INPLASY

Beyond Statistical Significance: A Systematic Review and Bayesian Reanalysis of Randomized Controlled Trials in Interventional Radiology

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ADMINISTRATIVE INFORMATION

Support - No specific funding.

Review stage at the time of initial registration - Piloting of the study selection process.

Conflicts of interest - The authors declare no competing interests relevant to this study.

INPLASY registration number: INPLASY2026110115

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 27 November 2026 and was last updated on 27 November 2026.

INTRODUCTION

Study aim This methodological study aims to systematically identify and perform a trial-level Bayesian reanalysis of prospective randomized controlled superiority trials comparing therapeutic body interventional radiology (IR) procedures with non-interventional radiology treatment strategies.

The primary objective is to characterize the relationship between conventional statistical superiority classifications and continuous Bayesian posterior probabilities of clinically meaningful benefit, clinically meaningful harm and clinically negligible treatment effects, using the original primary clinical outcomes.

Secondary objectives are to:

- Determine whether statistically significant results provide evidence of clinically meaningful treatment effects.
- Determine whether statistically nonsignificant results retain evidence of clinically meaningful benefit or provide evidence against such benefit.
- Quantify posterior probabilities of any treatment benefit and characterize residual uncertainty.
- Assess the robustness of Bayesian interpretations to alternative prior distributions, clinical effect margins and descriptive posterior probability benchmarks.
- Examine patterns across clinical domains, comparator types, outcome measures, age populations, randomized sample sizes, publication years and risk-of-bias assessments.
- Characterize the availability and adequacy of reported effect estimates, statistical uncertainty, clinically justified effect margins and serious procedural harms.

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Trials will be included irrespective of the direction or statistical significance of their original findings. No arbitrary publication-date, age, sample-size or center-count restrictions will be imposed.

Background Randomized controlled trials represent a fundamental source of evidence supporting the clinical application of interventional radiology. However, conventional interpretation of randomized trials frequently relies on dichotomous statistical significance thresholds, which do not necessarily distinguish clinically meaningful treatment effects from clinically negligible effects or unresolved uncertainty.

A statistically significant result may represent a treatment effect of limited clinical importance, whereas failure to demonstrate statistical superiority does not necessarily establish the absence of clinically meaningful benefit. These distinctions are particularly relevant to interventional radiology, where potential treatment benefits must be interpreted alongside procedural risks, alternative management strategies and patient-important outcomes.

Bayesian statistical methods provide a complementary framework by allowing direct estimation of posterior probabilities of treatment benefit, harm and effects within clinically negligible ranges, conditional on the available evidence and specified prior assumptions.

Previous methodological investigations in other medical specialties, including a Bayesian reanalysis of 230 phase III oncology trials, have demonstrated the relevance of distinguishing statistical significance from clinical importance (PMID: 42066235). Within interventional radiology, previous research has examined statistical fragility and reproducibility of randomized trial findings (PMID: 37070845).

However, the relationship between conventional statistical conclusions and Bayesian probabilities of clinically meaningful treatment effects across therapeutic body interventional radiology remains insufficiently characterized.

A systematic methodological investigation encompassing both historical and contemporary randomized evidence may improve understanding of the strength, limitations and clinical implications of the evidence supporting interventional radiology practice.

Rationale The proposed study addresses the distinction between statistical significance, clinical importance and uncertainty in randomized trials of interventional radiology.

Rather than interpreting statistically nonsignificant trials as evidence of treatment ineffectiveness, or statistically significant trials as definitive evidence of clinically meaningful benefit, this study will estimate continuous posterior probabilities using appropriate likelihoods and independently justified clinical effect margins.

Including trials irrespective of their original statistical findings will provide a balanced assessment and avoid selection based on the direction or statistical significance of reported treatment effects.

The study will preserve the original randomized treatment contrast, primary outcome, assessment time and estimand wherever possible. Clinical benefit and harm margins will be established using independent external evidence and structured clinical adjudication, rather than selected according to observed treatment effects.

A reference Bayesian analysis will support comparability across trials. Sensitivity analyses will evaluate independently calibrated prior distributions and alternative defensible clinical effect margins. Continuous posterior probabilities will constitute the primary interpretation, while descriptive probability benchmarks will facilitate comparison with previous methodological research without being treated as universal clinical decision thresholds.

