PREVALENCE OF ROTAVIRUS AMONG PEOPLE 5 YEARS AND OLDER WITH DIARRHEA: A SYSTEMATIC REVIEW & META-ANALYSIS

Lola Arakaki, Jessie Seiler, Deanna Tollefson, Paul Drain

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STRATEGIC ANALYSIS, RESEARCH & TRAINING CENTER

Department of Global Health | University of Washington

PROJECT TEAM

Lola Arakaki, MPH

PhD Student

Epidemiology

Research Assistant

Brenda Kharono, MBchB

MPH Student

Global Health

Research Assistant

Jessie Seiler, MPH

PhD Student

Epidemiology

Research Assistant

Deanna Tollefson, MPH

PhD Student

Implementation Science

Project Manager

Paul Drain, MD, MPH, FACP

Assistant Professor

Global Health

Faculty Lead

PROJECT OVERVIEW

WORK ORDER

Conduct a systematic literature review and meta-analysis of rotavirus prevalence among persons ≥5 years of age with diarrhea by age strata

Timeline: March – August 2019

DELIVERABLES

PowerPoint slide deck

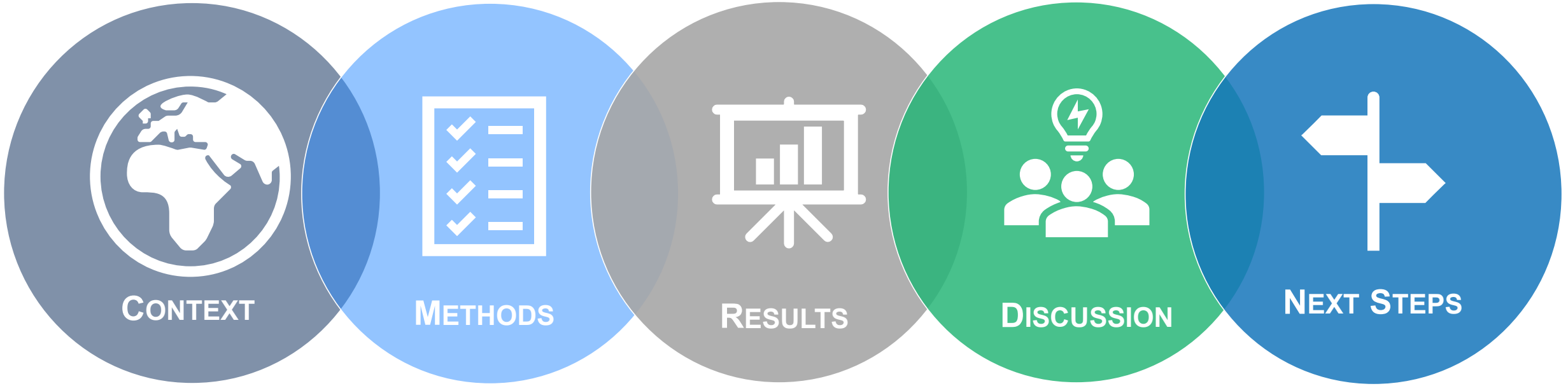
Excel workbook

- Summary of Included Studies
- Results tables
- Dataset
- Data dictionary

Meta-analysis code (R files)

PRESENTATION OVERVIEW

OBJECTIVE: REVIEW METHODS, SHARE RESULTS, AND DISCUSS FINDINGS



CONTEXT

UNCERTAIN ROTAVIRUS BURDEN IN PEOPLE ≥5 YEARS OLD

BACKGROUND

- **Rotavirus is leading cause of severe diarrhea in young children globally**
- **Other ages less affected but still at risk, especially:**
  - People who care for children
  - Immunocompromised individuals
  - Older adults

KNOWLEDGE GAP

- Overall burden of rotavirus in population ≥5 years not well understood
- Percent of diarrhea due to rotavirus in population ≥5 years not well documented
- Estimates of rotavirus in older populations needed to understand spread and severity of disease globally

What is the prevalence of rotavirus occurring in populations ≥5 years old with diarrhea?

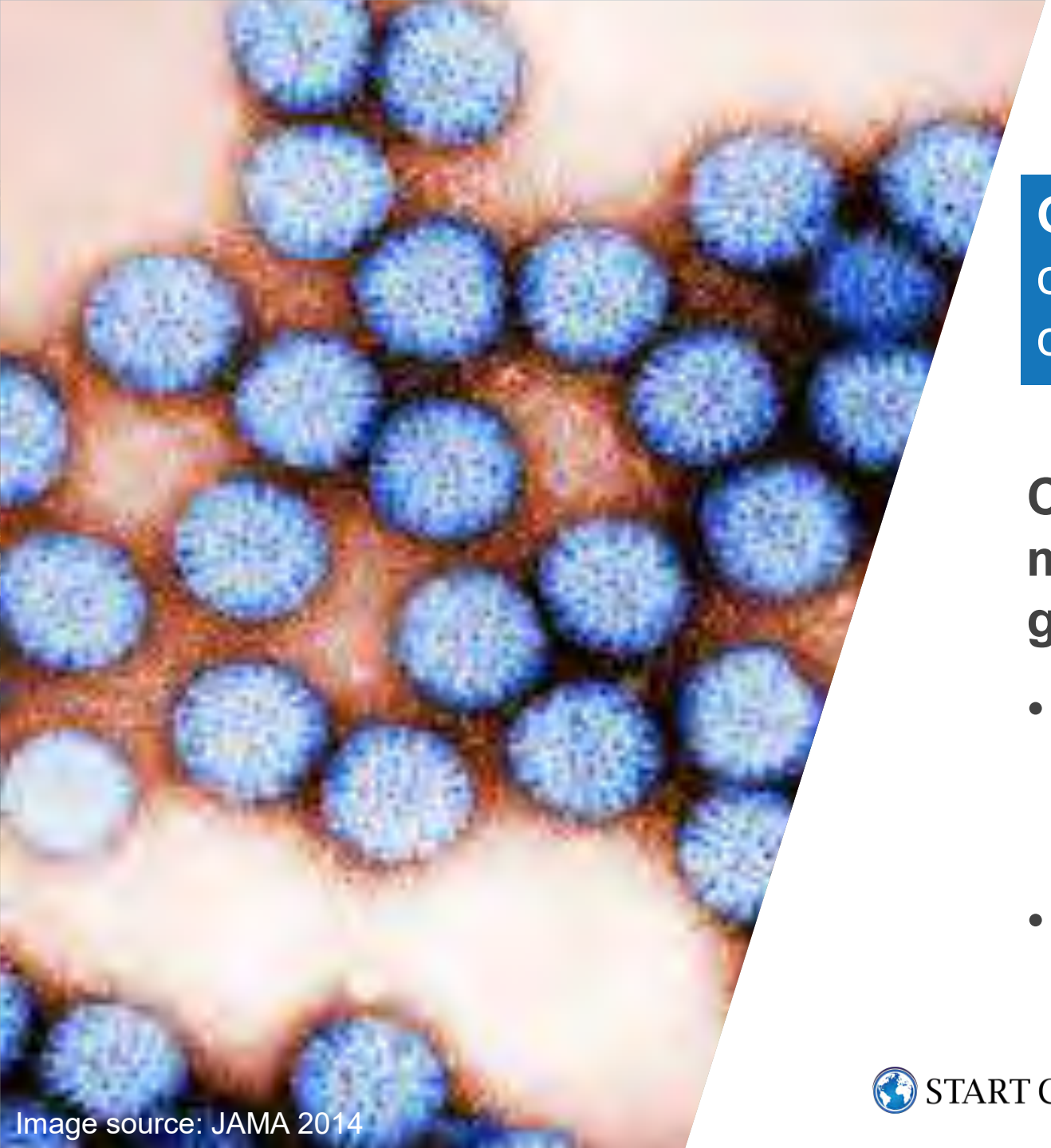


Image source: JAMA 2014

PURPOSE OF STUDY

Goal: Determine proportion of diarrhea cases due to rotavirus among older children and adults globally

Conduct systematic review and meta-analysis following PRISMA guidelines to:

- **Quantify** proportion of diarrhea cases due to rotavirus among persons ≥5 years old
- **Estimate** this proportion by age strata

METHODS

CONDITIONAL ROTAVIRUS PREVALENCE CHOSEN AS OUTCOME

Percentage of diarrhea cases due to rotavirus

=

$$\frac{\text{Number of people with laboratory confirmed rotavirus}}{\text{Number of symptomatic people tested for rotavirus}}$$

FOLLOWED STANDARD CRITERIA FOR ROTAVIRUS SYSTEMATIC REVIEWS

INCLUSION CRITERIA

- **Outcome**: rotavirus prevalence (% diarrhea due to rotavirus)
- **Population**: persons ≥5 years old symptomatic with diarrhea/gastroenteritis
- **Case definition:** lab confirmation of rotavirus
- **Study size**: at least 100 symptomatic individuals who were ≥5 years old
- **Study length**: ≥1 year of data
- **Publication date**: 1990 or later

EXCLUSION CRITERIA

- Case studies, outbreak investigations, conference abstracts, systematic reviews
- Non-English full-text
- No laboratory confirmation of rotavirus
- Special populations (e.g., military, schools, hospital-acquired infections)

DATA COLLECTION PROCESS

SEARCH DETAILS

- Search strings modeled after IHME
- Databases: PubMed & EMBASE
- Date conducted: April 5, 2019

SYSTEMATIC REVIEW PROCESS

- Followed PRISMA guidelines
- Double screening and consensus required at at all levels
- High barrier for exclusion of abstracts

SEARCH STRING USED*

('rotavirus'/exp OR 'rotavirus' OR 'human rotavirus'/exp OR 'human rotavirus' OR 'rotavirus infection'/exp OR 'rotavirus infection' OR rotavirus:ti,ab OR rotaviruses:ti,ab) AND ('prevalence'/exp OR 'mortality'/exp OR burden:ti OR etiology:ti OR aetiology:ti OR mortality:ti OR death:ti OR deaths:ti OR fatal:ti OR fatality:ti OR epidemiology:ti) AND [1990-3000]/py AND [humans]/lim NOT ('colitis':ti,ab OR enterocolitis:ti,ab OR 'inflammatory bowel':ti,ab OR irritable:ti,ab OR crohn*:ti,ab OR hiv:ti OR treatment:ti OR appendicitis:ti,ab OR esophag*:ti,ab OR surger*:ti,ab OR gastritis:ti,ab OR liver:ti,ab OR 'case report':ti OR 'case-report':ti OR outbreak*:ti OR travel*:ti OR therapy:ti OR 'conference abstract'/it)

*Refer to Appendix 1 for all search strings used

KEY VARIABLE DEFINITIONS

AGE GROUP

- **Older children and adolescents**:
  Range: 5-20 years old
- **Younger adults**:
  Range: 15-50 years old
- **Older adults**:
  Range: 50 years and older
- **Adults, broad ages**:
  Range: spans younger and older adults
- **Broad ages**:
  Range: spans child and adult ages

DIARRHEA

- **WHO definition:** ≥3 loose stools within 24 hours
- **Non-WHO definition**: other definitions or no definitions

ROTAVIRUS VACCINATION AVAILABLE

Rotavirus vaccine recommended as part of routine childhood vaccination in national guidelines, at/before start of study

OTHER DEFINITIONS

WHO Regions: 2019 definitions
Income Regions: World Bank 2019

INVERSE VARIANCE WEIGHTING AND RANDOM EFFECTS USED FOR META-ANALYSIS

KEY STEPS

Calculated 95% CI for point prevalences

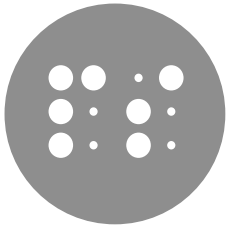
Used `metaprop` function in 'meta' package (Schwarzer 2007) in R for analysis

Generated outcomes for:

- *Primary*: Age groups
- *Secondary*: WHO regions, income regions, study settings, diarrhea definitions, time, laboratory diagnostic method
- *Tertiary:* Secondary variables by age

Weighted by inverse variance
Stronger method than weighting by sample size alone

Used arc sin transformation
Standard process to stabilize variance



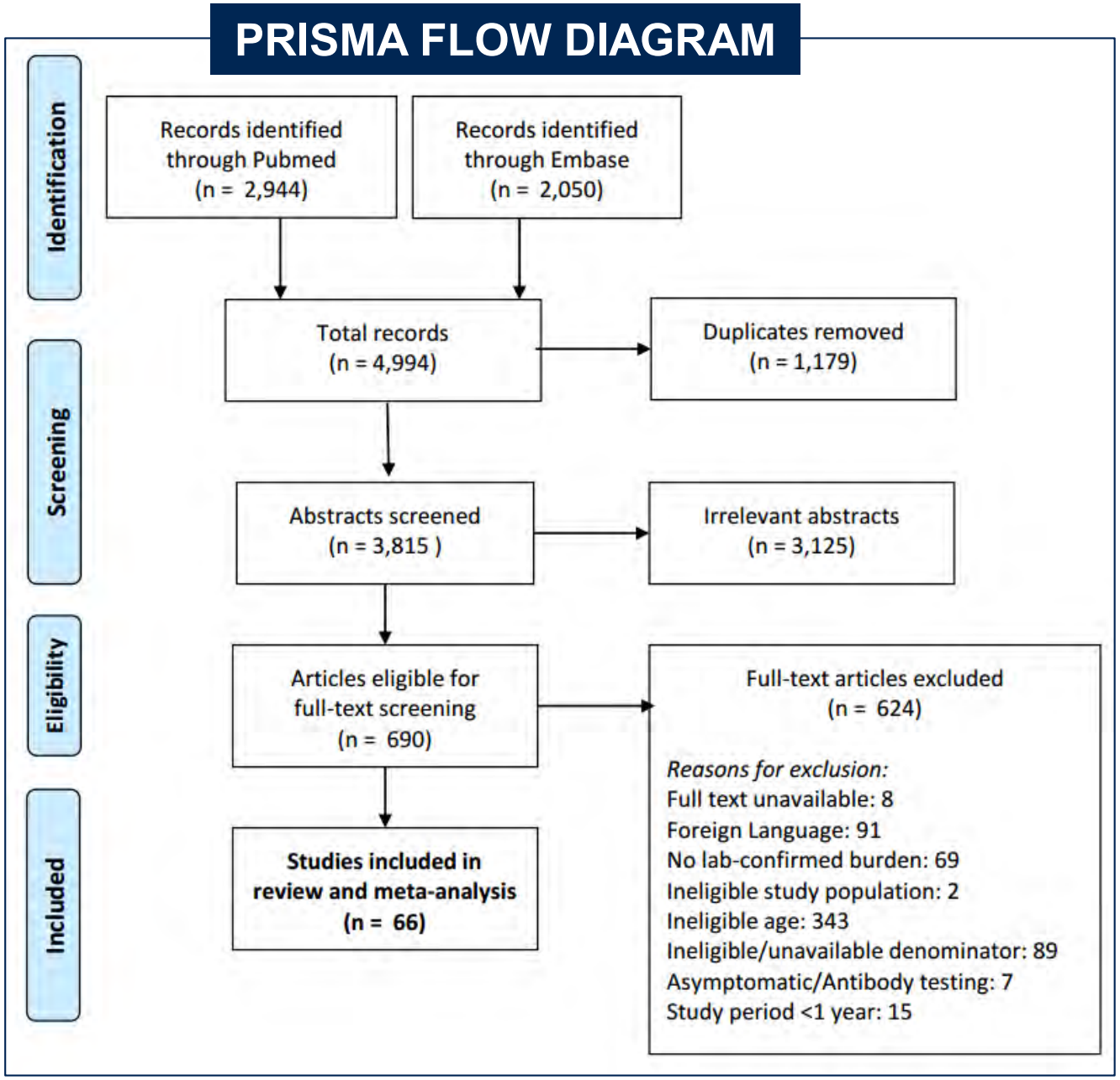
Modeled with random effects
Allows true effects to vary study to study

Outcomes: pooled prevalence, 95% confidence intervals, heterogeneity estimates (I^2), and prediction intervals

RESULTS:

Studies Included in Review

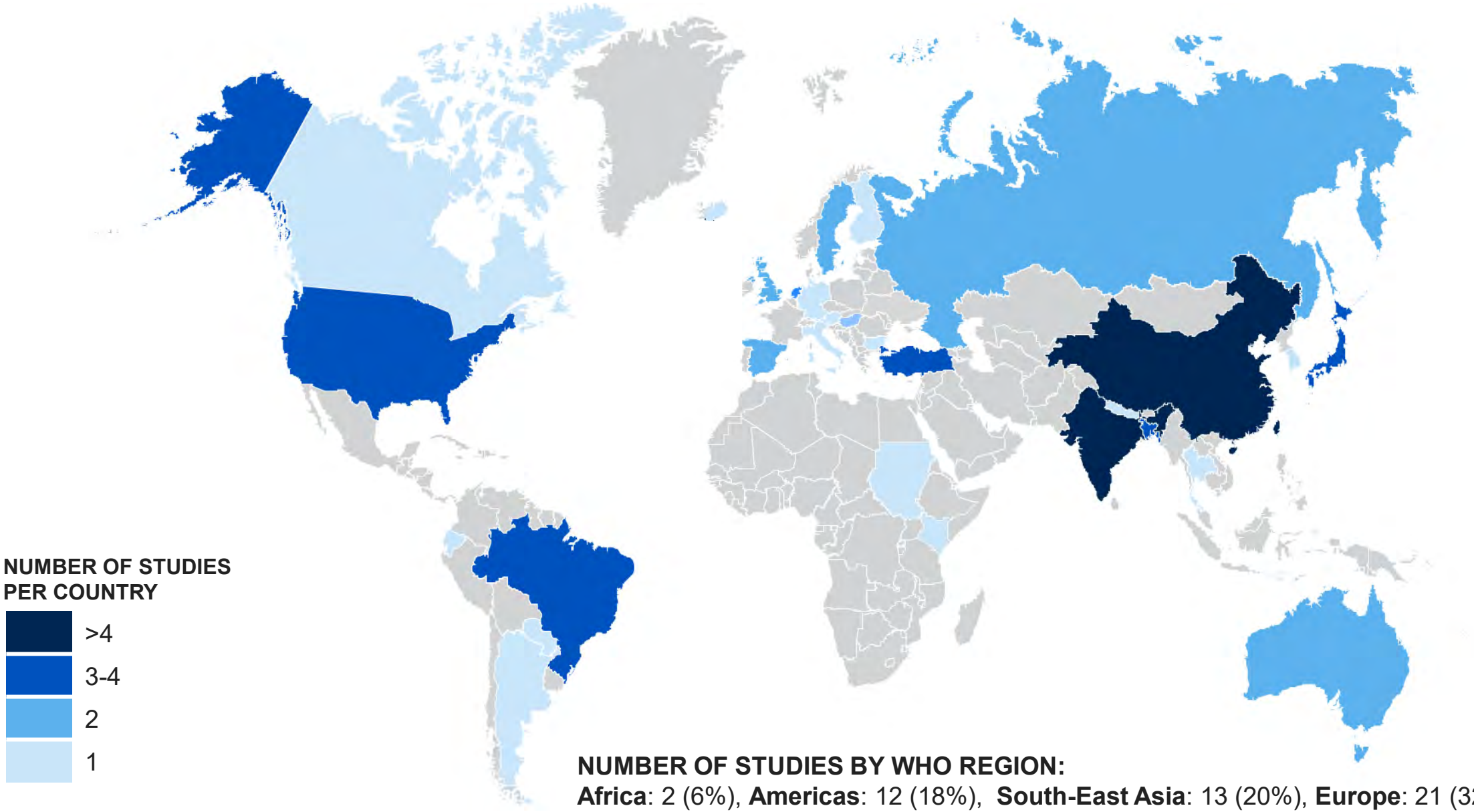
66 STUDIES INCLUDED IN ANALYSIS



NUMBER OF ARTICLES

- 4,994 abstracts identified
- 3,815 abstracts screened
- 690 articles reviewed
- 66 articles included

STUDIES IDENTIFIED FROM 32 COUNTRIES



NUMBER OF STUDIES BY WHO REGION:
Africa: 2 (6%), **Americas**: 12 (18%), **South-East Asia**: 13 (20%), **Europe**: 21 (32%), **Eastern Med**: 0 (0%), **Western Pacific**: 18 (27%)

WIDE VARIETY OF STUDIES INCLUDED

SUMMARY OF INCLUDED STUDIES (n=66)

STUDY CHARACTERISTIC	n (%)
Rotavirus vaccine available	3 (4.5%)
WHO definition of diarrhea	24 (36%)
Income region	
Low	2 (2%)
Lower-middle	13 (20%)
Upper-middle	26 (39%)
High	25 (38%)
Study setting	
Community	7 (10%)
Hospital – in-patient	20 (29%)
Hospital – out-patient	6 (9%)
Hospital – general	35 (51%)

STUDY CHARACTERISTIC	n (%)
Laboratory method	
ELISA	35 (53%)
PCR	20 (30%)
Electron Microscopy	3 (5%)
Multiple	11 (17%)
Study Period	
Before 2000	4 (6%)
2000 to 2009	18 (27%)
After 2009	44 (66%)

SIZE OF STUDIES
(No. symptomatic individuals)

- Median: 371
- IQR: 211 to 1,000
- Range: 101 to 287,724

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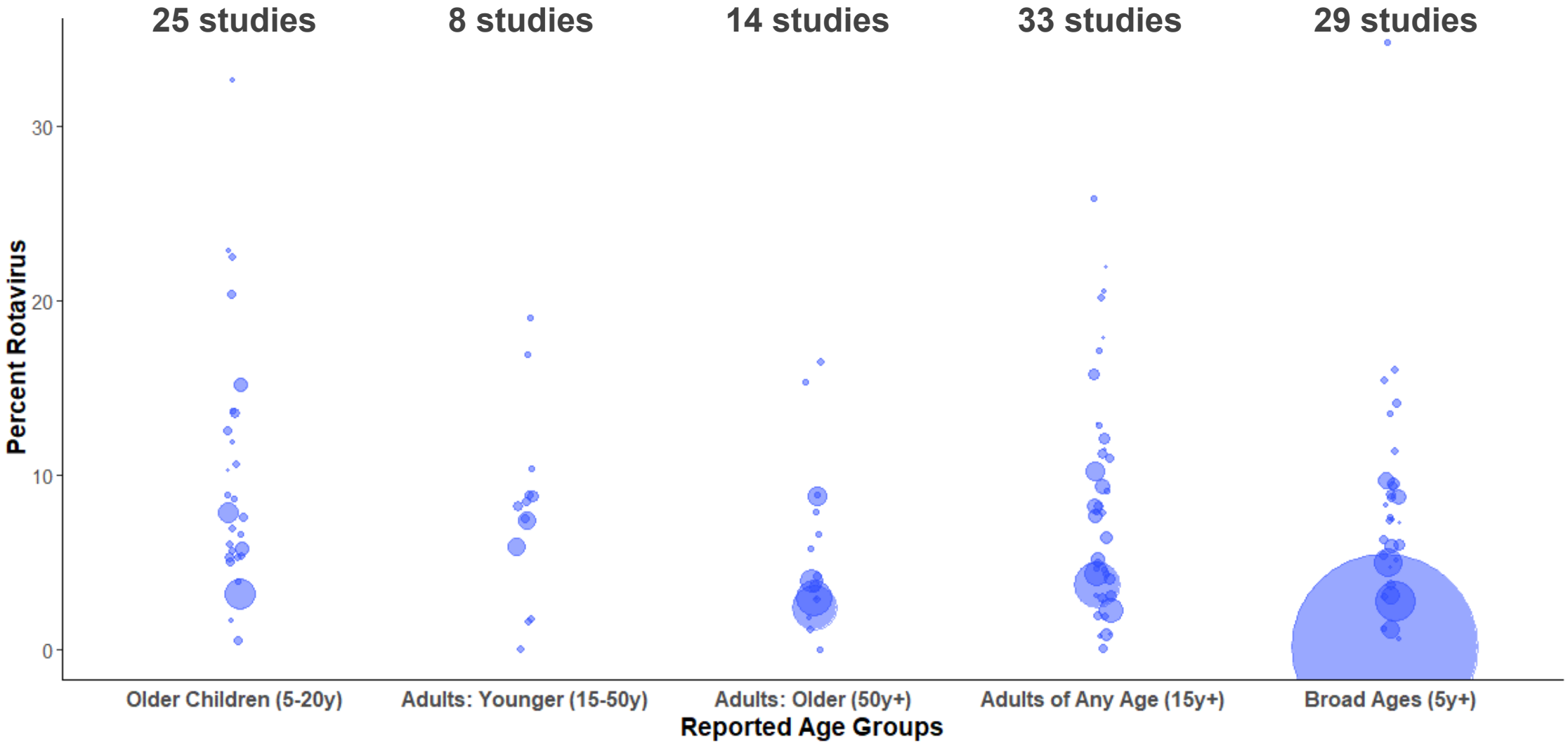
RESULTS:

Rotavirus Prevalence Among **People ≥5 Years Old with Diarrhea**

PERCENT OF DIARRHEA CASES DUE TO ROTAVIRUS BY AGE GROUP



1 circle per data point. Circle size corresponds to sample size (range: 100-200,000+).

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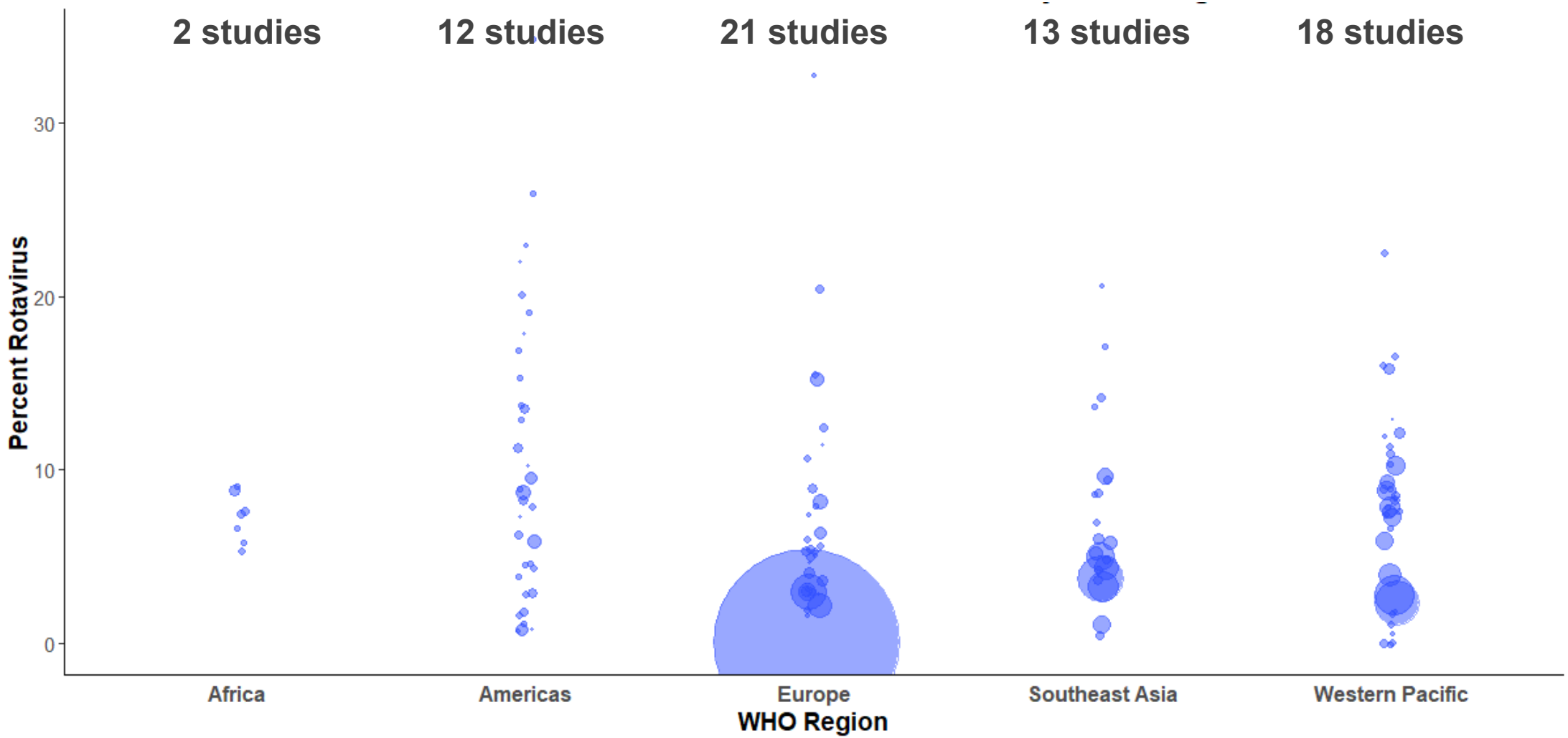
PERCENT OF DIARRHEA CASES DUE TO ROTAVIRUS BY WHO REGION



1 circle per data point. Circle size corresponds to sample size (range: 100-200,000+).

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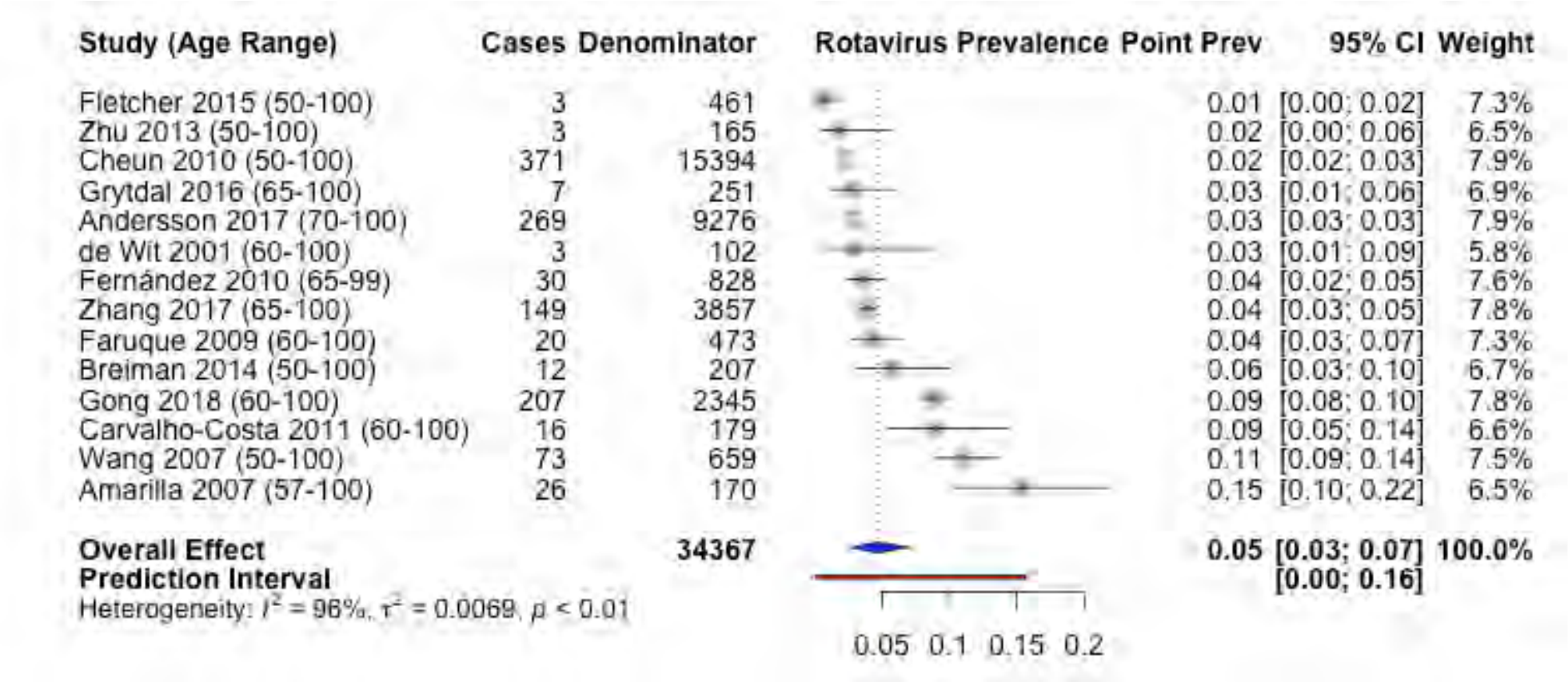
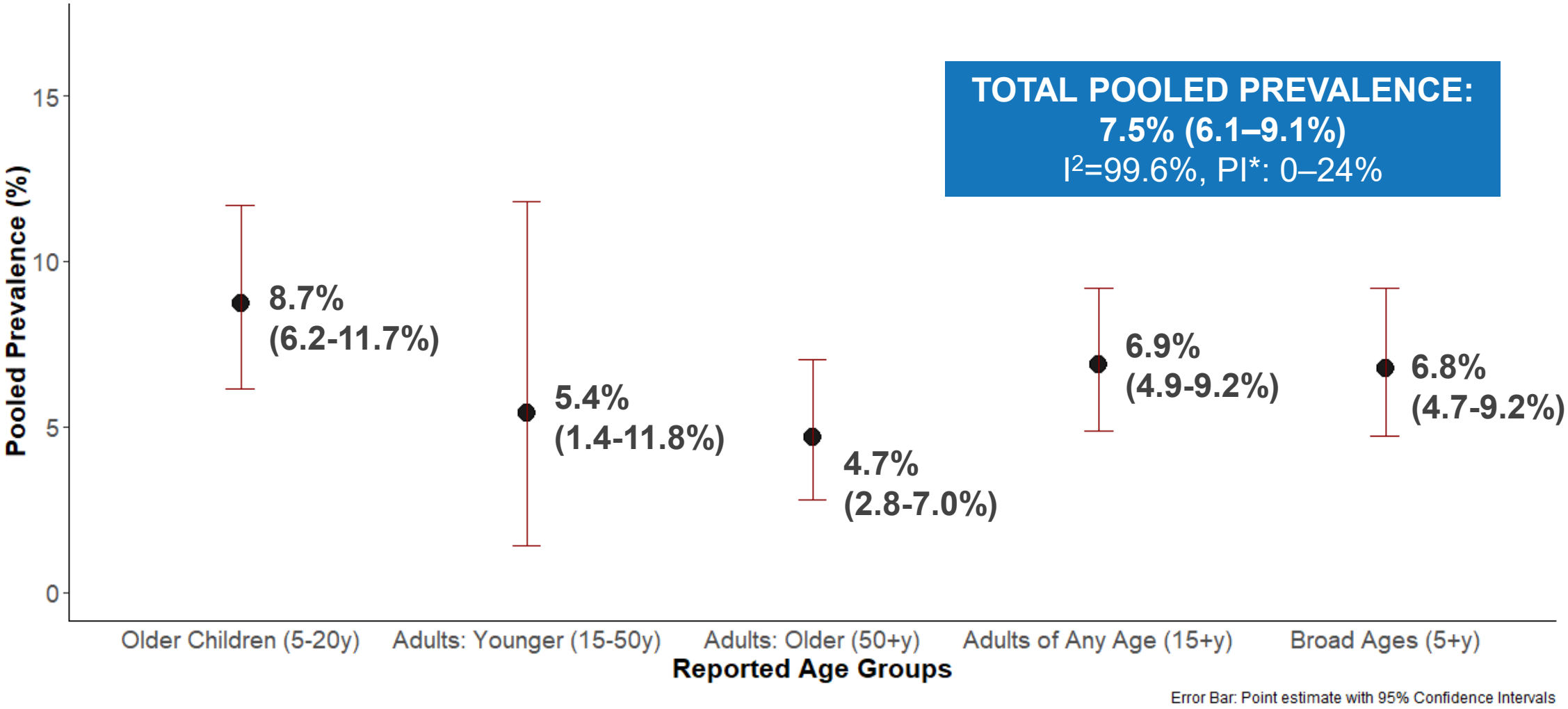
META-ANALYSIS RESULTS: EXAMPLE OUTPUT

ESTIMATED PREVALENCE OF ROTAVIRUS AMONG OLDER ADULTS (≥50 Y.O.)



Forest plots generated for all analyses are available in appendix

ESTIMATED ROTAVIRUS PREVALENCE BY AGE



Overall prevalence similar among all age groups

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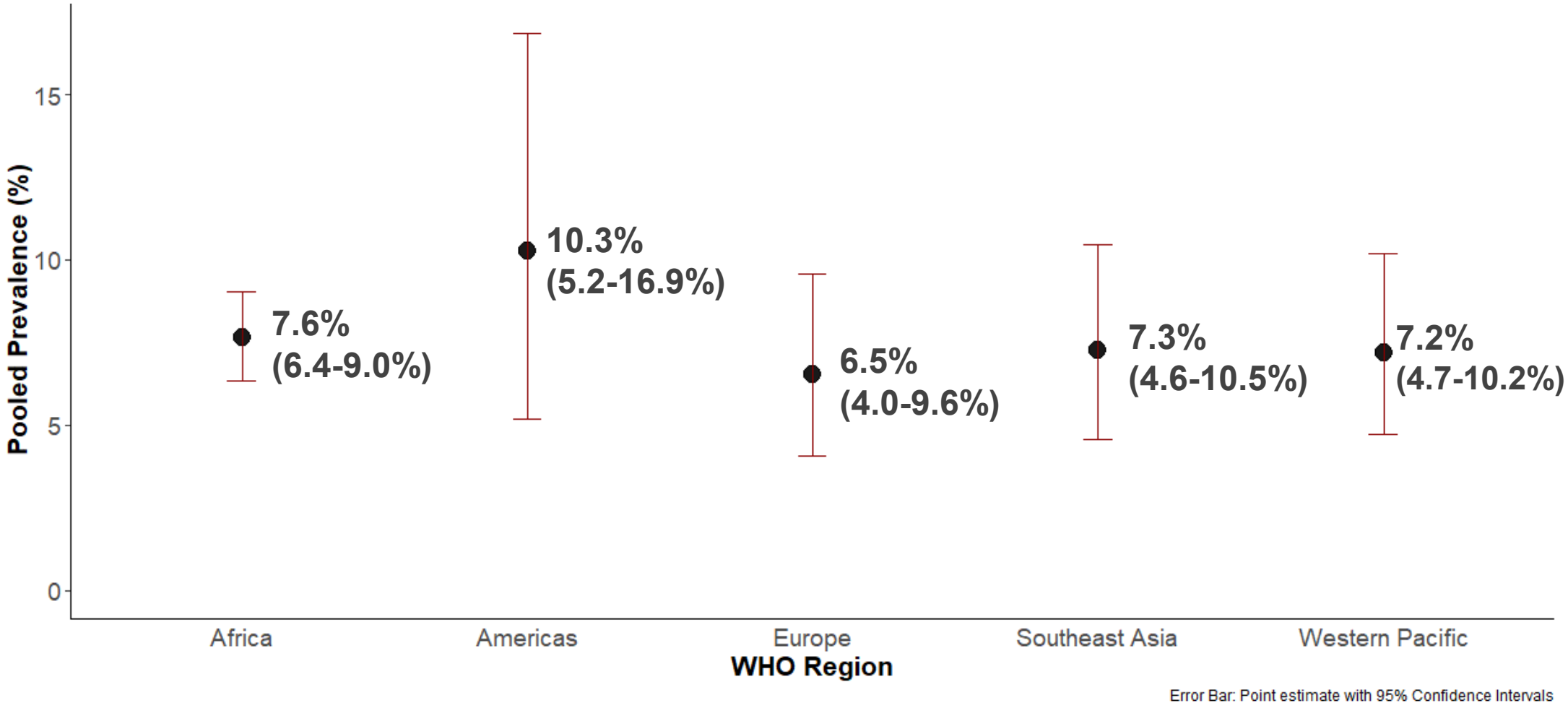
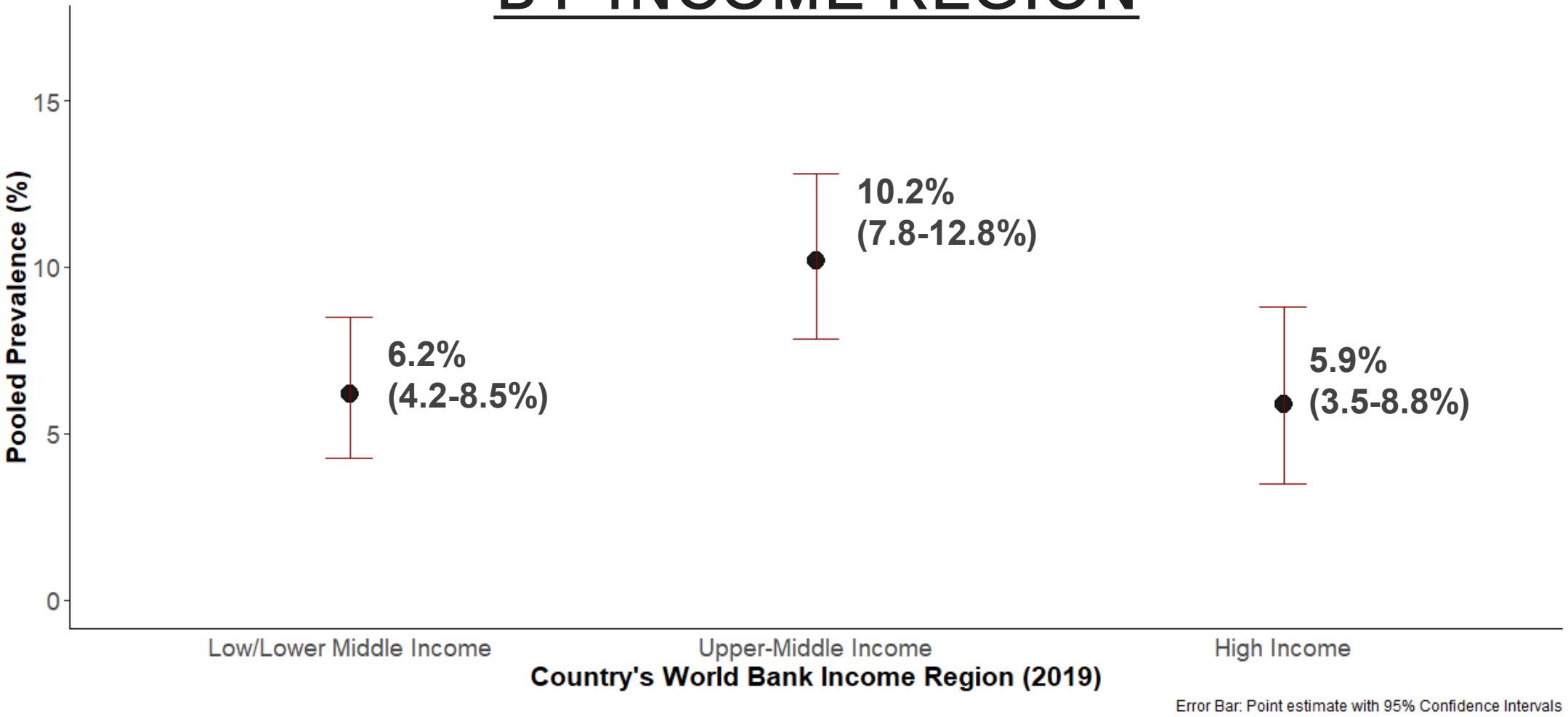
*Prediction Interval

