**S1a-S1i Tables. Reasons given as to why each suggestion would be effective at reducing publication bias and the barriers or negatives to implementing this system.**

**S1a Table: Mandatory publication.**

|  |  |
| --- | --- |
| **Why most effective** | **Barriers/negatives** |
| Removes the choice of what can be published; everything gets publishedEd1, Ed7, Ed61, Ed68, Ed55Ac49, Ac60, Ac93, Ac117, Ac146 | Time/workloadEd1, Ed58, Ed61, Ed71, Ed55Ac45, Ac49, Ac146, Ac158 |
| Encourages submissionEd62 | MoneyEd1, Ed71Ac63, Ac90, Ac146 |
| Least adminAc14 | Defining what needs to be published (e.g. a failed experiment vs one with undesirable results)Ed1, Ed35Ac47, Ac93, Ac135 |
| Covers many issuesAc29, Ac69 | Journals won’t want [unfavourable] studies which are less likely to get cited (impact factor)Ed7Ac14, Ac106 |
| Reduces repetition of studiesAc58 | Implementation and/or enforcement/regulationEd32, Ed61, Ed65, Ed72, Ed26, Ed49Ac49, Ac50, Ac58, Ac90, Ac93, Ac122 |
| Changes perceptions on research qualityAc63 | Researcher motivationEd58, Ed55Ac49 |
|  | May not suit every discipline/type of researchEd61, Ed9Ac139 |
|  | Increased admin/bureaucracy Ed61Ac45, Ac69 |
|  | NoneEd 62 |
|  | Promoting itEd 65 Ed 71 |
|  | Removes quality filterEd5, Ed62, Ed49Ac49, Ac54, Ac90, Ac117, Ac146 |
|  | Increases literature saturationEd5, Ed49Ac12, Ac63 |
|  | May lead to reduced fundingEd5 |
|  | Changing scientific cultureAc29 |
|  | Doesn’t fully eliminate bias (e.g. authors and reviewers have opinions)Ac49 |
|  | Industry/funder/researcher resistance / issues with patentsAc29, Ac45, Ac60, Ac69, Ac90, Ac93, Ac135, Ac18 |
|  | Somewhat devalues resultsAc90 |

**S1b Table: Negative results articles/journals.**

|  |  |
| --- | --- |
| **Why most effective** | **Barriers/negatives** |
| Provides space for unfavourable findingsEd10, Ed22, Ed24, Ed25, E35, Ed48, Ed57, Ed45Ac2, Ac17, Ac38, Ac84, Ac105, Ac119 | TimeEd10  |
| Reduces pressure for certain findingsEd16Ac92 | MoneyEd10, Ed24, Ed25, Ed35, Ed48, Ed10 |
| Null results are importantAc7, Ac107 | Motivation of authorsEd16, Ed35, Ed61Ac32, Ac38, Ac95 |
| Reduces time wasting replicating research / informs future researchAc13, Ac35, Ac92 | Impact factors / willingness of editors/publishersEd16, Ed22, Ed57, Ed64, Ed61, Ed10, Ed64Ac2, Ac7, Ac52, Ac65, Ac66, Ac84, Ac92, Ac95, Ac105, Ac119, Ac158, Ac107 |
| Encourages publicationAc32, Ac84 | Availability in science databases (will they include such journals?)Ed24 |
| Highlights outliers in positive resultsAc35 | Increased reviewer burdenEd25 |
| Gives authors credit for well conducted by negative researchAc147 | More papers submitted/published / adds to literature saturationEd25, Ed10Ac101, Ac122, Ac138 |
| Simple/not burdensome to implementAc107, Ac158 | Lack of audienceEd49 |
|  | Changing perceptions of research (negative results)Ac35, Ac107, Ac147 |
|  | Increased delays with publishingAc136 |
|  | NoneAc151 |

