Supplementary File 1. Preferred Reporting Items for Systematic Review and Meta-analysis Protocols (PRISMA-P) guideline.

#1a Identification:
Identify the report as a protocol of a systematic review.
Injury incidence rates in women's football: a systematic review and meta-analysis of prospective injury surveillance studies.

#1b Update:
If the protocol is for an update of a previous systematic review, identify as such.
N/A

#2 Registration:
If registered, provide the name of the registry (such as PROSPERO) and registration number.
This systematic review and meta-analysis will be registered at the International prospective register of systematic reviews (PROSPERO).

#3a Contact:
Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author.

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#3b Contributions:
Describe contributions of protocol authors and identify the guarantor of the review

Review team members and their organisational affiliations
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Daniel Horan and Eamonn Delahunt are the guarantors of the review. Eamonn Delahunt developed the eligibility criteria. Daniel Horan, Fionn Büttner and Eamonn Delahunt developed the search strategy. Daniel Horan and Eamonn Delahunt performed abstract, title and full-text screening. Any discrepancies in study selection were arbitrated by Martin Hägglund. Daniel Horan and Eamonn Delahunt performed data extraction, with any discrepancies arbitrated by Martin Hägglund. Statistical expertise was provided by Fionn Büttner and Catherine Blake. Contextual expertise on football was provided by Daniel Horan, Seamus Kelly and Martin Hägglund. All authors approved the final protocol.

#4 Amendments:
If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments.
N/A

#5a Sources:
Indicate sources of financial or other support for the review.
Daniel Horan is supported by the Irish Research Council Enterprise Partnership Scheme (Postgraduate) (Project ID: EPSPG/2019/543). The Irish Research Council's Enterprise Partnership Scheme is "a unique national initiative linking excellent researchers to enterprise. The scheme co-funds awardees to bring great research ideas into an enterprise with the support of a higher education institution". The Football Association of Ireland is the enterprise partner.

#5b Sponsor:
Provide name for the review funder and/or sponsor.
The Irish Research Council and the Football Association of Ireland funded this research.

Role of sponsor or funder: 5c
Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol.
Daniel Horan is the recipient of an Irish Research Council Enterprise Partnership Scheme (Postgraduate) award. This scheme provides funding for PhD students to undertake research with a specified enterprise partner; in this instance the enterprise partner is the Football Association of Ireland. Professor Eamonn Delahunt is designated as the Principal Investigator associated with this award and amongst other duties is responsible for overseeing the administration of the award budget. The Irish Research Council was not involved in any aspect of the project, such as the design of the project's protocol and analysis plan. The Irish Research Council will have no input on the interpretation or publication of the study results. The Football Association of Ireland was not involved in any aspect of the project, such as the design of the project's protocol and analysis plan. The Football Association of Ireland will have no input on the interpretation or publication of the study results.

#6 Describe the rationale for the review in the context of what is already known:
The protection of player health via the prevention of football-related injuries and illnesses are key policy concerns of Fédération Internationale de Football Association (FIFA) and Union des Associations Européennes de Football (UEFA). To date, a large majority of published research in football has been undertaken on the men's game. Presently, the quantity and quality of research related to the thematic focus of the protection of player health and the prevention of injuries in women's football, both nationally and internationally is limited. Thus, there is a critical need for research to inform future strategic policies in women's football. The aggregation of data on the epidemiology of injuries in senior women's football could be used to inform the future development and implementation of injury prevention strategies.

#7 Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO):
The aim of this systematic review and meta-analysis is to review the literature with the primary purpose of establishing injury incidence rates in senior women's football.

Population (P): Female football players participating in a senior women's football league (elite-level or amateur-level) or a senior women's international football tournament.

Intervention (I): In this case the intervention is actually an exposure. The exposure is considered as either of the following:
(1) participation in a senior women's football league (elite-level or amateur-level) for a minimum duration of one season
(2) participation in a senior women's international football tournament

Comparator (C): Not applicable.

