Incidence, temporal trends, and surgical shift of Achilles Tendon rupture: A systematic review and meta-analysis

Supplementary file

Sports Medicine

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Table S1. Search strategy

Pubmed

S1 (((achilles) OR (achilles tendon[MeSH Terms])) OR (achill*[Title/Abstract])) OR (tendoachill*[Title/Abstract])

S2 (((((rupture[MeSH Terms]) OR (tendon injuries[MeSH Terms])) OR (ruptur*[Title/Abstract])) OR (injur*[Title/Abstract])) OR (lesion*[Title/Abstract])) OR (tear*[Title/Abstract])

S3 ((((((((((((epidemiology[MeSH Terms]) OR epidemiolog*[Title/Abstract]) OR (survey[Title/Abstract])) OR (pattern*[Title/Abstract])) OR (incidence*[Title/Abstract])) OR (prevalence*[Title/Abstract])) OR (incidence[MeSH Terms])) OR (prevalence[MeSH Terms])) OR (exposure[Title/Abstract])) OR (audit*[Title/Abstract])) OR (rate[Title/Abstract])) OR (burden[Title/Abstract])) OR (frequenc*[Title/Abstract])) OR Surveillance [Title/Abstract])

S4 S1 AND S2 AND S3 – Filter: only humans

EMBASE

S1 (((exp achilles tendon/ or achilles.mp)) OR (achill*.ti,ab)) OR (tendoachill*.ti,ab)

S2 ((((((exp achilles tendon rupture/ or rupture.mp. Or exp rupture/ or exp tendon rupture/)) OR (tendon injuries.mp. or exp tendon injury/)) OR (ruptur*.ti,ab)) OR (injur*.ti,ab)) OR (lesion*.ti,ab)) OR (tear*.ti,ab)

S3 ((((((((((((exp epidemiology/ or epidemiology.mp)) OR (epidemiology*.ti,ab)) OR (survey.ti,ab)) OR (pattern*.ti,ab)) OR (incidence*.ti,ab)) OR (prevalence*.ti,ab)) OR (incidence.ti,ab)) OR (prevalence*.ti,ab)) OR (exposure, ti.ab)) OR (audit*.ti,ab)) OR (rate.ti,ab)) OR (burden.ti,ab)) OR (frequenc*.ti,ab)) OR (surveillance.ti,ab)

S4 S1 AND S2 AND S3 – Filter: only humans

Web of science

S1 TS=(achilles tendon OR achill* OR tendoachill*)

S2 TS=(ruptur* OR injur* OR lesion* OR tear*)

S3 TS=(epidemiolog* OR incidence OR prevalence OR pattern* OR survey OR exposure OR audit OR rate OR burden OR frequenc* OR surveillance)

S4 S1 AND S2 AND S3 (no filter available)

CINAHL

S1 achilles OR tendoachill*

S2 ruptur* OR injur* or lesion* or tear*

S3 epidemiolog* OR incidence OR prevalence OR survey OR rate OR burden OR exposure OR audit* OR frequenc* OR surveillance

S4 S1 AND S2 AND S3 – Filter: only humans

Global Index Medicus

S1 achilles OR tendoachill* (TITLE, ABSTRACT, SUBJECT)

S2 ruptur* OR injur* or lesion* or tear* (TITLE, ABSTRACT, SUBJECT)

S3 epidemiolog* OR incidence OR prevalence OR survey OR rate OR burden OR exposure OR audit* OR frequenc* OR surveillance (TITLE, ABSTRACT, SUBJECT)

S4 S1 AND S2 AND S3 (no filter available)

Google scholar

achilles AND rupture AND incidence

Table S2. Checklist for Prevalence Studies developed by the Joanna Briggs Institute

Author & year	Q1 (sample frame)	Q2 (recruitment)	Q3 (sample size)	Q4 (Subjects & setting)	Q5 (coverage)	Q6 (identification of the condition)	Q7 (measurement)	Q8 (statistics)	Q9 (response rate)
Nillius 1976 [1]	YES	YES	YES	YES	YES	YES	YES	UNCLEAR	NA
Moller 1996 [2]	YES	YES	YES	YES	YES	YES	YES	YES	NA
Levi 1997 [3]	YES	YES	YES	YES	YES	YES	YES	YES	NA
Houshian 1998 [4]	YES	YES	YES	YES	YES	YES	YES	YES	NA
Maffulli 1999 [5]	YES	YES	YES	YES	YES	YES	YES	YES	NA
Suchak 2005 [6]	YES	YES	YES	YES	YES	YES	YES	YES	NA
Sode 2007 [7]	YES	YES	YES	YES	YES	YES	YES	YES	NA
Tumilty 2007 [8]	YES	YES	YES	YES	NO	YES	YES	NO	NA
Clayton 2008 [9]	YES	YES	YES	YES	YES	YES	YES	UNCLEAR	NA
Nyyssönen 2008 [10]	YES	YES	YES	YES	YES	YES	YES	YES	NA
Gwynne-Jones 2011 [11]	NO	YES	YES	YES	YES	YES	YES	YES	NA
Lantto 2015 [12]	YES	YES	YES	YES	YES	YES	YES	YES	NA
Mattila 2015 [13]	YES	YES	YES	YES	YES	YES	YES	YES	NA
Ganestam 2016 [14]	YES	YES	YES	YES	YES	YES	YES	YES	NA
Sheth-a 2017 [15]	YES	YES	YES	YES	YES	YES	YES	YES	NA
Sheth-b 2017 [16]	YES	YES	YES	YES	YES	YES	YES	YES	NA
Yasui 2017 [17]	NO	YES	YES	YES	YES	YES	YES	UNCLEAR	NA
Lemme 2018 [18]	YES	YES	YES	YES	YES	YES	YES	YES	NA
Longo 2020 [19]	YES	YES	YES	YES	YES	YES	YES	YES	NA
Park 2021 [20]	YES	YES	YES	YES	YES	YES	YES	YES	NA
Yamaguchi 2021 [21]	YES	YES	YES	YES	YES	YES	YES	YES	NA
Leino 2022 [22]	YES	YES	YES	YES	YES	YES	YES	YES	NA
Park 2022 [23]	YES	YES	YES	YES	YES	YES	YES	YES	NA
Carmont 2023 [24]	YES	NO	YES	YES	YES	YES	YES	UNCLEAR	NA
Cretnik 2023 [25]	UNCLEAR	YES	YES	YES	YES	YES	YES	YES	NA
Maempel 2023 [26]	YES	YES	YES	YES	YES	YES	YES	YES	NA
Briggs-Price 2024 [27]	NO	YES	YES	UNCLEAR	YES	YES	YES	UNCLEAR	NA
Svedman 2024 [28]	YES	YES	YES	YES	YES	YES	YES	YES	NA