Because interventional radiology encompasses heterogeneous diseases, interventions and outcomes, pooling unrelated treatment effects would be clinically and statistically inappropriate. The study will instead characterize trial-level evidence, reporting limitations and differences between conventional and Bayesian interpretations.

No arbitrary publication-date restriction will be imposed. Historical trials will be assessed in their clinical and technological context rather than excluded solely because of publication year.

The findings may inform interpretation of randomized evidence, identification of unresolved clinical questions, future trial design and methodological standards within interventional radiology.

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METHODS

Search strategy We will search PubMed (MEDLINE and additional records), Cochrane CENTRAL (Cochrane Library) and Embase (Embase.com) from inception to the actual final search date, without any publication, enrollment or registration year restriction. No language, age, journal, comparator, outcome or statistical significance filters will be imposed.

The strategy combines controlled vocabulary (MeSH and Emtree) and free-text terms for general interventional radiology, embolotherapy and interventional oncology, vascular procedures, visceral and access interventions, and musculoskeletal interventions. Generic vascular procedure terms are combined with body anatomy or indication terms; unqualified terms and historical terminology will be audited for missed concepts. PubMed and Embase use sensitivity-oriented RCT filters adapted from Cochrane; CENTRAL uses no additional RCT or human filter. All database-specific translations and headings will be verified in the live interfaces, independently reviewed using PRESS, and tested against confirmed eligible seed trials across domains and eras plus an independent holdout set before registration.

ClinicalTrials.gov and WHO ICTRP (if accessible), backward and forward citation searching of primary trials and relevant reviews across eras, and trial registry linkage will supplement electronic retrieval. Investigate every missed indexable eligible seed and revise queries where indicated. Archive exact executed strategies, dates, filters, counts, exports and deduplication according to PRISMA-S. Update searches close to manuscript submission/publication.

Planned PubMed query (no date filter):

(
("Radiology, Interventional"[mh] OR "Endovascular Procedures"[mh] OR "interventional radiolog*"[tiab] OR "image guided"[tiab] OR "image-guided"[tiab] OR endovascular[tiab] OR "catheter directed"[tiab] OR "catheter-directed"[tiab] OR transcatheter[tiab] OR transarterial[tiab] OR transvenous[tiab] OR "percutaneous intervention*"[tiab] OR "percutaneous therap*"[tiab] OR "percutaneous treatment*"[tiab] OR "percutaneous procedure*"[tiab])
OR
("Embolization, Therapeutic"[mh] OR "Chemoembolization, Therapeutic"[mh] OR "Radiofrequency Ablation"[mh] OR "Cryosurgery"[mh] OR emboliz*[tiab] OR embolis*[tiab] OR chemoemboli*[tiab] OR radioemboli*[tiab] OR TACE[tiab] OR "DEB-TACE"[tiab] OR TARE[tiab] OR SIRT[tiab] OR "selective internal radiation"[tiab] OR "yttrium 90"[tiab] OR "yttrium-90"[tiab] OR "hepatic arterial infusion"[tiab] OR "hepatic perfusion"[tiab] OR "radiofrequency ablation"[tiab] OR "microwave ablation"[tiab] OR cryoablat*[tiab] OR "thermal ablation"[tiab] OR "percutaneous ablation"[tiab] OR "tumor ablation"[tiab] OR "tumour ablation"[tiab] OR "irreversible electroporation"[tiab] OR "laser ablation"[tiab] OR "percutaneous ethanol"[tiab] OR "ethanol injection"[tiab] OR "alcohol ablation"[tiab] OR "chemical ablation"[tiab] OR "portal vein embol*"[tiab] OR "partial splenic embol*"[tiab] OR "lymphatic embol*"[tiab] OR "varicocele embol*"[tiab] OR "genicular artery embol*"[tiab] OR "prostatic artery embol*"[tiab] OR "prostate artery embol*"[tiab] OR "uterine artery embol*"[tiab] OR "uterine fibroid embol*"[tiab])
OR
("Thrombectomy"[mh] OR "Vena Cava Filters"[mh] OR pharmacomechanical[tiab] OR "catheter thrombolys*"[tiab] OR "catheter thrombectom*"[tiab] OR "catheter-based thrombolys*"[tiab] OR "catheter-based thrombectom*"[tiab] OR "mechanical thrombectom*"[tiab] OR "renal denervation"[tiab] OR "pulmonary artery denervation"[tiab] OR "balloon pulmonary angioplasty"[tiab] OR "endovascular aneurysm repair"[tiab] OR EVAR[tiab] OR TEVAR[tiab] OR endograft*[tiab] OR "stent graft*"[tiab] OR "stent-graft*"[tiab] OR "venous recanaliz*"[tiab] OR "venous recanalis*"[tiab] OR "venous stent*"[tiab] OR "vena cava filter*"[tiab] OR "inferior vena caval filter*"[tiab] OR "peripheral angioplast*"[tiab] OR "renal angioplast*"[tiab] OR "renal artery stent*"[tiab] OR "iliac stent*"[tiab] OR "femoropopliteal stent*"[tiab] OR "arteriovenous fistula creation"[tiab] OR "endovascular fistula"[tiab] OR "percutaneous fistula"[tiab] OR endoAVF[tiab])
OR
("Portasystemic Shunt, Transjugular Intrahepatic"[mh] OR "Nephrostomy, Percutaneous"[mh] OR "Cholecystostomy"[mh] OR TIPS[tiab] OR TIPSS[tiab] OR "transjugular intrahepatic"[tiab] OR "percutaneous drainage"[tiab] OR "percutaneous catheter drainage"[tiab] OR "catheter drainage"[tiab] OR "abscess drainage"[tiab] OR "biliary drainage"[tiab] OR "biliary stent*"[tiab] OR "bile duct stent*"[tiab] OR "transhepatic drainage"[tiab] OR "transhepatic cholang*"[tiab] OR cholecystostom*[tiab] OR nephrostom*[tiab] OR "ureteral stent*"[tiab] OR "ureteric stent*"[tiab] OR "radiologic gastrostom*"[tiab] OR "radiological