**S1c Table: Open reviewing.**

|  |  |
| --- | --- |
| **Why most effective** | **Barriers/negatives** |
| Doesn’t add bureaucracy or slow down the systemEd41 | Less honest reviewersEd41 Ed26 |
| Improves fairness and objectivity of reviewsAc37, Ac76, Ac83, Ac123, Ac132 | This does not address biasEd61, Ed5Ac16, Ac90 |
| Avoid certain people always doing reviewsAc128 | Reviewers would refuse / getting and maintaining reviewersEd10, Ed55 Ac4, Ac37, Ac83, Ac132, Ac140 |
| Increases accountability/transparency for reviewsAc132, Ac140 | Author’s friends can review quickly and later posts won’t get as much attentionEd35 |
|  | Nasty reviews / creates conflictsEd49Ac122, Ac156, Ac91 |
|  | EditorsAc155 |
|  | Changing dogmaAc76, Ac123 |
|  | Lowers impact of peer-reviewAc122 |

**S1d Table: Peer-review training and accreditation.**

|  |  |
| --- | --- |
| **Why most effective** | **Barriers/negatives** |
| Increases value to the reviewerEd5 | Agreeing on standardsEd5, Ed44, Ed45 |
| Increases value to the reviewed / increases review qualityEd5, Ed45Ac91, Ac125 | Implementing/managing a programmeEd5, Ed8, Ed60 |
| Improves understanding of the role of peer-reviewerEd8 | Maintaining databaseEd8Ac142, Ac73 |
| Helps identify conflicts of interestEd8Ac125 | Time Ed13, Ed63Ac55, Ac142, Ac145, Ac115, Ac130 |
| Doesn’t change the system, just improves itAc142 | Resources Ed45  |
|  | Effort Ed45 |
|  | MoneyEd45Ac125, Ac142, Ac145, Ac115 |
|  | May reduce pool of reviewers, cooperation of reviewersEd45, Ed63, Ed49 |
|  | No guarantee of reliable reviewsEd60 |
|  | Enough training alreadyEd26 |
|  | Designing and delivering trainingAc79, Ac125, Ac142 |
|  | No incentive / extra work for a voluntary roleAc33, Ac72 |
|  | ReluctanceAc33, Ac72 |
|  | Admin burdenAc91 |

**S1e Table: Post-publication review.**

|  |  |
| --- | --- |
| **Why most effective** | **Barriers/negatives** |
|  | NoneEd29 |
|  | This would not reduce biasEd61 |
|  | Open to un-reviewed comments/abuseEd10, Ed55Ac120 |
|  | Cost of moderationEd10 |
|  | Author reluctance to embrace itEd 5 |
|  | Still has reviewer biasesAc120 |
|  | Has same issues as pre-publication peer-reviewAc120, Ac156 |
|  | TimeAc59, Ac156 |
|  | No incentiveAc59, Ac156 |

**S1f Table: Pre-study publication of methods.**

|  |  |
| --- | --- |
| **Why most effective** | **Barriers/negatives** |
| Judges research on design quality not outcomesEd37Ac8, Ac43, Ac127 | Changing the systemEd37 |
| Improves the quality of published literatureEd56 | Post-study hypothesis generationEd40 |
| Useful to get feedback at this stage to improve methods pre-studyAc22 | Loss of flexibilityEd56 |
| Methods papers can stimulate new ideas for other researchersAc43 | Lack of interested audience, publishers, subscribers and authors to pay for itEd56, Ed26, Ed49 |
| Quicker publicationAc43 | Increased workload for researchers (already done in grant application) and reviewersEd5Ac8, Ac43, Ac48, Ac67 |
|  | Publishers would not approveEd37 |
|  | Adds to a complex system Ed14 |
|  | Who would want to edit this journal?Ed26 |
|  | Impact factorsEd26 |
|  | Clutters literatureEd73 |
|  | TimeAc19 |
|  | Some might collect data first stillAc19 |
|  | Others might take your ideaAc67, Ac22 |

