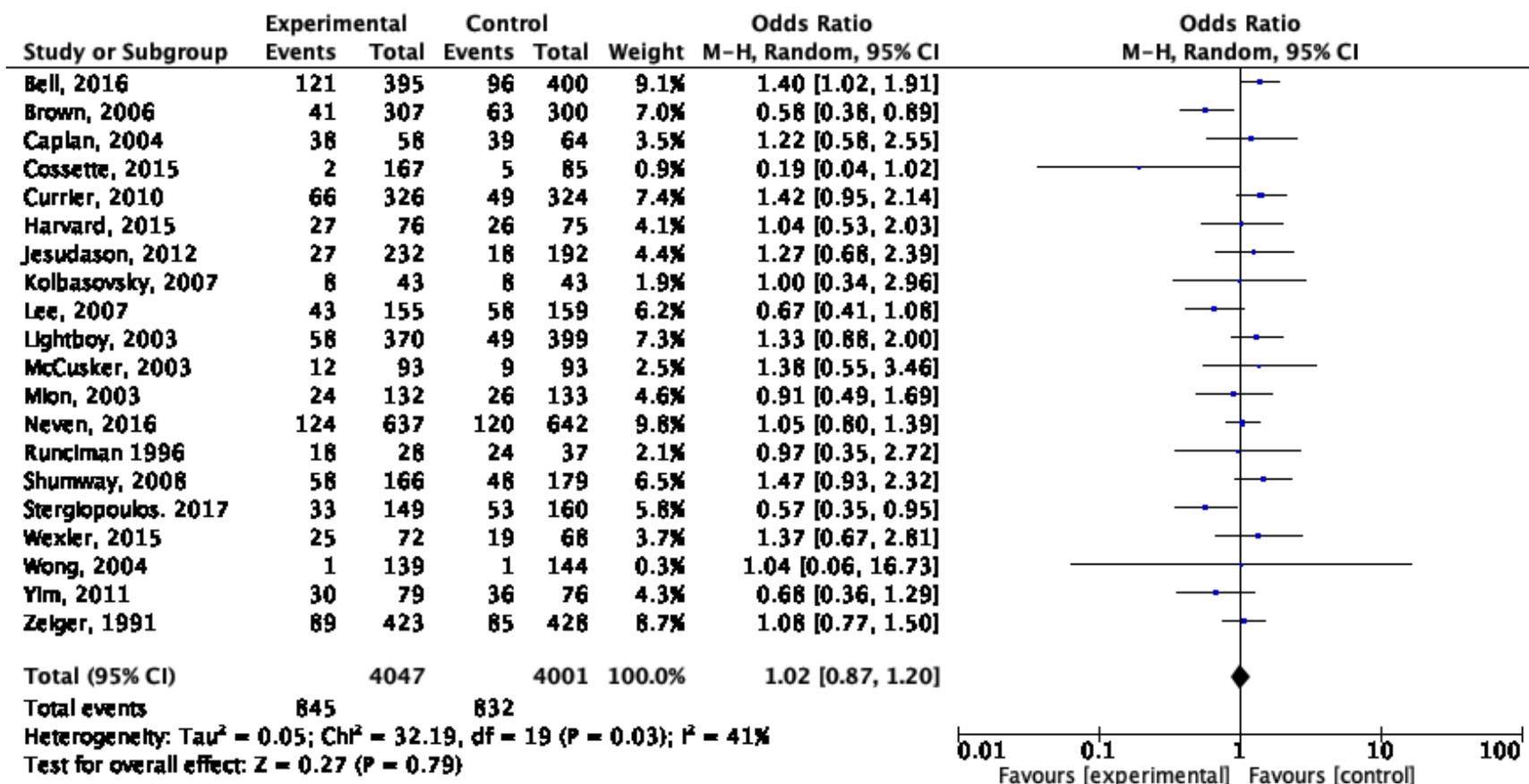
- 15 studies included patients who visited ED with general health care needs
- 5 studies included patients who were frequent ED users
- 14 studies were conducted in the elderly
- 4 studies accounted for ED patients that lacked specificity in the clinical conditions
- 4 studies recruited patients with addictions (opioid and alcohol)
- 5 studies had participants with mental health conditions