Outcome (O): The outcome measure of interest is injury (i.e. a player has sustained an injury). We will use injury incidence rate as the primary outcome metric to quantify "injury". Injury incidence rate will be calculated per 1000 units of exposure (i.e. per 1000 hours OR per 1000 athlete-exposures). Athlete-exposure is defined as 1 athlete participating in 1 match or training session.

$$Injury\ incidence = \frac{\Sigma\ injuries}{\Sigma\ exposure}$$

$$Injury\ incidence\ rate\ = (\frac{\Sigma\ injuries}{\Sigma\ exposure})\ x\ 1000\ (hours\ OR\ athlete\ exposures)$$

Where possible we will calculate the following outcome metrics:
(1) overall injury incidence rate
(2) match injury incidence rate
(3) training injury incidence rate
These outcome metrics (overall-, match- and training injury incidence rates) will also be calculated for level of play, as well as location of injury, type of injury, and severity of injury.

Level of play: The level of play will be stratified into the following categories: (1) international – UEFA defines international football as a match between two national teams composed of the best eligible players (https://www.uefa.com/insideuefa/dictionary/index.html); (2) elite – UEFA defines elite-level football as the highest national football league for women (Ekstrand et al, 2011); (3) amateur – any league below the highest national football league. The levels of play are outlined in Table 1.

Location of injury: The location of injury will be quantified according to the recommendations of Fuller et al (2006); see Table 2.

Type of injury: The type of injury will be quantified according to the recommendations of Fuller et al (2006); see Table 3.

Severity of injury: The severity of injury will be quantified according to the recommendations of Ekstrand et al (2011); see Table 4.

#8 Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review:
To be deemed eligible for inclusion, studies were required to fulfil the following criteria (framed according to PICO).

Population (P): The study had to include:
(1) female football players participating in a senior women's football league (elite-level or amateur-level)
(2) female football players participating in a senior women's international football tournament.

Intervention (I): In this case the intervention is actually an exposure. The exposure is considered as either of the following:
(1) participation in a senior women's football league (elite-level or amateur-level) for a minimum duration of one season
(2) participation in a senior women's international football tournament

Comparator (C): Not applicable.

Outcome (O): The outcome measure of interest is injury (i.e. a player has sustained an injury). We will use injury incidence rate as the primary outcome metric to quantify "injury". The study had to report Injury incidence rate(s) or provide sufficient data from which this outcome metric could be calculated through standardised equations (see #7)

Additional criteria: The study had to:
(1) be a full text article published in a peer-reviewed journal before August 2019
(2) be a prospective injury surveillance study

#9 Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage:
The search strategy will be applied across electronic bibliographic and grey literature databases; MEDLINE via PubMed; EMBASE via Ovid; CINAHL via Ebsco; and Web of Science. The search terms will be mapped to Medical Subject Headings (MeSH) terms where possible. Search terms will be applied from conception of each database to August 2019. The reference lists of included articles will be hand searched to identify other potentially relevant articles.

#10 Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated:
The following is the example of the search conducted on the PubMed database:
("women"[MeSH Terms] OR "women"[All Fields]) AND ("football"[MeSH Terms] OR "football"[All Fields]) OR ("soccer"[MeSH Terms] OR "soccer"[All Fields]) AND ("wounds and injuries"[MeSH Terms] OR ("wounds"[All Fields] AND "injuries"[All Fields]) OR "wounds and injuries"[All Fields] OR "injury"[All Fields])

#11a Describe the mechanism(s) that will be used to manage records and data throughout the review:
Studies will be imported from EndNote into the systematic review software, 'Rayyan'. We will use Rayyan to identify, screen (title, abstract, and full-text articles), and include eligible records. We will export included studies to an Endnote folder for data extraction.

#11b State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis):
Study selection will be performed by two reviewers (DH and ED) independently . A third reviewer (MH) will be consulted to resolve disagreements amongst these reviewers and to facilitate consensus. The two reviewers will independently screen the titles and abstracts of

the identified peer-reviewed articles to assess eligibility for inclusion in this review. Studies will be considered for inclusion based on their fulfilment of pre-specified eligibility criteria. Full-length texts of remaining peer-reviewed articles will be sought and reviewed in full to determine eligibility if reviewers are uncertain about their eligibility from title and abstract screening.