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gastrostom*"[tiab] OR "percutaneous gastrostom*"[tiab] OR gastrojejunostom*[tiab] OR "dialysis access"[tiab] OR "hemodialysis access"[tiab] OR "haemodialysis access"[tiab] OR "dialysis catheter*"[tiab] OR "tunneled catheter*"[tiab] OR "tunnelled catheter*"[tiab] OR sclerotherap*[tiab] OR lymphangiograph*[tiab] OR "thoracic duct embol*"[tiab] OR "percutaneous adhesiolysis"[tiab])
OR
("Vertebroplasty"[mh] OR "Kyphoplasty"[mh] OR vertebroplast*[tiab] OR kyphoplast*[tiab] OR "vertebral augmentation"[tiab] OR "cement augmentation"[tiab] OR cementoplast*[tiab] OR "percutaneous fixation"[tiab] OR "percutaneous decompression"[tiab] OR "percutaneous discectomy"[tiab] OR "percutaneous tenotomy"[tiab] OR "image guided therap*"[tiab] OR "image-guided therap*"[tiab] OR "image guided injection*"[tiab] OR "image-guided injection*"[tiab] OR barbotage[tiab] OR "percutaneous lavage"[tiab])
OR
(("Angioplasty"[mh] OR "Stents"[mh] OR "Thrombolytic Therapy"[mh] OR "Vascular Surgical Procedures"[mh] OR angioplast*[tiab] OR stent*[tiab] OR revascular*[tiab] OR thrombectom*[tiab] OR thrombolys*[tiab] OR thrombolytic*[tiab] OR recanaliz*[tiab] OR recanalis*[tiab]) AND ("Peripheral Arterial Disease"[mh] OR "Peripheral Vascular Diseases"[mh] OR "Venous Thrombosis"[mh] OR "Pulmonary Embolism"[mh] OR "Renal Artery Obstruction"[mh] OR "Aortic Aneurysm"[mh] OR "Aortic Dissection"[mh] OR "Arteriovenous Fistula"[mh] OR "Mesenteric Ischemia"[mh] OR "peripheral arter*"[tiab] OR "peripheral vascular"[tiab] OR "lower limb"[tiab] OR "lower extremit*"[tiab] OR "upper limb"[tiab] OR "upper extremit*"[tiab] OR "limb ischem*"[tiab] OR "limb ischaem*"[tiab] OR claudicat*[tiab] OR infrainguinal[tiab] OR infrapopliteal[tiab] OR femoropopliteal[tiab] OR "femoral arter*"[tiab] OR popliteal[tiab] OR "tibial arter*"[tiab] OR iliac[tiab] OR aortoiliac[tiab] OR aort*[tiab] OR "renal arter*"[tiab] OR mesenteric[tiab] OR "visceral arter*"[tiab] OR subclavian[tiab] OR innominate[tiab] OR brachiocephalic[tiab] OR venous[tiab] OR vein*[tiab] OR iliocaval[tiab] OR "deep vein thromb*"[tiab] OR DVT[tiab] OR "pulmonary embol*"[tiab] OR "pulmonary arter*"[tiab] OR "chronic thromboembolic"[tiab] OR dialysis[tiab] OR arteriovenous[tiab] OR "vascular access"[tiab] OR "inferior vena cava"[tiab] OR "vena caval"[tiab] OR hemodialysis[tiab] OR haemodialysis[tiab] OR "portal vein"[tiab] OR "hepatic vein"[tiab] OR "Budd-Chiari"[tiab] OR "superior vena cava"[tiab]))
)
AND
((randomized controlled trial[pt] OR controlled clinical trial[pt] OR randomized[tiab] OR randomised[tiab] OR placebo[tiab] OR drug therapy[sh] OR randomly[tiab] OR trial[tiab] OR groups[tiab]) NOT (animals[mh] NOT humans[mh]))