ESTIMATED ROTAVIRUS PREVALENCE BY WHO REGION



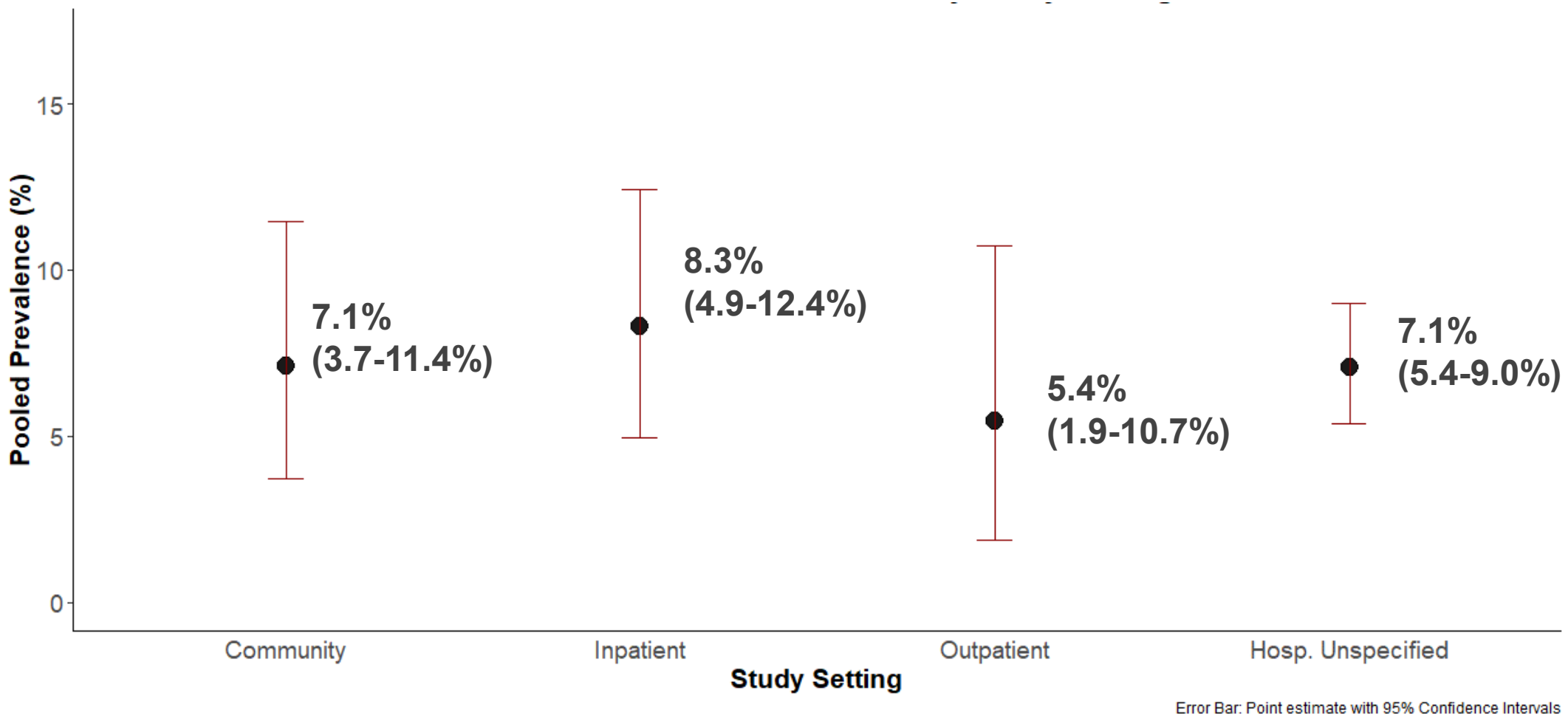
Similar rotavirus prevalence across all regions with available data

ESTIMATED ROTAVIRUS PREVALENCE BY INCOME REGION



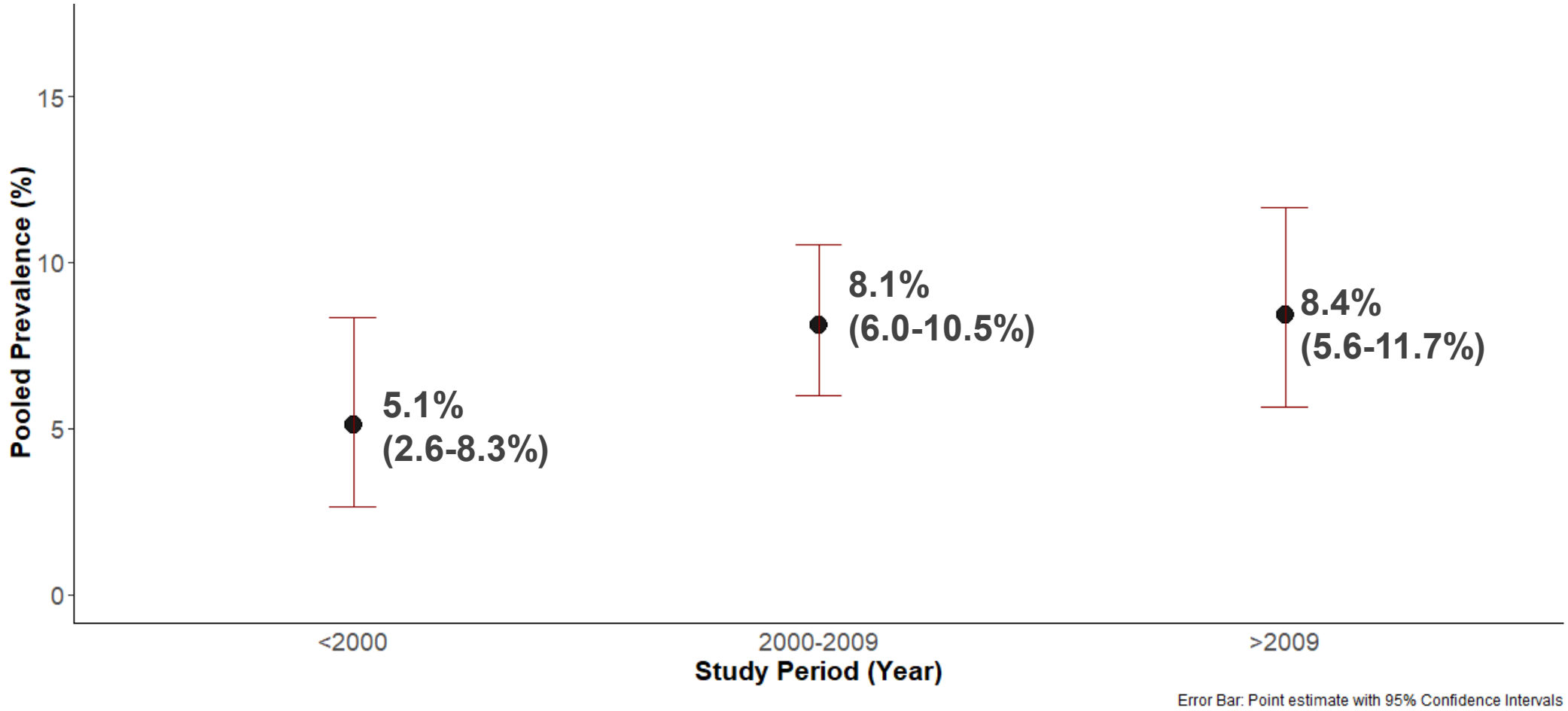
Similar rotavirus prevalence across income regions

ESTIMATED ROTAVIRUS PREVALENCE BY STUDY SETTING



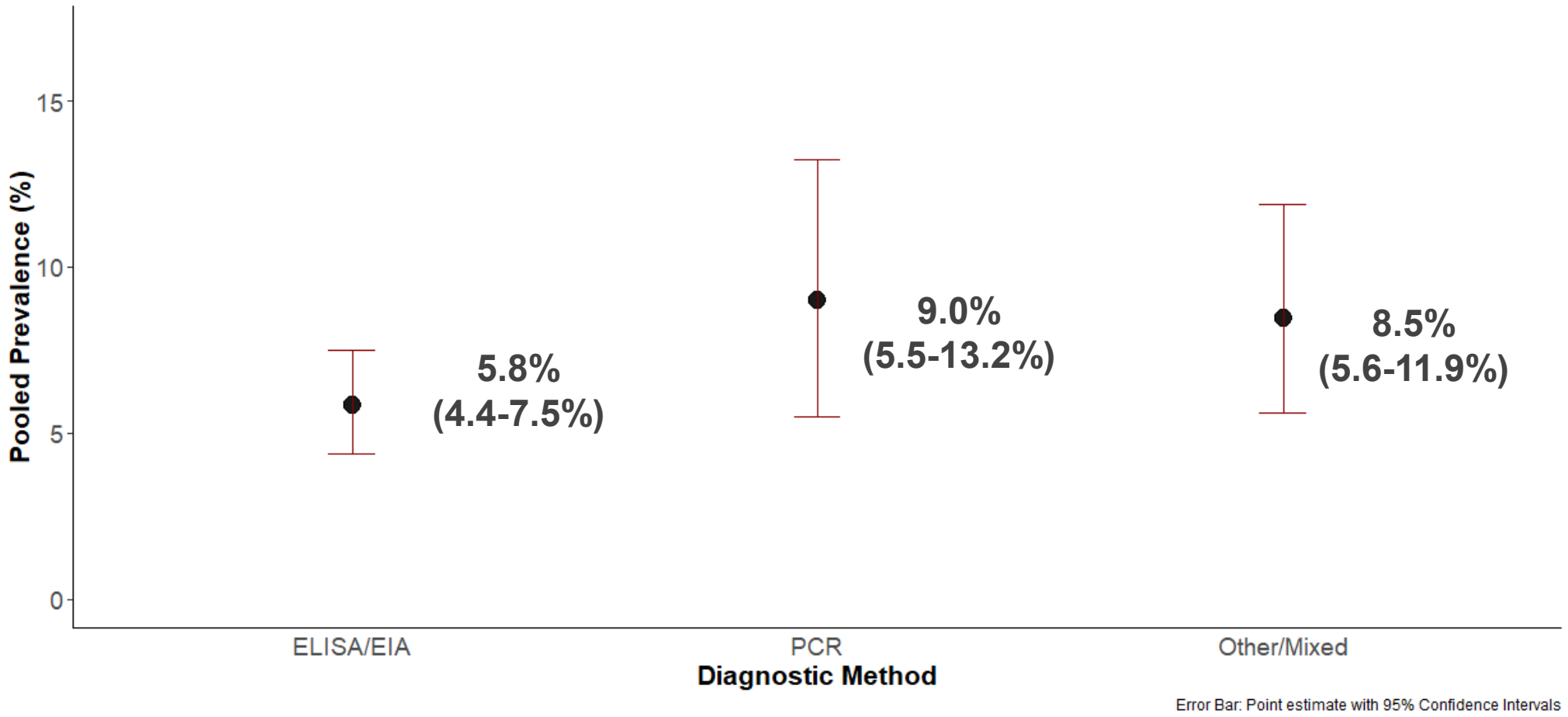
Similar prevalence by study setting

ESTIMATED ROTAVIRUS PREVALENCE BY STUDY PERIOD



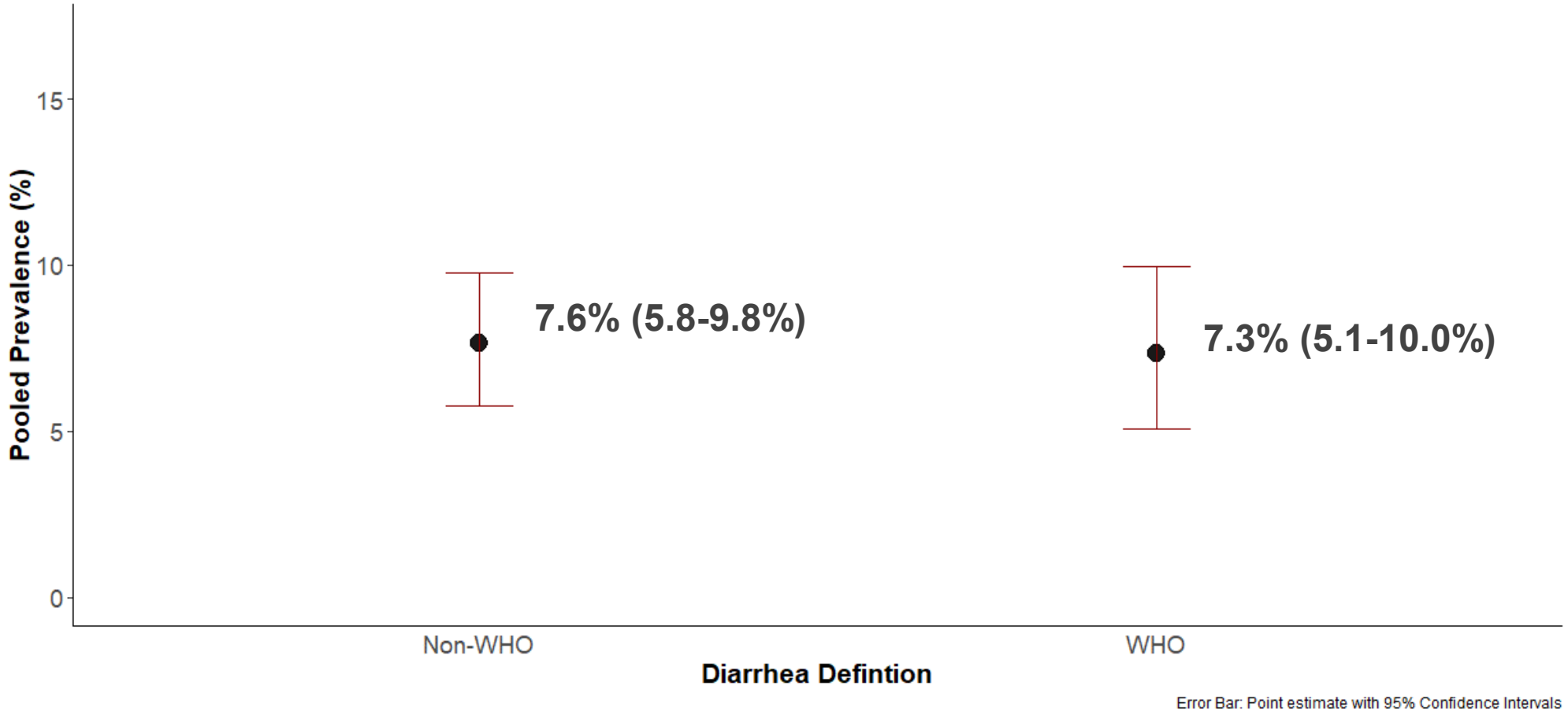
Similar prevalence across time periods

ESTIMATED ROTAVIRUS PREVALENCE BY DIAGNOSTIC METHOD



Similar prevalence across diagnostic methods

ESTIMATED ROTAVIRUS PREVALENCE BY STUDY DIARRHEA DEFINITION



Inclusion of studies with non-standardized definition for diarrhea does not alter results

DISCUSSION

SYNTHESIS OF FINDINGS

1. Qualitatively, rotavirus prevalence among those with diarrhea appears lower in older children and adults than in children under 5
2. Similar mean prevalence across variables analyzed
3. Paucity of data from lower income settings
4. Large heterogeneity observed and unexplained by analysis
5. Wide variation in reported prevalence yields broad prediction intervals

RIGOROUS META-ANALYSIS CONDUCTED DESPITE LIMITATIONS WITH AVAILABLE DATA

STRENGTHS

- Systematic literature review
- Wide time range covered (1990–2019)
- Large number of studies included in review
- Weighted studies by inverse variance
- Disaggregated by several factors

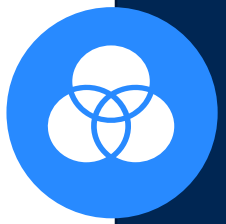
LIMITATIONS

- Few studies from lower-income regions limit understanding of global burden
- Reporting by age difficult due to variations in age categories studies used
- Unstable estimates for extreme values
- No assessment of study quality
- Conditional prevalence cannot speak to overall burden of rotavirus

STUDY HIGHLIGHTS: PREVALENCE OF ROTAVIRUS AMONG PEOPLE 5 YEARS AND OLDER WITH DIARRHEA

FINDINGS

- Estimated mean rotavirus prevalence in older children and adults with diarrhea is **7.5% (95% CI: 6.1–9.1%).**
- Generally **no differences observed** across geography, study design, or time, with similarly wide variation in disaggregated analyses
- **Cautious interpretation necessary** due to large heterogeneity of data



WHAT THIS STUDY ADDS

- **First known meta-analysis** of rotavirus burden among older children and adults
- **Summaries rotavirus prevalence** in populations ≥5 years old globally by age group, geography, and study type

REMAINING QUESTIONS

- What drives the heterogeneity observed between studies?
- How do these estimates of prevalence compare to other global estimates?
- How does prevalence change with roll-out of rotavirus vaccine?

NEXT STEPS

FINALIZE DELIVERABLE AND DEVELOP MANUSCRIPT

DELIVERABLE REVIEW

- Review workbook and appendices
- Discuss any preferred adjustments

PROJECT CLOSE-OUT

- Shareability of results
- Timeline of feedback and official close-out

MANUSCRIPT DEVELOPMENT

- Expectations and involvement
- Preferred timeline

THANK YOU

Questions?

Please contact the START Center: start@uw.edu

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APPENDICES

Appendix 1: Search strings
Appendix 2: Distribution of studies among older adults
Appendix 3: Pooled prevalence estimates: key variables by age
Appendix 4: Primary forest plots: age groups
Appendix 5: Secondary forest plots: other key variables
Appendix 6: Tertiary forest plots: key variables by age

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Appendix 1. Search Strings

PubMed

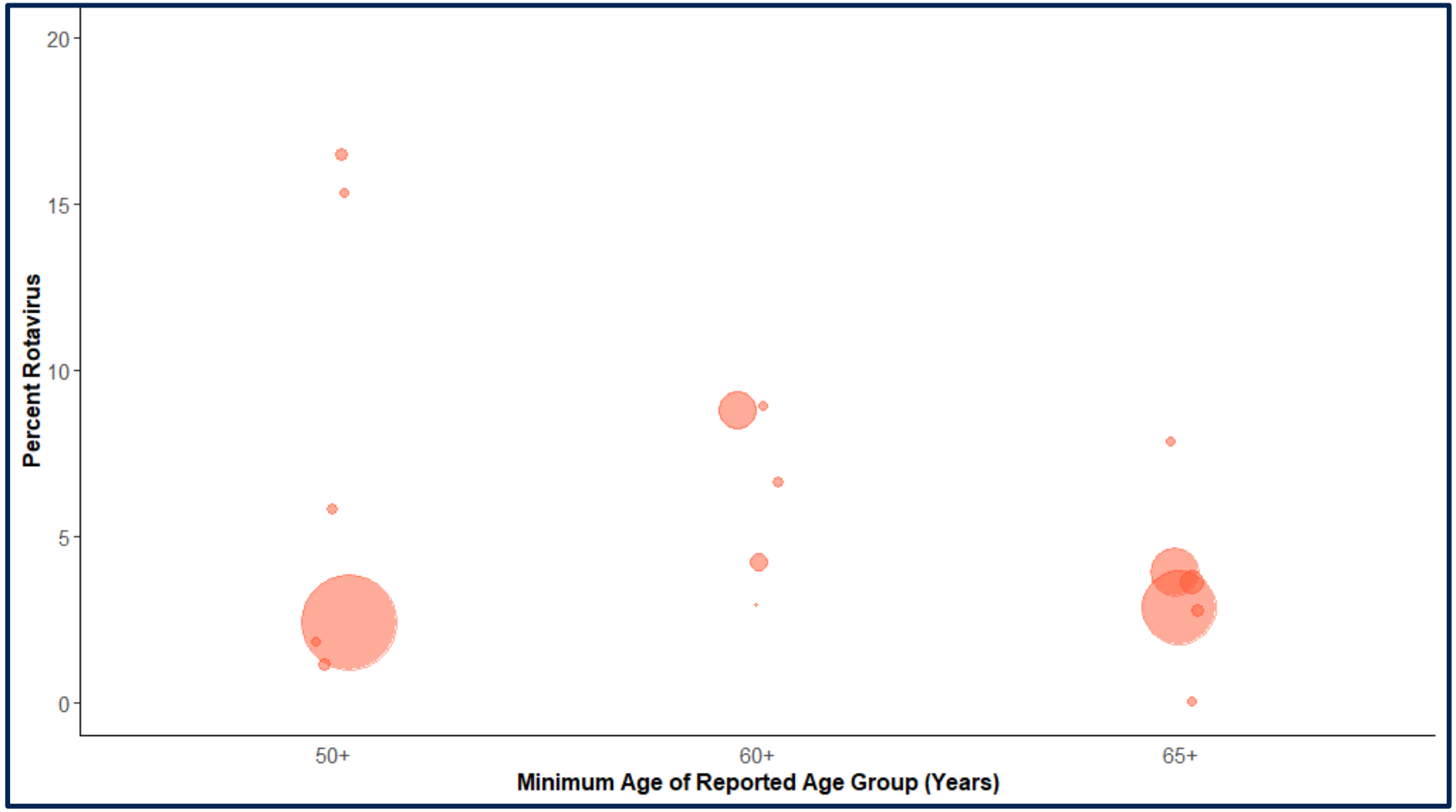
(((((((rotavirus infections/epidemiology[mh] OR ((rotavirus infections[majr] OR rotavirus[majr] OR rotavirus[tiab] OR rotaviruses[tiab]) AND (prevalence[mh] OR mortality[mh] OR burden[ti] OR etiology[ti] OR aetiology[ti] OR mortality[ti] OR death[ti] OR deaths[ti] OR fatal[ti] OR fatality[ti] OR epidemiology[ti])))) AND 1990:3000[pdat] NOT (animals[mh] NOT humans[mh]) NOT (colitis[tiab] OR enterocolitis[tiab] OR inflammatory bowel[tiab] OR irritable[tiab] OR Crohn*[tiab] OR HIV[ti] OR treatment[ti] OR therapy[ti] OR appendicitis[tiab] OR esophag*[tiab] OR surger*[tiab] OR gastritis[tiab] OR liver[tiab] OR case report[ti] OR case-report[ti] OR outbreak*[ti] OR travel*[ti] OR therapy[ti] OR treatment[ti])))))))

Embase

('rotavirus'/exp OR 'rotavirus' OR 'human rotavirus'/exp OR 'human rotavirus' OR 'rotavirus infection'/exp OR 'rotavirus infection' OR rotavirus:ti,ab OR rotaviruses:ti,ab) AND ('prevalence'/exp OR 'mortality'/exp OR burden:ti OR etiology:ti OR aetiology:ti OR mortality:ti OR death:ti OR deaths:ti OR fatal:ti OR fatality:ti OR epidemiology:ti) AND [1990-3000]/py AND [humans]/lim NOT ('colitis':ti,ab OR enterocolitis:ti,ab OR 'inflammatory bowel':ti,ab OR irritable:ti,ab OR crohn*:ti,ab OR hiv:ti OR treatment:ti OR appendicitis:ti,ab OR esophag*:ti,ab OR surger*:ti,ab OR gastritis:ti,ab OR liver:ti,ab OR 'case report':ti OR 'case-report':ti OR outbreak*:ti OR travel*:ti OR therapy:ti OR 'conference abstract'/it)

Appendix 2: Distribution of Studies for Older Adults

Data-driven approach used to determine cut-off for “older adults” category. A minimum age range of 50 was chosen due to similarities amongst data in the 50+, 60+, and 65+ groups, along with the limited number of studies reporting on this age group



Each circle represents one datapoint. *Circle size* corresponds to study size (range: 100-200,000+).

Appendix 3: Pooled Prevalence Estimates Disaggregated by Age and Key Variables

Key Variables:

WHO Region

Income Region

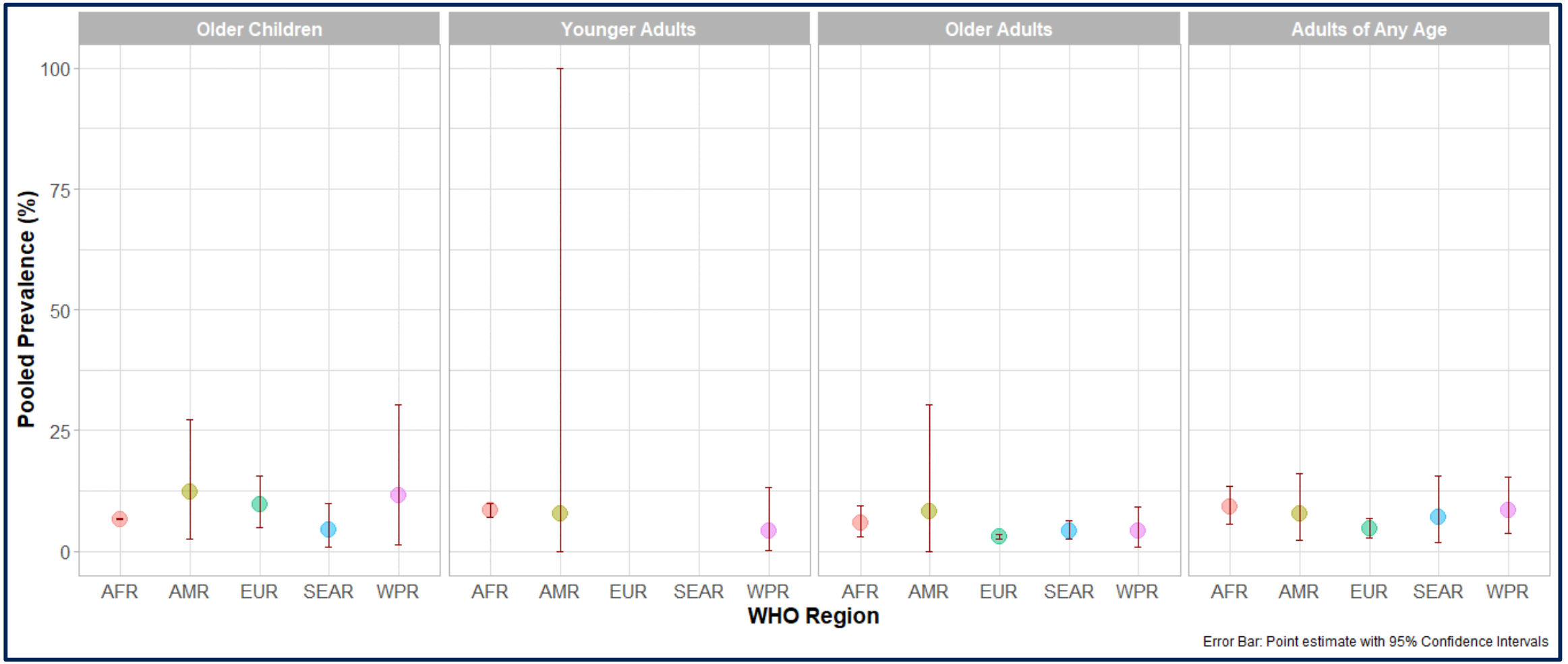
Study Setting

Study Period

Diarrhea Definition

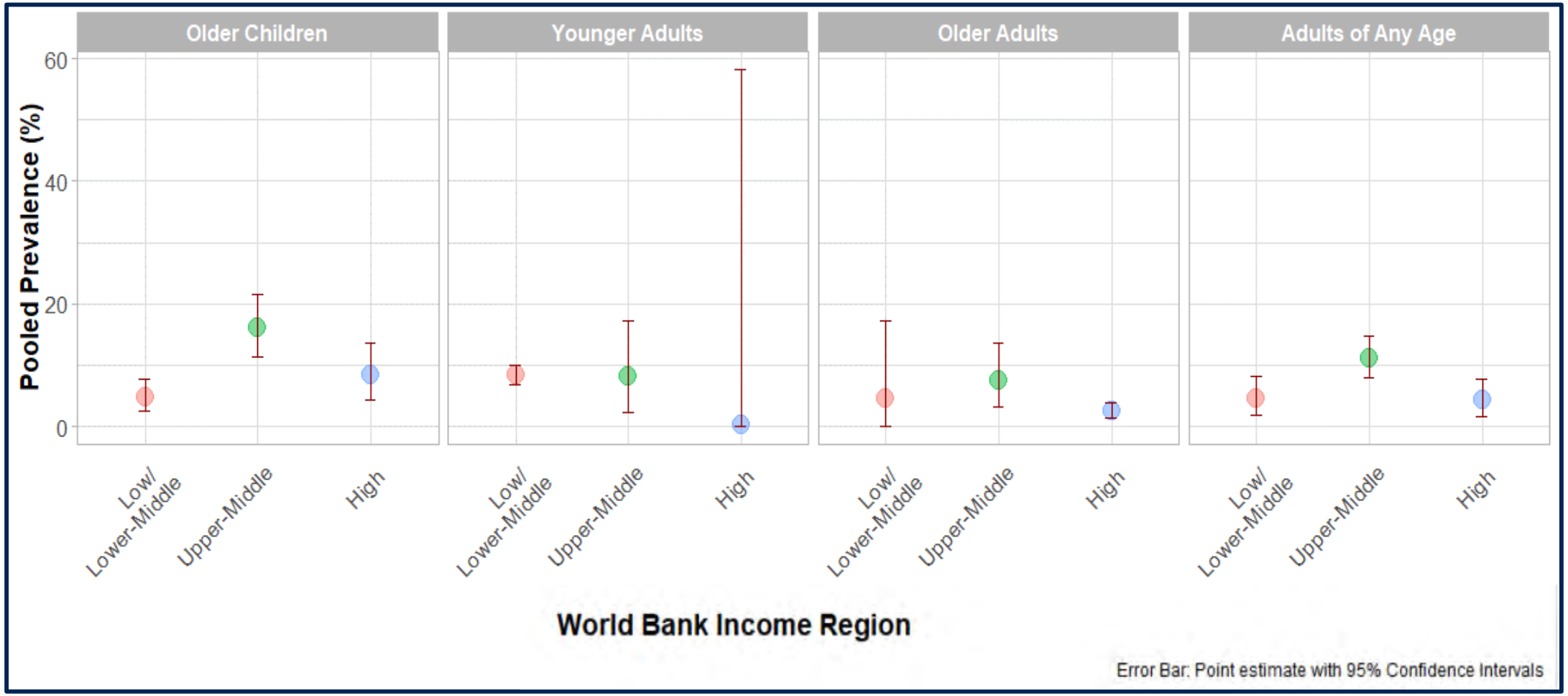
Estimated Rotavirus Prevalence by Age Group and WHO Region

Take-Away: No differences noted between WHO regions for each age group



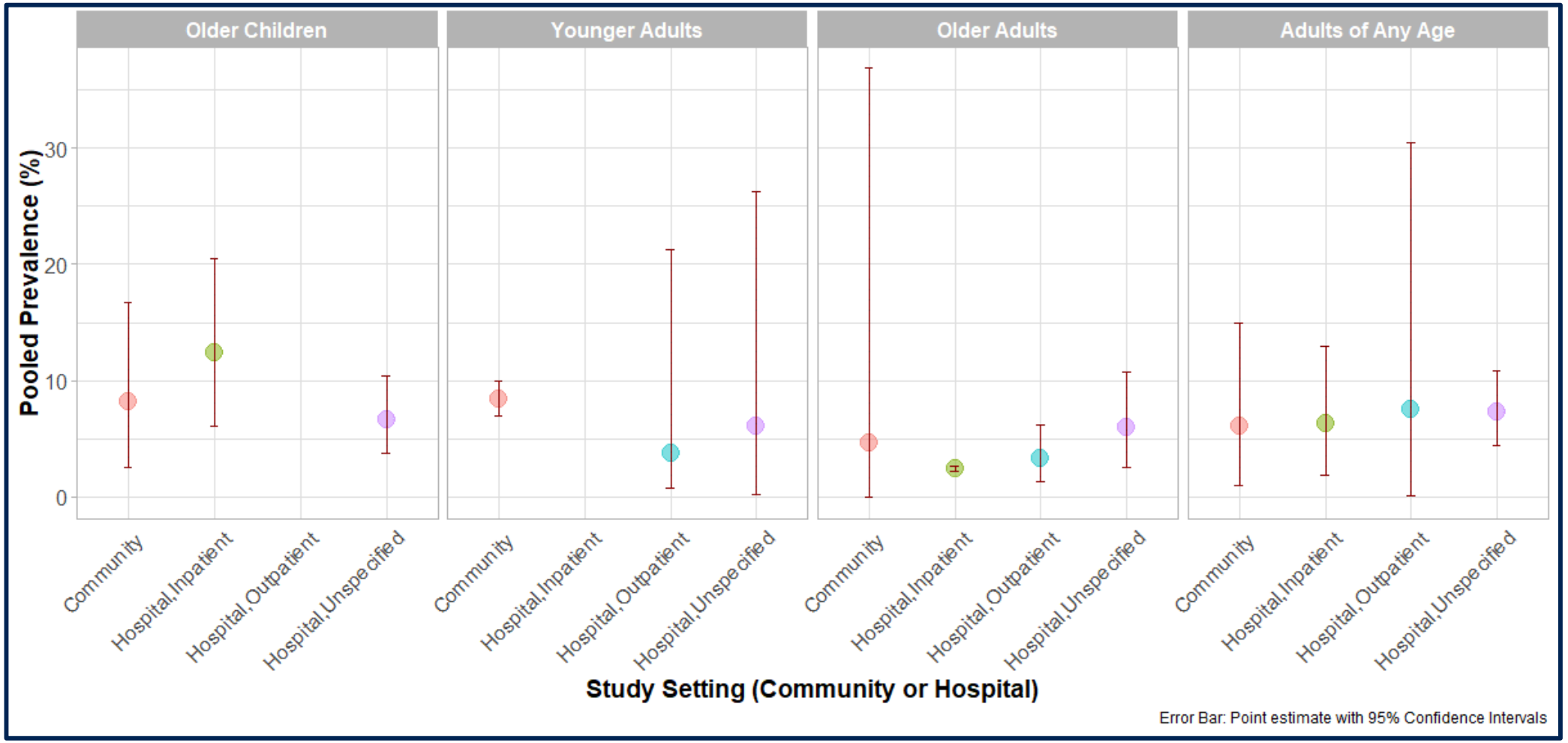
Estimated Rotavirus Prevalence by Age Group and Income Region

Take-Away: Similar patterns between income region observed for each age group



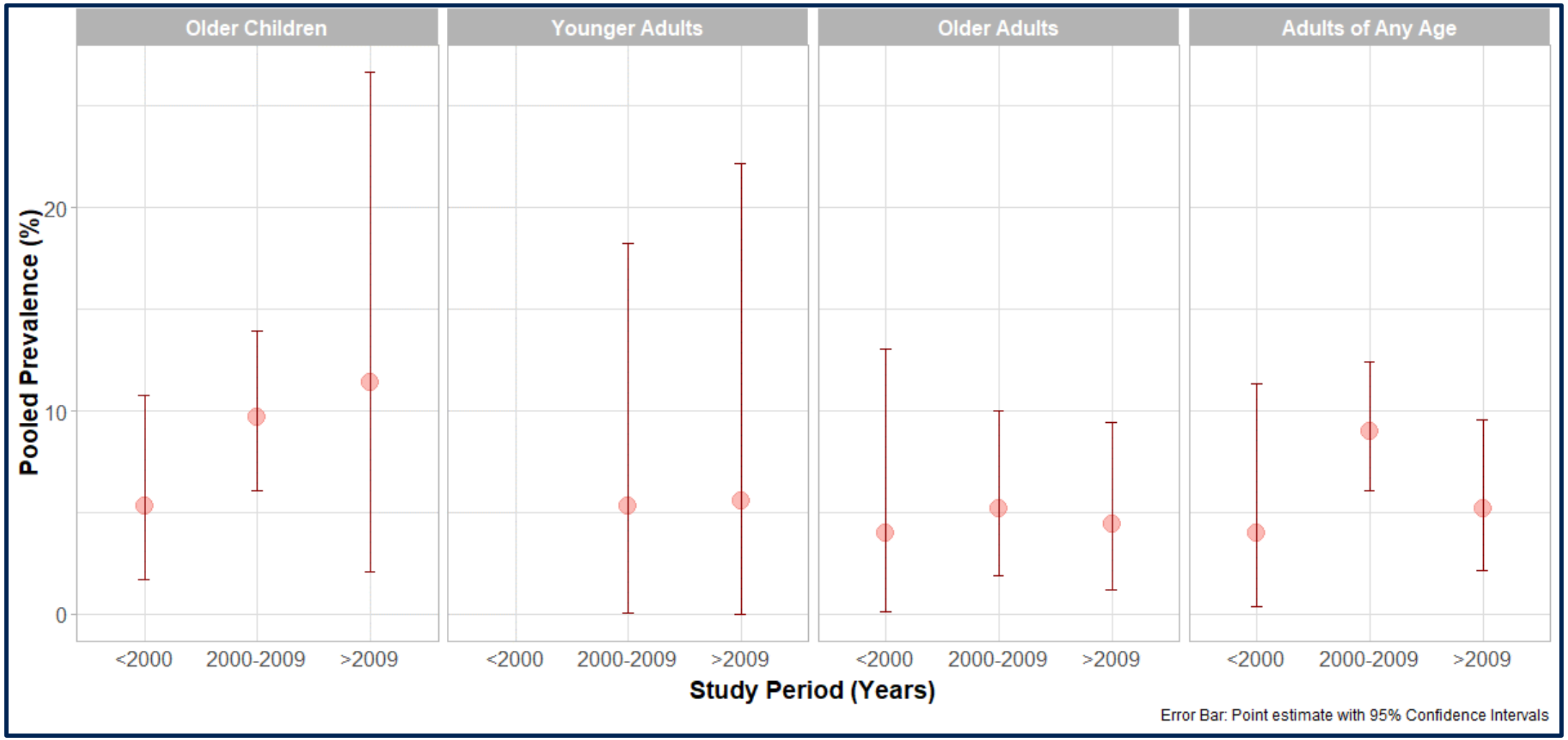
Estimated Rotavirus Prevalence by Age Group and Study Setting

Take-Away: No differences noted between age groups and study setting



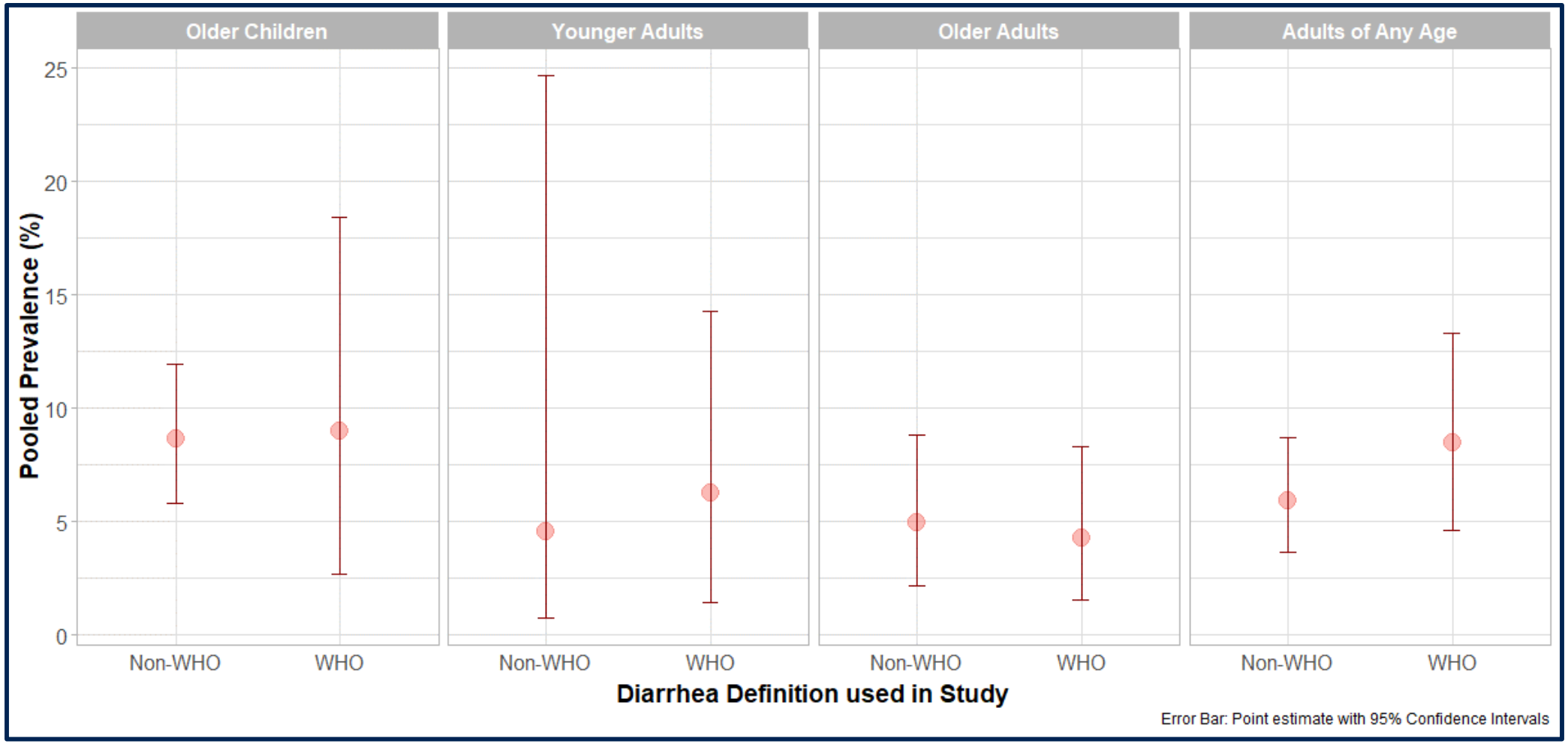
Estimated Rotavirus Prevalence by Age Group and Study Time Period

Take-Away: No difference noted in prevalence by age group and study period



Estimated Rotavirus Prevalence by Age Group and Diarrhea Definition

Take-Away: No difference noted in prevalence by age group and diarrhea definition