#11c Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators:
A standardized data extraction sheet (created in Microsoft Excel) will be used to extract data. Data extraction will be performed by two reviewers (Daniel Horan and Eamonn Delahunt) independently . A third reviewer (Martin Hägglund) will be consulted to resolve disagreements amongst these reviewers and to facilitate consensus.

#12 List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications:
Data will be organized in the following manner:

Study Characteristics:
(1) study lead author
(2) study title
(3) journal
(4) year of publication
(5) study design

Participant Characteristics:
(1) country
(2) tournament
(3) level of play (mapped to UEFA standardized levels)
(4) number of clubs/teams enrolled (n = …)
(5) number of participants enrolled (n = …)
(6) age of participants (years)
(7) body mass of participants (kg)
(8) playing experience of participants (years)
(9) hours per week of training (hours)
(10) number of matches per season/tournament (n = …)

Study Outcomes:
(1) length of season/tournament (weeks)
(2) number of seasons (n = …)
(3) injury definition (as per Fuller et al, 2006)
(4) mechanism of injury reporting (medical personnel; self-reported)
(5) number of clubs/teams included in reporting (n = …);
(6) number of participants included in reporting (n = …);
(7) total number of injuries (n = …)

Injury Incidence rate:
(1) season/tournament overall injury incidence rate (per 1000 hours OR per 1000 athlete-exposures)
(2) season/tournament match injury incidence rate (per 1000 hours OR per 1000 athlete-exposures)
(3) season/tournament training injury incidence rate (per 1000 hours OR per 1000 athlete-exposures)

* injury incidence rate(s) will be calculated for: level of play; location of injury; type of injury; severity of injury

#13 List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale:
The primary outcome measure of interest is injury (i.e. a player has sustained an injury). We will use injury incidence rate as the primary outcome metric to quantify "injury".
Injury incidence rate will be calculated per 1000 units of exposure (i.e. per 1000 hours OR per 1000 athlete-exposures). Athlete-exposure is defined as 1 athlete participating in 1 match or training session.

Where possible we will calculate the following outcome metrics:
(1) overall injury incidence rate
(2) match injury incidence rate
(3) training injury incidence rate
These outcome metrics (overall-, match- and training injury incidence rates) will also be calculated for level of play, as well as location of injury, type of injury, and severity of injury.

Level of play: The level of play will be stratified into the following categories:
(1) international – UEFA defines international football as a match between two national teams composed of the best eligible players (https://www.uefa.com/insideuefa/dictionary/index.html);
(2) elite – UEFA defines elite-level football as the highest national football league for women (Ekstrand et al, 2011);
(3) amateur – any league below the highest national football league. The levels of play are outlined in Table 1.

Location of injury: The location of injury will be quantified according to the recommendations of Fuller et al (2006); see Table 2.

Type of injury: The type of injury will be quantified according to the recommendations of Fuller et al (2006); see Table 3.

Severity of injury: The severity of injury will be quantified according to the recommendations of Ekstrand et al (2011); see Table 4.

#14 Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis:
Presently, we are unaware of any tools available to correctly assess risk of bias in prospective injury surveillance studies.

#15a Describe criteria under which study data will be quantitatively synthesised:
We will perform a meta-analysis when relevant data have sufficient conceptual and methodological homogeneity between studies to permit quantitative aggregation. This decision will be made by the authors based on their interpretation of perceived differences between study subpopulations (e.g., international, elite, and amateur), exposure type, and outcome metrics reported, as recommended by Higgins and Green (2008) and Borenstein et al (2009).

Our decision to perform a meta-analysis will not be determined by threshold estimates of heterogeneity (e.g., I^2 statistic to represent the proportion of observed dispersion that is real), or any estimate of heterogeneity (e.g., using Cochran's Q test). (Higgins et al, 2001; Borenstein et al, 2009). Due to the selection criteria of our systematic review, we anticipate that the review population and exposure characteristics will be sufficiently homogeneous across studies to permit meta-analysis. Where different injury outcome metrics are reported between eligible studies, we will convert reported injury outcome metrics to a common effect size, where possible (e.g., injury incidence rate per 1000 hours).