Overall IR by country

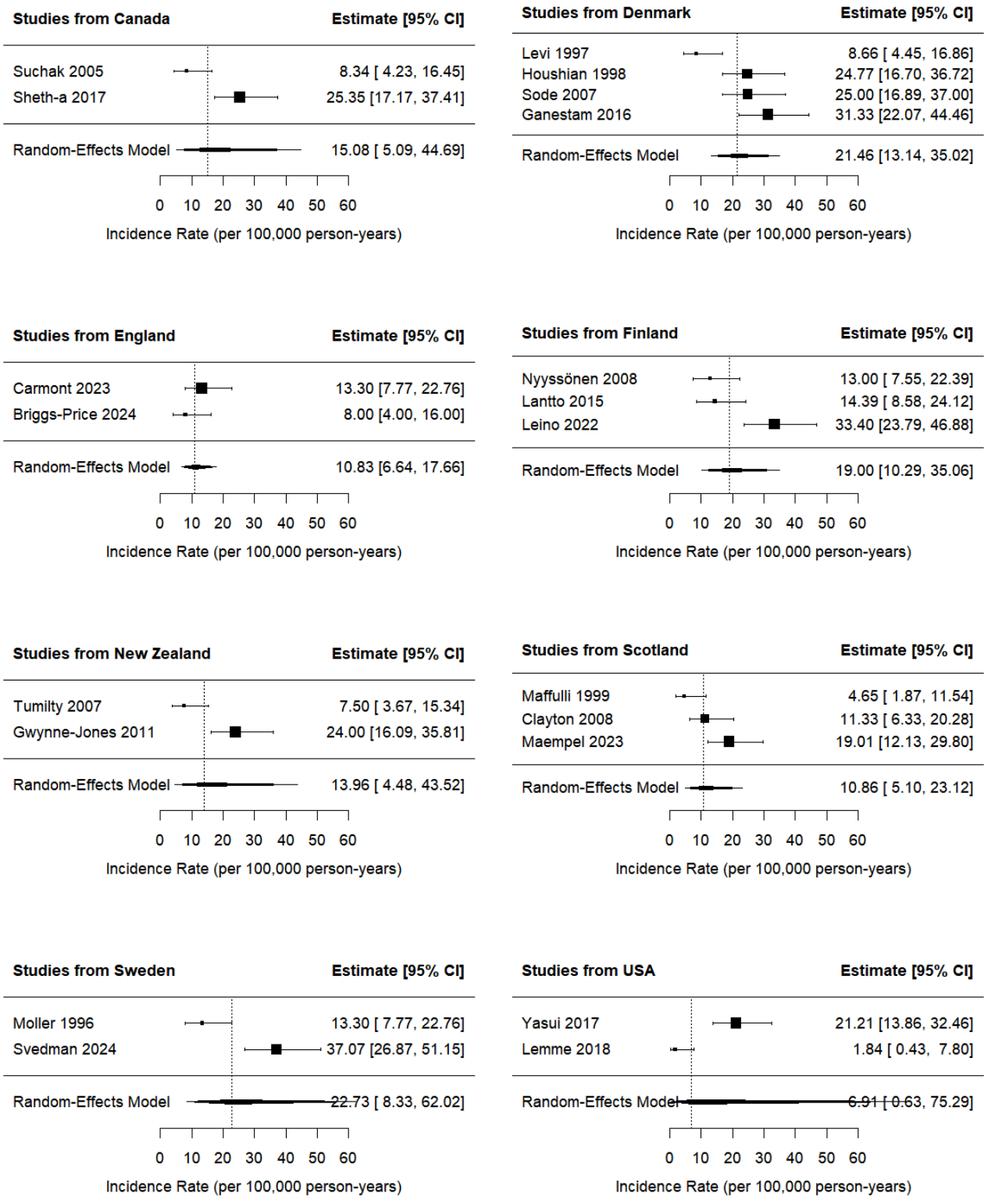

Fig. S1 Forest plots of Achilles tendon rupture incidence rates (per 100,000 person-years) by country. Each study's effect estimate is shown as a square with a horizontal line representing its 95% confidence interval for the incidence rate per 100,000 person-years. The diamond indicates the overall pooled estimate from the meta-analysis, with the x-axis displaying the back-transformed incidence rates.

Overall IR by continent

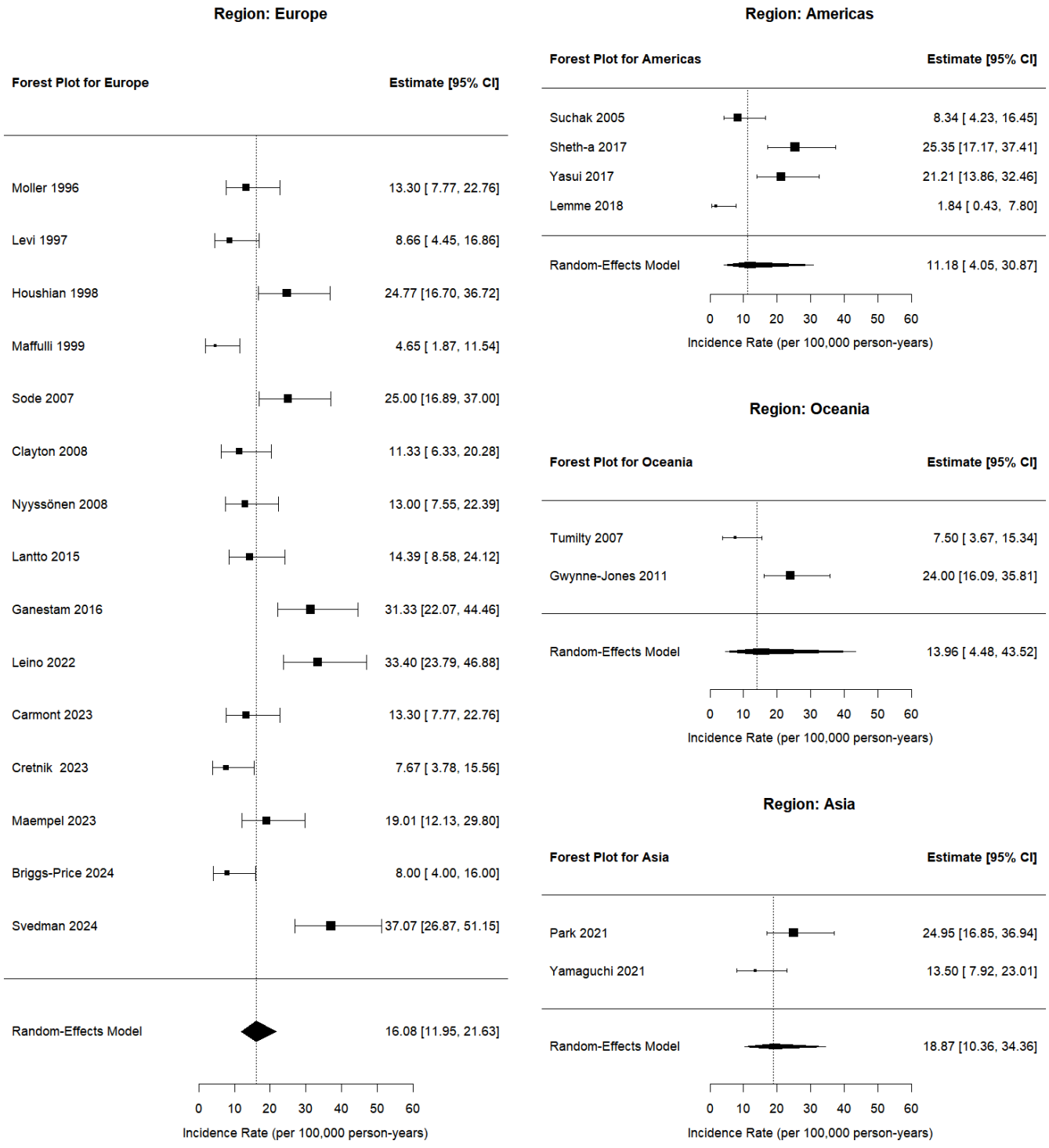

Fig. S2 Forest plots of Achilles tendon rupture incidence rates (per 100,000 person-years) by region. Each subplot presents a random-effects meta-analysis of studies within a specific region, with studies ordered by publication year. The horizontal lines represent 95% confidence intervals, and the vertical dotted line represents the regional pooled incidence estimate for reference.

Incidence rates by decade

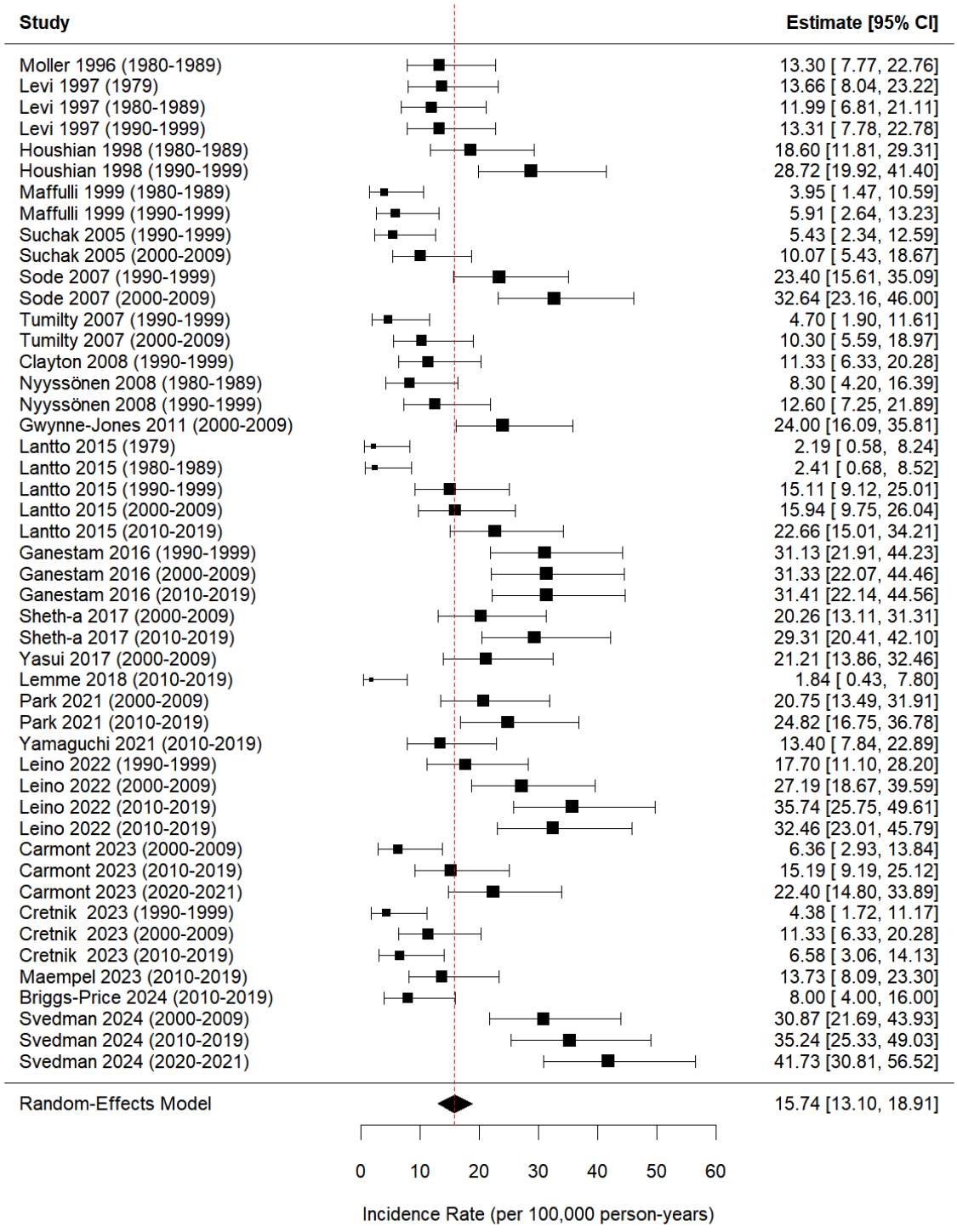

Fig. S3 Forest plot of Achilles tendon rupture incidence rates (per 100,000 person-years) by decade. Each horizontal line represents a study-specific incidence rate with its 95% confidence interval. For studies spanning multiple decades, the data point closest to the mid-decade was used. Studies are ordered chronologically by publication year The vertical line indicates the pooled estimate.