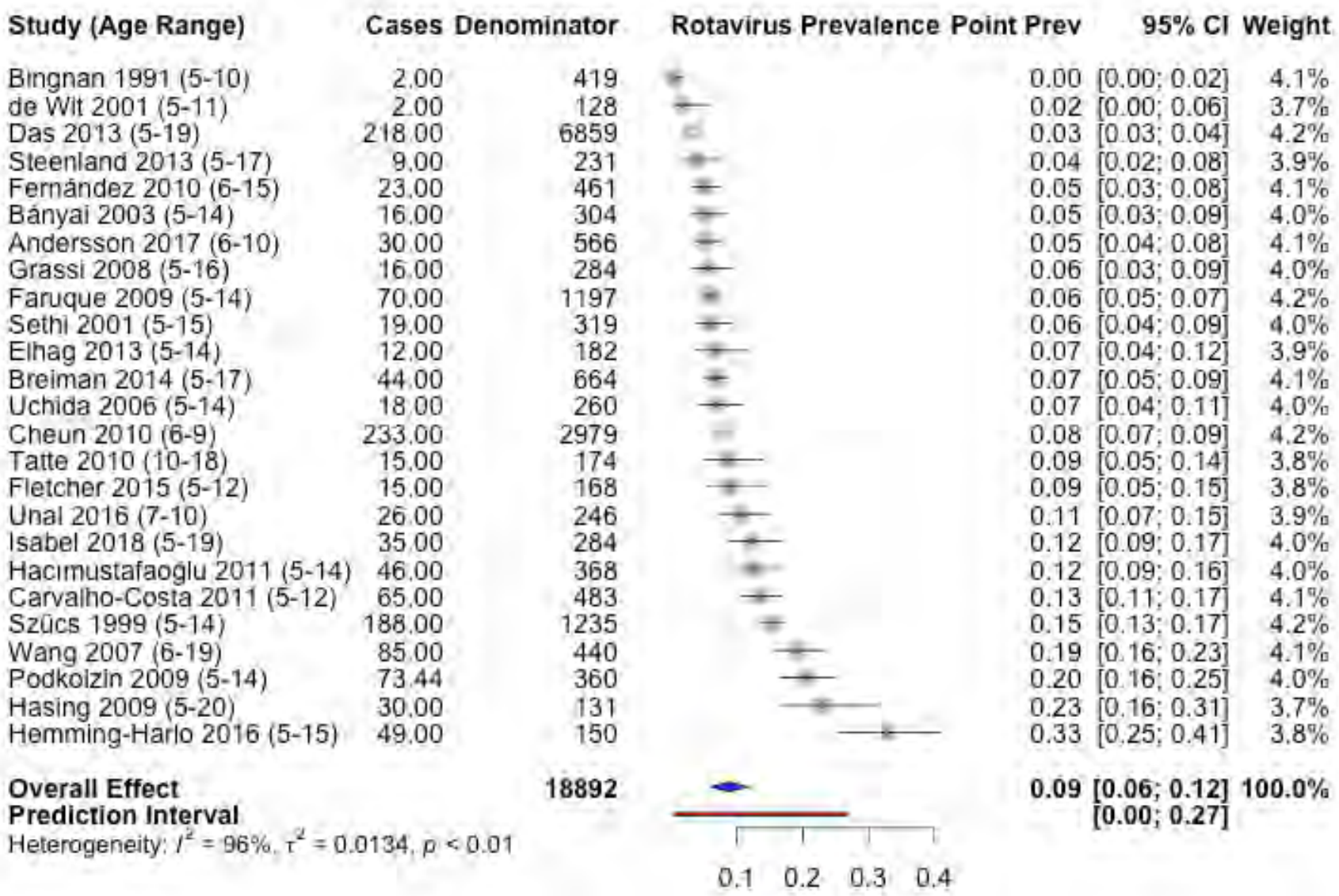


Appendix 4: Primary Forest Plots

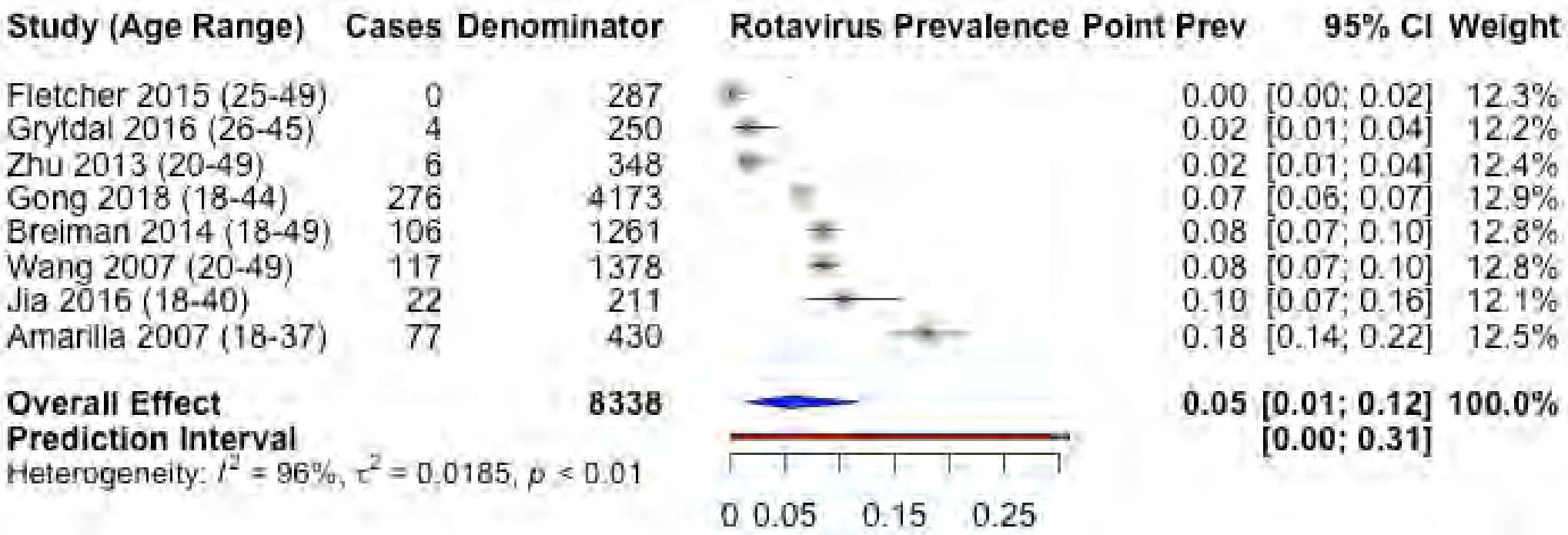
Pooled Prevalence by:

Age Group

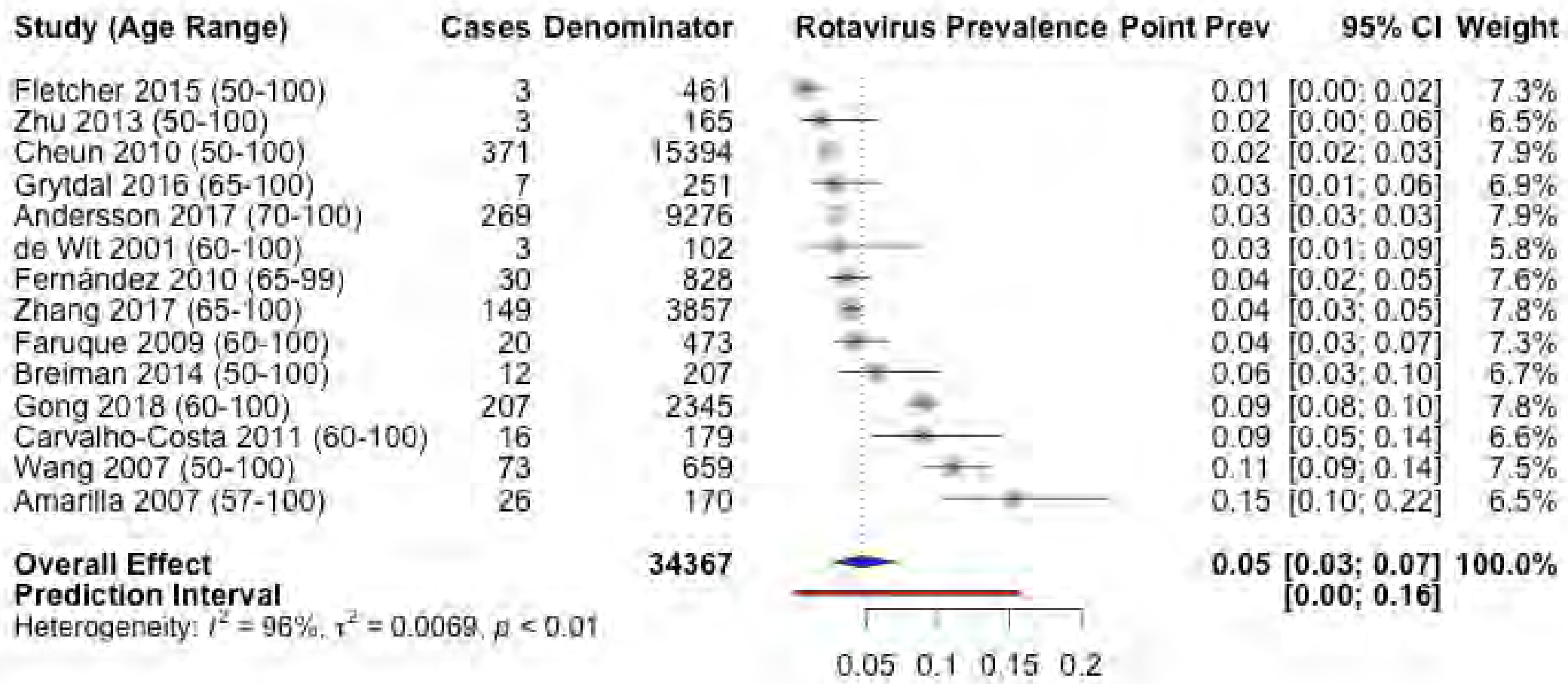
Forest Plot: Older Children and Adolescents (5-20 y.o.)



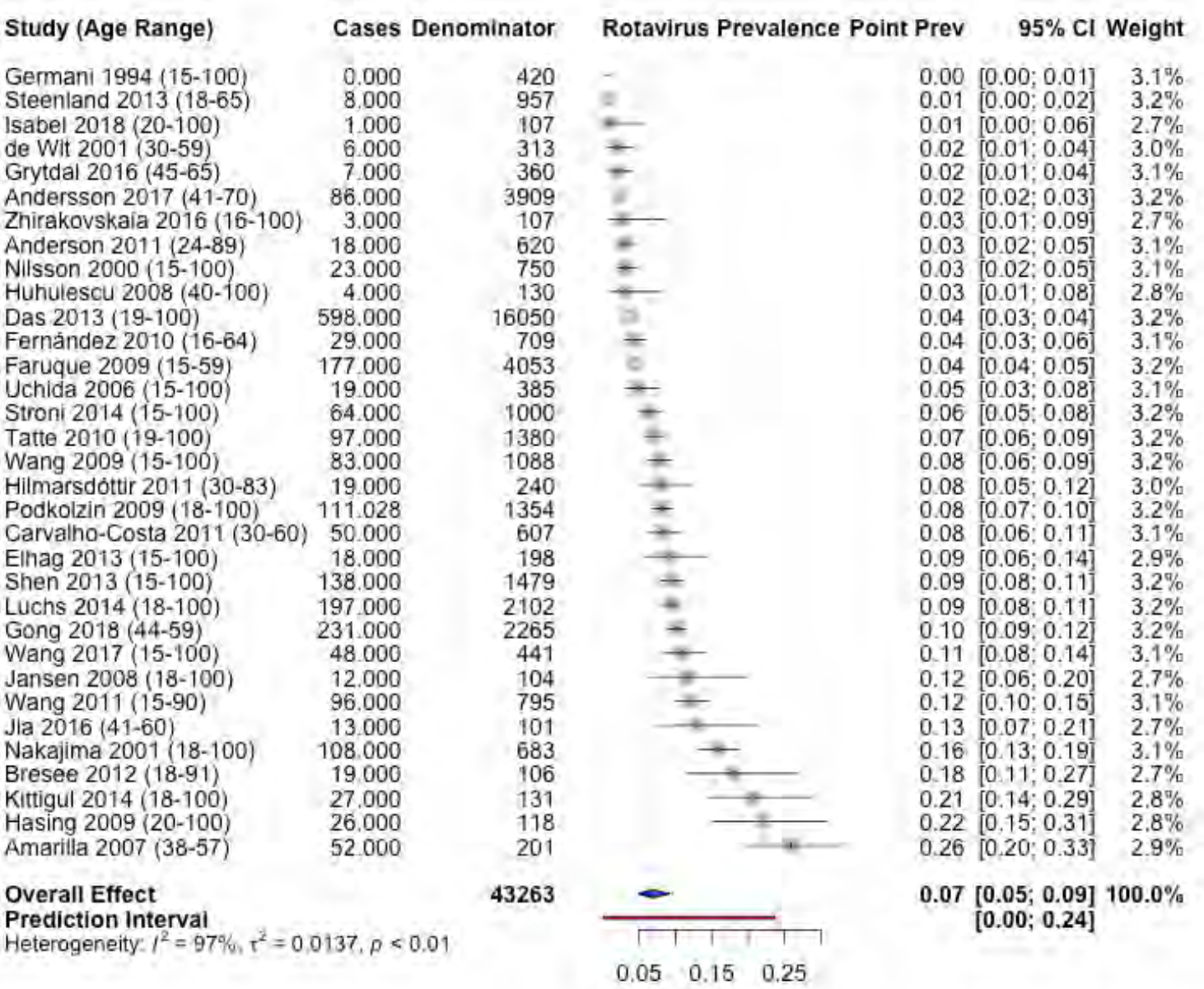
Forest Plot: Younger Adults (15-50 y.o.)



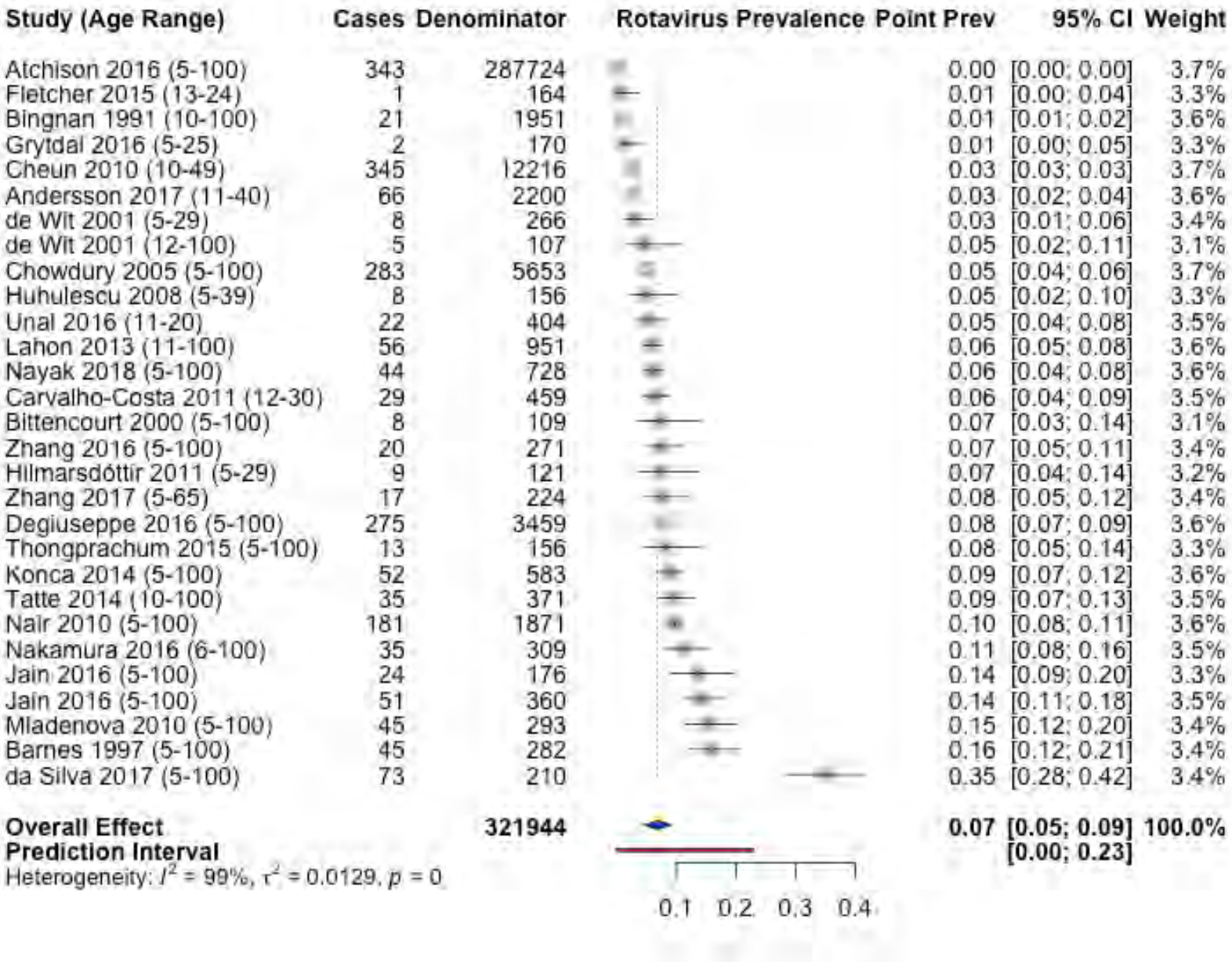
Forest Plot: Older Adults (50-100 y.o.)



Forest Plot: Broad Adult Ages (15-100 y.o.)



Forest Plot: Broad Age Groups (5-100 y.o.)



Appendix 5: Secondary Forest Plots

Pooled Prevalence by each level of the following variables:

WHO Region

Income Region

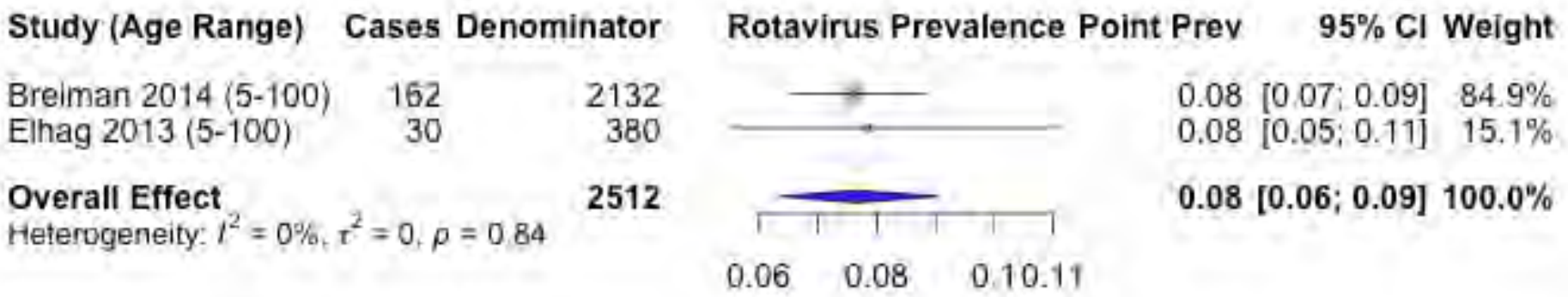
Study Setting

Laboratory Diagnostic Method

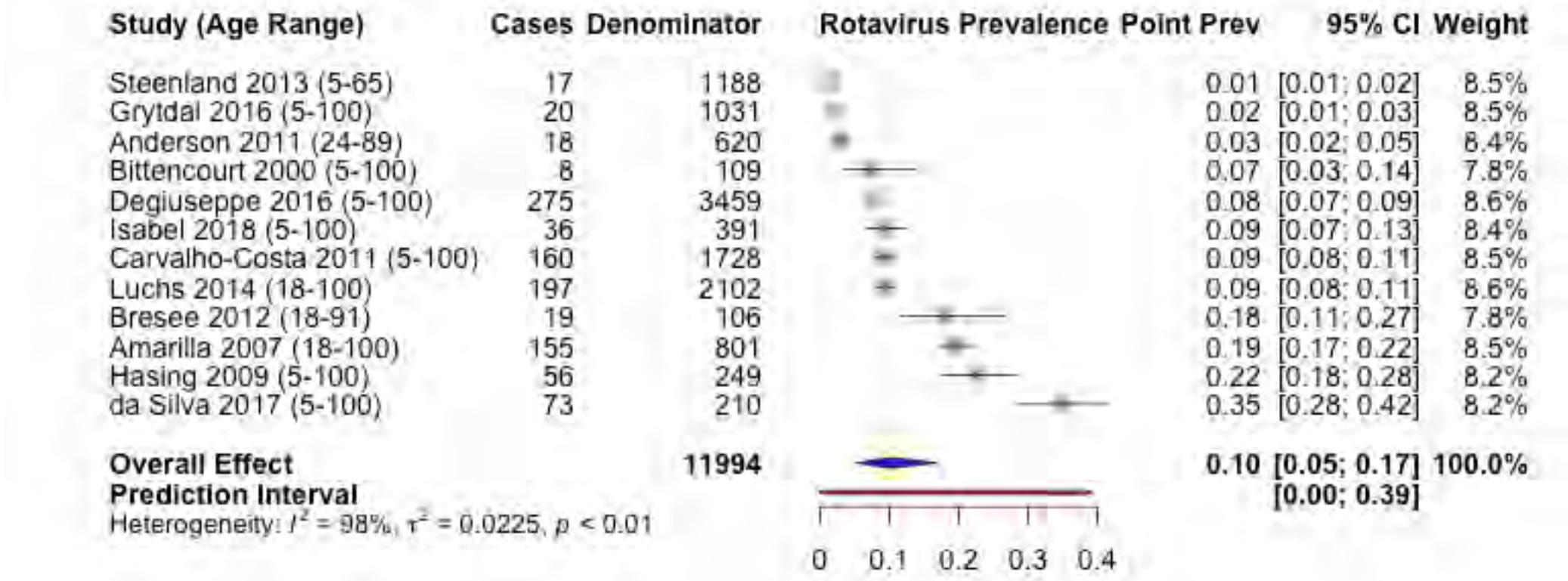
Study Period

Diarrhea Definition

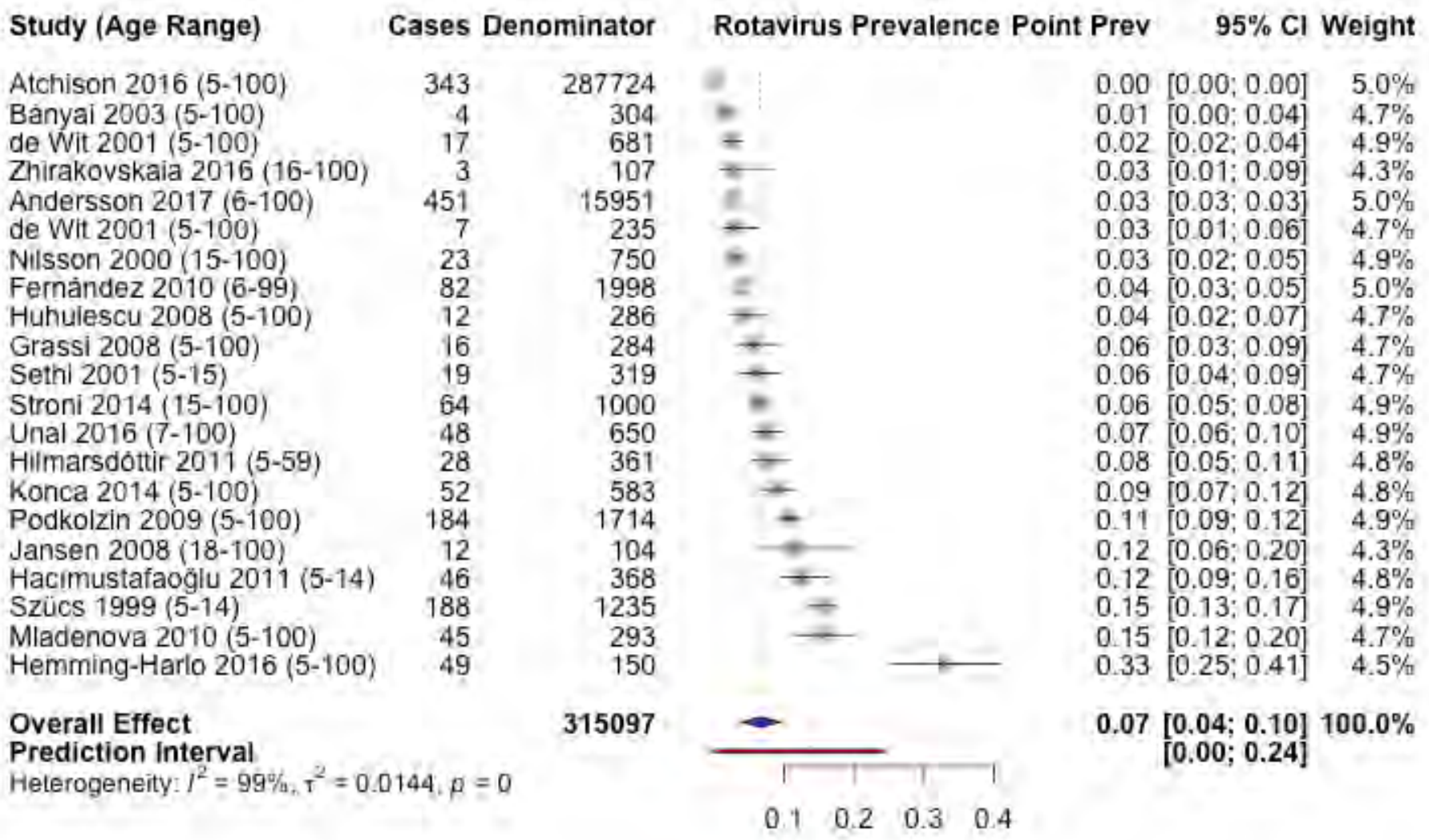
WHO REGION: Africa – Total



WHO REGION: The Americas – Total



WHO REGION: European Region – Total



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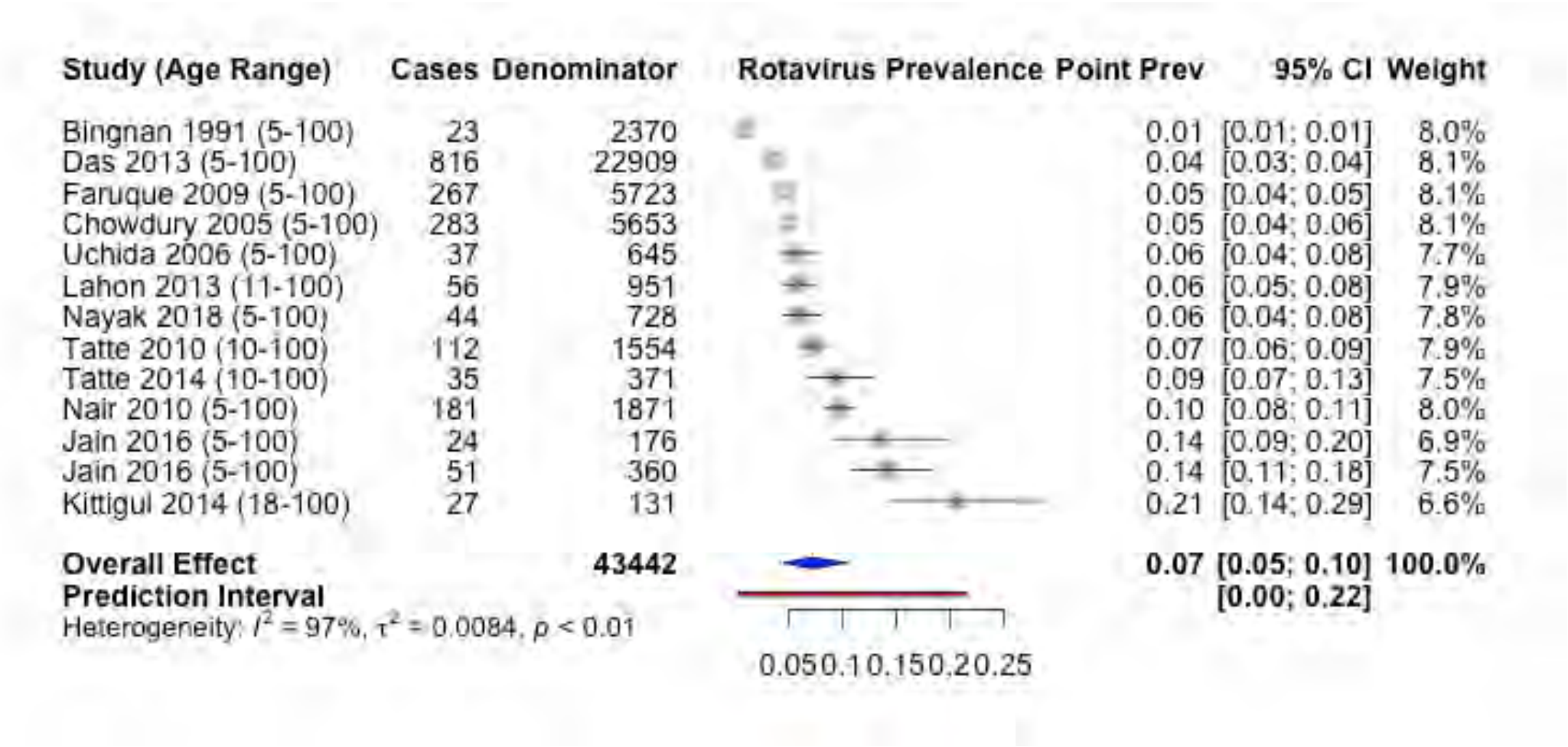
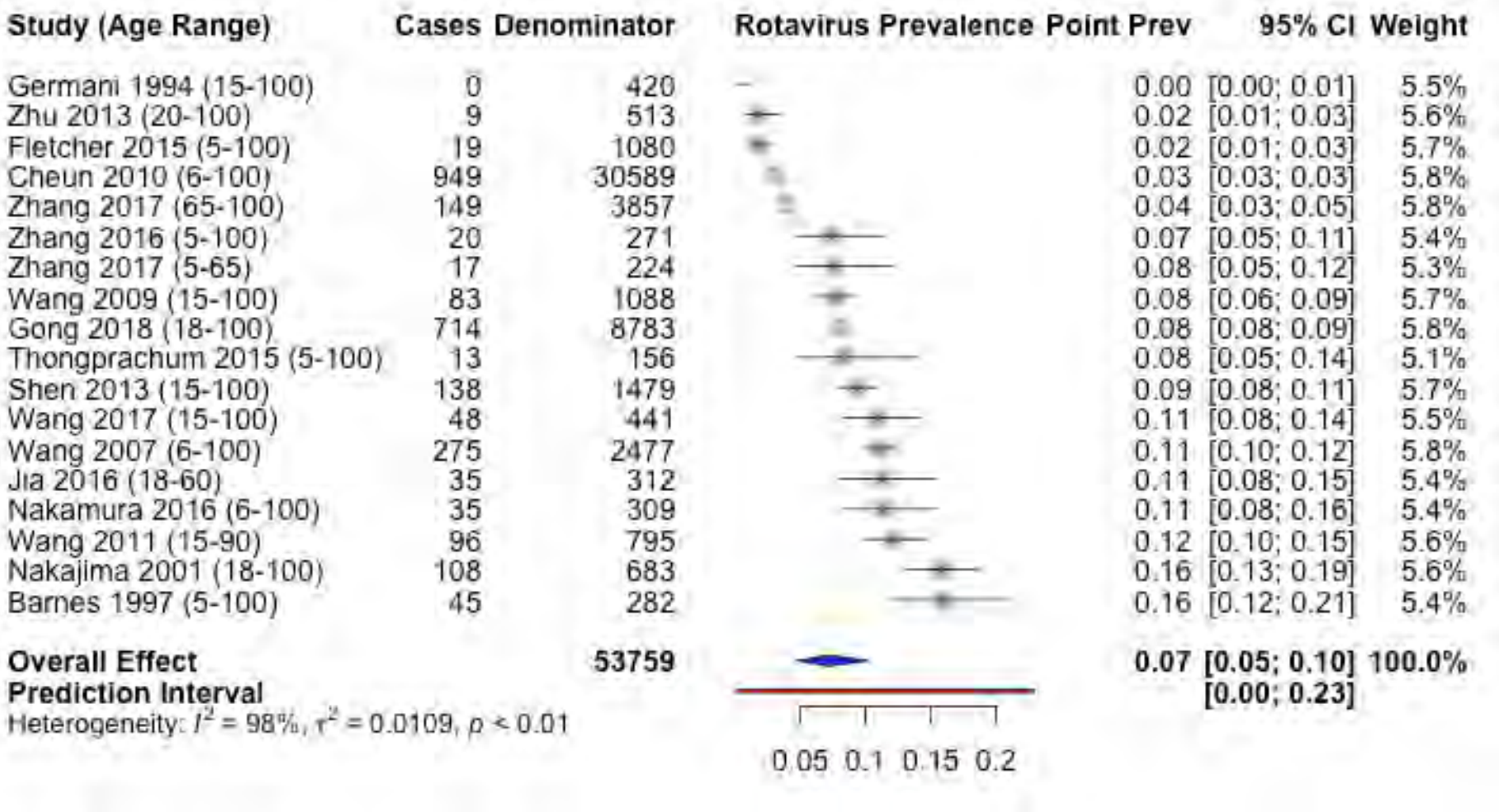
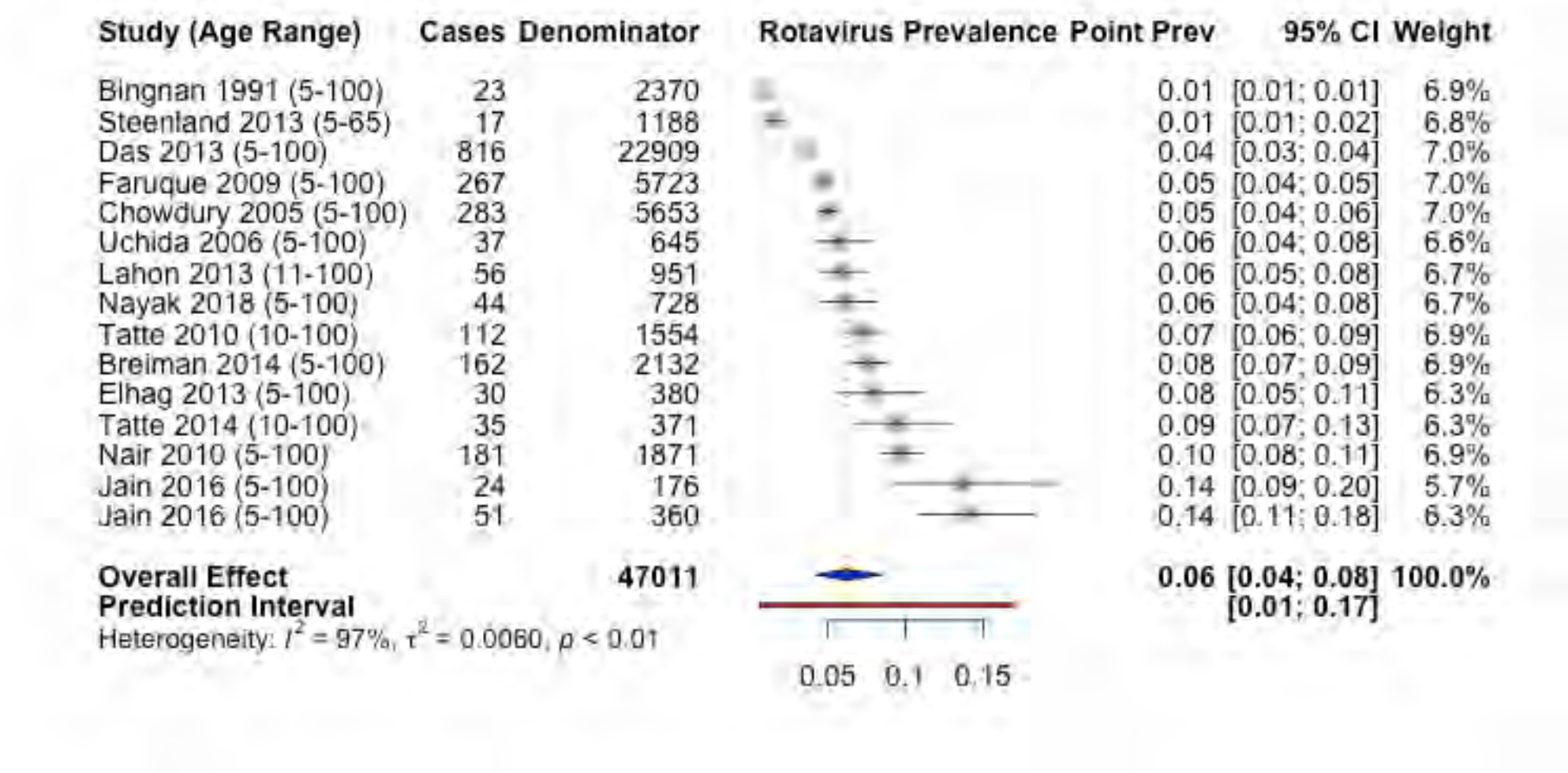
WHO REGION: Southeast Asia – Total



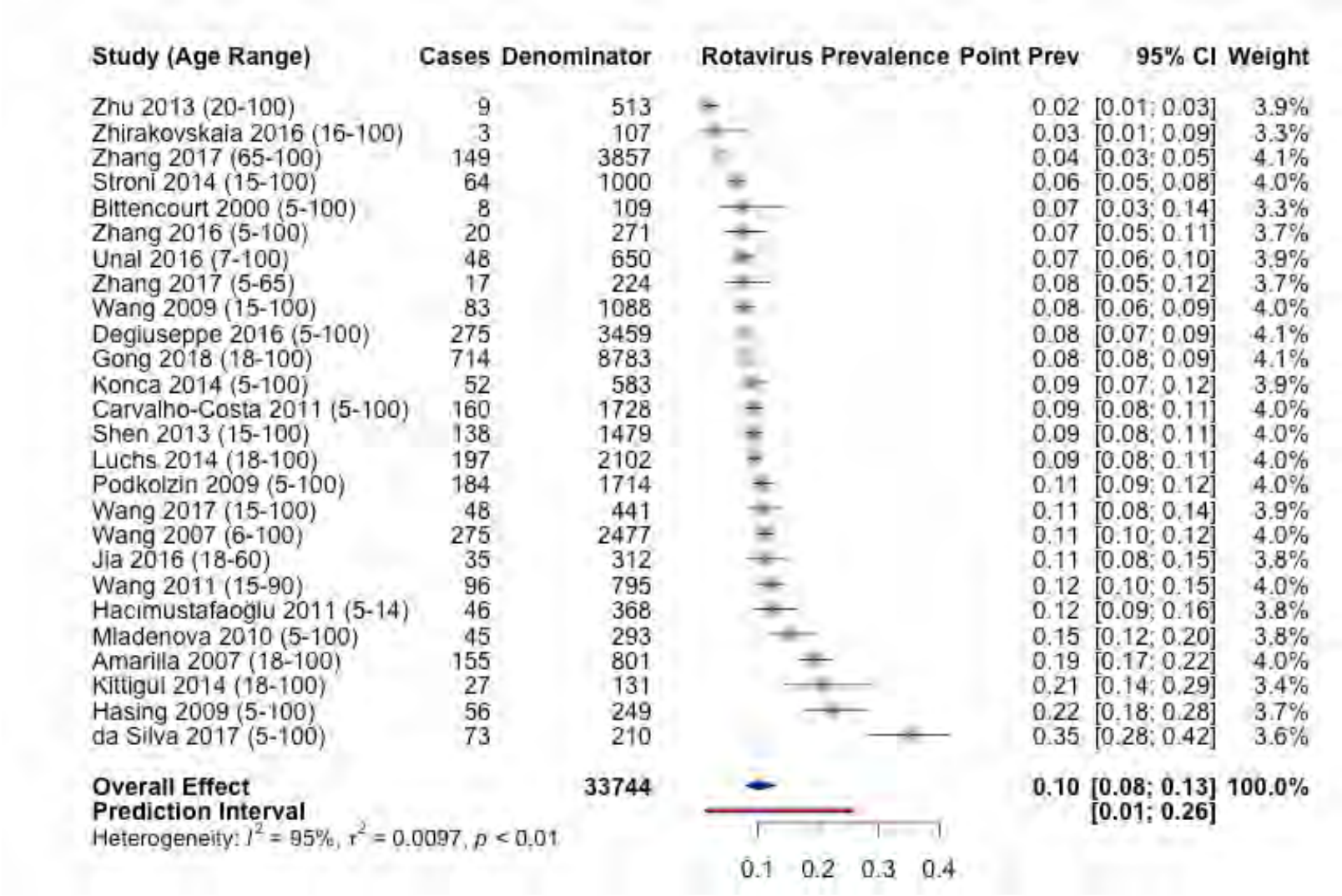
WHO REGION: Western Pacific Region– Total



