

David de Gijzel, MD, MSc · Dema Hakim, MPH · Blake Kruger, MPH · Sarah Moore, MPH  
One Medical Center Drive · Lebanon, NH 03756 · USA · ddg@dartmouth.edu

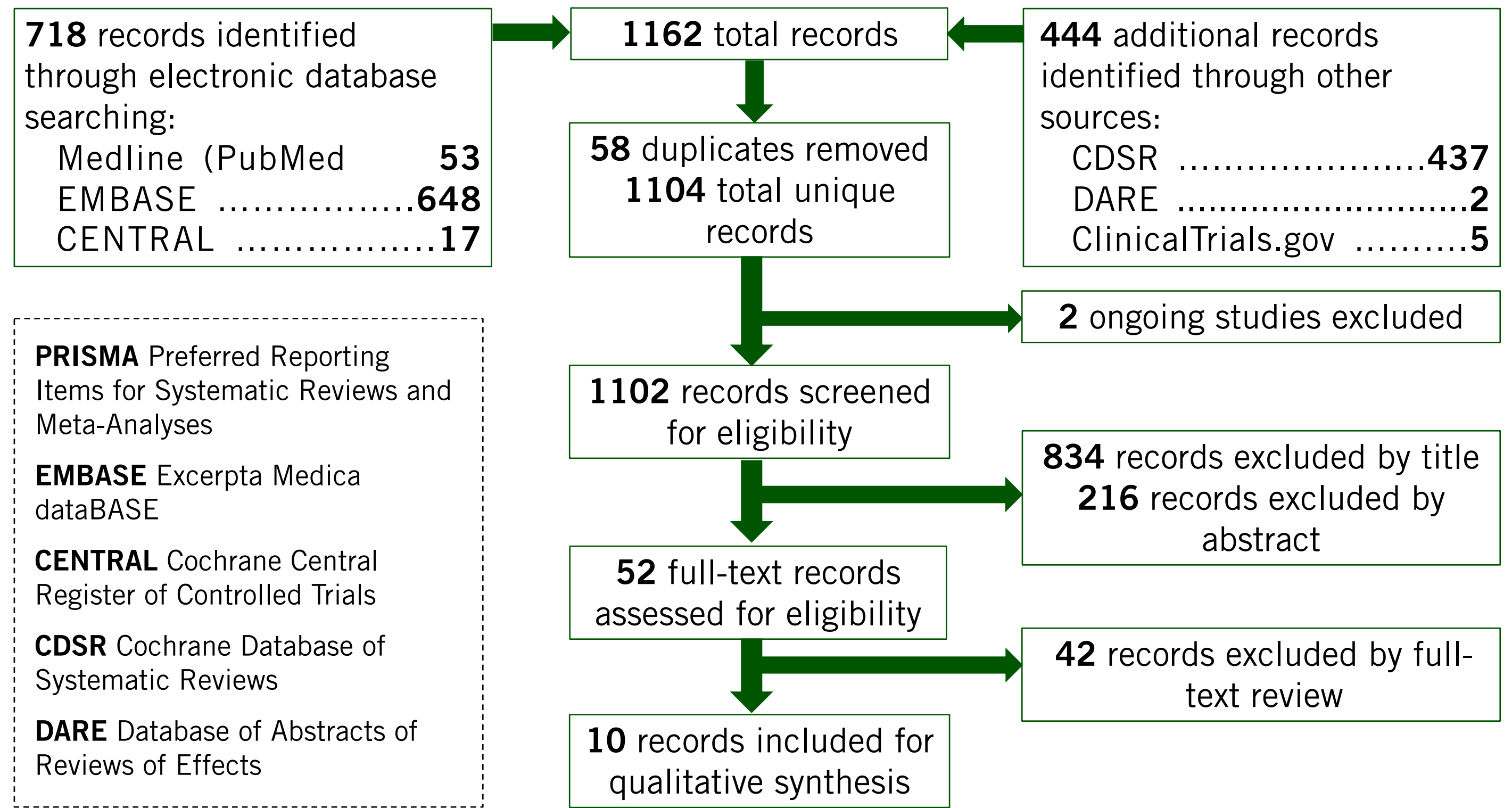
### Background

- 70 million infected with Hepatitis C (HCV) worldwide
- Direct-acting antivirals curative and safe
- Specialist treatment limited in rural areas
- Telemedicine can support generalist treatment

### Research Question

In people with chronic HCV infection who live and seek care in a rural setting, do telemedicine initiatives improve the rate of SVR as compared to usual care?

