Epidemiology and Infection

Supplementary File 1

Title: Animal sources of antimicrobial resistant bacterial infections in humans: a systematic review

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# PRISMA Checklist

| **Section and Topic** | **Item #** | **Checklist item** | **Location where item is reported** |
| --- | --- | --- | --- |
| **TITLE** | | | |
| Title | 1 | Identify the report as a systematic review. | Title |
| **ABSTRACT** | | | |
| Abstract | 2 | See the PRISMA 2020 for Abstracts checklist. | Lines 30-44 |
| **INTRODUCTION** | | | |
| Rationale | 3 | Describe the rationale for the review in the context of existing knowledge. | Lines 45-74 |
| Objectives | 4 | Provide an explicit statement of the objective(s) or question(s) the review addresses. | Lines 75-82 |
| **METHODS** | | | |
| Eligibility criteria | 5 | Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses. | Lines 102-116 |
| Information sources | 6 | Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted. | Lines 97-101, Suppl. File 1 (2.a) |
| Search strategy | 7 | Present the full search strategies for all databases, registers and websites, including any filters and limits used. | Suppl. File 1 (2.a., 3.a.-3.e.) |
| Selection process | 8 | Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process. | Suppl. File 1 (2.c.) |
| Data collection process | 9 | Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process. | Lines 117-128, Suppl. File 1 (2.c.) |
| Data items | 10a | List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect. | Lines 115-116, 123-125 |
| 10b | List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information. | Suppl. File 2 |
| Study risk of bias assessment | 11 | Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process. | Lines 130-131 *(no RoB)* |
| Effect measures | 12 | Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results. | Lines 129-137, Suppl. File 1 (4) |
| Synthesis methods | 13a | Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)). | / |
| 13b | Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions. | / |
| 13c | Describe any methods used to tabulate or visually display results of individual studies and syntheses. | Lines 136-137 |
| 13d | Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used. | / |
| 13e | Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression). | / |
| 13f | Describe any sensitivity analyses conducted to assess robustness of the synthesized results. | / |
| Reporting bias assessment | 14 | Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases). | / |
| Certainty assessment | 15 | Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome. | / |
| **RESULTS** | | | |
| Study selection | 16a | Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram. | Lines 139-143, Figure 1 |
| 16b | Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded. | Figure 1, |
| Study characteristics | 17 | Cite each included study and present its characteristics. | Table 1, Suppl. File 1 (2.b.) |
| Risk of bias in studies | 18 | Present assessments of risk of bias for each included study. | / |
| Results of individual studies | 19 | For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots. | Lines 145-327, incl. Figure 2-6. |
| Results of syntheses | 20a | For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies. | / |
| 20b | Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect. | / |
| 20c | Present results of all investigations of possible causes of heterogeneity among study results. | / |
| 20d | Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results. | / |
| Reporting biases | 21 | Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed. | / |
| Certainty of evidence | 22 | Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed. | / |
| **DISCUSSION** | | | |
| Discussion | 23a | Provide a general interpretation of the results in the context of other evidence. | Lines 328-399 |
| 23b | Discuss any limitations of the evidence included in the review. | Lines 355-370, 375-381 |
| 23c | Discuss any limitations of the review processes used. | Lines 352-354, 382-402 |
| 23d | Discuss implications of the results for practice, policy, and future research. | Lines 338-339, 362-365, 371-381, 403-407 |
| **OTHER INFORMATION** | | | |
| Registration and protocol | 24a | Provide registration information for the review, including register name and registration number, or state that the review was not registered. | Suppl. File 1 (2.b.) |
| 24b | Indicate where the review protocol can be accessed, or state that a protocol was not prepared. | Suppl. File 1 (2.b.) |
| 24c | Describe and explain any amendments to information provided at registration or in the protocol. | Suppl. File 1 (2.b.) |
| Support | 25 | Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review. | Lines 415-424 |
| Competing interests | 26 | Declare any competing interests of review authors. | Lines 425-426 |
| Availability of data, code and other materials | 27 | Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review. | Lines 413-414, Search strategies (Suppl. File 1 (3.)) & completed data extraction table (Suppl. File 2) |

# Methods – additional information

## Data sources and search strategy

No grey literature sources were included in our search. The search strategies contained free text and controlled vocabulary terms (i.e. MeSH, Emtree and Scopus index terms) relating to four key areas: 1) animals and their products; 2) antibiotic resistance in general and resistance to the most important antibiotic classes for human medicine (1); and 3) relevant study types and measures of association, including terms describing source attribution studies, risk assessments and observational studies and 4) humans as study population. To narrow down the results to studies addressing humans, we applied double-negative strategies for excluding studies indexed as concerning animals but not humans (Ovid MEDLINE example: "not (exp animals/ not exp humans/") as suggested by Cochrane (2), which is generally described to be less restrictive and therefore preferable to the human-filters predefined by the databases. Given our focus on animal sources of AMR, we expected this strategy to still exclude relevant studies that were not sufficiently indexed, so we additionally formulated filters to keep all studies specifying humans as the population of interest in the title, irrespective of the indexed population.

We combined the search terms using Boolean operators, truncations, and, in the databases that allowed for it (Embase and Web of Science), proximity operators. The search strategy was piloted in Ovid MEDLINE to ensure all publications known to be relevant to the authors were covered and then translated for all included databases. They were ran on August 26th, 2022.

## Protocol

The search strategy results were used both for this review and for a complementary systematic literature review and meta-analysis of observational studies on animal sources of sporadic cases of human AMR (in preparation), therefore, the search strategy also included terms not relevant for this study (i.e. relating to observational studies and associated measures of association). A joined protocol for both studies was published to PROSPERO (CRD42022356930).

## Data screening, selection, and extraction

The appraisal of the eligibility of studies for inclusion was mainly conducted by one researcher (CF). When in doubt, the study supervisor (BD) was consulted. Additionally, another researcher (HF) independently screened a subset of the studies (200 articles, ca. 2% of total) to test whether the same decisions would be made by both reviewers. No differences in the final in- and exclusion categorization was found between them. The data extraction was conducted in Excel (see supplementary file 2) by one researcher (CF).