INCOME REGION: Low/Lower-Middle Income – Total



INCOME REGION: Upper-Middle Income – Total



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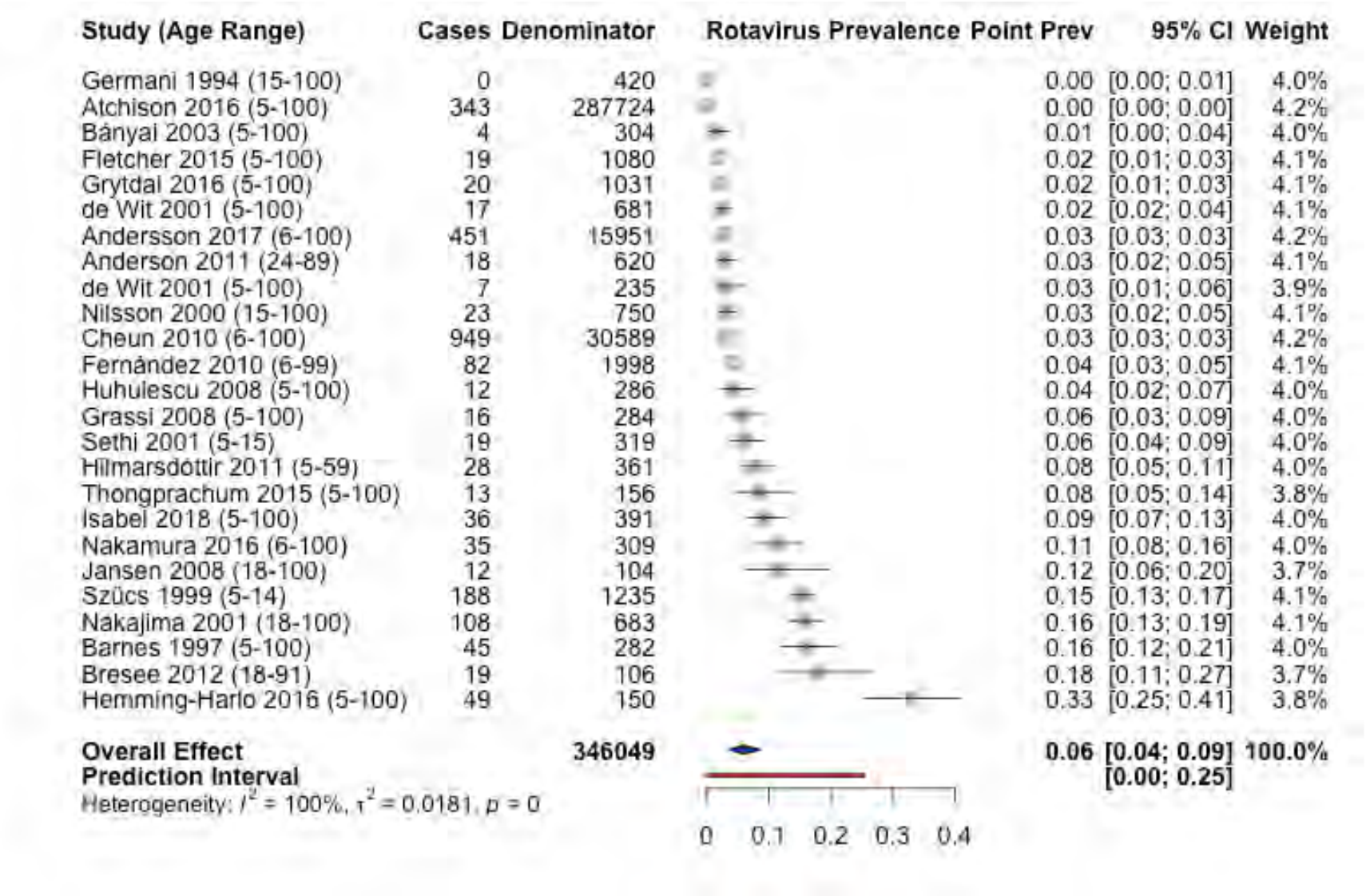
INCOME REGION: High Income – Total



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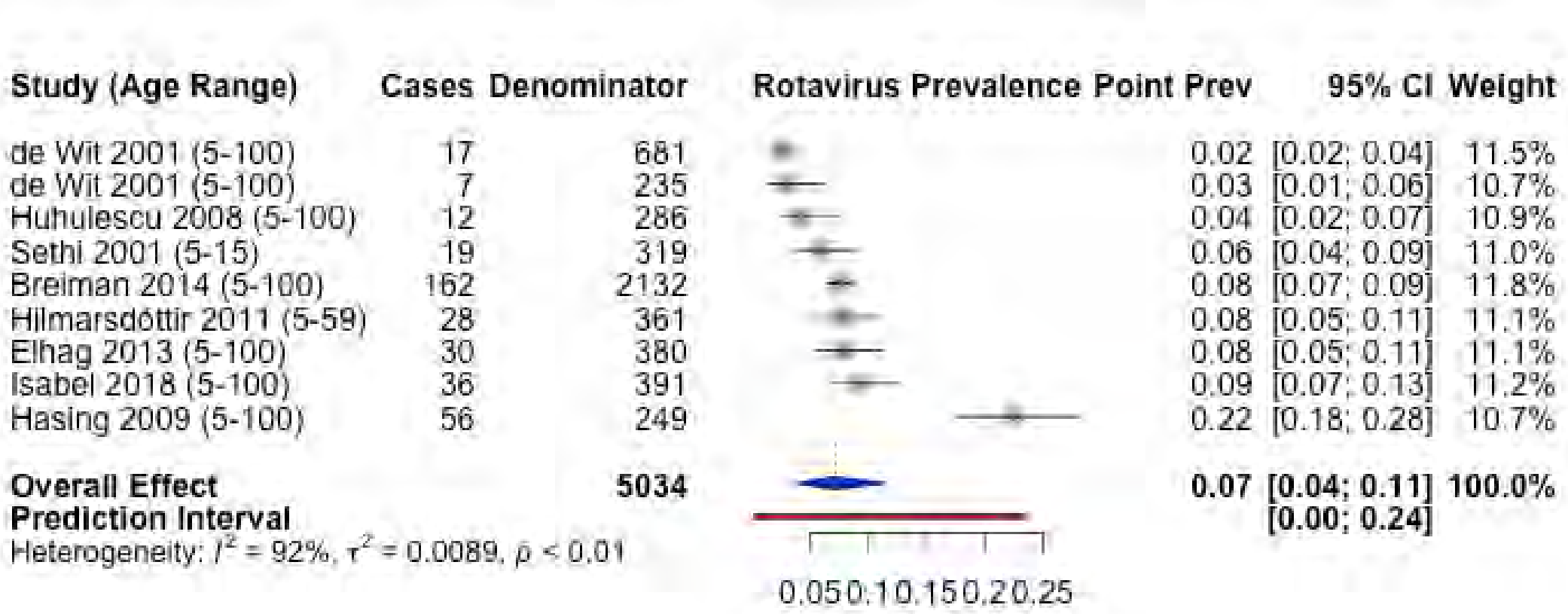
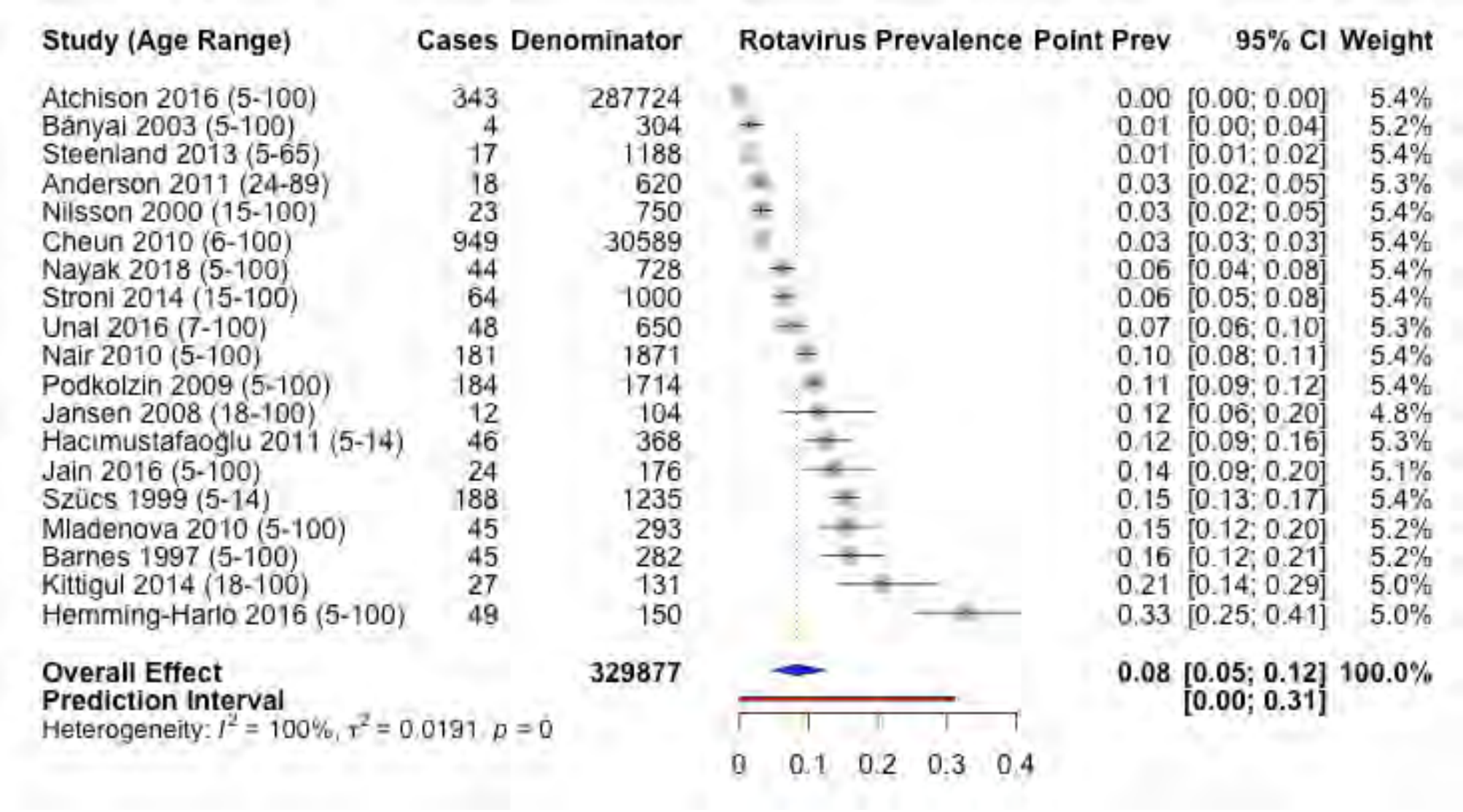
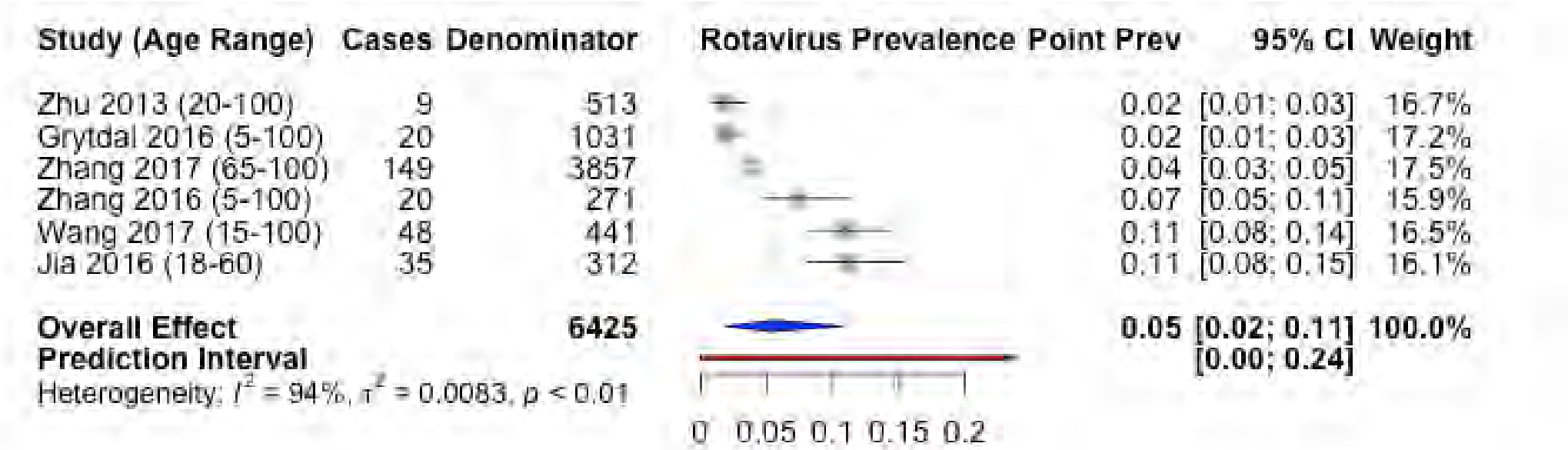
STUDY SETTING: Community – Total



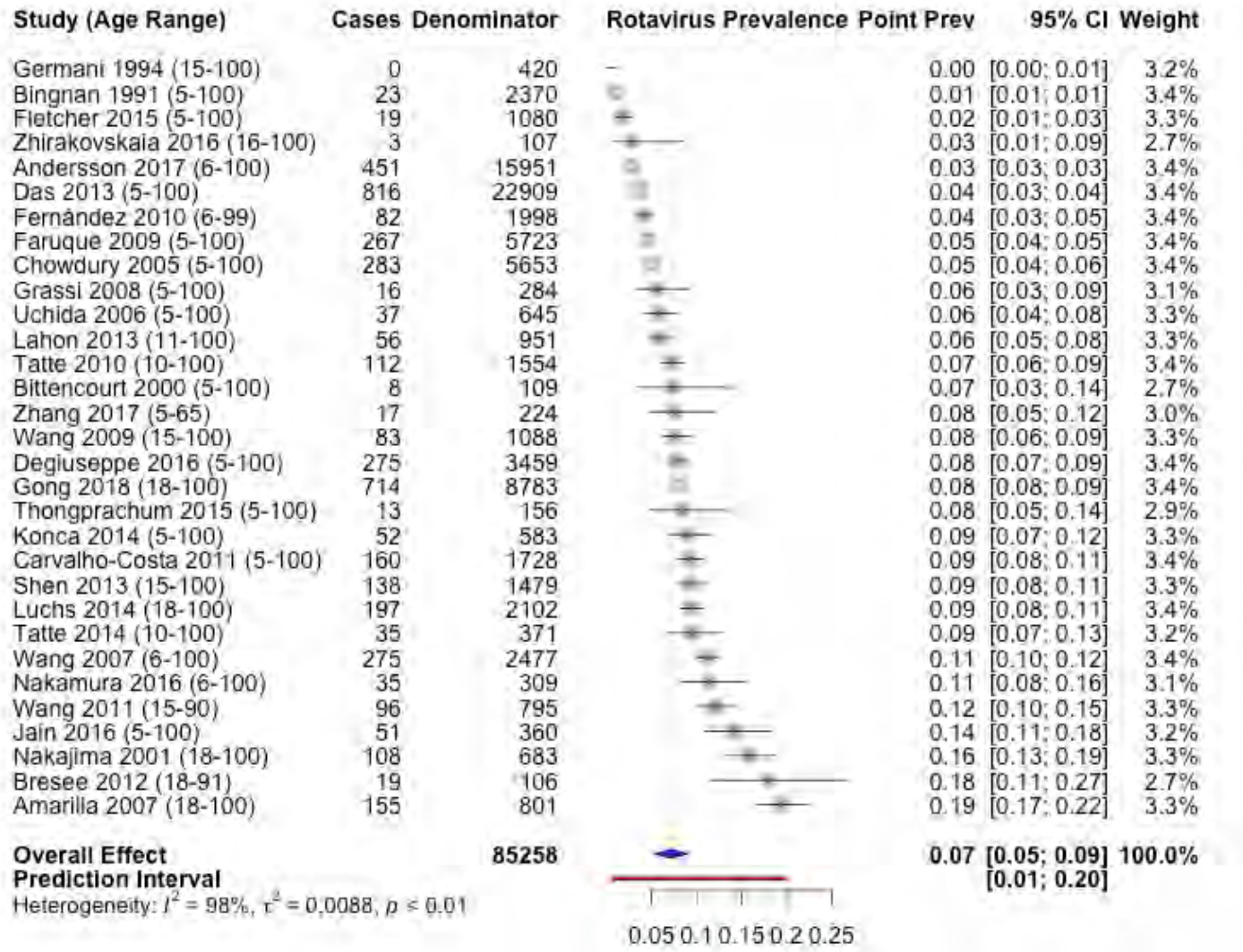
STUDY SETTING: Inpatient – Total



STUDY SETTING: Outpatient – Total



STUDY SETTING: Hospital Unspecified – Total



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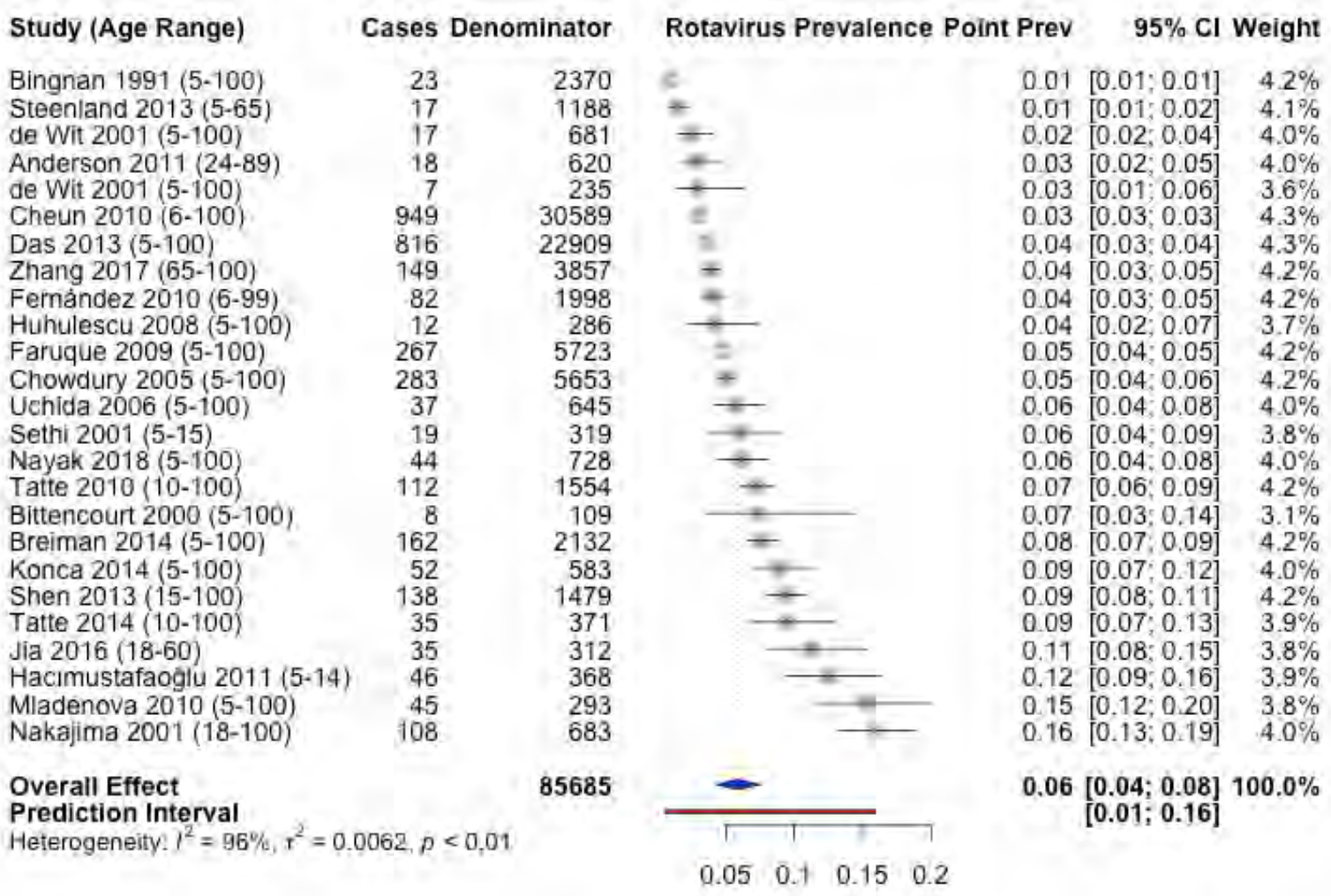
LAB DIAGNOSIS: ELISA– Total



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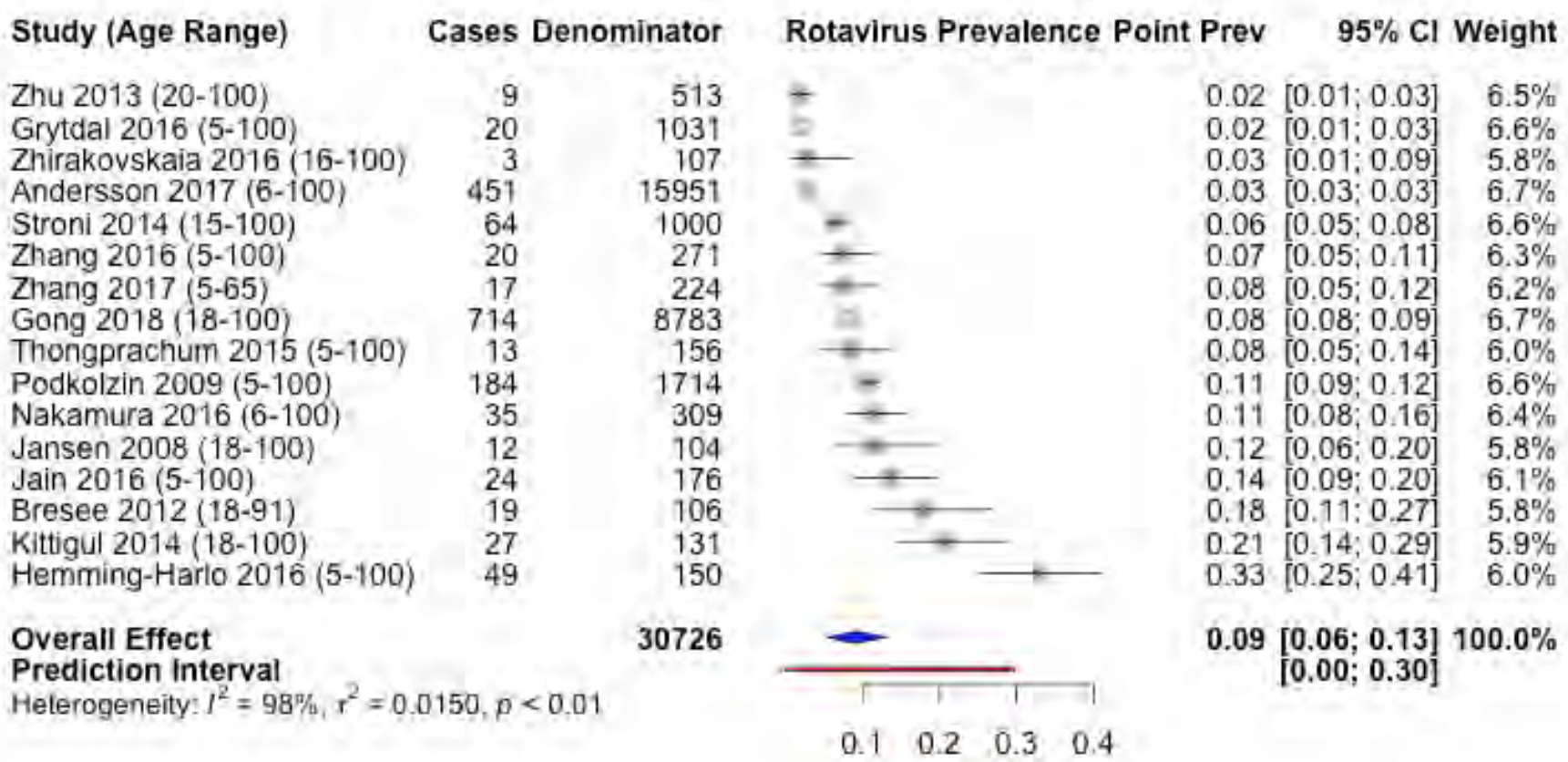
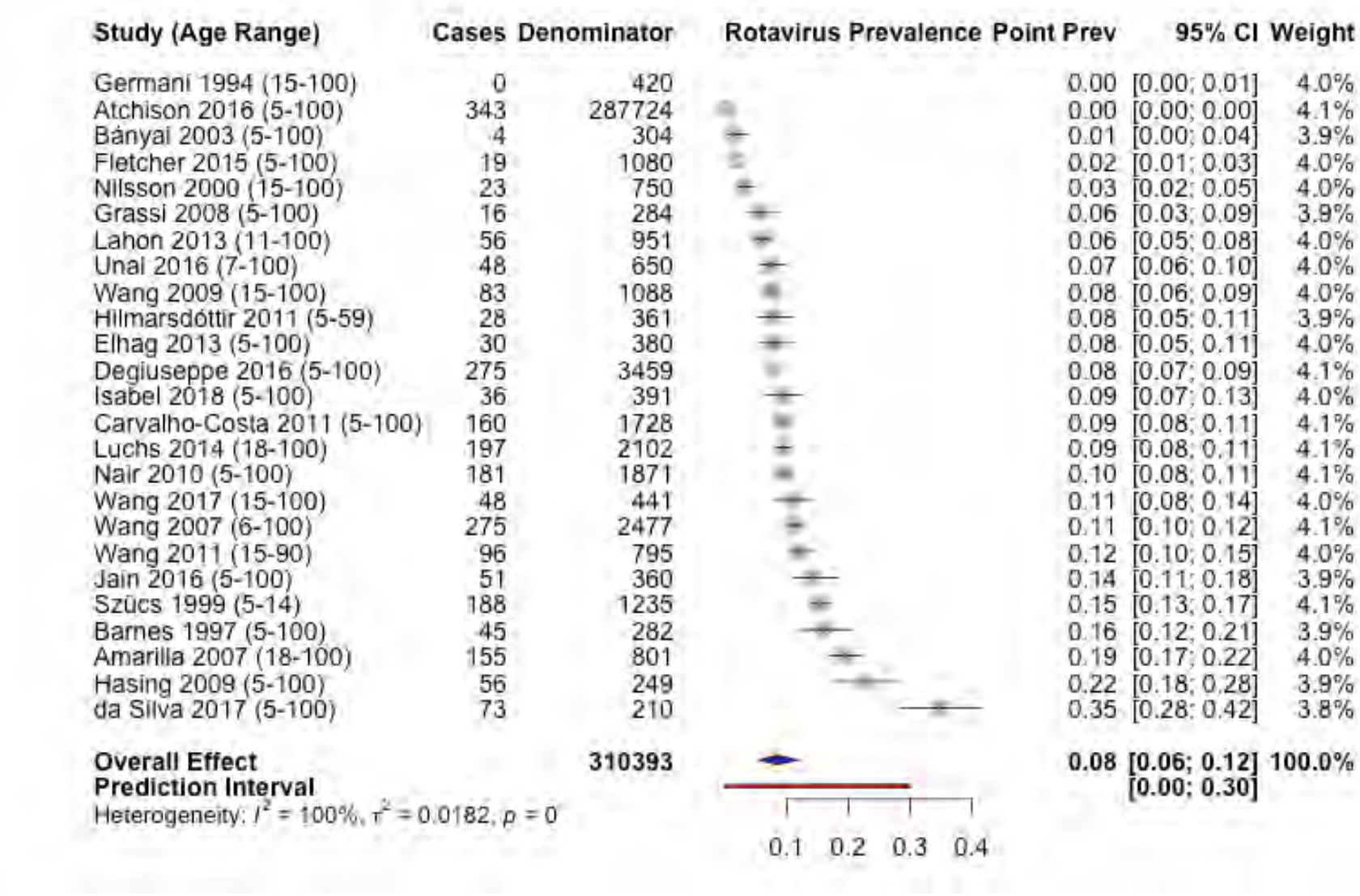
LAB DIAGNOSIS: PCR– Total



LAB DIAGNOSIS: Other/Mixed– Total



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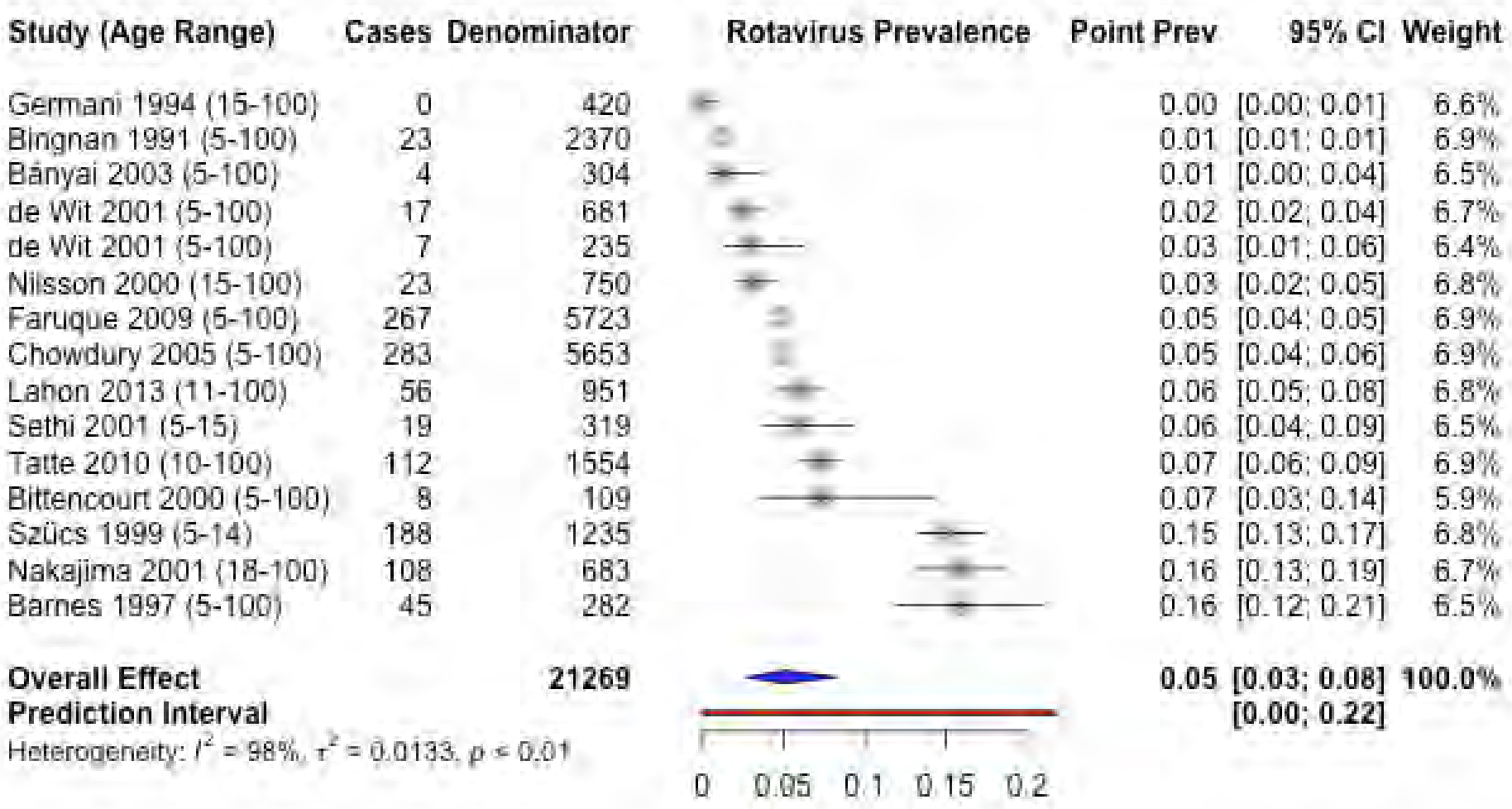
STUDY PERIOD: <2000– Total



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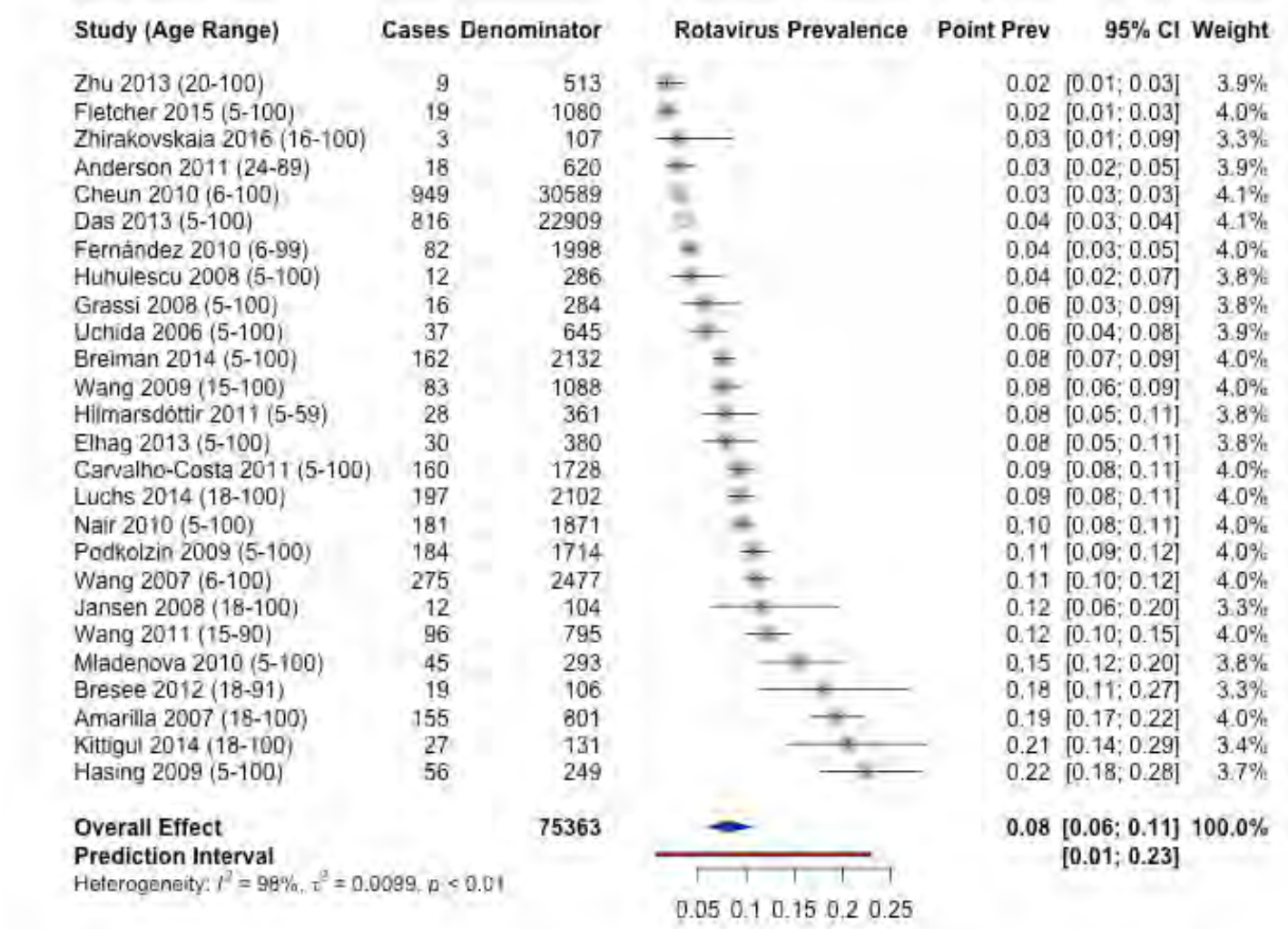
STUDY PERIOD: 2000s– Total



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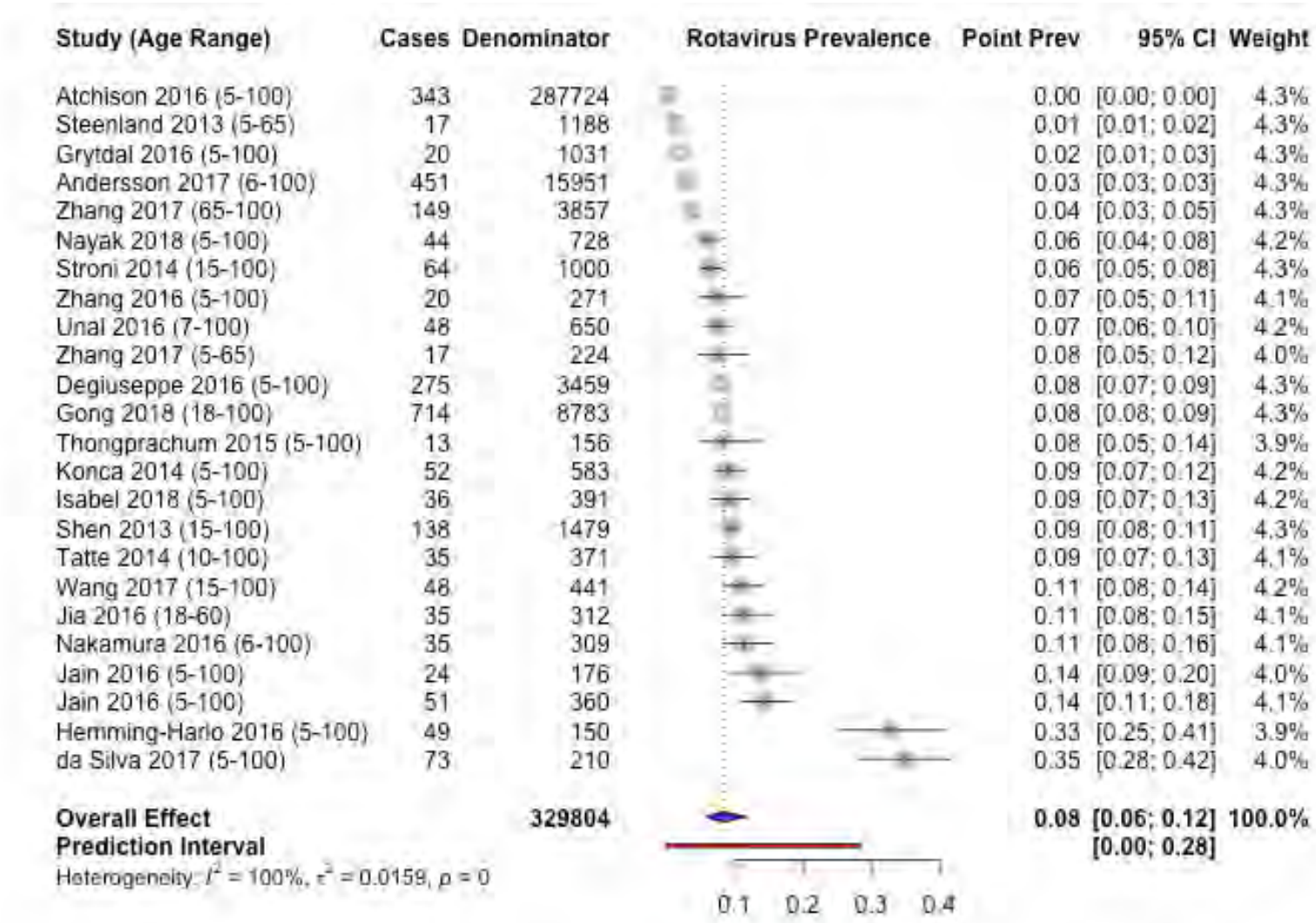
STUDY PERIOD: >2009– Total



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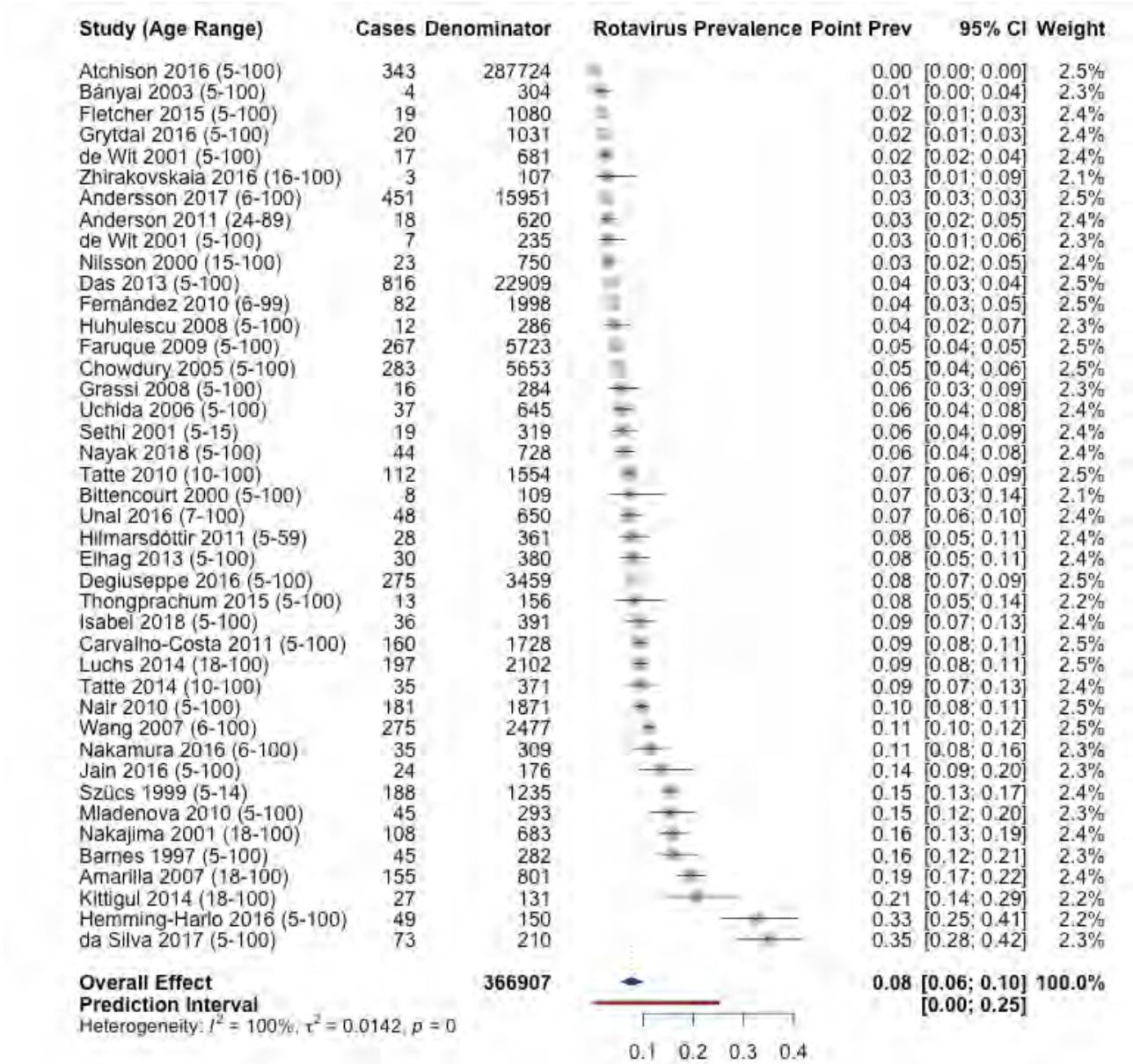
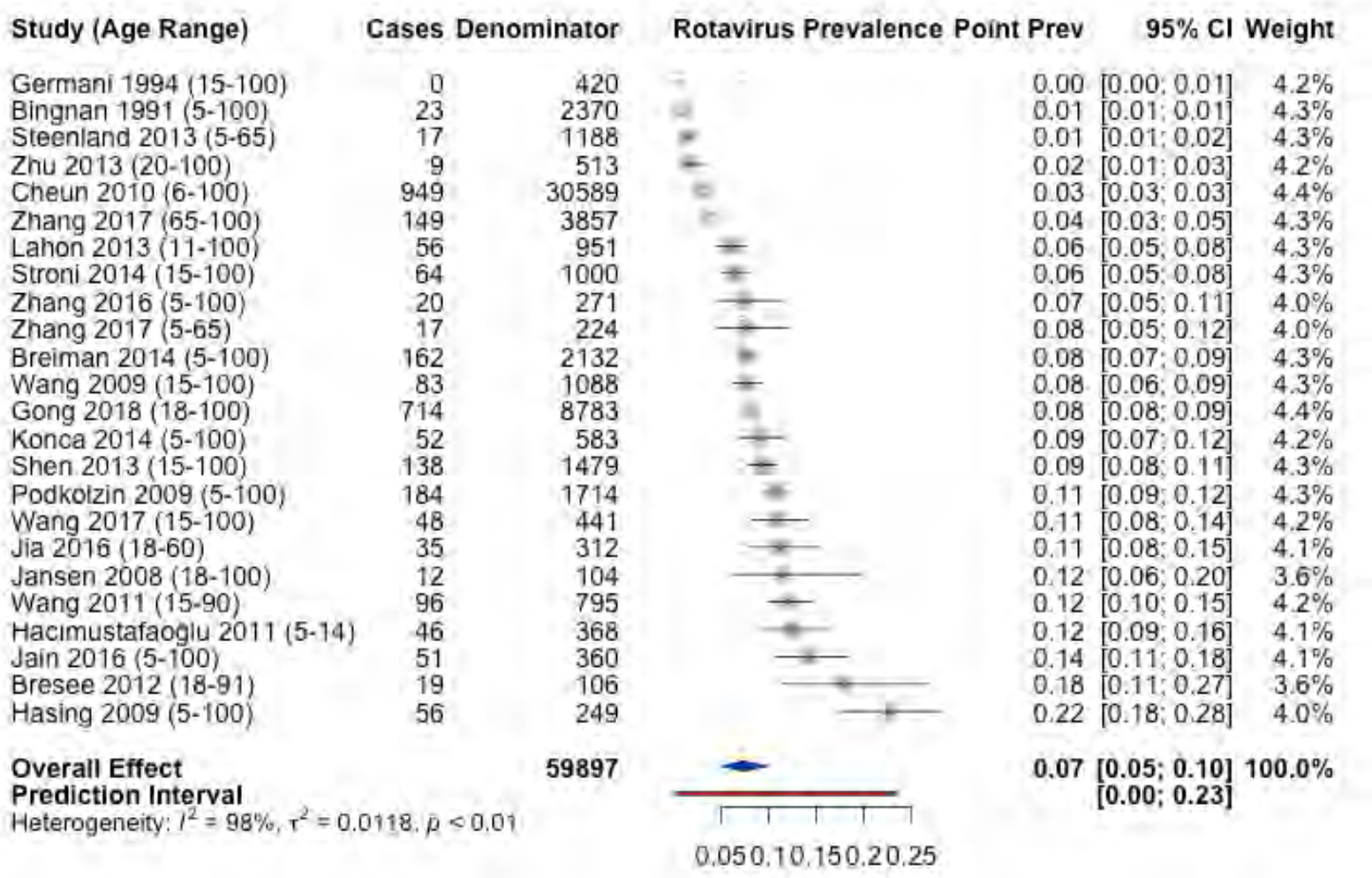
DIARRHEA DEFINITION: Non-WHO– Total