### PRISMA Diagram



### Methods

**Study Eligibility:** (1) RCTs & cohort studies (2) chronic HCV infection (3) rural (4) telemedicine (5) usual care (6) SVR

**Search Methods:** MeSH terms and keywords for “Telemedicine” and “Hepatitis C”

**Data Collection:** (1) standardized data collection form; (2) 2+ independent reviewers; (3) quality assessed by a Modified Newcastle-Ottawa Scale

**Analysis:** pooled ORs, summary estimates by random effects model;  $I^2$  to assess for heterogeneity

### Results

#### Characteristics of Included Studies Comparing Telemedicine vs. Face-to-Face

Study Name	Type of Study	Intervention Type	Comparison Type	Enrolled	SVR Rate AT		SVR Rate ITT (Overall)	
					Intervention	Comparison	Intervention	Comparison
Beste, 2017	Cohort	ECHO	PCP	38,753	N/A	N/A	0.58	0.54
Arora, 2011	Cohort	ECHO	Specialist	407	0.85	0.91	0.58	0.58
Nazareth, 2013	Cohort	Telemedicine	Specialist	609	0.73	0.53	0.72	N/A
Rossaro, 2013	Cohort	Telemedicine	Specialist	80	0.68	0.76	0.53	0.40
Georgie, 2016	Cohort	ECHO	Specialist	623	N/A	N/A	0.93	0.95
Jayasekera, 2015	Cohort	Telemedicine	Specialist	93	0.83	0.89	0.83	0.89
Chen, 2014	RCT	Telemedicine	Specialist	298	0.88	0.94	0.69	0.66
Hatashita, 2016	Cohort	ECHO	Specialist	1,287	0.95	0.95	0.11	0.21
Nazareth, 2015	Cohort	Telemedicine	Specialist	1,187	N/A	N/A	0.49	0.58
Torruellas, 2011	Cohort	Telemedicine	Specialist	80	N/A	N/A	0.55	0.43

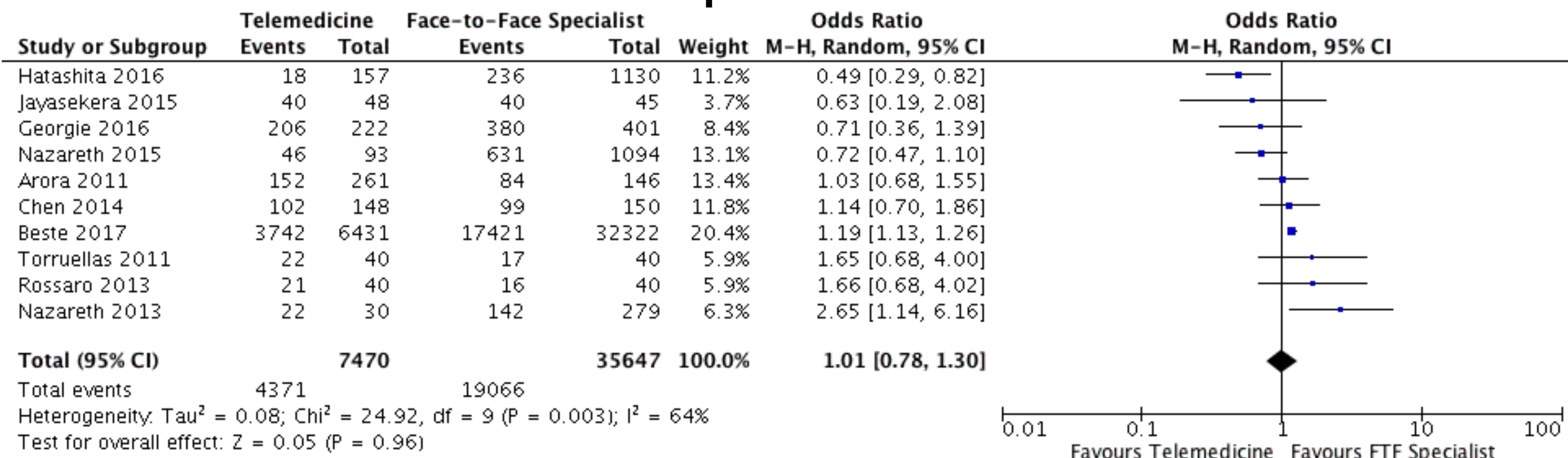
**Table 1** – Study characteristics and intention-to-treat (ITT) and as-treated (AT) sustained virologic response (SVR) rates by study.