Individual studies temporal changes

Individual studies temporal changes - All

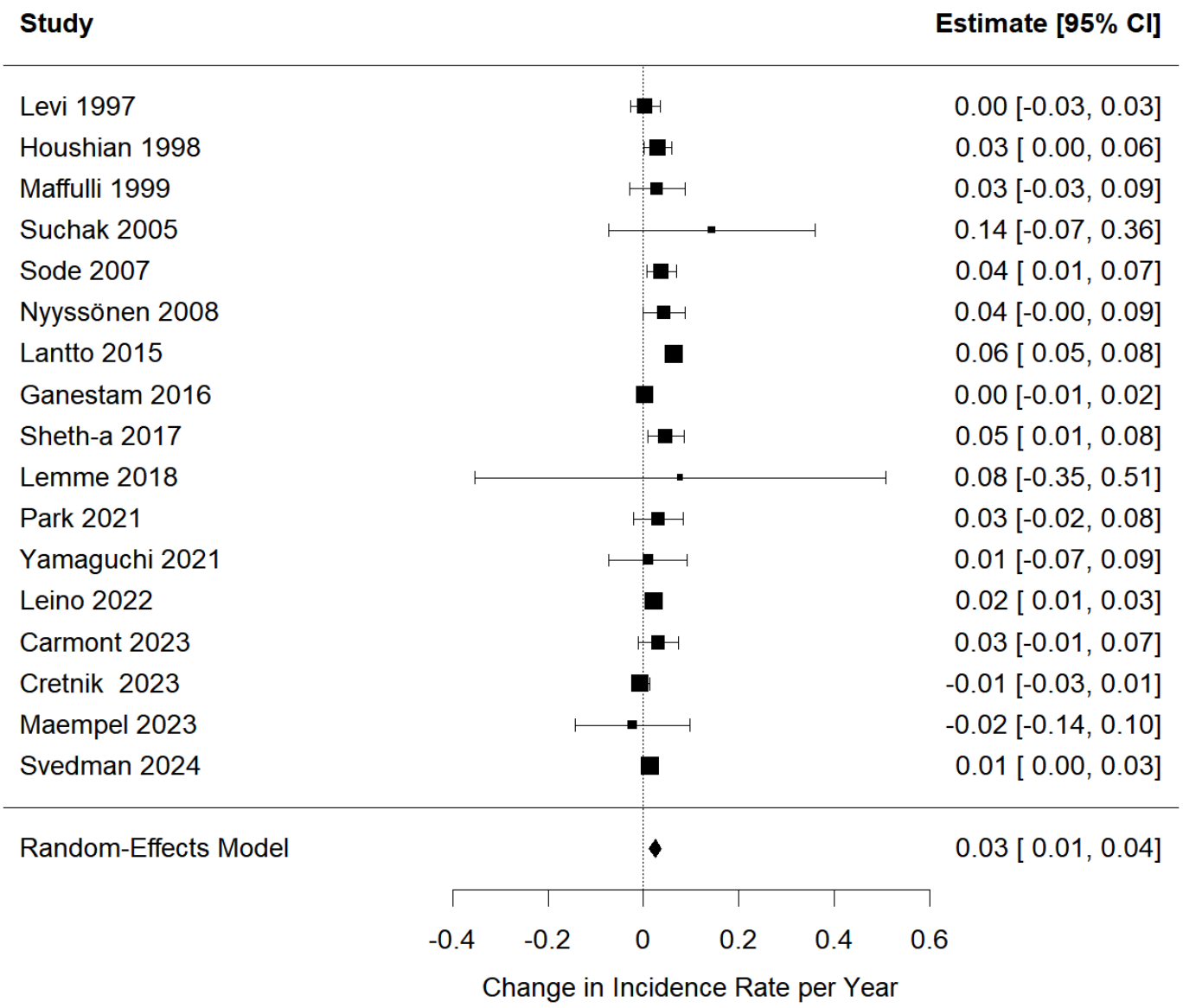

Fig. S4 Forest plot of temporal changes within each study of the incidence of Achilles tendon rupture. Each study's temporal trend was estimated using Poisson regression. Only studies which report at least five points were included. The overall pooled estimate from a random-effects meta-analysis is shown as a diamond. Error bars represent 95% confidence intervals.

Individual studies temporal changes by country

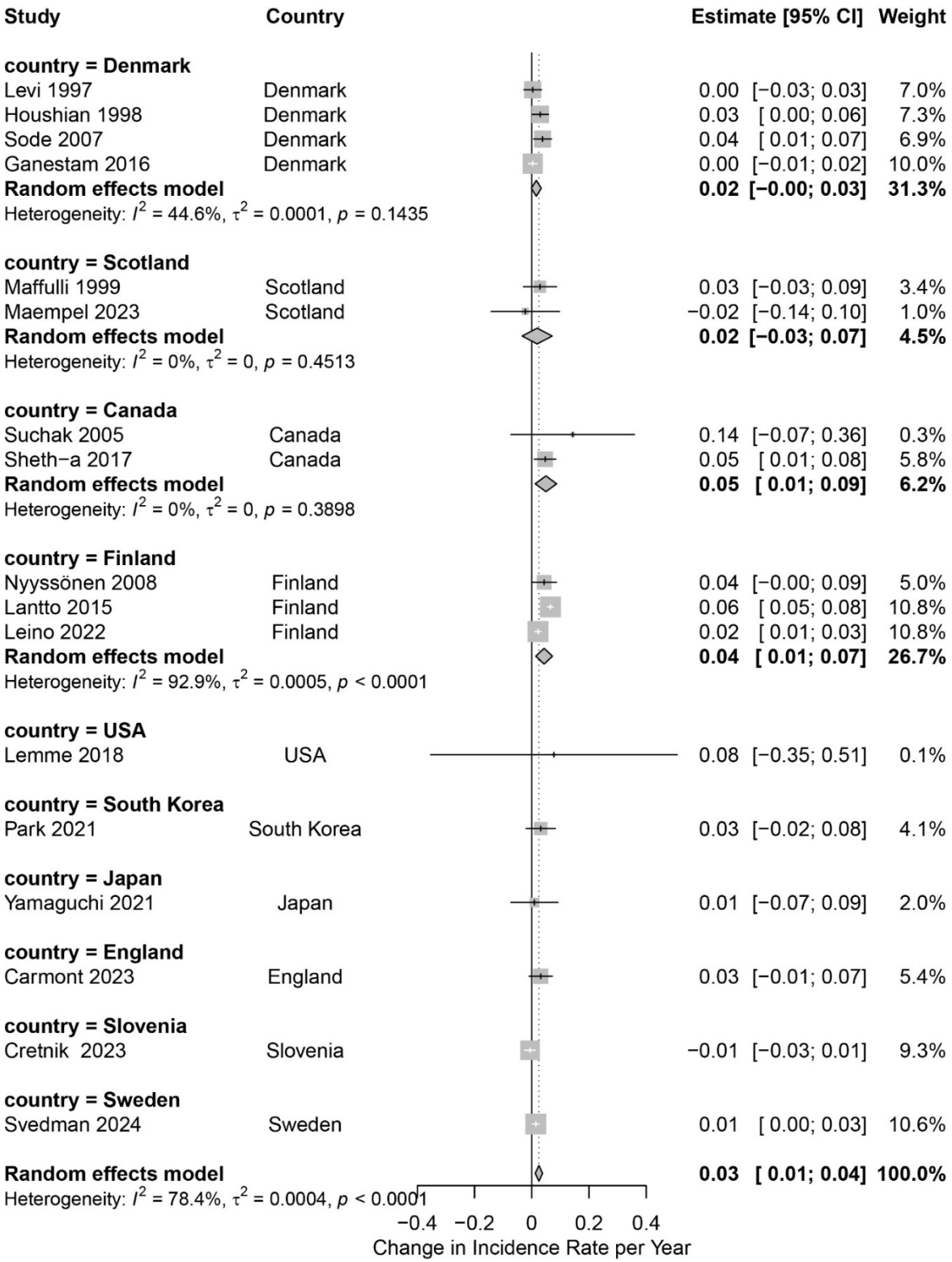

Fig. S5. Forest plot of temporal trends in Achilles tendon rupture incidence, stratified by country. Within-study changes over time are displayed with 95% confidence intervals, and where applicable, pooled estimates are calculated for each country. Diamond markers denote the country-specific pooled incidence trends.