#15b If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I2, Kendall's τ):

We will perform an inverse-variance, random-effects meta-analysis, using the 'metafor' package in RStudio (Viechtbauer, 2010), to calculate a pooled injury incidence rate and 95% confidence intervals. A random-effects model will be selected to reflect that no common underlying injury incidence rate exists across all studies, but rather that injury incidence rate differs from study to study depending on population characteristics (e.g., age and level of play).

We will identify and quantify heterogeneity to interpret the patterns of study effect estimates (i.e., injury incidence rate) and partition true variation in study effect sizes from random variation. We will quantify Cochran's Q value to reflect total dispersion, Kendall's Tau to estimate the standard deviation of true effects and interpret the distribution of true effects, and an I^2 statistic to estimate the ratio of true heterogeneity to total observed variation.

#15c Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression):

We will perform a subgroup analysis to assess the relationship between level of play (i.e., international, elite, and amateur) and pooled injury incidence rate.

#15d If quantitative synthesis is not appropriate, describe the type of summary planned:

If meta-analysis is not appropriate due to excessive heterogeneity, we will descriptively summarise and report the characteristics and results of included studies, systematically, in order of study:

1. sub-population;
2. exposure;
3. outcome metric, and;
4. methodology

Additionally, we will visually present injury outcome metrics in a forest plot, if possible, without quantitatively synthesising studies.

#16 Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies):
Presently, we are unaware of any tools available to correctly assess risk of bias in prospective injury surveillance studies.

#17 Describe how the strength of the body of evidence will be assessed (such as GRADE):
This will not be possible, as presently we are unaware of any tools available to correctly assess risk of bias in prospective injury surveillance studies.

References

Ekstrand J, Hägglund M, Fuller CW. Comparison of injuries sustained on artificial turf and grass by male and female elite football players. Scand J Med Sci Sports. 2011 Dec;21(6):824-32.

Fuller CW, Ekstrand J, Junge A, Andersen TE, Bahr R, Dvorak J, Hägglund M, McCrory P, Meeuwisse WH. Consensus statement on injury definitions and data collection procedures in studies of football (soccer) injuries. Br J Sports Med. 2006 Mar;40(3):193-201.

https://www.uefa.com/insideuefa/dictionary/index.html

Table 1. Level of play.

Level of play	Definition
International	UEFA defines international football as a *"match between two national teams composed of the best eligible players."*[1]
Elite	the highest national football league[2]
Amateur	any league below the highest national football league[3]

[1] https://www.uefa.com/insideuefa/dictionary/index.html
[2] Ekstrand et al (2011)
[3] By default based upon the definition provided by Ekstrand et al (2011)

Table 2. Location of injury.

Main grouping	Category
Head and neck	• Head and face • Neck/cervical spine
Upper limbs	• Shoulder/clavicle • Upper arm • Elbow • Forearm • Wrist • Hand/finger/thumb
Trunk	• Sternum/ribs/upper back
Lower limbs	• Hip/groin • Thigh • Knee • Lower leg/Achilles tendon • Ankle • Foot/toe

Table 3. Type of injury.

Main grouping	Category
Fractures and bone stress	• Fracture • Other bone injuries
Joint (non-bone) and ligaments	• Dislocation/subluxation • Sprain/ligament injury • Lesion of meniscus or cartilage
Muscle and tendon	• Muscle rupture/tear/strains/cramps • Tendon injury/rupture/tendinosis/bursitis
Contusion	• Haematoma/contusion/bruise
Laceration and skin lesion	• Abrasion • Laceration
Central/peripheral nervous system	• Concussion (with or without loss of consciousness) • Nerve injury
Other injuries	• Dental injuries • Other injuries

Table 4. Severity of injury.

Level of severity	Definition
Slight	Injury causing absence from training and match play for <1 day
Minimal	Injury causing absence 1-3 days from training and match play
Mild	Injury causing absence 4-7 days from training and match play
Moderate	Injury causing absence 8-28 days from training and match play
Severe	Injury causing absence >28 days from training and match play

All definitions were based upon those utilised by Ekstrand et al (2011)