#### Methodological Quality of Included Studies

Study ID	Cohort Selection	Blinding	Incomplete Data	Statistical Analysis	Selective Reporting	Overall Score
Beste, 2017	Green	Grey	Yellow	Green	Yellow	Yellow
Arora, 2011	Green	Grey	Yellow	Green	Yellow	Yellow
Nazareth, 2013	Green	Grey	Yellow	Green	Yellow	Yellow
Rossaro, 2013	Green	Grey	Yellow	Green	Yellow	Yellow
Georgie, 2016	Green	Grey	Yellow	Green	Yellow	Red
Jayasekera, 2015	Green	Grey	Yellow	Green	Yellow	Yellow
Chen, 2014	Green	Grey	Yellow	Green	Yellow	Yellow
Hatashita, 2016	Green	Grey	Yellow	Green	Yellow	Yellow
Nazareth, 2015	Green	Grey	Yellow	Green	Yellow	Yellow
Torruellas, 2011	Green	Grey	Yellow	Green	Yellow	Yellow

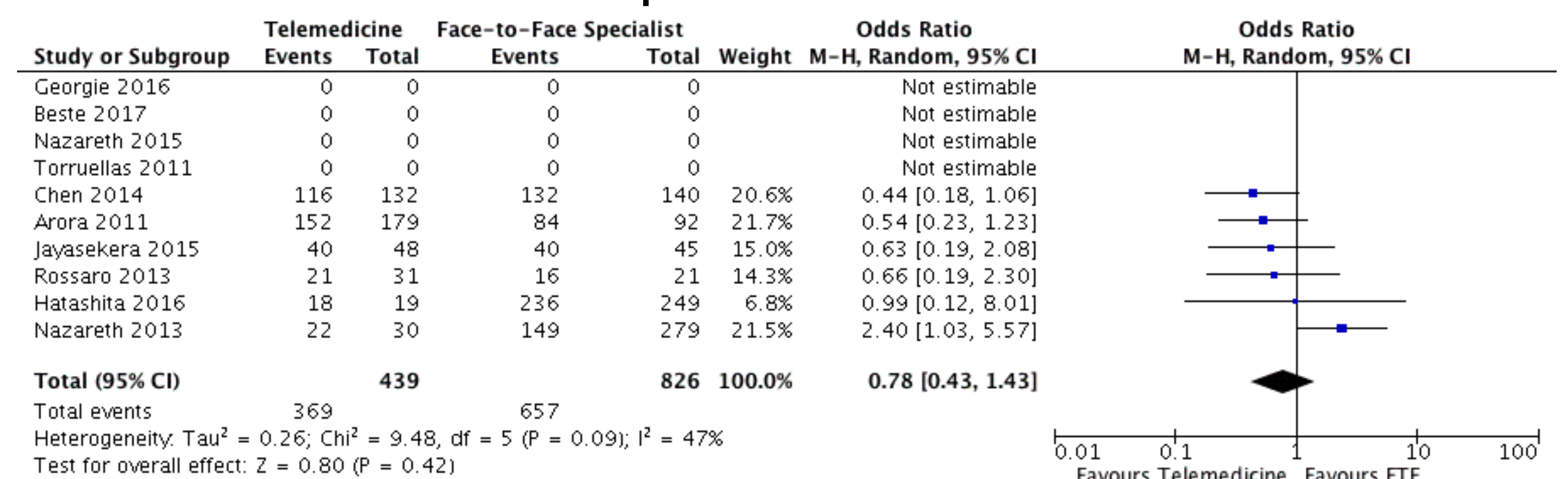
**Table 2** – Modified Newcastle-Ottawa Scale (mNOS): Green = Excellent; Yellow = Good; Red = Acceptable; Grey = N/A