Outpatient Follow-up



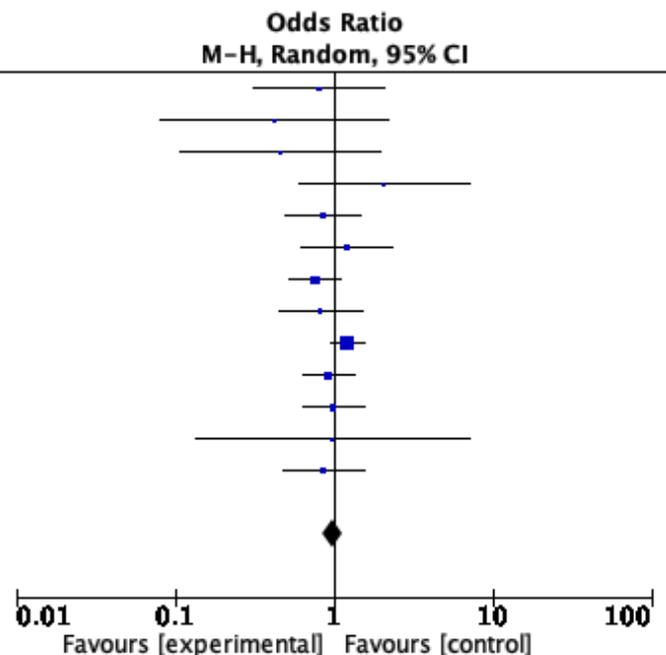
ED Readmission



Hospital Admission

| Study or Subgroup | Experimental | | Control | | Weight | Odds Ratio | |
|-----------------------|--------------|-------------|---------|-------------|---------------|---------------------|---------------------|
| | Events | Total | Events | Total | | M-H, Random, 95% CI | |
| Basic, 2005 | 8 | 155 | 10 | 159 | 2.2% | 0.81 | [0.31, 2.11] |
| Bell, 2016 | 2 | 149 | 5 | 160 | 0.7% | 0.42 | [0.08, 2.21] |
| Caplan, 2004 | 3 | 43 | 6 | 43 | 0.9% | 0.46 | [0.11, 1.98] |
| Cossette, 2015 | 8 | 132 | 4 | 133 | 1.3% | 2.08 | [0.61, 7.08] |
| Jesudason, 2012 | 21 | 107 | 62 | 280 | 6.4% | 0.86 | [0.49, 1.49] |
| Lee, 2007 | 23 | 141 | 18 | 130 | 4.4% | 1.21 | [0.62, 2.37] |
| Lightboy, 2003 | 61 | 370 | 82 | 399 | 14.7% | 0.76 | [0.53, 1.10] |
| Mion, 2003 | 29 | 93 | 33 | 93 | 5.3% | 0.82 | [0.45, 1.52] |
| Rosted 2013 | 198 | 637 | 174 | 642 | 33.8% | 1.21 | [0.95, 1.54] |
| Stergiopoulos, 2017 | 61 | 423 | 66 | 428 | 13.9% | 0.92 | [0.63, 1.35] |
| Vaiva, 2006 | 46 | 326 | 46 | 324 | 10.2% | 0.99 | [0.64, 1.54] |
| Yim, 2011 | 2 | 76 | 2 | 75 | 0.5% | 0.99 | [0.14, 7.19] |
| Zelger, 1991 | 29 | 114 | 31 | 110 | 5.6% | 0.87 | [0.48, 1.57] |
| Total (95% CI) | | 2766 | | 2976 | 100.0% | 0.99 | [0.86, 1.14] |

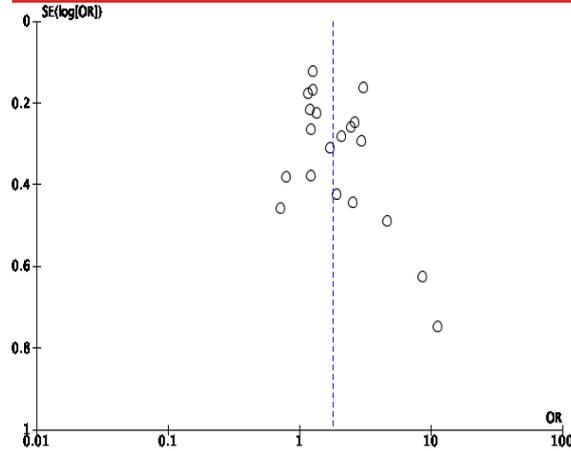
Total events 491 539
 Heterogeneity: $\tau^2 = 0.00$; $\text{Chi}^2 = 9.56$, $\text{df} = 12$ ($P = 0.65$); $I^2 = 0\%$
 Test for overall effect: $Z = 0.19$ ($P = 0.85$)