Eligibility criteria

Population

Human participants with any clinical indication relevant to eligible therapeutic body interventional radiology procedures. No restrictions will be imposed on age, geographical location or healthcare setting. Adult, pediatric and mixed-age populations will be documented, with population-appropriate clinical effect margins applied where available.

Study design

Only prospective randomized controlled superiority trials will be eligible, including single-center and multicenter trials, parallel-group trials, multiarm trials, independently randomized cohorts, cluster-randomized trials and crossover trials.

Design-appropriate statistical estimates will be required for quantitative reanalysis but not for initial study eligibility.

No minimum sample size or number of participating centers will be imposed. Prospective trial registration will not be mandatory for eligibility, particularly for historical randomized trials.

Trials will be included irrespective of the direction or statistical significance of their original results.

Interventions

Therapeutic image-guided percutaneous or catheter-based endovascular procedures within the clinical scope of body interventional radiology, including:

• Interventional oncology: transarterial chemoembolization, radioembolization, image-guided thermal, cryogenic and chemical tumor ablation, and other IR-delivered tumor-directed interventions.
• Arterial interventions: peripheral and visceral angioplasty and stenting, endovascular aortic repair and renal denervation.
• Venous and pulmonary vascular interventions: catheter-directed thrombolysis, thrombectomy,

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venous recanalization and stenting, inferior vena cava filters and balloon pulmonary angioplasty.
• Therapeutic embolization: uterine, prostatic, genicular, bronchial, visceral, lymphatic and hemorrhage-related interventions.
• Hepatobiliary, urinary, drainage and vascular access interventions: transjugular intrahepatic portosystemic shunts, percutaneous biliary and urinary interventions, therapeutic drainage, gastrostomy and image-guided dialysis access interventions.
• Musculoskeletal interventions: vertebroplasty, kyphoplasty, image-guided therapeutic ablation and other eligible image-guided therapeutic procedures.

Eligibility will depend on the nature of the intervention rather than the medical specialty of the operator.

Comparators

Medical treatment, systemic therapy, conservative management, observation, surgery, non-IR endoscopy, external-beam radiotherapy, sham procedures, placebo or usual care.

Trials comparing an IR procedure added to standard treatment with the same standard treatment alone will be eligible.

Bundled IR-containing strategies compared with non-IR strategies will be eligible and flagged for potential indirectness. Treatment effects from bundled comparisons will not be attributed solely to the IR procedure.

Outcomes

Eligible trials will evaluate patient-important clinical outcomes or clinically relevant intermediate disease outcomes as their original primary outcomes.

Direct clinical outcomes may include mortality, survival, major amputation, limb salvage, symptomatic recurrence, clinical events, validated symptom and pain scores, functional outcomes, quality of life, serious complications and clinically consequential composite outcomes.

Clinically relevant intermediate outcomes, including progression-free survival, recurrence-free survival, imaging-defined disease control, vascular patency and physiologic surrogate outcomes intended to assess disease response, will be analyzed separately from direct patient-important outcomes.

Primary outcomes will be established using original trial protocols, statistical analysis plans, registry entries or unambiguous original trial reports. Historical trials lacking registration will remain eligible.

Otherwise eligible trials with unclear primary outcome designation, insufficient statistical information or unavailable clinically meaningful effect margins will remain documented in the systematic review and analytical coverage assessments.