#### Telemedicine vs. Face-to-Face Specialist on SVR – Overall



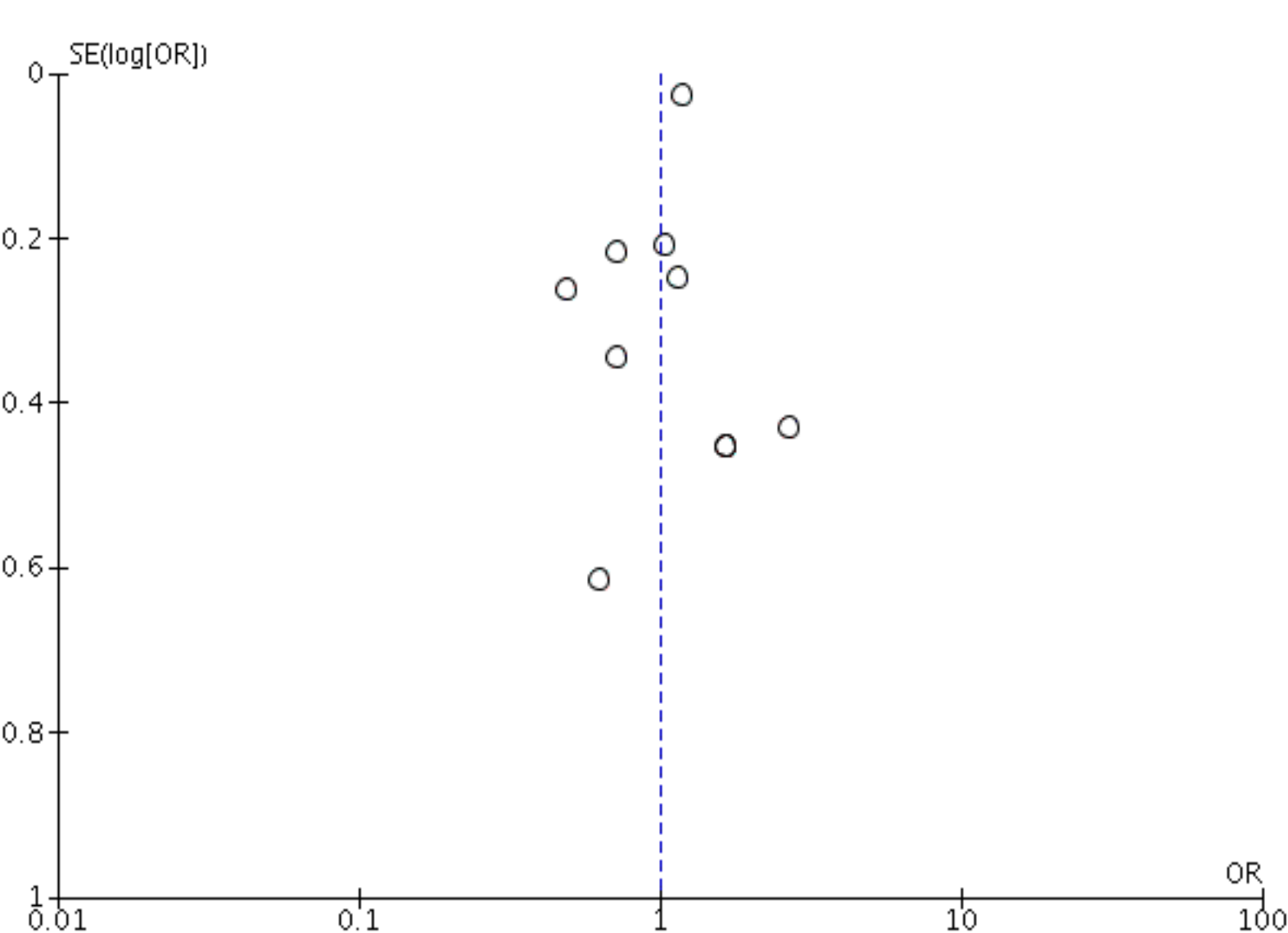
**Figure 2** – Forest plot depicting the odds ratios by study for achievement of SVR using Mantel-Haenszel (M-H) analyses and random effects models with intention-to-treat and as-treated (Nazareth, 2013) values.

#### Telemedicine vs. Face-to-Face Specialist on SVR – As-Treated



**Figure 3** – Forest plot depicting the odds ratios by study for achievement of SVR using M-H analyses and random effects models with as-treated values only.

### Publication Bias



**Figure 4** – Funnel plot depicting a slight publication bias in the ten included studies.

### Conclusions

**Major Findings:** Outcomes for treatment of chronic HCV through telemedicine do not significantly differ from those for treatment delivered through face-to-face (FTF) specialist care. These findings are robust across sensitivity analyses performed (overall, ITT, AT, papers only, abstracts only, and outliers).

#### Limitations:

- Varied types of telemedicine and treatment regimen
- Varied data availability for SVR across genotypes, ITT, and AT
- Top 5 studies contributed nearly 70% of weighted summary estimate
- 1 study contributed 20% for weighted summary estimate (Beste, 2017)

**Conclusion:** In areas with limited access to specialists, the use of telemedicine is as effective as usual care in the treatment of HCV.