DIARRHEA DEFINITION: WHO – Total



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Appendix 6: Tertiary Forest Plots

Pooled Prevalence by Age and:

Appendix 6A: WHO Region

Appendix 6B: Income Region

Appendix 6C: Study Setting

Appendix 6D: Study Period

6E: Diarrhea Definition

Appendix 6A: **WHO Regions by Age**

African Region by Age Groups

American Region by Age Groups

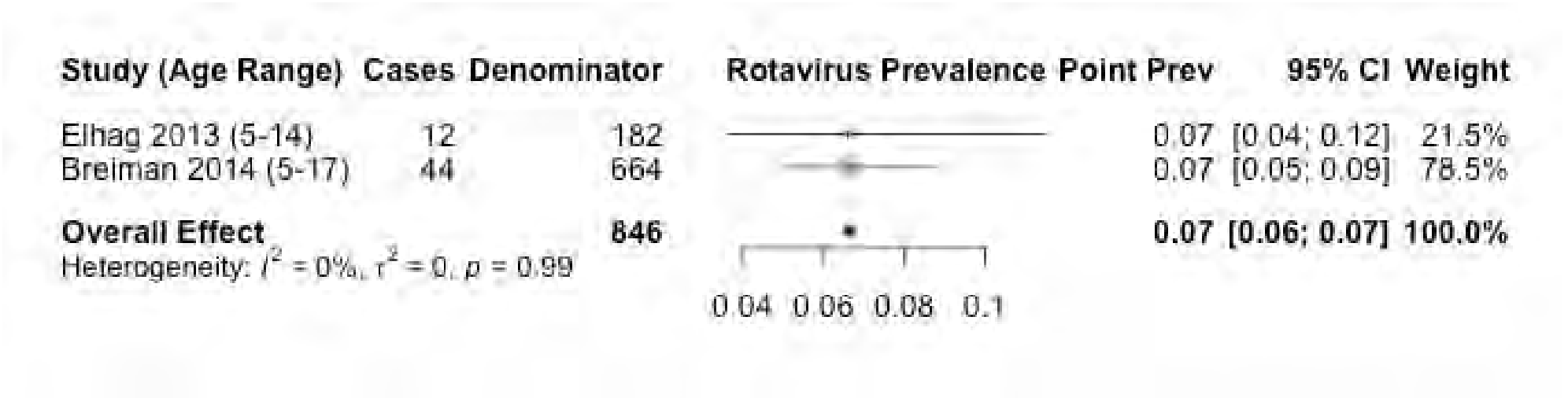
European Region by Age Groups

Southeast Asian Region by Age Groups

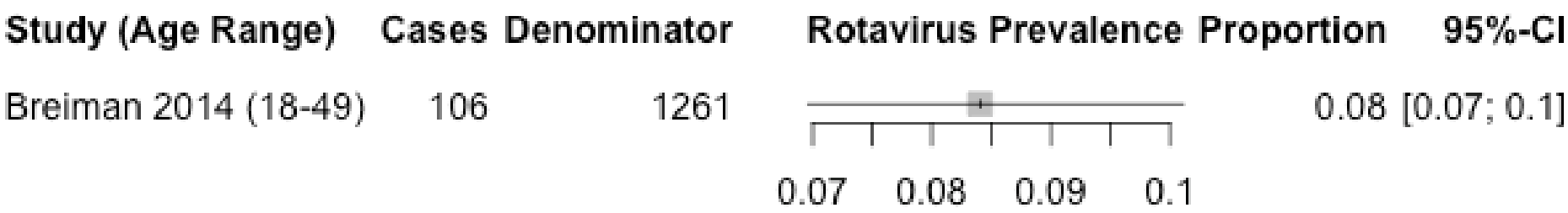
Western Pacific Region by Age Groups

African Region by Age Group

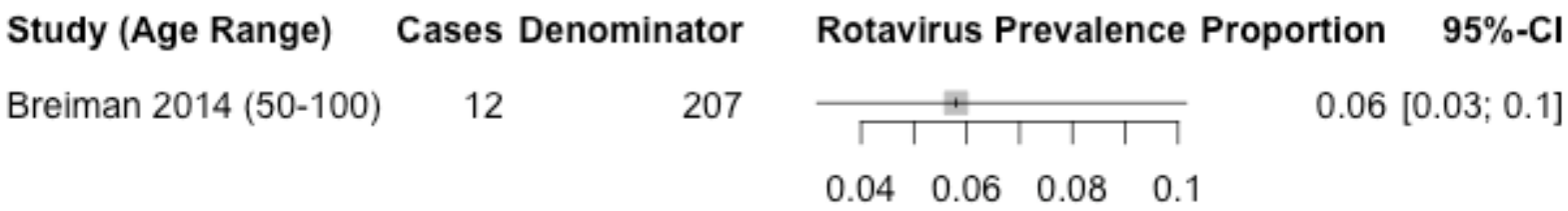
AFR: Older Children and Adolescents (5-20 y.o.)



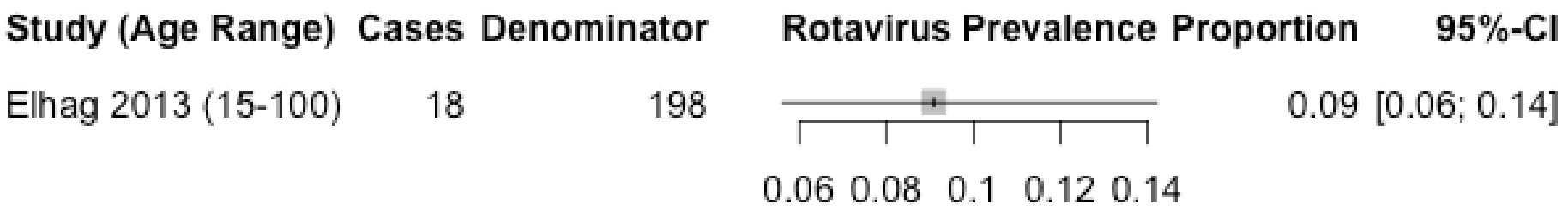
AFR: Younger Adults (15-50 y.o.)



AFR: Older Adults (50-100 y.o.)



AFR: Broad Adult Ages (15-100 y.o.)

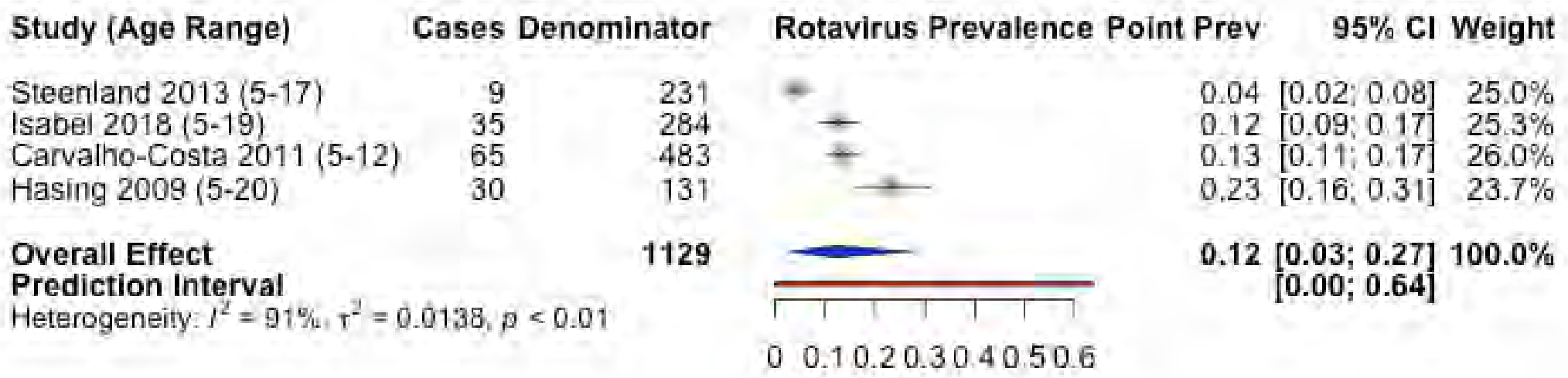


AFR: Broad Ages (5-100 y.o.)

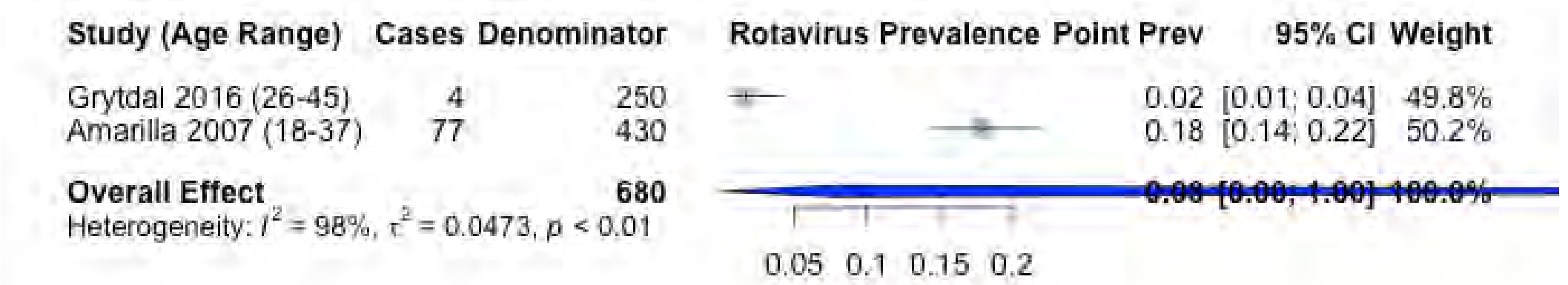
No data reported

The American Region by Age Group

AMR: Older Children and Adolescents (5-20 y.o.)



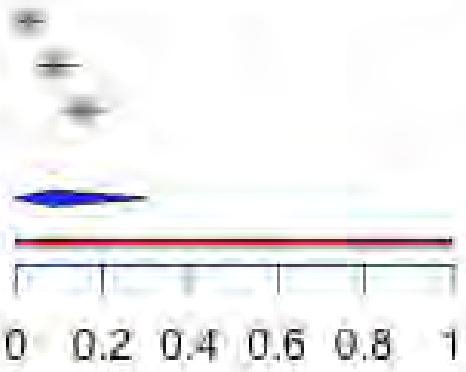
AMR: Younger Adults (15-50 y.o.)



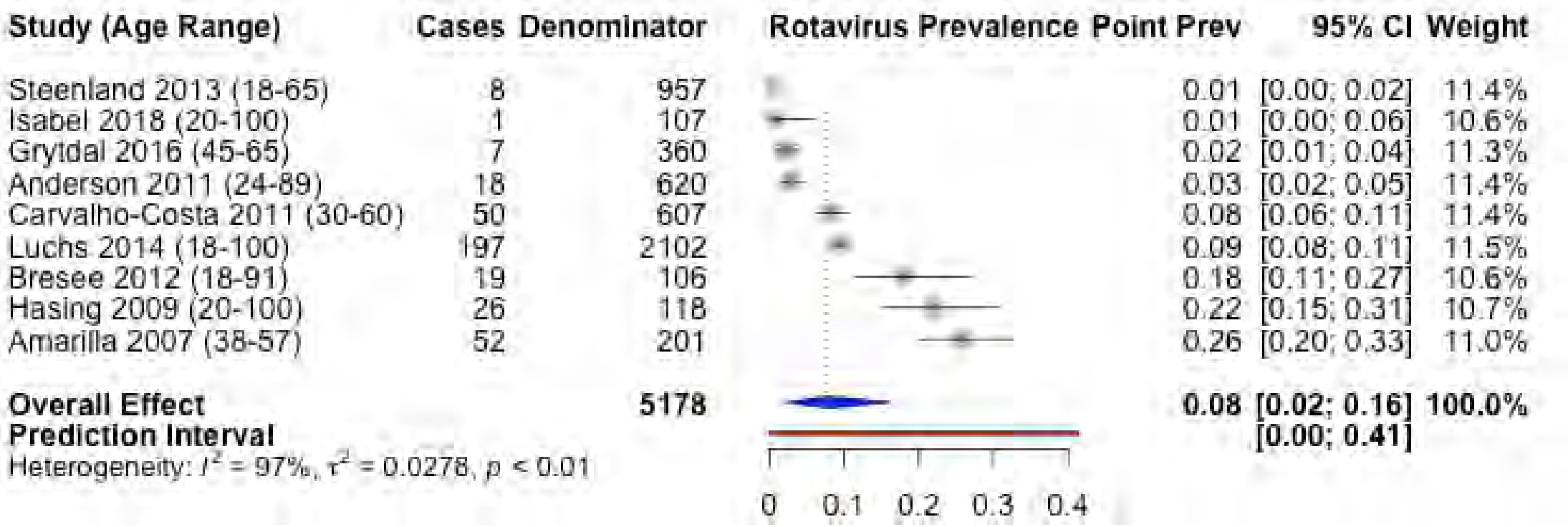
AMR: Older Adults (50-100 y.o.)

Study (Age Range)	Cases	Denominator	Point Prev	95% CI	Weight
Grytdal 2016 (65-100)	7	251	0.03	[0.01; 0.06]	34.0%
Carvalho-Costa 2011 (60-100)	16	179	0.09	[0.05; 0.14]	33.1%
Amarilla 2007 (57-100)	26	170	0.15	[0.10; 0.22]	32.9%
Overall Effect		**600**	**0.08**	**[0.00; 0.30]**	**100.0%**
Prediction Interval				**[0.00; 1.00]**	

Heterogeneity: $I^2 = 91\%$, $\tau^2 = 0.0126$, $p < 0.01$



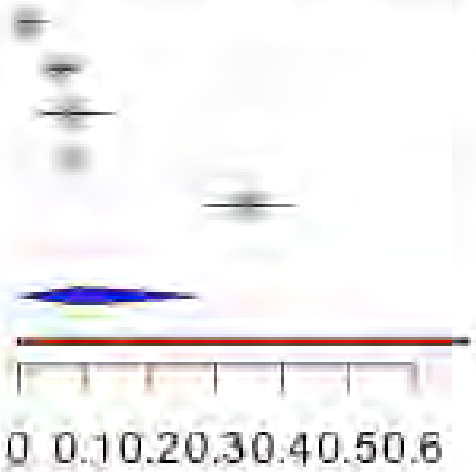
AMR: Broad Adult Ages (15-100 y.o.)



AMR: Broad Ages (5-100 y.o.)

Study (Age Range)	Cases	Denominator	Point Prev	95% CI	Weight
Grytdal 2016 (5-25)	2	170	0.01	[0.00; 0.05]	19.8%
Carvalho-Costa 2011 (12-30)	29	459	0.06	[0.04; 0.09]	20.3%
Bittencourt 2000 (5-100)	8	109	0.07	[0.03; 0.14]	19.4%
Deglusepppe 2016 (5-100)	275	3459	0.08	[0.07; 0.09]	20.6%
da Silva 2017 (5-100)	73	210	0.35	[0.28; 0.42]	20.0%
Overall Effect		**4407**	**0.09**	**[0.01; 0.27]**	**100.0%**
Prediction Interval				**[0.00; 0.68]**	

Heterogeneity: I^2 = 97%, τ^2 = 0.0358, p < 0.01



European Region by Age Group

EUR: Older Children and Adolescents (5-20 y.o.)

Study (Age Range)	Cases	Denominator	Point Prev	95% CI	Weight
de Wit 2001 (5-11)	2.00	128	0.02	[0.00; 0.06]	8.6%
Fernández 2010 (6-15)	23.00	461	0.05	[0.03; 0.08]	9.3%
Bányai 2003 (5-14)	16.00	304	0.05	[0.03; 0.09]	9.1%
Andersson 2017 (6-10)	30.00	566	0.05	[0.04; 0.08]	9.3%
Grassi 2008 (5-16)	16.00	284	0.06	[0.03; 0.09]	9.1%
Sethi 2001 (5-15)	19.00	319	0.06	[0.04; 0.09]	9.1%
Unal 2016 (7-10)	26.00	246	0.11	[0.07; 0.15]	9.0%
Hacimustafaoğlu 2011 (5-14)	46.00	368	0.12	[0.09; 0.16]	9.2%
Szücs 1999 (5-14)	188.00	1235	0.15	[0.13; 0.17]	9.4%
Podkolzin 2009 (5-14)	73.44	360	0.20	[0.16; 0.25]	9.2%
Hemming-Harlo 2016 (5-15)	49.00	150	0.33	[0.25; 0.41]	8.7%
Overall Effect		**4421**	**0.10**	**[0.05; 0.16]**	**100.0%**
Prediction Interval				**[0.00; 0.35]**	

Heterogeneity: $I^2 = 95\%$, $\tau^2 = 0.0174$, $p < 0.01$

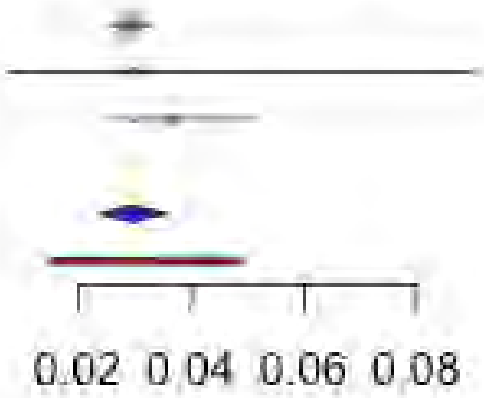
EUR: Younger Adults (15-50 y.o.)

No data reported

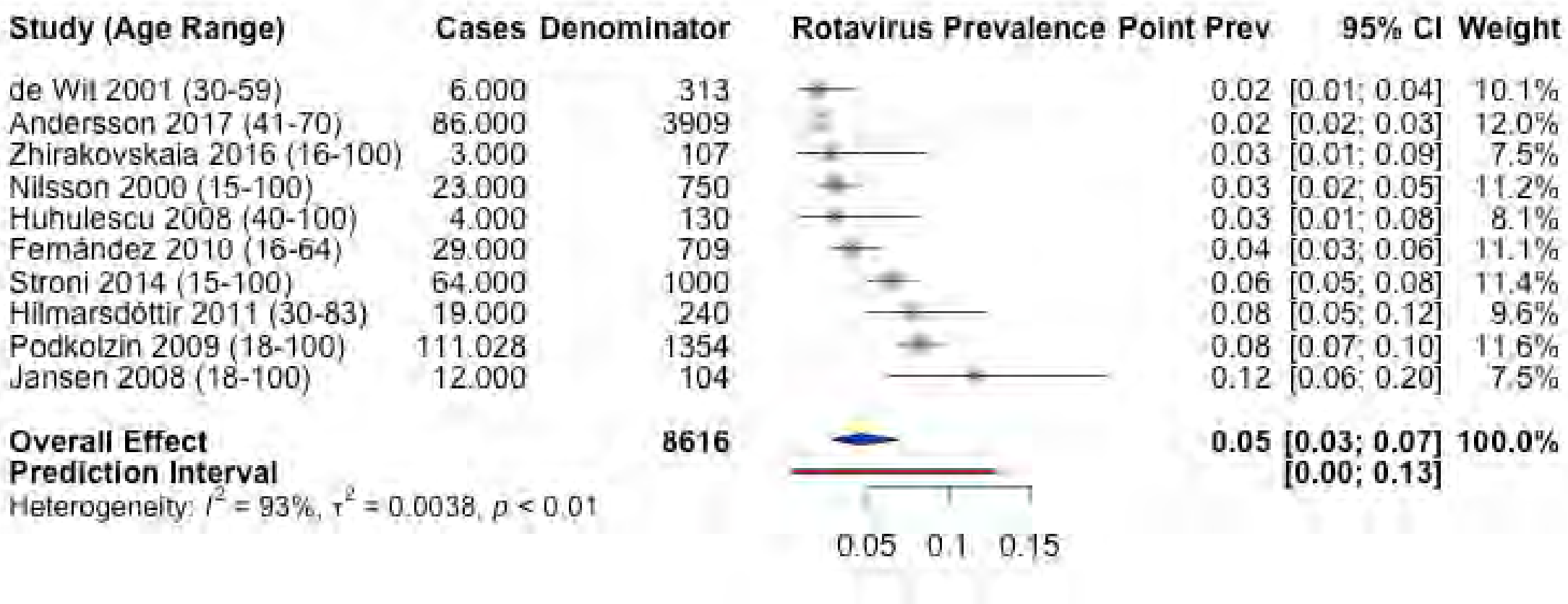
EUR: Older Adults (50-100 y.o.)

Study (Age Range)	Cases	Denominator	Rotavirus Prevalence	Point Prev	95% CI	Weight
Andersson 2017 (70-100)	269	9276		0.03	[0.03; 0.03]	90.9%
de Wit 2001 (60-100)	3	102		0.03	[0.01; 0.09]	1.0%
Fernández 2010 (65-99)	30	828		0.04	[0.02; 0.05]	8.1%
Overall Effect		**10206**		**0.03**	**[0.02; 0.04]**	**100.0%**
Prediction Interval					**[0.02; 0.05]**	

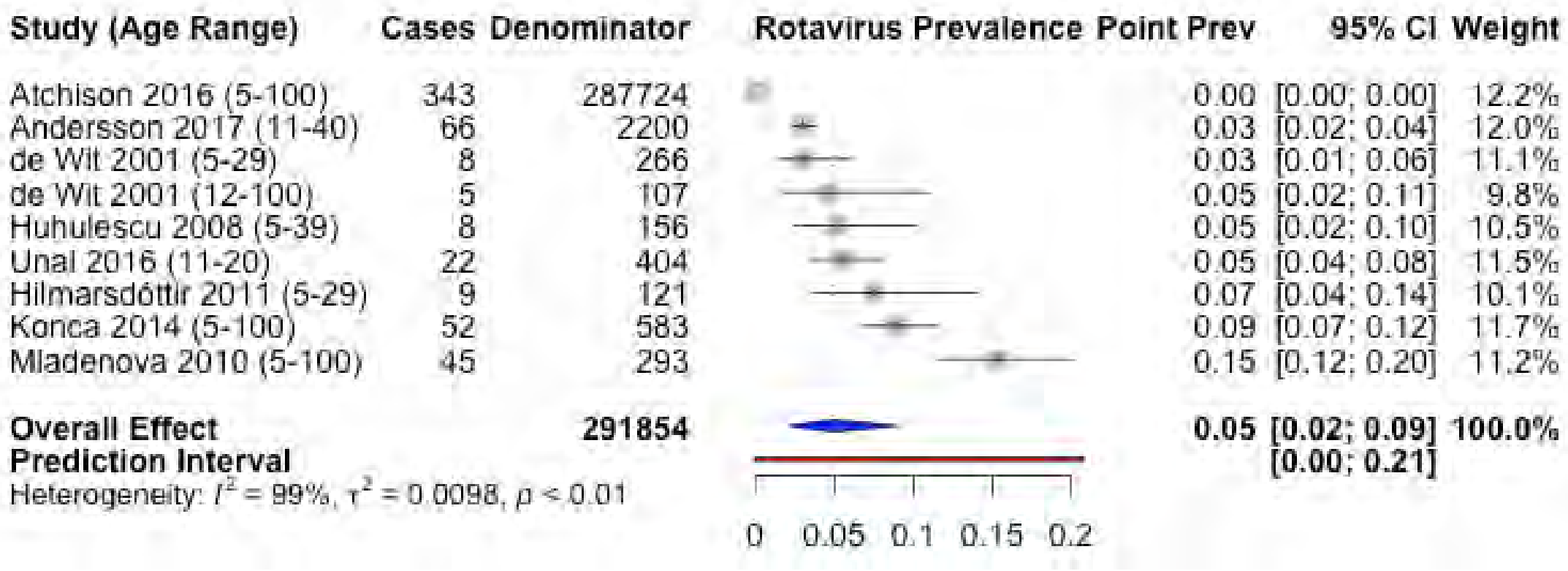
Heterogeneity: $I^2 = 0\%$, $\tau^2 = 0$, $p = 0.53$



EUR: Broad Adult Ages (15-100 y.o.)



EUR: Broad Ages (5-100 y.o.)

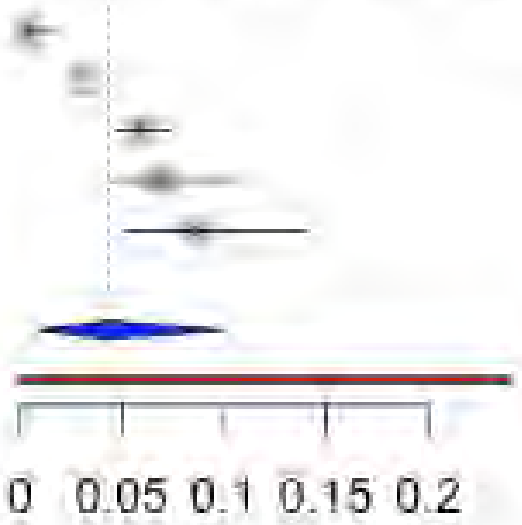


Southeast Asian Region by Age Group

SEAR: Older Children and Adolescents (5-20 y.o.)

Study (Age Range)	Cases	Denominator	Rotavirus Prevalence	Point Prev	95% CI	Weight
Bingnan 1991 (5-10)	2	419		0.00	[0.00; 0.02]	20.0%
Das 2013 (5-19)	218	6859		0.03	[0.03; 0.04]	21.6%
Faruque 2009 (5-14)	70	1197		0.06	[0.05; 0.07]	21.1%
Uchida 2006 (5-14)	18	260		0.07	[0.04; 0.11]	19.2%
Tatte 2010 (10-18)	15	174		0.09	[0.05; 0.14]	18.2%
Overall Effect		**8909**		**0.04**	**[0.01; 0.10]**	**100.0%**
Prediction Interval					**[0.00; 0.24]**	

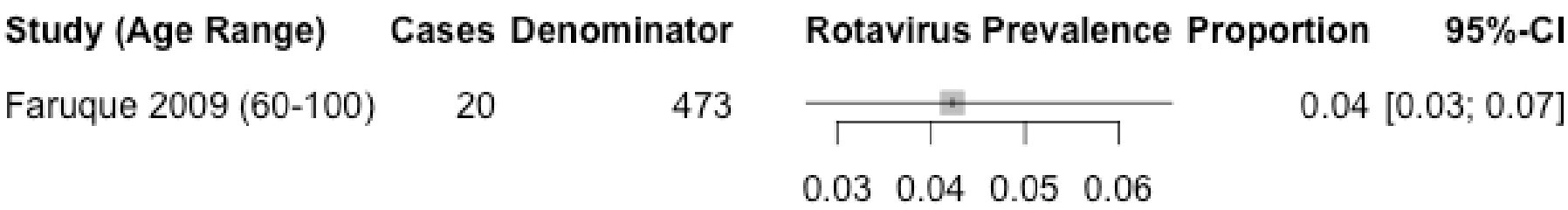
Heterogeneity: $I^2 = 93\%$, $\tau^2 = 0.0074$, $p < 0.01$



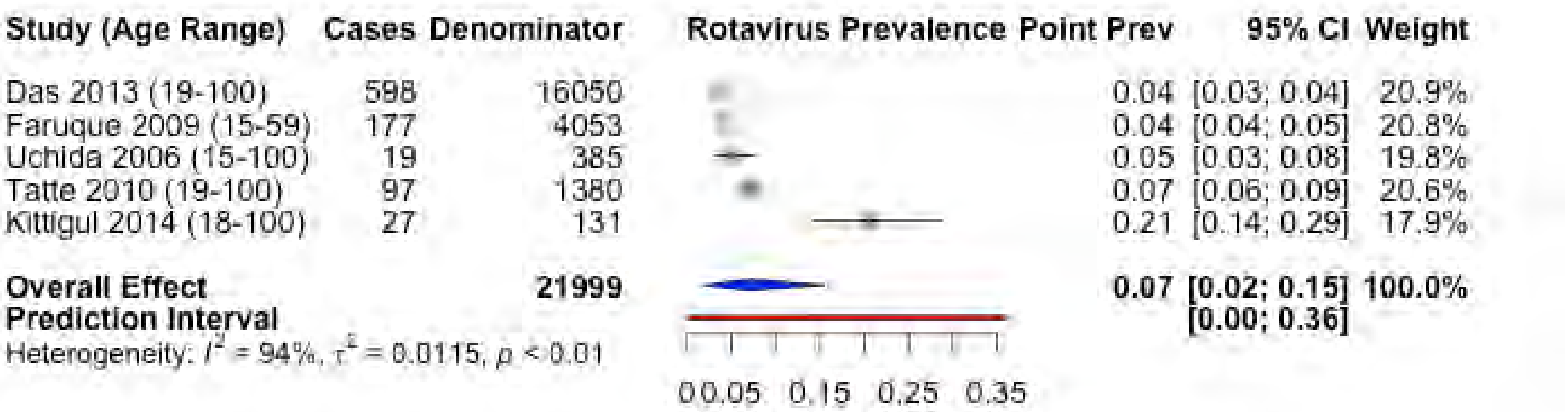
SEAR: Younger Adults (15-50 y.o.)

No data reported

SEAR: Older Adults (50-100 y.o.)



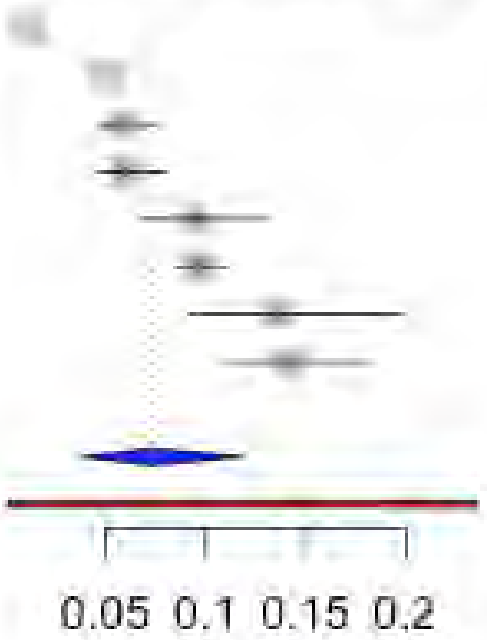
SEAR: Broad Adult Ages (15-100 y.o.)



SEAR: Broad Ages (5-100 y.o.)

Study (Age Range)	Cases	Denominator	Rotavirus Prevalence	Point Prev	95% CI	Weight
Bingnan 1991 (10-100)	21	1951		0.01	[0.01; 0.02]	13.0%
Chowdury 2005 (5-100)	283	5653		0.05	[0.04; 0.06]	13.1%
Lahon 2013 (11-100)	56	951		0.06	[0.05; 0.08]	12.8%
Nayak 2018 (5-100)	44	728		0.06	[0.04; 0.08]	12.6%
Tatte 2014 (10-100)	35	371		0.09	[0.07; 0.13]	12.2%
Nair 2010 (5-100)	181	1871		0.10	[0.08; 0.11]	13.0%
Jain 2016 (5-100)	24	176		0.14	[0.09; 0.20]	11.2%
Jain 2016 (5-100)	51	360		0.14	[0.11; 0.18]	12.1%
Overall Effect		**12061**		**0.07**	**[0.04; 0.12]**	**100.0%**
Prediction Interval					**[0.00; 0.24]**	

Heterogeneity: $I^2 = 97\%$, $\tau^2 = 0.0080$, $p < 0.01$

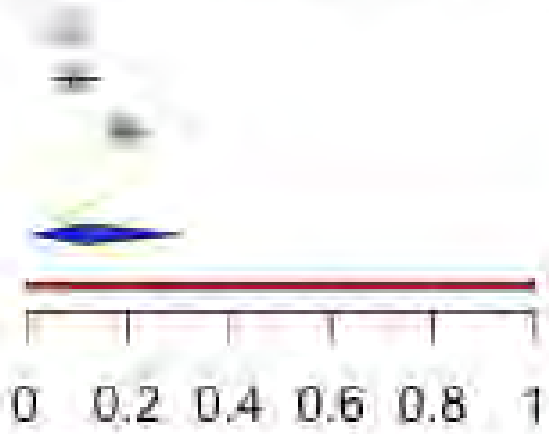


Western Pacific Region by Age Group

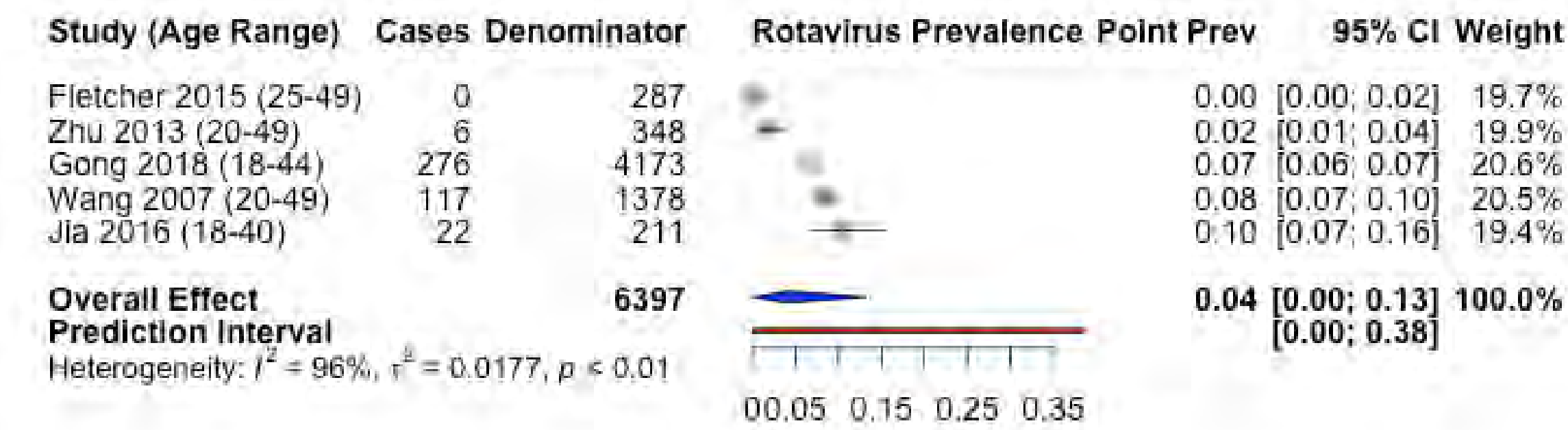
WPR: Older Children and Adolescents (5-20 y.o.)

Study (Age Range)	Cases	Denominator	Rotavirus Prevalence	Point Prev	95% CI	Weight
Cheun 2010 (6-9)	233	2979		0.08	[0.07; 0.09]	35.7%
Fletcher 2015 (5-12)	15	168		0.09	[0.05; 0.15]	30.6%
Wang 2007 (6-19)	85	440		0.19	[0.16; 0.23]	33.7%
Overall Effect		**3587**		**0.12**	**[0.01; 0.30]**	**100.0%**
Prediction Interval					**[0.00; 1.00]**	

Heterogeneity: $I^2 = 96\%$, $\tau^2 = 0.0083$, $p < 0.01$



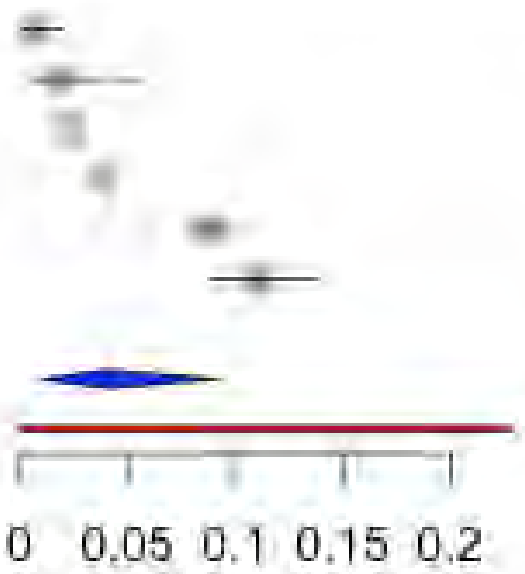
WPR: Younger Adults (15-50 y.o.)



WPR: Older Adults (50-100 y.o.)

Study (Age Range)	Cases	Denominator	Point Prev	95% CI	Weight
Fletcher 2015 (50-100)	3	461	0.01	[0.00; 0.02]	16.5%
Zhu 2013 (50-100)	3	165	0.02	[0.00; 0.06]	15.0%
Cheun 2010 (50-100)	371	15394	0.02	[0.02; 0.03]	17.4%
Zhang 2017 (65-100)	149	3857	0.04	[0.03; 0.05]	17.3%
Gong 2018 (60-100)	207	2345	0.09	[0.08; 0.10]	17.2%
Wang 2007 (50-100)	73	659	0.11	[0.09; 0.14]	16.7%
Overall Effect		**22881**	**0.04**	**[0.01; 0.09]**	**100.0%**
Prediction Interval				**[0.00; 0.23]**	

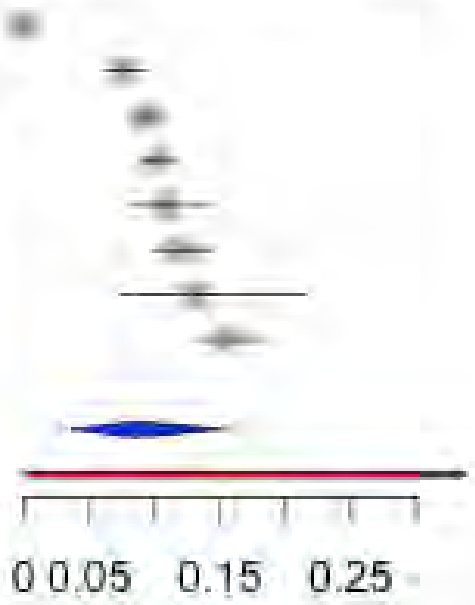
Heterogeneity: $I^2 = 98\%$, $\tau^2 = 0.0096$, $p < 0.01$



WPR: Broad Adult Ages (15-100 y.o.)

Study (Age Range)	Cases	Denominator	Point Prev	95% CI	Weight
Germani 1994 (15-100)	0	420	0.00	[0.00; 0.01]	12.5%
Wang 2009 (15-100)	83	1088	0.08	[0.06; 0.09]	12.8%
Shen 2013 (15-100)	138	1479	0.09	[0.08; 0.11]	12.8%
Gong 2018 (44-59)	231	2265	0.10	[0.09; 0.12]	12.9%
Wang 2017 (15-100)	48	441	0.11	[0.08; 0.14]	12.5%
Wang 2011 (15-90)	96	795	0.12	[0.10; 0.15]	12.7%
Jia 2016 (41-60)	13	101	0.13	[0.07; 0.21]	11.2%
Nakajima 2001 (18-100)	108	683	0.16	[0.13; 0.19]	12.7%
Overall Effect		**7272**	**0.09**	**[0.04; 0.15]**	**100.0%**
Prediction Interval				**[0.00; 0.34]**	

Heterogeneity: $I^2 = 97\%$, $\tau^2 = 0.0153$, $p < 0.01$



WPR: Broad Ages (5-100 y.o.)