# Complete search strategy by database

## OVID Medline

***Table S1:*** *Search strategy in OVID Medline.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Key area** | | **#** | **Search terms** | **# results (26.08.22)** |
| **Animals and animal products** | General terms | 1 | \*animals, domestic/ or exp aquaculture/ or exp livestock/ or exp Pets/ | 32,298 |
| 2 | (((farm$ or food or domestic or reservoir$ or companion$ or aquatic) adj3 animal$) or livestock$ or (fish$ not (fishbone or fluorescen$ or (fisher$ adj2 (exact or test or thermo or syndrome)))) or aquaculture$ or (pet not (pet adj3 (tomography or CT or FDG or MRI))) or pets).ti,ab. | 316,764 |
| Animal species | 3 | \*ruminants/ or exp buffaloes/ or exp cattle/ or exp goats/ or exp sheep/ or exp swine/ or exp chickens/ or exp turkeys/ or exp poultry/ or exp horses/ or exp cats/ or exp dogs/ or exp Crustacea/ or exp fishes/ or exp Mollusca/ | 1,660,590 |
| 4 | (bison$ or boar or boars or broiler$ or buffalo$ or bullock$ or calf or calves or camel$1 or cattle$ or chick$2 or cow$1 or donkey$ or duck$ or fowl$1 or geese or goat$ or goose or heifer$ or hog$1 or (horse$ not trojan) or "laying hen$" or Meleagris or oxen or pig$1 or poultr$ or rabbit$ or ruminant$ or sheep$ or steer$1 or swine$ or zebu$1 or dog or dogs or cats or shellfish or shrimp$ or mussel$1 or oyster$).ti,ab. | 1,371,419 |
| 5 | exp dairy products/ or exp animal proteins, dietary/ or exp eggs/ or exp meat/ | 237,491 |
| Food terms | 6 | ((animal$ adj2 (product$ or protein$)) or (food adj2 transmission) or bacon or beef or burger$ or caviar$ or cheese$ or dairy or egg$1 or ham or lamb or meat$1 or milk or mutton or offal$ or pork or seafood or "sea food" or steak$ or veal).ti,ab. | 422,789 |
| Total | 7 | 1 or 2 or 3 or 4 or 5 or 6 | 2,678,277 |
| **AMR** | General resistance terms | 8 | \*drug resistance, microbial/ or exp drug resistance, bacterial/ or \*drug resistance, multiple/ or exp drug resistance, multiple, bacterial/ or exp beta-Lactam Resistance/ | 121,833 |
| 9 | ("super bug" or superbug or AMR or multiresistan$ or MRSA or ESBL$ or "extended spectrum" or pAmpC or (plasmid adj2 AmpC)).ti,ab. | 51,884 |
| ABs + resistance terms  *(including critically, highly & important AB classes, as well as critically important ABs as defined in* (1)*)* | 10 | (exp Aminoglycosides/ or exp Anti-Bacterial Agents/ or exp beta-lactams/ or exp Chloramphenicol/ or exp Cyclitols/ or exp Lipopeptides/ or exp Macrolides/ or exp Mupirocin/ or exp Nitrofurans/ or exp Nitroimidazoles/ or exp Organophosphonates/ or exp Oxazolidinones/ or exp Peptides, Cyclic/ or exp Phosphorous Acids/ or exp Polymyxins/ or exp quinolines/ or exp Quinoxalines/ or exp Rifabutin/) and (resistan$ or resistom$ or susceptib$ or nonsusceptib$).ti,ab. | 219,860 |
| 11 | ((antimicrobial$ or "anti microbial" or antibiotic$ or antibacterial$ or "anti bacterial" or "beta lacta$" or "plasmid mediated" or cross or drug$1 or multidrug$ or met?icillin$ or ami??nopenicillin$ or aminocyclitol$ or aminoglycoside$ or amphenicol$ or ansamycin$ or carbapenem$ or cephalosporin$ or cephamycin$ or "cyclic polypeptide$" or fluoroquinolon$ or glycopeptid$ or glycylcyclin$ or lincosamid$ or lipopeptid$ or macrolid$ or monobactam$ or nitroimidazol$ or nitrofuran$ or organophosphonat$ or oxazolidinon$ or penicillin$ or "phosphonic acid$" or pleuromutilin$ or polymyxin$ or "pseudomonic acid$" or quinolon$ or quinoxalin$ or streptogramin$ or tetracyclin$ or ampicillin$ or aztreonam$ or ceftriaxone$ or ciprofloxacin$ or colistin$ or erythromycin$ or fosfomycin$ or gentamicin$ or isoniazid$ or linezolid$ or meropenem$ or rifampin$ or telithromycin$ or tigecyclin$ or vancomycin$) adj3 (resistan$ or resistom$ or susceptib$ or nonsusceptib$)).ti,ab. | 333,631 |
| Total | 12 | 8 or 9 or 10 or 11 | 435,819 |
| **Study type** | General terms | 13 | \*epidemiologic studies/ or exp case-control studies/ or exp Control Groups/ or exp Matched-Pair Analysis/ or exp cohort studies/ or \*risk/ or exp logistic models/ or exp risk factors/ or exp Risk Assessment/ or exp Odds Ratio/ | 3,428,315 |
| Source attribution terms | 14 | (quantif$ or driver$ or driving or outbreaks).ti. or (((source$ or origin$ or cause$ or root$ or reservoir$) adj10 (contribut$ or partition$ or assign$ or tracking or investigation$)) or (attribut$ not attributes) or subtyping or "population genetic$" or (exposure$ adj3 (human$ or assess$)) or (expert$ adj2 (elicitation$ or opinion$ or judgement$))).ti,ab,kw. | 668,594 |
| WGS terms | 15 | (exp whole genome sequencing/ or ("whole genome" or WGS or genotyping).ti,ab.) and (exp humans/ or (human$ or child$ or wom#n or men or man or person$ or consumer$ or farmer$ or worker$ or farmworker$ or fisherm#n or veterinarian$ or patient$ or inpatient$ or zoon$ or "public health").ti.) | 32,861 |
| Risk assessment terms | 16 | ((risk adj2 (assessment$ or analysis or characteri#ation or estimation or ranking or scoring or factor$1 or study or studies or model$)) or "fault tree" or "root cause$" or "panel regression" or "backward$ chain$" or (transmission adj2 (pathway$ or dynamic$ or model$))).ti,ab,kw. | 839,574 |
| Observational studies | 17 | ((case adj5 control) or (case adj3 comparison$) or "control group$" or ((frequency or control$) adj2 match$) or cohort or ecolog$ or sporadic).ti,ab,kw. | 1,666,062 |
| Measures of association | 18 | ("Odds ratio$1" or (risk adj1 (relative or ratio$1)) or "attributable fraction$").ti,ab,kw. | 433,661 |
| Total | 19 | 13 or 14 or 15 or 16 or 17 or 18 | 5,353,827 |
| **Total** | Total | 20 | 7 and 12 and 19 | 5,802 |
| **Humans** | Exclude animal-only | 21 | 20 not (exp animals/ not exp humans/) | 3,333 |
| Human terms | 22 | 20 and (human$ or child$ or wom#n or men or man or consumer$ or person$ or farmer$ or worker$ or farmworker$ or fisherm#n or veterinarian$ or patient$ or inpatient$ or zoon$ or "public health").ti. | 766 |
| 23 | 20 and (human adj2 (case$ or infection$ or disease$ or illness or sickness or exposure$)).ti,ab. | 469 |
| One health | 24 | 20 and (exp One Health/ or ("one health" or OneHealth).ti.) | 44 |
| Total | 25 | 21 or 22 or 23 or 24 | 3,433 |
| **Excluding irrelevant titles** | Excluding wrong domains | 26 | 25 not (((exp environment/ or exp geological phenomena/ or exp complex Mixtures/ or exp plants/) not (exp humans/ or exp one health/)) or ((wastewater$ or water$ or surfacewater$ or sewage$ or lake or pond or river$ or biofilm$ or soil$ or manure or plant or plants) not (human$ or child$ or wom#n or men or man or consumer$ or person$ or consumer$ or farmer$ or worker$ or farmworker$ or fisherm#n or veterinarian$ or patient$ or inpatient$ or zoon$ or "public health")).ti.) | 3,218 |
| Excluding wrong outcomes | 27 | 26 not (((exp viruses/ or exp virus diseases/ or exp parasites/ or exp parasitic diseases/ or exp fungi/ or exp mycoses/ or neoplasms/ or exp non-communicable diseases/) not (exp bacteria/ or exp bacterial infections/)) or (cancer$ or depression$ or parasite$ or fungal or fungi or virus or viral or influenza or therap$).ti.) | **3,028** |