Publication period, language and publication status

No earliest publication, enrollment or registration date will be imposed. Searches will extend from database inception to the final search date.

No language or publication-format restrictions will be imposed. Published and unpublished trial results, including full reports, conference abstracts, preprints and registry results, will be assessed using consistent analytical requirements.

Conference reports will be linked to subsequent full publications and trial registry records wherever possible. Trials reported exclusively in conference abstracts will undergo quantitative reanalysis only when sufficient methodological and statistical information is available. Otherwise, they will be documented separately.

Ongoing trials and trials without available results will be documented separately.

Exclusion criteria

• Nonrandomized, quasi-randomized, observational and retrospective nonrandomized studies.
• Noninferiority or equivalence trials without a prospectively specified eligible superiority objective.
• Feasibility studies without a clinical superiority objective.
• Diagnostic procedures and biopsy technique studies.
• Comparisons between IR procedures, devices, procedural techniques or materials without an eligible non-IR comparator.
• Coronary, intracardiac structural, electrophysiological and cerebrovascular interventions.
• Purely surgical, endoscopic or noninvasive procedures as the index IR intervention.

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• Routine anesthetic nerve blocks.
• Animal and laboratory studies.
• Trials exclusively evaluating technical or procedural performance without a clinical or disease-outcome objective.

Secondary publications, subgroup analyses, trial protocols and follow-up reports will be linked to their parent randomized trials rather than counted as independent trials.

Data extraction Two consultant interventional radiologists will independently screen titles, abstracts and full-text reports against prespecified eligibility criteria. Disagreements will be resolved by consensus or adjudication by a third investigator.

Two reviewers will independently extract core data using standardized, pilot-tested forms. Extracted variables will include trial identifiers, study design, clinical indication, population, intervention and comparator, randomized and analyzed sample sizes, primary outcome, assessment time, estimand, analysis population, effect estimate, statistical uncertainty, p-value, testing hierarchy, missing data and original trial conclusions.

Serious adverse events, major bleeding, procedure-related mortality, major complications and reinterventions will be recorded where available.

Trial protocols, statistical analysis plans, registries, supplementary materials and corrections will be examined to verify outcome prespecification and reporting consistency. Multiple reports will be linked to their parent randomized trials.

Two clinical reviewers will independently adjudicate clinically meaningful benefit and harm margins using external evidence, masked to comparative trial results where feasible. Statistical investigators will verify compatibility between margins and effect measures. Margins and prior calibration ranges will be finalized before unmasking.

Two reviewers will independently assess outcome-specific risk of bias using the appropriate Cochrane RoB 2 tool.

Missing information will be sought from trial investigators where feasible. Unavailable information and non-estimable results will be documented without unsupported imputation.

Extracted and derived values will retain source references and independent verification records. Statistical transformations and Bayesian analyses will undergo independent validation by two statistically experienced investigators.

Artificial intelligence may assist research activities but will not replace independent human judgments, source verification or statistical validation.

Outcome definitions The primary methodological outcome is the distribution of continuous Bayesian posterior probabilities of clinically meaningful benefit, clinically meaningful harm and clinically negligible treatment effects according to the original statistical superiority classification of eligible trials.

Treatment effects will be oriented so that positive values favor interventional radiology. Independently justified benefit and harm margins will be established on the original effect scale using applicable external clinical evidence and supported clinical adjudication.

Posterior probabilities of meaningful benefit, meaningful harm, negligible effect and any treatment benefit will be reported alongside posterior estimates and 95% credible intervals.

For comparison with previous methodological research, four descriptive evidence categories will be presented:

1. Clinically meaningful benefit: posterior probability of meaningful benefit of at least 90%.
2. Clinically meaningful harm: posterior probability of meaningful harm of at least 90%.
3. Clinically negligible effect: posterior probability of an effect within the independently justified negligible range of at least 90%.
4. Inconclusive evidence: none of these probabilities reaches 90%.

Classification will be repeated using a 95% benchmark. These benchmarks are descriptive rather than universal clinical decision thresholds.

Posterior probabilities of meaningful benefit of 10% or less, and 5% or less in sensitivity analysis, will indicate evidence against meaningful benefit but will not automatically establish clinical equivalence.

Trials lacking defensible clinical margins, compatible uncertainty estimates or ascertainable original statistical classifications will remain documented without forced classification.