Study (Age Range)	Cases	Denominator	Rotavirus Prevalence	Point Prev	95% CI	Weight
Fletcher 2015 (13-24)	1	164		0.01	[0.00; 0.04]	13.6%
Cheun 2010 (10-49)	345	12216		0.03	[0.03; 0.03]	15.5%
Zhang 2016 (5-100)	20	271		0.07	[0.05; 0.11]	14.3%
Zhang 2017 (5-65)	17	224		0.08	[0.05; 0.12]	14.1%
Thongprachum 2015 (5-100)	13	156		0.08	[0.05; 0.14]	13.6%
Nakamura 2016 (6-100)	35	309		0.11	[0.08; 0.16]	14.5%
Barnes 1997 (5-100)	45	282		0.16	[0.12; 0.21]	14.4%
Overall Effect		**13622**		**0.07**	**[0.03; 0.13]**	**100.0%**
Prediction Interval					**[0.00; 0.28]**	

Heterogeneity: I^2 = 95%, τ^2 = 0.0110, p < 0.01

Appendix 6B: Income Regions by Age

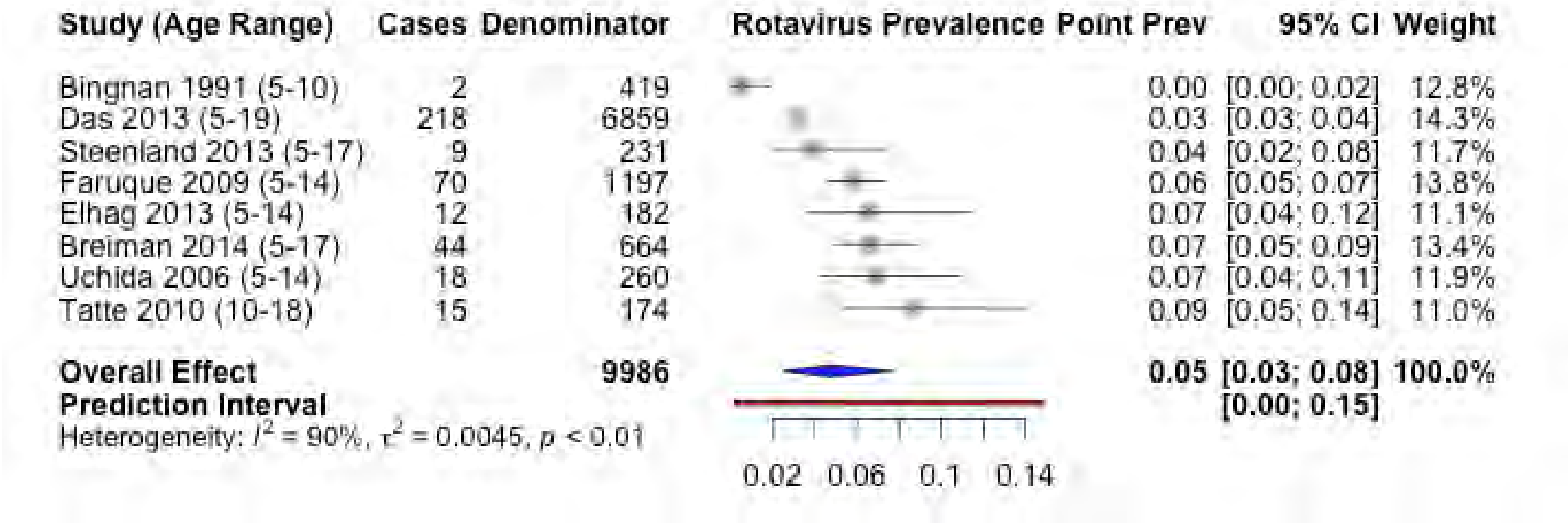
Low/Lower-Middle Income by Age Groups

Upper-Middle Income by Age Groups

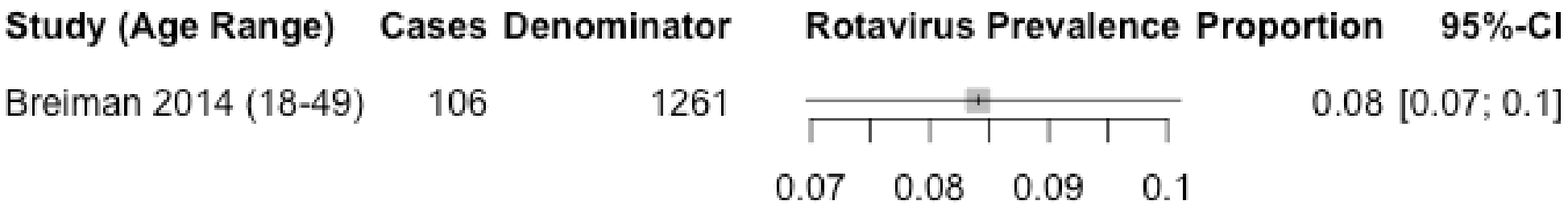
High Income by Age Groups

Low/Lower-Middle Income Countries by Age Group

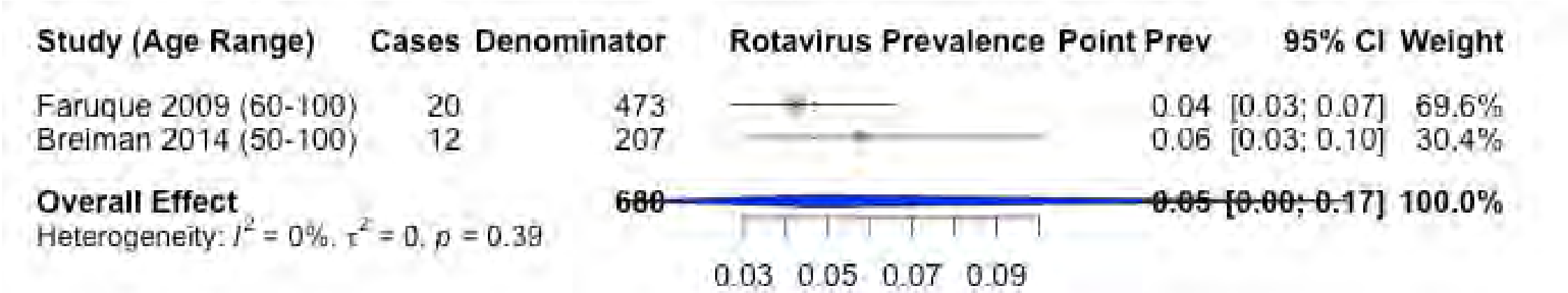
Low/Lower-Middle Income Countries: Older Children and Adolescents (5-20 y.o.)



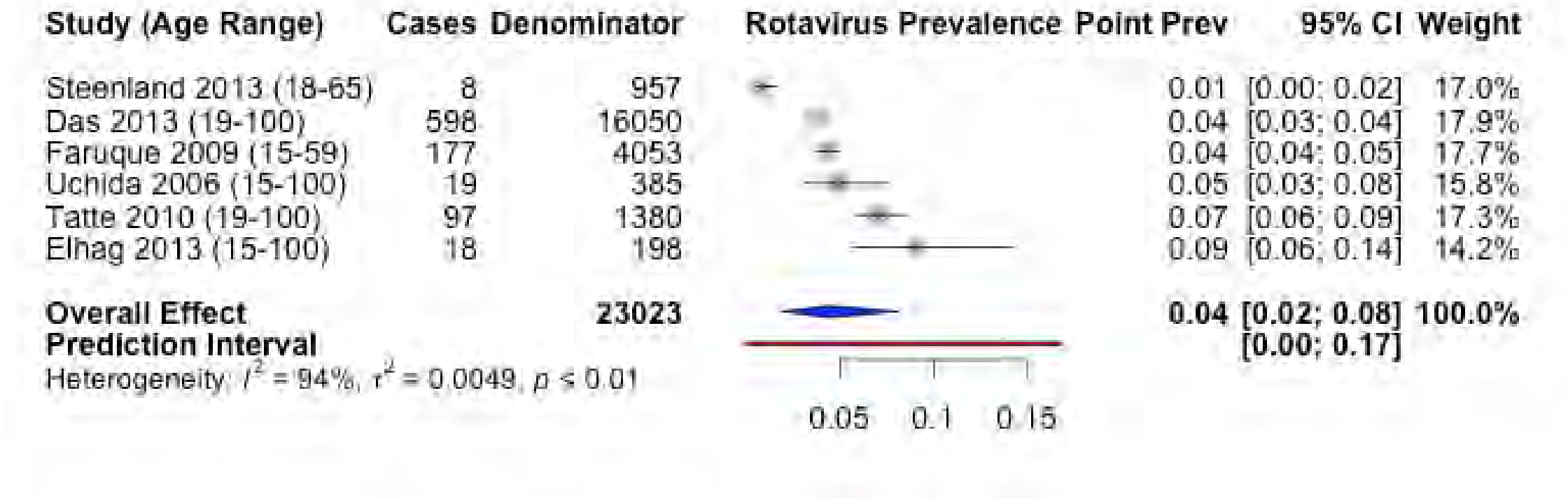
Low/Lower-Middle Income Countries: Younger Adults (15-50 y.o.)



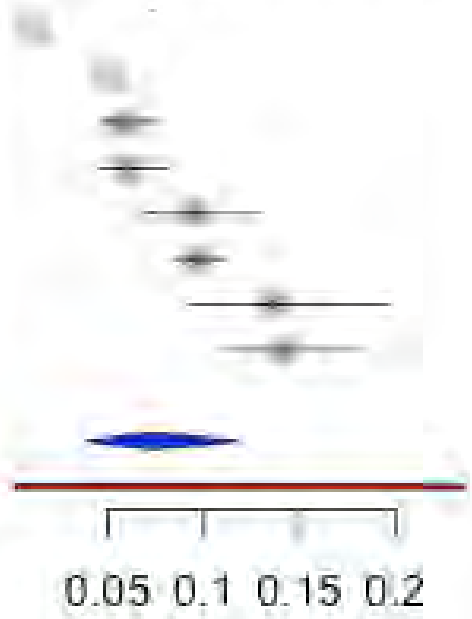
Low/Lower-Middle Income Countries: Older Adults (50-100 y.o.)



Low/Lower-Middle Income Countries: Broad Adult Ages (15-100 y.o.)



Low/Lower-Middle Income Countries: Broad Ages (5-100 y.o.)



Study (Age Range)	Cases	Denominator	Point Prev	95% CI	Weight
Bingnan 1991 (10-100)	21	1951	0.01	[0.01; 0.02]	13.0%
Chowdury 2005 (5-100)	283	5653	0.05	[0.04; 0.06]	13.1%
Lahon 2013 (11-100)	56	951	0.06	[0.05; 0.08]	12.8%
Nayak 2018 (5-100)	44	728	0.06	[0.04; 0.08]	12.6%
Tatte 2014 (10-100)	35	371	0.09	[0.07; 0.13]	12.2%
Nair 2010 (5-100)	181	1871	0.10	[0.08; 0.11]	13.0%
Jain 2016 (5-100)	24	176	0.14	[0.09; 0.20]	11.2%
Jain 2016 (5-100)	51	360	0.14	[0.11; 0.18]	12.1%
Overall Effect		**12061**	**0.07**	**[0.04; 0.12]**	**100.0%**
Prediction Interval				**[0.00; 0.24]**	

Heterogeneity: $I^2 = 97\%$, $\tau^2 = 0.0080$, $p < 0.01$

Rotavirus Prevalence

0.05 0.1 0.15 0.2

Upper-Middle Income Countries by Age Group

Upper-Middle Income Countries: Older Children and Adolescents (5-20 y.o.)

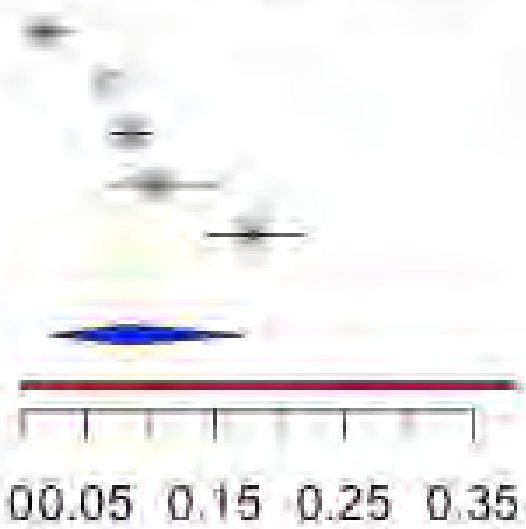
Study (Age Range)	Cases	Denominator	Point Prev	95% CI	Weight
Unal 2016 (7-10)	26.00	246	0.11	[0.07; 0.15]	16.1%
Hacımustafaoglu 2011 (5-14)	46.00	368	0.12	[0.09; 0.16]	17.4%
Carvalho-Costa 2011 (5-12)	65.00	483	0.13	[0.11; 0.17]	18.1%
Wang 2007 (6-19)	85.00	440	0.19	[0.16; 0.23]	17.8%
Podkolzin 2009 (5-14)	73.44	360	0.20	[0.16; 0.25]	17.3%
Hasing 2009 (5-20)	30.00	131	0.23	[0.16; 0.31]	13.4%
Overall Effect		**2028**	**0.16**	**[0.11; 0.21]**	**100.0%**
Prediction Interval				**[0.05; 0.31]**	

Heterogeneity: I^2 = 80%, τ^2 = 0.0035, p < 0.01

Upper-Middle Income Countries: Younger Adults (15-50 y.o.)

Study (Age Range)	Cases	Denominator	Point Prev	95% CI	Weight
Zhu 2013 (20-49)	6	348	0.02	[0.01; 0.04]	19.7%
Gong 2018 (18-44)	276	4173	0.07	[0.06; 0.07]	20.8%
Wang 2007 (20-49)	117	1378	0.08	[0.07; 0.10]	20.6%
Jia 2016 (18-40)	22	211	0.10	[0.07; 0.16]	19.0%
Amarilla 2007 (18-37)	77	430	0.18	[0.14; 0.22]	19.9%
Overall Effect		**6540**	**0.08**	**[0.02; 0.17]**	**100.0%**
Prediction Interval				**[0.00; 0.38]**	

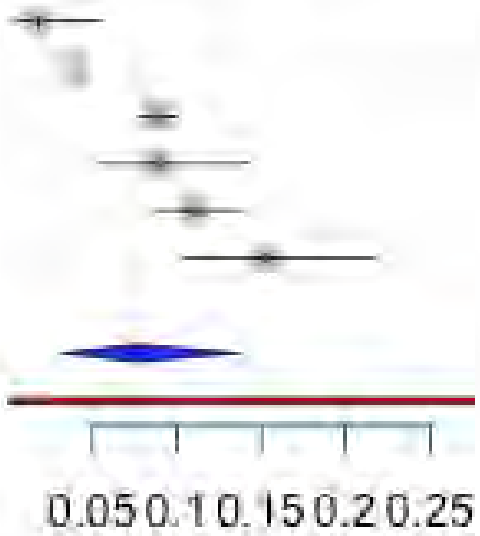
Heterogeneity: $I^2 = 95\%$, $\tau^2 = 0.0116$, $p < 0.01$



Upper-Middle Income Countries: Older Adults (50-100 y.o.)

Study (Age Range)	Cases	Denominator	Rotavirus Prevalence	Point Prev	95% CI	Weight
Zhu 2013 (50-100)	3	165		0.02	[0.00; 0.06]	15.4%
Zhang 2017 (65-100)	149	3857		0.04	[0.03; 0.05]	18.1%
Gong 2018 (60-100)	207	2345		0.09	[0.08; 0.10]	18.0%
Carvalho-Costa 2011 (60-100)	16	179		0.09	[0.05; 0.14]	15.6%
Wang 2007 (50-100)	73	659		0.11	[0.09; 0.14]	17.4%
Amarilla 2007 (57-100)	26	170		0.15	[0.10; 0.22]	15.5%
Overall Effect		**7375**		**0.08**	**[0.03; 0.14]**	**100.0%**
Prediction Interval					**[0.00; 0.28]**	

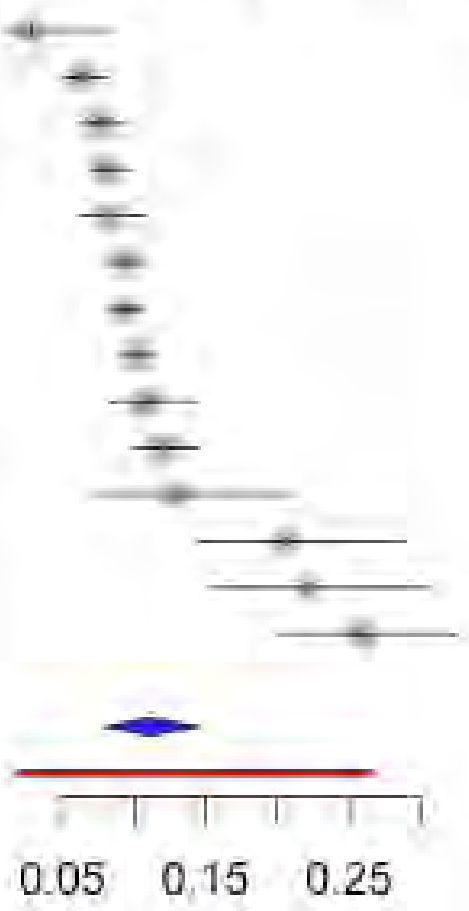
Heterogeneity: $I^2 = 96\%$, $\tau^2 = 0.0083$, $p < 0.01$



Upper-Middle Income Countries: Broad Adult Ages (15-100 y.o.)

Study (Age Range)	Cases	Denominator	Rotavirus Prevalence	Point Prev	95% CI	Weight
Zhirakovskaia 2016 (16-100)	3.000	107		0.03	[0.01; 0.09]	6.1%
Stroni 2014 (15-100)	64.000	1000		0.06	[0.05; 0.08]	7.6%
Wang 2009 (15-100)	83.000	1088		0.08	[0.06; 0.09]	7.6%
Podkolzin 2009 (18-100)	111.028	1354		0.08	[0.07; 0.10]	7.7%
Carvalho-Costa 2011 (30-60)	50.000	607		0.08	[0.06; 0.11]	7.5%
Shen 2013 (15-100)	138.000	1479		0.09	[0.08; 0.11]	7.7%
Luchs 2014 (18-100)	197.000	2102		0.09	[0.08; 0.11]	7.7%
Gong 2018 (44-59)	231.000	2265		0.10	[0.09; 0.12]	7.8%
Wang 2017 (15-100)	48.000	441		0.11	[0.08; 0.14]	7.3%
Wang 2011 (15-90)	96.000	795		0.12	[0.10; 0.15]	7.6%
Jia 2016 (41-60)	13.000	101		0.13	[0.07; 0.21]	6.0%
Kittigul 2014 (18-100)	27.000	131		0.21	[0.14; 0.29]	6.4%
Hasing 2009 (20-100)	26.000	118		0.22	[0.15; 0.31]	6.2%
Amarilla 2007 (38-57)	52.000	201		0.26	[0.20; 0.33]	6.8%
Overall Effect		**11789**		**0.11**	**[0.08; 0.15]**	**100.0%**
Prediction Interval					**[0.02; 0.27]**	

Heterogeneity: $I^2 = 88\%$, $\tau^2 = 0.0080$, $p < 0.01$



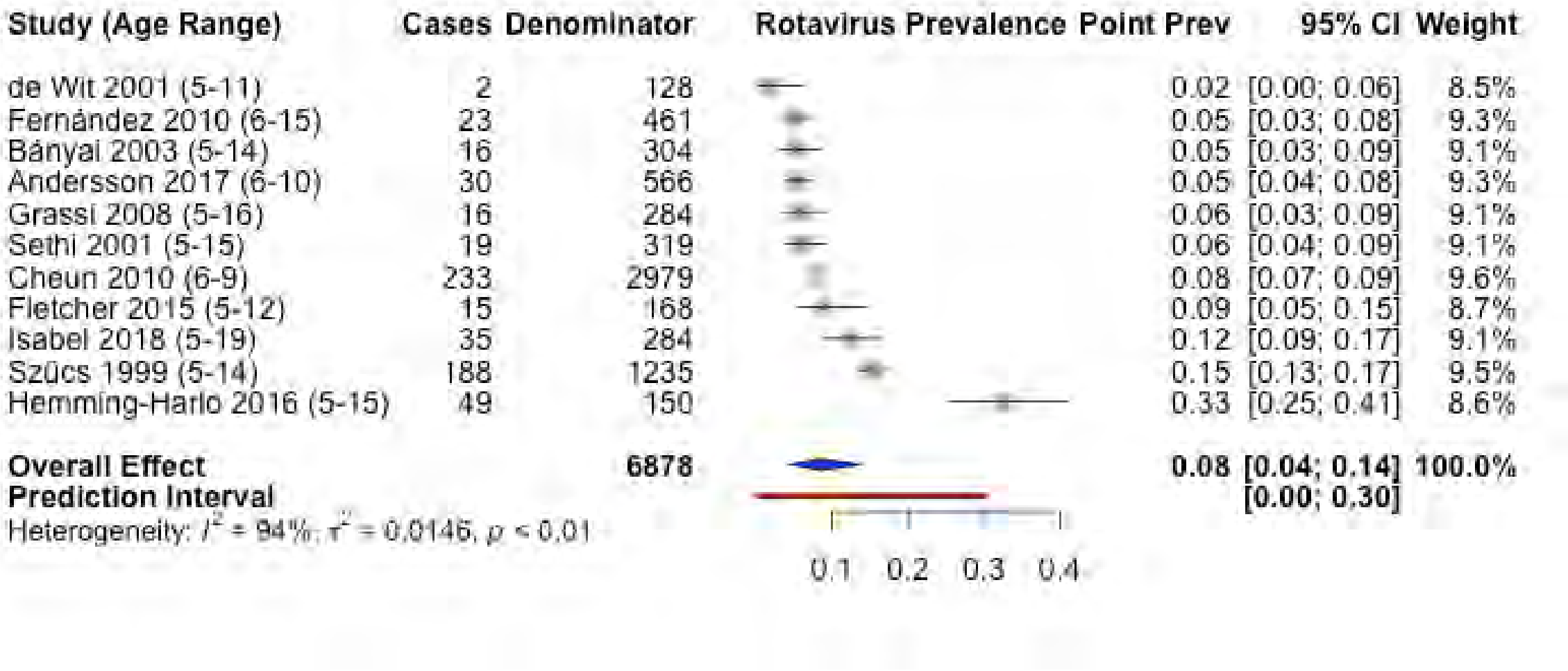
Upper-Middle Income Countries: Broad Ages (5-100 y.o.)

Study (Age Range)	Cases	Denominator	Rotavirus Prevalence	Point Prev	95% CI	Weight
Unal 2016 (11-20)	22	404		0.05	[0.04; 0.08]	11.3%
Carvalho-Costa 2011 (12-30)	29	459		0.06	[0.04; 0.09]	11.4%
Bittencourt 2000 (5-100)	8	109		0.07	[0.03; 0.14]	10.1%
Zhang 2016 (5-100)	20	271		0.07	[0.05; 0.11]	11.1%
Zhang 2017 (5-65)	17	224		0.08	[0.05; 0.12]	10.9%
Degiuseppe 2016 (5-100)	275	3459		0.08	[0.07; 0.09]	11.7%
Konca 2014 (5-100)	52	583		0.09	[0.07; 0.12]	11.4%
Mladenova 2010 (5-100)	45	293		0.15	[0.12; 0.20]	11.1%
da Silva 2017 (5-100)	73	210		0.35	[0.28; 0.42]	10.9%
Overall Effect		**6012**		**0.10**	**[0.05; 0.17]**	**100.0%**
Prediction Interval					**[0.00; 0.34]**	

Heterogeneity: $I^2 = 93\%$, $\tau^2 = 0.0141$, $p < 0.01$

High Income Countries by Age Group

High Income Countries:
Older Children and Adolescents (5-20 y.o.)



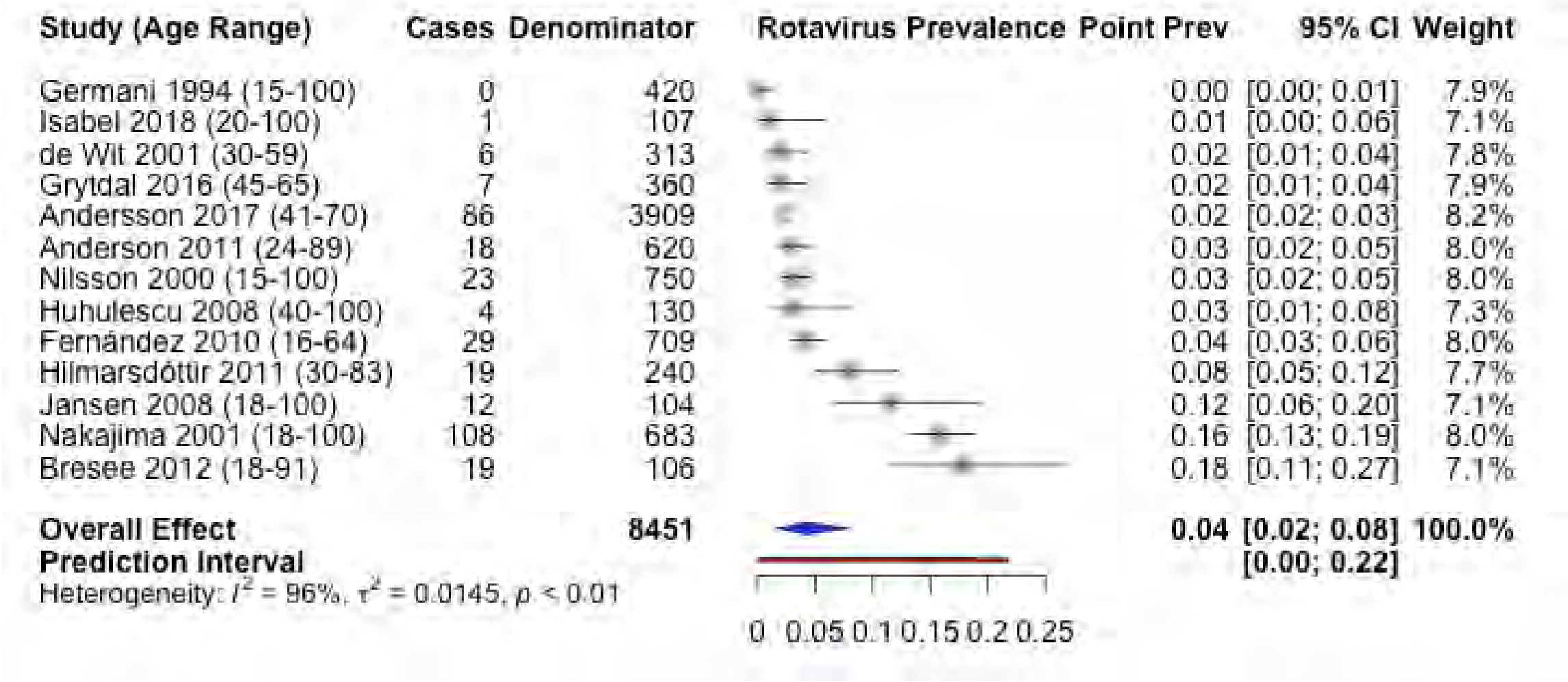
High Income Countries: Younger Adults (15-50 y.o.)

High Income Countries: Older Adults (50-100 y.o.)

Study (Age Range)	Cases	Denominator	Point Prev	95% CI	Weight
Fletcher 2015 (50-100)	3	461	0.01	[0.00; 0.02]	15.6%
Cheun 2010 (50-100)	371	15394	0.02	[0.02; 0.03]	23.6%
Grytdal 2016 (65-100)	7	251	0.03	[0.01; 0.06]	12.0%
Andersson 2017 (70-100)	269	9276	0.03	[0.03; 0.03]	23.4%
de Wit 2001 (60-100)	3	102	0.03	[0.01; 0.09]	7.0%
Fernández 2010 (65-99)	30	828	0.04	[0.02; 0.05]	18.4%
Overall Effect		**26312**	**0.02**	**[0.01; 0.04]**	**100.0%**
Prediction Interval				**[0.00; 0.06]**	

Heterogeneity: $I^2 = 76\%$, $\tau^2 = 0.0010$, $p < 0.01$

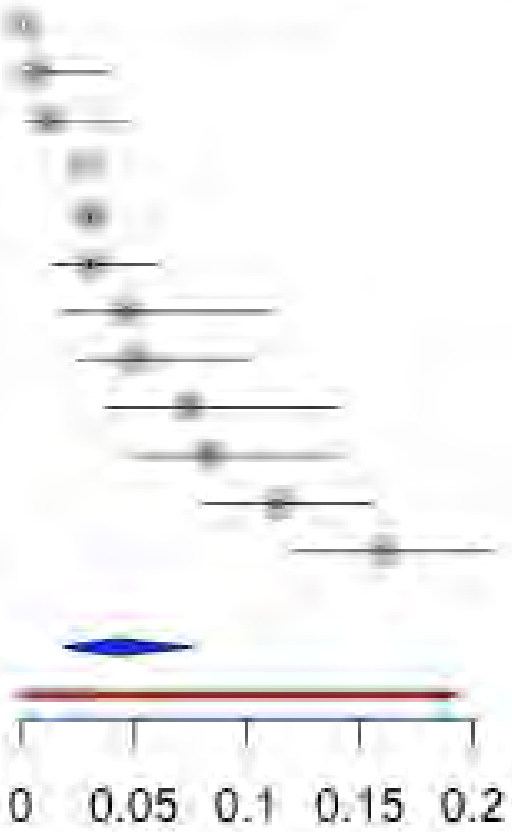
High Income Countries: Broad Adult Ages (15-100 y.o.)



High Income Countries: Broad Ages (5-100 y.o.)

Study (Age Range)	Cases	Denominator	Point Prev	95% CI	Weight
Atchison 2016 (5-100)	343	287724	0.00	[0.00; 0.00]	9.1%
Fletcher 2015 (13-24)	1	164	0.01	[0.00; 0.04]	8.0%
Grytdal 2016 (5-25)	2	170	0.01	[0.00; 0.05]	8.1%
Cheun 2010 (10-49)	345	12216	0.03	[0.03; 0.03]	9.1%
Andersson 2017 (11-40)	66	2200	0.03	[0.02; 0.04]	9.0%
de Wit 2001 (5-29)	8	266	0.03	[0.01; 0.06]	8.4%
de Wit 2001 (12-100)	5	107	0.05	[0.02; 0.11]	7.6%
Huhulescu 2008 (5-39)	8	156	0.05	[0.02; 0.10]	8.0%
Hilmarsdóttir 2011 (5-29)	9	121	0.07	[0.04; 0.14]	7.7%
Thongprachum 2015 (5-100)	13	156	0.08	[0.05; 0.14]	8.0%
Nakamura 2016 (6-100)	35	309	0.11	[0.08; 0.16]	8.5%
Barnes 1997 (5-100)	45	282	0.16	[0.12; 0.21]	8.5%
Overall Effect		**303871**	**0.04**	**[0.02; 0.08]**	**100.0%**
Prediction Interval				**[0.00; 0.19]**	

Heterogeneity: $I^2 = 99\%$, $\tau^2 = 0.0112$, $p < 0.01$



Appendix 6C: Study Setting by Age

Community by Age Groups

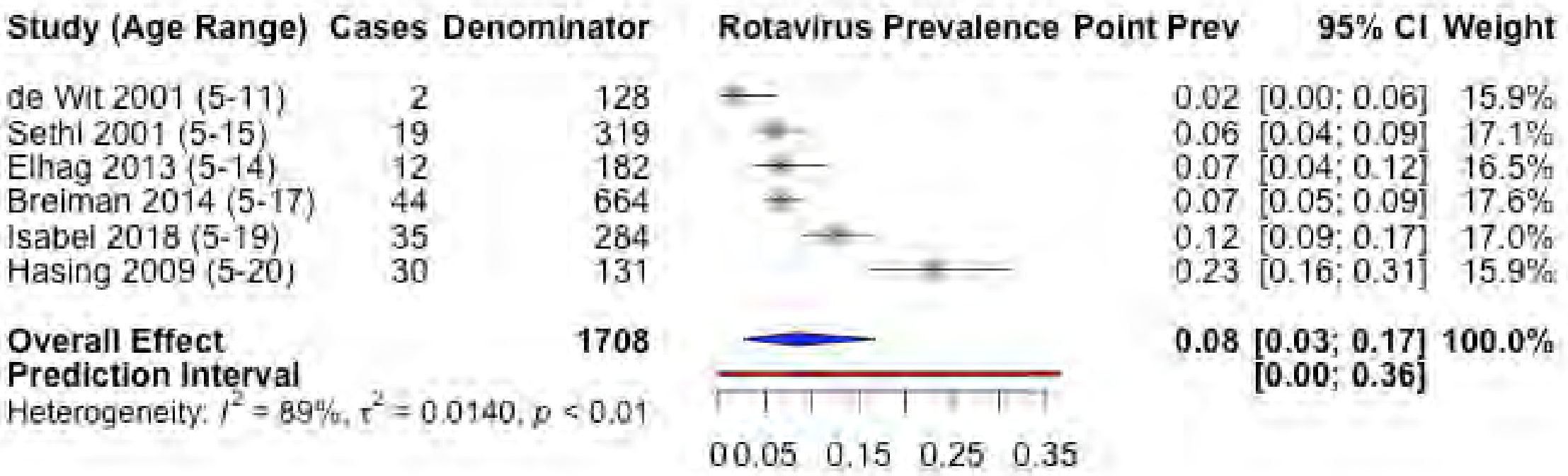
Inpatient by Age Groups

Outpatient by Age Groups

General Hospital by Age Groups

Community by Age Group

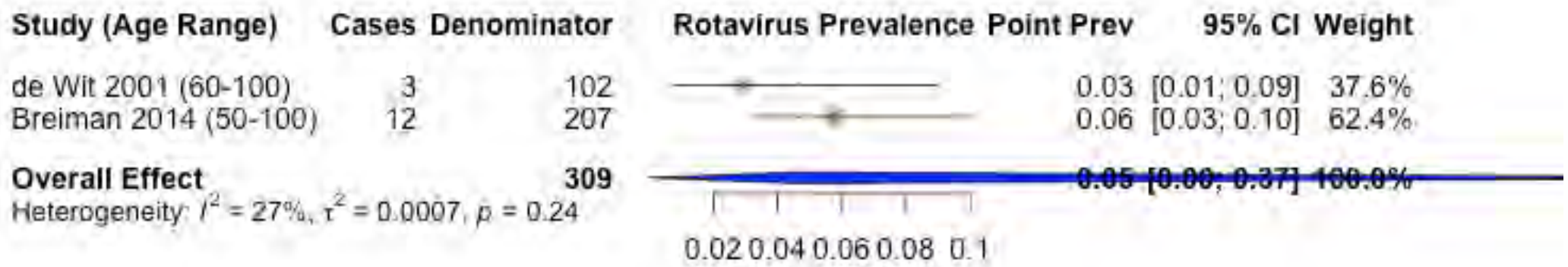
Community:
Older Children and Adolescents (5-20 y.o.)



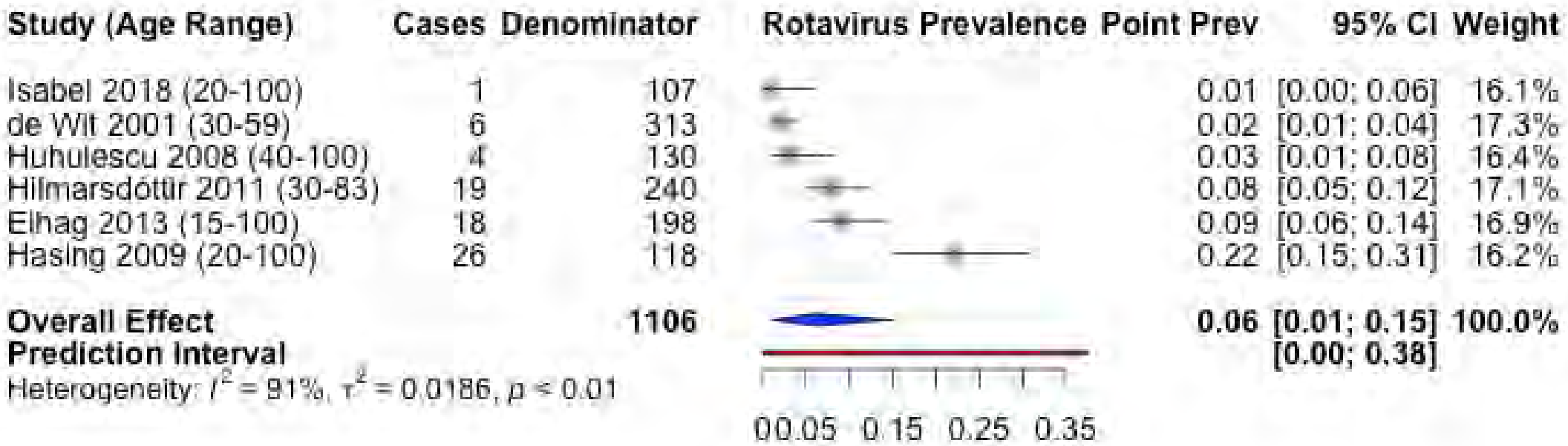
Community: Younger Adults (15-50 y.o.)

Study (Age Range)	Cases	Denominator	Rotavirus Prevalence	Proportion	95%-CI
Breiman 2014 (18-49)	106	1261		0.08	[0.07; 0.1]

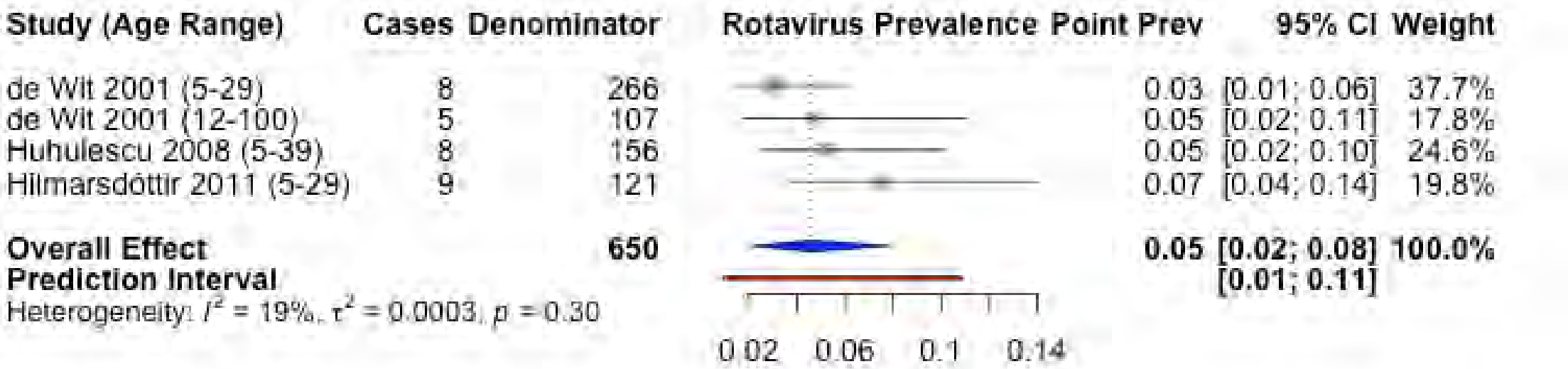
Community: Older Adults (50-100 y.o.)



Community: Broad Adult Ages (15-100 y.o.)

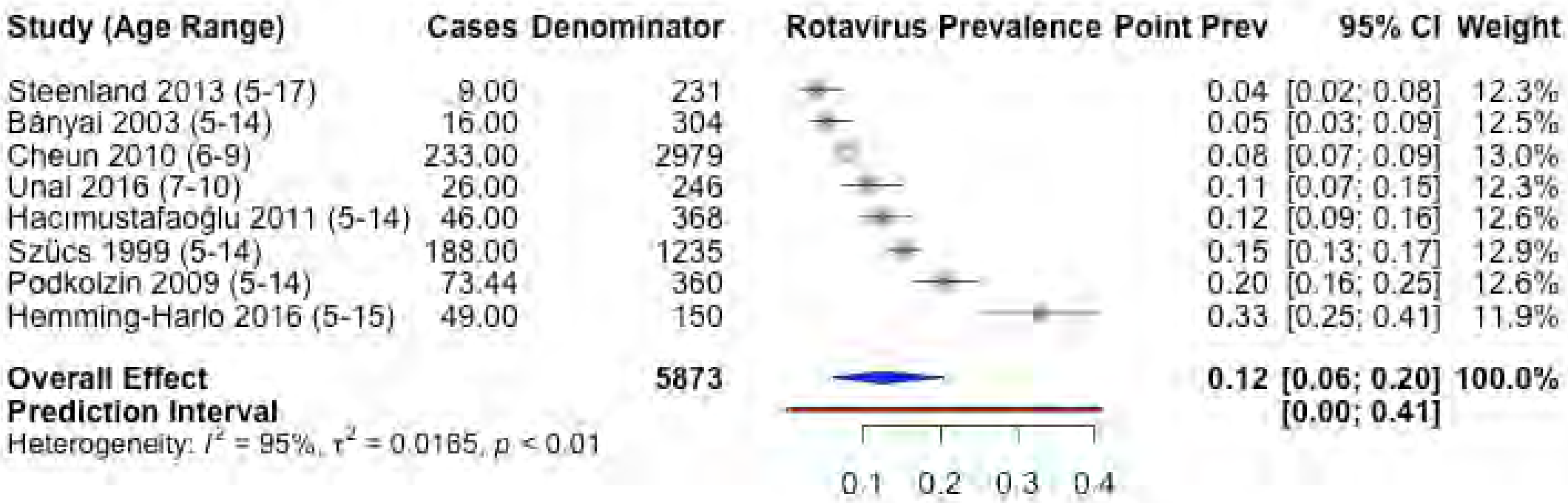


Community: Broad Ages (5-100 y.o.)



Inpatient by Age Group

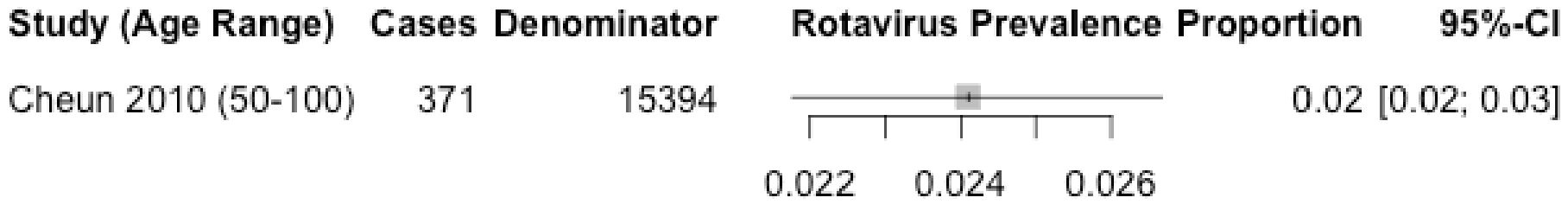
Inpatient:
Older Children and Adolescents (5-20 y.o.)