Individual studies temporal changes by continent

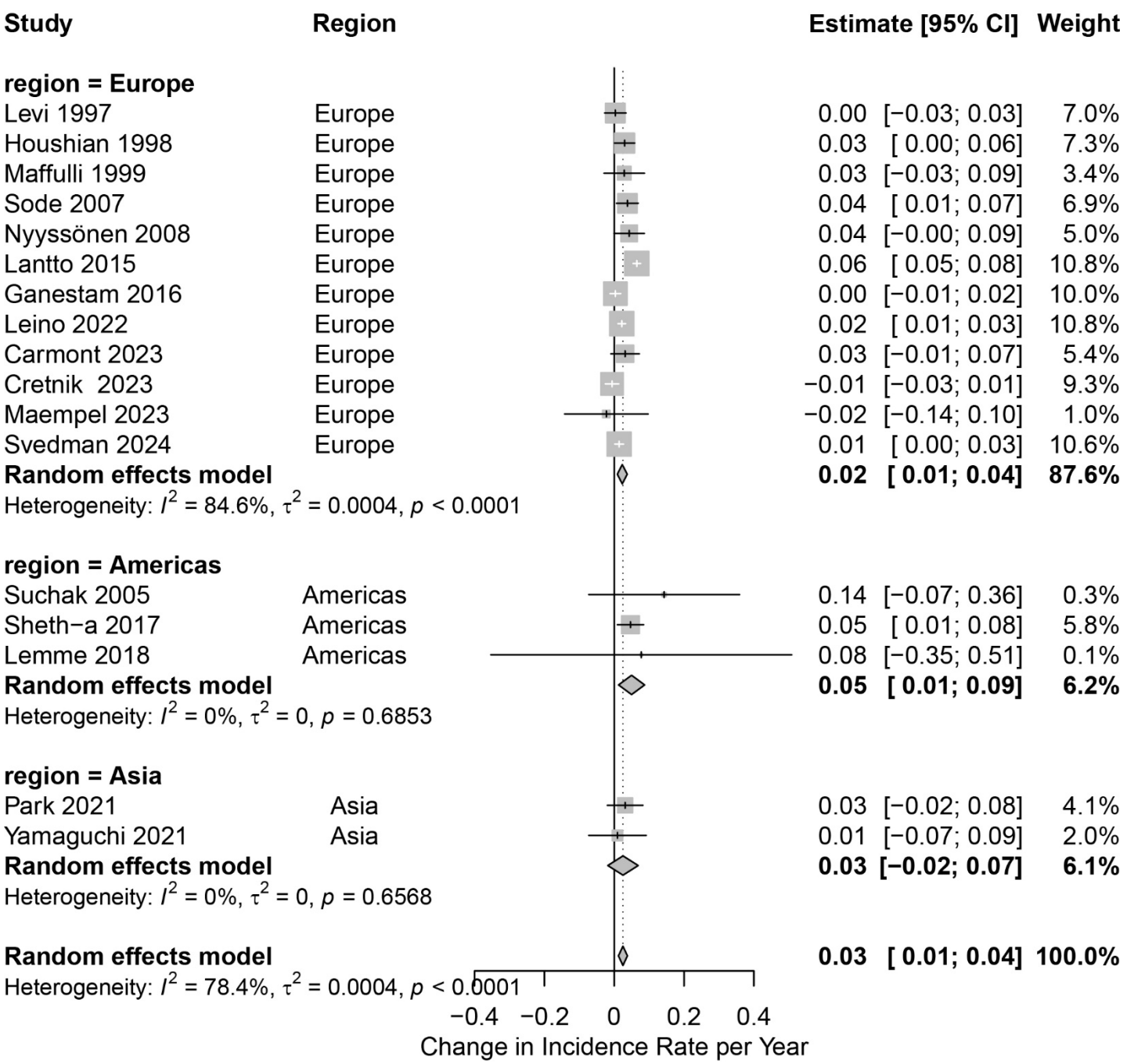

Fig. S6. Forest plot of temporal trends in Achilles tendon rupture incidence, stratified by continent. Within-study changes over time are displayed with 95% confidence intervals, and where applicable, pooled estimates are calculated for each region. Diamond markers denote the region-specific pooled incidence trends.

Individual studies temporal changes by sex

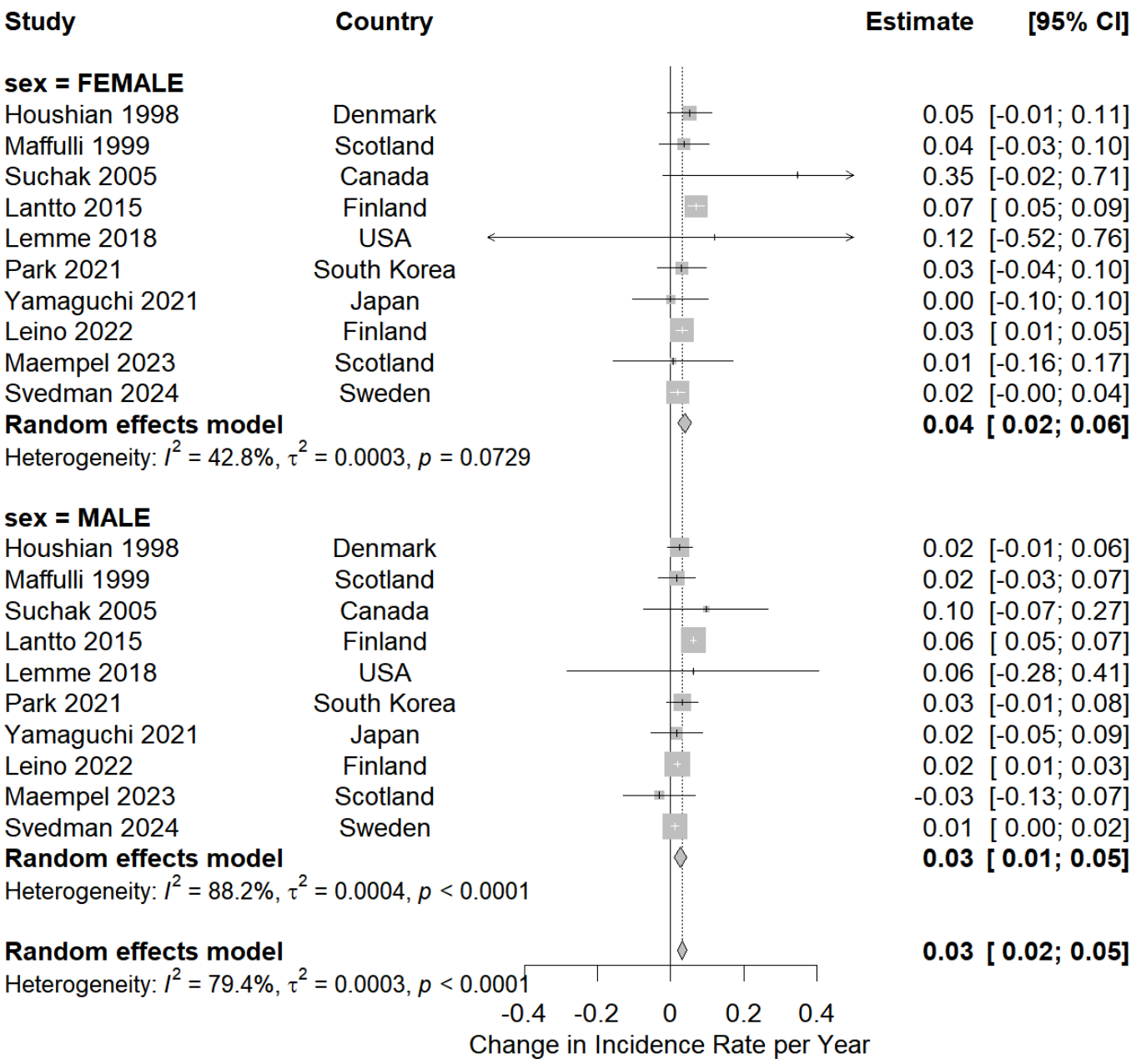

Fig. S7. Forest plot of temporal trends in Achilles tendon rupture incidence, stratified by sex. Within-study changes over time are displayed with 95% confidence intervals, and where applicable, pooled estimates are calculated for each country. Diamond markers denote the sex-specific pooled incidence trends.