## OVID Embase

***Table S2:*** *Search strategy in OVID Embase.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Key area** | | **#** | **Search terms** | **# results (26.08.22)** |
| **Animals and animal products** | General terms | 1 | \*animals, domestic/ or exp aquaculture/ or exp livestock/ or exp Pets/ | 134,134 |
| 2 | (((farm$ or food or domestic or reservoir$ or companion$ or aquatic) adj3 animal$) or livestock$ or (fish$ not (fishbone or fluorescen$ or (fisher$ adj2 (exact or test or thermo or syndrome)))) or aquaculture$ or (pet not (pet adj3 (tomography or CT or FDG or MRI))) or pets).ti,ab. | 387,420 |
| Animal species | 3 | \*ruminants/ or exp buffaloes/ or exp cattle/ or exp goats/ or exp sheep/ or exp swine/ or exp chickens/ or exp turkeys/ or exp poultry/ or exp horses/ or exp cats/ or exp dogs/ or exp Crustacea/ or exp fishes/ or exp Mollusca/ | 1,124,458 |
| 4 | (bison$ or boar or boars or broiler$ or buffalo$ or bullock$ or calf or calves or camel$1 or cattle$ or chick$2 or cow$1 or donkey$ or duck$ or fowl$1 or geese or goat$ or goose or heifer$ or hog$1 or (horse$ not trojan) or "laying hen$" or Meleagris or oxen or pig$1 or poultr$ or rabbit$ or ruminant$ or sheep$ or steer$1 or swine$ or zebu$1 or dog or dogs or cats or shellfish or shrimp$ or mussel$1 or oyster$).ti,ab. | 1,415,137 |
| 5 | exp dairy products/ or exp animal proteins, dietary/ or exp eggs/ or exp meat/ | 233,433 |
| Food terms | 6 | ((animal$ adj2 (product$ or protein$)) or (food adj2 transmission) or bacon or beef or burger$ or caviar$ or cheese$ or dairy or egg$1 or ham or lamb or meat$1 or milk or mutton or offal$ or pork or seafood or "sea food" or steak$ or veal).ti,ab. | 449,784 |
| Total | 7 | 1 or 2 or 3 or 4 or 5 or 6 | 2,479,514 |
| **AMR** | General resistance terms | 8 | \*drug resistance, microbial/ or exp drug resistance, bacterial/ or \*drug resistance, multiple/ or exp drug resistance, multiple, bacterial/ or exp beta-Lactam Resistance/ | 230,777 |
| 9 | ("super bug" or superbug or AMR or multiresistan$ or MRSA or ESBL$ or "extended spectrum" or pAmpC or (plasmid adj2 AmpC)).ti,ab. | 74,009 |
| ABs + resistance terms  *(including critically, highly & important AB classes, as well as critically important ABs as defined in* (1)*)* | 10 | (exp Aminoglycosides/ or exp Anti-Bacterial Agents/ or exp beta-lactams/ or exp Chloramphenicol/ or exp Cyclitols/ or exp Lipopeptides/ or exp Macrolides/ or exp Mupirocin/ or exp Nitrofurans/ or exp Nitroimidazoles/ or exp Organophosphonates/ or exp Oxazolidinones/ or exp Peptides, Cyclic/ or exp Phosphorous Acids/ or exp Polymyxins/ or exp quinolines/ or exp Quinoxalines/ or exp Rifabutin/) and (resistan$ or resistom$ or susceptib$ or nonsusceptib$).ti,ab. | 574,655 |
| 11 | ((antimicrobial$ or "anti microbial" or antibiotic$ or antibacterial$ or "anti bacterial" or "beta lacta$" or "plasmid mediated" or cross or drug$1 or multidrug$ or met?icillin$ or ami??nopenicillin$ or aminocyclitol$ or aminoglycoside$ or amphenicol$ or ansamycin$ or carbapenem$ or cephalosporin$ or cephamycin$ or "cyclic polypeptide$" or fluoroquinolon$ or glycopeptid$ or glycylcyclin$ or lincosamid$ or lipopeptid$ or macrolid$ or monobactam$ or nitroimidazol$ or nitrofuran$ or organophosphonat$ or oxazolidinon$ or penicillin$ or "phosphonic acid$" or pleuromutilin$ or polymyxin$ or "pseudomonic acid$" or quinolon$ or quinoxalin$ or streptogramin$ or tetracyclin$ or ampicillin$ or aztreonam$ or ceftriaxone$ or ciprofloxacin$ or colistin$ or erythromycin$ or fosfomycin$ or gentamicin$ or isoniazid$ or linezolid$ or meropenem$ or rifampin$ or telithromycin$ or tigecyclin$ or vancomycin$) adj3 (resistan$ or resistom$ or susceptib$ or nonsusceptib$)).ti,ab. | 413,007 |
| Total | 12 | 8 or 9 or 10 or 11 | 774,668 |
| **Study type** | General terms | 13 | \*epidemiologic studies/ or exp case-control studies/ or exp Control Groups/ or exp Matched-Pair Analysis/ or exp cohort studies/ or \*risk/ or exp logistic models/ or exp risk factors/ or exp Risk Assessment/ or exp Odds Ratio/ | 4,634,246 |
| Source attribution terms | 14 | (quantif$ or driver$ or driving or outbreaks).ti. or (((source$ or origin$ or cause$ or root$ or reservoir$) adj10 (contribut$ or partition$ or assign$ or tracking or investigation$)) or (attribut$ not attributes) or subtyping or "population genetic$" or (exposure$ adj3 (human$ or assess$)) or (expert$ adj2 (elicitation$ or opinion$ or judgement$))).ti,ab,kw. | 810,301 |
| WGS terms | 15 | (exp whole genome sequencing/ or ("whole genome" or WGS or genotyping).ti,ab.) and (exp humans/ or (human$ or child$ or wom#n or men or man or person$ or consumer$ or farmer$ or worker$ or farmworker$ or fisherm#n or veterinarian$ or patient$ or inpatient$ or zoon$ or "public health").ti.) | 117,081 |
| Risk assessment terms | 16 | ((risk adj2 (assessment$ or analysis or characteri#ation or estimation or ranking or scoring or factor$1 or study or studies or model$)) or "fault tree" or "root cause$" or "panel regression" or "backward$ chain$" or (transmission adj2 (pathway$ or dynamic$ or model$))).ti,ab,kw. | 1,215,254 |
| Observational studies | 17 | ((case adj5 control) or (case adj3 comparison$) or "control group$" or ((frequency or control$) adj2 match$) or cohort or ecolog$ or sporadic).ti,ab,kw. | 2,450,415 |
| Measures of association | 18 | ("Odds ratio$1" or (risk adj1 (relative or ratio$1)) or "attributable fraction$").ti,ab,kw. | 547,080 |
| Total | 19 | 13 or 14 or 15 or 16 or 17 or 18 | 6,944,148 |
| **Total** | Total | 20 | 7 and 12 and 19 | 10,463 |
| **Humans** | Exclude animal-only | 21 | 20 not (exp animals/ not exp humans/) | 6,304 |
| Human terms | 22 | 20 and (human$ or child$ or wom#n or men or man or consumer$ or person$ or farmer$ or worker$ or farmworker$ or fisherm#n or veterinarian$ or patient$ or inpatient$ or zoon$ or "public health").ti. | 1,192 |
| 23 | 20 and (human adj2 (case$ or infection$ or disease$ or illness or sickness or exposure$)).ti,ab. | 661 |
| One Health | 24 | 20 and (exp One Health/ or ("one health" or OneHealth).ti.) | 110 |
| Total | 25 | 21 or 22 or 23 or 24 | 6,549 |
| **Excluding irrelevant titles** | Excluding wrong domains | 26 | 25 not (((exp environment/ or exp geological phenomena/ or exp complex Mixtures/ or exp plants/) not (exp humans/ or exp one health/)) or ((wastewater$ or water$ or surfacewater$ or sewage$ or lake or pond or river$ or biofilm$ or soil$ or manure or plant or plants) not (human$ or child$ or wom#n or men or man or consumer$ or person$ or consumer$ or farmer$ or worker$ or farmworker$ or fisherm#n or veterinarian$ or patient$ or inpatient$ or zoon$ or "public health")).ti.) | 5,238 |
| Excluding wrong outcomes | 27 | 26 not (((exp viruses/ or exp virus diseases/ or exp parasites/ or exp parasitic diseases/ or exp fungi/ or exp mycoses/ or neoplasms/ or exp non-communicable diseases/) not (exp bacteria/ or exp bacterial infections/)) or (cancer$ or depression$ or parasite$ or fungal or fungi or virus or viral or influenza or therap$).ti.) | **4,440** |