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Intermediate disease outcomes and complex trials with multiple primary outcomes will be analyzed separately.

Additional outcomes will include analytical coverage, reporting limitations, robustness to prior and margin choices, risk of bias and serious procedural harms.

Strategy of data synthesis / Statistical analysis Bayesian reanalysis will be performed at the individual trial level using likelihoods compatible with the original primary effect estimate, estimand and statistical uncertainty. Reported standard errors or valid reconstruction from confidence intervals will be used on native or logarithmic effect scales.

Reference analyses will use flat effect-scale priors over feasible support where a proper posterior can be obtained. Compatible sparse unadjusted binary contrasts will use Jeffreys Beta(0.5,0.5) arm-risk priors, with uniform Beta(1,1) sensitivity analysis.

Proper sensitivity priors will be calibrated using independently justified clinically plausible effect ranges before unmasking trial results. Universal numerical prior scales will not be imposed across unrelated clinical indications.

Continuous posterior probabilities and 95% credible intervals will constitute the primary interpretation. Descriptive Bayesian classifications at 90% and 95% probability benchmarks will be cross-tabulated against original IR-favoring significant, nonsignificant and comparator-favoring significant results, respecting original statistical testing rules.

The primary synthesis will include one unequivocal direct clinical primary result per independently randomized trial with valid statistical estimates, ascertainable original statistical classification and independently supported benefit and harm margins.

Counts, denominators, percentages, analytical coverage and missing-classification bounds will be reported. Otherwise eligible trials lacking sufficient analytical information will be documented separately.

Sensitivity analyses will examine alternative priors, clinical margins, probability benchmarks, likelihood families, risk of bias, outcome prespecification, clinical domains, comparator types, trial designs and publication formats. Randomized sample size and publication year will be examined as continuous variables without arbitrary categorization.

Intermediate outcomes and complex primary endpoint structures will be analyzed separately without unsupported joint probability assumptions.

No universal treatment-effect meta-analysis across unrelated interventions or clinical indications will be performed.

Analyses will be conducted in R using reproducible scripts and independently validated by two statistically experienced investigators.

Countries involved Saudi Arabia.

Other relevant information

Use of artificial intelligence

Artificial intelligence tools were used to assist with protocol drafting, language refinement, and organization of methodological content. All methodological decisions, eligibility criteria, planned analyses, source verification, and final protocol content will be reviewed and approved by the review authors before protocol finalization. Artificial intelligence tools will not be used as the sole basis for final study exclusion, data extraction, risk-of-bias judgments, or interpretation of review findings.

Actual research-stage artificial intelligence use will be documented and disclosed in accordance with the requirements of the target journal.

Research governance

The research team comprises seven consultant interventional radiologists, including two experienced in statistical analysis.

Independent human screening, data extraction, risk-of-bias assessment, clinical effect margin adjudication and statistical validation will be maintained throughout the project.

The protocol is developed according to PRISMA-P principles. The completed study will be reported in accordance with PRISMA 2020 and PRISMA-S, with additional methodological and Bayesian reporting details.

Protocol amendments will be dated, justified and documented before implementation wherever feasible.

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The study will use published and publicly available aggregate trial data. Applicable institutional ethical and administrative requirements will be verified.

Registration

The study is primarily a methodological investigation of randomized clinical evidence using systematic identification and Bayesian reanalysis of prospective randomized controlled trials. INPLASY has been selected because it provides a dedicated registration pathway for methodological and meta-epidemiological research.

Keywords Interventional radiology; randomized controlled trials; Bayesian reanalysis; meta-epidemiology; posterior probability; clinical significance; superiority trials; treatment effects.

Dissemination plans The findings will be disseminated through publication in a peer-reviewed international interventional radiology journal, with the Journal of Vascular and Interventional Radiology and Cardiovascular and Interventional Radiology identified as potential publication venues.

The completed manuscript will present the methodological framework, systematic trial identification, Bayesian reanalysis, clinical interpretation, sensitivity analyses and limitations.

Detailed search strategies, study selection records, analytical coverage tables, clinical effect margin definitions, risk-of-bias assessments, source-linked aggregate data where permitted and reproducible statistical code will be made available through supplementary materials or an appropriate public repository.

The findings may also be presented at relevant national and international scientific meetings.

The final publication will reference the registered protocol, and any methodological deviations will be transparently reported.

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