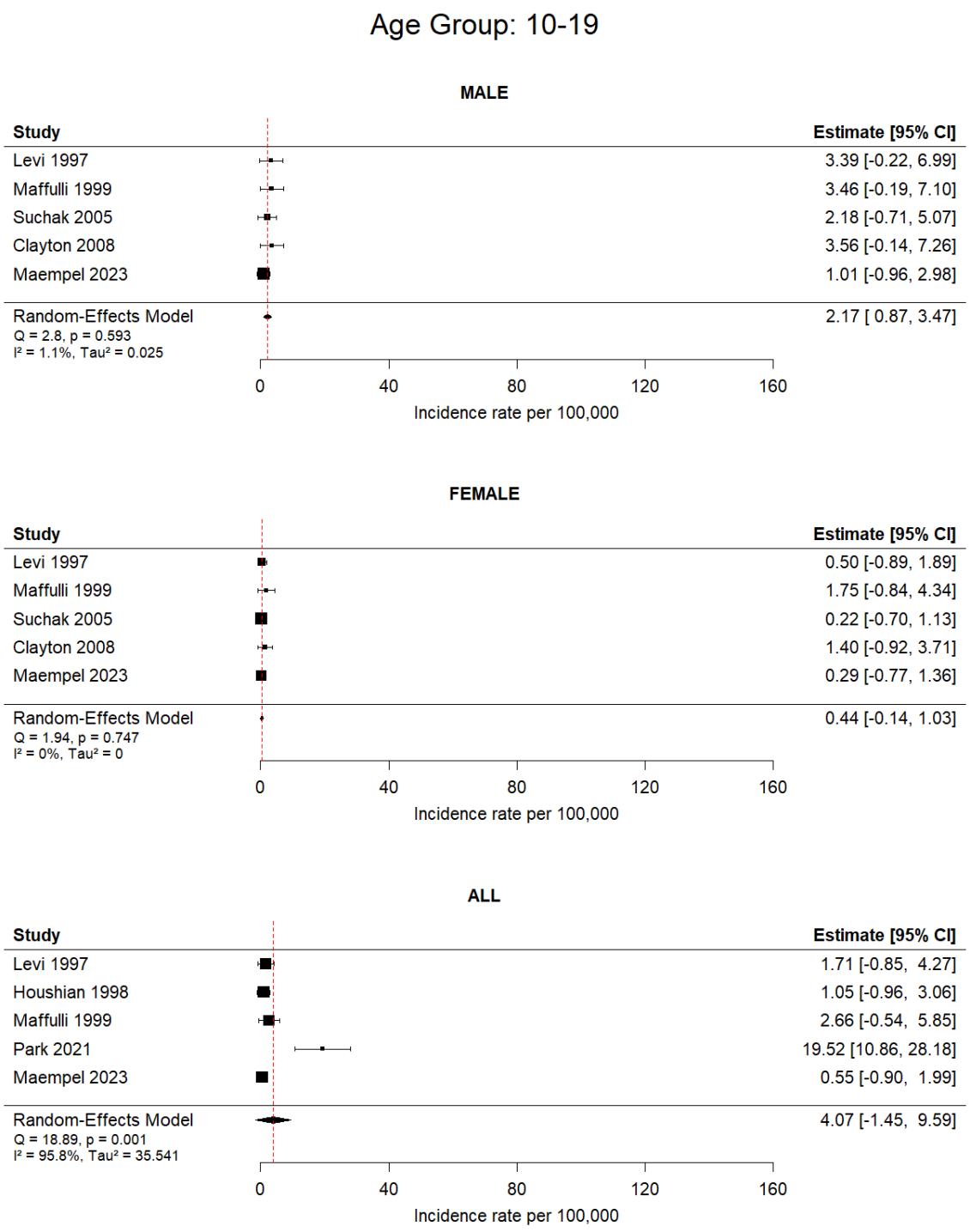

Fig. S8 Forest plots of incidence rates of Achilles tendon rupture per 100,000 person-years across age groups, stratified by sex. Each panel corresponds to one sex subgroup and presents the study-level incidence rates and 95% confidence intervals for a specific 10-year age group. The diamond represents the pooled incidence rate estimate from a random-effects model. The vertical dotted red line indicates the overall pooled estimate within each subgroup.

Age Group: 20-29

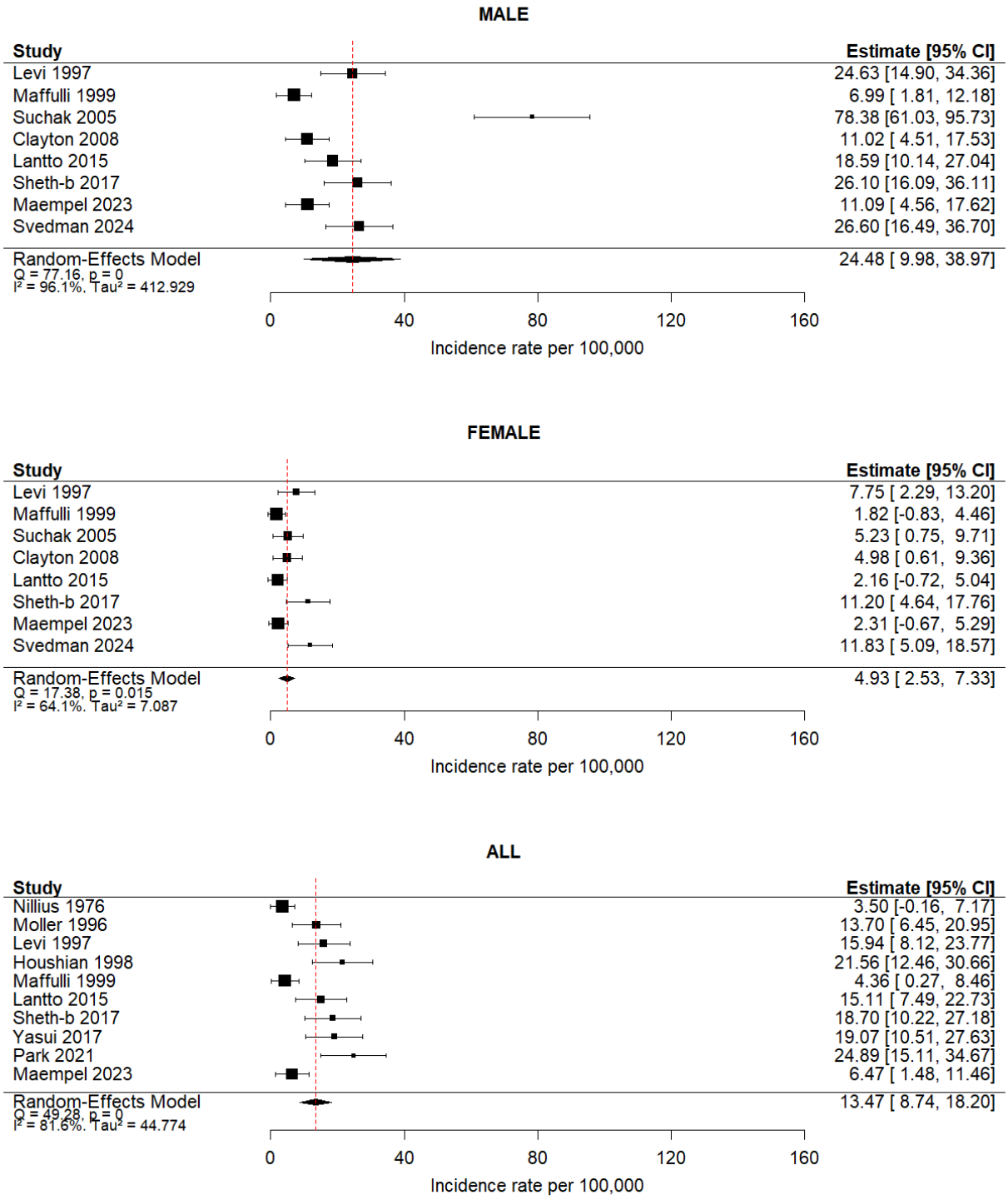

Fig. S9 Forest plots of incidence rates of Achilles tendon rupture per 100,000 person-years across age groups, stratified by sex. Each panel corresponds to one sex subgroup and presents the study-level incidence rates and 95% confidence intervals for a specific 10-year age group. The diamond represents the pooled incidence rate estimate from a random-effects model. The vertical dotted red line indicates the overall pooled estimate within each subgroup.