## Pubmed

***Table S3:*** *Search strategy in Pubmed.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Key area** | | **#** | **Search terms** | **# results (26.08.22)** |
| **Animals and animal products** | General terms | 1 | animals, domestic[mesh:noexp] OR aquaculture[mesh] OR livestock[mesh] OR pets[mesh] | 73,906 |
| 2 | "farm animal\*"[tiab] OR "food animal\*"[tiab] OR "domestic animal\*"[tiab] OR "animal reservoir\*"[tiab] OR "companion animal\*"[tiab] OR "aquatic animal\*"[tiab] OR livestock\*[tiab] OR (fish\*[tiab] NOT (fishbone[tiab] OR fluorescen\*[tiab] OR "fisher's"[tiab] OR "fisher exact"[tiab] OR "fisher test"[tiab] OR thermo[tiab] OR "fisher syndrome"[tiab])) OR aquaculture[tiab] OR (pet[tiab] NOT (tomography[tiab] OR "PET CT"[tiab] OR "FDG PET"[tiab] OR "PET MRI"[tiab])) OR pets[tiab] | 306,242 |
| Animal species | 3 | ruminants[mesh:noexp] OR buffaloes[mesh] OR cattle[mesh] OR goats[mesh] OR sheep[mesh] OR swine[mesh] OR chickens[mesh] OR turkeys[mesh] OR poultry[mesh] OR horses[mesh] OR cats[mesh] OR dogs[mesh] OR crustacea[mesh] OR fishes[mesh] OR mollusca[mesh] | 1,660,680 |
| 4 | bison[tiab] OR bisons[tiab] OR boar[tiab] OR boars[tiab] OR broiler[tiab] OR broilers[tiab] OR buffalo\*[tiab] OR bullock [tiab] OR bullocks[tiab] OR calf[tiab] OR calves[tiab] OR camel[tiab] OR camels[tiab] OR cattle[tiab] OR chick[tiab] OR chicks[tiab] OR chicken[tiab] OR cow[tiab] OR cows[tiab] OR donkey[tiab] OR donkeys[tiab] OR duck[tiab] OR ducks[tiab] OR fowl[tiab] OR fowls[tiab] OR geese[tiab] OR goat[tiab] OR goats[tiab] OR goose[tiab] OR heifer[tiab] OR heifers[tiab] OR hog[tiab] OR hogs[tiab] OR (horse\*[tiab] not trojan) OR "laying hen\*"[tiab] OR meleagris[tiab] OR oxen[tiab] OR pig[tiab] OR pigs[tiab] OR poultr\*[tiab] OR rabbit[tiab] OR rabbits[tiab] OR ruminant[tiab] OR ruminants[tiab] OR sheep[tiab] OR sheeps[tiab] OR steer[tiab] OR steers[tiab] OR swine[tiab] OR swines[tiab] OR zebu[tiab] OR zebus[tiab] OR dog[tiab] OR dogs[tiab] OR cats[tiab] OR shellfish[tiab] OR shrimp[tiab] OR shrimps[tiab] OR mussel[tiab] OR mussels[tiab] OR oyster[tiab] OR oysters[tiab] | 1,392,494 |
| 5 | dairy products[mesh] OR animal proteins, dietary[mesh] OR eggs[mesh] OR meat[mesh] | 237,406 |
| Food terms | 6 | "animal product\*"[tiab] OR "animal protein\*"[tiab] OR bacon[tiab] OR beef[tiab] OR burger\*[tiab] OR caviar\*[tiab] OR cheese\*[tiab] OR dairy[tiab] OR egg[tiab] OR eggs[tiab] OR ham[tiab] OR lamb[tiab] OR meat[tiab] OR meats[tiab] OR milk[tiab] OR mutton[tiab] OR offal\*[tiab] OR pork[tiab] OR seafood[tiab] OR "sea food"[tiab] OR steak\*[tiab] OR veal[tiab] | 420,419 |
| Total | 7 | #1 OR #2 OR #3 OR #4 OR #5 OR #6 | 2,674,861 |
| **AMR** | General resistance terms | 8 | drug resistance, microbial[mesh:noexp] OR drug resistance, bacterial[mesh] OR drug resistance, multiple[mesh:noexp] OR drug resistance, multiple, bacterial[mesh] OR beta-Lactam Resistance[mesh] | 171,118 |
| 9 | "super bug\*"[tiab] OR superbug\*[tiab] OR AMR[tiab] OR multiresistan\*[tiab] OR MRSA[tiab] OR ESBL\*[tiab] OR "extended spectrum\*"[tiab] OR pAmpC[tiab] OR "plasmid mediated AmpC"[tiab] | 55,997 |
| ABs + resistance terms *(including critically, highly & important AB classes, as well as critically important ABs as defined in* (1)*)* | 10 | (Aminoglycosides[mesh] OR Anti-Bacterial Agents[mesh] OR beta-lactams[mesh] OR Chloramphenicol[mesh] OR Cyclitols[mesh] OR Lipopeptides[mesh] OR Macrolides[mesh] OR Mupirocin[mesh] OR Nitrofurans[mesh] OR Nitroimidazoles[mesh] OR Organophosphonates[mesh] OR Oxazolidinones[mesh] OR Peptides, Cyclic[mesh] OR PhosphORous Acids[mesh] OR Polymyxins[mesh] OR quinolines[mesh] OR Quinoxalines[mesh] OR Rifabutin[mesh]) AND (resistan\*[tiab] OR resistom\*[tiab] OR susceptib\*[tiab]) | 212,371 |
| 11 | (((antimicrobial\*[tiab] OR "anti microbial"[tiab] OR antibiotic\*[tiab] OR antibacterial\*[tiab] OR "anti bacterial"[tiab] OR "beta lacta\*"[tiab] OR multidrug\*[tiab]) AND (resistan\*[tiab] OR resistom\*[tiab] OR susceptib\*[tiab] OR nonsusceptib\*[tiab] OR insusceptib\*[tiab] OR unsusceptib\*[tiab])) OR ("plasmid mediated resistan\*"[tiab] OR "drug resistan\*"[tiab] OR "meticillin resistan\*"[tiab] OR "methicillin resistan\*"[tiab] OR "aminopenicillin resistan\*"[tiab] OR "aminocyclitol resistan\*"[tiab] OR "aminoglycoside resistan\*"[tiab] OR "amphenicol resistan\*"[tiab] OR "carbapenem resistan\*"[tiab] OR "cephalosporin resistan\*"[tiab] OR "cephamycin resistan\*"[tiab] OR "polypeptide resistan\*"[tiab] OR "fluoroquinolon resistan\*"[tiab] OR "glycopeptid resistan\*"[tiab] OR "lipopeptide resistan\*"[tiab] OR "macrolid resistan\*"[tiab] OR "nitroimidazole resistan\*"[tiab] OR "nitrofuran resistan\*"[tiab] OR "oxazolidinone resistan\*"[tiab] OR "penicillin resistan\*"[tiab] OR "pleuromutilin resistan\*"[tiab] OR "polymyxin resistan\*"[tiab] OR "quinolone resistan\*"[tiab] OR "streptogramin resistan\*"[tiab] OR "tetracyclin resistan\*"[tiab] OR "ampicillin resistan\*"[tiab] OR "aztreonam resistan\*"[tiab] OR "ceftriaxone resistan\*"[tiab] OR "ciprofloxacin resistan\*"[tiab] OR "colistin resistan\*"[tiab] OR "erythromycin resistan\*"[tiab] OR "fosfomycin resistan\*"[tiab] OR "gentamicin resistan\*"[tiab] OR "isoniazid resistan\*"[tiab] OR "linezolid resistan\*"[tiab] OR "meropenem resistan\*"[tiab] OR "rifampin resistan\*"[tiab] OR "telithromycin resistan\*"[tiab] OR "tigecycline resistan\*"[tiab] OR "vancomycin resistan\*"[tiab])) | 357,382 |