**S1g Table: Published rejection lists.**

|  |  |
| --- | --- |
| **Why most effective** | **Barriers/negatives** |
| Increases accountability from journalsEd53 | Scale of the task, especially for big journals / extra work for editors and increased burdenEd53Ac39, Ac141 |
| Quick way to see what research has been done even if it wasn’t published; gets results out thereAc39, Ac74 | Might shame authorsEd49, Ed55Ac122 |
| Easy to implement first stepAc99 | Journal willingness and funds (doesn’t maximise profits)Ac141, Ac74 |
|  | Lack of incentiveAc74 |
|  | Moderating/ensuring fairnessAc73 |
|  | NoneAc99 |
|  | Affecting chances of being published elsewhereAc73 |

**S1h Table: Research registration.**

|  |  |
| --- | --- |
| **Why most effective** | **Barriers/negatives** |
| Prevents data dredgingEd15Ac6, Ac42 | ResistanceEd2, Ed15  |
| Attacks cause of problemEd15 | Time burdenEd2, Ed20Ac44, Ac98, Ac118 |
| Increases research accountability without clogging up literatureEd26, Ed66Ac44 | Can only be done with publicly funded studiesEd3 |
| Low potential to be manipulated during research/publicationEd59Ac82 | Unsuitable for all studies/disciplinesEd17, Ed61, Ed9Ac122, Ac143 |
|  | Conflicts of interest and author biasEd20, Ed73 |
|  | Agreeing on acceptable structures/standardising/defining what needs to be publishedEd26, Ed54Ac70 |
|  | Increased admin (especially for smaller studies)Ed54  |
|  | Only works for pre-planned studies/analysesEd54, Ed61 |
|  | MoneyEd59Ac98, Ac118 |
|  | Lack of incentiveEd59 |
|  | EnforcementEd59, Ed66, Ed49Ac159 |
|  | Getting funders/publishers on boardEd59Ac42 |
|  | Mitigates against efforts to try new thingsEd5 |
|  | LogisticsAc82 |
|  | Increased admin / burdenAc82 Ac70, Ac84 |
|  | May block patent opportunitiesAc50 |

**S1i Table: Two-stage review.**

|  |  |
| --- | --- |
| **Why most effective** | **Barriers/negatives** |
| Encourages submission of unfavourable findingsEd9 | Harder to get reviewersEd9Ac23, Ac53, Ac137 |
| Flexibility is maintained in analysis phaseAc143 | Time (for reviewers/editors)Ed19, Ed28, Ed33, Ed49Ac18, Ac22, Ac36, Ac111, Ac112, Ac137 |
| Judges research on quality rather than resultsAc15, Ac18, Ac36, Ac51, Ac80, Ac89, Ac124, Ac139 | Higher rejection rates Ed19 |
| Maintains peer-reviewAc16 | Increased work for reviewerEd49 |
| Easy to implementAc16 | Unsuitable for all disciplinesEd61 |
| Reduced motives for submitting only favourable resultsAc143 | Bias at second stage of reviewEd57Ac61, Ac64 |
| Reduces time for reviewAc30, Ac18 | Adds to a complex systemEd14 |
| Long term and sustainable vs other solutionsAc30 | Increased time to publicationAc15, Ac20, Ac22, Ac31, Ac34, Ac53, Ac78, Ac111, Ac139, Ac73, Ac122 |
|  | Negative results not useful in every fieldAc117 |
|  | CostAc124 |
|  | Journals/impact factorsAc10, Ac64, Ac96, Ac110, Ac143, Ac150 |
|  | Might create a different type of bias (accepting ‘safe bets’ and not ‘long shots’)Ac10 |
|  | NoneAc16, Ac26, Ac80 |
|  | Changing habits/attitudes / lack of will / too much effortAc30, Ac124, Ac153 |
|  | TimeAc96, Ac100, Ac124, Ac143, Ac150, Ac153 |
|  | Increased adminAc89 |
|  | Logistics / difficult to implementAc150, Ac30 |