Age Group: 30-39

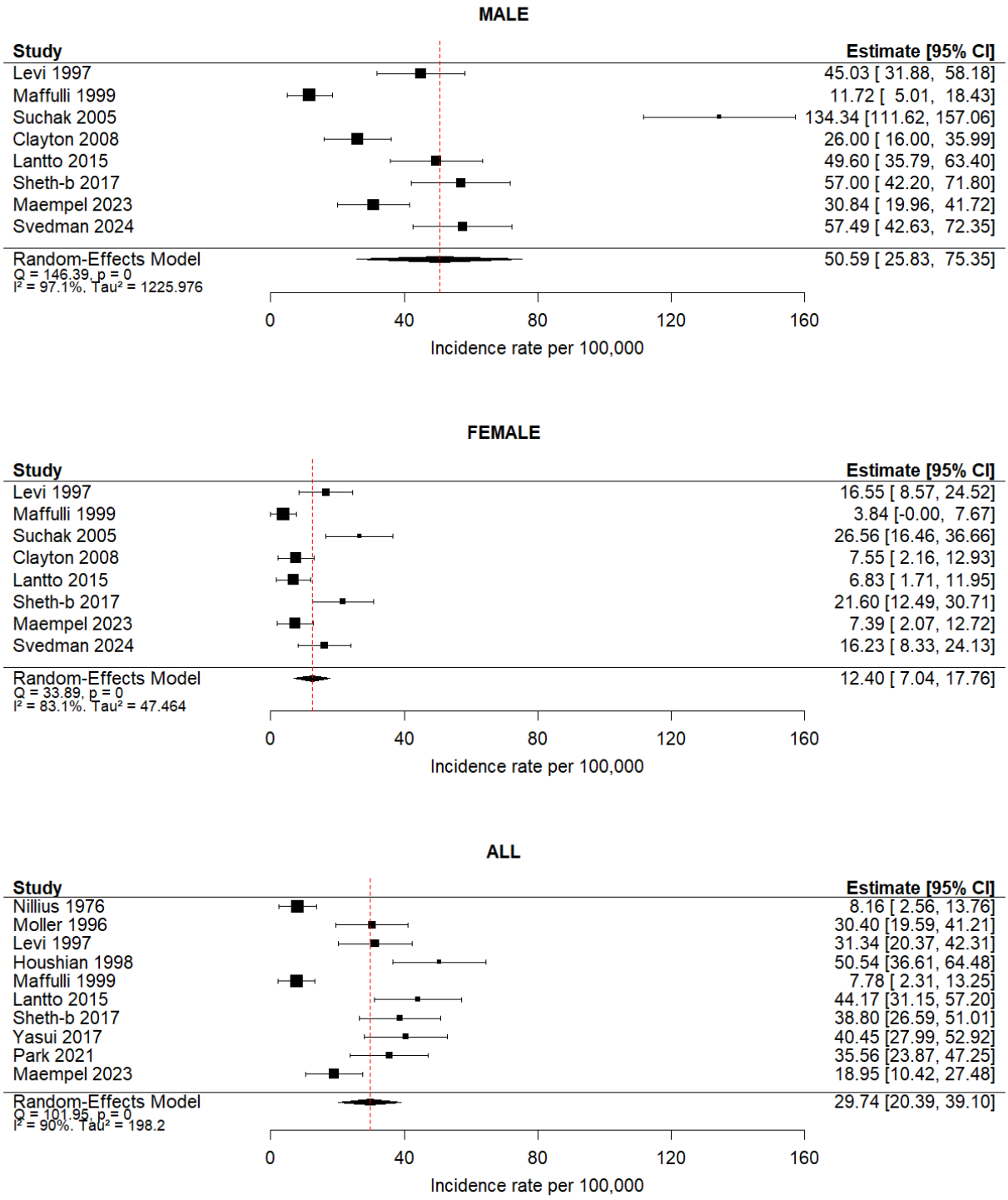

Fig. S10 Forest plots of incidence rates of Achilles tendon rupture per 100,000 person-years across age groups, stratified by sex. Each panel corresponds to one sex subgroup and presents the study-level incidence rates and 95% confidence intervals for a specific 10-year age group. The diamond represents the pooled incidence rate estimate from a random-effects model. The vertical dotted red line indicates the overall pooled estimate within each subgroup.

Age Group: 40-49

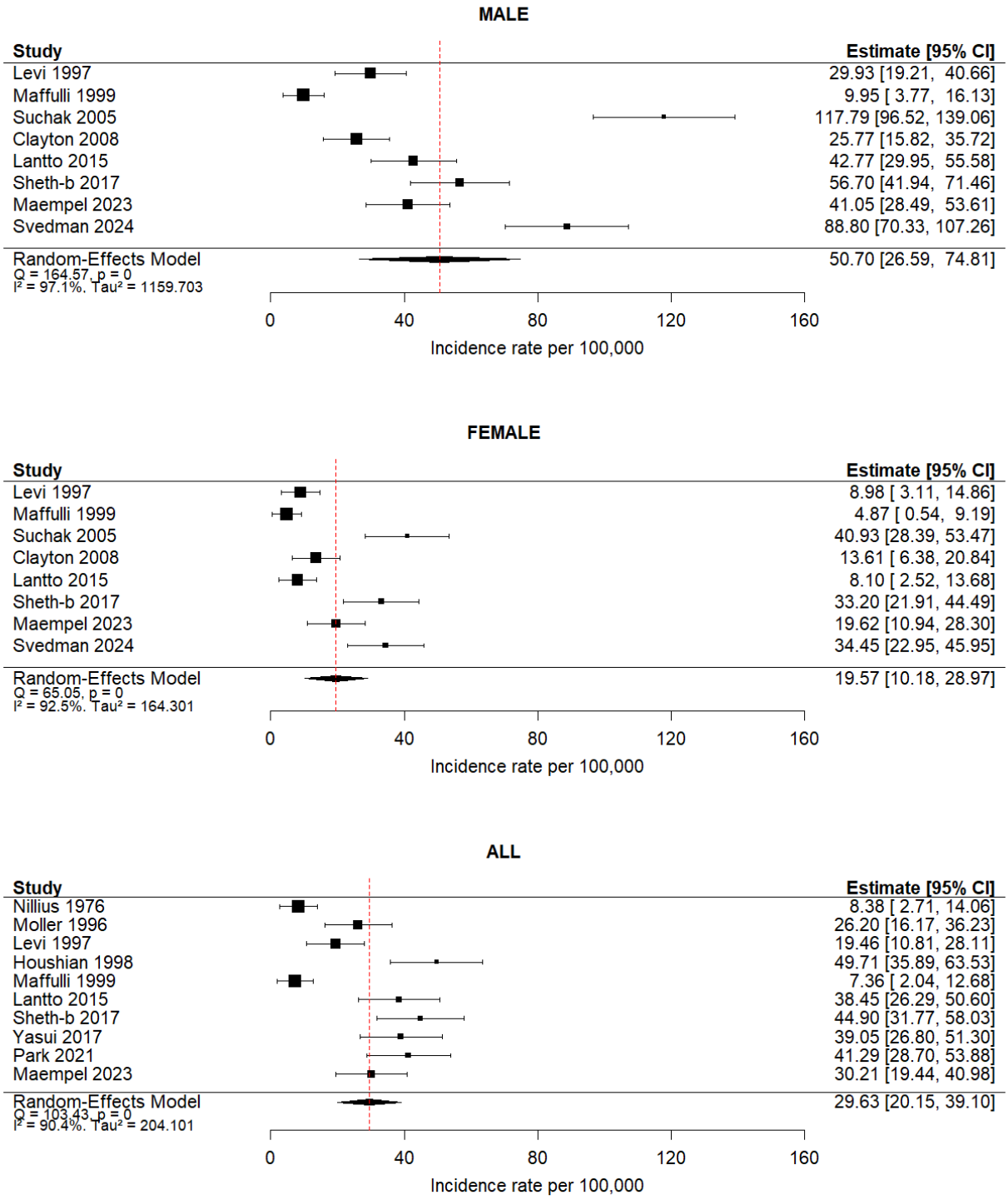

Fig. S11 Forest plots of incidence rates of Achilles tendon rupture per 100,000 person-years across age groups, stratified by sex. Each panel corresponds to one sex subgroup and presents the study-level incidence rates and 95% confidence intervals for a specific 10-year age group. The diamond represents the pooled incidence rate estimate from a random-effects model. The vertical dotted red line indicates the overall pooled estimate within each subgroup.