| Total | 12 | #8 OR #9 OR #10 OR #11 | 460,657 |
| **Study type** | General terms | 13 | epidemiologic studies[mesh:noexp] OR case-control studies[mesh] OR Control Groups[mesh] OR Matched-Pair Analysis[mesh] OR cohort studies[mesh] OR risk[mesh:noexp] OR logistic models[mesh] OR risk factors[mesh] OR Risk Assessment[mesh] OR Odds Ratio[mesh] | 3,510,987 |
| Source attribution terms | 14 | quantif\*[ti] OR driver\*[ti] OR driving[ti] OR outbreaks[ti] OR (attribut\*[tiab] NOT attributes[tiab]) OR ((source\*[tiab] OR origin\*[tiab] OR cause\*[tiab] OR root\*[tiab] OR reservoir\*) AND (contribut\*[tiab] OR partition\*[tiab] OR assign\*[tiab] OR tracking[tiab] OR investigation[tiab])) OR subtyping[tiab] OR "population genetic\*"[tiab] OR "exposure assess\*"[tiab] OR "human exposure\*"[tiab] OR "expert elicitation\*"[tiab] OR "expert opinion\*"[tiab] OR "expert judgement\*"[tiab] | 1,606,118 |
| WGS terms | 15 | (whole genome sequencing[mesh] OR ("whole genome"[tiab] OR WGS[tiab] OR genotyping[tiab])) AND (humans[mesh] OR (human[ti] OR humans[ti] OR child [ti] OR children[ti] OR woman[ti] OR women[ti] OR men[ti] OR man[ti] OR person[ti] OR persons[ti] OR consumer[ti] OR consumers[ti] OR farmer[ti] OR farmers[ti] OR worker[ti] OR workers[ti] OR farmworker[ti] OR farmworkers[ti] OR fishermen[ti] OR veterinarian[ti] OR veterinarians[ti] OR patients[ti] OR inpatients[ti] OR zoon\*[ti] OR "public health"[ti])) | 80,592 |
| Risk assessment terms | 16 | "risk assessment\*"[tiab] OR "risk analysis"[tiab] OR "risk characterization\*"[tiab] OR "risk characterisation\*"[tiab] OR "risk estimation"[tiab] OR "risk ranking"[tiab] OR "risk scoring"[tiab] OR "risk factor\*"[tiab] OR "risk study"[tiab] OR "fault tree"[tiab] OR "root cause\*"[tiab] OR "panel regression"[tiab] OR "backward chain\*"[tiab] OR "transmission pathway\*"[tiab] OR "transmission dynamic\*"[tiab] OR "transmission model\*"[tiab] OR "pathways of transmission"[tiab] OR "dynamics of transmission"[tiab] | 812,988 |
| Observational studies | 17 | "case control"[tiab] OR "case comparison"[tiab] OR "control group\*"[tiab] OR "frequency match\*"[tiab] OR "matched control\*"[tiab] OR cohort[tiab] OR ecolog\*[tiab] OR sporadic[tiab] | 1,634,004 |
| Measures of association | 18 | "Odds ratio\*"[tiab] OR "relative risk\*"[tiab] OR "risk ratio$"[tiab] OR "attributable fraction\*"[tiab] | 443,589 |
| Total | 19 | #13 OR #14 OR #15 OR #16 OR #17 OR #18 | 6,067,892 |
| **Total** | Total | 20 | #7 AND #12 AND #19 | 8,204 |
| **Humans** | Exclude animal-only | 21 | #20 NOT (animals[mesh] NOT humans[mesh]) | 4,673 |
| Human terms/ One Health | 22 | #20 AND (human[ti] OR humans[ti] OR child [ti] OR children[ti] OR woman[ti] OR women[ti] OR men[ti] OR man[ti] OR person[ti] OR persons[ti] OR consumer[ti] OR consumers[ti] OR farmer[ti] OR farmers[ti] OR worker[ti] OR workers[ti] OR farmworker[ti] OR farmworkers[ti] OR fishermen[ti] OR veterinarian[ti] OR veterinarians[ti] OR patients[ti] OR inpatients[ti] OR zoon\*[ti] OR "public health"[ti] OR "human case\*"[tiab] OR "human infection\*"[tiab] OR "human disease\*"[tiab] OR "human illness"[tiab] OR "human sickness"[tiab] OR "human exposure\*"[tiab] OR One Health[mesh] OR "one health"[ti] OR OneHealth[ti]) | 1,463 |
| Total | 23 | #21 OR #22 | 4,816 |
| **Excluding irrelevant titles** |  | 24 | #23 NOT (((environment[mesh] OR geological phenomena[mesh] or complex mixtures[mesh] OR plants[mesh]) NOT (humans[mesh] OR one health[mesh])) OR ((wastewater\*[ti] OR water\*[ti] OR surfacewater\*[ti] OR sewage\*[ti] OR lake\*[ti] OR pond\*[ti] OR river\*[ti] OR biofilm[ti] OR soil\*[ti] OR manure[ti] OR plant[ti] OR plants[ti]) NOT (human[ti] OR humans[ti] OR child [ti] OR children[ti] OR woman[ti] OR women[ti] OR men[ti] OR man[ti] OR person[ti] OR persons[ti] OR consumer[ti] OR consumers[ti] OR farmer[ti] OR farmers[ti] OR worker[ti] OR workers[ti] OR farmworker[ti] OR farmworkers[ti] OR fishermen[ti] OR veterinarian[ti] OR veterinarians[ti] OR patients[ti] OR inpatients[ti] OR zoon\*[ti] OR "public health"[ti]))) | 4,495 |
| Excluding wrong outcomes | 25 | #24 NOT (((viruses[mesh] OR virus diseases[mesh] OR parasites[mesh] OR parasitic diseases[mesh] OR fungi[mesh] OR mycoses[mesh] OR neoplasms[mesh] OR non-communicable diseases[mesh]) NOT (bacteria[mesh] OR bacterial infections[mesh])) OR (cancer\*[ti] OR parasite\*[ti] OR fungal[ti] OR fungi[ti] OR virus[ti] OR viral[ti] OR influenza[ti] OR therap\*[ti])) | **4,155** |