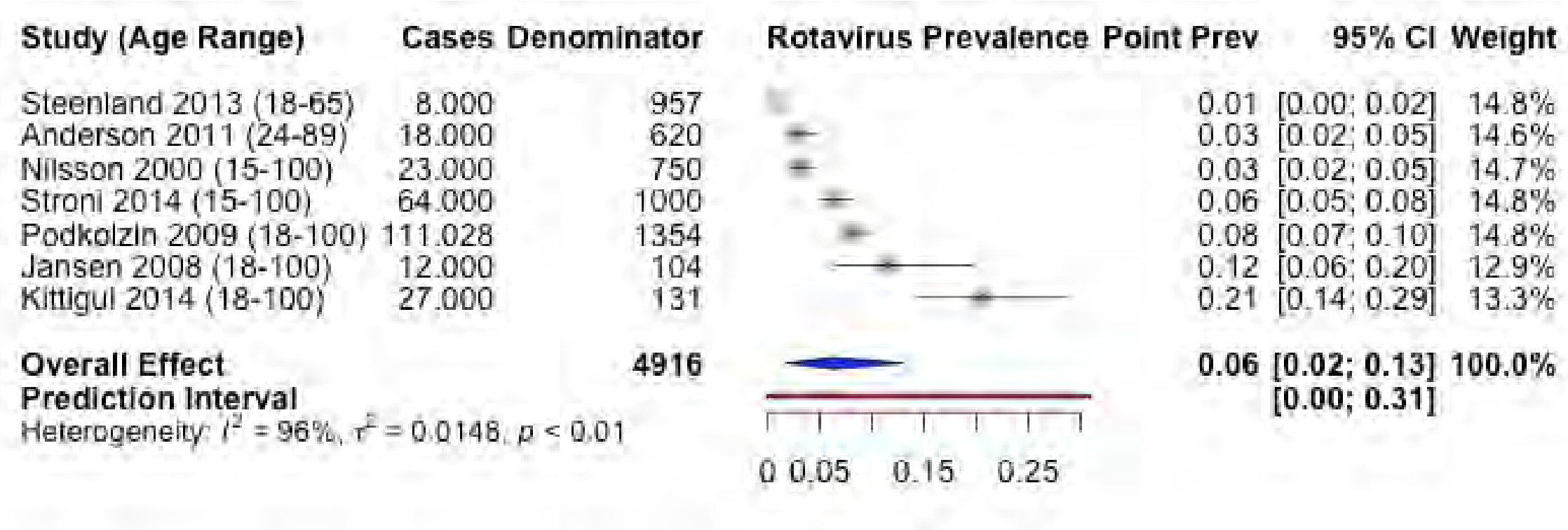
Inpatient: Younger Adults (15-50 y.o.)

No data reported

Inpatient: Older Adults (50-100 y.o.)



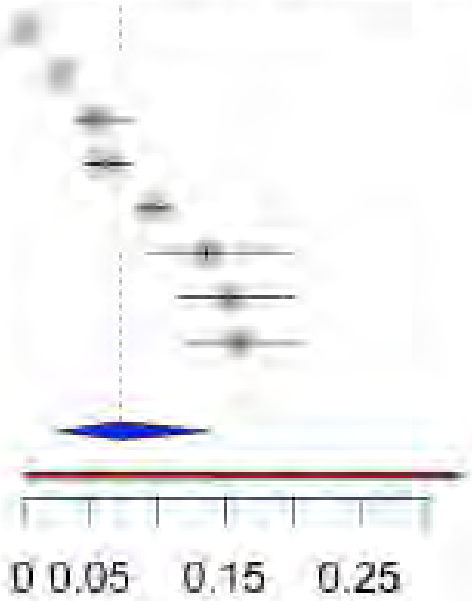
Inpatient: Broad Adult Ages (15-100 y.o.)



Inpatient: Broad Ages (5-100 y.o.)

Study (Age Range)	Cases	Denominator	Rotavirus Prevalence	Point Prev	95% CI	Weight
Atchison 2016 (5-100)	343	287724		0.00	[0.00; 0.00]	12.9%
Cheun 2010 (10-49)	345	12216		0.03	[0.03; 0.03]	12.9%
Unal 2016 (11-20)	22	404		0.05	[0.04; 0.08]	12.4%
Nayak 2018 (5-100)	44	728		0.06	[0.04; 0.08]	12.6%
Nair 2010 (5-100)	181	1871		0.10	[0.08; 0.11]	12.8%
Jain 2016 (5-100)	24	176		0.14	[0.09; 0.20]	11.9%
Mladenova 2010 (5-100)	45	293		0.15	[0.12; 0.20]	12.3%
Barnes 1997 (5-100)	45	282		0.16	[0.12; 0.21]	12.2%
Overall Effect		**303694**		**0.07**	**[0.03; 0.14]**	**100.0%**
Prediction Interval					**[0.00; 0.32]**	

Heterogeneity: $I^2 = 100\%$, $\tau^2 = 0.0165$, $p = 0$

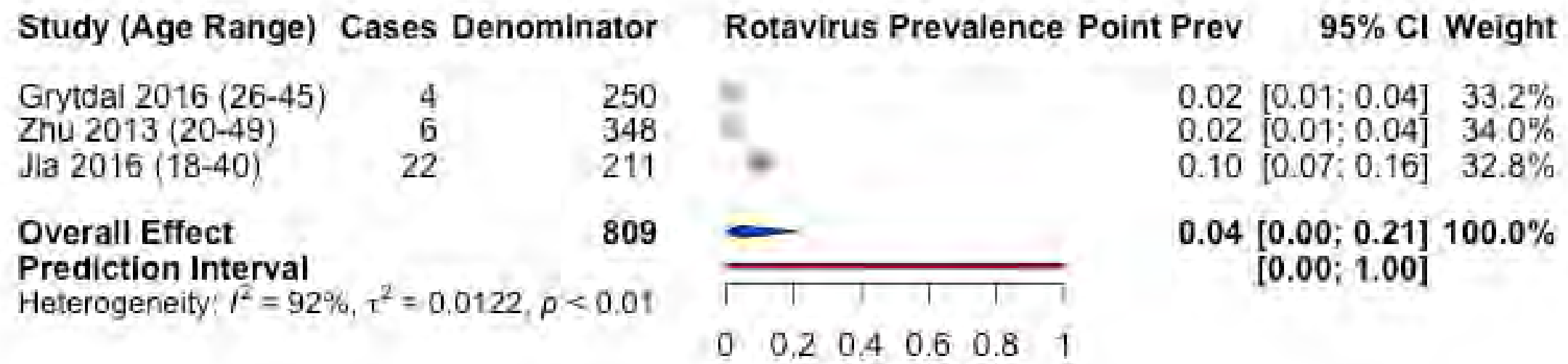


Outpatient by Age Group

Outpatient:
Older Children and Adolescents (5-20 y.o.)

No data reported

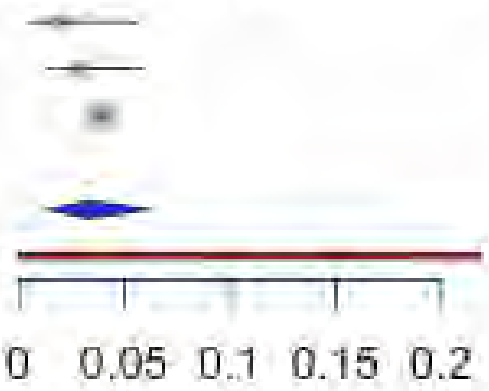
Outpatient: Younger Adults (15-50 y.o.)



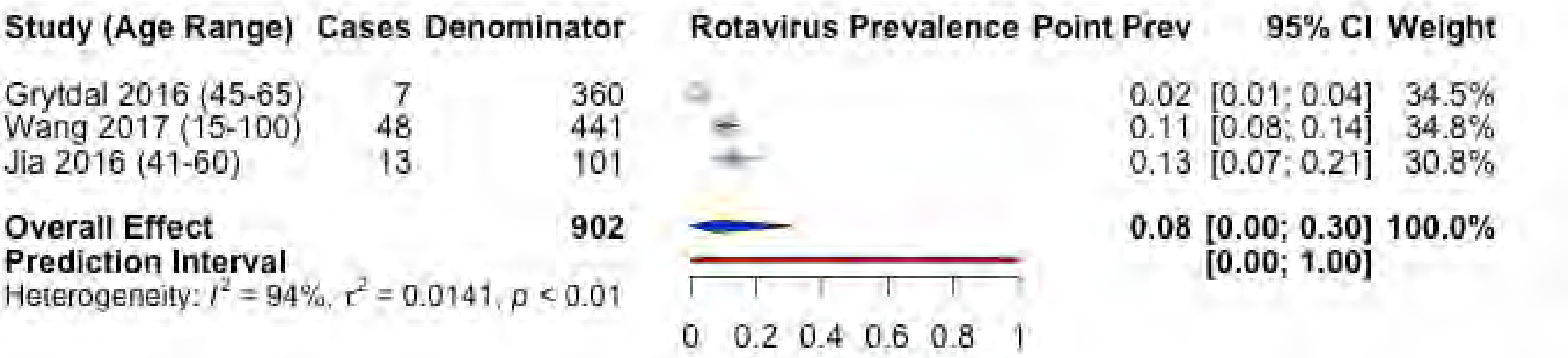
Outpatient: Older Adults (50-100 y.o.)

Study (Age Range)	Cases	Denominator	Rotavirus Prevalence	Point Prev	95% CI	Weight
Zhu 2013 (50-100)	3	165		0.02	[0.00; 0.06]	13.9%
Grytdal 2016 (65-100)	7	251		0.03	[0.01; 0.06]	19.4%
Zhang 2017 (65-100)	149	3857		0.04	[0.03; 0.05]	66.8%
Overall Effect		**4273**		**0.03**	**[0.01; 0.06]**	**100.0%**
Prediction Interval					**[0.00; 0.22]**	

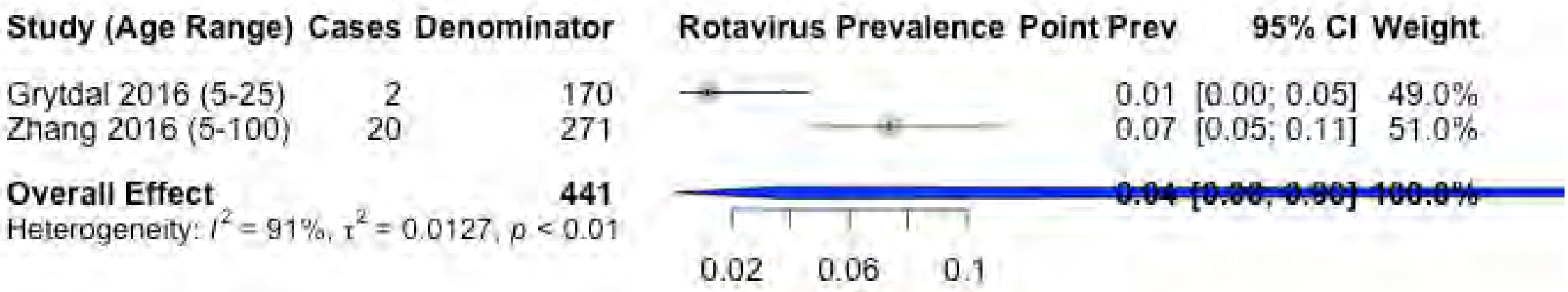
Heterogeneity: $I^2 = 37\%$, $\tau^2 = 0.0003$, $p = 0.20$



Outpatient: Broad Adult Ages (15-100 y.o.)

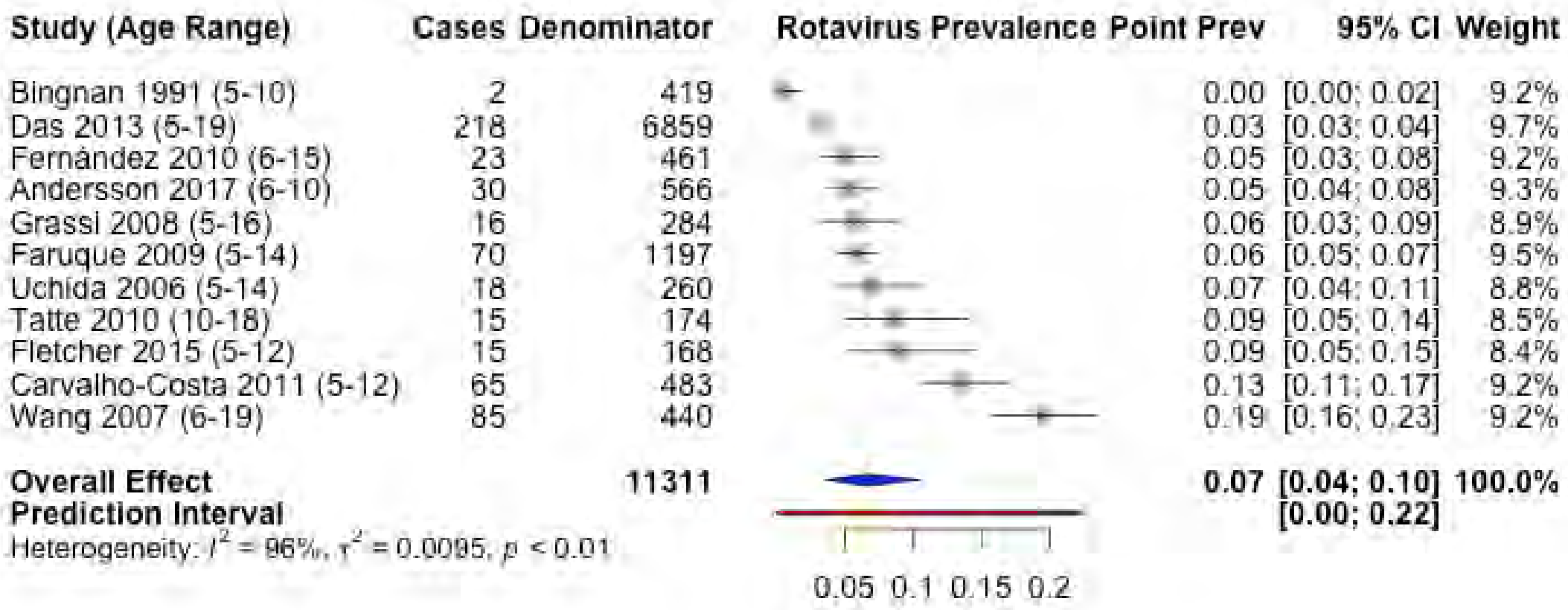


Outpatient: Broad Ages (5-100 y.o.)

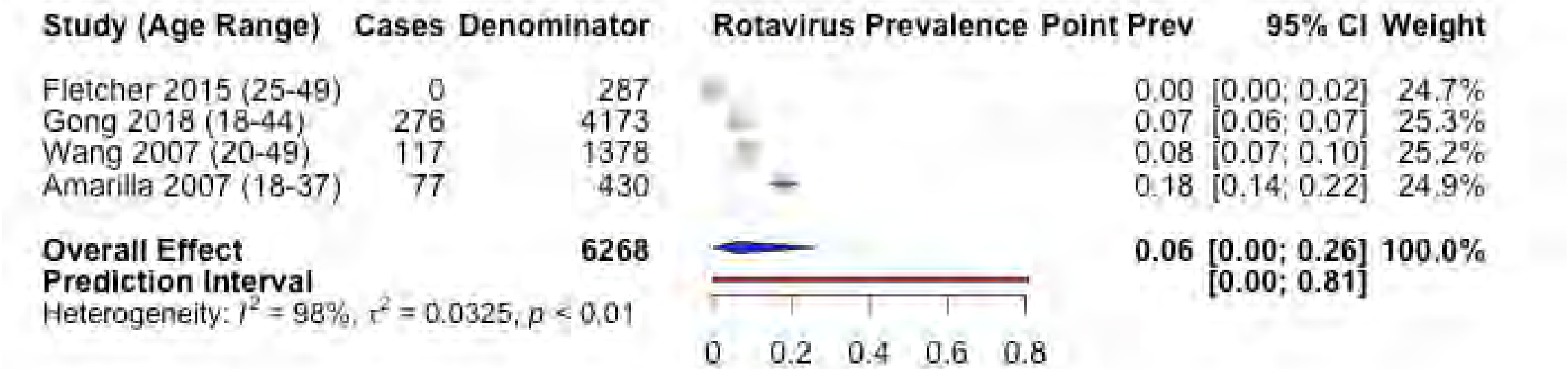


General Hospital by Age Group

General Hospital:
Older Children and Adolescents (5-20 y.o.)



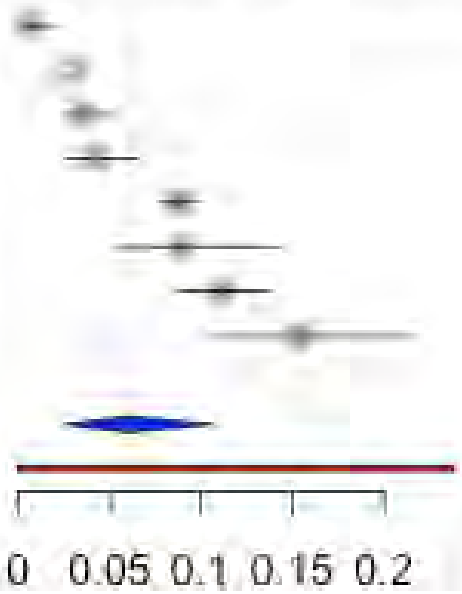
General Hospital: Younger Adults (15-50 y.o.)



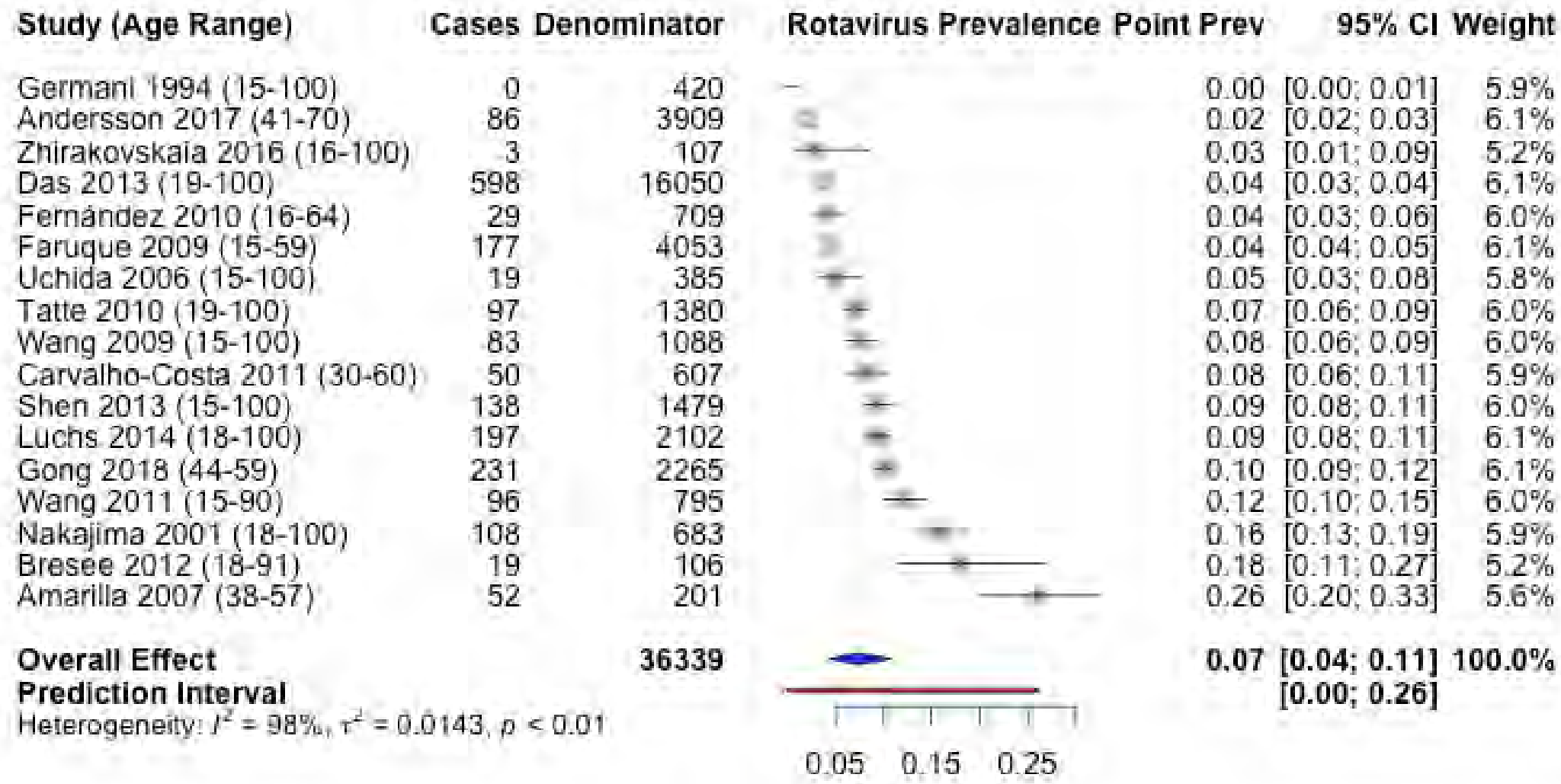
General Hospital: Older Adults (50-100 y.o.)

Study (Age Range)	Cases	Denominator	Point Prev	95% CI	Weight
Fletcher 2015 (50-100)	3	461	0.01	[0.00; 0.02]	12.5%
Andersson 2017 (70-100)	269	9276	0.03	[0.03; 0.03]	13.2%
Fernández 2010 (65-99)	30	828	0.04	[0.02; 0.05]	12.8%
Faruque 2009 (60-100)	20	473	0.04	[0.03; 0.07]	12.5%
Gong 2018 (60-100)	207	2345	0.09	[0.08; 0.10]	13.1%
Carvalho-Costa 2011 (60-100)	16	179	0.09	[0.05; 0.14]	11.6%
Wang 2007 (50-100)	73	659	0.11	[0.09; 0.14]	12.7%
Amarilla 2007 (57-100)	26	170	0.15	[0.10; 0.22]	11.5%
Overall Effect		**14391**	**0.06**	**[0.03; 0.11]**	**100.0%**
Prediction Interval				**[0.00; 0.24]**	

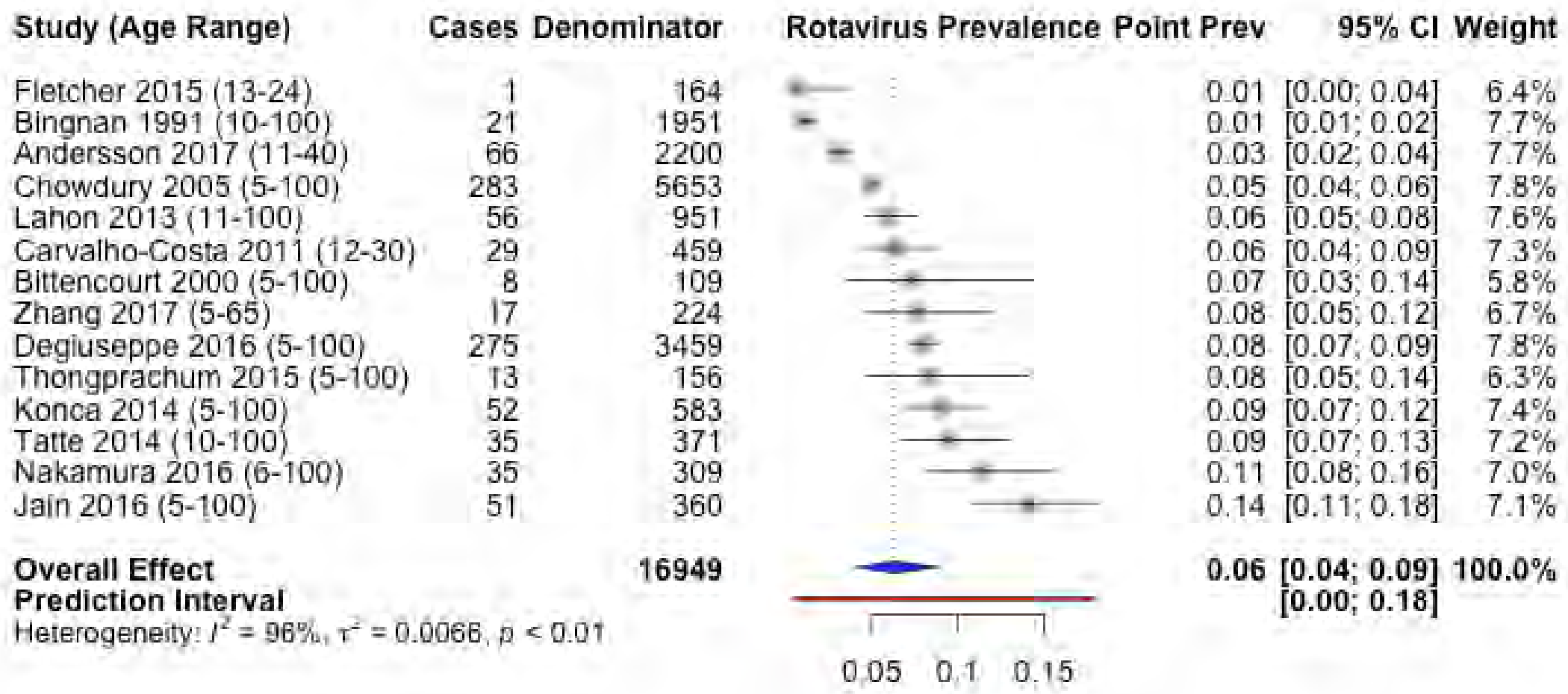
Heterogeneity: $I^2 = 97\%$, $\tau^2 = 0.0102$, $p < 0.01$



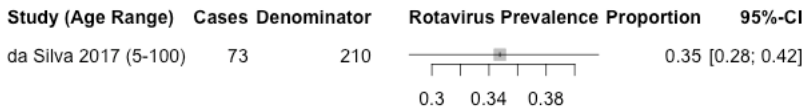
General Hospital: Broad Adult Ages (15-100 y.o.)



General Hospital: Broad Ages (5-100 y.o.)



Hospital and Community: Broad Ages (5–100 y)



Appendix 6D: Study Period by Age

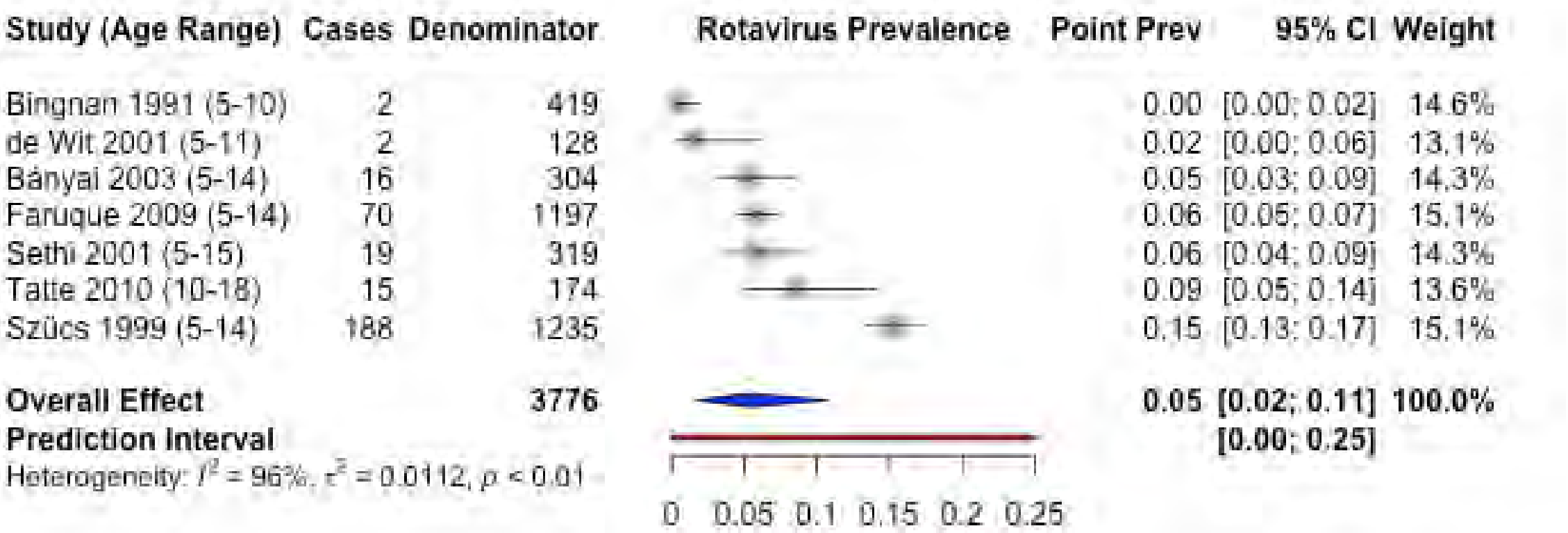
1990s by Age Groups

2000s by Age Groups

2010s by Age Groups

1990s by Age Group

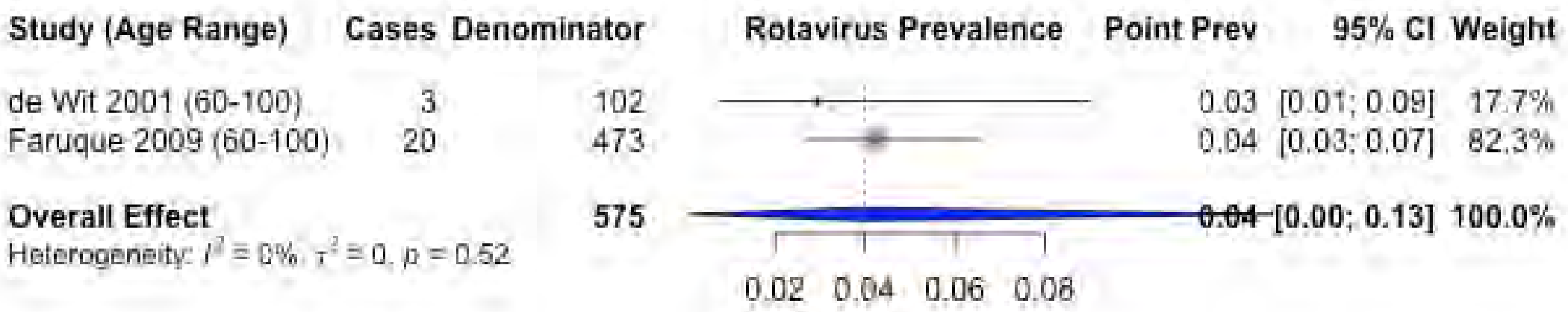
1990s:
Older Children and Adolescents (5-20 y.o.)



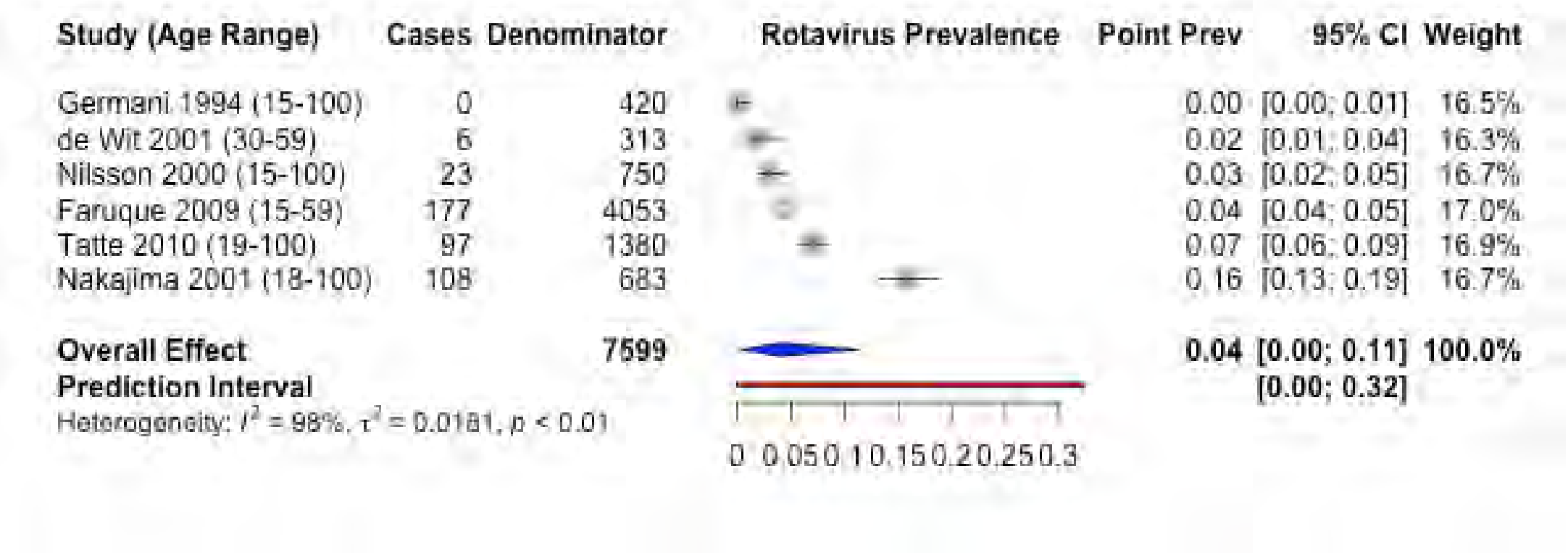
1990s: Younger Adults (15-50 y.o.)

No data reported

1990s: Older Adults (50-100 y.o.)



1990s: Broad Adult Ages (15-100 y.o.)



1990s: Broad Ages (5-100 y.o.)

Study (Age Range)	Cases	Denominator	Point Prev	95% CI	Weight
Bingnan 1991 (10-100)	21	1951	0.01	[0.01; 0.02]	15.6%
de Wit 2001 (5-29)	8	266	0.03	[0.01; 0.06]	14.2%
de Wit 2001 (12-100)	5	107	0.05	[0.02; 0.11]	12.4%
Chowdury 2005 (5-100)	283	5653	0.05	[0.04; 0.06]	15.8%
Lahon 2013 (11-100)	56	951	0.06	[0.05; 0.08]	15.4%
Bittencourt 2000 (5-100)	8	109	0.07	[0.03; 0.14]	12.4%
Barnes 1997 (5-100)	45	282	0.16	[0.12; 0.21]	14.3%
Overall Effect		**9319**	**0.05**	**[0.02; 0.10]**	**100.0%**
Prediction Interval				**[0.00; 0.22]**	

Heterogeneity: I^2 = 96%, τ^2 = 0.0083, p < 0.01

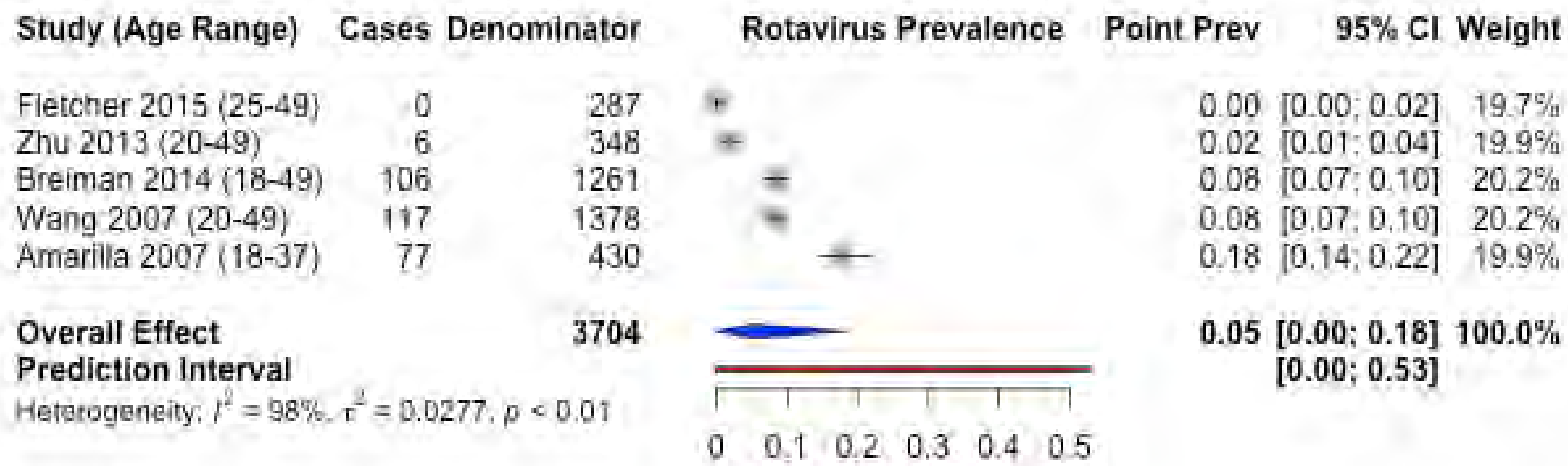
2000s by Age Group

2000s:
Older Children and Adolescents (5-20 y.o.)

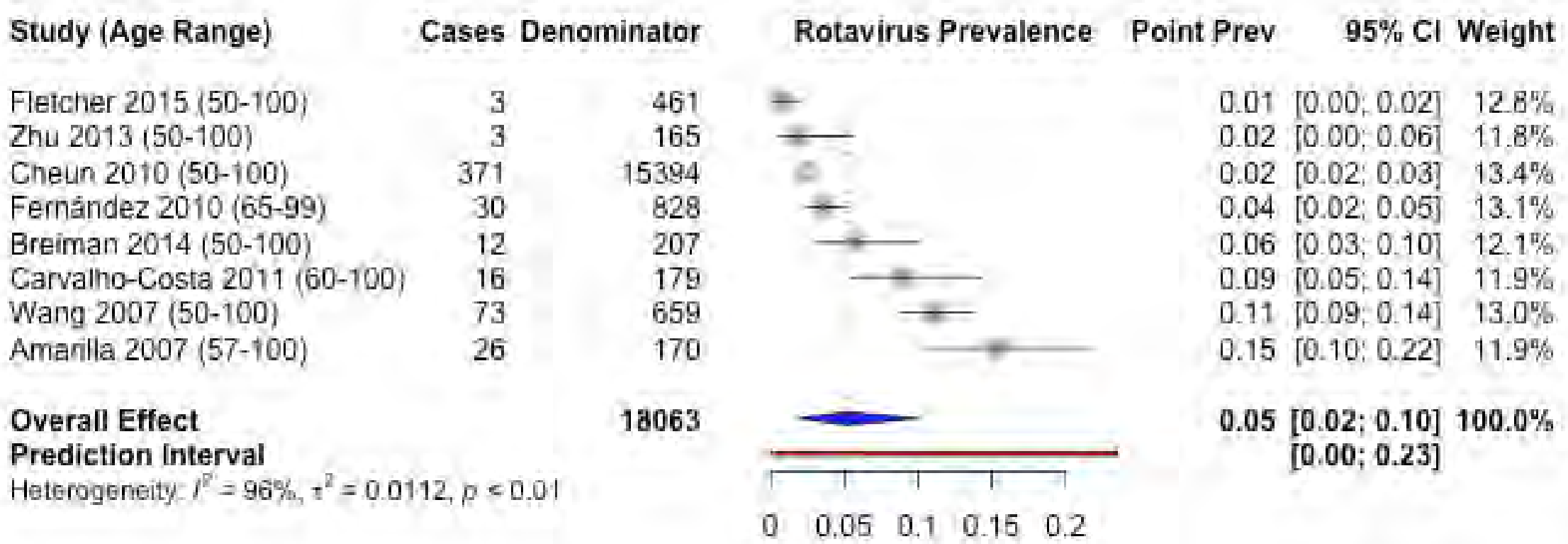
Study (Age Range)	Cases	Denominator	Point Prev	95% CI	Weight
Das 2013 (5-19)	218.00	6859	0.03	[0.03; 0.04]	8.9%
Fernández 2010 (6-15)	23.00	461	0.05	[0.03; 0.08]	8.5%
Grassi 2008 (5-16)	16.00	284	0.06	[0.03; 0.09]	8.2%
Elhag 2013 (5-14)	12.00	182	0.07	[0.04; 0.12]	7.9%
Breiman 2014 (5-17)	44.00	664	0.07	[0.05; 0.09]	8.6%
Uchida 2006 (5-14)	18.00	260	0.07	[0.04; 0.11]	8.2%
Cheun 2010 (6-9)	233.00	2979	0.08	[0.07; 0.09]	8.9%
Fletcher 2015 (5-12)	15.00	168	0.09	[0.05; 0.15]	7.8%
Carvalho-Costa 2011 (5-12)	65.00	483	0.13	[0.11; 0.17]	8.5%
Wang 2007 (6-19)	85.00	440	0.19	[0.16; 0.23]	8.5%
Podkolzin 2009 (5-14)	73.44	360	0.20	[0.16; 0.25]	8.4%
Hasing 2009 (5-20)	30.00	131	0.23	[0.16; 0.31]	7.5%
Overall Effect		**13271**	**0.10**	**[0.06; 0.14]**	**100.0%**
Prediction Interval				**[0.01; 0.27]**	

Heterogeneity: $I^2 = 97\%$, $\tau^2 = 0.0103$, $p < 0.01$

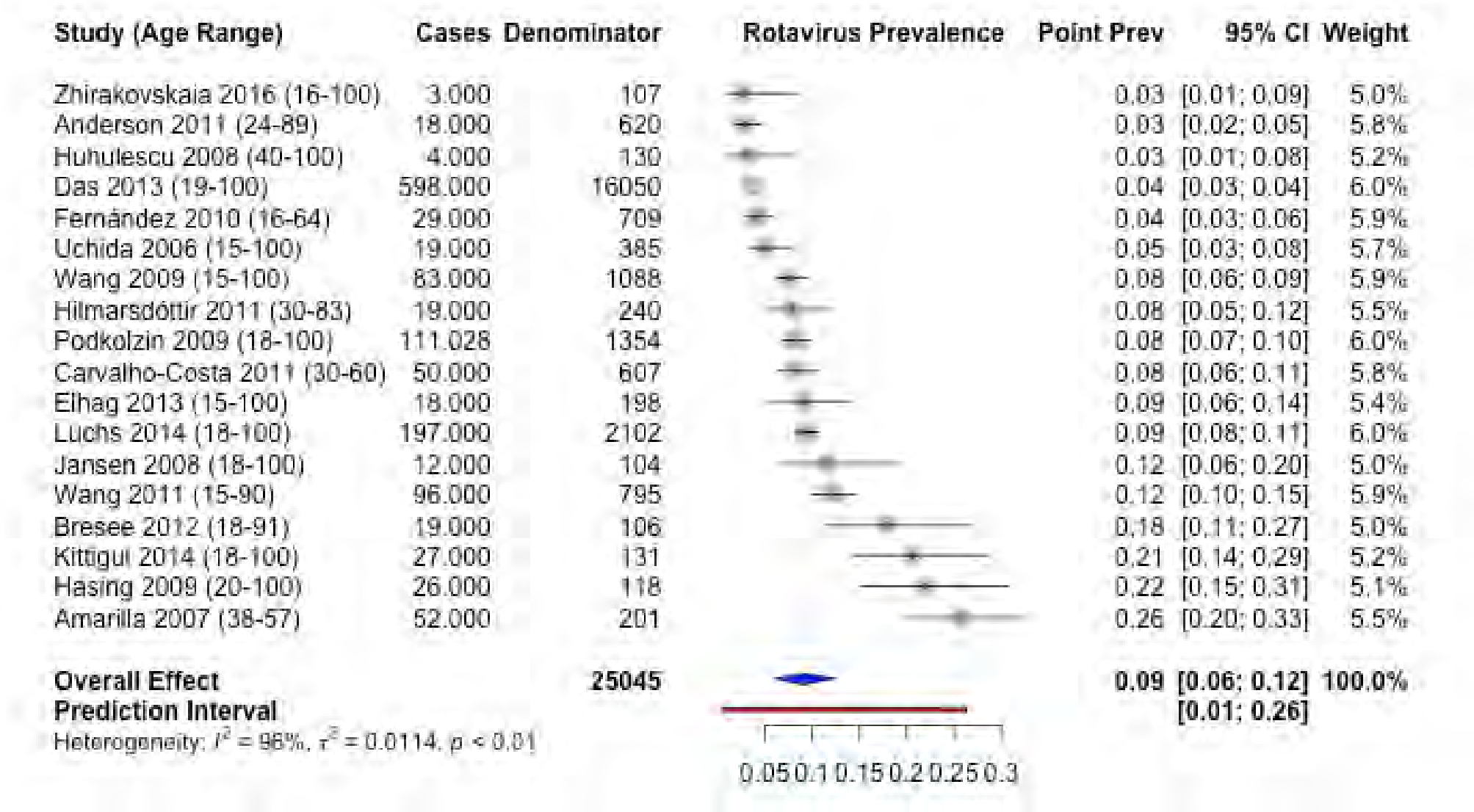
2000s: Younger Adults (15-50 y.o.)