Age Group: 50-59

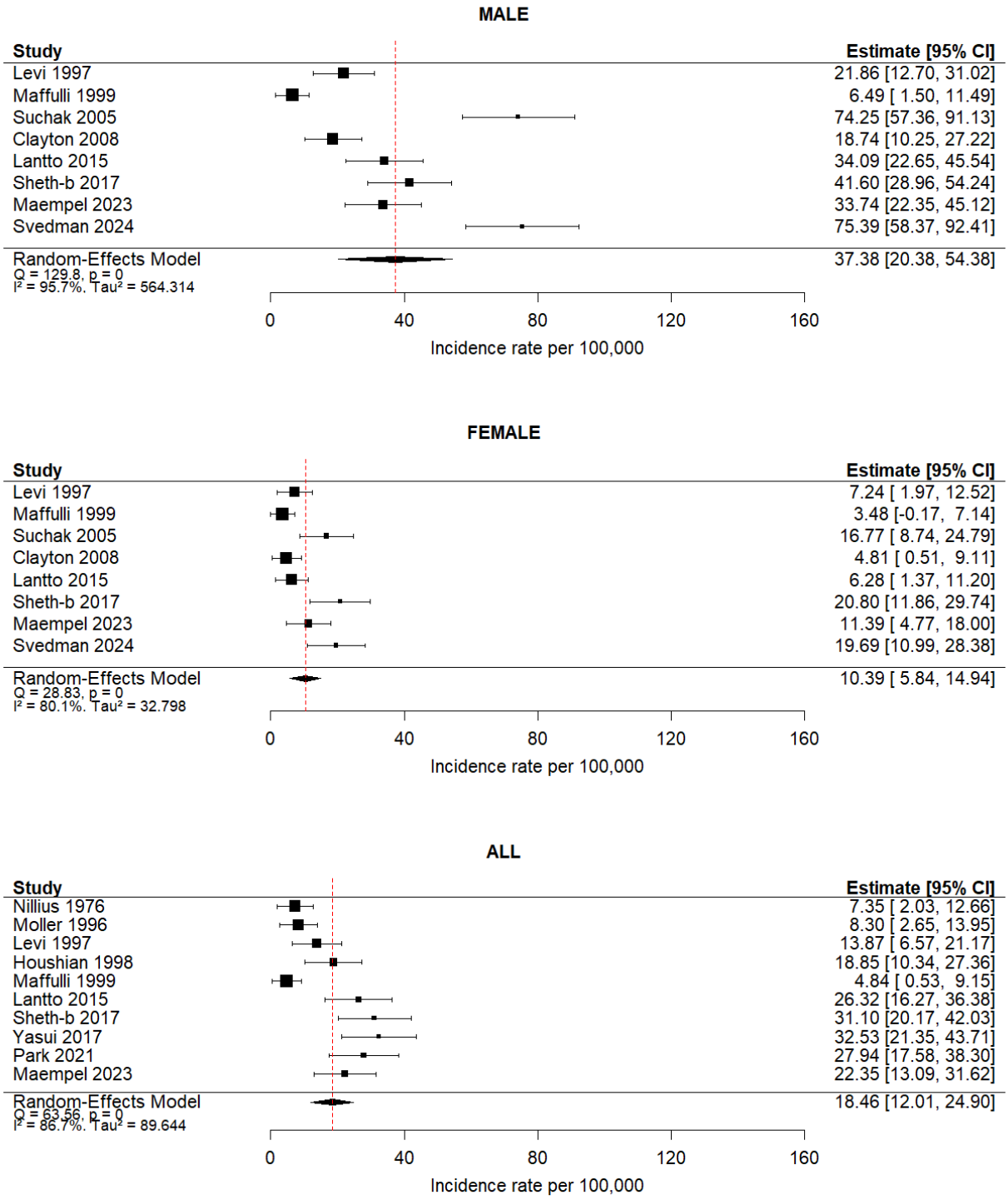

Fig. S12 Forest plots of incidence rates of Achilles tendon rupture per 100,000 person-years across age groups, stratified by sex. Each panel corresponds to one sex subgroup and presents the study-level incidence rates and 95% confidence intervals for a specific 10-year age group. The diamond represents the pooled incidence rate estimate from a random-effects model. The vertical dotted red line indicates the overall pooled estimate within each subgroup.

Age Group: 60-69

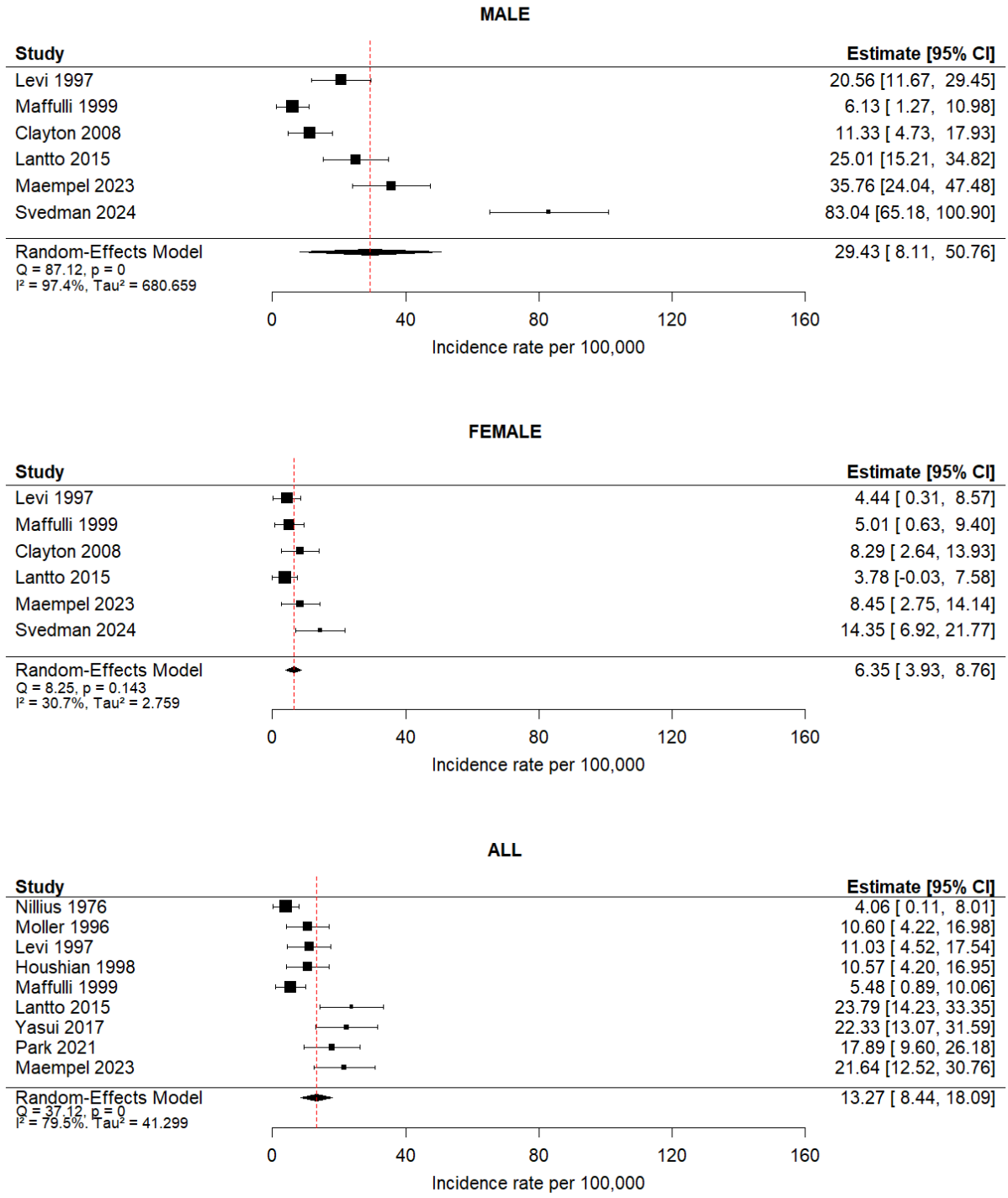

Fig. S13 Forest plots of incidence rates of Achilles tendon rupture per 100,000 person-years across age groups, stratified by sex. Each panel corresponds to one sex subgroup and presents the study-level incidence rates and 95% confidence intervals for a specific 10-year age group. The diamond represents the pooled incidence rate estimate from a random-effects model. The vertical dotted red line indicates the overall pooled estimate within each subgroup.

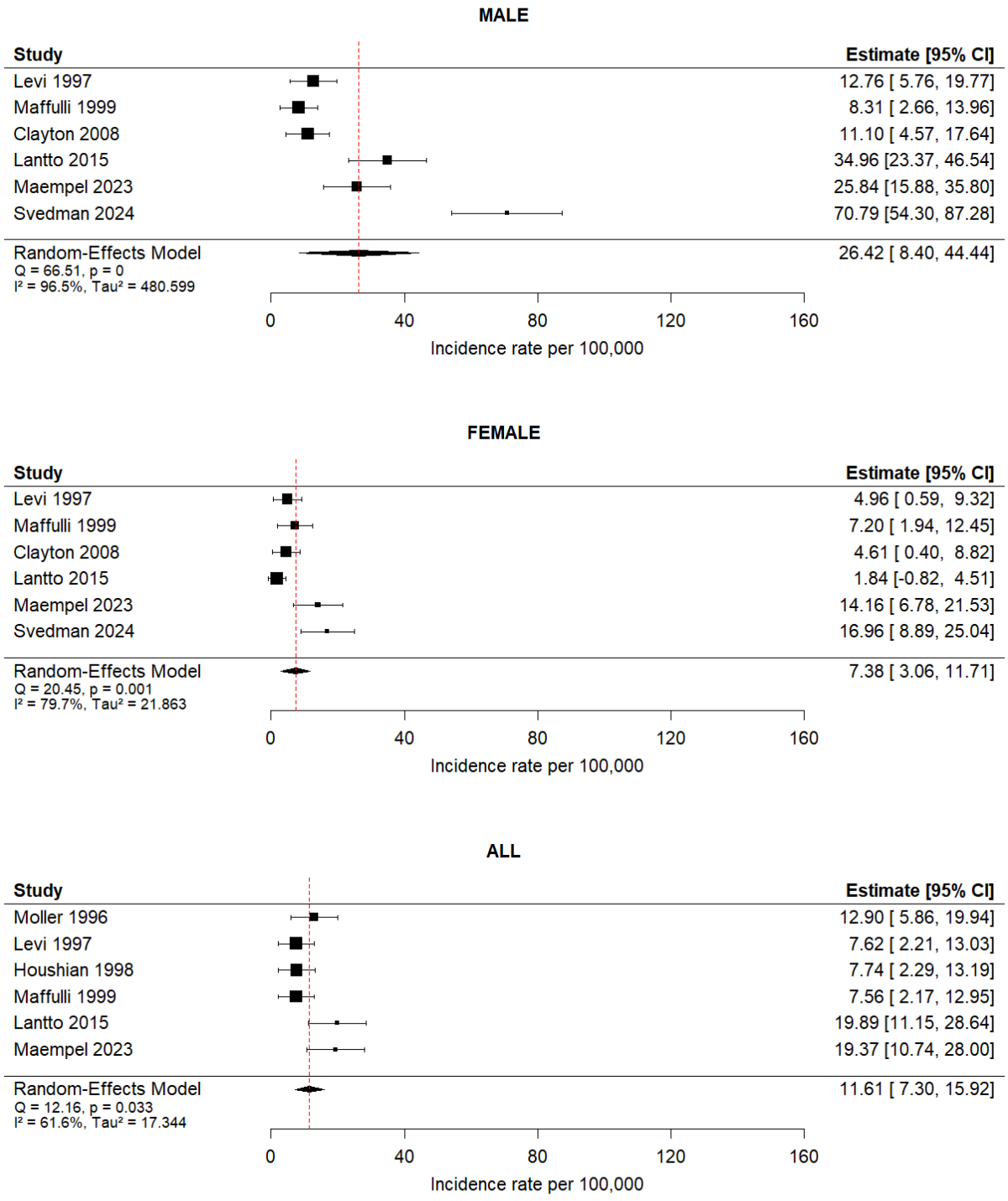

Fig. S14 Forest plots of incidence rates of Achilles tendon rupture per 100,000 person-years across age groups, stratified by sex. Each panel corresponds to one sex subgroup and presents the study-level incidence rates and 95% confidence intervals for a specific 10-year age group. The diamond represents the pooled incidence rate estimate from a random-effects model. The vertical dotted red line indicates the overall pooled estimate within each subgroup.