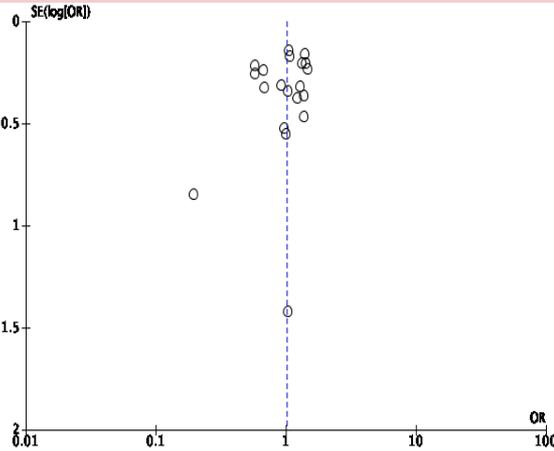
- Patel et al. reported an increase in patient satisfaction from 71.6% to 78.7% (7.1% increase, $p=0.05$) for those who received email or telephone follow-up vs no follow-up
- Mion et al. found that a comprehensive geriatric assessment in the ED resulted in higher satisfaction with the information patients received (3.41 vs 3.03; mean difference 0.37; 95% CI 0.13 to 0.62)
- Cossette et al. reported that nursing intervention designed to assess patient concerns before discharge led to patient satisfaction with post- ED outpatient care
- However, Griffey et al. found no significant differences between teach-back and standard discharge for perceived comprehension or patient satisfaction
- Wong et al. reported nonsignificant patients' satisfaction ($P= 0.603$) and self-evaluated health ($P=0.343$) after the ED intervention

- Kolbasovsky et al. reported that the intervention resulted in an ED cost savings of \$7.92 /pt/month for psychiatric services during the 6-month study period
- Shumway et al. also found ED costs were significantly lower among case management patients than among usual care patients
- Mion et al. reported costs for subsequent ED visits, costs for hospitalizations and hospital admissions did not differ significantly between intervention and control groups at either 30 or 120 days
- McCusker et al. estimated the ratio of overall costs per patient in the intervention versus the control group, and found no significant differences (0.94, 95% CI 0.75 to 1.17)
- Eisenstein et al. also found that there were no treatment-related differences in ED encounter rates, or in the secondary outcomes of outpatient and hospital encounter rates and medical costs when evaluated at 12 months timepoint

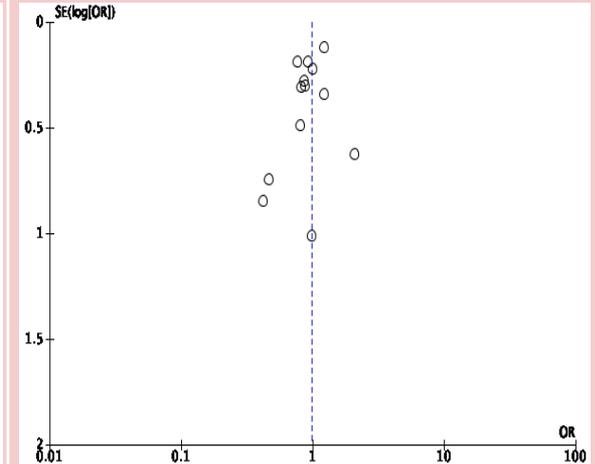
A: Outpatient Follow-up



B: ED Readmission



C: Hospital Admission



- We identified 40 RCTs, involving 23,851 patients
- No effect on ED readmission: (20 studies, n= 8048) OR: 1.02, 95% CI 0.87–1.20
- No effect on Hospital admission (13 studies, n=5742) OR: 0.99, 95% CI 0.86–1.14
- Increase in Outpatient follow-up: (20 studies, n=8178) OR:1.79, 95% CI 1.43–2.24
- Overall increase on patient satisfaction
- Inconclusive results on cost savings

- 22 interventions supported all three functions of care continuity (information, communication and coordination)
- The ED-based CTIs were multi-component, heterogeneous, complex and not focused on specific patient conditions
- Majority of studies that found significant improvements in outpatient follow-up rates found no reductions in ED revisit or hospital admissions with the same intervention

- Evidence suggests that improvement in follow-up care by primary care physicians improves continuity of care while reducing care fragmentation across the continuum, therefore some form of follow-up after ED discharge is required especially for elderly
- There is limited evidence on the effect of care transition from ED to primary care providers using EHR to improve ED revisit and hospitalization after ED discharge. Future studies should explore this potential



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- Joanna Abraham PhD