2000s: Older Adults (50-100 y.o.)



2000s: Broad Adult Ages (15-100 y.o.)



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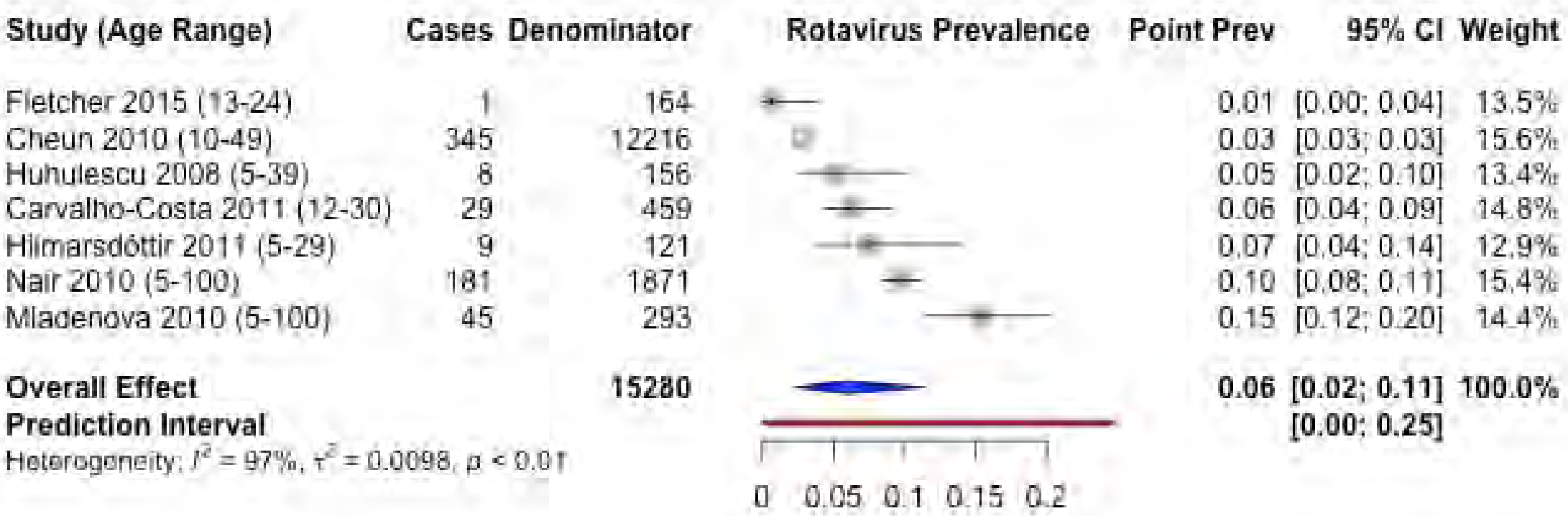
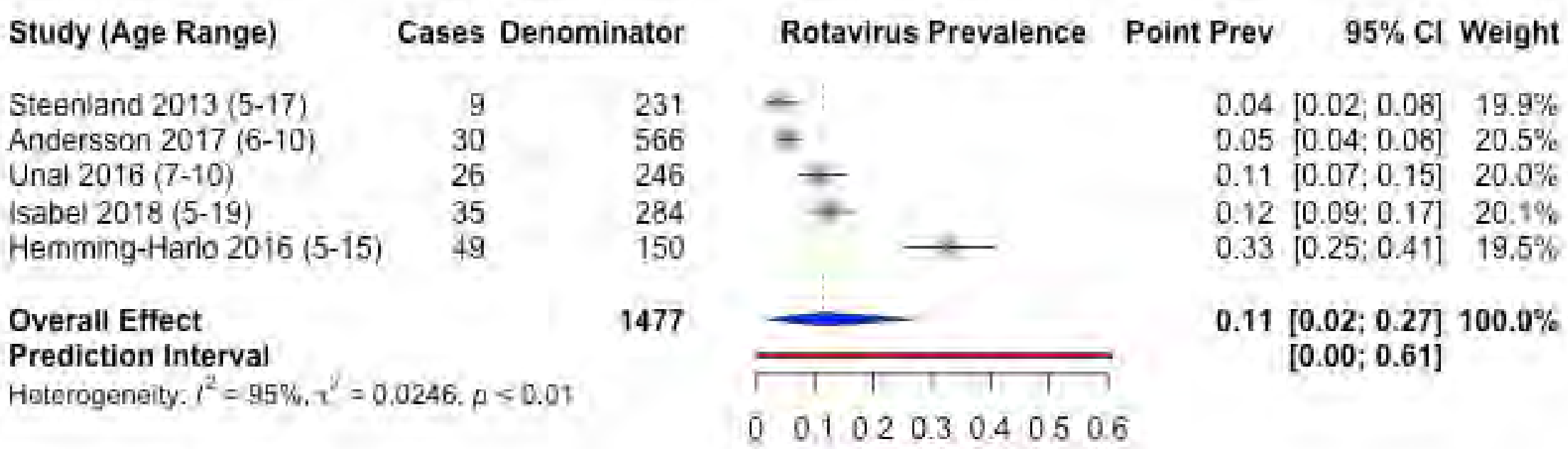
2000s: Broad Ages (5-100 y.o.)



2010s by Age Group

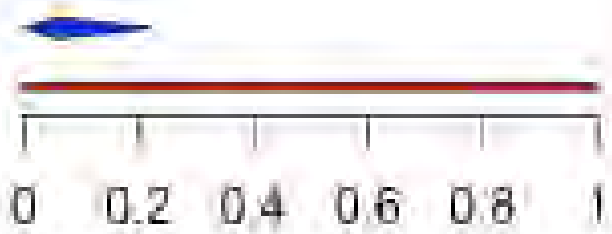
2010s:
Older Children and Adolescents (5-20 y.o.)



2010s: Younger Adults (15-50 y.o.)

Study (Age Range)	Cases	Denominator	Rotavirus Prevalence	Point Prev	95% CI	Weight
Grytdal 2016 (26-45)	4	250		0.02	[0.01; 0.04]	32.5%
Gong 2018 (18-44)	276	4173		0.07	[0.06; 0.07]	35.6%
Jia 2016 (18-40)	22	211		0.10	[0.07; 0.16]	31.9%
Overall Effect		**4634**		**0.06**	**[0.00; 0.22]**	**100.0%**
Prediction Interval					**[0.00; 1.00]**	

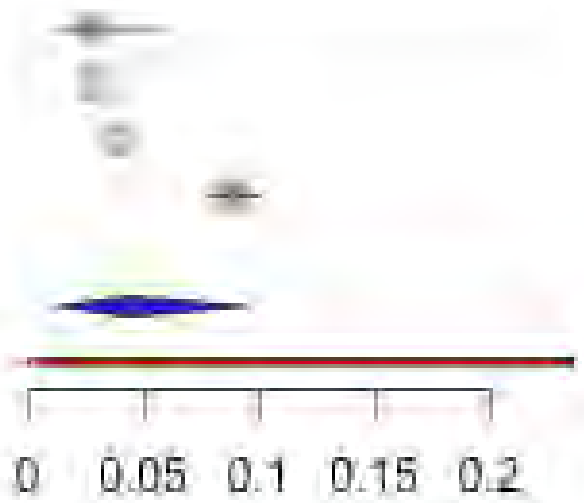
Heterogeneity: $I^2 = 91\%$, $\tau^2 = 0.0095$, $p < 0.01$



2010s: Older Adults (50-100 y.o.)

Study (Age Range)	Cases	Denominator	Point Prev	95% CI	Weight
Grytdal 2016 (65-100)	7	251	0.03	[0.01; 0.06]	21.1%
Andersson 2017 (70-100)	269	9276	0.03	[0.03; 0.03]	26.6%
Zhang 2017 (65-100)	149	3857	0.04	[0.03; 0.05]	26.3%
Gong 2018 (60-100)	207	2345	0.09	[0.08; 0.10]	26.0%
Overall Effect		**15729**	**0.04**	**[0.01; 0.09]**	**100.0%**
Prediction Interval				**[0.00; 0.24]**	

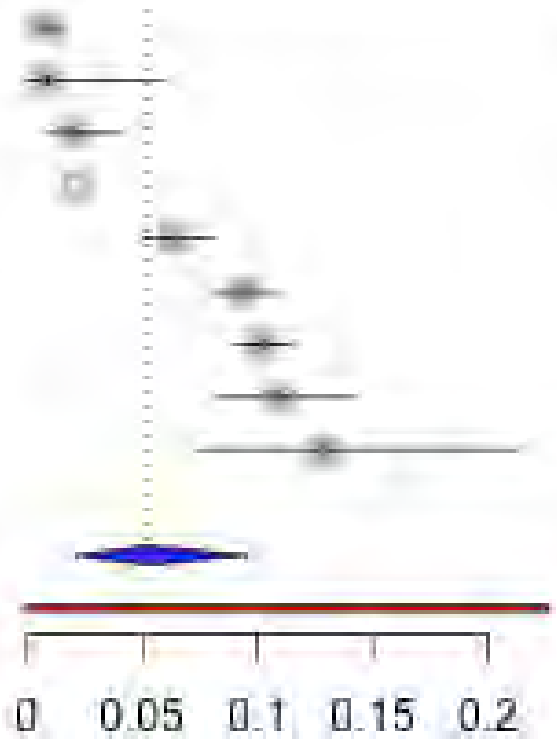
Heterogeneity: $I^2 = 98\%$, $\tau^2 = 0.0037$, $p < 0.01$



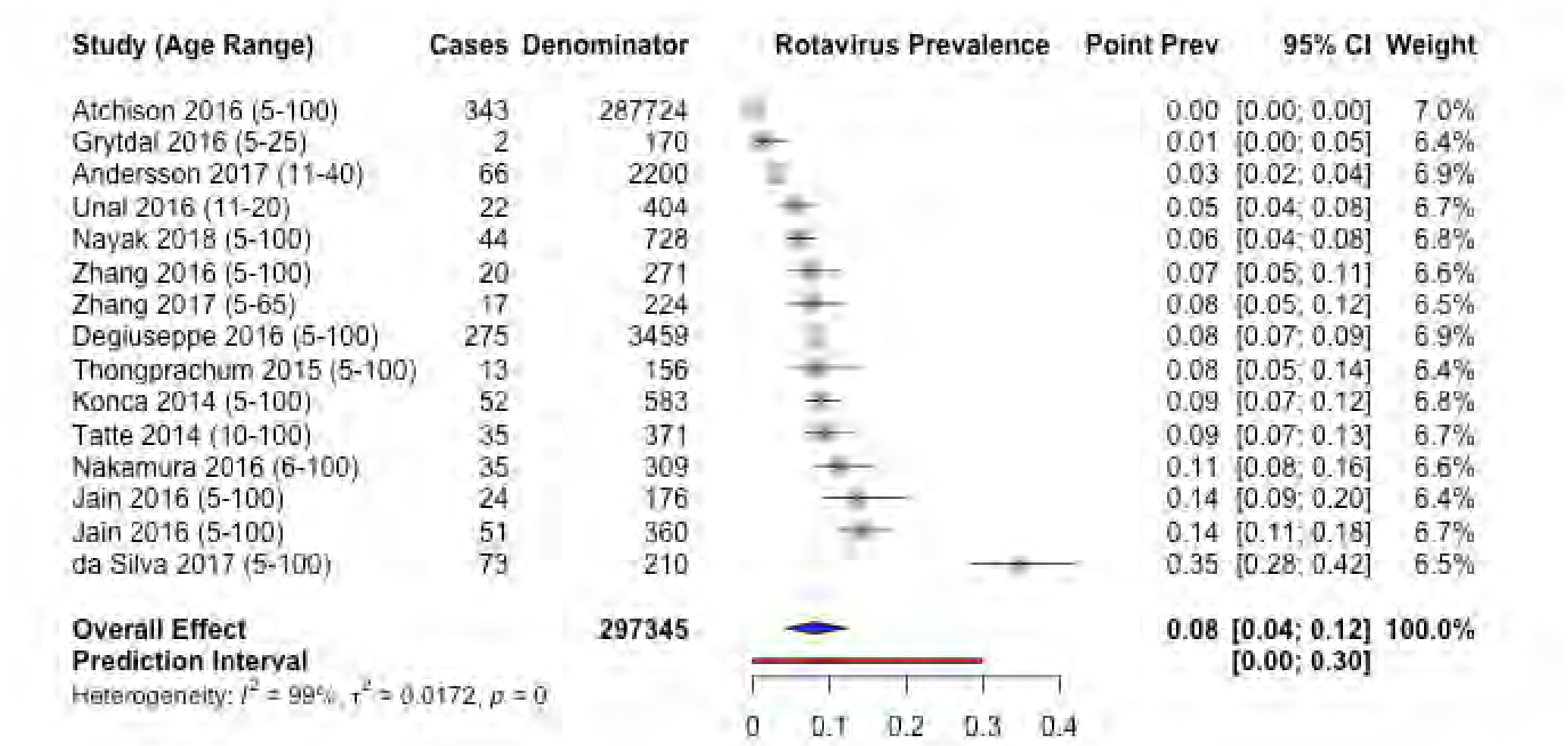
2010s: Broad Adult Ages (15-100 y.o.)

Study (Age Range)	Cases	Denominator	Point Prev	95% CI	Weight
Steenland 2013 (18-65)	8	957	0.01	[0.00; 0.02]	11.5%
Isabel 2018 (20-100)	1	107	0.01	[0.00; 0.06]	9.8%
Grytdal 2016 (45-65)	7	360	0.02	[0.01; 0.04]	11.1%
Andersson 2017 (41-70)	86	3909	0.02	[0.02; 0.03]	11.7%
Stroni 2014 (15-100)	64	1000	0.06	[0.05; 0.08]	11.6%
Shen 2013 (15-100)	138	1479	0.09	[0.08; 0.11]	11.6%
Gong 2018 (44-59)	231	2265	0.10	[0.09; 0.12]	11.7%
Wang 2017 (15-100)	48	441	0.11	[0.08; 0.14]	11.2%
Jia 2016 (41-60)	13	101	0.13	[0.07; 0.21]	9.7%
Overall Effect		**10619**	**0.05**	**[0.02; 0.10]**	**100.0%**
Prediction Interval				**[0.00; 0.23]**	

Heterogeneity: $I^2 = 98\%$, $\tau^2 = 0.0112$, $p < 0.01$



2010s: Broad Ages (5-100 y.o.)



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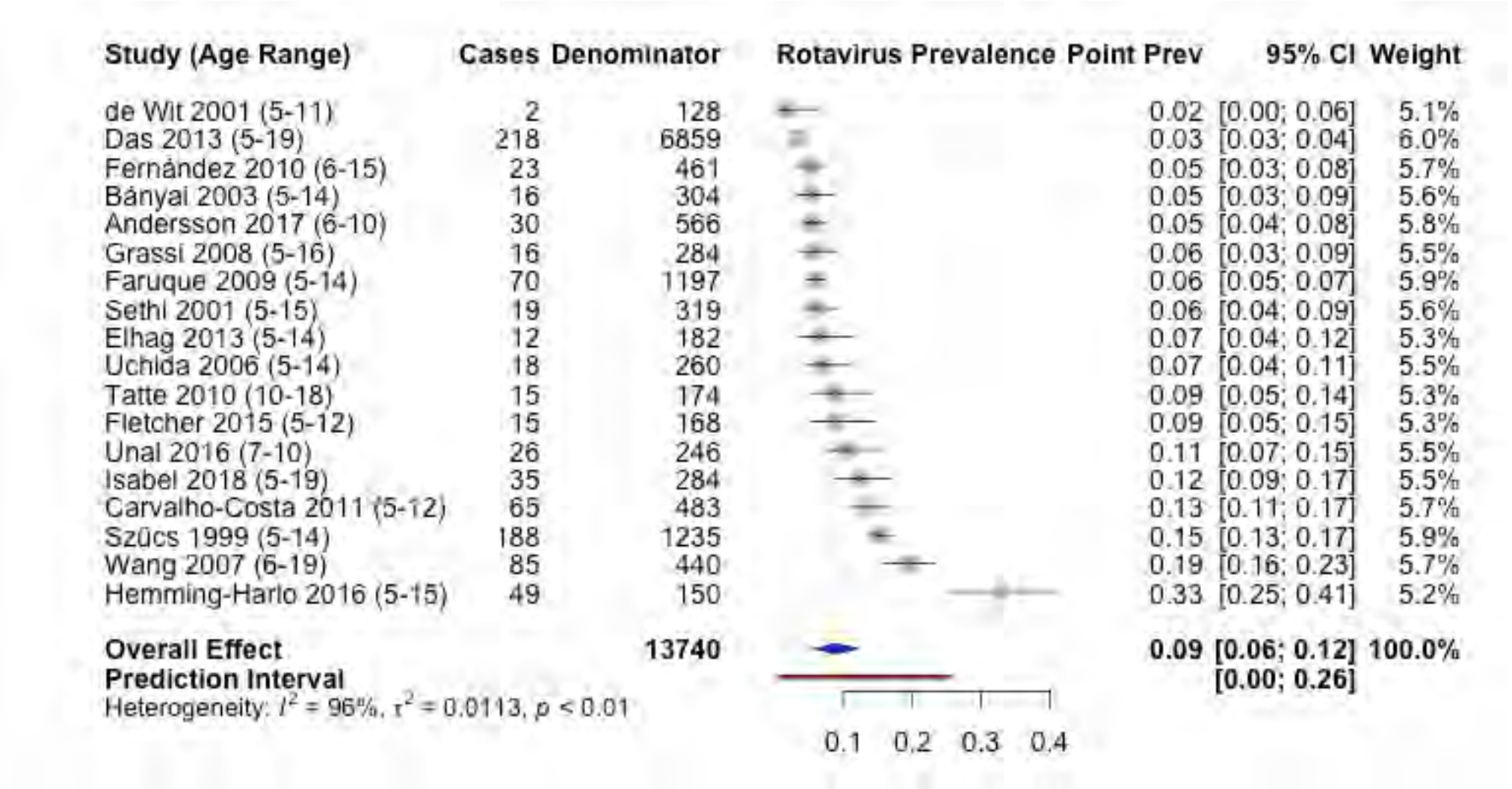
Appendix 6E: Diarrhea Definition by Age

Non-WHO Diarrhea Definition by Age Groups

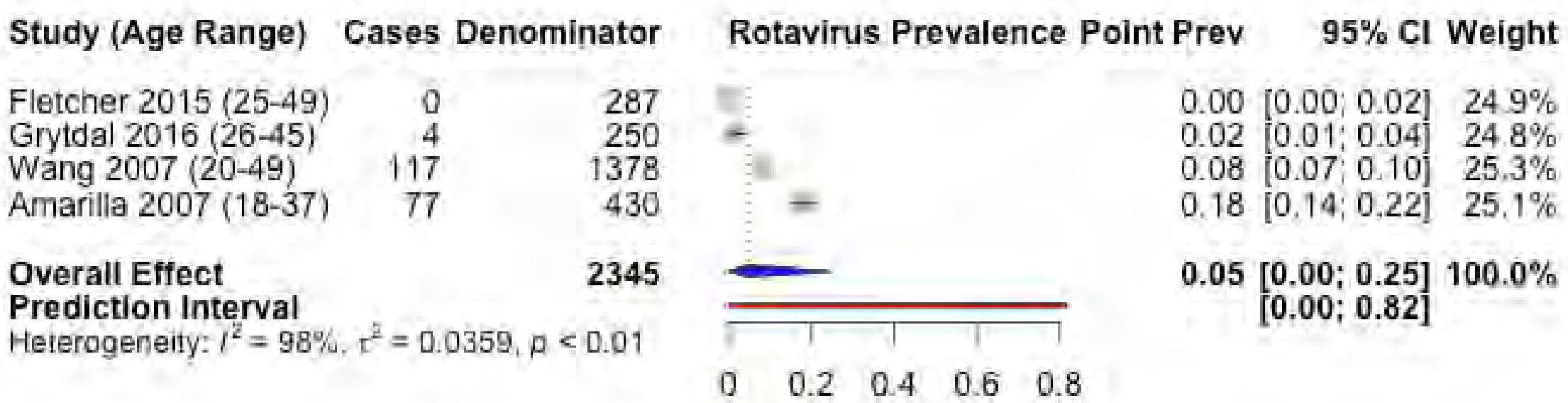
WHO Diarrhea Definition by Age Groups

Non-WHO Diarrhea Definition by Age Group

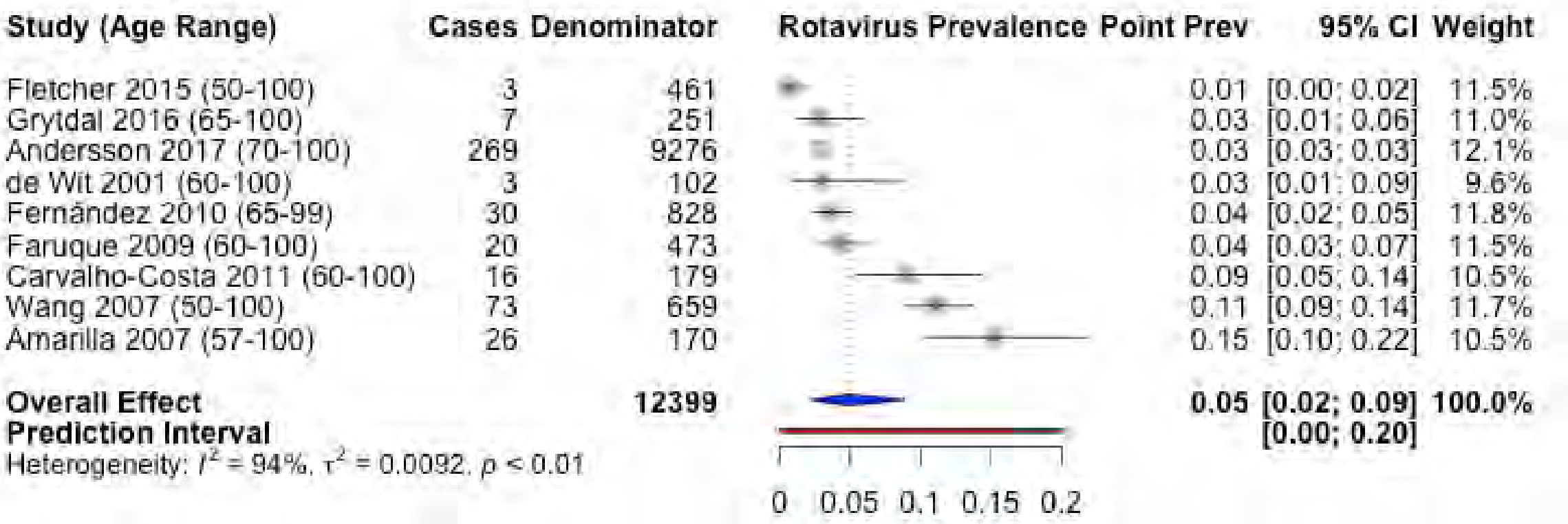
Non-WHO Diarrhea Definition: Older Children and Adolescents (5-20 y.o.)



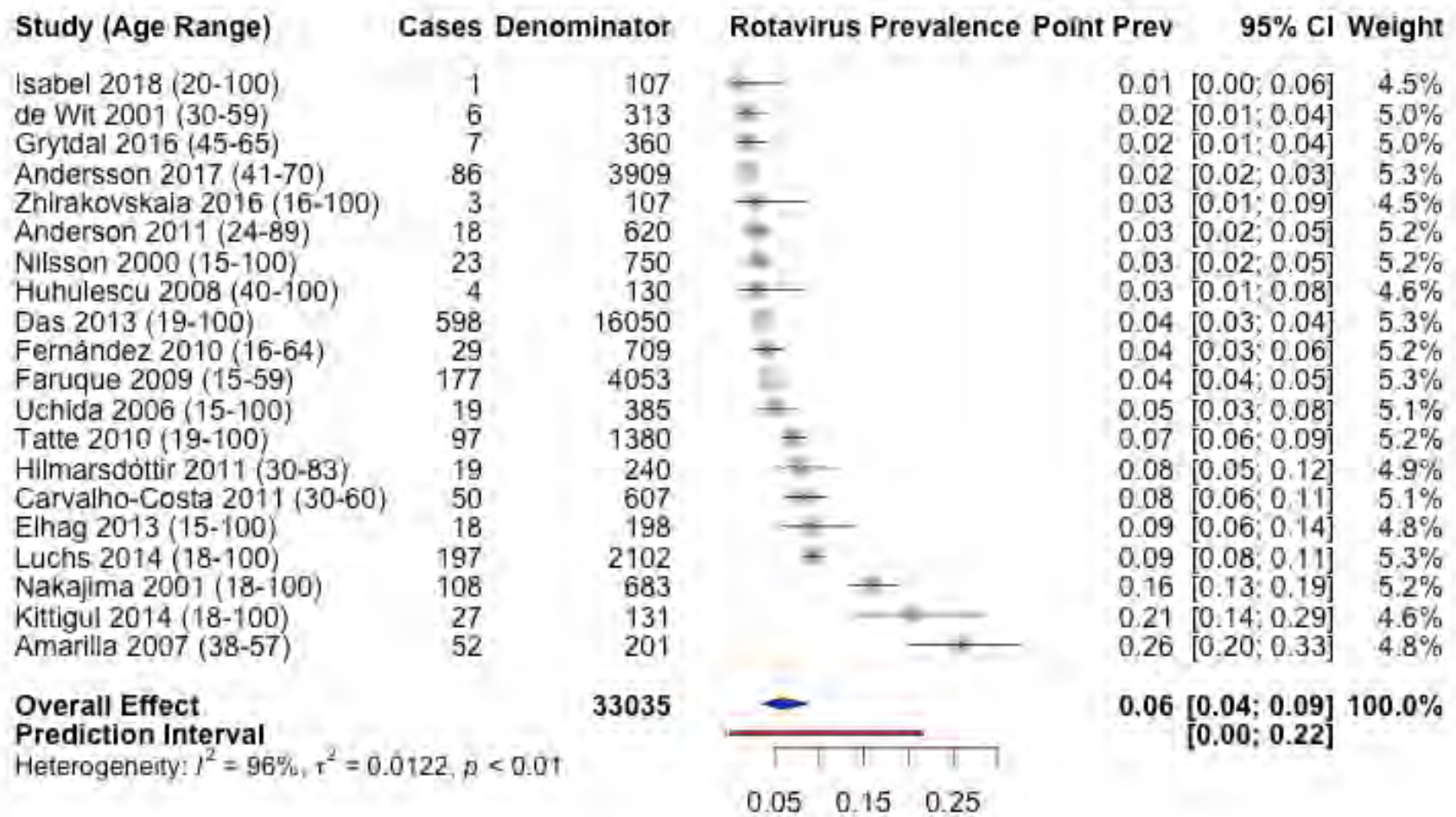
Non-WHO Diarrhea Definition: Younger Adults (15-50 y.o.)



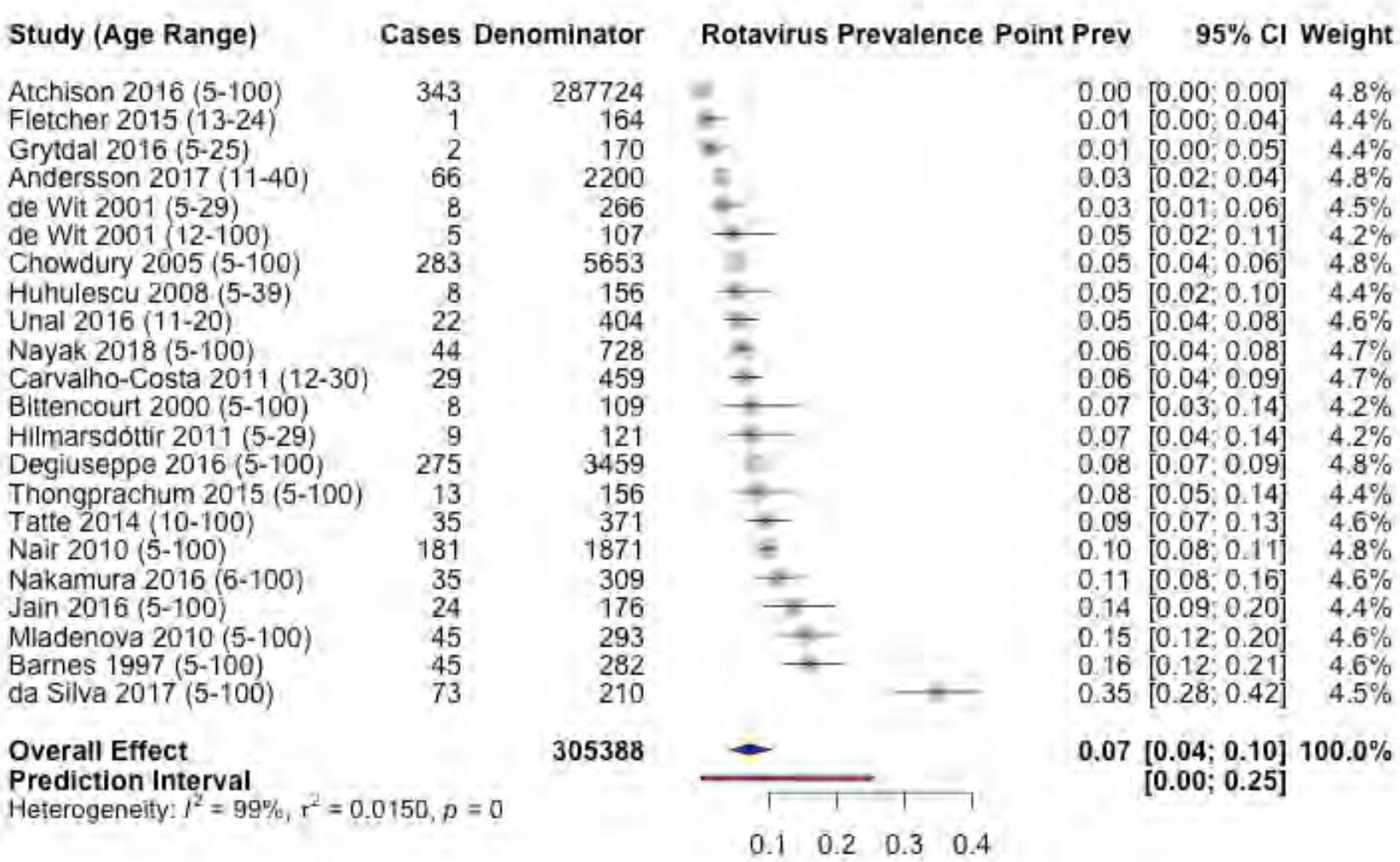
Non-WHO Diarrhea Definition: Older Adults (50-100 y.o.)



Non-WHO Diarrhea Definition: Broad Adult Ages (15-100 y.o.)



Non-WHO Diarrhea Definition: Broad Ages (5-100 y.o.)



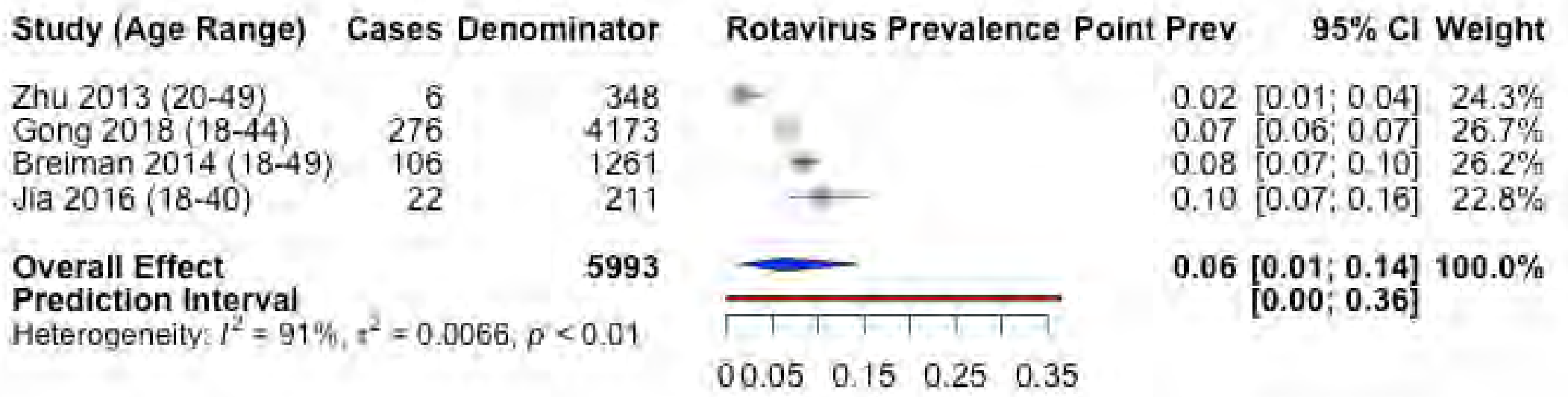
WHO Diarrhea Definition by Age Group

WHO Diarrhea Definition: Older Children and Adolescents (5-20 y.o.)

Study (Age Range)	Cases	Denominator	Rotavirus Prevalence	Point Prev	95% CI	Weight
Bingnan 1991 (5-10)	2.00	419		0.00	[0.00; 0.02]	14.4%
Steenland 2013 (5-17)	9.00	231		0.04	[0.02; 0.08]	14.1%
Breiman 2014 (5-17)	44.00	664		0.07	[0.05; 0.09]	14.5%
Cheun 2010 (6-9)	233.00	2979		0.08	[0.07; 0.09]	14.7%
Hacımustafaoğlu 2011 (5-14)	46.00	368		0.12	[0.09; 0.16]	14.3%
Podkolzin 2009 (5-14)	73.44	360		0.20	[0.16; 0.25]	14.3%
Hasing 2009 (5-20)	30.00	131		0.23	[0.16; 0.31]	13.6%
Overall Effect		**5152**		**0.09**	**[0.03; 0.18]**	**100.0%**
Prediction Interval					**[0.00; 0.43]**	

Heterogeneity: $I^2 = 96\%$, $\tau^2 = 0.0218$, $p < 0.01$

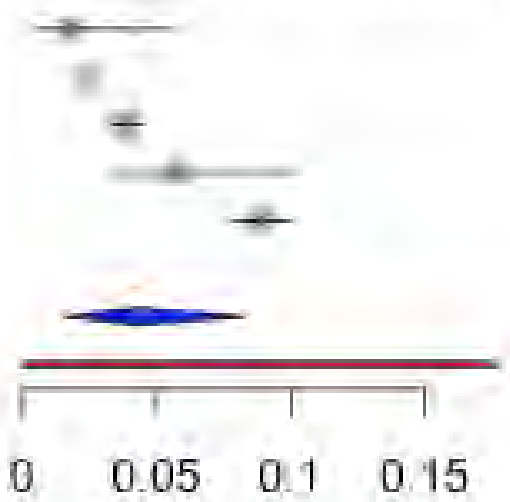
WHO Diarrhea Definition: Younger Adults (15-50 y.o.)



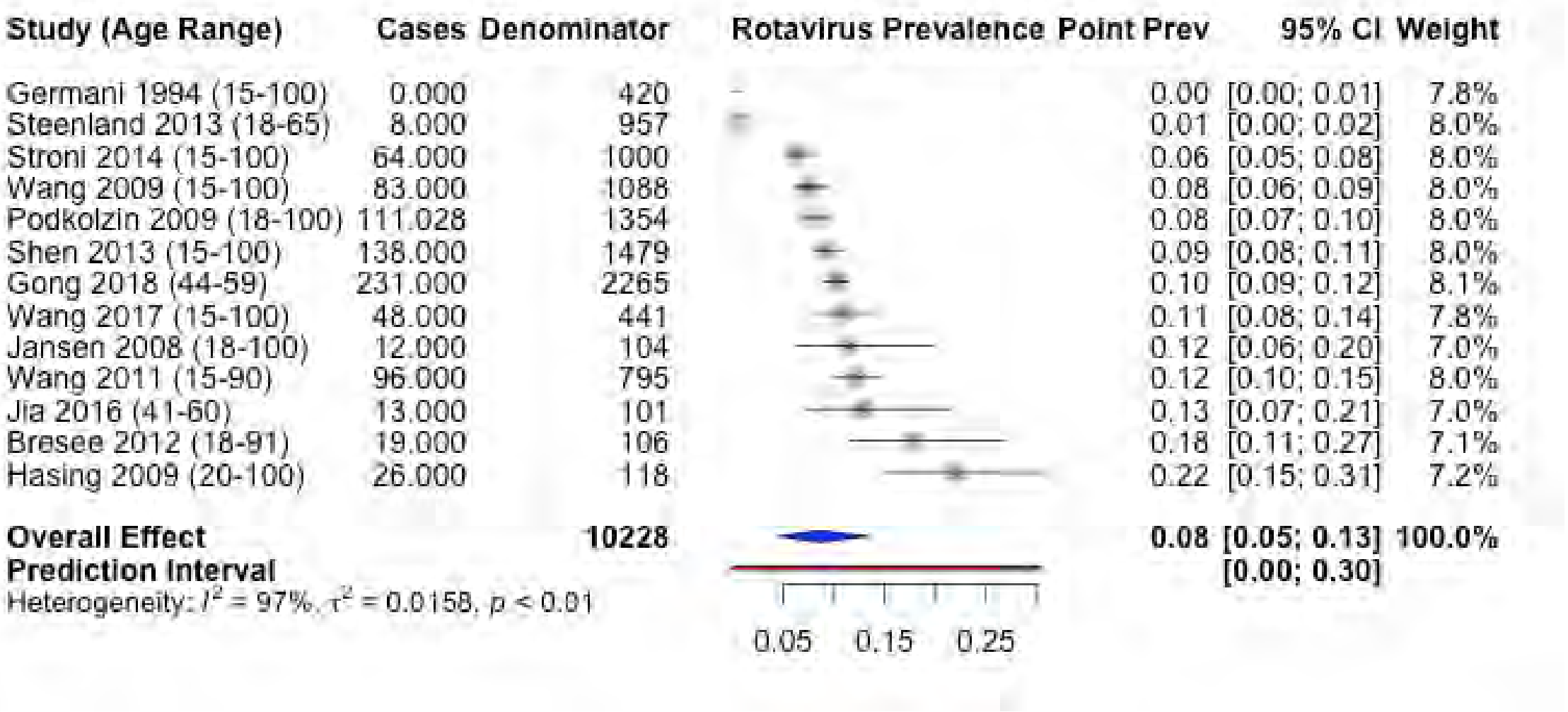
WHO Diarrhea Definition: Older Adults (50-100 y.o.)

Study (Age Range)	Cases	Denominator	Rotavirus Prevalence	Point Prev	95% CI	Weight
Zhu 2013 (50-100)	3	165		0.02	[0.00; 0.06]	16.3%
Cheun 2010 (50-100)	371	15394		0.02	[0.02; 0.03]	22.4%
Zhang 2017 (65-100)	149	3857		0.04	[0.03; 0.05]	22.1%
Breiman 2014 (50-100)	12	207		0.06	[0.03; 0.10]	17.3%
Gong 2018 (60-100)	207	2345		0.09	[0.08; 0.10]	21.9%
Overall Effect		**21968**		**0.04**	**[0.02; 0.08]**	**100.0%**
Prediction Interval					**[0.00; 0.18]**	

Heterogeneity: $I^2 = 98\%$, $\tau^2 = 0.0040$, $p < 0.01$



WHO Diarrhea Definition: Broad Adult Ages (15-100 y.o.)



WHO Diarrhea Definition: Broad Ages (5-100 y.o.)

Study (Age Range)	Cases	Denominator	Rotavirus Prevalence	Point Prev	95% CI	Weight
Bingnan 1991 (10-100)	21	1951		0.01	[0.01; 0.02]	14.9%
Cheun 2010 (10-49)	345	12216		0.03	[0.03; 0.03]	15.1%
Lahon 2013 (11-100)	56	951		0.06	[0.05; 0.08]	14.7%
Zhang 2016 (5-100)	20	271		0.07	[0.05; 0.11]	13.6%
Zhang 2017 (5-65)	17	224		0.08	[0.05; 0.12]	13.3%
Konca 2014 (5-100)	52	583		0.09	[0.07; 0.12]	14.4%
Jain 2016 (5-100)	51	360		0.14	[0.11; 0.18]	14.0%
Overall Effect		**16556**		**0.06**	**[0.03; 0.11]**	**100.0%**
Prediction Interval					**[0.00; 0.23]**	

Heterogeneity: $I^2 = 97\%$, $\tau^2 = 0.0081$, $p < 0.01$