Age Group: 80-89

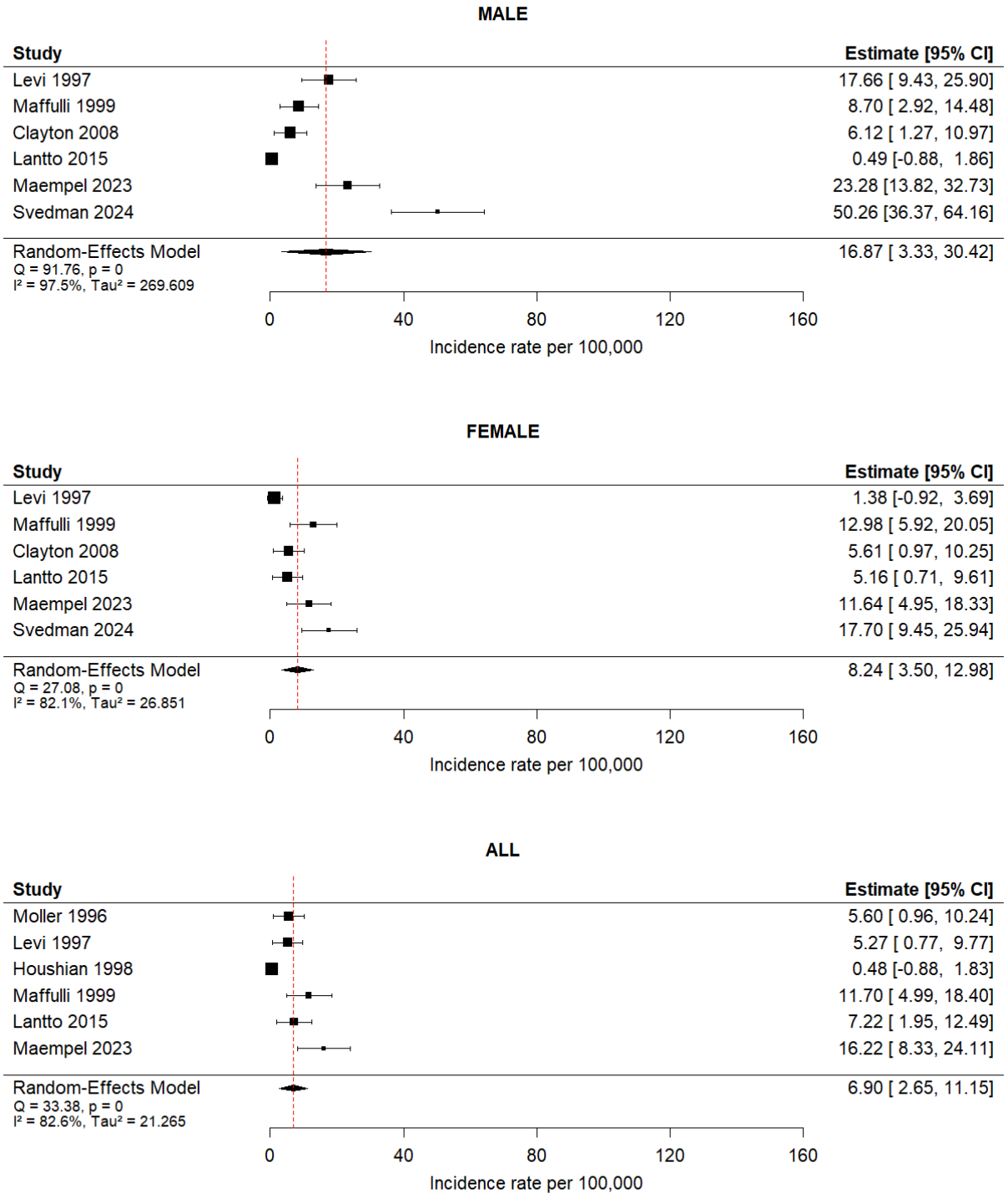

Fig. S15 Forest plots displaying pooled incidence rates of Achilles tendon rupture per 100,000 person-years across age groups, stratified by sex. Each panel corresponds to one sex subgroup and presents the study-level incidence rates and 95% confidence intervals for a specific 10-year age group. The diamond represents the pooled incidence rate estimate from a random-effects model. The vertical dotted red line indicates the overall pooled estimate within each subgroup.

Incidence rates by age group and sport participation

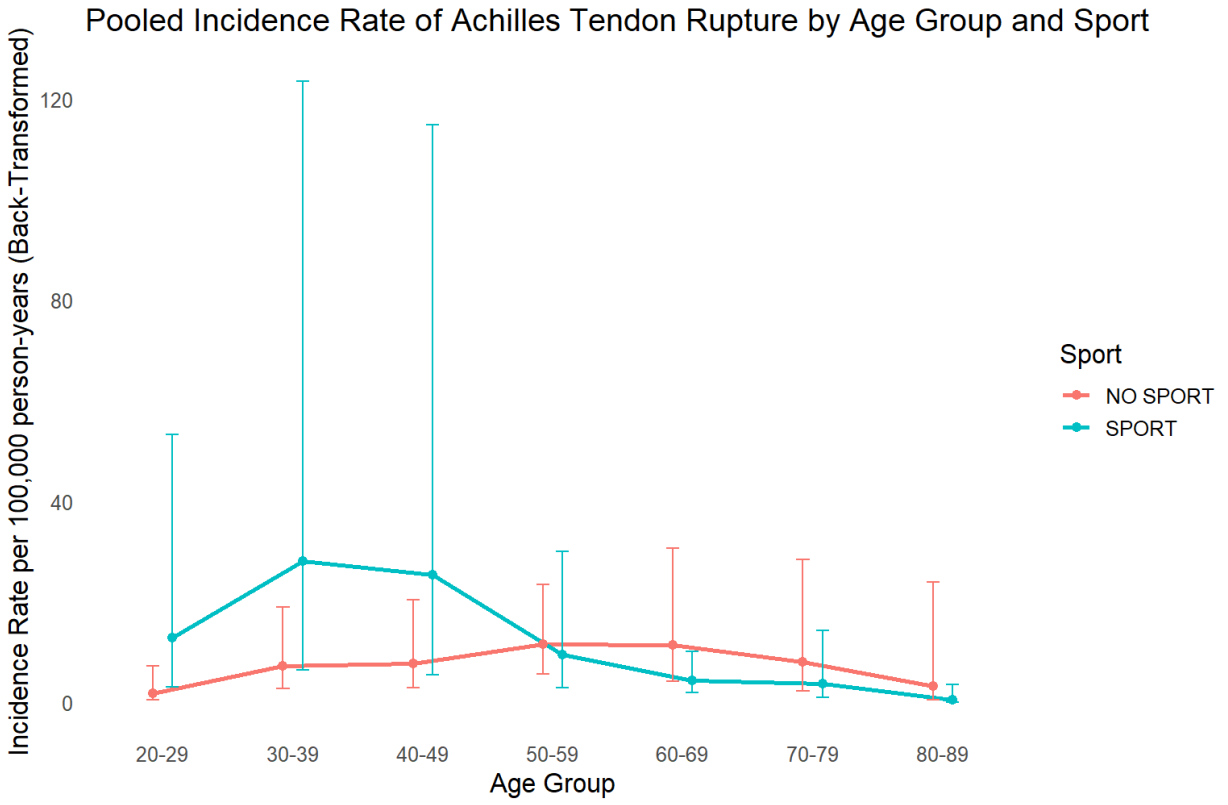

Fig. S16 Pooled incidence rates of Achilles tendon rupture per 100,000 person-years, stratified by age group and injury mechanism. Estimates are presented separately for sport-related (red) and non-sport-related (blue) ruptures. Rates were derived from a random-effects meta-analysis using log-transformed incidence values and inverse-variance weighting under Poisson assumptions, and are shown as back-transformed values with corresponding 95% confidence intervals.

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