## Web of Science

***Table S4:*** *Search strategy in Web of Science.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Key area** | | **#** | **Search terms** | **# results (26.08.22)** |
| **Animals and animal products** | General terms | 1 | TS=(((farm\* OR food OR domestic OR reservoir\* OR companion\* OR aquatic) NEAR/4 animal\*) OR livestock\* OR (fish\* NOT (fishbone OR fluorescen\* OR (fisher\* NEAR/2 (exact OR test OR thermo OR syndrome)))) OR aquaculture\* OR (pet NOT (pet NEAR/3 (tomography OR CT OR FDG OR MRI))) OR pets) | 951,958 |
| Animal species | 2 | TS=(bison\* OR boar OR boars OR broiler\* OR buffalo\* OR bullock\* OR calf OR calves OR camel OR camels OR cattle\* OR chick OR chicks OR chicken OR cow OR cows OR donkey\* OR duck\* OR fowl OR fowls OR geese OR goat\* OR goose OR heifer\* OR hog OR hogs OR (horse\* NOT trojan) OR "laying hen\*" OR Meleagris OR oxen OR pig OR pigs OR poultr\* OR rabbit\* OR ruminant\* OR sheep\* OR steer OR steers OR swine\* OR zebu OR zebus OR dog OR dogs OR cats OR crustacea\* OR mollus\* OR shellfish OR shrimp\* OR mussel OR mussels OR oyster\*) | 2,389,273 |
| Food terms | 3 | TS=((animal\* NEAR/2 (product\* OR protein\*)) OR (food NEAR/2 transmission) OR bacon OR beef OR burger\* OR caviar\* OR cheese\* OR dairy\* OR egg OR eggs OR ham OR lamb OR meat OR meats OR milk OR mutton OR offal\* OR pork OR seafood OR "sea food" OR steak\* OR veal) | 925,658 |
| Total | 4 | #1 OR #2 OR #3 | 3,758,551 |
| **AMR** | General resistance terms | 5 | TS=("super bug" OR superbug OR AMR OR multiresistan\* OR MRSA OR ESBL\* OR "extended spectrum" OR pAmpC OR (plasmid NEAR/2 AmpC)) | 34,429 |
| ABs + resistance terms  *(including critically, highly & important AB classes, as well as critically important ABs as defined in* (1)*)* | 6 | TS=((antimicrobial\* OR "anti microbial" OR antibiotic\* OR antibacterial\* OR "anti bacterial" OR "beta lacta\*" OR "plasmid mediated" OR cross OR drug OR drugs OR multidrug\* OR met?icillin\* OR ami??nopenicillin\* OR aminocyclitol\* OR aminoglycoside\* OR amphenicol\* OR ansamycin\* OR carbapenem\* OR cephalosporin\* OR cephamycin\* OR "cyclic polypeptide\*" OR fluoroquinolon\* OR glycopeptid\* OR glycylcyclin\* OR lincosamid\* OR lipopeptid\* OR macrolid\* OR monobactam\* OR nitroimidazol\* OR nitrofuran\* OR organophosphonat\* OR oxazolidinon\* OR penicillin\* OR "phosphonic acid\*" OR pleuromutilin\* OR polymyxin\* OR "pseudomonic acid\*" OR quinolon\* OR quinoxalin\* OR streptogramin\* OR tetracyclin\* OR ampicillin\* OR aztreonam\* OR ceftriaxone\* OR ciprofloxacin\* OR colistin\* OR erythromycin\* OR fosfomycin\* OR gentamicin\* OR isoniazid\* OR linezolid\* OR meropenem\* OR rifampin\* OR telithromycin\* OR tigecyclin\* OR vancomycin\*) NEAR/3 (resistan\* OR resistom\* OR susceptib\* OR nonsusceptib\*)) | 415,603 |
| Total | 7 | #5 OR #6 | 428,885 |
| **Study type** | Source attribution terms | 8 | (TI=((quantif\* OR driver\* OR driving OR outbreaks) )) OR TS=(((source\* OR origin\* OR cause\* OR root\* OR reservoir\*) NEAR/10 (contribut\* OR partition\* OR assign\* OR tracking OR investigation\*)) OR (attribut\* NOT attributes) OR subtyping OR "population genetic\*" OR (exposure\* NEAR/3 (human\* OR assess\*)) OR (expert\* NEAR/2 (elicitation\* OR opinion\* OR judgement\*))) | 1,358,871 |
| WGS terms | 9 | TS=("whole genome" OR WGS OR genotyping) and TI=(human\* OR child\* OR wom?n OR men OR man OR person\* OR consumer\* OR farmer\* OR worker\* OR farmworker\* OR fisherm?n OR veterinarian\* OR patient\* OR inpatient\* OR zoon\* OR "public health") | 84,515 |
| Risk assessment terms | 10 | TS=((risk NEAR/2 (assessment\* OR analysis OR characteri?ation\* OR estimation OR ranking OR scoring OR factor OR factors OR study OR studies OR model\*)) OR "fault tree" OR "root cause\*" OR "panel regression" OR "backward\* chain\*" OR (transmission NEAR/2 (pathway\* OR dynamic\* OR model\*))) | 1,437,679 |
| Observational studies | 11 | TS=((case NEAR/5 control) OR (case NEAR/3 comparison\*) OR "control group\*" OR ((frequency OR control\*) NEAR/2 match\*) OR cohort OR ecolog\* OR sporadic) | 2,385,541 |
| Measures of association | 12 | TS=("Odds ratio" OR (risk NEAR/1 (relative OR ratio OR ratios)) OR "attributable fraction\*") | 386,158 |
| Total | 13 | #8 OR #9 OR #10 OR #11 OR #12 | 4,958,285 |
| **Total** | Total | 14 | #4 AND #7 AND #13 | 7,404 |
| **Humans** | Human/ One Health terms | 15 | #14 AND TS=(human\* OR "public health" OR child\* OR wom?n OR men OR man OR person\* OR household OR consumer\* OR farmer\* OR worker\* OR farmworker\* OR fisherm?n OR veterinarian\* OR"one health" OR "OneHealth" OR "public health" or patients or inpatients or zoon\*) | 4,948 |
| **Excluding irrelevant titles** | Excluding wrong domains | 16 | #15 NOT ((TI=((environment\* OR wastewater\* OR water\* OR surfacewater\* OR groundwater OR sewage\* OR lake OR pond OR river\* OR biofilm\* OR soil\* OR manure OR plant OR plants ))) NOT (TI=(human\* OR "public health" OR child\* OR wom?n OR men OR man OR person\* OR household OR consumer\* OR farmer\* OR worker\* OR farmworker\* OR fisherm?n OR veterinarian\* OR"one health" OR "OneHealth" OR zoon\*))) | 4,544 |
| Excluding wrong outcomes | 17 | #16 NOT (((TS=((virus\* OR viral\* OR parasit\* OR fungi OR fungal OR mycos\*))) NOT (TS=(bacteri\*))) OR TI=(cancer\* OR parasit\* OR fungal OR fungi OR virus OR viral OR influenza OR therap\*)) | **4,177** |

## Scopus

***Table S5:*** *Search strategy in Scopus.*

|  |  |
| --- | --- |
| **Search terms** | **# results (26.08.22)** |
| (((((TITLE((quantif\* OR driver OR driving OR {outbreaks}) )) OR (TITLE-ABS-KEY(((source OR origin OR cause OR root OR reservoir) W/10 (contribut\* OR partition\* OR assign\* OR tracking OR investigation)) OR (attribut\* NOT attributes) OR subtyping OR "population genetic" OR (exposure W/3 (human OR assess\*)) OR (expert W/2 (elicitation OR opinion OR judgement)) OR (risk W/2 (assessment OR analysis OR characteri?ation OR estimation OR ranking OR scoring OR factor OR study OR studies OR model)) OR "fault tree" OR "root cause\*" OR "panel regression" OR "backward\* chain\*" OR (transmission W/2 (pathway OR dynamic OR model)) OR (case W/5 control) OR (case W/3 comparison) OR "control group" OR ((frequency OR control) W/2 match\*) OR cohort OR ecolog\* OR sporadic OR "Odds ratio" OR (risk W/1 (relative OR ratio)) OR "attributable fraction\*")) OR (((KEY("whole genome sequencing")) OR (TITLE-ABS("whole genome" OR WGS OR genotyping))) AND ((KEY(human)) OR (TITLE(human OR child\* OR wom?n OR men OR man OR person\* OR consumer\* OR farmer\* OR worker\* OR farmworker\* OR fisherm?n OR veterinarian\* OR patient OR inpatient OR zoon\* OR "public health")))))  AND (TITLE-ABS-KEY((animal W/2 (product OR protein) ) OR (food W/2 transmission) OR bacon OR beef OR burger OR caviar OR cheese OR dairy OR egg OR ham OR lamb OR meat OR milk OR mutton OR offal OR pork OR seafood OR "sea food\*" OR steak OR veal OR bison OR boar OR broiler OR buffalo OR bullock OR calf OR calves OR camel OR cattle OR chick OR chicks OR chicken OR cow OR donkey OR duck OR fowl OR geese OR goat OR goose OR heifer OR hog OR (horse AND NOT trojan ) OR "laying hen\*" OR meleagris OR oxen OR pig OR poultry\* OR rabbit OR ruminant OR sheep OR steer OR swine OR zebu OR dog OR cats OR crustacea OR mollus OR shellfish OR shrimp OR mussel OR oyster OR ((farm OR food OR domestic OR reservoir OR companion OR aquatic) W/3 animal) OR (fish AND NOT (fishbone OR fluorescen\* OR (fisher W/2 (exact OR thermo OR syndrome)))) OR aquaculture OR (pet AND NOT (pet W/3 (tomography OR CT OR FDG OR MRI))) OR pets))  AND (TITLE-ABS-KEY("super bug" OR superbug OR AMR OR multiresistan\* OR MRSA OR ESBL OR "extended spectrum" OR pAmpC OR (plasmid w/2 AmpC) OR ((antimicrobial OR "anti microbial" OR antibiotic OR antibacterial OR "anti bacterial" OR "beta\* lacta\*" OR "plasmid mediated" OR cross OR drug OR multidrug OR met\*icillin OR aminopenicillin OR aminocyclitol OR aminoglycoside OR amphenicol OR ansamycin OR carbapenem OR cephalosporin OR cephamycin OR "cyclic polypeptide" OR fluoroquinolon OR glycopeptid OR glycylcyclin OR lincosamid OR lipopeptid OR macrolid OR monobactam OR nitroimidazol OR nitrofuran OR organophosphonat OR oxazolidinon OR penicillin OR "phosphonic acid" OR pleuromutilin OR polymyxin OR "pseudomonic acid" OR quinolon OR quinoxalin OR streptogramin OR tetracyclin OR ampicillin OR aztreonam OR ceftriaxone OR ciprofloxacin OR colistin OR erythromycin OR fosfomycin OR gentamicin OR isoniazid OR linezolid OR meropenem OR rifampin OR telithromycin OR tigecyclin OR vancomycin) W/3 (resistan\* OR resistome OR susceptib\* OR nonsusceptib\*)))))  AND NOT ((INDEXTERMS(animal)) AND NOT (INDEXTERMS(human))))  OR  ((((TITLE((quantif\* OR driver OR driving OR {outbreaks}) )) OR (TITLE-ABS-KEY(((source OR origin OR cause OR root OR reservoir) W/10 (contribut\* OR partition\* OR assign\* OR tracking OR investigation)) OR (attribut\* NOT attributes) OR subtyping OR "population genetic" OR (exposure W/3 (human OR assess\*)) OR (expert W/2 (elicitation OR opinion OR judgement)) OR (risk W/2 (assessment OR analysis OR characteri?ation OR estimation OR ranking OR scoring OR factor OR study OR studies OR model)) OR "fault tree" OR "root cause\*" OR "panel regression" OR "backward\* chain\*" OR (transmission W/2 (pathway OR dynamic OR model)) OR (case W/5 control) OR (case W/3 comparison) OR "control group" OR ((frequency OR control) W/2 match\*) OR cohort OR ecolog\* OR sporadic OR "Odds ratio" OR (risk W/1 (relative OR ratio)) OR "attributable fraction\*")) OR (((KEY("whole genome sequencing")) OR (TITLE-ABS("whole genome" OR WGS OR genotyping))) AND ((KEY(human)) OR (TITLE(human OR child\* OR wom?n OR men OR man OR person\* OR consumer\* OR farmer\* OR worker\* OR farmworker\* OR fisherm?n OR veterinarian\* OR patient OR inpatient OR zoon\* OR "public health")))))  AND (TITLE-ABS-KEY((animal W/2 (product OR protein) ) OR (food W/2 transmission) OR bacon OR beef OR burger OR caviar OR cheese OR dairy OR egg OR ham OR lamb OR meat OR milk OR mutton OR offal OR pork OR seafood OR "sea food\*" OR steak OR veal OR bison OR boar OR broiler OR buffalo OR bullock OR calf OR calves OR camel OR cattle OR chick OR chicks OR chicken OR cow OR donkey OR duck OR fowl OR geese OR goat OR goose OR heifer OR hog OR (horse AND NOT trojan ) OR "laying hen\*" OR meleagris OR oxen OR pig OR poultry\* OR rabbit OR ruminant OR sheep OR steer OR swine OR zebu OR dog OR cats OR crustacea OR mollus OR shellfish OR shrimp OR mussel OR oyster OR ((farm OR food OR domestic OR reservoir OR companion OR aquatic) W/3 animal) OR (fish AND NOT (fishbone OR fluorescen\* OR (fisher W/2 (exact OR thermo OR syndrome)))) OR aquaculture OR (pet AND NOT (pet W/3 (tomography OR CT OR FDG OR MRI))) OR pets))  AND (TITLE-ABS-KEY("super bug" OR superbug OR AMR OR multiresistan\* OR MRSA OR ESBL OR "extended spectrum" OR pAmpC OR (plasmid w/2 AmpC) OR ((antimicrobial OR "anti microbial" OR antibiotic OR antibacterial OR "anti bacterial" OR "beta\* lacta\*" OR "plasmid mediated" OR cross OR drug OR multidrug OR met\*icillin OR aminopenicillin OR aminocyclitol OR aminoglycoside OR amphenicol OR ansamycin OR carbapenem OR cephalosporin OR cephamycin OR "cyclic polypeptide" OR fluoroquinolon OR glycopeptid OR glycylcyclin OR lincosamid OR lipopeptid OR macrolid OR monobactam OR nitroimidazol OR nitrofuran OR organophosphonat OR oxazolidinon OR penicillin OR "phosphonic acid" OR pleuromutilin OR polymyxin OR "pseudomonic acid" OR quinolon OR quinoxalin OR streptogramin OR tetracyclin OR ampicillin OR aztreonam OR ceftriaxone OR ciprofloxacin OR colistin OR erythromycin OR fosfomycin OR gentamicin OR isoniazid OR linezolid OR meropenem OR rifampin OR telithromycin OR tigecyclin OR vancomycin) W/3 (resistan\* OR resistome OR susceptib\* OR nonsusceptib\*)))))  AND ((TITLE(human OR child\* OR wom?n OR men OR man OR person\* OR consumer\* OR farmer\* OR worker\* OR farmworker\* OR fisherm?n OR veterinarian\* OR patient OR inpatient OR zoon\* OR "public health" OR "one health" OR OneHealth)) OR (TITLE-ABS(human W/2 (case or infection or disease OR illness OR sickness OR exposure))) OR (KEY("One Health")))))  AND NOT (((TITLE((environment OR wastewater OR water OR surfacewater OR groundwater OR sewage OR lake OR pond OR river OR biofilm OR soil OR manure OR plant))) AND NOT (TITLE(human OR child\* OR wom?n OR men OR man OR person\* OR consumer\* OR farmer\* OR worker\* OR farmworker\* OR fisherm?n OR veterinarian\* OR patient OR inpatient OR zoon\* OR "public health" OR "one health")))OR ((KEY((virus OR viral OR parasit\* OR fungi OR fungal OR mycos\*) AND NOT (bacteria OR "bacterial infections"))) OR (TITLE(cancer or parasit\* OR fungal OR fungi OR virus OR viral OR influenza OR therap\*)))) | 4476 |

# Compiling the results of the studies

To give an impression of the relative significance of the animal sources in relation to each other, we assigned ranks based on the qualitative or quantitative findings of all studies reporting results for multiple animal-related sources. For example, if a study investigated cattle, chicken and pigs as potential sources of human AMR and found cattle to be responsible for 30% of resistant human infections, chickens for 10% and pigs for 2%, we assigned cattle rank one, chickens rank two and pigs rank three. The ranks were solely based on the reported estimates and did not take uncertainty into account. Whenever a study reported on both consumption of food based on an animal and contact to the same animal (e.g. beef consumption and contact with cattle), their relative contribution was added up for the ranking. For studies comparing different models, we used the results of the model with the highest degree of complexity (i.e. the model that included most sources and/or used most typing methods). We only included animal-related sources in this ranking, not taking into account any sources not relevant for this review that might have been included by the study (e.g. person-to-person). The values the rankings were based on may be found in the data extraction table (Supplementary file 2, sheet "outcomes").

# References

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